

## SYNOPSIS

### General

This year is the 53<sup>rd</sup> consecutive year that an Annual Operating Plans (AOP) has been prepared for the Federally-owned dams and reservoirs in the Niobrara, Lower Platte, and Kansas River Basins. The plan has been developed by the Water Operations Group in McCook, Nebraska for the 16 dams and reservoirs that are located in Colorado, Nebraska, and Kansas. These reservoirs, together with 9 diversion dams, 9 pumping plants, and 20 canal systems, serve approximately 265,467 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 at the end of this report shows the location of these features.

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

A Supervisory Control and Data Acquisition System (SCADA) located at McCook is used to assist in operational management of all 11 dams under Reclamation's jurisdiction that are located in the Kansas River Basin. A Hydromet system collects and stores near real-time data at selected stations in the Nebraska-Kansas Projects. The data includes water levels in streams, canals, and reservoirs and also gate openings. This data is transmitted to a satellite and downloaded to a Reclamation receiver in Boise, Idaho. The data can then be accessed by anyone interested in monitoring water levels or water usage in an irrigation system. The Nebraska-Kansas Projects currently has 109 Hydromet stations that can be accessed. The McCook Field Office has installed and maintains 55 Hydromet stations with plans to install more as time permits. When fully implemented, the projects will have a Hydromet station installed to provide real-time data on all reservoirs, most diversion dams, and most of the measuring structures in the irrigation systems. These stations can be found on the Internet by accessing Reclamation's home page at <http://www.usbr.gov/gp>. From the home page, select "Hydromet Data Center" under the Water Operations heading.

The Headlines 2005 that follows this synopsis is indicative of the awareness that the local people have of the natural resource development and conservation in the Niobrara, Lower Platte, and Kansas River Basins.

### 2005 Summary

#### Climatic Conditions

Precipitation at the project dams during 2005 ranged from 92 percent of normal at Cedar Bluff Dam to 143 percent of normal at Kirwin Dam. Temperatures during the first four months of were generally above normal throughout the projects area. Precipitation during the first four months of the year varied throughout the projects area. Precipitation totals were above normal at 12 of the 16 project dams, varying from 78 to 250 percent. Cedar Bluff recorded the second greatest February precipitation total ever recorded at the site while Red Willow Dam recorded the second greatest March precipitation at the site. Precipitation during April at Merritt Dam was 250% of normal which was the greatest ever recorded for the month at that site.

Precipitation during May was generally below normal throughout the basin. Only three project dams recorded above normal precipitation during May. Lovewell Dam recorded the lowest precipitation ever recorded at the site for the month of May. June was generally wetter than normal while July was generally drier than normal. Virginia Smith Dam recorded the lowest July precipitation total ever and Medicine Creek Dam recorded the second lowest July precipitation total at the respective sites. Average temperatures were above normal in May, June and July. August precipitation improved considerably with only three project dams having below normal precipitation for the month. The improvement turned out to be short lived as September precipitation was well below normal at all project dams. Precipitation during September was only 43 percent of normal over the projects. Temperatures in August were generally near to above normal throughout the projects area and well above normal in September.

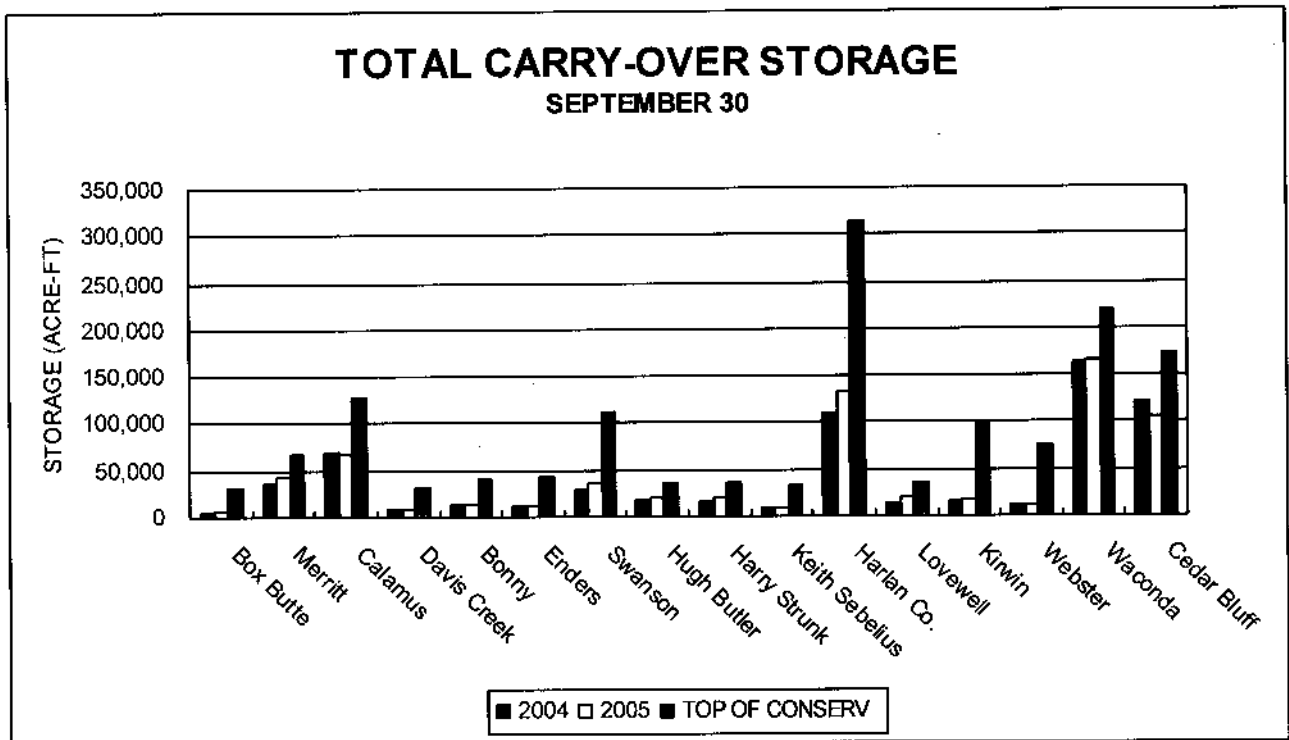
October was generally wetter than normal while November was generally drier than normal. Only five dams recorded below normal precipitation during October and only five dams recorded above normal precipitation during the month of November. Precipitation during December was well below normal at all project dams with the exception of Harry Strunk Lake. Temperatures continued above average during October, November, and December.

### Storage Reservoirs

1. Conservation Operations. The 2005 inflow was below the dry-year forecast at Bonny and Enders Reservoirs, and Swanson, Hugh Butler and Harry Strunk Lakes. Box Butte, Merritt, Calamus, Kirwin, Webster, Lovewell and Cedar Bluff Reservoirs along with Harlan County, Keith Sebelius and Waconda Lakes had inflows between the dry- and normal-year forecasts. Davis Creek Reservoir had inflows between the normal-year and wet-year forecast.

All project reservoirs had below average carryover storage from the 2004 water year with the exception of Cedar Bluff Reservoir. Of the 12 project reservoirs in the Kansas River Basin, only Keith Sebelius Lake and Lovewell and Cedar Bluff Reservoirs did not record below average inflows during all 12 months of 2005. Keith Sebelius Lake and Cedar Bluff Reservoir recorded below average inflows during 11 months of 2005. Reservoir releases were made from Merritt and Virginia Smith Dams to maintain reservoir levels prior to the 2005 irrigation season. Just prior to the irrigation season, Enders, Kirwin, Webster and Box Butte Reservoirs, along with Keith Sebelius, Swanson, Hugh Butler, Harry Strunk and Harlan County Lakes, did not have sufficient storage to provide water users with a full water supply. Harry Strunk Lake and Lovewell Reservoir had some flood storage occupied prior to the irrigation season. The high irrigation demand months of July and August significantly reduced storage in those project reservoirs that had storage available for irrigation. Precipitation during late July and August was of little help in reducing the demands on project reservoirs. Storage in the Kansas River Basin project reservoirs was below normal at the end of the irrigation season with the exception of Cedar Bluff Reservoir.

The following summarized graph shows a comparison of 2004 and 2005 carry-over storage conditions as compared to the top of conservation storage for all reservoirs in the Niobrara, Lower Platte, and Kansas River Basins as of September 30<sup>th</sup>.



2. Flood Control Operations. Harry Strunk Lake and Lovewell Reservoir utilized flood pool storage in 2005. Flood releases were not required to reduce or maintain pool levels. The fiscal year 2005 flood control benefits accrued by the operation of Reclamation's Nebraska-Kansas Projects facilities was \$641,000 as determined by the Corps of Engineers. An additional benefit of \$464,000 was credited to Harlan County Lake. The accumulative total of flood control benefits for the years 1951 through 2005 by facilities in this report total \$1,873,552,000 (see Table 5). To date no benefits have been accrued by the operation of Box Butte, Merritt, Calamus, or Davis Creek Reservoirs.

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

#### Water Service

There was 228,542 acre-feet (AF) of water diverted to irrigate approximately 151,173 acres of project lands in the 12 irrigation districts (see tables 3 and 6). The project water supply was either inadequate or limited for 169,024 acres of the total project lands. This includes lands in Mirage Flats, Frenchman Valley, H&RW, Frenchman-Cambridge, Almena, Bostwick in Nebraska, Kansas Bostwick, Kirwin and Webster Irrigation Districts. The project water supplies for the other units mentioned in this report were more than adequate in 2005.

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

## Irrigation Production

The 2005 crop yields on lands receiving project water in the Nebraska-Kansas Projects were lower than 2004 for three of the five reporting districts. The average corn yield, the principal crop of all reporting districts, was 172 bushels per acre. This was approximately five bushels per acre less than in 2004. The average unit price of corn when harvested was lower than the previous year at approximately \$1.75/bu. The start of irrigation releases from project reservoirs varied considerably depending on storage water available. Much of the growing season was warmer and drier than normal. Most districts experienced some relief from the dry conditions during the first part of August. Crop maturity progressed near normal during the growing season. Several irrigation districts had finished making irrigation releases by mid September. Eleven canals did not divert water in 2005 as a result of extremely short water supplies. Nearly all irrigation districts had finished delivering water by the end of September with corn harvest commencing by mid-October.

## Fish and Wildlife and Recreation Benefits

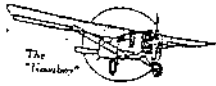
The National Recreational Fisheries Policy declares that the Government's vested stewardship responsibilities must work in concert with the state managing agency's recreational fisheries constituency and the general public to conserve, restore, and enhance recreational fisheries and their habitats. As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

During the early part of the 2005 season, normal reservoir operations were favorable for recreation and fish and wildlife uses at several project reservoirs. Lower water levels have been experienced at most reservoirs in the Kansas River Basin over the past few years somewhat limiting the recreation benefits. Normal summer drawdown due to irrigation releases did allow for some late summer shoreline revegetation.

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

# HEADLINES 2005

Much more rain needed to restore lakes



Enders Dam road to be closed for repairs

*McCook Daily Gazette*

Drought concerns spread

Farmers to be paid not to irrigate

More than water flow important to a river

Irrigators feeling pinch of new water laws, regulations

Lower Republican NRD adopts integrated management plan

High Court says DNR does not have authority over groundwater

Water rules raise questions for irrigators

Rain welcome, whenever it comes to area

*The Imperial Republican*

Low water hurts lake businesses

Pumping water into the Republican River; retiring thousands of acres possible solution to complying with Kansas pact

Report: Nebraska over its water allocation for Republican River

Game & Parks: groundwater depletion threatens area reservoirs, hatchery

Water issues far from over

CREP sign-up nears 40,000 acres statewide

Reservoirs filling; drought effects remain

Frenchman Creek low flow Blamed for Dec. 31 fish fill

Public weighs in on water regs

Moisture was plentiful first six months, but July is dry

**GROUND ZERO**

Swanson Lake the front line for saltcedar invasion

## 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 2005 and serves as a guideline for the 2006 operations. This report also describes the responsibilities of Reclamation, Corps of Engineers, and the irrigation and reclamation districts in the Niobrara, Lower Platte, and Kansas River Basins.

### Operational Responsibilities

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

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

An updated Field Working Agreement was executed on July 17, 2001 between the Corps of Engineers and Reclamation regarding operation of Harlan County Dam and Lake. The agreement provides for a sharing of the decreasing water supply into Harlan County Lake. Storage capacity allocations were redefined based on the latest sediment survey (2000) and a procedure was established for sharing the reduced inflow and summer evaporation among the various lake uses.

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

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

### Tables and Exhibits

Records for the facilities reported in the AOP are included as tables and exhibits and are located following page 35.

## Water Supply

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

Inflow records from 1986 through 2005 were used for the analysis of reservoirs in the Niobrara, Lower Platte and Kansas River Basins.

## Reservoir Operations

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

## Major Features

The Mirage Flats Project was constructed under the Water Conservation and Utilization Act and includes an irrigation storage reservoir, diversion dam, and canal system. The other features discussed in this report are all a part of the Pick-Sloan Missouri Basin Program and include single and multipurpose reservoirs, diversion dams, pump stations, and canal systems. The 16 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 Virginia Smith and Davis Creek Dams in the Lower Platte River Basin.
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

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

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

### Long Term Water Service Contract Renewal

The Ainsworth Irrigation District (AID) notified Reclamation on February 16, 2005 that the Board approved a motion to request renewal of the AID contract with Reclamation. The long-term water service contract with the AID will expire December 31, 2006. The current schedule provides for the completion of the draft Environmental Assessment and contract negotiations in 2006.

### 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 for waterfowl habitat. The Calamus Fish Hatchery located below Calamus Reservoir is operated by the State of Nebraska for fish production.

### State of Colorado Division of Wildlife

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

### State of Kansas Department of Wildlife and Parks

The State of Kansas acquired the use and control of portions of the conservation capacity at Cedar Bluff Reservoir following the reformulation of the Cedar Bluff Unit in October of 1992. The City of Russell's existing water storage right and contract with the United States remained unchanged.

### Power Interference Considerations

A Power Interference Agreement exists between Reclamation, the Twin Loups Reclamation District, and the Loup River Public Power District. A Subordination Agreement also exists between Reclamation, the Ainsworth Irrigation District and the Nebraska Public Power District. Provisions of these agreements will be incorporated into the 2006 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 Reclamation reservoirs in the Kansas River Basin, Niobrara River Basin, and the Lower Platte River Basin. The regulated outflow will also benefit farmers, ranchers, cities, and other interests below the reservoirs.

### Republican River Compact – Kansas v. Nebraska

On May 26, 1998, Kansas filed a petition with the U. S. Supreme Court complaining that Nebraska had violated the Republican River Compact by using more than its share of the Republican River water supply. The three original parties to the Compact; Kansas, Nebraska and Colorado, became parties to the case. Because all of the major water development structures in the Republican River Basin were constructed by the Bureau of Reclamation and the Corps of Engineers, the United States was allowed to participate as an *amicus curiae*. After seventeen months of negotiations the Final Settlement Stipulation was signed by each respective governor and attorney general and was filed with the Special Master on December 16, 2002. The United States Supreme Court approved the settlement and dismissed the case on May 19, 2003.

The settlement provides for a moratorium on new groundwater wells, special rules for administration of water during water-short years, protection of storage releases, minimized flood flow effects on the accounting, recognition by Nebraska of a 1948 priority date for the Kansas-Bostwick Irrigation District, inclusion of the impacts of groundwater pumping from tableland wells in the accounting, and accounting for all reservoirs 15 acre-feet and larger within the river basin.

With the support of Kansas and Nebraska, Reclamation completed an Appraisal Study which analyzed system improvement alternatives in the lower portion of the basin that would provide for more efficient use of the water supply. This study was completed in 2004 and distributed to interested parties in February of 2005. The study met requirements of the Final Settlement Stipulation by investigating system improvements in the Basin, including measures to improve the ability to utilize the water supply below Hardy, Nebraska. This study also met the responsibilities of the Republican River Compact by investigating the most efficient use of the water of the Republican River Basin for multiple purposes.

The appraisal study recommends further Federal participation in a feasibility study and that such a study be undertaken to investigate solutions. Specific congressional authorization is required for Reclamation to perform a feasibility study. The purpose of a feasibility study is to identify, evaluate, and recommend to decision makers an appropriate, viable solution to the identified problems and opportunities. The States have indicated they would provide in-kind support and/or funding for the feasibility study. Both states have expressed interest in pursuing legislation for the study. Legislation for the study was introduced in 2003 but the legislation was not advanced. On February 14<sup>th</sup>, 2006, congressmen from both Nebraska and Kansas reintroduced

the Lower Republican River Basin Study Act (H.R. 4750).

The Stipulation also required that the States, in cooperation with the United States, form a Conservation Committee to develop a proposed study plan to determine the quantitative effects of non-federal reservoirs and land terracing practices on water supplies in the Republican River Basin above Hardy, Nebraska. The Study Plan supported by the three states, the Natural Resources Conservation Service, and Reclamation was completed and signed on April 28, 2004. Cooperative agreements for completing the five year study were developed between Reclamation, the University of Nebraska-Lincoln (UNL), and Kansas State University. Installation of data loggers on 35 reservoirs throughout the basin was completed in 2004. Additional monitoring equipment for terraces and additional reservoirs will be installed by UNL in 2006.

Water-Short Year Administration will be in effect in those years in which the projected or actual irrigation supply is less than 119,000 acre feet of storage available for use from Harlan County Lake as determined by Reclamation. It was determined in 2005 that a "Water-Short Year Administration" was in effect.

#### Frenchman Valley Appraisal Study

In 2004, the state of Nebraska proposed to Reclamation an appraisal study that will examine opportunities for more efficient management of water supplies in the Frenchman River Valley including Reclamation's Enders Reservoir, a feature of the Frenchman-Cambridge Division in Nebraska. The study will focus on problems and opportunities in an area that has experienced dramatically reduced ground and surface water supplies, including reduced reservoir inflows. Pre-planning activities, including developing a Plan of Study (POS) for the appraisal study, began in 2005 and will continue in 2006. Agencies developing the POS include the NKAO, the Nebraska DNR, the Frenchman Valley and H&RW Irrigation Districts, the Nebraska Game and Parks Commission, the Upper and Middle Republican Natural Resources Districts. The POS is anticipated to be completed in calendar year 2006.

#### Emergency Management

The Nebraska-Kansas Area Office (NKAO) continued to coordinate with local jurisdictions that could potentially be impacted by flooding from large operational releases and/or dam failure. Four tabletop exercises and one functional exercise were conducted during calendar year 2005. Orientation meetings were held for all of the NKAO dams. Tabletop exercises were held for the Box Butte Dam Emergency Action Plan (EAP), Trenton Dam EAP, Red Willow Dam EAP, and the Medicine Creek Dam EAP. A functional exercise was held for the Merritt Dam EAP. Emergency radios have been installed at all dams. These radios will be used as a backup means of communication when notifying the local emergency management officials in the event of an emergency at the dam. Both the Nebraska-Kansas Area Office and the McCook Field Office have a satellite phone that can be used in an emergency. Management and the dam operators have been trained on the use of these phones.

There was one internal alert declared at NKAO projects in 2005. At Red Willow Dam, an Internal Alert was declared after material was discovered in the outlet works stilling basin under drain system. Additional analysis of the drain system is scheduled to be completed in 2006. An internal alert at Enders Dam is still in effect until the investigation of the stability of the outlet works stilling basin and risk assessment are complete.

One table top exercise and three functional exercises are planned in 2006. EAP orientation meetings will be held at all NKAO dams. Site security plans for each dam are scheduled to be written in 2006.

### Public Safety Reviews

The Annual Safety Training was conducted in February 2005. This training provided maintenance personnel the opportunity to acquire a 10 hour certification with respect to OSHA construction standards. First Aid and CPR training was also provided. During the planning stages of this training, an informational letter, and invite was sent to all of the water users within the NKAO jurisdiction. This letter included some safety tips, an invitation to the Annual Safety Training, and promoted the utilization of Reclamation when developing or maintaining safety programs for the water districts.

Life Safety Code Assessments for each structure at all of the reserved works facilities within the NKAO jurisdiction were formally completed during FY 2005. The "Simplified Life Safety Code Assessment" worksheet (developed by the LSC team and the Regional Life Safety Coordinator) was utilized. In addition, assessments for the Grand Island Area Office, and the new McCook Field Office were also performed. Assessments were provided to the Regional Office which included the AHJ determinations, and recommendations for each facility and appurtenances.

The ongoing safety reviews of project facilities continues to identify potential safety hazards to the public and operating personnel. During 2005, NKAO combined the Safety Reviews of the major facilities with the Dam Safety Facility Reviews. This format provides for input from both the Area Safety Manager, and teams of Dam Safety Specialists. Some recommendations included enhanced confined space signage, expanding the public knowledge of safety issues around our facilities, and provide training to employees regarding some of the new OSHA requirements for record keeping.

Automatic External Defibrillators (AEDs) were acquired for the McCook Office, the Grand Island Office, and two field ready models. This process involved developing a protocol with the Federal Occupational and Health Services center in Denver. Formal training will be provided to employees in early 2006.

In order to ensure facility accessibility, reliability and safety, focus continues regarding compliance with accessibility standards. Specialists from the Denver Technical Center performed additional accessibility evaluations at public access sites at three different reservoirs. These evaluations were comprehensive, and set out specific suggestions as to improvements at public facilities. These evaluations are expected to continue throughout 2006.

Attention continues with regards to issues concerning ergonomics, West Nile Virus, hazardous materials, pesticide use, arc flash hazards, extraction of injured personnel, and communications. Employees were provided training, and given information related to these and several other issues.

Several individuals volunteered and were deployed with respect to Hurricane Katrina relief efforts; particular safety concerns were identified and addressed prior to deployment of the individuals.

## Facility Reviews, Maintenance and Construction

Periodic Facility Reviews were conducted at Bonny, Norton, Kirwin, Webster, and Cedar Bluff Dams during 2005. Annual Site Inspections were conducted at the other ten NKAO dams in 2005.

Associated Facility Reviews were conducted in 2005 for the following canal systems: Ainsworth, Mirage Flats, Geranium, Mirdan, Scotia, Fullerton, Elba, Franklin, Naponee, Franklin Pump, Superior, Courtland in Nebraska, Courtland above Lovewell Dam, and Courtland below Lovewell Dam.

Technical surveys were completed at Bonny, Red Willow, Virginia Smith, and Davis Creek Dams in 2005.

Construction of a new Reclamation office building in McCook, Nebraska began in June of 2004 to replace the existing structure built more than 70 years ago. The new office building was completed in May 2005.

Video inspections of the toe drain systems at Merritt, Enders, Trenton, Norton, Webster, and Cedar Bluff Dams were attempted with varying degrees of success during 2005. A program to examine all of our toe drain systems was initiated in 2001.

Security enhancements continue at NKAO dams.

## CHAPTER II - NIOBRARA AND LOWER PLATTE RIVER BASINS

### Mirage Flats Project in Nebraska

#### General

Flows in the Niobrara River along with Box Butte Reservoir storage provide a water supply for the 11,662 acre Mirage Flats Project. From 1996 to 2005, the project water supply averaged 12,000 AF, which is about 1.03 acre-feet per irrigable acre. Many irrigators supplement their water supply with private wells.

The Mirage Flats Irrigation District cooperates with the Nebraska Game and Parks Commission (Commission) by operating the Box Butte Dam outlet works gate and the Dunlap Diversion Dam gates in a manner to avoid sudden large changes in the flows of the Niobrara River. A 30-year agreement was made in 1990 between the district and the Commission whereby the district would not draw the reservoir water level below elevation 3978.00 feet (2,819 AF). In return the district received an up-front payment which was used to improve the efficiency of the project's delivery system. On March 17, 2000, the district agreed to increasing the minimum reservoir level by one additional foot to elevation 3979.00 feet (3,244 AF). In return the district received an additional payment from the Commission for the 20 years left on the original agreement.

A data collection platform (DCP) was installed in May of 1992 to monitor the reservoir elevation and outflow at Box Butte Dam. A telephone (primary communication system) and a radio (backup communication system) have been installed at the outlet works for contacting the Region 23 Emergency Management Agency.

#### 2005 Summary

The flows of the Niobrara River plus the carry-over storage in Box Butte Reservoir were not adequate to provide a full water supply for the project lands. Precipitation at the Mirage Flats Irrigation District Office totaled 17.78 inches, which is 104 percent of normal. The 2005 total inflow of 16,464 AF was between the dry- and normal-year forecasts.

From early July through early September, diversions of 10,617 AF to the Mirage Flats Canal provided irrigation water for approximately 11,092 acres, 95 percent of the service available acreage. The farm deliveries from the project water supply totaled 4,113 AF (0.35 acre-foot per irrigable acre), which is a delivery efficiency of 39 percent. Total reservoir storage was only 5,572 AF at the end of the irrigation season. Privately owned irrigation wells supplemented the project water supply.

On-site dam operator training was conducted in May 2005. A tabletop exercise of the Box Butte Dam EAP took place in June and the Annual Site Inspection of Box Butte Dam was conducted in October.

In 2005, the District installed additional canal lining on the upper end of the Mirage Flats Canal. This extended the 1.0 mile canal lining section an additional 0.5 miles. The District continued to implement water conservation measures as outlined in their Water Management Plan and their Long Range Plan. The district continued to assist irrigators with delivery improvements that provide on-farm efficiency improvements, such as relocation of turnouts, burying pipe for

better access, and on-farm efficiency incentives. The district continues to modify and update their computer software to improve system operations, scheduling, and accounting and continued development of their web page that allows irrigators to place water orders, review water accounts, and keep updated on district operations. The district continues to develop and expand on the canal automation and remote monitoring 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 two feet below the top of conservation capacity and within the repaired area of soil cement on the upstream face of the dam. The reservoir is regulated to maintain this level until the ice clears each spring. Maintaining the reservoir at this elevation during the winter will help avoid ice damage to the older existing soil cement at lower elevations. Upon ice-out the outlet pipe is drained, inspected, and repaired as necessary. The reservoir will then be rapidly filled to elevation 2946.0 feet to reduce shoreline erosion around the reservoir and minimize sand accumulations on the face of the dam. This filling process generally takes place in April. The reservoir level is maintained until irrigation releases begin to draw on the pool around mid May. A minimum release of 75 cubic feet per second (cfs) should be made to the river during spring filling operations if at all possible. This operation enhances the spring fish spawn. Seepage, pickup and toe drain flow normally result in flows of up to 15 cfs below Merritt Dam. Whenever possible, daily changes in releases to the river should be made in no more than 50 cfs increments. This will minimize adverse impacts on the Snake River trout fishery downstream of the dam.

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

### 2005 Summary

Precipitation, as recorded near Merritt Dam, totaled 28.18 inches, which was 140 percent of normal. April and June precipitation was the highest on record for the respective months. The inflow for the year totaled 178,277 AF. This inflow was between the dry- and normal-year forecasts. The water supply was more than adequate to meet the project's irrigation requirement.

There were 71,713 AF diverted from Merritt Reservoir into Ainsworth Canal, with 45,517 AF delivered to the farm headgates (delivery efficiency of 64 percent). There were 34,158 acres of land irrigated in 2005.

The district provided a total of 349 AF of irrigation water from holding ponds located within the district's service area.

New Area-Capacity Tables for Merritt Reservoir became effective on January 1, 2005. These revised tables resulted from a sedimentation survey conducted in June, 2003.

A functional exercise of the Merritt Dam EAP took place in January 2005 and the Annual Site Inspection of Merritt Dam was conducted in September.

The Standing Operating Procedures (SOP) for Merritt Dam was updated and republished in August 2005.

The Ainsworth Irrigation District, along with Reclamation and the local Natural Resource Districts, provided support to the University of Nebraska Extension Service for an irrigation scheduling/nitrogen management demonstration that will educate and improve irrigation management in the area. The first demonstration site included a center pivot in the District and a field day was held in the fall of 2005. A furrow irrigated site may be added to this project in 2006.

## North Loup Division in Nebraska

### General

The North Loup Division is located in the Loup River drainage basin. Water is diverted from both the Calamus and North Loup Rivers for the irrigation of approximately 55,000 acres of project lands. Operation of the division will also provide a sustained groundwater supply for an additional 17,000 acres. Principal features of the division include Virginia Smith Dam and Calamus Reservoir, Calamus Fish Hatchery, Kent Diversion Dam, Davis Creek Dam and Reservoir, five principal canals, one major and one small pumping plant and numerous open ditch and buried pipe laterals.

Calamus Reservoir is normally regulated at three to four feet below the top of conservation capacity during the winter months. Maintaining the reservoir at this elevation during the winter will help avoid ice damage to the soil cement on the upstream face of the dam. After the ice clears in the spring, the reservoir will be filled to conservation capacity. The North Loup Division project operation is restricted to no water diversions from the Calamus and North Loup Rivers during the months of July and August, and also during the month of September whenever sufficient water is available in storage reservoirs to deliver canal design capacity. During this time, inflows to Calamus 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 and as required in the authorizing legislation.

Davis Creek Reservoir will be regulated near elevation 2048.0 feet following the irrigation season and throughout the winter months. This carry-over elevation provides a minimal recreational pool while reducing increases in groundwater storage due to reservoir seepage. The reservoir is filled via Mirdan Canal, starting in April and reaching full content by the end of June. A 160-acre recreation area adjoining the reservoir was constructed and is managed by the Lower Loup Natural Resources District. The area includes a boat ramp, a handicapped fishing pier, a day-use area, a primitive camping area, shelter and a hiking path. Kent Diversion Dam is also open to day-use fishing with handicapped accessibility provided.

### 2005 Summary

Precipitation at Virginia Smith Dam was 21.99 inches which is 93 percent of normal. The inflow totaled 251,935 AF which was between the dry- and normal-year forecasts. There were 72,780 AF of water released into Mirdan Canal and 27,050 AF diverted through Kent Canal from the North Loup River. A total of 43,770 AF was diverted for district use above Davis Creek Reservoir. The farm headgate delivery was 22,944 AF which is a delivery efficiency of 52 percent. Land irrigated in 2005 totaled 33,211 acres above Davis Creek Reservoir. Reservoir inflows were bypassed during July, August, and September as required. The reservoir elevation at the end of the year was at 2238.35 feet. The Calamus Fish Hatchery used bypassed natural flows and storage from Calamus Reservoir totaling 6,623 AF during 2005.

The precipitation of 23.91 inches near Davis Creek Dam was 101 percent of normal. Inflow to Davis Creek Reservoir totaled 48,226 AF during 2005. Beginning in mid April, Davis Creek Reservoir was filled from an elevation of approximately 2047.5 feet to a peak elevation of 2076.12 feet on June 26<sup>th</sup> using diversions from the North Loup River and Calamus Reservoir. A release of 40,100 AF was made from Davis Creek Dam into Fullerton Canal, with 26,353 AF delivered to the farm headgates (66 percent delivery efficiency). There were 21,430 acres irrigated below



Davis Creek Reservoir. The reservoir elevation at the end of 2005 was near the normal wintering level at 2048.33 feet.

An orientation meeting to review the Virginia Smith Dam and Davis Creek Dam EAPs took place in November 2005.

In December of 2002, the irrigation district reported a small depression along the right side of the river outlet works stilling basin wall at Virginia Smith Dam. Safety of Dams personnel in both Denver and Billings were notified and discussions were conducted with the Technical Service Center. Investigations determined that a problem existed with the under-drain system in the outlet works stilling basin. Gravel material beneath the outlet works chute structure and stilling basin was being transported creating a void. Reclamation personnel drilled holes into the floor of the structure and filled the voids and under-drain system with grout. Grouting was completed in March of 2003. Investigations then began on the under-drain system at the spillway stilling basin because of the similarity to the outlet works system. A risk analysis of the spillway chute and stilling basin under-drain system was completed in September 2003. The risk analysis recommends that the drain system under the spillway basin be grouted. Grouting was originally scheduled to start in October of 2004, but was delayed by the cancellation of the stop log fabrication contract due to contract non performance of the contractor. The stop logs were installed by a different contractor in September 2005. Grouting operations were completed in October 2005.

The Standing Operations Procedures for Virginia Smith Dam were updated and republished in January 2005. Technical surveys of both Davis Creek and Virginia Smith Dams were conducted in October.

## CHAPTER III - REPUBLICAN RIVER BASIN

### Armel Unit, Upper Republican Division in Colorado

#### General

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

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

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

Toe drains were added at Bonny Dam in 1988 and 1994 to address Safety of Dams concerns. These drains were constructed to minimize the potential for dam failure due to piping when the reservoir elevation exceeds 3691.0 feet.

#### 2005 Summary

The annual precipitation total of 18.23 inches at Bonny Dam was 106 percent of normal. The annual computed inflow of 7,353 AF to Bonny Reservoir was below the dry-year forecast. Below normal inflows were recorded during every month of the year. February, March and April inflows were the lowest on record for the respective months since first filling. The reservoir level was 17.6 feet below the top of conservation at the first of the year. The reservoir level gradually increased 2.4 feet to a maximum reservoir level of 3655.43 feet on June 13<sup>th</sup>. Bonny Dam recorded a maximum one day precipitation total of 1.34 inches overnight on October 11<sup>th</sup>. The reservoir level gradually decreased throughout the remainder of the year. A new historical low reservoir elevation of 3652.96 feet was recorded on December 9<sup>th</sup>. The reservoir elevation at the end of the year was 19.0 feet below the top of conservation at 3653.05. The Corps of Engineers determined that \$91,000 in flood prevention benefits were realized from the operation of Bonny Reservoir during 2005.

As directed by the Colorado Water Commissioner, 89 AF of reservoir inflows from the South Fork of the Republican River and Landsman Creek were passed through Bonny Reservoir into Hale Ditch for irrigation purposes. Releases to Hale Ditch began on May 17 and ended on May 24, 2005.

A Periodic Facility Review of Bonny Dam was conducted in April 2005 and an EAP orientation meeting took place in May.

## Frenchman Unit, Frenchman-Cambridge Division in Nebraska

### General

The Culbertson Canal and the Culbertson Extension Canal systems serve 9,295 acres in the Frenchman Valley Irrigation District and 11,695 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 located on Frenchman Creek, a tributary of the Republican River in southwest Nebraska. Irrigation releases are conveyed via Frenchman Creek from Enders Reservoir to Culbertson Diversion Dam. Reclamation maintains/clears this section of Frenchman Creek prior to the irrigation season each spring.

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.

### 2005 Summary

The annual precipitation total of 21.03 inches at Enders Dam was above normal (111 percent). The 2005 inflow into Enders Reservoir of 4,649 AF was below the dry-year forecast. This inflow was the lowest ever recorded at the site. Due to extensive groundwater pumping above the reservoir, the inflow was only eight percent of the average historical preconstruction runoff at the Enders Dam site (60,700 AF from 1929-1947). This year was the 38<sup>th</sup> consecutive year with below-normal inflows in which the conservation pool did not fill. The reservoir level was 26.0 feet below the top of conservation at the first of the year. The reservoir pool gradually increased with late winter and spring inflows peaking at 3088.12 feet (25.2 feet below the top of conservation) on June 22<sup>nd</sup>. Due to the extremely low water supply available, no water was released from Enders Reservoir. The greatest 24-hour precipitation total recorded during the year at Enders Dam was 3.08 inches overnight on May 23<sup>rd</sup>. The end of the year reservoir level was 26.0 feet below the top of conservation.

The Frenchman Valley Irrigation District reports that approximately 1,482 acres received water in 2005 from natural flow diversions from Frenchman Creek. Farm delivery averaged about 0.05 foot per irrigable acre in the Irrigation District. Some farmers were able to supplement their project water supply from private irrigation wells. Farm delivery efficiency was seven percent for the district. The H&RW Irrigation District did not divert water into Culbertson Extension Canal in 2005 due to the extremely low water supply. This was the fourth consecutive year that the district did not deliver water. H&RW Irrigation District storage water in Enders Reservoir was carried over into 2006.

In August 2004, a small depression was discovered near the outlet works stilling basin at Enders Dam. An Internal Alert remains in effect until investigations to the cause of the depression are completed. Reclamation has installed instrumentation in the area to collect additional data. Investigations and additional analysis are scheduled in 2006.

On-site dam operator training was conducted in March at Enders Dam.

An Annual Site Inspection of Enders Dam was conducted in August 2005 and an orientation meeting to review the Enders Dam EAP took place in October.

A silica fume concrete material overlay was installed on the spillway bridge deck in September 2005.

In 2005, the district (along with Reclamation) again provided support for a Limited Irrigation Demonstration Project with the University of Nebraska Extension Service. One demonstration site was located near Benkelman and demonstrated various irrigation strategies with a short water supply.

## 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 16,562 acres; Red Willow Canal to 4,877 acres; Bartley Canal to 6,435 acres; and Cambridge Canal to 17,297 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. The Frenchman-Cambridge Irrigation District has replaced all of the open laterals which were physically or economically feasible with pipe laterals which has significantly increased both system and on-farm efficiencies.

### 2005 Summary

The annual precipitation total of 20.66 inches at Trenton Dam was 103 percent of normal. The inflow of 15,542 AF to Swanson Lake was well below the dry-year forecast and the third lowest annual computed inflow ever recorded at the lake. The inflow was below normal for all twelve months. The reservoir level began the year approximately 22.5 feet below the top of conservation pool. The reservoir level gradually increased during the spring and summer and peaked at 2733.28 feet on June 21<sup>st</sup> (approximately 18.7 feet below full). Due to the extremely low water supply available, no water was released from Swanson Lake. Irrigation diversions were not made into Meeker-Driftwood or Bartley Canals. This was the third consecutive year that the district did not deliver water from the two canals. At the end of the year the reservoir level was 20.6 feet below the top of conservation at 2731.37 feet. The Corps of Engineers determined that \$91,000 of flood damages were prevented by the operation of Swanson Lake.

The annual precipitation total of 22.15 inches at Red Willow Dam was 113 percent of normal. The greatest precipitation event recorded at Red Willow Dam in 2005 was 1.97 inches overnight on March 29 . The annual inflow of 9,090 AF into Hugh Butler Lake was below the dry-year forecast and the lowest ever recorded at the site. The computed inflow for all twelve months of the year was below normal with record lows recorded during February and July. The reservoir level at the first of the year was 13.2 feet below the top of conservation. Inflows gradually increased the level of the reservoir to a peak of 2571.49 feet (10.3 feet below full) on June 17<sup>th</sup>. Releases were not made from Hugh Butler Lake in 2005 due to the extremely low water supply available. Irrigation diversions were not made into Red Willow Canal for the third consecutive year. The level of Hugh Butler Lake at the end of the year was 11.5 feet below the top of conservation, the fifth lowest end of year storage ever recorded. The Corps of Engineers determined that \$91,000 of flood damages were prevented by the operation of Hugh Butler Lake.

The annual precipitation total of 22.32 inches at Medicine Creek Dam was 108 percent of normal. The inflow of 30,861 AF was below the dry-year forecast and the fifth lowest annual total ever recorded. The computed inflow was below normal during all twelve months. The reservoir level at the beginning of 2005 was 9.8 feet below the top of conservation. The reservoir pool gradually increased peaking at 2366.64 feet on June 21<sup>st</sup> (0.5 foot into flood pool). Precipitation during August (6.45 inches) was the greatest ever recorded at the dam for the month. Irrigation

releases began on June 27<sup>th</sup> and were shut off on August 30<sup>th</sup> with nearly 19,000 AF of water released from the reservoir for irrigation. The Nebraska Department of Natural Resources directed that some reservoir inflow be bypassed into Medicine Creek for livestock watering in 2005. Releases were made from September 23<sup>rd</sup> through September 25<sup>th</sup>, September 27<sup>th</sup>, September 29<sup>th</sup> through September 30<sup>th</sup> and again on October 6<sup>th</sup>. The greatest 24-hour precipitation event recorded at Medicine Creek Dam was 4.41 inches overnight on August 14<sup>th</sup>. Harry Strunk Lake was 5.4 feet below the top of conservation at the end of the year. The Corps of Engineers determined that the reservoir prevented \$98,000 in flood damages.

The water supply was limited with 19,732 AF of water diverted to irrigate 15,945 acres of land served by the Cambridge Canal (farm delivery efficiency was 50 percent).

A combined tabletop exercise of the Trenton, Red Willow, and the Medicine Creek Dams' EAPs took place in September of 2005. Annual Site Inspections were conducted in February at Medicine Creek Dam, March at Red Willow Dam, and in August at Trenton Dam in 2005.

On-site dam operator training was conducted at Trenton Dam in March.

In July 2005, a small quantity of fine sand was discovered near the river outlet works stilling basin drain outlet during an inspection at Red Willow Dam. An Internal Alert remains in effect until additional analysis of the under drain system is complete. Additional analysis of the drain system is scheduled to be completed in 2006.

The district (along with Reclamation) continued to provide support for a Limited Irrigation Demonstration Project with the University of Nebraska Extension Service. The demonstration site was located just east of Arapahoe and demonstrated various irrigation strategies with a short water supply. The project received water from the Cambridge Canal and a field day was well attended. The district continues to investigate remote monitoring opportunities that will improve delivery system operations.

## Almena Unit, Kanaska Division in Kansas

### General

Service is available to 5,764 acres in the Almena Irrigation District. The project water supply is provided by Prairie Dog Creek flows and Keith Sebelius Lake storage.

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

### 2005 Summary

The annual precipitation at Norton Dam totaled 27.69 inches, which is 112 percent of normal. The total inflow of 4,555 AF was between the dry- and normal-year forecasts. The reservoir level was 17.9 feet below the top of conservation on December 31, 2004. Late winter and spring inflows gradually increased the reservoir level to a peak elevation of 2287.65 feet on June 13<sup>th</sup> (16.7 feet below full pool). The greatest 24-hour precipitation event occurred overnight on April 5<sup>th</sup> with 2.68 inches recorded. Irrigation releases were not made from the reservoir in 2005. Keith Sebelius Lake was 17.8 feet below the top of conservation (2286.47 feet) at the end of the year.

The city of Norton used 412 AF of municipal water during 2005.

A Periodic Facility Review of Norton Dam was conducted in April and an orientation meeting to review the Norton Dam EAP took place in September 2005.

A Safety of Dams recommendation was made in 2000 concerning the seepage through the left abutment and around the outlet works house at Norton Dam. Technical Service Center personnel inspected the seepage areas in June 2001 and recommended consideration of monitoring improvement and additional instrumentation. A final issue evaluation report of findings (Technical Memorandum ND-8312-2) in 2003 concluded that the assessed risks for seepage and piping through the foundation in the left abutment falls in the range of "justification to take action to reduce risk." Topographic surveys and additional instrumentation were installed near the outlet works in 2004. In December 2005, a Corrective Action Study Technical Memorandum evaluated various alternatives for risk reduction and produced two new recommendations. Design of a filter drain system is scheduled for completion in 2006 with construction beginning in 2007.

## 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 22,935 acres in the Bostwick Irrigation District in Nebraska, and 13,378 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 29,122 acres below Lovewell Reservoir in the Kansas-Bostwick Irrigation District.

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

In accordance with the off-season flow alternative outlined in Reclamation's final environmental assessment dated December 16, 1983, and amended on November 21, 2002, Harlan County Lake releases will be 10 cfs during the months of December, January, and February, except when the reservoir is at low levels. During water-short years releases for these three months will be either zero or 5 cfs depending on reservoir levels. At the request of the State of Nebraska, releases of 30 cfs for a maximum 5-day period may be made to relieve icing conditions in the river.

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

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

### 2005 Summary - Bostwick Division - Harlan County Lake Operations

The annual precipitation at Harlan County Dam totaled 22.51 inches of rainfall, which is 98 percent of normal. The 2005 inflow of 53,682 AF was between the dry- and normal-year forecast. The inflow was below normal for all twelve months. A release was not required during January,



February or December in accordance to the environmental assessment and the annual operating plan.

Harlan County Lake began 2005 approximately 20.3 feet below the top of conservation pool, at 1925.44 feet. Inflows during the first six months of the year slowly increased the reservoir pool to a peak of 1929.94 feet on June 26<sup>th</sup> (top of conservation pool is elevation 1945.73 feet). Harlan County Dam recorded 1.73 inches of rain overnight on June 9<sup>th</sup> (the greatest one day total in 2005). Due to the extremely low water supply available, no water was released from Harlan County Lake. This was the second time since deliveries began in the early 50's that irrigation deliveries were not made from the lake. The reservoir level continued to decline throughout the remainder of the year. The level of Harlan County Lake at the end of 2005 was 1928.31 feet (17.4 feet below the top of conservation). Harlan County Lake prevented \$464,000 of downstream flood damages during 2005 according to the Corps of Engineers.

A total of 29,265 AF (approximately 66 percent of total inflow) was delivered to Lovewell Reservoir through the Courtland Canal.

#### 2005 Summary - Bostwick Division - Nebraska

The Bostwick Irrigation District in Nebraska diverted 4,712 AF of natural flows for the irrigation of 2,800 acres on Superior Canal. Farm delivery efficiency averaged 32 percent in the district. Irrigation diversions were not made into Franklin, Naponee, Franklin Pump, or Courtland Canal in Nebraska in 2005.

The district continued to replace open ditch laterals with buried pipe to reduce losses and improve system operations. The District was selected for a Water 2025 Challenge Grant Project that will replace approximately 10 miles of open ditch laterals with buried pipe. Identified laterals to be placed in pipe include all or portions of Superior Canal Laterals 9.5, 17.5, 21.2, and 27.3. The District started installing pipe on these projects in the fall of 2005 and should complete these projects in 2006. These pipe projects provide delivery system improvements by eliminating seepage losses, eliminating operational wasteways, improve water measurement and accounting by utilizing water meters, and provide on-farm benefits by allowing land owners the opportunity to convert to sprinkler irrigation.

#### 2005 Summary - Bostwick Division - Kansas

The 2005 precipitation at Lovewell Dam totaled 28.07 inches, which was 103 percent of normal. Lovewell Reservoir began 2005 with a water surface elevation only 8.3 feet below the top of conservation. Inflows during the first six months of the year from White Rock Creek and diversion of Republican River flows via Courtland Canal slowly increased the reservoir filling the reservoir conservation pool on May 13<sup>th</sup> (elevation 1582.6 feet), and in filling the reservoir to an elevation of 1584.20 feet on June 20<sup>th</sup>. Releases were made into the lower Courtland Canal beginning on June 20<sup>th</sup> to season the canal and maintain the reservoir level. A strong storm system stalled out over Lovewell Reservoir on the evening of July 25<sup>th</sup> dropping 3.33 inches of precipitation overnight. The reservoir pool increased 0.5 foot as a result of the storm. Lovewell Dam recorded another 7.40 inches of rainfall in August, the second greatest precipitation ever recorded for the month. Irrigation demands reduced the pool elevation to 1576.04 feet on August 23<sup>rd</sup>. Diversions of Republican River natural flows into Lovewell Reservoir continued after the irrigation release had ended and were maintained throughout the remainder of December. The

water surface elevation gradually increased to 1578.98 feet on December 31, 2005 (3.6 feet below the top of active conservation).

The Kansas-Bostwick Irrigation District diverted a total of 27,780 AF to serve 1,107 acres above Lovewell Dam and 23,439 acres below Lovewell Dam. Farm delivery efficiency averaged 45 percent in the district.

The Standing Operating Procedures for Lovewell Dam were updated and republished in January 2005.

On-site dam operator training was conducted in June at Lovewell Dam. An Annual Site Inspection of Lovewell Dam was conducted in August and an orientation meeting to review the Lovewell Dam EAP took place in November.

In 2005 the district continued to replace open ditch laterals with buried pipe. The district and Reclamation also provided assistance to Kansas State University (KSU) for a sprinkler irrigation demonstration located northeast of Courtland, Kansas. Courtland Canal supplies water for this demonstration and a field day was held at the site in the fall. In the fall of 2005, the District replaced open ditch Courtland West lateral 1.4 with buried pipe. These pipe projects provide delivery system improvements by eliminating seepage losses, eliminating operational wasteways, improve water measurement and accounting by utilizing water meters, and provide on-farm benefits by allowing land owners the opportunity to convert to sprinkler irrigation. The District is also planning on replacing portions of open ditch Ridge lateral 5.0 and Courtland West lateral 0.3-1.3 with buried pipe in the spring of 2006.

The Kansas Department of Agriculture submitted a Water 2025 Challenge Grant proposal which was selected for funding in 2005. Through this project, the Division of Water Resources will install flow meter data logging equipment and remote monitoring equipment on approximately 100 diversions in the Republican River Basin. The real time monitoring of the diversions will enhance administration of water rights, improve water management, and expand water marketing opportunities between senior and junior water rights holders.

## CHAPTER IV - SMOKY HILL RIVER BASIN

### Kirwin Unit, Solomon Division in Kansas

#### General

The water supply for the 11,465 acres of land in the Kirwin Irrigation District is furnished by Kirwin Reservoir storage and inflows from the North Fork Solomon River and Bow Creek.

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

#### 2005 Summary

The annual precipitation total of 33.61 inches at Kirwin Dam was 143 percent of normal and the third highest annual total ever recorded at the site. The inflow of 10,440 AF was between the dry- and normal-year forecast. Kirwin Reservoir was 27.2 feet below the top of conservation pool at the first of the year. Due to extremely low water supply, no water was released from the Kirwin Reservoir. Precipitation during August (7.35 inches) was the greatest ever recorded for the month. The greatest 24-hour precipitation event occurred overnight on August 14<sup>th</sup> with 4.10 inches recorded. The reservoir level continued to gradually increase throughout the remainder of the year to a peak elevation of 1705.39 feet (23.9 feet below full) on December 31<sup>st</sup>. The reservoir was credited with preventing \$11,000 in flood damages as determined by the Corps of Engineers.

A Periodic Facility Review of Kirwin Dam was conducted in May and an orientation meeting to review the Kirwin Dam EAP took place in June 2005.

## Webster Unit, Solomon Division in Kansas

### General

The Webster Irrigation District has service available to 8,537 acres. The project water supply is provided by Webster Reservoir storage and flows of the South Fork Solomon River.

### 2005 Summary

In 2005, the precipitation at Webster Dam was 114 percent of normal (26.94 inches). The inflow of 5,967 AF was between the dry- and normal-year forecasts. Webster Reservoir began 2005, 27.2 feet (elevation 1865.23 feet) below the top of conservation pool. The reservoir pool gradually increased to a peak elevation of 1866.85 feet (25.6 feet below full) on June 17<sup>th</sup>. Irrigation releases were not made from the reservoir in 2005. August precipitation (6.52 inches) was the fifth highest total ever recorded for the month. Webster Dam received 2.43 inches of rainfall overnight on August 28<sup>th</sup>, the greatest 24-hour precipitation event during the year. The reservoir level continued to decline during the final four months of the year and was 27.1 feet below the top of conservation on December 31, 2005.

A Periodic Facility Review of Webster Dam was conducted in May and an orientation meeting to review the Webster Dam EAP took place in June.

A special inspection was conducted on the spillway counterweights at Webster Dam in 2004. The inspection concluded that deterioration had affected the structural integrity of the counterweights. Repairs to the counterweights were completed by a contractor in November 2005.

The spillway under drain system was inspected in July 2005 and was found to be in good condition.

The district continued to explore opportunities to cost share with Reclamation and district irrigators for the replacement of open ditch laterals with buried pipe. In the fall and winter of 2005, the district replaced open ditch Lateral 25.0 and open ditch lateral 26.1 with buried pipe. These projects provided increased delivery water surface to project irrigators and eliminated approximately 2.0 miles of high loss, high maintenance open ditch lateral.

## Glen Elder Unit, Solomon Division in Kansas

### General

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

The water service contract with Beloit, Kansas, provides for the annual use of up to 2,000 AF of Waconda Lake storage. Water is measured at the Glen Elder Dam river outlet works. In any 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 1,009 AF of storage water as available from Waconda Lake. Based on the current State of Kansas Certificate of Appropriation, water usage is not to exceed 737 AF per calendar year.

The water service contract with the Glen Elder Irrigation District provides for the use of up to 18,000 AF of storage water each year. Based on the current State of Kansas Certificate of Appropriation, water usage is not to exceed 15,170 AF per calendar year. Water is released and measured through the river outlet works.

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, Waconda Lake will be allowed to fill during the late summer and early fall to flood exposed shoreline vegetation. This flooded aquatic vegetation is very beneficial to waterfowl management.

Waconda Lake will normally be regulated at one to two feet below the top of conservation capacity during the winter months. Maintaining the lake at this level will reduce shoreline erosion, provide a buffer for spring runoff and lessen ice damage to the upstream face of Glen Elder Dam. Releases from Waconda Lake will be regulated each year to maintain a constant water surface level while the lake is ice-covered.

## 2005 Summary

The annual precipitation total of 27.38 inches at Glen Elder Dam was 106 percent of normal. The inflow of 63,624 AF was between the dry- and normal-year forecast. Waconda Lake began the year 5.3 feet below the top of conservation. The lake level peaked at elevation 1451.91 feet on June 14<sup>th</sup> (3.7 feet below the top of conservation). This was the lowest annual peak since first<sup>th</sup> filling of the reservoir. Irrigation releases began on May 18<sup>th</sup> and continued through October 11<sup>th</sup> reducing the lake level to 1450.68 feet. Rainfall during the first week of June increased the pool level nearly one foot (11,000 AF), with a peak average daily inflow of approximately 3,000 cfs. Glen Elder Dam recorded 3.92 inches of precipitation overnight on July 25<sup>th</sup>, the greatest 24-hour precipitation event recorded at the dam in 2005. The Corps of Engineers determined Waconda Lake prevented \$259,000 in flood damages. On December 31, 2005 the lake level was 1450.50 feet (5.1 feet below full).

A total of 19,907 AF of water was released from Glen Elder Dam in 2005. Storage releases of 3,556 AF combined with natural flow releases of 6,631 AF for the irrigation of 6,509 acres in the Glen Elder Irrigation District. Five individual temporary water service contracts received storage water totaling 175 AF for the irrigation of approximately 274 acres. Storage releases totaling 640 AF were made for the City of Beloit, with an additional 8,025 AF bypassed for quality control as directed by the State Water Commissioner. Releases to the Mitchell County Rural Water District No. 2 totaled 705 AF.

The Standing Operating Procedures (SOP) for Glen Elder Dam was republished in January 2005 and on-site dam operator training at Glen Elder Dam was conducted in June.

An orientation meeting to review the Glen Elder Dam EAP took place in July 2005 and a Annual Site Inspection of Glen Elder Dam was conducted in August.

A new vacuum relief valve was installed at an existing manhole on top of the outlet pipe in September 2005.

## Cedar Bluff Unit, Smoky Hill Division in Kansas

### General

Cedar Bluff Reservoir storage furnishes a maximum of 2,000 AF each year for the City of Russell, Kansas when required. Prior to 1993, Cedar Bluff Reservoir storage and Smoky Hill River flows had provided a water supply for 6,800 acres in the Cedar Bluff Irrigation District. No water had been available for delivery to the district since 1978. Reformulation of the Cedar Bluff Unit in October of 1992 allowed the Cedar Bluff Irrigation District to begin the proceedings to disband, and the Kansas Water Office and Kansas Department of Wildlife and Parks to acquire the use and control of portions of the reservoir conservation capacity. The district completed all activities necessary to accomplish disbandment in 1994. A "designated operating pool" has been established for Cedar Bluff Reservoir and includes the following sub allocation pools: The City of Russell's existing water storage right which remained unchanged (2,700 AF); an artificial recharge pool under control of the Kansas Water Office (5,110 AF); and a fish, wildlife and recreation pool under control of the Kansas Department of Wildlife and Parks (21,061 AF). A "joint-use pool" has been established between the operating pool and the flood control pool for water supply, flood control, environmental and fish, wildlife and recreation purposes. Water rights for the "joint-use pool" are held jointly between the Kansas Department of Wildlife and Parks and the Kansas Water Office. A Contract Administration Memorandum between the United States of America, represented by Reclamation, the State of Kansas and the City of Russell was signed in November/December of 2003, establishing a continuous accounting procedure for water storage in Cedar Bluff Reservoir.

### 2005 Summary

The annual precipitation total at Cedar Bluff Dam was 19.51 inches which is 92 percent of normal. The inflow (8,134 AF) was between the dry- and normal-year forecasts. At the beginning of the year, the level of Cedar Bluff Reservoir was 2134.93 feet (top of active conservation is 2144.00 feet). The peak reservoir level recorded during the year was 2135.08 feet on February 13<sup>th</sup>. Precipitation in February (1.69 inches) was the second greatest total ever recorded for the month. The greatest 24-hour precipitation event occurred overnight on May 23<sup>rd</sup> with 2.99 inches of rainfall. The reservoir gradually decreased throughout the remainder of the year and by December 31, 2005, the reservoir level had decreased to 2131.67 feet (12.3 feet below the top of active conservation).



The State of Kansas used the fish hatchery facility located below Cedar Bluff Dam for waterfowl habitat with 4 AF released to the facility. A total of 1,405 AF of water was released from Cedar Bluff Reservoir during 2005 for the City of Russell.

A Periodic Facility Review of Cedar Bluff Dam was conducted in April and an orientation meeting to review the Cedar Bluff Dam EAP took place in December 2005.

TABLE 1

RESERVOIR DATA - NIOBRARA, LOWER PLATTE AND KANSAS RIVER BASINSCAPACITY ALLOCATIONS 1/

RESERVOIR		LIVE CONSERVATION			FLOOD CONTROL
		DEAD	Inactive	Active	
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	774	4,662	66,726	---
	Net Acre-feet	774	3,888	62,064	---
Calamus	- Elevation Ft.	2185.0	2213.3	2244.0	---
	Total Acre-feet	817	24,646	127,400	---
	Net Acre-feet	817	23,829	102,754	---
Davis Creek	- Elevation Ft.	1998.5	2003.0	2076.0	---
	Total Acre-feet	76	172	31,158	---
	Net Acre-feet	76	96	30,986	---
Bonny	- Elevation Ft.	3635.5	3638.0	3672.0	3710.0
	Total Acre-feet	1,418	2,134	41,340	170,160
	Net Acre-feet	1,418	716	39,206	128,820
Enders	- Elevation Ft.	3080.0	3082.4	3112.3	3127.0
	Total Acre-feet	7,516	8,948	42,910	72,958
	Net Acre-feet	7,516	1,432	33,962	30,048
Swanson 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	5,185	8,921	36,224	85,070
	Net Acre-feet	5,185	3,736	27,303	48,846
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	1,636	3,993	34,510	133,740
	Net Acre-feet	1,636	2,357	30,517	99,230
Harlan County Lake 3/	- Elevation Ft.	1885.0	1927.0	1945.73	1973.5
	Total Acre-feet	0	118,099	314,111	814,111
	Net Acre-feet	0	118,099	196,012	500,000
Lovewell	- Elevation Ft.	1562.07	1571.7	1582.6	1595.3
	Total Acre-feet	1,674	11,644	35,666	86,131
	Net Acre-feet	1,674	9,970	24,022	50,465
Kirwin	- Elevation Ft.	1693.0	1697.0	1729.25	1757.3
	Total Acre-feet	4,969	8,515	98,154	313,290
	Net Acre-feet	4,969	3,546	89,639	215,136
Webster	- Elevation Ft.	1855.5	1860.0	1892.45	1923.7
	Total Acre-feet	1,256	4,231	76,157	259,510
	Net Acre-feet	1,256	2,975	71,926	183,353
Waconda Lake	- Elevation Ft.	1407.8	1428.0	1455.6	1488.3
	Total Acre-feet	248	26,237	219,420	942,408
	Net Acre-feet	248	25,989	193,183	722,988
Cedar Bluff	- Elevation Ft.	2090.0	2107.8	2144.0	2166.0
	Total Acre-feet	4,402	28,574	172,452	364,342
	Net Acre-feet	4,402	24,172	143,878	191,890
Total Storage (A.F.)		36,889	274,340	1,475,207	3,909,611 2/
Total Net Acre-feet		36,889	237,451	1,200,867	2,357,568

1/ Includes space for sediment storage.

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

3/ Bottom of irrigation pool for Harlan County Lake is 1932.5 feet, 164,111 AF.

TABLE 2  
SUMMARY OF 2005 OPERATIONS  
MIRAGE FLATS PROJECT

## BOX BUTTE RESERVOIR

Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	MIRAGE FLATS CANAL	
						Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	1,166	61	67	0.00	8,806	0	0
Feb.	1,429	56	91	0.00	10,088	0	0
Mar.	1,469	61	172	0.90	11,324	0	0
Apr.	1,907	60	299	2.15	12,872	0	0
May	1,531	79	375	4.09	13,949	0	0
June	1,788	71	497	5.98	15,169	0	0
July	1,480	6,359	630	1.65	9,660	4,845	1,611
Aug.	1,100	4,407	380	2.05	5,973	4,830	2,367
Sep.	998	718	219	0.00	6,034	942	135
Oct.	1,276	34	167	0.89	7,109	0	0
Nov.	1,175	34	100	0.00	8,150	0	0
Dec.	1,145	65	63	0.07	9,167	0	0
<b>TOTAL</b>	<b>16,464</b>	<b>12,005</b>	<b>3,060</b>	<b>17.78</b>	<b>--</b>	<b>10,617</b>	<b>4,113</b>

NOTE - Acres irrigated 2005: Mirage Flats Canal - 11,092 acres.

SANDHILLS DIVISION  
AINSWORTH UNIT

## MERRITT RESERVOIR

Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	AINSWORTH CANAL	
						Release To Canal (AF)	Delivered To Farms (AF)
Jan.	14,320	14,083	237	0.42	61,370	0	0
Feb.	12,822	12,793	299	0.23	61,100	0	0
Mar.	15,214	13,983	418	2.14	61,913	0	0
Apr.	17,289	11,752	724	6.42	66,726	0	0
May	14,417	13,458	1,249	3.18	66,436	1,956	8
June	17,035	15,362	1,673	9.23	66,436	3,971	264
July	14,726	30,946	1,555	1.50	48,661	29,897	19,623
Aug.	16,524	25,408	1,005	2.50	38,772	25,630	18,099
Sep.	15,209	11,151	834	1.11	41,996	10,259	7,523
Oct.	13,876	2,777	594	0.71	52,501	0	0
Nov.	12,735	4,264	408	0.47	60,564	0	0
Dec.	14,110	12,992	312	0.27	61,370	0	0
<b>TOTAL</b>	<b>178,277</b>	<b>168,969</b>	<b>9,308</b>	<b>28.18</b>	<b>--</b>	<b>71,713</b>	<b>45,517</b>

NOTE -- Acres irrigated 2005: Ainsworth Canal - 34,158 acres.

NORTH LOUP DIVISION  
CALAMUS RESERVOIR

Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	ABOVE DAVIS CREEK MIRDAN CANAL			Delivered To Farms (AF)
						Release to Calamus Fish Hatch. (AF)	Release to Canal (AF)	Canal Use (AF)	
Jan.	19,579	7,252	444	0.32	112,532	430	0	0	0
Feb.	18,964	8,313	590	0.94	122,593	424	0	0	0
Mar.	21,286	19,309	1,075	2.50	123,495	362	0	0	0
Apr.	24,117	23,675	1,743	2.86	122,194	693	0	0	0
May	23,504	23,502	1,789	3.10	120,407	623	3,320	1,119	303
June	27,443	24,502	1,901	5.48	121,447	691	10,120	2,470	208
July	19,188	45,423	2,381	0.55	92,831	810	31,380	23,011	13,482
Aug.	21,291	38,822	1,400	3.60	73,900	833	23,080	13,609	7,153
Sep.	18,466	24,343	1,163	0.30	66,860	637	4,880	3,561	1,798
Oct.	19,411	11,052	994	0.50	74,225	654	0	0	0
Nov.	17,694	5,587	582	1.39	85,750	128	0	0	0
Dec.	20,992	5,810	371	0.45	100,561	338	0	0	0
<b>TOTAL</b>	<b>251,935</b>	<b>237,590</b>	<b>14,433</b>	<b>21.99</b>	<b>--</b>	<b>6,623</b>	<b>72,780</b>	<b>43,770</b>	<b>22,944</b>

NOTE - Acres irrigated 2005: Mirdan Canal - 33,211 acres.

## NORTH LOUP DIVISION (Continued)

## DAVIS CREEK RESERVOIR

## BELOW DAVIS CREEK

Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Mo. Content (AF)	FULLERTON CANAL	
						Release To Canal (AF)	Delivered To Farms (AF)
Jan.	5	165	48	0.10	9,137	0	0
Feb.	30	133	59	0.76	8,975	0	0
Mar.	75	179	104	1.82	8,767	0	0
Apr.	6,690	716	200	1.61	14,541	0	0
May	14,649	2,878	316	4.71	25,996	1,370	3
June	10,578	4,822	515	8.58	31,237	3,490	194
July	6,970	18,359	565	0.88	19,283	17,320	15,039
Aug.	7,956	14,198	276	2.78	12,765	14,190	9,929
Sep.	1,169	3,782	225	0.24	9,927	3,730	1,188
Oct.	43	252	146	1.00	9,572	0	0
Nov.	46	190	78	1.08	9,350	0	0
Dec.	15	125	44	0.35	9,196	0	0
<b>TOTAL</b>	<b>48,226</b>	<b>45,799</b>	<b>2,576</b>	<b>23.91</b>	<b>--</b>	<b>40,100</b>	<b>26,353</b>

NOTE - Acres irrigated 2005: Fullerton Canal - 21,430 acres.

TABLE 2  
SUMMARY OF 2005 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.	562	307	104	0.31	13,905	0
Feb.	601	278	134	0.16	14,094	0
Mar.	599	307	185	0.67	14,201	0
Apr.	907	298	426	1.43	14,384	0
May	902	397	633	2.64	14,256	89
June	1,612	298	824	3.92	14,746	0
July	274	307	983	1.34	13,730	0
Aug.	444	307	687	2.47	13,180	0
Sep.	264	298	605	0.01	12,541	0
Oct.	497	307	245	4.53	12,486	0
Nov.	252	298	197	0.57	12,243	0
Dec.	439	307	110	0.18	12,265	0
TOTAL	7,353	3,709	5,133	18.23	--	89

TABLE 2  
SUMMARY OF 2005 OPERATIONS

FRENCHMAN-CAMBRIDGE DIVISION  
FRENCHMAN UNIT

ENDERS RESERVOIR					End of CULBERTSON CANAL			CULBERTSON EXT. CANAL	
Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	Month Content (AF)	Diversions To Canal (AF)	Delivered To Farms (AF)	Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	452	184	54	0.46	11,846	0	0	0	0
Feb.	378	167	69	0.11	11,988	0	0	0	0
Mar.	526	184	110	2.37	12,220	149	0	0	0
Apr.	569	179	208	2.46	12,402	1,250	0	0	0
May	766	155	296	5.29	12,717	1,696	0	0	0
June	723	179	343	3.95	12,918	1,527	3	0	0
July	0	184	506	1.03	12,228	1,288	224	0	0
Aug.	83	184	311	2.05	11,816	652	220	0	0
Sep.	0	179	362	0.05	11,275	0	0	0	0
Oct.	370	184	136	2.84	11,325	0	0	0	0
Nov.	355	179	118	0.24	11,383	0	0	0	0
Dec.	427	184	60	0.18	11,566	0	0	0	0
<b>TOTAL</b>	<b>4,649</b>	<b>2,142</b>	<b>2,573</b>	<b>21.03</b>	<b>-</b>	<b>6,562</b>	<b>447</b>	<b>0</b>	<b>0</b>

NOTE: Acres irrigated 2005: Culbertson Canal - 1,482 acres; Culbertson Extension Canal - 0 acres.

FRENCHMAN-CAMBRIDGE DIVISION (Continued)  
MEEKER-DRIFTWOOD UNIT  
SWANSON LAKE

SWANSON LAKE					End of MEEKER-DRIFTWOOD			BARTLEY CANAL	
Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	Month Content (AF)	Release To Canal (AF)	Delivered To Farms (AF)	Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	1,911	61	171	0.35	32,168	0	0	0	0
Feb.	2,524	56	228	0.11	34,408	0	0	0	0
Mar.	3,081	61	379	2.77	37,049	0	0	0	0
Apr.	2,367	60	746	0.94	38,610	0	0	0	0
May	1,653	61	1,180	2.69	39,022	0	0	0	0
June	2,212	60	1,404	3.02	39,770	0	0	0	0
July	654	61	1,916	1.58	38,447	0	0	0	0
Aug.	373	61	1,391	4.66	37,368	0	0	0	0
Sep.	0	60	1,597	0.92	35,711	0	0	0	0
Oct.	335	61	584	2.77	35,401	0	0	0	0
Nov.	105	60	429	0.63	35,017	0	0	0	0
Dec.	327	61	215	0.22	35,068	0	0	0	0
<b>TOTAL</b>	<b>15,542</b>	<b>723</b>	<b>10,240</b>	<b>20.66</b>	<b>--</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

NOTE: Acres irrigated 2005: Meeker-Driftwood Canal - 0 acres; Bartley Canal - 0 acres.

FRENCHMAN-CAMBRIDGE DIVISION (Continued)  
RED WILLOW UNIT  
HUGH BUTLER LAKE

HUGH BUTLER LAKE					End of RED WILLOW CANAL		
Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	Month Content (AF)	Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	763	246	72	0.42	18,832	0	0
Feb.	687	222	90	0.12	19,207	0	0
Mar.	1,083	246	155	3.51	19,889	0	0
Apr.	1,022	238	374	0.99	20,299	0	0
May	1,028	246	552	1.87	20,529	0	0
June	1,762	238	613	5.33	21,440	0	0
July	63	246	809	1.10	20,448	0	0
Aug.	666	246	615	4.94	20,253	0	0
Sep.	84	238	514	0.88	19,585	0	0
Oct.	624	246	277	2.43	19,686	0	0
Nov.	555	238	181	0.33	19,822	0	0
Dec.	753	246	87	0.23	20,242	0	0
<b>TOTAL</b>	<b>9,090</b>	<b>2,896</b>	<b>4,339</b>	<b>22.15</b>	<b>-</b>	<b>0</b>	<b>0</b>

NOTE -- Acres irrigated 2005: Red Willow Canal - 0 acres.

FRENCHMAN-CAMBRIDGE DIVISION (Continued)  
CAMBRIDGE UNIT  
HARRY STRUNK LAKE

HARRY STRUNK LAKE					End of CAMBRIDGE CANAL		
Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	Month Content (AF)	Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	2,612	61	81	0.60	23,647	0	0
Feb.	2,385	56	106	0.38	25,870	0	0
Mar.	2,527	61	193	3.24	28,143	0	0
Apr.	2,757	60	486	1.03	30,354	0	0
May	3,695	61	767	1.56	33,221	0	0
June	5,163	1,343	985	4.66	36,056	1,855	116
July	1,101	10,098	1,107	0.76	25,952	10,452	5,816
Aug.	2,672	7,694	618	6.45	20,312	7,425	3,826
Sep.	1,325	107	520	0.70	21,010	0	0
Oct.	2,021	71	308	1.74	22,652	0	0
Nov.	2,082	60	203	0.81	24,471	0	0
Dec.	2,521	61	98	0.39	26,833	0	0
<b>TOTAL</b>	<b>30,861</b>	<b>19,733</b>	<b>5,472</b>	<b>22.32</b>	<b>--</b>	<b>19,732</b>	<b>9,758</b>

NOTE - Acres irrigated 2005: Cambridge Canal - 15,945 acres.

TABLE 2  
SUMMARY OF 2005 OPERATIONS

KANASKA DIVISION  
ALMENA UNIT  
KEITH SEBELIUS LAKE

Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	Release To City Of Norton (AF)	ALMENA CANAL	
							Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	248	58	56	0.88	8,381	27	0	0
Feb.	326	44	71	0.69	8,592	16	0	0
Mar.	444	48	122	2.59	8,866	18	0	0
Apr.	720	57	285	4.37	9,244	28	0	0
May	549	81	477	2.91	9,235	50	0	0
June	422	78	556	2.45	9,023	48	0	0
July	345	90	729	4.11	8,549	60	0	0
Aug.	396	77	479	4.04	8,389	46	0	0
Sep.	415	73	442	1.74	8,289	43	0	0
Oct.	253	65	288	2.34	8,189	34	0	0
Nov.	171	53	134	1.33	8,173	23	0	0
Dec.	266	50	67	0.24	8,322	19	0	0
<b>TOTAL</b>	<b>4,555</b>	<b>774</b>	<b>3,706</b>	<b>27.69</b>	<b>-</b>	<b>412</b>	<b>0</b>	<b>0</b>

NOTE: Acres irrigated 2005: Almena Canal - 0 acres.

BOSTWICK DIVISION  
FRANKLIN UNIT

HARLAN COUNTY LAKE

Month	Data from Corps of Engineers				End of Month Content (AF)	FRANKLIN CANAL		NAPONEE CANAL	
	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)		Release To Canal (AF)	Delivered To Farms (AF)	Release To Canal (AF)	Delivered To Farms (AF)
Jan.	992	0	446	0.76	107,599	0	0	0	0
Feb.	5,474	0	524	0.85	112,554	0	0	0	0
Mar.	7,002	0	772	2.36	118,779	0	0	0	0
Apr.	11,673	0	1,789	1.67	128,666	0	0	0	0
May	6,040	0	2,952	2.03	131,754	0	0	0	0
June	13,250	0	3,888	5.75	141,112	0	0	0	0
July	2,013	0	5,408	2.81	137,717	0	0	0	0
Aug.	4,076	0	4,821	3.15	136,971	0	0	0	0
Sep.	454	0	5,591	0.74	131,834	0	0	0	0
Oct.	1,694	0	3,831	1.46	129,695	0	0	0	0
Nov.	250	0	1,834	0.67	128,111	0	0	0	0
Dec.	764	0	764	0.26	128,111	0	0	0	0
<b>TOTAL</b>	<b>53,682</b>	<b>0</b>	<b>32,620</b>	<b>22.51</b>	<b>--</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

NOTE: Acres irrigated 2005: Franklin Canal - 0 acres; Naponee Canal - 0 acres.

BOSTWICK DIVISION (Continued)  
SUPERIOR-COURTLAND UNIT

COURTLAND CANAL - ABOVE LOVEWELL

Month	FRANKLIN PUMP CANAL		SUPERIOR CANAL		Total Diversion (AF)	NEBRASKA USE		KANSAS USE	
	Diverted To Canal (AF)	Delivered To Farms (AF)	Diverted To Canal (AF)	Delivered To Farms (AF)		Total (AF)	Delivered To Farms (AF)	Diversion To Canal (AF)	Delivered To Farms (AF)
Jan.	0	0	0	0	0	0	0	0	0
Feb.	0	0	0	0	0	0	0	0	0
Mar.	0	0	0	0	0	0	0	0	0
Apr.	0	0	0	0	0	0	0	0	0
May	0	0	0	0	0	0	0	0	0
June	0	0	2,160	493	0	0	0	541	373
July	0	0	1,982	795	0	0	0	1,221	125
Aug.	0	0	570	195	0	0	0	102	63
Sep.	0	0	0	0	0	0	0	0	0
Oct.	0	0	0	0	0	0	0	0	0
Nov.	0	0	0	0	0	0	0	0	0
Dec.	0	0	0	0	0	0	0	0	0
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>4,712</b>	<b>1,483</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1,864</b>	<b>561</b>

NOTE: Acres irrigated 2005: Franklin Pump Canal - 0 acres; Superior Canal - 2,800 acres; Courtland Canal-Nebraska use - 0 acres; Courtland Canal-Kansas use - 1,107 acres.

BOSTWICK DIVISION (Continued)

COURTLAND UNIT  
LOVEWELL RESERVOIR

Month	Est. Flow from White Rock Creek (AF)	Inflow from Courtland (AF)	Total Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	COURTLAND (Below)	
								Release To Canal (AF)	Delivered To Farms (AF)
Jan.	824	1,804	2,628	12	107	1.28	18,413	0	0
Feb.	1,314	3,430	4,744	11	153	1.22	22,993	0	0
Mar.	1,019	3,950	4,969	12	312	2.17	27,638	0	0
Apr.	1,668	5,677	7,345	18	1,035	2.65	33,930	0	0
May	688	3,749	4,437	25	1,347	0.85	36,995	0	0
June	1,005	4,164	5,169	3,687	1,512	3.69	36,965	4,310	1,394
July	3,500	0	3,500	14,595	1,527	4.91	24,343	14,572	7,353
Aug.	2,855	1,562	4,417	7,059	898	7.40	20,803	7,034	3,293
Sep.	293	913	1,206	18	930	1.25	21,061	0	0
Oct.	628	884	1,512	12	558	1.89	22,003	0	0
Nov.	504	1,512	2,016	12	345	0.57	23,662	0	0
Dec.	728	1,620	2,348	12	162	0.19	25,836	0	0
<b>TOTAL</b>	<b>15,026</b>	<b>29,265</b>	<b>44,291</b>	<b>25,473</b>	<b>8,886</b>	<b>28.07</b>	<b>-</b>	<b>25,916</b>	<b>12,040</b>

NOTE: Acres irrigated 2005: Courtland Canal below Lovewell - 23,439 acres.

TABLE 2  
SUMMARY OF 2005 OPERATIONS

SOLOMON DIVISION  
KIMAAN UNIT

Month	KIRVVIN RESERVOIR				KIRVVIN CANAL		
	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	Release To Canal (AF)	Delivered To Farms (AF)
Jan.	230	0	84	0.89	14,560	0	0
Feb.	489	0	114	1.09	14,935	0	0
Mar.	670	0	191	2.94	15,414	0	0
Apr.	2,315	0	486	4.20	17,243	0	0
May	826	0	708	2.70	17,361	0	0
June	1,624	0	844	4.48	18,141	0	0
July	677	0	994	4.94	17,824	0	0
Aug.	1,889	0	710	7.35	19,003	0	0
Sep.	605	0	699	1.86	18,909	0	0
Oct.	344	0	406	2.04	18,847	0	0
Nov.	340	0	247	0.87	18,940	0	0
Dec.	431	0	119	0.25	19,252	0	0
<b>TOTAL</b>	<b>10,440</b>	<b>0</b>	<b>5,602</b>	<b>33.61</b>	<b>-</b>	<b>0</b>	<b>0</b>

NOTE: Acres irrigated 2005: Kirwin Canal - 0 acres.

SOLOMON DIVISION (Continued)  
WEBSTER UNIT

Month	WEBSTER RESERVOIR				OSBORNE CANAL		
	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	225	0	91	1.03	10,287	0	0
Feb.	247	0	112	0.76	10,422	0	0
Mar.	375	0	199	1.43	10,598	0	0
Apr.	1,892	0	528	1.28	11,962	0	0
May	633	0	747	2.12	11,848	0	0
June	1,039	0	854	5.10	12,033	0	0
July	108	0	1,077	2.69	11,064	0	0
Aug.	828	0	745	6.52	11,147	0	0
Sep.	0	0	725	1.63	10,422	0	0
Oct.	238	0	386	2.66	10,274	0	0
Nov.	192	0	219	1.47	10,247	0	0
Dec.	190	0	110	0.25	10,327	0	0
<b>TOTAL</b>	<b>5,967</b>	<b>0</b>	<b>5,793</b>	<b>26.94</b>	<b>-</b>	<b>0</b>	<b>0</b>

NOTE: Acres irrigated 2005: Osborne Canal - 0 acres.

SOLOMON DIVISION (Continued)  
GLEN ELDER UNIT

Month	WACONDA LAKE				OUTFLOW TO RIVER					
	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	City of Beloit Storage Release (AF)	Quality Bypass (AF)	Irrig. District Storage Release (AF)	Other Controlled Releases (AF)	Release To Mitchell Co. RWD No. 2 (AF)
Jan.	2,160	979	585	1.10	160,397	0	923	0	0	56
Feb.	4,059	886	771	1.90	162,799	0	833	0	0	53
Mar.	2,782	985	1,394	1.68	163,202	0	922	0	0	63
Apr.	9,302	950	3,137	2.91	168,417	0	893	0	0	57
May	3,278	1,575	5,601	1.35	164,519	0	573	393	549	60
June	17,403	2,426	6,999	3.55	172,497	69	417	12	1,867	61
July	13,141	4,842	7,664	6.20	173,132	97	49	2,676	1,945	75
Aug.	6,433	3,118	5,108	2.96	171,339	20	401	70	2,566	61
Sep.	501	947	5,151	1.69	165,742	81	812	0	0	54
Oct.	2,142	1,273	3,207	2.32	163,404	262	499	405	54	53
Nov.	616	943	1,583	1.38	161,494	111	781	0	0	51
Dec.	1,807	983	724	0.34	161,594	0	922	0	0	61
<b>TOTAL</b>	<b>63,624</b>	<b>19,907</b>	<b>41,924</b>	<b>27.38</b>	<b>--</b>	<b>640</b>	<b>8,025</b>	<b>3,556</b>	<b>6,981</b>	<b>705</b>

NOTE: Acres irrigated 2005: Glen Elder District - 6,509 acres.

SMOKY HILL DIVISION  
ELLIS UNIT

Month	CEDAR BLUFF RESERVOIR				End of Month Content (AF)	Release to City of Russell (AF)	Release To Fish Hatchery (AF)
	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)			
Jan.	415	0	415	0.87	117,211	0	0
Feb.	1,083	0	505	1.69	117,789	0	0
Mar.	360	0	833	1.17	117,316	0	0
Apr.	668	0	1,868	1.09	116,116	0	0
May	926	0	2,629	2.05	114,413	0	0
June	1,678	3	3,357	3.09	112,731	0	3
July	1,152	1	4,156	2.80	109,726	0	1
Aug.	1,456	0	2,785	2.37	108,397	0	0
Sep.	0	0	2,950	1.20	105,447	0	0
Oct.	396	0	1,489	2.29	104,354	0	0
Nov.	0	0	1,224	0.65	103,130	0	0
Dec.	0	1,405	544	0.24	101,181	1405	0
<b>TOTAL</b>	<b>8,134</b>	<b>1,409</b>	<b>22,755</b>	<b>19.51</b>	<b>--</b>	<b>1,405</b>	<b>4</b>

TABLE 3  
ACRES IRRIGATED IN 2005

Irrigation District and Canal	Acres With Service Available	Acres Irrigated in 2005
Mirage Flats Irrigation District		
Mirage Flats Canal	11,662	11,092
Ainsworth Irrigation District		
Ainsworth Canal	34,539	34,158
Twin Loups Irrigation District		
Above Davis Creek	34,053	33,211
Below Davis Creek	20,851	21,430
Total Twin Loups Irrigation District	54,904	54,641
Frenchman Valley Irrigation District		
Culbertson Canal	9,295	1,482
H & RW Irrigation District		
Culbertson Extension Canal	11,695	0
Frenchman-Cambridge Irrigation District		
Meeker-Driftwood Canal	16,562	0
Red Willow Canal	4,877	0
Bartley Canal	6,435	0
Cambridge Canal	17,297	15,945
Total Frenchman-Cambridge Irrigation District	45,171	15,945
Almena Irrigation District		
Almena Canal	5,764	0
Bostwick Irrigation District in Nebraska		
Franklin Canal	11,262	0
Naponee Canal	1,628	0
Franklin Pump Canal	2,106	0
Superior Canal	5,972	2,800
Courtland Canal (Nebraska)	1,967	0
Total Bostwick Irrigation Dist. in Nebraska	22,935	2,800
Kansas-Bostwick Irrigation District		
Courtland Canal above Lovewell	13,378	1,107
Courtland Canal below Lovewell	29,122	23,439
Total Kansas-Bostwick Irrigation District	42,500	24,546
Kirwin Irrigation District		
Kirwin Canal	11,465	0
Webster Irrigation District		
Osborne Canal	8,537	0
Glen Elder Irrigation District	7,000	6,509
TOTAL PROJECT USES	265,467	151,173
Non-Project Uses		
Hale Ditch	700	0
TOTAL PROJECT AND NON-PROJECT	266,167	151,173



**TABLE 5****FLOOD DAMAGES PREVENTED BY NEBRASKA-KANSAS PROJECTS RESERVOIRS**

RESERVOIR	DURING FY 2005	PRIOR TO 2005	ACCUMULATED TOTAL
BONNY	\$91,000	\$2,689,000	\$2,780,000
ENDERS	\$0	\$3,281,000	\$3,281,000
SWANSON	\$91,000	\$19,066,000	\$19,157,000
HUGH BUTLER	\$91,000	\$2,574,000	\$2,665,000
HARRY STRUNK	\$98,000	\$4,924,000	\$5,022,000
KEITH SEBELIUS	\$0	\$3,958,000	\$3,958,000
HARLAN COUNTY	\$464,000	\$150,090,000	\$150,554,000
LOVEWELL	\$0	\$146,608,000	\$146,608,000
KIRWIN	\$11,000	\$86,859,000	\$86,870,000
WEBSTER	\$0	\$110,313,000	\$110,313,000
WACONDA	\$259,000	\$1,213,195,000	\$1,213,454,000
CEDAR BLUFF	\$0	\$128,890,000	\$128,890,000
<b>TOTAL</b>	<b>\$1,105,000</b>	<b>\$1,872,447,000</b>	<b>\$1,873,552,000</b>

Estimates of damages prevented are received from the Army Corps of Engineer's Kansas City District Office. The Accumulated Totals date from 1951 through 2005. Cumulative totals are revised by the Corps of Engineers in some cases to reflect data not previously included in the reporting and may not match previous cumulative totals,

Construction Cost of storage dams was \$208,954,130.

The reservoirs upstream of Harlan County Lake did not receive benefits for damages prevented from 1972 to 1993.

TABLE 6  
WATER DIVERTED IN 2005  
(Units - Acre-Feet)

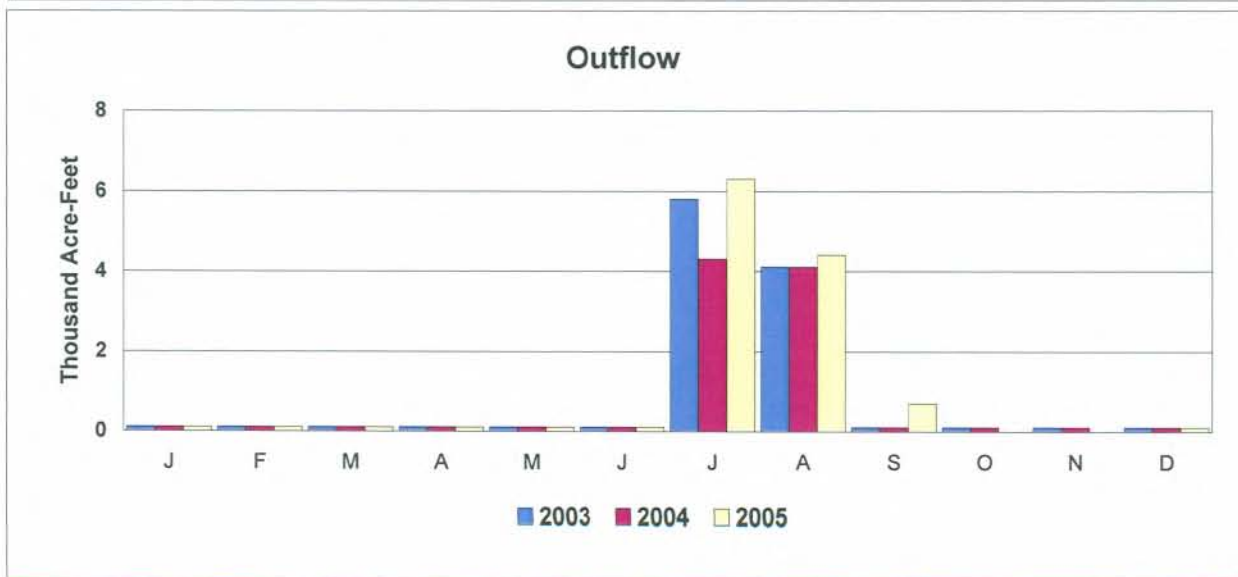
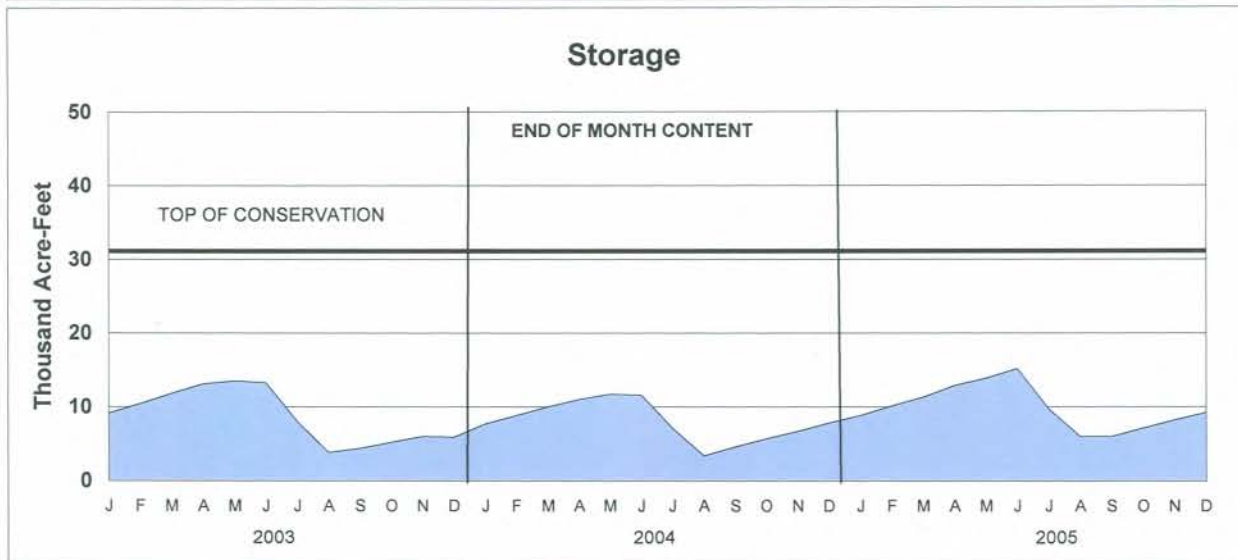
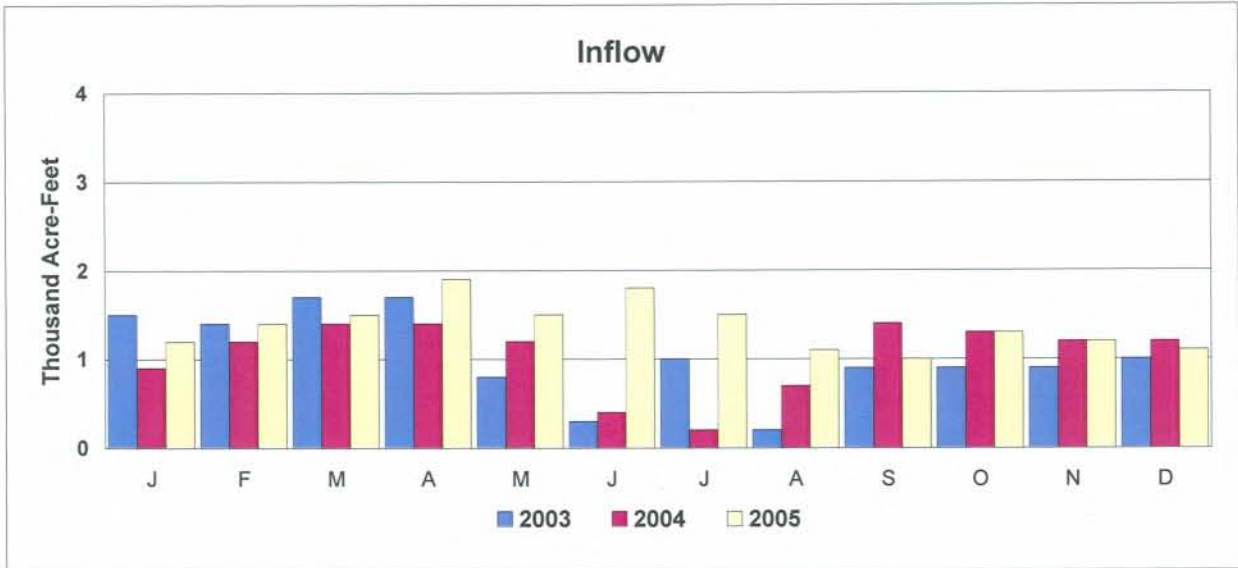
Irrigation District and Canal	2005 Irrigation Operations		10-Year Average Diversion (1995-2004)	2005 Diversion
	From	To		
Mirage Flats Irrigation District				
Mirage Flats Canal	7/10	9/9	12,516	10,617
Ainsworth Irrigation District				
Ainsworth Canal	5/15	9/17	74,501	71,713
Twin Loups Irrigation District				
Above Davis Creek	5/17	9/15	40,591	43,770
Below Davis Creek	5/17	9/15	37,599	40,100
Total Twin Loups Irrigation District			78,190	83,870
Frenchman Valley Irrigation District				
Culbertson Canal	3/29	8/24	8,961	6,562
H & RW Irrigation District				
Culbertson Extension Canal	Did not run.		7,942	0
Frenchman-Cambridge Irrigation District				
Meeker-Driftwood Canal	Did not run.		20,317	0
Red Willow Canal	Did not run.		5,376	0
Bartley Canal	Did not run.		6,168	0
Cambridge Canal	6/20	8/31	23,203	19,732
Total Frenchman-Cambridge Irrigation District			55,064	19,732
Almena Irrigation District				
Almena Canal	Did not run.		4,605	0
Bostwick Irrigation District in Nebraska				
Franklin Canal	Did not run.		26,707	0
Naponee Canal	Did not run.		2,423	0
Franklin Pump Canal	Did not run.		2,712	0
Superior Canal	6/6	8/19	12,829	4,712
Courtland Canal (Nebraska)	Did not run.		1,898	0
Total Bostwick Irrigation District in Nebraska			46,569	4,712
Kansas-Bostwick Irrigation District				
Courtland Canal above Lovewell	6/1	8/15	24,361	1,864
Courtland Canal below Lovewell	6/20	8/23	46,282	25,916
Total Kansas-Bostwick Irrigation District			70,643	27,780
Kirwin Irrigation District				
Kirwin Canal	Did not run.		20,325	0
Webster Irrigation District				
Osborne Canal	Did not run.		13,422	0
Glen Elder Irrigation District	5/18	10/11	5,749	3,556
TOTAL			398,487	228,542

**TABLE 7**  
**NEBRASKA-KANSAS PROJECTS**  
**Summary of Precipitation, Reservoir Storage and Inflows**  
**CALENDAR YEAR 2005**

Reservoir	Total	Percent Of	Storage	Storage	Gain or	Maximum	Storage	Minimum	Storage	Total
	Precip.	Average	12-31-04	12-31-05	Loss	Content	Date	Content	Date	
	Inches	%	AF	AF	AF	AF		AF		AF
Box Butte	17.78	104	7,768	9,167	1,399	15,179	JUN 29	5,270	SEP 3	16,464
Merritt	28.18	140	61,370	61,370	0	67,749	APR 24	35,051	SEP 9	178,277
Calamus	21.99	93	100,649	100,561	-88	123,495	MAR 30	66,625	SEP 28	251,935
Davis Creek	23.91	101	9,345	9,196	-149	31,462	JUN 26	8,813	APR 14	48,226
Bonny	18.23	106	13,754	12,265	-1,489	14,916	JUN 13	12,173	DEC 9	7,353
Enders	21.03	111	11,632	11,566	-66	12,981	JUN 22	11,174	OCT 9	4,649
Swanson	20.66	103	30,489	35,068	4,579	40,193	JUN 21	30,559	JAN 1	15,542
Hugh Butler	22.15	113	18,387	20,242	1,855	21,630	JUN 17	18,397	JAN 1	9,090
Harry Strunk	22.32	108	21,177	26,833	5,656	36,707	JUN 21	20,310	AUG 31	30,861
Keith Sebelius	27.69	112	8,247	8,322	75	9,342	JUN 13	8,091	NOV 22	4,555
Harlan County	22.51	98	107,050	128,111	21,061	141,360	JUN 26	106,981	JAN 3	53,682
Lovewell	28.07	103	15,904	25,836	9,932	41,060	JUN 20	15,994	JAN 1	44,291
Kirwin	33.61	143	14,414	19,252	4,838	19,252	DEC 31	14,307	JAN 2	10,440
Webster	26.94	114	10,153	10,327	174	12,405	JUN 17	18,060	NOV 25	5,967
Waconda	27.38	106	159,801	161,594	1,793	176,227	JUN 14	159,603	JAN 2	63,624
Cedar Bluff	19.51	92	117,211	101,181	-16,030	117,999	FEB 13	101,181	DEC 31	8,134

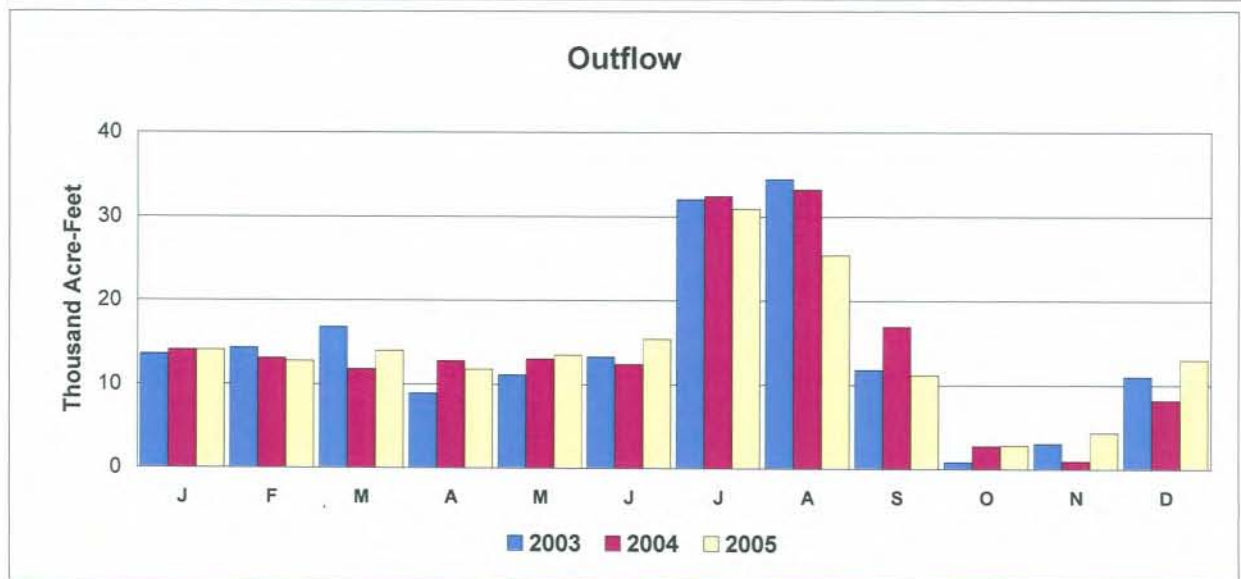
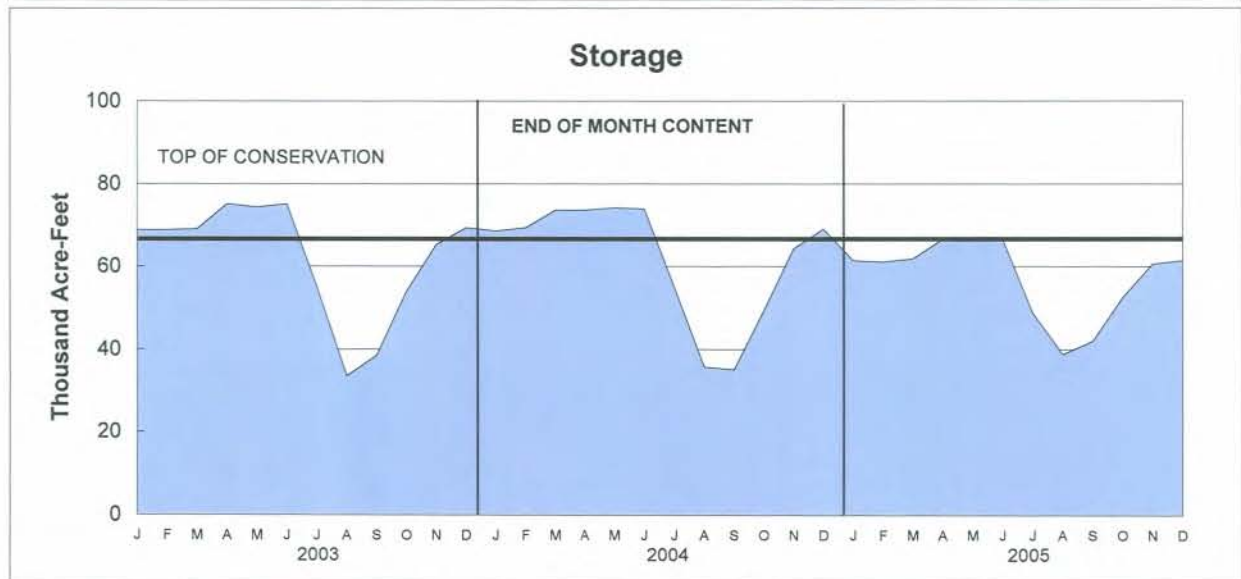
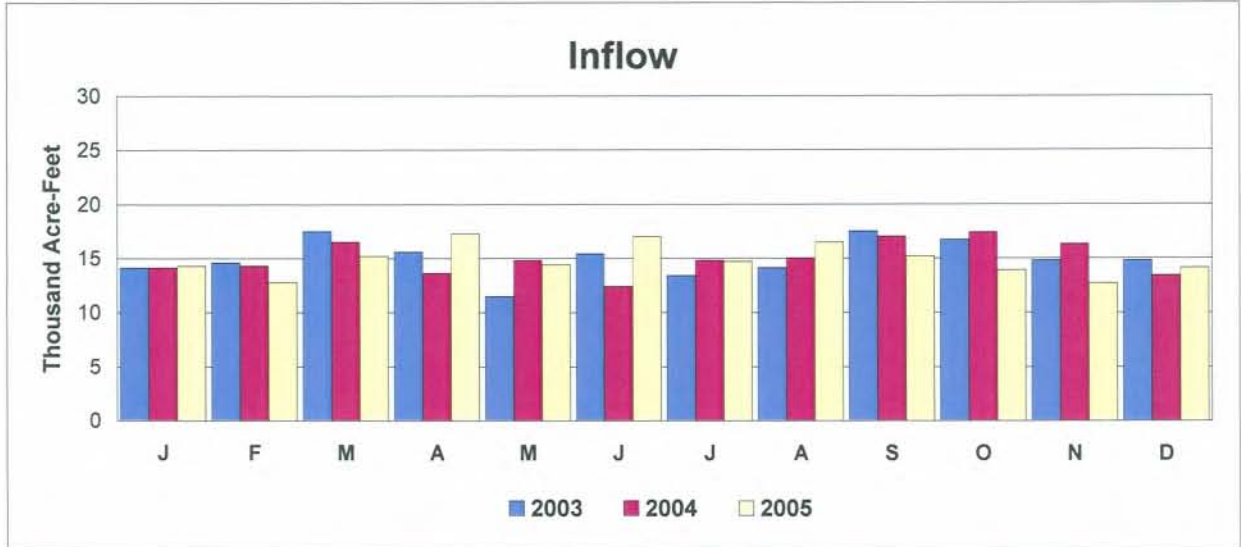
# BOX BUTTE RESERVOIR

## ACTUAL OPERATION



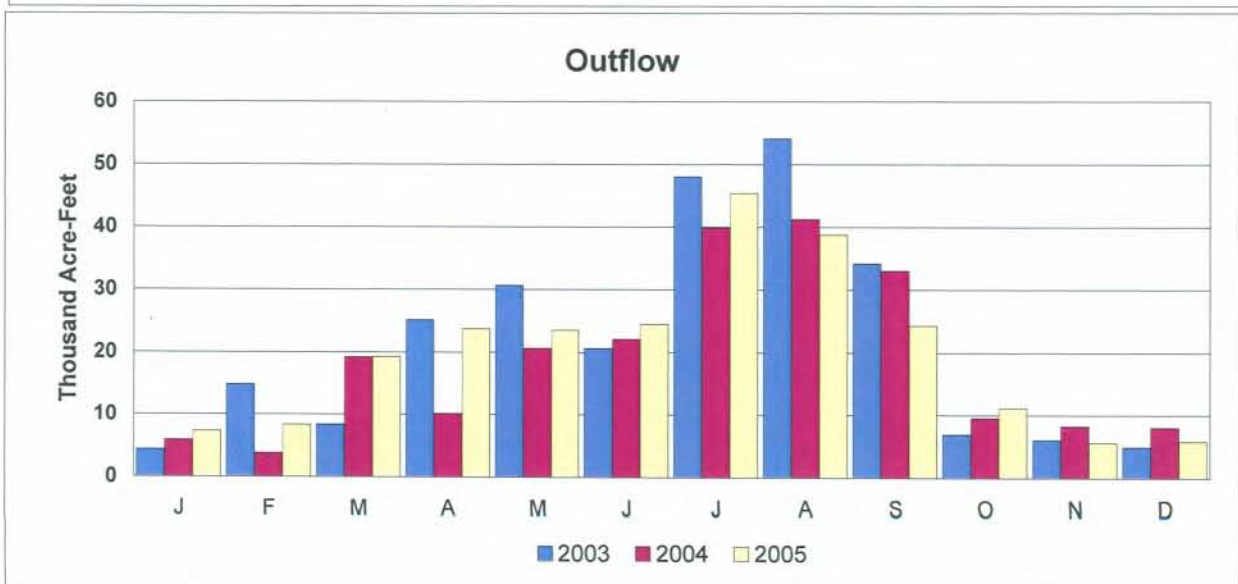
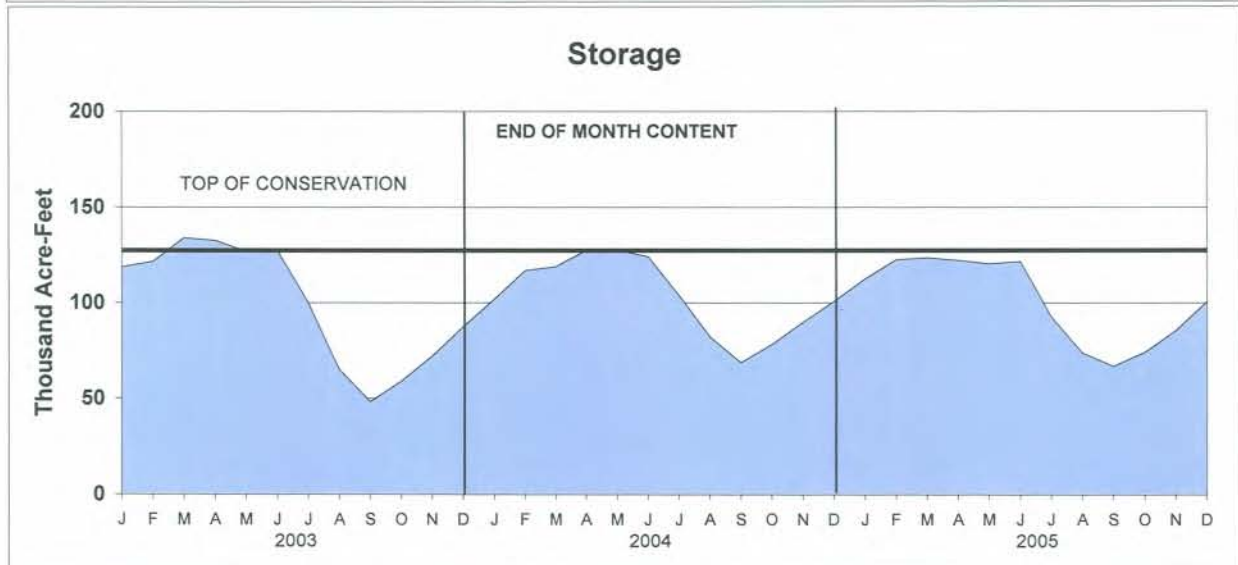
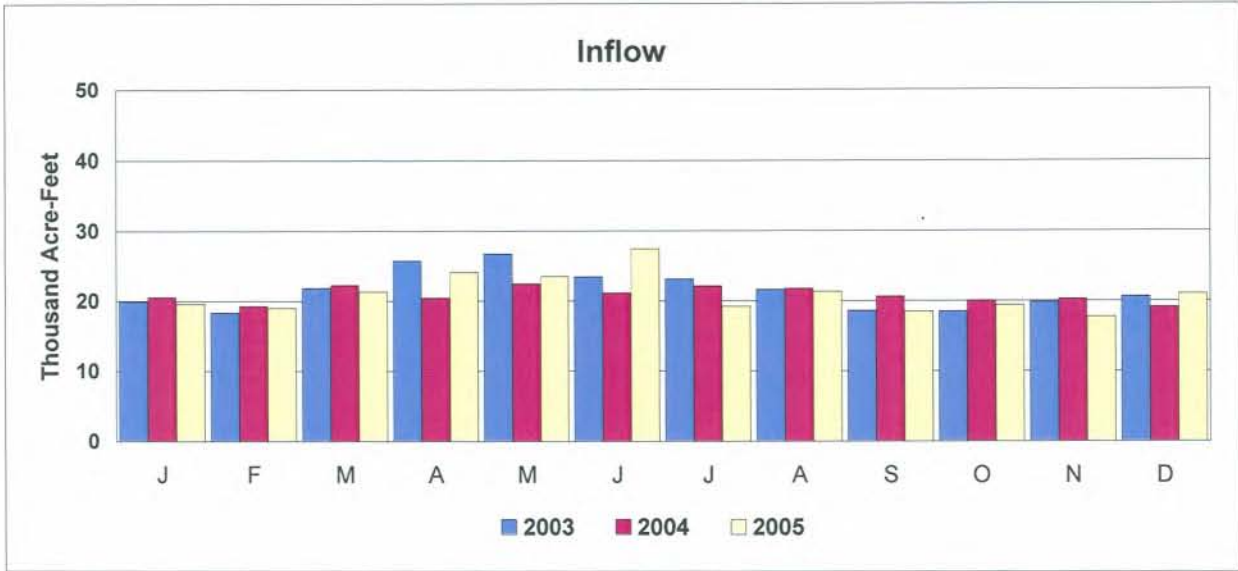
# MERRITT RESERVOIR

## ACTUAL OPERATION



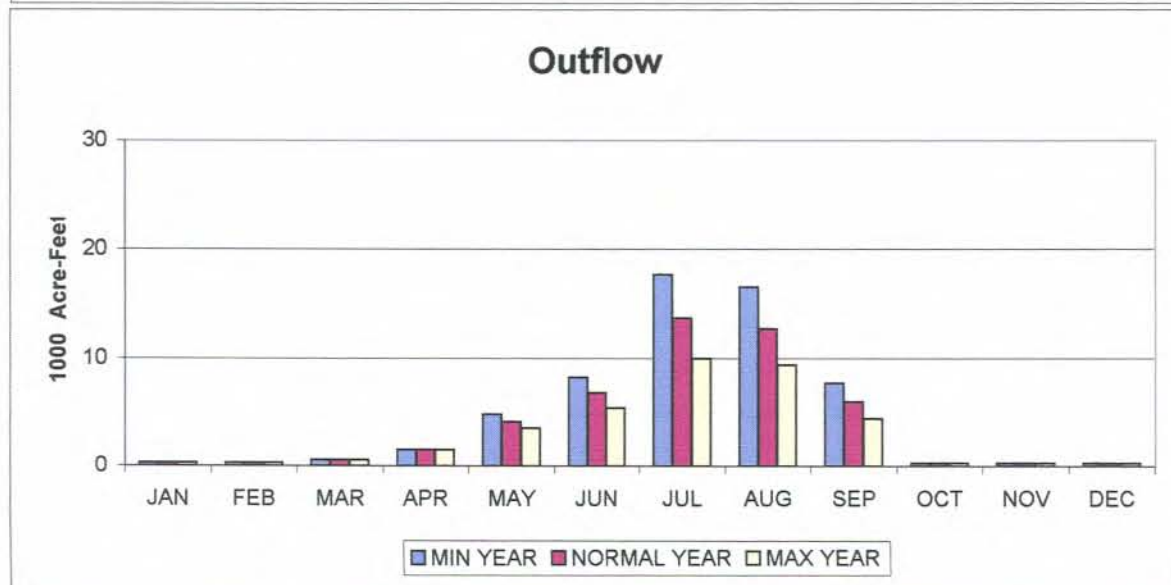
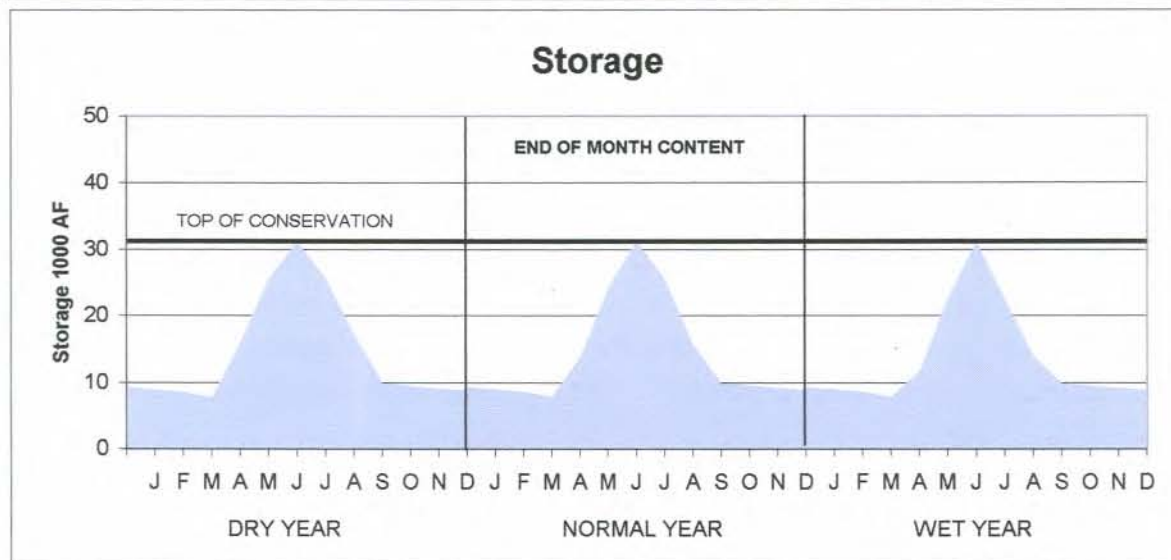
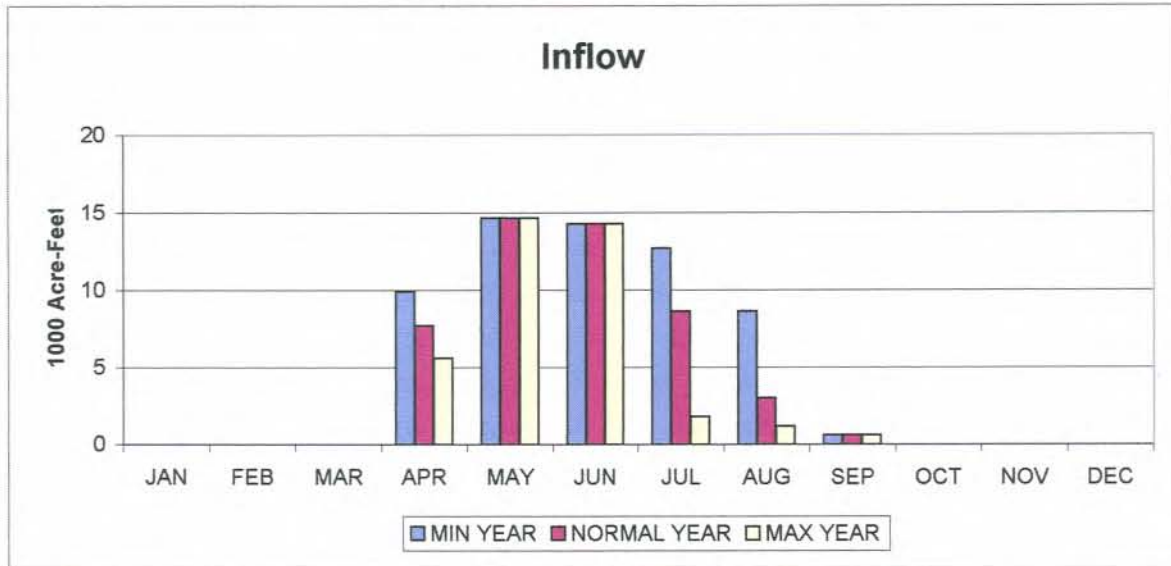
# CALAMUS RESERVOIR

## ACTUAL OPERATION



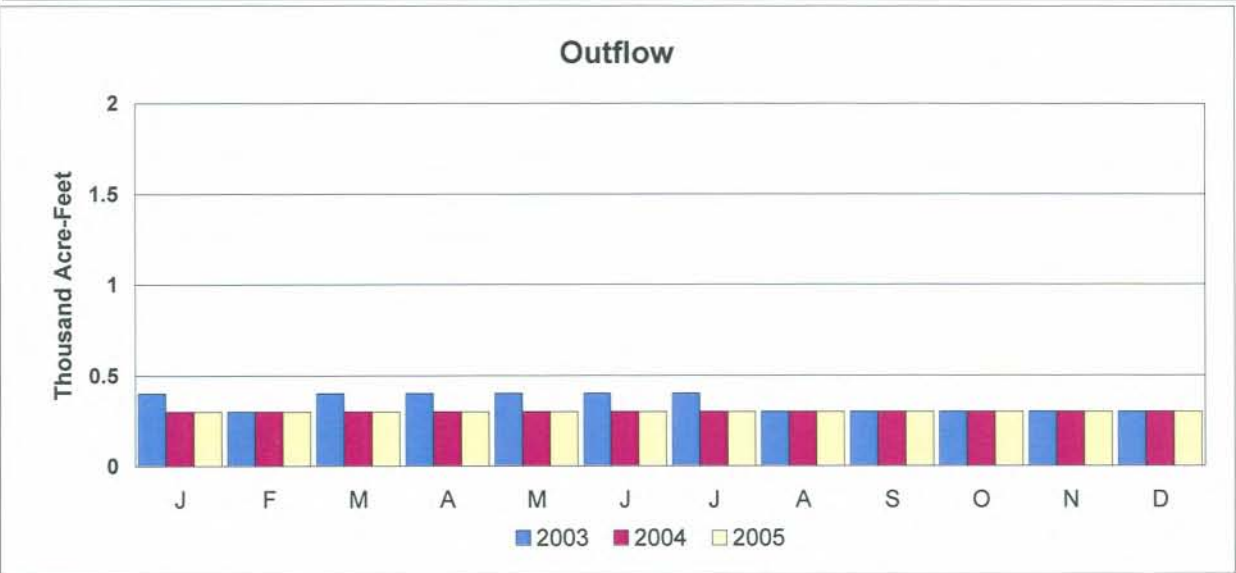
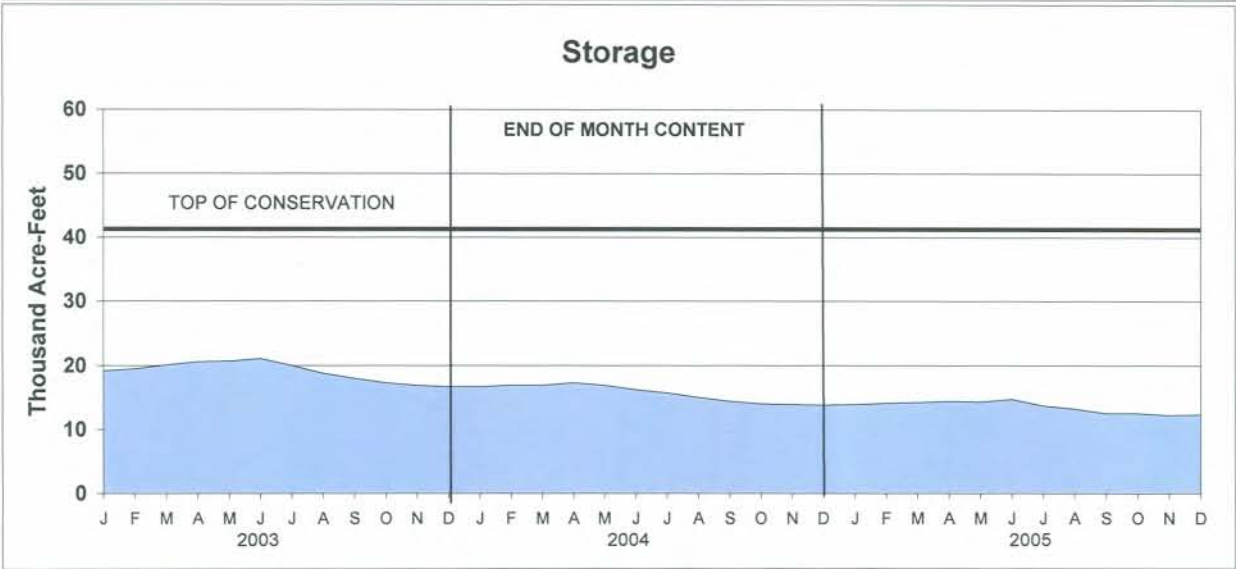
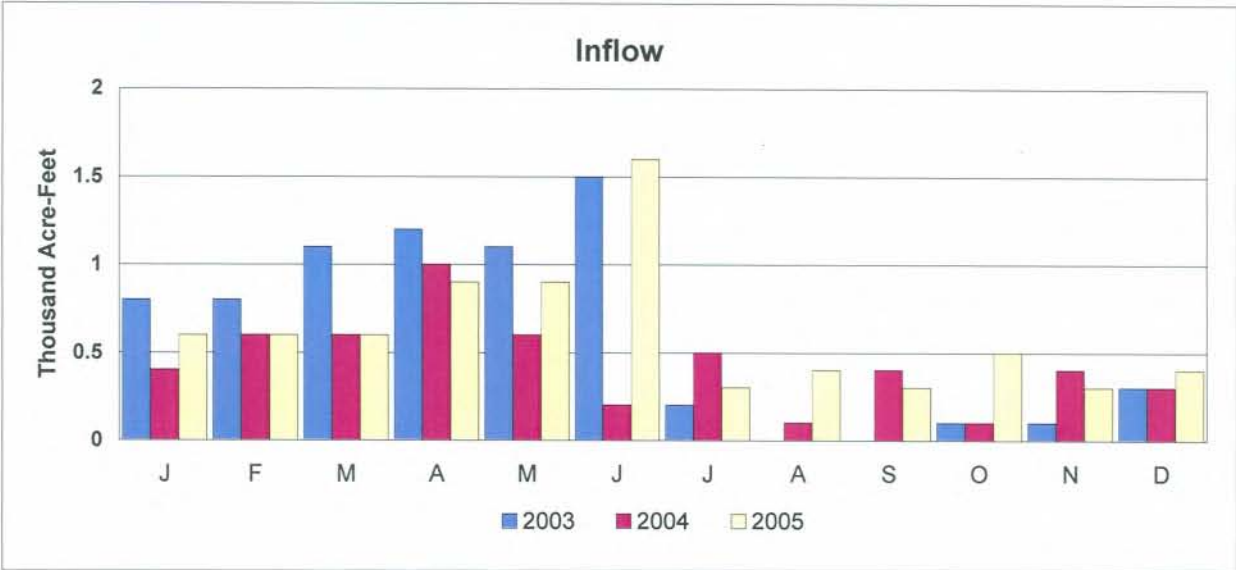
# DAVIS CREEK RESERVOIR

## 2005 OPERATION PLAN



# BONNY RESERVOIR

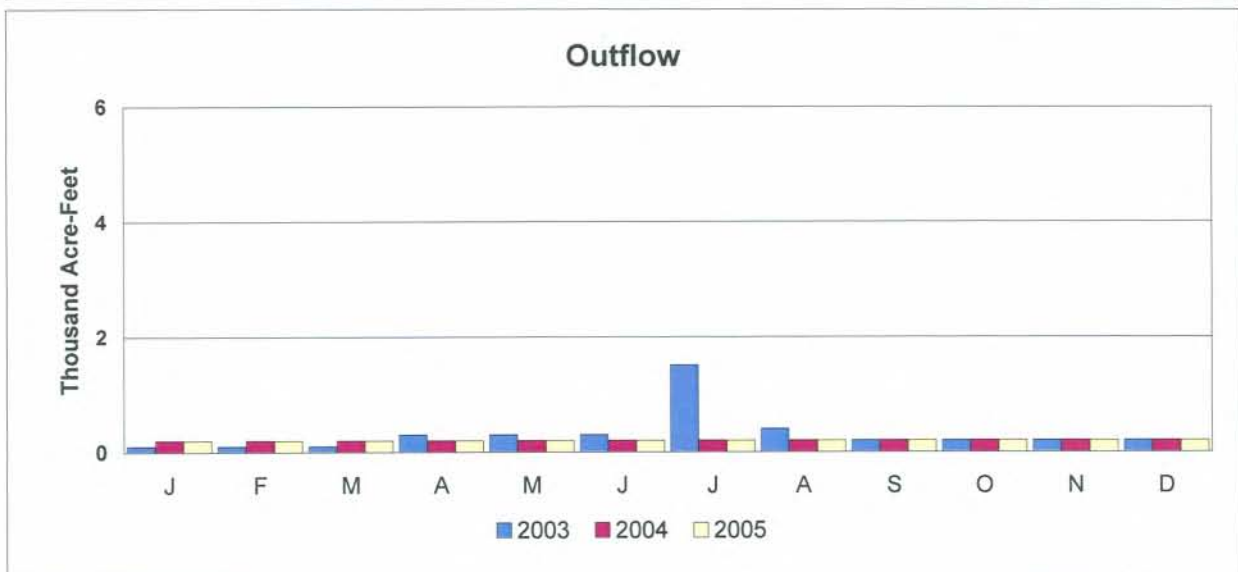
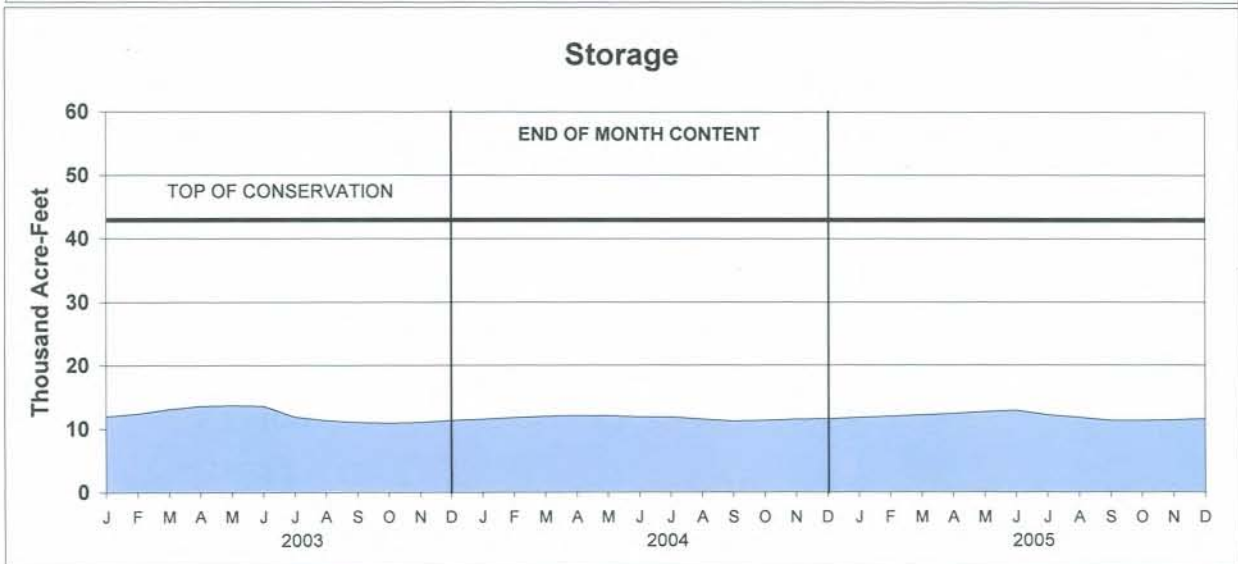
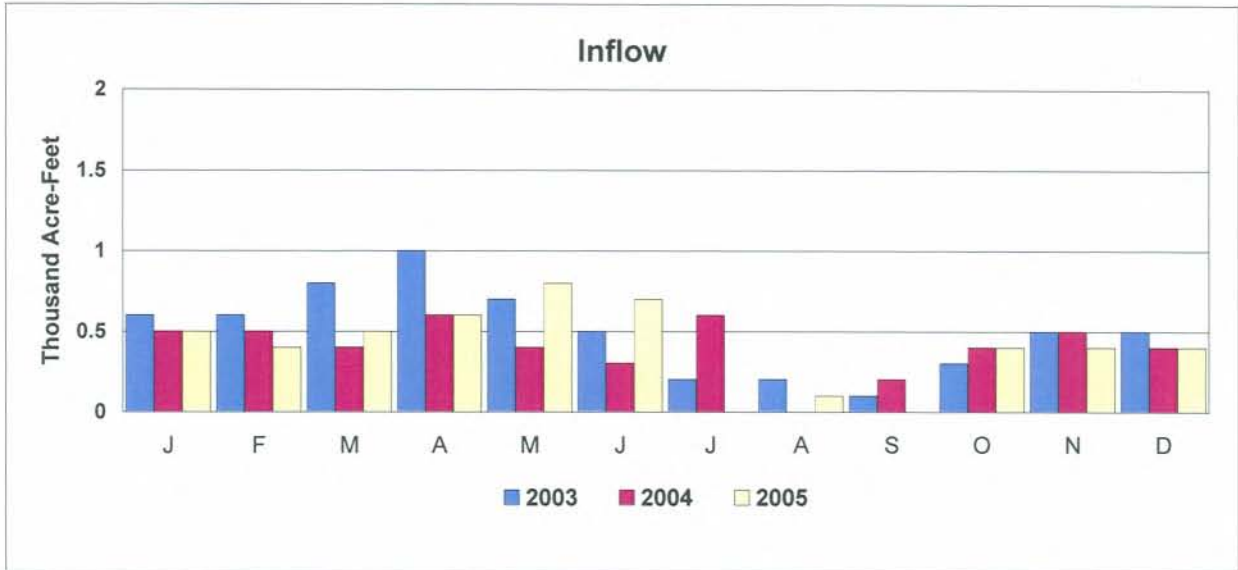
## ACTUAL OPERATION





# ENDERS RESERVOIR

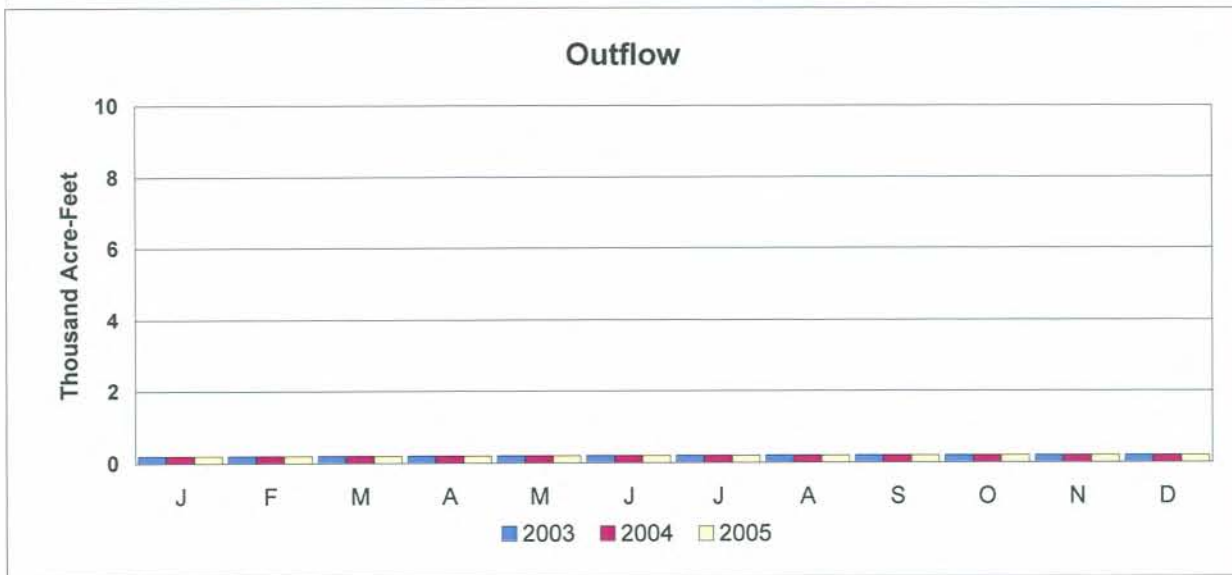
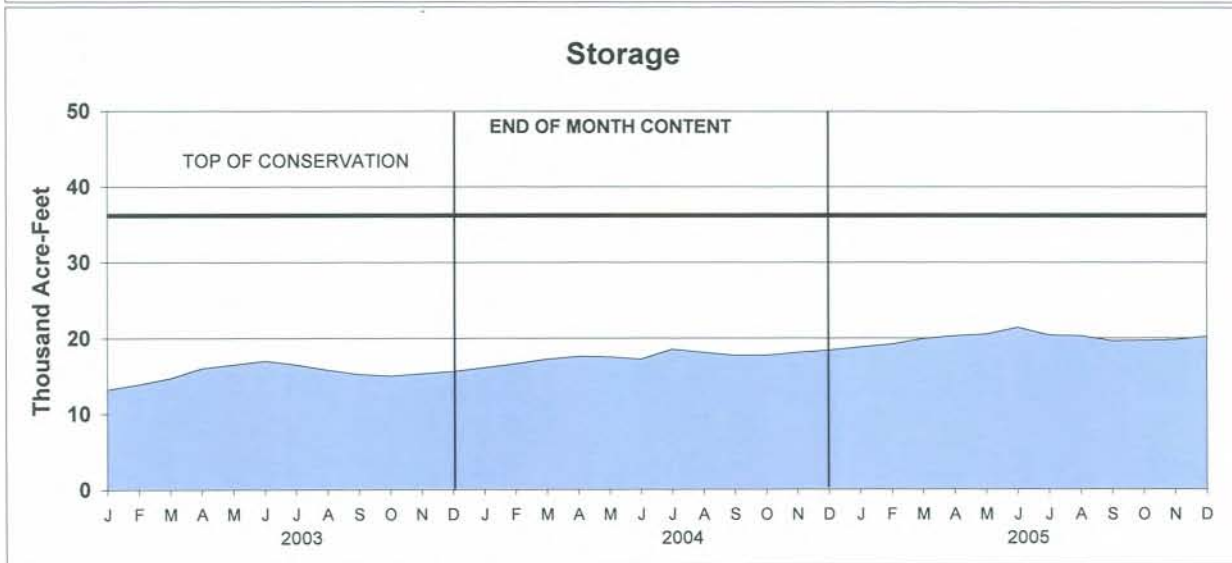
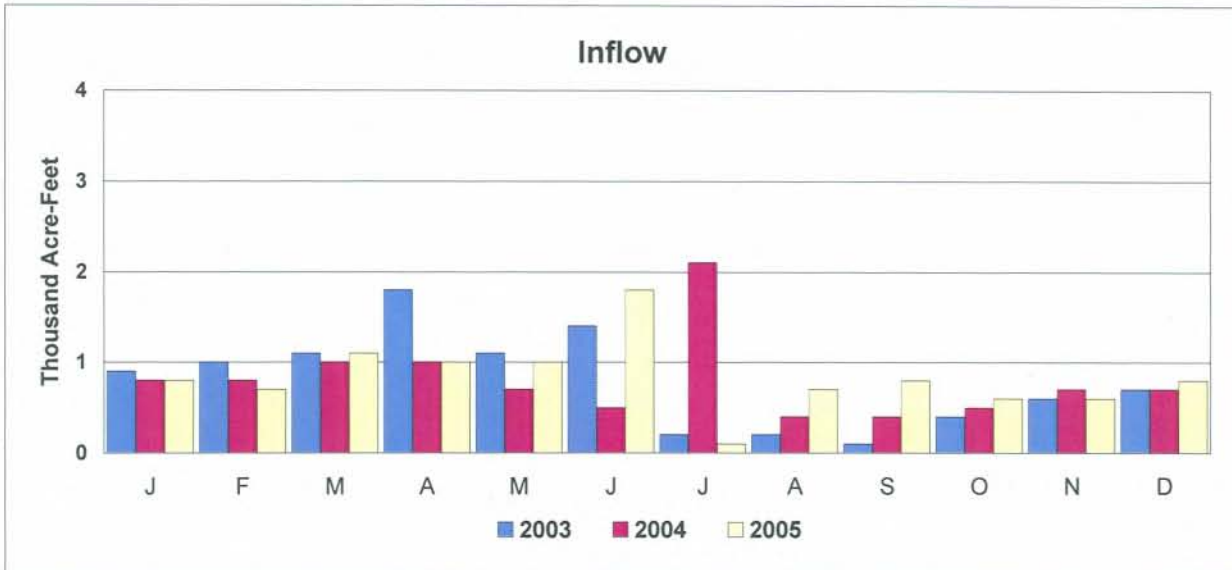
## ACTUAL OPERATION





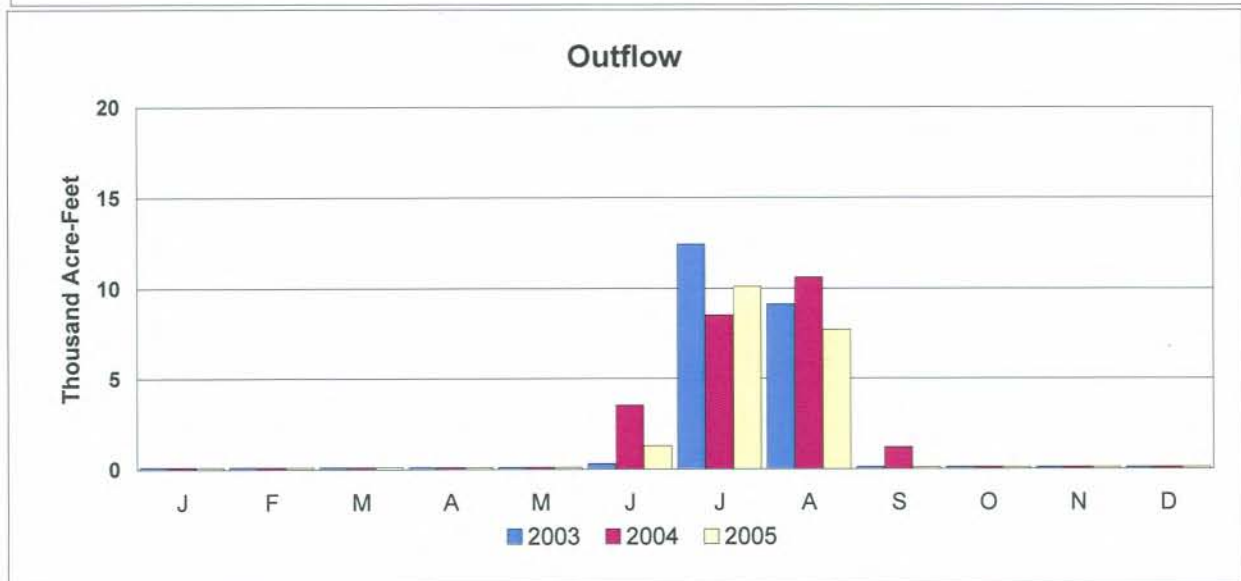
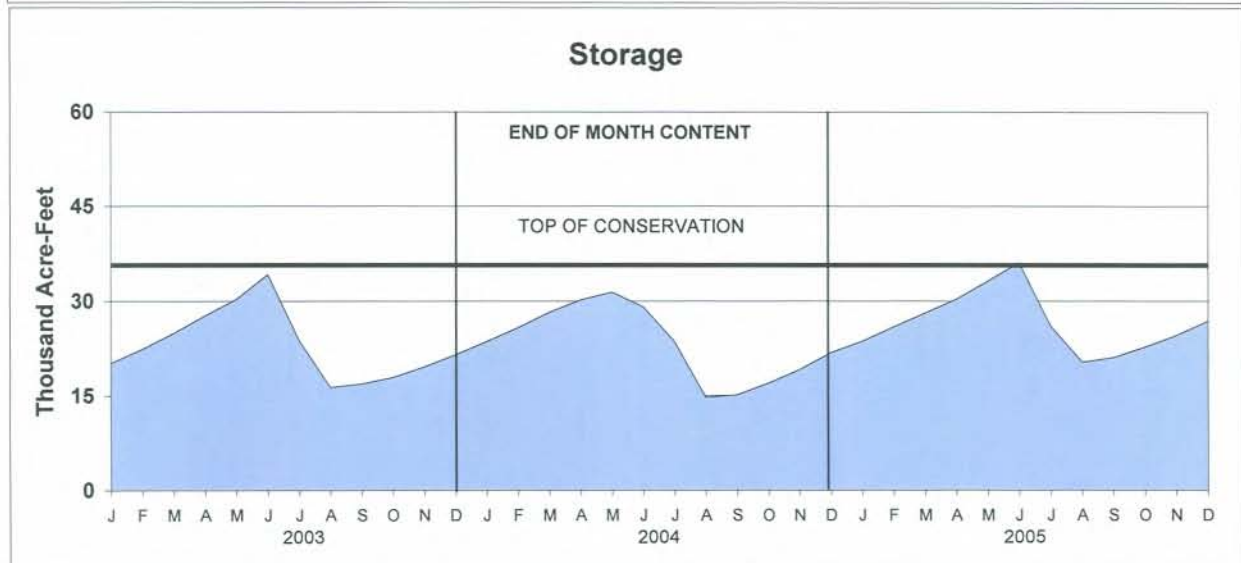
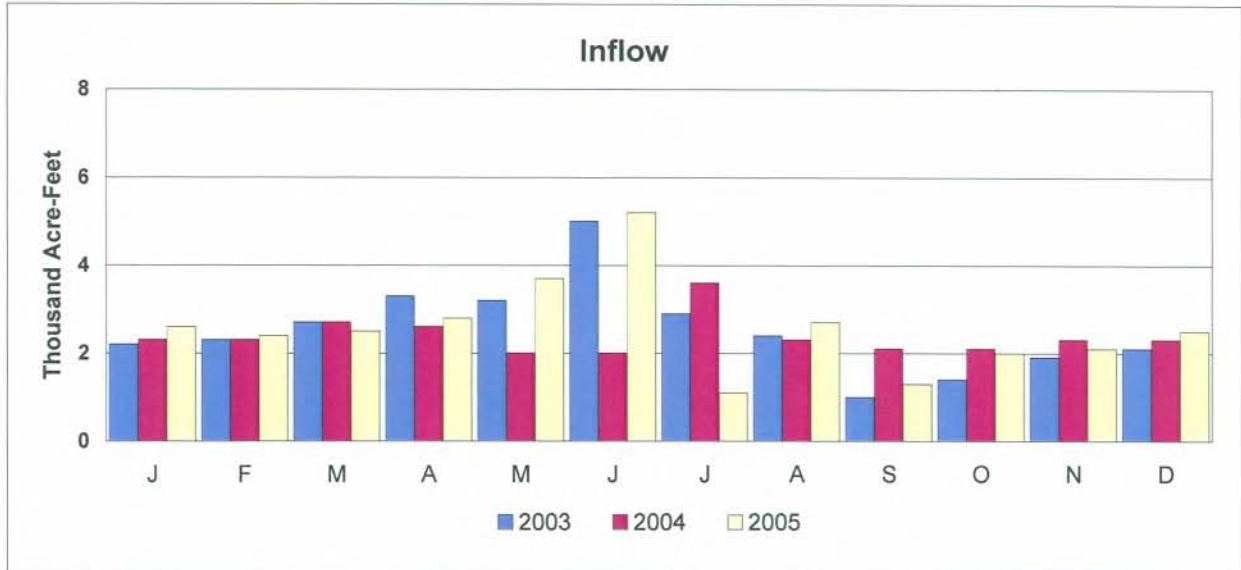
# HUGH BUTLER LAKE

## ACTUAL OPERATION



# HARRY STRUNK LAKE

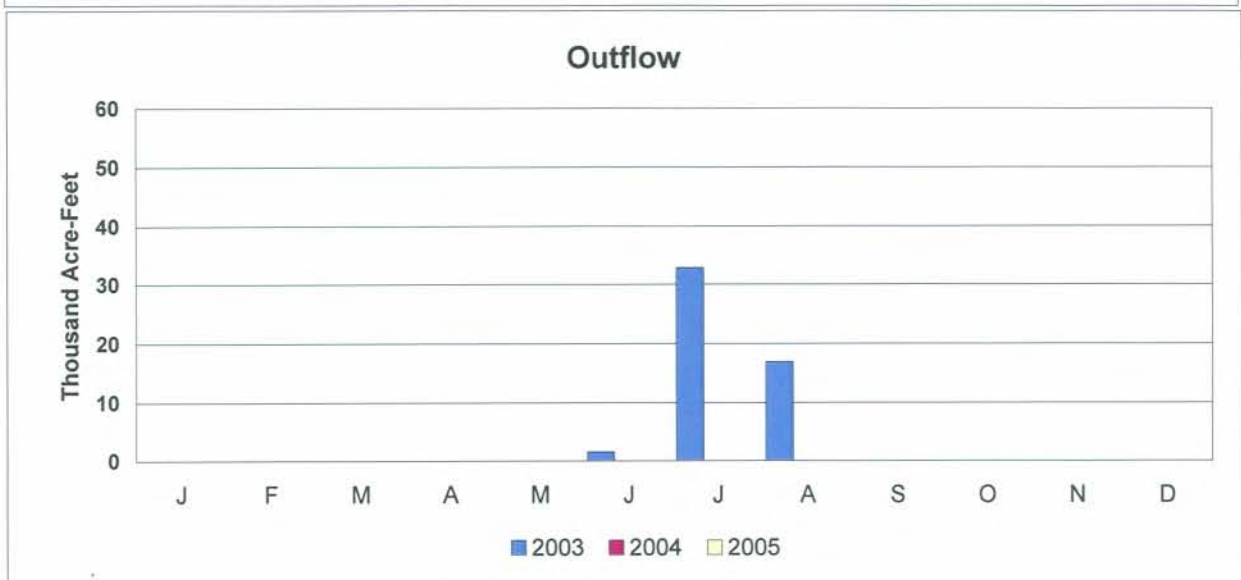
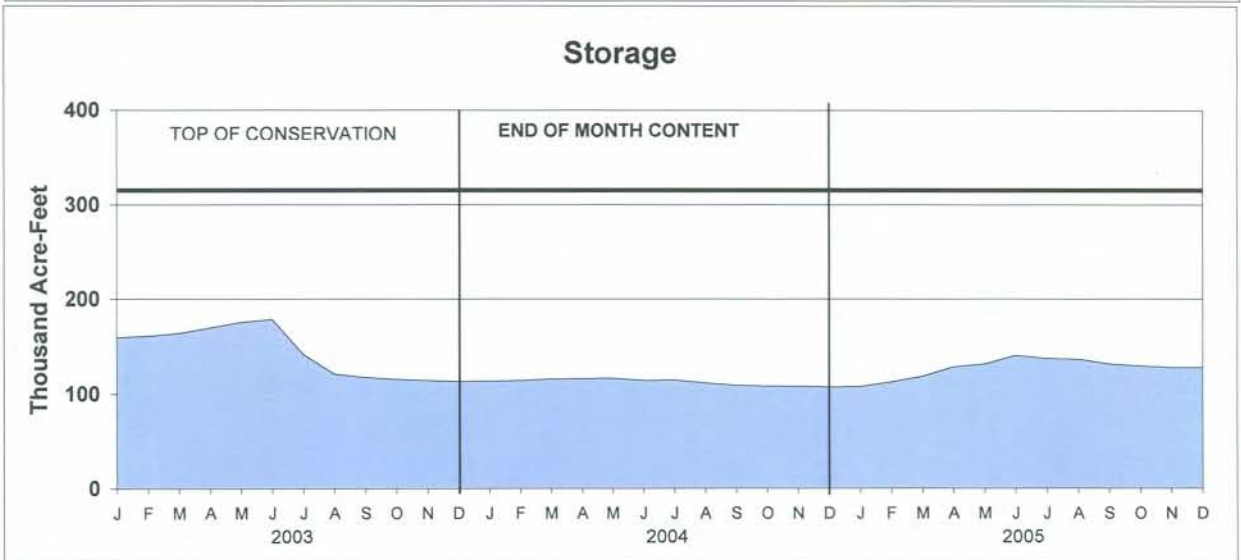
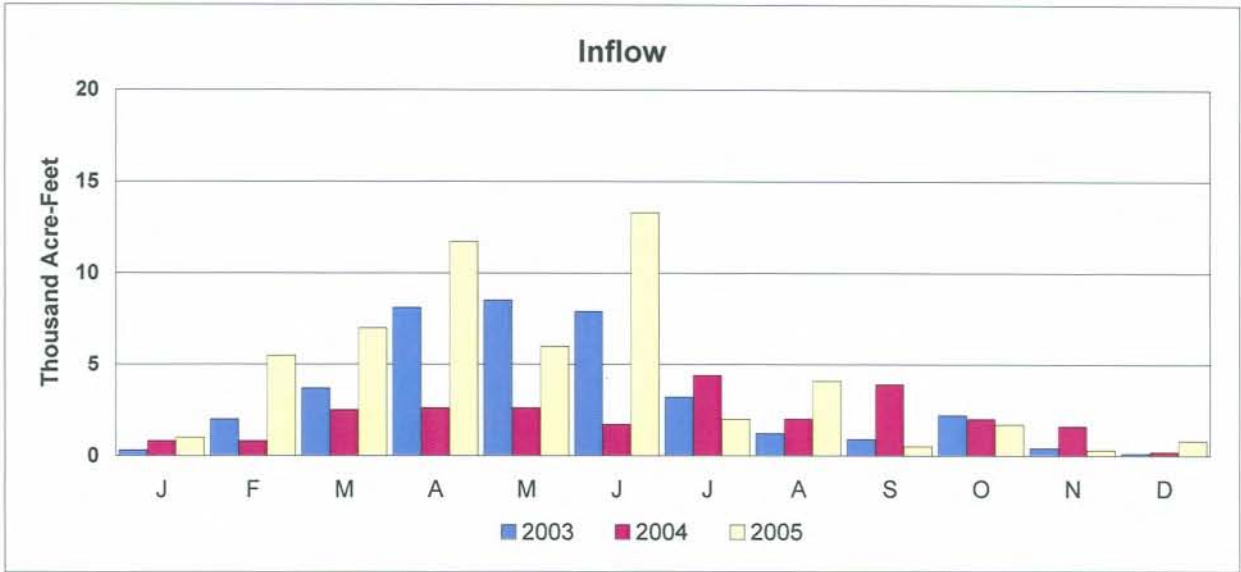
## ACTUAL OPERATION





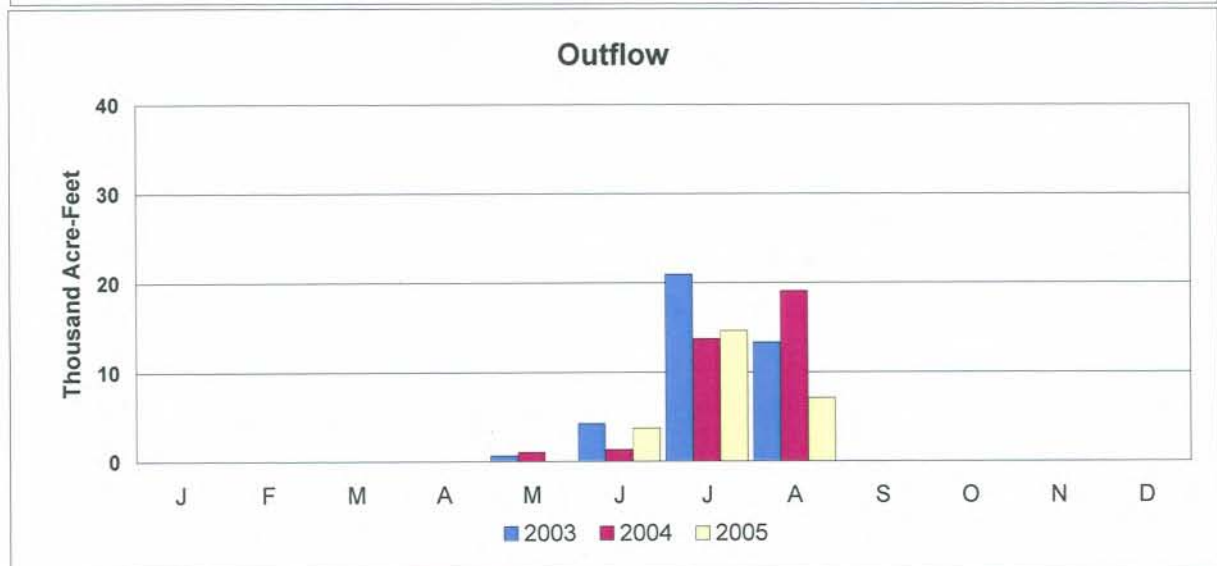
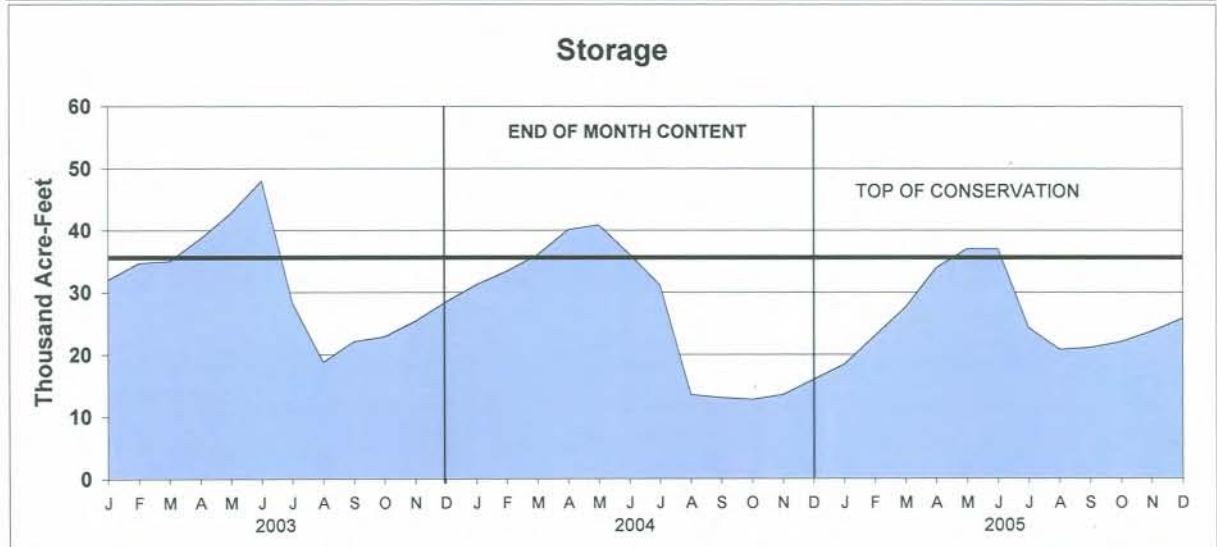
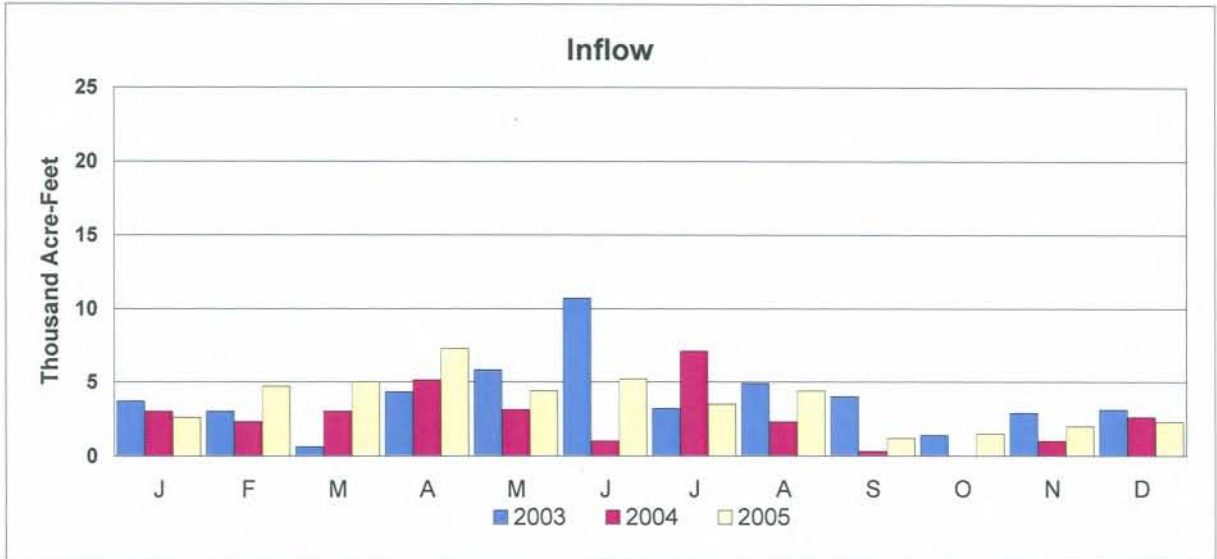
# HARLAN COUNTY LAKE

## ACTUAL OPERATION

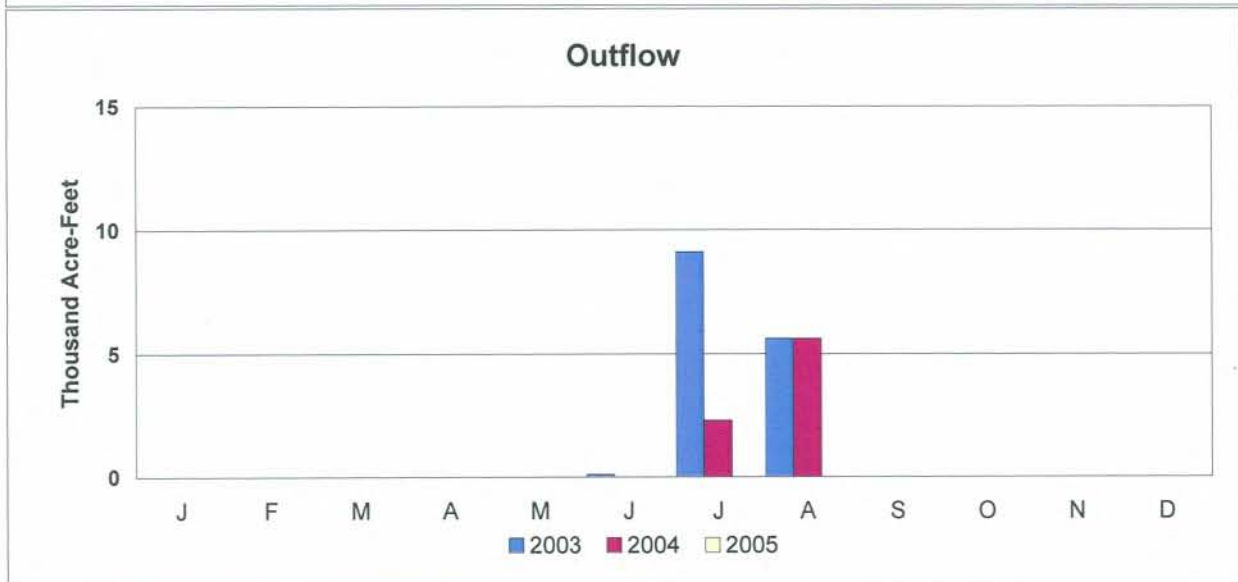
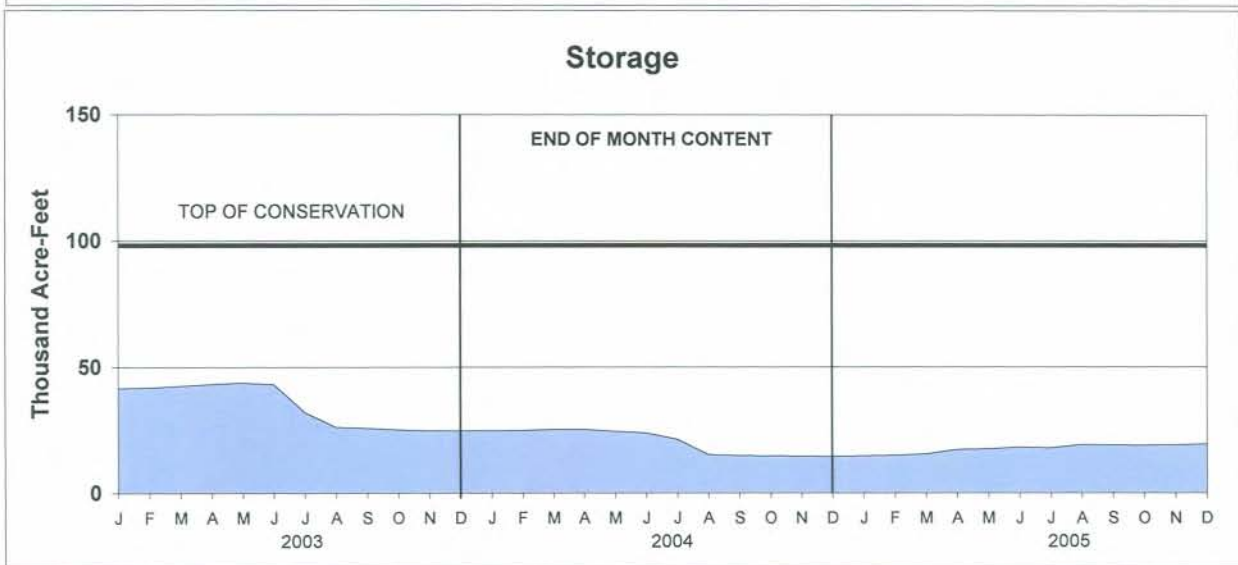
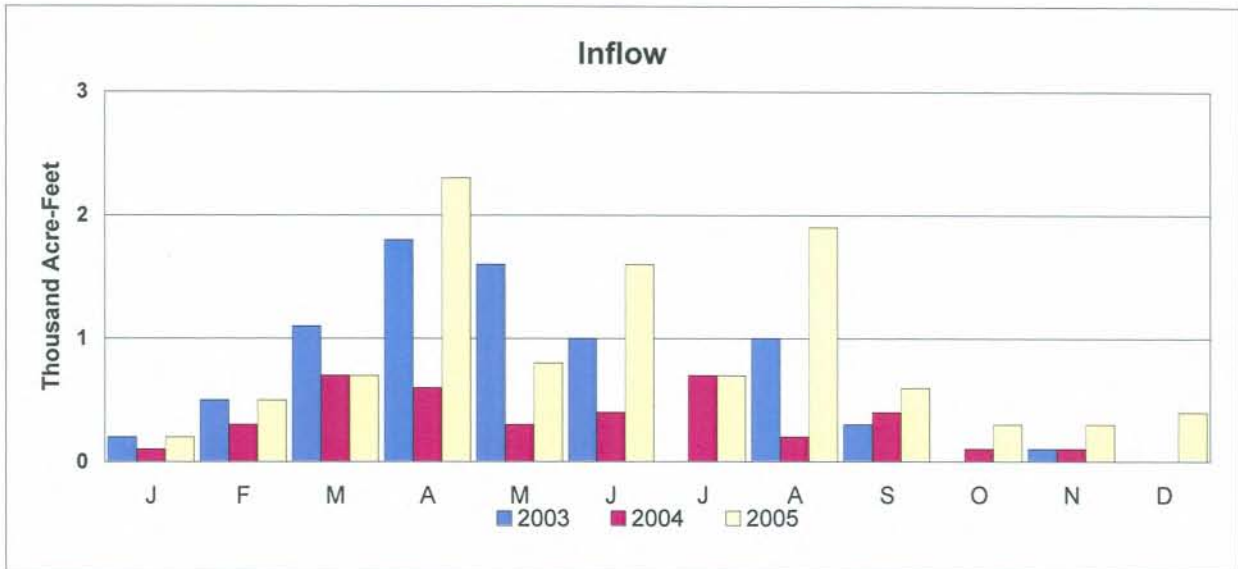


# LOVEWELL RESERVOIR

## ACTUAL OPERATION



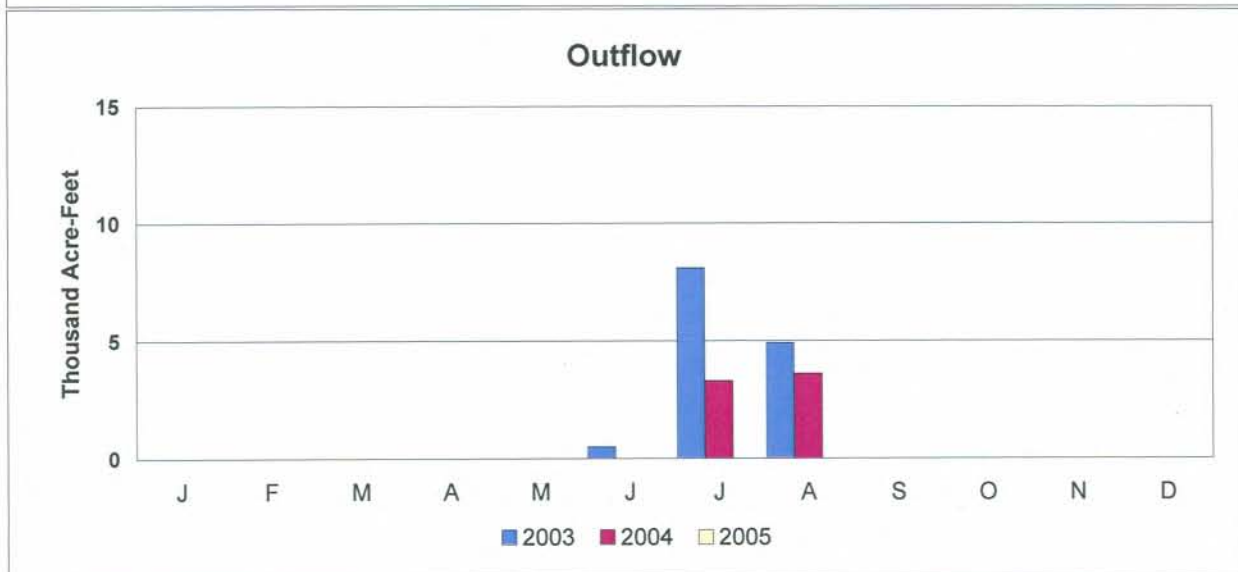
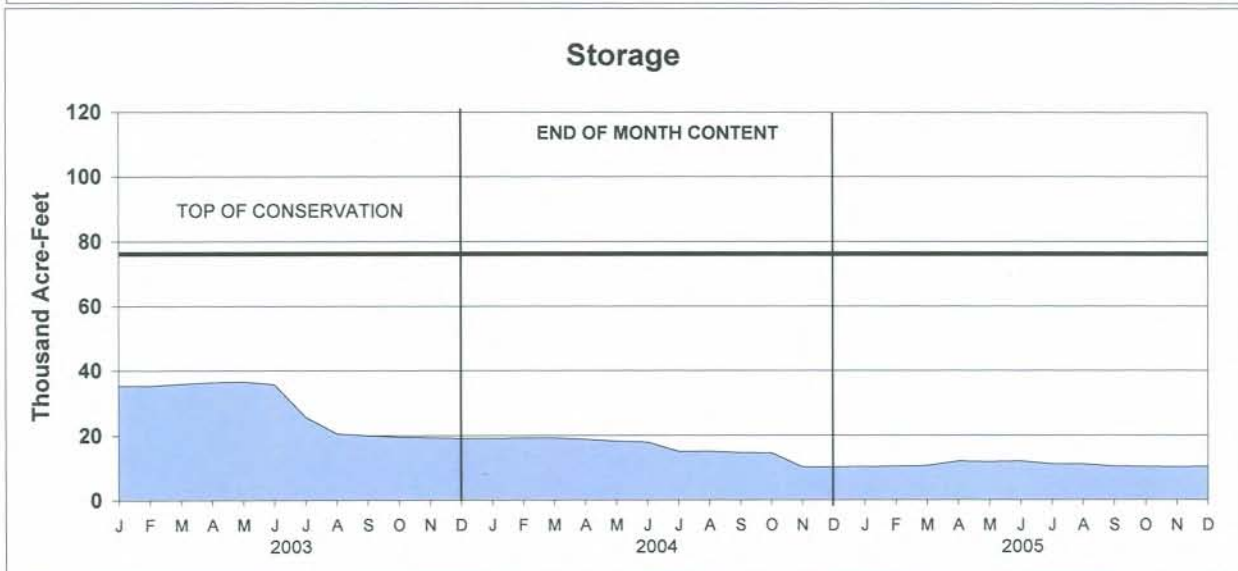
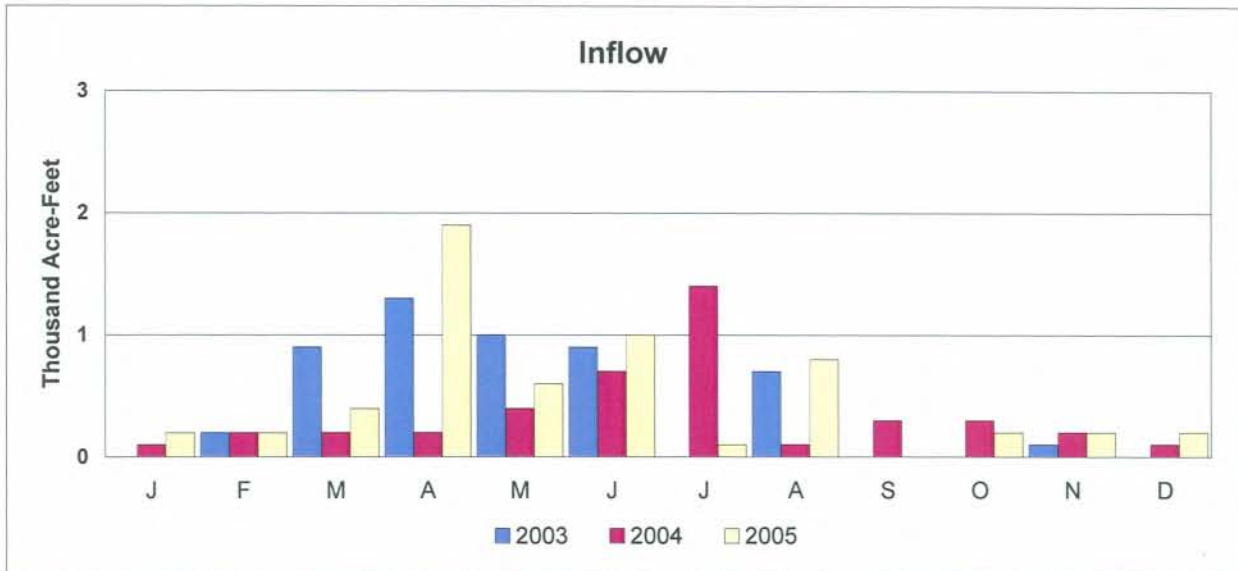
# KIRWIN RESERVOIR ACTUAL OPERATION



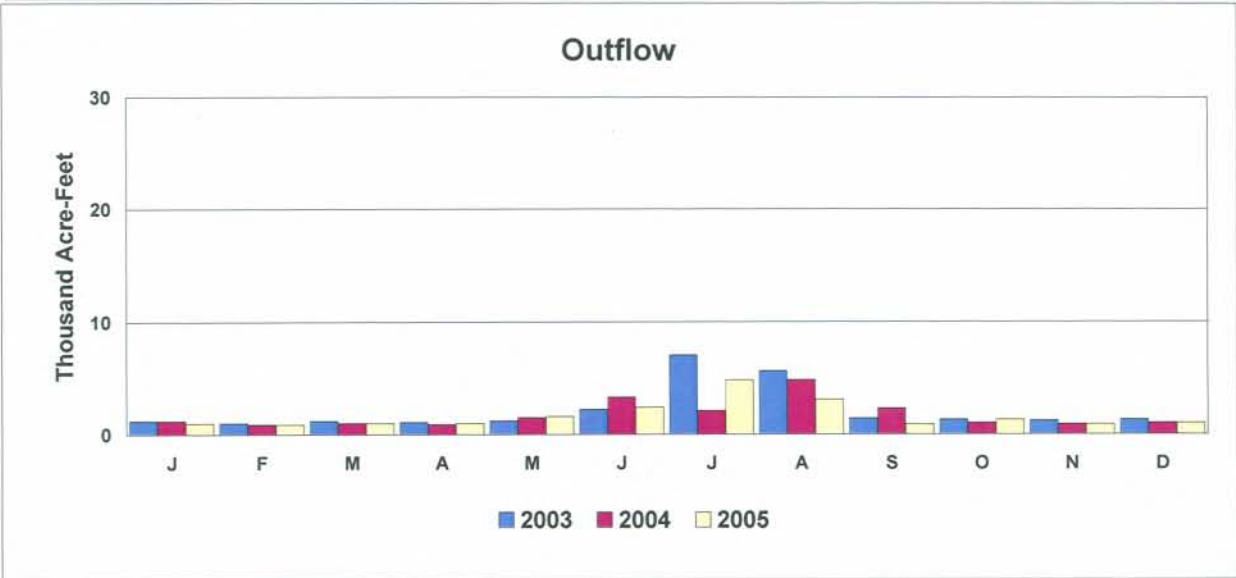
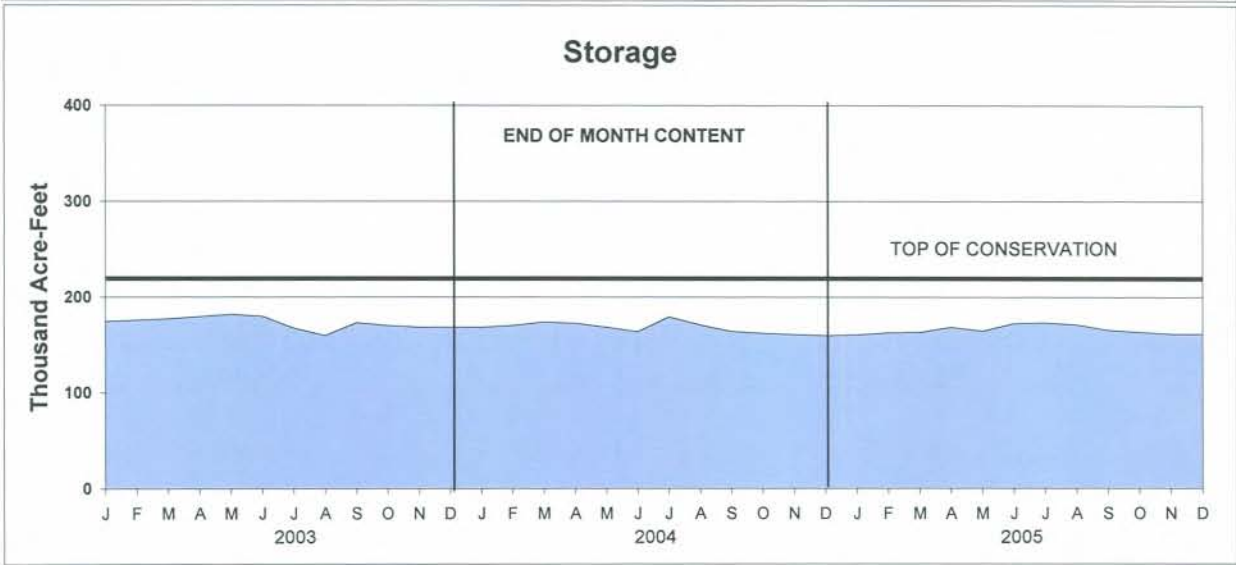
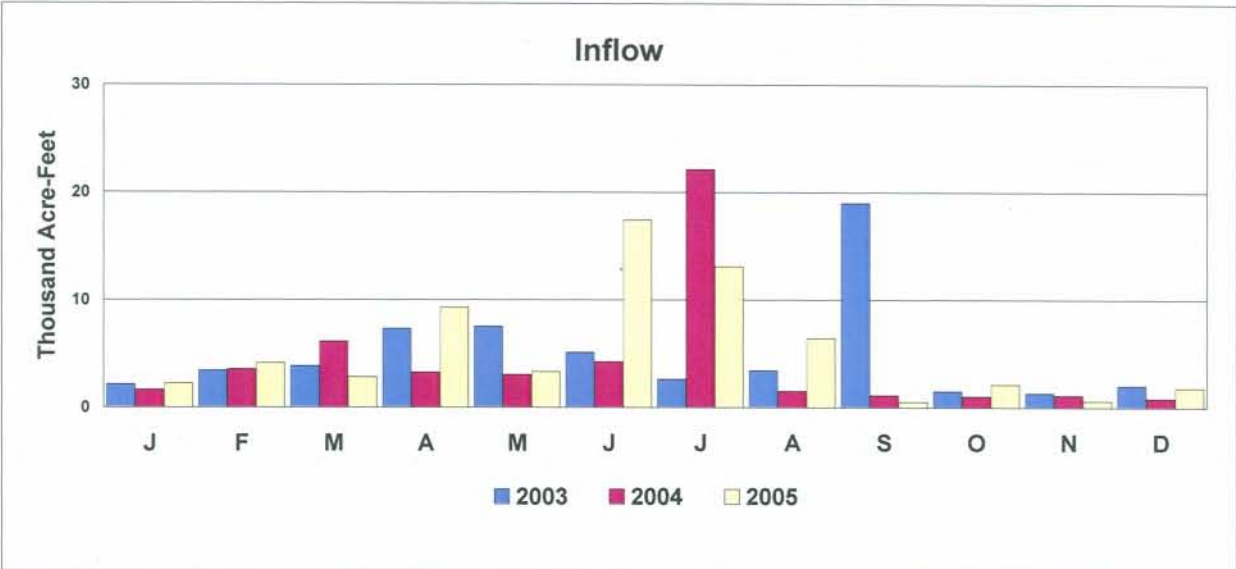


# WEBSTER RESERVOIR

## ACTUAL OPERATION

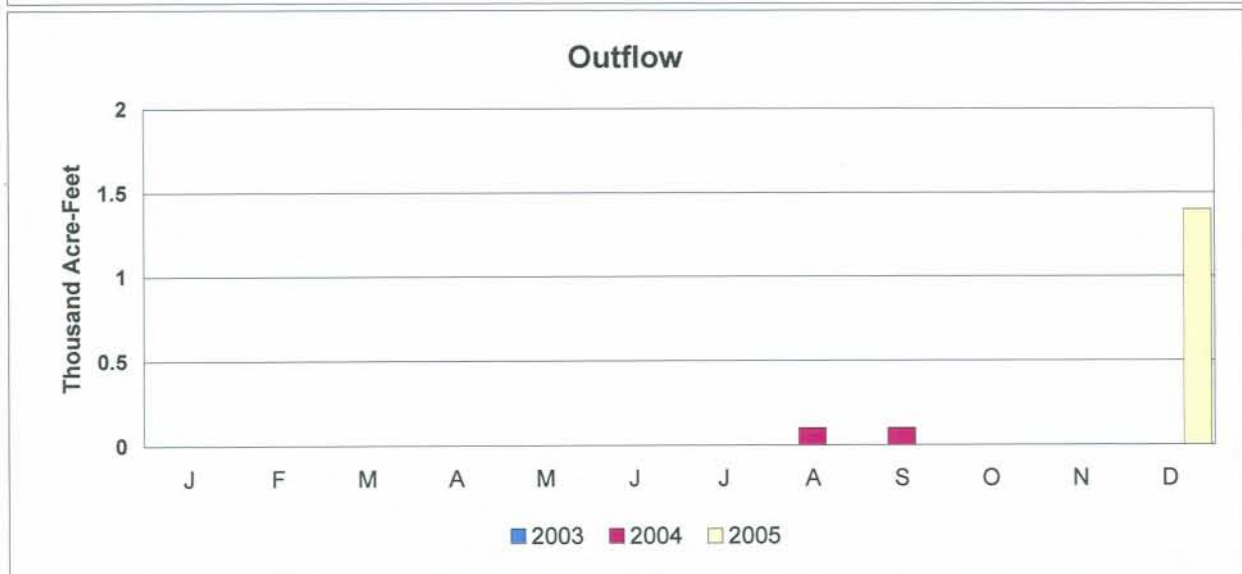
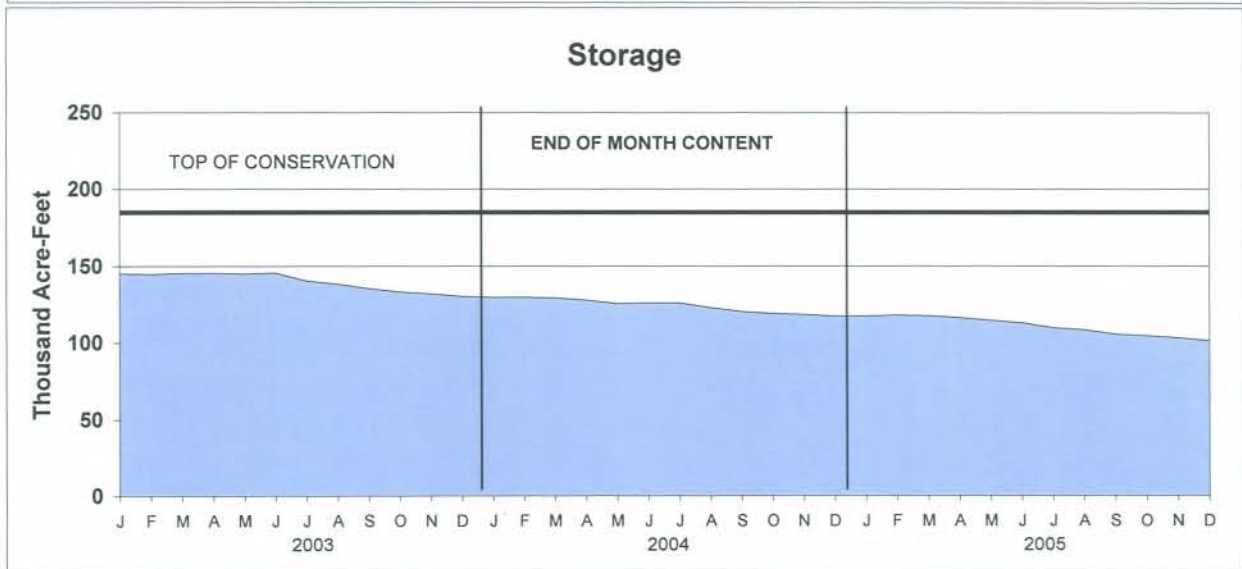
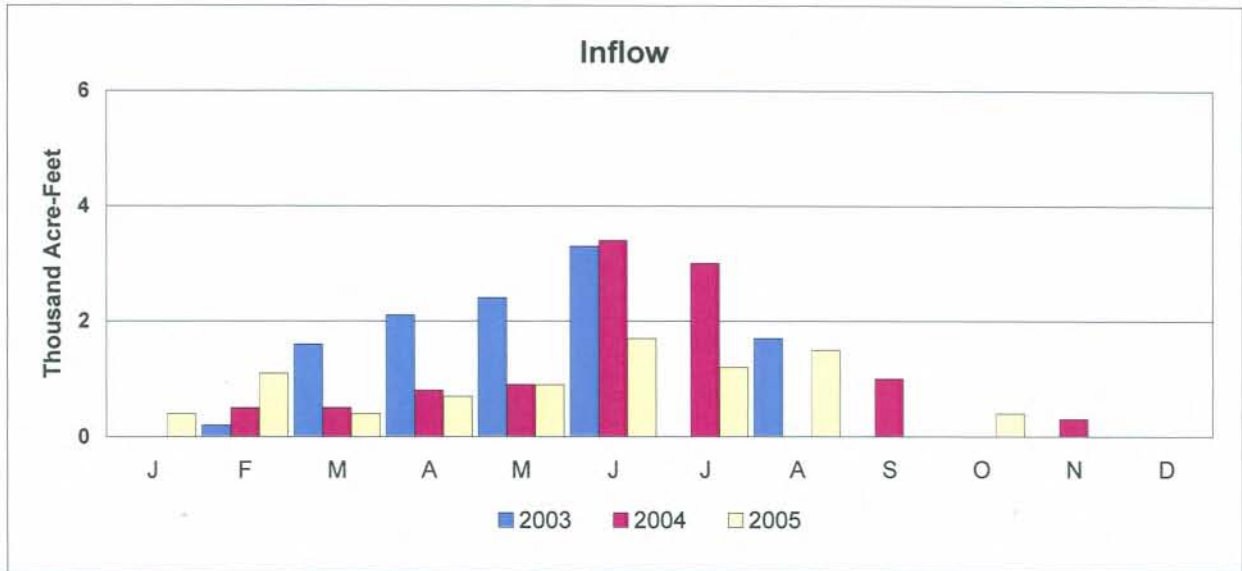


# WACONDA LAKE ACTUAL OPERATION



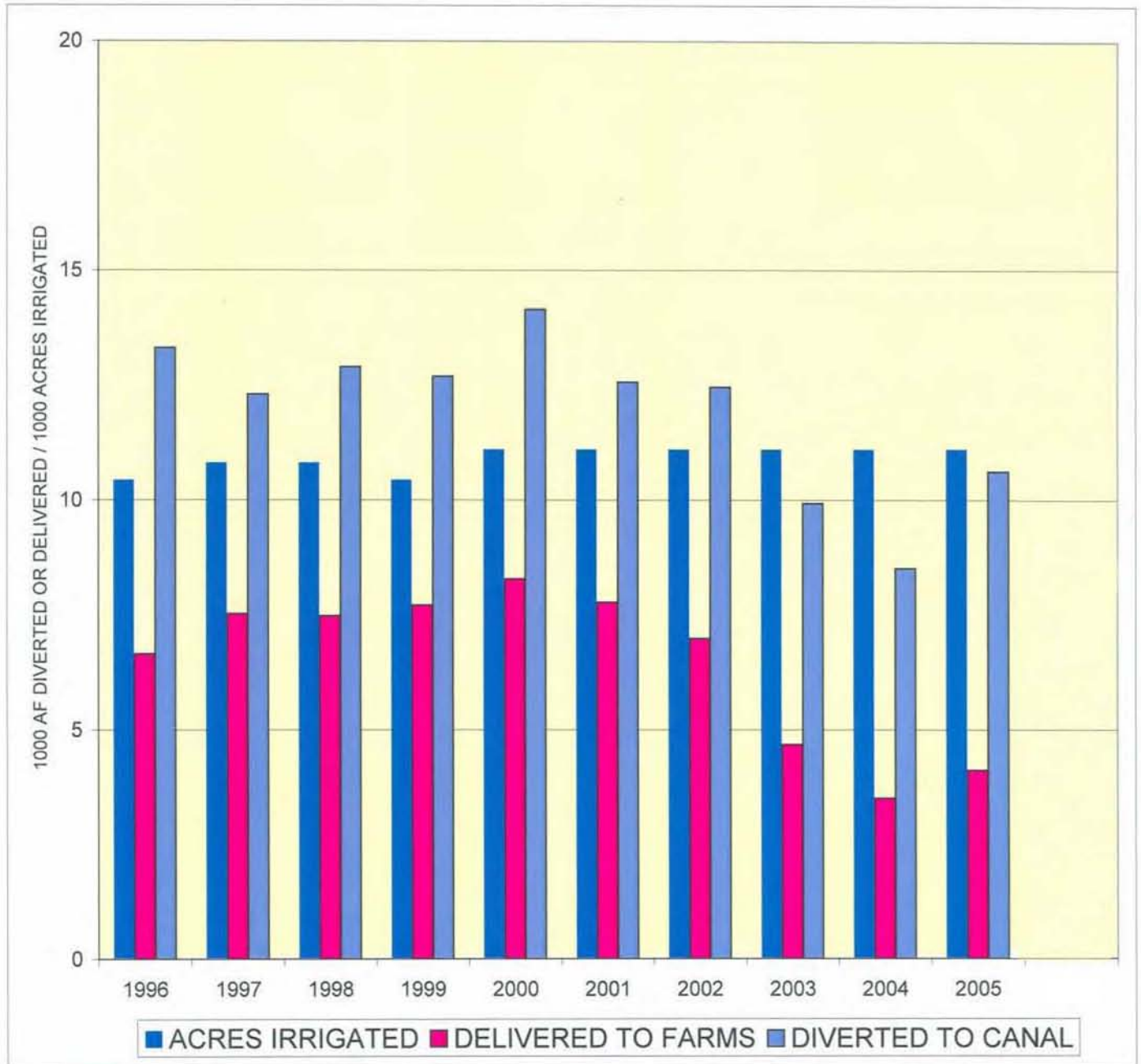
# CEDAR BLUFF RESERVOIR

## ACTUAL OPERATION



# MIRAGE FLATS IRRIGATION DISTRICT

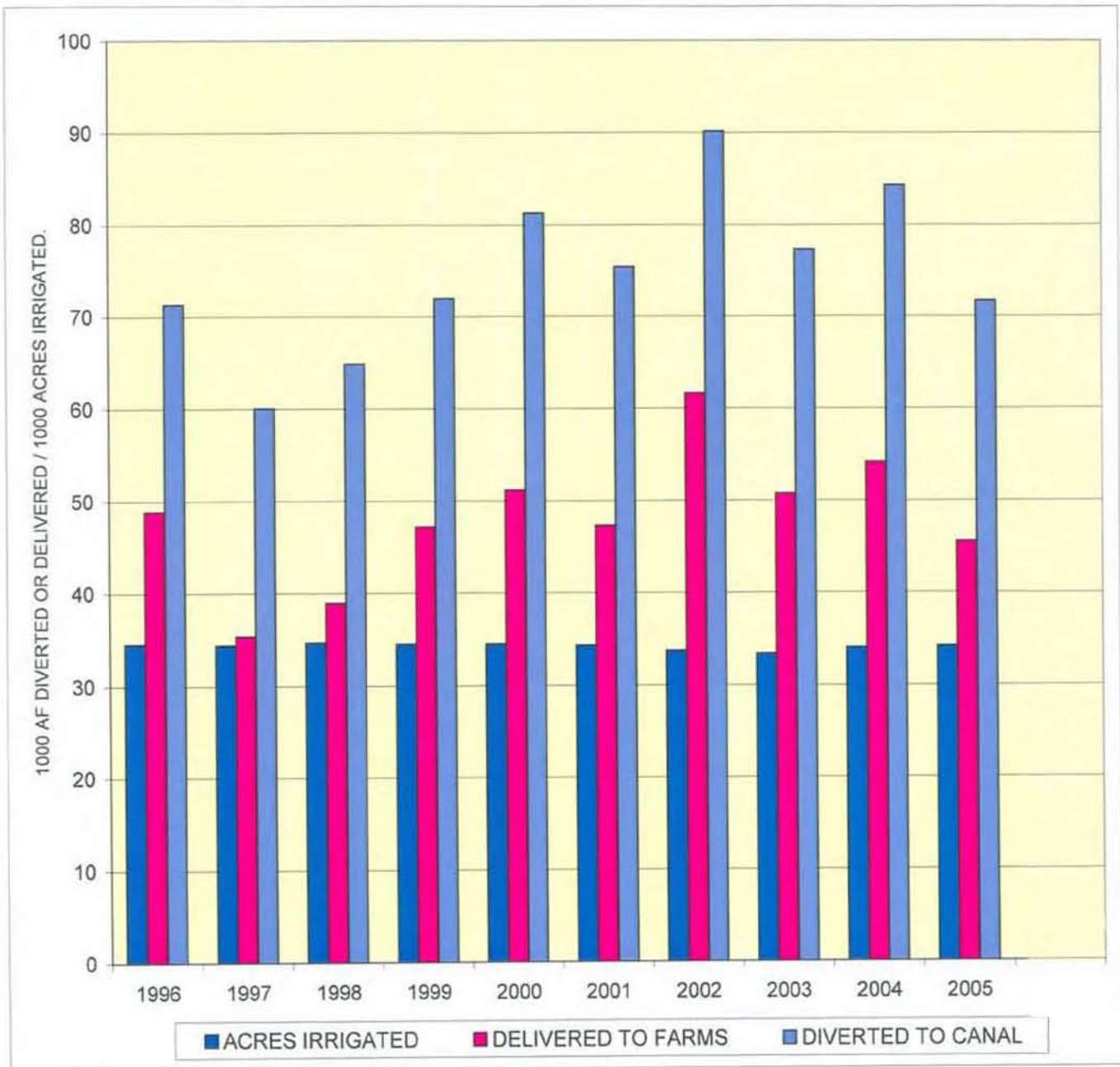
CANAL DIV., FARM DEL., AND ACRES IRRIG.



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
DIVERTED af/acre	1.28	1.14	1.20	1.22	1.28	1.13	1.12	0.90	0.77	0.96
DELIVERED af/acre	0.64	0.70	0.69	0.74	0.75	0.70	0.63	0.42	0.32	0.37
EFFICIENCY	50%	61%	58%	61%	58%	62%	56%	47%	41%	39%

# AINSWORTH IRRIGATION DISTRICT

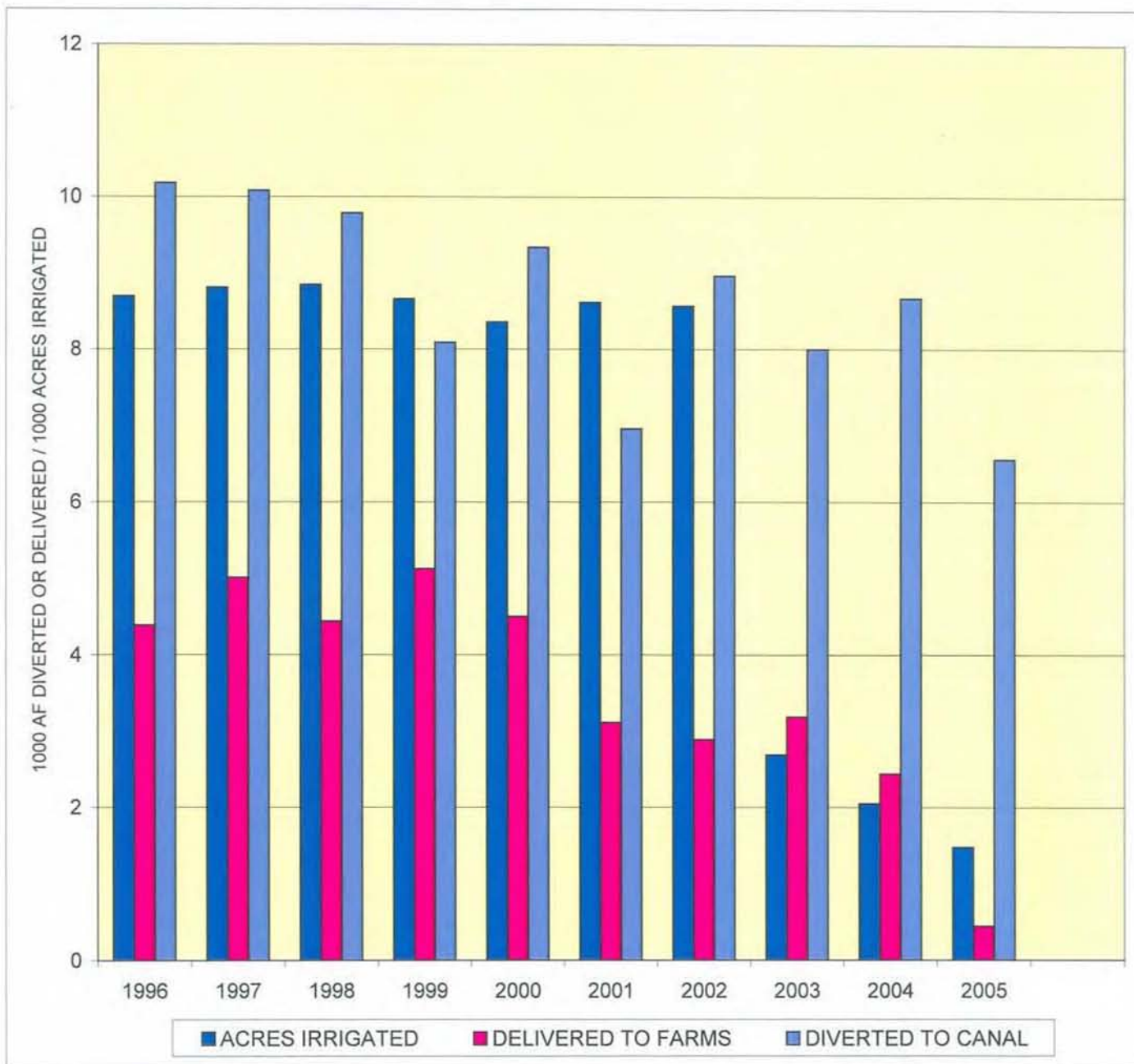
CANAL DIV., FARM DEL., AND ACRES IRRIG.



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
DIVERTED af/acre	2.07	1.75	1.87	2.09	2.36	2.20	2.67	2.31	2.48	2.10
DELIVERED af/acre	1.42	1.03	1.13	1.37	1.49	1.38	1.83	1.52	1.59	1.33
EFFICIENCY	68%	59%	60%	66%	63%	63%	68%	66%	64%	63%

# FRENCHMAN VALLEY IRRIGATION DISTRICT

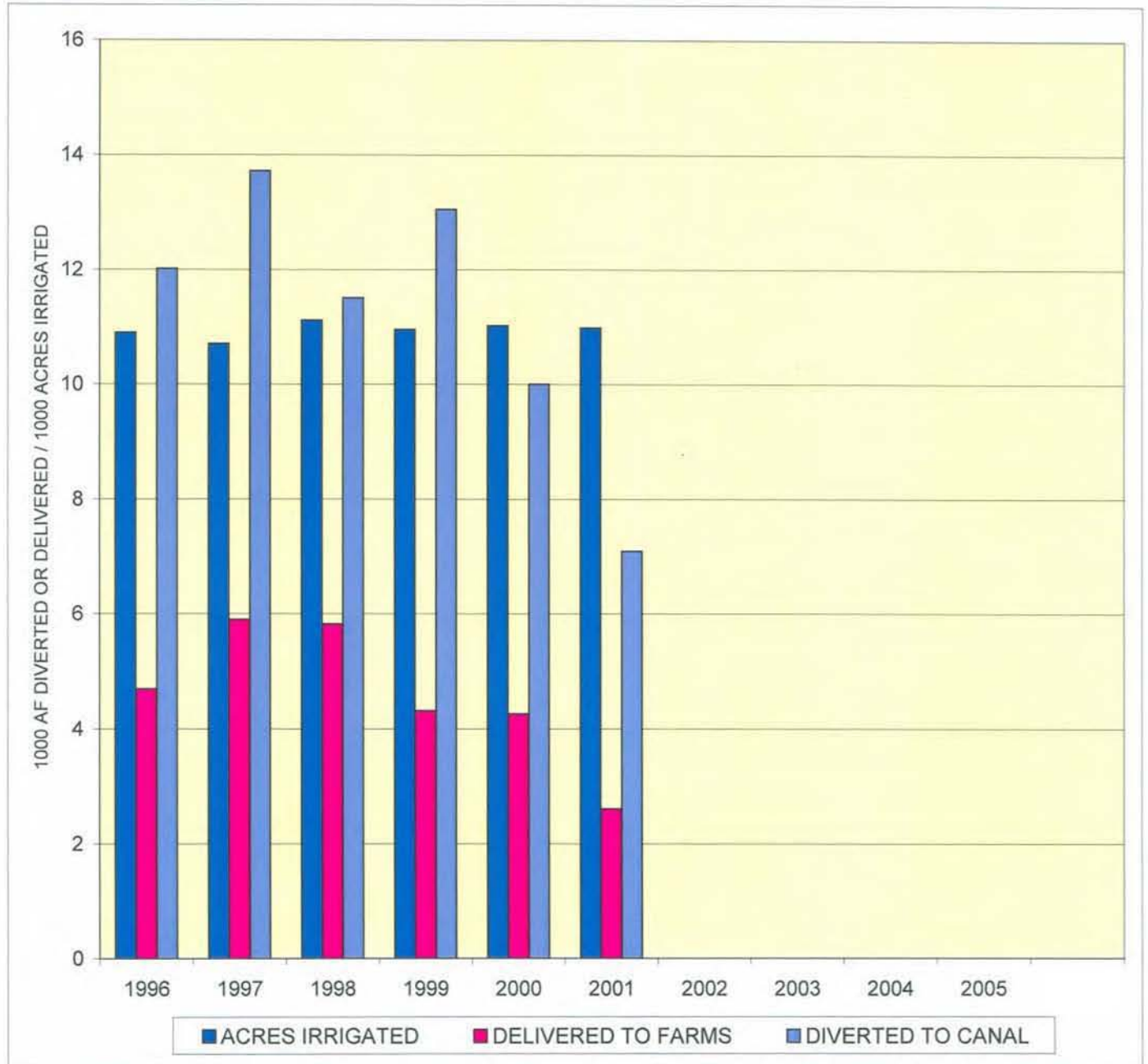
CANAL DIV., FARM DEL., AND ACRES IRRIG.



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
DIVERTED af/acre	1.17	1.14	1.11	0.93	1.12	0.81	1.05	2.97	4.24	4.43
DELIVERED af/acre	0.50	0.57	0.50	0.59	0.54	0.36	0.34	1.18	1.19	0.30
EFFICIENCY	43%	50%	45%	63%	48%	45%	32%	40%	28%	7%

# H AND RW IRRIGATION DISTRICT

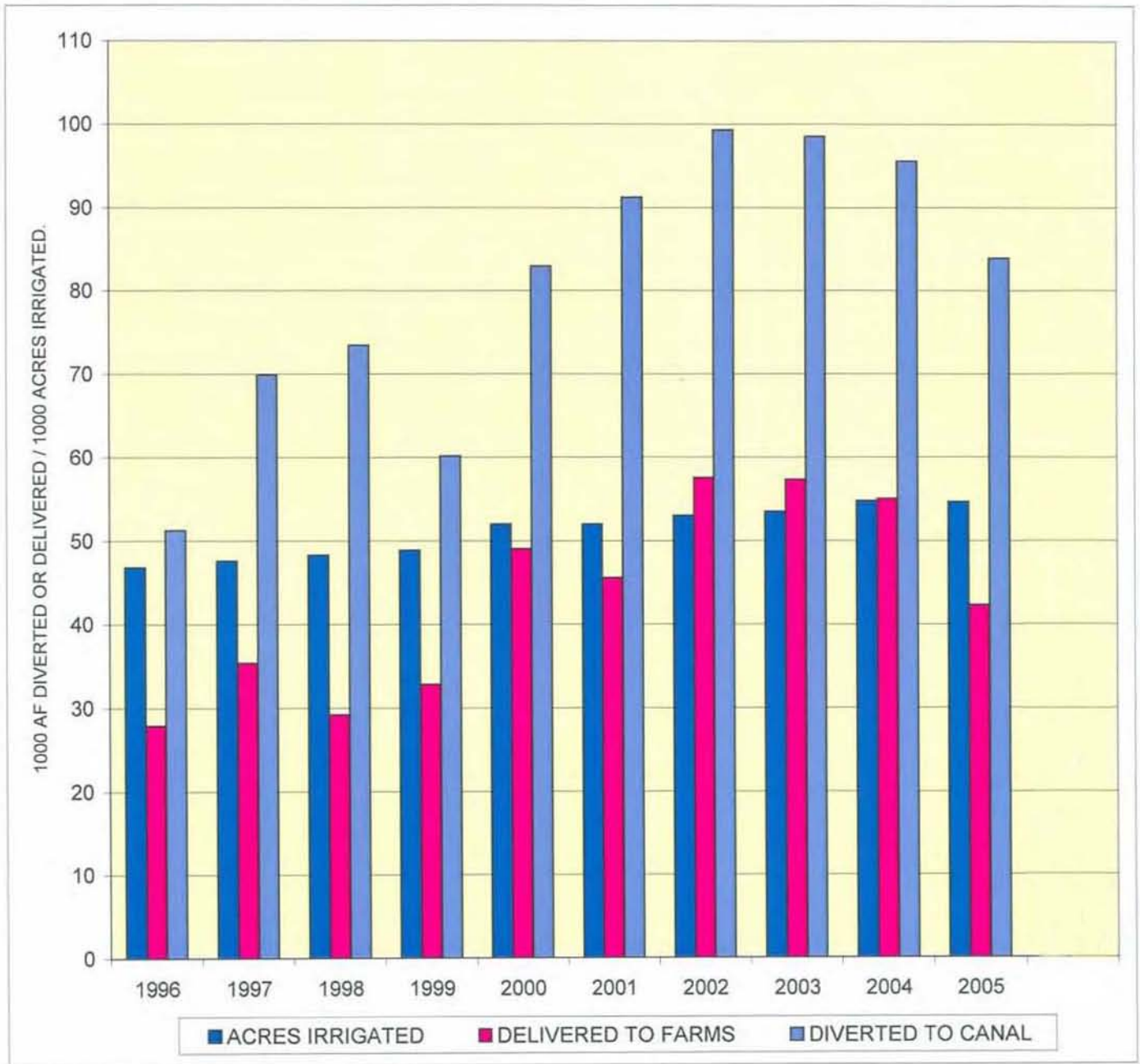
CANAL DIV., FARM DEL., AND ACRES IRRIG.



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
DIVERTED af/acre	1.10	1.28	1.03	1.19	0.91	0.65	0.00	0.00	0.00	0.00
DELIVERED af/acre	0.43	0.55	0.52	0.39	0.39	0.24	0.00	0.00	0.00	0.00
EFFICIENCY	39%	43%	51%	33%	43%	37%	0%	0%	0%	0%

# TWIN LOUPS IRRIGATION DISTRICT

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

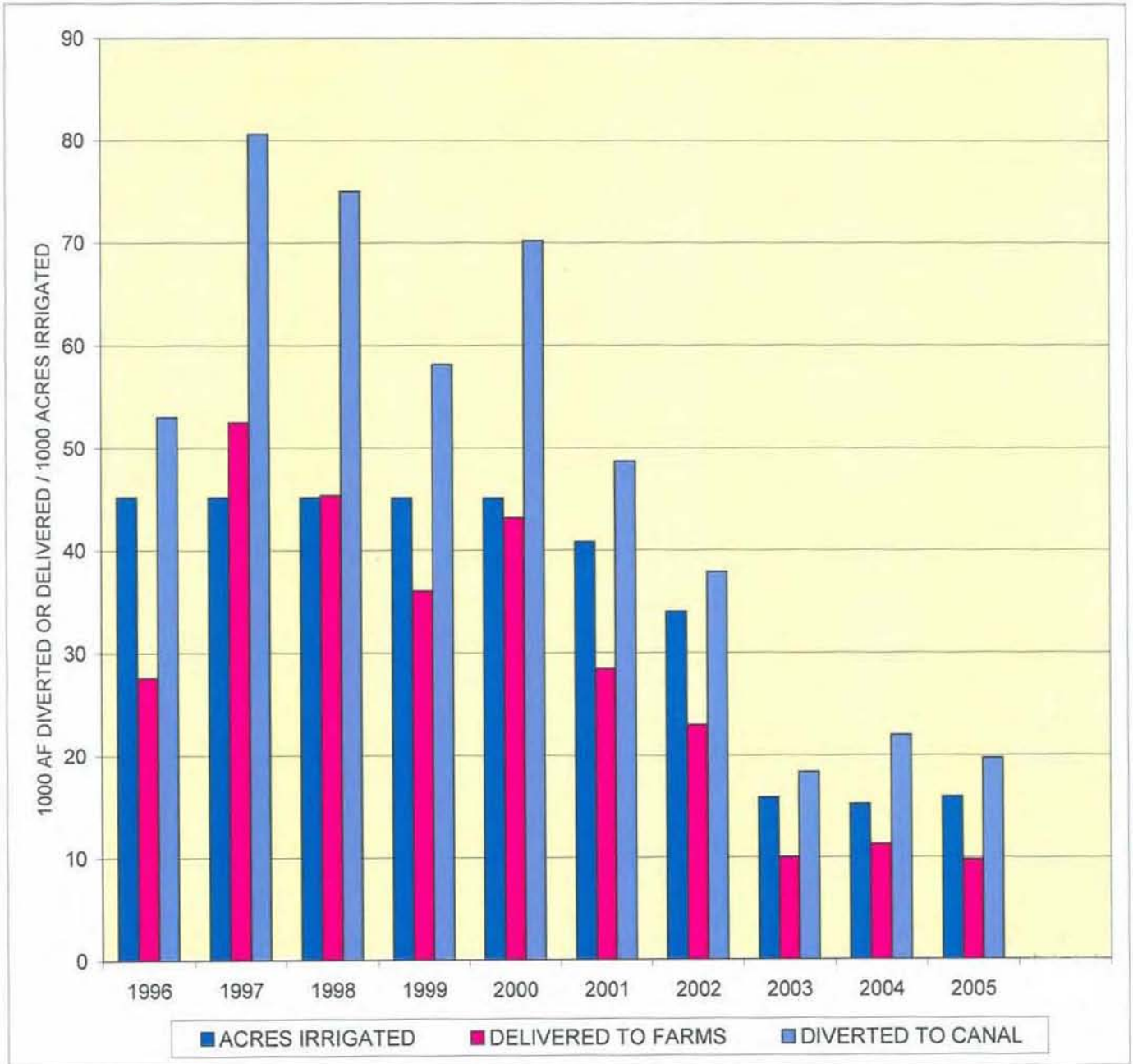


	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
DIVERTED af/acre	1.10	1.47	1.52	1.23	1.60	1.76	1.87	1.84	1.75	1.53
DELIVERED af/acre	0.60	0.74	0.60	0.67	0.94	0.88	1.09	1.07	1.00	0.77
EFFICIENCY	54%	51%	40%	55%	59%	50%	58%	58%	58%	50%



# FRENCHMAN-CAMBRIDGE IRRIGATION DISTRICT

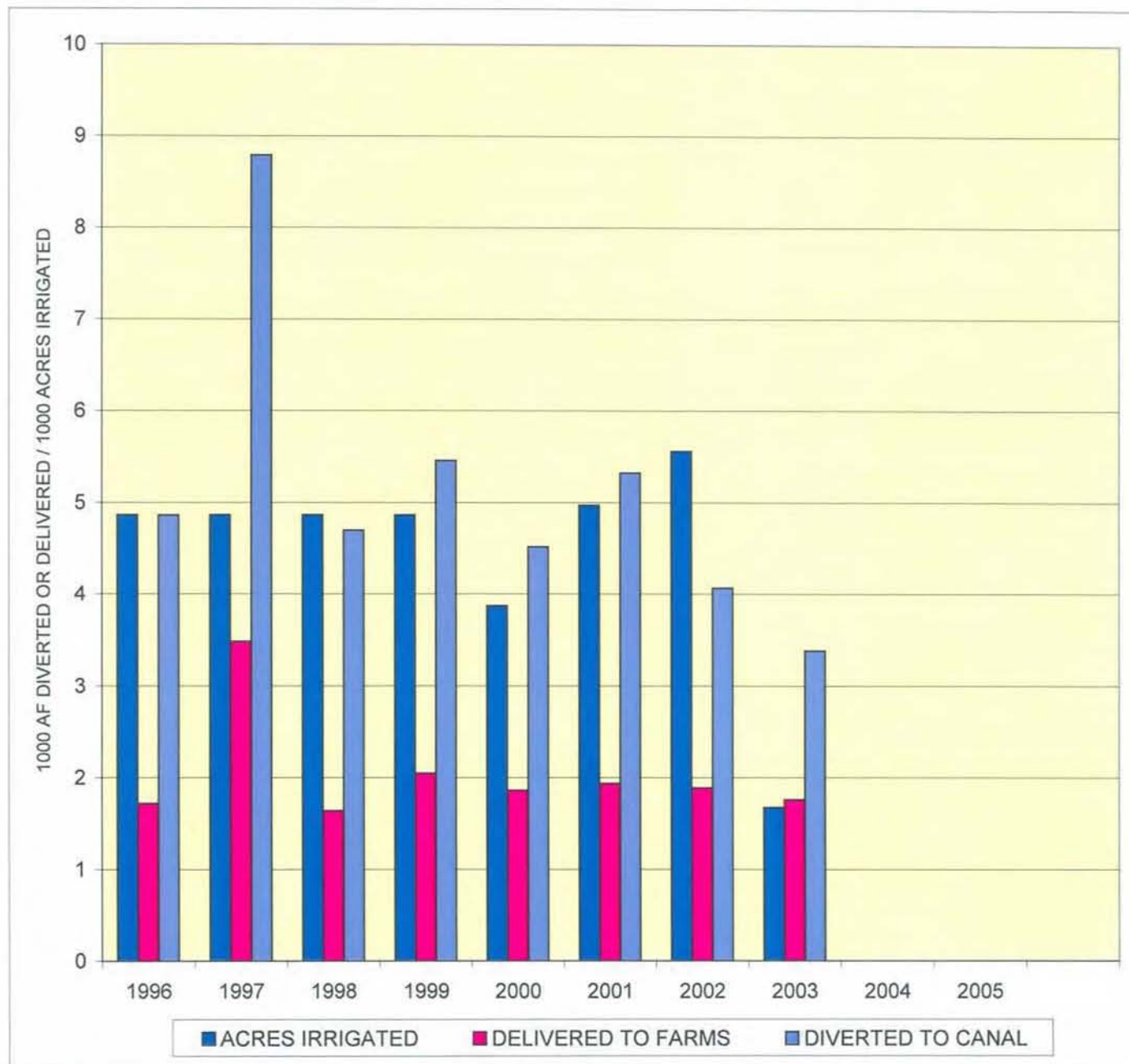
CANAL DIV., FARM DEL., AND ACRES IRRIG.



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
DIVERTED af/acre	1.17	1.79	1.66	1.29	1.56	1.19	1.12	1.15	1.45	1.24
DELIVERED af/acre	0.61	1.16	1.00	0.80	0.96	0.70	0.67	0.63	0.74	0.61
EFFICIENCY	52%	65%	60%	62%	61%	58%	61%	55%	52%	50%

# ALMENA IRRIGATION DISTRICT

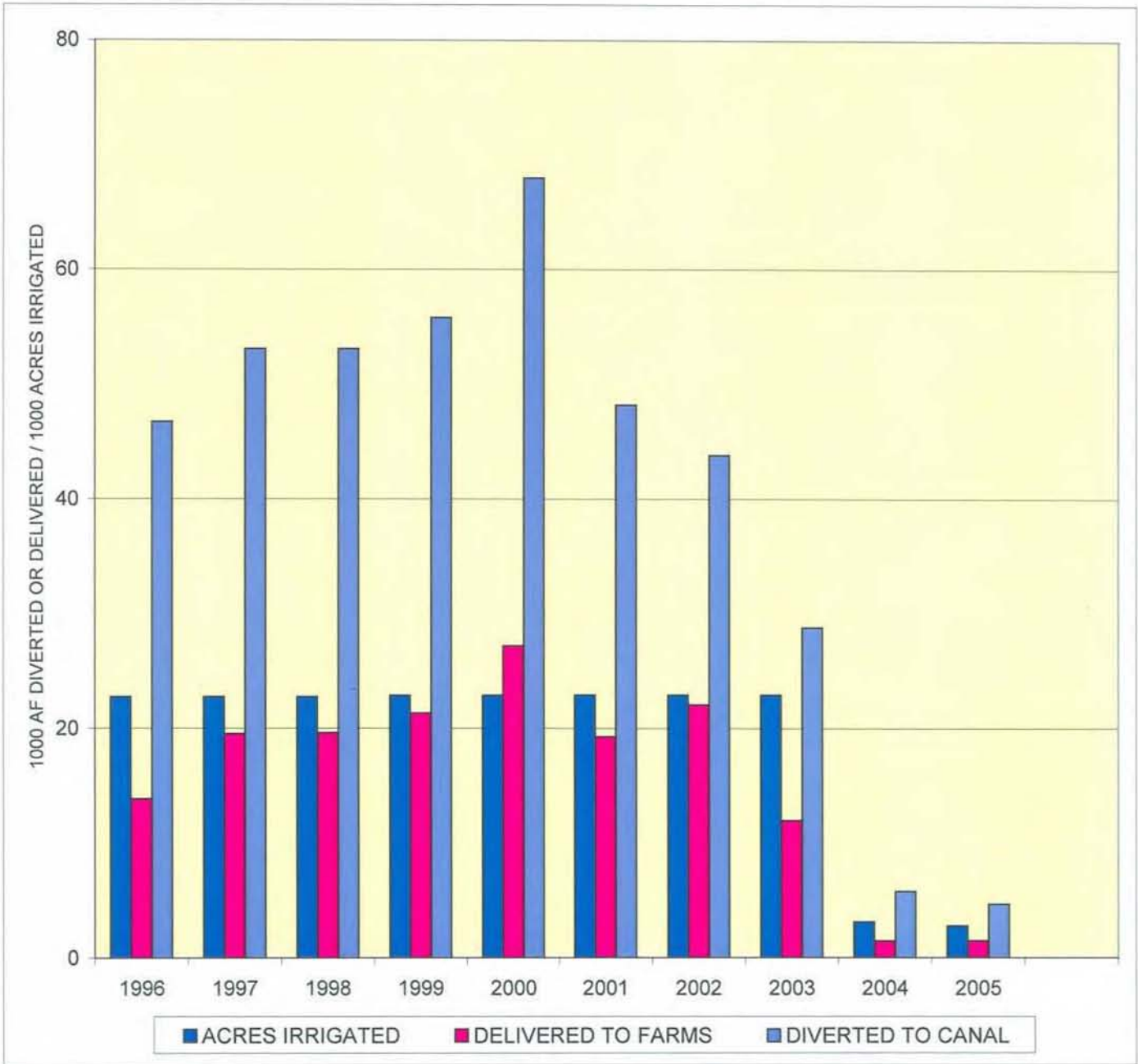
CANAL DIV., FARM DEL., AND ACRES IRRIG.



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
DIVERTED af/acre	1.00	1.81	0.97	1.12	1.17	1.07	0.73	2.02	0.00	0.00
DELIVERED af/acre	0.35	0.72	0.34	0.42	0.48	0.39	0.34	1.05	0.00	0.00
EFFICIENCY	35%	40%	35%	38%	41%	36%	46%	52%	0%	0%

# BOSTWICK IRRIGATION DISTRICT - NEBRASKA

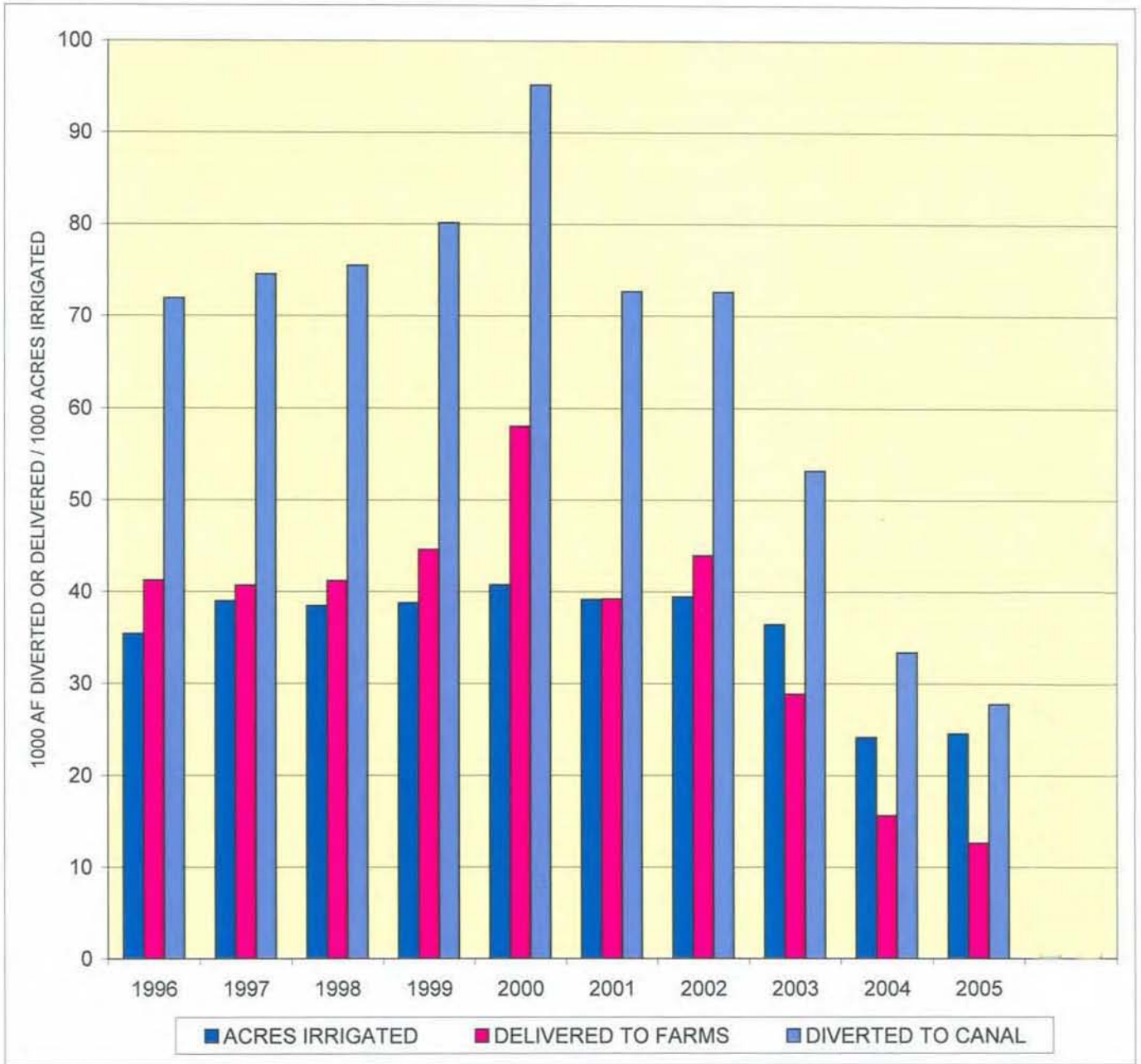
CANAL DIV., FARM DEL., AND ACRES IRRIG.



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
DIVERTED af/acre	2.05	2.33	2.33	2.44	2.97	2.10	1.91	1.25	1.85	1.68
DELIVERED af/acre	0.61	0.86	0.86	0.93	1.19	0.84	0.96	0.52	0.47	0.53
EFFICIENCY	30%	37%	37%	38%	40%	40%	50%	42%	25%	32%

# KANSAS-BOSTWICK IRRIGATION DISTRICT

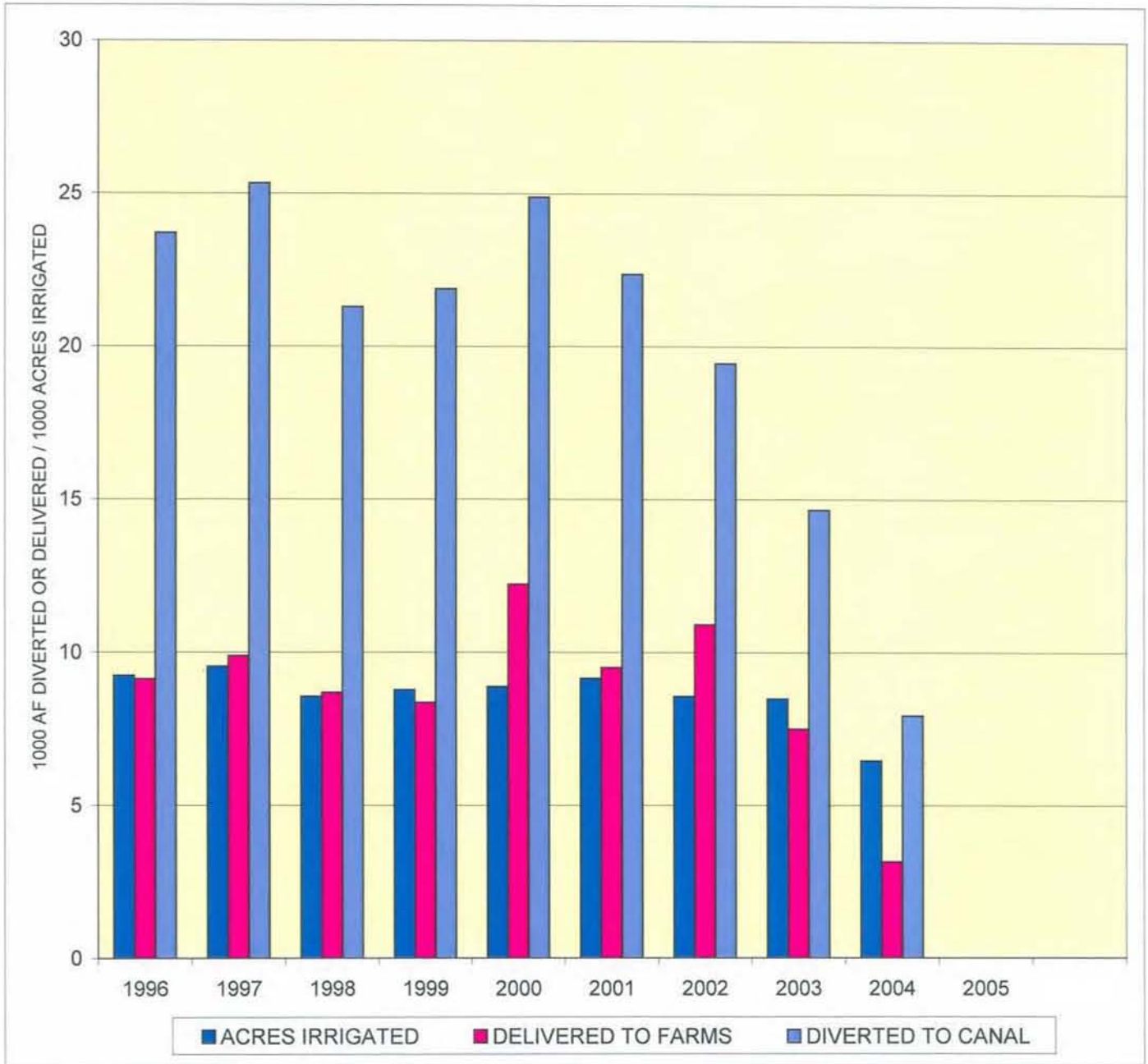
CANAL DIV., FARM DEL., AND ACRES IRRIG.



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
DIVERTED <i>af/acre</i>	2.03	1.91	1.96	2.07	2.33	1.86	1.84	1.46	1.38	1.13
DELIVERED <i>af/acre</i>	1.16	1.04	1.07	1.15	1.42	1.00	1.11	0.79	0.65	0.51
EFFICIENCY	57%	55%	55%	56%	61%	54%	61%	54%	47%	45%

# KIRWIN IRRIGATION DISTRICT

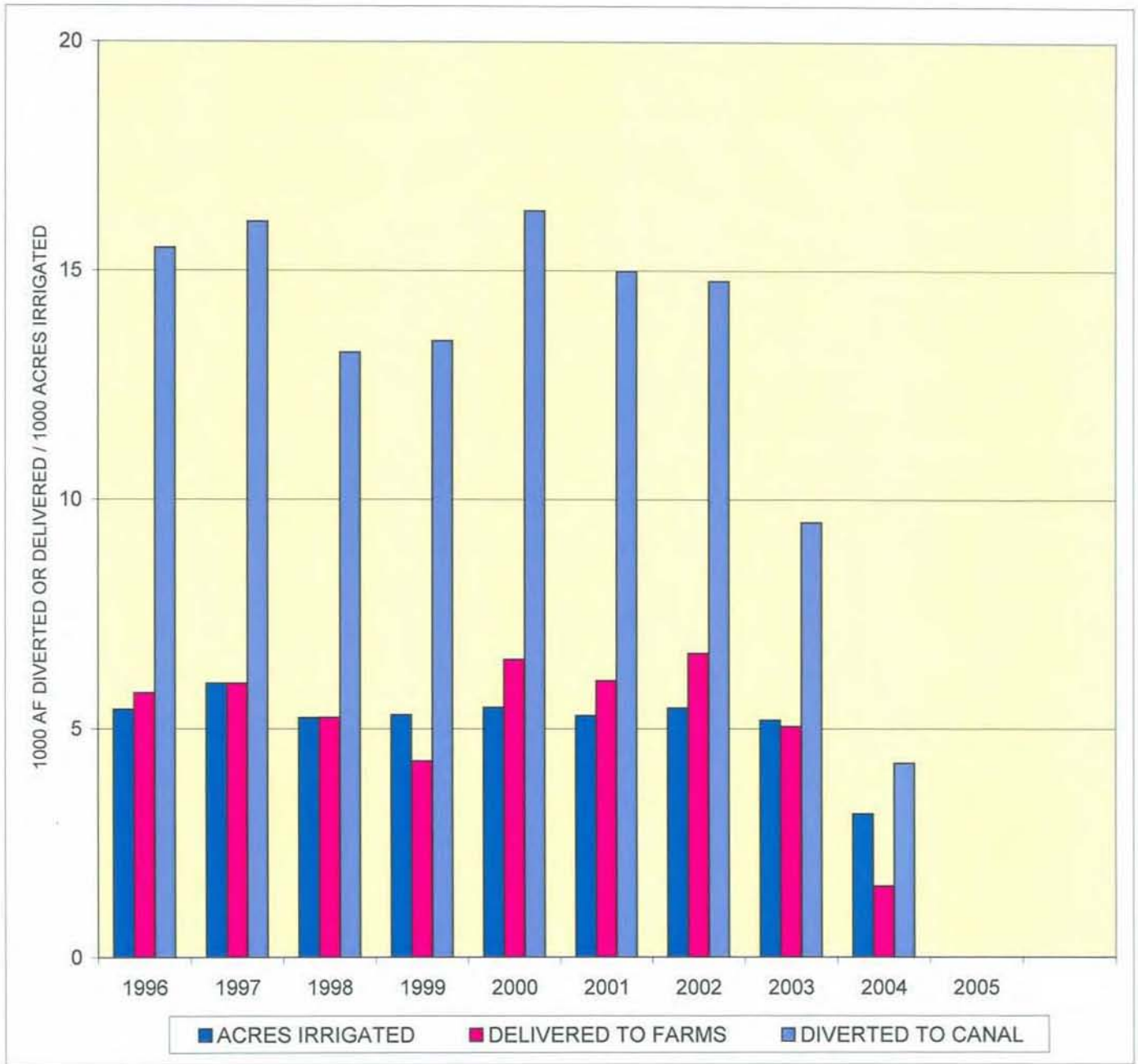
CANAL DIV., FARM DEL., AND ACRES IRRIG.



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
DIVERTED af/acre	2.56	2.65	2.48	2.49	2.80	2.44	2.27	1.73	1.23	0.00
DELIVERED af/acre	0.99	1.04	1.01	0.95	1.37	1.04	1.27	0.88	0.49	0.00
EFFICIENCY	39%	39%	41%	38%	49%	43%	56%	51%	40%	0%

# WEBSTER IRRIGATION DISTRICT

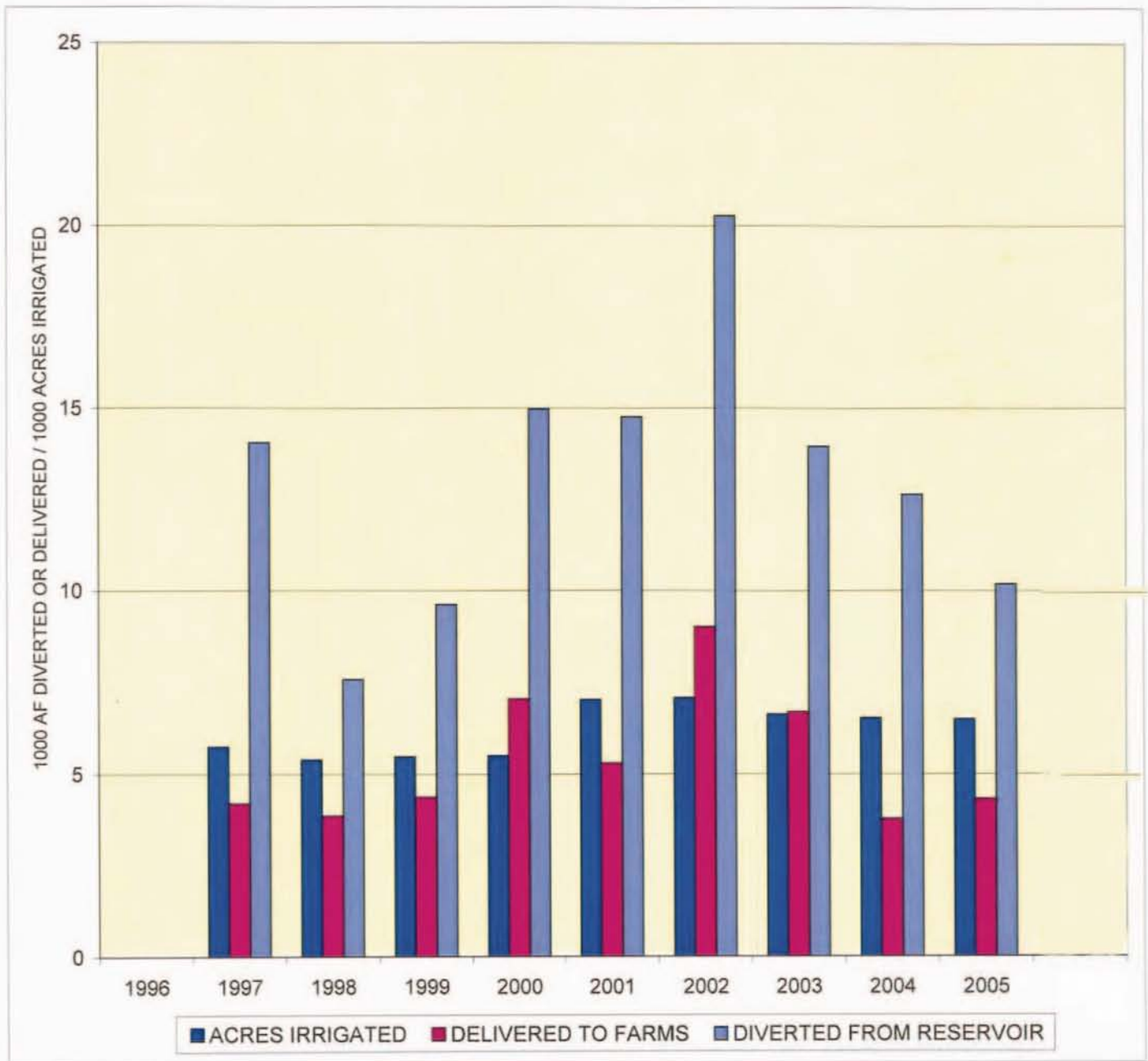
CANAL DIV., FARM DEL., AND ACRES IRRIG.



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
DIVERTED af/acre	2.86	2.68	2.52	2.54	2.98	2.83	2.71	1.83	1.35	0.00
DELIVERED af/acre	1.07	1.00	1.00	0.81	1.19	1.14	1.22	0.97	0.50	0.00
EFFICIENCY	37%	37%	40%	32%	40%	40%	45%	53%	37%	0%

# GLEN ELDER IRRIGATION DISTRICT

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



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
DIVERTED af/acre	0.00	2.45	1.41	1.76	2.72	2.10	2.86	2.10	1.93	1.57
DELIVERED af/acre	0.00	0.73	0.71	0.80	1.28	0.75	1.27	1.01	0.58	0.66
EFFICIENCY	0%	30%	51%	45%	47%	36%	44%	48%	30%	42%