

## SYNOPSIS

### General

This year is the 57<sup>th</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 nine diversion dams, nine pumping plants, and 20 canal systems, serve approximately 269,744 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 have 63 Hydromet stations that can be accessed. The McCook Field Office has installed and maintains 42 Hydromet stations. 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 2009 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.

### 2009 Summary

#### Climatic Conditions

Precipitation at the project dams during 2009 ranged from 78 percent of normal at Lovewell Dam to 156 percent of normal at Enders Dam. Temperatures and precipitation during the first 3 months of the year were generally below normal throughout the projects area. Precipitation totals varied from 11 percent to 224 percent during January through March.

Temperatures were near normal during the spring. Precipitation during April and May was generally above normal throughout the basin.

Average temperatures were near normal through June, July, and August. Total precipitation for June, July, and August, was above normal project wide. Five project dams recorded below normal precipitation in June, while only three project dams recorded below normal precipitation in July and August.

September precipitation varied considerably throughout the projects while precipitation in October was well above normal. October precipitation varied from 121 percent of normal at Lovewell Dam to 414 percent of normal at Medicine Creek Dam. Medicine Creek Dam recorded the greatest October precipitation on record at that site. Temperatures in September were above normal and October temperatures were below normal throughout the projects area.

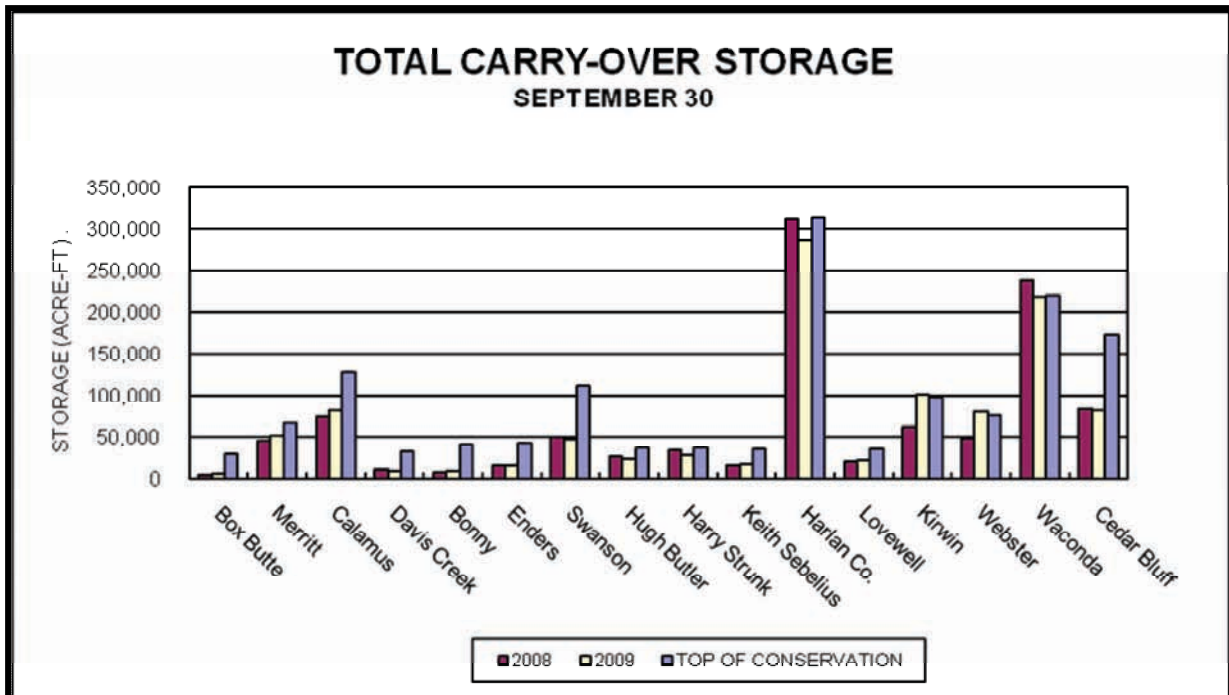
Precipitation during November averaged only 45 percent of normal over the projects with Davis Creek Dam recording zero precipitation in November. December precipitation was above normal. Temperatures were above normal in November and below normal in December.

### Storage Reservoirs

1. Conservation Operations. The 2009 inflow was above the dry-year forecast at all project reservoirs. Box Butte, Bonny, Enders, Merritt, Davis Creek, Lovewell, and Cedar Bluff Reservoirs, and Hugh Butler and Keith Sebelius Lakes had inflows between the dry- and normal-year forecasts. Calamus, Kirwin, and Webster Reservoirs along with Swanson, Harry Strunk, Waconda, and Harlan County Lakes had inflows between the normal- and wet-year forecasts. No reservoirs had inflows above the wet-year forecast.

Ten of the 16 project reservoirs had below average carry-over storage from the 2008 water year. Reservoir releases were made from Merritt, Virginia Smith, Medicine Creek, Harlan County, Lovewell, Kirwin, Webster, and Glen Elder Dams to maintain or reduce reservoir levels prior to the 2009 irrigation season. Just prior to the irrigation season, Enders and Box Butte Reservoirs, along with Keith Sebelius, Swanson, and Hugh Butler Lakes, did not have sufficient storage to provide water users with a full water supply. Harry Strunk, Harlan County, Waconda Lakes, and Lovewell, Kirwin, and Webster Reservoirs had some flood storage occupied prior to the irrigation season. The irrigation demand months of July and August did little to reduce storage in those project reservoirs that had storage available for full irrigation as inflows maintained reservoir pools. Precipitation during July and August helped in reducing the demands on project reservoirs. Reservoir storage was below normal at eight project reservoirs at the end of 2009.

The following summarized graph shows a comparison of 2008 and 2009 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.



2. Flood Control Operations. Harry Strunk, Harlan County, Waconda Lakes, and Lovewell, Kirwin, and Webster Reservoirs utilized flood pool storage and made flood releases in 2009. The water year 2009 flood damages prevented by the operation of Reclamation’s Nebraska-Kansas Projects facilities was \$10,253,700 as determined by the Corps of Engineers. An additional benefit of \$4,131,500 was credited to Harlan County Lake. The accumulative total of flood control benefits for the years 1951 through 2009 by facilities in this report total \$1,946,542,200 (see Table 5). Box Butte, Merritt, Calamus, and Davis Creek Reservoirs do not have a designated flood pool and have not accrued any flood benefits to date.

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

#### Water Service

There was 342,836 acre-feet (AF) of water diverted to irrigate approximately 210,545 acres of project lands in the 12 irrigation districts (see Tables 3 and 6). The project water supply was either inadequate or limited for 84,302 acres of the total project lands. This includes lands in Mirage Flats, Frenchman Valley, H&RW, Frenchman-Cambridge, and Almena Irrigation Districts. The project water supplies for the other units mentioned in this report were more than adequate in 2009.

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 2009 crop yields on lands receiving project water in the Nebraska-Kansas Projects were higher than 2008. The average corn yield, the principal crop of all reporting districts, was 201 bushels per acre. This was approximately 22 bushels per acre more than in 2008. The start of irrigation releases from project reservoirs varied considerably depending on May rainfall amounts and storage water available. Above normal rainfall was experienced during much of the growing season with near normal temperatures. August was generally cooler than normal. Crop maturity progressed slower than normal during the growing season. Most irrigation districts had finished making irrigation releases by mid September. Only one canal did not divert water in 2009 as a result of short water supplies. All irrigation districts had finished delivering water by the end of September with corn harvest delayed until early winter due to an extremely wet 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. 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 2009 season, normal reservoir operations were favorable for recreation and fish and wildlife uses at project reservoirs with full or nearly full conservation pool levels. Higher water levels during 2009 were experienced at most reservoirs in the Kansas River Basin providing increased recreation benefits. Higher than normal inflows prevented summer drawdown from irrigation releases and thus did not allow for some late summer shoreline re-vegetation. Increased water levels did however submerge existing shoreline vegetation.

The Calamus Fish Hatchery is located below Virginia Smith Dam and Calamus Reservoir. The hatchery consists of an office/visitor center, laboratory, two residences, a shop and feed storage building, 51 rearing ponds lined with VLDPE and covering 45.5 acres, 24 concrete raceways, two lined effluent ponds, eight 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 Nebraska Game and Parks Commission (Commission) and produces approximately 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.

# 2009 HEADLINES

**DNR: Rep. Basin won't be water short in 2010**

State to present area water plans

**Bureau lowering lake**

Fully-appropriated designation reversal impacts Upper Loup

**Harlan supports LRNRD water**

**Reclamation temporarily closes road across Red Willow Dam**

Red Willow situation leaves irrigators dry

**Wolfe: Release was to test the waters**

**Nebraska leads nation in irrigated acreage**

**Kan., Neb. reject water ruling**

**Red Willow Dam's cracks threaten 2010 irrigation, reservoir fun**

Irrigation District has to shut water off due to canal break

**Judge ready to weigh Republican River evidence**

Dam inspection moves to upstream face

Irrigation shutoff 'last resort'

**Transfer of water will be limited to six**

Lawmakers get earful on water

## 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 2009 and serves as a guideline for the 2010 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 water supply 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 are 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. As provided by the lease agreement between Reclamation and the states, the states are responsible for administering the water surface activities and the federal lands around the reservoirs. The U.S. Fish and Wildlife Service administer 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 33.

## 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 1990 through 2009 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.

## 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 Guide Rock Diversion Dam and the 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 through October 15 or such additional period from April 1 through May 1 of each year as determined between the district and Reclamation. The contracted irrigation season for Twin Loups Reclamation District and Almena, Bostwick in Nebraska and Kansas-Bostwick Irrigation Districts is May 1 through September 30 or such additional period from April 1 through November 15 of each year as determined between the district and Reclamation. For Ainsworth, Kirwin, Webster, and Glen Elder Irrigation Districts, the contracted irrigation season is from May 1 through September 30.

## Municipal Water

Three municipalities in Kansas (Norton, Russell, and Beloit) and one rural water district in Kansas (Mitchell County Rural Water District No. 2) 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 Nebraska Game and Parks Commission 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 2010 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 operational 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 can 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 (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 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 *amicus curiae*. After 17 months of negotiations the Final Settlement Stipulation (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.

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 5 year study were developed between Reclamation, the University of Nebraska-Lincoln (UNL), and Kansas State University (KSU). Installation of data loggers on 35 reservoirs throughout the basin was completed in 2004. Advanced monitoring equipment for terraces and additional reservoirs was installed by UNL in 2006. Data collection and model development continued through 2009. The Conservation Committee provided an update on the study at the 2009 Republican River Compact annual meeting held in Lincoln on August 12, 2009. The Conservation Committee is currently working with UNL and KSU to assemble a draft study report which will be presented to the Compact Commissioners in early 2010. A final study report will be presented at the 2010 Republican River Compact annual meeting.

“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 2009 that a “Water-Short Year Administration” was not in effect.

#### Lower Republican River Basin Appraisal Study / Feasibility Study

With the support of Kansas and Nebraska, Reclamation completed the Lower Republican River Basin Appraisal Report in January 2005. This study analyzed system improvement alternatives in the lower portion of the Republican River Basin that would provide for more efficient use of the water supply. The study met requirements of the 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 Compact by investigating the most efficient use of the water of the Republican River Basin for multiple purposes.

Nine alternatives were formulated using the recommended proposals provided by the Compact Commissioners. Three other alternatives were investigated for supplying water in meeting Minimum Desirable Streamflow (MDS) related needs in Kansas. The appraisal report concluded that additional water can be made available for storage in Lovewell Reservoir. The appraisal report 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.

Legislation authorizing a feasibility study was introduced in 2003 but was not advanced. Congressmen from both Nebraska and Kansas reintroduced legislation authorizing the feasibility study in 2007, but again it was not advanced. Language authorizing the feasibility study was included in Senate Bill S2739, which was passed by the Senate and the House of Representatives in April of 2008. On May 8, 2008, the President signed the Consolidated Natural Resources Act of 2008 (P.L. 110-229).

Section 510 of Title V of the Act authorizes the Secretary of the Interior, acting through the Bureau of Reclamation and in consultation and cooperation with the states of Nebraska, Kansas, and Colorado, to conduct a study to determine the feasibility of implementing a water supply and conservation project that will:

1. Improve water supply reliability in the Republican River Basin between Harlan County Lake in Nebraska and Milford Lake in Kansas.
2. Increase the capacity of water storage through modification of existing projects or through new projects that serve areas in the Republican River Basin.
3. Improve water management efficiency in the Republican River Basin through conservation and other available means.
4. Where appropriate, evaluate integrated water resource management and supply needs in the Republican River Basin. Funds must be appropriated before Reclamation can begin the feasibility study.

Both states have expressed support of the feasibility study. At the 2009 Republican River Compact annual meeting, the Compact Commissioners re-affirmed their support of the feasibility study by passing a resolution of support. In late 2009, Reclamation, the Kansas Department of Agriculture (KDA), and the Nebraska Department of Natural Resources (NDNR) began discussions of ways to take advantage of other state and federal programs to complete feasibility study tasks while awaiting appropriations. Initial tasks included detailed topography of the Lovewell Dam embankment, recreation areas, and initial surface water model scoping activities.

#### Frenchman Valley Appraisal Study

In 2004, the NDNR requested Reclamation prepare an Appraisal Study (AS) to 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 focused on problems and opportunities in an area that has experienced dramatically reduced ground and surface water supplies, including reduced reservoir inflows. Study activities have been ongoing since 2005. Agencies participating in the study include Reclamation, NDNR, Frenchman Valley, and H&RW, and Riverside Irrigation Districts, Nebraska Game and Parks Commission, and the Upper and Middle Republican Natural Resources Districts. A final draft report was distributed to participating agencies for review and a meeting to discuss concerns was held on October 27. Agencies have submitted final comments and following Reclamation's review and incorporation of these comments, the report will be finalized in early 2010.

#### Emergency Management

The Nebraska-Kansas Area Office (NKAO) continues to coordinate with local jurisdictions that could potentially be impacted by flooding from large operational releases and/or dam failure. Two tabletop exercises and one functional exercise were conducted during calendar year 2009. The functional exercise was held for Norton Dam. Tabletop exercises were conducted for Glen Elder and Webster Dams. Orientation meetings were held for all of NKAO dams.

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 NKAO and the McCook Field Office have a satellite phone that can be used in an emergency. Management and dam operators have been trained on the use of these phones.

### Public Safety Reviews

The Annual Safety Training for field personnel was held at the McCook Field Office and at the Community College in McCook, Nebraska, in February 2009. This training provided maintenance personnel the opportunity to update their training in Crane, Hoist, and Rigging Safety, NFPA 70E Electrical Safety/Arc Flash Familiarization, Lockout/Tagout Safety Training, Confined Space Refresher Training, Fall Protection Refresher Training, Welding and Cutting Safety, Chemical Safety (Herbicide and Pesticide Use), and Respirator Training and Fit Testing. First Aid and CPR training was provided by the McCook Fire Department to all field personnel, as well as any other Reclamation employees interested in taking the class to become certified in 2008. A refresher will be taught again in 2010.

The ongoing safety reviews of project facilities continue to identify potential safety hazards to the public and operating personnel. NKAO combines elements of the Annual Safety Inspections of the major facilities with the Dam Safety Facility Reviews when possible, and conducts follow up inspections when deficiencies aren't on-the-spot correctible. This format provides for enhanced communication and coordination between both the Area Safety Manager and staff, and teams of Dam Safety Specialists.

Formal training for the Automated External Defibrillators (AEDs) was provided, as part of the CPR Certification Training in February 2008. A refresher will be taught again in 2010. AEDs are located at the McCook Field Office and the Grand Island Office, along with an additional field ready AED at each location for employees to take to the field when activities are being conducted. NKAO continues to involve Great Plains Region Occupational Health in Billings, Montana, and the Federal Occupational and Health Services Center in Denver, Colorado, when maintenance and operational items, such as replacing AED batteries and pads, and reprogramming CPR protocol, is required.

Attention continues with regards to issues concerning lock out/tag out, personal protective equipment (PPE), welding and coating safety procedures, pesticide and herbicide use (MSDS), fall protection/slips, trips, and falls, working alone, near-miss accident reporting, and completing job hazard analyses (JHAs). Employees were provided safety and health training, and given information related to these and several other issues throughout the year.

## 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 2000 to 2009, the project water supply averaged 10,000 AF, which is about 0.86 AF 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 (2,026 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 increase the minimum reservoir level by one additional foot to elevation 3979.00 feet (2,392 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.

#### 2009 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 in the Mirage Flats Irrigation District totaled 19.98 inches, which is 118 percent of normal. The 2009 total inflow of 15,432 AF was slightly below the normal-year forecast.

From mid July through late August, diversions of 8,262 AF to the Mirage Flats Canal provided irrigation water for approximately 5,755 acres, 49 percent of the service available acreage. The farm deliveries from the project water supply totaled 1,446 AF (0.25 acre-foot per irrigated acre), which is a delivery efficiency of 18 percent. Total reservoir storage was 6,133 AF at the end of the irrigation season. Privately owned irrigation wells supplemented the project water supply.

The district continued to implement water conservation measures as outlined in their Water Management Plan and their Long Range Plan. Assistance to project irrigators provided by the district include delivery system 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, accounting, and continued development of their web page that allows irrigators to place water orders, review water accounts, and keep updated on district operations.

## Ainsworth Unit, Sandhills Division in Nebraska

### General

Within the Ainsworth Irrigation District, there are approximately 35,000 acres with available service. The project water supply is provided by storage of Snake River flows in Merritt Reservoir. The reservoir is filled to elevation 2944.0 feet each fall after the irrigation season. This level is approximately 2 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 is then 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. Seepage, pickup and toe drain flow normally result in flows of up to 15 cfs below Merritt Dam.

Reclamation has executed a Memorandum of Agreement (MOA) between Reclamation, the Nebraska Game and Parks Commission, and the Ainsworth Irrigation District for Snake River Releases below Merritt Dam. The purpose of this MOA is to establish the protocol that will be used to make future releases of water from Merritt Dam to the lower Snake River. The development of the MOA was an environmental commitment outlined in the Ainsworth Irrigation District Final Environmental Assessment (FEA) for the Conversion of a Long-Term Water Service Contract to a Repayment Contract (December 2006).

Release criteria will be based on the best available scientific data to determine when local conditions warrant releases to the Snake River. When it becomes necessary to release water from Merritt Reservoir, Reclamation will direct the Ainsworth Irrigation District to make the necessary releases to the river.

### 2009 Summary

Precipitation as recorded near Merritt Dam, totaled 28.14 inches, which was 137 percent of normal. The inflow for the year totaled 182,155 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 61,333 AF diverted from Merritt Reservoir into Ainsworth Canal, with 34,120 AF delivered to the farm headgates (delivery efficiency of 56 percent). There were 34,582 acres of land irrigated in 2009.

The district provided a total of 308 AF of irrigation water from holding ponds located within the district's service area.

The Ainsworth Irrigation District, along with Reclamation and the local Natural Resource District, continued to provide 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. Field days were subsequently held in 2006, 2007, 2008, and 2009. This project is expected to continue in 2010.

Working with Reclamation's technical and financial assistance through a cooperative agreement, the District installed automation on the Sand Draw and Airport Lateral. Additionally, burial of lateral B-7.2, B-10.3, and A-16.2 were completed through the Water Conservation Field Services Program. In addition to these current projects, the district has plans for additional lateral burial and automation efforts.

## 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 55,100 acres of project lands.

Operation of the division also provides a sustained groundwater supply for an additional 17,000 acres. Principal features of the division include Virginia Smith Dam, Calamus Reservoir, Calamus Fish Hatchery, Kent Diversion Dam, Davis Creek Dam and Reservoir, five principal canals, one major, one small pumping plant, and numerous open ditch and buried pipe laterals.

Calamus Reservoir is normally regulated at 3 to 4 feet below the top of conservation capacity during the winter months. Maintaining the reservoir at this elevation during the winter helps avoid ice damage to the soil cement on the upstream face of the dam. After the ice clears in the spring, the reservoir is 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 the storage reservoirs to deliver full water demands. 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 level is maintained at an average elevation of 2048.0 feet from the end of the irrigation season through the winter months. Off season seepage and evaporation has historically resulted in a reservoir drawdown of 2.5 to 3.0 feet requiring an end of September reservoir level of 2050.0 feet or less. 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 continues to be managed by the Lower Loup Natural Resources District. The area includes a boat ramp, a handicapped accessible fishing pier, a day-use area, a primitive camping area, shelter, and a hiking path. Public lands adjoining Kent Diversion Dam are managed by the Commission and is also open to day-use fishing with handicapped accessibility provided.

### 2009 Summary

Precipitation at Virginia Smith Dam was 26.14 inches which is 108 percent of normal. The inflow totaled 278,685 AF which was between the normal- and wet-year forecasts. There were 82,080 AF of water released into Mirdan Canal and 8,626 AF diverted through Kent Canal from the North Loup River. A total of 35,419 AF was diverted for district use above Davis Creek Reservoir. The farm headgate delivery was 16,379 AF which is a delivery efficiency of 46 percent. Land irrigated in 2009 totaled 33,999 acres above Davis Creek Reservoir. Calamus Reservoir inflows were bypassed during July, August, and September as required. Virginia Smith Dam recorded 5.65 inches of precipitation during October, the most ever recorded for the month. The reservoir elevation at the end of the year was at 2239.88 feet. The Calamus Fish Hatchery used bypassed natural flows and storage from Calamus Reservoir totaling 4,512 AF during 2009.

The precipitation total of 25.20 inches near Davis Creek Dam was 102 percent of normal. The site recorded 6.10 inches of precipitation during August 208 percent of average for the month. Inflow to Davis Creek Reservoir totaled 47,962 AF during 2009. Beginning in late April, Davis Creek Reservoir was filled from an elevation of approximately 2048.4 feet to a peak elevation of 2074.02 feet on July 7 using diversions from the North Loup River and Calamus Reservoir.



A release of 41,996 AF was made from Davis Creek Dam into Fullerton Canal, with 17,879 AF delivered to the farm headgates (43 percent delivery efficiency). There were 20,922 acres irrigated below Davis Creek Reservoir. The reservoir elevation at the end of 2009 was very near the normal wintering level at 2047.77 feet.

Through a cooperative agreement with Reclamation, the district began installing remote monitoring equipment at key canal sites to improve delivery system operations. In 2008 equipment was placed at the Parshall flume located below Virginia Smith Dam, at the 9.5 check structure, and at the 13.4 check structure. Further work is anticipated to equip each of the sites with remote control capabilities.

## 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 is 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 Reservoir 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, when inflows are allowed to be stored, enhances fish spawning in the spring and provides excellent fishing opportunities during the summer and hunting conditions each fall.

#### 2009 Summary

The annual precipitation total of 26.56 inches at Bonny Dam was 155 percent of normal and the greatest ever recorded at the site. The annual computed inflow of 11,698 AF to Bonny Reservoir was very close to the normal-year forecast. The reservoir level began the year at elevation 3649.96 feet and gradually increased to a peak elevation of 3652.66 feet by the end of April (19.3 feet below full pool). Bonny Dam received 4.46 inches of precipitation in June and 4.61 inches in July, 166 percent of average for the 2 month period. Rainfall during October was 3.59 inches, 318 percent of average for the month. These rains resulted in the reservoir level increasing approximately 1.5 feet (1,500 acre-feet) from October 1 through November 30. River releases were made during the months of May, June, and December in accordance with orders of the state of Colorado for Republican River Compact compliance. A total of 3,361 AF of river outflow was recorded for this purpose. No flood release was required during 2009 as the reservoir elevation remained well within the conservation pool. The reservoir elevation at the end of the year was 21.0 feet below the top of conservation at 3651.00 feet. The Corps of Engineers determined that \$3,400 of flood prevention benefits was realized from the operation of Bonny Reservoir during 2009.

The Colorado State Water Commissioner directed inflows from the South Fork of the Republican River and Landsman Creek be passed through Bonny Reservoir into Hale Ditch from April 28 through June 2. A total of 674 AF was released into Hale Ditch during 2009.

## Frenchman Unit, Frenchman-Cambridge Division in Nebraska

### General

The Culbertson Canal and the Culbertson Extension Canal systems serve 9,292 acres in the Frenchman Valley Irrigation District and 11,915 acres in the H&RW Irrigation District. The water supply for these lands is furnished by flows from Frenchman, 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 normally deplete the conservation storage by late summer, thereby limiting the fishing and recreational usage.

### 2009 Summary

The annual precipitation total of 29.69 inches at Enders Dam was well above normal (156 percent), and the greatest ever recorded for the site. The 2009 inflow into Enders Reservoir of 6,577 AF was between the dry-year and normal-year forecasts. This was the 42<sup>nd</sup> consecutive year with below-normal inflows in which the conservation pool did not fill. The reservoir level began the year at elevation 3090.99 feet (21.3 feet below top of conservation). The reservoir level increased slightly during the spring to a peak elevation of 3091.91 feet on June 18 and then gradually decreased through early October. The minimum elevation (3090.59 feet) occurred on October 5. Due to the extremely low water supply available, no water was released from Enders Reservoir. The end of the year reservoir level was 21.0 feet below the top of conservation. The Corps of Engineers determined that the reservoir prevented \$1,300 in flood damages in 2009. The Frenchman Valley Irrigation District reports that approximately 874 acres received water in 2009 from natural flow diversions from Frenchman Creek. Farm delivery averaged about 0.61 foot per irrigated acre in the Irrigation District. Some farmers were able to supplement their project water supply from private irrigation wells. The H&RW Irrigation District did not divert water into Culbertson Extension Canal in 2009 due to the extremely low water supply. This was the 7<sup>th</sup> consecutive year that the district did not deliver water.

In August 2004, a small depression was discovered near the outlet works stilling basin at Enders Dam. An Internal Alert remains in effect until investigation of the stability of the outlet works stilling basin and risk assessment are complete. A Safety of Dams recommendation in 2006 recommended filling the stilling basin under drain system and potential voids with low-pressure grout and backfilling the existing sinkhole with compacted material after completion of the grouting program. A rapid increase in reservoir elevation in June 2007 prompted the addition of 50,000 pounds of concrete weights to be placed on the outlet works to counter any uplift on the structure.

In 2009, the Frenchman Valley Irrigation District (along with Reclamation) again provided support for a Limited Irrigation Demonstration Project with the University of Nebraska Extension Service.

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

#### General

Service is provided for Frenchman-Cambridge Irrigation District by Meeker-Driftwood Canal to 16,855 acres; Red Willow Canal to 4,797 acres; Bartley Canal to 6,353 acres; and Cambridge Canal to 17,664 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, Red Willow, and Medicine Creeks. The Frenchman-Cambridge Irrigation District has replaced all of the open ditch laterals which were economically feasible with buried pipe which has significantly increased both system and on-farm efficiencies.

#### 2009 Summary

The annual precipitation total of 27.75 inches at Trenton Dam was 136 percent of normal. The inflow of 37,749 AF to Swanson Lake was slightly above the normal-year forecast. The lake level began the year at elevation 2737.16 feet and peaked at 2742.04 feet (10 feet below the top of conservation) on June 17. The reservoir level decreased during the irrigation season and reached a minimum elevation of 2735.58 feet on October 13.

Irrigation diversions were made into Meeker-Driftwood Canal for the first time since 2002. The district diverted 23,274 AF from June 8 through August 28 and delivered 5,603 AF to the farms. At the end of the year the reservoir level was 13.8 feet below the top of conservation at 2738.17 feet. The Corps of Engineers determined that Swanson Lake prevented \$4,055,000 in flood damages.

The annual precipitation total of 23.96 inches at Red Willow Dam was 122 percent of normal. The annual inflow of 13,279 AF into Hugh Butler Lake was between the dry-year and normal-year forecasts. The reservoir level at the first of the year was 2575.27 feet, 6.5 feet below the top of conservation. The reservoir level peaked at 2577.18 feet (4.6 feet below full) on June 26. Irrigation releases began on June 28 and ended on August 27 dropping the pool level 4.1 feet. The district diverted 5,166 AF into Red Willow Canal and 10,711 AF into Bartley Canal. Flood releases were not required in 2009. October precipitation totaled 4.86 inches, the greatest October total recorded at the site. Discovery of embankment cracking at Red Willow Dam in late October resulted in the evacuation of 21,000 AF from Hugh Butler Lake. The end of year storage at Hugh Butler Lake was the lowest end of December storage ever recorded at the site (elevation 2554.07 feet), 27.7 feet below the top of conservation. The Corps of Engineers determined that Hugh Butler Lake prevented \$1,300 of flood damages during 2009.

The annual precipitation total of 28.90 inches at Medicine Creek Dam was 140 percent of normal and the second highest ever recorded at the dam. The inflow of 42,805 AF was between the normal-year and wet-year forecasts. The reservoir level at the beginning of 2009 was only .8 foot below the top of conservation. Releases were made during the first 4 months of 2009 to maintain the reservoir elevation approximately .5 foot below the flood pool. The reservoir was allowed to fill on April 26 and the reservoir level gradually increased to elevation 2367.27 feet (1.2 feet into flood pool) on June 16. Irrigation releases began on June 23 and ran through September 4 reducing the reservoir level to 2360.22 feet. The district diverted 23,961 AF into Cambridge Canal. Medicine Creek Dam recorded 5.34 inches of precipitation during October, the most ever recorded for the month. Late fall and early winter inflows increased the level of Harry Strunk Lake to only 0.5 foot below the top of conservation at the end of the year (2365.54 feet). The Corps of Engineers determined that Harry Strunk Lake prevented \$4,900 in flood damages.

During an inspection at Red Willow Dam in July 2005, a small quantity of fine sand was discovered near the river outlet works stilling basin drain outlet. Five piezometers were installed in April 2006 adjacent to the outlet works and spillway stilling basins, and temporary plugs were placed in the underdrain outlets in May. An Internal Alert remains in effect. Grouting of the underdrain system was scheduled for the fall of 2009. On October 21, 2009, a small hole was observed on the face of the downstream embankment in a location 130 feet upstream of the outlet works gatehouse on the alignment of the outlet works conduit. Dye was introduced into the hole and subsequent excavation revealed cracks in the embankment material. Reclamation geotechnical engineers and geologists were onsite to conduct the investigations in coordination with the NKAO staff. A Dam Safety decision document was signed calling for a reduction of the reservoir water surface elevation to a range within 2552 to 2554 feet msl. A release of 100 cfs was initiated through the outlet works on October 30, 2009. The release was increased each morning by 50 cfs through November 4, 2009. The release from Red Willow Dam peaked at 350 cfs and was maintained through November 23, 2009, when the release was reduced to 200 cfs.

The release was further reduced to 150cfs on November 25, 2009, to 100cfs on December 2, 2009, and to 65 cfs on December 4, 2009. Hugh Butler Lake reached a new historical low reservoir level on November 23, 2009, since the initial filling of the reservoir and continued to decrease reaching elevation 2554.07 feet by the end of December. Releases will continue as necessary to maintain the reservoir level within the operating level of 2552.00 to 2554.00 feet until permanent corrective actions are made to the dam.

In 2008, the district began making water measurement improvement upgrades on Meeker, Red Willow, and Cambridge Canals, including improving farm turnouts, lateral turnouts, and canal measurement structures. Reclamation provided financial assistance for this project through a cooperative agreement with the district.

### 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.

#### 2009 Summary

The annual precipitation at Norton Dam totaled 32.01 inches, which is 131 percent of normal. The total inflow of 7,452 AF was slightly below the normal-year forecast. The reservoir was 10.4 feet below the top of conservation pool at the first of the year. The reservoir level gradually increased peaking at 2294.85 feet on June 16. Irrigation releases were made during July reducing the lake level by .75 feet. The lake level ended the year at elevation 2294.64 feet (9.7 feet below the top of conservation). The Corps of Engineers determined that Keith Sebelius Lake prevented \$1,000 in flood damages.

The Almena Irrigation District reports that approximately 1,100 acres received water in 2009. 1,551 acre- feet was diverted into the Almena Canal. Farm delivery averaged about 27 foot per irrigated acre in the Irrigation District. Farm delivery efficiency was 19 percent for the District.

The city of Norton used 376 AF of municipal water during 2009.

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 weighted filter drain system and a seepage stability berm was completed in 2006. Construction of the drain was completed 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 22,454 acres in the Bostwick Irrigation District in Nebraska, and 13,378 acres in the Kansas-Bostwick Irrigation District No. 2 above Lovewell Reservoir. This storage and natural 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 3 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 have 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.

Harlan County Dam is currently operating under an Interim Operating Plan (IOP) initiated in 2003. The IOP resulted from a "Dam Safety Assurance Study" that evaluated the adequacy of the dam as required by Corps of Engineers dam safety regulations.

There were three primary findings from this study:

1. Tainter gate bearings may experience significant bearing friction when operated under increasing water load.
2. Concerns of spillway stability due to water pressure in the foundation of the dam.
3. Spillway was found to be hydrologically deficient when modern hydrologic criteria were applied to the dam. The IOP has resulted in a decrease of flood protection capability.



The “Lovewell Reservoir Regulation Manual” is to be revised in 2010 to allow for a 2 foot raise in the conservation pool for water storage during drought years. Storing additional water during drought periods increases the project’s irrigation beneficial purpose, without adversely affecting the ability to protect for the project design storm. A calculation of available water supply will be made at the end of March to determine if additional water can be stored in Lovewell Reservoir.

#### 2009 Summary - Bostwick Division - Harlan County Lake Operations

The annual precipitation at Harlan County Dam totaled 24.50 inches of rainfall, which is 108 percent of normal. The 2009 inflow of 136,747 AF was between the normal- and wet-year forecasts. Harlan County Lake began 2009 approximately .4 foot above the top of conservation pool, at 1946.12 feet. Flood releases were made during the first 3 months of the year. The reservoir level increased gradually during the spring peaking at 1947.46 feet on June 21. Irrigation releases started in mid June and continued through early September. The lake level decreased to elevation 1943.57 feet on September 30. Lake levels increased through the fall and flood releases began on December 29 to maintain the pool level near the top of conservation. A 10 cfs river release was made throughout December as required. The reservoir elevation was 1946.19 feet (0.5 foot in the flood pool) on December 31, 2009. Harlan County Lake prevented \$4,131,500 of downstream flood damages during 2009 according to the Corps of Engineers.

A total of 17,608 AF (approximately 42 percent of total inflow) was delivered to Lovewell Reservoir through the Courtland Canal.

#### 2009 Summary - Bostwick Division - Nebraska

Irrigation diversions were made into Franklin, Naponee, Franklin Pump, Superior, and Courtland Canals in Nebraska in 2009. The district diverted 27,813 AF of water and delivered 10,855 AF to the farm headgates (39 percent delivery efficiency).

The district continued to replace open ditch laterals with buried pipe to reduce losses and improve system operations. In 2009, the district was selected for a Water for America Challenge Grant that is slated to replace approximately 4 miles of open ditch laterals with buried pipe. Identified laterals on the Franklin Canal include: 16.3, 21.1, 21.6, 23.2, 24.0, and a portion of 30.9. These pipe projects provide delivery system improvements by eliminating seepage losses, eliminating operational wasteways, improve water measurement, accounting by utilizing water meters, and provide on-farm benefits by allowing land owners the opportunity to convert to sprinkler irrigation.

#### 2009 Summary - Bostwick Division - Kansas

The 2009 precipitation at Lovewell Dam totaled 21.33 inches, which was 78 percent of normal. The reservoir elevation at the beginning of 2009 was 1581.13 feet (1.5 feet below the top of conservation pool). The pool level gradually increased, filling the conservation capacity on March 4 (1582.6 feet). Flood releases were initiated and continued into April to maintain the reservoir level near the top of conservation. The pool level gradually increased during May peaking at 1583.48 feet on June 5. Irrigation releases to the canal began on May 18 and continued through September 12, dropping the reservoir level 7.5 feet.

Water was then diverted into Lovewell Reservoir via Courtland Canal through early November. The reservoir level at the end of the year was 1579.26 feet (3.34 feet below top of conservation). Lovewell Reservoir prevented \$163,200 of downstream flood damages during 2009 according to the Corps of Engineers.

The Kansas-Bostwick Irrigation District diverted a total of 54,464 AF to serve 10,346 acres above Lovewell Dam and 26,017 acres below Lovewell Dam. Farm delivery efficiency averaged 42 percent in the district.

In 2007, the Kansas Bostwick Irrigation District No. 2 was awarded a Water 2025 Challenge Grant that allowed the district to replace approximately 9 miles of open ditch lateral with buried pipe. The district completed this project during 2009.

## 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.

The U.S. Fish and Wildlife Service (Service) has completed the Kirwin National Wildlife Refuge Comprehensive Conservation Plan (CCP). The 1997 National Refuge System Improvement Act required the Service to develop a CCP for each of its refuges. The Kirwin Refuge CCP will guide the refuge management activities through 2025.

#### 2009 Summary

The annual precipitation total of 27.86 inches at Kirwin Dam was 118 percent of normal. The inflow of 78,204 AF was between the normal-year and wet-year forecasts. The reservoir level was 1.98 feet below the top of conservation pool at the first of the year (elevation 1727.27 feet). Spring and early summer runoff gradually increased the reservoir level, filling the conservation pool on April 27 for the first time since 2000, and reaching 1 foot into the flood pool by June. June precipitation increased the reservoir level to a peak elevation of 1732.85 feet (3.60 feet into the flood pool) on June 17. Flood releases began on June 10 and continued through July 14. June precipitation was the third highest on record for the month. Irrigation releases began on July 11 and continued through August 26 decreasing the reservoir level to 1729.65 feet. The reservoir level continued to increase after irrigation releases ended. Additional flood releases started on November 2 and continued through the remainder of the year. The reservoir elevation was 1729.35 feet on December 31 (0.1 foot above the top of conservation). The Corps of Engineers determined that Kirwin Reservoir prevented \$27,400 in flood damages.

A total of 7,103 acres received project water during 2009 with 6,687 AF delivered to farms. Farm delivery efficiency was 36 percent.

## 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.

### 2009 Summary

In 2009, the precipitation at Webster Dam was 99 percent of normal (23.50 inches). The inflow of 61,300 AF was between the normal-year and wet-year forecasts. The reservoir level was approximately 2 feet below the top of conservation pool at the first of the year (elevation 1890.46 feet). Storage in the reservoir increased during the spring, filling the conservation pool on March 5 for the first time since 2000. The reservoir level continued to increase reaching 2.2 feet into the flood pool by mid May. Flood releases began on May 19 to prevent the reservoir level from climbing any higher. Storms on June 10 and again on June 14 resulted in nearly 4 inches of rainfall, increasing the reservoir level to 4.4 feet into the flood pool on June 17 (elevation 1896.81 feet). Flood releases were increased to 450 cfs from June 17 through July 2. Irrigation releases continued through August 26 decreasing the reservoir level to 1893.47 feet. The reservoir level increased during October and flood releases resumed on November 2 and continued through the remainder of the year. The pool level steadily decreased ending the year at elevation 1893.07 feet on December 31 (0.6 foot above the top of conservation). The COE determined that the reservoir prevented \$15,500 in flood damages.

A total of 3,570 acres received project water during 2009 with 4,229 AF delivered to farms. Farm delivery efficiency was 30 percent.

Concrete repairs in the spillway chute were completed in 2008. Approximately 2,500 ft<sup>2</sup> of concrete was repaired in the flat portion of the spillway by NKAO personnel. Repairs to the other areas of the spillway were contracted to Vieco Development and Construction Company, Inc. Vieco repaired approximately 15,000 ft<sup>2</sup> of spillway.

The district continued to explore opportunities to cost share with Reclamation and district irrigators for the replacement of open ditch laterals with buried pipe. Future conservation projects include the possibility of installing remote monitoring equipment at the key canal measurement sites on Osborne Canal. Future conservation projects may be delayed due to the declining water supply and availability of cost-share funding.

## 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.

Renewal of the long term water service contract with the city of Beloit, Kansas was completed in 2008. The new repayment contract became effective on January 1, 2009. The repayment contract with Beloit, Kansas, provides for the annual use of up to 2,000AF of Waconda Lake storage. Water is measured at the Glen Elder Dam river outlet works.

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.

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.

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 1 to 2 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.

### 2009 Summary

The annual precipitation total of 22.05 inches at Glen Elder Dam was 86 percent of normal. The inflow of 222,698 AF was between the normal-year and wet-year forecasts. The lake level at the beginning of the year was 1 foot below the top of conservation. Flood releases were carried over from the previous year to maintain the reservoir level. Releases were reduced in the spring and Waconda Lake filled on June 10 (elevation 1455.6 feet). The lake level continued to increase and flood releases were increased on June 12. Flood releases varied from 50 to 1,500 cfs throughout the summer as additional runoff increased the reservoir level to approximately .8 foot into the flood pool. The peak reservoir level recorded during the year was 1456.38 feet on June 18 (10,000 acre-feet in the flood pool). The lake level dropped from the flood pool on June 27 and reached elevation 1455.27 feet on August 24. The reservoir level was allowed to increase to .7 foot into the flood pool during the fall in cooperation with the Kansas Wildlife and Parks. River releases were once again increased in early November and continued through the end of the year. The level of Waconda Lake at the end of the year was .5 foot (elevation 1455.15 feet) below the top of conservation. Waconda Lake prevented \$4,208,700 of downstream flood damages during 2009 according to the Corps of Engineers.

A total of 172,104 AF of water was released from Glen Elder Dam in 2009. Storage releases of 2,153 AF combined with natural flow releases of 9,439 AF for the irrigation of 6,318 acres in the Glen Elder Irrigation District. The district delivered 5,225 AF to the farms resulting in a delivery efficiency of 45 percent. No storage releases were made for the city of Beloit; however, 671 AF was bypassed for water quality as directed by the State Water Commissioner. Releases to the Mitchell County Rural Water District No. 2 totaled 674 AF.

## 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. Reformulation of the Cedar Bluff Unit in October of 1992 resulted in the dissolution of the Cedar Bluff Irrigation District with the Kansas Water Office and Kansas Department of Wildlife and Parks acquiring the use and control of portions of the reservoir conservation capacity. A "designated operating pool" was 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 an accounting procedure for water storage in Cedar Bluff Reservoir. In January 2006, a Memorandum of Understanding was signed by the state of Kansas agencies, Kansas Water Office, and Kansas Department of Wildlife and Parks. Kansas Department of Wildlife and Parks will be responsible for the joint pool releases and for the water rights.

### 2009 Summary

The annual precipitation total at Cedar Bluff Dam was 23.22 inches which is 111 percent of normal. The 2009 inflow of 14,391 AF was slightly below the normal-year forecast. The reservoir level at the beginning of the year was 2127.50 feet (16.5 feet below top of conservation). Cedar Bluff Dam recorded 4.47 inches of precipitation during April, the second greatest for the month. Inflows in late May and September increased the reservoir level only slightly. The peak reservoir level recorded during the year was 2127.59 feet on May 8.

The reservoir level gradually decreased through August and increased gradually the remainder of the year. No flood release was made from the dam in 2009. The reservoir level at the end of the year was 2127.54 feet (16.5 feet below the top of conservation).

The state of Kansas utilized the fish hatchery facility located below Cedar Bluff Dam with 3 AF released to the facility. No water was released from Cedar Bluff Reservoir during 2009 for the city of Russell.



TABLE 1  
RESERVOIR DATA - NIOBRARA, LOWER PLATTE AND KANSAS RIVER BASINS

CAPACITY ALLOCATIONS 1/

LIVE CONSERVATION

RESERVOIR		DEAD	Inactive	Active	FLOOD CONTROL
Box Butte	- Elevation Ft.	3969.0	3979.0	4007.0	---
	Total Acre-feet	188	2,392	29,161	---
	Net Acre-feet	188	2,204	26,769	---
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	3,408	7,897	34,647	87,361
	Net Acre-feet	3,408	4,489	26,750	52,714
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.)		35,685	273,495	1,472,250	3,829,817 2/
Total Net Acre-feet		35,685	237,810	1,198,755	2,357,567

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 2009 OPERATIONS

MIRAGE FLATS PROJECT

BOX BUTTE RESERVOIR					MIRAGE FLATS CANAL		
Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	708	32	58	0.65	6,993	0	0
Feb.	879	30	77	0.30	7,765	0	0
Mar.	1,362	35	149	0.33	8,943	0	0
Apr.	2,698	52	276	3.23	11,313	0	0
May	1,192	46	364	1.17	12,095	0	0
June	1,375	44	476	3.98	12,950	0	0
July	697	3,767	502	3.79	9,378	3,721	580
Aug.	1,393	4,286	352	2.75	6,133	4,541	866
Sep.	903	363	227	0.30	6,446	0	0
Oct.	1,480	36	176	2.40	7,714	0	0
Nov.	1,599	35	107	0.36	9,171	0	0
Dec.	1,147	36	69	0.72	10,213	0	0
<b>TOTAL</b>	<b>15,432</b>	<b>8,761</b>	<b>2,833</b>	<b>19.98</b>	<b>--</b>	<b>8,262</b>	<b>1,446</b>

NOTE -- Acres irrigated 2009: Mirage Flats Canal 5,755 acres.

SANDHILLS DIVISION  
AINSWORTH UNIT

MERRITT RESERVOIR					AINSWORTH CANAL		
Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	Release To Canal (AF)	Delivered To Farms (AF)
Jan.	14,787	14,281	236	0.47	61,370	0	0
Feb.	15,176	14,876	300	1.23	61,370	0	0
Mar.	16,260	15,571	418	0.96	61,641	0	0
Apr.	18,224	12,417	722	3.20	66,726	0	0
May	14,287	13,131	1,156	2.26	66,726	3,544	220
June	14,938	13,726	1,212	7.44	66,726	3,116	48
July	15,830	24,705	1,133	6.22	56,718	21,108	12,780
Aug.	15,244	18,258	980	2.51	52,724	19,355	11,457
Sep.	14,166	14,210	620	0.59	52,060	14,210	9,615
Oct.	16,154	6,129	715	2.53	61,370	0	0
Nov.	13,767	13,587	450	0.25	61,100	0	0
Dec.	13,324	13,012	312	0.48	61,100	0	0
<b>TOTAL</b>	<b>182,155</b>	<b>173,901</b>	<b>8,254</b>	<b>28.14</b>	<b>--</b>	<b>61,333</b>	<b>34,120</b>

NOTE -- Acres irrigated 2009: Ainsworth Canal 34,582 acres.

NORTH LOUP DIVISION  
CALAMUS RESERVOIR

CALAMUS RESERVOIR					ABOVE DAVIS CREEK MIRDAN CANAL				
Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Month Content (AF)	Release to Calamus Fish Hatch. (AF)	Release to Canal (AF)	Canal Use (AF)	Delivered To Farms (AF)
Jan.	20,275	18,849	452	0.35	110,001	170	0	0	0
Feb.	21,030	19,061	567	0.56	111,403	124	0	0	0
Mar.	26,399	15,567	1,036	0.57	121,199	446	0	0	0
Apr.	24,645	17,201	1,499	1.85	127,144	638	4,126	0	0
May	24,520	22,664	1,907	2.15	127,093	540	13,605	3,297	1,217
June	28,223	28,340	1,868	6.47	125,108	475	14,650	2,544	351
July	22,465	43,823	1,956	1.89	101,794	639	26,301	14,300	7,346
Aug.	23,768	36,030	1,558	4.44	87,974	574	16,788	10,362	4,694
Sep.	19,819	24,340	821	1.28	82,632	615	6,610	4,916	2,771
Oct.	25,369	13,155	1,139	5.65	93,707	273	0	0	0
Nov.	22,439	11,818	667	0.16	103,661	18	0	0	0
Dec.	19,734	15,574	404	0.77	107,417	0	0	0	0
<b>TOTAL</b>	<b>278,685</b>	<b>266,421</b>	<b>13,874</b>	<b>26.14</b>	<b>--</b>	<b>4,512</b>	<b>82,080</b>	<b>35,419</b>	<b>16,379</b>

NOTE -- Acres irrigated 2009: Mirdan Canal 33,999 acres.

NORTH LOUP DIVISION (Continued)

DAVIS CREEK RESERVOIR					BELOW DAVIS CREEK FULLERTON CANAL		
Month	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	End of Mo. Content (AF)	Release To Canal (AF)	Delivered To Farms (AF)
Jan.	40	209	51	0.37	9,906	0	0
Feb.	77	179	63	0.31	9,741	0	0
Mar.	8	189	109	0.44	9,451	0	0
Apr.	2,336	268	187	1.50	11,332	0	0
May	12,618	4,025	267	1.67	19,658	3,138	24
June	13,269	4,775	407	5.92	27,745	3,810	7
July	10,536	14,515	433	3.09	23,333	13,565	9,738
Aug.	6,372	13,583	352	6.10	15,770	13,277	6,037
Sep.	2,140	8,670	133	1.25	9,107	8,206	2,073
Oct.	461	173	140	3.99	9,255	0	0
Nov.	102	164	76	0.00	9,117	0	0
Dec.	4	155	44	0.56	8,922	0	0
<b>TOTAL</b>	<b>47,962</b>	<b>46,904</b>	<b>2,262</b>	<b>25.20</b>	<b>--</b>	<b>41,996</b>	<b>17,879</b>

NOTE - Acres irrigated 2009: Fullerton Canal 20,922 acres.

TABLE 2  
SUMMARY OF 2009 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.	899	246	86	0.19	9,843	0
Feb.	1,029	256	106	0.60	10,510	0
Mar.	908	307	157	0.73	10,954	0
Apr.	1,539	337	316	2.84	11,840	39
May	1,140	1,547	461	3.23	10,972	593
June	1,351	1,401	411	4.46	10,511	36
July	713	314	490	4.61	10,420	6
Aug.	296	307	417	2.93	9,992	0
Sep.	547	298	315	2.45	9,926	0
Oct.	1,269	307	208	3.59	10,680	0
Nov.	1,172	298	184	0.50	11,370	0
Dec.	835	1,886	99	0.43	10,220	0
<b>TOTAL</b>	<b>11,698</b>	<b>7,504</b>	<b>3,250</b>	<b>26.56</b>	<b>--</b>	<b>674</b>

FRENCHMAN-CAMBRIDGE DIVISION  
FRENCHMAN UNIT

Month	ENDERS RESERVOIR				End of Month Content (AF)	CULBERTSON CANAL		CULBERTSON EXT. CANAL	
	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)		Diversions To Canal (AF)	Delivered To Farms (AF)	Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	436	307	67	0.27	15,430	0	0	0	0
Feb.	510	278	80	0.95	15,582	0	0	0	0
Mar.	420	307	131	0.31	15,564	0	0	0	0
Apr.	886	298	282	4.03	15,870	718	0	0	0
May	795	307	369	3.74	15,989	2,403	0	0	0
June	705	298	320	5.74	16,076	2,253	88	0	0
July	530	307	420	5.84	15,879	2,126	208	0	0
Aug.	224	307	384	2.28	15,412	1,759	197	0	0
Sep.	256	298	257	2.06	15,113	365	44	0	0
Oct.	688	307	126	3.70	15,368	0	0	0	0
Nov.	584	298	153	0.18	15,501	0	0	0	0
Dec.	542	307	74	0.59	15,662	0	0	0	0
<b>TOTAL</b>	<b>6,577</b>	<b>3,620</b>	<b>2,663</b>	<b>29.69</b>	<b>--</b>	<b>9,624</b>	<b>537</b>	<b>0</b>	<b>0</b>

NOTE: Acres irrigated 2009: Culbertson Canal - 874 acres; Culbertson Extension Canal - 0 acres.

FRENCHMAN-CAMBRIDGE DIVISION (Continued)  
MEEKER-DRIFTWOOD UNIT

Month	SWANSON LAKE				End of Month Content (AF)	MEEKER-DRIFTWOOD	
	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)		Release To Canal (AF)	Delivered To Farms (AF)
Jan.	1,811	61	248	0.16	53,491	0	0
Feb.	3,306	56	299	0.52	56,442	0	0
Mar.	2,822	61	499	0.05	58,704	0	0
Apr.	4,907	60	1,005	2.83	62,546	0	0
May	6,070	61	1,508	4.33	67,047	0	0
June	6,393	4,417	1,517	4.70	67,506	4,555	9
July	2,523	10,449	1,767	4.47	57,813	10,307	2,654
Aug.	631	8,600	1,457	2.31	48,387	8,412	2,940
Sep.	157	60	908	2.30	47,576	0	0
Oct.	2,346	61	403	4.64	49,458	0	0
Nov.	3,780	60	538	0.42	52,640	0	0
Dec.	3,001	61	266	0.52	55,314	0	0
<b>TOTAL</b>	<b>37,749</b>	<b>24,009</b>	<b>10,415</b>	<b>27.25</b>	<b>--</b>	<b>23,274</b>	<b>5,603</b>

NOTE: Acres irrigated 2009: Meeker-Driftwood Canal - 12,714 acres.

FRENCHMAN-CAMBRIDGE DIVISION (Continued)  
RED WILLOW UNIT

Month	HUGH BUTLER LAKE				End of Month Content (AF)	RED WILLOW CANAL		BARTLEY CANAL	
	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)		Diversions To Canal (AF)	Delivered To Farms (AF)	Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	683	246	94	0.16	26,794	0	0	0	0
Feb.	823	222	117	0.35	27,278	0	0	0	0
Mar.	662	246	193	0.07	27,501	0	0	0	0
Apr.	1,496	238	440	2.99	28,319	0	0	1,254	0
May	1,298	246	594	3.39	28,777	0	0	2,723	16
June	1,074	347	563	3.87	28,941	55	0	2,193	197
July	862	3,043	716	4.26	26,044	2,951	520	2,246	725
Aug.	843	2,868	643	2.05	23,376	2,160	736	2,295	1,150
Sep.	518	238	368	1.42	23,288	0	0	0	0
Oct.	1,352	357	236	4.86	24,047	0	0	0	0
Nov.	2,121	17,257	160	0.27	8,751	0	0	0	0
Dec.	1,548	3,894	48	0.27	6,357	0	0	0	0
<b>TOTAL</b>	<b>13,279</b>	<b>29,201</b>	<b>4,172</b>	<b>23.96</b>	<b>--</b>	<b>5,166</b>	<b>1,256</b>	<b>10,711</b>	<b>2,088</b>

NOTE -- Acres irrigated 2009: Red Willow Canal - 2,962 acres; Bartley Canal 5,865 acres.

FRENCHMAN-CAMBRIDGE DIVISION (Continued)  
CAMBRIDGE UNIT

Month	HARRY STRUNK LAKE				End of Month Content (AF)	CAMBRIDGE CANAL	
	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)		Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	3,260	2,767	121	0.19	33,523	0	0
Feb.	3,294	2,717	146	0.57	33,954	0	0
Mar.	3,517	3,382	243	0.07	33,846	0	0
Apr.	4,293	2,340	616	3.35	35,183	0	0
May	4,252	2,179	769	4.49	36,487	1,489	0
June	4,056	3,959	725	3.34	35,859	5,702	880
July	4,054	6,563	879	5.12	32,471	7,171	3,223
Aug.	3,473	9,001	806	3.79	26,137	8,572	4,108
Sep.	2,576	1,139	374	1.73	27,200	1,027	635
Oct.	3,747	62	223	5.34	30,662	0	0
Nov.	3,351	60	269	0.20	33,684	0	0
Dec.	2,933	2,864	123	0.71	33,630	0	0
<b>TOTAL</b>	<b>42,805</b>	<b>37,032</b>	<b>5,294</b>	<b>28.90</b>	<b>--</b>	<b>23,961</b>	<b>8,846</b>

NOTE -- Acres irrigated 2009: Cambridge Canal 15,964 acres.

KANSASKA DIVISION  
ALMENA UNIT

Month	KEITH SEBELIUS LAKE				End of Month Content (AF)	Release To City Of Norton (AF)	ALMENA CANAL	
	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)			Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	376	54	92	0.12	16,543	23	0	0
Feb.	354	48	115	0.37	16,734	20	0	0
Mar.	344	53	195	0.02	16,830	22	0	0
Apr.	959	53	476	3.33	17,260	23	0	0
May	1,032	69	682	3.81	17,541	38	0	0
June	705	73	652	2.46	17,521	43	218	0
July	694	1,037	757	5.36	16,421	41	1,099	300
Aug.	938	79	696	7.07	16,584	48	234	0
Sep.	204	87	428	2.19	16,273	57	0	0
Oct.	800	53	245	5.92	16,775	22	0	0
Nov.	495	49	225	0.15	16,996	19	0	0
Dec.	552	51	111	1.21	17,386	20	0	0
<b>TOTAL</b>	<b>7,452</b>	<b>1,705</b>	<b>4,674</b>	<b>32.01</b>	<b>--</b>	<b>376</b>	<b>1,551</b>	<b>300</b>

NOTE: Acres irrigated 2009: Almena Canal - 1,100 acres.

BOSTWICK DIVISION  
FRANKLIN UNIT

Month	HARLAN COUNTY LAKE 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.	7,617	7,553	876	0.14	318,499	0	0	0	0
Feb.	9,352	7,323	947	0.28	319,581	0	0	0	0
Mar.	12,020	9,094	1,437	0.00	321,070	0	0	0	0
Apr.	12,714	0	3,785	1.71	329,999	0	0	0	0
May	12,803	4,263	5,249	4.16	333,290	0	0	0	0
June	10,859	11,437	3,795	2.59	328,917	2,805	517	74	10
July	13,190	23,685	6,163	6.89	312,259	9,618	2,818	421	94
Aug.	7,656	22,364	6,608	3.79	290,943	9,979	3,571	538	115
Sep.	1,904	2,442	4,238	0.43	286,167	844	321	62	27
Oct.	10,721	0	4,415	3.58	292,473	0	0	0	0
Nov.	21,846	4,927	2,958	0.02	306,434	0	0	0	0
Dec.	16,066	992	1,250	0.91	320,258	0	0	0	0
<b>TOTAL</b>	<b>136,747</b>	<b>94,079</b>	<b>41,721</b>	<b>24.50</b>	<b>--</b>	<b>23,246</b>	<b>7,227</b>	<b>1,095</b>	<b>246</b>

NOTE: Acres irrigated 2009: Franklin Canal - 10,920 acres; Naponee Canal - 1,650 acres.

BOSTWICK DIVISION (Continued)  
SUPERIOR-COURTLAND UNIT

Month	FRANKLIN PUMP CANAL		SUPERIOR CANAL		Total Diversion (AF)	COURTLAND CANAL - ABOVE LOVEWELL		KANSAS USE	
	Diverted To Canal (AF)	Delivered To Farms (AF)	Diverted To Canal (AF)	Delivered To Farms (AF)		NEBRASKA USE 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	3,168	0	0	0	0
June	214	66	536	17	10,794	98	85	4,905	315
July	371	99	2,550	989	13,676	343	297	6,563	2,611
Aug.	324	85	3,021	1,446	13,376	277	227	6,700	3,002
Sep.	0	0	229	71	5,161	0	0	665	190
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>909</b>	<b>250</b>	<b>6,336</b>	<b>2,523</b>	<b>46,175</b>	<b>718</b>	<b>609</b>	<b>18,833</b>	<b>6,118</b>

NOTE: Acres irrigated 2009: Franklin Pump Canal - 2,090 acres; Superior Canal - 5,848 acres.  
Courtland Canal-Nebraska use - 1,946 acres.  
Courtland Canal-Kansas use - 10,346 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.	2,391	0	2,391	0	160	0.08	33,669	0	0
Feb.	2,165	0	2,165	11	217	0.36	35,606	0	0
Mar.	1,048	0	1,048	2,374	379	0.06	33,901	0	0
Apr.	1,983	0	1,983	1,052	757	2.91	34,075	0	0
May	5,217	288	5,505	601	1,185	0.64	37,794	728	0
June	2,904	2,571	5,475	5,338	1,332	3.20	36,599	5,850	888
July	2,588	4,169	6,757	13,806	1,295	4.99	28,255	13,772	7,343
Aug.	2,189	3,846	6,035	13,877	992	3.24	19,421	13,710	8,020
Sep.	1,061	2,781	3,842	1,704	498	1.78	21,061	1,571	562
Oct.	975	3,353	4,328	12	367	2.32	25,010	0	0
Nov.	779	600	1,379	12	369	0.48	26,008	0	0
Dec.	698	0	698	12	166	1.27	26,528	0	0
<b>TOTAL</b>	<b>23,998</b>	<b>17,608</b>	<b>41,606</b>	<b>38,798</b>	<b>7,717</b>	<b>21.33</b>	<b>--</b>	<b>35,631</b>	<b>16,813</b>

NOTE: Acres irrigated 2009: Courtland Canal below Lovewell 26,017 acres.

SOLOMON DIVISION  
KIRWIN UNIT

Month	KIRWIN RESERVOIR				End of Month Content (AF)	KIRWIN CANAL	
	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)		Release To Canal (AF)	Delivered To Farms (AF)
Jan.	3,428	0	303	0.07	91,550	0	0
Feb.	3,018	0	420	0.37	94,148	0	0
Mar.	2,738	0	697	0.00	96,189	0	0
Apr.	4,225	0	1,752	2.25	98,662	0	0
May	5,281	0	1,889	4.34	102,054	0	0
June	27,476	16,001	2,513	5.92	111,016	3,955	367
July	10,475	18,627	2,772	4.40	100,092	7,953	2,900
Aug.	10,012	6,556	2,787	4.01	100,761	6,421	3,420
Sep.	2,334	0	1,456	1.02	101,639	0	0
Oct.	4,028	0	1,047	3.67	104,620	0	0
Nov.	2,920	4,860	834	0.50	101,846	0	0
Dec.	2,270	5,058	396	1.31	98,662	0	0
<b>TOTAL</b>	<b>78,204</b>	<b>51,101</b>	<b>16,866</b>	<b>27.86</b>	<b>--</b>	<b>18,329</b>	<b>6,687</b>

NOTE: Acres irrigated 2009: Kirwin Canal - 7,103 acres.

SOLOMON DIVISION (Continued)  
WEBSTER UNIT

Month	WEBSTER RESERVOIR				End of Month Content (AF)	OSBORNE CANAL	
	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)		Diversions To Canal (AF)	Delivered To Farms (AF)
Jan.	3,971	0	263	0.09	72,593	0	0
Feb.	3,424	0	311	0.11	75,706	0	0
Mar.	2,944	0	557	0.00	78,093	0	0
Apr.	5,783	0	1,194	2.79	82,682	582	0
May	4,632	918	1,681	1.56	84,715	1,743	0
June	19,324	15,586	1,816	4.98	86,637	3,095	81
July	5,572	6,113	2,222	4.86	83,874	4,547	1,806
Aug.	3,908	4,987	2,115	3.25	80,680	4,322	2,342
Sep.	1,529	0	1,100	1.24	81,109	0	0
Oct.	3,098	0	732	2.69	83,475	0	0
Nov.	3,984	4,959	646	0.65	81,854	0	0
Dec.	3,131	6,149	322	1.28	78,514	0	0
<b>TOTAL</b>	<b>61,300</b>	<b>38,712</b>	<b>12,959</b>	<b>23.50</b>	<b>--</b>	<b>14,289</b>	<b>4,229</b>

NOTE: Acres irrigated 2009: Osborne Canal - 3,570 acres.

SOLOMON DIVISION (Continued)  
GLEN ELDER UNIT

Month	WACONDA LAKE				End of Month Content (AF)	OUTFLOW TO RIVER				
	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)		City of Beloit Storage Release (AF)	Quality Bypass (AF)	Irrig. District Storage Release (AF)	Other Controlled Releases (AF)	Release To Mitchell No. 2 RWD (AF)
Jan.	19,597	23,866	778	0.02	201,373	0	0	0	23,806	60
Feb.	15,355	14,536	938	0.15	201,254	0	0	0	14,487	49
Mar.	13,467	6,640	1,661	0.03	206,420	0	0	0	6,583	57
Apr.	13,725	3,245	4,475	1.99	212,425	0	0	0	3,180	65
May	13,995	3,607	5,905	0.97	216,908	0	0	0	3,545	62
June	50,947	43,866	6,288	5.28	217,701	0	0	157	43,653	56
July	29,147	20,115	6,935	4.04	219,798	0	0	770	19,283	62
Aug.	16,149	9,543	6,732	3.34	219,672	0	0	1,226	8,257	60
Sep.	6,882	3,677	3,961	2.10	218,916	0	16	0	3,614	47
Oct.	7,316	662	2,605	2.36	222,965	0	615	0	0	47
Nov.	16,365	11,545	2,011	0.29	225,774	0	40	0	11,454	51
Dec.	19,753	30,802	935	1.48	213,790	0	0	0	30,744	58
<b>TOTAL</b>	<b>222,698</b>	<b>172,104</b>	<b>43,224</b>	<b>22.05</b>	<b>--</b>	<b>0</b>	<b>671</b>	<b>2,153</b>	<b>168,606</b>	<b>674</b>

NOTE: Acres irrigated 2009: Glen Elder District 6,318 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)	Release to Kansas Water Office (AF)
	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)				
Jan.	0	0	468	0.11	83,074	0	0	0
Feb.	17	0	367	0.06	82,724	0	0	0
Mar.	0	0	658	0.03	82,066	0	0	0
Apr.	2,880	0	1,286	4.47	83,660	0	0	0
May	2,049	0	2,049	2.30	83,660	0	0	0
June	1,005	1	1,949	1.92	82,715	0	1	0
July	175	2	2,163	1.93	80,725	0	2	0
Aug.	1,366	0	2,350	3.70	79,741	0	0	0
Sep.	3,523	0	1,121	3.55	82,143	0	0	0
Oct.	1,284	0	819	3.01	82,608	0	0	0
Nov.	1,409	0	670	1.29	83,347	0	0	0
Dec.	683	0	331	0.85	83,699	0	0	0
<b>TOTAL</b>	<b>14,391</b>	<b>3</b>	<b>14,231</b>	<b>23.22</b>	<b>--</b>	<b>0</b>	<b>3</b>	<b>0</b>

**TABLE 3**  
**ACRES IRRIGATED IN 2009**

Irrigation District and Canal	Acres With Service Available	Acres Irrigated in 2009
Mirage Flats Irrigation District		
Mirage Flats Canal	11,662	5,755
Ainsworth Irrigation District		
Ainsworth Canal	35,000	34,582
Twin Loups Irrigation District		
Above Davis Creek	34,053	33,999
Below Davis Creek	21,063	20,922
Total Twin Loups Irrigation District	55,116	54,921
Frenchman Valley Irrigation District		
Culbertson Canal	9,292	874
H & RW Irrigation District		
Culbertson Extension Canal	11,915	0
Frenchman-Cambridge Irrigation District		
Meeker-Driftwood Canal	16,855	12,714
Red Willow Canal	4,797	2,962
Bartley Canal	6,353	5,865
Cambridge Canal	17,664	15,964
Total Frenchman-Cambridge Irrigation District	45,669	37,505
Almena Irrigation District		
Almena Canal	5,764	1,100
Bostwick Irrigation District in Nebraska		
Franklin Canal	10,920	10,920
Naponee Canal	1,650	1,650
Franklin Pump Canal	2,090	2,090
Superior Canal	5,848	5,848
Courtland Canal (Nebraska)	1,946	1,946
Total Bostwick Irrigation Dist. in Nebraska	22,454	22,454
Kansas-Bostwick Irrigation District		
Courtland Canal above Lovewell	13,378	10,346
Courtland Canal below Lovewell	29,122	26,017
Total Kansas-Bostwick Irrigation District	42,500	36,363
Kirwin Irrigation District		
Kirwin Canal	11,465	7,103
Webster Irrigation District		
Osborne Canal	8,537	3,570
Glen Elder Irrigation District	10,370	6,318
TOTAL PROJECT USES	269,744	210,545
Non-Project Uses		
Hale Ditch	700	0
TOTAL PROJECT AND NON-PROJECT	270,444	210,545

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

RESERVOIR	DURING FY 2009	PRIOR TO 2009	ACCUMULATED TOTAL
BONNY	\$3,400	\$2,802,300	\$2,805,700
ENDERS	\$1,300	\$3,564,300	\$3,565,600
SWANSON	\$4,055,000	\$23,046,900	\$27,101,900
HUGH BUTLER	\$1,300	\$3,016,600	\$3,017,900
HARRY STRUNK	\$4,900	\$10,190,700	\$10,195,600
KEITH SEBELIUS	\$1,000	\$3,989,700	\$3,990,700
HARLAN COUNTY	\$4,131,500	\$186,960,600	\$191,092,100
LOVEWELL	\$163,200	\$149,665,300	\$149,828,500
KIRWIN	\$27,400	\$87,018,000	\$87,045,400
WEBSTER	\$15,500	\$110,367,800	\$110,383,300
WACONDA	\$4,208,700	\$1,220,804,400	\$1,225,013,100
CEDAR BLUFF	\$1,772,000	\$130,730,400	\$132,502,400
TOTAL	\$14,385,200	\$1,932,157,000	\$1,946,542,200

Estimates of damages prevented are received from the Army Corps of Engineer's Kansas City District Office. The Accumulated Totals date from 1951 through 2009. 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 2009

(Units - Acre-Feet)

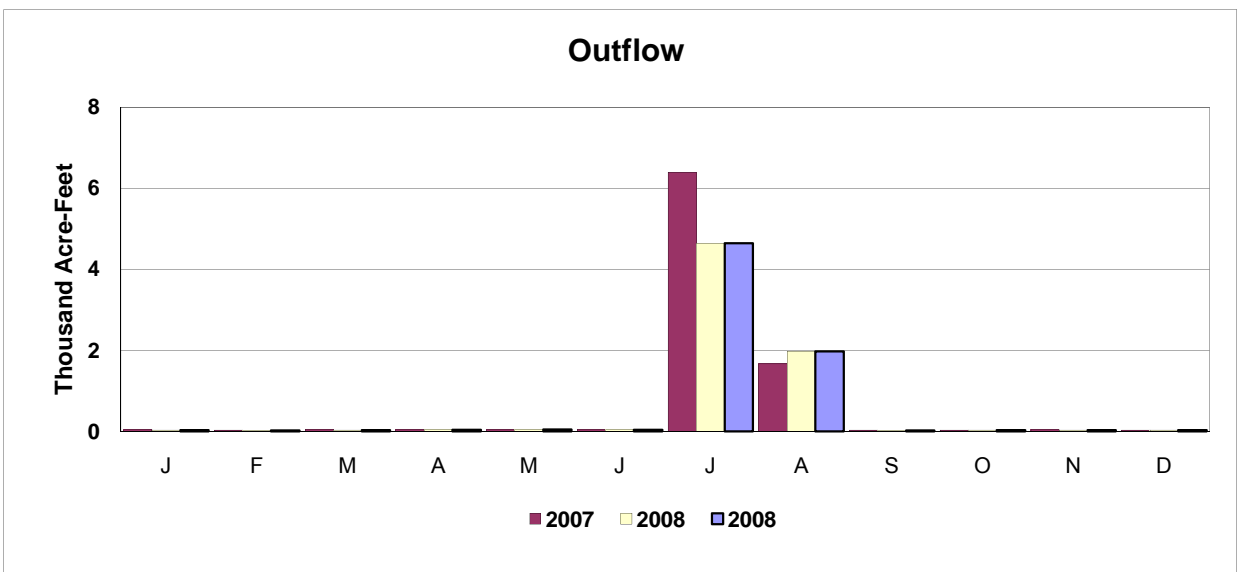
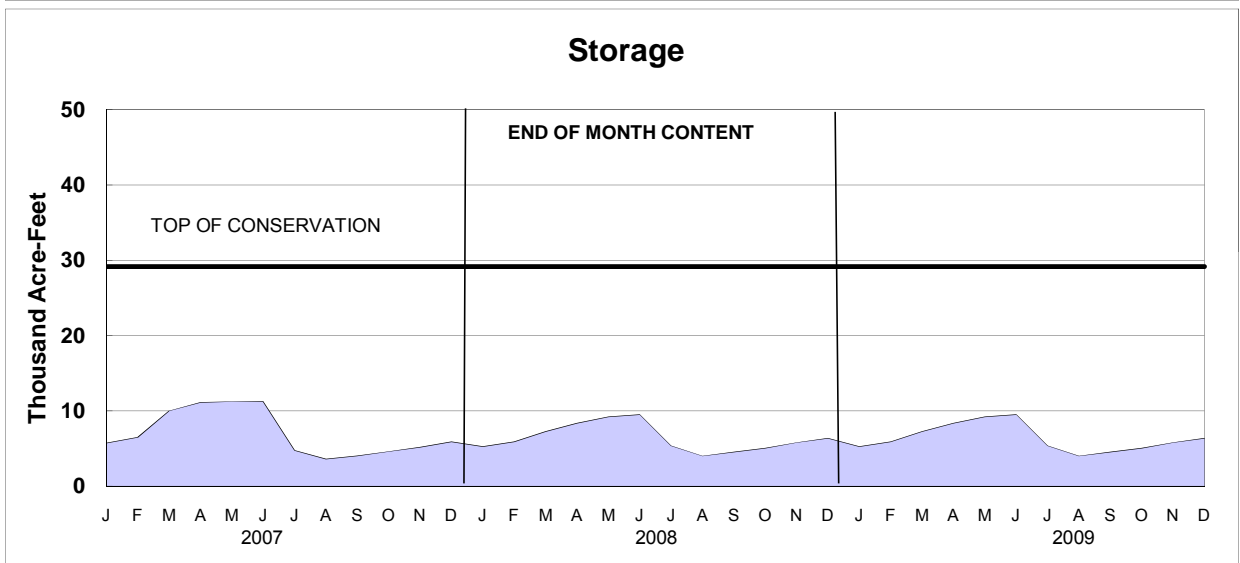
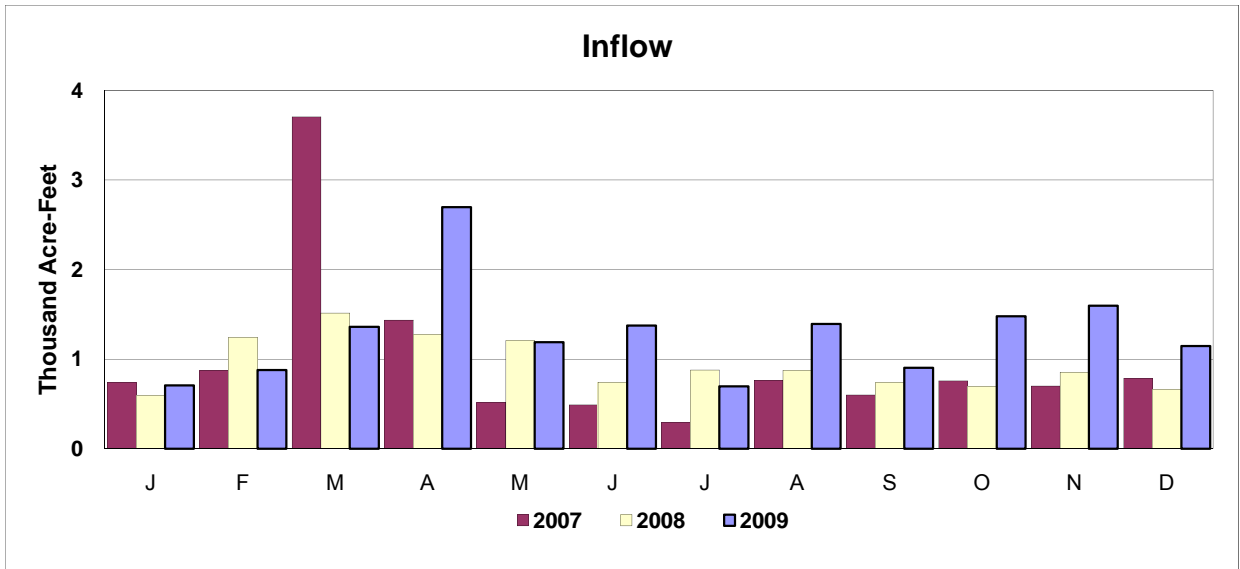
Irrigation District and Canal	2009 Irrigation Operations		10-Year Average Diversion (1999-2008)	2009 Diversion
	From	To		
Mirage Flats Irrigation District				
Mirage Flats Canal	7/15	8/29	10,416	8,262
Ainsworth Irrigation District				
Ainsworth Canal	5/10	9/25	77,378	61,333
Twin Loups Irrigation District				
Above Davis Creek	4/20	9/21	44,557	35,419
Below Davis Creek	5/5	9/25	41,095	41,996
Total Twin Loups Irrigation District			85,652	77,415
Frenchman Valley Irrigation District				
Culbertson Canal	4/21	9/9	5,660	9,624
H & RW Irrigation District				
Culbertson Extension Canal	Did not run.		3,016	0
Frenchman-Cambridge Irrigation District				
Meeker-Driftwood Canal	6/8	8/28	7,844	23,274
Red Willow Canal	6/30	8/28	2,678	5,166
Bartley Canal	4/13	8/29	3,115	10,711
Cambridge Canal	5/20	9/4	18,756	23,961
Total Frenchman-Cambridge Irrigation District			32,393	63,112
Almena Irrigation District				
Almena Canal	6/3	8/3	2,605	1,551
Bostwick Irrigation District in Nebraska				
Franklin Canal	6/23	9/4	15,537	23,246
Naponee Canal	6/29	9/4	1,438	1,095
Franklin Pump Canal	6/24	8/21	1,585	909
Superior Canal	6/23	9/4	8,066	6,336
Courtland Canal (Nebraska)	6/23	9/4	1,187	718
Total Bostwick Irrigation District in Nebraska			27,813	32,304
Kansas-Bostwick Irrigation District				
Courtland Canal above Lovewell	6/10	9/11	17,755	18,833
Courtland Canal below Lovewell	5/18	9/12	39,074	35,631
Total Kansas-Bostwick Irrigation District			56,829	54,464
Kirwin Irrigation District				
Kirwin Canal	6/10	8/26	12,902	18,329
Webster Irrigation District				
Osborne Canal	4/14	8/26	7,328	14,289
Glen Elder Irrigation District				
Glen Elder Canal	5/18	8/25	7,289	2,153
TOTAL			329,281	342,836

**TABLE 7**  
**NEBRASKA-KANSAS PROJECTS**  
**Summary of Precipitation, Reservoir Storage and Inflows**  
**CALENDAR YEAR 2009**

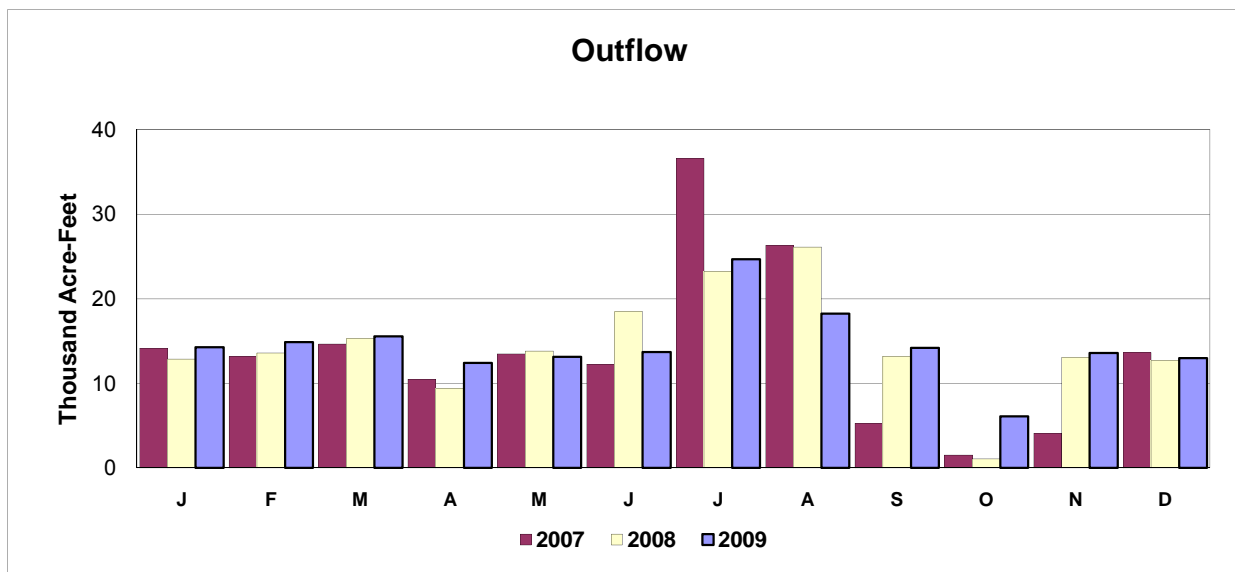
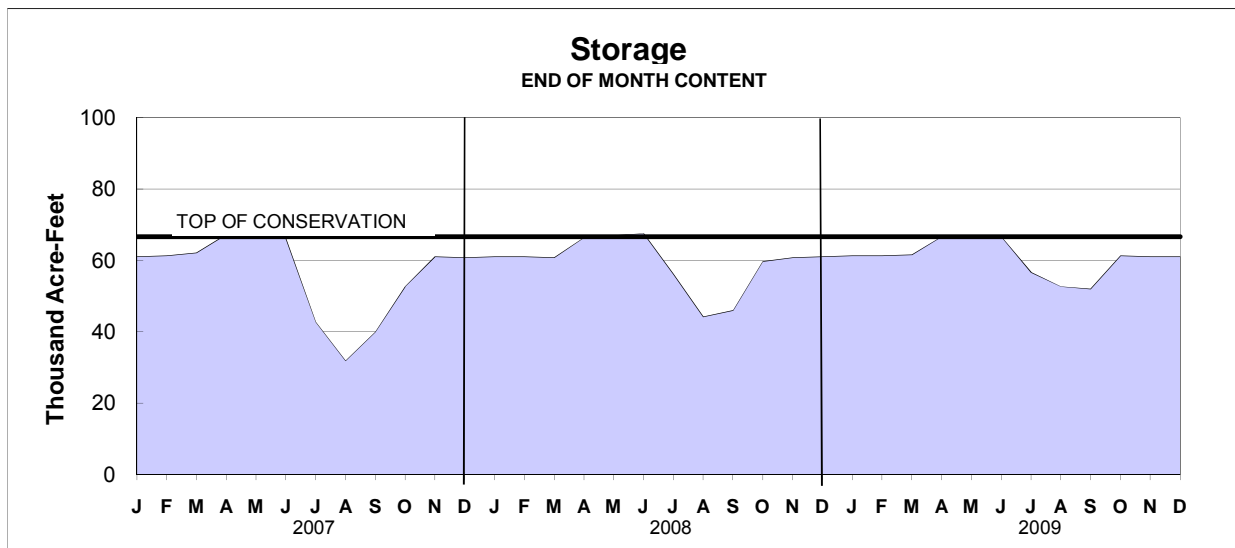
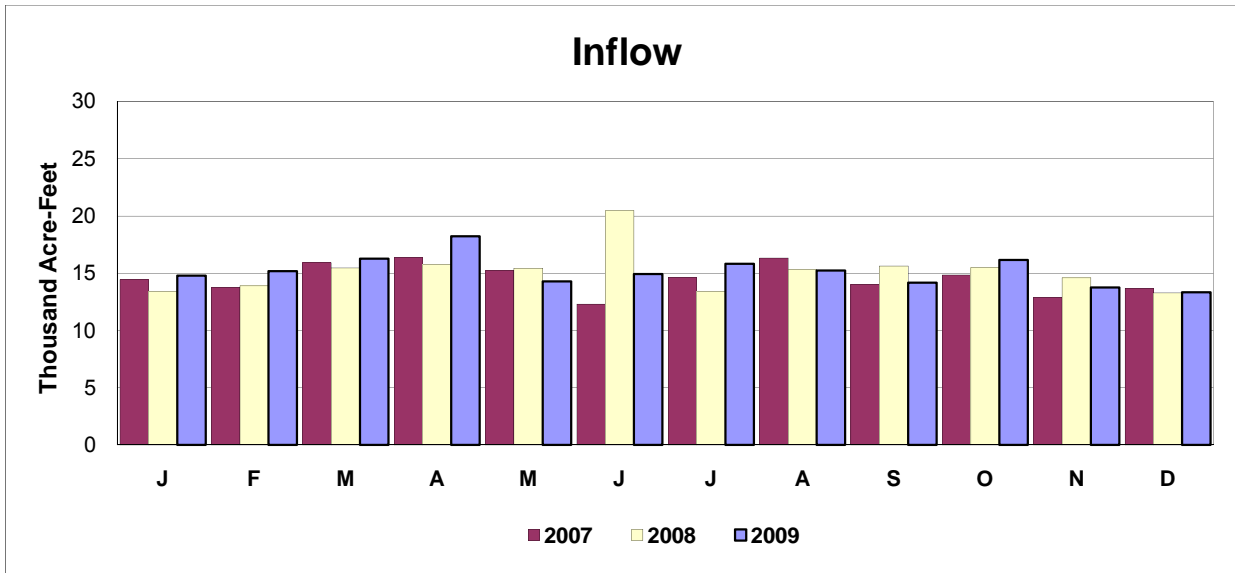
Reservoir	Total Precip. Inches	Percent Of Average %	Storage 12-31-08 AF	Storage 12-31-09 AF	Gain or Loss AF	Maximum Content AF	Storage Date	Minimum Content AF	Storage Date	Total Inflow AF
Box Butte	19.98	118	6,375	10,213	3,838	13,522	JUL 14	6,076	AUG 28	15,432
Merritt	28.14	137	61,100	61,100	0	67,602	JUN 14	48,661	SEP 19	182,155
Calamus	26.14	108	109,027	107,417	-1,610	127,965	APR 19	82,324	SEP 20	278,685
Davis Creek	25.20	102	10,126	8,922	-1,204	28,956	JUL 7	8,734	SEP 24	47,962
Bonny	26.56	155	9,276	10,220	944	11,860	MAY 4	9,293	JAN 1	11,698
Enders	29.69	156	15,368	15,662	294	16,200	JUN 18	15,017	OCT 8	6,577
Swanson	27.25	136	51,989	55,314	3,325	69,029	JUN 17	46,987	OCT 13	37,749
Hugh Butler	23.96	122	26,451	6,357	-20,094	29,136	JUN 26	6,327	DEC 23	13,279
Harry Strunk	28.90	140	33,151	33,630	479	36,852	JUN 17	25,375	SEP 4	42,805
Keith Sebelius	32.01	131	16,313	17,386	1,073	17,682	JUN 16	16,152	OCT 5	7,452
Harlan County	24.50	108	319,311	320,258	947	337,577	JUN 21	285,161	OCT 5	136,747
Lovewell	21.33	78	31,438	26,528	-4,910	38,354	JUN 5	18,853	SEP 4	41,606
Kirwin	27.86	118	88,425	98,662	10,237	117,565	JUN 17	88,615	JAN 1	78,204
Webster	23.50	99	68,885	78,514	9,629	93,666	JUN 17	69,063	JAN 1	61,300
Waconda	22.05	86	206,420	213,790	7,370	229,378	JUN 18	200,541	FEB 23	222,698
Cedar Bluff	23.22	111	83,542	83,699	157	83,895	MAY 8	79,327	SEP 7	14,391

# BOX BUTTE RESERVOIR

## ACTUAL OPERATION

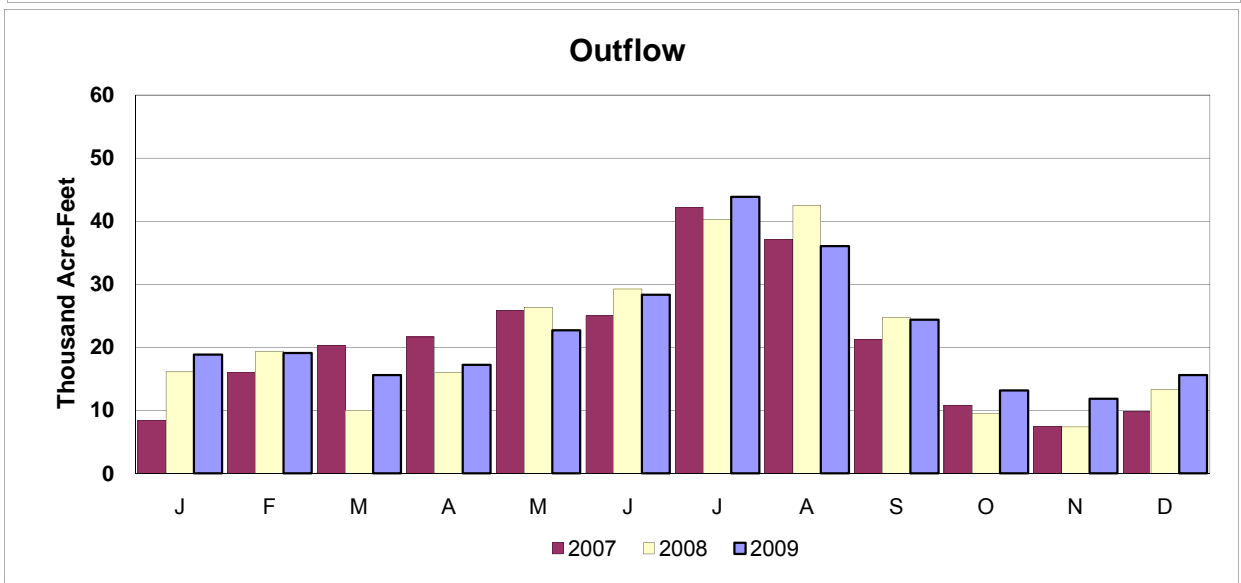
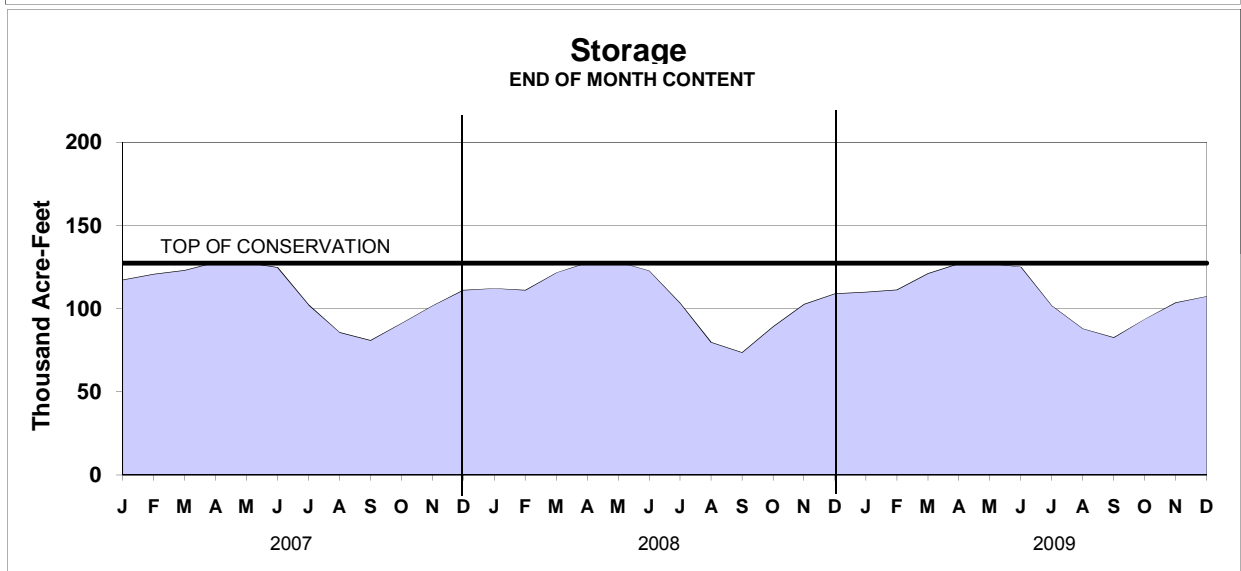
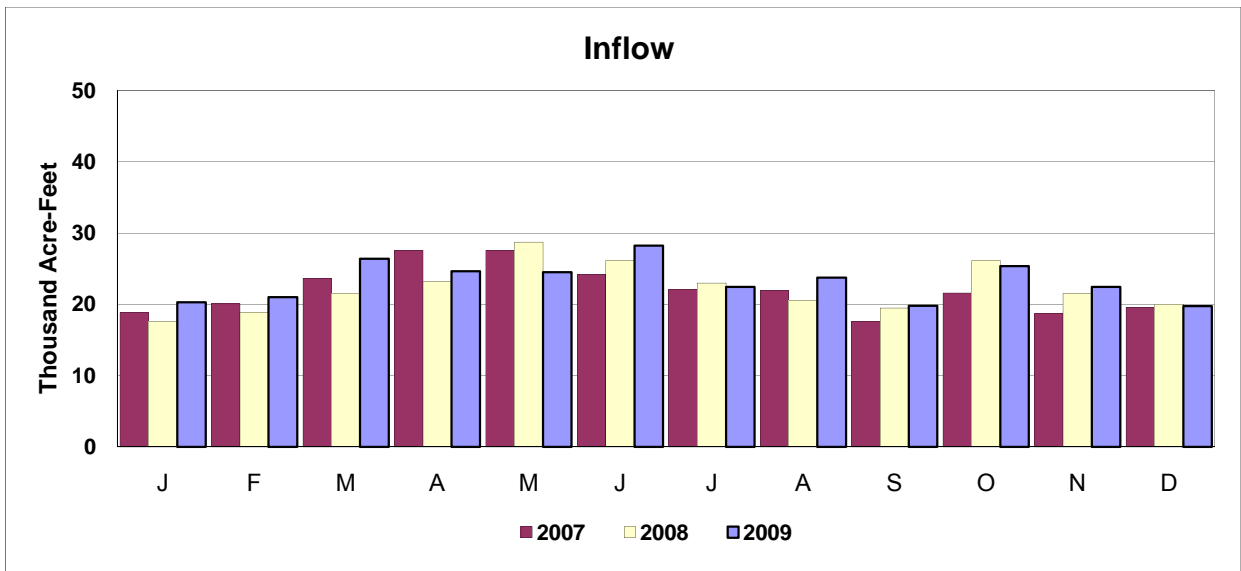


# MERRITT RESERVOIR ACTUAL OPERATION

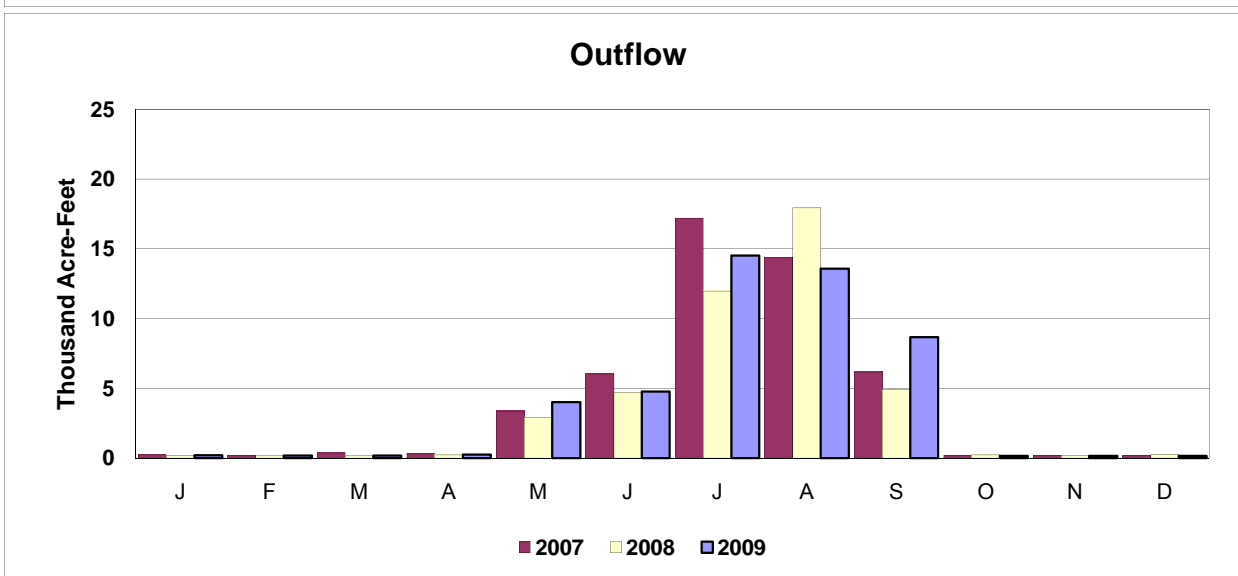
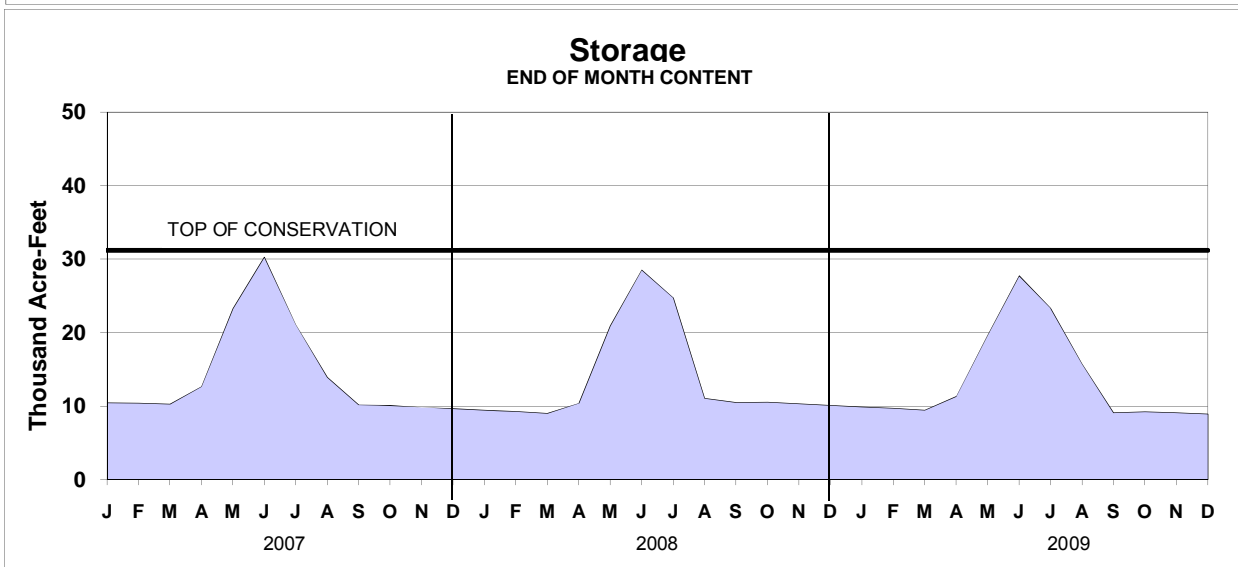
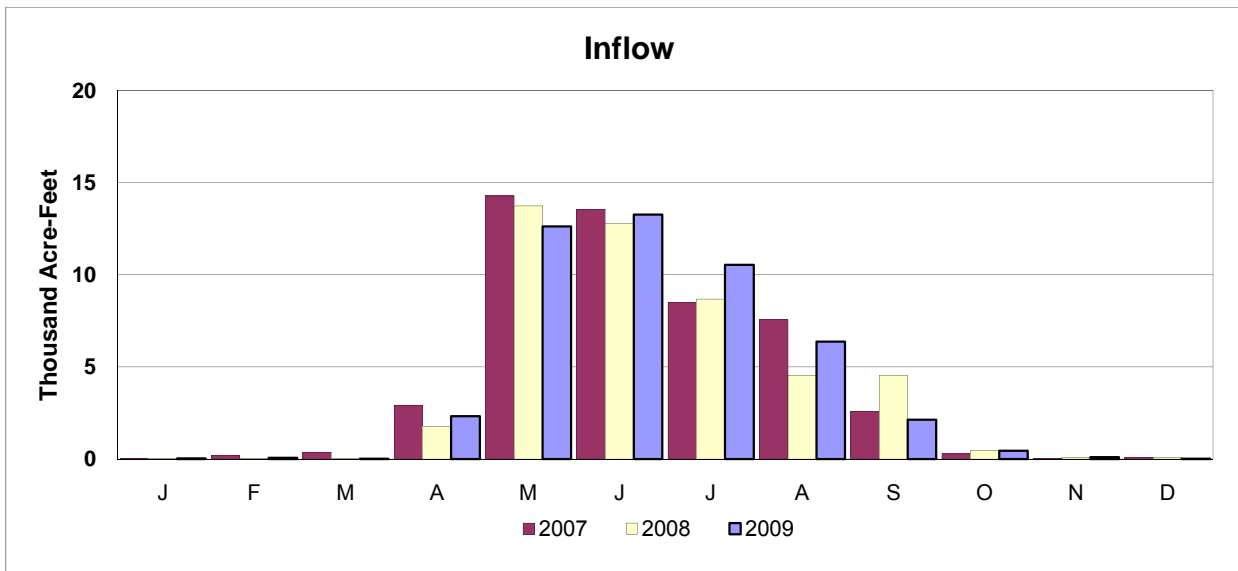


# CALAMUS RESERVOIR

## ACTUAL OPERATION

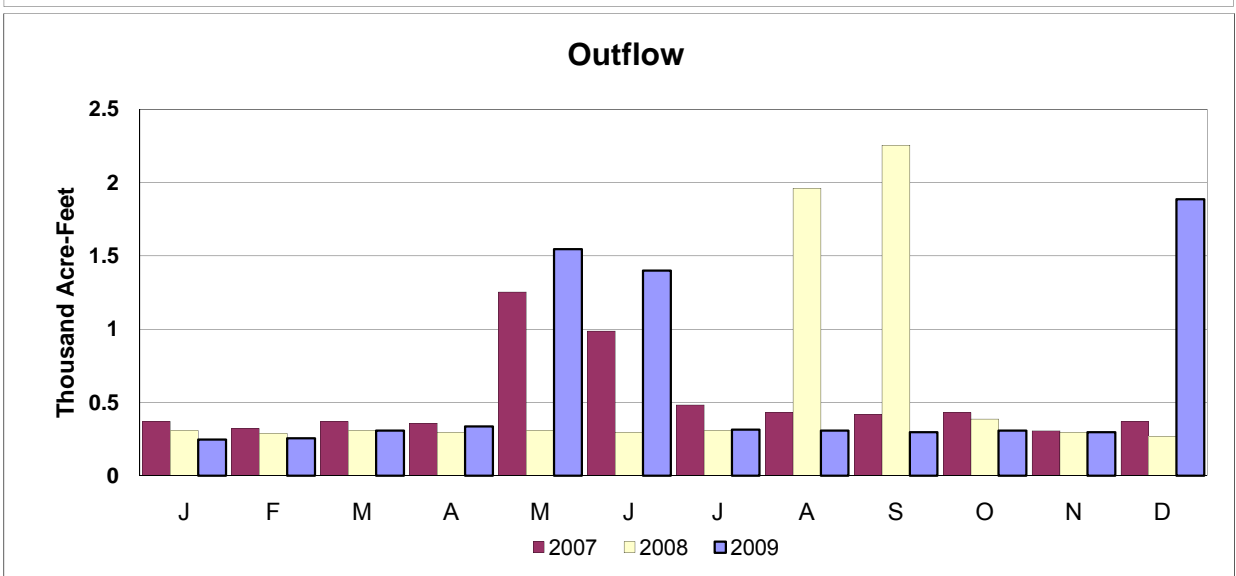
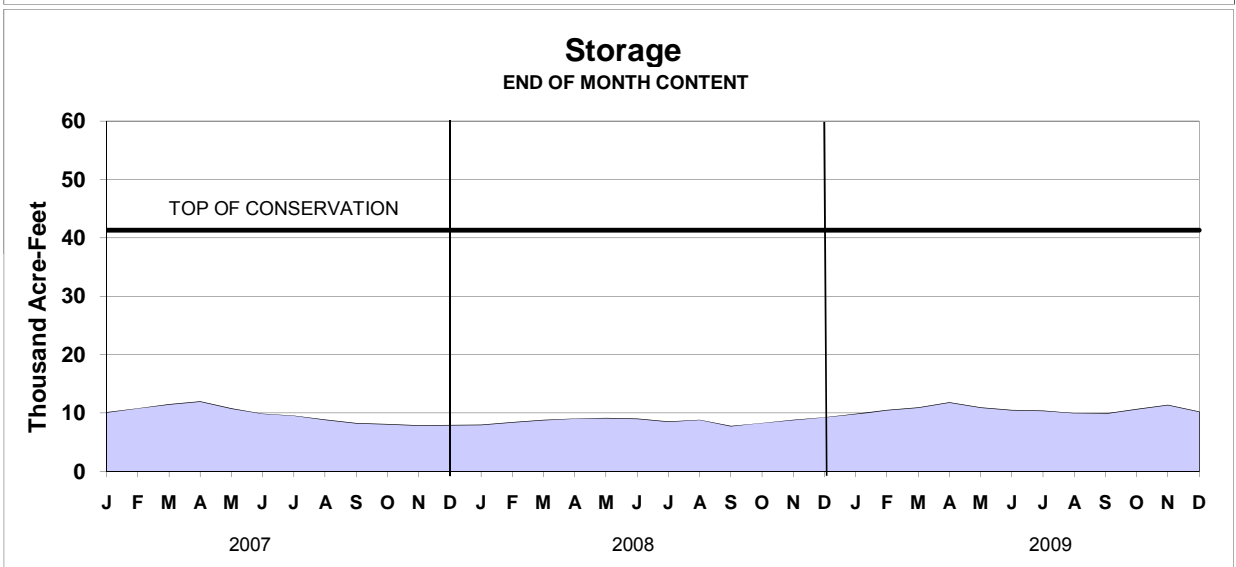
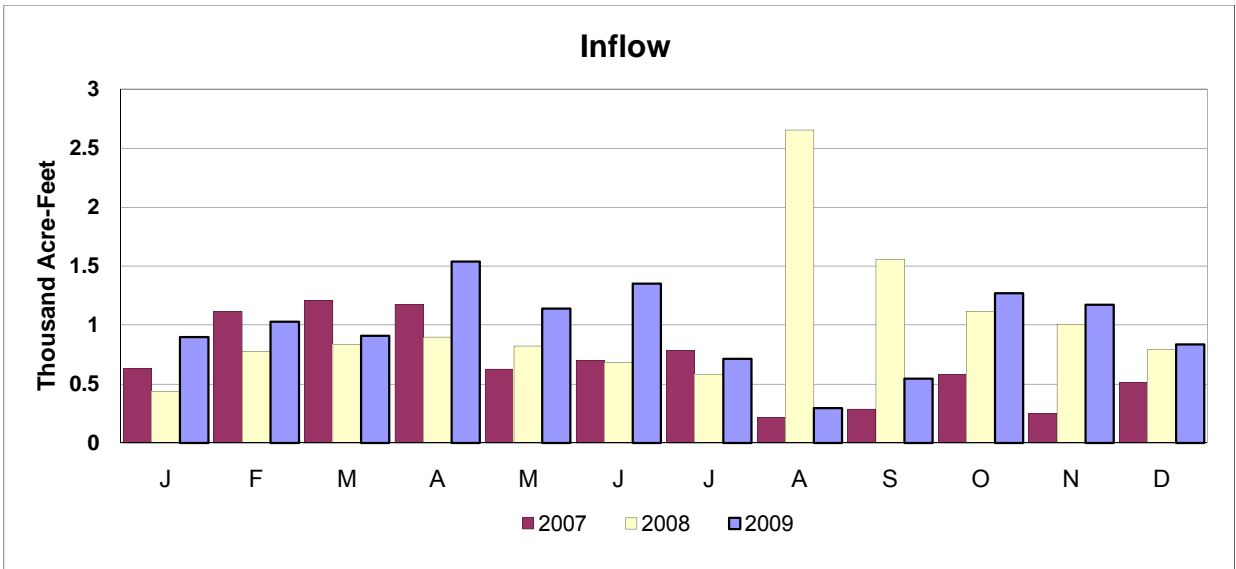


# DAVIS CREEK RESERVOIR ACTUAL OPERATION



# BONNY RESERVOIR

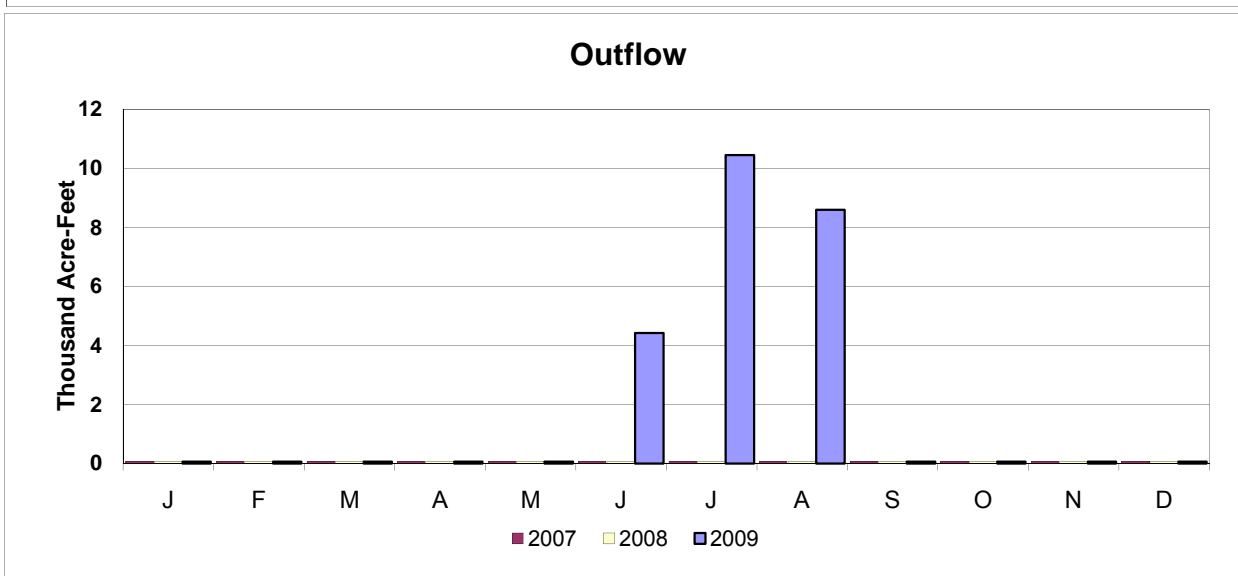
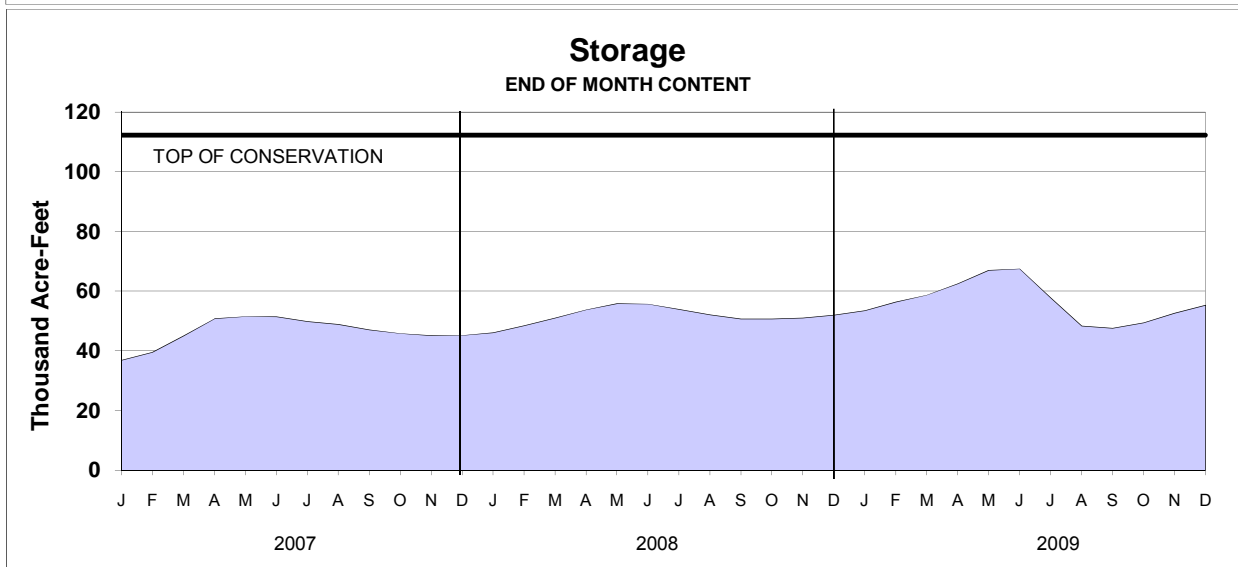
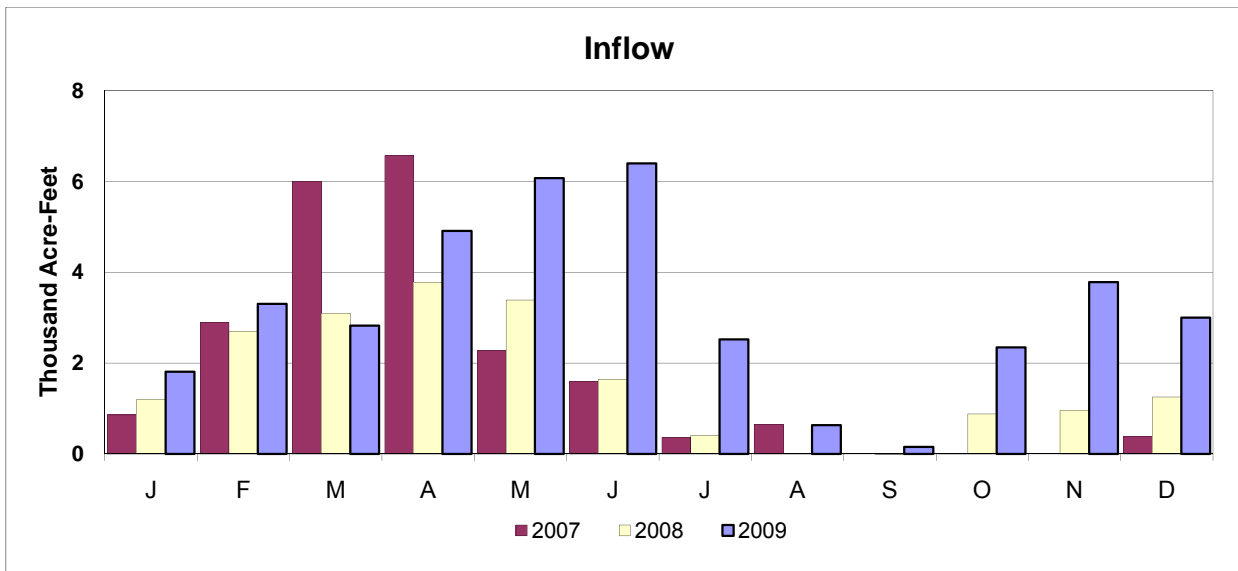
## ACTUAL OPERATION



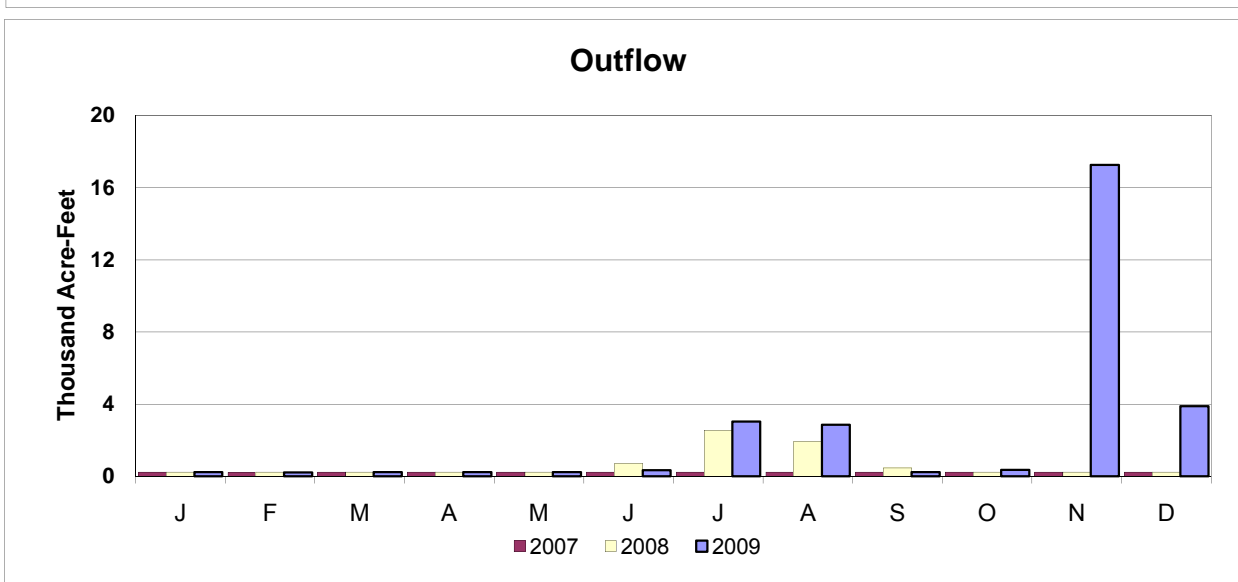
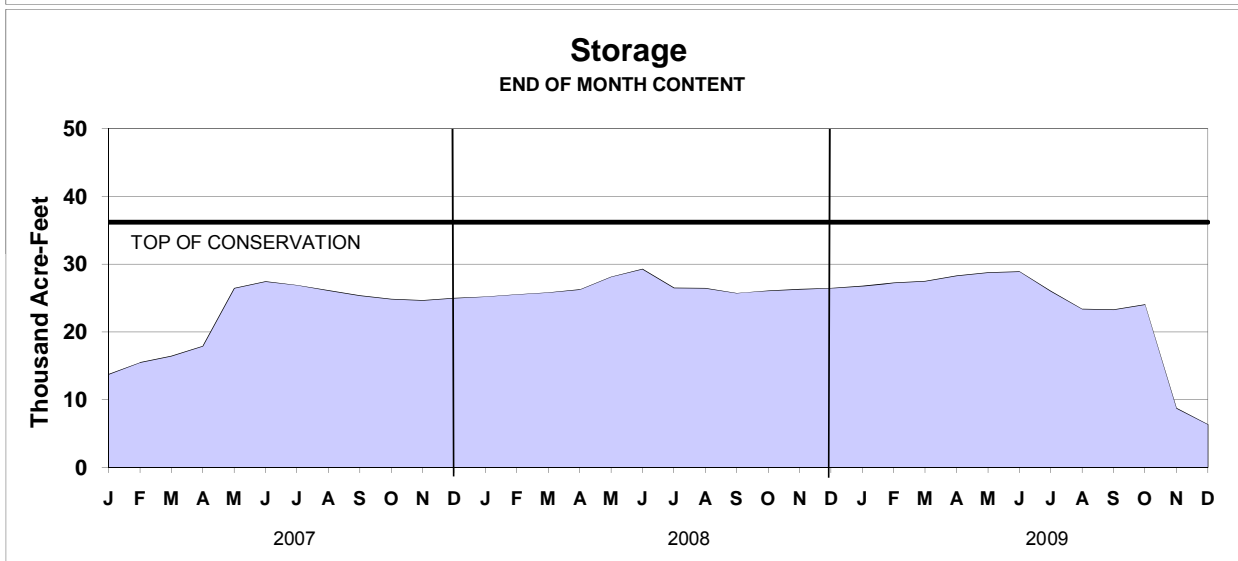
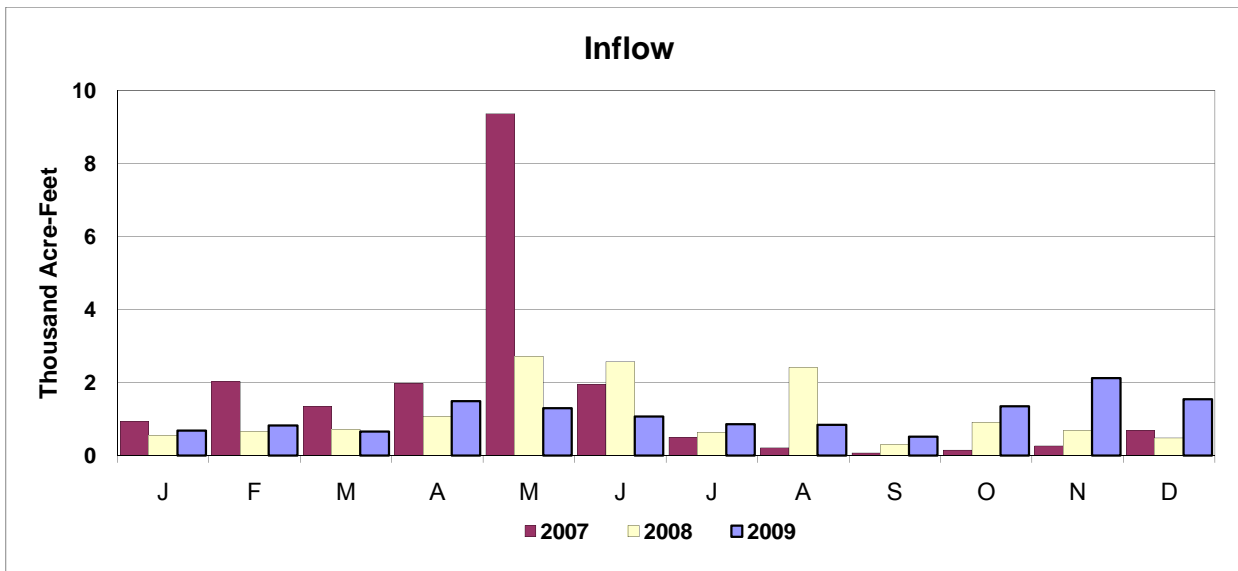




# SWANSON LAKE ACTUAL OPERATION

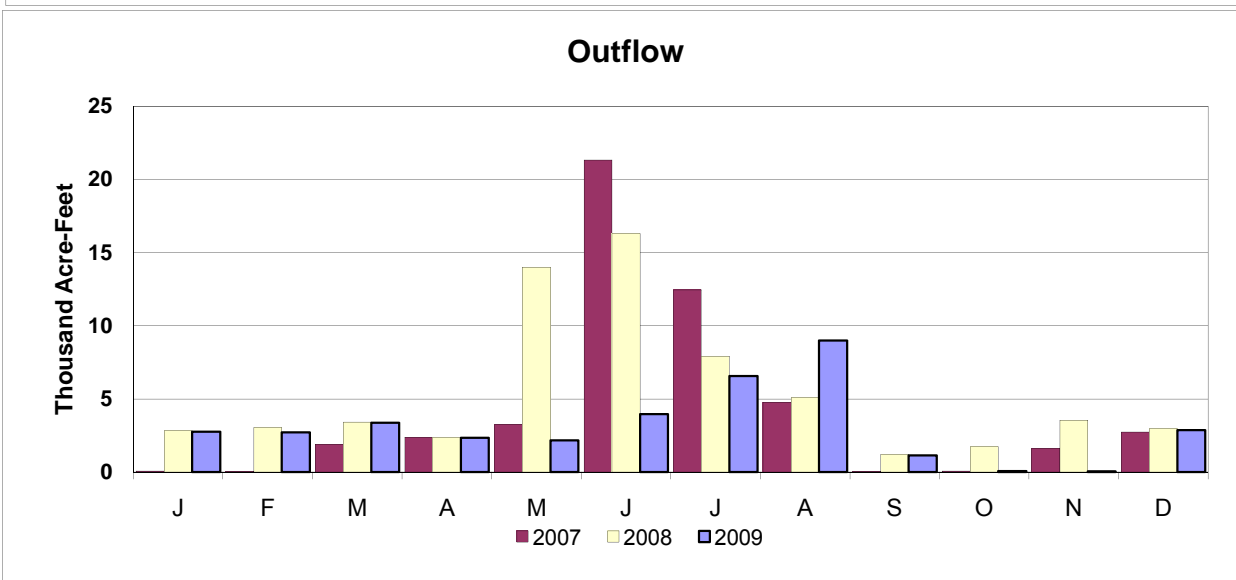
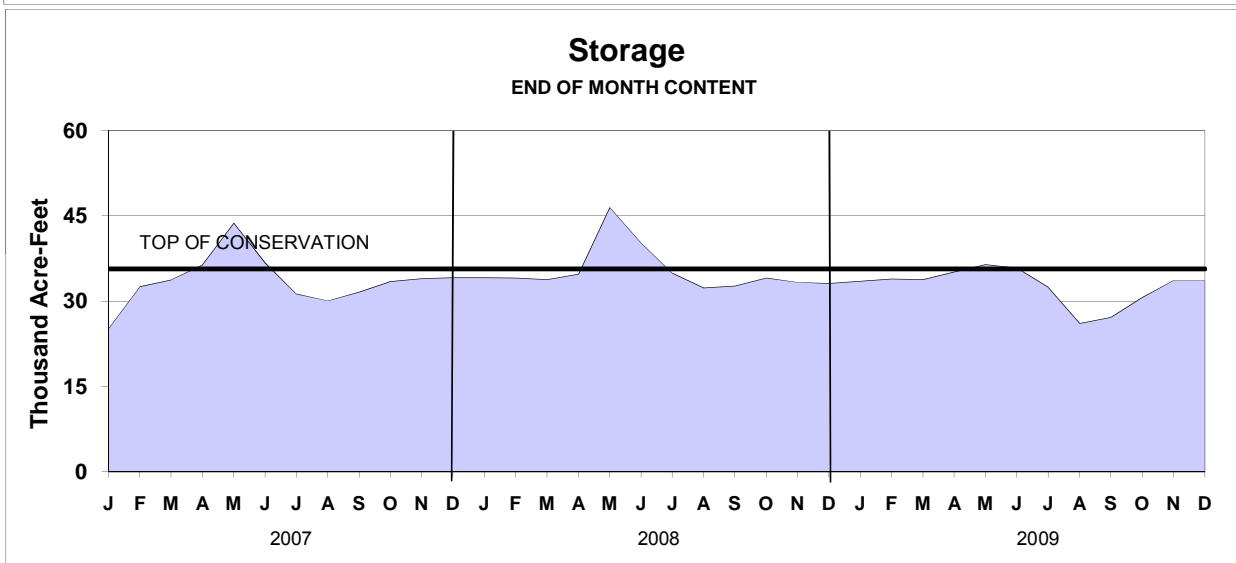
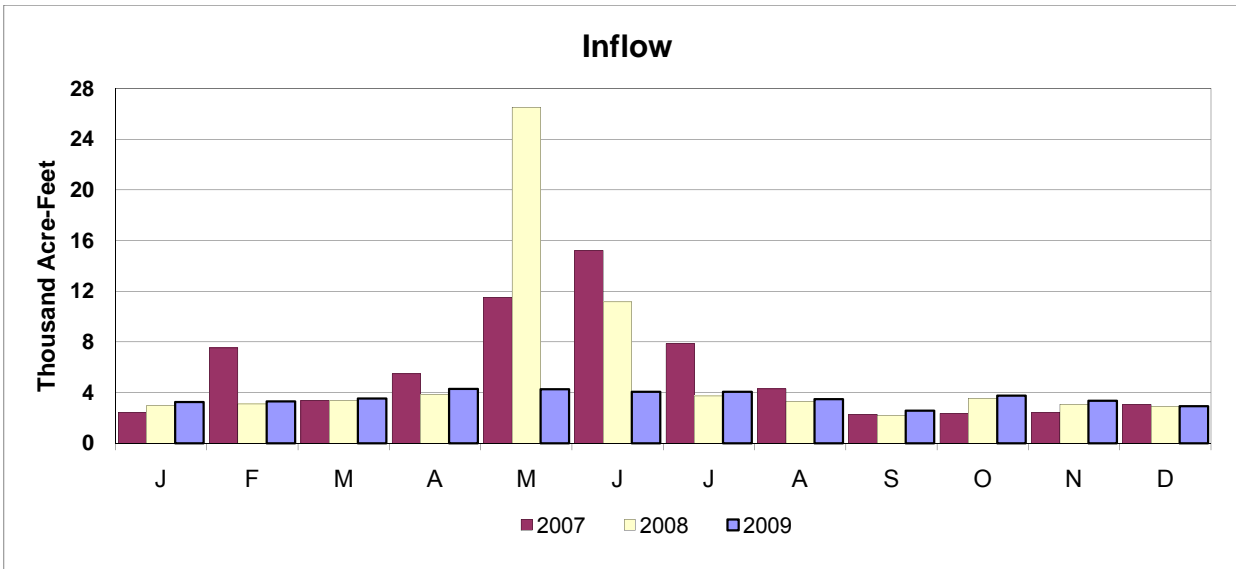


# HUGH BUTLER LAKE ACTUAL OPERATION

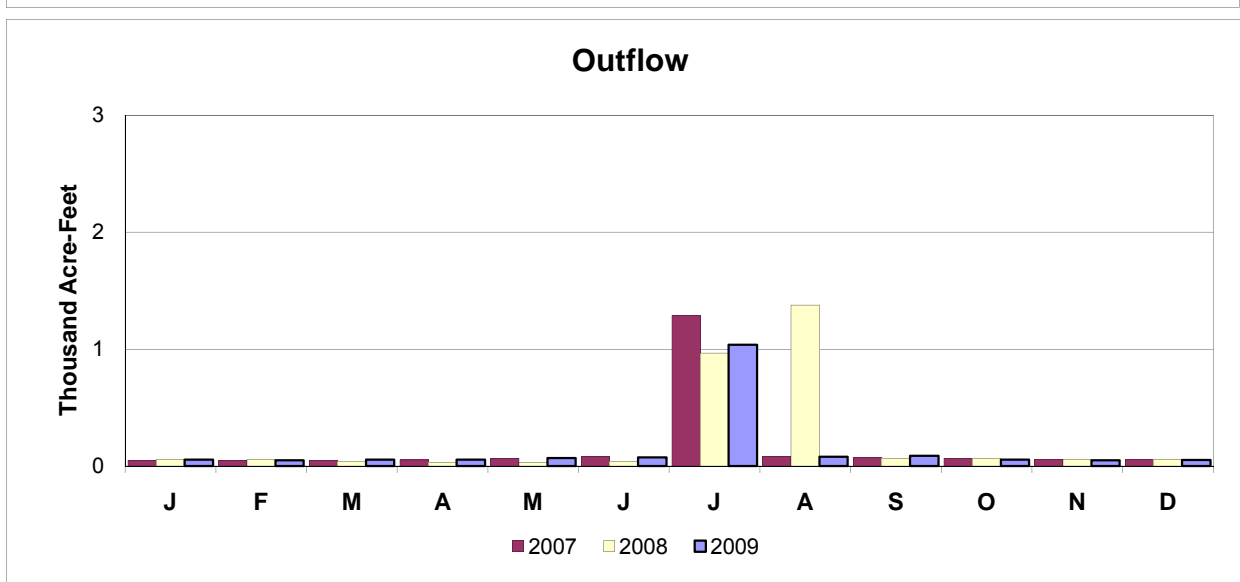
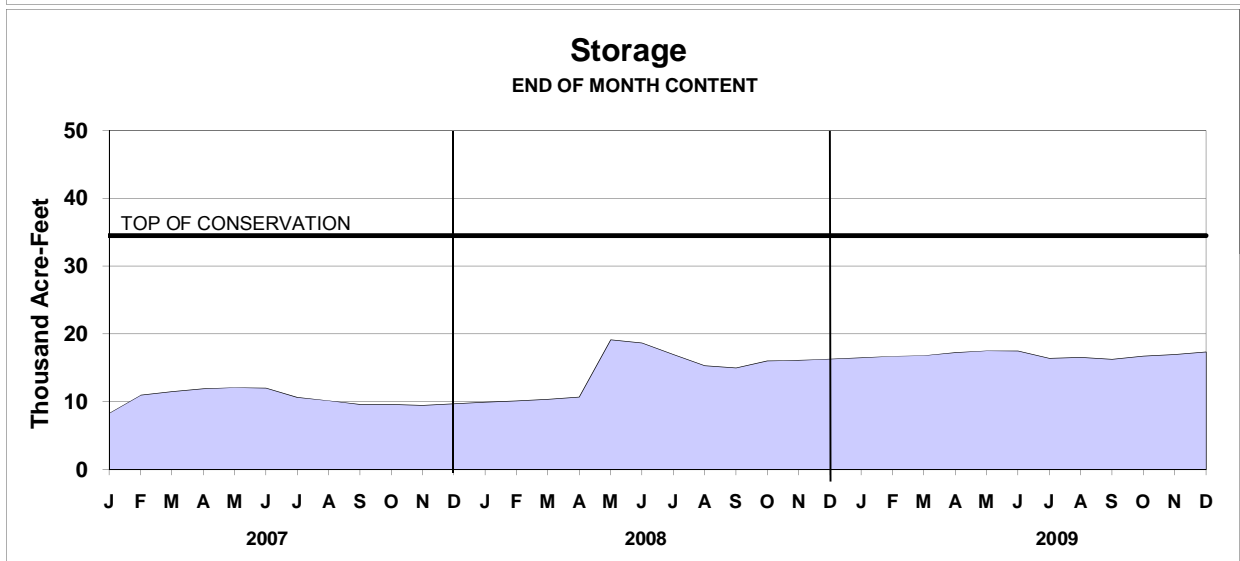
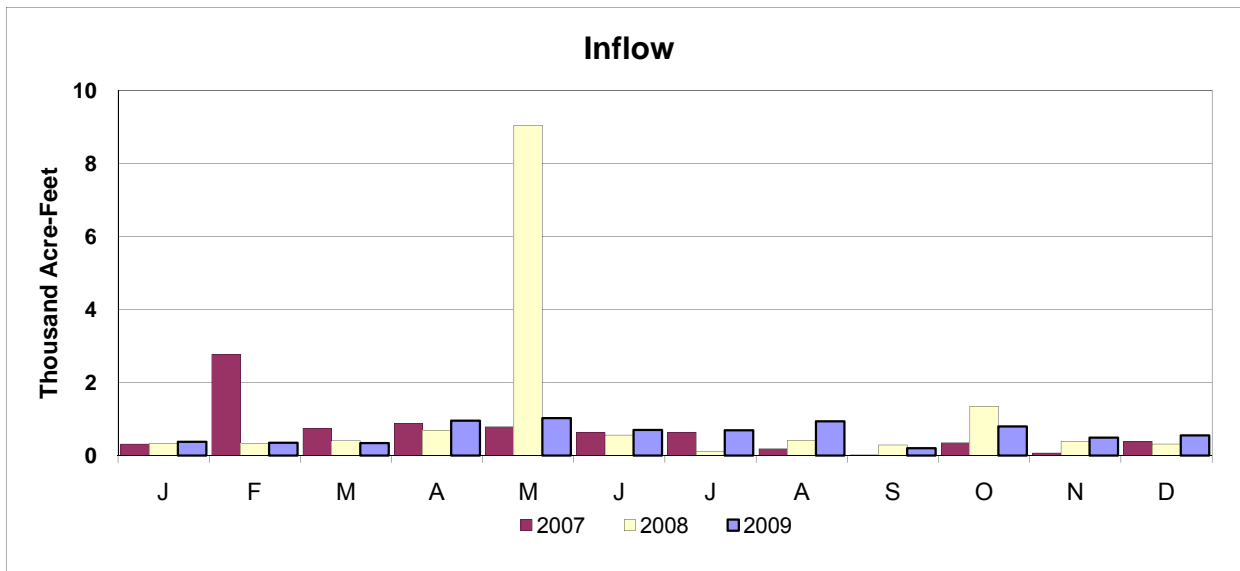


# HARRY STRUNK LAKE

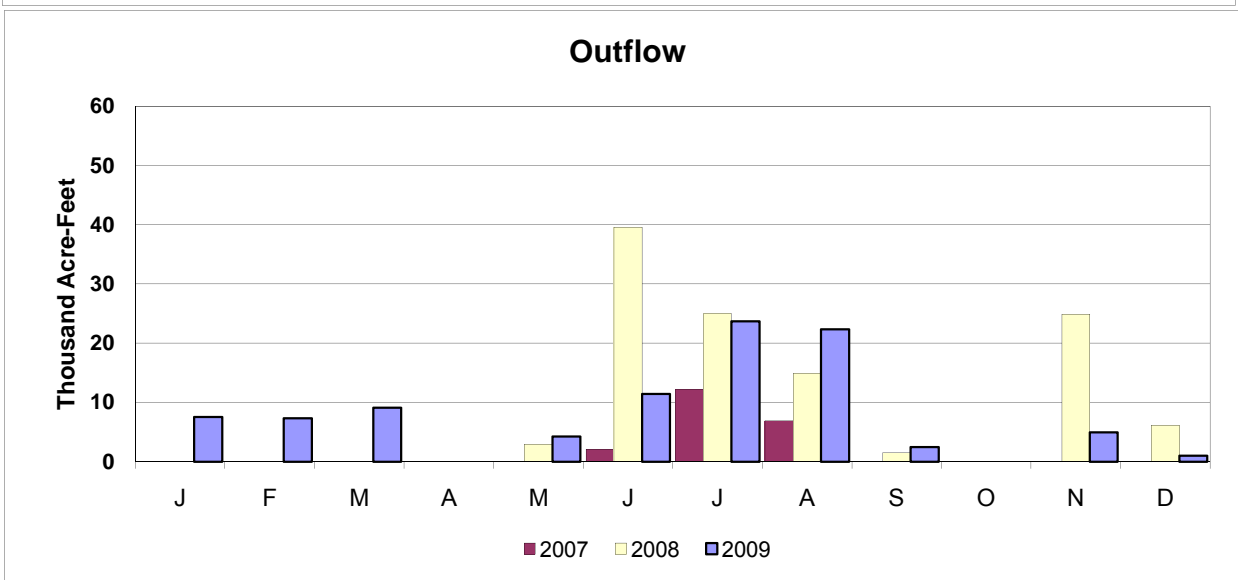
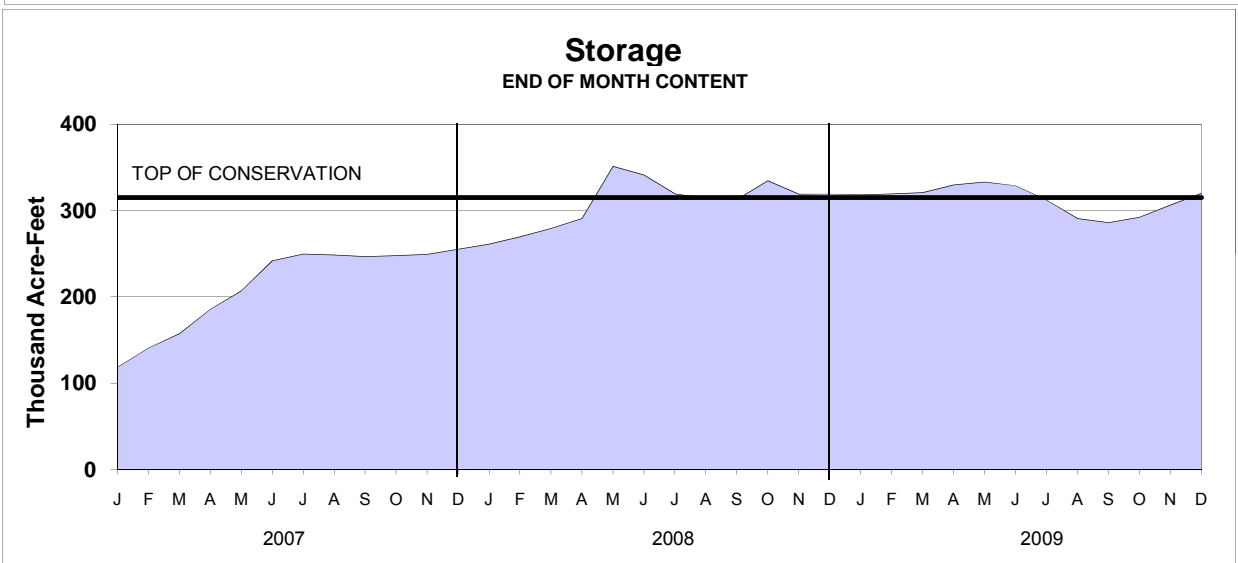
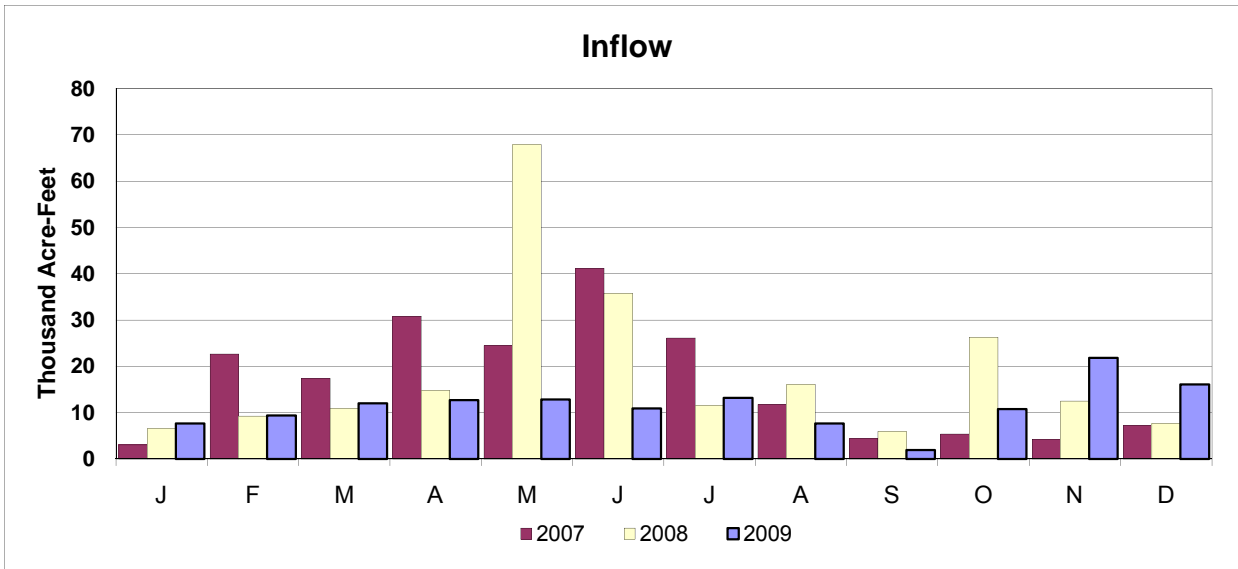
## ACTUAL OPERATION



# KEITH SEBELIUS LAKE ACTUAL OPERATION

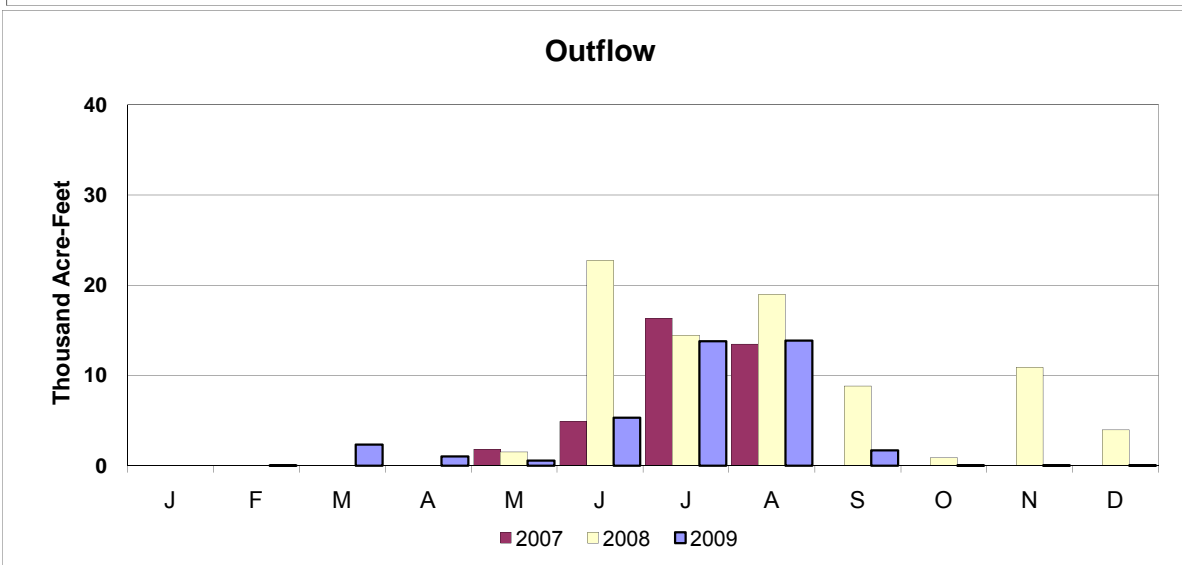
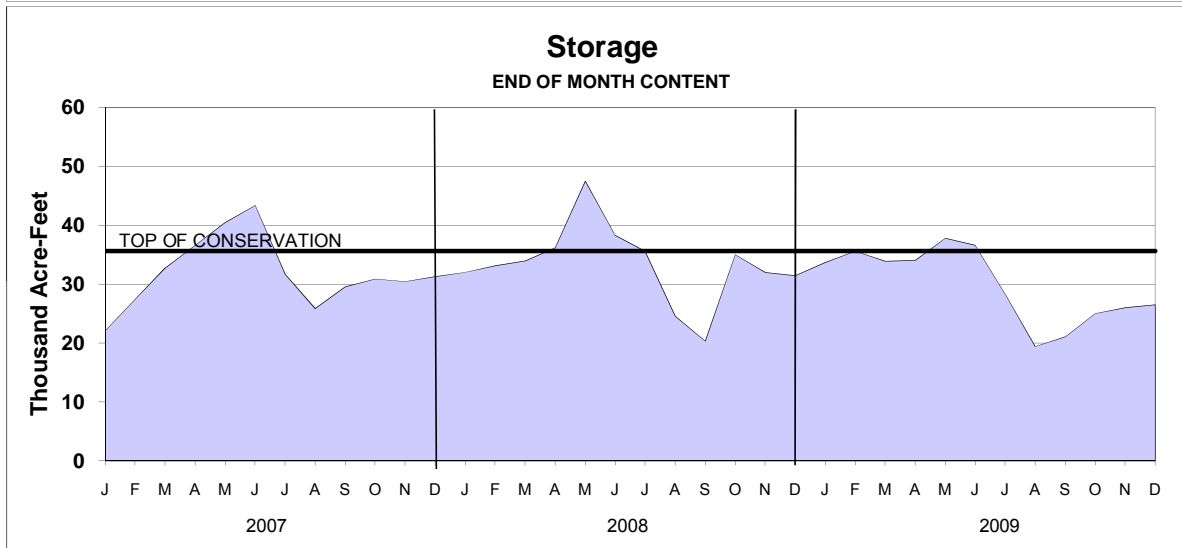
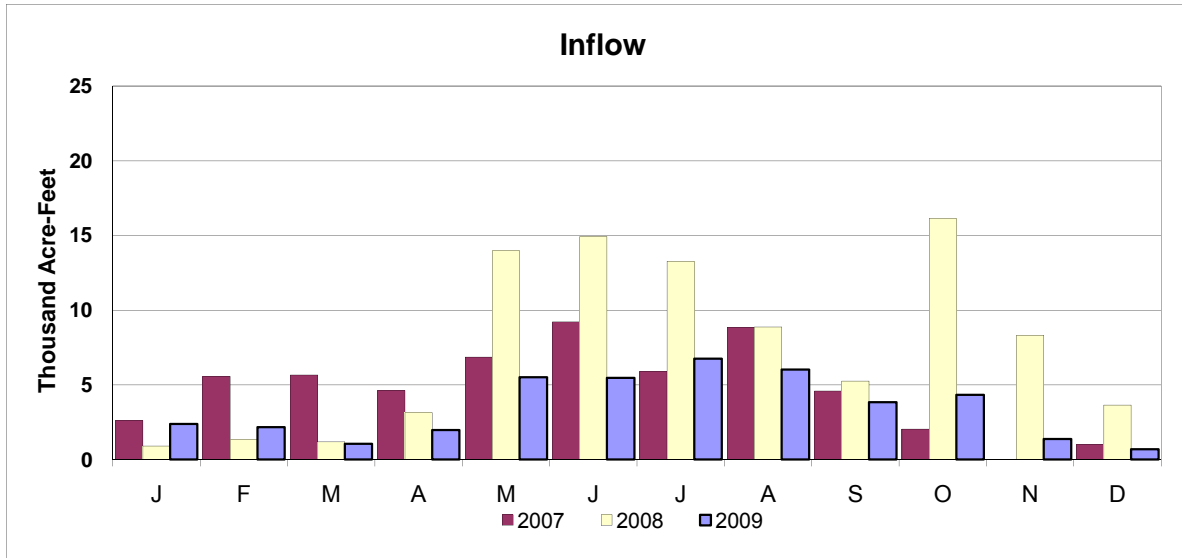


# HARLAN COUNTY LAKE ACTUAL OPERATION

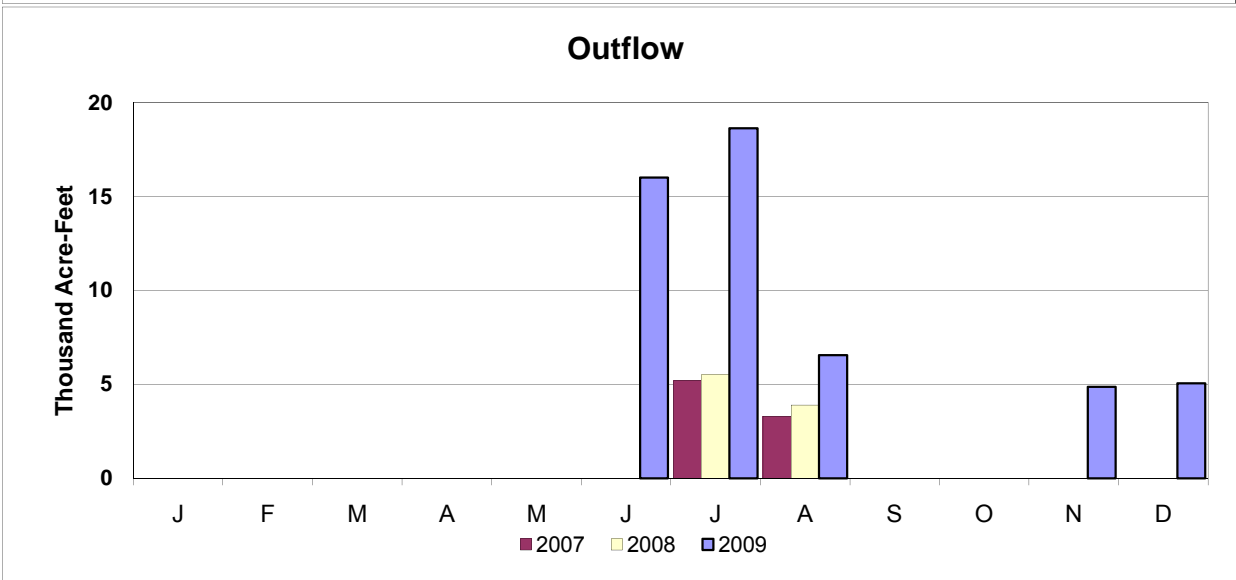
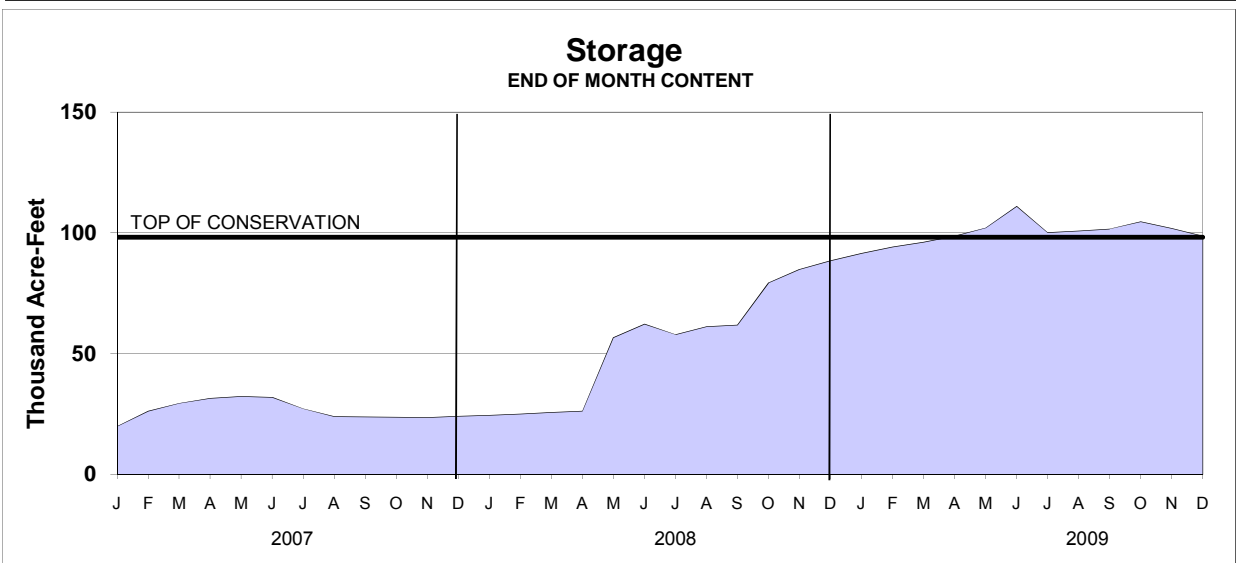
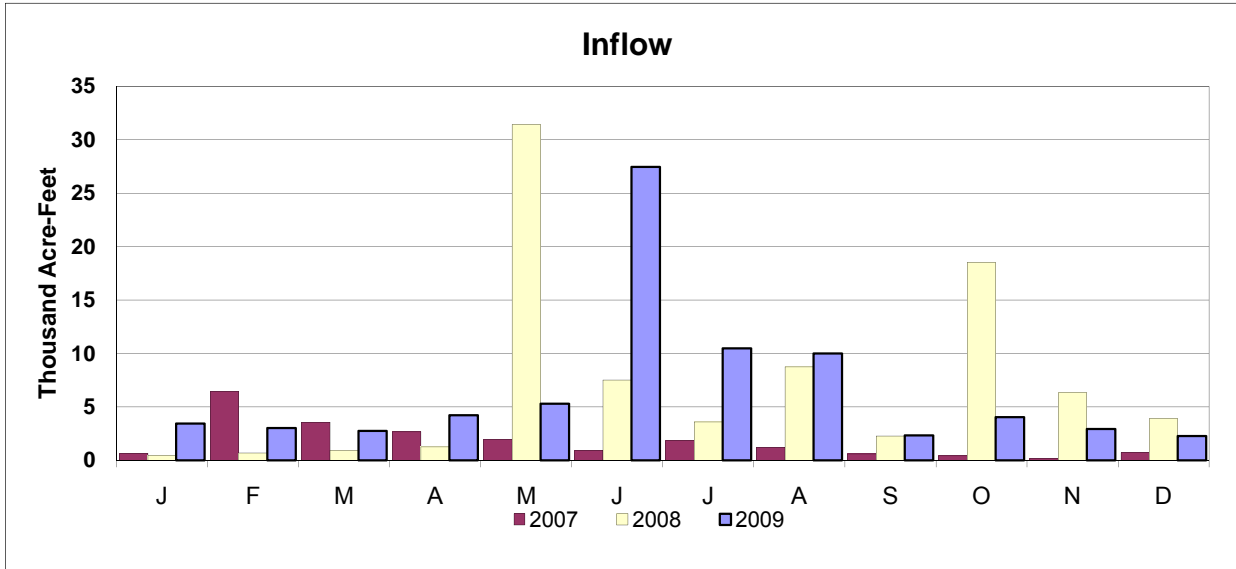


# LOVEWELL RESERVOIR

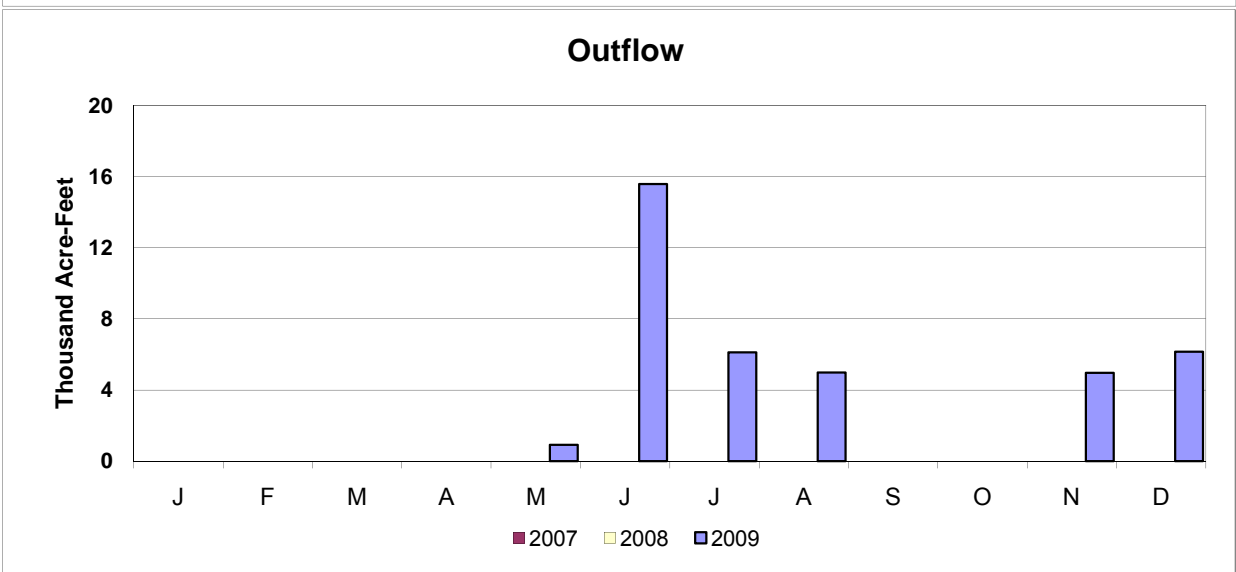
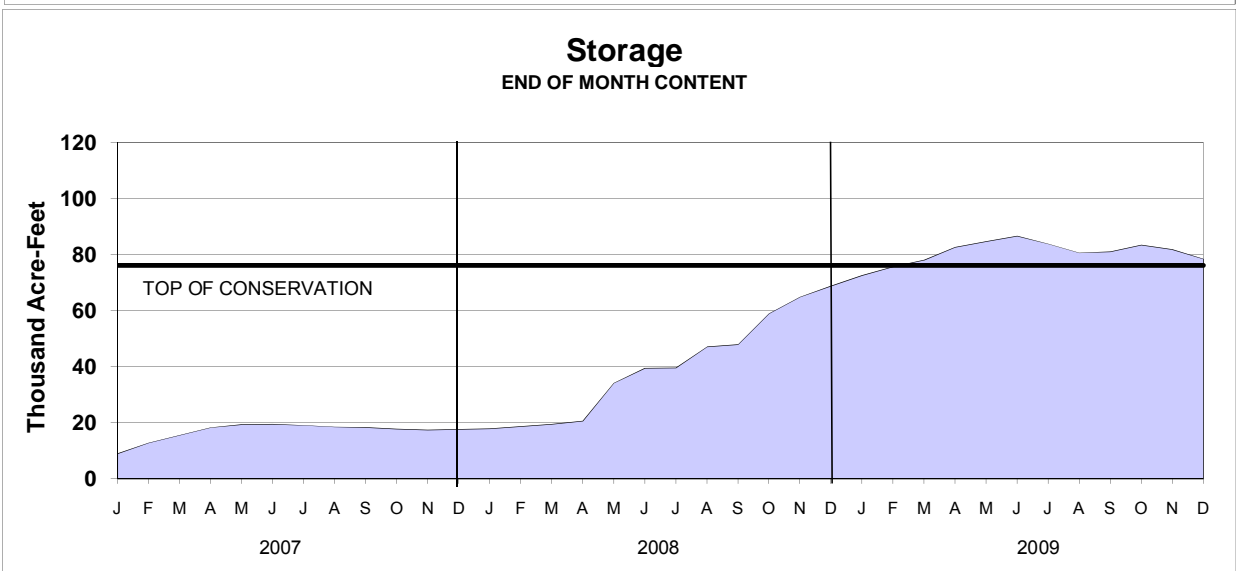
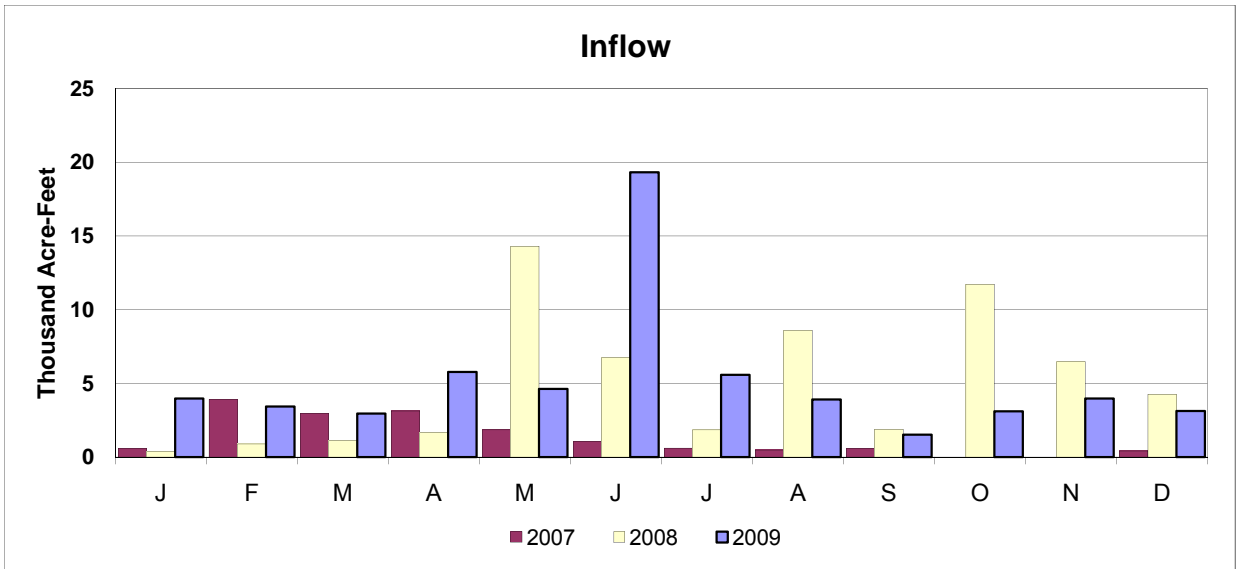
## ACTUAL OPERATION



# KIRWIN RESERVOIR ACTUAL OPERATION

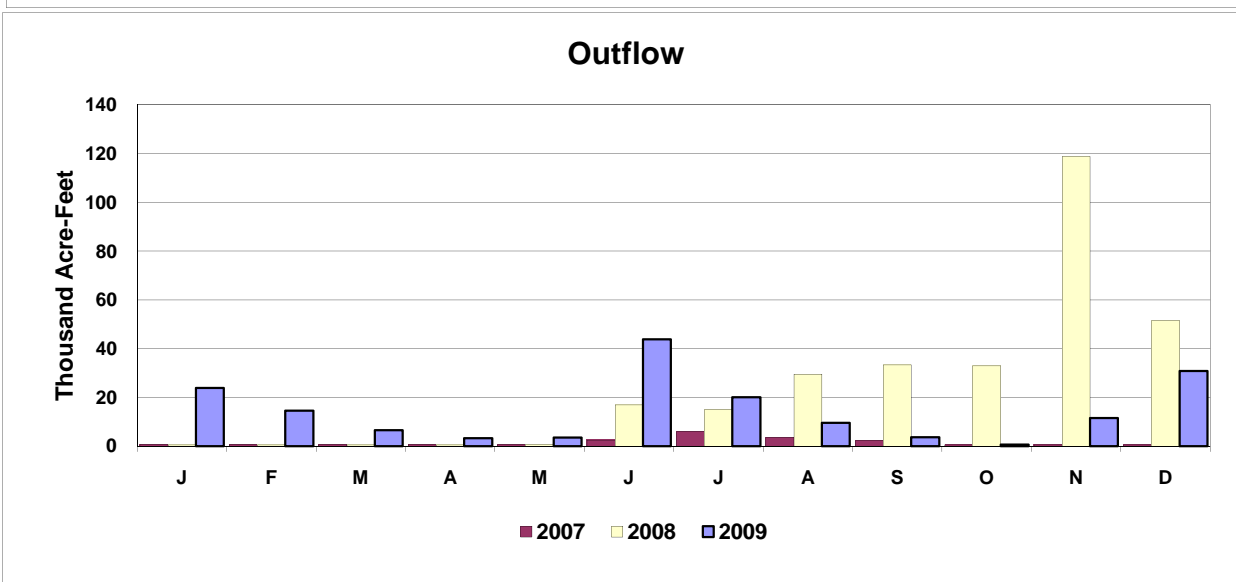
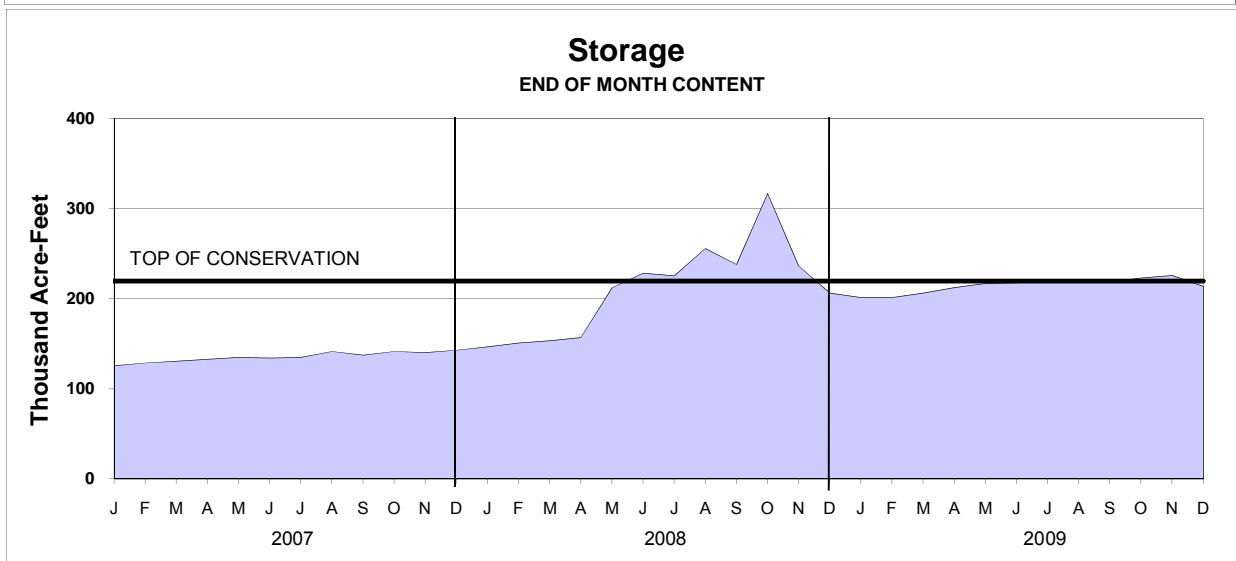
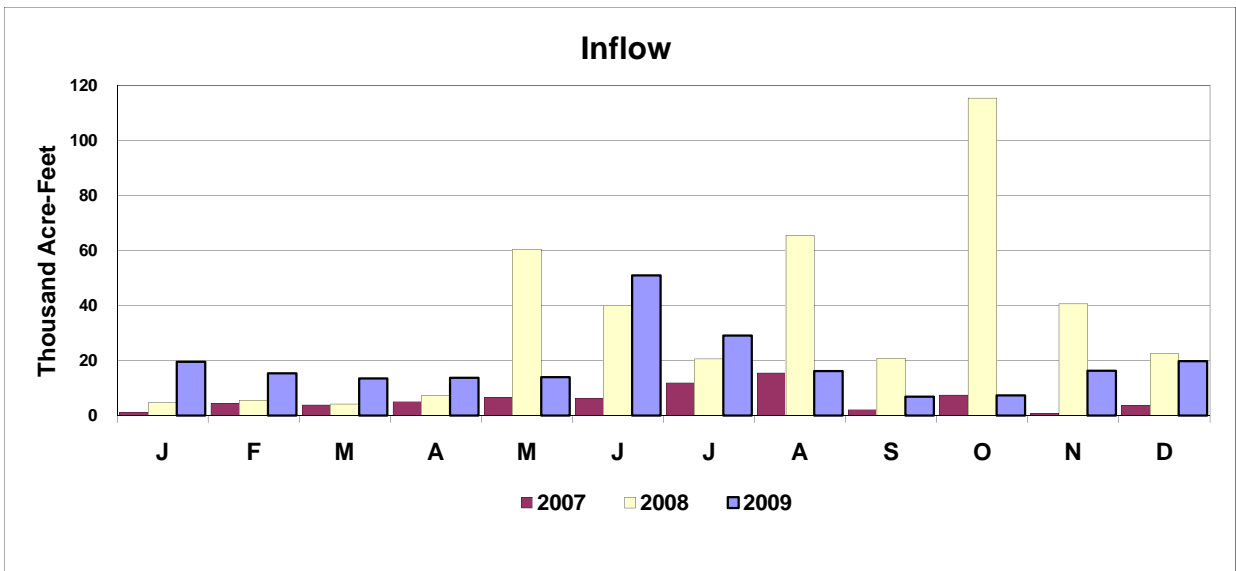


# WEBSTER RESERVOIR ACTUAL OPERATION





# WACONDA LAKE ACTUAL OPERATION



# CEDAR BLUFF RESERVOIR

## ACTUAL OPERATION

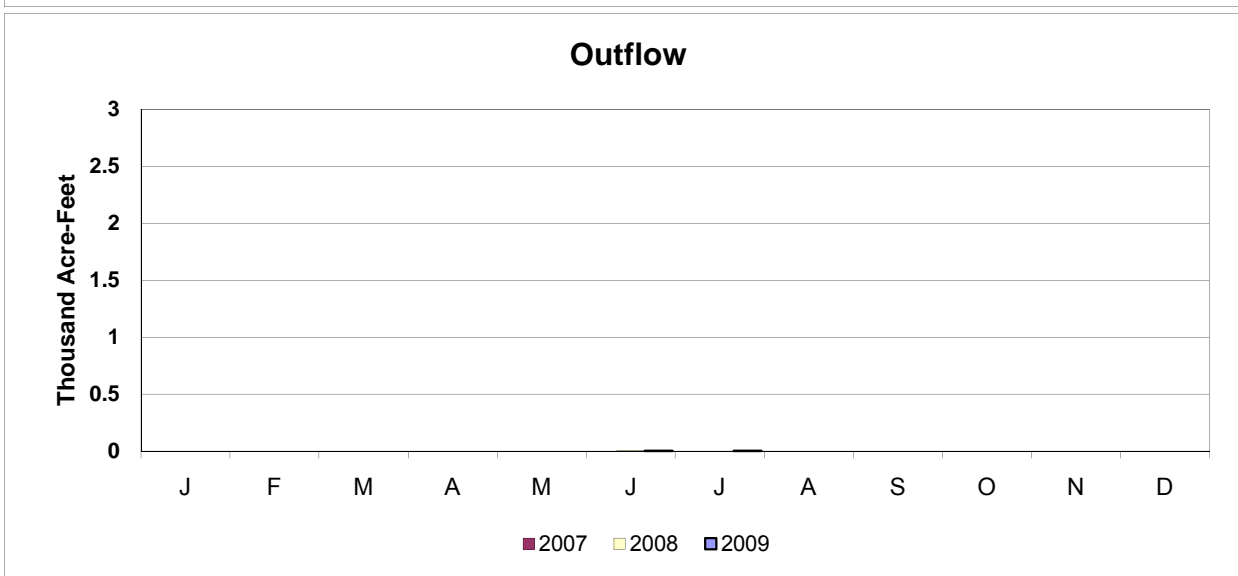
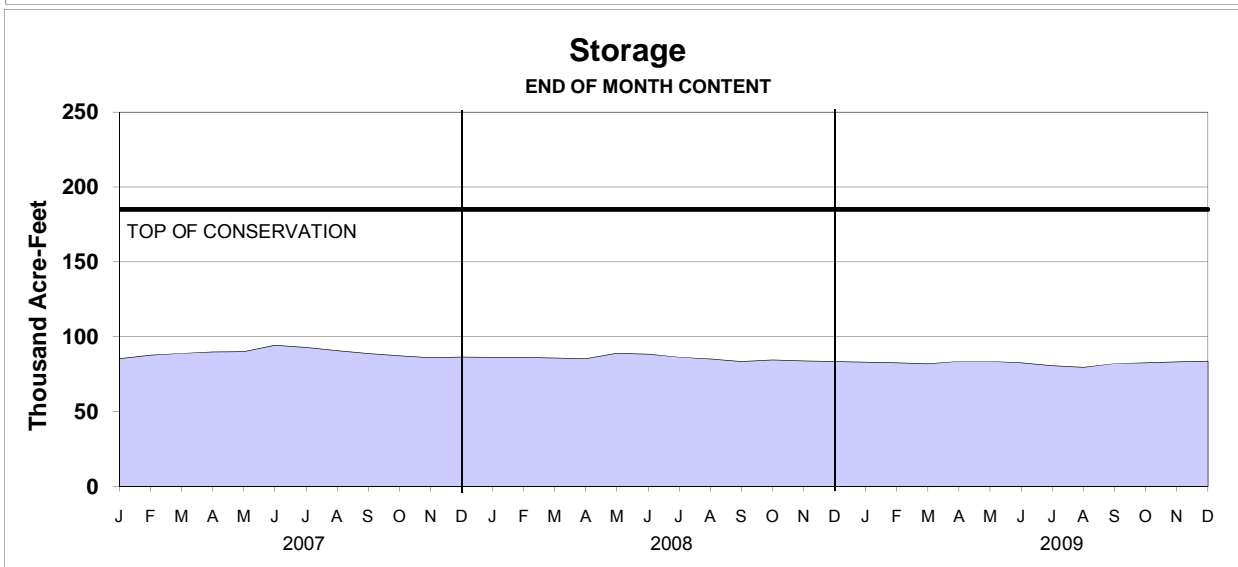
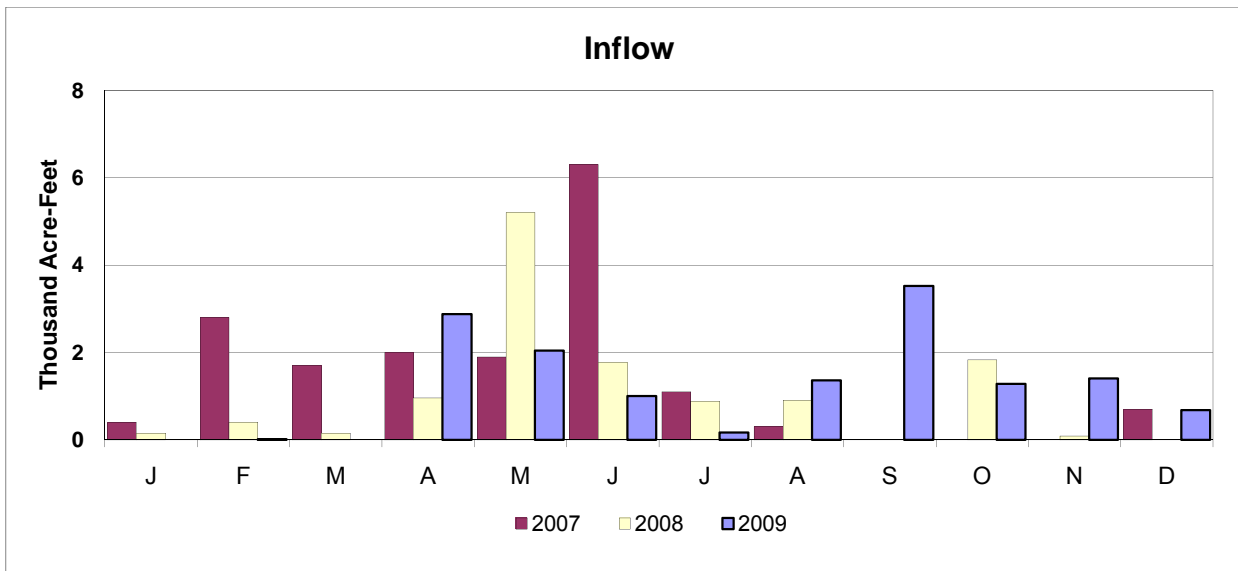
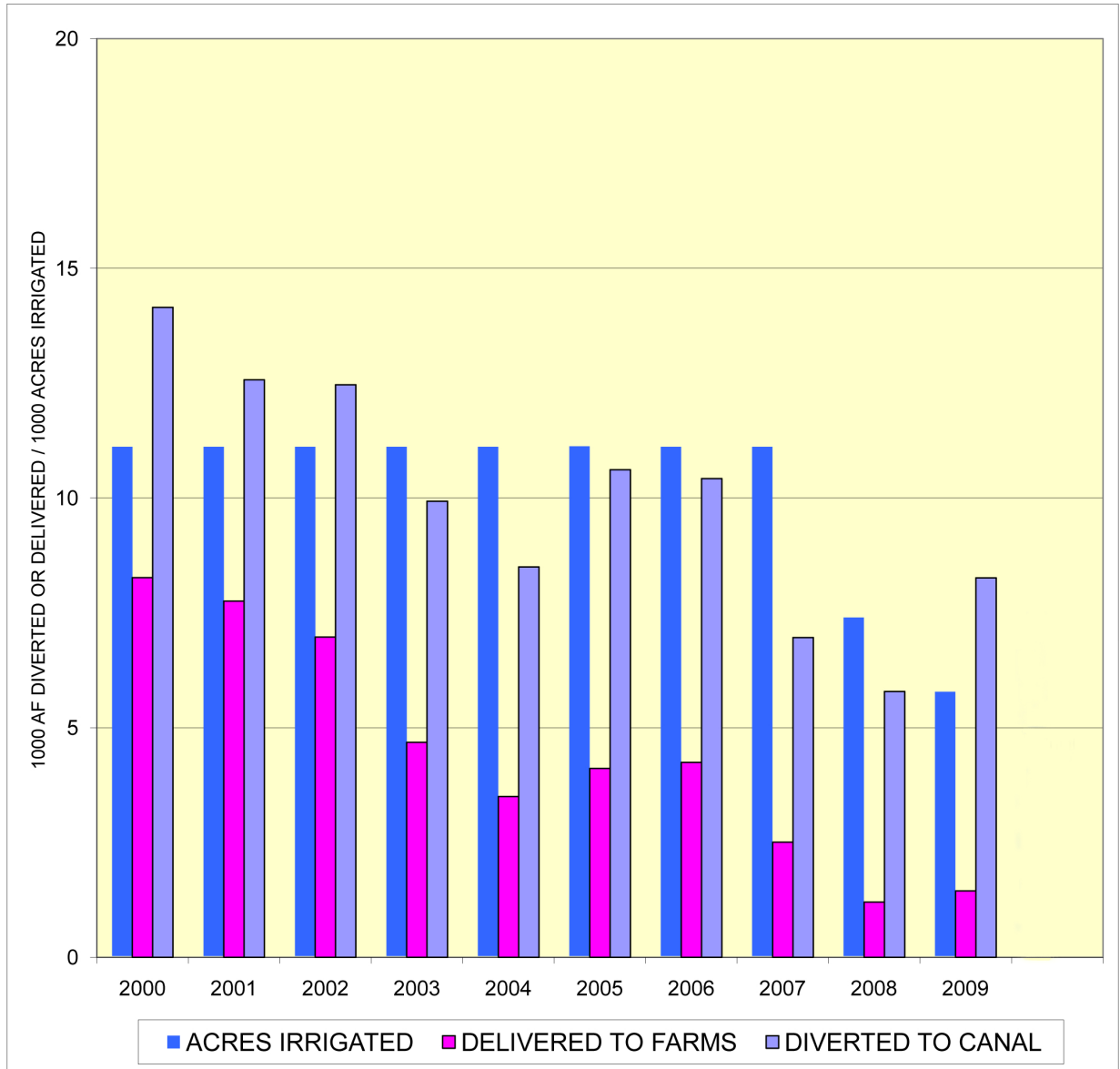


EXHIBIT 17

# MIRAGE FLATS IRRIGATION DISTRICT

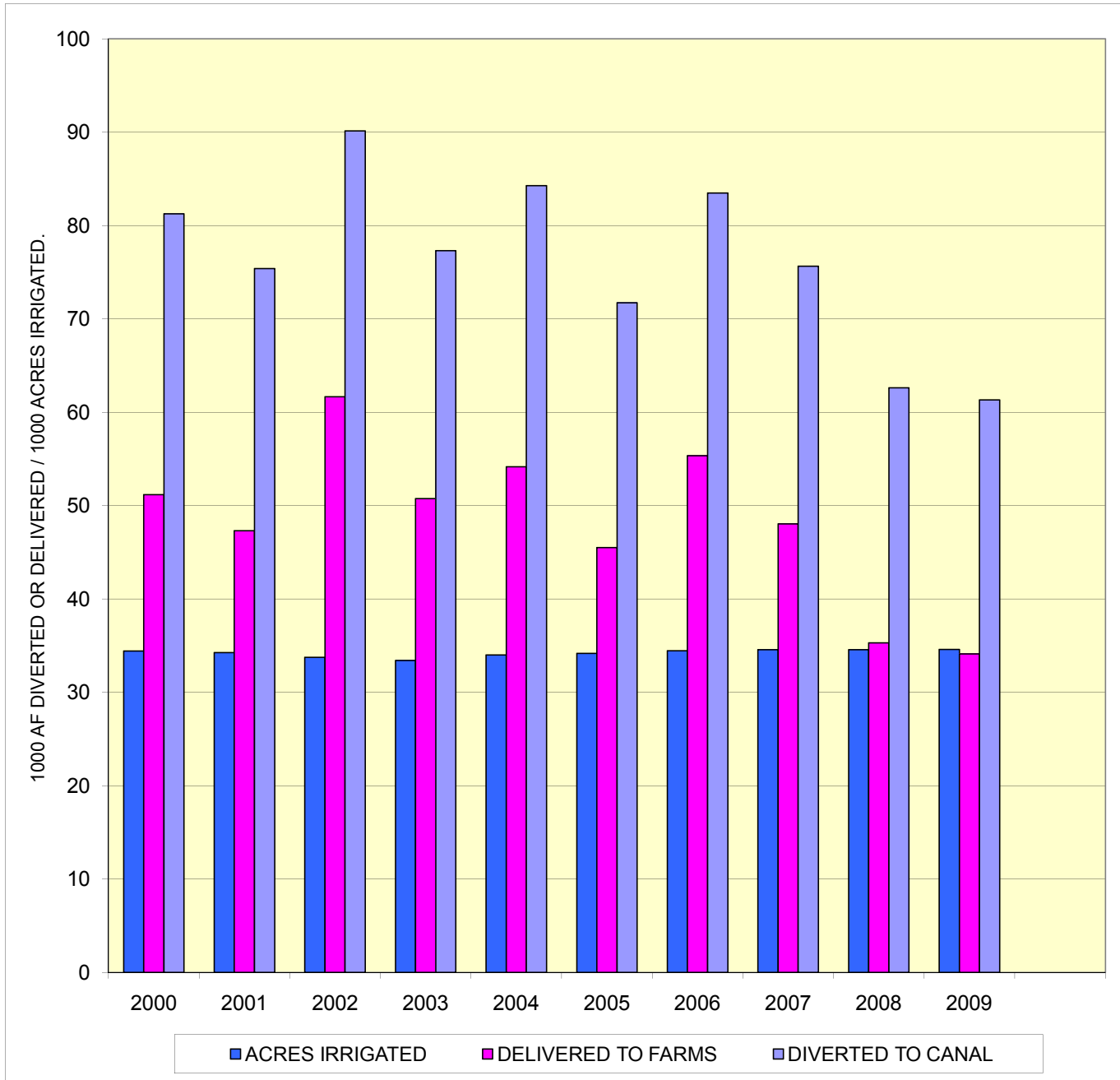
CANAL DIV., FARM DEL., AND ACRES IRRIG.



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
DIVERTED <i>af/acre</i>	1.28	1.13	1.12	0.90	0.77	0.96	0.94	0.63	0.78	1.44
DELIVERED <i>af/acre</i>	0.75	0.70	0.63	0.42	0.32	0.37	0.38	0.23	0.16	0.25
EFFICIENCY	58%	62%	56%	47%	41%	39%	41%	36%	21%	18%

# AINSWORTH IRRIGATION DISTRICT

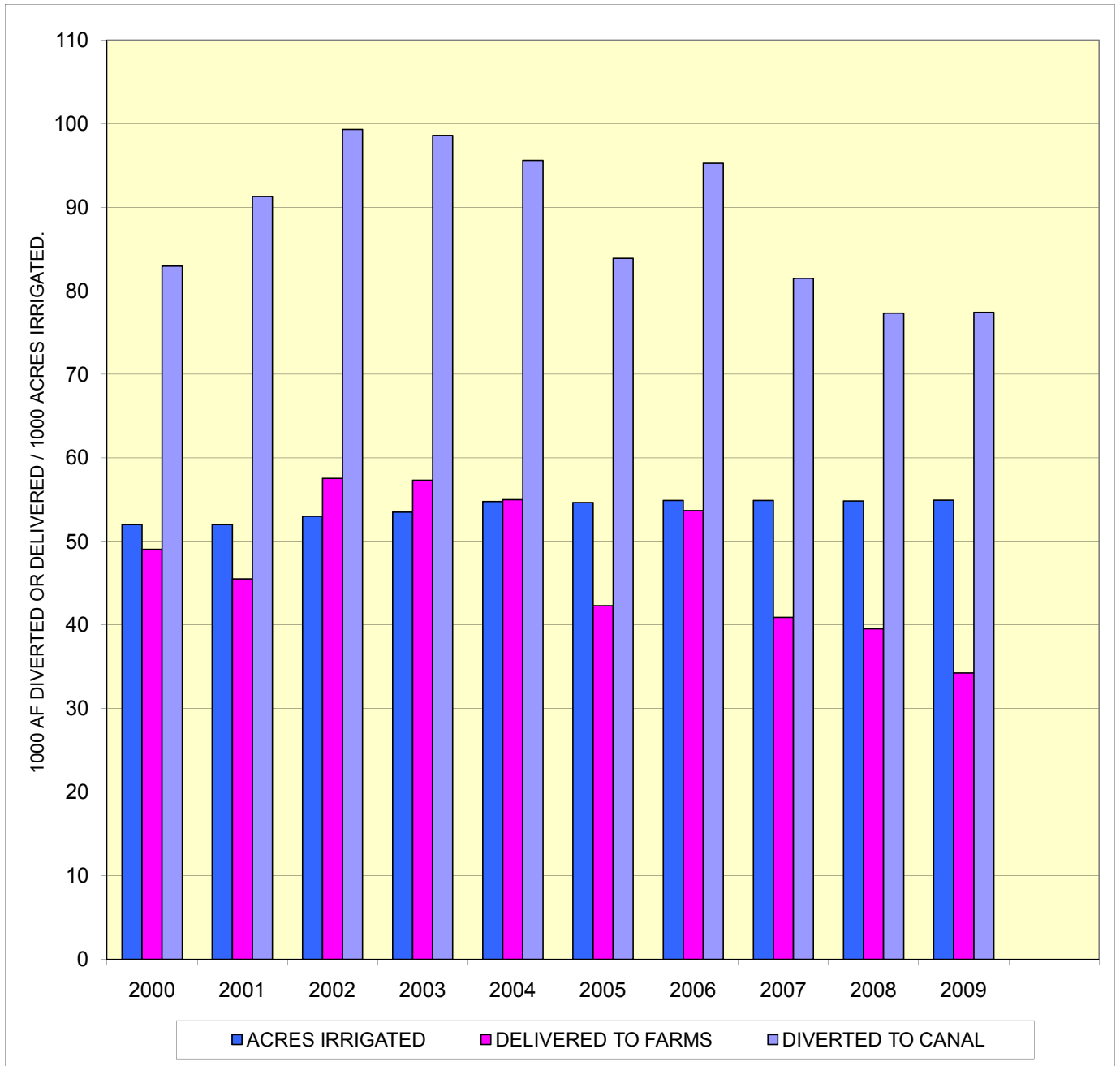
CANAL DIV., FARM DEL., AND ACRES IRRIG.



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
DIVERTED af/acre	2.36	2.20	2.67	2.31	2.48	2.10	2.42	2.19	1.81	1.77
DELIVERED af/acre	1.49	1.38	1.83	1.52	1.59	1.33	1.61	1.39	1.02	0.99
EFFICIENCY	63%	63%	68%	66%	64%	63%	66%	64%	56%	56%

# TWIN LOUPS IRRIGATION DISTRICT

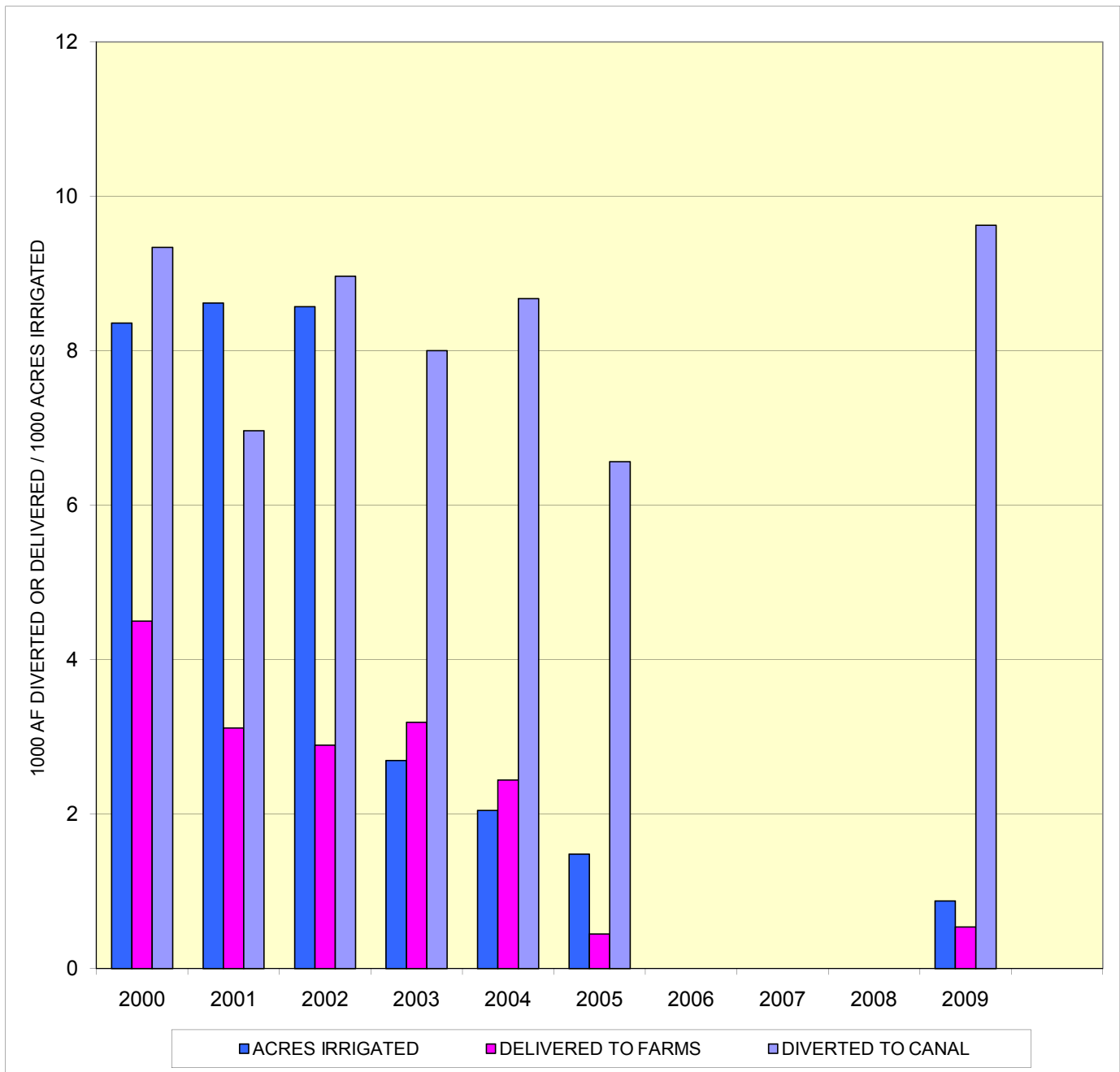
CANAL DIV., FARM DEL., AND ACRES IRRIG.



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
DIVERTED af/acre	1.60	1.76	1.87	1.84	1.75	1.53	1.74	1.48	1.41	1.41
DELIVERED af/acre	0.94	0.88	1.09	1.07	1.00	0.77	0.98	0.74	0.72	0.62
EFFICIENCY	59%	50%	58%	58%	58%	50%	56%	50%	51%	44%

# FRENCHMAN VALLEY IRRIGATION DISTRICT

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

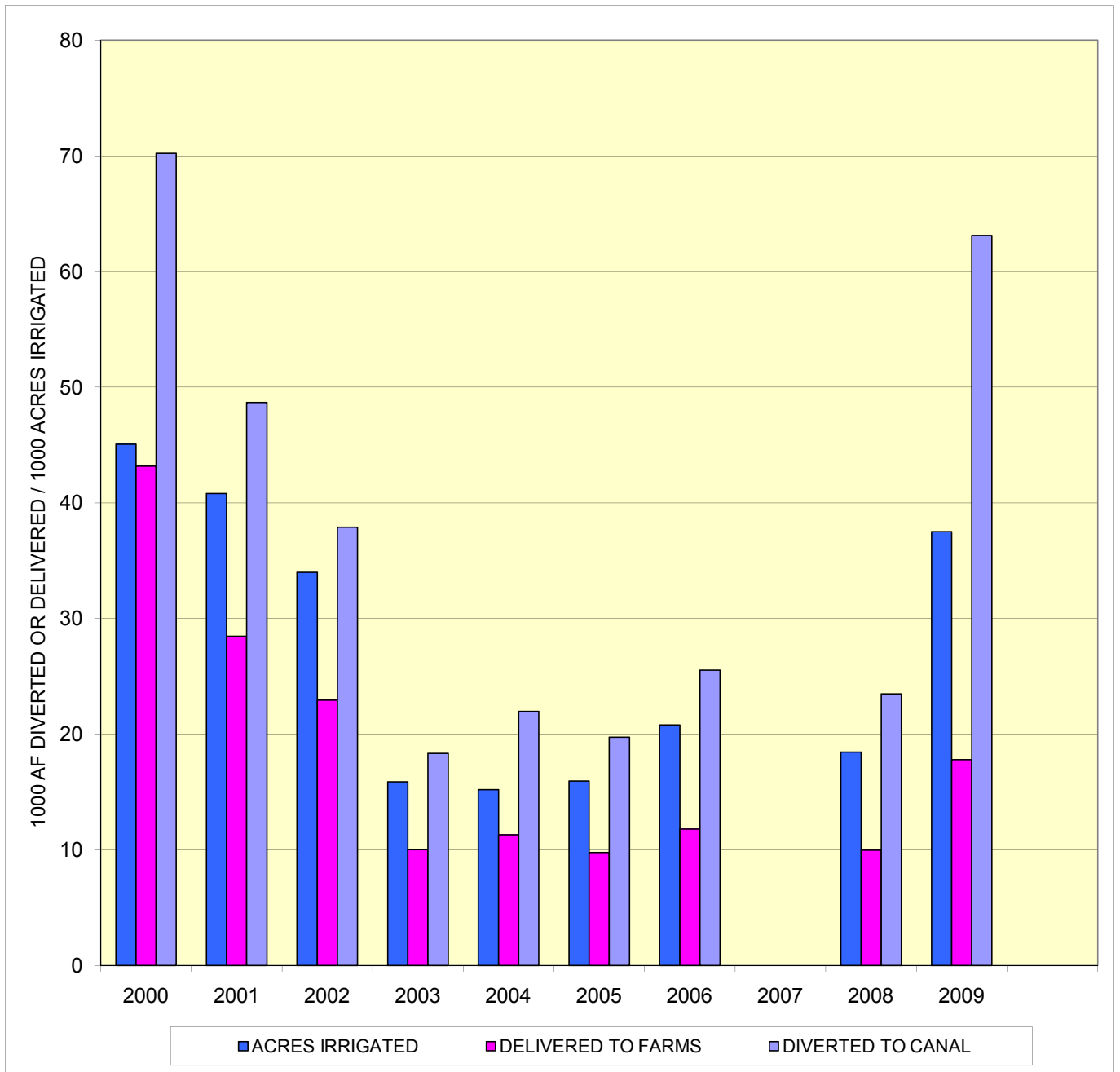


	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
DIVERTED af/acre	1.12	0.81	1.05	2.97	4.24	4.43	0.00	0.00	0.00	11.01
DELIVERED af/acre	0.54	0.36	0.34	1.18	1.19	0.30	0.00	0.00	0.00	0.61
EFFICIENCY	48%	45%	32%	40%	28%	7%	0%	0%	0%	6%



# FRENCHMAN-CAMBRIDGE IRRIGATION DISTRICT

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

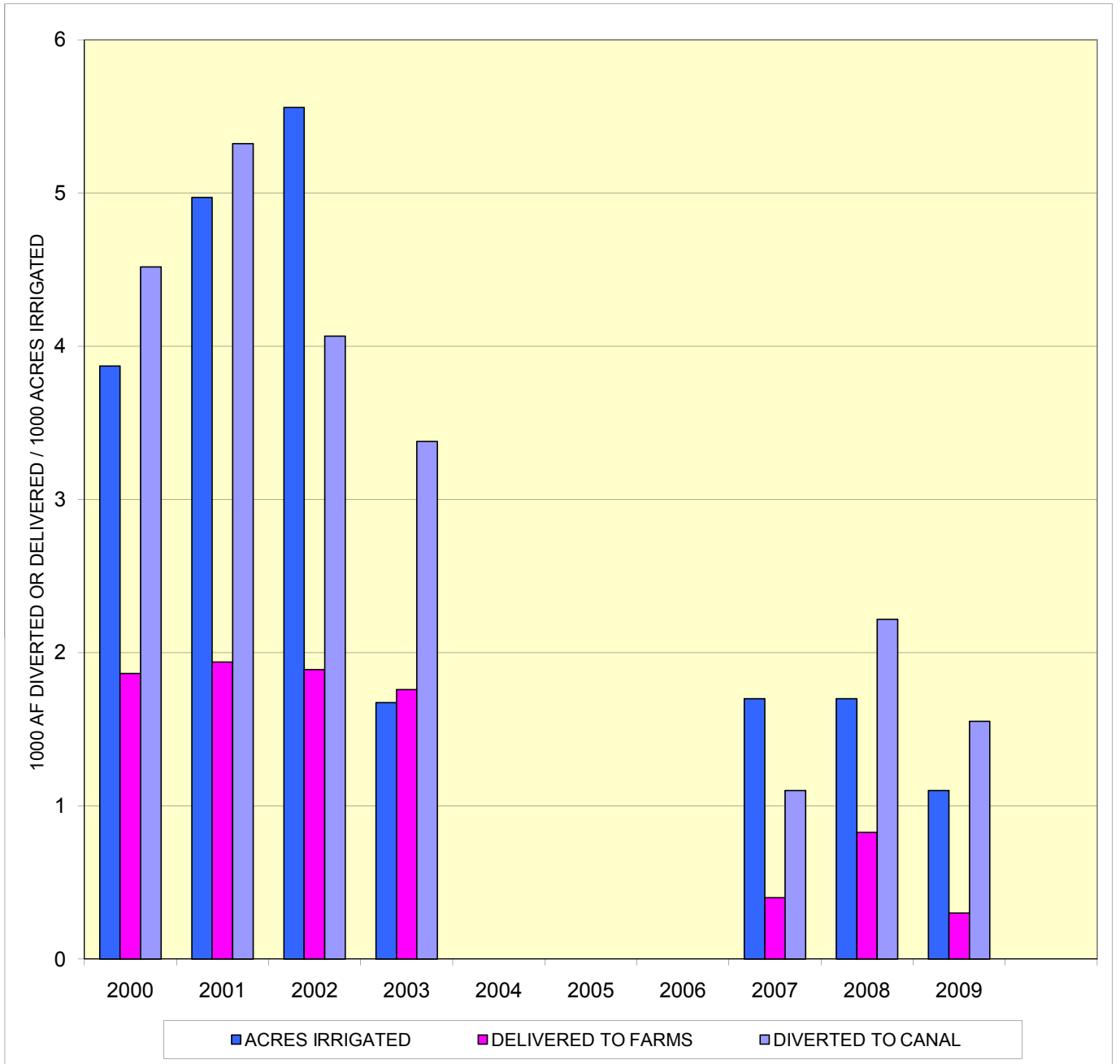


	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
DIVERTED af/acre	1.56	1.19	1.12	1.15	1.45	1.24	1.23	0.00	1.27	1.68
DELIVERED af/acre	0.96	0.70	0.67	0.63	0.74	0.61	0.57	0.00	0.54	0.47
EFFICIENCY	61%	58%	61%	55%	52%	50%	46%	0%	42%	28%



# ALMENA IRRIGATION DISTRICT

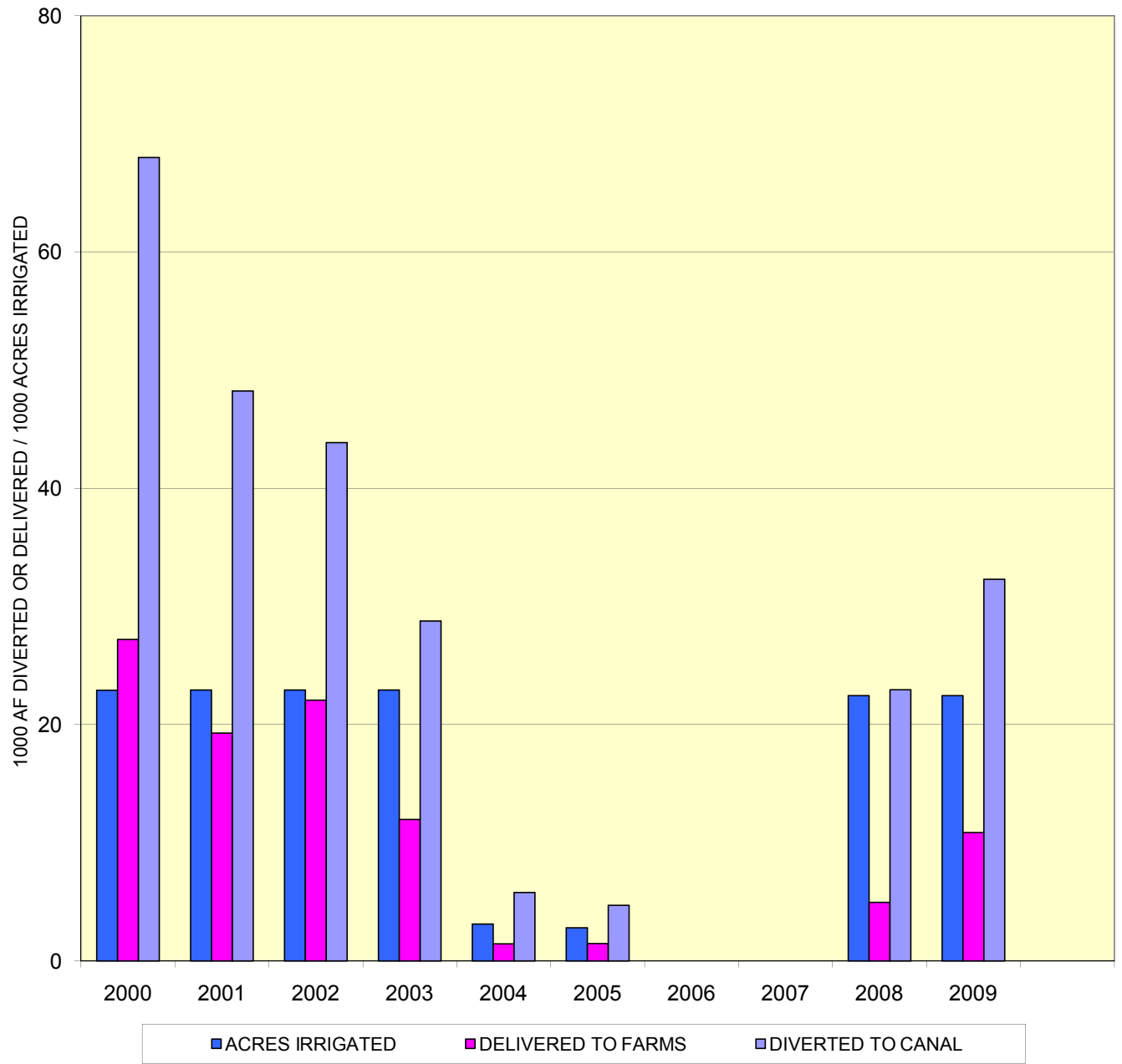
CANAL DIV., FARM DEL., AND ACRES IRRIG.



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
DIVERTED af/acre	1.17	1.07	0.73	2.02	0.00	0.00	0.00	0.65	1.30	1.41
DELIVERED af/acre	0.48	0.39	0.34	1.05	0.00	0.00	0.00	0.24	0.49	0.27
EFFICIENCY	41%	36%	46%	52%	0%	0%	0%	36%	37%	19%

# BOSTWICK IRRIGATION DISTRICT - NEBRASKA

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

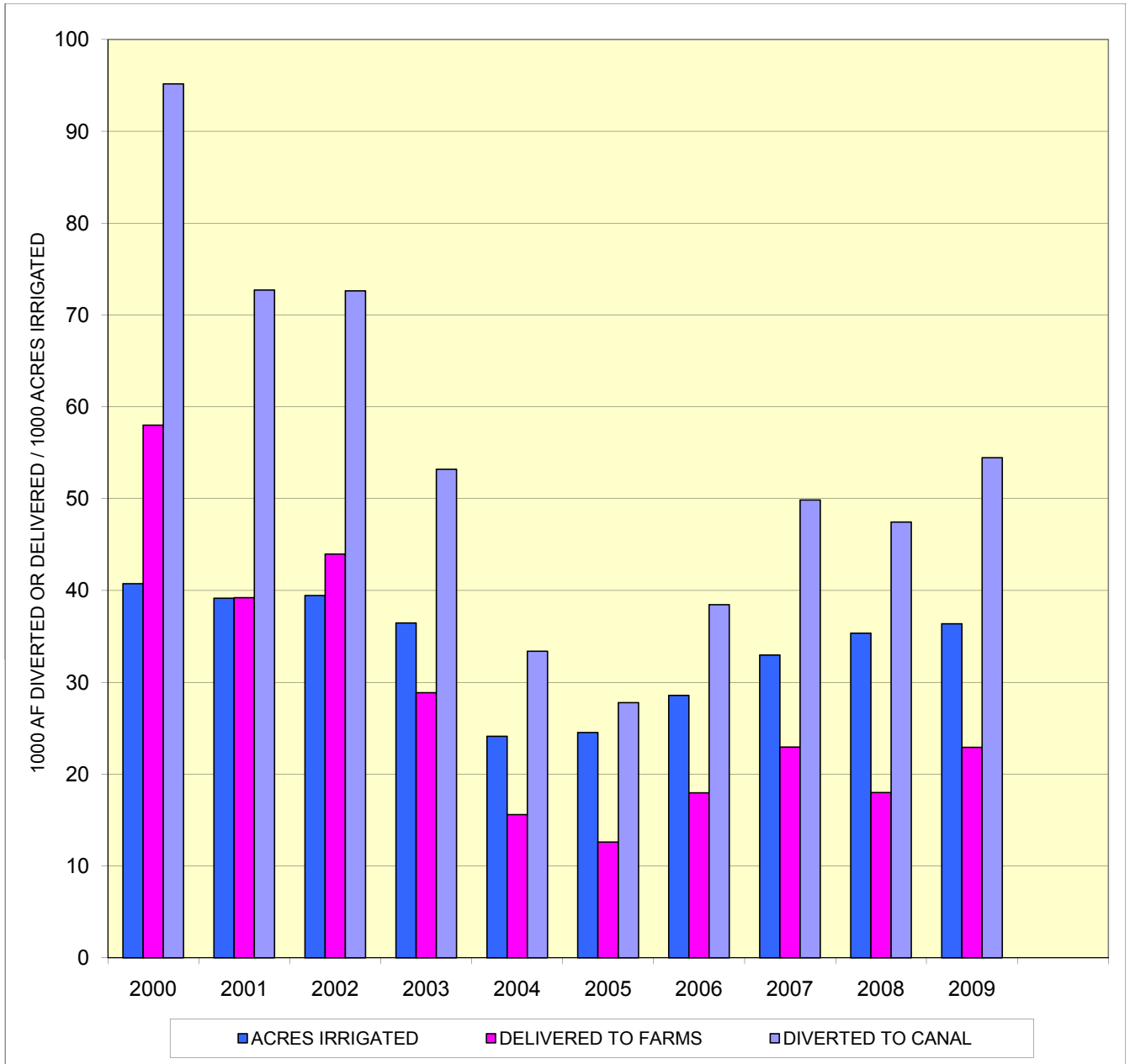


	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
DIVERTED af/acre	2.97	2.10	1.91	1.25	1.85	1.68	0.00	0.00	1.02	1.44
DELIVERED af/acre	1.19	0.84	0.96	0.52	0.47	0.53	0.00	0.00	0.22	0.48
EFFICIENCY	40%	40%	50%	42%	25%	32%	0%	0%	22%	34%

EXHIBIT 25

# KANSAS-BOSTWICK IRRIGATION DISTRICT

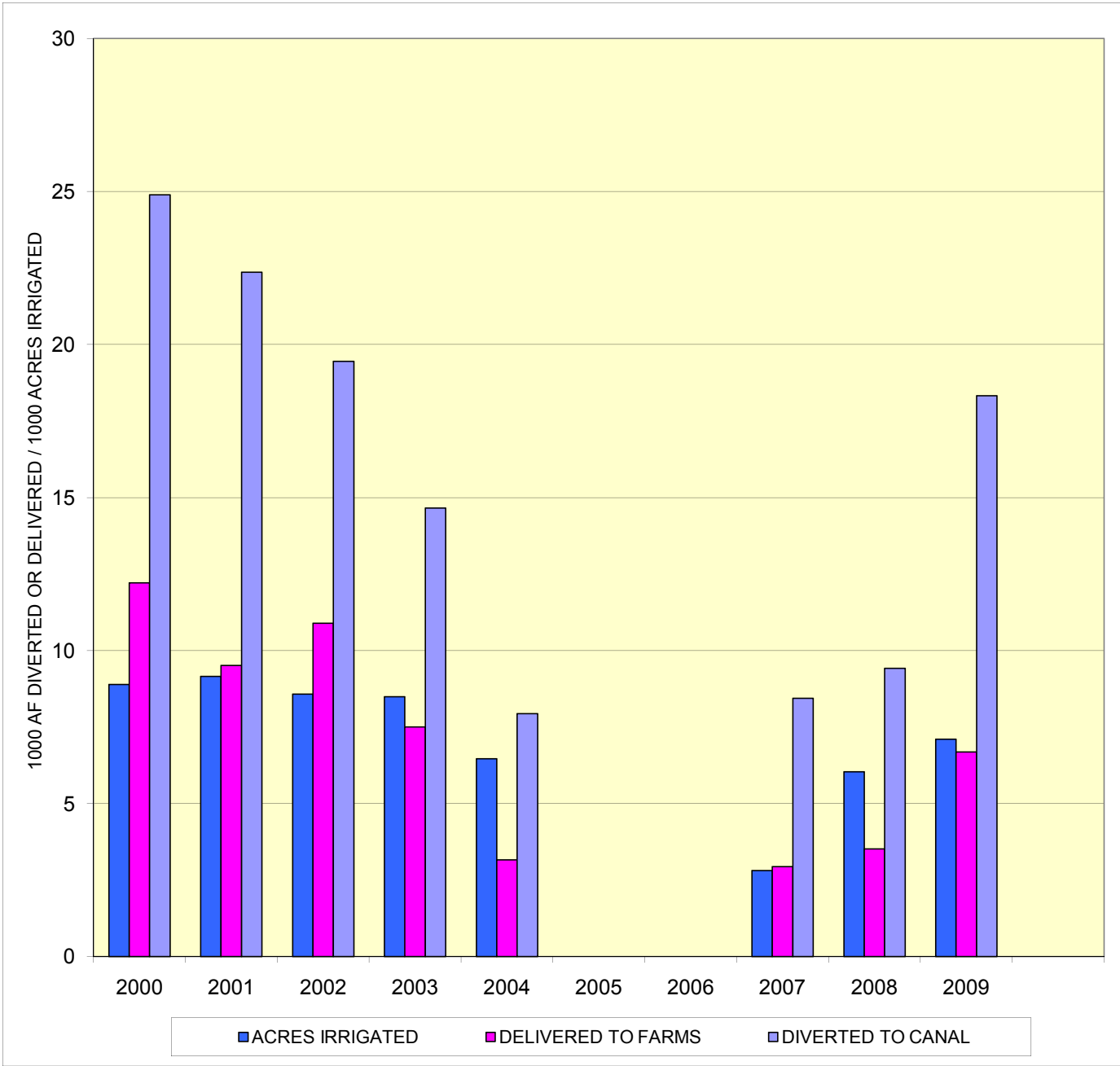
CANAL DIV., FARM DEL., AND ACRES IRRIG.



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
DIVERTED af/acre	2.33	1.86	1.84	1.46	1.38	1.13	1.35	1.51	1.34	1.50
DELIVERED af/acre	1.42	1.00	1.11	0.79	0.65	0.51	0.63	0.70	0.51	0.63
EFFICIENCY	61%	54%	61%	54%	47%	45%	47%	46%	38%	42%

# KIRWIN IRRIGATION DISTRICT

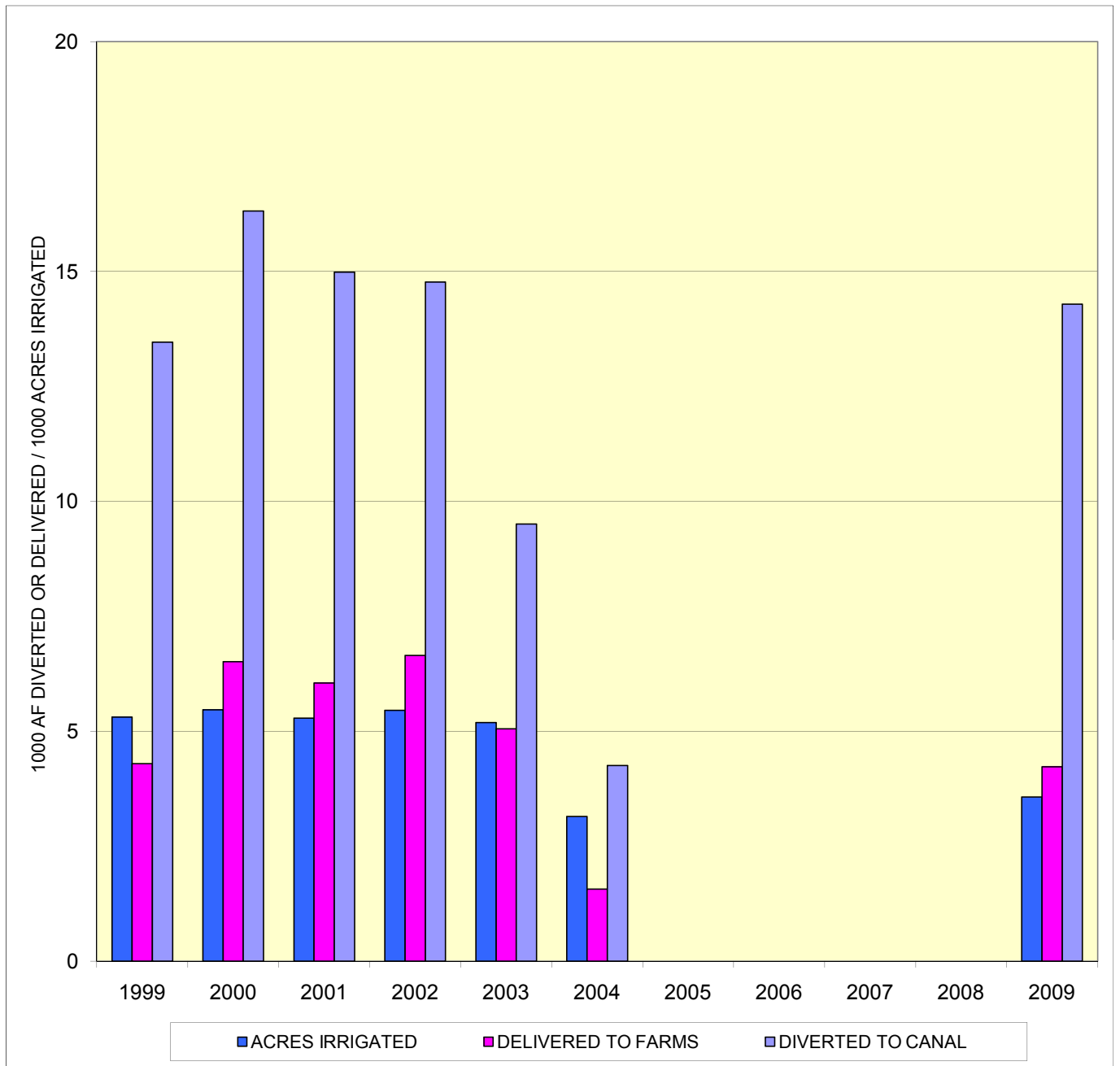
CANAL DIV., FARM DEL., AND ACRES IRRIG.



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
DIVERTED af/acre	2.80	2.44	2.27	1.73	1.23	0.00	0.00	3.00	1.56	2.58
DELIVERED af/acre	1.37	1.04	1.27	0.88	0.49	0.00	0.00	1.05	0.58	0.94
EFFICIENCY	49%	43%	56%	51%	40%	0%	0%	35%	37%	36%

# WEBSTER IRRIGATION DISTRICT

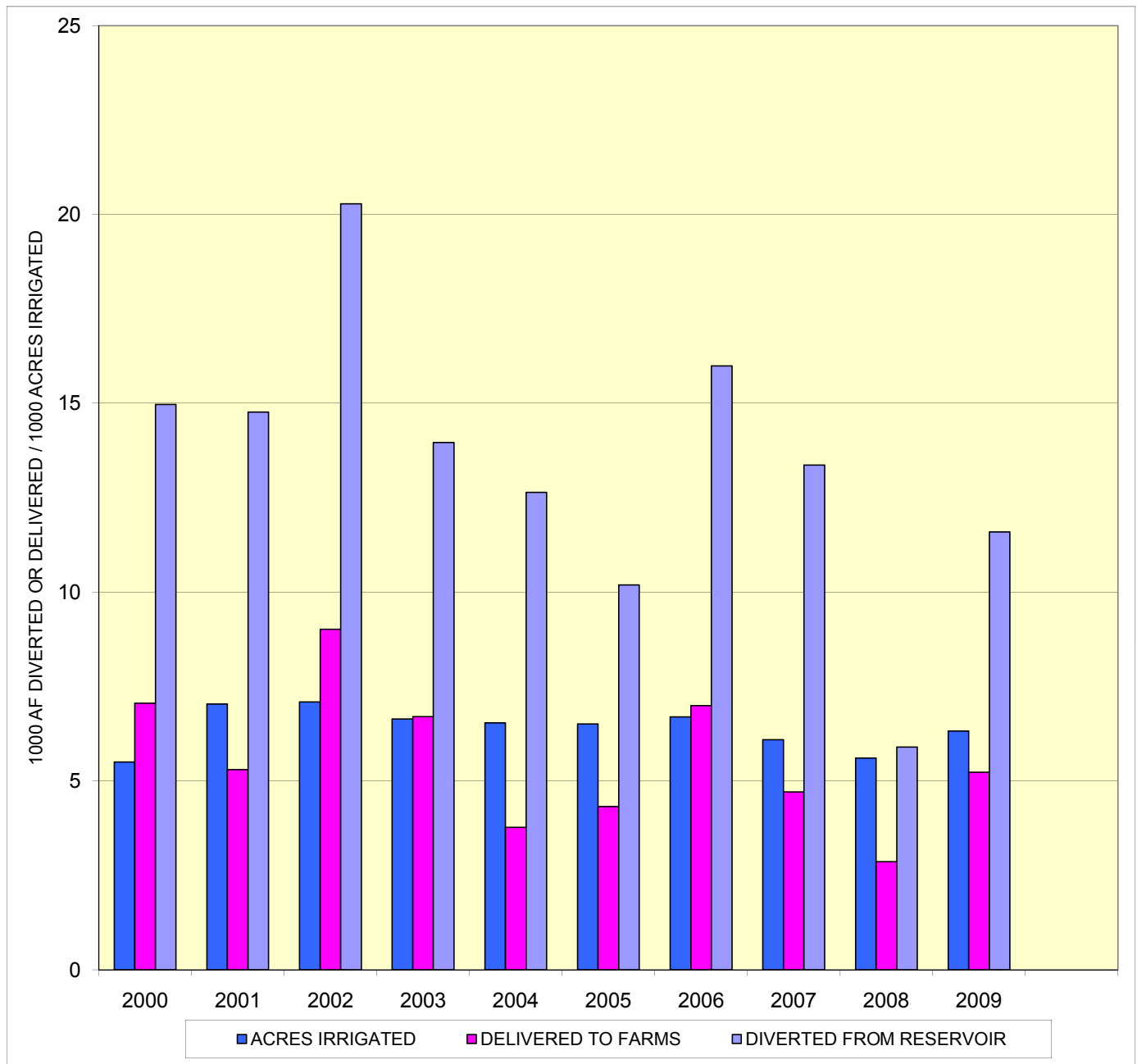
CANAL DIV., FARM DEL., AND ACRES IRRIG.



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
DIVERTED af/acre	2.98	2.83	2.71	1.83	1.35	0.00	0.00	0.00	0.00	4.00
DELIVERED af/acre	1.19	1.14	1.22	0.97	0.50	0.00	0.00	0.00	0.00	1.18
EFFICIENCY	40%	40%	45%	53%	37%	0%	0%	0%	0%	30%

# GLEN ELDER IRRIGATION DISTRICT

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



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
DIVERTED af/acre	2.72	1.00	1.00	1.00	1.93	1.57	2.39	2.19	1.05	1.83
DELIVERED af/acre	1.28	0.75	1.27	1.01	0.58	0.66	1.04	0.77	0.51	0.83
EFFICIENCY	47%	36%	44%	48%	30%	42%	44%	35%	48%	45%