# SYNOPSIS

## General

This year is the 59th consecutive year that an Annual Operating Plans (AOP) has been prepared for the Federally-owned dams and reservoirs in the Niobrara, Lower Platte, and Kansas River Basins. The plan has been developed by the Water Operations Group in McCook, Nebraska for the 16 dams and reservoirs that are located in Colorado, Nebraska, and Kansas. These reservoirs, together with 9 diversion dams, 9 pumping plants, and 20 canal systems, serve approximately 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 65 Hydromet stations that can be accessed. The McCook Field Office has installed and maintains 40 of these Hydromet stations. 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 2011 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.

## 2011 Summary

### Climatic Conditions

Precipitation at the project dams during 2011 ranged from 71 percent of normal at Cedar Bluff Dam to 137 percent of normal at Merritt Dam. Temperatures during the first 3 months of the year were generally above normal throughout the projects area. Precipitation totals varied from 52 percent to 161 percent during January through March. January and February precipitation was near normal with the exception of northern Nebraska where above normal precipitation was recorded. March precipitation was well below normal in most of the project areas.

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

Temperatures were above normal during the summer with well above normal temperatures recorded in July. Total precipitation for June and July varied considerably across the projects with June precipitation averaging slightly below normal and July slightly above normal. August precipitation was generally above normal project wide.

Precipitation during the fall and early winter varied from month to month. Precipitation recorded in September and November was well below normal throughout the project areas with none of the dams recording above normal precipitation in either month. Precipitation during October and December was generally above normal. Temperatures in September were slightly below normal while temperatures during October and November were generally above normal throughout the project areas. December temperatures began the month well below normal and ended the month well above normal.

Storage Reservoirs

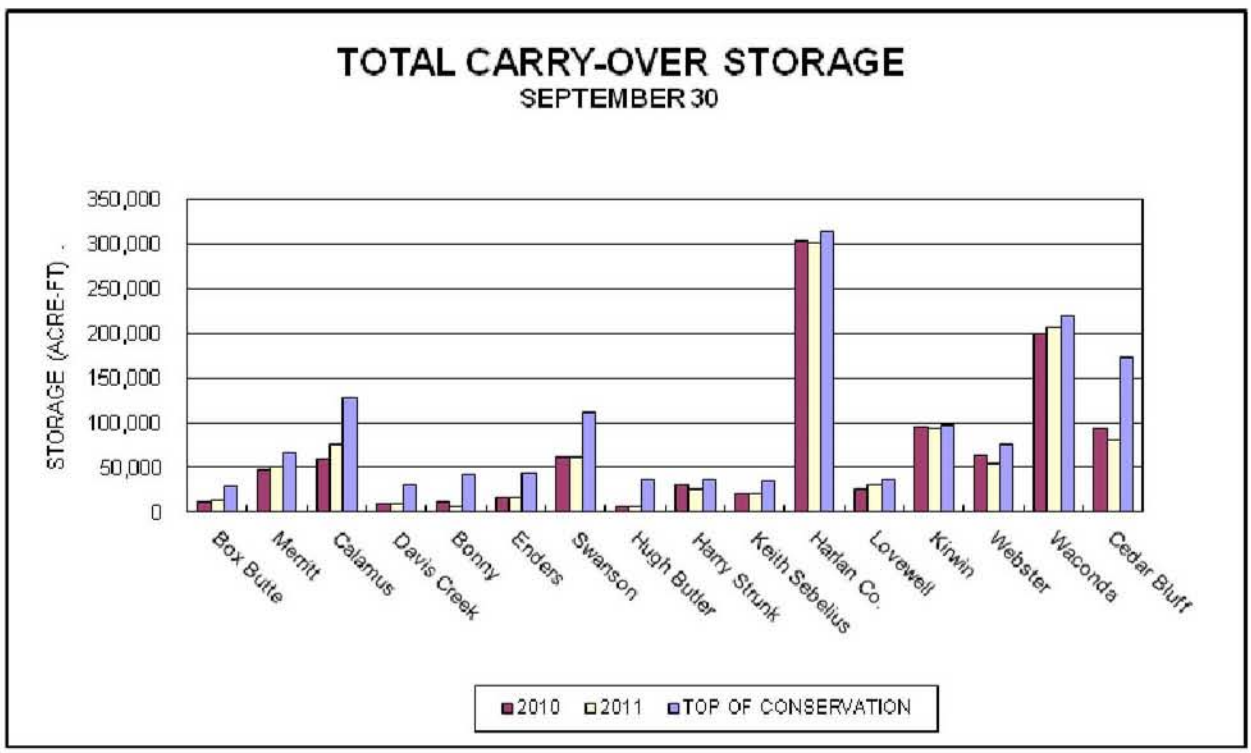
1. Conservation Operations: The 2011 inflow was above the dry-year forecast at all 16 of the reservoirs. Bonny, Enders, Webster, and Cedar Bluff Reservoirs along with Swanson Lake had inflows between the dry-year and normal-year forecasts. Box Butte, Merritt, Davis Creek, and Kirwin Reservoirs along with Hugh Butler, Harry Strunk, Keith Sebelius, Waconda, and Harlan County Lakes had inflows between the normal-year and wet-year forecasts. Calamus and Lovewell Reservoirs had inflows above the wet-year forecast.

Ten of the sixteen reservoirs had below average carryover storage from the 2010 water year. Reservoir releases were made from Merritt, Virginia Smith, Medicine Creek, Harlan County, Kirwin, and Glen Elder Dams to maintain or reduce reservoir levels prior to the 2011 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, and Waconda Lakes and Lovewell, and Kirwin Reservoirs had some flood storage occupied prior to the irrigation season. Irrigation demands only minimally reduced storage in these project reservoirs as early summer inflows maintained the reservoir pools. Reservoir storage was below normal at nine reservoirs at the end of 2011.

On September 20, 2011, the State of Colorado ordered that Bonny Reservoir be drained for Republican River Compact Compliance. The conservation pool was essentially empty by the end of December. The order currently remains in effect and inflows continue to be bypassed.

Hugh Butler Lake continues to be maintained near the dead pool level due to the embankment cracking discovered in 2009. Safety of dam work began at this facility in 2011 and is expected to continue through the fall of 2013.

The following graph shows a comparison of 2010 and 2011 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, and Waconda Lakes, and Lovewell, and Kirwin Reservoirs utilized flood pool storage and made flood releases in 2011. The water year 2011 flood damages prevented by the operation of Reclamation's Nebraska-Kansas Projects facilities was $40,254,000 as determined by the Corps of Engineers. An additional benefit of $10,447,200 was credited to Harlan County Lake. The accumulative total of flood control benefits for the years 1951 through 2011 by facilities in this report total $2,066,406,100 (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 the facilities of the Nebraska-Kansas Projects during 2011 can be found in Table 7.

Water Service

There was 343,094 acre-feet (AF) of water diverted to irrigate approximately 206,822 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 2011.

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 2011 crop yields on lands receiving project water in the Nebraska-Kansas Projects were slightly higher than 2010. The average corn yield, the principal crop of all reporting districts, was 170 bushels per acre. This was approximately 7 bushels per acre more than in 2010. The start of irrigation releases from project reservoirs varied considerably but was generally near normal. Above normal rainfall was experienced during much of the growing season with a few exceptions. Temperatures averaged above normal during the season. Crop maturity progressed near normal during the growing season. Most irrigation districts had finished with irrigation releases by early September and all irrigation districts had finished delivering water by the end of September. Corn harvest generally commenced in late October and concluded in November. Only two canals did not divert water in 2011 as a result of short water supplies.

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 from the agencies to enhance fisheries resources within the flexibility allowed while still meeting contractual obligations with the various irrigation districts.

During the 2011 season, normal reservoir operations were favorable for recreation and fish and wildlife uses at those project reservoirs with full or nearly full conservation pool levels. Higher water levels experienced at Lovewell Reservoir and Waconda Lake due to spring flood events negatively affected both recreation benefits and late summer shoreline revegetation. Increased water levels submerged existing shoreline vegetation early in the year. Low water levels experienced at Bonny Reservoir and Hugh Butler Lake also diminished recreation benefits.

2012 Outlook

Three forecast conditions have been developed for each of the reservoirs in the Niobrara, Lower Platte, and Kansas River Basins conforming with established operating criteria under various reservoir inflow conditions. These operation studies are included in Table 4, Sheets 1 through 16. The municipal and rural water district water supply requirements will be met under all three inflow forecast conditions for all units. Hugh Butler Lake will be maintained at low water levels again throughout 2012 as safety of dam work continues.

Under reasonable minimum inflow forecast conditions, irrigation districts receiving storage water from the following lakes and reservoirs are expected to receive less than a full supply: Box Butte, Enders, Swanson, Hugh Butler, Harry Strunk, and Keith Sebelius. The irrigation districts affected are Mirage Flats; Frenchman Valley, and H&RW; Frenchman-Cambridge; and Almena; respectively. If 2012 is a dry year, 84,302 of the total 269,744 acres with service available to be irrigated (31 percent) will have an inadequate water supply.

Under most probable inflow conditions, it is expected that Frenchman Valley, H&RW, Frenchman-Cambridge, Almena, and Mirage Flats Irrigation Districts would experience some shortages to irrigation demands from Enders Reservoir, Hugh Butler Lake, Keith Sebelius Lake, and Box Butte Reservoir. Most irrigators in these districts plan to use water from private wells to supplement the project water supply.

Even under reasonable maximum inflow conditions, Frenchman Valley, H&RW, and Frenchman-Cambridge Irrigation Districts are expected to experience irrigation demand shortages from Enders Reservoir and Hugh Butler Lake.

Under reasonable minimum inflow conditions, the conservation pools at Merritt, Calamus, Davis Creek, Kirwin, and Lovewell Reservoirs, and Harry Strunk and Harlan County Lakes are expected to fill during 2012.

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

# 2011 HEADLINES

**Kansas cleared to reopen suit**
Republican River Compact

**Dam repair bids open on Tuesday**
Game, Parks Commission To meet here that morning

**Conference emphasizes efficiency**

Groundwater Week recognizes valuable resource

**Lawsuit, study on NRD agenda**

**Legal development puts Nebraska's water resolve to test**

**Bonny Lake being drained for compact**

**Trenton Dam road to stay closed through September**

**Company gears up for dam repair**

Highway 61 to close at Enders Dam

**Lawmakers compromise on water bill**

**NRD uses nearly 40 percent less water**

**Lower NRD approves water plan**

**MRNRD reaches compromise with surface water irrigators**

Repairing Red Willow Dam
**Apparent low bid $15.3 million**

**Officials: Idled acres to boost stream flow**

**Irrigation district argues case in court**

# 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 2011 and serves as a guideline for the 2012 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 2000 sediment survey 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 35.

Water Supply

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

Inflow records from 1992 through 2011 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 Superior-Courtland 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 Mirage Flats Irrigation District is April through September. The contracted irrigation season for Frenchman-Cambridge Irrigation District is April 15 through October 15 or such additional period from April 1 to April 15 of each year as may be agreed upon between the District and Reclamation. The contracted irrigation season for Frenchman Valley and H&RW 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 or repayment contracts for full or supplemental water supplies.

Fish and Wildlife

The Calamus Fish Hatchery is located below Virginia Smith Dam and Calamus Reservoir. 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.

The state of Kansas is presently using the fish hatchery facility below Cedar Bluff Reservoir for waterfowl habitat.

State of Colorado Division of Wildlife

The state of Colorado 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. Subordination Agreements also exists between Reclamation, the Ainsworth Irrigation District and the Nebraska Public Power District and between Reclamation, the Mirage Flats Irrigation District and the Nebraska Public Power District. Provisions of these agreements will be incorporated into the 2012 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 presented a Summary Report of Preliminary Findings for the study at the 2011 Republican River Compact annual meeting held in Burlington, Colorado on August 31, 2011. The Republican River Compact Administration (RRCA) will review the report and determine if a formal study report is needed. If the RRCA requests a formal study report, the Conservation Committee will complete the report within 6 months of the RRCA's request.

"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 that "Water-Short Year Administration" would not be in effect in 2011.

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; and 3) improve water management efficiency in the Republican River Basin through conservation and other available means, and 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 and recreation areas and initial surface water model scoping activities. To date, Reclamation has not received the necessary funding for the study.

Late in 2011, the states of Colorado, Kansas, and Nebraska submitted a combined letter of interest proposing a study of the Republican River Basin under Reclamation's WaterSMART (Sustain and Manage America's Resources for Tomorrow) Basin Study Program. The proposed 2-year study would encompass the entire Republican River Basin down to the Clay Center stream gage in Kansas. The study would be a collaborative effort with each state providing in-kind services or cash. A short study proposal is being developed that will be utilized by a Reclamation-wide application review committee to determine if the Basin Study will be selected to receive funding in 2012.

Niobrara Basin Study

In 2010, the Nebraska Department of Natural Resources (NDNR) was selected for a Reclamation WaterSMART Basin Study for the Niobrara River Basin. Reclamation will provide $350,000 of federal funding and staff resources for the estimated $850,000 Niobrara Basin Study. The Niobrara Basin Study will determine current and future water demands of the basin, assist in the development and implementation of Integrated Management Plans (IMPs) for the basin, identify opportunities for meeting water supply needs through structural and nonstructural means, and analyze the potential effects of climate variability on water supply. Reclamation and NDNR will work collaborative in the development of a groundwater model and surface water

operations model to test the effects and potential viability of various management strategies under both current and potential future conditions. A Plan of Study was developed in early 2011 and a Memorandum of Agreement was signed in May 2011 outlining the scope of work for each agency. NDNR is proceeding with development of the groundwater and surface water operations model. Reclamation will be developing an economic model that will work in conjunction with the groundwater/surface water operations model. The targeted completion date for the study is April 2013.

Northeast Nebraska Rural Water Supply Feasibility Study

Through Reclamation's 2010 Rural Water Supply Program, the Lower Niobrara Natural Resource District (LNNRD) recently completed an "Appraisal Investigation for Regional Water Supply System Study in Northeast Nebraska, January 2011". This investigation evaluated and pursued the formation of a new rural water system in northeastern Nebraska. The study area (which experiences both water quality and quantity concerns) included the towns of Center, Niobrara, and Creighton, along with the Santee Sioux Nation and areas served by the West Knox Rural Water System (RWS). Expansion of the West Knox RWS was identified as the most promising alternative.

Reclamation reviewed the LNNRD Appraisal Investigation and completed a report titled "Northeast Nebraska Water Supply System Appraisal Report, March, 2011". Reclamation concluded that the LNNRD Appraisal Investigation met all requirements of the Rural Water Supply Program and that the alternatives suggested were viable to move to the Feasibility Study phase.

The LNNRD used the results of the appraisal investigation and report to successfully compete for funding of a Feasibility Study through the 2011 Rural Water Supply Program. The Feasibility Study will attempt to identify a preferred alternative that will provide the area with a clean and reliable water supply, including determining affordable solutions to reduce the secondary contaminant levels in the Santee Sioux water supply, to improve water quality to the villages of Center and Niobrara, and to identify a water supply sufficient to meet the areas water demands projected for the year 2055. The study will determine potential costs, environmental issues, and provide an economic analysis of each of the alternatives identified. Through a cooperative agreement with the LNNRD, Reclamation is providing financial assistance for the Feasibility Study, which is scheduled to be completed by April 2013. The non-federal study partners are required to provide a minimum of 50 percent of the study costs.

South Sioux City, Nebraska – Rural Water Supply Appraisal Investigation

The city of South Sioux City, Nebraska submitted a successful appraisal investigation proposal through Reclamation's 2011 Rural Water Supply Program. The intent of the appraisal investigation is to examine the comprehensive water supply problems, needs, and opportunities throughout Dakota and Thurston Counties located in northeast Nebraska. These two counties are located adjacent to the Missouri River and include a mixture of large and small communities, two existing rural water systems, Indian tribes/tribal organization (Omaha and Winnebago), multiple Natural Resources Districts, and numerous rural customers. The study area is experiencing both limited water quantities and poor water quality.

Reclamation is providing financial assistance to South Sioux City through a cooperative agreement. The appraisal investigation is scheduled to be completed by April 2013, after which Reclamation will complete an appraisal report by October 2013.

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. A Tabletop Exercise of the Emergency Action Plan (EAP) for Kirwin Dam was held in 2011, and Functional Exercises were held for the Box Butte, Merritt, and Lovewell Dam EAP's. EAP Tabletop Exercises are scheduled in 2012 for Davis Creek, Virginia Smith, Norton, Trenton, Red Willow, and Medicine Creek Dams. Functional Exercises are scheduled for the Glen Elder and Webster Dam EAPs in 2012. Communications Directories for all of the EAPs are reviewed annually.

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, and open to any other NKAO personnel finding the training relevant to their duties, was held at the McCook Field Office and the Kiplinger Arena in McCook, Nebraska in March 2011. This training, held in conjunction with the Dam Operator training required every 3 years, provided personnel the opportunity to update their training in Confined Space, Fall Protection, Lock Out/Tag Out, Severe Weather, Paints/Coatings/MSDS, Security, Skid Steer, UTV/ATV Operator Safety, Respirator Training, and Fit Testing.

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 Specialist 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 March 2010, and will be taught again as a refresher in 2012. 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, pads, and reprogramming CPR protocol is required.

Attention continues with regards to issues concerning contractor safety, defensive driving, NFPA 70E Electrical Safety/Arc Flash, construction equipment safety, lock out/tag out, personal protective equipment (PPE), welding, cutting, coating safety procedures, confined space, pesticide/herbicide use (MSDS), fall protection/slips, trips and falls, working alone, near-miss accident reporting, and completing job hazard analyses (JHAs), with emphasis from managers, supervisors, employees, and the NKAO Safety Committee. 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 2002 to 2011, the project water supply averaged 9,525 AF, which is about 0.82 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 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.

#### 2011 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 20.94 inches, which is 124 percent of normal. The 2011 total inflow of 17,737 AF was between the normal-year and wet-year forecasts. Late winter snowfall and spring rains increased the reservoir level to a peak elevation of 4004.24 feet on July 4. This was the greatest recorded water surface level since 1959, but remained 2.76 feet below the top of conservation.

The higher pool levels resulted in increased toe drain seepage and observed wet areas below the dam. An Emergency Action Plan (EAP) Response Level I was issued for Box Butte Dam on July 12, 2011, and daily monitoring ensued. Engineers with Reclamation's Technical Service Center (TSC) out of Denver, Colorado, followed up with a special inspection on July 14. Irrigation releases decreased the reservoir level throughout the summer and seepage returned to near normal levels and observed wet areas dried up. The Response Level I was terminated on August 15. An Internal Alert remains in effect.

From early July through early September, diversions of 12,885 AF to the Mirage Flats Canal provided irrigation water for approximately 10,709 acres, 92 percent of the service available acreage. The farm deliveries from the project water supply totaled 4,759 AF (0.44 acre-foot per irrigated acre), which is a delivery efficiency of 37 percent. Total reservoir storage was 12,635 AF at the end of the irrigation season. Privately owned irrigation wells supplemented the project water supply. The State of Nebraska Department of Natural Resources (NDNR) ordered that natural flows of the Niobrara River not be stored in Box Butte Reservoir from September 17 through October 8 because the demands of other legal appropriators were not being met.

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. In 2011, the district received funding assistance through the Water Conservation Field Services Program (WCFSP) to install a trash screen and a number of flow meters on an existing pipe lateral. This project will improve district operations and water accounting.

2012 Outlook

The project water supply is expected to be inadequate in 2012 as it has been since the early 1960's. In the spring, the district will inform their water users of the amount of water that will be available from storage in Box Butte Reservoir. It is anticipated that district irrigators will continue to use their privately-owned irrigation wells as a supplemental supply.

The district's future water conservation plans include the automation of Dunlap Diversion Dam and the outlet works gate at Box Butte Dam. The district will again seek assistance from Reclamation's WRRL to assist in installing equipment to meet those needs as well as to fine tune the automation and remote monitoring system already in place.

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 cubic feet per second (cfs) below Merritt Dam.

Reclamation has executed a Memorandum of Agreement (MOA) between Reclamation, the 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.

2011 Summary

Precipitation, as recorded near Merritt Dam, totaled 27.95 inches, which was 137 percent of normal. June precipitation totaled 7.60 inches, the third greatest ever recorded for the month. The inflow for the year totaled 192,404 AF. This inflow was between the normal-year and wet-year forecasts. The water supply was more than adequate to meet the project's irrigation requirement. There were 63,664 AF diverted from Merritt Reservoir into Ainsworth Canal, with 34,032 AF delivered to the farm headgates (delivery efficiency of 53 percent). There were 34,597 acres of land irrigated in 2011.

The district provided a total of 287 AF of irrigation water from holding ponds located within the district's service area.

The NDNR ordered that natural flows of the Snake River not be stored in Merritt Reservoir from September 20 through October 8 because the demands of other legal appropriators were not being met. This was the first time that a closing order had ever been issued for Merritt Reservoir.

During the annual site inspection at Merritt Dam in late September a large seep located near the outlet works stilling basin wing wall was observed to be transporting a sand material. An EAP Response Level I was issued on September 22, 2011, for Merritt Dam and daily monitoring ensued. Following a second site visit on September 23 and additional monitoring, it was determined that the seep was an ongoing issue that did not warrant a Response Level I. The EAP notification was downgraded to an Internal Alert on September 26, 2011. The area continues to be monitored to ensure the situation remains stable and an Internal Alert remains in effect.

Working with Reclamation's technical and financial assistance through a cooperative agreement, the district installed automation equipment on the lateral turnouts to the Sand Draw and Airport Laterals. Additionally, burial of lateral B-7.2, B-10.3, A-16.2, and B-13.1, 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.

2012 Outlook

During the winter months, the reservoir will be regulated to maintain elevation 2944.0 feet (2.0 feet below the top of conservation capacity). In order to alleviate erosive action to the lands around the reservoir and to maximize all benefits associated with the reservoir, releases from Merritt Reservoir will be regulated to fill the conservation capacity during the early spring. This filling generally takes place during April. If weather conditions or irrigation demands dictate, it may be necessary to begin filling the reservoir prior to this time. The reservoir level will be maintained from the end of April until irrigation releases begin. A 50 cfs release to the Snake River will begin when irrigation releases drop the reservoir pool below elevation 2946.0 feet. This release will be made for approximately 20 days and then terminated until the end of the irrigation season. Once the reservoir begins to refill following the irrigation season, a release of 50 cfs to the Snake River will resume until the reservoir reaches the desired winter elevation. The water supply is expected to be adequate in 2012 for the irrigation of 35,000 acres.

The Standing Operating Procedures (SOP) for Merritt Dam is scheduled for revision in 2012.

Initiation of an Issue Evaluation for the river outlet/spillway structure drains will be pursued in 2012 to address the transportation of sand observed in 2009 and also 2011.

In accordance with the Ainsworth Irrigation District's water conservation plan, improved water measurement opportunities were identified as one of the main objectives of the district. The district is working with Reclamation to investigate the possibility of installing some new ramp flumes to improve delivery system operations. The district continues to evaluate measurement and automation opportunities on a number of laterals and turnouts.

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 and 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 are also open to day-use fishing with handicapped accessibility provided.

2011 Summary

Precipitation at Virginia Smith Dam was 24.22 inches which is 100 percent of normal for the year. The inflow totaled 317,697 AF which was above the wet-year forecast. There were 98,372 AF of water released into Mirdan Canal and 2,045 AF diverted through Kent Canal from the North Loup River. A total of 45,090 AF was diverted for district use above Davis Creek Reservoir. The farm headgate delivery was 22,274 AF which is a delivery efficiency of 49 percent. Land irrigated in 2011 totaled 33,593 acres above Davis Creek Reservoir. Calamus Reservoir inflows were bypassed during July, August, and September as required. The reservoir elevation at the end of the year was at 2239.37 feet. The Calamus Fish Hatchery used bypassed natural flows and storage from Calamus Reservoir totaling 5,911 AF during 2011.

The precipitation total of 27.26 inches near Davis Creek Dam was 110 percent of normal. Inflow to Davis Creek Reservoir totaled 44,921 AF during 2011. Beginning in late April, Davis Creek Reservoir was filled from an elevation of approximately 2047.46 feet to a peak elevation of 2073.35 feet on July 19 using diversions from the North Loup River and Calamus Reservoir. A release of 40,185 AF was made from Davis Creek Dam into Fullerton Canal, with 17,563 AF delivered to the farm headgates which is a 44 percent delivery efficiency. There were 20,389 acres irrigated below Davis Creek Reservoir. The reservoir elevation at the end of 2011 was near the normal wintering level at 2048.50 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. In 2011, the district completed automation of turnouts on Mirdan laterals 36.3 and 37.1 and also completed a small canal lining project.

2012 Outlook

Filling of Calamus Reservoir will continue through late winter and early spring. The reservoir will be allowed to fill to an elevation of 2244.0 feet (top of conservation capacity) in late March or April. This reservoir level will be maintained in order to minimize shoreline erosion until demands begin to draw on the reservoir. Bypassing of inflows will be made during July, August, and September under all inflow forecast conditions. In the fall the reservoir will be filled to an elevation of approximately 2240.0 feet, if possible.

Water will be available for all irrigable acres with service from the Mirdan, Geranium, Scotia Canals, and Lateral Systems. It is estimated that approximately 33,500 acres will be irrigated from these canals. Water supplies will be sufficient to meet the full dry-year requirements.

Filling of Davis Creek Reservoir will take place this spring with flows diverted from the North Loup River at Kent Division Dam and transported through Kent and Mirdan Canals. Storage water can also be transferred from Calamus Reservoir into Davis Creek Reservoir during the summer months via Mirdan Canal. Water will be sufficient to irrigate an estimated 20,500 acres from Elba and Fullerton Canals under all inflow forecast conditions. The reservoir level will be regulated to normal winter levels at the end of the season.

The fish hatchery demand for 2012 is expected to be similar to that of the last few years with approximately 6,000 AF required for the hatchery.

The district plans to expand their remote monitoring capabilities by installing equipment at additional wasteways and key canal measurement sites throughout their delivery system. In addition to further remote monitoring capabilities, the district will continue to expand the radio control network. Additionally, the district intends to further integrate an alarm and monitoring system into their existing infrastructure to reduce the risk of operational failure.

# CHAPTER III - REPUBLICAN RIVER BASIN

## Armel Unit, Upper Republican Division in Colorado

### General

Normal reservoir operations for Bonny Reservoir have historically been for recreation and fish and wildlife support, although water has been 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 can utilize Bonny Reservoir storage water for 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 historic operation pattern of Bonny Reservoir enhanced the spring fish spawn and provided excellent fishing opportunities during the summer and hunting conditions each fall. In September 2011, the state of Colorado ordered all storage water evacuated from Bonny Reservoir for Republican River Compact compliance. As a result, the reservoir fishery was decimated and future operations are unlikely to provide fishing opportunities.

### 2011 Summary

The annual precipitation total of 19.01 inches at Bonny Dam was 111 percent of average. The annual computed inflow of 9,008 AF to Bonny Reservoir was between the dry-year and normal-year forecasts. The reservoir level began the year at elevation 3652.27 feet and gradually increased to elevation 3655.89 feet on June 2. River releases were made from June 20 through July 9 in accordance with orders of the state of Colorado for Republican River Compact compliance. A total of 2,024 AF of river outflow was recorded during this period. River releases resumed on September 21 once again in accordance with orders by the state of Colorado for Republican River Compact compliance. The river release continued through the end of the year with an additional 6,816 AF of river outflow recorded. The total release to the river in 2011 made for compact compliance was 8,840 AF. The reservoir elevation at the end of the year was 32.3 feet below the top of conservation at 3639.70 feet. Approximately 135 AF of storage remained in the reservoir. The Corps of Engineers determined that $54,700 of flood prevention benefits was realized from the operation of Bonny Reservoir during 2011.

As directed by the Colorado State Water Commissioner, a release was also made into Hale Ditch beginning on September 23 and ending on October 9. A total of 272 AF was released into Hale Ditch during 2011. A Periodic Facility Review was held at Bonny Dam in June of 2011.

2012 Outlook

The state of Colorado's order to release all of the storage in Bonny Reservoir for Republican River Compact compliance remains in effect. If the order continues throughout 2012, water will not be available in the reservoir for irrigation or fishery purposes. Any water allowed to be stored in Bonny Reservoir during 2012 would be available to Hale Ditch and other private irrigators under short-term water service contracts executed with the state. The Bonny Dam SOP is scheduled for revision in 2012.

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 and Stinking Water Creeks and off-season storage in Enders Reservoir located on Frenchman Creek, a tributary of the Republican River in southwest Nebraska. Irrigation releases are conveyed via Frenchman Creek from Enders Reservoir to Culbertson Diversion Dam. Reclamation maintains/clears this section of Frenchman Creek prior to irrigation releases 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.

Annual reservoir inflows have steadily declined from around 61,000 AF when Enders Dam was constructed to only 6,000 AF in recent years. Extensive groundwater pumping from upstream well development along with various conservation practices have resulted in the depletion of inflows. The conservation pool has not filled since 1968.

2011 Summary

The annual precipitation total of 21.46 inches at Enders Dam was above normal (113 percent). The 2011 inflow into Enders Reservoir of 7,516 AF was between the dry-year and normal-year forecasts. The reservoir level began the year at elevation 3092.49 feet (19.81 feet below top of conservation). The reservoir level increased slightly during the spring to a peak elevation of 3094.83 feet on June 21 and then gradually decreased through mid November reaching elevation 3092.92 feet on November 15. Due to the extremely low water supply available, no water was released from Enders Reservoir. The end of the year reservoir level was 19.04 feet (3093.26 feet) below the top of conservation. The Corps of Engineers determined that the reservoir prevented $300 in flood damages in 2011. The Frenchman Valley Irrigation District reports that approximately 1,250 acres received 1,096 AF of water in 2011 from natural flow diversions from Frenchman Creek. Farm delivery averaged about 0.88 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 2011 due to the extremely low water supply. This was the ninth consecutive year that the district did not deliver water.

A December 2008 Corrective Action Study recommended grouting the outlet works stilling basin drains and constructing a filtered drainage system around the outlet works conduit and outlet works structure. The drains were grouted in 2009 and a filtered drainage system was constructed in the fall of 2010. A Technical Report of Construction was issued in June 2011 stating that the desired risk reductions were attained with the modifications.

On June 20, 2011, a minor erosional slide occurred on the downstream slope of Enders Dam near the left abutment. Enders Dam had received more than 6 inches of rain in the preceding 24-hours. The slide was evaluated and a repair was made over the following weeks.

In 2011, the Frenchman Valley Irrigation District (along with Reclamation) again provided support for a Limited Irrigation Demonstration project with the University of Nebraska Extension Service.

2012 Outlook

The fall and early winter inflows into Enders Reservoir were below the normal-year forecast. If reasonable minimum inflow conditions prevail, the project water supply is expected to experience a shortage of about 70,000 AF. Most probable inflow conditions are expected to be inadequate by 49,900 AF and reasonable maximum inflow conditions by 15,000 AF, to irrigate the 9,292 acres in the Frenchman Valley Irrigation District and 11,915 acres in the H&RW Irrigation District.

A 4-inch sinkhole was discovered near the left wall of the spillway stilling basin in October 2010. While the location of the sinkhole suggests that the issue is not urgent, further investigations are warranted to ensure that the situation is understood. A recommendation has been made to perform dye testing and additional exploration as appropriate.

The Frenchman Valley Irrigation District has expressed an interest in replacement of additional open ditch laterals with buried pipe. Future piping projects are somewhat limited due to the water supply shortage. The district is also investigating remote monitoring opportunities to improve the delivery system operations. The district has identified two additional operational wasteways sites that would improve delivery systems with remote monitoring.

The Frenchman Valley Irrigation District and the H&RW Irrigation District are investigating possible alternatives for the most efficient use of the declining water supply in the basin. The districts have also participated in discussions with NDNR on the water supply issues as they relate to the Republican River Compact and the settlement.

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 and 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.

2011 Summary

The annual precipitation total of 19.99 inches at Trenton Dam was 100 percent of normal. The inflow of 33,791 AF to Swanson Lake was slightly less than the normal-year forecast. The lake level began the year at elevation 2740.15 feet and gradually increased to a peak elevation of 2745.40 feet (6.60 feet below the top of conservation) on June 21. The reservoir level decreased throughout the irrigation season and reached an elevation of 2740.17 feet on September 3. The district diverted 21,538 AF from June 20 through September 2 and delivered 7,998 AF to the farms. At the end of the year the reservoir level was 11.84 feet below the top of conservation at 2740.16 feet. The Corps of Engineers determined that Swanson Lake prevented $59,300 in flood damages.

During a 2007 dam inspection it was noted that bedding material along the upstream riprap slope protection was exposed in several areas at Trenton Dam. A repair contract was awarded in 2011 for the placement of additional riprap in those areas identified. Construction was completed in October. The bridge at Trenton Dam was also repaired in 2011. The construction contract included repair of the bridge bearing supports, deck joints, exposed rebar, and other miscellaneous items.

The annual precipitation total of 21.58 inches at Red Willow Dam was 110 percent of normal. The annual inflow of 17,863 AF into Hugh Butler Lake was between the normal-year and the wet-year forecasts. The reservoir level at the first of the year was 2553.52 feet, 28.28 feet below the top of conservation. Due to dam safety concerns, releases were made throughout the year to maintain the reservoir elevation between 2552.00 and 2554.00 feet. May precipitation totaled 6.61 inches, the second greatest May total recorded at the site. Runoff from the late May storms increased the reservoir level to a peak of 2556.68 feet on May 29. River releases were increased to reduce the pool level to elevation 2554.00 feet. Releases varied from 24 cfs up to 125 cfs during the summer months in maintaining the desired reservoir level. No irrigation releases were made from Hugh Butler Lake in 2011. The end of year storage at Hugh Butler Lake was the lowest end of December storage ever recorded at the site (elevation 2553.45 feet), 28.35 feet below the top of conservation. The Corps of Engineers determined that Hugh Butler Lake prevented $3,362,100 of flood damages during 2011.

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 was issued and grouting of the underdrain system was completed in the fall of 2010. 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 Response Level I was declared and remains in effect. 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 Corrective Action Study (CAS) began in March 2010 to identify structural alternatives for repairing the dam, estimate risk for potential failure modes, and to document the technical cost, and constructability of the various alternatives. The December 2010 CAS Decision Document identified the preferred alternative consisting of a full-height full-length filter/drain and construction of a berm/buttress to protect the filter and drains. The Modification Report, Finding of No Significant Impact, and Environmental Assessment were transmitted to Congress in July 2011. Final designs and contract documents were prepared during the summer of 2011. In September 2011 a contract was awarded for the dam modification and construction began in late 2011. 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 completed.

The annual precipitation total of 23.06 inches at Medicine Creek Dam was 111 percent of normal. The inflow of 44,135 AF was between the normal-year and wet-year forecasts. The reservoir level at the beginning of 2011 was only .4 foot below the top of conservation. Releases were made during the first 3 months of 2011 to maintain the reservoir elevation approximately .5 foot below the flood pool. The reservoir was allowed to fill on April 17 (elevation 2366.10 feet) and the reservoir level gradually increased to elevation 2367.00 feet on May 3. Medicine Creek Dam recorded 6.99 inches of precipitation during May, 217 percent of average. Runoff from the late May storms increased the pool level to a peak elevation of 2368.38 feet on May 30. Uncontrolled spills along with minimal irrigation releases slowly decreased the pool level through mid July. Irrigation releases began in earnest on July 17 and ran through September 9 reducing the reservoir level to 2359.21 feet. The district diverted 28,850 AF into Cambridge Canal and delivered 10,801 AF to 16,071 acres of district lands. Late fall and early winter inflows increased the level of Harry Strunk Lake to only 0.9 foot below the top of conservation at the end of the year (2365.24 feet). The Corps of Engineers determined that Harry Strunk Lake prevented $3,473,900 in flood damages.

The SOP for Medicine Creek Dam was revised in 2011.

The district was selected for a 2011 WaterSMART Water and Energy Efficiency Grant (WEEG) for a project which consists of installing a pumping plant on Cambridge Diversion Dam and 2 miles of 30-inch diameter pipe to the Bartley Canal.

The pumping plant will include installation of four 2,500 gallon per minute pumps. This project will allow alternative water management options for the water supply in Bartley Canal. The project is expected to result in water savings of 4,660 acre-feet per year. Water conserved as a result of the project will be left in Swanson Lake. Reclamation is providing $630,000 of financial and technical assistance for the estimated $1.26 million project.

2012 Outlook

Forecasts show that carry-over storage, streamflow gains, plus reasonable minimum inflows for the three lakes supplying the Frenchman-Cambridge Irrigation District will be inadequate to meet the full dry-year irrigation requirement by 24,000 AF. The water supply will be adequate under most probable inflow conditions.

Repairs will continue at Red Willow Dam, with a majority of the work items to be completed by late 2012. The contract completion date is the fall of 2013.

A sediment survey is underway for Swanson Lake. Field collection data obtained in 2011 is being processed and analyzed. A final report is expected to be published early in 2012.

The district is exploring the possibility of installing automation equipment on Cambridge Canal in an effort to better manage the district's reduced water supply. The district plans to submit a 2012 WaterSMART WEEG proposal to seek Reclamation funding assistance for the project.

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.

In July of 2007, the Kansas Department of Wildlife and Parks and the Almena Irrigation District entered into a Memorandum of Agreement (MOA) to maintain a minimum pool elevation in the reservoir for 10 years. The MOA was approved by the irrigators within the district and provided that no water would be released for irrigation below elevation 2288.5 feet.

2011 Summary

The annual precipitation at Norton Dam totaled 34.36 inches, which is 140 percent of normal and the fourth greatest recorded at the site. The total inflow of 11,995 AF was between the normal-year and wet-year forecasts. The reservoir was 7.5 feet below the top of conservation pool at the first of the year (2296.81 feet). The reservoir level slowly increased to elevation 2298.18 feet on May 30.

Irrigation releases were made during July reducing the lake level by nearly 2 feet. Norton Dam received 10.42 inches of precipitation during August, the greatest ever recorded for the month. No irrigation releases were made in August and the lake level increased to 2297.02 feet by the end of August. Norton Dam recorded 7.26 inches of rainfall in October, the second greatest on record for the month. Runoff from the storms increased the lake level again and Keith Sebelius Lake ended the year at elevation 2298.43 feet (5.9 feet below the top of conservation). The Corps of Engineers determined that Keith Sebelius Lake prevented $55,400 in flood damages.

The Almena Irrigation District reports that approximately 1,500 acres received 722 AF of water in 2011. There were 2,277 AF of water diverted into the Almena Canal. Farm delivery averaged about .48 foot per irrigated acre with a farm delivery efficiency of 32 percent in the district. The city of Norton used 339 AF of municipal water during 2011. A Periodic Facility Review was held at Norton Dam in May 2011.

2012 Outlook

If 2012 is a dry year without significant runoff producing storms above Keith Sebelius Lake, it is anticipated that the water supply may be inadequate by as much as 12,000 AF. If normal inflow into the lake and normal rainfall over the irrigated area occur in 2012, a shortage of 6,200 AF may be experienced. Requirements for the city of Norton will be met in full in 2012.

The district continues to plan projects to replace open ditch laterals with buried pipe that will reduce seepage losses, lessen maintenance requirements, and provide improvements in on-farm efficiencies. However, due to uncertainty of the district's water supply in the past and the temporary agreements with the State to forgo irrigation releases, the district may delay some identified delivery system improvement projects.

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.

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" was 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.

Bostwick Division - Harlan County Lake Operations

2011 Summary

The annual precipitation at Harlan County Dam totaled 30.69 inches of rainfall, which is 135 percent of normal. The 2011 inflow of 174,830 AF was between the normal-year and wet-year forecasts. Harlan County Lake began 2011 approximately 0.32 foot above the top of conservation pool, at 1946.05 feet. River releases varied from 50 cfs to 350 cfs during the first 3 months of the year and the lake level gradually filled to elevation 1947.40 feet by March 21. Additional water was temporarily stored into the flood pool so releases could be made to flush the downstream channel. The Corps of Engineers has cooperated with the state of Nebraska and the Twin Valleys Weed Management Group in making an elevated March release since 2009. These releases keep the Republican River channel from developing areas of vegetation and help re-establish channel capacity.

River releases were staged up from 300 to 1,000 cfs on March 21 and staged back down to 500 cfs on March 25. The release was decreased to 275 cfs on April 1 and to 200 cfs on April 28. The lake level was maintained near elevation 1946.5 feet through mid May. Precipitation during May totaled 6.73 inches at the dam, the fourth greatest recorded for the month. Runoff from the late May storms increased the reservoir level to an elevation of 1947.30 feet on May 31. River releases were staged up to 500 cfs during early June to maintain this elevation. Irrigation releases began on June 14 and continued through September 9. Harlan County Dam recorded 7.93 inches of precipitation during August, the greatest ever recorded for the month at the dam. Late summer rainfall significantly reduced irrigation demands. The lake level gradually decreased to elevation 1944.70 feet on October 6 and then increased through the fall and early winter. The reservoir elevation was 1946.39 feet (0.66 foot in the flood pool) on December 31, 2011. Harlan County Lake prevented $10,447,200 of downstream flood damages during 2011 according to the Corps of Engineers. A total of 10,316 AF (approximately 12 percent of total inflow) was delivered to Lovewell Reservoir via Courtland Canal during the irrigation season.

Bostwick Division - Nebraska

2011 Summary

Irrigation diversions were made into Franklin, Naponee, Franklin Pump, Superior, and Courtland Canals in Nebraska in 2011. The district diverted 28,262 AF of water and delivered 9,108 AF to the farm headgates (32 percent delivery efficiency).

In 2011, the Bostwick Irrigation District in Nebraska was awarded a WaterSMART WEEG for a project which will replace approximately 8.3 miles of open ditch laterals with buried pipe. Franklin Laterals 30.9 and 41.9 will be replaced with buried pipe, resulting in an estimated water savings of 1,660 AF/year. Reclamation is providing $250,000 of financial assistance and the district is providing nearly $400,000 of funds and in-kind services. These pipe projects provide delivery system improvements by eliminating seepage losses, eliminating operational wasteways, improving water measurement and accounting by utilizing water meters, and providing on-farm benefits by allowing land owners the opportunity to convert to sprinkler irrigation.

Bostwick Division - Kansas

2011 Summary

The 2011 precipitation at Lovewell Dam totaled 27.87 inches, which was 101 percent of normal. May precipitation (8.34 inches) was the second greatest ever recorded for the month and the corresponding inflow was the greatest recorded for the month. The total inflow recorded at Lovewell Reservoir of 83,167 AF was above the wet-year forecast. The reservoir elevation at the beginning of 2011 was 1579.47 feet. The pool level gradually increased to elevation 1582.12 feet on May 18 (.5 foot below top of conservation). Spring diversions via Courtland Canal into Lovewell Reservoir were not required in 2011.

Three separate storm systems moved through North Central Kansas from May 18 through June 2. Each system resulted in 2 to 4 inches of rainfall with some localized areas receiving 5 to 6 inches. Runoff from the first storm system increased the level of Lovewell Reservoir to 4.5 feet into the flood pool with 30 percent of the flood pool occupied. The peak average daily inflow was approximately 3,300 cfs. A 500 cfs flood release was started on May 23 to decrease the level of the reservoir. A second storm system moved across the drainage basin overnight on May 24. Runoff from this storm increased the level of Lovewell Reservoir an additional 3 feet peaking at elevation 1590.12 feet on May 27 (7.5 feet into the flood pool with 53 percent of flood storage occupied). The peak average daily inflow from this storm was approximately 3,500 cfs. Flood releases were staged up to 1,250 cfs on May 26. A Response Level 1 was issued on May 26 due to the amount of flood storage occupied and 24-hour attendance was required at the dam while the pool level exceeded 1589.8 feet. The flood release decreased the pool level to 1587.11 feet by June 2 and the Response Level 1 was reduced to Internal Alert status. A third storm system overnight on June 2 resulted in the pool level increasing to 1588.26 feet by June 4. The peak average daily inflow from this storm was approximately 3,000 cfs. Flood releases continued at 1,250 cfs through June 6 dropping the pool level to elevation 1586.67 feet (4.1 feet into the flood pool). The flood release was staged off by June 8 as ordered by the Corps of Engineers to mitigate downstream flooding conditions on the Missouri River. Irrigation releases to the canal began on June 7 and continued through September 15. The reservoir level dropped from the flood pool on August 25 and ended the irrigation season at elevation 1580.86 feet. The pool level at the end of the year was 1581.31 feet (1.3 feet below top of conservation). Lovewell Reservoir prevented $464,200 of downstream flood damages during 2011 according to the Corps of Engineers.

The Kansas-Bostwick Irrigation District diverted a total of 54,072 AF to serve 11,463 acres above Lovewell Dam and 25,784 acres below Lovewell Dam. Farm delivery efficiency averaged 46 percent in the district.

In 2011, the district was awarded a WaterSMART WEEG for a project which will replace approximately 5.5 miles of open ditch laterals with buried pipe. Courtland West Laterals 4.0 and 5.7 will be placed in pipe which will result in an estimated water savings of 2,064 AF/year. Reclamation is providing $290,000 of funding assistance and the district is providing $465,000 of financial and in-kind services.

Bostwick Division

2012 Outlook

The storage in Harlan County Lake and Lovewell Reservoir and flows of the Republican River and White Rock Creek is expected to be fully adequate in meeting the full dry-year irrigation requirement for the Bostwick lands.

The Corps of Engineers plan on making a river release from Harlan County Dam this spring similar to the March 2011 release in a continuing effort to reestablish the channel capacity below the dam.

A sediment survey is underway for Lovewell Reservoir. Field collection data obtained in 2011 is being processed and analyzed. A final report is expected to be published early in 2012.

Both districts will continue to investigate remote monitoring site installation that will provide system operations improvements. Bostwick Irrigation District in Nebraska has installed canal automation equipment on a number of check structures along Franklin Canal through a Water Conservation Field Services grant. The district continues to explore opportunities to increase this radio automated network. Kansas Bostwick Irrigation District will continue to replace open ditch laterals with pipe.

## 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, 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.

2011 Summary

The annual precipitation total of 27.59 inches at Kirwin Dam was 117 percent of normal. The inflow of 49,576 AF was between the normal-year and wet-year forecasts. The reservoir level was 0.1 foot above the top of conservation pool at the first of the year (elevation 1729.40 feet). A flood release was made from January 1 through May 9 maintaining the pool level near the top of conservation. May precipitation of 7.76 inches was the fifth highest May total on record at Kirwin Dam. Runoff from the May storms increased the reservoir level to a peak elevation of 1730.81 feet (1.6 feet into the flood pool) on June 18. Flood releases were not made during late May or June to allow for construction of a county road bridge directly below the dam. Irrigation releases began on June 14 and continued through August 31 decreasing the reservoir level to 1728.61 feet. The reservoir storage dropped from the flood pool on July 25. The reservoir level decreased to elevation 1728.35 feet following the end of the irrigation season and then gradually increased from October through December reaching 1729.67 feet on December 15. Flood releases began on December 15 and continued through the remainder of the year. The reservoir elevation was 1729.61 feet on December 31 (0.4 foot above the top of conservation). The Corps of Engineers determined that Kirwin Reservoir prevented $520,700 in flood damages.

A total of 8,154 acres received project water during 2011 with 5,942 AF delivered to farms. Farm delivery efficiency was 39 percent.

A Periodic Facility Review was held at Kirwin Dam in May 2011.

In the spring of 2011, the district completed a WCFSP project which replaced approximately 2.6 miles of open ditch laterals with buried pipe. Kirwin South Laterals 8.6 and 9.2 were placed in pipe which resulted in an estimated water savings of 600 AF/year. Reclamation provided $85,000 of financial assistance and the district provided $92,000 of funds and in-kind services.

2012 Outlook

Carry-over storage and the forecasted inflows in the North Fork of the Solomon River are expected to be adequate to irrigate all district lands even with below normal precipitation and dry-year forecasted inflows.

The district has been awarded a WCFSP Grant for a project to replace approximately 2 miles of open ditch lateral with buried pipe. Kirwin South Lateral 14.4 will be placed in pipe which will result in an estimated water savings of 504 AF/year. Reclamation is providing $100,000 of financial assistance and the district will provide $110,000 of funds and in-kind services. The project should be completed prior to the 2012 irrigation season. The district is also assisting landowners with on-farm improvements such as the installation of sprinklers through assisting with burying lines to pivots and through the relocation of turnouts. Future conservation projects include the possibility of installing remote monitoring equipment at the wasteways and at the Kirwin North/South Canal split. Future conservation projects may be delayed due to the declining water supply and availability of cost-share funding.

The district and Reclamation continue to participate in the Solomon Basin Working Group meetings as part of the State of Kansas' Subbasin Water Resources Management Program. This group is designed to take a proactive approach in developing water management strategies that address declines in stream flows and groundwater levels.

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.

2011 Summary

In 2011, the precipitation at Webster Dam was 97 percent of normal (23.04 inches). The inflow of 21,937 AF was slightly below the normal-year forecast. The reservoir level was approximately 3.6 feet below the top of conservation pool at the first of the year (elevation 1888.85 feet). The reservoir level gradually increased to a peak elevation of 1891.57 feet on June 5. The conservation pool did not fill for the first time since 2008. Irrigation releases began June 16 and continued through August 30 decreasing the reservoir level to 1886.57 feet. The pool level dropped to elevation 1886.01 feet on October 7 and then gradually increased to elevation 1887.29 feet on December 31 (5.2 feet below the top of conservation). The Corps of Engineers determined that the reservoir prevented $167,600 in flood damages.

A total of 4,605 acres received project water during 2011 with 4,048 AF delivered to farms. Farm delivery efficiency was 39 percent.

A Periodic Facility Review was held at Webster Dam in June 2011, and the Webster Dam SOP was also revised this past year.

The district continued to explore opportunities to cost share with Reclamation and district irrigators for the replacement of open ditch laterals with buried pipe.

2012 Outlook

The carry-over storage and the flows in the South Fork Solomon River are expected to be adequate to irrigate all district lands in 2012 even under dry-year forecasted inflows and below normal precipitation.

The district has been awarded a WaterSMART WEEG for a project that will replace approximately 2 miles of open ditch laterals with buried pipe. Osborne Lateral 27.3 will be replaced with buried pipe, resulting in an estimated water savings of 684 AF/year. Reclamation is providing $118,500 of financial assistance and the district is providing $118,500 of funds and in-kind services. The project is expected to be completed prior to the 2012 irrigation season.

Due to the recent improvement in the district's water supplies, there has been increased interest in cost sharing for water conservation projects such as replacement of open ditch laterals with buried pipe. The district will continue to seek outside funding for water conservation improvement projects. Future conservation projects include the possibility of installing remote monitoring equipment at the wasteways and at the beginning of the second and third sections of Osborne Canal.

Glen Elder Unit, Solomon Division in Kansas

General

Releases from Waconda Lake are 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 2,000 AF 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 is 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 is normally regulated at one to two feet below the top of conservation capacity during the winter months. Maintaining the lake at this level reduces shoreline erosion, provides a buffer for spring runoff and lessens ice damage to the upstream face of Glen Elder Dam. Releases from Waconda Lake are regulated each year to maintain a constant water surface level while the lake is ice-covered.

2011 Summary

The annual precipitation total of 30.80 inches at Glen Elder Dam was 121 percent of normal. The inflow of 427,789 AF was between the normal-year and wet-year forecasts. May and June computed inflows were the third and first greatest recorded for the respective months since dam construction. The lake level at the beginning of the year was 1.8 feet below the top of conservation. River releases were staged from 150 cfs to 500 cfs during the first 3 months of the year gradually decreasing the pool level to a target elevation of approximately 3.5 feet below top of conservation. This level was targeted and maintained to assist with two ongoing construction projects that were taking place at Glen Elder Dam. One project was the repair of the spillway concrete apron upstream of the gates and the other project was repairing areas of soil cement on the face of the dam. Both repair projects began in 2010. The target level of approximately 1452.0 feet was maintained until mid May.

Glen Elder Dam recorded 8.27 inches of precipitation from May 18 through June 2. Runoff from the earlier of three storm systems increased the level of Waconda Lake 2.3 feet to elevation 1454.50 feet (.9 foot below the top of conservation level). The peak average daily inflow was approximately 5,900 cfs. The river release was increased to 300 cfs on May 23 to maintain the pool level. Runoff from the second storm system on May 24 increased the lake level an additional 6.4 feet reaching elevation 1460.90 feet on May 28. This was 5.3 feet into the flood pool with 10.1 percent of the flood storage occupied. An Internal Alert was issued for Glen Elder Dam when the level exceeded 1460.0 feet. Both repair projects at the dam were postponed due to the high reservoir levels. The peak average daily inflow from this storm was approximately 19,000 cfs. The river release was staged up to 1,500 cfs by June 2.

Runoff from the third storm system overnight on June 2 resulted in the lake level increasing an additional 6.4 feet peaking at elevation 1467.28 feet on June 6 (11.7 feet into the flood pool with 25 percent of flood storage occupied). The peak average daily inflow from this system was nearly 29,000 cfs. Flood releases of 1,500 cfs continued through August 19 and the lake level decreased to 1456.3 feet. The Internal Alert was terminated on July 29. Releases were staged down to 75 cfs by early October drawing the pool to a target elevation of 1454.6 feet (1 foot below the top of conservation). This elevation was maintained through the end of the year to assist with the work on the face of the dam as well as work on the spillway approach apron.

The level of Waconda Lake at the end of the year was 1.1 foot (elevation 1454.53 feet) below the top of conservation. Waconda Lake prevented $32,087,900 of downstream flood damages during 2011 according to the Corps of Engineers.

A total of 362,047 AF of water was released from Glen Elder Dam in 2011. Storage releases of 1,142 AF combined with natural flow releases of 6,781 AF for the irrigation of 5,648 acres in the Glen Elder Irrigation District. The district delivered 3,962 AF to the farms resulting in a delivery efficiency of 50 percent. No storage releases were made for the city of Beloit and no water was bypassed for water quality as directed by the State Water Commissioner. Releases to the Mitchell County Rural Water District No. 2 totaled 655 AF.

Both construction projects involving the repair of the soil cement on the upstream face of the dam and the repair of the spillway apron upstream of the spillway gates were completed in November 2011.

2012 Outlook

The municipal requirement of Beloit and the requirements of the Mitchell County Rural Water District No. 2 will be met in full with releases as required from Waconda Lake. It is expected that the Kansas Water Commissioner will request that inflows be passed through the lake for water right administration. The storage in Waconda Lake and flows in the North and South Forks of the Solomon River will furnish an adequate water supply to the Glen Elder Irrigation District. The reservoir will be regulated to maintain a constant level during the winter months when the reservoir is ice-covered to minimize ice damage. Under normal-year conditions, the lake is expected to be maintained between 1 and 2 feet below the top of the conservation pool during the winter.

A Functional Exercise of the Glen Elder Dam EAP and a revision of the SOP are scheduled for 2012.

The Glen Elder Irrigation District continues to encourage their producers to advance water ordering times to improve on water releases, making more efficient use of the district's water supply. Some district pumping sites present problems due to river conditions at the sites. In order to minimize required reservoir releases, the district is investigating potential improvements to those water pumping sites.

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 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 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.

2011 Summary

The annual precipitation total at Cedar Bluff Dam was 14.99 inches which is 71 percent of normal. The 2011 inflow of 7,116 AF was between the dry-year and normal-year forecasts. The reservoir level at the beginning of the year was 2129.37 feet (14.6 feet below top of conservation). Inflows during the spring offset evaporation and seepage losses, and the reservoir level at the end of April was 2129.21 feet. Evaporation exceeded inflows throughout the remainder of the year and the reservoir level gradually decreased to elevation 2126.41 feet on December 31 (17.6 feet below the top of conservation). No release was made from the dam in 2011. Cedar Bluff Reservoir prevented $7,900 of downstream flood damages during 2011 according to the Corps of Engineers.

The state of Kansas operates and maintains the fish hatchery facility located below Cedar Bluff Dam. There were no releases to the facility in 2011. No water was released from Cedar Bluff Reservoir during 2011 for the city of Russell.

A contract to repair damaged concrete in the outlet works stilling basin was awarded in 2011 and construction work was completed in October.

A Periodic Facility Review was held at Cedar Bluff Dam in June 2011.

2012 Outlook

Storage in Cedar Bluff Reservoir on December 31, 2011, was within the joint use pool. The Kansas Department of Wildlife and Parks is expected to use very little if any water in the operations of the fish hatchery facility. If conditions remain dry, the city of Russell and the Kansas Water Office may request a release to the river for recharge in 2012.

TABLE 1

RESERVOIR DATA - NIOBRARA, LOWER PLATTE AND KANSAS RIVER BASINS

| RESERVOIR | | | CAPACITY ALLOCATIONS 1/ | | | |
|---|---|---|---|---|---|---|
| | | | LIVE CONSERVATION | | | |
| | | DEAD | Inactive | Active | FLOOD CONTROL | |
| Box Butte | - Elevation | 3969.0 | 3979.0 | 4007.0 | --- | |
| | Total Acre- | 188 | 2,392 | 29,161 | --- | |
| | Net Acre- | 188 | 2,204 | 26,769 | --- | |
| Merritt | - Elevation | 2875.0 | 2896.0 | 2946.0 | --- | |
| | Total Acre- | 774 | 4,662 | 66,726 | --- | |
| | Net Acre- | 774 | 3,888 | 62,064 | --- | |
| Calamus | - Elevation | 2185.0 | 2213.3 | 2244.0 | --- | |
| | Total Acre- | 817 | 24,646 | 127,400 | --- | |
| | Net Acre- | 817 | 23,829 | 102,754 | --- | |
| Davis Creek | - Elevation | 1998.5 | 2003.0 | 2076.0 | --- | |
| | Total Acre- | 76 | 172 | 31,158 | --- | |
| | Net Acre- | 76 | 96 | 30,986 | --- | |
| Bonny | - Elevation | 3635.5 | 3638.0 | 3672.0 | 3710.0 | |
| | Total Acre- | 0 | 0 | 36,508 | 165,328 | |
| | Net Acre- | 0 | 0 | 36,508 | 128,820 | |
| Enders | - Elevation | 3080.0 | 3082.4 | 3112.3 | 3127.0 | |
| | Total Acre- | 7,516 | 8,948 | 42,910 | 72,958 | |
| | Net Acre- | 7,516 | 1,432 | 33,962 | 30,048 | |
| Swanson | - Elevation | 2710.0 | 2720.0 | 2752.0 | 2773.0 | |
| Lake | Total Acre- | 2,118 | 12,430 | 112,214 | 246,291 | |
| | Net Acre- | 2,118 | 10,312 | 99,784 | 134,077 | |
| Hugh Butler | - Elevation | 2552.0 | 2558.0 | 2581.8 | 2604.9 | |
| Lake | Total Acre- | 5,185 | 8,921 | 36,224 | 85,070 | |
| | Net Acre- | 5,185 | 3,736 | 27,303 | 48,846 | |
| Harry Strunk | - Elevation | 2335.0 | 2343.0 | 2366.1 | 2386.2 | |
| Lake | Total Acre- | 3,408 | 7,897 | 34,647 | 87,361 | |
| | Net Acre- | 3,408 | 4,489 | 26,750 | 52,714 | |
| Keith Sebelius | - Elevation | 2275.0 | 2280.4 | 2304.3 | 2331.4 | |
| Lake | Total Acre- | 1,636 | 3,993 | 34,510 | 133,740 | |
| | Net Acre- | 1,636 | 2,357 | 30,517 | 99,230 | |
| Harlan County | - Elevation | 1885.0 | 1927.0 | 1945.73 | 1973.5 | |
| Lake 3/ | Total Acre- | 0 | 118,099 | 314,111 | 814,111 | |
| | Net Acre- | 0 | 118,099 | 196,012 | 500,000 | |
| Lovewell | - Elevation | 1562.07 | 1571.7 | 1582.6 | 1595.3 | |
| | Total Acre- | 1,674 | 11,644 | 35,666 | 86,131 | |
| | Net Acre- | 1,674 | 9,970 | 24,022 | 50,465 | |
| Kirwin | - Elevation | 1693.0 | 1697.0 | 1729.25 | 1757.3 | |
| | Total Acre- | 4,969 | 8,515 | 98,154 | 313,290 | |
| | Net Acre- | 4,969 | 3,546 | 89,639 | 215,136 | |
| Webster | - Elevation | 1855.5 | 1860.0 | 1892.45 | 1923.7 | |
| | Total Acre- | 1,256 | 4,231 | 76,157 | 259,510 | |
| | Net Acre- | 1,256 | 2,975 | 71,926 | 183,353 | |
| Waconda | - Elevation | 1407.8 | 1428.0 | 1455.6 | 1488.3 | |
| Lake | Total Acre- | 248 | 26,237 | 219,420 | 942,408 | |
| | Net Acre- | 248 | 25,989 | 193,183 | 722,988 | |
| Cedar Bluff | - Elevation | 2090.0 | 2107.8 | 2144.0 | 2166.0 | |
| | Total Acre- | 4,402 | 28,574 | 172,452 | 364,342 | |
| | Net Acre- | 4,402 | 24,172 | 143,878 | 191,890 | |
| Total Storage | | 34,267 | 271,361 | 1,467,418 | 3,824,985 | 2/ |
| Total Net Acre-feet | | 34,267 | 237,094 | 1,196,057 | 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 2011 OPERATIONS

MIRAGE FLATS PROJECT
BOX BUTTE RESERVOIR

| Month | Inflow (AF) | Outflow (AF) | Gross Evap. (AF) | Precip. (Inches) | End of Month Content (AF) | MIRAGE FLATS CANAL Diversions To Canal (AF) | MIRAGE FLATS CANAL Delivered To Farms (AF) |
|---|---|---|---|---|---|---|---|
| Jan. | 1,003 | 44 | 98 | 0.60 | 15,384 | 0 | 0 |
| Feb. | 1,292 | 38 | 128 | 0.60 | 16,510 | 0 | 0 |
| Mar. | 3,121 | 41 | 241 | 0.54 | 19,349 | 0 | 0 |
| Apr. | 2,234 | 46 | 417 | 2.12 | 21,120 | 0 | 0 |
| May | 3,219 | 52 | 443 | 5.60 | 23,844 | 0 | 0 |
| June | 1,819 | 52 | 684 | 3.15 | 24,927 | 0 | 0 |
| July | 674 | 6,066 | 738 | 3.73 | 18,797 | 6,869 | 2,554 |
| Aug. | 538 | 4,846 | 563 | 1.57 | 13,926 | 5,072 | 1,841 |
| Sep. | 455 | 1,202 | 372 | 0.80 | 12,807 | 944 | 364 |
| Oct. | 1,000 | 134 | 266 | 1.71 | 13,407 | 0 | 0 |
| Nov. | 1,209 | 42 | 149 | 0.34 | 14,425 | 0 | 0 |
| Dec. | 1,173 | 44 | 90 | 0.18 | 15,464 | 0 | 0 |
| TOTAL | 17,737 | 12,607 | 4,189 | 20.94 | – | 12,885 | 4,759 |

NOTE -- Acres irrigated 2011: Mirage Flats Canal 10,709 acres.

SANDHILL LS DIVISION
AINSWORTH UNIT
MERRITT RESERVOIR

| Month | Inflow (AF) | Outflow (AF) | Gross Evap. (AF) | Precip. (Inches) | End of Month Content (AF) | AINSWORTH CANAL Release To Canal (AF) | AINSWORTH CANAL Delivered To Farms (AF) |
|---|---|---|---|---|---|---|---|
| Jan. | 15,149 | 14,103 | 236 | 0.90 | 61,641 | 0 | 0 |
| Feb. | 14,179 | 14,420 | 300 | 0.85 | 61,100 | 0 | 0 |
| Mar. | 16,772 | 16,086 | 416 | 1.05 | 61,370 | 0 | 0 |
| Apr. | 16,985 | 10,909 | 720 | 2.22 | 66,726 | 0 | 0 |
| May | 16,470 | 15,571 | 899 | 3.87 | 66,726 | 1,914 | 0 |
| June | 17,739 | 15,571 | 1,292 | 7.60 | 67,602 | 4,921 | 215 |
| July | 17,175 | 27,005 | 1,300 | 4.35 | 56,472 | 23,334 | 13,228 |
| Aug. | 17,889 | 24,129 | 947 | 3.67 | 49,285 | 23,609 | 13,941 |
| Sep. | 15,170 | 13,736 | 593 | 1.18 | 50,126 | 9,886 | 6,648 |
| Oct. | 15,989 | 3,769 | 705 | 1.33 | 61,641 | 0 | 0 |
| Nov. | 14,300 | 14,390 | 451 | 0.65 | 61,100 | 0 | 0 |
| Dec. | 14,587 | 14,004 | 313 | 0.28 | 61,370 | 0 | 0 |
| TOTAL | 192,404 | 183,693 | 8,172 | 27.95 | – | 63,664 | 34,032 |

NOTE – Acres irrigated 2011: Ainsworth Canal 34,597 acres.

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NORTH LOUP DIVISION
CALAMUS RESERVOIR

| Month | Inflow (AF) | Outflow (AF) | Gross Evap. (AF) | Precip. (Inches) | End of Month Content (AF) | Release to Calamus Fish Hatch. (AF) | ABOVE DAVIS CREEK MIRDAN CANAL Release to Canal (AF) | Canal Use (AF) | Delivered To Farms (AF) |
|---|---|---|---|---|---|---|---|---|---|
| Jan. | 23,029 | 20,997 | 453 | 1.02 | 110,560 | 338 | 0 | 0 | 0 |
| Feb. | 23,800 | 19,355 | 573 | 0.18 | 114,432 | 321 | 0 | 0 | 0 |
| Mar. | 28,762 | 19,101 | 1,050 | 1.07 | 123,043 | 463 | 0 | 0 | 0 |
| Apr. | 32,843 | 29,328 | 1,753 | 2.21 | 124,805 | 679 | 5,161 | 0 | 0 |
| May | 28,443 | 25,181 | 1,638 | 4.09 | 126,429 | 461 | 15,239 | 3,706 | 1,662 |
| June | 32,107 | 28,293 | 1,558 | 3.95 | 128,685 | 528 | 18,018 | 3,369 | 890 |
| July | 33,767 | 53,441 | 1,822 | 2.78 | 107,189 | 871 | 26,900 | 14,580 | 7,127 |
| Aug | 24,625 | 47,366 | 1,623 | 2.94 | 82,825 | 841 | 26,112 | 17,838 | 9,316 |
| Sep. | 19,894 | 26,375 | 1,138 | 0.97 | 75,206 | 682 | 6,942 | 5,597 | 3,279 |
| Oct. | 26,495 | 14,559 | 1,076 | 4.60 | 86,066 | 292 | 0 | 0 | 0 |
| Nov. | 21,381 | 5,804 | 643 | 0.12 | 101,000 | 229 | 0 | 0 | 0 |
| Dec. | 22,551 | 18,054 | 398 | 0.29 | 105,099 | 206 | 0 | 0 | 0 |
| TOTAL | 317,697 | 307,854 | 13,725 | 24.22 | – | 5,911 | 98,372 | 45,090 | 22,274 |

NOTE -- Acres irrigated 2011: Mirdan Canal 33,593 acres.

NORTH LOUP DIVISION (Continued)
DAVIS CREEK RESERVOIR

| Month | Inflow (AF) | Outflow (AF) | Gross Evap. (AF) | Precip. (Inches) | End of Mo. Content (AF) | BELOW DAVIS CREEK FULLERTON CANAL Release To Canal (AF) | BELOW DAVIS CREEK FULLERTON CANAL Delivered To Farms (AF) |
|---|---|---|---|---|---|---|---|
| Jan. | 66 | 166 | 49 | 1.30 | 9,201 | 0 | 0 |
| Feb. | 48 | 151 | 60 | 0.20 | 9,038 | 0 | 0 |
| Mar. | 89 | 155 | 104 | 1.30 | 8,868 | 0 | 0 |
| Apr. | 3,169 | 200 | 185 | 2.82 | 11,652 | 0 | 0 |
| May | 11,232 | 2,844 | 223 | 6.29 | 19,817 | 2,269 | 0 |
| June | 12,002 | 4,576 | 480 | 4.89 | 26,763 | 3,590 | 49 |
| July | 9,757 | 11,120 | 435 | 2.66 | 24,965 | 10,118 | 6,140 |
| Aug. | 6,828 | 14,690 | 340 | 3.46 | 16,763 | 15,461 | 9,233 |
| Sep. | 1,426 | 8,192 | 184 | 0.70 | 9,813 | 8,747 | 2,141 |
| Oct. | 234 | 196 | 146 | 3.01 | 9,705 | 0 | 0 |
| Nov. | 1 | 179 | 86 | 0.05 | 9,441 | 0 | 0 |
| Dec. | 69 | 185 | 45 | 0.58 | 9,280 | 0 | 0 |
| TOTAL | 44,921 | 42,654 | 2,337 | 27.26 | -- | 40,185 | 17,563 |

NOTE - Acres irrigated 2011: Fullerton Canal 20,389 acres.

**TABLE 2**
**SUMMARY OF 2011 OPERATIONS**
UPPER REPUBLICAN DIVISION
ARMEL UNIT
BONNY RESERVOIR

| Month | Inflow (AF) | Outflow (AF) | Gross Evap. (AF) | Precip. (Inches) | End of Month Content (AF) | Outflow To Hale Ditch (AF) |
|---|---|---|---|---|---|---|
| Jan. | 1,125 | 307 | 90 | 0.62 | 7,651 | 0 |
| Feb. | 988 | 278 | 102 | 0.74 | 8,259 | 0 |
| Mar. | 953 | 307 | 168 | 0.75 | 8,737 | 0 |
| Apr. | 1,057 | 278 | 292 | 2.24 | 9,224 | 0 |
| May | 2,162 | 246 | 495 | 4.36 | 10,645 | 0 |
| June | 514 | 1,319 | 519 | 3.73 | 9,321 | 0 |
| July | 486 | 1,192 | 734 | 1.90 | 7,881 | 0 |
| Aug. | 197 | 246 | 598 | 2.11 | 7,234 | 0 |
| Sep. | 8 | 1,228 | 297 | 0.95 | 5,717 | 118 |
| Oct. | 612 | 2,945 | 289 | 1.08 | 3,095 | 154 |
| Nov. | 419 | 2,249 | 95 | 0.44 | 1,170 | 0 |
| Dec. | 487 | 1,494 | 28 | 0.09 | 135 | 0 |
| TOTAL | 9,008 | 12,089 | 3,707 | 19.01 | -- | 272 |

**TABLE 2**
**SUMMARY OF 2011 OPERATIONS**

FRENCHMAN-CAMBRIDGE DIVISION
FRENCHMAN UNIT

ENDERS RESERVOIR

| Month | Inflow (AF) | Outflow (AF) | Gross Evap. (AF) | Precip. (Inches) | End of Month Content (AF) | CULBERTSON CANAL Diversions To Canal (AF) | CULBERTSON CANAL Delivered To Farms (AF) | CULBERTSON EXT.CANAL Diversions To Canal (AF) | CULBERTSON EXT.CANAL Delivered To Farms (AF) |
|---|---|---|---|---|---|---|---|---|---|
| Jan. | 709 | 307 | 68 | 0.37 | 17,077 | 0 | 0 | 0 | 0 |
| Feb. | 657 | 278 | 79 | 0.40 | 17,377 | 0 | 0 | 0 | 0 |
| Mar. | 745 | 307 | 144 | 0.78 | 17,671 | 0 | 0 | 0 | 0 |
| Apr. | 1,047 | 298 | 280 | 2.36 | 18,140 | 392 | 0 | 0 | 0 |
| May | 1,128 | 307 | 395 | 3.79 | 18,566 | 2,537 | 0 | 0 | 0 |
| June | 1,235 | 298 | 523 | 7.39 | 18,980 | 2,461 | 136 | 0 | 0 |
| July | 226 | 307 | 415 | 1.86 | 18,484 | 2,241 | 394 | 0 | 0 |
| Aug. | 234 | 307 | 472 | 2.30 | 17,939 | 1,755 | 455 | 0 | 0 |
| Sep. | 86 | 298 | 292 | 0.71 | 17,435 | 503 | 111 | 0 | 0 |
| Oct. | 313 | 307 | 249 | 0.96 | 17,192 | 0 | 0 | 0 | 0 |
| Nov. | 495 | 298 | 158 | 0.29 | 17,231 | 0 | 0 | 0 | 0 |
| Dec. | 641 | 307 | 81 | 0.25 | 17,484 | 0 | 0 | 0 | 0 |
| TOTAL | 7,516 | 3,619 | 3,156 | 21.46 | -- | 9,889 | 1,096 | 0 | 0 |

NOTE: Acres irrigated 2011: Culbertson Canal - 1,250 acres; Culbertson Extension Canal - 0 acres.

FRENCHMAN-CAMBRIDGE DIVISION (Continued)
MEEKER-DRIFTWOOD UNIT

SWANSON LAKE

| Month | Inflow (AF) | Outflow (AF) | Gross Evap. (AF) | Precip. (Inches) | End of Month Content (AF) | MEEKER-DRIFTWOOD Release To Canal (AF) | MEEKER-DRIFTWOOD Delivered To Farms (AF) |
|---|---|---|---|---|---|---|---|
| Jan. | 2,501 | 61 | 259 | 0.38 | 64,266 | 0 | 0 |
| Feb. | 3,396 | 56 | 299 | 0.59 | 67,307 | 0 | 0 |
| Mar. | 4,545 | 61 | 553 | 0.46 | 71,238 | 0 | 0 |
| Apr. | 5,836 | 60 | 1,079 | 2.48 | 75,935 | 0 | 0 |
| May | 7,078 | 61 | 1,755 | 5.08 | 81,197 | 0 | 0 |
| June | 3,716 | 1,894 | 2,109 | 2.07 | 80,910 | 2,222 | 311 |
| July | 2,562 | 9,622 | 2,265 | 3.18 | 71,585 | 10,422 | 3,879 |
| Aug. | 745 | 7,837 | 1,627 | 3.37 | 62,866 | 8,522 | 3,613 |
| Sep. | 3 | 575 | 1,510 | 0.43 | 60,784 | 372 | 195 |
| Oct. | 27 | 61 | 975 | 1.29 | 59,775 | 0 | 0 |
| Nov. | 884 | 60 | 581 | 0.18 | 60,018 | 0 | 0 |
| Dec. | 2,498 | 61 | 299 | 0.48 | 62,156 | 0 | 0 |
| TOTAL | 33,791 | 20,409 | 13,311 | 19.99 | -- | 21,538 | 7,998 |

NOTE: Acres irrigated 2011: Meeker-Driftwood Canal - 13,016 acres.

FRENCHMAN-CAMBRIDGE DIVISION (Continued)
RED WILLOW UNIT

HUGH BUTLER LAKE

| Month | Inflow (AF) | Outflow (AF) | Gross Evap. (AF) | Precip. (Inches) | End of Month Content (AF) | RED WILLOW CANAL Diversions To Canal (AF) | RED WILLOW CANAL Delivered To Farms (AF) | BARTLEY CANAL Diversions To Canal (AF) | BARTLEY CANAL Delivered To Farms (AF) |
|---|---|---|---|---|---|---|---|---|---|
| Jan. | 1,068 | 990 | 38 | 0.34 | 6,074 | 0 | 0 | 0 | 0 |
| Feb. | 1,058 | 1,055 | 44 | 0.37 | 6,033 | 0 | 0 | 0 | 0 |
| Mar. | 1,359 | 1,740 | 79 | 0.42 | 5,573 | 0 | 0 | 0 | 0 |
| Apr. | 1,950 | 1,236 | 190 | 2.27 | 6,097 | 0 | 0 | 0 | 0 |
| May | 2,786 | 633 | 290 | 6.61 | 7,960 | 0 | 0 | 2,258 | 18 |
| June | 1,955 | 2,815 | 349 | 1.78 | 6,751 | 0 | 0 | 2,072 | 201 |
| July | 1,863 | 1,932 | 337 | 3.68 | 6,345 | 0 | 0 | 2,367 | 1,139 |
| Aug. | 1,537 | 1,484 | 324 | 3.74 | 6,074 | 0 | 0 | 2,512 | 1,277 |
| Sep. | 805 | 978 | 199 | 0.36 | 5,702 | 0 | 0 | 509 | 143 |
| Oct. | 1,085 | 837 | 186 | 1.21 | 5,764 | 0 | 0 | 0 | 0 |
| Nov. | 1,093 | 555 | 93 | 0.33 | 6,209 | 0 | 0 | 0 | 0 |
| Dec. | 1,304 | 1,476 | 44 | 0.47 | 5,993 | 0 | 0 | 0 | 0 |
| TOTAL | 17,863 | 15,731 | 2,173 | 21.58 | -- | 0 | 0 | 9,718 | 2,778 |

NOTE -- Acres irrigated 2011: Red Willow Canal - 0 acres; Bartley Canal 4,655 acres.

FRENCHMAN-CAMBRIDGE DIVISION (Continued)
CAMBRIDGE UNIT

HARRY STRUNK LAKE

| Month | Inflow (AF) | Outflow (AF) | Gross Evap. (AF) | Precip. (Inches) | End of Month Content (AF) | CAMBRIDGE CANAL Diversions To Canal (AF) | CAMBRIDGE CANAL Delivered To Farms (AF) |
|---|---|---|---|---|---|---|---|
| Jan. | 3,008 | 2,710 | 117 | 0.34 | 34,117 | 0 | 0 |
| Feb. | 2,806 | 3,253 | 129 | 0.42 | 33,541 | 0 | 0 |
| Mar. | 3,398 | 3,461 | 239 | 0.47 | 33,239 | 0 | 0 |
| Apr. | 4,113 | 607 | 602 | 2.49 | 36,143 | 0 | 0 |
| May | 6,612 | 2,924 | 850 | 6.99 | 38,981 | 4,297 | 119 |
| June | 4,941 | 4,836 | 1,141 | 2.05 | 37,945 | 5,545 | 1,027 |
| July | 4,402 | 8,176 | 1,090 | 3.14 | 33,081 | 8,701 | 4,417 |
| Aug. | 3,663 | 11,016 | 843 | 3.61 | 24,885 | 9,077 | 4,997 |
| Sep. | 2,403 | 1,543 | 466 | 0.46 | 25,279 | 1,230 | 241 |
| Oct. | 2,910 | 62 | 423 | 2.18 | 27,704 | 0 | 0 |
| Nov. | 2,759 | 60 | 240 | 0.27 | 30,163 | 0 | 0 |
| Dec. | 3,120 | 62 | 123 | 0.64 | 33,098 | 0 | 0 |
| TOTAL | 44,135 | 38,710 | 6,263 | 23.06 | -- | 28,850 | 10,801 |

NOTE -- Acres irrigated 2011: Cambridge Canal 16,071 acres.

**TABLE 2**
**SUMMARY OF 2011 OPERATIONS**



KANASKA DIVISION
ALMENA UNIT

| | KEITH SEBELIUS LAKE | | | | | | ALMENA CANAL | |
|---|---|---|---|---|---|---|---|---|
| Month | Inflow (AF) | Outflow (AF) | Gross Evap. (AF) | Precip. (Inches) | End of Month Content (AF) | Release To City Of Norton (AF) | Diversions To Canal (AF) | Delivered To Farms (AF) |
| Jan. | 547 | 50 | 105 | 0.51 | 20,992 | 20 | 0 | 0 |
| Feb. | 647 | 47 | 124 | 0.87 | 21,468 | 20 | 0 | 0 |
| Mar. | 648 | 51 | 228 | 0.43 | 21,837 | 20 | 0 | 0 |
| Apr. | 797 | 51 | 552 | 1.86 | 22,031 | 21 | 0 | 0 |
| May | 1,639 | 62 | 806 | 5.01 | 22,802 | 32 | 399 | 0 |
| June | 442 | 72 | 1,027 | 1.59 | 22,145 | 43 | 85 | 0 |
| July | 1,127 | 2,437 | 1,158 | 5.18 | 19,677 | 46 | 1,628 | 638 |
| Aug. | 2,203 | 67 | 884 | 10.42 | 20,929 | 36 | 165 | 84 |
| Sep. | 5 | 65 | 564 | 0.28 | 20,305 | 36 | 0 | 0 |
| Oct. | 2,837 | 58 | 463 | 7.26 | 22,621 | 27 | 0 | 0 |
| Nov. | 451 | 49 | 270 | 0.45 | 22,753 | 19 | 0 | 0 |
| Dec. | 652 | 50 | 137 | 0.50 | 23,218 | 19 | 0 | 0 |
| TOTAL | 11,995 | 3,059 | 6,318 | 34.36 | -- | 339 | 2,277 | 722 |

NOTE: Acres irrigated 2011: Almena Canal - 1,500 acres.

BOSTWICK DIVISION
FRANKLIN UNIT

| | HARLAN COUNTY LAKE Data from Corps of Engineers | | | | | FRANKLIN CANAL | | NAPONEE CANAL | |
|---|---|---|---|---|---|---|---|---|---|
| Month | Inflow (AF) | Outflow (AF) | Gross Evap. (AF) | Precip. (Inches) | End of Month Content (AF) | Release To Canal (AF) | Delivered To Farms (AF) | Release To Canal (AF) | Delivered To Farms (AF) |
| Jan. | 12,180 | 1,773 | 801 | 0.74 | 327,970 | 0 | 0 | 0 | 0 |
| Feb. | 15,045 | 12,839 | 447 | 0.38 | 329,729 | 0 | 0 | 0 | 0 |
| Mar. | 18,208 | 18,587 | 1,515 | 0.49 | 327,835 | 0 | 0 | 0 | 0 |
| Apr. | 17,629 | 16,652 | 3,413 | 3.27 | 325,399 | 0 | 0 | 0 | 0 |
| May | 22,175 | 8,384 | 3,825 | 6.73 | 335,365 | 0 | 0 | 0 | 0 |
| June | 18,069 | 11,439 | 5,801 | 2.72 | 336,194 | 1,902 | 156 | 39 | 13 |
| July | 15,283 | 27,097 | 9,473 | 3.54 | 314,907 | 10,061 | 3,139 | 661 | 417 |
| Aug. | 14,549 | 16,336 | 7,216 | 7.93 | 305,904 | 5,986 | 2,236 | 482 | 275 |
| Sep. | 4,988 | 1,535 | 6,969 | 0.50 | 302,388 | 904 | 170 | 0 | 0 |
| Oct. | 22,007 | 0 | 4,814 | 3.42 | 319,581 | 0 | 0 | 0 | 0 |
| Nov. | 8,132 | 1,890 | 3,130 | 0.39 | 322,693 | 0 | 0 | 0 | 0 |
| Dec. | 6,565 | 4,457 | 1,837 | 0.58 | 322,964 | 0 | 0 | 0 | 0 |
| TOTAL | 174,830 | 120,989 | 49,241 | 30.69 | -- | 18,853 | 5,701 | 1,182 | 705 |

NOTE: Acres irrigated 2011: Franklin Canal - 7,357 acres; Naponee Canal - 660 acres.

BOSTWICK DIVISION (Continued)
SUPERIOR-COURTLAND UNIT

| | FRANKLIN PUMP CANAL | | SUPERIOR CANAL | | | COURTLAND CANAL - ABOVE LOVEWELL | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | NEBRASKA USE | | KANSAS USE | |
| Month | Diverted To Canal (AF) | Delivered To Farms (AF) | Diverted To Canal (AF) | Delivered To Farms (AF) | Total Diversion (AF) | Total (AF) | Delivered To Farms (AF) | Diversion To Canal (AF) | Delivered To Farms (AF) |
| Jan. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Feb. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mar. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Apr. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| May | 0 | 0 | 29 | 0 | 4,698 | 0 | 0 | 0 | 0 |
| June | 63 | 36 | 1,571 | 152 | 5,989 | 10 | 8 | 4,106 | 509 |
| July | 531 | 212 | 3,609 | 1,315 | 12,784 | 274 | 159 | 7,996 | 4,134 |
| Aug. | 135 | 68 | 1,770 | 696 | 9,000 | 144 | 50 | 4,308 | 1,631 |
| Sep. | 0 | 0 | 91 | 6 | 3,436 | 0 | 0 | 1,479 | 537 |
| Oct. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Nov. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Dec. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 729 | 316 | 7,070 | 2,169 | 35,907 | 428 | 217 | 17,889 | 6,811 |

NOTE: Acres irrigated 2011: Franklin Pump Canal - 679 acres; Superior Canal - 5,595 acres.
Courtland Canal-Nebraska use - 1,097 acres.
Courtland Canal-Kansas use - 11,463 acres.

BOSTWICK DIVISION (Continued)
COURTLAND UNIT
LOVEWELL RESERVOIR

| | | | | | | | | COURTLAND (Below) | |
|---|---|---|---|---|---|---|---|---|---|
| Month | Est. Flow from White Rock Creek (AF) | Inflow from Courtland 34.8 (AF) | Total Inflow (AF) | Outflow (AF) | Gross Evap. (AF) | Precip. (Inches) | End of Month Content (AF) | Release To Canal (AF) | Delivered To Farms (AF) |
| Jan. | 1,252 | 0 | 1,252 | 12 | 143 | 0.64 | 28,151 | 0 | 0 |
| Feb. | 1,927 | 0 | 1,927 | 11 | 181 | 0.77 | 29,886 | 0 | 0 |
| Mar. | 1,584 | 0 | 1,584 | 12 | 350 | 0.68 | 31,108 | 0 | 0 |
| Apr. | 2,450 | 0 | 2,450 | 12 | 905 | 1.57 | 32,641 | 0 | 0 |
| May | 38,070 | 1,974 | 40,044 | 16,272 | 1,530 | 8.34 | 54,883 | 349 | 0 |
| June | 17,560 | 876 | 18,436 | 22,106 | 1,847 | 3.83 | 49,366 | 6,015 | 1,356 |
| July | 3,891 | 2,879 | 6,770 | 16,289 | 1,587 | 3.68 | 38,260 | 15,860 | 10,081 |
| Aug. | 3,091 | 2,826 | 5,917 | 9,244 | 974 | 5.34 | 33,959 | 9,387 | 4,418 |
| Sep. | 432 | 1,761 | 2,193 | 4,798 | 684 | 0.44 | 30,670 | 4,572 | 2,189 |
| Oct. | 141 | 0 | 141 | 12 | 671 | 0.48 | 30,128 | 0 | 0 |
| Nov. | 1,047 | 0 | 1,047 | 12 | 411 | 1.00 | 30,752 | 0 | 0 |
| Dec. | 1,406 | 0 | 1,406 | 12 | 208 | 1.10 | 31,938 | 0 | 0 |
| TOTAL | 72,851 | 10,316 | 83,167 | 68,792 | 9,491 | 27.87 | -- | 36,183 | 18,044 |

NOTE: Acres irrigated 2011: Courtland Canal below Lovewell 25,784 acres.

**TABLE 2**
**SUMMARY OF 2011 OPERATIONS**



SOLOMON DIVISION
KIRWIN UNIT
KIRWIN RESERVOIR

| Month | Inflow (AF) | Outflow (AF) | Gross Evap. (AF) | Precip. (Inches) | End of Month Content (AF) | KIRWIN CANAL Release To Canal (AF) | KIRWIN CANAL Delivered To Farms (AF) |
|---|---|---|---|---|---|---|---|
| Jan. | 3,133 | 2,767 | 315 | 0.42 | 98,967 | 0 | 0 |
| Feb. | 3,494 | 2,618 | 417 | 0.60 | 99,426 | 0 | 0 |
| Mar. | 3,995 | 3,382 | 715 | 0.46 | 99,324 | 0 | 0 |
| Apr. | 4,273 | 3,273 | 1,713 | 1.83 | 98,611 | 0 | 0 |
| May | 8,796 | 873 | 2,230 | 7.76 | 104,304 | 0 | 0 |
| June | 5,265 | 2,489 | 3,250 | 2.89 | 103,830 | 2,649 | 329 |
| July | 5,181 | 8,099 | 3,214 | 6.45 | 97,698 | 8,045 | 3,537 |
| Aug. | 4,245 | 4,489 | 2,513 | 3.27 | 94,941 | 4,381 | 2,076 |
| Sep. | 809 | 14 | 1,786 | 0.47 | 93,950 | 0 | 0 |
| Oct. | 5,038 | 0 | 1,542 | 1.88 | 97,446 | 0 | 0 |
| Nov. | 2,483 | 0 | 809 | 0.76 | 99,120 | 0 | 0 |
| Dec. | 2,864 | 1,571 | 424 | 0.80 | 99,989 | 0 | 0 |
| TOTAL | 49,576 | 29,575 | 18,928 | 27.59 | -- | 15,075 | 5,942 |

NOTE: Acres irrigated 2011: Kirwin Canal - 8,154 acres.

SOLOMON DIVISION (Continued)
WEBSTER UNIT
WEBSTER RESERVOIR

| Month | Inflow (AF) | Outflow (AF) | Gross Evap. (AF) | Precip. (Inches) | End of Month Content (AF) | OSBORNE CANAL Diversions To Canal (AF) | OSBORNE CANAL Delivered To Farms (AF) |
|---|---|---|---|---|---|---|---|
| Jan. | 2,063 | 0 | 230 | 0.45 | 65,161 | 0 | 0 |
| Feb. | 2,216 | 0 | 282 | 0.92 | 67,095 | 0 | 0 |
| Mar. | 2,875 | 0 | 517 | 0.78 | 69,453 | 0 | 0 |
| Apr. | 3,012 | 0 | 1,363 | 1.48 | 71,102 | 0 | 0 |
| May | 3,246 | 0 | 1,682 | 3.47 | 72,666 | 0 | 0 |
| June | 1,152 | 2,053 | 2,347 | 2.01 | 69,418 | 1,564 | 103 |
| July | 624 | 7,252 | 2,191 | 5.39 | 60,599 | 5,640 | 2,475 |
| Aug. | 1,389 | 4,354 | 1,721 | 4.31 | 55,913 | 3,243 | 1,470 |
| Sep. | 1 | 0 | 1,340 | 1.07 | 54,574 | 0 | 0 |
| Oct. | 2,213 | 0 | 937 | 1.46 | 55,850 | 0 | 0 |
| Nov | 1,332 | 0 | 514 | 0.65 | 56,668 | 0 | 0 |
| Dec. | 1,814 | 0 | 286 | 1.05 | 58,196 | 0 | 0 |
| TOTAL | 21,937 | 13,659 | 13,410 | 23.04 | -- | 10,447 | 4,048 |

NOTE: Acres irrigated 2011: Osborne Canal - 4,605 acres.

SOLOMON DIVISION (Continued)
GLEN ELDER UNIT
WACONDA LAKE

| Month | Inflow (AF) | Outflow (AF) | Gross Evap. (AF) | Precip. (Inches) | End of Month Content (AF) | OUTFLOW TO RIVER City of Beloit Storage Release (AF) | City of Beloit Quality Bypass (AF) | Irrig.District Storage Release (AF) | Other Controlled Releases (AF) | Release To Mitchell Co. RWD No. 2 (AF) |
|---|---|---|---|---|---|---|---|---|---|---|
| Jan. | 14,172 | 12,543 | 687 | 0.73 | 199,002 | 0 | 0 | 0 | 12,480 | 63 |
| Feb. | 16,026 | 24,227 | 846 | 0.79 | 189,955 | 0 | 0 | 0 | 24,175 | 52 |
| Mar. | 16,760 | 27,877 | 1,534 | 0.53 | 177,304 | 0 | 0 | 0 | 27,820 | 57 |
| Apr. | 16,652 | 12,282 | 4,478 | 2.33 | 177,196 | 0 | 0 | 0 | 12,224 | 58 |
| May | 133,126 | 11,595 | 6,696 | 5.94 | 292,031 | 0 | 0 | 53 | 11,491 | 51 |
| June | 135,853 | 74,906 | 9,305 | 4.42 | 343,673 | 0 | 0 | 95 | 74,759 | 52 |
| July | 26,379 | 92,299 | 10,518 | 5.57 | 267,235 | 0 | 0 | 434 | 91,799 | 66 |
| Aug. | 29,379 | 73,629 | 6,953 | 5.97 | 216,032 | 0 | 0 | 343 | 73,233 | 53 |
| Sep. | 8,183 | 12,407 | 4,538 | 0.68 | 207,270 | 0 | 0 | 217 | 12,139 | 51 |
| Oct. | 8,688 | 5,127 | 4,168 | 1.63 | 206,663 | 0 | 0 | 0 | 5,076 | 51 |
| Nov. | 9,463 | 4,859 | 1,921 | 0.86 | 209,346 | 0 | 0 | 0 | 4,810 | 49 |
| Dec. | 13,108 | 10,296 | 968 | 1.35 | 211,190 | 0 | 0 | 0 | 10,244 | 52 |
| TOTAL | 427,789 | 362,047 | 52,612 | 30.80 | -- | 0 | 0 | 1,142 | 360,250 | 655 |

NOTE: Acres irrigated 2011: Glen Elder District 5,648 acres.

SMOKY HILL DIVISION
ELLIS UNIT
CEDAR BLUFF RESERVOIR

| Month | Inflow (AF) | Outflow (AF) | Gross Evap. (AF) | Precip. (Inches) | End of Month Content (AF) | Release to City of Russell (AF) | Release To Fish Hatchery (AF) | Release to Kansas Water Office (AF) |
|---|---|---|---|---|---|---|---|---|
| Jan. | 144 | 0 | 312 | 0.28 | 90,942 | 0 | 0 | 0 |
| Feb. | 497 | 0 | 371 | 0.35 | 91,068 | 0 | 0 | 0 |
| Mar. | 917 | 0 | 666 | 0.83 | 91,319 | 0 | 0 | 0 |
| Apr. | 947 | 0 | 1,824 | 1.14 | 90,442 | 0 | 0 | 0 |
| May | 1,213 | 0 | 2,371 | 2.09 | 89,284 | 0 | 0 | 0 |
| June | 1,371 | 0 | 2,926 | 1.89 | 87,729 | 0 | 0 | 0 |
| July | 768 | 0 | 3,339 | 2.51 | 85,158 | 0 | 0 | 0 |
| Aug. | 404 | 0 | 2,449 | 2.00 | 83,113 | 0 | 0 | 0 |
| Sep. | 3 | 0 | 2,086 | 0.66 | 81,030 | 0 | 0 | 0 |
| Oct. | 301 | 0 | 1,439 | 1.20 | 79,892 | 0 | 0 | 0 |
| Nov. | 0 | 0 | 715 | 0.62 | 79,177 | 0 | 0 | 0 |
| Dec. | 551 | 0 | 363 | 1.42 | 79,365 | 0 | 0 | 0 |
| TOTAL | 7,116 | 0 | 18,861 | 14.99 | -- | 0 | 0 | 0 |

**TABLE 3**

**ACRES IRRIGATED IN 2011 AND ESTIMATES FOR 2012**

| Irrigation District and Canal | Acres With Service Available | Acres Irrigated in 2011 | Estimated Acres to be Irrigated in 2012 |
|---|---|---|---|
| Mirage Flats Irrigation District | | | |
| Mirage Flats Canal | 11,662 | 10,709 | 10,500 |
| Ainsworth Irrigation District | | | |
| Ainsworth Canal | 35,000 | 34,597 | 34,500 |
| Twin Loups Irrigation District | | | |
| Above Davis Creek | 34,053 | 33,593 | 33,500 |
| Below Davis Creek | 21,063 | 20,389 | 20,500 |
| Total Twin Loups Irrigation District | 55,116 | 53,982 | 54,000 |
| Frenchman Valley Irrigation District | | | |
| Culbertson Canal | 9,292 | 1,250 | 1,500 |
| H & RW Irrigation District | | | |
| Culbertson Extension Canal | 11,915 | 0 | 0 |
| Frenchman-Cambridge Irrigation District | | | |
| Meeker-Driftwood Canal | 16,855 | 13,016 | 13,500 |
| Red Willow Canal | 4,797 | 0 | 0 |
| Bartley Canal | 6,353 | 4,655 | 5,000 |
| Cambridge Canal | 17,664 | 16,071 | 16,000 |
| Total Frenchman-Cambridge Irrigation District | 45,669 | 33,742 | 34,500 |
| Almena Irrigation District | | | |
| Almena Canal | 5,764 | 1,500 | 1,500 |
| Bostwick Irrigation District in Nebraska | | | |
| Franklin Canal | 10,920 | 7,357 | 7,500 |
| Naponee Canal | 1,650 | 660 | 1,000 |
| Franklin Pump Canal | 2,090 | 679 | 1,000 |
| Superior Canal | 5,848 | 5,595 | 5,500 |
| Courtland Canal (Nebraska) | 1,946 | 1,097 | 1,000 |
| Total Bostwick Irrigation Dist. in Nebraska | 22,454 | 15,388 | 16,000 |
| Kansas-Bostwick Irrigation District | | | |
| Courtland Canal above Lovewell | 13,378 | 11,463 | 11,500 |
| Courtland Canal below Lovewell | 29,122 | 25,784 | 26,500 |
| Total Kansas-Bostwick Irrigation District | 42,500 | 37,247 | 38,000 |
| Kirwin Irrigation District | | | |
| Kirwin Canal | 11,465 | 8,154 | 8,500 |
| Webster Irrigation District | | | |
| Osborne Canal | 8,537 | 4,605 | 4,500 |
| Glen Elder Irrigation District | 10,370 | 5,648 | 5,500 |
| TOTAL PROJECT USES | 269,744 | 206,822 | 209,000 |
| Non-Project Uses | | | |
| Hale Ditch | 700 | 350 | 300 |
| TOTAL PROJECT AND NON-PROJECT | 270,444 | 207,172 | 209,300 |

## BOX BUTTE RESERVOIR OPERATION ESTIMATES - 2012

| MONTH | INFLOW MEAN CFS | INFLOW 1000 AF | EVAPORATION INCHES | EVAPORATION 1000 AF | RELEASE REQUIREMENT MEAN CFS | RELEASE REQUIREMENT 1000 AF | RESERVOIR SPILL 1000 AF | REQUIREMENT SHORTAGE 1000 AF | END OF MONTH ELEV FT | END OF MONTH CONT 1000 AF | RESERVOIR CHANGE 1000 AF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **REASONABLE MINIMUM INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 16 | 1.0 | 1.2 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 3997.7 | 16.3 | 0.8 |
| FEB | 20 | 1.1 | 1.5 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 3998.5 | 17.2 | 0.9 |
| MAR | 26 | 1.6 | 2.5 | 0.3 | 2 | 0.1 | 0.0 | 0.0 | 3999.4 | 18.4 | 1.2 |
| APR | 24 | 1.4 | 4.1 | 0.4 | 2 | 0.1 | 0.0 | 0.0 | 4000.1 | 19.3 | 0.9 |
| MAY | 18 | 1.1 | 4.9 | 0.5 | 2 | 0.1 | 0.0 | 0.0 | 4000.5 | 19.8 | 0.5 |
| JUN | 10 | 0.6 | 6.0 | 0.6 | 89 | 5.3 | 0.0 | 0.0 | 3996.1 | 14.5 | -5.3 |
| JUL | 7 | 0.4 | 6.9 | 0.4 | 226 | 13.9 | 0.0 | 1.8 | 3979.0 | 2.4 | -12.1 |
| AUG | 11 | 0.7 | 6.3 | 0.2 | 213 | 13.1 | 0.0 | 12.6 | 3979.0 | 2.4 | 0.0 |
| SEP | 13 | 0.8 | 4.6 | 0.1 | 40 | 2.4 | 0.0 | 1.7 | 3979.0 | 2.4 | 0.0 |
| OCT | 16 | 1.0 | 3.4 | 0.1 | 5 | 0.3 | 0.0 | 0.0 | 3980.4 | 3.0 | 0.6 |
| NOV | 20 | 1.2 | 1.8 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 3982.6 | 4.0 | 1.0 |
| DEC | 16 | 1.0 | 1.1 | 0.0 | 2 | 0.1 | 0.0 | 0.0 | 3984.2 | 4.9 | 0.9 |
| TOTAL | | 11.9 | 44.3 | 2.9 | | 35.7 | 0.0 | 16.1 | | | -10.6 |
| **MOST PROBABLE INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 21 | 1.3 | 1.1 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 3997.9 | 16.6 | 1.1 |
| FEB | 27 | 1.5 | 1.3 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 3999.0 | 17.9 | 1.3 |
| MAR | 36 | 2.2 | 2.3 | 0.2 | 2 | 0.1 | 0.0 | 0.0 | 4000.5 | 19.8 | 1.9 |
| APR | 30 | 1.8 | 3.8 | 0.4 | 2 | 0.1 | 0.0 | 0.0 | 4001.5 | 21.1 | 1.3 |
| MAY | 24 | 1.5 | 4.5 | 0.5 | 2 | 0.1 | 0.0 | 0.0 | 4002.2 | 22.0 | 0.9 |
| JUN | 13 | 0.8 | 5.7 | 0.6 | 71 | 4.2 | 0.0 | 0.0 | 3999.1 | 18.0 | -4.0 |
| JUL | 10 | 0.6 | 6.5 | 0.5 | 210 | 12.9 | 0.0 | 0.0 | 3984.8 | 5.2 | -12.8 |
| AUG | 16 | 1.0 | 5.8 | 0.2 | 164 | 10.1 | 0.0 | 6.5 | 3979.0 | 2.4 | -2.8 |
| SEP | 17 | 1.0 | 4.2 | 0.1 | 29 | 1.7 | 0.0 | 0.8 | 3979.0 | 2.4 | 0.0 |
| OCT | 21 | 1.3 | 3.1 | 0.1 | 5 | 0.3 | 0.0 | 0.0 | 3981.1 | 3.3 | 0.9 |
| NOV | 27 | 1.6 | 1.7 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 3983.9 | 4.7 | 1.4 |
| DEC | 21 | 1.3 | 1.0 | 0.0 | 2 | 0.1 | 0.0 | 0.0 | 3985.9 | 5.9 | 1.2 |
| TOTAL | | 15.9 | 41.0 | 2.9 | | 29.9 | 0.0 | 7.3 | | | -9.6 |
| **REASONABLE MAXIMUM INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 26 | 1.6 | 1.0 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 3998.2 | 16.9 | 1.4 |
| FEB | 34 | 1.9 | 1.2 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 3999.6 | 18.6 | 1.7 |
| MAR | 46 | 2.8 | 2.1 | 0.2 | 2 | 0.1 | 0.0 | 0.0 | 4001.5 | 21.1 | 2.5 |
| APR | 40 | 2.4 | 3.4 | 0.4 | 2 | 0.1 | 0.0 | 0.0 | 4002.9 | 23.0 | 1.9 |
| MAY | 31 | 1.9 | 4.1 | 0.5 | 2 | 0.1 | 0.0 | 0.0 | 4003.8 | 24.3 | 1.3 |
| JUN | 18 | 1.1 | 5.3 | 0.6 | 47 | 2.8 | 0.0 | 0.0 | 4002.2 | 22.0 | -2.3 |
| JUL | 13 | 0.8 | 5.9 | 0.6 | 135 | 8.3 | 0.0 | 0.0 | 3995.6 | 13.9 | -8.1 |
| AUG | 21 | 1.3 | 5.4 | 0.4 | 104 | 6.4 | 0.0 | 0.0 | 3989.6 | 8.4 | -5.5 |
| SEP | 22 | 1.3 | 3.9 | 0.2 | 18 | 1.1 | 0.0 | 0.0 | 3989.6 | 8.4 | 0.0 |
| OCT | 26 | 1.6 | 2.8 | 0.2 | 5 | 0.3 | 0.0 | 0.0 | 3991.0 | 9.5 | 1.1 |
| NOV | 32 | 1.9 | 1.5 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 3992.9 | 11.2 | 1.7 |
| DEC | 28 | 1.7 | 0.9 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 3994.4 | 12.7 | 1.5 |
| TOTAL | | 20.3 | 37.5 | 3.5 | | 19.6 | 0.0 | 0.0 | | | -2.8 |

TABLE 4



## MERRITT RESERVOIR OPERATION ESTIMATES - 2012

| | INFLOW | | EVAPORATION | | RELEASE REQUIREMENT CANAL | RIVER | TOTAL | | RESERVOIR SPILL | REQUIREMENT SHORTAGE | END OF MONTH ELEV | CONT | RESERVOIR CHANGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MEAN | 1000 | | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | | 1000 | 1000 |
| MONTH | CFS | AF | INCHES | AF | AF | AF | CFS | AF | AF | AF | FT | AF | AF |
| **REASONABLE MINIMUM INFLOW CONDITIONS** | | | | | | | | | | | | | |
| JAN | 223 | 13.7 | 1.3 | 0.3 | 0.0 | 1.0 | 16 | 1.0 | 12.7 | 0.0 | 2944.0 | 61.1 | -0.3 |
| FEB | 243 | 13.5 | 1.6 | 0.4 | 0.0 | 1.0 | 18 | 1.0 | 12.1 | 0.0 | 2944.0 | 61.1 | 0.0 |
| MAR | 250 | 15.4 | 2.2 | 0.5 | 0.0 | 1.0 | 16 | 1.0 | 11.1 | 0.0 | 2945.0 | 63.9 | 2.8 |
| APR | 255 | 15.2 | 3.5 | 0.8 | 0.0 | 1.0 | 17 | 1.0 | 10.6 | 0.0 | 2946.0 | 66.7 | 2.8 |
| MAY | 247 | 15.2 | 4.8 | 1.2 | 3.4 | 1.0 | 72 | 4.4 | 9.6 | 0.0 | 2946.0 | 66.7 | 0.0 |
| JUN | 235 | 14.0 | 6.0 | 1.5 | 7.6 | 1.0 | 145 | 8.6 | 3.9 | 0.0 | 2946.0 | 66.7 | 0.0 |
| JUL | 236 | 14.5 | 6.8 | 1.3 | 33.4 | 3.0 | 592 | 36.4 | 0.0 | 0.0 | 2936.1 | 43.5 | -23.2 |
| AUG | 242 | 14.9 | 6.0 | 0.8 | 31.0 | 1.0 | 520 | 32.0 | 0.0 | 0.0 | 2924.5 | 25.6 | -17.9 |
| SEP | 239 | 14.2 | 4.8 | 0.5 | 8.5 | 1.0 | 160 | 9.5 | 0.0 | 0.0 | 2927.7 | 29.8 | 4.2 |
| OCT | 242 | 14.9 | 4.0 | 0.5 | 0.0 | 5.0 | 81 | 5.0 | 0.0 | 0.0 | 2933.7 | 39.2 | 9.4 |
| NOV | 235 | 14.0 | 2.3 | 0.4 | 0.0 | 1.0 | 17 | 1.0 | 0.0 | 0.0 | 2940.2 | 51.8 | 12.6 |
| DEC | 220 | 13.5 | 1.5 | 0.3 | 0.0 | 1.0 | 16 | 1.0 | 2.9 | 0.0 | 2944.0 | 61.1 | 9.3 |
| TOTAL | | 173.0 | 44.8 | 8.5 | 83.9 | 18.0 | | 101.9 | 62.9 | 0.0 | | | -0.3 |
| **MOST PROBABLE INFLOW CONDITIONS** | | | | | | | | | | | | | |
| JAN | 237 | 14.6 | 1.1 | 0.2 | 0.0 | 1.0 | 16 | 1.0 | 13.7 | 0.0 | 2944.0 | 61.1 | -0.3 |
| FEB | 259 | 14.4 | 1.3 | 0.3 | 0.0 | 1.0 | 18 | 1.0 | 13.1 | 0.0 | 2944.0 | 61.1 | 0.0 |
| MAR | 267 | 16.4 | 1.9 | 0.4 | 0.0 | 1.0 | 16 | 1.0 | 12.2 | 0.0 | 2945.0 | 63.9 | 2.8 |
| APR | 274 | 16.3 | 3.2 | 0.8 | 0.0 | 1.0 | 17 | 1.0 | 11.7 | 0.0 | 2946.0 | 66.7 | 2.8 |
| MAY | 265 | 16.3 | 4.3 | 1.0 | 2.9 | 1.0 | 63 | 3.9 | 11.4 | 0.0 | 2946.0 | 66.7 | 0.0 |
| JUN | 252 | 15.0 | 5.4 | 1.3 | 6.5 | 1.0 | 126 | 7.5 | 6.2 | 0.0 | 2946.0 | 66.7 | 0.0 |
| JUL | 252 | 15.5 | 6.3 | 1.3 | 28.5 | 3.0 | 512 | 31.5 | 0.0 | 0.0 | 2939.0 | 49.4 | -17.3 |
| AUG | 259 | 15.9 | 5.4 | 0.8 | 26.6 | 1.0 | 449 | 27.6 | 0.0 | 0.0 | 2932.4 | 36.9 | -12.5 |
| SEP | 254 | 15.1 | 4.3 | 0.6 | 7.3 | 1.0 | 139 | 8.3 | 0.0 | 0.0 | 2935.9 | 43.1 | 6.2 |
| OCT | 259 | 15.9 | 3.6 | 0.6 | 0.0 | 5.0 | 81 | 5.0 | 0.0 | 0.0 | 2940.9 | 53.4 | 10.3 |
| NOV | 252 | 15.0 | 2.0 | 0.4 | 0.0 | 1.0 | 17 | 1.0 | 5.9 | 0.0 | 2944.0 | 61.1 | 7.7 |
| DEC | 233 | 14.3 | 1.4 | 0.3 | 0.0 | 1.0 | 16 | 1.0 | 13.0 | 0.0 | 2944.0 | 61.1 | 0.0 |
| TOTAL | | 184.7 | 40.2 | 8.0 | 71.8 | 18.0 | | 89.8 | 87.2 | 0.0 | | | -0.3 |
| **REASONABLE MAXIMUM INFLOW CONDITIONS** | | | | | | | | | | | | | |
| JAN | 254 | 15.6 | 1.0 | 0.2 | 0.0 | 1.0 | 16 | 1.0 | 14.7 | 0.0 | 2944.0 | 61.1 | -0.3 |
| FEB | 277 | 15.4 | 1.2 | 0.3 | 0.0 | 1.0 | 18 | 1.0 | 14.1 | 0.0 | 2944.0 | 61.1 | 0.0 |
| MAR | 286 | 17.6 | 1.7 | 0.4 | 0.0 | 1.0 | 16 | 1.0 | 13.4 | 0.0 | 2945.0 | 63.9 | 2.8 |
| APR | 292 | 17.4 | 2.8 | 0.7 | 0.0 | 1.0 | 17 | 1.0 | 12.9 | 0.0 | 2946.0 | 66.7 | 2.8 |
| MAY | 283 | 17.4 | 3.8 | 0.9 | 2.4 | 1.0 | 55 | 3.4 | 13.1 | 0.0 | 2946.0 | 66.7 | 0.0 |
| JUN | 269 | 16.0 | 4.9 | 1.2 | 5.3 | 1.0 | 106 | 6.3 | 8.5 | 0.0 | 2946.0 | 66.7 | 0.0 |
| JUL | 270 | 16.6 | 5.5 | 1.2 | 23.3 | 3.0 | 428 | 26.3 | 0.0 | 0.0 | 2941.9 | 55.8 | -10.9 |
| AUG | 276 | 17.0 | 4.9 | 0.9 | 21.8 | 1.0 | 371 | 22.8 | 0.0 | 0.0 | 2938.9 | 49.1 | -6.7 |
| SEP | 272 | 16.2 | 3.8 | 0.7 | 5.9 | 1.0 | 116 | 6.9 | 0.0 | 0.0 | 2942.7 | 57.7 | 8.6 |
| OCT | 276 | 17.0 | 3.1 | 0.7 | 0.0 | 5.0 | 81 | 5.0 | 7.9 | 0.0 | 2944.0 | 61.1 | 3.4 |
| NOV | 269 | 16.0 | 1.8 | 0.4 | 0.0 | 1.0 | 17 | 1.0 | 14.6 | 0.0 | 2944.0 | 61.1 | 0.0 |
| DEC | 249 | 15.3 | 1.2 | 0.3 | 0.0 | 1.0 | 16 | 1.0 | 14.0 | 0.0 | 2944.0 | 61.1 | 0.0 |
| TOTAL | | 197.5 | 35.7 | 7.9 | 58.7 | 18.0 | | 76.7 | 113.2 | 0.0 | | | -0.3 |

## CALAMUS RESERVOIR OPERATION ESTIMATES - 2012

| | INFLOW | | EVAPORATION | | RELEASE REQUIREMENT CANAL | RIVER | TOTAL | | RESERVOIR SPILL | REQUIREMENT SHORTAGE | END OF MONTH ELEV | CONT | RESERVOIR CHANGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MEAN | 1000 | | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | | 1000 | 1000 |
| MONTH | CFS | AF | INCHES | AF | AF | AF | CFS | AF | AF | AF | FT | AF | AF |
| **REASONABLE MINIMUM INFLOW CONDITIONS** | | | | | | | | | | | | | |
| JAN | 299 | 18.4 | 1.3 | 0.5 | 0.5 | 3.1 | 59 | 3.6 | 11.4 | 0.0 | 2240.0 | 108.0 | 2.9 |
| FEB | 317 | 17.6 | 1.6 | 0.6 | 0.5 | 2.8 | 59 | 3.3 | 13.7 | 0.0 | 2240.0 | 108.0 | 0.0 |
| MAR | 355 | 21.8 | 2.9 | 1.1 | 0.5 | 3.1 | 59 | 3.6 | 7.7 | 0.0 | 2242.0 | 117.4 | 9.4 |
| APR | 366 | 21.8 | 4.6 | 1.9 | 0.5 | 3.0 | 59 | 3.5 | 6.4 | 0.0 | 2244.0 | 127.4 | 10.0 |
| MAY | 407 | 25.0 | 4.8 | 2.0 | 2.7 | 3.1 | 94 | 5.8 | 17.2 | 0.0 | 2244.0 | 127.4 | 0.0 |
| JUN | 370 | 22.0 | 5.8 | 2.5 | 5.6 | 3.0 | 145 | 8.6 | 10.9 | 0.0 | 2244.0 | 127.4 | 0.0 |
| JUL | 346 | 21.3 | 6.6 | 2.6 | 33.0 | 21.3 | 883 | 54.3 | 0.0 | 0.0 | 2236.3 | 91.8 | -35.6 |
| AUG | 327 | 20.1 | 6.6 | 2.0 | 30.0 | 20.1 | 815 | 50.1 | 0.0 | 0.0 | 2227.5 | 59.8 | -32.0 |
| SEP | 309 | 18.4 | 5.1 | 1.3 | 8.3 | 18.4 | 449 | 26.7 | 0.0 | 0.0 | 2224.2 | 50.2 | -9.6 |
| OCT | 306 | 18.8 | 3.9 | 1.0 | 0.5 | 3.1 | 59 | 3.6 | 0.0 | 0.0 | 2228.9 | 64.4 | 14.2 |
| NOV | 333 | 19.8 | 2.1 | 0.6 | 0.5 | 3.0 | 59 | 3.5 | 0.0 | 0.0 | 2233.3 | 80.1 | 15.7 |
| DEC | 320 | 19.7 | 1.2 | 0.4 | 0.5 | 3.1 | 59 | 3.6 | 0.0 | 0.0 | 2237.2 | 95.8 | 15.7 |
| TOTAL | | 244.7 | 46.5 | 16.5 | 83.1 | 87.1 | | 170.2 | 67.3 | 0.0 | | | -9.3 |
| **MOST PROBABLE INFLOW CONDITIONS** | | | | | | | | | | | | | |
| JAN | 337 | 20.7 | 1.2 | 0.5 | 0.5 | 3.1 | 59 | 3.6 | 13.7 | 0.0 | 2240.0 | 108.0 | 2.9 |
| FEB | 357 | 19.8 | 1.4 | 0.5 | 0.5 | 2.8 | 59 | 3.3 | 16.0 | 0.0 | 2240.0 | 108.0 | 0.0 |
| MAR | 398 | 24.5 | 2.5 | 1.0 | 0.5 | 3.1 | 59 | 3.6 | 10.5 | 0.0 | 2242.0 | 117.4 | 9.4 |
| APR | 412 | 24.5 | 4.1 | 1.7 | 0.5 | 3.0 | 59 | 3.5 | 9.3 | 0.0 | 2244.0 | 127.4 | 10.0 |
| MAY | 457 | 28.1 | 4.2 | 1.8 | 2.3 | 3.1 | 88 | 5.4 | 20.9 | 0.0 | 2244.0 | 127.4 | 0.0 |
| JUN | 417 | 24.8 | 5.2 | 2.2 | 4.7 | 3.0 | 129 | 7.7 | 14.9 | 0.0 | 2244.0 | 127.4 | 0.0 |
| JUL | 390 | 24.0 | 5.9 | 2.3 | 25.0 | 24.0 | 797 | 49.0 | 0.0 | 0.0 | 2238.2 | 100.1 | -27.3 |
| AUG | 368 | 22.6 | 5.9 | 2.0 | 22.6 | 22.6 | 735 | 45.2 | 0.0 | 0.0 | 2232.1 | 75.5 | -24.6 |
| SEP | 348 | 20.7 | 4.6 | 1.4 | 5.5 | 20.7 | 440 | 26.2 | 0.0 | 0.0 | 2230.1 | 68.6 | -6.9 |
| OCT | 345 | 21.2 | 3.3 | 1.0 | 0.5 | 3.1 | 59 | 3.6 | 0.0 | 0.0 | 2234.6 | 85.2 | 16.6 |
| NOV | 375 | 22.3 | 1.8 | 0.6 | 0.5 | 3.0 | 59 | 3.5 | 0.0 | 0.0 | 2239.0 | 103.4 | 18.2 |
| DEC | 363 | 22.3 | 1.0 | 0.4 | 0.5 | 3.1 | 59 | 3.6 | 13.7 | 0.0 | 2240.0 | 108.0 | 4.6 |
| TOTAL | | 275.5 | 41.1 | 15.4 | 63.6 | 94.6 | | 158.2 | 99.0 | 0.0 | | | 2.9 |
| **REASONABLE MAXIMUM INFLOW CONDITIONS** | | | | | | | | | | | | | |
| JAN | 385 | 23.7 | 1.0 | 0.4 | 0.5 | 3.1 | 59 | 3.6 | 16.8 | 0.0 | 2240.0 | 108.0 | 2.9 |
| FEB | 412 | 22.9 | 1.3 | 0.5 | 0.5 | 2.8 | 59 | 3.3 | 19.1 | 0.0 | 2240.0 | 108.0 | 0.0 |
| MAR | 457 | 28.1 | 2.3 | 0.9 | 0.5 | 3.1 | 59 | 3.6 | 14.2 | 0.0 | 2242.0 | 117.4 | 9.4 |
| APR | 472 | 28.1 | 3.6 | 1.5 | 0.5 | 3.0 | 59 | 3.5 | 13.1 | 0.0 | 2244.0 | 127.4 | 10.0 |
| MAY | 525 | 32.3 | 3.8 | 1.6 | 1.9 | 3.1 | 81 | 5.0 | 25.7 | 0.0 | 2244.0 | 127.4 | 0.0 |
| JUN | 479 | 28.5 | 4.6 | 2.0 | 3.8 | 3.0 | 114 | 6.8 | 19.7 | 0.0 | 2244.0 | 127.4 | 0.0 |
| JUL | 447 | 27.5 | 5.3 | 2.2 | 16.7 | 27.5 | 719 | 44.2 | 0.0 | 0.0 | 2240.1 | 108.5 | -18.9 |
| AUG | 421 | 25.9 | 5.3 | 1.9 | 14.3 | 25.9 | 654 | 40.2 | 0.0 | 0.0 | 2236.4 | 92.3 | -16.2 |
| SEP | 398 | 23.7 | 4.1 | 1.4 | 4.6 | 23.7 | 476 | 28.3 | 0.0 | 0.0 | 2234.9 | 86.3 | -6.0 |
| OCT | 395 | 24.3 | 2.9 | 1.0 | 0.5 | 3.1 | 59 | 3.6 | 0.0 | 0.0 | 2239.6 | 106.0 | 19.7 |
| NOV | 430 | 25.6 | 1.6 | 0.6 | 0.5 | 3.0 | 59 | 3.5 | 19.5 | 0.0 | 2240.0 | 108.0 | 2.0 |
| DEC | 416 | 25.6 | 0.9 | 0.3 | 0.5 | 3.1 | 59 | 3.6 | 21.7 | 0.0 | 2240.0 | 108.0 | 0.0 |
| TOTAL | | 316.2 | 36.7 | 14.3 | 44.8 | 104.4 | | 149.2 | 149.8 | 0.0 | | | 2.9 |

TABLE 4



## DAVIS CREEK RESERVOIR OPERATION ESTIMATES - 2012

| MONTH | INFLOW MEAN CFS | INFLOW 1000 AF | EVAPORATION INCHES | EVAPORATION 1000 AF | RELEASE REQUIREMENT MEAN CFS | RELEASE REQUIREMENT 1000 AF | RESERVOIR SPILL 1000 AF | REQUIREMENT SHORTAGE 1000 AF | END OF MONTH ELEV FT | END OF MONTH CONT 1000 AF | RESERVOIR CHANGE 1000 AF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **REASONABLE MINIMUM INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 0 | 0.0 | 1.3 | 0.1 | 5 | 0.3 | 0.0 | 0.0 | 2047.7 | 8.9 | -0.4 |
| FEB | 0 | 0.0 | 1.6 | 0.1 | 5 | 0.3 | 0.0 | 0.0 | 2046.8 | 8.5 | -0.4 |
| MAR | 0 | 0.0 | 2.9 | 0.1 | 10 | 0.6 | 0.0 | 0.0 | 2045.2 | 7.8 | -0.7 |
| APR | 170 | 10.1 | 4.6 | 0.2 | 25 | 1.5 | 0.0 | 0.0 | 2059.9 | 16.2 | 8.4 |
| MAY | 239 | 14.7 | 4.9 | 0.4 | 78 | 4.8 | 0.0 | 0.0 | 2070.9 | 25.7 | 9.5 |
| JUN | 240 | 14.3 | 5.9 | 0.5 | 139 | 8.3 | 0.0 | 0.0 | 2076.0 | 31.2 | 5.5 |
| JUL | 169 | 10.4 | 6.3 | 0.5 | 289 | 17.8 | 0.0 | 0.0 | 2068.4 | 23.3 | -7.9 |
| AUG | 156 | 9.6 | 4.9 | 0.3 | 270 | 16.6 | 0.0 | 0.0 | 2059.6 | 16.0 | -7.3 |
| SEP | 37 | 2.2 | 4.3 | 0.2 | 131 | 7.8 | 0.0 | 0.0 | 2050.1 | 10.2 | -5.8 |
| OCT | 0 | 0.0 | 3.8 | 0.2 | 5 | 0.3 | 0.0 | 0.0 | 2049.2 | 9.7 | -0.5 |
| NOV | 0 | 0.0 | 2.0 | 0.1 | 5 | 0.3 | 0.0 | 0.0 | 2048.5 | 9.3 | -0.4 |
| DEC | 0 | 0.0 | 1.2 | 0.0 | 5 | 0.3 | 0.0 | 0.0 | 2047.9 | 9.0 | -0.3 |
| **TOTAL** | | 61.3 | 43.7 | 2.7 | | 58.9 | 0.0 | 0.0 | | | -0.3 |
| **MOST PROBABLE INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 0 | 0.0 | 1.3 | 0.1 | 5 | 0.3 | 0.0 | 0.0 | 2047.7 | 8.9 | -0.4 |
| FEB | 0 | 0.0 | 1.5 | 0.1 | 5 | 0.3 | 0.0 | 0.0 | 2046.8 | 8.5 | -0.4 |
| MAR | 0 | 0.0 | 2.7 | 0.1 | 10 | 0.6 | 0.0 | 0.0 | 2045.2 | 7.8 | -0.7 |
| APR | 131 | 7.8 | 4.2 | 0.2 | 25 | 1.5 | 0.0 | 0.0 | 2056.5 | 13.9 | 6.1 |
| MAY | 239 | 14.7 | 4.5 | 0.3 | 67 | 4.1 | 0.0 | 0.0 | 2069.4 | 24.2 | 10.3 |
| JUN | 240 | 14.3 | 5.5 | 0.5 | 114 | 6.8 | 0.0 | 0.0 | 2076.0 | 31.2 | 7.0 |
| JUL | 102 | 6.3 | 5.9 | 0.5 | 223 | 13.7 | 0.0 | 0.0 | 2068.4 | 23.3 | -7.9 |
| AUG | 94 | 5.8 | 4.6 | 0.3 | 208 | 12.8 | 0.0 | 0.0 | 2059.6 | 16.0 | -7.3 |
| SEP | 7 | 0.4 | 4.0 | 0.2 | 101 | 6.0 | 0.0 | 0.0 | 2050.1 | 10.2 | -5.8 |
| OCT | 0 | 0.0 | 3.5 | 0.2 | 5 | 0.3 | 0.0 | 0.0 | 2049.2 | 9.7 | -0.5 |
| NOV | 0 | 0.0 | 1.9 | 0.1 | 5 | 0.3 | 0.0 | 0.0 | 2048.5 | 9.3 | -0.4 |
| DEC | 0 | 0.0 | 1.2 | 0.0 | 5 | 0.3 | 0.0 | 0.0 | 2047.9 | 9.0 | -0.3 |
| **TOTAL** | | 49.3 | 40.8 | 2.6 | | 47.0 | 0.0 | 0.0 | | | -0.3 |
| **REASONABLE MAXIMUM INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 0 | 0.0 | 1.1 | 0.0 | 5 | 0.3 | 0.0 | 0.0 | 2047.9 | 9.0 | -0.3 |
| FEB | 0 | 0.0 | 1.4 | 0.1 | 5 | 0.3 | 0.0 | 0.0 | 2047.0 | 8.6 | -0.4 |
| MAR | 0 | 0.0 | 2.4 | 0.1 | 10 | 0.6 | 0.0 | 0.0 | 2045.5 | 7.9 | -0.7 |
| APR | 97 | 5.8 | 4.0 | 0.2 | 25 | 1.5 | 0.0 | 0.0 | 2053.4 | 12.0 | 4.1 |
| MAY | 239 | 14.7 | 4.3 | 0.3 | 59 | 3.6 | 0.0 | 0.0 | 2067.8 | 22.8 | 10.8 |
| JUN | 240 | 14.3 | 5.3 | 0.5 | 91 | 5.4 | 0.0 | 0.0 | 2076.0 | 31.2 | 8.4 |
| JUL | 36 | 2.2 | 5.7 | 0.5 | 164 | 10.1 | 0.0 | 0.0 | 2067.8 | 22.8 | -8.4 |
| AUG | 20 | 1.2 | 4.3 | 0.3 | 153 | 9.4 | 0.0 | 0.0 | 2057.1 | 14.3 | -8.5 |
| SEP | 7 | 0.4 | 3.8 | 0.2 | 74 | 4.4 | 0.0 | 0.0 | 2049.9 | 10.1 | -4.2 |
| OCT | 0 | 0.0 | 3.3 | 0.1 | 5 | 0.3 | 0.0 | 0.0 | 2049.2 | 9.7 | -0.4 |
| NOV | 0 | 0.0 | 1.7 | 0.1 | 5 | 0.3 | 0.0 | 0.0 | 2048.5 | 9.3 | -0.4 |
| DEC | 0 | 0.0 | 1.0 | 0.0 | 5 | 0.3 | 0.0 | 0.0 | 2047.9 | 9.0 | -0.3 |
| **TOTAL** | | 38.6 | 38.3 | 2.4 | | 36.5 | 0.0 | 0.0 | | | -0.3 |

## BONNY RESERVOIR OPERATION ESTIMATES - 2012

| | INFLOW | | EVAPORATION | | RELEASE REQUIREMENT CANAL | RIVER | TOTAL | | RESERVOIR SPILL | REQUIREMENT SHORTAGE | END OF MONTH ELEV | CONT | RESERVOIR CHANGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MEAN | 1000 | | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | | 1000 | 1000 |
| MONTH | CFS | AF | INCHES | AF | AF | AF | CFS | AF | AF | AF | FT | AF | AF |
| **REASONABLE MINIMUM INFLOW CONDITIONS** | | | | | | | | | | | | | |
| JAN | 10 | 0.6 | 1.4 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 0.5 | 0.0 | 3639.1 | 0.1 | 0.0 |
| FEB | 11 | 0.6 | 1.5 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 0.5 | 0.0 | 3639.1 | 0.1 | 0.0 |
| MAR | 11 | 0.7 | 2.3 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 0.6 | 0.0 | 3639.1 | 0.1 | 0.0 |
| APR | 13 | 0.8 | 4.7 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 0.7 | 0.0 | 3639.1 | 0.1 | 0.0 |
| MAY | 15 | 0.9 | 6.0 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 0.8 | 0.0 | 3639.1 | 0.1 | 0.0 |
| JUN | 13 | 0.8 | 7.6 | 0.1 | 0.0 | 0.1 | 2 | 0.1 | 0.6 | 0.0 | 3639.1 | 0.1 | 0.0 |
| JUL | 7 | 0.4 | 8.4 | 0.1 | 0.0 | 0.1 | 2 | 0.1 | 0.2 | 0.0 | 3639.1 | 0.1 | 0.0 |
| AUG | 5 | 0.3 | 7.4 | 0.1 | 0.0 | 0.1 | 2 | 0.1 | 0.1 | 0.0 | 3639.1 | 0.1 | 0.0 |
| SEP | 3 | 0.2 | 6.2 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 0.1 | 0.0 | 3639.1 | 0.1 | 0.0 |
| OCT | 5 | 0.3 | 3.9 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 0.2 | 0.0 | 3639.1 | 0.1 | 0.0 |
| NOV | 8 | 0.5 | 2.6 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 0.4 | 0.0 | 3639.1 | 0.1 | 0.0 |
| DEC | 10 | 0.6 | 1.6 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 0.5 | 0.0 | 3639.1 | 0.1 | 0.0 |
| TOTAL | | 6.7 | 53.6 | 0.3 | 0.0 | 1.2 | | 1.2 | 5.2 | 0.0 | | | 0.0 |
| **MOST PROBABLE INFLOW CONDITIONS** | | | | | | | | | | | | | |
| JAN | 16 | 1.0 | 1.1 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 0.9 | 0.0 | 3639.1 | 0.1 | 0.0 |
| FEB | 18 | 1.0 | 1.3 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 0.9 | 0.0 | 3639.1 | 0.1 | 0.0 |
| MAR | 18 | 1.1 | 2.0 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 1.0 | 0.0 | 3639.1 | 0.1 | 0.0 |
| APR | 24 | 1.4 | 4.3 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 1.3 | 0.0 | 3639.1 | 0.1 | 0.0 |
| MAY | 24 | 1.5 | 5.4 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 1.4 | 0.0 | 3639.1 | 0.1 | 0.0 |
| JUN | 22 | 1.3 | 6.8 | 0.1 | 0.0 | 0.1 | 2 | 0.1 | 1.1 | 0.0 | 3639.1 | 0.1 | 0.0 |
| JUL | 11 | 0.7 | 7.6 | 0.1 | 0.0 | 0.1 | 2 | 0.1 | 0.5 | 0.0 | 3639.1 | 0.1 | 0.0 |
| AUG | 8 | 0.5 | 6.7 | 0.1 | 0.0 | 0.1 | 2 | 0.1 | 0.3 | 0.0 | 3639.1 | 0.1 | 0.0 |
| SEP | 5 | 0.3 | 5.6 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 0.2 | 0.0 | 3639.1 | 0.1 | 0.0 |
| OCT | 8 | 0.5 | 3.5 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 0.4 | 0.0 | 3639.1 | 0.1 | 0.0 |
| NOV | 15 | 0.9 | 2.3 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 0.8 | 0.0 | 3639.1 | 0.1 | 0.0 |
| DEC | 15 | 0.9 | 1.4 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 0.8 | 0.0 | 3639.1 | 0.1 | 0.0 |
| TOTAL | | 11.1 | 48.0 | 0.3 | 0.0 | 1.2 | | 1.2 | 9.6 | 0.0 | | | 0.0 |
| **REASONABLE MAXIMUM INFLOW CONDITIONS** | | | | | | | | | | | | | |
| JAN | 26 | 1.6 | 1.0 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 1.5 | 0.0 | 3639.1 | 0.1 | 0.0 |
| FEB | 29 | 1.6 | 1.1 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 1.5 | 0.0 | 3639.1 | 0.1 | 0.0 |
| MAR | 29 | 1.8 | 1.7 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 1.7 | 0.0 | 3639.1 | 0.1 | 0.0 |
| APR | 34 | 2.0 | 3.7 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 1.9 | 0.0 | 3639.1 | 0.1 | 0.0 |
| MAY | 37 | 2.3 | 4.9 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 2.2 | 0.0 | 3639.1 | 0.1 | 0.0 |
| JUN | 34 | 2.0 | 6.1 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 1.9 | 0.0 | 3639.1 | 0.1 | 0.0 |
| JUL | 18 | 1.1 | 6.7 | 0.1 | 0.0 | 0.1 | 2 | 0.1 | 0.9 | 0.0 | 3639.1 | 0.1 | 0.0 |
| AUG | 11 | 0.7 | 6.0 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 0.6 | 0.0 | 3639.1 | 0.1 | 0.0 |
| SEP | 7 | 0.4 | 5.0 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 0.3 | 0.0 | 3639.1 | 0.1 | 0.0 |
| OCT | 13 | 0.8 | 3.1 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 0.7 | 0.0 | 3639.1 | 0.1 | 0.0 |
| NOV | 24 | 1.4 | 2.0 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 1.3 | 0.0 | 3639.1 | 0.1 | 0.0 |
| DEC | 23 | 1.4 | 1.2 | 0.0 | 0.0 | 0.1 | 2 | 0.1 | 1.3 | 0.0 | 3639.1 | 0.1 | 0.0 |
| TOTAL | | 17.1 | 42.5 | 0.1 | 0.0 | 1.2 | | 1.2 | 15.8 | 0.0 | | | 0.0 |

**TABLE 4**



## ENDERS RESERVOIR OPERATION ESTIMATES - 2012

| MONTH | INFLOW MEAN CFS | INFLOW 1000 AF | EVAPORATION INCHES | EVAPORATION 1000 AF | RELEASE REQUIREMENT MEAN CFS | RELEASE REQUIREMENT 1000 AF | RESERVOIR SPILL 1000 AF | REQUIREMENT SHORTAGE 1000 AF | END OF MONTH ELEV FT | END OF MONTH CONT 1000 AF | RESERVOIR CHANGE 1000 AF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **REASONABLE MINIMUM INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 7 | 0.4 | 1.0 | 0.1 | 3 | 0.2 | 0.0 | 0.0 | 3093.4 | 17.6 | 0.1 |
| FEB | 7 | 0.4 | 1.1 | 0.1 | 4 | 0.2 | 0.0 | 0.0 | 3093.5 | 17.7 | 0.1 |
| MAR | 7 | 0.4 | 1.9 | 0.2 | 3 | 0.2 | 0.0 | 0.0 | 3093.5 | 17.7 | 0.0 |
| APR | 7 | 0.4 | 4.1 | 0.3 | 3 | 0.2 | 0.0 | 0.0 | 3093.4 | 17.6 | -0.1 |
| MAY | 7 | 0.4 | 5.2 | 0.4 | 3 | 0.2 | 0.0 | 0.0 | 3093.2 | 17.4 | -0.2 |
| JUN | 7 | 0.4 | 6.6 | 0.4 | 176 | 10.5 | 0.0 | 2.0 | 3082.3 | 8.9 | -8.5 |
| JUL | 8 | 0.5 | 7.2 | 0.4 | 533 | 32.8 | 0.0 | 32.7 | 3082.3 | 8.9 | 0.0 |
| AUG | 7 | 0.4 | 6.1 | 0.3 | 506 | 31.1 | 0.0 | 31.0 | 3082.3 | 8.9 | 0.0 |
| SEP | 7 | 0.4 | 4.5 | 0.2 | 76 | 4.5 | 0.0 | 4.3 | 3082.3 | 8.9 | 0.0 |
| OCT | 7 | 0.4 | 2.9 | 0.2 | 3 | 0.2 | 0.0 | 0.0 | 3082.3 | 8.9 | 0.0 |
| NOV | 7 | 0.4 | 2.1 | 0.1 | 3 | 0.2 | 0.0 | 0.0 | 3082.5 | 9.0 | 0.1 |
| DEC | 7 | 0.4 | 1.2 | 0.1 | 3 | 0.2 | 0.0 | 0.0 | 3082.6 | 9.1 | 0.1 |
| TOTAL | | 4.9 | 43.9 | 2.8 | | 80.5 | 0.0 | 70.0 | | | -8.4 |
| **MOST PROBABLE INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 15 | 0.9 | 0.9 | 0.1 | 3 | 0.2 | 0.0 | 0.0 | 3093.9 | 18.1 | 0.6 |
| FEB | 14 | 0.8 | 1.0 | 0.1 | 4 | 0.2 | 0.0 | 0.0 | 3094.4 | 18.6 | 0.5 |
| MAR | 15 | 0.9 | 1.7 | 0.1 | 3 | 0.2 | 0.0 | 0.0 | 3094.9 | 19.2 | 0.6 |
| APR | 15 | 0.9 | 3.9 | 0.3 | 3 | 0.2 | 0.0 | 0.0 | 3095.3 | 19.6 | 0.4 |
| MAY | 15 | 0.9 | 4.9 | 0.4 | 3 | 0.2 | 0.0 | 0.0 | 3095.6 | 19.9 | 0.3 |
| JUN | 15 | 0.9 | 6.0 | 0.5 | 118 | 7.0 | 0.0 | 0.0 | 3088.5 | 13.3 | -6.6 |
| JUL | 16 | 1.0 | 6.6 | 0.4 | 488 | 30.0 | 0.0 | 25.0 | 3082.3 | 8.9 | -4.4 |
| AUG | 15 | 0.9 | 5.6 | 0.3 | 389 | 23.9 | 0.0 | 23.3 | 3082.3 | 8.9 | 0.0 |
| SEP | 13 | 0.8 | 4.2 | 0.2 | 37 | 2.2 | 0.0 | 1.6 | 3082.3 | 8.9 | 0.0 |
| OCT | 15 | 0.9 | 2.7 | 0.1 | 3 | 0.2 | 0.0 | 0.0 | 3083.2 | 9.5 | 0.6 |
| NOV | 15 | 0.9 | 2.0 | 0.1 | 3 | 0.2 | 0.0 | 0.0 | 3084.2 | 10.1 | 0.6 |
| DEC | 13 | 0.8 | 1.1 | 0.1 | 3 | 0.2 | 0.0 | 0.0 | 3084.9 | 10.6 | 0.5 |
| TOTAL | | 10.6 | 40.6 | 2.7 | | 64.7 | 0.0 | 49.9 | | | -6.9 |
| **REASONABLE MAXIMUM INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 29 | 1.8 | 0.8 | 0.1 | 3 | 0.2 | 0.0 | 0.0 | 3094.7 | 19.0 | 1.5 |
| FEB | 29 | 1.6 | 0.9 | 0.1 | 4 | 0.2 | 0.0 | 0.0 | 3096.0 | 20.3 | 1.3 |
| MAR | 28 | 1.7 | 1.6 | 0.1 | 3 | 0.2 | 0.0 | 0.0 | 3097.2 | 21.7 | 1.4 |
| APR | 29 | 1.7 | 3.5 | 0.3 | 3 | 0.2 | 0.0 | 0.0 | 3098.2 | 22.9 | 1.2 |
| MAY | 29 | 1.8 | 4.4 | 0.4 | 3 | 0.2 | 0.0 | 0.0 | 3099.2 | 24.1 | 1.2 |
| JUN | 32 | 1.9 | 5.5 | 0.5 | 40 | 2.4 | 0.0 | 0.0 | 3098.4 | 23.1 | -1.0 |
| JUL | 34 | 2.1 | 6.0 | 0.5 | 298 | 18.3 | 0.0 | 2.5 | 3082.3 | 8.9 | -14.2 |
| AUG | 31 | 1.9 | 5.0 | 0.3 | 229 | 14.1 | 0.0 | 12.5 | 3082.3 | 8.9 | 0.0 |
| SEP | 27 | 1.6 | 3.8 | 0.2 | 3 | 0.2 | 0.0 | 0.0 | 3084.2 | 10.1 | 1.2 |
| OCT | 28 | 1.7 | 2.4 | 0.1 | 3 | 0.2 | 0.0 | 0.0 | 3086.2 | 11.5 | 1.4 |
| NOV | 29 | 1.7 | 1.8 | 0.1 | 3 | 0.2 | 0.0 | 0.0 | 3088.0 | 12.9 | 1.4 |
| DEC | 28 | 1.7 | 1.0 | 0.1 | 3 | 0.2 | 0.0 | 0.0 | 3089.7 | 14.3 | 1.4 |
| TOTAL | | 21.2 | 36.7 | 2.8 | | 36.6 | 0.0 | 15.0 | | | -3.2 |

## SWANSON LAKE OPERATION ESTIMATES- 2012

| | INFLOW | | EVAPORATION | | RELEASE REQUIREMENT CANAL | RIVER | TOTAL | | RESERVOIR SPILL | REQUIREMENT SHORTAGE | END OF MONTH ELEV | CONT | RESERVOIR CHANGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MEAN | 1000 | | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | | 1000 | 1000 |
| MONTH | CFS | AF | INCHES | AF | AF | AF | CFS | AF | AF | AF | FT | AF | AF |
| **REASONABLE MINIMUM INFLOW CONDITIONS** | | | | | | | | | | | | | |
| JAN | 20 | 1.2 | 1.0 | 0.3 | 0.0 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2740.4 | 63.0 | 0.8 |
| FEB | 31 | 1.7 | 1.1 | 0.3 | 0.0 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2740.7 | 64.3 | 1.3 |
| MAR | 34 | 2.1 | 2.0 | 0.6 | 0.0 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2741.1 | 65.7 | 1.4 |
| APR | 35 | 2.1 | 4.4 | 1.3 | 0.0 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2741.3 | 66.4 | 0.7 |
| MAY | 34 | 2.1 | 5.2 | 1.6 | 0.1 | 0.1 | 3 | 0.2 | 0.0 | 0.0 | 2741.4 | 66.7 | 0.3 |
| JUN | 27 | 1.6 | 6.7 | 2.0 | 4.4 | 0.9 | 89 | 5.3 | 0.0 | 0.0 | 2739.8 | 61.0 | -5.7 |
| JUL | 15 | 0.9 | 6.7 | 1.8 | 16.3 | 6.9 | 377 | 23.2 | 0.0 | 0.0 | 2732.1 | 36.9 | -24.1 |
| AUG | 8 | 0.5 | 6.7 | 1.3 | 13.6 | 4.9 | 301 | 18.5 | 0.0 | 3.3 | 2725.0 | 20.9 | -16.0 |
| SEP | 3 | 0.2 | 5.2 | 0.8 | 2.0 | 1.9 | 66 | 3.9 | 0.0 | 3.8 | 2724.6 | 20.2 | -0.7 |
| OCT | 7 | 0.4 | 3.2 | 0.5 | 0.0 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2724.5 | 20.0 | -0.2 |
| NOV | 13 | 0.8 | 2.2 | 0.4 | 0.0 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2724.7 | 20.3 | 0.3 |
| DEC | 16 | 1.0 | 1.2 | 0.2 | 0.0 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2725.1 | 21.0 | 0.7 |
| TOTAL | | 14.6 | 45.6 | 11.1 | 36.4 | 15.4 | | 51.8 | 0.0 | 7.1 | | | -41.2 |
| **MOST PROBABLE INFLOW CONDITIONS** | | | | | | | | | | | | | |
| JAN | 44 | 2.7 | 0.9 | 0.3 | 0.0 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2740.8 | 64.5 | 2.3 |
| FEB | 68 | 3.8 | 1.0 | 0.3 | 0.0 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2741.7 | 67.9 | 3.4 |
| MAR | 76 | 4.7 | 1.7 | 0.5 | 0.0 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2742.8 | 72.0 | 4.1 |
| APR | 84 | 5.0 | 4.1 | 1.3 | 0.0 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2743.7 | 75.6 | 3.6 |
| MAY | 75 | 4.6 | 4.8 | 1.6 | 0.1 | 0.1 | 3 | 0.2 | 0.0 | 0.0 | 2744.4 | 78.4 | 2.8 |
| JUN | 61 | 3.6 | 6.2 | 2.1 | 3.8 | 0.1 | 66 | 3.9 | 0.0 | 0.0 | 2743.8 | 76.0 | -2.4 |
| JUL | 33 | 2.0 | 7.0 | 2.2 | 14.2 | 4.2 | 299 | 18.4 | 0.0 | 0.0 | 2738.8 | 57.4 | -18.6 |
| AUG | 18 | 1.1 | 6.2 | 1.6 | 11.7 | 4.1 | 257 | 15.8 | 0.0 | 0.0 | 2733.6 | 41.1 | -16.3 |
| SEP | 8 | 0.5 | 4.8 | 1.1 | 1.7 | 0.1 | 30 | 1.8 | 0.0 | 0.0 | 2732.7 | 38.7 | -2.4 |
| OCT | 13 | 0.8 | 2.8 | 0.6 | 0.0 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2732.8 | 38.8 | 0.1 |
| NOV | 32 | 1.9 | 2.0 | 0.5 | 0.0 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2733.2 | 40.1 | 1.3 |
| DEC | 36 | 2.2 | 1.1 | 0.3 | 0.0 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2733.9 | 41.9 | 1.8 |
| TOTAL | | 32.9 | 42.6 | 12.4 | 31.5 | 9.3 | | 40.8 | 0.0 | 0.0 | | | -20.3 |
| **REASONABLE MAXIMUM INFLOW CONDITIONS** | | | | | | | | | | | | | |
| JAN | 91 | 5.6 | 0.8 | 0.2 | 0.0 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2741.6 | 67.5 | 5.3 |
| FEB | 142 | 7.9 | 0.9 | 0.3 | 0.0 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2743.6 | 75.0 | 7.5 |
| MAR | 159 | 9.8 | 1.6 | 0.5 | 0.0 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2745.8 | 84.2 | 9.2 |
| APR | 175 | 10.4 | 3.7 | 1.3 | 0.0 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2747.9 | 93.2 | 9.0 |
| MAY | 158 | 9.7 | 4.3 | 1.6 | 0.1 | 0.1 | 3 | 0.2 | 0.0 | 0.0 | 2749.7 | 101.1 | 7.9 |
| JUN | 126 | 7.5 | 5.6 | 2.2 | 3.1 | 0.1 | 54 | 3.2 | 0.0 | 0.0 | 2750.1 | 103.2 | 2.1 |
| JUL | 68 | 4.2 | 6.4 | 2.4 | 11.6 | 1.2 | 208 | 12.8 | 0.0 | 0.0 | 2747.7 | 92.2 | -11.0 |
| AUG | 37 | 2.3 | 5.6 | 2.0 | 9.6 | 1.7 | 184 | 11.3 | 0.0 | 0.0 | 2745.1 | 81.2 | -11.0 |
| SEP | 20 | 1.2 | 4.3 | 1.5 | 1.4 | 0.1 | 25 | 1.5 | 0.0 | 0.0 | 2744.7 | 79.4 | -1.8 |
| OCT | 26 | 1.6 | 2.6 | 0.9 | 0.0 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2744.8 | 80.0 | 0.6 |
| NOV | 67 | 4.0 | 1.9 | 0.7 | 0.0 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2745.6 | 83.2 | 3.2 |
| DEC | 73 | 4.5 | 1.0 | 0.4 | 0.0 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2746.5 | 87.2 | 4.0 |
| TOTAL | | 68.7 | 38.7 | 14.0 | 25.8 | 3.9 | | 29.7 | 0.0 | 0.0 | | | 25.0 |

TABLE 4



## HUGH BUTLER LAKE OPERATION ESTIMATES - 2012

| MONTH | INFLOW MEAN CFS | INFLOW 1000 AF | EVAPORATION INCHES | EVAPORATION 1000 AF | RELEASE REQUIREMENT MEAN CFS | RELEASE REQUIREMENT 1000 AF | RESERVOIR SPILL 1000 AF | REQUIREMENT SHORTAGE 1000 AF | END OF MONTH ELEV FT | END OF MONTH CONT 1000 AF | RESERVOIR CHANGE 1000 AF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **REASONABLE MINIMUM INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 11 | 0.7 | 0.9 | 0.0 | 3 | 0.2 | 0.2 | 0.0 | 2554.0 | 6.3 | 0.3 |
| FEB | 14 | 0.8 | 1.0 | 0.0 | 4 | 0.2 | 0.6 | 0.0 | 2554.0 | 6.3 | 0.0 |
| MAR | 16 | 1.0 | 1.8 | 0.1 | 3 | 0.2 | 0.7 | 0.0 | 2554.0 | 6.3 | 0.0 |
| APR | 17 | 1.0 | 5.0 | 0.2 | 3 | 0.2 | 0.6 | 0.0 | 2554.0 | 6.3 | 0.0 |
| MAY | 18 | 1.1 | 5.9 | 0.3 | 3 | 0.2 | 0.6 | 0.0 | 2554.0 | 6.3 | 0.0 |
| JUN | 17 | 1.0 | 7.2 | 0.3 | 29 | 1.7 | 0.0 | 0.0 | 2552.2 | 5.3 | -1.0 |
| JUL | 15 | 0.9 | 8.0 | 0.4 | 73 | 4.5 | 0.0 | 3.9 | 2552.0 | 5.2 | -0.1 |
| AUG | 15 | 0.9 | 7.1 | 0.3 | 62 | 3.8 | 0.0 | 3.2 | 2552.0 | 5.2 | 0.0 |
| SEP | 8 | 0.5 | 5.5 | 0.2 | 15 | 0.9 | 0.0 | 0.6 | 2552.0 | 5.2 | 0.0 |
| OCT | 10 | 0.6 | 3.5 | 0.2 | 3 | 0.2 | 0.0 | 0.0 | 2552.4 | 5.4 | 0.2 |
| NOV | 12 | 0.7 | 2.1 | 0.1 | 3 | 0.2 | 0.0 | 0.0 | 2553.1 | 5.8 | 0.4 |
| DEC | 11 | 0.7 | 1.1 | 0.1 | 3 | 0.2 | 0.0 | 0.0 | 2553.8 | 6.2 | 0.4 |
| TOTAL | | 9.9 | 49.1 | 2.2 | | 12.5 | 2.7 | 7.7 | | | 0.2 |
| **MOST PROBABLE INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 16 | 1.0 | 0.8 | 0.0 | 3 | 0.2 | 0.5 | 0.0 | 2554.0 | 6.3 | 0.3 |
| FEB | 22 | 1.2 | 0.9 | 0.0 | 4 | 0.2 | 1.0 | 0.0 | 2554.0 | 6.3 | 0.0 |
| MAR | 24 | 1.5 | 1.6 | 0.1 | 3 | 0.2 | 1.2 | 0.0 | 2554.0 | 6.3 | 0.0 |
| APR | 25 | 1.5 | 4.5 | 0.2 | 3 | 0.2 | 1.1 | 0.0 | 2554.0 | 6.3 | 0.0 |
| MAY | 26 | 1.6 | 5.4 | 0.3 | 3 | 0.2 | 1.1 | 0.0 | 2554.0 | 6.3 | 0.0 |
| JUN | 27 | 1.6 | 6.5 | 0.3 | 24 | 1.4 | 0.0 | 0.0 | 2553.8 | 6.2 | -0.1 |
| JUL | 21 | 1.3 | 7.1 | 0.3 | 62 | 3.8 | 0.0 | 1.8 | 2552.0 | 5.2 | -1.0 |
| AUG | 21 | 1.3 | 6.4 | 0.3 | 52 | 3.2 | 0.0 | 2.2 | 2552.0 | 5.2 | 0.0 |
| SEP | 13 | 0.8 | 5.0 | 0.2 | 13 | 0.8 | 0.0 | 0.2 | 2552.0 | 5.2 | 0.0 |
| OCT | 15 | 0.9 | 3.1 | 0.1 | 3 | 0.2 | 0.0 | 0.0 | 2553.1 | 5.8 | 0.6 |
| NOV | 17 | 1.0 | 1.9 | 0.1 | 3 | 0.2 | 0.2 | 0.0 | 2554.0 | 6.3 | 0.5 |
| DEC | 16 | 1.0 | 1.0 | 0.0 | 3 | 0.2 | 0.8 | 0.0 | 2554.0 | 6.3 | 0.0 |
| TOTAL | | 14.7 | 44.2 | 1.9 | | 10.8 | 5.9 | 4.2 | | | 0.3 |
| **REASONABLE MAXIMUM INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 23 | 1.4 | 0.7 | 0.0 | 3 | 0.2 | 0.9 | 0.0 | 2554.0 | 6.3 | 0.3 |
| FEB | 31 | 1.7 | 0.8 | 0.0 | 4 | 0.2 | 1.5 | 0.0 | 2554.0 | 6.3 | 0.0 |
| MAR | 36 | 2.2 | 1.5 | 0.1 | 3 | 0.2 | 1.9 | 0.0 | 2554.0 | 6.3 | 0.0 |
| APR | 35 | 2.1 | 4.0 | 0.2 | 3 | 0.2 | 1.7 | 0.0 | 2554.0 | 6.3 | 0.0 |
| MAY | 36 | 2.2 | 4.8 | 0.2 | 3 | 0.2 | 1.8 | 0.0 | 2554.0 | 6.3 | 0.0 |
| JUN | 37 | 2.2 | 5.9 | 0.3 | 18 | 1.1 | 0.8 | 0.0 | 2554.0 | 6.3 | 0.0 |
| JUL | 29 | 1.8 | 6.5 | 0.3 | 46 | 2.8 | 0.0 | 0.2 | 2552.0 | 5.2 | -1.1 |
| AUG | 29 | 1.8 | 5.8 | 0.3 | 39 | 2.4 | 0.0 | 0.9 | 2552.0 | 5.2 | 0.0 |
| SEP | 20 | 1.2 | 4.5 | 0.2 | 8 | 0.5 | 0.0 | 0.0 | 2552.9 | 5.7 | 0.5 |
| OCT | 21 | 1.3 | 2.8 | 0.1 | 3 | 0.2 | 0.4 | 0.0 | 2554.0 | 6.3 | 0.6 |
| NOV | 24 | 1.4 | 1.8 | 0.1 | 3 | 0.2 | 1.1 | 0.0 | 2554.0 | 6.3 | 0.0 |
| DEC | 23 | 1.4 | 0.9 | 0.0 | 3 | 0.2 | 1.2 | 0.0 | 2554.0 | 6.3 | 0.0 |
| TOTAL | | 20.7 | 40.0 | 1.8 | | 8.4 | 11.3 | 1.1 | | | 0.3 |

**TABLE 4**



## HARRY STRUNK LAKE OPERATON ESTIMATES - 2012

| MONTH | INFLOW MEAN CFS | INFLOW 1000 AF | EVAPORATION INCHES | EVAPORATION 1000 AF | RELEASE REQUIREMENT MEAN CFS | RELEASE REQUIREMENT 1000 AF | RESERVOIR SPILL 1000 AF | REQUIREMENT SHORTAGE 1000 AF | END OF MONTH ELEV FT | END OF MONTH CONT 1000 AF | RESERVOIR CHANGE 1000 AF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **REASONABLE MINIMUM INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 34 | 2.1 | 0.9 | 0.1 | 2 | 0.1 | 1.3 | 0.0 | 2365.6 | 33.7 | 0.6 |
| FEB | 43 | 2.4 | 1.0 | 0.1 | 2 | 0.1 | 2.2 | 0.0 | 2365.6 | 33.7 | 0.0 |
| MAR | 47 | 2.9 | 1.8 | 0.3 | 2 | 0.1 | 2.5 | 0.0 | 2365.6 | 33.7 | 0.0 |
| APR | 45 | 2.7 | 4.9 | 0.7 | 2 | 0.1 | 1.0 | 0.0 | 2366.1 | 34.6 | 0.9 |
| MAY | 50 | 3.1 | 5.7 | 0.9 | 2 | 0.1 | 2.1 | 0.0 | 2366.1 | 34.6 | 0.0 |
| JUN | 50 | 3.0 | 7.1 | 1.0 | 89 | 5.3 | 0.0 | 0.0 | 2364.2 | 31.3 | -3.3 |
| JUL | 47 | 2.9 | 7.8 | 0.8 | 319 | 19.6 | 0.0 | 0.0 | 2350.3 | 13.8 | -17.5 |
| AUG | 37 | 2.3 | 6.9 | 0.5 | 268 | 16.5 | 0.0 | 8.8 | 2343.0 | 7.9 | -5.9 |
| SEP | 25 | 1.5 | 5.4 | 0.3 | 27 | 1.6 | 0.0 | 0.4 | 2343.0 | 7.9 | 0.0 |
| OCT | 31 | 1.9 | 3.5 | 0.2 | 2 | 0.1 | 0.0 | 0.0 | 2345.2 | 9.5 | 1.6 |
| NOV | 34 | 2.0 | 2.1 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2347.5 | 11.3 | 1.8 |
| DEC | 33 | 2.0 | 1.1 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2349.5 | 13.1 | 1.8 |
| TOTAL | | 28.8 | 48.2 | 5.1 | | 43.8 | 9.1 | 9.2 | | | -20.0 |
| **MOST PROBABLE INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 47 | 2.9 | 0.8 | 0.1 | 2 | 0.1 | 2.1 | 0.0 | 2365.6 | 33.7 | 0.6 |
| FEB | 59 | 3.3 | 0.9 | 0.1 | 2 | 0.1 | 3.1 | 0.0 | 2365.6 | 33.7 | 0.0 |
| MAR | 63 | 3.9 | 1.6 | 0.2 | 2 | 0.1 | 3.6 | 0.0 | 2365.6 | 33.7 | 0.0 |
| APR | 62 | 3.7 | 4.3 | 0.7 | 2 | 0.1 | 2.0 | 0.0 | 2366.1 | 34.6 | 0.9 |
| MAY | 67 | 4.1 | 5.1 | 0.8 | 2 | 0.1 | 3.2 | 0.0 | 2366.1 | 34.6 | 0.0 |
| JUN | 69 | 4.1 | 6.6 | 1.0 | 74 | 4.4 | 0.0 | 0.0 | 2365.3 | 33.3 | -1.3 |
| JUL | 63 | 3.9 | 7.3 | 0.9 | 265 | 16.3 | 0.0 | 0.0 | 2356.0 | 20.0 | -13.3 |
| AUG | 50 | 3.1 | 6.4 | 0.5 | 223 | 13.7 | 0.0 | 0.0 | 2344.4 | 8.9 | -11.1 |
| SEP | 34 | 2.0 | 4.8 | 0.3 | 20 | 1.2 | 0.0 | 0.0 | 2345.1 | 9.4 | 0.5 |
| OCT | 41 | 2.5 | 3.2 | 0.2 | 2 | 0.1 | 0.0 | 0.0 | 2347.8 | 11.6 | 2.2 |
| NOV | 45 | 2.7 | 1.9 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2350.6 | 14.1 | 2.5 |
| DEC | 44 | 2.7 | 1.0 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2353.0 | 16.6 | 2.5 |
| TOTAL | | 38.9 | 43.9 | 5.0 | | 36.4 | 14.0 | 0.0 | | | -16.5 |
| **REASONABLE MAXIMUM INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 72 | 4.4 | 0.7 | 0.1 | 2 | 0.1 | 3.6 | 0.0 | 2365.6 | 33.7 | 0.6 |
| FEB | 92 | 5.1 | 0.8 | 0.1 | 2 | 0.1 | 4.9 | 0.0 | 2365.6 | 33.7 | 0.0 |
| MAR | 96 | 5.9 | 1.3 | 0.2 | 2 | 0.1 | 5.6 | 0.0 | 2365.6 | 33.7 | 0.0 |
| APR | 96 | 5.7 | 4.0 | 0.6 | 2 | 0.1 | 4.1 | 0.0 | 2366.1 | 34.6 | 0.9 |
| MAY | 102 | 6.3 | 4.7 | 0.7 | 2 | 0.1 | 5.5 | 0.0 | 2366.1 | 34.6 | 0.0 |
| JUN | 106 | 6.3 | 5.9 | 0.9 | 47 | 2.8 | 2.6 | 0.0 | 2366.1 | 34.6 | 0.0 |
| JUL | 98 | 6.0 | 6.5 | 0.9 | 182 | 11.2 | 0.0 | 0.0 | 2362.4 | 28.5 | -6.1 |
| AUG | 78 | 4.8 | 5.8 | 0.7 | 155 | 9.5 | 0.0 | 0.0 | 2358.5 | 23.1 | -5.4 |
| SEP | 50 | 3.0 | 4.4 | 0.5 | 2 | 0.1 | 0.0 | 0.0 | 2360.3 | 25.5 | 2.4 |
| OCT | 63 | 3.9 | 2.8 | 0.3 | 2 | 0.1 | 0.0 | 0.0 | 2362.7 | 29.0 | 3.5 |
| NOV | 71 | 4.2 | 1.6 | 0.2 | 2 | 0.1 | 0.0 | 0.0 | 2365.1 | 32.9 | 3.9 |
| DEC | 67 | 4.1 | 0.9 | 0.1 | 2 | 0.1 | 3.1 | 0.0 | 2365.6 | 33.7 | 0.8 |
| TOTAL | | 59.7 | 39.4 | 5.3 | | 24.4 | 29.4 | 0.0 | | | 0.6 |

## KEITH SEBELIUS LAKE OPERATION ESTIMATES - 2012

| MONTH | INFLOW MEAN CFS | INFLOW 1000 AF | EVAPORATION INCHES | EVAPORATION 1000 AF | RELEASE REQUIREMENT MEAN CFS | RELEASE REQUIREMENT 1000 AF | RESERVOIR SPILL 1000 AF | REQUIREMENT SHORTAGE 1000 AF | END OF MONTH ELEV FT | END OF MONTH CONT 1000 AF | RESERVOIR CHANGE 1000 AF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **REASONABLE MINIMUM INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 3 | 0.2 | 1.1 | 0.2 | 2 | 0.1 | 0.0 | 0.0 | 2298.3 | 23.1 | -0.1 |
| FEB | 4 | 0.2 | 1.3 | 0.2 | 2 | 0.1 | 0.0 | 0.0 | 2298.3 | 23.0 | -0.1 |
| MAR | 7 | 0.4 | 2.1 | 0.3 | 2 | 0.1 | 0.0 | 0.0 | 2298.3 | 23.0 | 0.0 |
| APR | 8 | 0.5 | 5.5 | 0.8 | 2 | 0.1 | 0.0 | 0.0 | 2298.1 | 22.6 | -0.4 |
| MAY | 11 | 0.7 | 6.1 | 0.8 | 7 | 0.4 | 0.0 | 0.0 | 2297.7 | 22.1 | -0.5 |
| JUN | 15 | 0.9 | 7.7 | 1.0 | 57 | 3.4 | 0.0 | 0.0 | 2295.5 | 18.6 | -3.5 |
| JUL | 10 | 0.6 | 8.6 | 0.9 | 146 | 9.0 | 0.0 | 2.1 | 2289.8 | 11.4 | -7.2 |
| AUG | 10 | 0.6 | 7.7 | 0.5 | 138 | 8.5 | 0.0 | 8.4 | 2289.8 | 11.4 | 0.0 |
| SEP | 5 | 0.3 | 6.1 | 0.3 | 27 | 1.6 | 0.0 | 1.5 | 2289.7 | 11.3 | -0.1 |
| OCT | 2 | 0.1 | 4.2 | 0.2 | 2 | 0.1 | 0.0 | 0.0 | 2289.5 | 11.1 | -0.2 |
| NOV | 2 | 0.1 | 2.3 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2289.4 | 11.0 | -0.1 |
| DEC | 3 | 0.2 | 1.2 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2289.4 | 11.0 | 0.0 |
| TOTAL | | 4.8 | 53.9 | 5.4 | | 23.6 | 0.0 | 12.0 | | | -12.2 |
| **MOST PROBABLE INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 5 | 0.3 | 0.9 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2298.5 | 23.3 | 0.1 |
| FEB | 7 | 0.4 | 1.1 | 0.2 | 2 | 0.1 | 0.0 | 0.0 | 2298.5 | 23.4 | 0.1 |
| MAR | 13 | 0.8 | 1.8 | 0.3 | 2 | 0.1 | 0.0 | 0.0 | 2298.8 | 23.8 | 0.4 |
| APR | 15 | 0.9 | 4.8 | 0.7 | 2 | 0.1 | 0.0 | 0.0 | 2298.8 | 23.9 | 0.1 |
| MAY | 21 | 1.3 | 5.5 | 0.8 | 3 | 0.2 | 0.0 | 0.0 | 2299.0 | 24.2 | 0.3 |
| JUN | 29 | 1.7 | 6.7 | 0.9 | 47 | 2.8 | 0.0 | 0.0 | 2297.8 | 22.2 | -2.0 |
| JUL | 20 | 1.2 | 7.7 | 0.9 | 138 | 8.5 | 0.0 | 0.0 | 2292.1 | 14.0 | -8.2 |
| AUG | 18 | 1.1 | 6.7 | 0.6 | 112 | 6.9 | 0.0 | 5.2 | 2291.0 | 12.8 | -1.2 |
| SEP | 10 | 0.6 | 5.4 | 0.3 | 22 | 1.3 | 0.0 | 1.0 | 2291.0 | 12.8 | 0.0 |
| OCT | 5 | 0.3 | 3.6 | 0.2 | 2 | 0.1 | 0.0 | 0.0 | 2291.0 | 12.8 | 0.0 |
| NOV | 5 | 0.3 | 2.1 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2291.1 | 12.9 | 0.1 |
| DEC | 5 | 0.3 | 1.1 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2291.2 | 13.0 | 0.1 |
| TOTAL | | 9.2 | 47.4 | 5.2 | | 20.4 | 0.0 | 6.2 | | | -10.2 |
| **REASONABLE MAXIMUM INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 10 | 0.6 | 0.8 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2298.6 | 23.6 | 0 |
| FEB | 14 | 0.8 | 0.9 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2299.0 | 24.2 | 1 |
| MAR | 24 | 1.5 | 1.5 | 0.2 | 2 | 0.1 | 0.0 | 0.0 | 2299.7 | 25.4 | 1 |
| APR | 27 | 1.6 | 4.2 | 0.6 | 2 | 0.1 | 0.0 | 0.0 | 2300.2 | 26.3 | 1 |
| MAY | 42 | 2.6 | 4.8 | 0.7 | 3 | 0.2 | 0.0 | 0.0 | 2301.1 | 28.0 | 2 |
| JUN | 54 | 3.2 | 6.2 | 1.0 | 27 | 1.6 | 0.0 | 0.0 | 2301.4 | 28.6 | 1 |
| JUL | 37 | 2.3 | 6.8 | 1.0 | 72 | 4.4 | 0.0 | 0.0 | 2299.7 | 25.5 | -3 |
| AUG | 34 | 2.1 | 6.2 | 0.9 | 68 | 4.2 | 0.0 | 0.0 | 2298.0 | 22.5 | -3 |
| SEP | 17 | 1.0 | 4.8 | 0.7 | 15 | 0.9 | 0.0 | 0.0 | 2297.6 | 21.9 | -1 |
| OCT | 8 | 0.5 | 3.2 | 0.4 | 2 | 0.1 | 0.0 | 0.0 | 2297.6 | 21.9 | 0 |
| NOV | 10 | 0.6 | 1.8 | 0.2 | 2 | 0.1 | 0.0 | 0.0 | 2297.8 | 22.2 | 0 |
| DEC | 10 | 0.6 | 0.9 | 0.1 | 2 | 0.1 | 0.0 | 0.0 | 2298.1 | 22.6 | 0 |
| TOTAL | | 17.4 | 42.1 | 6.0 | | 12.0 | 0.0 | 0.0 | | | -0.6 |

**TABLE 4**



## HARLAN COUNTY LAKE OPERATION ESTIMATES - 2012

| MONTH | INFLOW MEAN CFS | INFLOW 1000 AF | EVAPORATION INCHES | EVAPORATION 1000 AF | RELEASE REQUIREMENT MEAN CFS | RELEASE REQUIREMENT 1000 AF | RESERVOIR SPILL 1000 AF | REQUIREMENT SHORTAGE 1000 AF | END OF MONTH ELEV FT | END OF MONTH CONT 1000 AF | RESERVOIR CHANGE 1000 AF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **REASONABLE MINIMUM INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 42 | 2.6 | 1.0 | 1.1 | 0 | 0.0 | 10.4 | 0.0 | 1945.7 | 314.1 | -8.9 |
| FEB | 67 | 3.7 | 1.1 | 1.2 | 0 | 0.0 | 2.5 | 0.0 | 1945.7 | 314.1 | 0.0 |
| MAR | 89 | 5.5 | 1.9 | 2.1 | 0 | 0.0 | 3.4 | 0.0 | 1945.7 | 314.1 | 0.0 |
| APR | 77 | 4.6 | 4.5 | 5.0 | 0 | 0.0 | 0.0 | 0.0 | 1945.7 | 313.7 | -0.4 |
| MAY | 106 | 6.5 | 5.5 | 6.1 | 0 | 0.0 | 0.0 | 0.0 | 1945.7 | 314.1 | 0.4 |
| JUN | 84 | 5.0 | 6.6 | 7.1 | 328 | 19.5 | 0.0 | 0.0 | 1944.1 | 292.5 | -21.6 |
| JUL | 83 | 5.1 | 7.4 | 7.6 | 864 | 53.1 | 0.0 | 0.0 | 1939.5 | 236.9 | -55.6 |
| AUG | 67 | 4.1 | 6.5 | 5.9 | 712 | 43.8 | 0.0 | 0.0 | 1935.3 | 191.3 | -45.6 |
| SEP | 32 | 1.9 | 5.2 | 4.4 | 79 | 4.7 | 0.0 | 0.0 | 1934.6 | 184.1 | -7.2 |
| OCT | 31 | 1.9 | 3.5 | 2.9 | 0 | 0.0 | 0.0 | 0.0 | 1934.5 | 183.1 | -1.0 |
| NOV | 40 | 2.4 | 2.2 | 1.8 | 0 | 0.0 | 0.0 | 0.0 | 1934.5 | 183.7 | 0.6 |
| DEC | 41 | 2.5 | 1.4 | 1.2 | 0 | 0.0 | 0.0 | 0.0 | 1934.7 | 185.0 | 1.3 |
| TOTAL | | 45.8 | 46.8 | 46.4 | | 121.1 | 16.3 | 0.0 | | | -138.0 |
| **MOST PROBABLE INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 135 | 8.3 | 0.8 | 0.9 | 0 | 0.0 | 16.3 | 0.0 | 1945.7 | 314.1 | -8.9 |
| FEB | 211 | 11.7 | 0.9 | 1.0 | 0 | 0.0 | 10.7 | 0.0 | 1945.7 | 314.1 | 0.0 |
| MAR | 283 | 17.4 | 1.6 | 1.8 | 0 | 0.0 | 15.6 | 0.0 | 1945.7 | 314.1 | 0.0 |
| APR | 245 | 14.6 | 4.0 | 4.4 | 0 | 0.0 | 10.2 | 0.0 | 1945.7 | 314.1 | 0.0 |
| MAY | 309 | 19.0 | 4.9 | 5.4 | 0 | 0.0 | 13.6 | 0.0 | 1945.7 | 314.1 | 0.0 |
| JUN | 257 | 15.3 | 5.9 | 6.5 | 64 | 3.8 | 5.0 | 0.0 | 1945.7 | 314.1 | 0.0 |
| JUL | 260 | 16.0 | 6.7 | 7.2 | 677 | 41.6 | 0.0 | 0.0 | 1943.2 | 281.3 | -32.8 |
| AUG | 210 | 12.9 | 5.8 | 6.0 | 441 | 27.1 | 0.0 | 0.0 | 1941.5 | 261.1 | -20.2 |
| SEP | 103 | 6.1 | 4.7 | 4.8 | 34 | 2.0 | 0.0 | 0.0 | 1941.5 | 260.4 | -0.7 |
| OCT | 98 | 6.0 | 3.1 | 3.1 | 0 | 0.0 | 0.0 | 0.0 | 1941.7 | 263.3 | 2.9 |
| NOV | 129 | 7.7 | 1.9 | 1.9 | 0 | 0.0 | 0.0 | 0.0 | 1942.2 | 269.1 | 5.8 |
| DEC | 127 | 7.8 | 1.1 | 1.1 | 10 | 0.6 | 0.0 | 0.0 | 1942.7 | 275.2 | 6.1 |
| TOTAL | | 142.8 | 41.4 | 44.1 | | 75.1 | 71.4 | 0.0 | | | -47.8 |
| **REASONABLE MAXIMUM INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 296 | 18.2 | 0.7 | 0.8 | 0 | 0.0 | 26.3 | 0.0 | 1945.7 | 314.1 | -8.9 |
| FEB | 463 | 25.7 | 0.7 | 0.8 | 0 | 0.0 | 24.9 | 0.0 | 1945.7 | 314.1 | 0.0 |
| MAR | 623 | 38.3 | 1.3 | 1.4 | 0 | 0.0 | 36.9 | 0.0 | 1945.7 | 314.1 | 0.0 |
| APR | 538 | 32.0 | 3.5 | 3.9 | 0 | 0.0 | 28.1 | 0.0 | 1945.7 | 314.1 | 0.0 |
| MAY | 680 | 41.8 | 4.2 | 4.6 | 0 | 0.0 | 37.2 | 0.0 | 1945.7 | 314.1 | 0.0 |
| JUN | 565 | 33.6 | 5.4 | 6.0 | 37 | 2.2 | 25.4 | 0.0 | 1945.7 | 314.1 | 0.0 |
| JUL | 572 | 35.2 | 5.9 | 6.5 | 156 | 9.6 | 19.1 | 0.0 | 1945.7 | 314.1 | 0.0 |
| AUG | 460 | 28.3 | 5.2 | 5.8 | 156 | 9.6 | 12.9 | 0.0 | 1945.7 | 314.1 | 0.0 |
| SEP | 227 | 13.5 | 4.1 | 4.5 | 20 | 1.2 | 7.8 | 0.0 | 1945.7 | 314.1 | 0.0 |
| OCT | 215 | 13.2 | 2.6 | 2.9 | 0 | 0.0 | 10.3 | 0.0 | 1945.7 | 314.1 | 0.0 |
| NOV | 286 | 17.0 | 1.6 | 1.8 | 0 | 0.0 | 15.2 | 0.0 | 1945.7 | 314.1 | 0.0 |
| DEC | 280 | 17.2 | 1.0 | 1.1 | 0 | 0.0 | 16.1 | 0.0 | 1945.7 | 314.1 | 0.0 |
| TOTAL | | 314.0 | 36.2 | 40.1 | | 22.6 | 260.2 | 0.0 | | | -8.9 |

TABLE 4



## LOVEWELL RESERVOIR OPERATION ESTIMATES - 2012

| MONTH | WHITE ROCK CREEK INFLOW 1000 AF | COURTLAND CANAL INFLOW 1000 AF | TOTAL INFLOW MEAN CFS | TOTAL INFLOW 1000 AF | EVAPORATION INCHES | EVAPORATION 1000 AF | RELEASE REQUIREMENT MEAN CFS | RELEASE REQUIREMENT 1000 AF | RES SPILL 1000 AF | REQ SHORT 1000 AF | END OF MONTH ELEV FT | END OF MONTH CONT 1000 AF | RESERVOIR CHANGE 1000 AF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **REASONABLE MINIMUM INFLOW CONDITIONS** | | | | | | | | | | | | | |
| JAN | 0.5 | 0.0 | 8.0 | 0.5 | 0.8 | 0.2 | 0 | 0.0 | 0.0 | 0.0 | 1581.4 | 32.2 | 0.3 |
| FEB | 0.7 | 0.0 | 13.0 | 0.7 | 1.0 | 0.2 | 0 | 0.0 | 0.0 | 0.0 | 1581.6 | 32.7 | 0.5 |
| MAR | 1.6 | 0.0 | 26.0 | 1.6 | 1.8 | 0.4 | 0 | 0.0 | 0.0 | 0.0 | 1582.0 | 33.9 | 1.2 |
| APR | 1.5 | 0.0 | 25.0 | 1.5 | 3.7 | 0.9 | 0 | 0.0 | 0.0 | 0.0 | 1582.2 | 34.5 | 0.6 |
| MAY | 1.8 | 1.5 | 54.0 | 3.3 | 4.7 | 1.2 | 15 | 0.9 | 0.0 | 0.0 | 1582.6 | 35.7 | 1.2 |
| JUN | 2.0 | 9.5 | 193.0 | 11.5 | 6.1 | 1.5 | 168 | 10.0 | 0.0 | 0.0 | 1582.6 | 35.7 | 0.0 |
| JUL | 1.4 | 15.4 | 273.0 | 16.8 | 6.6 | 1.4 | 506 | 31.1 | 0.0 | 0.0 | 1576.4 | 20.0 | -15.7 |
| AUG | 0.1 | 13.8 | 226.0 | 13.9 | 5.4 | 0.8 | 348 | 21.4 | 0.0 | 0.0 | 1571.7 | 11.7 | -8.3 |
| SEP | 1.1 | 2.2 | 55.0 | 3.3 | 4.1 | 0.5 | 47 | 2.8 | 0.0 | 0.0 | 1571.7 | 11.7 | 0.0 |
| OCT | 0.7 | 1.9 | 42.0 | 2.6 | 2.8 | 0.4 | 0 | 0.0 | 0.0 | 0.0 | 1573.1 | 13.9 | 2.2 |
| NOV | 0.6 | 2.5 | 52.0 | 3.1 | 2.1 | 0.3 | 0 | 0.0 | 0.0 | 0.0 | 1574.7 | 16.7 | 2.8 |
| DEC | 0.4 | 2.6 | 49.0 | 3.0 | 1.0 | 0.2 | 0 | 0.0 | 0.0 | 0.0 | 1576.2 | 19.5 | 2.8 |
| TOTAL | 12.4 | 49.4 | | 61.8 | 40.1 | 8.0 | | 66.2 | 0.0 | 0.0 | | | -12.4 |
| **MOST PROBABLE INFLOW CONDITIONS** | | | | | | | | | | | | | |
| JAN | 1.1 | 0.0 | 18.0 | 1.1 | 0.7 | 0.2 | 0 | 0.0 | 0.0 | 0.0 | 1581.6 | 32.8 | 0.9 |
| FEB | 1.6 | 0.0 | 29.0 | 1.6 | 0.9 | 0.2 | 0 | 0.0 | 0.0 | 0.0 | 1582.1 | 34.2 | 1.4 |
| MAR | 3.7 | 0.0 | 60.0 | 3.7 | 1.6 | 0.4 | 0 | 0.0 | 1.8 | 0.0 | 1582.6 | 35.7 | 1.5 |
| APR | 3.3 | 0.0 | 55.0 | 3.3 | 3.2 | 0.8 | 0 | 0.0 | 2.5 | 0.0 | 1582.6 | 35.7 | 0.0 |
| MAY | 4.2 | 0.0 | 68.0 | 4.2 | 4.1 | 1.0 | 13 | 0.8 | 2.4 | 0.0 | 1582.6 | 35.7 | 0.0 |
| JUN | 4.6 | 4.6 | 155.0 | 9.2 | 5.1 | 1.3 | 133 | 7.9 | 0.0 | 0.0 | 1582.6 | 35.7 | 0.0 |
| JUL | 3.1 | 13.5 | 270.0 | 16.6 | 5.9 | 1.3 | 405 | 24.9 | 0.0 | 0.0 | 1579.1 | 26.1 | -9.6 |
| AUG | 0.3 | 4.7 | 81.0 | 5.0 | 4.7 | 0.8 | 278 | 17.1 | 0.0 | 0.0 | 1572.7 | 13.2 | -12.9 |
| SEP | 2.4 | 0.6 | 50.0 | 3.0 | 3.5 | 0.5 | 37 | 2.2 | 0.0 | 0.0 | 1572.9 | 13.5 | 0.3 |
| OCT | 1.6 | 4.7 | 102.0 | 6.3 | 2.4 | 0.4 | 0 | 0.0 | 0.0 | 0.0 | 1576.1 | 19.4 | 5.9 |
| NOV | 1.4 | 4.1 | 92.0 | 5.5 | 1.8 | 0.3 | 0 | 0.0 | 0.0 | 0.0 | 1578.5 | 24.6 | 5.2 |
| DEC | 1.0 | 4.6 | 91.0 | 5.6 | 0.8 | 0.2 | 0 | 0.0 | 0.0 | 0.0 | 1580.6 | 30.0 | 5.4 |
| TOTAL | 28.3 | 36.8 | | 65.1 | 34.7 | 7.4 | | 52.9 | 6.7 | 0.0 | | | -1.9 |
| **REASONABLE MAXIMUM INFLOW CONDITIONS** | | | | | | | | | | | | | |
| JAN | 3.0 | 0.0 | 49.0 | 3.0 | 0.6 | 0.1 | 0 | 0.0 | 0.0 | 0.0 | 1582.3 | 34.8 | 2.9 |
| FEB | 4.4 | 0.0 | 79.0 | 4.4 | 0.7 | 0.2 | 0 | 0.0 | 3.3 | 0.0 | 1582.6 | 35.7 | 0.9 |
| MAR | 10.1 | 0.0 | 164.0 | 10.1 | 1.3 | 0.3 | 0 | 0.0 | 9.8 | 0.0 | 1582.6 | 35.7 | 0.0 |
| APR | 9.2 | 0.0 | 155.0 | 9.2 | 2.8 | 0.7 | 0 | 0.0 | 8.5 | 0.0 | 1582.6 | 35.7 | 0.0 |
| MAY | 11.5 | 0.0 | 187.0 | 11.5 | 3.5 | 0.9 | 8 | 0.5 | 10.1 | 0.0 | 1582.6 | 35.7 | 0.0 |
| JUN | 12.6 | 1.2 | 232.0 | 13.8 | 4.5 | 1.1 | 87 | 5.2 | 7.5 | 0.0 | 1582.6 | 35.7 | 0.0 |
| JUL | 8.5 | 1.2 | 158.0 | 9.7 | 5.1 | 1.2 | 265 | 16.3 | 0.0 | 0.0 | 1579.8 | 27.9 | -7.8 |
| AUG | 0.9 | 1.2 | 34.0 | 2.1 | 4.1 | 0.8 | 179 | 11.0 | 0.0 | 0.0 | 1575.5 | 18.2 | -9.7 |
| SEP | 6.7 | 0.6 | 123.0 | 7.3 | 3.0 | 0.5 | 24 | 1.4 | 0.0 | 0.0 | 1578.0 | 23.6 | 5.4 |
| OCT | 4.5 | 0.0 | 73.0 | 4.5 | 2.0 | 0.4 | 0 | 0.0 | 0.0 | 0.0 | 1579.7 | 27.7 | 4.1 |
| NOV | 3.9 | 0.0 | 66.0 | 3.9 | 1.5 | 0.3 | 0 | 0.0 | 1.3 | 0.0 | 1580.6 | 30.0 | 2.3 |
| DEC | 2.7 | 0.0 | 44.0 | 2.7 | 0.7 | 0.2 | 0 | 0.0 | 2.5 | 0.0 | 1580.6 | 30.0 | 0.0 |
| TOTAL | 78.0 | 4.2 | | 82.2 | 29.8 | 6.7 | | 34.4 | 43.0 | 0.0 | | | -1.9 |

**TABLE 4**



## KIRWIN RESERVOIR OPERATION ESTIMATES - 2012

| MONTH | INFLOW MEAN CFS | INFLOW 1000 AF | EVAPORATION INCHES | EVAPORATION 1000 AF | RELEASE REQUIREMENT MEAN CFS | RELEASE REQUIREMENT 1000 AF | RESERVOIR SPILL 1000 AF | REQUIREMENT SHORTAGE 1000 AF | END OF MONTH ELEV FT | END OF MONTH CONT 1000 AF | RESERVOIR CHANGE 1000 AF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **REASONABLE MINIMUM INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 5 | 0.3 | 0.9 | 0.4 | 0 | 0.0 | 1.7 | 0.0 | 1729.3 | 98.2 | -1.8 |
| FEB | 7 | 0.4 | 1.1 | 0.5 | 0 | 0.0 | 0.0 | 0.0 | 1729.2 | 98.1 | -0.1 |
| MAR | 13 | 0.8 | 2.0 | 0.8 | 0 | 0.0 | 0.0 | 0.0 | 1729.2 | 98.1 | 0.0 |
| APR | 13 | 0.8 | 4.4 | 1.9 | 0 | 0.0 | 0.0 | 0.0 | 1729.0 | 97.0 | -1.1 |
| MAY | 23 | 1.4 | 5.4 | 2.3 | 8 | 0.5 | 0.0 | 0.0 | 1728.7 | 95.6 | -1.4 |
| JUN | 18 | 1.1 | 6.6 | 2.7 | 87 | 5.2 | 0.0 | 0.0 | 1727.3 | 88.8 | -6.8 |
| JUL | 18 | 1.1 | 7.5 | 2.8 | 194 | 11.9 | 0.0 | 0.0 | 1724.3 | 75.2 | -13.6 |
| AUG | 13 | 0.8 | 6.6 | 2.2 | 179 | 11.0 | 0.0 | 0.0 | 1721.3 | 62.8 | -12.4 |
| SEP | 7 | 0.4 | 5.1 | 1.6 | 8 | 0.5 | 0.0 | 0.0 | 1720.9 | 61.1 | -1.7 |
| OCT | 5 | 0.3 | 3.5 | 1.1 | 0 | 0.0 | 0.0 | 0.0 | 1720.6 | 60.3 | -0.8 |
| NOV | 5 | 0.3 | 2.1 | 0.7 | 0 | 0.0 | 0.0 | 0.0 | 1720.5 | 59.9 | -0.4 |
| DEC | 3 | 0.2 | 1.1 | 0.3 | 0 | 0.0 | 0.0 | 0.0 | 1720.5 | 59.8 | -0.1 |
| TOTAL | | 7.9 | 46.3 | 17.3 | | 29.1 | 1.7 | 0.0 | | | -40.2 |
| **MOST PROBABLE INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 21 | 1.3 | 0.8 | 0.3 | 0 | 0.0 | 2.8 | 0.0 | 1729.3 | 98.2 | -1.8 |
| FEB | 32 | 1.8 | 1.1 | 0.5 | 0 | 0.0 | 1.3 | 0.0 | 1729.3 | 98.2 | 0.0 |
| MAR | 54 | 3.3 | 1.8 | 0.8 | 0 | 0.0 | 2.5 | 0.0 | 1729.3 | 98.2 | 0.0 |
| APR | 59 | 3.5 | 3.9 | 1.6 | 0 | 0.0 | 1.9 | 0.0 | 1729.3 | 98.2 | 0.0 |
| MAY | 93 | 5.7 | 4.8 | 2.0 | 7 | 0.4 | 3.3 | 0.0 | 1729.3 | 98.2 | 0.0 |
| JUN | 77 | 4.6 | 6.0 | 2.5 | 74 | 4.4 | 0.0 | 0.0 | 1728.8 | 95.9 | -2.3 |
| JUL | 73 | 4.5 | 6.8 | 2.7 | 194 | 11.9 | 0.0 | 0.0 | 1726.7 | 85.8 | -10.1 |
| AUG | 50 | 3.1 | 6.0 | 2.3 | 150 | 9.2 | 0.0 | 0.0 | 1724.8 | 77.4 | -8.4 |
| SEP | 27 | 1.6 | 4.6 | 1.7 | 8 | 0.5 | 0.0 | 0.0 | 1724.7 | 76.8 | -0.6 |
| OCT | 18 | 1.1 | 3.1 | 1.1 | 0 | 0.0 | 0.0 | 0.0 | 1724.7 | 76.8 | 0.0 |
| NOV | 24 | 1.4 | 2.0 | 0.7 | 0 | 0.0 | 0.0 | 0.0 | 1724.9 | 77.5 | 0.7 |
| DEC | 16 | 1.0 | 1.0 | 0.4 | 0 | 0.0 | 0.0 | 0.0 | 1725.0 | 78.1 | 0.6 |
| TOTAL | | 32.9 | 41.9 | 16.6 | | 26.4 | 11.8 | 0.0 | | | -21.9 |
| **REASONABLE MAXIMUM INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 65 | 4.0 | 0.7 | 0.3 | 0 | 0.0 | 5.5 | 0.0 | 1729.3 | 98.2 | -1.8 |
| FEB | 104 | 5.8 | 0.9 | 0.4 | 0 | 0.0 | 5.4 | 0.0 | 1729.3 | 98.2 | 0.0 |
| MAR | 168 | 10.3 | 1.5 | 0.6 | 0 | 0.0 | 9.7 | 0.0 | 1729.3 | 98.2 | 0.0 |
| APR | 187 | 11.1 | 3.6 | 1.5 | 0 | 0.0 | 9.6 | 0.0 | 1729.3 | 98.2 | 0.0 |
| MAY | 294 | 18.1 | 4.4 | 1.9 | 5 | 0.3 | 15.9 | 0.0 | 1729.3 | 98.2 | 0.0 |
| JUN | 244 | 14.5 | 5.4 | 2.3 | 59 | 3.5 | 8.7 | 0.0 | 1729.3 | 98.2 | 0.0 |
| JUL | 229 | 14.1 | 6.2 | 2.6 | 168 | 10.3 | 1.2 | 0.0 | 1729.3 | 98.2 | 0.0 |
| AUG | 161 | 9.9 | 5.4 | 2.3 | 119 | 7.3 | 0.3 | 0.0 | 1729.3 | 98.2 | 0.0 |
| SEP | 84 | 5.0 | 4.1 | 1.7 | 7 | 0.4 | 2.9 | 0.0 | 1729.3 | 98.2 | 0.0 |
| OCT | 54 | 3.3 | 2.7 | 1.1 | 0 | 0.0 | 2.2 | 0.0 | 1729.3 | 98.2 | 0.0 |
| NOV | 74 | 4.4 | 1.7 | 0.7 | 0 | 0.0 | 3.7 | 0.0 | 1729.3 | 98.2 | 0.0 |
| DEC | 57 | 3.5 | 0.9 | 0.4 | 0 | 0.0 | 3.1 | 0.0 | 1729.3 | 98.2 | 0.0 |
| TOTAL | | 104.0 | 37.5 | 15.8 | | 21.8 | 68.2 | 0.0 | | | -1.8 |

## WEBSTER RESERVOIR OPERATION ESTIMATES - 2012

| MONTH | INFLOW MEAN CFS | INFLOW 1000 AF | EVAPORATION INCHES | EVAPORATION 1000 AF | RELEASE REQUIREMENT MEAN CFS | RELEASE REQUIREMENT 1000 AF | RESERVOIR SPILL 1000 AF | REQUIREMENT SHORTAGE 1000 AF | END OF MONTH ELEV FT | END OF MONTH CONT 1000 AF | RESERVOIR CHANGE 1000 AF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **REASONABLE MINIMUM INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 3 | 0.2 | 0.9 | 0.2 | 0 | 0.0 | 0.0 | 0.0 | 1887.3 | 58.2 | 0.0 |
| FEB | 5 | 0.3 | 1.1 | 0.3 | 0 | 0.0 | 0.0 | 0.0 | 1887.3 | 58.2 | 0.0 |
| MAR | 8 | 0.5 | 2.0 | 0.5 | 0 | 0.0 | 0.0 | 0.0 | 1887.3 | 58.2 | 0.0 |
| APR | 12 | 0.7 | 4.5 | 1.2 | 0 | 0.0 | 0.0 | 0.0 | 1887.1 | 57.7 | -0.5 |
| MAY | 18 | 1.1 | 5.7 | 1.5 | 15 | 0.9 | 0.0 | 0.0 | 1886.7 | 56.4 | -1.3 |
| JUN | 13 | 0.8 | 7.2 | 1.8 | 101 | 6.0 | 0.0 | 0.0 | 1884.4 | 49.4 | -7.0 |
| JUL | 11 | 0.7 | 7.9 | 1.7 | 236 | 14.5 | 0.0 | 0.0 | 1878.5 | 33.9 | -15.5 |
| AUG | 7 | 0.4 | 7.3 | 1.2 | 213 | 13.1 | 0.0 | 0.0 | 1871.6 | 20.0 | -13.9 |
| SEP | 5 | 0.3 | 5.4 | 0.8 | 8 | 0.5 | 0.0 | 0.0 | 1871.0 | 19.0 | -1.0 |
| OCT | 2 | 0.1 | 3.6 | 0.5 | 0 | 0.0 | 0.0 | 0.0 | 1870.8 | 18.6 | -0.4 |
| NOV | 3 | 0.2 | 2.2 | 0.3 | 0 | 0.0 | 0.0 | 0.0 | 1870.7 | 18.5 | -0.1 |
| DEC | 3 | 0.2 | 1.2 | 0.2 | 0 | 0.0 | 0.0 | 0.0 | 1870.7 | 18.5 | 0.0 |
| TOTAL | | 5.5 | 49.0 | 10.2 | | 35.0 | 0.0 | 0.0 | | | -39.7 |
| **MOST PROBABLE INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 16 | 1.0 | 0.8 | 0.2 | 0 | 0.0 | 0.0 | 0.0 | 1887.5 | 59.0 | 0.8 |
| FEB | 25 | 1.4 | 1.0 | 0.3 | 0 | 0.0 | 0.0 | 0.0 | 1887.9 | 60.1 | 1.1 |
| MAR | 39 | 2.4 | 1.8 | 0.5 | 0 | 0.0 | 0.0 | 0.0 | 1888.4 | 62.0 | 1.9 |
| APR | 55 | 3.3 | 4.1 | 1.1 | 0 | 0.0 | 0.0 | 0.0 | 1889.1 | 64.2 | 2.2 |
| MAY | 83 | 5.1 | 5.2 | 1.5 | 13 | 0.8 | 0.0 | 0.0 | 1889.9 | 67.0 | 2.8 |
| JUN | 61 | 3.6 | 6.5 | 1.9 | 74 | 4.4 | 0.0 | 0.0 | 1889.1 | 64.3 | -2.7 |
| JUL | 57 | 3.5 | 7.1 | 1.9 | 208 | 12.8 | 0.0 | 0.0 | 1885.6 | 53.1 | -11.2 |
| AUG | 34 | 2.1 | 6.5 | 1.6 | 161 | 9.9 | 0.0 | 0.0 | 1882.4 | 43.7 | -9.4 |
| SEP | 20 | 1.2 | 4.9 | 1.1 | 5 | 0.3 | 0.0 | 0.0 | 1882.3 | 43.5 | -0.2 |
| OCT | 11 | 0.7 | 3.3 | 0.7 | 0 | 0.0 | 0.0 | 0.0 | 1882.3 | 43.5 | 0.0 |
| NOV | 15 | 0.9 | 2.0 | 0.5 | 0 | 0.0 | 0.0 | 0.0 | 1882.4 | 43.9 | 0.4 |
| DEC | 15 | 0.9 | 1.1 | 0.2 | 0 | 0.0 | 0.0 | 0.0 | 1882.7 | 44.6 | 0.7 |
| TOTAL | | 26.1 | 44.3 | 11.5 | | 28.2 | 0.0 | 0.0 | | | -13.6 |
| **REASONABLE MAXIMUM INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 65 | 4.0 | 0.8 | 0.2 | 0 | 0.0 | 0.0 | 0.0 | 1888.4 | 62.0 | 3.8 |
| FEB | 97 | 5.4 | 0.9 | 0.3 | 0 | 0.0 | 0.0 | 0.0 | 1889.9 | 67.1 | 5.1 |
| MAR | 153 | 9.4 | 1.6 | 0.5 | 0 | 0.0 | 0.0 | 0.0 | 1892.4 | 76.0 | 8.9 |
| APR | 218 | 13.0 | 3.6 | 1.1 | 0 | 0.0 | 11.7 | 0.0 | 1892.4 | 76.2 | 0.2 |
| MAY | 327 | 20.1 | 4.7 | 1.5 | 7 | 0.4 | 18.2 | 0.0 | 1892.4 | 76.2 | 0.0 |
| JUN | 237 | 14.1 | 5.9 | 1.9 | 42 | 2.5 | 9.7 | 0.0 | 1892.4 | 76.2 | 0.0 |
| JUL | 223 | 13.7 | 6.5 | 2.0 | 125 | 7.7 | 4.0 | 0.0 | 1892.4 | 76.2 | 0.0 |
| AUG | 132 | 8.1 | 5.9 | 1.9 | 101 | 6.2 | 0.0 | 0.0 | 1892.4 | 76.2 | 0.0 |
| SEP | 79 | 4.7 | 4.5 | 1.4 | 2 | 0.1 | 3.2 | 0.0 | 1892.4 | 76.2 | 0.0 |
| OCT | 42 | 2.6 | 2.9 | 0.9 | 0 | 0.0 | 1.7 | 0.0 | 1892.4 | 76.2 | 0.0 |
| NOV | 57 | 3.4 | 1.8 | 0.6 | 0 | 0.0 | 2.8 | 0.0 | 1892.4 | 76.2 | 0.0 |
| DEC | 55 | 3.4 | 1.0 | 0.3 | 0 | 0.0 | 3.1 | 0.0 | 1892.4 | 76.2 | 0.0 |
| TOTAL | | 101.9 | 40.1 | 12.6 | | 16.9 | 54.4 | 0.0 | | | 18.0 |

## WACONDA LAKE OPERATION ESTIMATES - 2012

| MONTH | INFLOW MEAN CFS | INFLOW 1000 AF | EVAPORATION INCHES | EVAPORATION 1000 AF | RELEASE REQUIREMENT MEAN CFS | RELEASE REQUIREMENT 1000 AF | RESERVOIR SPILL 1000 AF | REQUIREMENT SHORTAGE 1000 AF | END OF MONTH ELEV FT | END OF MONTH CONT 1000 AF | RESERVOIR CHANGE 1000 AF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **REASONABLE MINIMUM INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 33 | 2.0 | 0.8 | 0.8 | 20 | 1.2 | 4.1 | 0.0 | 1454.6 | 207.1 | -4.1 |
| FEB | 49 | 2.7 | 1.0 | 1.0 | 20 | 1.1 | 0.6 | 0.0 | 1454.6 | 207.1 | 0.0 |
| MAR | 89 | 5.5 | 1.9 | 1.9 | 18 | 1.1 | 2.5 | 0.0 | 1454.6 | 207.1 | 0.0 |
| APR | 94 | 5.6 | 4.8 | 4.9 | 17 | 1.0 | 0.0 | 0.0 | 1454.6 | 206.8 | -0.3 |
| MAY | 109 | 6.7 | 5.9 | 6.0 | 18 | 1.1 | 0.0 | 0.0 | 1454.5 | 206.4 | -0.4 |
| JUN | 92 | 5.5 | 7.4 | 7.4 | 45 | 2.7 | 0.0 | 0.0 | 1454.1 | 201.8 | -4.6 |
| JUL | 150 | 9.2 | 8.7 | 8.5 | 156 | 9.6 | 0.0 | 0.0 | 1453.4 | 192.9 | -8.9 |
| AUG | 55 | 3.4 | 7.5 | 7.0 | 125 | 7.7 | 0.0 | 0.0 | 1452.4 | 181.6 | -11.3 |
| SEP | 42 | 2.5 | 6.0 | 5.4 | 35 | 2.1 | 0.0 | 0.0 | 1451.9 | 176.6 | -5.0 |
| OCT | 33 | 2.0 | 3.9 | 3.5 | 21 | 1.3 | 0.0 | 0.0 | 1451.7 | 173.8 | -2.8 |
| NOV | 37 | 2.2 | 2.1 | 1.9 | 27 | 1.6 | 0.0 | 0.0 | 1451.5 | 172.5 | -1.3 |
| DEC | 29 | 1.8 | 1.0 | 0.9 | 24 | 1.5 | 0.0 | 0.0 | 1451.5 | 171.9 | -0.6 |
| TOTAL | | 49.1 | 51.0 | 49.2 | | 32.0 | 7.2 | 0.0 | | | -39.3 |
| **MOST PROBABLE INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 117 | 7.2 | 0.7 | 0.7 | 10 | 0.6 | 10.0 | 0.0 | 1454.6 | 207.1 | -4.1 |
| FEB | 176 | 9.8 | 0.9 | 0.9 | 11 | 0.6 | 8.3 | 0.0 | 1454.6 | 207.1 | 0.0 |
| MAR | 332 | 20.4 | 1.7 | 1.7 | 10 | 0.6 | 18.1 | 0.0 | 1454.6 | 207.1 | 0.0 |
| APR | 346 | 20.6 | 4.3 | 4.4 | 8 | 0.5 | 15.7 | 0.0 | 1454.6 | 207.1 | 0.0 |
| MAY | 400 | 24.6 | 5.2 | 5.4 | 10 | 0.6 | 6.3 | 0.0 | 1455.6 | 219.4 | 12.3 |
| JUN | 339 | 20.2 | 6.7 | 7.0 | 34 | 2.0 | 11.2 | 0.0 | 1455.6 | 219.4 | 0.0 |
| JUL | 553 | 34.0 | 7.9 | 8.3 | 112 | 6.9 | 18.8 | 0.0 | 1455.6 | 219.4 | 0.0 |
| AUG | 203 | 12.5 | 6.8 | 7.1 | 89 | 5.5 | 0.0 | 0.0 | 1455.6 | 219.3 | -0.1 |
| SEP | 155 | 9.2 | 5.4 | 5.7 | 22 | 1.3 | 2.1 | 0.0 | 1455.6 | 219.4 | 0.1 |
| OCT | 120 | 7.4 | 3.5 | 3.7 | 10 | 0.6 | 3.1 | 0.0 | 1455.6 | 219.4 | 0.0 |
| NOV | 136 | 8.1 | 1.9 | 1.9 | 15 | 0.9 | 29.6 | 0.0 | 1453.6 | 195.1 | -24.3 |
| DEC | 111 | 6.8 | 0.9 | 0.9 | 13 | 0.8 | 5.1 | 0.0 | 1453.6 | 195.1 | 0.0 |
| TOTAL | | 180.8 | 45.9 | 47.7 | | 20.9 | 128.3 | 0.0 | | | -16.1 |
| **REASONABLE MAXIMUM INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 426 | 26.2 | 0.7 | 0.7 | 3 | 0.2 | 29.4 | 0.0 | 1454.6 | 207.1 | -4.1 |
| FEB | 637 | 35.4 | 0.8 | 0.8 | 4 | 0.2 | 34.4 | 0.0 | 1454.6 | 207.1 | 0.0 |
| MAR | 1207 | 74.2 | 1.5 | 1.5 | 5 | 0.3 | 72.4 | 0.0 | 1454.6 | 207.1 | 0.0 |
| APR | 1257 | 74.8 | 3.9 | 3.9 | 5 | 0.3 | 70.6 | 0.0 | 1454.6 | 207.1 | 0.0 |
| MAY | 1451 | 89.2 | 4.7 | 4.9 | 5 | 0.3 | 71.7 | 0.0 | 1455.6 | 219.4 | 12.3 |
| JUN | 1235 | 73.5 | 6.0 | 6.3 | 22 | 1.3 | 65.9 | 0.0 | 1455.6 | 219.4 | 0.0 |
| JUL | 2007 | 123.4 | 7.0 | 7.4 | 70 | 4.3 | 111.7 | 0.0 | 1455.6 | 219.4 | 0.0 |
| AUG | 737 | 45.3 | 6.1 | 6.4 | 57 | 3.5 | 35.4 | 0.0 | 1455.6 | 219.4 | 0.0 |
| SEP | 563 | 33.5 | 4.8 | 5.0 | 12 | 0.7 | 27.8 | 0.0 | 1455.6 | 219.4 | 0.0 |
| OCT | 437 | 26.9 | 3.1 | 3.3 | 7 | 0.4 | 23.2 | 0.0 | 1455.6 | 219.4 | 0.0 |
| NOV | 496 | 29.5 | 1.7 | 1.7 | 5 | 0.3 | 51.8 | 0.0 | 1453.6 | 195.1 | -24.3 |
| DEC | 395 | 24.3 | 0.8 | 0.8 | 5 | 0.3 | 23.2 | 0.0 | 1453.6 | 195.1 | 0.0 |
| TOTAL | | 656.2 | 41.1 | 42.7 | | 12.1 | 617.5 | 0.0 | | | -16.1 |

## CEDAR BLUFF RESERVOIR OPERATION ESTIMATES - 2012

| MONTH | INFLOW MEAN CFS | INFLOW 1000 AF | EVAPORATION INCHES | EVAPORATION 1000 AF | RELEASE REQUIREMENT MEAN CFS | RELEASE REQUIREMENT 1000 AF | RESERVOIR SPILL 1000 AF | REQUIREMENT SHORTAGE 1000 AF | END OF MONTH ELEV FT | END OF MONTH CONT 1000 AF | RESERVOIR CHANGE 1000 AF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **REASONABLE MINIMUM INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 3 | 0.2 | 1.1 | 0.3 | 0 | 0.0 | 0.0 | 0.0 | 2126.4 | 79.3 | -0.1 |
| FEB | 4 | 0.2 | 1.2 | 0.4 | 0 | 0.0 | 0.0 | 0.0 | 2126.3 | 79.1 | -0.2 |
| MAR | 7 | 0.4 | 2.1 | 0.7 | 0 | 0.0 | 0.0 | 0.0 | 2126.2 | 78.8 | -0.3 |
| APR | 10 | 0.6 | 5.4 | 1.7 | 0 | 0.0 | 0.0 | 0.0 | 2125.9 | 77.7 | -1.1 |
| MAY | 15 | 0.9 | 6.4 | 2.0 | 5 | 0.3 | 0.0 | 0.0 | 2125.6 | 76.3 | -1.4 |
| JUN | 15 | 0.9 | 7.9 | 2.4 | 5 | 0.3 | 0.0 | 0.0 | 2125.1 | 74.5 | -1.8 |
| JUL | 20 | 1.2 | 9.5 | 2.8 | 13 | 0.8 | 0.0 | 0.0 | 2124.4 | 72.1 | -2.4 |
| AUG | 13 | 0.8 | 8.1 | 2.3 | 11 | 0.7 | 0.0 | 0.0 | 2123.7 | 69.9 | -2.2 |
| SEP | 5 | 0.3 | 7.0 | 2.0 | 3 | 0.2 | 0.0 | 0.0 | 2123.2 | 68.0 | -1.9 |
| OCT | 2 | 0.1 | 4.9 | 1.4 | 0 | 0.0 | 0.0 | 0.0 | 2122.8 | 66.7 | -1.3 |
| NOV | 2 | 0.1 | 2.3 | 0.6 | 0 | 0.0 | 0.0 | 0.0 | 2122.7 | 66.2 | -0.5 |
| DEC | 2 | 0.1 | 1.3 | 0.4 | 0 | 0.0 | 0.0 | 0.0 | 2122.6 | 65.9 | -0.3 |
| TOTAL | | 5.8 | 57.2 | 17.0 | | 2.3 | 0.0 | 0.0 | | | -13.5 |
| **MOST PROBABLE INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 8 | 0.5 | 1.0 | 0.3 | 0 | 0.0 | 0.0 | 0.0 | 2126.5 | 79.6 | 0.2 |
| FEB | 11 | 0.6 | 1.1 | 0.3 | 0 | 0.0 | 0.0 | 0.0 | 2126.5 | 79.9 | 0.3 |
| MAR | 20 | 1.2 | 2.0 | 0.6 | 0 | 0.0 | 0.0 | 0.0 | 2126.7 | 80.5 | 0.6 |
| APR | 32 | 1.9 | 4.9 | 1.6 | 0 | 0.0 | 0.0 | 0.0 | 2126.8 | 80.8 | 0.3 |
| MAY | 47 | 2.9 | 5.7 | 1.8 | 3 | 0.2 | 0.0 | 0.0 | 2127.0 | 81.7 | 0.9 |
| JUN | 50 | 3.0 | 7.1 | 2.3 | 3 | 0.2 | 0.0 | 0.0 | 2127.1 | 82.2 | 0.5 |
| JUL | 65 | 4.0 | 8.5 | 2.7 | 11 | 0.7 | 0.0 | 0.0 | 2127.3 | 82.8 | 0.6 |
| AUG | 46 | 2.8 | 7.3 | 2.4 | 7 | 0.4 | 0.0 | 0.0 | 2127.3 | 82.8 | 0.0 |
| SEP | 18 | 1.1 | 6.3 | 2.0 | 2 | 0.1 | 0.0 | 0.0 | 2127.0 | 81.8 | -1.0 |
| OCT | 8 | 0.5 | 4.5 | 1.4 | 0 | 0.0 | 0.0 | 0.0 | 2126.8 | 80.9 | -0.9 |
| NOV | 10 | 0.6 | 2.2 | 0.7 | 0 | 0.0 | 0.0 | 0.0 | 2126.8 | 80.8 | -0.1 |
| DEC | 7 | 0.4 | 1.1 | 0.3 | 0 | 0.0 | 0.0 | 0.0 | 2126.8 | 80.9 | 0.1 |
| TOTAL | | 19.5 | 51.7 | 16.4 | | 1.6 | 0.0 | 0.0 | | | 1.5 |
| **REASONABLE MAXIMUM INFLOW CONDITIONS** | | | | | | | | | | | |
| JAN | 24 | 1.5 | 0.9 | 0.3 | 0 | 0.0 | 0.0 | 0.0 | 2126.7 | 80.6 | 1.2 |
| FEB | 34 | 1.9 | 1.0 | 0.3 | 0 | 0.0 | 0.0 | 0.0 | 2127.1 | 82.2 | 1.6 |
| MAR | 59 | 3.6 | 1.7 | 0.6 | 0 | 0.0 | 0.0 | 0.0 | 2127.9 | 85.2 | 3.0 |
| APR | 97 | 5.8 | 4.3 | 1.5 | 0 | 0.0 | 0.0 | 0.0 | 2129.0 | 89.5 | 4.3 |
| MAY | 140 | 8.6 | 5.1 | 1.8 | 3 | 0.2 | 0.0 | 0.0 | 2130.5 | 96.1 | 6.6 |
| JUN | 151 | 9.0 | 6.4 | 2.4 | 3 | 0.2 | 0.0 | 0.0 | 2131.9 | 102.5 | 6.4 |
| JUL | 194 | 11.9 | 7.6 | 3.1 | 3 | 0.2 | 0.0 | 0.0 | 2133.7 | 111.1 | 8.6 |
| AUG | 135 | 8.3 | 6.5 | 2.8 | 0 | 0.0 | 0.0 | 0.0 | 2134.8 | 116.6 | 5.5 |
| SEP | 55 | 3.3 | 5.6 | 2.4 | 0 | 0.0 | 0.0 | 0.0 | 2135.0 | 117.5 | 0.9 |
| OCT | 21 | 1.3 | 4.1 | 1.8 | 0 | 0.0 | 0.0 | 0.0 | 2134.9 | 117.0 | -0.5 |
| NOV | 29 | 1.7 | 1.8 | 0.8 | 0 | 0.0 | 0.0 | 0.0 | 2135.1 | 117.9 | 0.9 |
| DEC | 21 | 1.3 | 1.0 | 0.4 | 0 | 0.0 | 0.0 | 0.0 | 2135.2 | 118.8 | 0.9 |
| TOTAL | | 58.2 | 46.0 | 18.2 | | 0.6 | 0.0 | 0.0 | | | 39.4 |

## TABLE 5

## FLOOD DAMAGES PREVENTED BY NEBRASKA-KANSAS PROJECTS RESERVOIRS

| RESERVOIR | DURING FY 2011 | PRIOR TO 2011 | ACCUMULATED |
|---|---|---|---|
| BONNY | $54,700 | $2,813,800 | $2,868,500 |
| ENDERS | $300 | $3,573,700 | $3,574,000 |
| SWANSON | $59,300 | $29,580,300 | $29,639,600 |
| HUGH BUTLER | $3,362,100 | $3,026,600 | $6,388,700 |
| HARRY STRUNK | $3,473,900 | $12,653,000 | $16,126,900 |
| KEITH SEBELIUS | $55,400 | $4,011,500 | $4,066,900 |
| HARLAN COUNTY | $10,447,200 | $218,127,500 | $228,574,700 |
| LOVEWELL | $464,200 | $152,306,700 | $152,770,900 |
| KIRWIN | $520,700 | $94,486,700 | $95,007,400 |
| WEBSTER | $167,600 | $112,903,700 | $113,071,300 |
| WACONDA | $32,087,900 | $1,247,288,600 | $1,279,376,500 |
| CEDAR BLUFF | $7,900 | $134,932,800 | $134,940,700 |
| TOTAL | $50,701,200 | $2,015,704,900 | $2,066,406,100 |

Estimates of damages prevented are received from the Army Corps of Engineer's Kansas City District Office. The Accumulated Totals date from 1951 through 2011. 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 2011 AND THE ESTIMATED DIVERSION FOR 2012**
**(Units - Acre-Feet)**

| Irrigation District and Canal | 2011 Irrigation Operations From | To | 10-Year Average Diversion (2001-2010) | 2011 Diversion | Estimated Diversion in 2012 |
|---|---|---|---|---|---|
| Mirage Flats Irrigation District | | | | | |
| Mirage Flats Canal | 7/4 | 9/6 | 9,494 | 12,885 | 12,500 |
| Ainsworth Irrigation District | | | | | |
| Ainsworth Canal | 5/15 | 9/18 | 75,226 | 63,664 | 75,000 |
| Twin Loups Irrigation District | | | | | |
| Above Davis Creek | 4/18 | 9/15 | 44,648 | 45,090 | 44,000 |
| Below Davis Creek | 5/9 | 9/15 | 42,576 | 40,185 | 41,000 |
| Total Twin Loups Irrigation District | | | 87,224 | 85,275 | 85,000 |
| Frenchman Valley Irrigation District | | | | | |
| Culbertson Canal | 4/25 | 9/12 | 5,840 | 9,889 | 10,000 |
| H & RW Irrigation District | | | | | |
| Culbertson Extension | Did not run. | | 710 | 0 | 0 |
| Frenchman-Cambridge Irrigation | | | | | |
| Meeker-Driftwood Canal | 6/20 | 9/2 | 7,045 | 21,538 | 23,000 |
| Red Willow Canal | Did not run. | | 1,804 | 0 | 0 |
| Bartley Canal | 5/2 | 9/9 | 3,459 | 9,718 | 10,000 |
| Cambridge Canal | 5/4 | 9/9 | 18,797 | 28,850 | 28,000 |
| Total Frenchman-Cambridge Irrigation District | | | 31,105 | 60,106 | 61,000 |
| Almena Irrigation | | | | | |
| District Almena | 5/17 | 8/19 | 2,096 | 2,277 | 2,500 |
| Bostwick Irrigation District in | | | | | |
| Franklin Canal | 6/22 | 9/9 | 12,165 | 18,853 | 20,000 |
| Naponee Canal | 6/29 | 8/30 | 970 | 1,182 | 1,000 |
| Franklin Pump Canal | 6/28 | 8/30 | 1,061 | 729 | 1,000 |
| Superior Canal | 6/14 | 9/12 | 5,973 | 7,070 | 7,000 |
| Courtland Canal (Nebraska) | 5/4 | 9/15 | 697 | 428 | 500 |
| Total Bostwick Irrigation District in Nebraska | | | 20,866 | 28,262 | 29,500 |
| Kansas-Bostwick Irrigation District | | | | | |
| Courtland Canal above Lovewell | 5/7 | 9/15 | 15,356 | 17,889 | 20,000 |
| Courtland Canal below Lovewell | 5/23 | 9/15 | 35,210 | 36,183 | 38,000 |
| Total Kansas-Bostwick Irrigation District | | | 50,566 | 54,072 | 58,000 |
| Kirwin Irrigation | | | | | |
| District Kirwin | 6/14 | 8/31 | 11,350 | 15,075 | 18,000 |
| Webster Irrigation District | | | | | |
| Osborne Canal | 6/14 | 8/31 | 6,707 | 10,447 | 14,000 |
| Glen Elder Irrigation District | 5/1 | 9/19 | 6,499 | 1,142 | 2,500 |
| TOTAL | | | 307,683 | 343,094 | 368,000 |

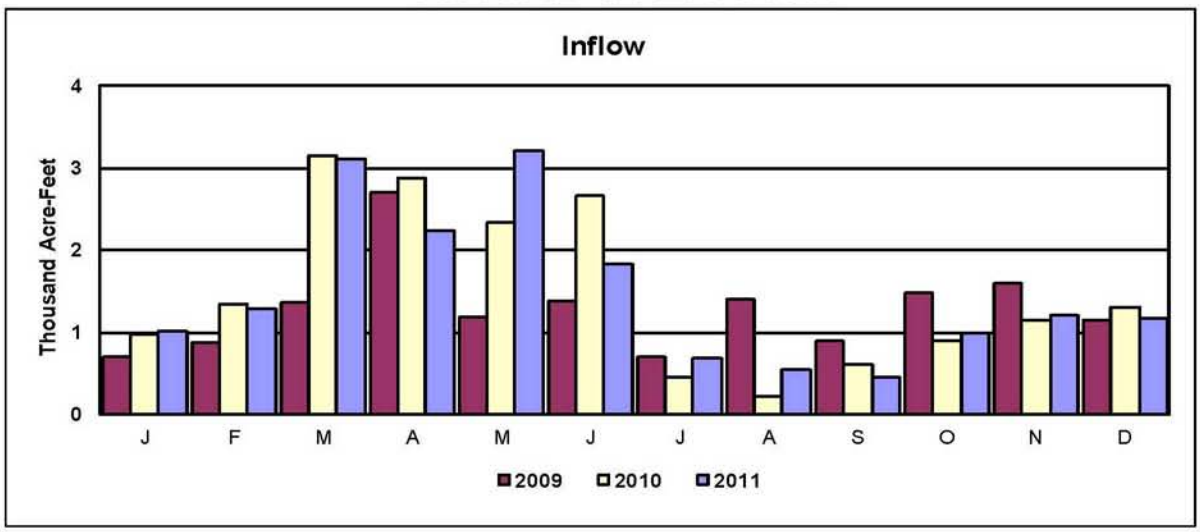
**TABLE 7**
**NEBRASKA-KANSAS PROJECTS**
**Summary of Precipitation, Reservoir Storage and Inflows**
**CALENDAR YEAR 2011**

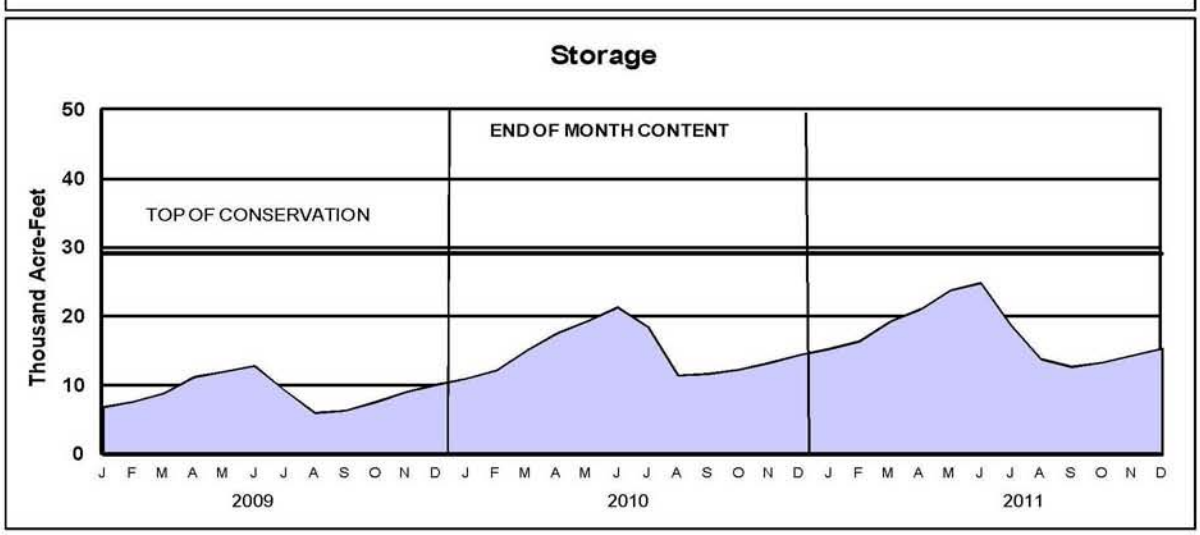
| Reservoir | Total Precip. Inches | Percent Of Average % | Storage 12-31-10 AF | Storage 12-31-11 AF | Gain or Loss AF | Maximum Content AF | Storage Date | Minimum Content AF | Storage Date | Total Inflow AF | Percent Of Most Probable % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Box Butte | 20.94 | 124 | 14,523 | 15,464 | 941 | 24942 | JUL 4 | 12635 | SEP 6 | 17,737 | 111 |
| Merritt | 27.95 | 137 | 60,831 | 61,370 | 539 | 67602 | JUN 20 | 46824 | SEP 12 | 192,404 | 105 |
| Calamus | 24.22 | 100 | 108,981 | 105,099 | -3,882 | 129253 | JUN 27 | 75169 | OCT 1 | 317,697 | 117 |
| Davis Creek | 27.26 | 110 | 9,350 | 9,280 | -70 | 28234 | JUL 19 | 8772 | APR 13 | 44,921 | 91 |
| Bonny | 19.01 | 111 | 6,923 | 135 | -6,788 | 10724 | JUN 2 | 135 | DEC 25 | 9,008 | 78 |
| Enders | 21.46 | 113 | 16,743 | 17,484 | 741 | 19075 | JUN 21 | 16761 | JAN 1 | 7,516 | 67 |
| Swanson | 19.99 | 100 | 62,085 | 62,156 | 71 | 82354 | JUN 21 | 59393 | NOV 12 | 33,791 | 99 |
| Hugh Butler | 21.58 | 110 | 6,034 | 5,993 | -41 | 8007 | MAY 29 | 5429 | APR 14 | 17,863 | 122 |
| Harry Strunk | 23.06 | 111 | 33,936 | 33,098 | -838 | 39041 | MAY 30 | 24014 | SEP 9 | 44,135 | 115 |
| Keith Sebelius | 34.36 | 140 | 20,600 | 23,218 | 2,618 | 23219 | DEC 31 | 19571 | AUG 4 | 11,995 | 139 |
| Harlan County | 30.69 | 135 | 318,364 | 322,964 | 4,600 | 339236 | JUN 22 | 300830 | OCT 6 | 174,830 | 131 |
| Lovewell | 27.87 | 101 | 27,054 | 31,938 | 4,884 | 62412 | MAY 27 | 27105 | JAN 2 | 83,167 | 131 |
| Kirwin | 27.59 | 117 | 98,916 | 99,989 | 1,073 | 106268 | JUN 18 | 93654 | OCT 6 | 49,576 | 173 |
| Webster | 23.04 | 97 | 63,328 | 58,196 | -5,132 | 72886 | JUN 5 | 54173 | OCT 7 | 21,937 | 93 |
| Waconda | 30.80 | 121 | 198,060 | 211,190 | 13,130 | 398868 | JUN 6 | 175048 | APR 14 | 427,789 | 274 |
| Cedar Bluff | 14.99 | 71 | 91,110 | 79,365 | -11,745 | 91319 | MAR 23 | 78953 | DEC 3 | 7,116 | 37 |

EXHIBIT 1A

# BOX BUTTE RESERVOIR

## ACTUAL OPERATION



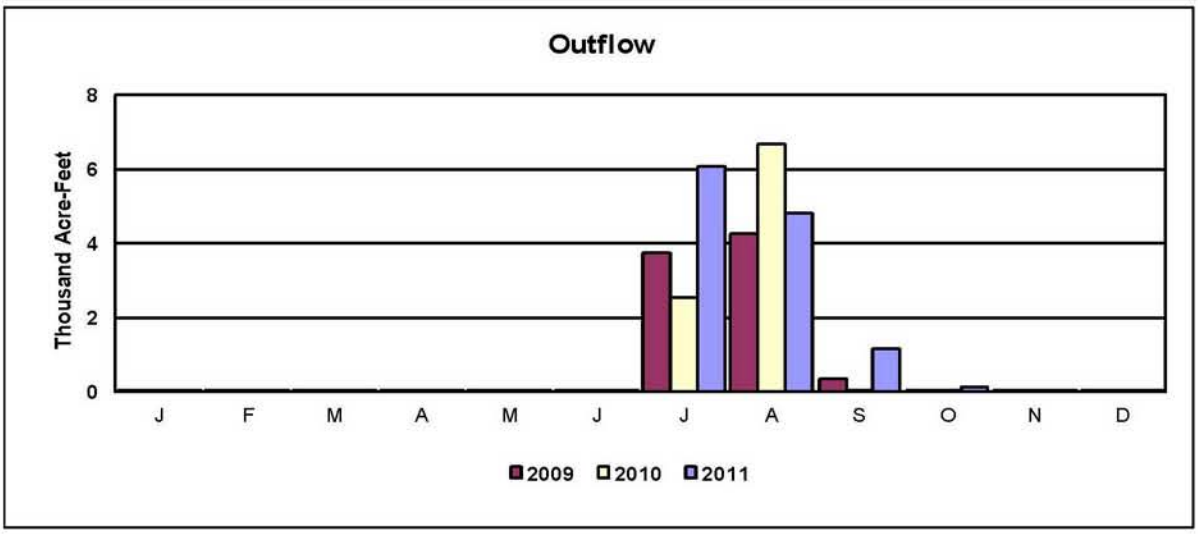
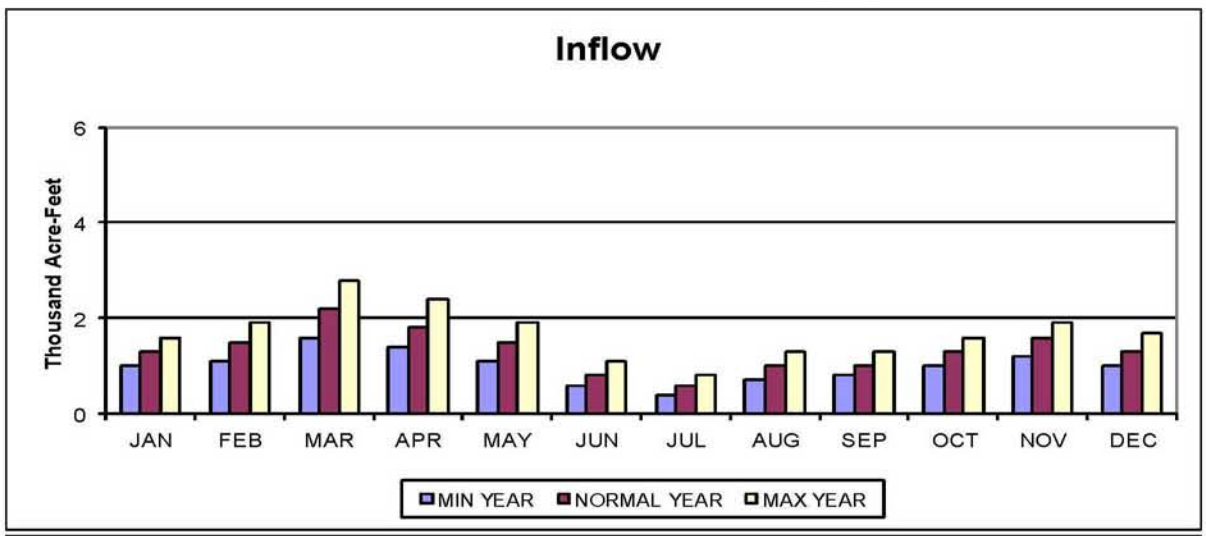
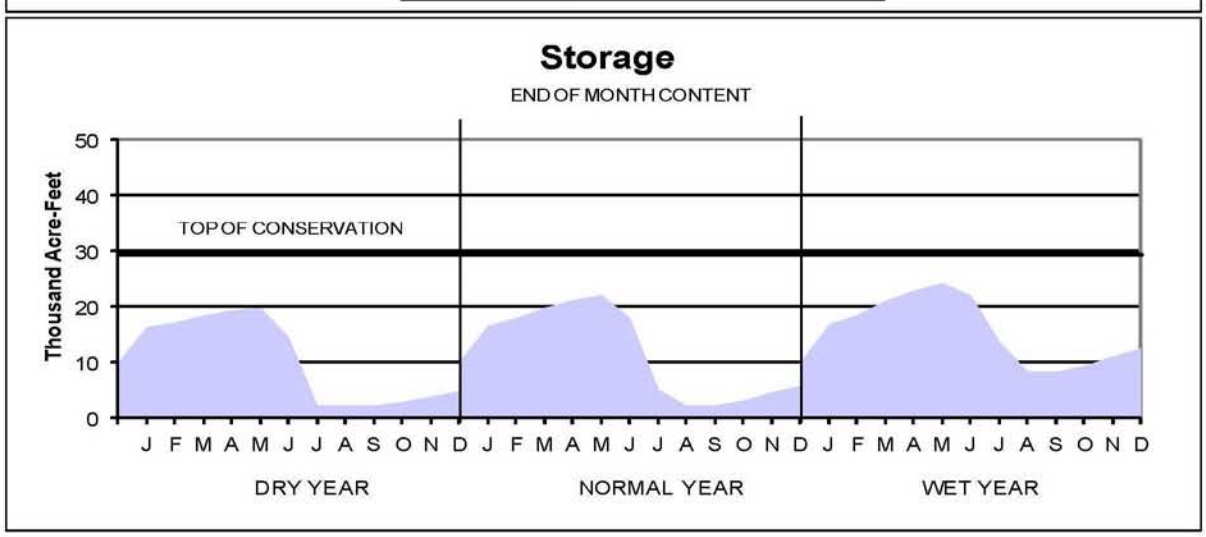



EXHIBIT 1B

# BOX BUTTE RESERVOIR

## 2012 OPERATION PLAN



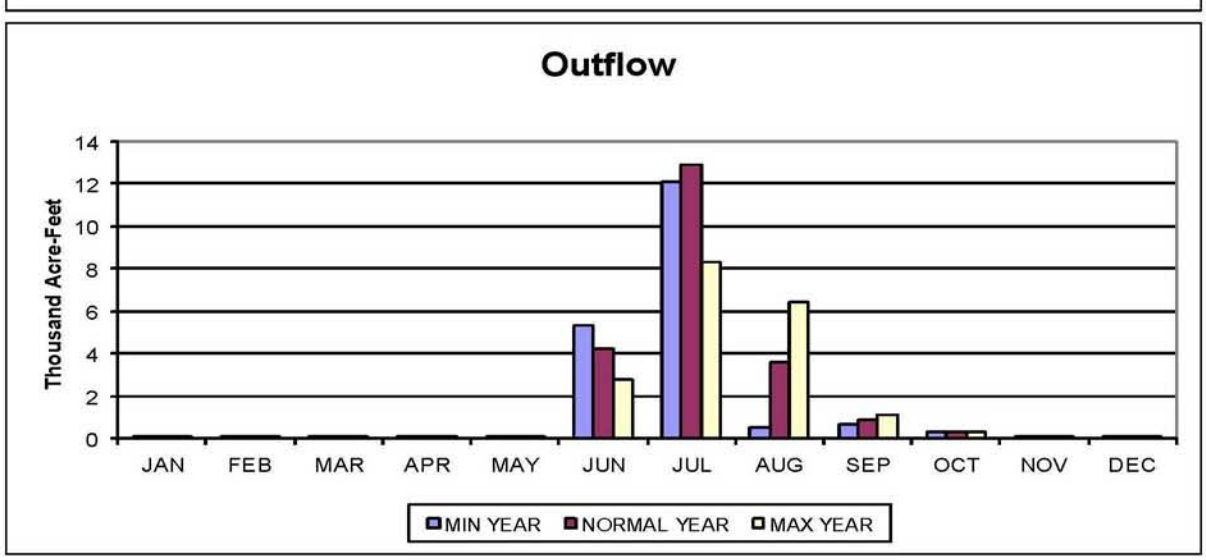
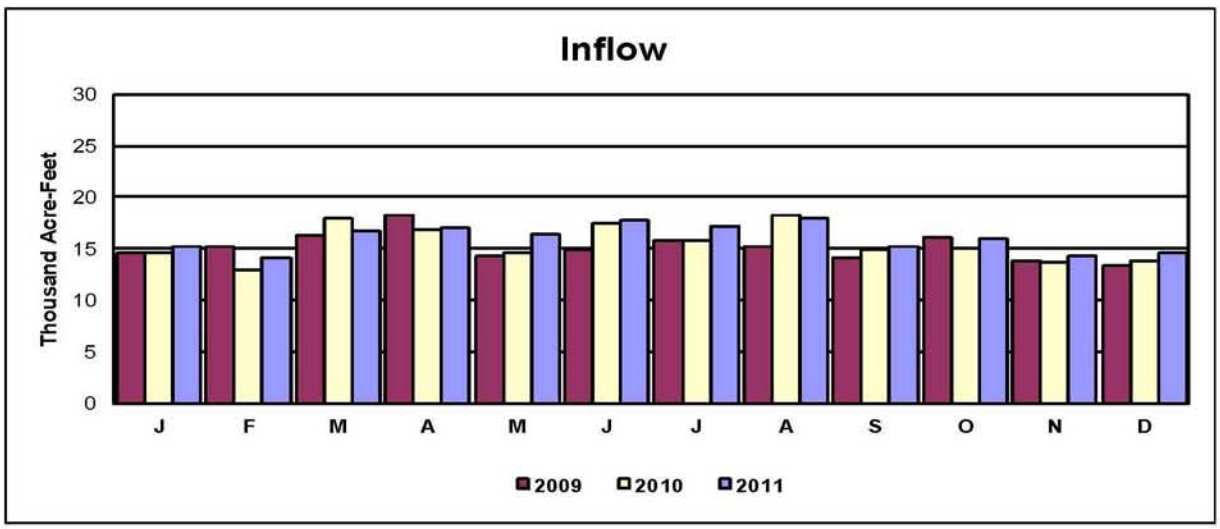
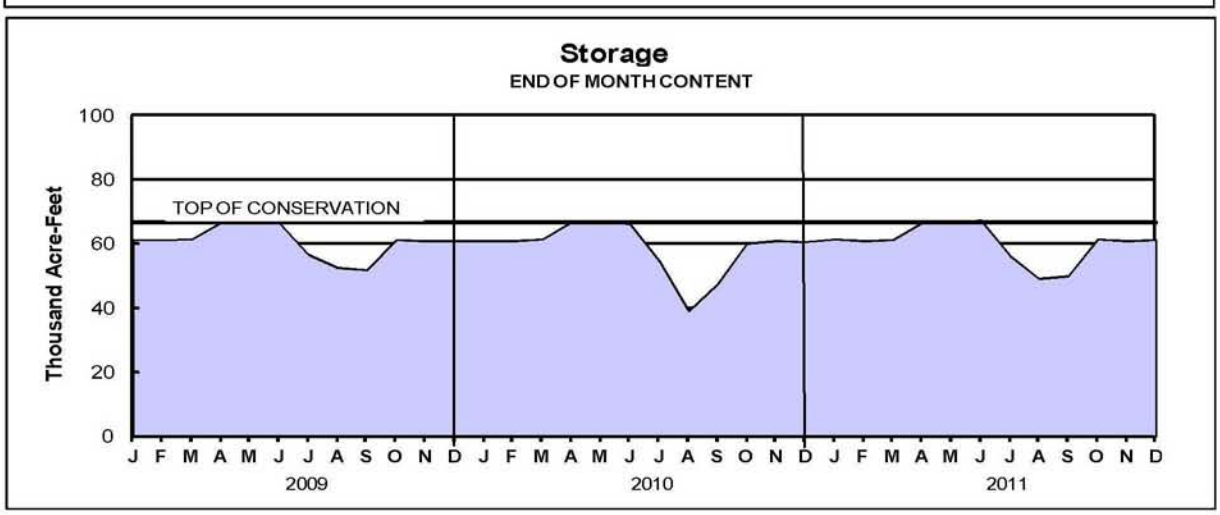



EXHIBIT 2A

# MERRITT RESERVOIR

## ACTUAL OPERATION



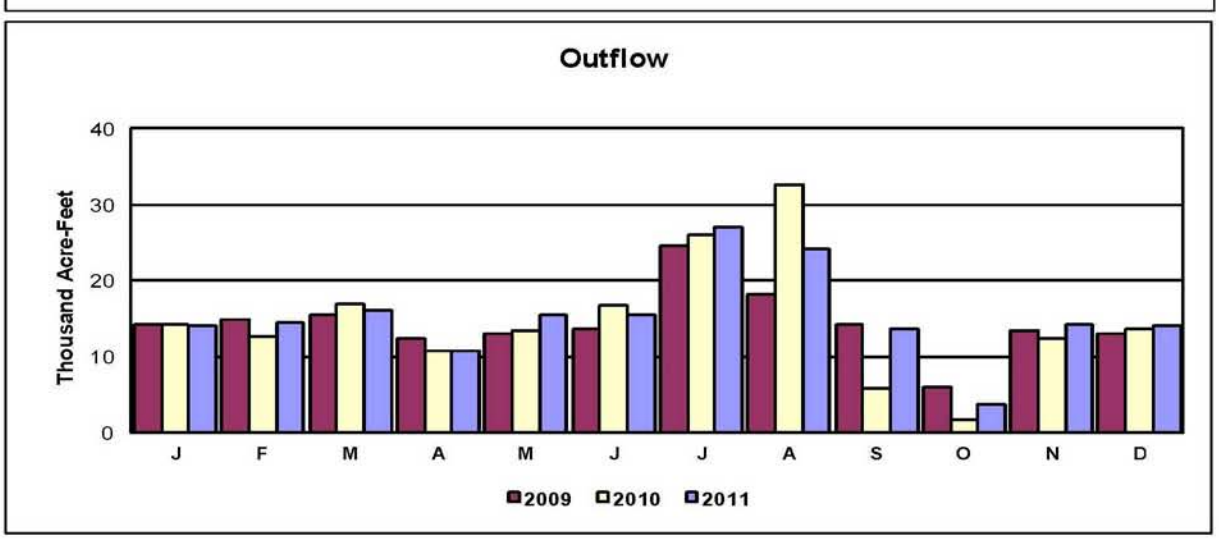
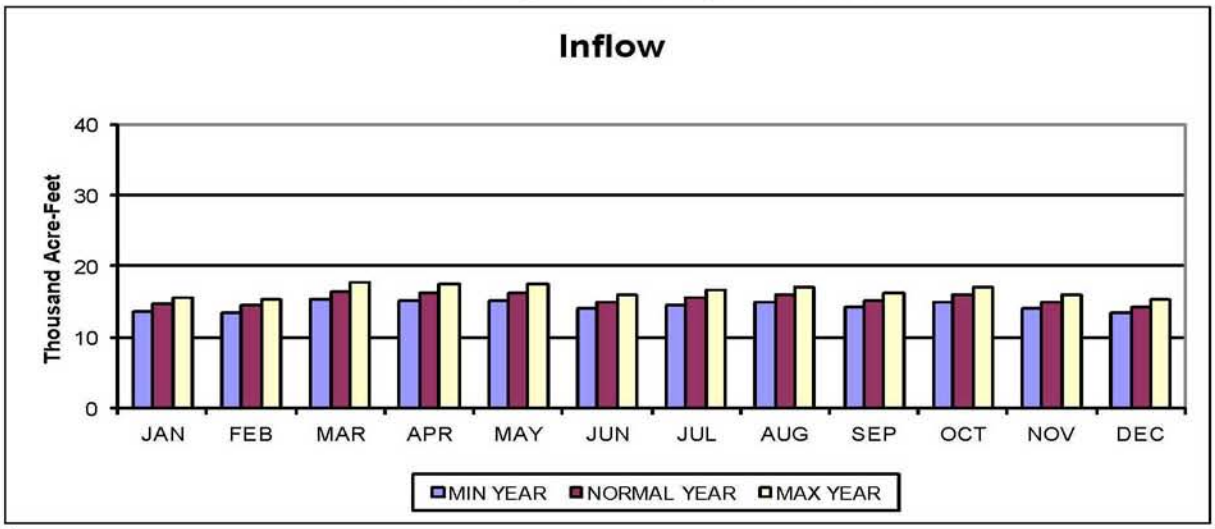
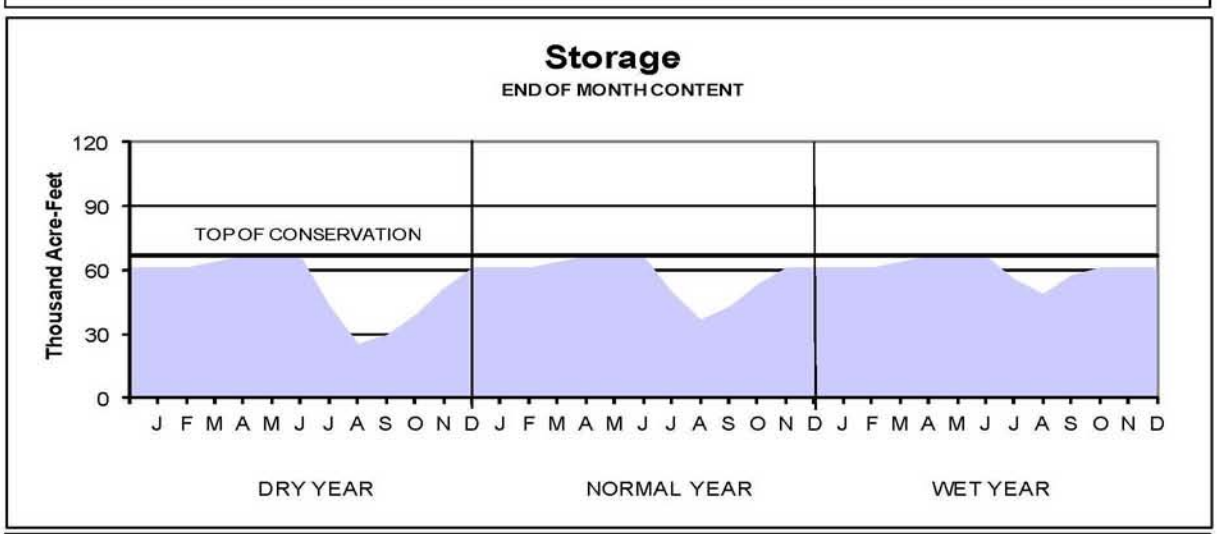



EXHIBIT 2B

# MERRITT RESERVOIR

## 2012 OPERATION PLAN



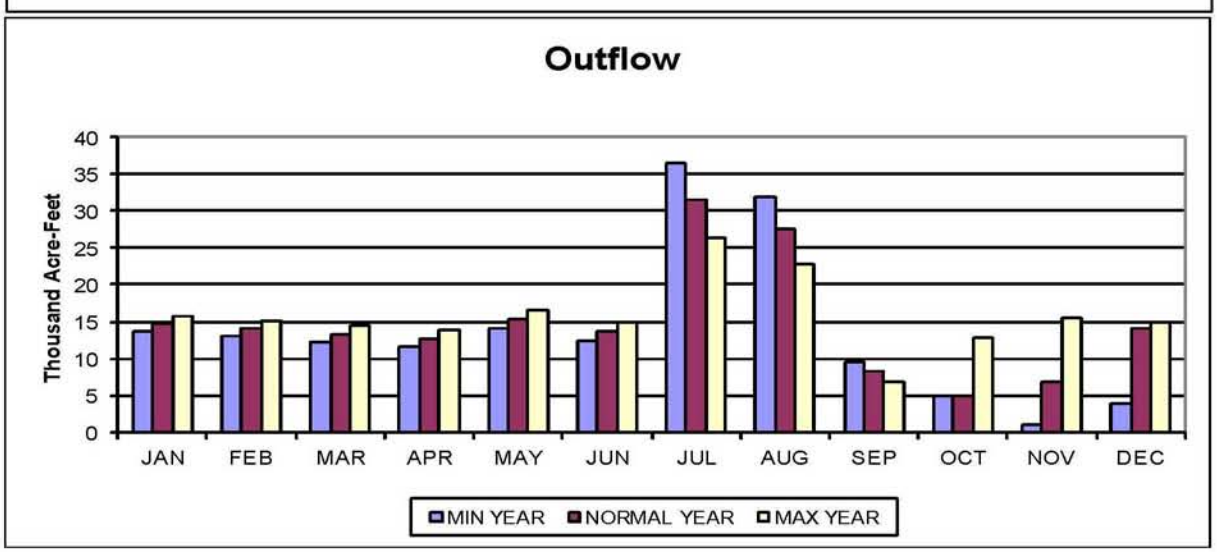
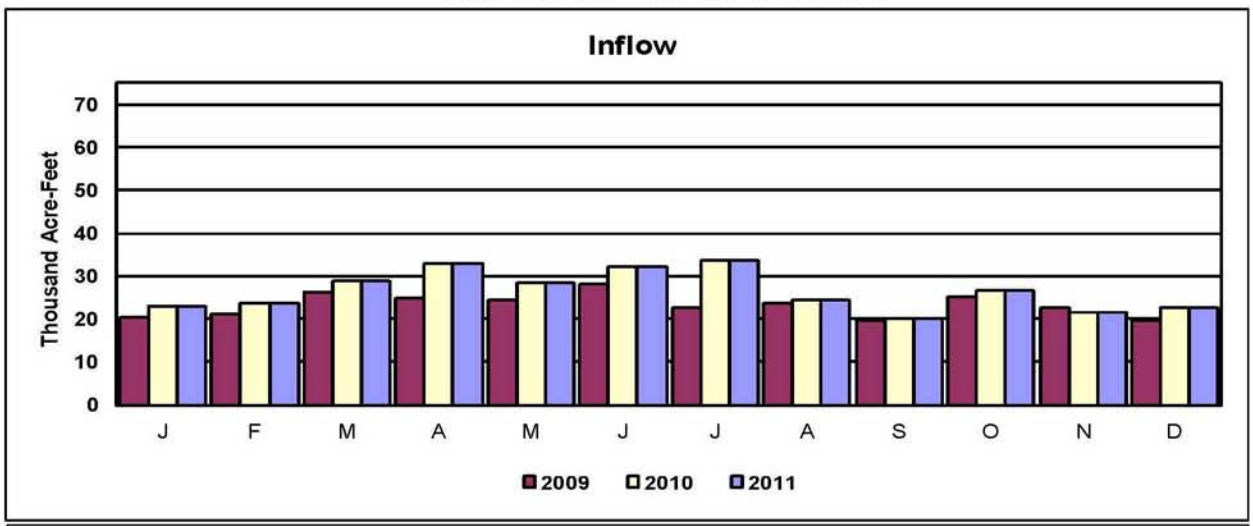
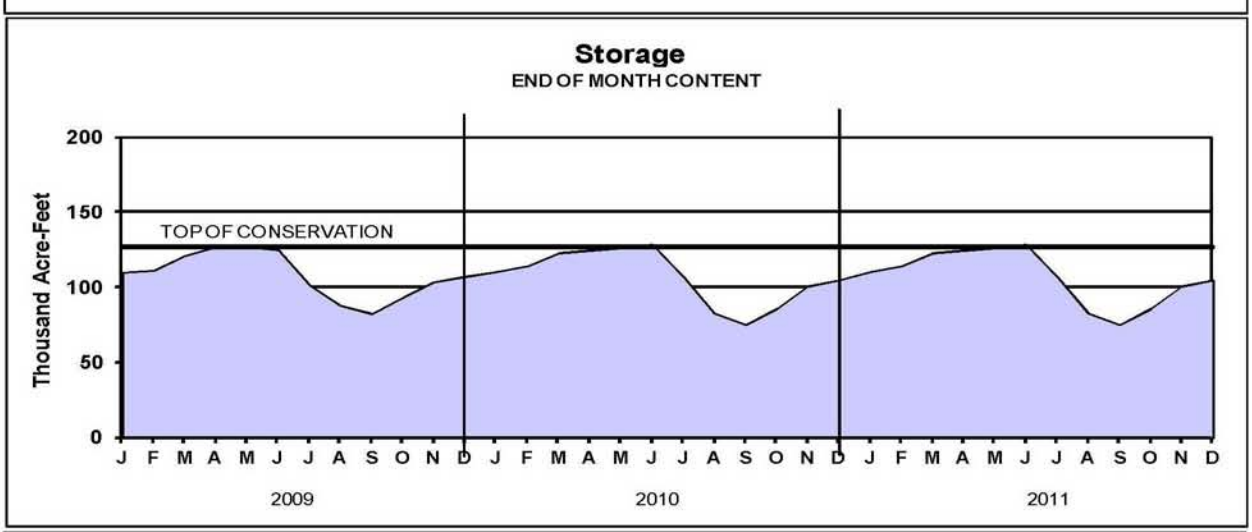



EXHIBIT 3A

# CALAMUS RESERVOIR
## ACTUAL OPERATION



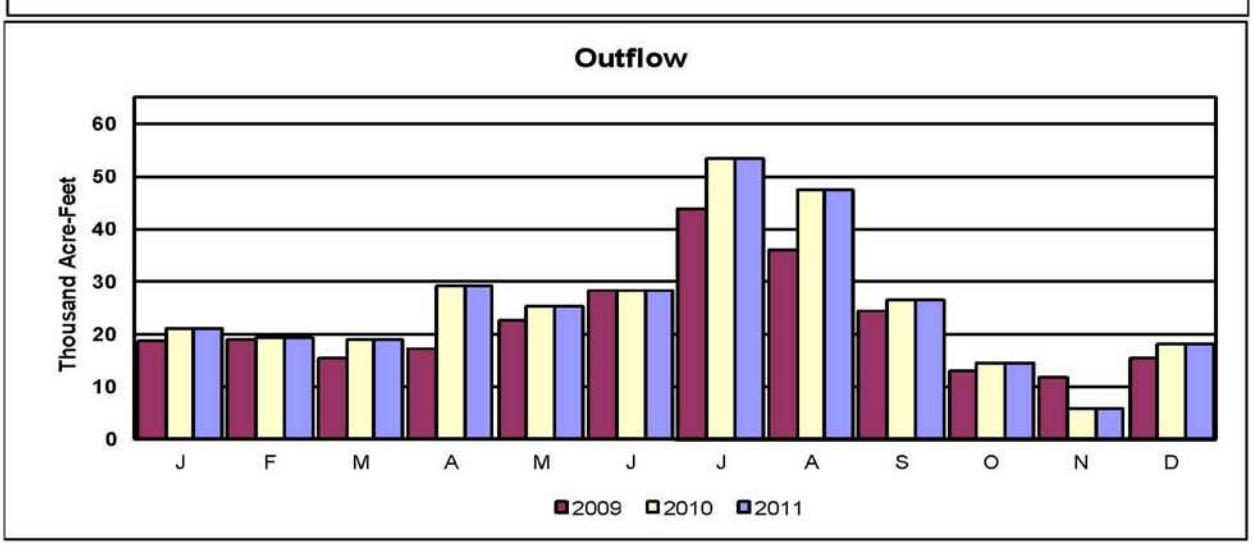
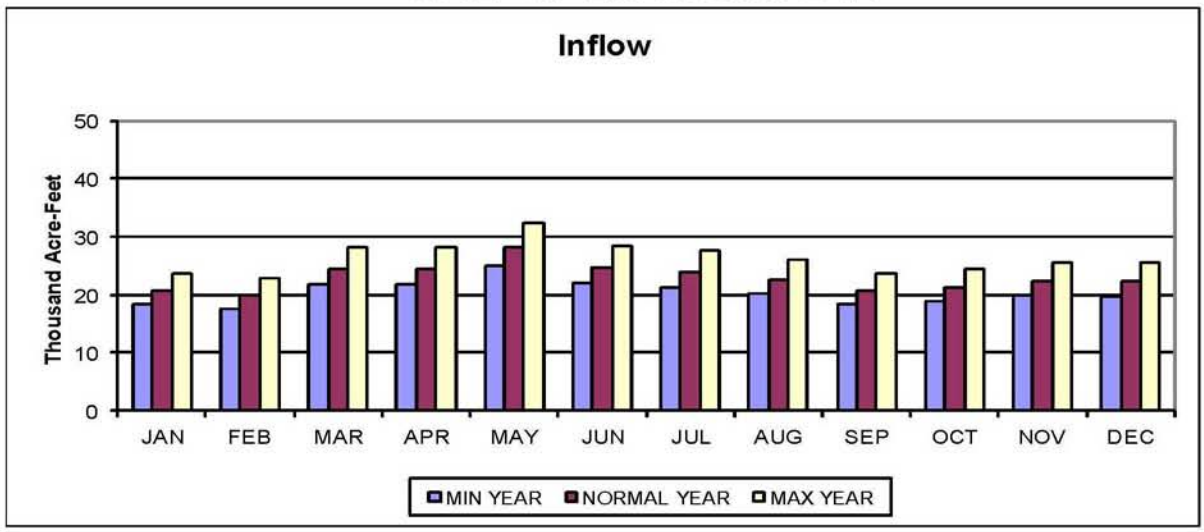
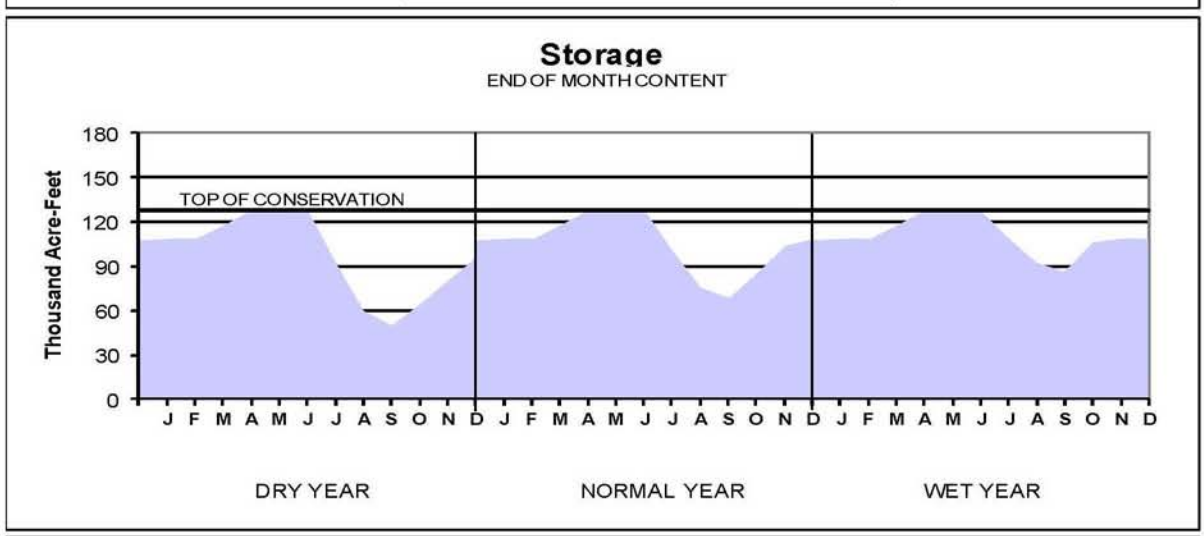



EXHIBIT 3B

# CALAMUS RESERVOIR

## 2012 OPERATION PLAN



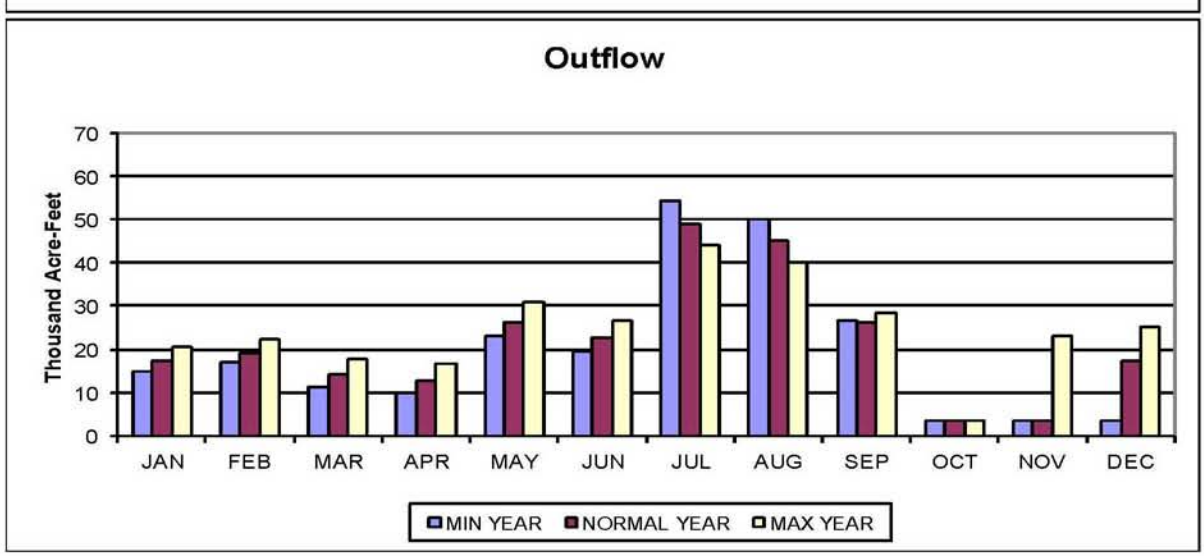
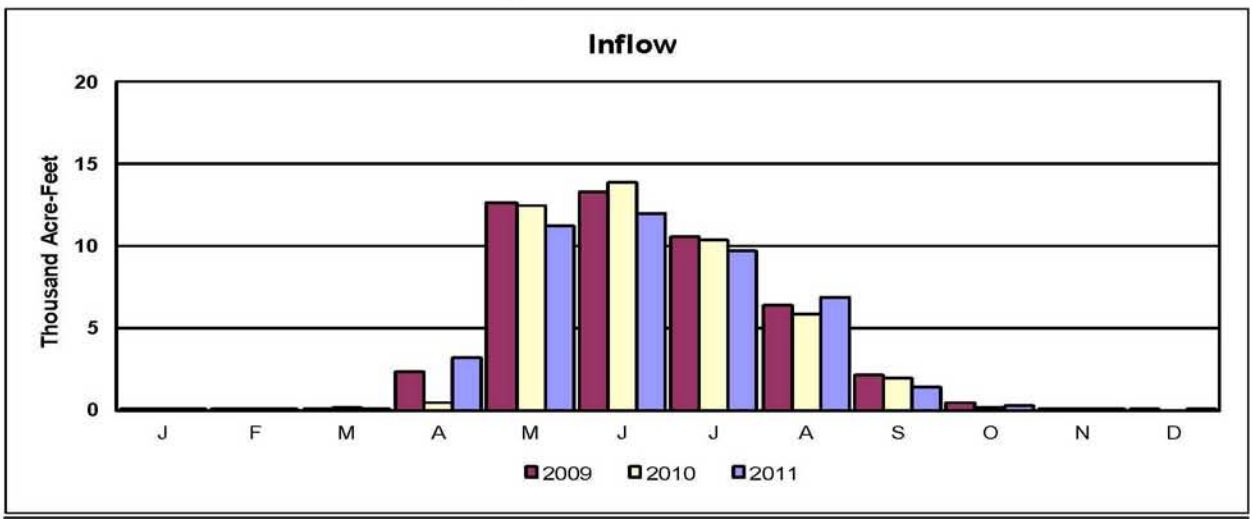
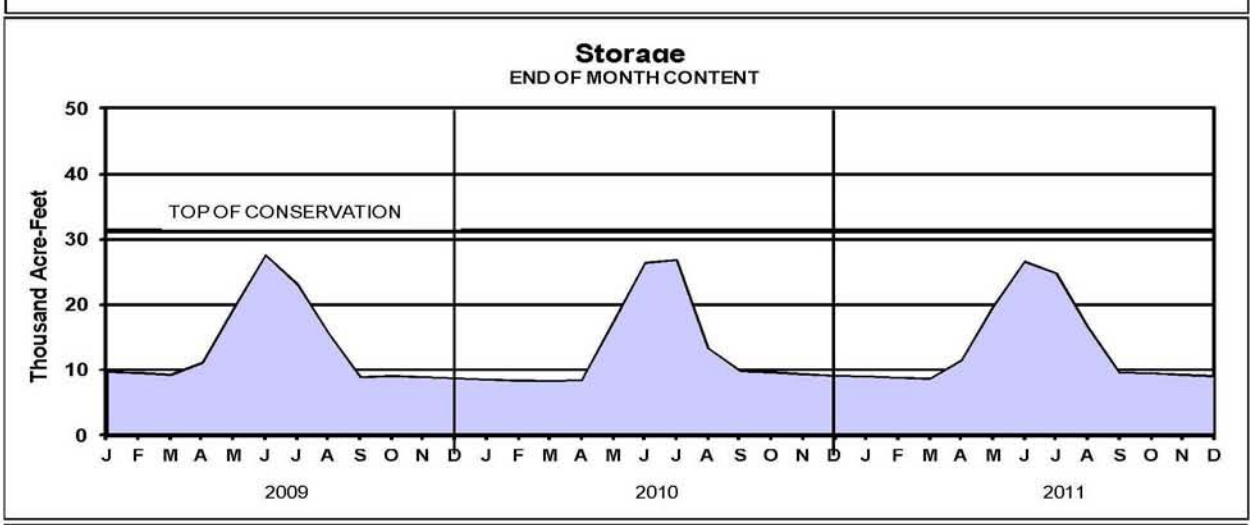



EXHIBIT 4A

# DAVIS CREEK RESERVOIR
## ACTUAL OPERATION



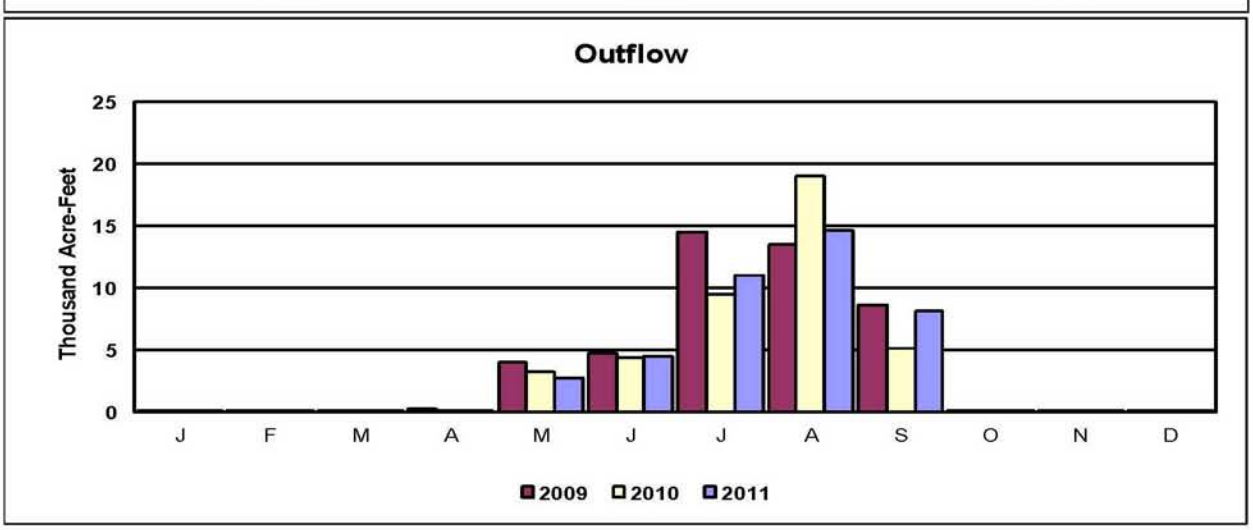
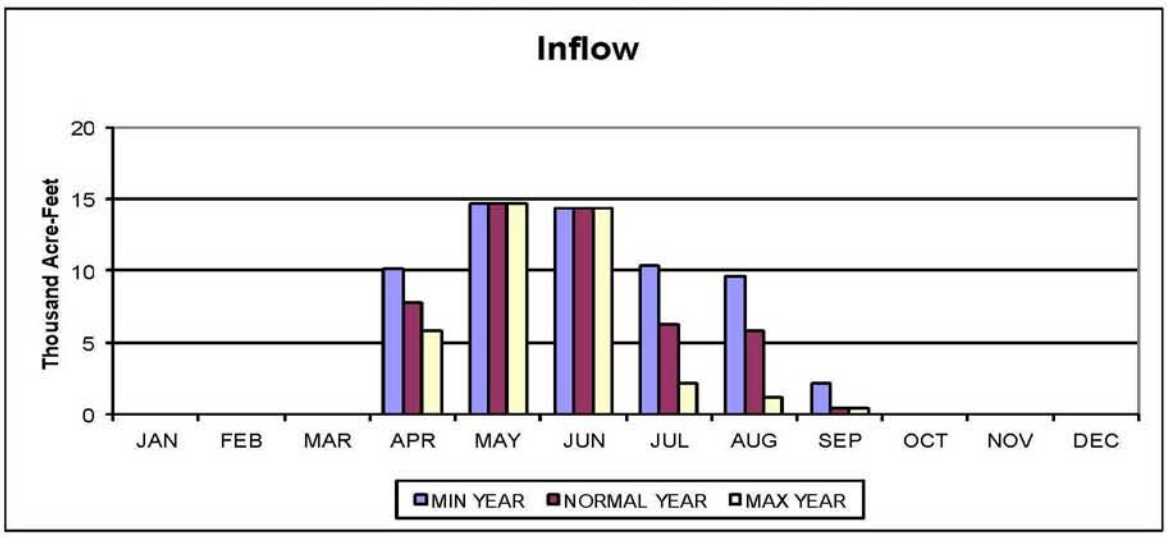
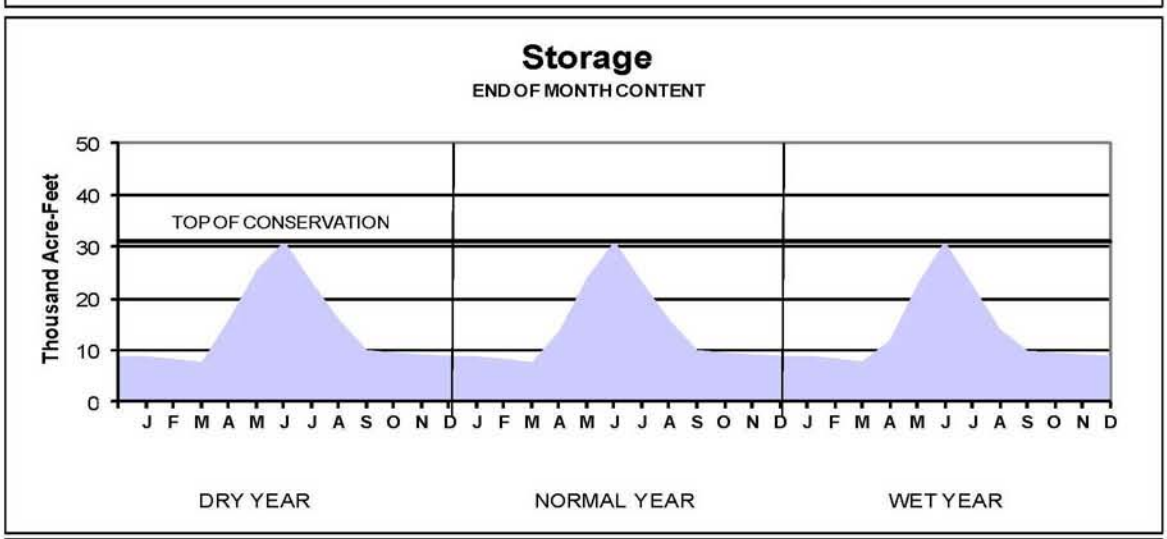



EXHIBIT 4B

# DAVIS CREEK RESERVOIR

## 2012 OPERATION PLAN



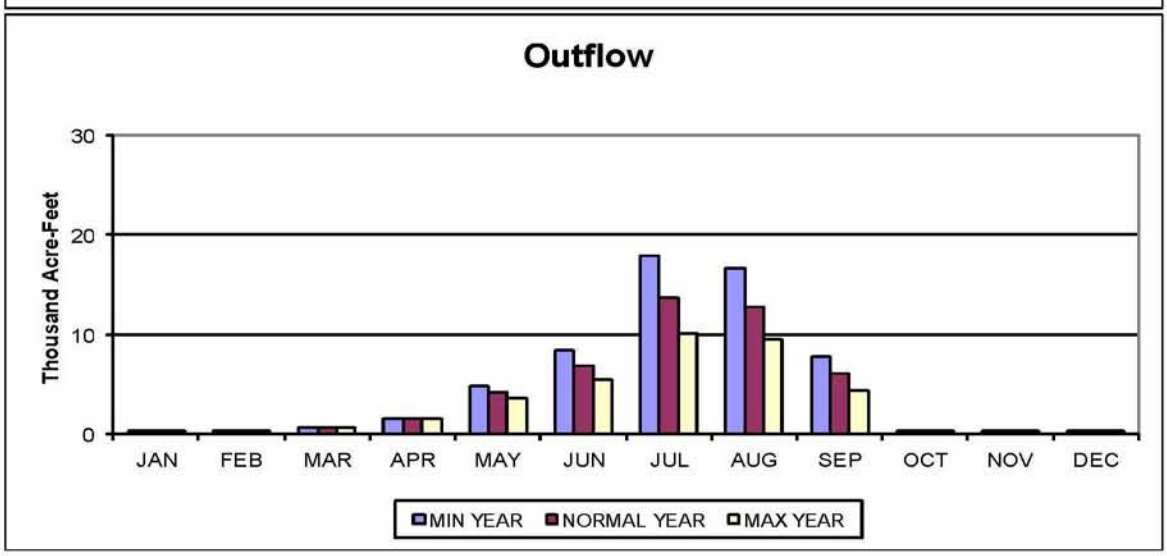
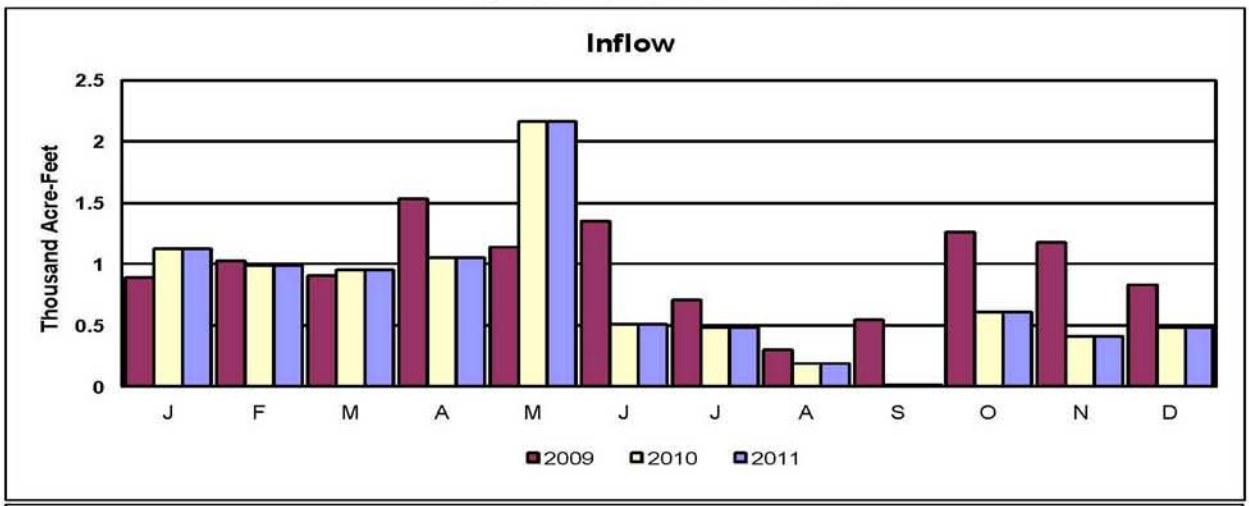
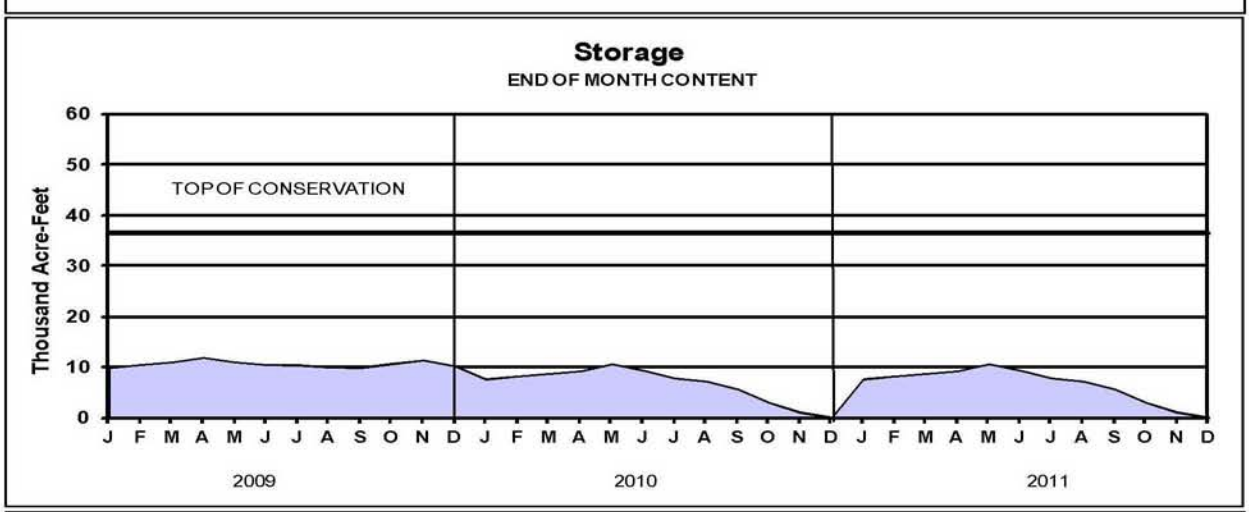



EXHIBIT 5A

# BONNY RESERVOIR
## ACTUAL OPERATION



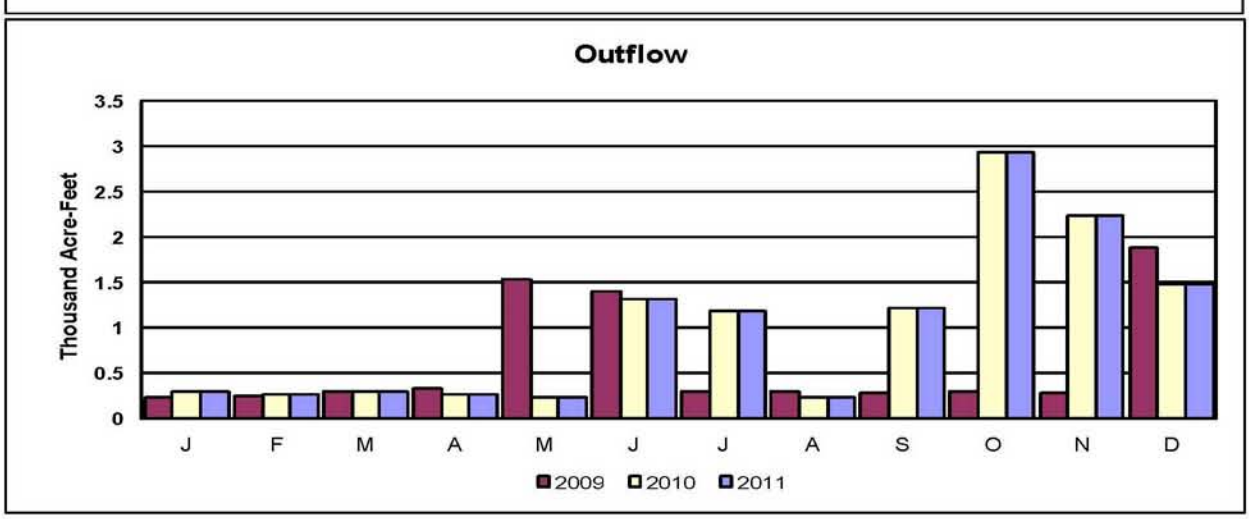
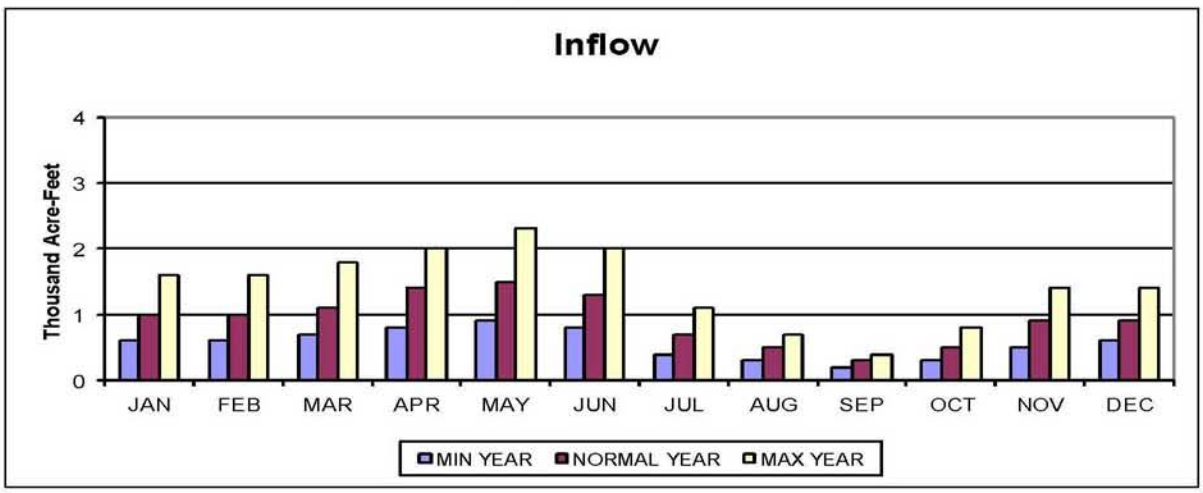
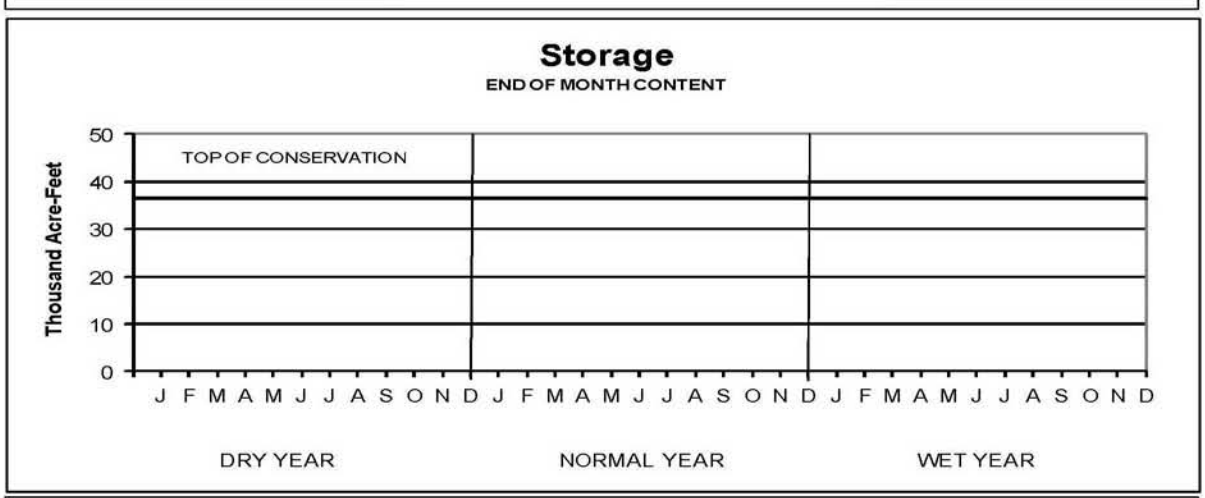



EXHIBIT 5B

# BONNY RESERVOIR
## 2012 OPERATION PLAN



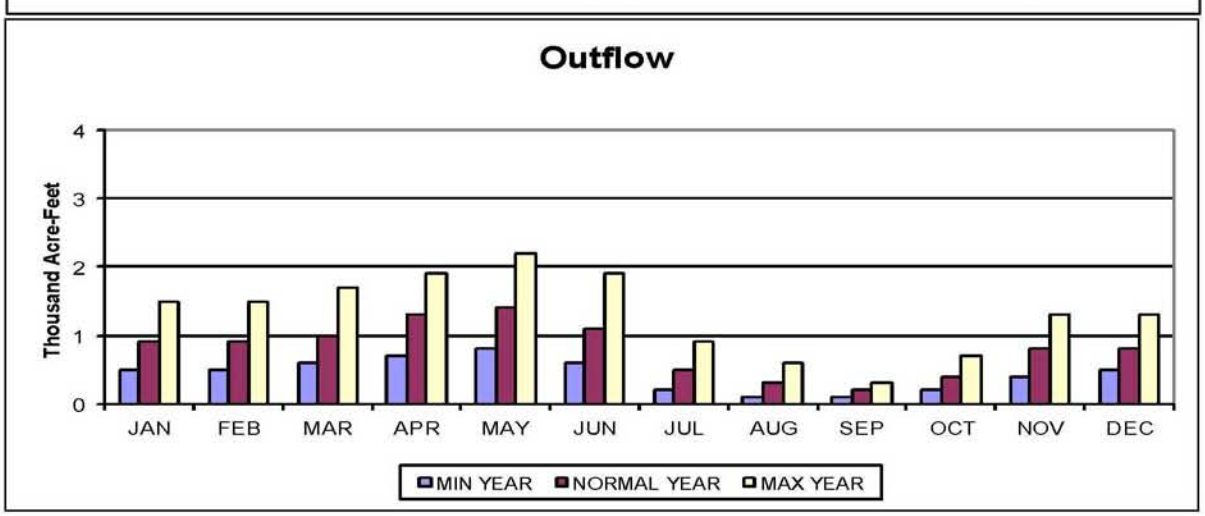
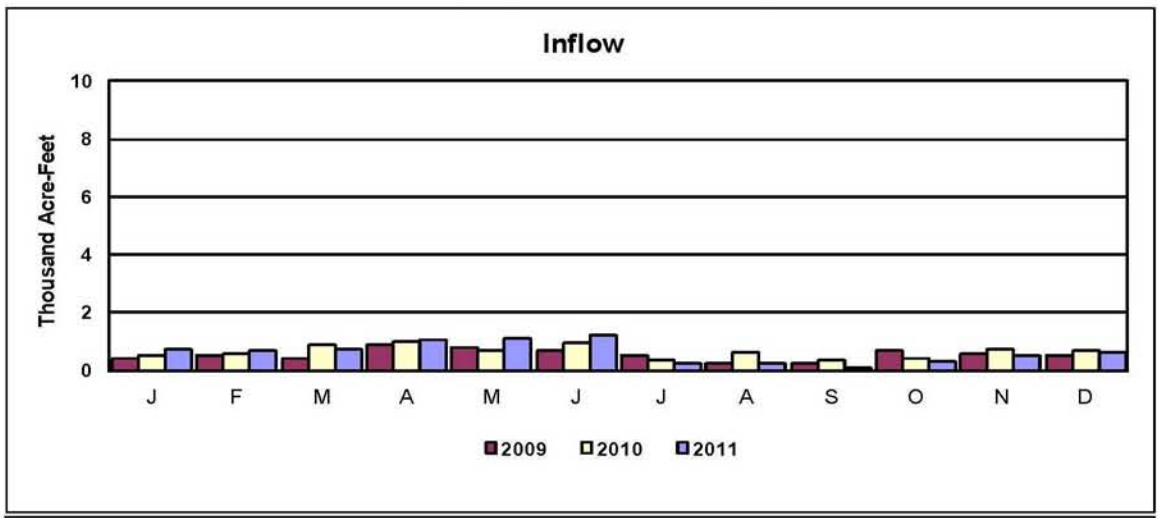
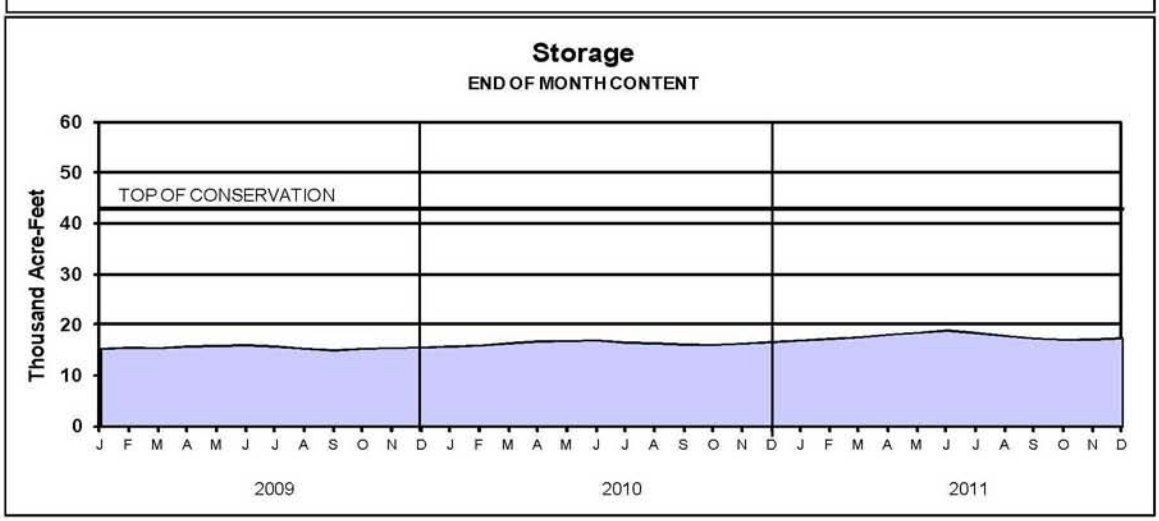



EXHIBIT 6A

# ENDERS RESERVOIR

## ACTUAL OPERATION



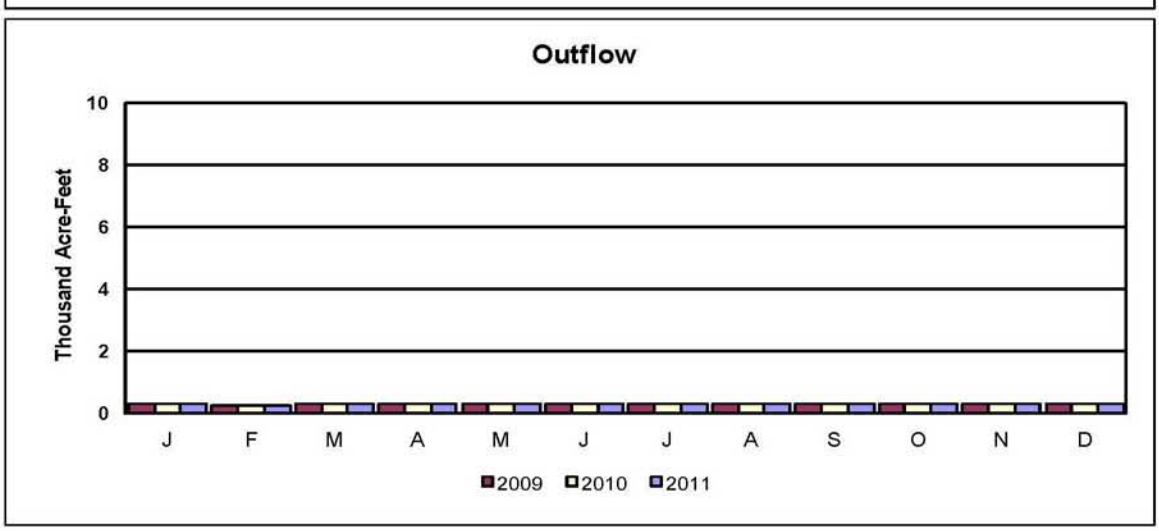
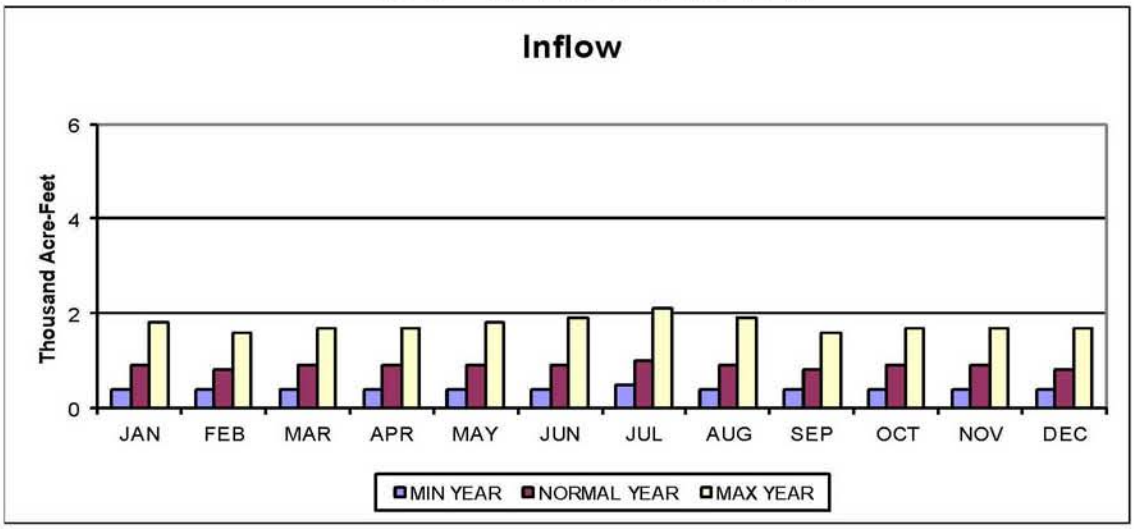
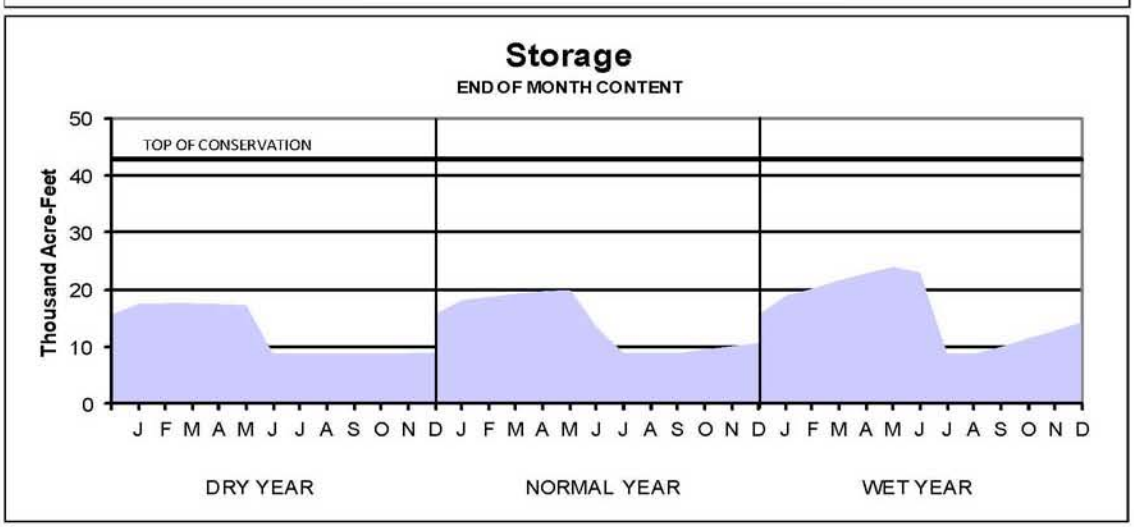



EXHIBIT 6B

# ENDERS RESERVOIR

## 2012 OPERATION PLAN



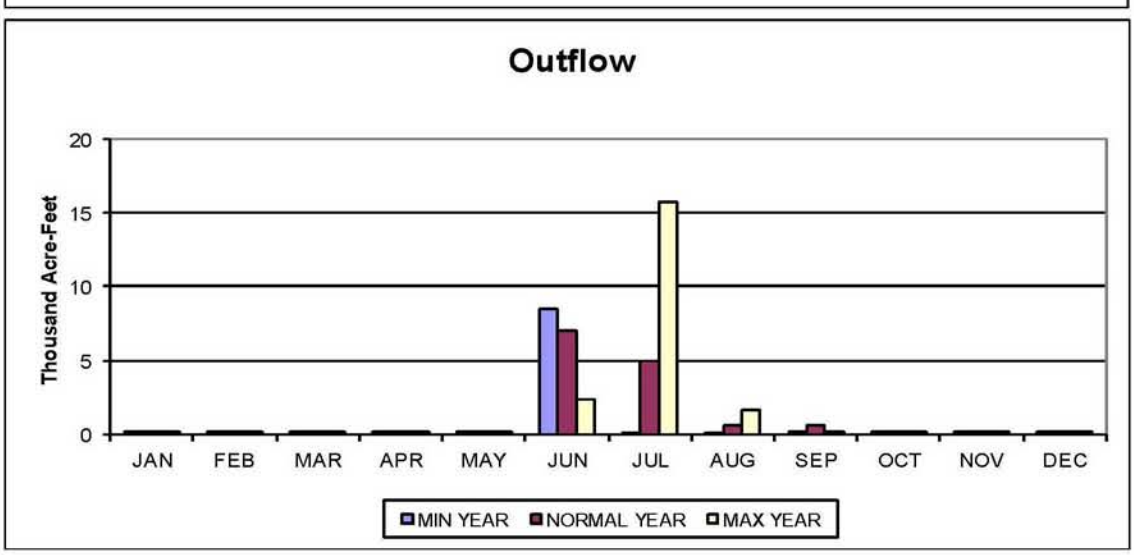
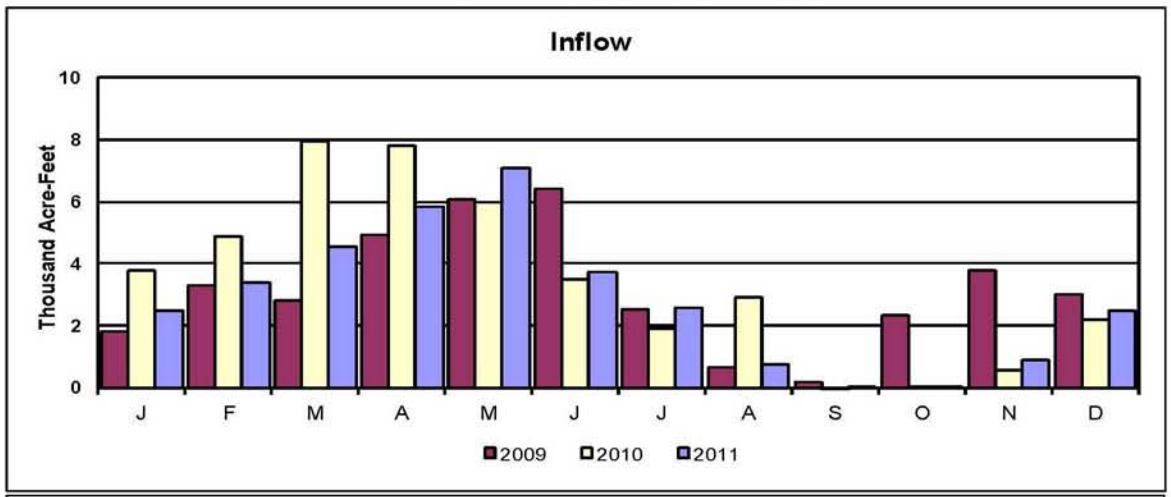
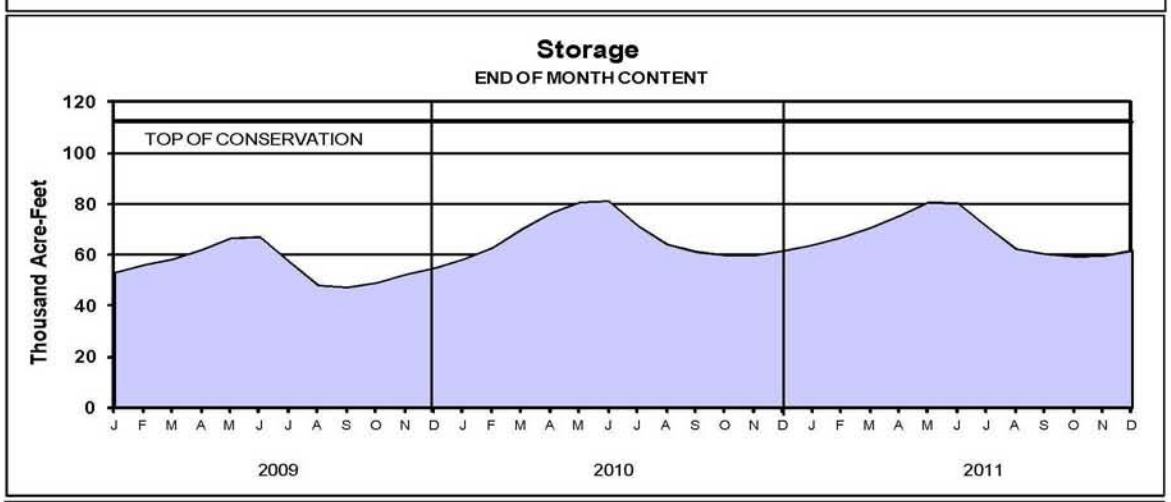



EXHIBIT 7A

# SWANSON LAKE
## ACTUAL OPERATION



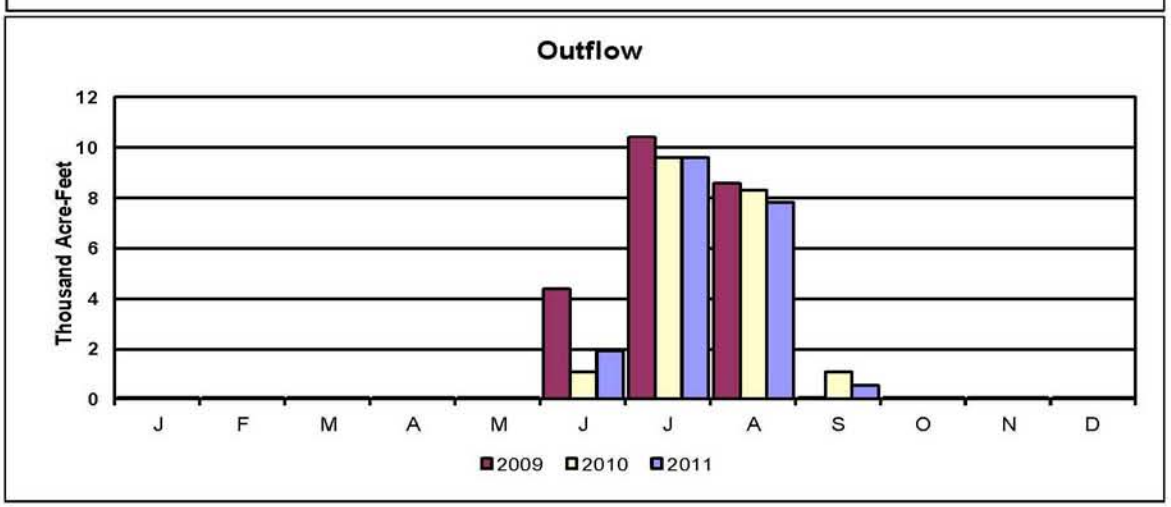
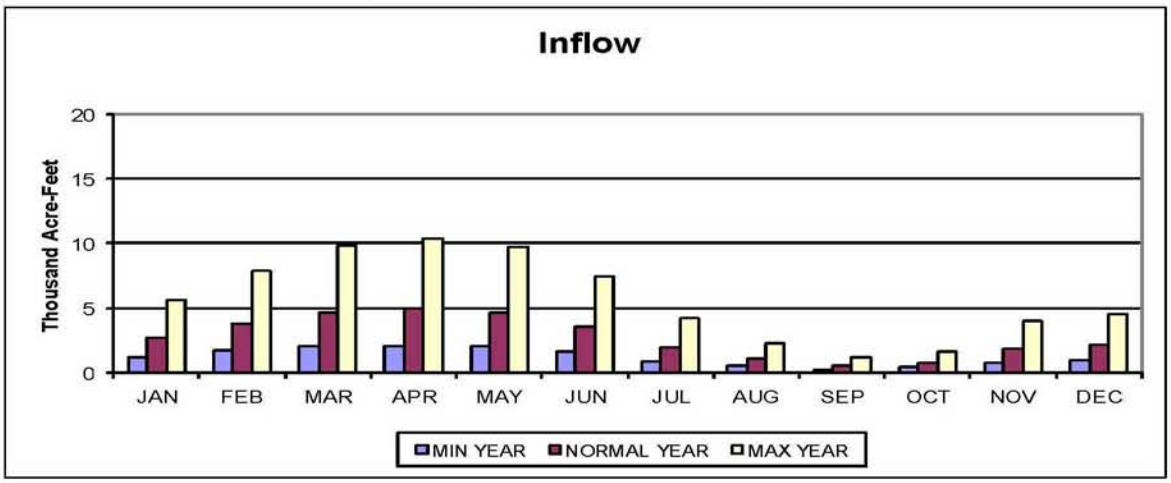
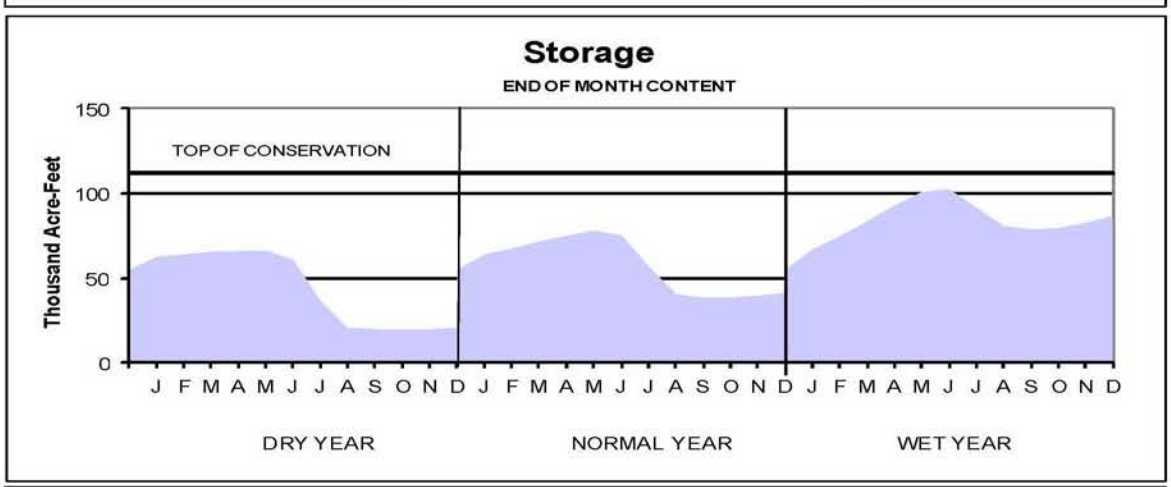



EXHIBIT 7B

# SWANSON LAKE
## 2012 OPERATION PLAN



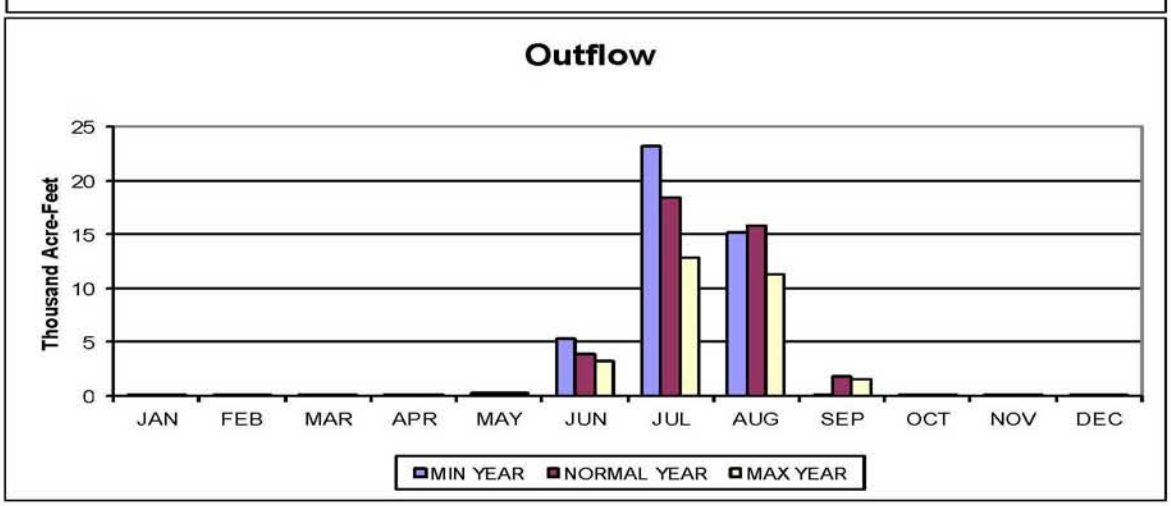
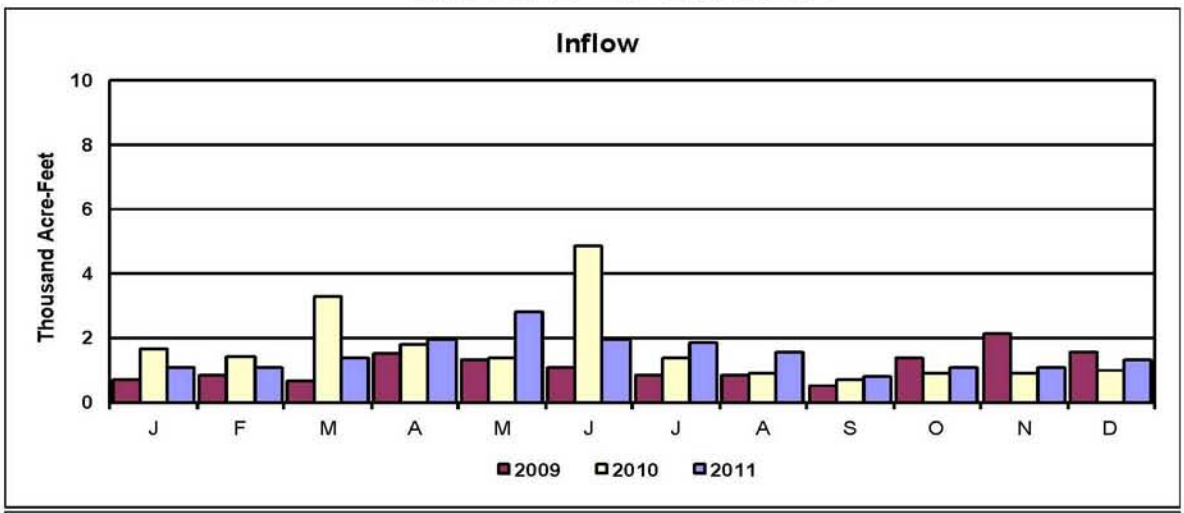
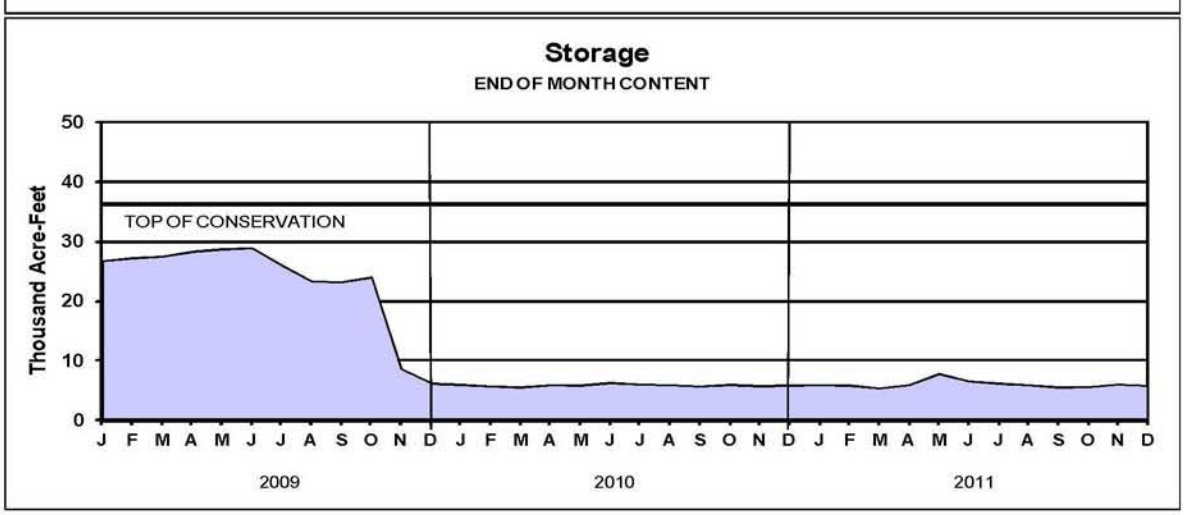



EXHIBIT 8A

# HUGH BUTLER LAKE

## ACTUAL OPERATION



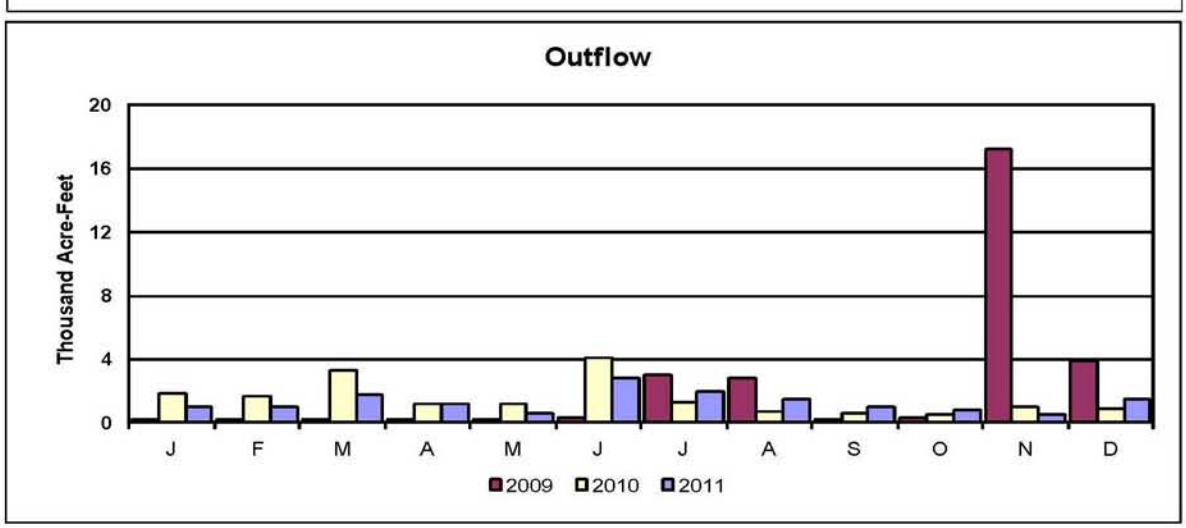
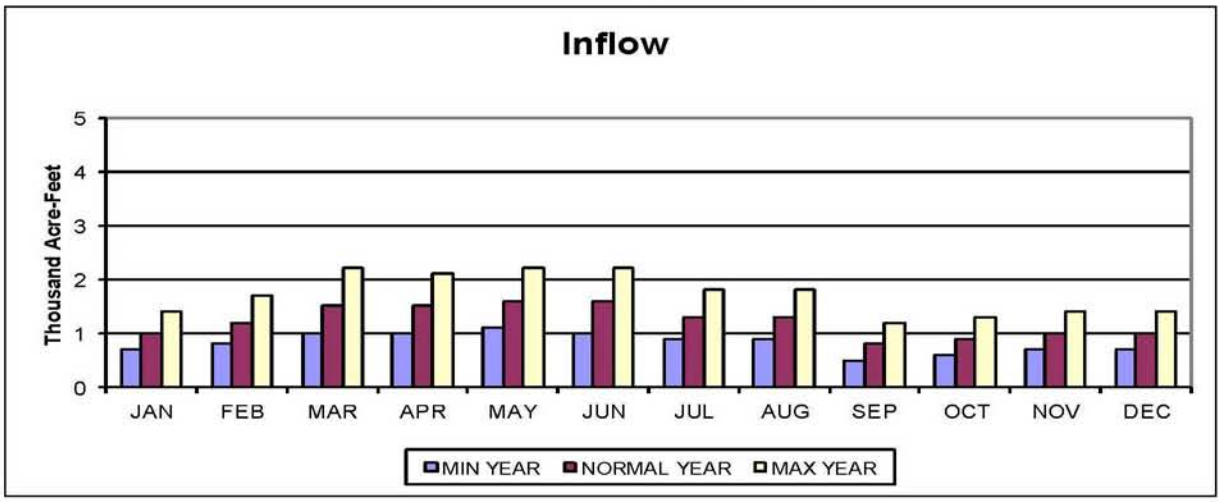
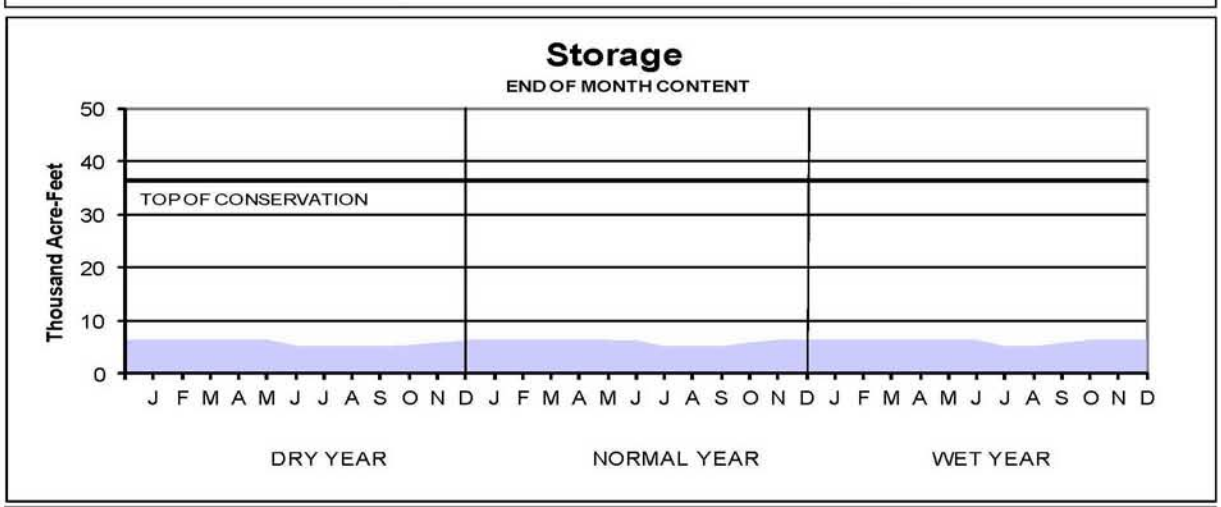



EXHIBIT 8B

# HUGH BUTLER LAKE
## 2012 OPERATION PLAN



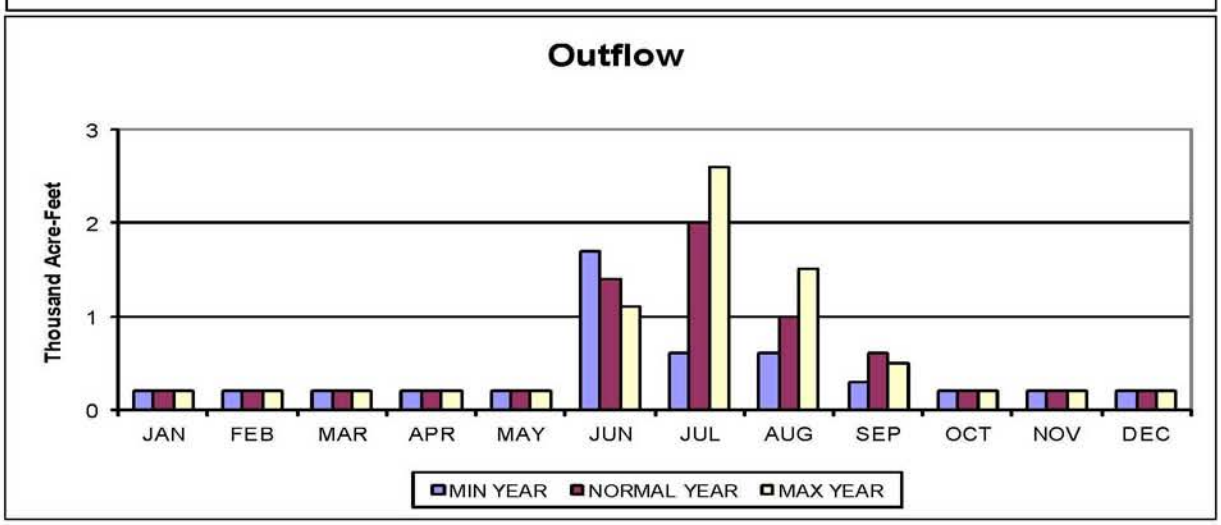
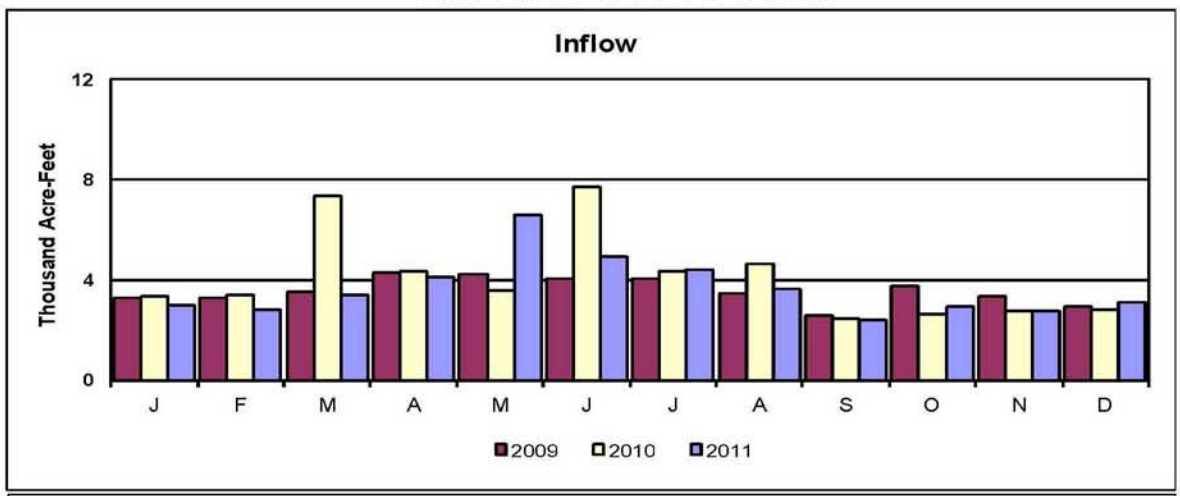
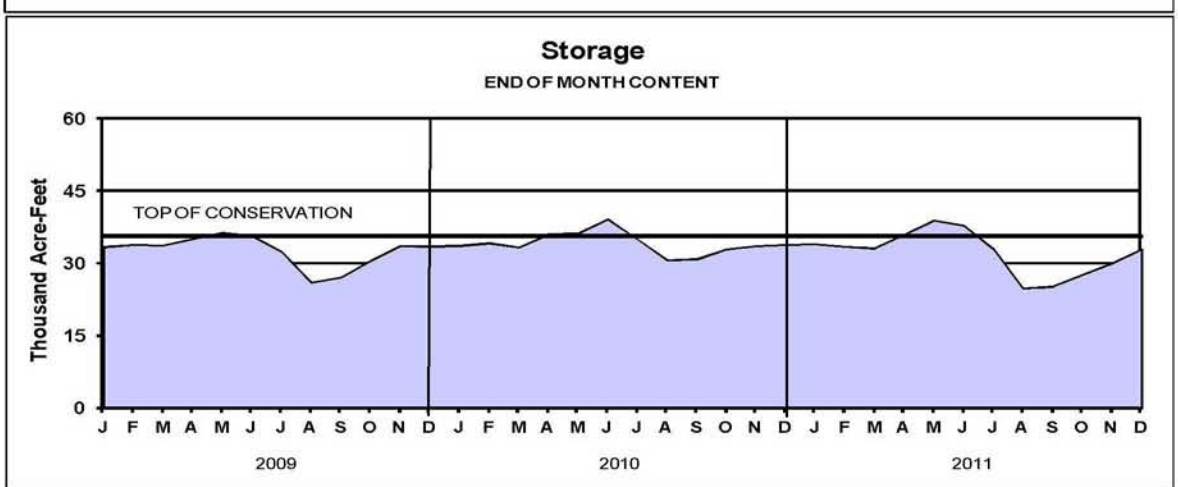



EXHIBIT 9A

# HARRY STRUNK LAKE

## ACTUAL OPERATION



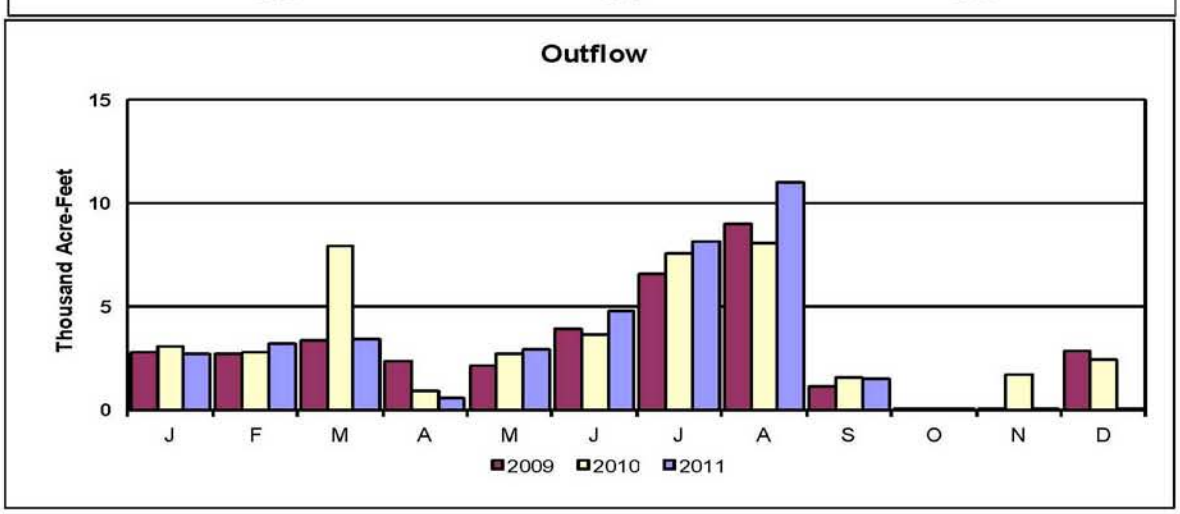
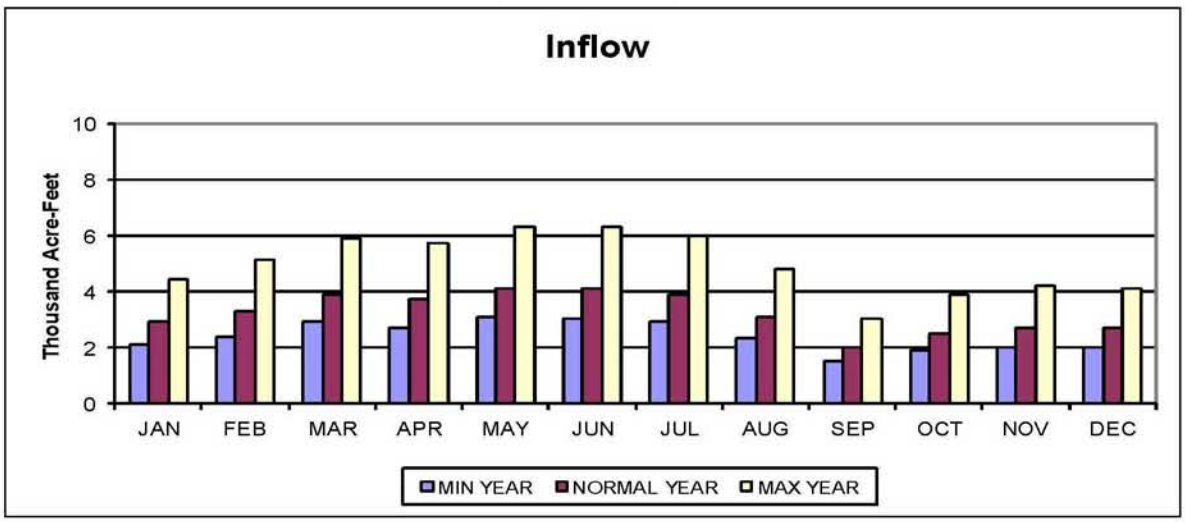
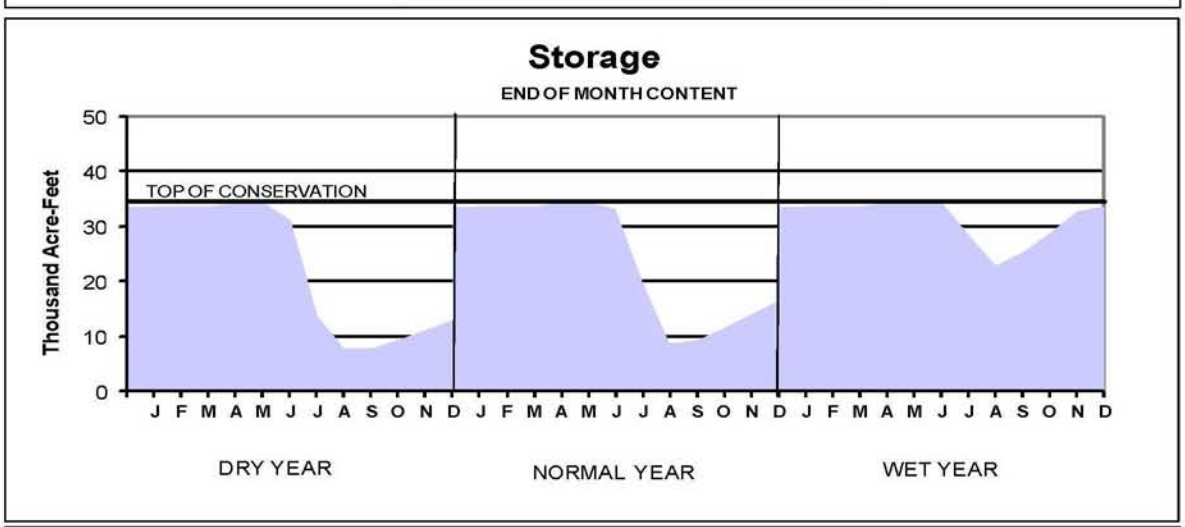



EXHIBIT 9B

# HARRY STRUNK LAKE
## 2012 OPERATION PLAN



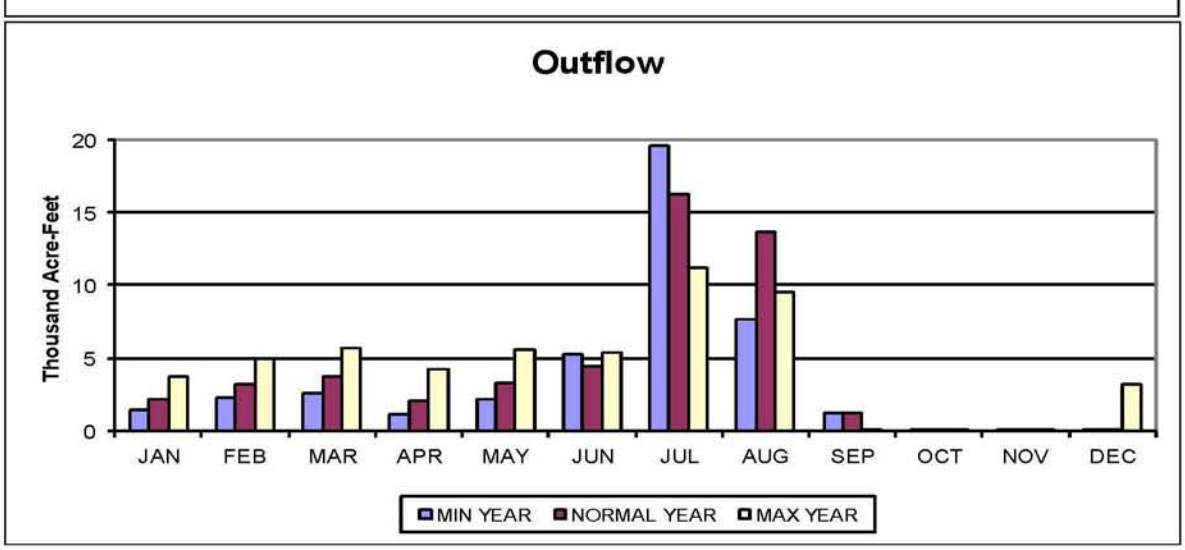
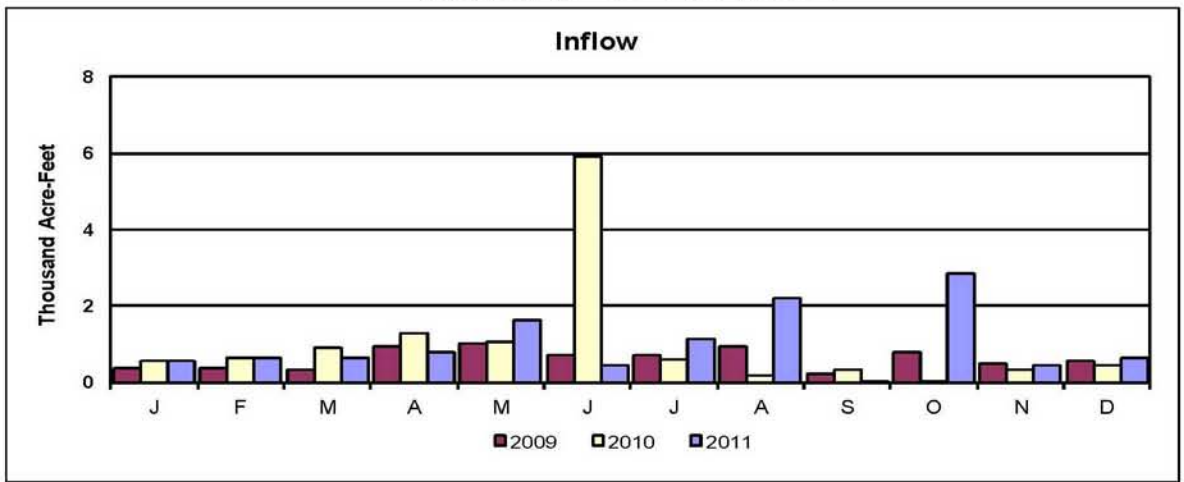
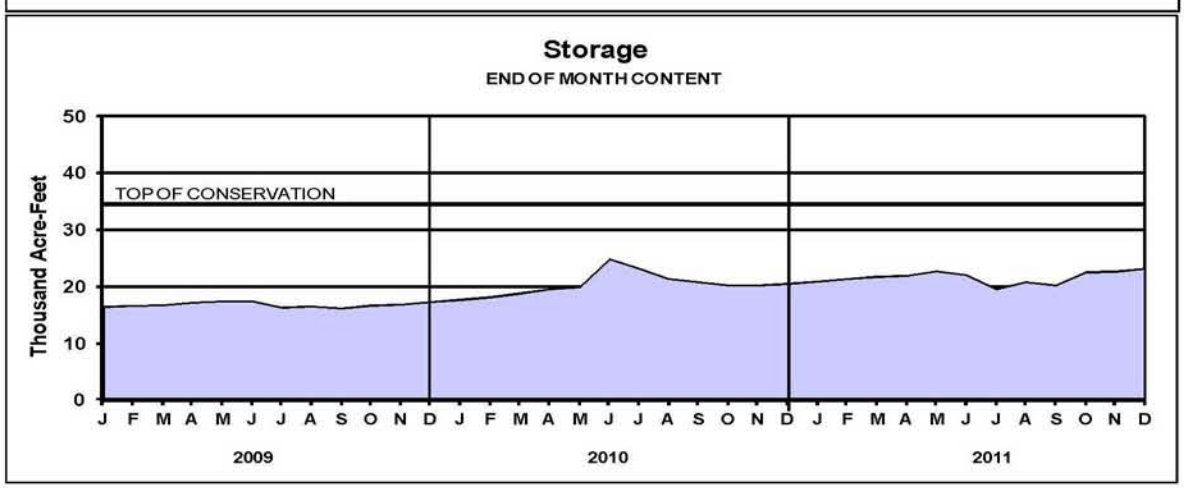



EXHIBIT 10A

# KEITH SEBELIUS LAKE

## ACTUAL OPERATION



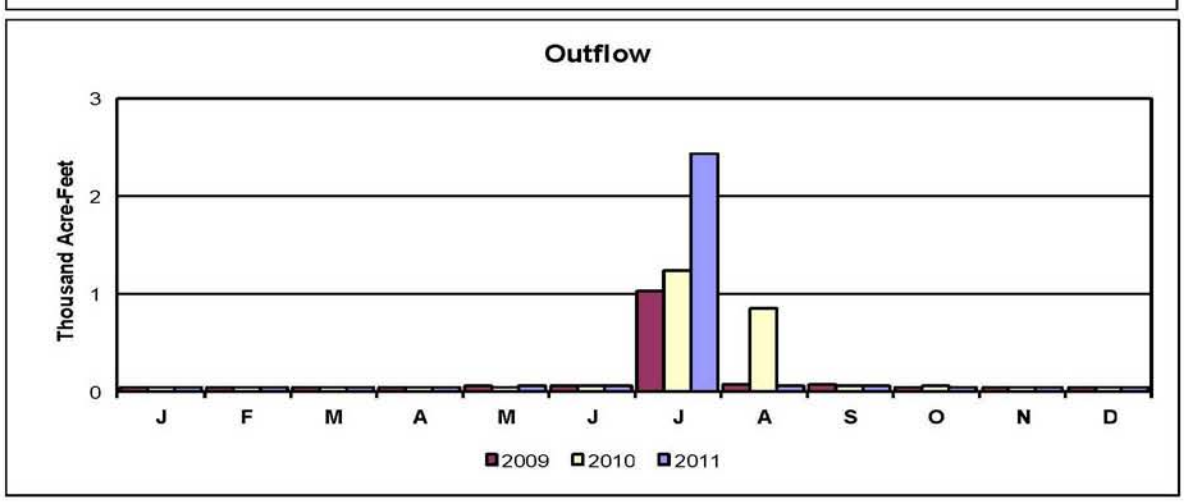
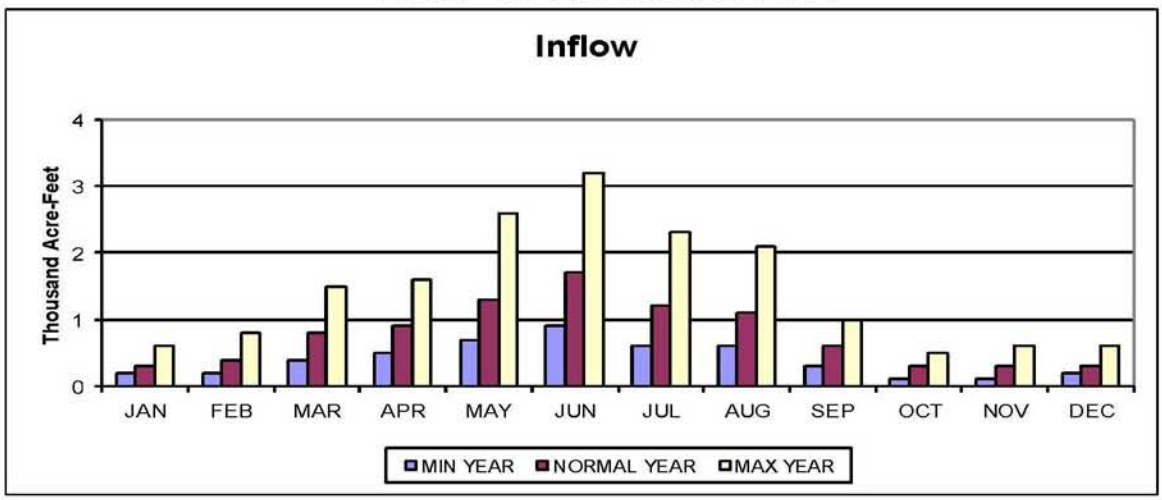
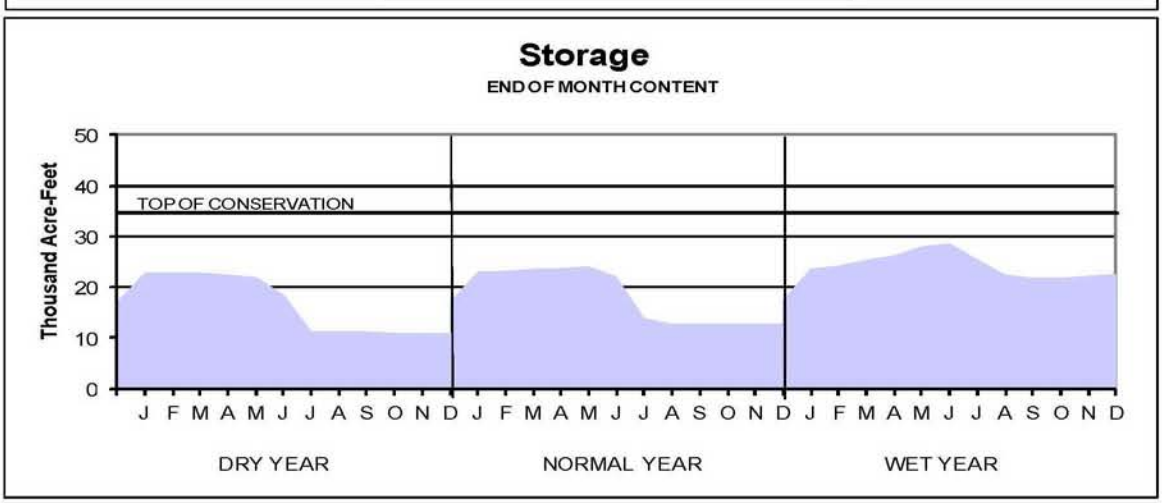



EXHIBIT 10B

# KEITH SEBELIUS LAKE

## 2012 OPERATION PLAN



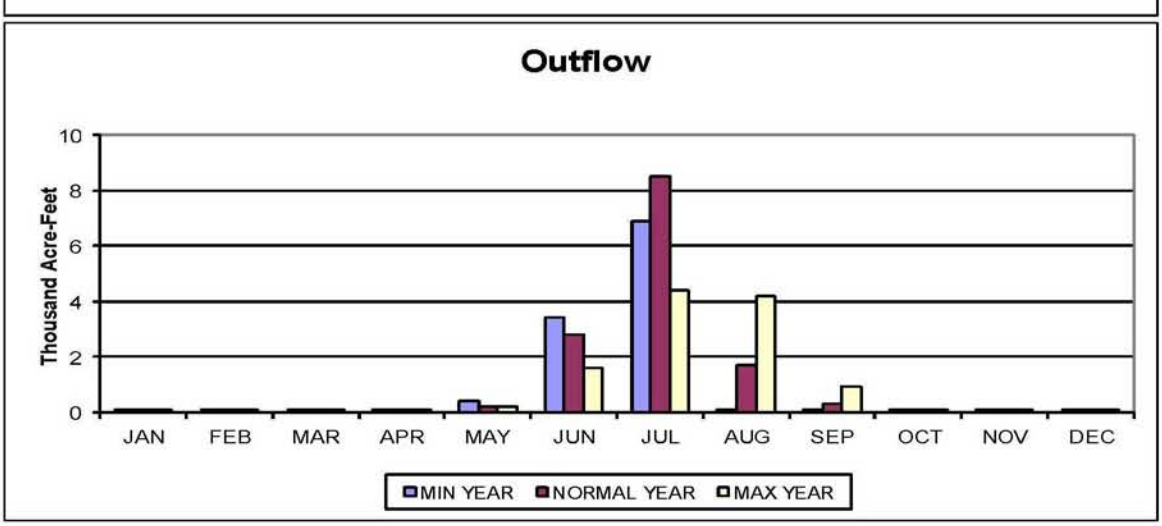
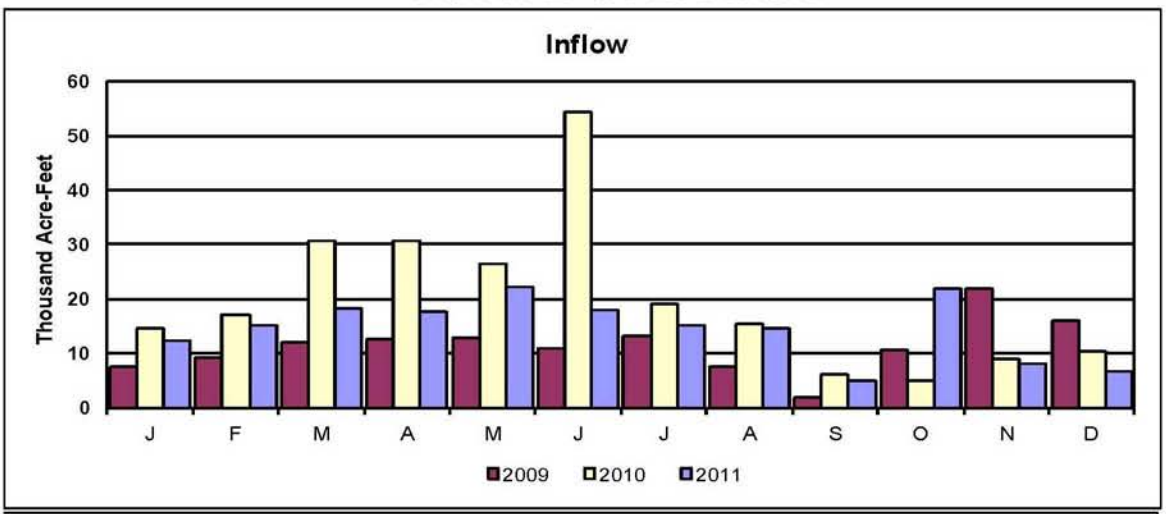
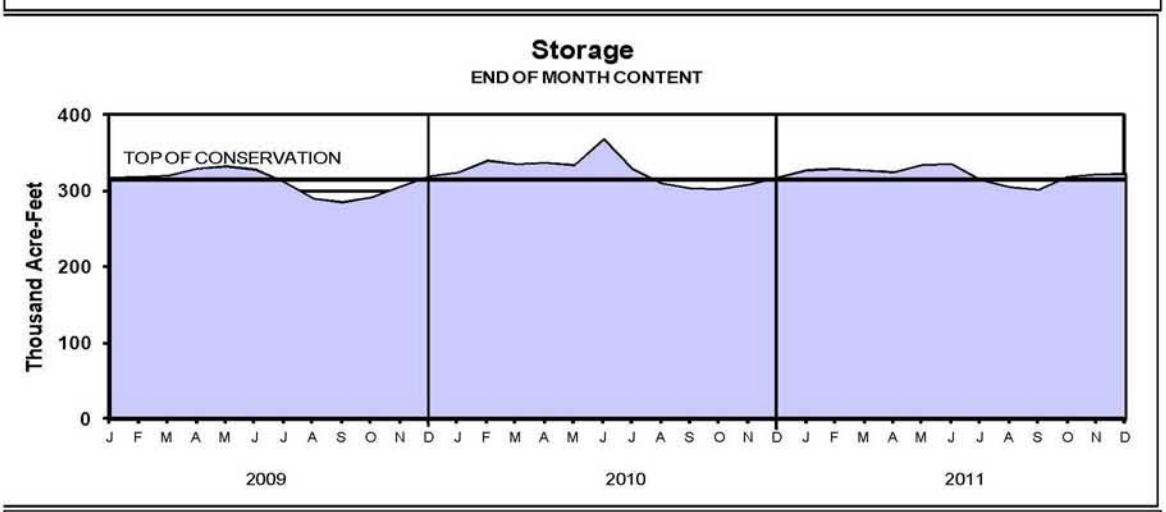



EXHIBIT 11A

# HARLAN COUNTY LAKE

## ACTUAL OPERATION



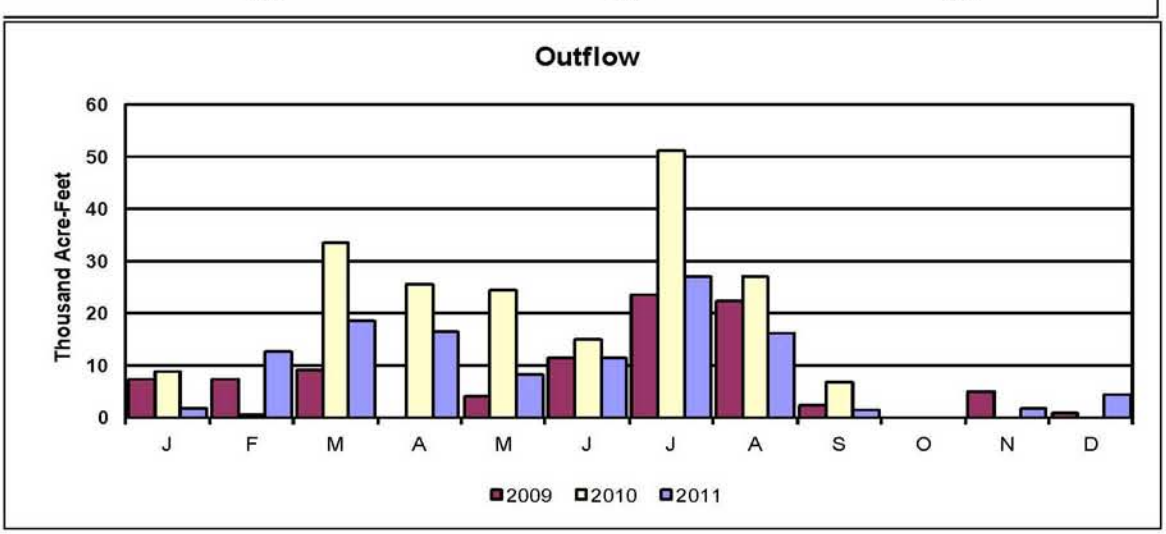
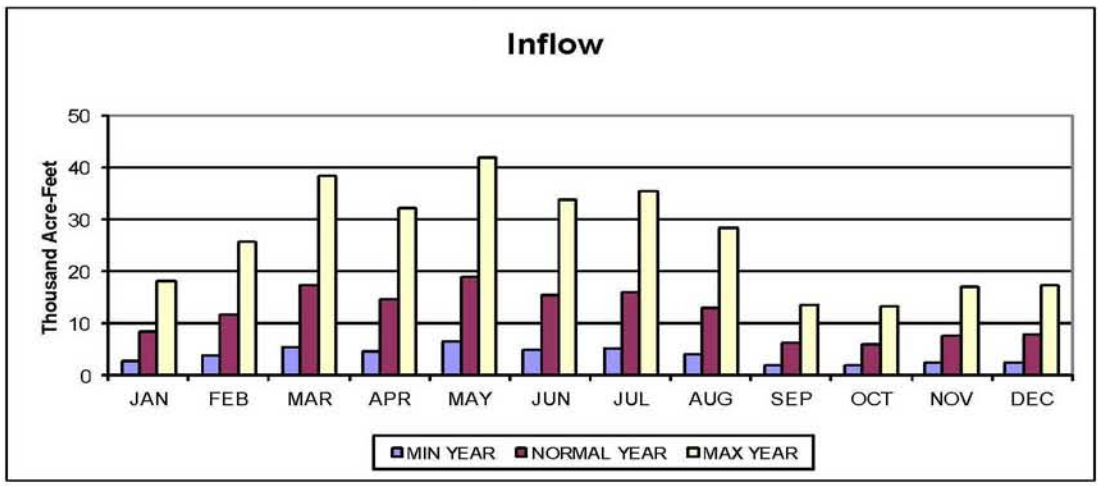
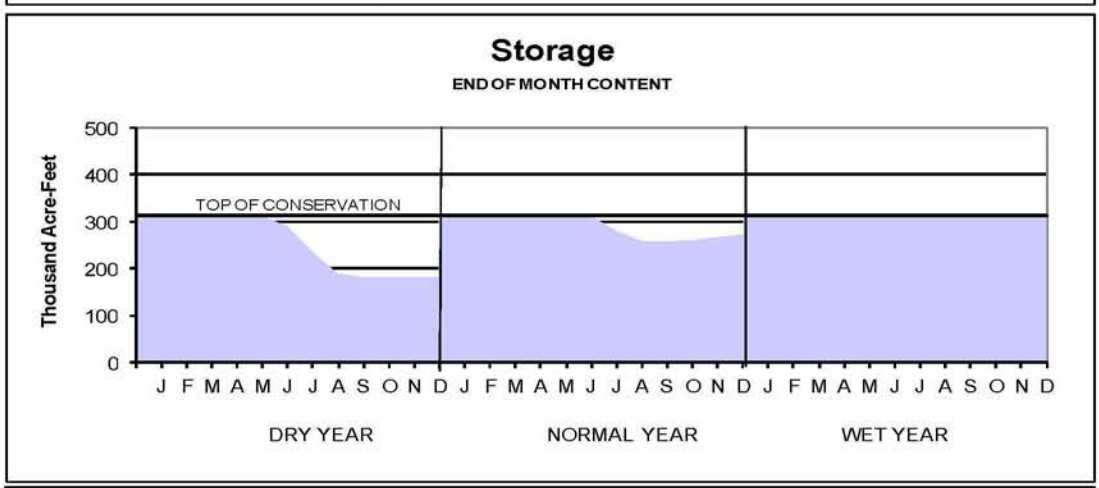



EXHIBIT 11B

# HARLAN COUNTY LAKE

## 2012 OPERATION PLAN



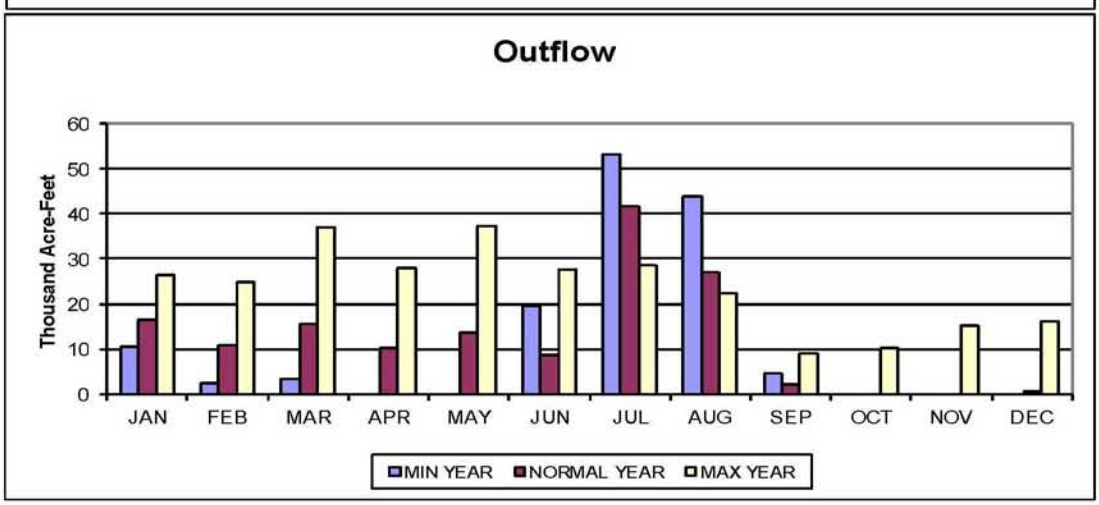
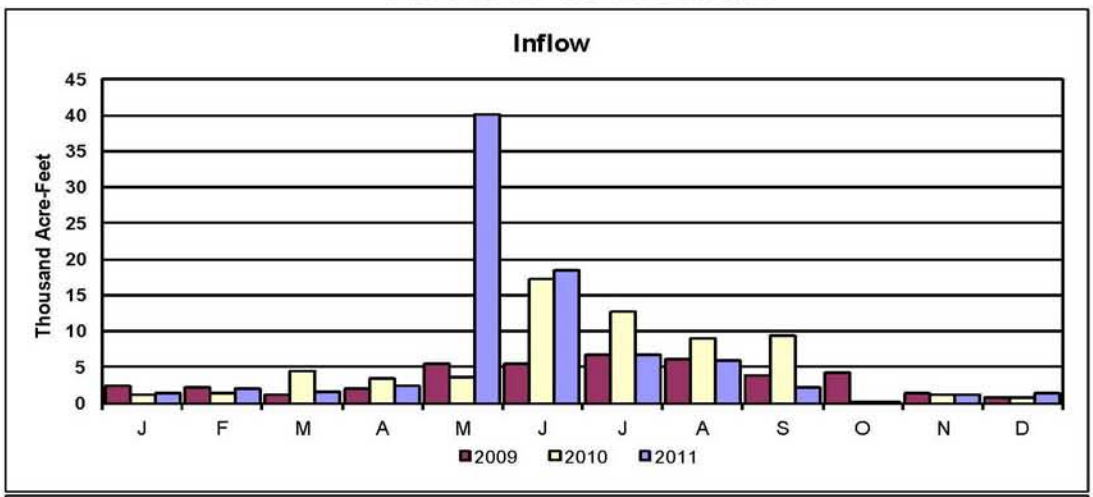
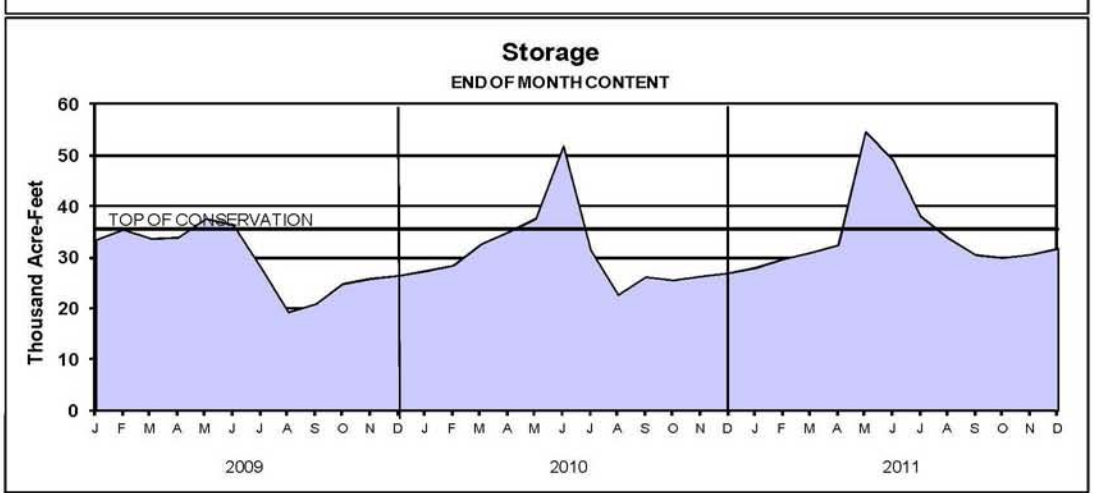



EXHIBIT 12A

# LOVEWELL RESERVOIR

## ACTUAL OPERATION



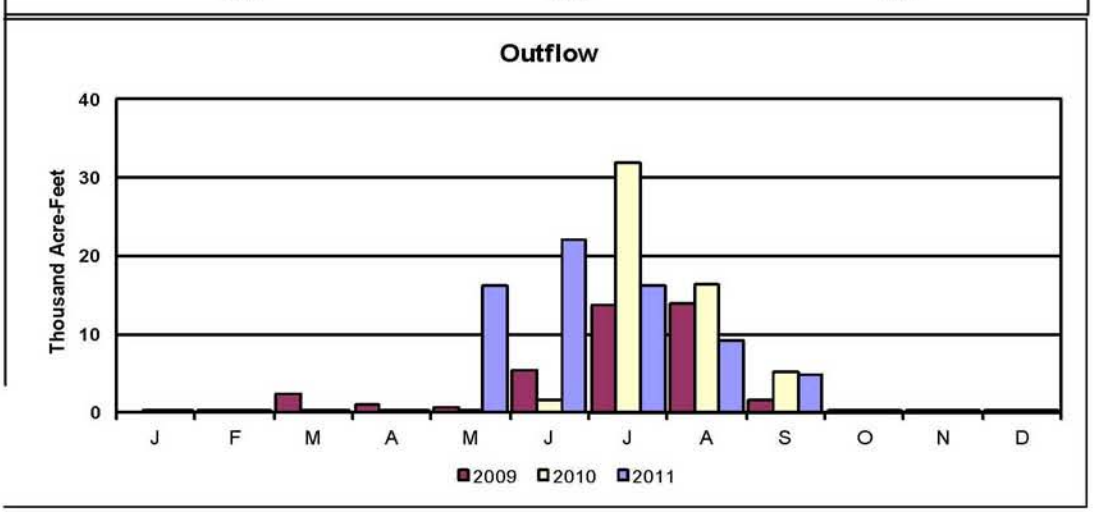
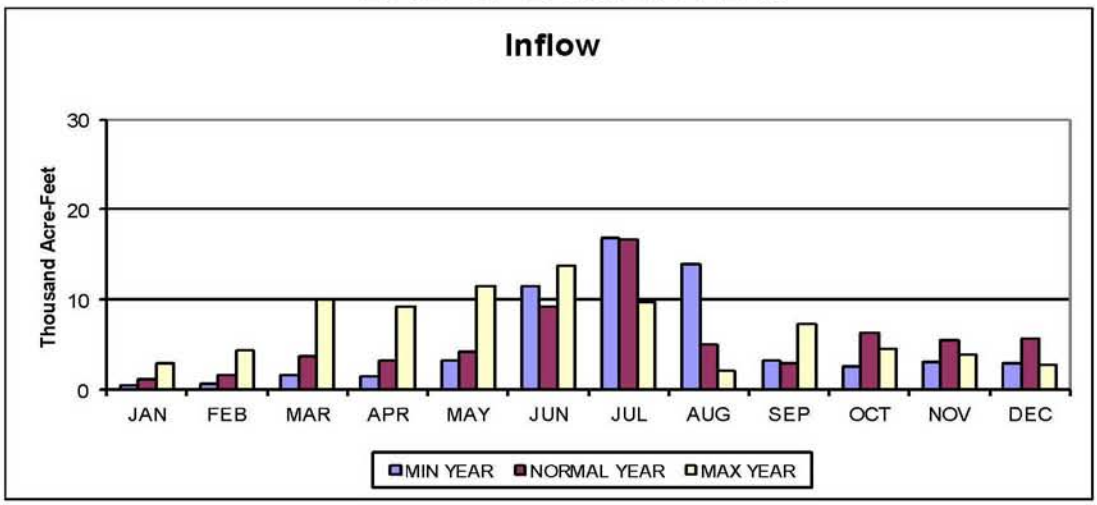
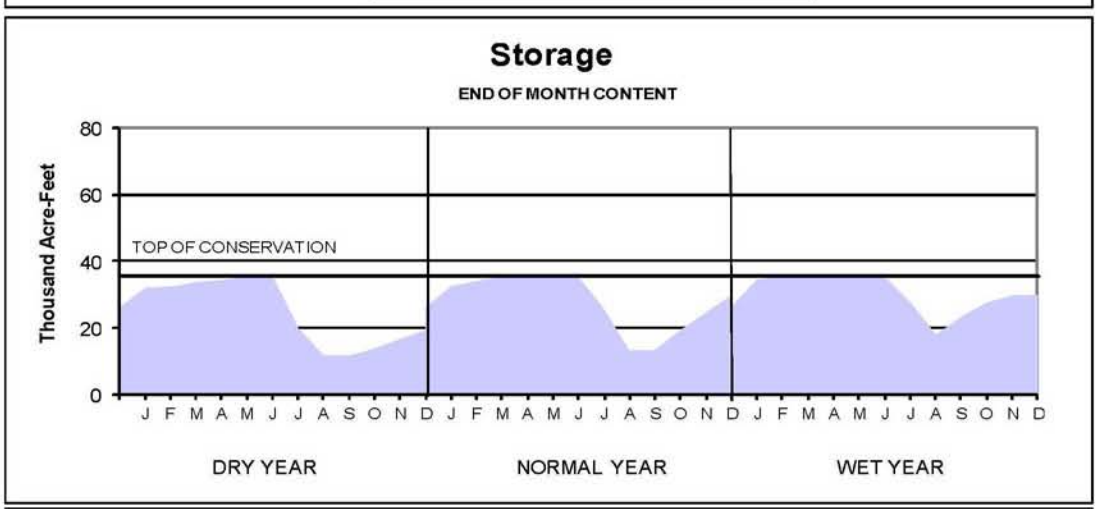



EXHIBIT 12B

# LOVEWELL RESERVOIR

## 2012 OPERATION PLAN



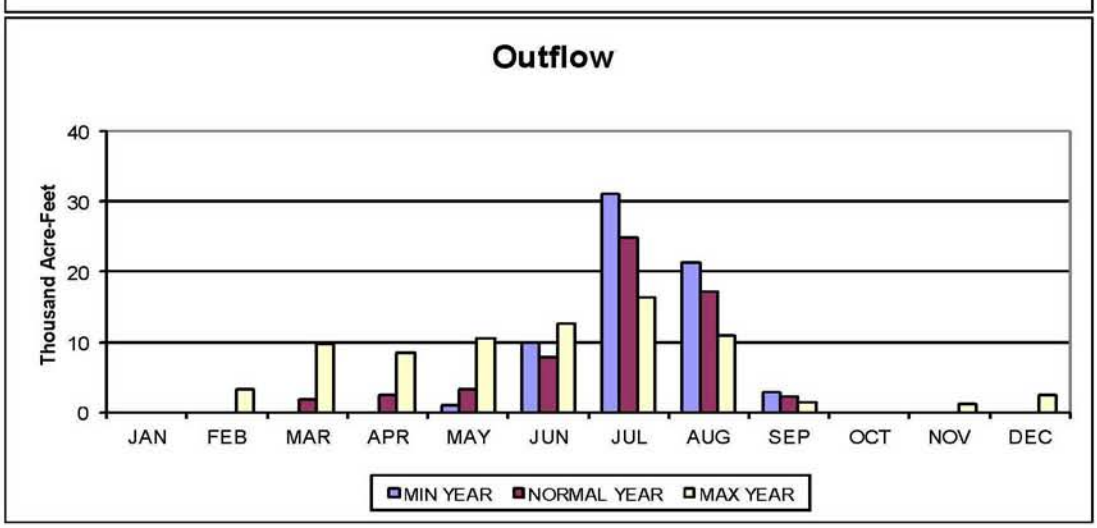
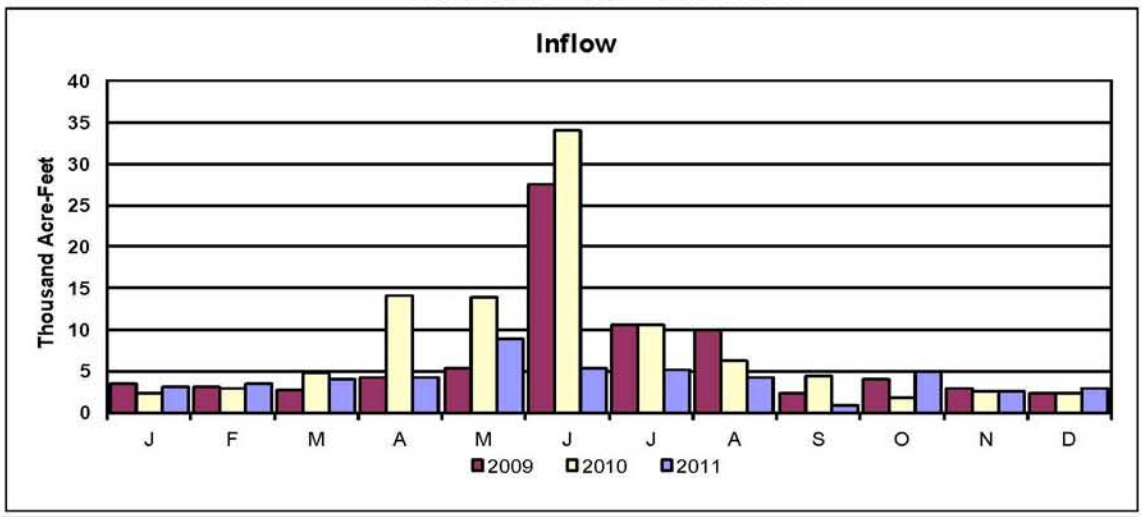
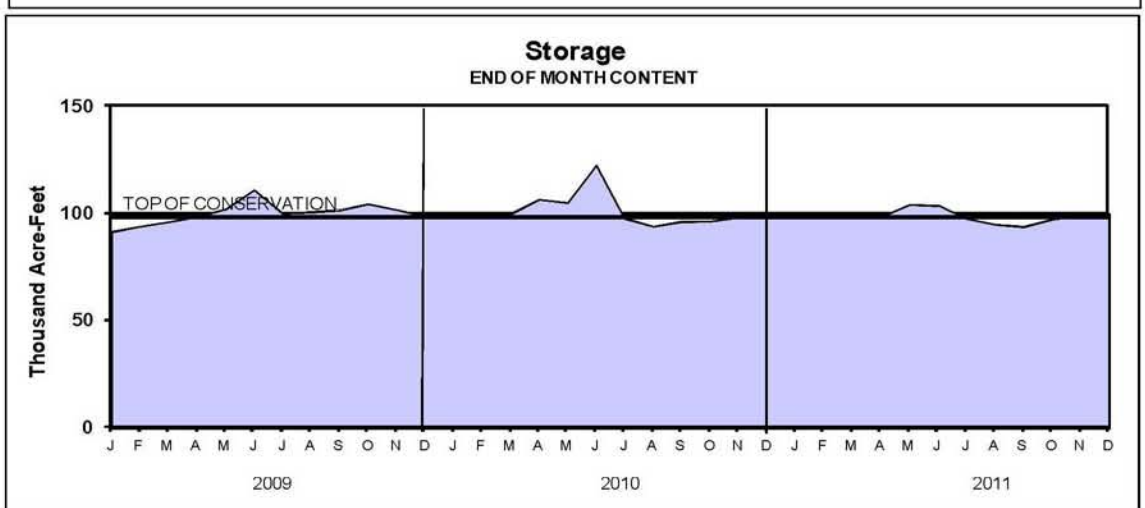



EXHIBIT 13A

# KIRWIN RESERVOIR

## ACTUAL OPERATION



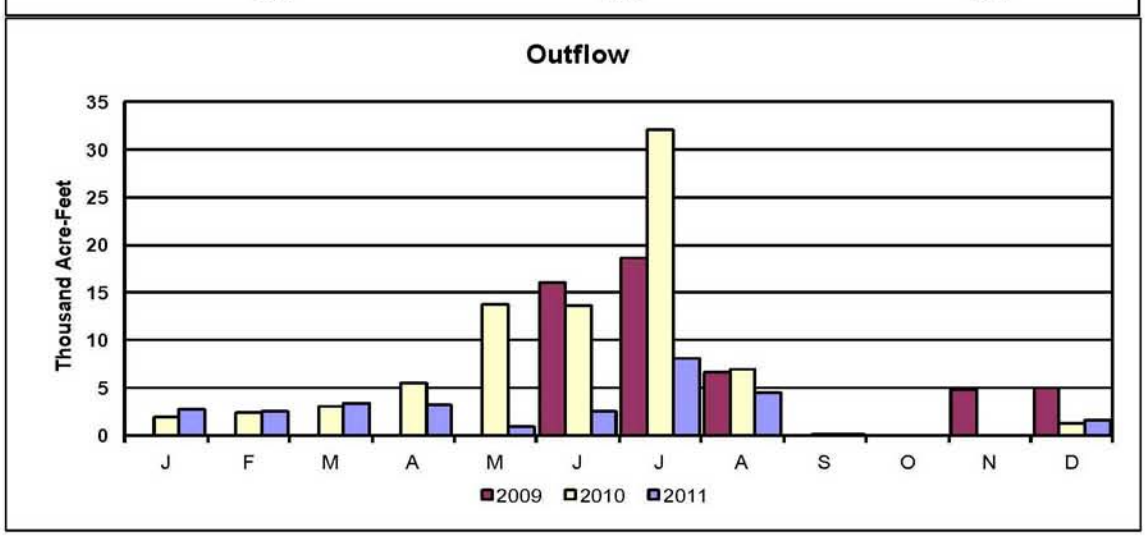
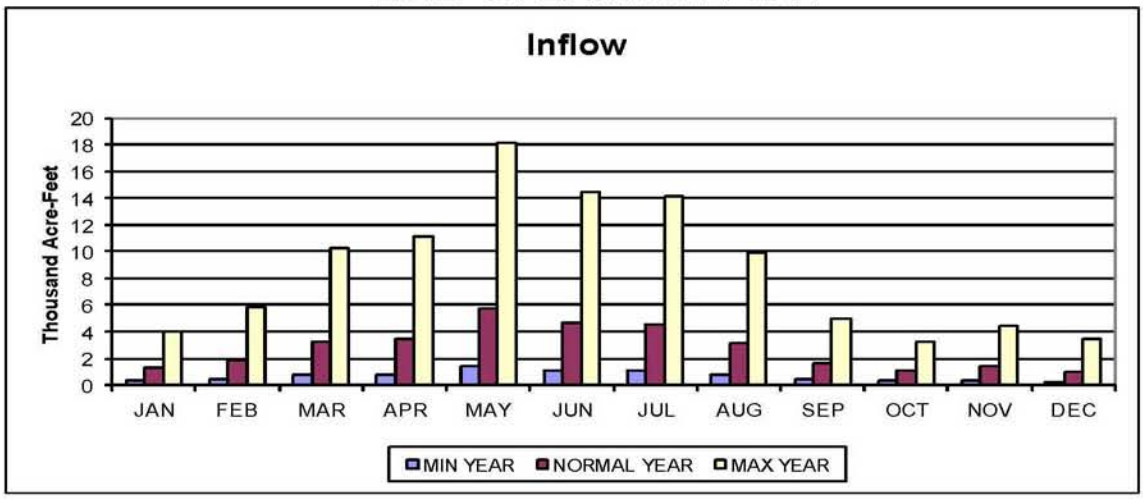
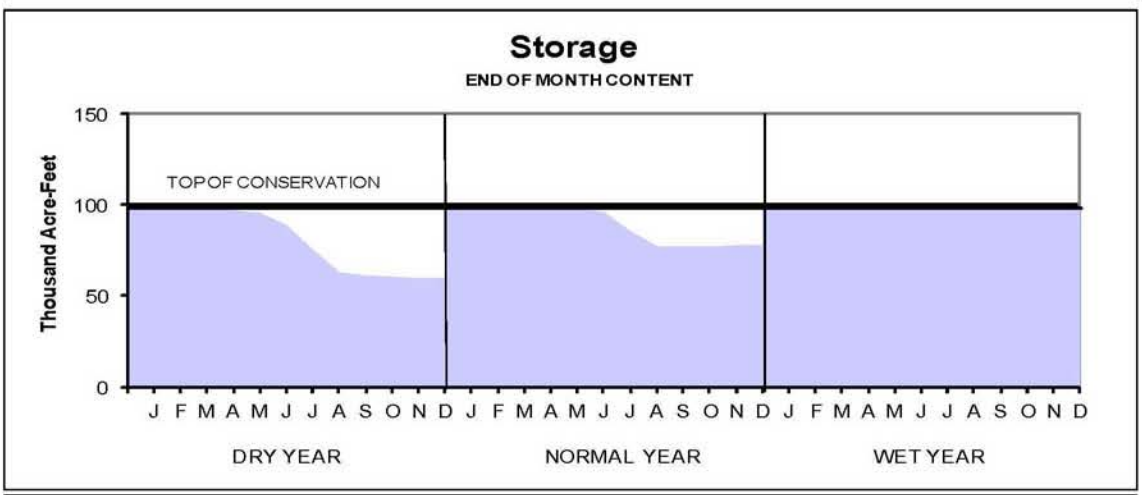



EXHIBIT 13B

# KIRWIN RESERVOIR

## 2012 OPERATION PLAN



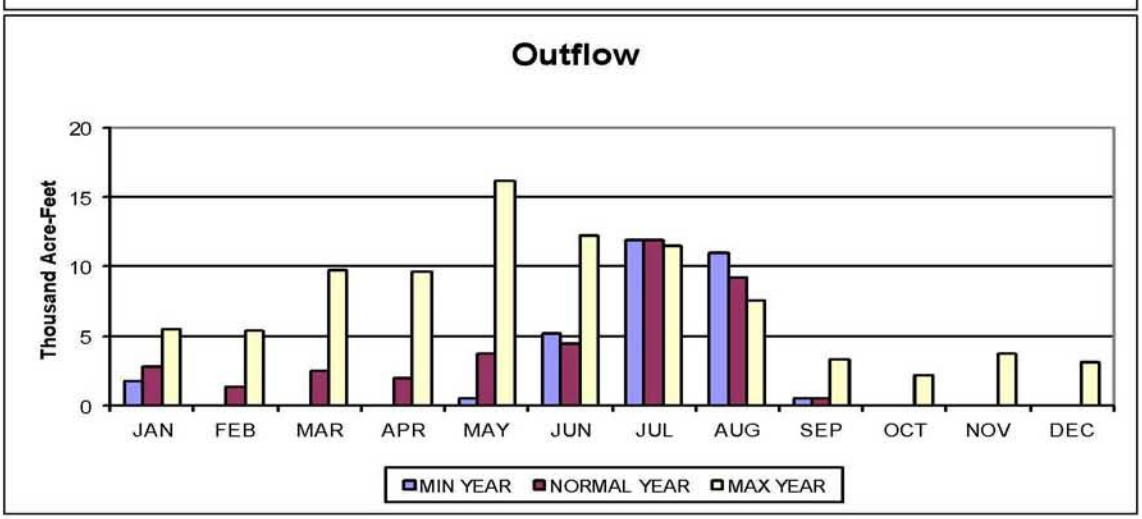
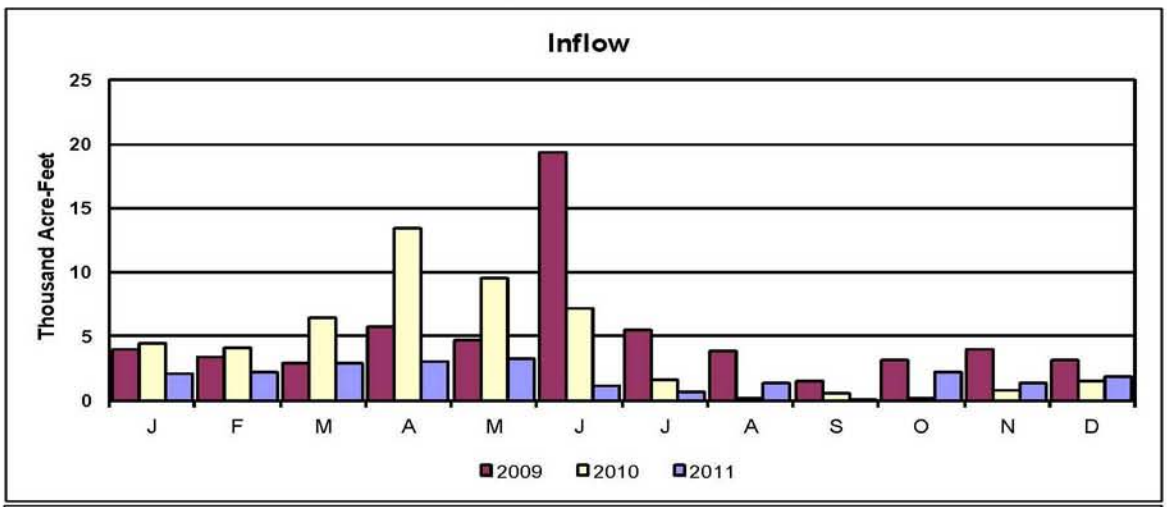
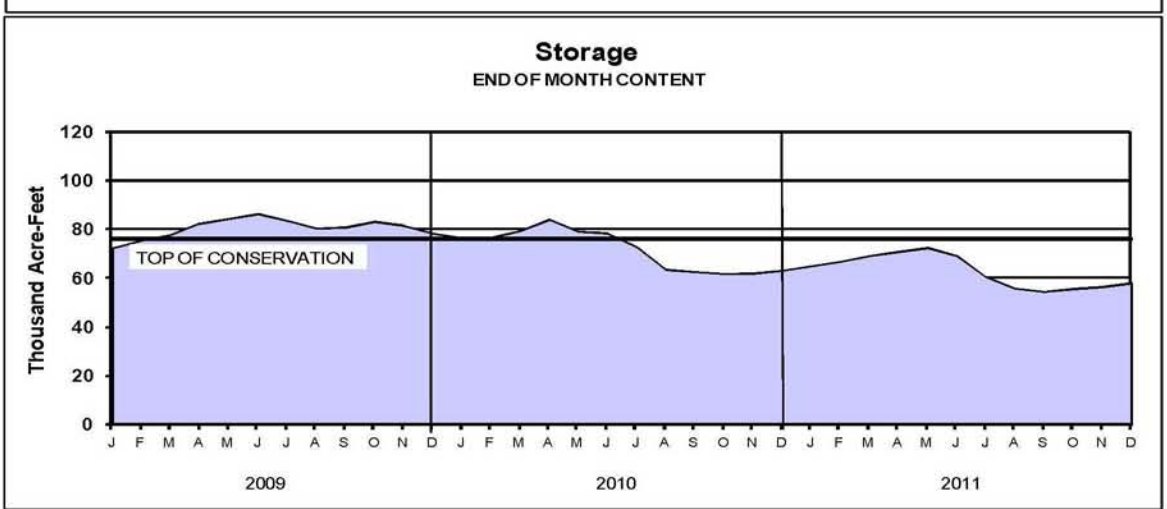



EXHIBIT 14A

# WEBSTER RESERVOIR

## ACTUAL OPERATION



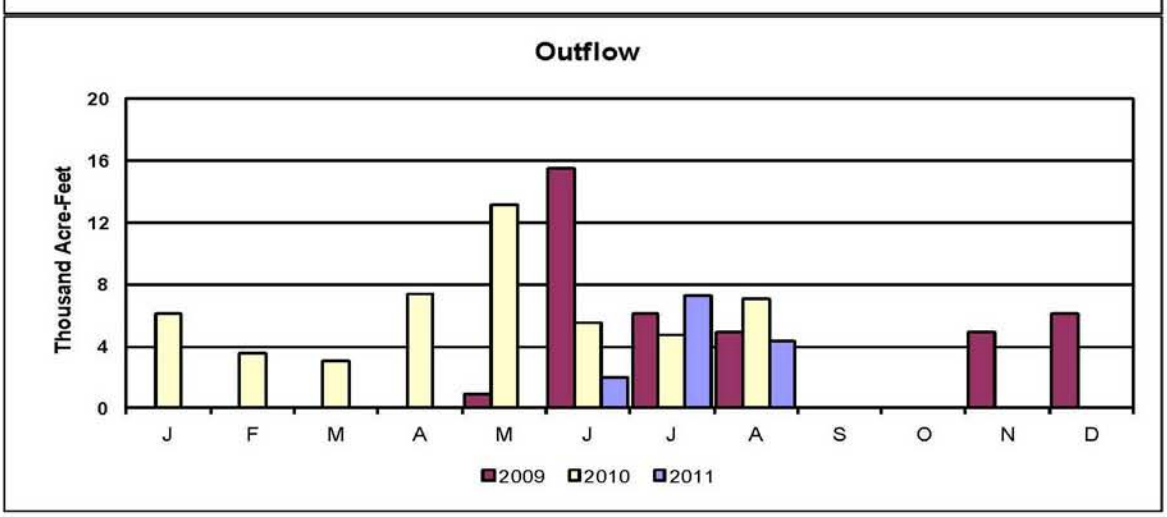
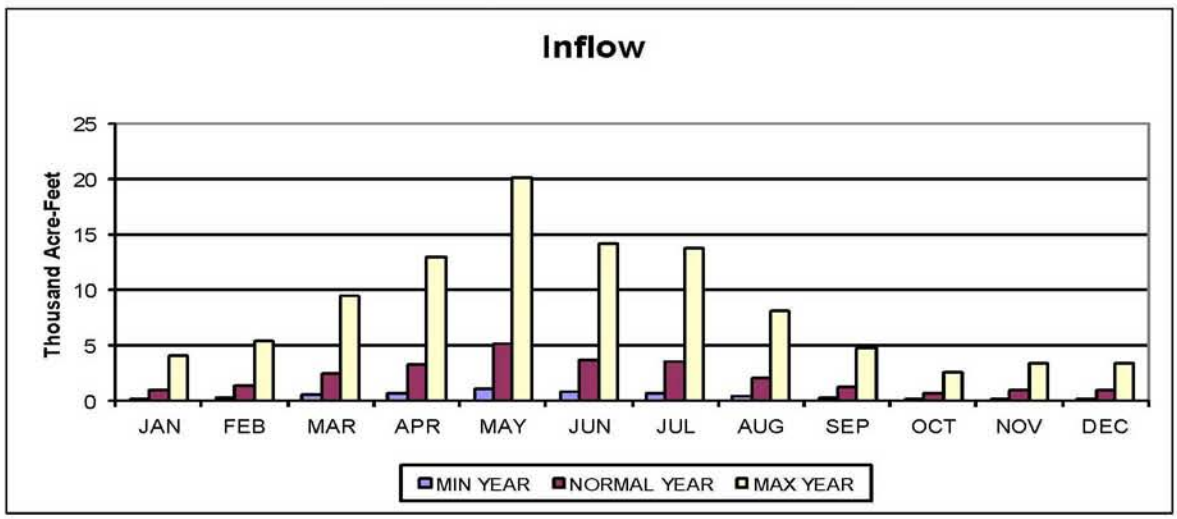
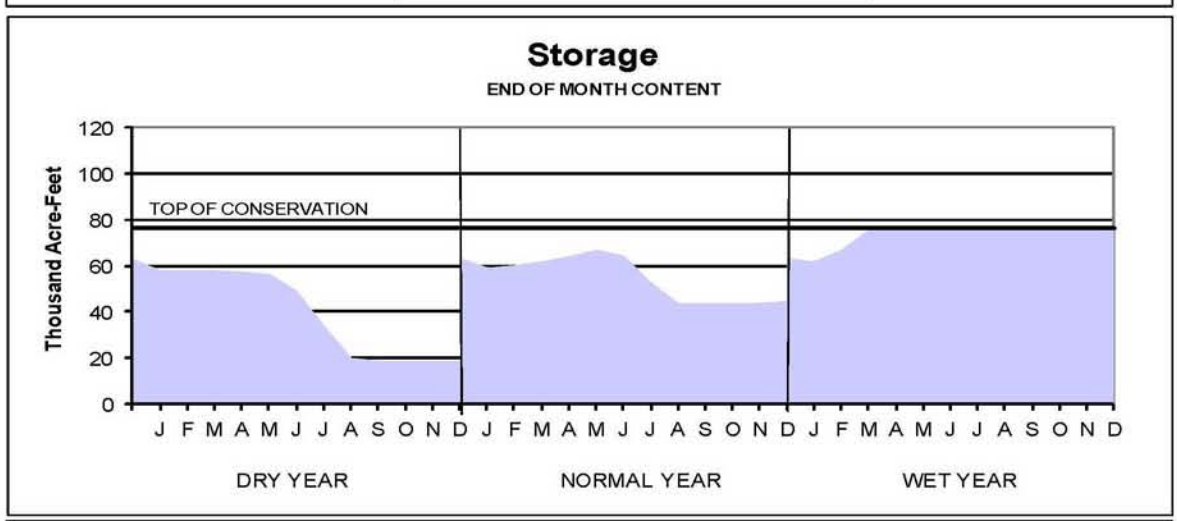



EXHIBIT 14B

# WEBSTER RESERVOIR

## 2012 OPERATION PLAN



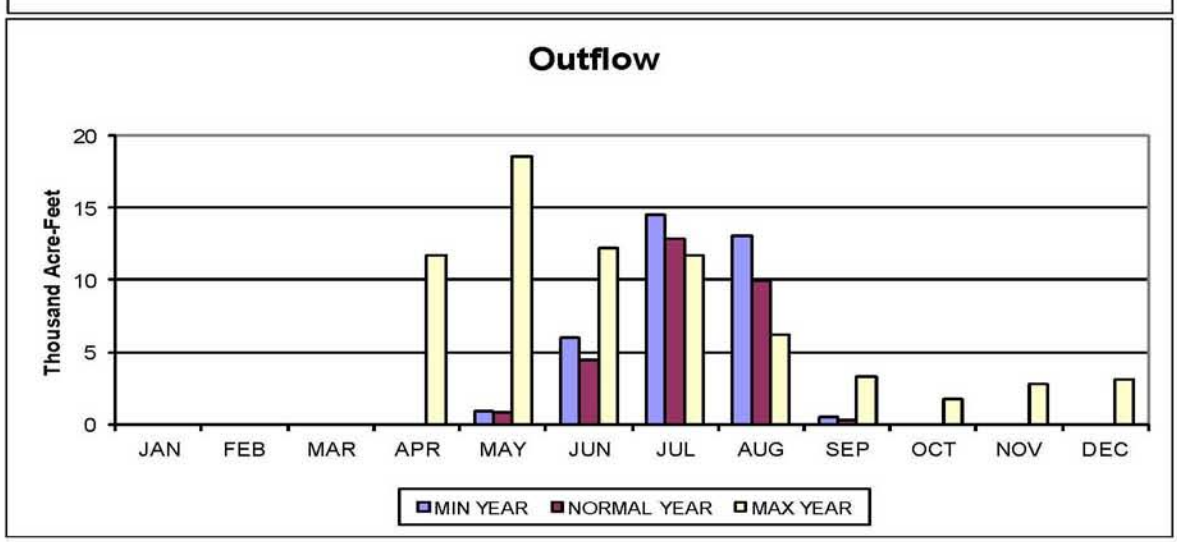
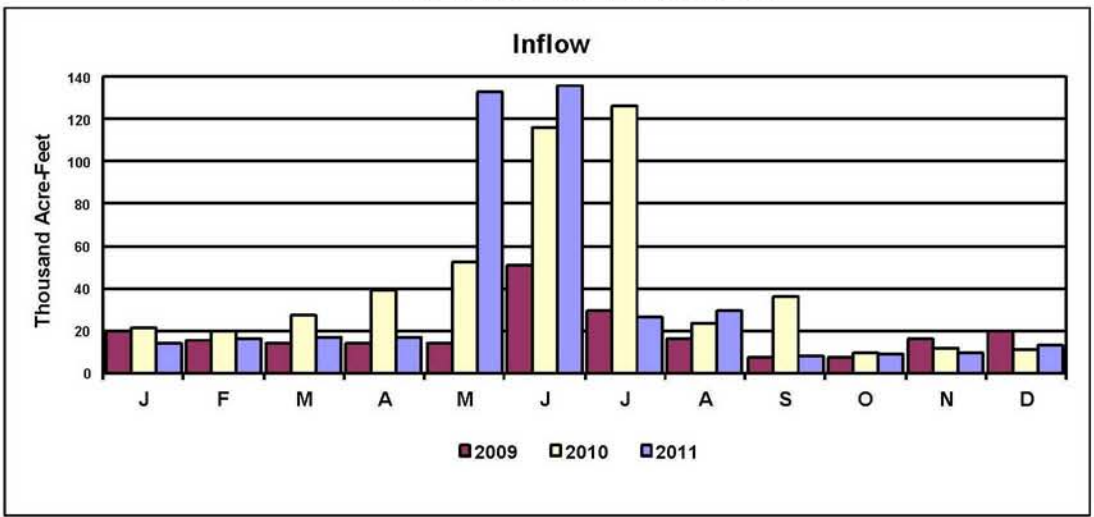
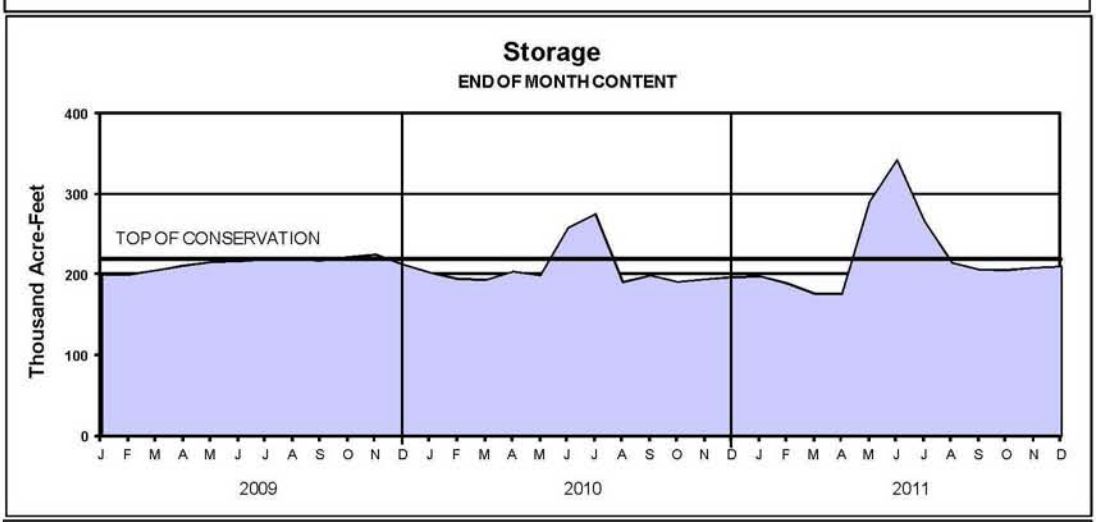



EXHIBIT 15A

# WACONDA LAKE
## ACTUAL OPERATION



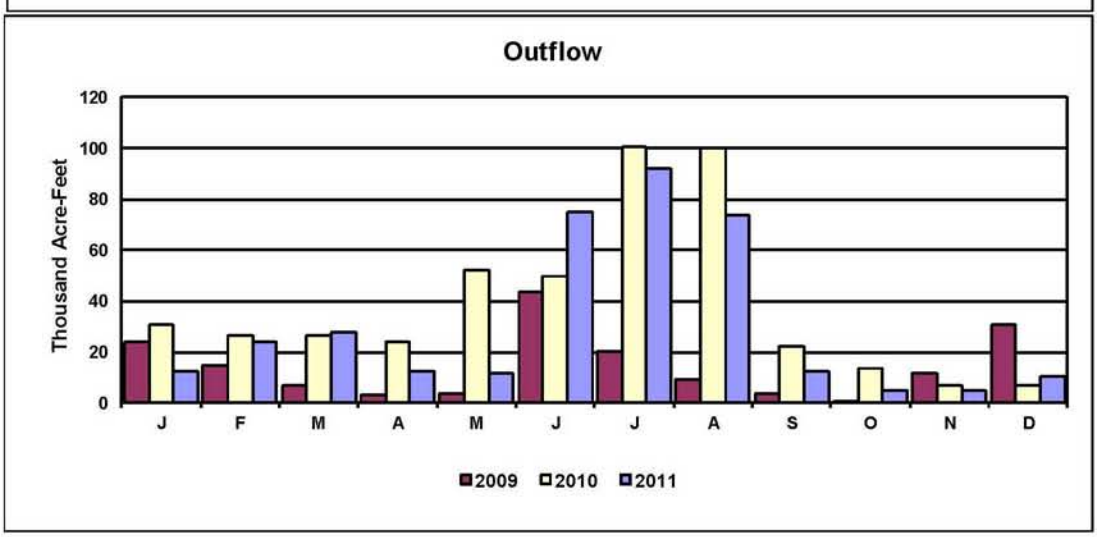
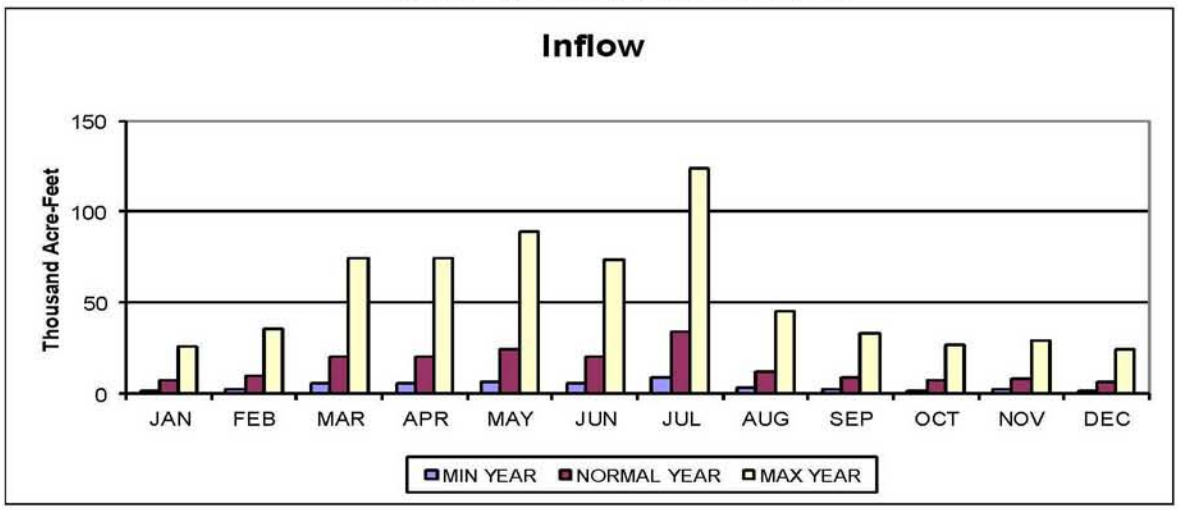
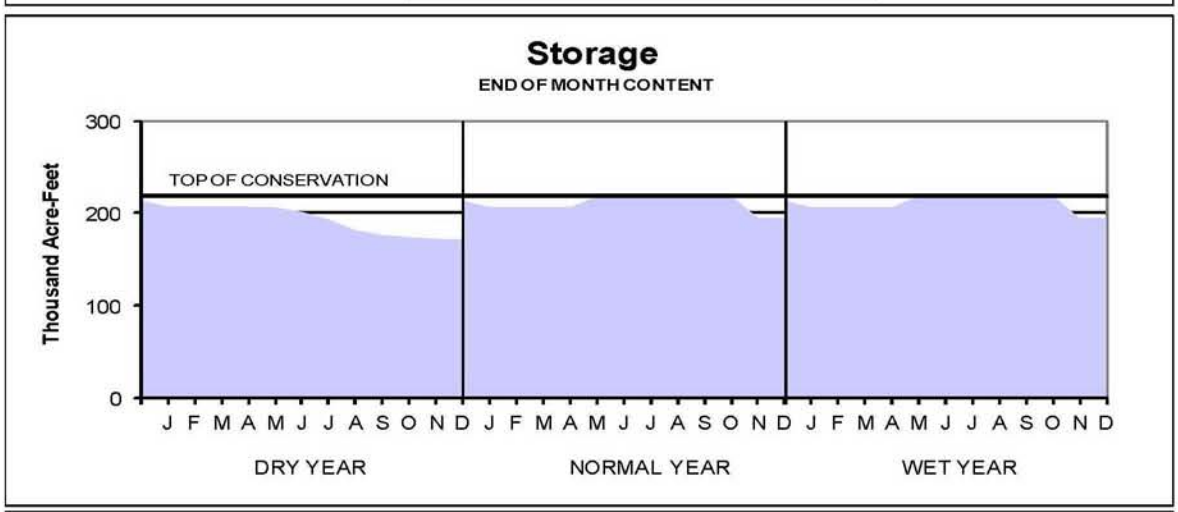



EXHIBIT 15B

# WACONDA LAKE
## 2012 OPERATION PLAN



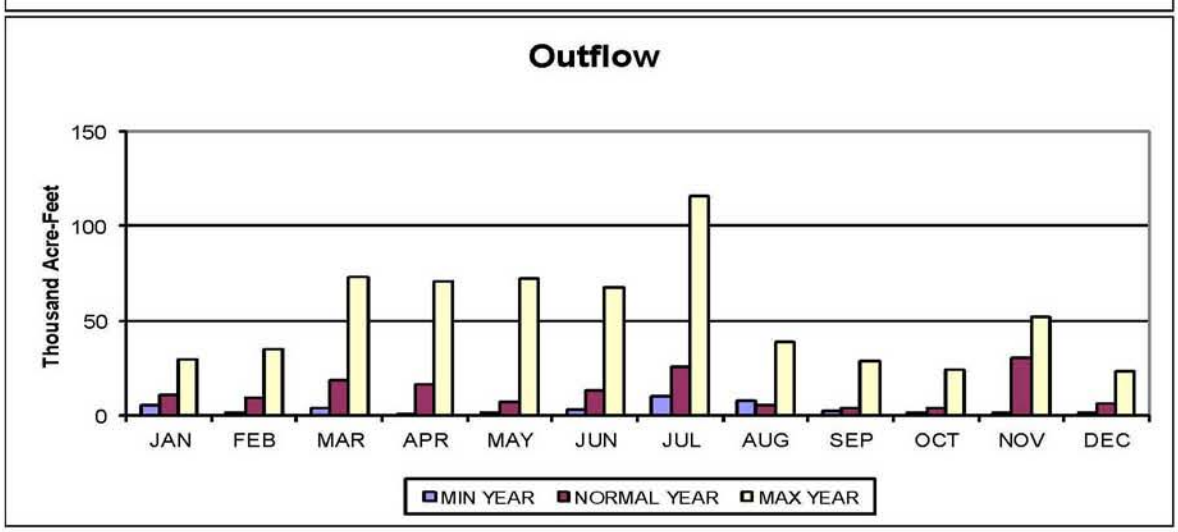
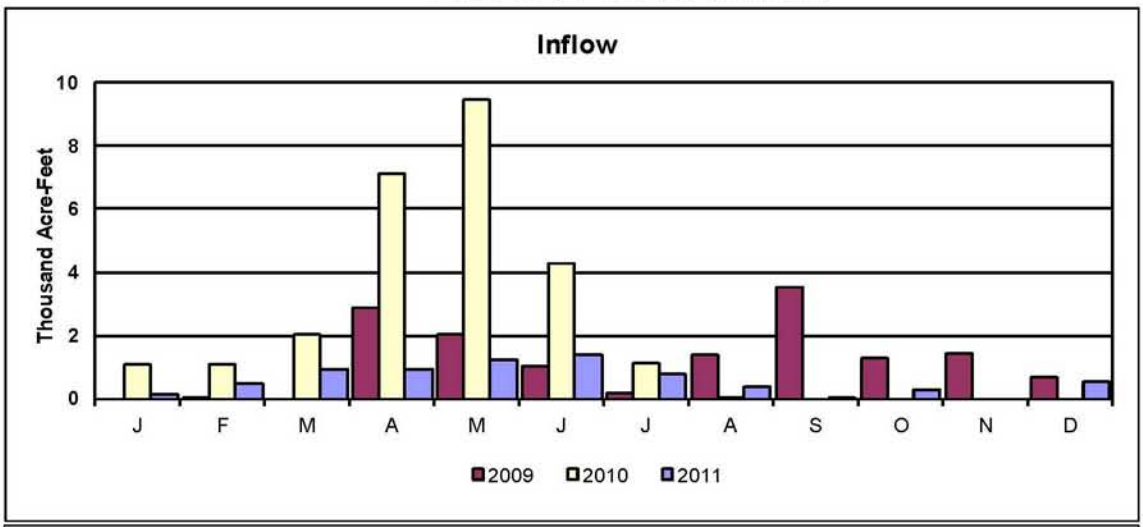
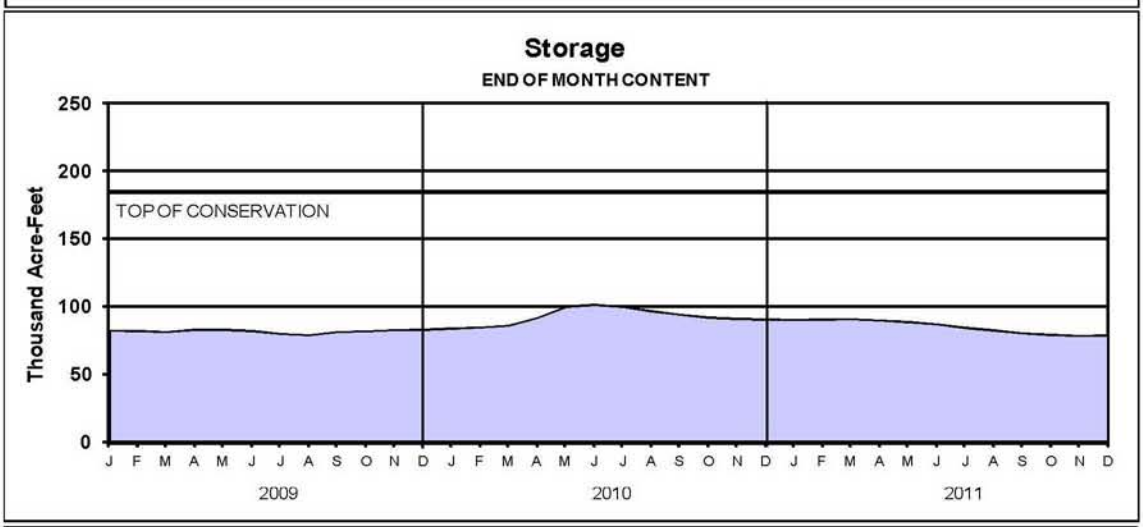



EXHIBIT 16A

# CEDAR BLUFF RESERVOIR

## ACTUAL OPERATION



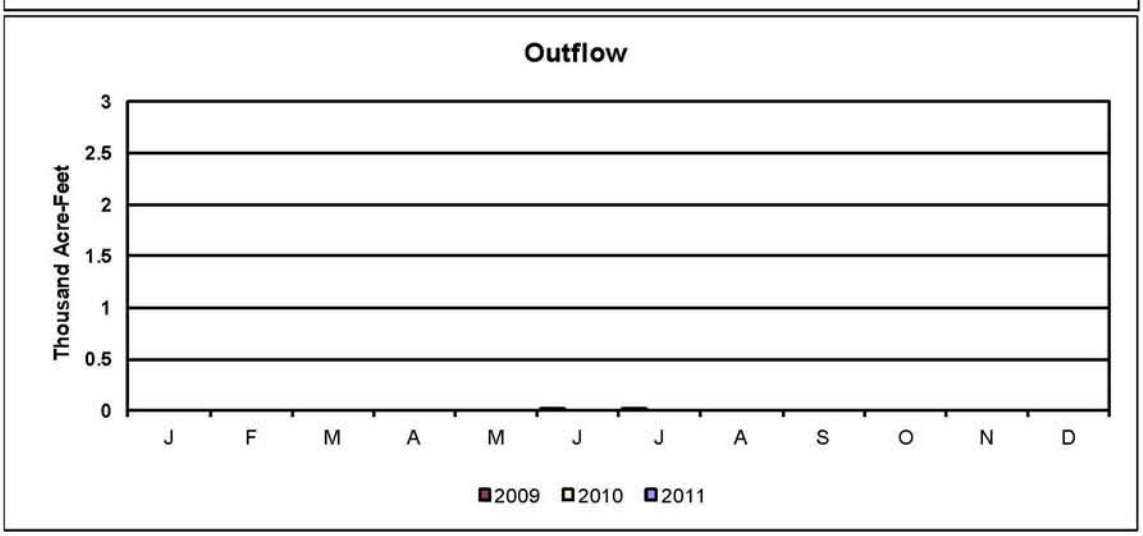
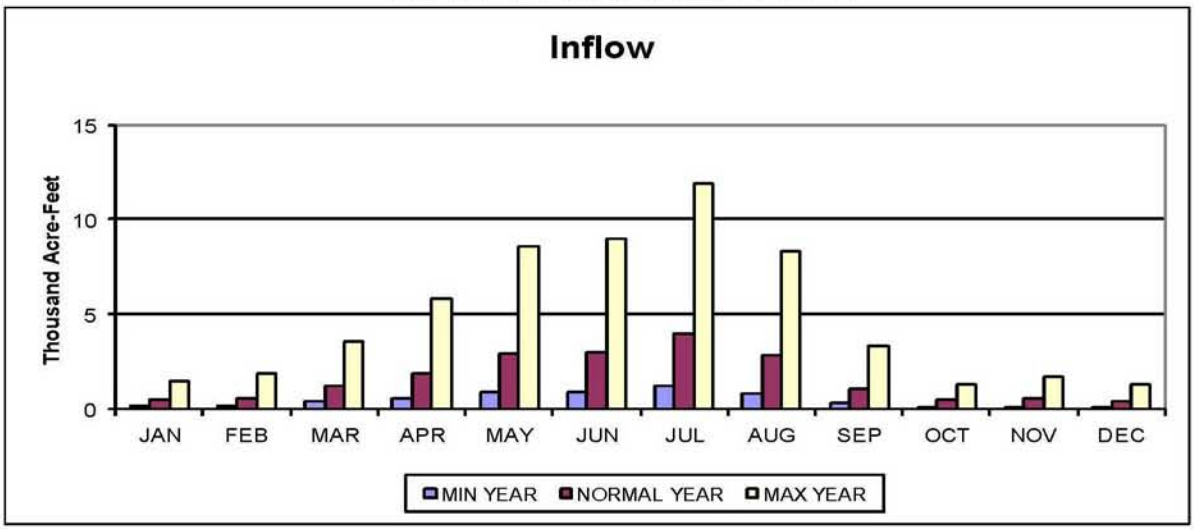
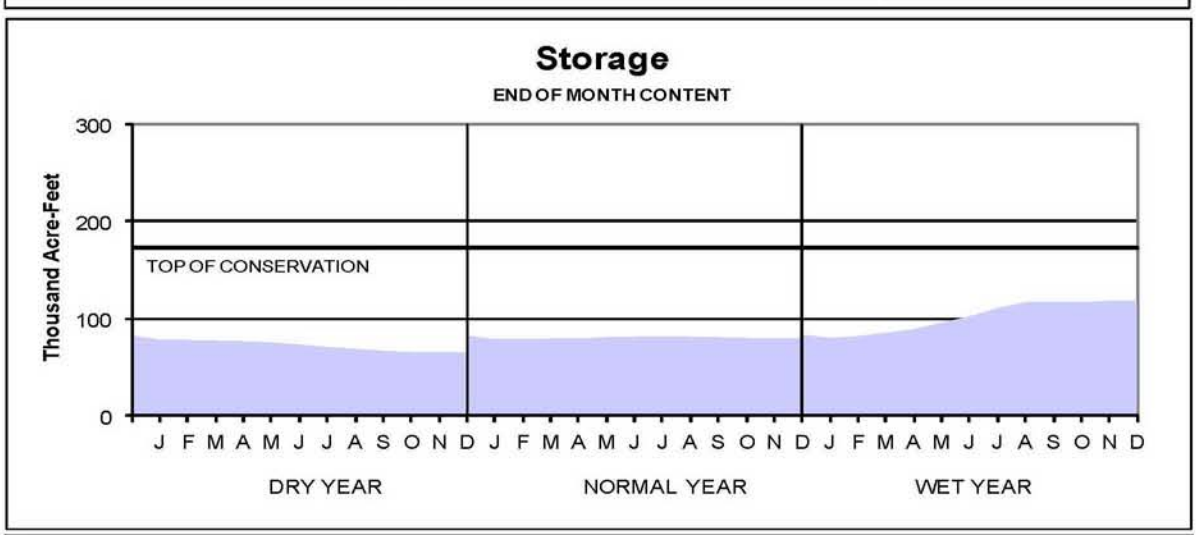



EXHIBIT 16B

# CEDAR BLUFF RESERVOIR

## 2012 OPERATION PLAN



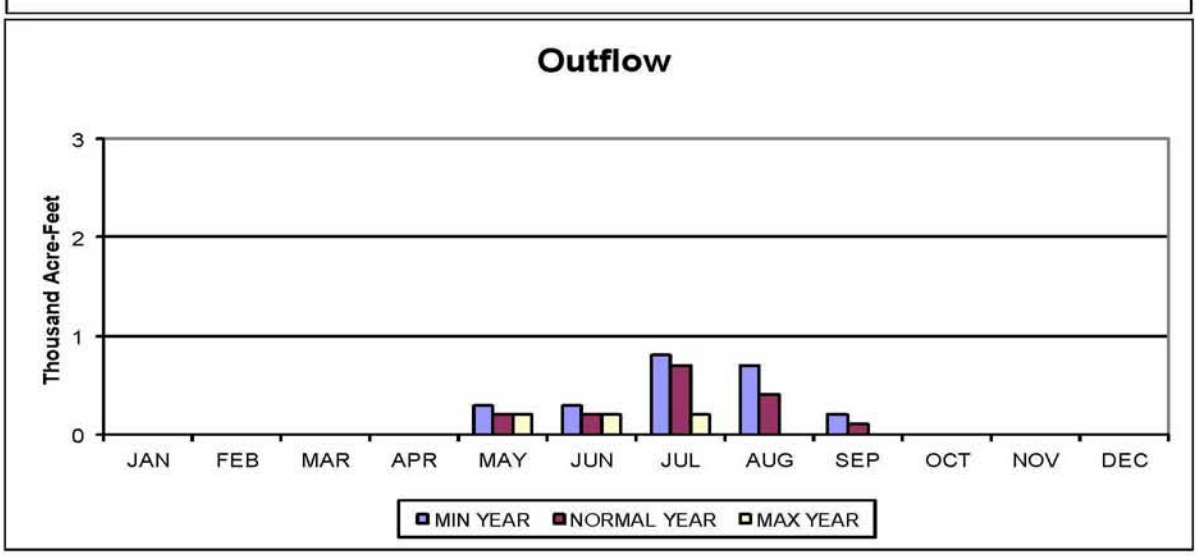
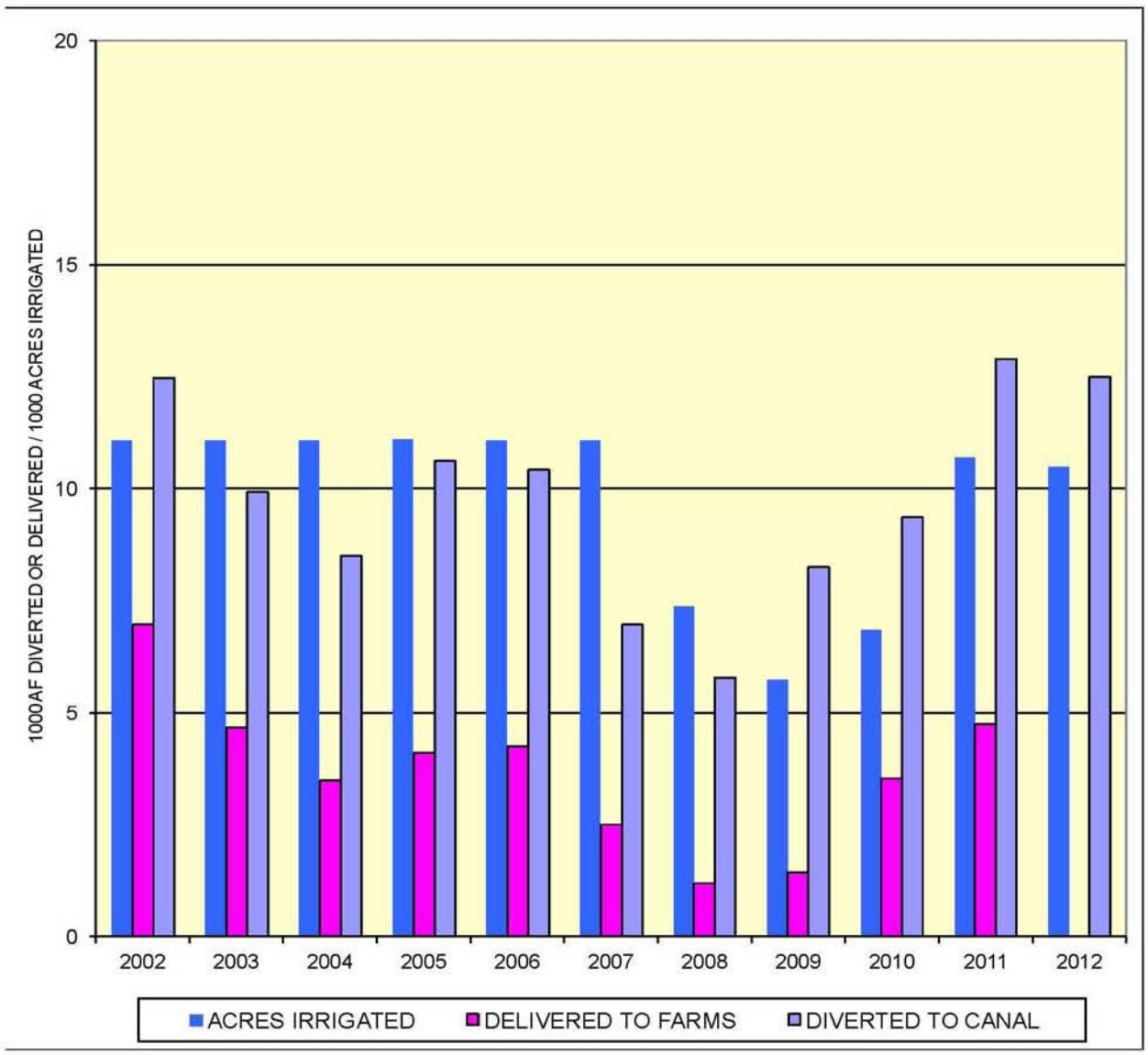



EXHIBIT 17

# MIRAGE FLATS IRRIGATION DISTRICT

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




| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| DIVERTED af/acre | 1.12 | 0.90 | 0.77 | 0.96 | 0.94 | 0.63 | 0.78 | 1.44 | 1.37 | 1.20 |
| DELIVERED af/acre | 0.63 | 0.42 | 0.32 | 0.37 | 0.38 | 0.23 | 0.16 | 0.25 | 0.52 | 0.44 |
| EFFICIENCY | 56% | 47% | 41% | 39% | 41% | 36% | 21% | 18% | 38% | 37% |

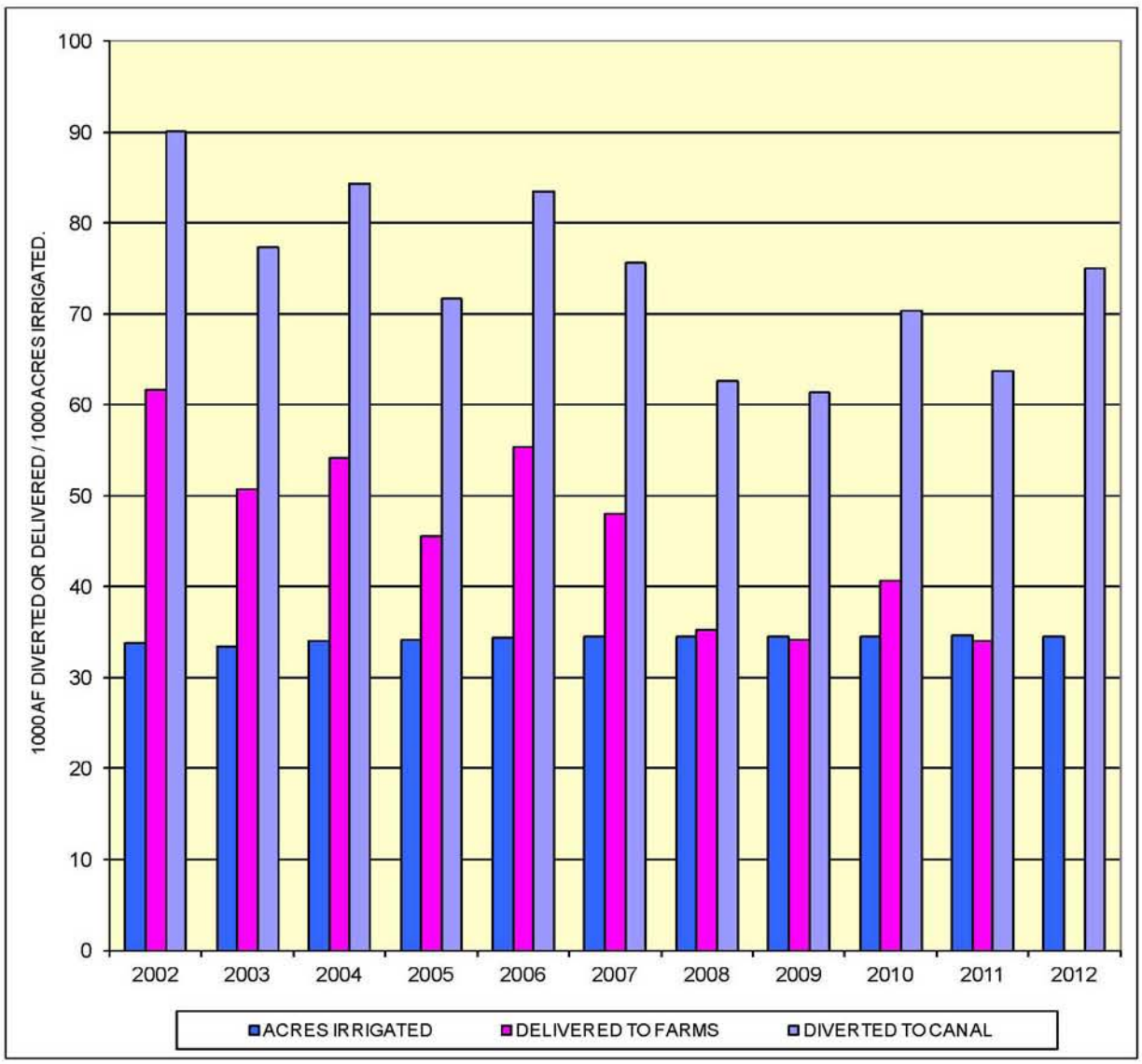
FORECASTED SHORTAGES (2012)

| | |
|---|---|
| DRY YEAR | 16,100 AF |
| NORMAL YEAR | 7,300 AF |
| WET YEAR | 0 AF |

EXHIBIT 18

# AINSWORTH IRRIGATION DISTRICT

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




| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| DIVERTED af/acre | 2.67 | 2.31 | 2.48 | 2.10 | 2.42 | 2.19 | 1.81 | 1.77 | 2.03 | 1.84 |
| DELIVERED af/acre | 1.83 | 1.52 | 1.59 | 1.33 | 1.61 | 1.39 | 1.02 | 0.99 | 1.18 | 0.98 |
| EFFICIENCY | 68% | 66% | 64% | 63% | 66% | 64% | 56% | 56% | 58% | 53% |

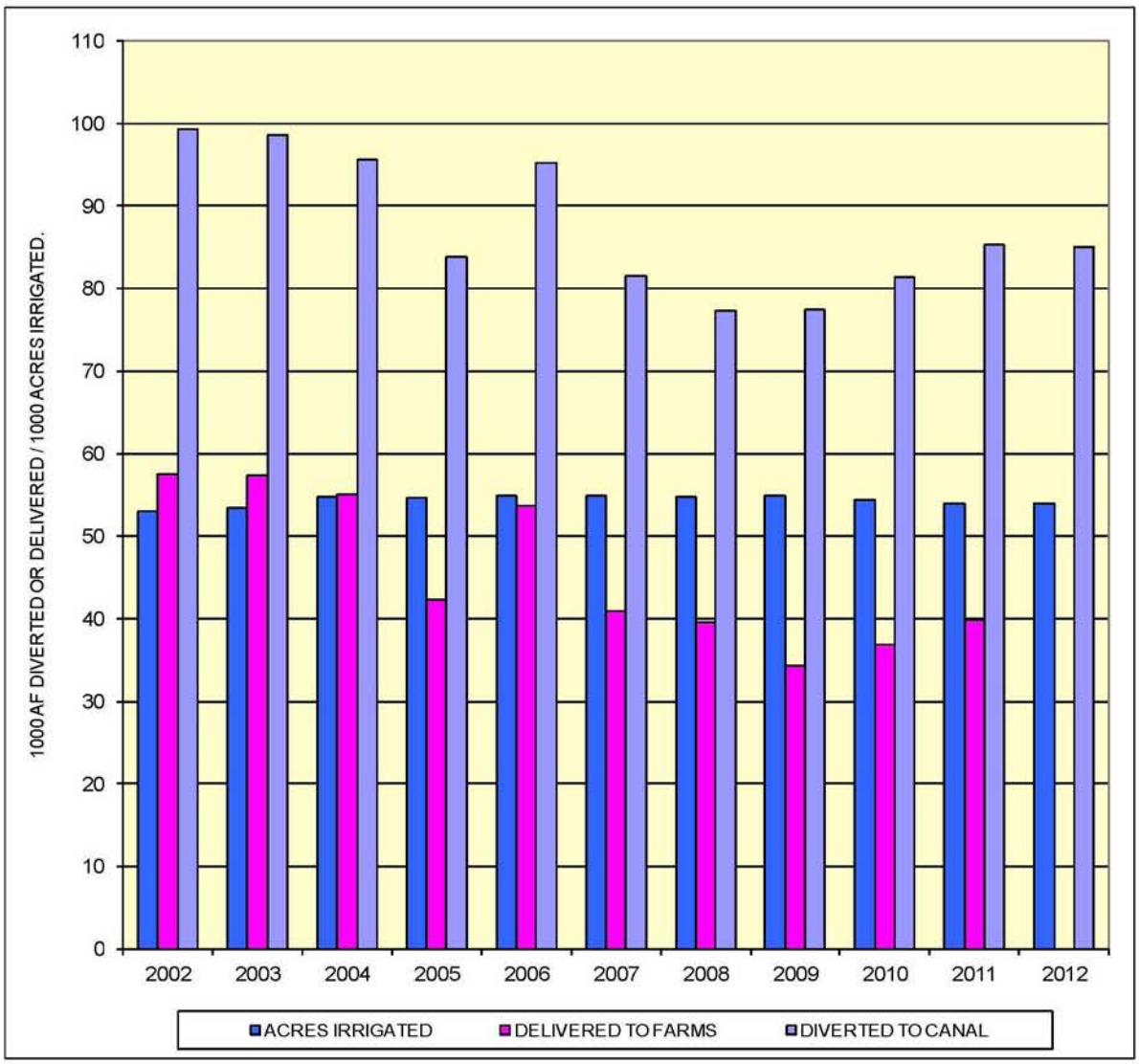
FORECASTED SHORTAGES (2012)

| | |
|---|---|
| DRY YEAR | 0 AF |
| NORMAL YEAR | 0 AF |
| WET YEAR | 0 AF |

EXHIBIT 19

# TWIN LOUPS IRRIGATION DISTRICT

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




| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| DIVERTED af/acre | 1.87 | 1.84 | 1.75 | 1.53 | 1.74 | 1.48 | 1.41 | 1.41 | 1.50 | 1.58 |
| DELIVERED af/acre | 1.09 | 1.07 | 1.00 | 0.77 | 0.98 | 0.74 | 0.72 | 0.62 | 0.68 | 0.74 |
| EFFICIENCY | 58% | 58% | 58% | 50% | 56% | 50% | 51% | 44% | 45% | 47% |

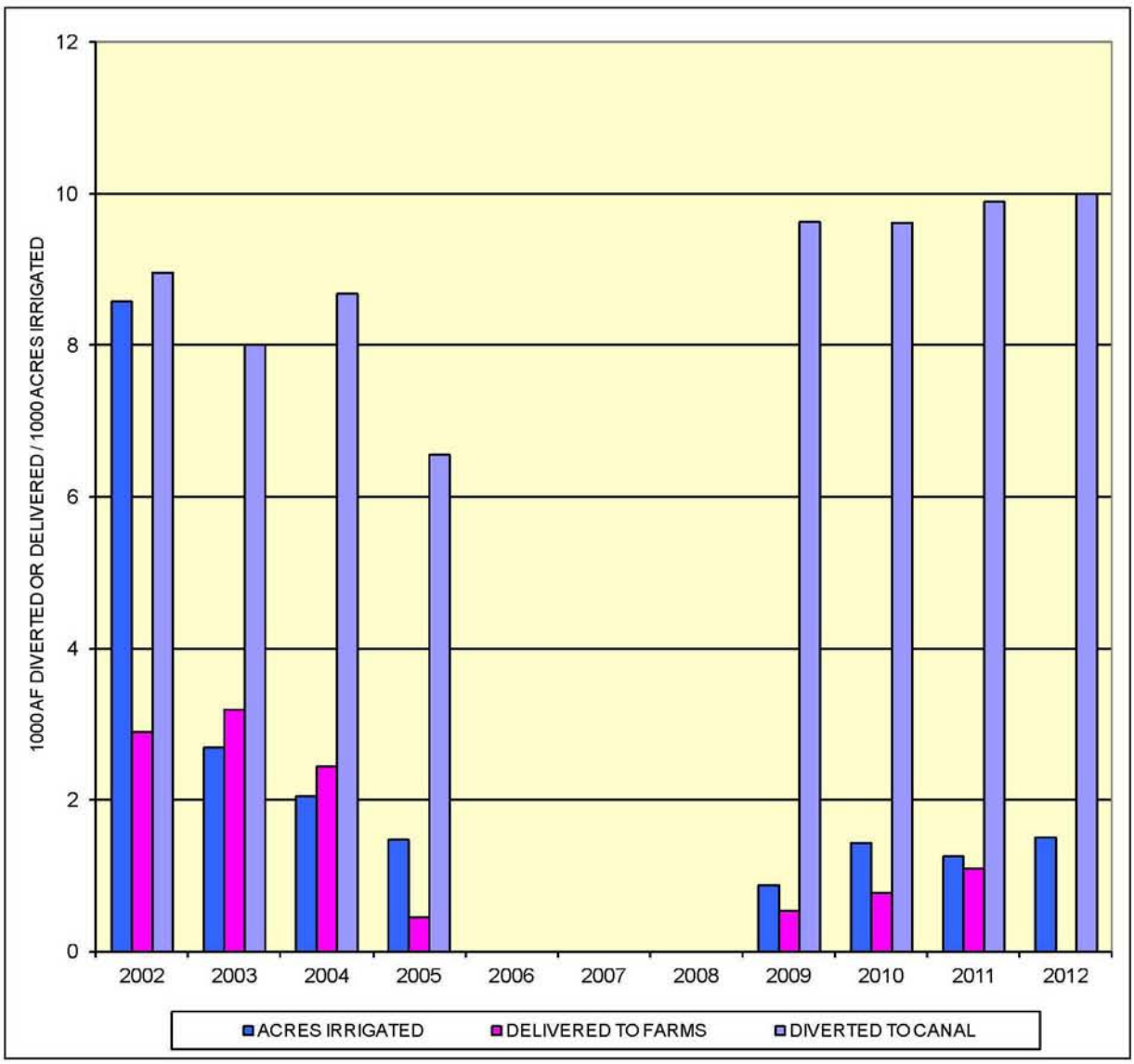
FORECASTED SHORTAGES (2012)

| | |
|---|---|
| DRY YEAR | 0 AF |
| NORMAL YEAR | 0 AF |
| WET YEAR | 0 AF |

EXHIBIT 20

# FRENCHMAN VALLEY IRRIGATION DISTRICT

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




| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| DIVERTED af/acre | 1.05 | 2.97 | 4.24 | 4.43 | 0.00 | 0.00 | 0.00 | 11.01 | 6.74 | 7.91 |
| DELIVERED af/acre | 0.34 | 1.18 | 1.19 | 0.30 | 0.00 | 0.00 | 0.00 | 0.61 | 0.54 | 0.88 |
| EFFICIENCY | 32% | 40% | 28% | 7% | 0% | 0% | 0% | 6% | 8% | 11% |

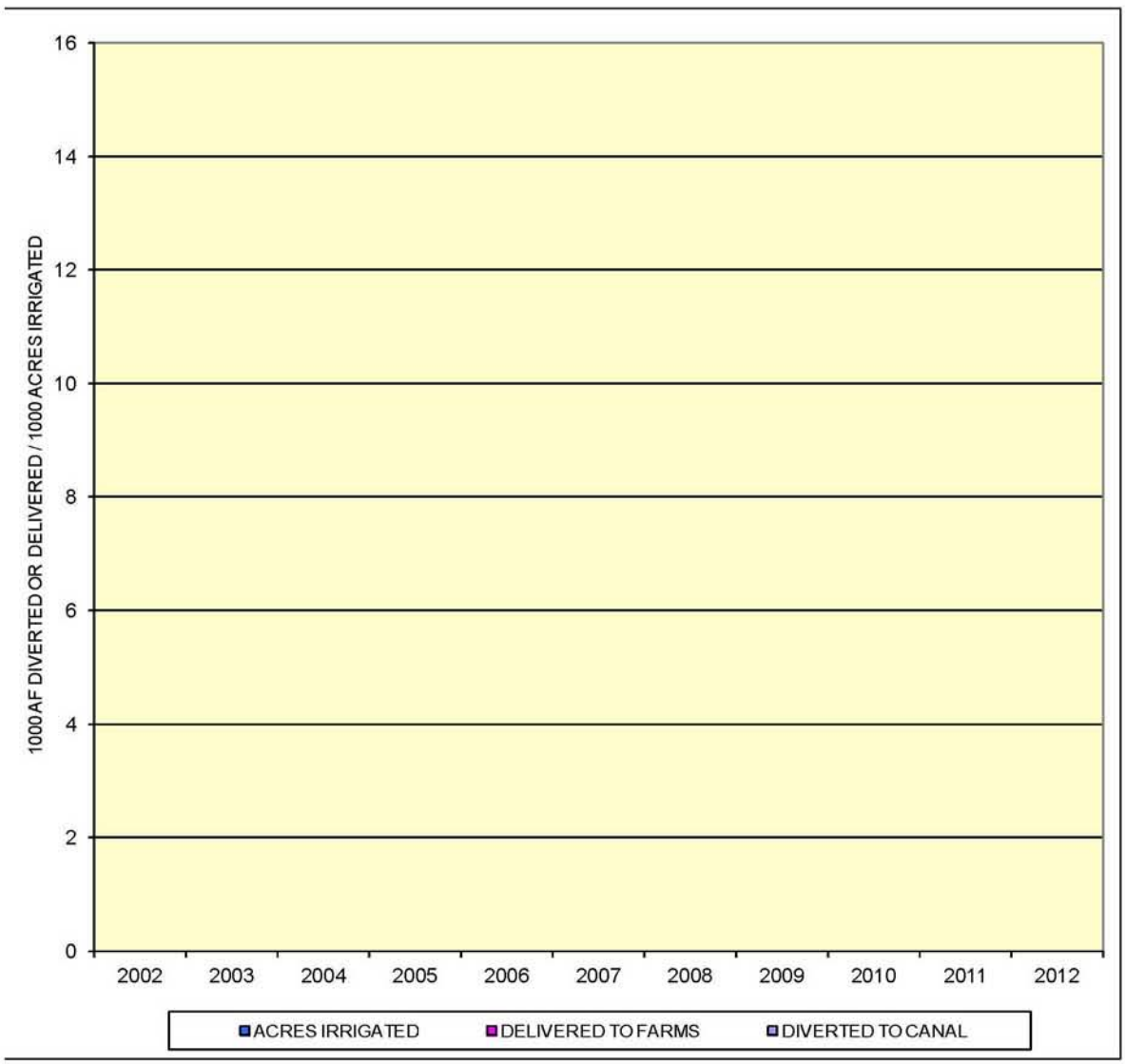
FORECASTED SHORTAGES (2012)

| | |
|---|---|
| DRY YEAR | 30,800 AF |
| NORMAL YEAR | 22,000 AF |
| WET YEAR | 6,600 AF |

EXHIBIT 21

# H AND RW IRRIGATION DISTRICT

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




| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| DIVERTED af/acre | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| DELIVERED af/acre | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| EFFICIENCY | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |

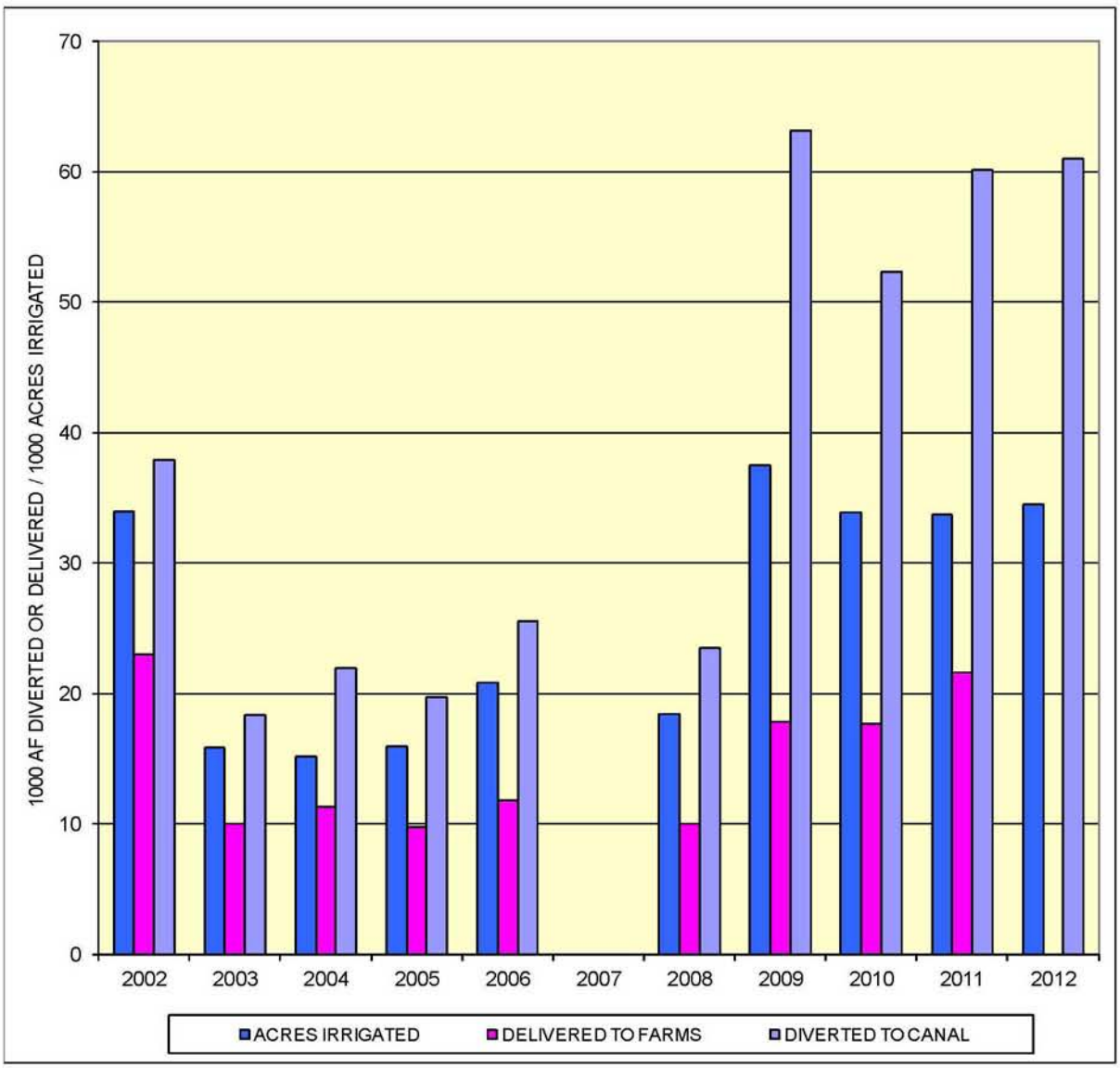
FORECASTED SHORTAGES (2012)

| | |
|---|---|
| DRY YEAR | 39,200 AF |
| NORMAL YEAR | 27,900 AF |
| WET YEAR | 8,400 AF |

EXHIBIT 22

# FRENCHMAN-CAMBRIDGE IRRIGATION DISTRICT

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




| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| DIVERTED af/acre | 1.12 | 1.15 | 1.45 | 1.24 | 1.23 | 0.00 | 1.27 | 1.68 | 1.55 | 1.78 |
| DELIVERED af/acre | 0.67 | 0.63 | 0.74 | 0.61 | 0.57 | 0.00 | 0.54 | 0.47 | 0.52 | 0.64 |
| EFFICIENCY | 61% | 55% | 52% | 50% | 46% | 0% | 42% | 28% | 34% | 36% |

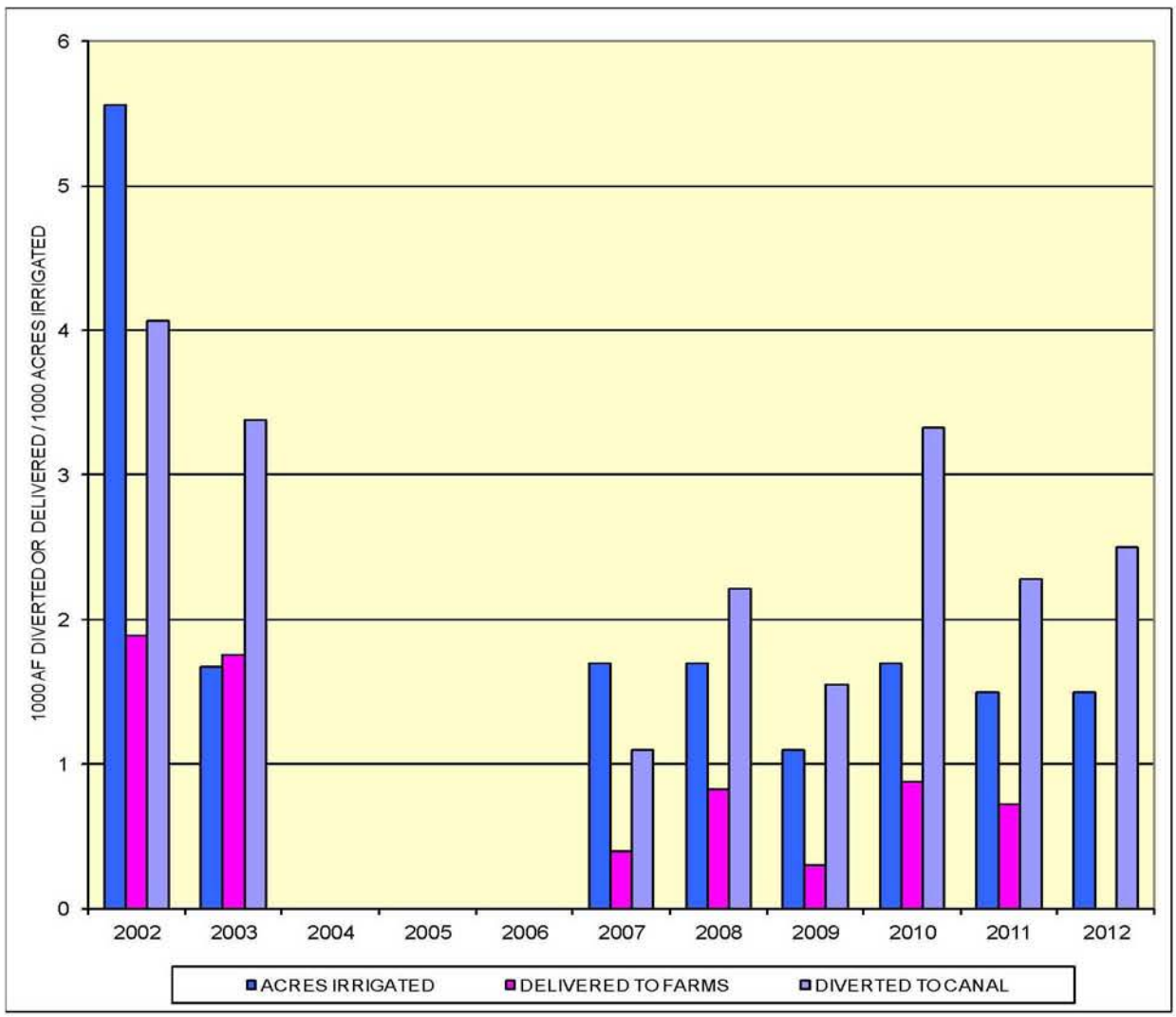
FORECASTED SHORTAGES (2012)

| | |
|---|---|
| DRY YEAR | 24,000 AF |
| NORMAL YEAR | 4,200 AF |
| WET YEAR | 1,100 AF |

EXHIBIT 23

# ALMENA IRRIGATION DISTRICT

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




| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| DIVERTED af/acre | 0.73 | 2.02 | 0.00 | 0.00 | 0.00 | 0.65 | 1.30 | 1.41 | 1.96 | 1.52 |
| DELIVERED af/acre | 0.34 | 1.05 | 0.00 | 0.00 | 0.00 | 0.24 | 0.49 | 0.27 | 0.52 | 0.48 |
| EFFICIENCY | 46% | 52% | 0% | 0% | 0% | 36% | 37% | 19% | 26% | 32% |

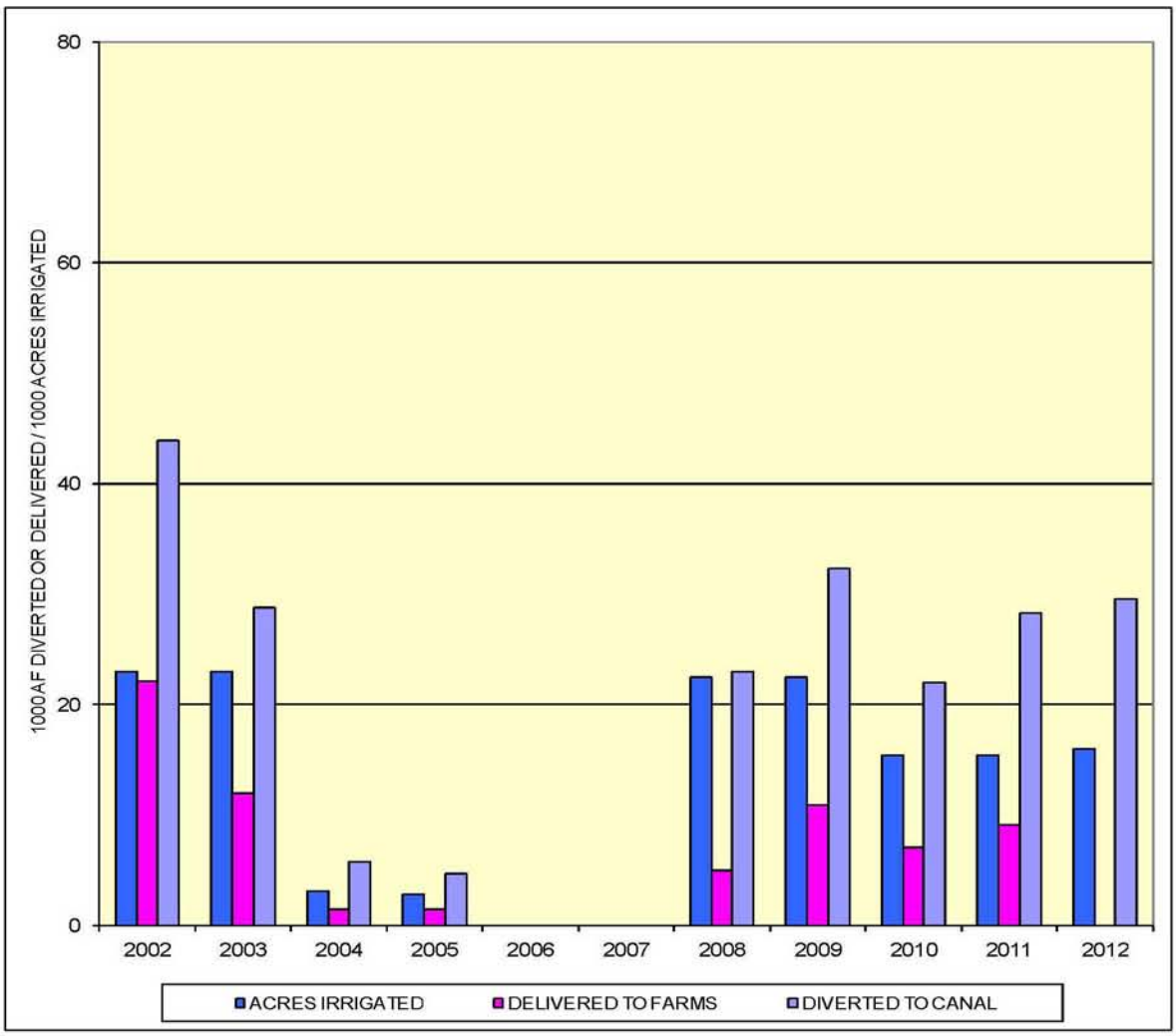
FORECASTED SHORTAGES (2012)

| | |
|---|---|
| DRY YEAR | 12,000 AF |
| NORMAL YEAR | 6,200 AF |
| WET YEAR | 0 AF |

EXHIBIT 24

# BOSTWICK IRRIGATION DISTRICT - NEBRASKA

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




| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| DIVERTED af/acre | 1.91 | 1.25 | 1.85 | 1.68 | 0.00 | 0.00 | 1.02 | 1.44 | 1.43 | 1.84 |
| DELIVERED af/acre | 0.96 | 0.52 | 0.47 | 0.53 | 0.00 | 0.00 | 0.22 | 0.48 | 0.46 | 0.59 |
| EFFICIENCY | 50% | 42% | 25% | 32% | 0% | 0% | 22% | 34% | 32% | 32% |

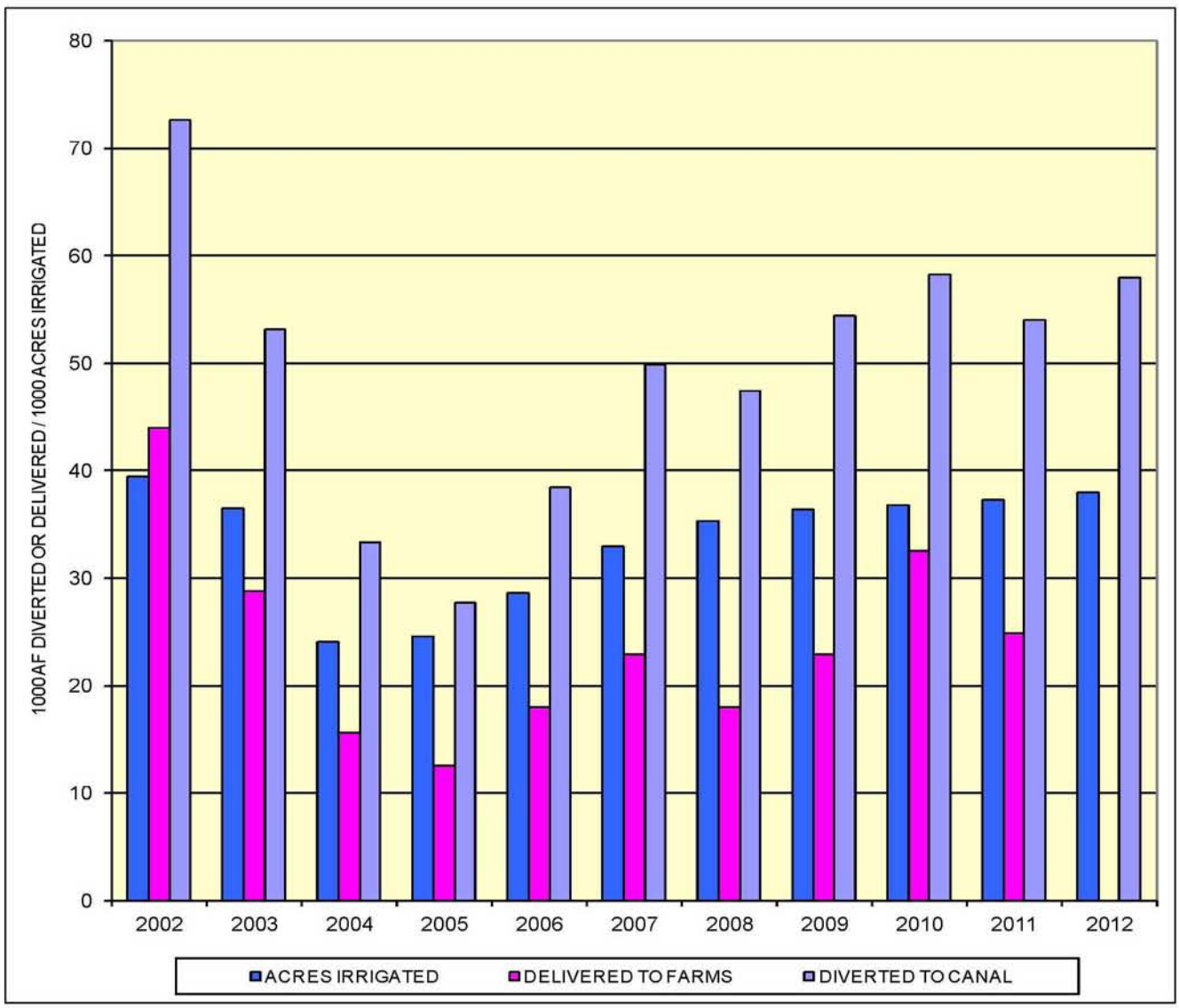
FORECASTED SHORTAGES (2012)

| | |
|---|---|
| DRY YEAR | 0 AF |
| NORMAL YEAR | 0 AF |
| WET YEAR | 0 AF |

EXHIBIT 25

# KANSAS-BOSTWICK IRRIGATION DISTRICT

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




| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| DIVERTED af/acre | 1.84 | 1.46 | 1.38 | 1.13 | 1.35 | 1.51 | 1.34 | 1.50 | 1.58 | 1.45 |
| DELIVERED af/acre | 1.11 | 0.79 | 0.65 | 0.51 | 0.63 | 0.70 | 0.51 | 0.63 | 0.89 | 0.67 |
| EFFICIENCY | 61% | 54% | 47% | 45% | 47% | 46% | 38% | 42% | 56% | 46% |

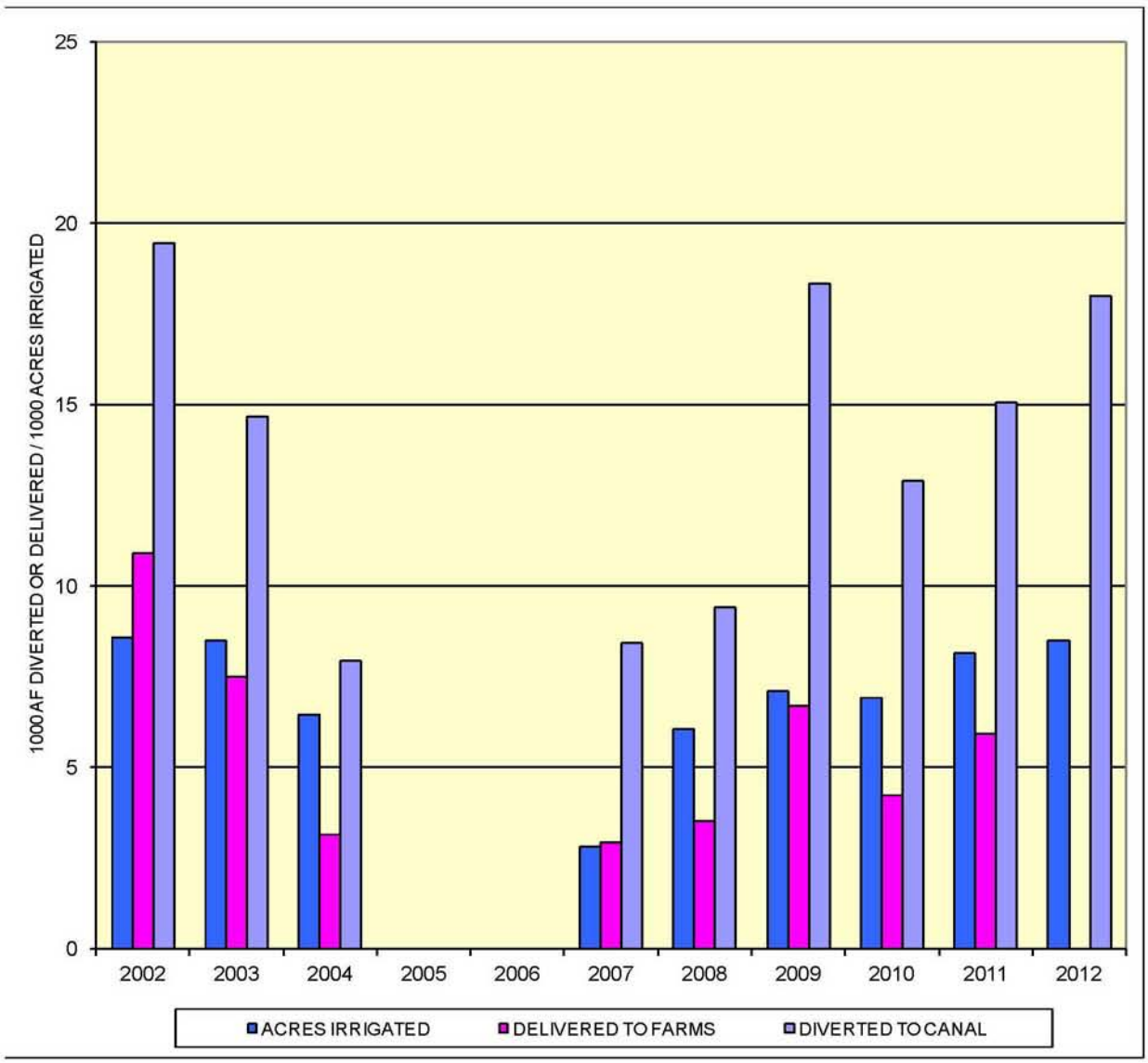
FORECASTED SHORTAGES (2012)

| | |
|---|---|
| DRY YEAR | 0 AF |
| NORMAL YEAR | 0 AF |
| WET YEAR | 0 AF |

EXHIBIT 26

# KIRWIN IRRIGATION DISTRICT

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




| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| DIVERTED af/acre | 2.27 | 1.73 | 1.23 | 0.00 | 0.00 | 3.00 | 1.56 | 2.58 | 1.87 | 1.85 |
| DELIVERED af/acre | 1.27 | 0.88 | 0.49 | 0.00 | 0.00 | 1.05 | 0.58 | 0.94 | 0.61 | 0.73 |
| EFFICIENCY | 56% | 51% | 40% | 0% | 0% | 35% | 37% | 36% | 33% | 39% |

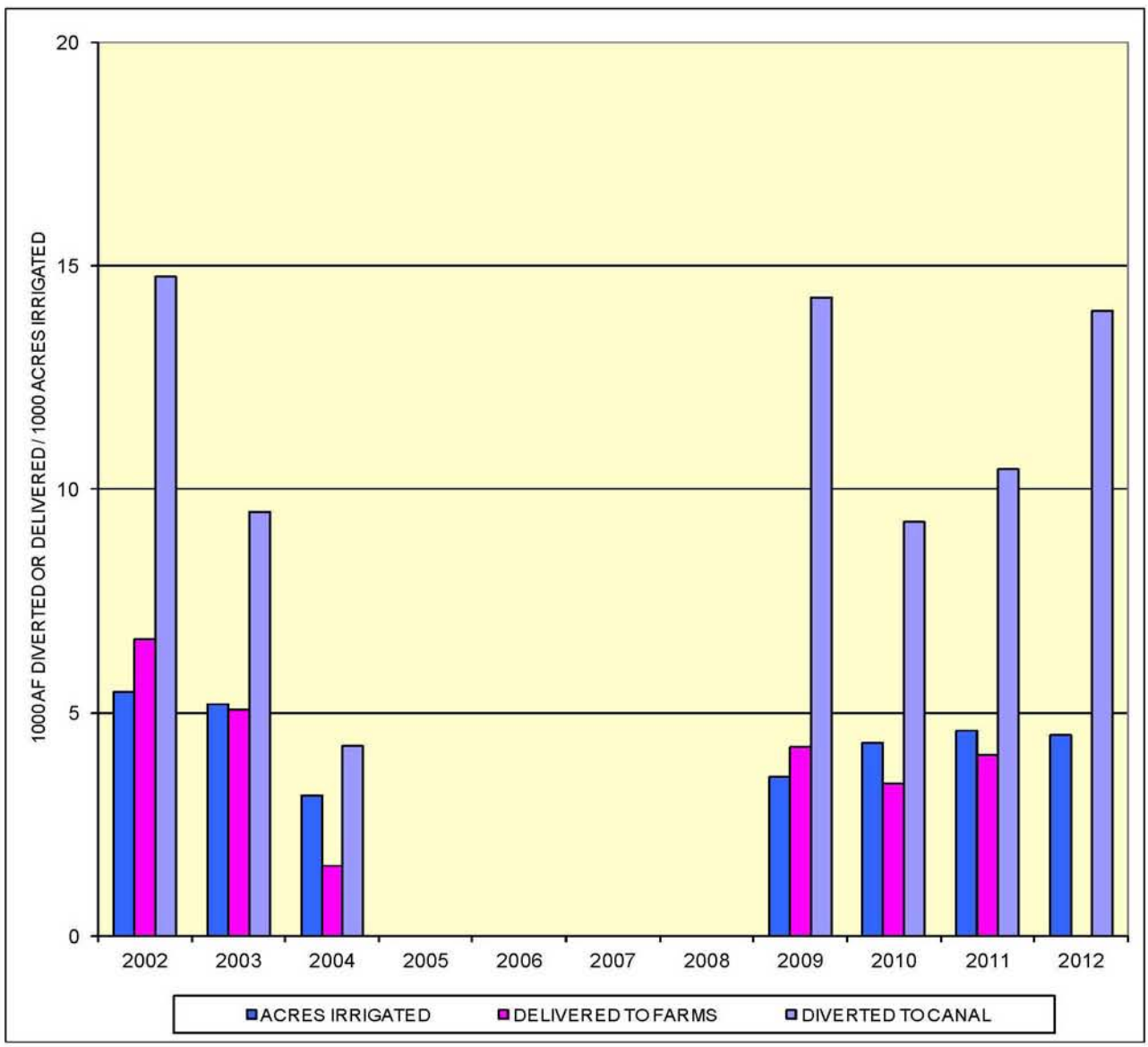
FORECASTED SHORTAGES (2012)

| | |
|---|---|
| DRY YEAR | 0 AF |
| NORMAL YEAR | 0 AF |
| WET YEAR | 0 AF |

EXHIBIT 27

# WEBSTER IRRIGATION DISTRICT

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




| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| DIVERTED af/acre | 2.71 | 1.83 | 1.35 | 0.00 | 0.00 | 0.00 | 0.00 | 4.00 | 2.14 | 2.27 |
| DELIVERED af/acre | 1.22 | 0.97 | 0.50 | 0.00 | 0.00 | 0.00 | 0.00 | 1.18 | 0.79 | 0.88 |
| EFFICIENCY | 45% | 53% | 37% | 0% | 0% | 0% | 0% | 30% | 37% | 39% |

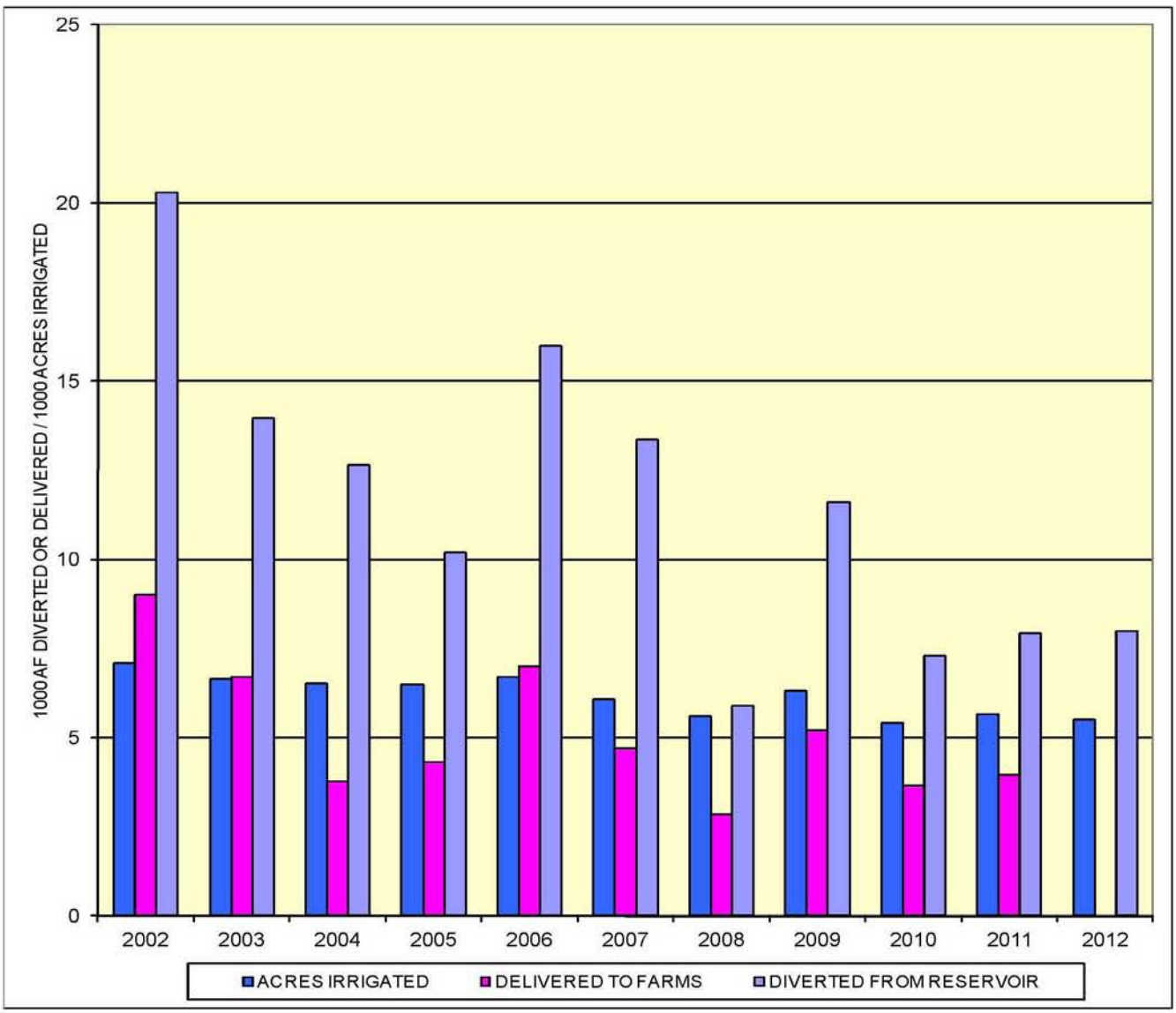
FORECASTED SHORTAGES (2012)

| | |
|---|---|
| DRY YEAR | 0 AF |
| NORMAL YEAR | 0 AF |
| WET YEAR | 0 AF |

EXHIBIT 28

# GLEN ELDER IRRIGATION DISTRICT

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




| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| DIVERTED af/acre | 1.00 | 1.00 | 1.93 | 1.57 | 2.39 | 2.19 | 1.05 | 1.83 | 1.35 | 1.40 |
| DELIVERED af/acre | 1.27 | 1.01 | 0.58 | 0.66 | 1.04 | 0.77 | 0.51 | 0.83 | 0.67 | 0.70 |
| EFFICIENCY | 44% | 48% | 30% | 42% | 44% | 35% | 48% | 45% | 50% | 50% |

FORECASTED SHORTAGES (2012)

| | |
|---|---|
| DRY YEAR | 0 AF |
| NORMAL YEAR | 0 AF |
| WET YEAR | 0 AF |