#### **SYNOPSIS**

#### General

This year is the 55<sup>th</sup> consecutive year that an Annual Operating Plans (AOP) has been prepared for the Federally-owned dams and reservoirs in the Niobrara, Lower Platte, and Kansas River Basins. The plan has been developed by the Water Operations Group in McCook, Nebraska for the 16 dams and reservoirs that are located in Colorado, Nebraska, and Kansas. These reservoirs, together with 9 diversion dams, 9 pumping plants, and 20 canal systems, serve approximately 269,532 acres of project lands in Nebraska and Kansas. In addition to irrigation and municipal water, these features serve flood control, recreation, and fish and wildlife purposes. A map at the end of this report shows the location of these features.

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

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

The Headlines 2007 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.

#### 2007 Summary

#### **Climatic Conditions**

Precipitation at the project dams during 2007 ranged from 77 percent of normal at Box Butte Dam to 152 percent of normal near Virginia Smith Dam. Temperatures during the first two months of the year were generally well below normal throughout the projects area. Precipitation during the first two months of the year varied throughout the projects area. Precipitation totals were above normal at 9 of the 16 project dams, varying from 62 to 350 percent. Temperatures were above normal during March and May and near normal in April. Precipitation during March, April, and May was generally above normal throughout the basin. Red Willow and Medicine

Creek Dams recorded the greatest precipitation total ever during the month of April while Davis Creek Dam recorded the greatest precipitation total ever for the month of May.

Average temperatures were near normal in June and July and above normal in August. Precipitation during June, July, and August was generally below normal throughout the basin. Twelve project dams recorded below normal precipitation in June, while eight project dams recorded below normal precipitation in July, and eleven project dams had below normal precipitation in August. Merritt Dam recorded the lowest precipitation total ever recorded for the month of July at the site.

September precipitation was generally below normal while precipitation in October was generally above normal. Both Virginia Smith and Davis Creek Dams recorded the greatest October precipitation total ever for the month at the respective sites. Temperatures in September and October were generally above normal throughout the projects area.

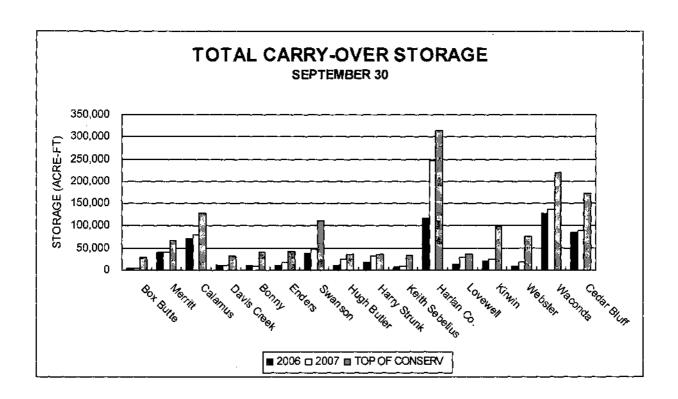
Precipitation during November was only 12 percent of normal over the projects with all project dams recording below normal precipitation. Virginia Smith and Harlan County Dams recorded zero precipitation for the month of November. Precipitation during December was well above normal at all project dams. December precipitation ranked within the top five greatest ever recorded for the month at 13 of the 16 project dams. Temperatures were above normal in November and below normal in December.

#### Storage Reservoirs

1. Conservation Operations. The 2007 inflow was above the dry-year forecast at all project reservoirs with the exception of Box Butte Reservoir. Merritt, Davis Creek, Bonny, Enders, Lovewell, and Webster Reservoirs, and Swanson and Waconda Lakes had inflows between the dry- and normal-year forecasts. Calamus, Kirwin, and Cedar Bluff Reservoirs along with Hugh Butler, Keith Sebelius, and Harlan County Lakes had inflows between the normal- and wet-year forecasts. Harry Strunk Lake had inflows above the wet-year forecast.

All project reservoirs had below average carryover storage from the 2006 water year. Swanson Lake in Southwest Nebraska and Bonny Reservoir in Eastern Colorado recorded below average inflows during all 12 months of 2007. Enders, Webster, and Box Butte Reservoirs, and Waconda Lake recorded below average inflows during 11 months of 2007. Reservoir releases were made from Merritt, Virginia Smith, Medicine Creek, and Lovewell Dams to maintain or reduce reservoir levels prior to the 2007 irrigation season. Just prior to the irrigation season, Enders, Kirwin, Webster and Box Butte Reservoirs, along with Keith Sebelius, Swanson, Hugh Butler, Harry Strunk and Harlan County Lakes, did not have sufficient storage to provide water users with a full water supply. Harry Strunk Lake and Lovewell Reservoir had some flood storage occupied prior to the irrigation season. The high irrigation demand months of July and August significantly reduced storage in those project reservoirs that had storage available for irrigation. Precipitation during July and August was of little help in reducing the demands on project reservoirs. Reservoir storage remained near or below normal in all the project reservoirs at the end of the irrigation season with the exception of Harry Strunk Lake.

The following summarized graph shows a comparison of 2006 and 2007 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 Lake and Lovewell Reservoir utilized flood pool storage in 2007. A flood release was made from Lovewell Reservoir from June 28<sup>th</sup> through July 6<sup>th</sup> to reduce pool levels. The fiscal year 2007 flood control benefits accrued by the operation of Reclamation's Nebraska-Kansas Projects facilities was \$13,802,000 as determined by the Corps of Engineers. An additional benefit of \$27,002,000 was credited to Harlan County Lake. The accumulative total of flood control benefits for the years 1951 through 2007 by facilities in this report total \$1,914,399,000 (see Table 5). To date no benefits have been accrued by the operation of Box Butte, Merritt, Calamus, or Davis Creek Reservoirs.

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

#### Water Service

There was 230,949 acre-feet (AF) of water diverted to irrigate approximately 144,170 acres of project lands in the 12 irrigation districts (see tables 3 and 6). The project water supply was either inadequate or limited for 169,258 acres of the total project lands. This includes lands in Mirage Flats, Frenchman Valley, H&RW, Frenchman-Cambridge, Almena, Bostwick in Nebraska, Kansas Bostwick, Kirwin and Webster Irrigation Districts. The project water supplies for the other units mentioned in this report were more than adequate in 2007.

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

#### <u>Irrigation Production</u>

The 2007 crop yields on lands receiving project water in the Nebraska-Kansas Projects were higher than 2006 for two of the three reporting districts. The average corn yield, the principal crop of all reporting districts, was 167 bushels per acre. This was approximately seven bushels per acre less than in 2006. The average unit price of corn when harvested was higher than the previous year at approximately \$3.30/bu. The start of irrigation releases from project reservoirs varied considerably depending on storage water available. Much of the growing season was drier than normal with near normal temperatures. Crop maturity progressed near normal during the growing season. Several irrigation districts had finished making irrigation releases by mid September. Twelve canals did not divert water in 2007 as a result of extremely short water supplies. All irrigation districts had finished delivering water by the end of September with corn harvest commencing by mid October.

#### Fish and Wildlife and Recreation Benefits

The National Recreational Fisheries Policy declares that the Government's vested stewardship responsibilities must work in concert with the state managing agency's recreational fisheries constituency and the general public to conserve, restore, and enhance recreational fisheries and their habitats. The Nebraska-Kansas Area Office is available for meetings if requested with Nebraska, Colorado, and Kansas state management agencies to discuss the Annual Operating Plans (AOP). Information is solicited that will allow Reclamation the flexibility to enhance fisheries resources while still meeting contractual obligations with the various irrigation districts.

During the early part of the 2007 season, normal reservoir operations were favorable for recreation and fish and wildlife uses at project reservoirs with full or nearly full conservation pool levels. Lower water levels have been experienced at most reservoirs in the Kansas River Basin over the past few years somewhat limiting the recreation benefits. Normal summer drawdown due to irrigation releases did allow for some late summer shoreline revegetation.

The Calamus Fish Hatchery is located below Virginia Smith Dam and Calamus Reservoir. The hatchery consists of an office/visitor center, laboratory, 2 residences, a shop and feed storage building, 51 rearing ponds lined with VLDPE and covering 45.5 acres, 24 concrete raceways, 2 lined effluent ponds, 8 groundwater wells, a 36-inch diameter buried pipeline from Virginia Smith Dam, a groundwater degassing tank, and a computerized monitoring and alarm system. The hatchery is operated and maintained by the Commission and 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.

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

A Periodic Facility Review of Enders Dam was conducted in June 2007 and a Functional EAP exercise took place in September.

In 2007, the Frenchman Valley Irrigation District (along with Reclamation) again provided support for a Limited Irrigation Demonstration project with the University of Nebraska Extension Service.

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

#### General

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

Service is provided for Frenchman-Cambridge Irrigation District by Meeker-Driftwood Canal to 16,855 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.

#### 2007 Summary

The annual precipitation total of 21.20 inches at Trenton Dam was 106 percent of normal. The inflow of 21,582 AF to Swanson Lake was between the dry-year and normal-year forecast. The reservoir level began the year approximately 20.2 feet below the top of conservation pool. The reservoir level gradually increased during the spring and peaked at 2737.14 feet on June 22<sup>nd</sup> (approximately 14.9 feet below full). Due to the extremely low water supply available, no water was released from Swanson Lake. Irrigation diversions were not made into Meeker-Driftwood Canal. This was the fifth consecutive year that the district did not deliver water from the Meeker-Driftwood Canal. At the end of the year the reservoir level was 17.0 feet below the top of conservation at 2735.00 feet. The Corps of Engineers determined that the reservoir prevented \$3,828,000 in flood damages.

The annual precipitation total of 22.36 inches at Red Willow Dam was 114 percent of normal. The greatest precipitation event recorded at Red Willow Dam in 2007 was 2.32 inches overnight on April 23<sup>th</sup>. The annual inflow of 19,478 AF into Hugh Butler Lake was near the wet-year forecast. This was due to flood water in late May that increased the lake elevation 7.8 feet for a total of over 9,000 AF. The reservoir level at the first of the year was 18.6 feet below the top of conservation. Inflows increased the level of the reservoir to a peak of 2576.26 feet (5.5 feet below full) on June 6<sup>th</sup>. No irrigation releases were made in 2007. Irrigation diversions were not made into Red Willow Canal for the fifth consecutive year. The level of Hugh Butler Lake at the end of the year was 7.6 feet below the top of conservation. The Corps of Engineers determined that the reservoir prevented \$286,000 in flood damages in 2007.

The annual precipitation total of 27.41 inches at Medicine Creek Dam was 133 percent of normal. The inflow of 67,732 AF was above the wet-year forecast. The reservoir level at the beginning of 2007 was 7.7 feet below the top of conservation. The reservoir pool gradually increased, filling the conservation capacity on April 23<sup>rd</sup> (2366.1 feet). The reservoir level increased to elevation 2372.19 feet (6.1 feet into the flood pool) on June 3<sup>rd</sup> due to large storms. Theses storms increased the storage approximately 11,000 AF with a peak average inflow of 3,500 cfs. Frenchman-Cambridge Irrigation District sold their 2007 water rights to the Republican River NRD's to aid in compact compliance. Water was released to mimic normal reservoir operations. Harry Strunk Lake was 0.3 foot below the top of conservation at the end of the year. The Corps of Engineers determined that the reservoir prevented \$4,306,000 in flood damages.

An orientation meeting to review the Trenton, Red Willow, and the Medicine Creek Dams' EAPs took place in August 2007. An Annual Site Inspections was conducted in July at Red Willow Dam and August at Medicine Creek Dam. A Periodic Facility Review was conducted at Trenton Dam in June 2007. The Standing Operating Procedures for Trenton Dam was updated and republished in 2007. On-site dam operator training took place in September at both Red Willow and Medicine Creek Dams.

A technical survey of Trenton Dam was completed in September 2007.

In July 2005, a small quantity of fine sand was discovered near the river outlet works stilling basin drain outlet during an inspection at Red Willow Dam. Five piezometers were installed in April 2006 adjacent to the outlet works and spillway stilling basins, and temporary plugs were placed in the underdrain outlets in May. An Internal Alert remains in effect until additional analysis of the underdrain system is complete.

Painting of the spillway gate and associated metal work at Trenton Dam began in 2006 but was discontinued due to winter weather. The painting contractor completed the painting in 2007. A new storage building at Trenton Dam was completed in 2007.

In 2007, the District completed a pipe project that replaced approximate 3 miles of the end section of Cambridge Canal with buried pipe. Reclamation provided technical and financial assistance for this project through a cooperative agreement with the District. This project eliminated approximately 3 miles of open ditch canal and will also provide improved delivery service to a number of project irrigators.

#### 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.

#### 2007 Summary

The annual precipitation at Norton Dam totaled 24.66 inches, which is 101 percent of normal. The total inflow of 7,801 AF was slightly above the normal-year forecast. The reservoir level was 18.1 feet below the top of conservation on December 31, 2006. Late winter and early spring inflows increased the reservoir level to a peak elevation of 2290.56 feet on June 19<sup>th</sup> (13.7 feet

below full pool). Irrigation releases were made from the reservoir in 2007. A total of 1,099 AF was released into Almena Canal with 403 AF delivered to farms (37 percent efficiency). Keith Sebelius Lake was 16.2 feet below the top of conservation (2288.08 feet) at the end of the year.

The city of Norton used 399 AF of municipal water during 2007.

An Annual Site Inspection of Norton Dam was conducted in April and an orientation exercise of the Norton Dam EAP took place in August 2007.

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

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

#### General

Harlan County Lake storage and Republican River flows provide a project water supply for 22,454 acres in the Bostwick Irrigation District in Nebraska, and 13,378 acres in the Kansas-Bostwick Irrigation District No. 2 above Lovewell Reservoir. This storage and natural flows, together with White Rock Creek flows and Lovewell Reservoir storage, furnish a water supply for 29,122 acres below Lovewell Reservoir in the Kansas-Bostwick Irrigation District.

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

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

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

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

#### 2007 Summary - Bostwick Division - Harlan County Lake Operations

The annual precipitation at Harlan County Dam totaled 26.92 inches of rainfall, which is 119 percent of normal. The 2007 inflow of 198,528 AF was between the normal- and wet-year forecasts. A release was not required during January, February or December in accordance to the environmental assessment and the annual operating plan.

Harlan County Lake began 2007 approximately 19.0 feet below the top of conservation pool, at 1926.75 feet. Above normal temperatures the week of February 18th rapidly melted snow cover resulting in above normal inflows into Harlan County Lake. Storage in Harlan County increased over 22,000 AF with a peak average daily inflow of approximately 1,700 cfs. The reservoir level increased to 1929.90 feet at the end of February. Isolated thunderstorms in the basin above Harlan County produced some localized short term runoff during April and May. Strong storms dumped some heavy rainfall in the basin from April 20th through April 24th. Runoff from these storms increased the storage in Harlan County by approximately 24,000 AF with a peak average daily inflow of 2,300 cfs. The lake level increased to 1934.77 at the end of April. The basin received another 4 to 8 inches of rainfall in late May. Storm runoff from these storms peaked at approximately 1,000 cfs and increased the storage in Harlan County nearly 17,000 AF. The lake level at the end of June was 1939.36 feet, a storage increase of approximately 126,000 AF since the beginning of 2007. Irrigation releases began on June 21 st and continued through August 31 st. Flood releases were not required in 2007. The lake level continued to increase throughout the remainder of the year peaking at 1941.08 on December 31 st Harlan County Lake prevented \$27,002,000 of downstream flood damages during 2007 according to the Corps of Engineers.

Approximately 8,923 acres in the Kansas Bostwick Irrigation District above Lovewell Dam were furnished a limited water supply.

A total of 34,687 AF (approximately 61 percent of total inflow) was delivered to Lovewell Reservoir through the Courtland Canal.

#### 2007 Summary - Bostwick Division - Nebraska

Irrigation diversions were not made into Franklin, Naponee, Franklin Pump, Superior, or Courtland Canals in Nebraska in 2007. In the spring of 2007, the Nebraska Department of Natural Resources and the Bostwick Irrigation District in Nebraska entered into a Memorandum of Agreement (MOA) to purchase the district's water supply for the 2007 calendar year. The MOA was approved by the irrigators within the district which provided that the district relinquish the rights to use its share of natural flow and storage water for the 2007 irrigation season.

The district continued to replace open ditch laterals with buried pipe to reduce losses and improve system operations. In 2005 the District was selected for a Water 2025 Challenge Grant Project that will replace approximately 10 miles of open ditch laterals with buried pipe. Identified laterals to be placed in pipe include all or portions of Superior Laterals 9.5, 17.5, 21.2, and 27.3. These pipe projects provide delivery system improvements by eliminating seepage losses, eliminating operational wasteways, improve water measurement and accounting by utilizing water meters, and provide on-farm benefits by allowing land owners the opportunity to convert to sprinkler irrigation. Due to the rising pipe prices, the District was only able to replace 3 of the 4 planned laterals in 2006.

The District applied and was selected for a 2006 Water 2025 project that will allow the District to complete the original Water 2025 proposal. The District completed the pipe installation on Superior Lateral 27.3 in the fall of 2007.

#### <u>2007 Summary</u> - <u>Bostwick Division - Kansas</u>

The 2007 precipitation at Lovewell Dam totaled 31.52 inches, which was 115 percent of normal. Lovewell Reservoir began 2007 with a water surface elevation 6.4 feet below the top of conservation. Inflows during the first four months of the year from White Rock Creek and diversion of Republican River flows via Courtland Canal slowly increased the reservoir filling the reservoir conservation pool on April 25 th (elevation 1582.6 feet). Overnight on June 27 th, an isolated thunderstorm dropped 3.29 inches of rainfall at the dam. The reservoir peaked at elevation 1585.11 feet on June 28 th. Releases were made into White Rock Creek beginning on June 28 th and discontinued on July 6th to lower the reservoir level. Diversions of Republican River natural flows into Lovewell Reservoir continued after the irrigation release had ended and were discontinued in October. The water surface elevation gradually increased to 1581.07 feet on December 31, 2007 (1.5 feet below the top of active conservation). Lovewell Reservoir prevented \$4,000 of downstream flood damages during 2007 according to the Corps of Engineers

The Kansas-Bostwick Irrigation District diverted a total of 49,849 AF to serve 8,923 acres above Lovewell Dam and 24,055 acres below Lovewell Dam. Farm delivery efficiency averaged 46 percent in the district.

A dive inspection of the outlet works inlet and spillway were conducted in September 2007.

A new storage building at Lovewell Dam was completed in 2007.

In 2007, the Kansas Bostwick Irrigation District No. 2 was awarded a Water 2025 Challenge Grant that will allow the District to replace approximately 9 miles of open ditch lateral with buried pipe. The District began placing pipe in the fall of 2007, and this project will continue for the next 2 years.

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

#### CAPACITY ALLOCATIONS 1/ LIVE CONSERVATION

RESERVOIR		DEAD	Inactive	Active	FLOOD CONTROL
Box Butte 4/	- Elevation Ft.	3969.0	3979.0	4007.0	
Bon Butte	Total Acre-feet	188	2,392	29,161	
	Net Acre-feet	188	2,204	26,769 —	
Merritt	- Elevation Ft.	2875.0	2896.0	2946.0	
1,1011111	Total Acre-feet	774	4,662	66,726	
	Net Acre-feet	774	3,888	62,064 —	
Calamus	- Elevation Ft.	2185.0	2213.3	2244.0	
	Total Acre-feet	817	24,646	127,400	
	Net Acre-feet	817	23,829	102,754 —	
Davis Creek	- Elevation Ft.	1998.5	2003.0	2076.0	
	Total Acre-feet	76	172	31,158	
	Net Acre-feet	76	<u>96</u>	<u> 30,986</u> —	
Bonny	- Elevation Ft.	3635.5	3638.0	3672.0	3710.0
,	Total Acre-feet	1,418	2,134	41,340	170,160
	Net Acre-feet	<u>1,418</u>	716	39,206	128,820
Enders	- Elevation Ft.	3080.0	3082.4	3112.3	3127.0
	Total Acre-feet	7,516	8,948	42,910	72,958
	Net Acre-feet	<u>7,516</u>	1,432	33,962	30,048
Swanson	- Elevation Ft.	2710.0	2720.0	2752.0	2773.0
Lake	Total Acre-feet	2,118	12,430	112,214	246,291
	Net Acre-feet	2,118	10,312	99,784	134,077
Hugh Butler	- Elevation Ft.	2552.0	2558.0	2581.8	2604.9
Lake	Total Acre-feet	5,185	8,921	36,224	85,070
	Net Acre-feet	5,185	3,736	27,303	48,846
Harry Strunk	- Elevation Ft.	2335.0	2343.0	2366.1	2386.2
Lake	Total Acre-feet	3,408	7,897	34,647	87,361
	Net_Acre-feet	3,408	4,489	26,750	52,714
Keith Sebelius	- Elevation Ft.	2275.0	2280.4	2304.3	2331.4
Lake	Total Acre-feet	1,636	3,993	34,510	133,740
	Net Acre-feet	1,636	2,357	30,517	99,230
Harlan County	- Elevation Ft.	1885.0	1927.0	1945.73	1973.5
Lake 3/	Total Acre-feet	0	118,099	314,111	814,111
	Net Acre-feet	0	118,099	<u>196,012</u>	500,000
Lovewell	- Elevation Ft.	1562.07	1571.7	1582.6	1595.3
	Total Acre-feet	1,659	11,644	35,666	86,131
	Net Acre-feet	<u>1,659</u>	<u>9,970</u>	24,022	<u>50,465</u>
Kirwin	- Elevation Ft.	1693.0	1697.0	1729.25	1757.3
	Total Acre-feet	4,969	8,515	98,154	313,290
	Net Acre-feet	<u>4,969</u>	<u>3,546</u>	<u>89,639</u>	215,136
Webster	- Elevation Ft.	1855.5	1860.0	1892.45	1923.7
	Total Acre-feet	1,256	4,231	76,157	259,510
	Net Acre-feet	<u>1,256</u>	<u>2,975</u>	<u>71,926</u>	183,353
Waconda	- Elevation Ft.	1407.8	1428.0	1455.6	1488.3
Lake	Total Acre-feet	248	26,237	219,420	942,408
	Net Acre-feet	248	<u>25,989</u>	<u>193,183</u>	<u>722,988</u>
Cedar Bluff	- Elevation Ft.	2090.0	2107.8	2144.0	2166.0
	Total Acre-feet	4,402	28,574	172,452	364,342
	Net Acre-feet	<u>4,402</u>	<u>24,172</u>	143,878	<u>191,890</u>
Total Storage (A.F.)		35,670	273,495	1,472,250	3,909,611 2/
Total Net Acre-feet		35,670	237,810	1,198,755	2,357,568

<sup>1/</sup> Includes space for sediment storage.

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

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

<sup>4/</sup> New Area-Capacity Tables in effect 1 1 08. Sedimentation survey finished in April 2007.

#### TABLE 2 SUMMARY OF 2007 OPERATIONS

### FRENCHMAN-CAMBRIDGE DIVISION FRENCHMAN UNIT

		ENDERS R	ESERVOIR.						
		-	-		End of	CULBERTSC	N CANAL	CULBERTSON	EXT.CANAL
			Gross		Month	Diversions	Delivered	Diversions	Delivered
	Inflow	Outflow	Evap.	Precip.	Content	To Canal	To Farms	To Canal	To Farms
Month	(AF)	(AF)	(AF)	(Inches)	(AF)	(AF)	(AF)	(AF)	(AF)
Jan.	472	184	51	0.59	11,311	0	0	0	0
Feb.	550	167	55	0.88	11,639	0	0	0	0
Mar.	573	184	108	0.30	11,920	0	0	0	0
Apr.	603	179	184	3.61	12,160	0	0	0	0
May	588	185	297	3.62	12,266	0	0	0	0
June	9,312	179	399	6.88	21,000	0	0	0	0
July	233	738	643	4.66	19,852	0	0	0	0
Aug.	109	639	694	1.61	18,628	0	0	0	0
Sep.	62	555	444	1.68	17,691	0	0	0	0
Oct.	96	307	413	0.48	17,067	0	0	0	0
Nov.	196	298	156	0.25	16,809	0	0	0	0
Dec.	<u>464</u>	307	<u>81</u>	0.83	16,885	0	0	<u>0</u>	0
TOTAL	13,258	3,922	3,525	25.39		0	0	0	0

NOTE: Acres irrigated 2007: Culbertson Canal - 0 acres; Culbertson Extension Canal - 0 acres.

## FRENCHMAN-CAMBRIDGE DIVISION (Continued) MEEKER-DRIFTWOOD UNIT

SWANSON LAKE End of MEEKER-DRIFTWOOD Month Release Delivered Gross Inflow Outflow Content To Canal To Farms Evap. Precip. (AF) (AF) (AF) (AF) (Inches) (AF) (AF) Month 189 0.41 36,916 0 Jan. 856 61 0 Feb. 2,897 210 0.16 39,547 0 45,060 50,796 5,999 6,563 61 60 0 0 Mar. 425 1.64 0 767 0 Apr. 4.93 2,275 2.18 51,537 0 0 62 1,472 May 1,594 60 1,599 1.25 51,472 June July 359 62 1,867 2.65 49,902 0 0 48,889 47,079 45,851 Aug. 655 62 1,606 4.58 0 1,750 0 60 1.36 0 Sep. 0 1,167 0.70 0 61 0 Oct. 0 60 640 0.12 45,151 0 0 Nov. 264 1\_22 45 211 0 0 Dec. 385 21,582 726 11,956 21.20 0 TOTAL NOTE: Acres irrigated 2007: Meeker-Driftwood Canal - 0 acres.

> FRENCHMAN-CAMBRIDGE DIVISION (Continued) RED WILLOW UNIT <u>HUGH BUT</u>LER LAKF

		HUGH BUTL	ER LAKE						
					End of F	RED WILLO	V CANAL	BARTLEY	CANAL
			Gross		Month	Diversions	Delivered	Diversions	Delivered
	Inflow	Outflow	Evap.	Precip.	Content	To Canal	To Farms	To Canal	To Farms
Month	(AF)	(AF)	(AF)	(Inches)	(AF)	(AF)	(AF)	(AF)	(AF)
Jan.	942	246	58	0.42	13,743	0	0	0	0
Feb.	2,026	222	66	0.18	15,481	0	0	0	0
Mar.	1,348	246	136	1.52	16,447	0	0	0	0
Apr.	1,973	238	256	5.67	17,926	0	0	0	0
May	9,359	246	588	2.27	26,451	0	0	0	0
June	1,949	238	689	2.23	27,473	0	0	0	0
July	499	246	808	4.56	26,918	0	0	0	0
Aug.	210	246	743	2.12	26,139	0	0	0	0
Sep.	73	238	612	1.63	25,362	0	0	0	0
Oct.	152	246	419	0.74	24,849	0	0	0	0
Nov.	265	238	210	0.10	24,666	0	0	0	0
Dec.	682	<u>246</u>	<u>109</u>	0.92	24,993	0	0	<u>0</u>	0
TOTAL	19,478	2,896	4,694	22.36	_	0	0	0	

NOTE -- Acres irrigated 2007: Red Willow Canal - 0 acres; Bartley Canal 0 acres.

## FRENCHMAN-CAMBRIDGE DIVISION (Continued) CAMBRIDGE UNIT

	]	HARRY STRI	JNK LAKE				
					End of C	CAMBRIDG	E CANAL
			Gross		Month -	Diversions	Delivered
	Inflow	Outflow	Evap.	Precip.	Content	To Canal	To Farms
Month	(AF)	(AF)	(AF)	(Inches)	(AF)	(AF)	(AF)
Jan.	2,430	61	86	0.72	25,211	0	0
Feb.	7,525	56	106	0.86	32,574	0	0
Mar.	3,364	1,908	238	0.95	33,792	0	0
Apr.	5,483	2,394	452	6.61	36,429	0	0
May	11,522	3,243	960	3.05	43,748	0	0
June	15,194	21,335	852	2.14	36,755	0	0
July	7,840	12,452	857	6.71	31,286	0	0
Aug.	4,275	4,770	708	2.48	30,083	0	0
Sep.	2,281	60	668	2.11	31,636	0	0
Oct.	2,351	62	455	0.68	33,470	0	0
Nov.	2,422	1,619	283	0.07	33,990	0	0
Dec.	3,045	2,737	<u>145</u>	1.03	<u>34 153</u>	0	0
TOTAL	67,732	50,698	5,810	27.41		0	0

NOTE -- Acres irrigated 2007: Cambridge Canal 0 acres.

#### TABLE 2 SUMMARY OF 2007 OPERATIONS

#### KANASKA DIVISION

				ANASKA DIVI ALMENA UNI				
		KEITH SEBE		ALIVILIVA OIVI				
					End of	Release 2	ALMENA	CANAL
			Gross		Month	To City	Diversions	Delivered
	Inflow	Outflow	Evap.	Precip.	Content	Of Norton	To Canal	To Farms
Month	(AF)	(AF)	(AF)	(Inches)	(AF)	(AF)	(AF)	(AF)
Jan.	319	49	55	0.55	8,330	18	0	0
Feb.	2,774	45	74	0.26	10,985	17	0	0
Mar.	749	49	158	1.84	11,527	19	0	0
Apr.	884	50	403	3.17	11,958	20	0	0
May	791	65	571	3.97	12,113	34	0	0
June	632	81	618	3.14	12,046	51	0	0
July	631	1,287	728	3.47	10,662	65	1,099	403
Aug.	185	80	593	2.37	10,174	49	0	0
Sep.	23	71	481	1.19	9,645	41	0	0
Oct.	355	66	321	3.14	9,613	35	0	0
Nov.	72	56	152	0.08	9,477	26	0	0
Dec.	386	<u>55</u>	<u>76</u>	1.48	9,732	24	0	0
TOTAL	7,801	1,954	4,230	24.66		399	1,099	403

NOTE: Acres irrigated 2007: Almena Canal - 1,700 acres.

## BOSTWICK DIVISION FRANKLIN UNIT

		HARLAN CC	UNTY LAKE						
	Dat	a from Corps	of Engineer	'S	End of FRANKLIN CANAL			NAPONEE	CANAL
			Gross		Month	Release	Delivered	Release	Delivered
	Inflow	Outflow	Evap.	Precip.	Content	To Canal	To Farms	To Canal	To Farms
Month	(AF)	(AF)	(AF)	(Inches)	(AF)	(AF)	(AF)	(AF)	(AF)
Jan.	3,035	0	479	2.77	118,855	0	0	0	0
Feb.	22,631	0	457	0.31	141,029	0	0	0	0
Mar.	17.425	0	899	2,52	157,555	0	0	0	0
Apr.	30,803	0	2,390	2.78	185,968	0	0	0	0
May	24,476	0	3,171	5.29	207,273	0	0	0	0
June	41,187	2,088	4,313	2.78	242,059	0	0	0	0
July	26,130	12,238	6,174	2.79	249,777	0	0	0	0
Aug.	11,702	6,911	5,981	1.56	248,587	0	0	0	0
Sep.	4,304	0	5,970	2.41	246,921	0	0	0	0
Oct.	5,355	0	4,165	2.18	248,111	0	0	0	0
Nov.	4.284	0	3,094	0.00	249,301	0	0	0	0
Dec.	7,196	0	1,104	<u>1.53</u>	255,393	0	<u>0</u>	<u>0</u>	0
TOTAL	198,528	21,237	38,197	26.92		0	0	0	0

NOTE: Acres irrigated 2007: Franklin Canal - 0 acres; Naponee Canal - 0 acres.

#### BOSTWICK DIVISION (Continued) SUPERIOR-COURTLAND UNIT

			SUPERIOR	R-COURTLANI	D UNIT						
						COURTLAND CANAL - ABOVE LOVEWELL					
	FRANKLIN	PUMP CANA	L SUPE	RIOR CANAL	_	NEBRAS	KA USE	KANSA	SUSE		
	Diverted	Delivered	Diverted	Delivered	Total		Delivered	Diversion	Delivered		
	To Canal	To Farms	To Canal	To Farms	Diversion	' Total	To Farms	To Canal	To Farms		
Month	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)		
Jan.	0	0	0	0	0	0	0	0	0		
Feb.	0	0	0	0	0	0	0	0	0		
Mar.	0	0	0	0	0	0	0	0	0		
Apr.	0	0	0	0	0	0	0	0	0		
May	0	0	0	0	0	0	0	0	0		
June	0	0	0	0	0	0	0	3,114	66		
July	0	0	0	0	0	0	0	7,041	3,266		
Aug.	0	0	0	0	0	0	0	4,593	2,457		
Sep.	0	0	0	0	0	0	0	0	0		
Oct.	0	0	0	0	0	0	0	0	0		
Nov.	0	0	0	0	0	0	0	0	0		
Dec.	0	0	0	0	0	0	0	<u>0</u>	0		
TOTAL	0	0	0	0	0	0	0	14,748	5,789		

Franklin Pump Canal - 0 acres; Superior Canal - 0 acres.
Courtland Canal-Nebraska use - 0 acres. NOTE: Acres irrigated 2007:

Courtland Canal-Kansas use - 8,923 acres.

## BOSTWICK DIVISION (Continued) COURTLAND UNIT

				LOVEWE	ELL RESERV	OIR			
	Est. Flow	Inflow					End of	COURTLAN	ND (Below)
	from	from	Total		Gross		Month	Release	Delivered
Month	White Rock Creek (AF)	Courtland 34.8 (AF)	Inflow (AF)	Outflow (AF)	Evap. (AF)	Precip. (Inches)	Content (AF)	To Canal <u>(AF)</u>	To Farms (AF)
Jan.	549	2,047	2,596	12	120	0.43	22,069	0	0
Feb.	1,485	4,076	5,561	11	160	0.71	27,459	0	0
Mar.	2,052	3,602	5,654	12	347	2.44	32,754	0	0
Apr.	682	3,941	4,623	12	766	1.57	36,599	0	0
May	2,410	4,447	6,857	1,836	1,142	5.61	40,478	1,695	0
June	7,402	1,806	9,208	4,924	1,390	8.11	43,372	4,637	196
July	558	5,318	5,876	16,318	1,215	1.94	31,715	15,064	8,735
Aug.	2,879	5,975	8,854	13,489	1,219	2.98	25,861	13,505	8,233
Sep.	1,372	3,227	4,599	12	908	2.83	29,540	0	0
Oct.	1,795	248	2,043	12	683	3.05	30,888	0	0
Nov.	0	0	0	12	424	0.02	30,452	0	0
Dec.	1,024	0	11024	<u>12</u>	<u>191</u>	1.83	31,273	<u>0</u>	0
TOTAL	22,208	34,687	56,895	36,663	8,565	31.52		35,101	17,164

TOTAL 22,208 34,687 56,895 36,663 8,565 NOTE: Acres irrigated 2007: Courtland Canal below Lovewell 24,055 acres.

#### TABLE 3

#### ACRES IRRIGATED IN 2007

	Acres With Service	Acres Irrigated
Irrigation District and Canal	<u>Available</u>	<u>in 2007</u>
Mirage Flats Irrigation District		
Mirage Flats Canal	11,662	11,092
Ainsworth Irrigation District Ainsworth Canal	35,000	34,577
Twin Loups Irrigation District	33,000	34,377
Above Davis Creek	34,053	33,999
Below Davis Creek	20,851	20,922
Total Twin Loups Irrigation District	54,904	54,921
Frenchman Valley Irrigation District		
Culbertson Canal	9,292	0
H & RW Irrigation District	44.04.5	0
Culbertson Extension Canal	11,915	0
Frenchman-Cambridge Irrigation District Meeker-Driftwood Canal	16,855	0
Red Willow Canal	4,797	0
Bartley Canal	6,353	0
Cambridge Canal	17,664	0
Total Frenchman-Cambridge Irrigation District	45,669	0
Almena Irrigation District		
Almena Canal	5,764	1,700
Bostwick Irrigation District in Nebraska		
Franklin Canal	10,920	0
Naponee Canal	1,650	0
Franklin Pump Canal Superior Canal	2,090 5,848	0
Courtland Canal (Nebraska)	1,946	0
Total Bostwick Irrigation Dist. in Nebraska	22,454	0
, and the second	,	
Kansas-Bostwick Irrigation District	12.250	0.022
Courtland Canal below Lovewell	13,378	8,923 24,055
Courtland Canal below Lovewell	29,122	24,055
Total Kansas-Bostwick Irrigation District	42,500	32,978
Kirwin Irrigation District		
Kirwin Canal	11,465	2,810
Webster Irrigation District	0.527	0
Osborne Canal Glen Elder Irrigation District	8,537	6.002
	10,370	6,092
TOTAL PROJECT USES	269,532	144,170
Non-Project Uses		
Hale Ditch	700	0
TOTAL PROJECT AND NON-PROJECT	270,232	144,170

TABLE 5
FLOOD DAMAGES PREVENTED BY NEBRASKA-KANSAS PROJECTS RESERVOIRS

<u>RESERVOIR</u>	<u>DURING FY 2007</u>	PRIOR TO 2007'""""'A	CCUMULATED TOTAL
BONNY	\$4,000	\$2,787,000	\$2,791,000
<u>ENDERS</u>	<u>\$277,000</u>	\$3,281,000	\$3,558,000
<u>SWANSON</u>	\$3,828,000	\$19,157,000	\$22,985,000
HUGH BUTLER	\$286,000	<b>\$2,665,</b> 000	\$2,951,000
<u>HARRY STRUNK</u>	<b>\$4,306,000</b>	\$5,037,000	\$9,343,000
KEITH SEBELIUS	<b>\$31,</b> 000	\$3,958,000	\$3,989,000
HARLAN COUNTY	<u>\$27,002,000</u>	\$150,561,000	\$177,563,000
<u>LOVEWELL</u>	\$4,000	\$146,615,000	\$146,619,000
KIRWIN	\$18,000	\$86,870,000	\$86,888,000
<u>WEBSTER</u>	\$20,000	\$110,320,000	\$110,340,000
<u>WACONDA</u>	\$3,880,000	\$1,213,454,000	\$1,217,334,000
CEDAR BLUFF	\$1,148,000	\$128,890,000	\$130,038,000
TOTAL	<u>\$40,804,000</u>	\$1,873,595,000	\$1,914,399,000

Estimates of damages prevented are received from the Army Corps of Engineer's Kansas City District Office. The Accumulated Totals date from 1951 through 2007. 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.

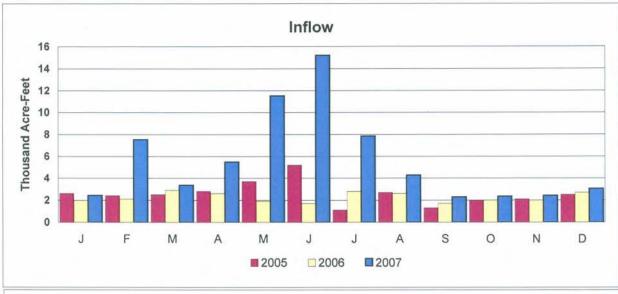
#### TABLE 6 WATER DIVERTED IN 2007 (Units - Acre-Feet)

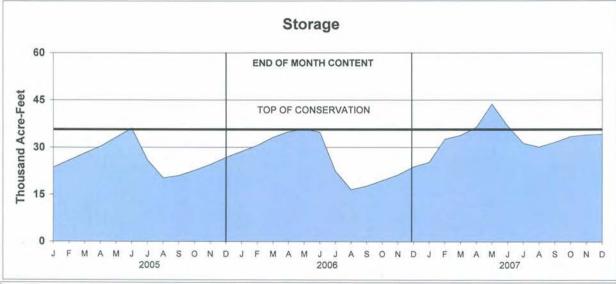
Irrigation District and Canal	2007 Irrigation Operations From To	10-Year Average Diversion (1997-2006)	2007 Diversion
Minara Elata Imination District			
Mirage Flats Irrigation District Mirage Flats Canal Ainsworth Irrigation District	7/6 8/13	11,663	6,963
Ainsworth Canal Twin Loups Irrigation District	5/15 9/15	76,058	75,646
Above Davis Creek	4/18 9/17	44,864	38,126
Below Davis Creek	5/14 9/19	39,919	43,352
Total Twin Loups Irrigation District		84,783	81,478
Frenchman Valley Irrigation District			
Culbertson Canal	Did not run.	7,646	0
H & RW Irrigation District	210 1100 1 0111	,,,,,,	
Culbertson Extension Canal	Did not run.	5,538	0
Frenchman-Cambridge Irrigation District		,	
Meeker-Driftwood Canal	Did not run.	14,080	0
Red Willow Canal	Did not run.	3,957	0
Bartley Canal	Did not run.	5,058 22,532	0
Cambridge Canal	Did not run.	22,532	0
Total Frenchman-Cambridge Irrig	ation District	45,627	0
Almena Irrigation District Almena Canal Bostwick Irrigation District in Nebraska	7/22 7/31	3,623	1,099
Franklin Canal	Did not run.	20,392	0
Naponee Canal	Did not run.	1,958	0
Franklin Pump Canal	Did not run.	2,093	0
Superior Canal	Did not run.	10,150	0
Courtland Canal (Nebraska)	Did not run.	1,549	0
Total Bostwick Irrigation District	in Nebraska	36,142	0
Kansas-Bostwick Irrigation District			
Courtland Canal above Lovewell	6/18 8/28	19,789	14,748
Courtland Canal below Lovewell	5/14 8/30	42,351	<u>35,101</u>
Total Kansas-Bostwick Irrigation		62,140	49,849
Kirwin Irrigation District			
Kirwin Canal	7/10 8/17	15,779	8,441
Webster Irrigation District			-,
Osborne Canal	Did not run.	10,256	0
Glen Elder Irrigation District	6/9 9/19	7,306	7,473
TOTAL		366,561	230,949

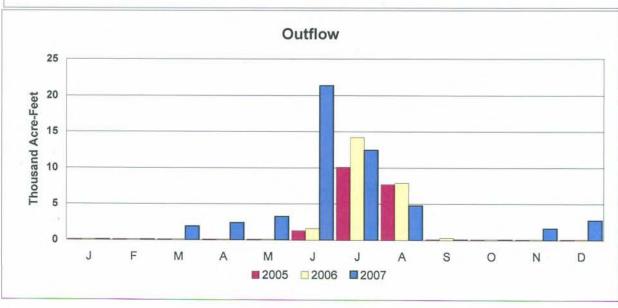
TABLE 7
NEBRASKA-KANSAS PROJECTS
Summary of Precipitation, Reservoir Storage and Inflows
CALENDAR YEAR 2007

	Total	Percent Of	Storage	Storage	Gain or_	Maximum St	t <u>orage</u>	Minimum Sto		Total
	Precip.	<u>Average</u>	<u>12-31-06</u>	<u>12-31-07</u>	<u>Loss</u>	<u>Content</u>	<u>Date</u>	<u>Content</u>	<u>Date</u>	<u>Inflow</u>
<u>Reservoir</u>	<u>Inches</u>	<u>%</u>	<u>AF</u>	<u>AF</u>	<u>AF</u>	<u>AF</u>		<u>AF</u>		<u>AF</u>
Box Butte	13.06	77	5,081	5,895	814	11,444	JUN 21	3,204	AUG 13	11,674
Merritt	26.76	132	61,100	60,831	-269	67,720	MAY 30	31,230	SEP 6	174,371
Calamus	35.96	152	107,326	111,215	3,889	129,253	APR 16	79,922	SEP 16	263,302
Davis Creek	32.81	135	10,712	9,684	-1,028	30,289	JUN 29	9,608	SEP 17	50,424
Bonny	15.43	90	9,935	7,947	-1,988	13,048	MAY 2	7,874	DEC 2	8,094
Enders	25.39	134	11,074	16,885	5,811	21,577	JUN 18	11,081	JAN 1	13,258
Swanson	21.20	106	36,310	45,211	8,901	51,925	JUN 22	36,310	JAN 1	21,582
Hugh Butler	22.36	114	13,105	24,993	11,888	27,824	JUN 22	13,123	JAN 1	19,478
Harry Strunk	27.41	133	23,751	34,153	10,402	47,271	JUN 3	22,941	JAN 1	67,732
Keith Sebelius	24.66	101	8,115	9,732	1,617	12,256	JUN 19	8,132	JAN 1	7,801
Harlan County	26.92	119	116,299	255,393	139,094	255,393	DEC 31	116,761	JAN 1	198,528
Lovewell	31.52	115	19,605	31,273	11,668	43,809	JUN 28	19,688	JAN 1	56,895
Kirwin	29.49	126	19,394	24,096	4,702	32,379	JUN 4	19,473	JAN 1	21,000
Webster	30.04	128	8,562	17,720	9,158	19,715	JUN 24	8,587	JAN 1	15,574
Waconda	26.39	103	125,621	142,983	17,362	146,709	AUG 8	146,710	AUG 8	68,7676
Cedar Bluff	20.76	99	85,357	86,517	1,160	94,761	JUN 24	85,357	JAN 19	17,303

# HARRY STRUNK LAKE ACTUAL OPERATION

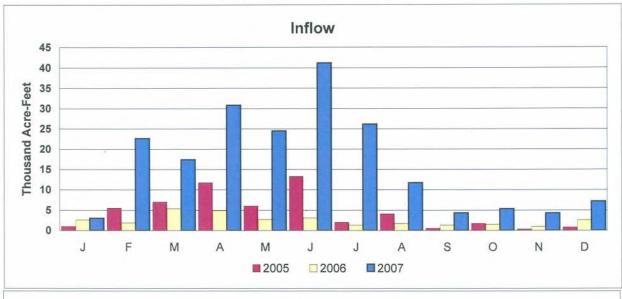


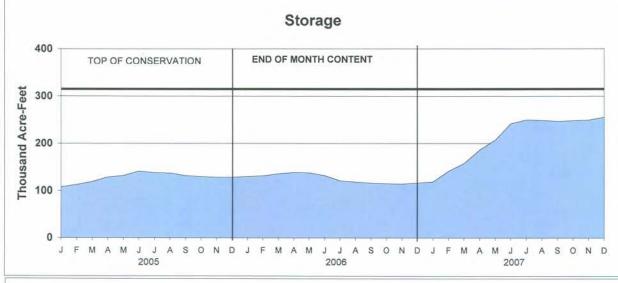


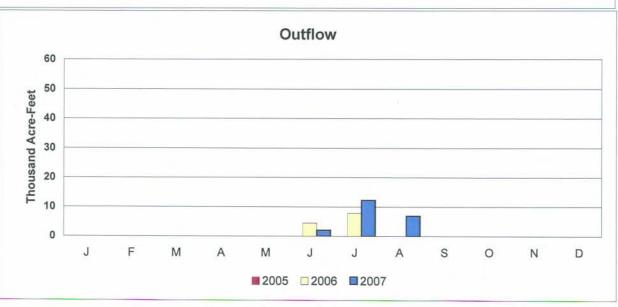


## HARLAN COUNTY LAKE

## **ACTUAL OPERATION**

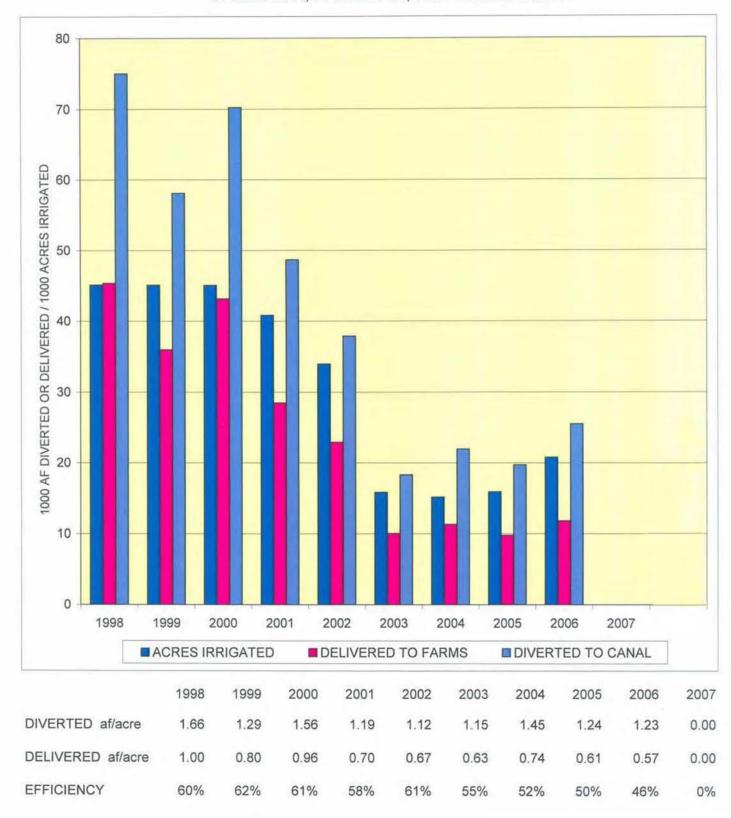






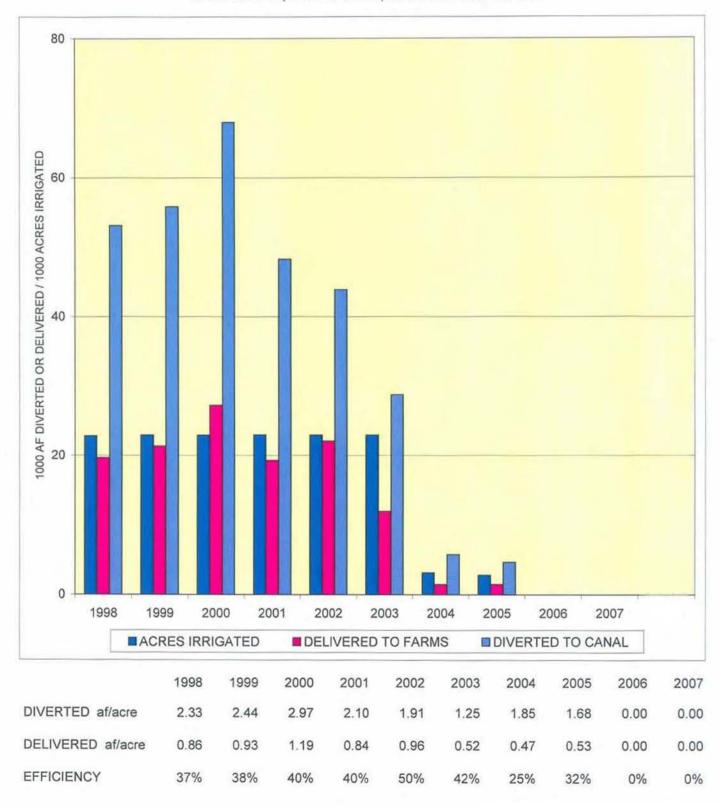
## FRENCHMAN-CAMBRIDGE IRRIGATION DISTRICT

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



## **BOSTWICK IRRIGATION DISTRICT - NEBRASKA**

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



## KANSAS-BOSTWICK IRRIGATION DISTRICT

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

