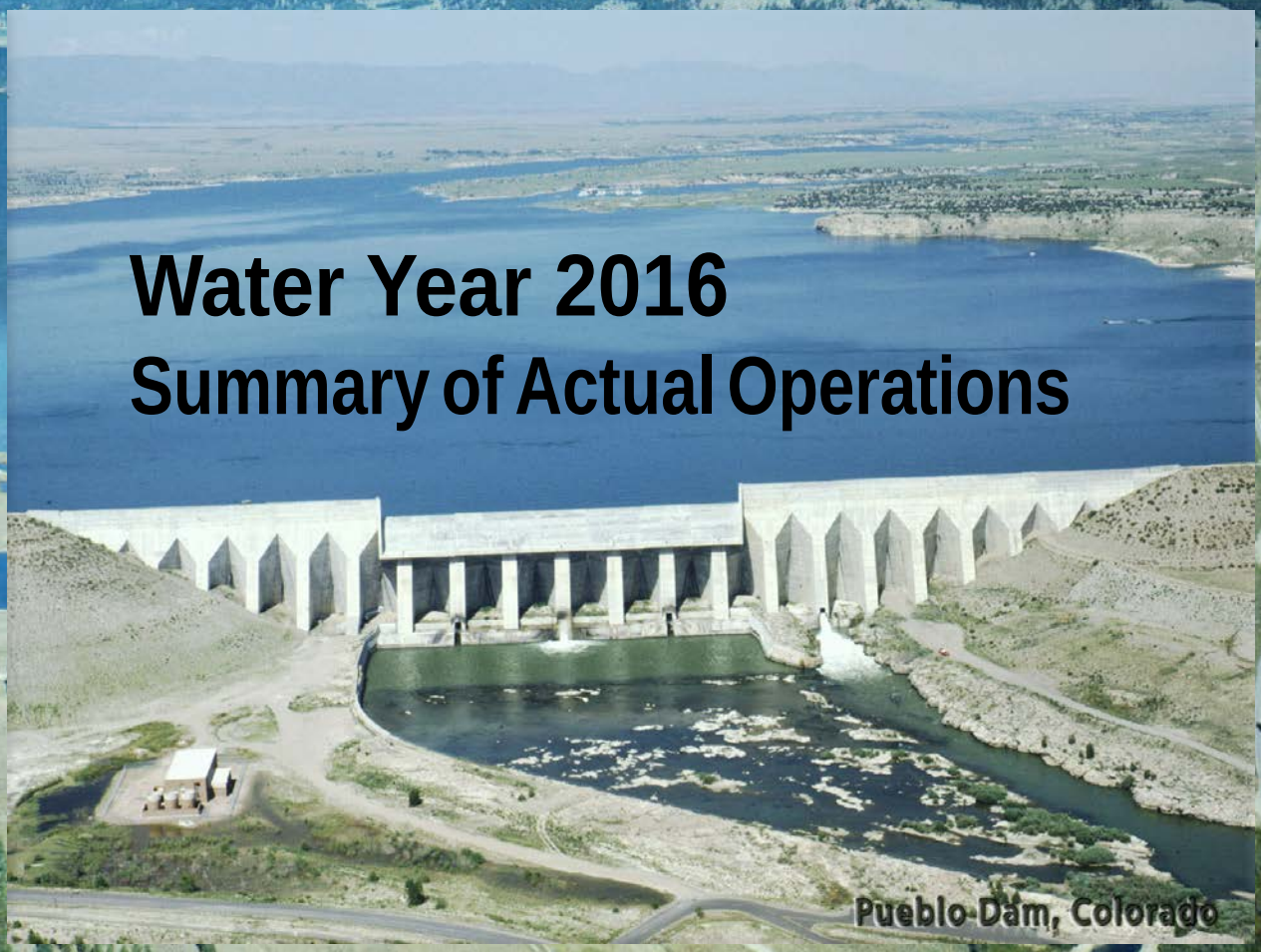
RECLAMATION

Managing Water in the West

Annual Operating Plan

Fryingpan—Arkansas Project

Water Year 2016
Summary of Actual Operations



Pueblo Dam, Colorado

U.S. Department of the Interior
Bureau of Reclamation
Great Plains Region

Table of Contents

ANNUAL OPERATING PLAN FRYINGPAN-ARKANSAS PROJECT WATER YEAR (WY) 2016 OPERATIONS

APPENDIX B: EXHIBITS

APPENDIX C: TWIN LAKES RESERVOIR AND CANAL COMPANY EXCHANGE WITH FRYINGPAN-ARKANSAS PROJECT WATER

APPENDIX D: DAILY DISCHARGE RECORDS, FRYINGPAN-ARKANSAS PROJECT COLLECTION SYSTEM

APPENDIX E: FRYINGPAN-ARKANSAS PROJECT OPERATING PRINCIPLES

PROJECT HIGHLIGHTS

August 16, 1962	Project authorized under Public Law 87-590
August 1964	Construction began on Ruedi Dam
November 2, 1965	Started excavating Charles H. Boustead Tunnel
December 1965	Construction began on Sugar Loaf Dam
April 15, 1968	Breached old Sugar Loaf Dam
May 1968	Began storing water in Ruedi Reservoir
June 15, 1969	Charles H. Boustead Tunnel "holed through"
July 1970	Construction began on Pueblo Dam - first contract
May 16, 1972	Initial Project diversion (Chapman, South Fork, and Fryingpan)
June 7, 1972	Initial diversion from Sawyer Creek
July 1972	Construction began on Pueblo Dam - second contract
July 1972	First sale of Project transmountain water
January 9, 1974	Began storing water in Pueblo Reservoir
May 6, 1974	Initial diversion from Lily Pad
May 4, 1976	Initial diversion from Ivanhoe Creek
May 1977	First replacement water released from Ruedi Reservoir
June 1977	First sale of water from Ruedi Reservoir
November 22, 1977	Adopted the recommended bypass flow of 15 cfs or natural inflow, whichever is less on Lake Creek below Twin Lakes Dam
June 1, 1979	Initial diversion from Middle Cunningham Creek
June 4, 1979	Initial diversion from Mormon Creek
June 14, 1979	Initial diversion from North Cunningham Creek

May 8, 1980	Initial diversion from Hunter, Midway and No Name Creek Diversions
June 4, 1980	Initial diversion from North Fork and South Cunningham
December 8, 1980	Federal Register notification of availability of water from Ruedi Reservoir
April 28, 1981	Initial diversion from Carter
May 6, 1981	Initial diversion from Granite Creek
June 1, 1981	Assume operation at Twin Lakes Dam
June 23, 1981	Mt. Elbert Forebay filled
September 29, 1981	Mt. Elbert Power Plant dedicated
October 1, 1981	Mt. Elbert Unit #1 was made commercially available to WAPA for their use
May 5, 1982	Initial diversion from Halfmoon Creek
July 29, 1982	Turquoise Lake filled for first time
September 14, 1983	Initial diversion from south outlet works at Pueblo Dam for Pueblo West
August 9, 1984	Mt. Elbert Unit #2 was made commercially available to WAPA for their use
May 24, 1985	Began storing water under Arkansas River Decree
July 1, 1985	Initial diversion through Fountain Valley Conduit
August 1985	Ruedi Hydroplant began operations
November 27, 1985	Twin Lakes pipeline began operations
May 7, 1986	Sugar Loaf Hydroplant began operations
June 1986	Imports restricted due to high east slope storage
November 10, 1987	Winter water storage decree approved and signed
November 17, 1989	Completed the removal of dikes and constructed the bypass channel around the old outlet works in the old Twin Lakes dam July 1990 Initial

	release from Twin Lakes Reservoir for recreational benefits on the Arkansas River
August 14, 1990	Initial release from Ruedi Reservoir for endangered fish (conservation flows pursuant to the biological opinion) in the Colorado River's "15-mile reach" for the U.S. Fish & Wildlife Service from water leased by the Colorado Water Conservation Board
September 28, 1990	Dedication of Pueblo Fish Hatchery and the completion of construction on the Fryingpan-Arkansas Project ceremony
November 1990	Final winter storage decree signed by court
July 21, 1992	Dedication of Leadville Mine Drainage Tunnel Water Treatment Plant
September 29, 1994	Transfer of Phase II of the Pueblo Fish Hatchery at Pueblo Reservoir to Colorado Division of Wildlife
May 15, 1995	Final transfer of recreational facilities at Pueblo to the Department of Parks and Outdoor Recreation
July 7, 1995	Began storing water under Arkansas River Decree
July 18, 1995	Began restricting imports due to high east slope storage
July 1997	Reservoir level at Pueblo Reservoir restricted after a routine risk assessment of Pueblo Dam was completed and raised concern about the foundation below the spillway section of the dam
May 1999	Reservoir restriction lifted
July 2000	Risk Analysis Study for Pueblo Dam completed
July 11, 2000	Long-term contract between United States government and the Pueblo Board of Water Works executed.
September 11, 2001	As a result of the terrorist attacks on September 11, 2001, all Fryingpan-Arkansas Project facilities were closed to the public. The facilities remained closed until security measures to safeguard the federal investment were implemented. Reclamation has maintained a heightened level of security at Fry-Ark facilities since that time.

July 23, 2002	Initial release of water through Pueblo Board of Water Works south outlet works joint-use manifold
September 12, 2007	Long-Term Contract between the United States Government and the city of Aurora executed
May 2010	The upgrade to the control and monitoring system for the Fryingpan-Arkansas collection system was completed.
September 2012	Fiberoptic control of west slope systems from the east slope
February 27, 2014	Reclamation issued Record of Decision for Arkansas Valley Conduit and Long Term Excess Capacity Master Contracts
October 1, 2015	New Pueblo Reservoir capacity tables
February 23, 2016	Reclamation and others come to an agreement to allow Pueblo West to temporarily take delivery of their water through the North Outlet Works (Southern Delivery System)
April 28, 2016	Southern Delivery System begins water deliveries

ANNUAL OPERATING PLAN FRYINGPAN-ARKANSAS PROJECT
WATER YEAR (WY) 2016 OPERATIONS

GENERAL

This is the forty-eighth Annual Operating Plan (AOP) for the Fryingpan-Arkansas Project. The project, completed in 1990, imports spring snowmelt runoff from Colorado's west slope to the semi-arid Arkansas River Basin on Colorado's east slope. The project consists of federally owned dams, reservoirs, stream diversion structures, conduits, tunnels, pumping plants, a pumped-storage power plant, electric transmission lines, substations, and recreation facilities. These features are located in the Fryingpan River and Hunter Creek watersheds of the upper Colorado River Basin, and in the Arkansas River Basin in central and southeastern Colorado. The project provides water for irrigation, municipal and industrial use, hydroelectric power generation, recreation, and wildlife habitat. The project also provides for flood control.

The project was authorized under Public Law 87-590 on August 16, 1962. This law provides that the project will be operated under the operating principles adopted by the state of Colorado on April 30, 1959, as amended on December 30, 1959, and on December 9, 1960. These operating principles were published as House Document 130 (Eighty-Seventh Congress, First Session), and are included in Appendix E.

This annual operating plan is a summary of the actual project operation in WY 2016 (October 1, 2015 through September 30, 2016).

PROJECT FEATURES IN OPERATION DURING WY 2016

Ruedi Dam and Reservoir are located on the Fryingpan River, a tributary of the Roaring Fork River, on Colorado's west slope about 13 miles east of Basalt, Colorado. Ruedi Reservoir has a total capacity of 102,373 AF (AF) at a water surface elevation of 7,766.0 feet. The reservoir is operated on an annual cycle. Steady winter releases draft the reservoir such that it is filled with the spring runoff, while releases to the Fryingpan River are maintained below the safe channel capacity. The reservoir provides replacement water for out-of-priority depletions to the Colorado River by the project as well as water for west slope irrigation, municipal, and industrial uses on a contractual basis. The reservoir is also operated to provide for recreation and wildlife habitat.

The west slope collection system, located upstream of Ruedi Reservoir in the upper Fryingpan River and Hunter Creek watersheds, is a series of 16 stream diversion structures and eight tunnels. The system collects spring snowmelt runoff for diversion, by gravity, to the inlet of the Charles H. Boustead Tunnel. The Boustead Tunnel conveys water collected by the west slope collection system under the continental divide and into Turquoise Lake on the east slope. The tunnel is 5 miles long and has a water conveyance capacity of 945 cubic feet per second (cfs).

Sugarloaf Dam and Turquoise Lake are located on Lake Fork Creek, a tributary of the Arkansas River, about 5 miles west of Leadville, Colorado. The lake has a total capacity of 129,398 AF at a water surface elevation of 9,869.4 feet. The lake is operated to provide regulation of both project and non-project water imported from the west slope. Turquoise Lake is operated on an annual cycle. The lake is drafted through the Mt. Elbert Conduit during the winter to provide adequate space for the spring imports of west slope water. Most of the native inflow from Lake Fork Creek is impounded in the lake and returned to the Arkansas River via the Mt. Elbert Conduit, the Mt. Elbert Power Plant, and Twin Lakes. The lake is also operated to provide for recreation and wildlife habitat.

The Mt. Elbert Conduit conveys project, non-project, and native Lake Fork Creek water from Turquoise Lake to Twin Lakes. The conduit is 10.7 miles long and has a water conveyance capacity of 370 cfs. Native water from Halfmoon Creek is also added to the conduit and returned to the Arkansas River from Twin Lakes Dam. The Sugarloaf Powerplant, a privately operated electrical generation station, runs when water is being conveyed from Sugarloaf Dam to the Mt. Elbert Conduit. All conduit flow which reaches the Mt. Elbert Forebay is used to generate electricity at the Mt. Elbert Power Plant as it is delivered to Twin Lakes.

The Mt. Elbert Powerplant is a pumped-storage facility located on the shore of Twin Lakes. It has two 100-megawatt turbine generators, which can be reversed and used as 340,000 horsepower pumps. In addition to being used to generate energy with the Mt. Elbert Conduit flow, the plant is used to follow daily peak power loads. This load following is accomplished by pumping water to the Mt. Elbert Forebay, an 11,143 AF regulating pool at the terminus of the Mt. Elbert Conduit, from Twin Lakes during off-peak load hours using surplus or low cost energy. That water is then returned to Twin Lakes through the turbines during peak load hours, along with the Mt. Elbert Conduit flow. The energy generated at the plant is transmitted and marketed by the Western Area Power Administration, with the revenues applied to the repayment of the project.

Twin Lakes Dam and Twin Lakes are located on Lake Creek, a tributary of the Arkansas River, about 13 miles south of Leadville, Colorado. Twin Lakes has a surveyed capacity of 140,855 AF at a maximum water surface elevation of 9,200 feet. The morning glory spillway is slightly tilted which reduces the active storage space by 498 AF. During construction, the dead pool (the elevation below which water cannot physically be released) was determined to be 9,157.5 feet (54,955 AF). In the 1980s, a 24 inch bypass line used during construction was grouted. At that time, the dead pool was increased to 9,162.8 feet (63,324 AF). The inactive pool has remained at the same elevation of 9,168.7 feet (72,939 AF) so there has not been a change in operations.

The Twin Lakes Reservoir is operated to regulate both project and non-project water imported from the west slope. The project water stored in the reservoir is released to Lake Creek for storage in Pueblo Reservoir during the winter months, in anticipation of spring imports from the west slope. Native inflows into Turquoise Lake, native flows diverted from Halfmoon Creek, and native inflows into Twin Lakes, are all released to Lake Creek from the Twin Lakes Dam. The cities of Colorado Springs and Aurora take direct delivery of water from the reservoir through their Otero Pipeline. The operation of Twin Lakes also provides for recreation and wildlife habitat.

Pueblo Dam and Reservoir are located on the Arkansas River 6 miles west of the city of Pueblo, Colorado. The reservoir is the terminal storage facility for the Fryingpan-Arkansas Project and has a total storage capacity of 338,374 AF at a water surface elevation of 4,898.7 feet. The upper 26,990 AF of storage space are reserved exclusively for flood control at all times, while an additional 66,011 AF of space are reserved for flood control seasonally from April 15 through November 1. Pueblo Reservoir is also operated to provide for recreation, wildlife habitat, and flood control. A sedimentation survey completed in 2012 resulted in new area and capacity tables for Pueblo Reservoir.

Non-project water may be stored in the Pueblo Reservoir under contract with Reclamation. Native inflow can be stored when the project storage right is in priority or under the winter water storage program (WWSP). Under the WWSP, irrigators are permitted to store native Arkansas River water in Pueblo Reservoir during the winter months for an additional supply of irrigation water, on the condition that the water is used before May 1 of the current water year.

The majority of water deliveries are made from Pueblo Reservoir. The Fountain Valley Authority, the Pueblo West Metropolitan District, and the Pueblo Board of Water Works can take direct delivery of municipal water through the south outlet works and joint-use manifold. The Southern Delivery System in the north outlet works began water deliveries to the Fountain Valley Authority participants and Pueblo West beginning in WY 2016. A direct irrigation delivery is made to the Bessemer Ditch. Releases from the fish hatchery outlet at Pueblo Dam support the Pueblo Fish Hatchery. Other project and contract deliveries are made as releases to the Arkansas River for diversion downstream.

HYDROLOGIC CONDITIONS AND WEATHER EVENTS IN WY 2016

Precipitation over the Fryingpan watershed above Ruedi Reservoir was close to average for most of WY 2016. In early April 2016, a combination of decreased snowfall and increased melting brought the snowpack below average. A series of storms in late April and May 2016, an expected result of the El Nino conditions, brought the snowpack to above average and it appeared the imports would be well above average. From June 1 to June 8, 2016, the snowpack began to disappear at an unprecedented rate. Reports by collection system personnel were that the temperatures and wind combined to sublimate much of the snow rather than having it melt out. On average, all the SNOTEL sites in the forecast group melted out about 6 days before the normal melt out date.

The combined snow water equivalents compared to average is shown in Figure 1.

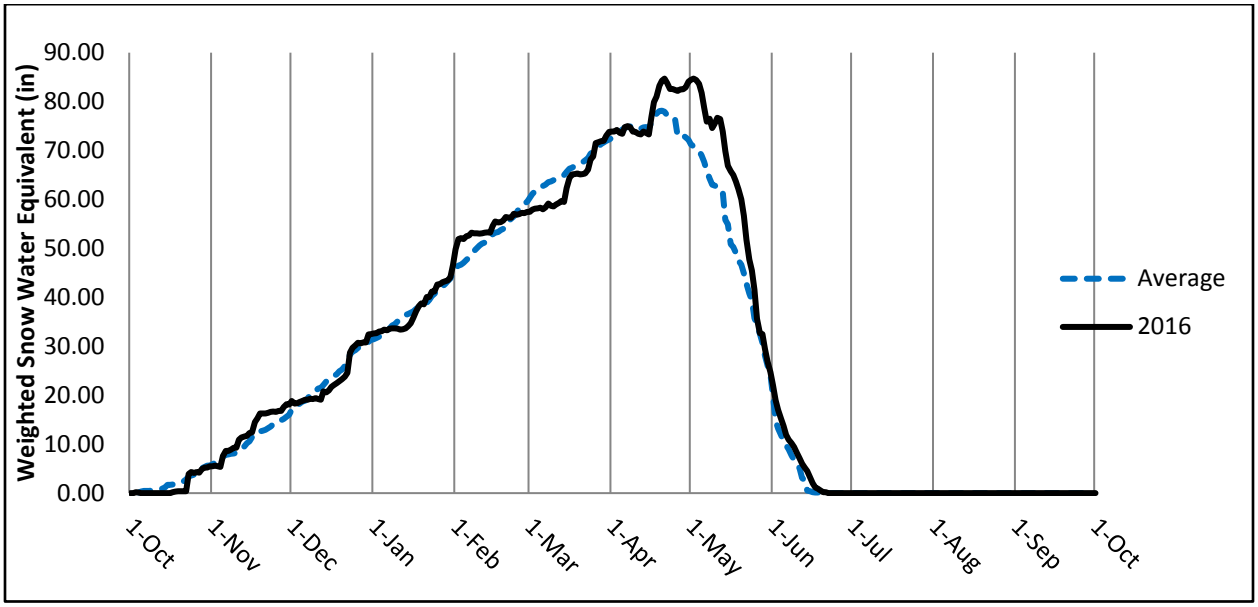


Figure 1: Combined snow water equivalent of Fremont Pass, Independence Pass, Ivanhoe Lake and Nast SNOTEL sites

Import forecasts for 2016 were: February 62,800 AF; March 54,850 AF; April 60,050 AF; May 65,460 AF. The total project imports in WY 2016 were 59,230 AF.

The collection system began diverting May 5, 2016. The inflow from the Boustead Tunnel peaked between June 12 and 13, 2016 (see Figure 2). By July 7, 2016 there was no longer snow registering on the National Operational Hydrologic Remote Sensing Center Interactive Snow Map.

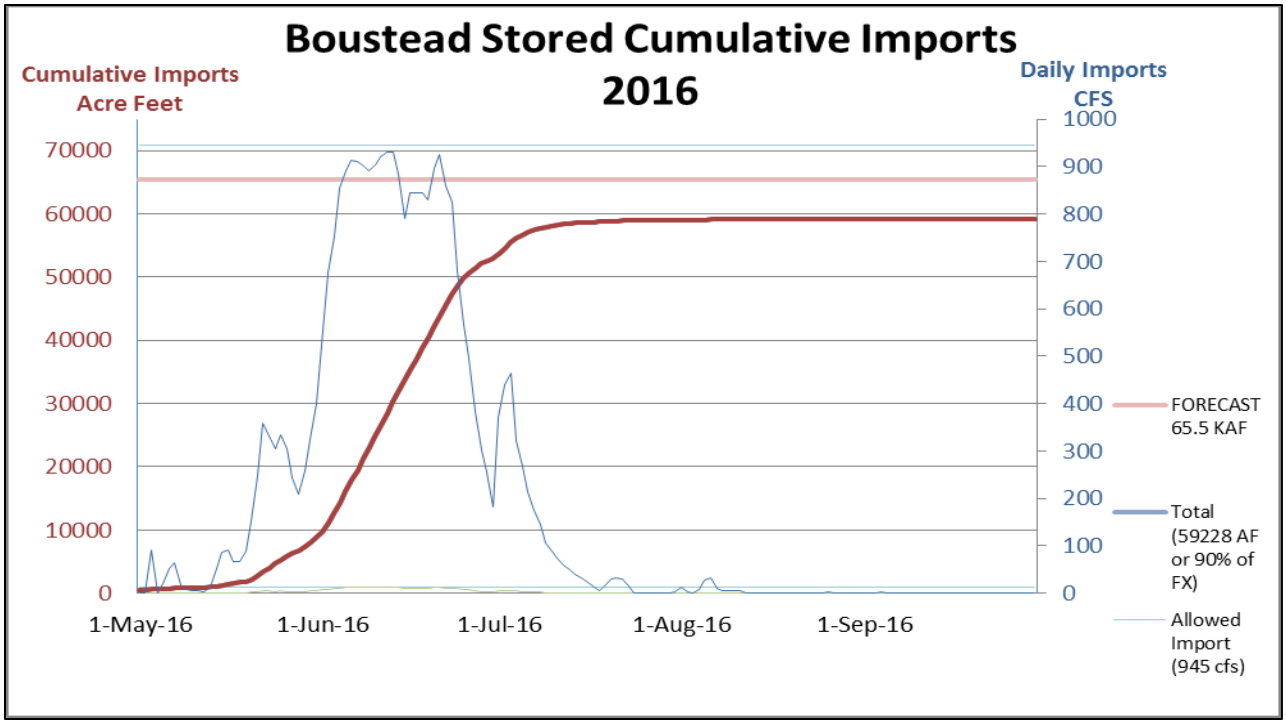


Figure 2: Boustead Tunnel Imports

Average daily temperatures measured at the SNOTEL sites in and around the upper Fryingpan River basin were above average for almost every month of WY 2016 with only two months at or below average. In the fall and early winter months of WY 2016 temperatures ranged from 104 percent of average to 116 percent or 6 degrees above average for the month. Temperatures spiked in February 2016 to 121 percent of average or 4 degrees above average. By the spring and summer of 2016 temperatures returned to near average and continued at those levels through the end of WY 2016.

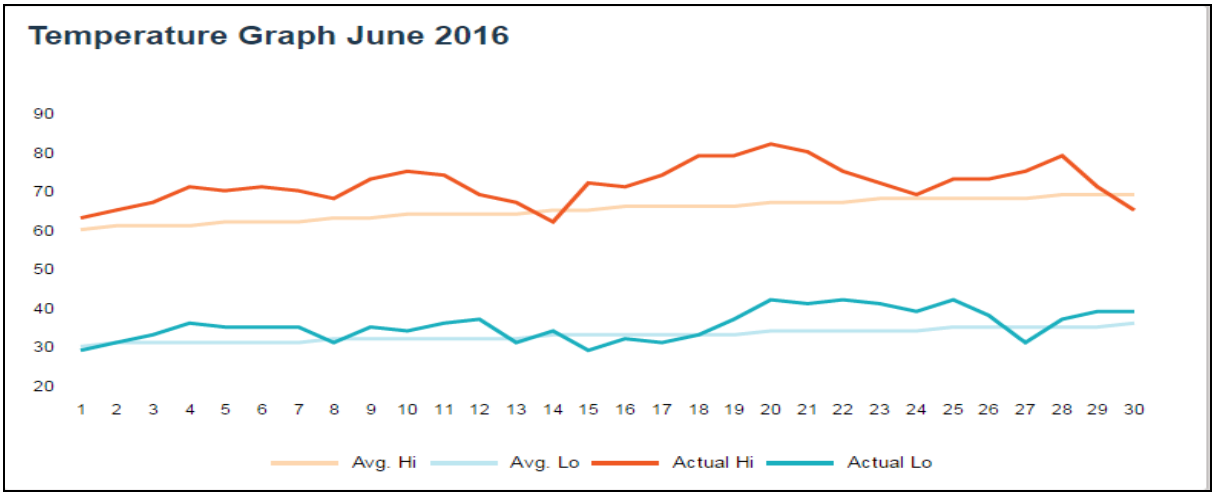


Figure 3: http://www.accuweather.com/en/us/leadville-co/80461/month/332177?monyr=6/01/2016

Inflows to Ruedi Reservoir were below average for almost every month of WY 2016. The year was split with the fall and early winter months well below average and the spring and summer months closer to average runoff. The total inflow volume for the April through July period was 75,622 AF which was 60 percent exceedance of the period of record starting in 1975.

High inflows on the Arkansas brought Twin Lakes Canal Company (TLCC) east slope water rights into priority from June 6 to June 7, 2016 and again from June 19 to 28, 2016. TLCC reached its maximum storage capacity on June 16, 2016. Imports through Twin Lakes Tunnel were curtailed between June 3 and July 20, 2016 and the TLCC Exchange was stopped on June 17, 2016 and began again on June 27, 2016. This was done to maximize the east slope storage rights. TLCC Exchange was called out of priority on September 15, 2016 and remained out of priority for the rest of WY 2016.

REPORT ON OPERATIONS DURING WY 2016

Ruedi Reservoir

Ruedi Reservoir started out WY 2016 with a storage content of 80,335 AF, which was 90 percent of average. By mid-October 2015 the release from Ruedi decreased to the winter target of 70 cfs and was held at this rate until the end of April 2016. The winter target releases were made through the city of Aspen's hydroelectric powerplant.

In January 2016 the years first forecast of inflow to Ruedi was computed. This forecast projected that the runoff resulting from snow pack in the basin would be 94 percent of average. This forecast would result in an April through July 2016 runoff volume of 131,000 AF. The reservoir storage was below average at the beginning of January 2016 and releases continued at 70 cfs. Modeling of reservoir futures, assuming these conditions and based on the January 2016 inflow forecast, suggested that continuing at the then current release rate would allow the reservoir to fill in early July 2016 so no release changes were made.

In February 2016 the runoff forecast increased to 105 percent of average and the predicted runoff volume was 146,000 AF for the April through July 2016 period. The reservoir storage was still below average at 97 percent of average and the release from the reservoir continued at 70 cfs. Modeling of reservoir futures assuming these conditions and the February 2016 runoff forecast indicated that the reservoir would fill in early July 2016 at the 70 cfs release. Therefore no changes were made to the reservoir release.

In March 2016 the runoff forecast decreased to 96 percent of average. The resulting April through July 2016 runoff volume was 133,000 AF. Reservoir storage was slightly above average at 101 percent of average. Modeling indicated that the reservoir would fill and did not suggest a significant risk of exceeding the channel capacity below the reservoir. As a result, the releases were kept at 70 cfs through the month of March 2016.

By the beginning of April 2016 the reservoir was drafted down to its lowest storage content of 67,451 AF on April 4, 2016. Snow was still accumulating at the SNOTEL sites and runoff was just starting to increase. The April 2016 most probable forecast of inflow for April through July

called for 136,000 AF or 98 percent of average. This forecast projected that Ruedi would fill under the most probable case and spill under the maximum reasonable case.

The meeting required under stipulation 1.7.b of Case Numbers 02CW324 and 02CW365 between Reclamation, Southeastern, Division 5, and the River District was held April 11, 2016. Given the April 1, 2016 forecast, it was agreed there was a high probability of Ruedi filling in 2016. This consensus allowed Reclamation to divert an additional 45 cfs through the Boustead Tunnel, not to exceed 945 cfs, in accordance with stipulation five of the above mentioned Case Numbers.

Runoff started increasing rapidly in early April 2016 and only stalled a few times at the end of the month as temperatures dipped below average. Release from the reservoir was increased several times at the end of April 2016. On April 21, 2016 the release was increased to 101 cfs and then on April 28, 2016 to125 cfs.

Runoff continued to increase in early May 2016 and releases from the reservoir were increased several times to keep on the fill target. On May 6, 2016 the release was increased to 175 cfs and on May 11, 2016 it was increased to 235 cfs. The most probable forecast of inflow was 137,000 AF or 106 percent of average over the May to July 2016 period. This forecast indicated that the reservoir would fill and not need to release flows above the downstream channel capacity. It also indicated that there would be enough water to make Coordinated Reservoir Operations (CROS) releases to the 15-Mile reach of the Colorado River.

Ruedi Reservoir is a participating reservoir in the CROS efforts of the Upper Colorado River Endangered Fish Recovery Program. Reservoir operations are directed at augmenting the peak flows in the 15-Mile reach of the Colorado River in the spring and early summer as the natural runoff is increasing. Ruedi Reservoir did participate in CROS operations for WY 2016. Over the period of June 3 to June 7, 2016 the reservoir release was increased from 250 cfs to 700 cfs, releasing a total of 4,007 AF over the 5 day period.

After CROS operations ended, releases were decreased to the minimum flow of 110 cfs to secure a physical fill of the reservoir. The reservoir storage reached a maximum physical content of 102,015 AF on July 7, 2016. This storage content was 104 percent of the 30 year average on that day.

The senior Grand Valley Irrigators priority call was placed in WY 2016 and Ruedi Reservoir was called out of priority for several periods. While Ruedi Reservoir was in priority it stored inflow from the first of the year until September 14, 2016. Outside this period, Ruedi was required to make contract and replacement releases to the Colorado River. Ruedi released 83 AF of water for out of priority diversions and 1,033 AF for contracts during the period that the reservoir was out of priority.

On July 18, 2016 contracted water was released to support fish recovery efforts in the 15-Mile reach of the Colorado River. These releases are designed to enhance habitat for endangered fish in the Colorado River. A total of 27,412.5 AF was released between July 18, 2016 and October 13, 2016. This total includes 5,000 AF from the firm endangered fish pool, 5,412.5 AF from the

mitigation water pool, 5,000 AF from the 4-out-of-5 fish pool and 12,000 AF of the southern Ute Indian Tribe rental water.

West Slope Collection System and Project Diversions

The most probable forecasts for the first of February, March, April, and May 2016 were 62,800 AF, 54,850 AF, 60,050 AF, and 65,460 AF, respectively. Storms after the May 2016 forecast increased the snowpack slightly but an unusually hot June 2016 reduced the snowpack by sublimation. A total of 61,051 AF of the water diverted through the Boustead Tunnel and 59,228 AF of water was stored during WY 2016, which is 106 percent of average for the period from WY 1972 to WY 2016 and 90 percent of the May 2016 forecast.

The Sawyer Creek Diversion record was not recoverable for this season. The SDR failed and was not identified until after diversion operations were completed. Sawyer Creek, Chapman Gulch and the Hunter Creek Collection System diversions are included in the Chapman Diversion record. The problem has been corrected.

The import of project water through the Boustead Tunnel began on May 5, 2016. The maximum mean daily import through Boustead Tunnel was 945 cfs on June 12 and 13, 2016. A portion of the diversion system was shut down in late August 2016 and the rest during late September 2016. Boustead Tunnel seepage was recorded whenever the Fry-Ark Project water rights were in priority. There was no Busk-Ivanhoe water conveyed through the Boustead Tunnel. The daily discharge record for the diversion structures is included as Appendix D. An aggregated discharge record is shown in Table 4. The 45 years of total project accumulated imports total 2,344,505 AF, for an unimpeded average of 55,530 AF per year, is shown on Table 5. A plot of the Boustead Tunnel imports during WY 2016 is shown on Figure 2 and Exhibit 5.

Ruedi Reservoir was forecast to fill in WY 2016. In accordance with stipulations to 02CW324 and 02CW354 and the November 30, 2004 agreement between the Southeastern Colorado Water Conservancy District, Colorado River Water Conservation District and the Twin Lakes Reservoir Canal Company, imports through the Boustead Tunnel were constrained to a maximum of 945 cfs.

Twin Lakes Reservoir and Canal Company/Fryingpan-Arkansas Project Exchange

The Bureau of Reclamation is obligated to maintain minimum stream flows in the Roaring Fork River by the authorizing legislation of the project. This is accomplished through an exchange of water with the Twin Lakes Reservoir and Canal Company (TLCC). On October 1, 2015, the company began bypassing water into the Roaring Fork River on the west slope in exchange for project water stored in Twin Lakes on the east slope.

TLCC space in Twin Lakes was full between June 17 and 28, 2016 thus TLCC west slope diversions were curtailed. During the curtailment TLCC did not receive any credits for the releases made to the upper Roaring Fork. The west slope entities became concerned that Twin Lakes exchange water would not be fully utilized, as a result the participants reached an agreement to increase the bypass on Roaring Fork from 3 cfs to 4 cfs for August and September 2016 to help use more of the exchange water. The exchange was called out of priority on September 15, 2016.

The total amount of TLCC exchange was 2,532 AF with a net credit to TLCC of 2,510 AF. The operating criteria and the monthly summary of the exchange are shown in Appendix C.

Turquoise Lake

On September 30, 2015 there was 121,234 AF of water (elevation of 9,864.79 feet) stored in Turquoise Lake, 109 percent of average. The maximum storage level was 121,164 AF of water (elevation 9864.75 feet) on October 1, 2015. Releases made down Lake Fork Creek and to Twin Lakes through the Mt. Elbert Conduit drafted Turquoise Lake to 62,926 AF (elevation 9828.36 feet), the lowest storage of WY 2016. At the end of WY 2016 on September 30, 2016 there was 113,625 AF, at elevation 9,860.41 feet, which is 100 percent of average. Exhibits 8 and 9 show the precipitation and pan evaporation at Turquoise Lake. Table 6 and Exhibit 10 depict the monthly operation of Turquoise Lake during WY 2016.

There was 4,605.5 AF imported through Homestake Tunnel to the account in Turquoise Reservoir.

Busk-Ivanhoe imports through the Carlton Tunnel totaled 4,799.9 AF. Pueblo Water received 2,831.9 AF of the imports and the City of Aurora received 1,968.0 AF.

Spring 2016 runoff and releases down Lake Fork Creek were high but there were no issues.

Project water imports through the Boustead Tunnel totaled 59,228 AF.

Exhibits 5, 6, and 7 show the monthly imports through the Boustead, Homestake, and Busk-Ivanhoe Tunnels, respectively.

Mt. Elbert Conduit/Halfmoon Creek Diversion

During WY 2016, 90,127 AF of water was released from Turquoise Lake through the Sugarloaf Powerplant; 5,848 AF of water was bypassed around the powerplant; and 7,808 AF of water was diverted from Halfmoon Creek and was conveyed through the Mt. Elbert Conduit to the Mt. Elbert Forebay, and subsequently to Twin Lakes through the Mt. Elbert Power Plant. An additional 3,920 AF of water were released into the conduit from Turquoise Lake for use by the Leadville Federal Fish Hatchery. The water was diverted from the conduit and delivered to the hatchery. It was then returned to the Arkansas River and stored in Pueblo Reservoir. The conduit operations are shown on Exhibit 11.

Twin Lakes/Mt. Elbert Forebay and Mt. Elbert Pumped-Storage Power Plant

The storage in Twin Lakes was 123,202 AF and in Mt. Elbert Forebay was 8,764 AF of water (Twin Lakes elevation 9193.26 feet and Mt. Elbert Forebay elevation 9636.77 feet) on September 30, 2015, which was 108 percent of average. Twin Lakes releases to Lake Creek were made throughout the winter of WY 2016 to pass the flow of the Mt. Elbert Conduit, and to transfer project water stored in Twin Lakes to Pueblo Reservoir.

The native inflow of 5,933 AF was stored in TLCC storage space from November 15, 2015 through March 15, 2016 as winter water storage. A total of 54,412 AF of project water was released to Lake Creek during this time.

The Twin Lakes/Mt. Elbert Forebay combined water storage reached a low point of 103,454 AF on May 31, 2016 and was at its high point of 135,334 AF on July 17, 2016. On September 30, 2016 Twin Lakes held 103,803 AF (elevation 9184.84 feet) and Mt. Elbert Forebay held 10,489 AF (elevation 9643.30 feet), the combined total of which was 92 percent of average. Exhibits 12 and 13 show the precipitation and pan evaporation at Turquoise Lake. Table 7 and Exhibit 14 depict the monthly operation of Twin Lakes during WY 2016.

Colorado Division of Water Resources determines the amount of water trapped as bank storage in ice before March 15, 2016 that will be credited to TLCC as winter water. The bank storage amount of 15 AF was prorated between the first day of melting and the average last day of freezing at Twin Lakes. This amount was deducted from native inflows and credited daily to the TLCC account.

A total of 10,000 AF of Fry-Ark Project water was made available to the Upper Arkansas Voluntary Flow Management Program (VFMP) to augment flows at the Arkansas River gage at Wellsville. While Reclamation is not signatory to the 2006 or the revised 2016 agreement between Southeastern Colorado Water Conservancy District; Colorado Parks and Wildlife; Chafee County; the Arkansas River Outfitters Association; and Trout Unlimited, project water is made available when possible to support this agreement. Water may be called-for year-round to support fishery flows at 250 cfs. Recreational flows may be provided from July 1 to August 15 if the flow at Wellsville is below 700 cfs. The flows may be ramped down to prevent streambank erosion after August 15. The Bureau provided 7,529 AF of water between July 1, 2016 and August 18, 2016 in support of the VFMP.

A total of 262,217 megawatt hours of energy was generated at the power plant, with 790,421 AF of water; 103,415 AF came through the Mt. Elbert Conduit; and 689,958 AF were first pumped to the Mt. Elbert Forebay from Twin Lakes during off-peak electric demand hours. Table 8 depicts the monthly power plant operation for WY 2016.

Pueblo Reservoir

The water storage content of Pueblo Reservoir was 189,065 AF (elevation 4,866.42 feet) on September 30, 2015, 140 percent of average. The reservoir reached a maximum storage level of 272,010 AF (elevation 4886.09 feet) on March 12, 2016 and minimum storage level on November 10, 2015 at 181,475 AF (elevation 4864.33 feet). At the end of WY 2016 on September 30, 2016 there was 186,027 AF, an elevation of 4865.59 feet, which is 136 percent of average.

A total of 57,924 AF of native inflow was stored in the reservoir under the Pueblo Reservoir winter water storage program between November 15, 2015 and March 14, 2016. This program allows agricultural entities to store native flows during the winter to be used during irrigation season. On March 15, 2016 it was distributed to agricultural entities.

WY 2016 was a wet year which resulted in storage at 140 percent of average in Pueblo Reservoir at the beginning of the WY 2017. Winter water storage was about 18,000 AF above average as well. Pueblo Reservoir storage was 260,873 AF on April 1, 2016. The Corps of Engineers (COE) requires the joint use pool be evacuated by April 15 and the reservoir drawn down to 245,373 AF. In the past, COE issued waivers to allow accounts to encroach into the joint use pool until May 1 the day all winter water carryover must be out of the reservoir and any remaining project carryover will revert to the project. Changes in guidance from COE mean waivers may no longer be issued as in the past. This makes it more likely that a spill, the forced evacuation of account water, will occur in mid-April in the future. In WY 2016, account holders cooperated to draw down their accounts, even when the timing of releases wasn't optimal for an individual account holder, releasing water before the April 15 deadline. Water was moved to other vessels, including John Martin and the Great Plains Reservoirs, or used early for irrigation. The increased probability of a spill encouraged a re-examination of the spill priorities. Reclamation and Southeast Colorado Water Conservancy District agreed on the interpretation of the priorities and wrote new guidance to reflect this agreement.

Ground water contamination from perfluorinated compounds were discovered in the Widefield Security and Fountain area. Discussions between Reclamation and the Fountain Valley Conduit participants were held to consider options to help improve the issues.

Table 9 and Exhibit 19 depict Pueblo Reservoir monthly operations during WY 2016. The WY 2016 winter water storage is shown on Exhibit 16, and the winter water releases are shown on Exhibit 17. The precipitation and evaporation at the reservoir are shown on Exhibits 15 and 18. Project water releases are shown on Exhibit 20.

Storage Contracts

There were four long term storage contracts for a total of 57,416 AF of non-project storage in Turquoise Lake, one for 54,452 AF in Twin Lakes and six for 51,562 AF in Pueblo Reservoir.

Twenty-two contracts totaling 18,879 AF were interim 1-year contracts for "if and when" storage space in Pueblo Reservoir. Under "if and when" contracts, non-project water may be stored in project storage space as long as that storage space is not required for project water.

Project Water Sales and Deliveries

There was 43,480 AF of Fryingpan-Arkansas Project water made available to the Southeastern Colorado Water Conservancy District (District) during WY 2016 for initial allocation. The District routinely offers less than the full allocation to entities to mitigate an import over-forecast with the remainder of the allocation allotted in August. During WY 2016, the first part of the allocation was 41,331 AF. The second portion of the allocation was 3,799 AF for a total allocation of 45,336 AF apportioned to the participating entities.

Entities called for 36,786 AF of project and 2,604 project carryover water during WY 2016.

Evaporation reduced the project carryover water in storage by 9,146 AF. By the end of the water year (September 30, 2016), the District had 12,003 AF of 2016 allocated water and 128,712 AF of carryover water remaining in storage. The monthly release of project water from Pueblo Reservoir is shown on Exhibit 21.

Reservoir Storage Allocation Data

Table 10 presents the reservoir storage allocations for the five project reservoirs.

Reservoir Evaporation and Precipitation

Tables 12 and 13 present the monthly average evaporation and precipitation at the four weather stations near project facilities. When an evaporation pan is not in service and a reservoir is not completely ice-covered, the daily water surface evaporation is computed using seasonal evaporation factors. Those factors are listed in Table 11. The assumption is that there is no evaporation from a reservoir water surface when ice completely covers the reservoir.

Flood Control Benefits

The COE estimated that the operations at Ruedi Reservoir during WY 2016 didn't prevent flood damages. Since impoundment, Ruedi Reservoir has prevented a total of $19,718,700 (unadjusted for inflation) in potential flood damages.

The COE estimated that the operations at Pueblo Reservoir didn't prevent flood damages during WY 2016. Since impoundment, Pueblo Reservoir has prevented a total of $36,785,000 (unadjusted for inflation) in potential flood damages.

Table 14 shows the historic flood control benefits provided by Pueblo and Ruedi Dams.

APPENDIX A: TABLES

1. Ruedi Reservoir Operations WY 2016

Fryingpan-Arkansas Project
Unit: 1,000 AF

Month	Inflow	Evaporation	Outflow	End of Month Content	Water Surface Elevation (feet)
OCT 2015	3.0	0.1	9.7	74.0	7734.55
NOV 2015	2.3	0	3.1	73.2	7733.54
DEC 2015	0.7	0	2.0	71.9	7731.91
JAN 2016	2.4	0	4.0	70.2	7729.83
FEB 2016	2.5	0	4.1	68.6	7727.76
MAR 2016	3.3	0	4.4	67.5	7726.32
APR 2016	7.5	0	4.9	70.1	7729.60
MAY 2016	19.8	0.2	12.8	76.9	7738.07
JUN 2016	37.1	0.6	13.3	100.1	7763.70
JUL 2016	12.3	0.6	12.3	99.5	7763.06
AUG 2016	7.7	0.4	16.9	89.9	7752.96
SEP 2016	5.3	0.2	16.7	77.9	7739.27
Total* (AF)	**103,859**	**2,066**	**104,259**		

*Rounding may introduce discrepancies between monthly and yearly totals

2. Ruedi Reservoir Releases for Contracts WY 2016

Fryingpan-Arkansas Project

Unit: AF

Month	Round 1	Round 2 Nonfish	Round 2 Fish
OCT-2015			
NOV-2015			
DEC-2015			
JAN-2016			
FEB-2016			
MAR-2016			
APR-2016			
MAY-2016			
JUN-2016			
JUL-2016			1,964
AUG-2016			10,523
SEP-2016	153	498	11,425
OCT-2016	79	302	3,501
Total	**233**	**800**	**27,413**

3. Ruedi Reservoir Releases for Endangered Fish WY 2016

FRYINGPAN-ARKANSAS PROJECT
RUEDI RESERVOIR
RELEASES FOR ENDANGERED FISH
WATER YEAR 2016
April

DAY	DATE	ELEV. (FT)	STORAGE (AC-FT)	INFLOW (CFS)	EVAP. (CFS)	TOTAL RESERVOIR RELEASE (CFS)	ROCKY FORK CREEK (CFS)	FRYINGPAN RIVER GAGE BELOW DAM (CFS)	RUEDI CALLED OUT? (Y= YES) (N= NO)	REQUIRED MIN FLOW BELOW RUEDI w/o FISH REL (CFS)	REQUIRED FISH RELEASE (CFS)	CUMULATIVE FISH RELEASE (AC-FT)	PALISADE GAGE (CFS)
FRI	4/1/2016	7,726.26	67,504	48	0	71	3	74	N	39	0	0	1,532
SAT	4/2/2016	7,726.22	67,474	56	0	71	3	74	N	39	0	0	1,477
SUN	4/3/2016	7,726.19	67,451	60	0	72	3	74	N	39	0	0	1,373
MON	4/4/2016	7,726.19	67,451	71	0	71	3	74	N	39	0	0	1,230
TUE	4/5/2016	7,726.21	67,466	79	0	71	3	74	N	39	0	0	1,104
WED	4/6/2016	7,726.22	67,474	75	0	71	3	74	N	39	0	0	1,110
THU	4/7/2016	7,726.27	67,512	91	0	71	3	75	N	39	0	0	1,191
FRI	4/8/2016	7,726.37	67,588	110	0	72	3	75	N	39	0	0	1,214
SAT	4/9/2016	7,726.53	67,710	134	0	72	4	76	N	39	0	0	1,193
SUN	4/10/2016	7,726.69	67,832	133	0	72	4	76	N	39	0	0	1,634
MON	4/11/2016	7,726.87	67,969	141	0	72	4	76	N	39	0	0	1,704
TUE	4/12/2016	7,727.02	68,083	130	0	72	4	76	N	39	0	0	1,642
WED	4/13/2016	7,727.20	68,221	142	0	72	5	77	N	39	0	0	1,685
THU	4/14/2016	7,727.38	68,359	142	0	72	5	77	N	39	0	0	1,598
FRI	4/15/2016	7,727.66	68,574	180	0	72	5	77	N	39	0	0	1,995
SAT	4/16/2016	7,727.81	68,689	130	0	72	5	77	N	39	0	0	2,356
SUN	4/17/2016	7,727.92	68,774	119	0	76	5	81	N	39	0	0	2,058
MON	4/18/2016	7,728.00	68,835	111	0	80	5	85	N	39	0	0	1,589
TUE	4/19/2016	7,728.07	68,889	112	0	85	5	90	N	39	0	0	1,296
WED	4/20/2016	7,728.14	68,943	116	0	89	5	94	N	39	0	0	1,164
THU	4/21/2016	7,728.23	69,013	128	0	93	5	98	N	39	0	0	1,111
FRI	4/22/2016	7,728.34	69,098	140	0	98	5	102	N	39	0	0	1,087
SAT	4/23/2016	7,728.58	69,284	201	0	107	5	112	N	39	0	0	1,383
SUN	4/24/2016	7,728.82	69,470	200	0	107	5	111	N	39	0	0	1,959
MON	4/25/2016	7,729.04	69,640	193	0	107	5	112	N	39	0	0	2,432
TUE	4/26/2016	7,729.22	69,780	177	0	107	5	112	N	39	0	0	2,534
WED	4/27/2016	7,729.39	69,913	173	0	106	6	112	N	39	0	0	2,506
THU	4/28/2016	7,729.50	69,999	150	0	107	6	113	N	39	0	0	2,412
FRI	4/29/2016	7,729.57	70,053	138	0	110	6	116	N	39	0	0	2,286
SAT	4/30/2016	7,729.60	70,076	126	0	114	6	120	N	39	0	0	2,160
Averages		7,727.65	68,571	127	0	84	4	89		39	0		1,667
Totals (acft)				7,550	0	5,024	262	5,285		2,321	0	0	99,204

NOTES: Releases of water to support 15-Mile Reach target started 7/18 and ceased 10/13. A total of 27,412.5 acre-feet was released to support Recovery Program target flows.

FRYINGPAN-ARKANSAS PROJECT
RUEDI RESERVOIR
RELEASES FOR ENDANGERED FISH
WATER YEAR 2016
May

DAY	DATE	ELEV. (FT)	STORAGE (AC-FT)	INFLOW (CFS)	EVAP. (CFS)	TOTAL RESERVOIR RELEASE (CFS)	ROCKY FORK CREEK (CFS)	FRYINGPAN RIVER GAGE BELOW DAM (CFS)	RUEDI CALLED OUT? (Y= YES) (N= NO)	REQUIRED MIN FLOW BELOW RUEDI w/o FISH REL (CFS)	ENDANGERED FISH RELEASE (CFS)	CUMULATIVE FISH RELEASE (AC-FT)	PALISADE GAGE (CFS)
SUN	5/1/2016	7,729.60	70,076	118	0	118	6	124	N	110	0	0	2,017
MON	5/2/2016	7,729.60	70,076	123	0	122	6	128	N	110	0	0	1,824
TUE	5/3/2016	7,729.64	70,108	138	0	122	5	128	N	110	0	0	1,608
WED	5/4/2016	7,729.79	70,224	181	0	122	5	127	N	110	0	0	1,646
THU	5/5/2016	7,730.09	70,459	241	0	122	5	128	N	110	0	0	2,199
FRI	5/6/2016	7,730.50	70,781	297	0	135	5	140	N	110	0	0	3,390
SAT	5/7/2016	7,730.88	71,080	328	0	177	6	183	N	110	0	0	5,381
SUN	5/8/2016	7,731.09	71,245	260	0	177	7	183	N	110	0	0	5,896
MON	5/9/2016	7,731.34	71,443	277	0	177	8	185	N	110	0	0	5,592
TUE	5/10/2016	7,731.71	71,736	324	0	176	10	187	N	110	0	0	5,463
WED	5/11/2016	7,731.80	71,808	255	0	218	11	229	N	110	0	0	6,124
THU	5/12/2016	7,731.81	71,816	239	0	235	11	245	N	110	0	0	5,835
FRI	5/13/2016	7,731.90	71,887	271	0	235	10	245	N	110	0	0	5,479
SAT	5/14/2016	7,732.09	72,038	312	0	236	10	245	N	110	0	0	5,758
SUN	5/15/2016	7,732.43	72,309	374	0	237	10	247	N	110	0	0	6,929
MON	5/16/2016	7,732.84	72,636	402	0	237	11	248	N	110	0	0	8,706
TUE	5/17/2016	7,733.11	72,853	346	0	237	13	250	N	110	0	0	9,403
WED	5/18/2016	7,733.32	73,022	323	0	238	14	252	N	110	0	0	8,774
THU	5/19/2016	7,733.58	73,231	345	0	239	14	253	N	110	0	0	8,290
FRI	5/20/2016	7,733.89	73,480	364	0	238	13	251	N	110	0	0	8,517
SAT	5/21/2016	7,734.31	73,820	411	0	239	13	252	N	110	0	0	9,749
SUN	5/22/2016	7,734.88	74,282	473	0	240	14	254	N	110	0	0	10,733
MON	5/23/2016	7,735.43	74,729	466	0	240	18	258	N	110	0	0	11,302
TUE	5/24/2016	7,735.88	75,096	426	0	241	20	261	N	110	0	0	10,883
WED	5/25/2016	7,736.28	75,424	407	0	241	20	261	N	110	0	0	10,338
THU	5/26/2016	7,736.67	75,744	403	0	241	20	261	N	110	0	0	10,113
FRI	5/27/2016	7,736.98	75,999	370	0	241	19	260	N	110	0	0	9,553
SAT	5/28/2016	7,737.24	76,213	350	0	241	17	259	N	110	0	0	8,685
SUN	5/29/2016	7,737.49	76,420	346	0	241	17	258	N	110	0	0	8,059
MON	5/30/2016	7,737.77	76,652	359	0	242	17	258	N	110	0	0	8,164
TUE	5/31/2016	7,738.08	76,909	372	0	242	18	260	N	110	0	0	8,801
Averages		7,733.29	73,019	319	0	208	12	220		110	0		6,942
Totals (acft)				19,638	18	12,788	741	13,529		6,764	0	0	426,873

NOTES: Releases of water to support 15-Mile Reach target started 7/18 and ceased 10/13. A total of 27,412.5 acre-feet was released to support Recovery Program target flows.

FRYINGPAN-ARKANSAS PROJECT
RUEDI RESERVOIR
RELEASES FOR ENDANGERED FISH
WATER YEAR 2016
June

DAY	DATE	ELEV. (FT)	STORAGE (AC-FT)	INFLOW (CFS)	EVAP. (CFS)	TOTAL RESERVOIR RELEASE (CFS)	ROCKY FORK CREEK (CFS)	FRYINGPAN RIVER GAGE BELOW DAM (CFS)	RUEDI CALLED OUT? (Y= YES) (N= NO)	REQUIRED MIN FLOW BELOW RUEDI w/o FISH REL (CFS)	ENDANGERED FISH RELEASE (CFS)	CUMULATIVE FISH RELEASE (AC-FT)	PALISADE GAGE (CFS)
WED	6/1/2016	7,738.51	77,267	424	1	243	19	262	N	110	0	0	9,260
THU	6/2/2016	7,739.05	77,717	471	1	243	22	265	N	110	0	0	10,060
FRI	6/3/2016	7,739.71	78,270	529	1	249	26	275	N	110	0	0	11,197
SAT	6/4/2016	7,740.47	78,910	643	1	320	33	353	N	110	0	0	12,510
SUN	6/5/2016	7,741.55	79,826	875	1	413	41	454	N	110	0	0	14,859
MON	6/6/2016	7,742.62	80,739	971	1	510	57	567	N	110	0	0	16,958
TUE	6/7/2016	7,743.28	81,305	882	1	595	69	665	N	110	0	0	17,252
WED	6/8/2016	7,743.86	81,804	883	1	631	71	702	N	110	0	0	17,625
THU	6/9/2016	7,744.46	82,324	894	1	631	71	702	N	110	0	0	17,255
FRI	6/10/2016	7,745.43	83,169	942	1	515	72	588	N	110	0	0	17,408
SAT	6/11/2016	7,747.01	84,555	1,015	1	316	74	390	N	110	0	0	17,345
SUN	6/12/2016	7,748.74	86,090	1,006	1	232	71	303	N	110	0	0	16,469
MON	6/13/2016	7,750.13	87,333	865	1	238	65	302	N	110	0	0	15,394
TUE	6/14/2016	7,751.23	88,326	698	1	197	59	255	N	110	0	0	14,478
WED	6/15/2016	7,752.08	89,097	531	1	141	54	195	N	110	0	0	13,202
THU	6/16/2016	7,753.04	89,974	549	1	106	51	157	N	110	0	0	12,591
FRI	6/17/2016	7,754.02	90,875	518	1	63	48	111	N	110	0	0	12,374
SAT	6/18/2016	7,754.95	91,735	503	1	69	46	115	N	110	0	0	11,650
SUN	6/19/2016	7,755.86	92,582	499	1	72	44	116	N	110	0	0	11,286
MON	6/20/2016	7,756.83	93,491	531	1	72	43	115	N	110	0	0	11,074
TUE	6/21/2016	7,757.87	94,471	568	1	73	41	114	N	110	0	0	11,318
WED	6/22/2016	7,758.79	95,345	516	1	75	40	115	N	110	0	0	11,371
THU	6/23/2016	7,759.73	96,242	529	1	75	38	113	N	110	0	0	11,136
FRI	6/24/2016	7,760.44	96,924	423	1	78	35	112	N	110	0	0	11,327
SAT	6/25/2016	7,761.08	97,542	400	1	88	32	120	N	110	0	0	10,716
SUN	6/26/2016	7,761.68	98,123	381	1	87	29	116	N	110	0	0	9,909
MON	6/27/2016	7,762.22	98,648	360	1	95	27	121	N	110	0	0	9,091
TUE	6/28/2016	7,762.76	99,175	364	1	97	25	122	N	110	0	0	7,900
WED	6/29/2016	7,763.25	99,654	339	1	97	24	120	N	110	0	0	6,653
THU	6/30/2016	7,763.72	100,115	329	1	96	23	119	N	110	0	0	6,057
Averages		7,751.81	89,054	615	1	224	45	269		110	0		12,524
Totals (acft)				36,575	47	13,321	2,679	15,999		6,546	0	0	745,254

NOTES: Releases of water to support 15-Mile Reach target started 7/18 and ceased 10/13. A total of 27,412.5 acre-feet was released to support Recovery Program target flows.

FRYINGPAN-ARKANSAS PROJECT
RUEDI RESERVOIR
RELEASES FOR ENDANGERED FISH
WATER YEAR 2016
July

DAY	DATE	ELEV. (FT)	STORAGE (AC-FT)	INFLOW (CFS)	EVAP. (CFS)	TOTAL RESERVOIR RELEASE (CFS)	ROCKY FORK CREEK (CFS)	FRYINGPAN RIVER GAGE BELOW DAM (CFS)	RUEDI CALLED OUT? (Y= YES) (N= NO)	REQUIRED MIN FLOW BELOW RUEDI w/o FISH REL (CFS)	ENDANGERED FISH RELEASE (CFS)	CUMULATIVE FISH RELEASE (AC-FT)	PALISADE GAGE (CFS)
FRI	7/1/2016	7,764.08	100,469	275	1	96	23	119	N	110	0	0	5,907
SAT	7/2/2016	7,764.44	100,825	277	1	97	22	119	N	110	0	0	6,007
SUN	7/3/2016	7,764.90	101,279	326	1	96	26	122	N	110	0	0	6,728
MON	7/4/2016	7,765.15	101,527	222	1	96	24	120	N	110	0	0	6,366
TUE	7/5/2016	7,765.35	101,726	210	1	109	21	130	N	110	0	0	5,668
WED	7/6/2016	7,765.55	101,925	251	1	150	20	169	N	110	0	0	5,168
THU	7/7/2016	7,765.64	102,015	206	1	160	18	178	N	110	0	0	4,753
FRI	7/8/2016	7,765.62	101,995	194	1	203	17	220	N	110	0	0	4,245
SAT	7/9/2016	7,765.61	101,985	199	1	203	16	220	N	110	0	0	3,838
SUN	7/10/2016	7,765.59	101,965	195	1	204	16	219	N	110	0	0	3,493
MON	7/11/2016	7,765.58	101,955	199	1	204	15	219	N	110	0	0	3,111
TUE	7/12/2016	7,765.53	101,905	179	1	204	15	218	N	110	0	0	2,818
WED	7/13/2016	7,765.49	101,866	185	1	204	14	218	N	110	0	0	2,493
THU	7/14/2016	7,765.43	101,806	175	1	204	14	218	N	110	0	0	2,121
FRI	7/15/2016	7,765.36	101,736	170	1	204	13	218	N	110	0	0	1,816
SAT	7/16/2016	7,765.29	101,667	170	1	205	13	217	N	110	0	0	1,567
SUN	7/17/2016	7,765.21	101,587	166	1	205	13	218	N	110	0	0	1,346
MON	7/18/2016	7,765.17	101,547	197	1	216	8	224	N	110	11	21	1,171
TUE	7/19/2016	7,765.09	101,468	203	1	242	6	248	N	110	37	94	1,133
WED	7/20/2016	7,764.96	101,338	178	1	242	6	249	N	110	37	168	1,335
THU	7/21/2016	7,764.91	101,289	218	1	242	6	248	N	110	37	241	1,341
FRI	7/22/2016	7,764.82	101,200	198	1	242	6	248	N	110	37	314	1,446
SAT	7/23/2016	7,764.66	101,042	163	1	242	7	248	N	110	37	386	1,468
SUN	7/24/2016	7,764.50	100,884	163	1	242	7	249	N	110	37	459	1,534
MON	7/25/2016	7,764.34	100,726	161	1	240	6	247	N	110	35	529	1,359
TUE	7/26/2016	7,764.17	100,558	156	1	239	6	246	N	110	34	597	1,174
WED	7/27/2016	7,763.97	100,361	141	1	240	6	246	N	110	136	866	983
THU	7/28/2016	7,763.77	100,164	142	1	240	6	245	N	110	135	1134	909
FRI	7/29/2016	7,763.54	99,939	130	1	243	5	248	N	110	138	1408	818
SAT	7/30/2016	7,763.29	99,693	122	1	245	5	250	N	110	140	1686	816
SUN	7/31/2016	7,763.06	99,468	132	1	245	5	250	N	110	140	1964	762
Averages		7,764.84	101,223	190	1	200	12	213		110	32		2,700
Totals (acft)				11,706	48	12,305	762	13,067		6,764	1964	1964	166,010

NOTES: Releases of water to support 15-Mile Reach target started 7/18 and ceased 10/13. A total of 27,412.5 acre-feet was released to support Recovery Program target flows.

FRYINGPAN-ARKANSAS PROJECT
RUEDI RESERVOIR
RELEASES FOR ENDANGERED FISH
WATER YEAR 2016
August

DAY	DATE	ELEV. (FT)	STORAGE (AC-FT)	INFLOW (CFS)	EVAP. (CFS)	TOTAL RESERVOIR RELEASE (CFS)	ROCKY FORK CREEK (CFS)	FRYINGPAN RIVER GAGE BELOW DAM (CFS)	RUEDI CALLED OUT? (Y= YES) (N= NO)	REQUIRED MIN FLOW BELOW RUEDI w/o FISH REL (CFS)	ENDANGERED FISH RELEASE (CFS)	CUMULATIVE FISH RELEASE (AC-FT)	PALISADE GAGE (CFS)
MON	8/1/2016	7,762.84	99,253	137	1	245	5	250	N	110	140	2241	761
TUE	8/2/2016	7,762.61	99,028	132	1	245	5	249	N	110	139	2518	786
WED	8/3/2016	7,762.36	98,784	122	1	244	5	249	N	110	139	2793	761
THU	8/4/2016	7,762.21	98,638	171	1	244	4	249	N	110	139	3069	766
FRI	8/5/2016	7,762.07	98,501	176	1	244	4	248	N	110	138	3343	854
SAT	8/6/2016	7,761.88	98,317	150	1	243	5	247	N	110	137	3616	1,199
SUN	8/7/2016	7,761.65	98,094	131	1	243	5	248	N	110	138	3889	1,390
MON	8/8/2016	7,761.47	97,919	155	1	243	5	248	N	110	138	4162	1,392
TUE	8/9/2016	7,761.27	97,726	145	1	242	5	247	N	110	137	4433	1,288
WED	8/10/2016	7,761.09	97,551	154	1	241	5	246	N	110	136	4703	1,130
THU	8/11/2016	7,760.85	97,319	126	1	242	5	246	N	110	136	4974	1,119
FRI	8/12/2016	7,760.54	97,021	120	1	270	4	275	N	110	165	5300	991
SAT	8/13/2016	7,760.16	96,654	110	1	294	4	299	N	110	189	5674	982
SUN	8/14/2016	7,759.78	96,290	111	1	294	4	298	N	110	188	6048	936
MON	8/15/2016	7,759.38	95,907	102	1	294	4	298	N	106	192	6429	878
TUE	8/16/2016	7,758.98	95,525	102	1	294	4	298	N	106	192	6810	824
WED	8/17/2016	7,758.59	95,155	107	1	294	4	298	N	110	188	7182	803
THU	8/18/2016	7,758.19	94,775	103	1	294	4	298	N	107	191	7561	757
FRI	8/19/2016	7,757.80	94,405	108	1	294	4	298	N	110	188	7933	658
SAT	8/20/2016	7,757.40	94,028	104	1	294	4	298	N	108	190	8310	803
SUN	8/21/2016	7,756.98	93,631	94	1	294	4	297	N	98	199	8705	837
MON	8/22/2016	7,756.57	93,247	100	1	294	4	297	N	104	193	9089	761
TUE	8/23/2016	7,756.15	92,853	95	1	293	3	297	N	99	198	9482	762
WED	8/24/2016	7,755.75	92,479	106	1	294	3	297	N	109	188	9854	844
THU	8/25/2016	7,755.37	92,125	115	1	293	3	296	N	110	186	10223	806
FRI	8/26/2016	7,754.99	91,772	115	1	293	3	296	N	110	186	10592	968
SAT	8/27/2016	7,754.60	91,411	111	1	293	3	296	N	110	186	10961	1,173
SUN	8/28/2016	7,754.20	91,041	106	1	292	4	296	N	110	186	11330	1,147
MON	8/29/2016	7,753.81	90,681	111	1	291	4	295	N	110	185	11697	1,096
TUE	8/30/2016	7,753.41	90,314	107	1	292	4	296	N	110	186	12066	1,094
WED	8/31/2016	7,752.95	89,891	80	1	293	4	296	N	84	212	12487	1,130
Averages		7,758.58	95,172	120	1	275	4	279		108	171		958
Totals (acft)				7,354	33	16,897	250	17,148		6,625	10,523	12,487	58,902

NOTES: Releases of water to support 15-Mile Reach target started 7/18 and ceased 10/13. A total of 27,412.5 acre-feet was released to support Recovery Program target flows.

FRYINGPAN-ARKANSAS PROJECT
RUEDI RESERVOIR
RELEASES FOR ENDANGERED FISH
WATER YEAR 2016
September

DAY	DATE	ELEV. (FT)	STORAGE (AC-FT)	INFLOW (CFS)	EVAP. (CFS)	TOTAL RELEASE (CFS)	ROCKY FORK CREEK (CFS)	FRYINGPAN RIVER GAGE BELOW DAM (CFS)	RUEDI CALLED OUT? (Y= YES) (N= NO)	REQUIRED MIN FLOW BELOW RUEDI w/o FISH REL (CFS)	ENDANGERED FISH RELEASE (CFS)	CUMULATIVE FISH RELEASE (AC-FT)	PALISADE GAGE (CFS)
THU	9/1/2016	7,752.53	89,508	99	0	292	4	295	N	102	193	12,870	1,061
FRI	9/2/2016	7,752.19	89,197	135	0	291	4	295	N	110	185	13,236	1,030
SAT	9/3/2016	7,751.84	88,879	131	0	291	3	294	N	110	184	13,602	1,116
SUN	9/4/2016	7,751.48	88,552	127	0	291	3	294	N	110	184	13,968	1,226
MON	9/5/2016	7,751.08	88,190	109	0	291	4	295	N	110	185	14,334	1,194
TUE	9/6/2016	7,750.64	87,793	90	0	290	4	294	N	94	200	14,731	1,161
WED	9/7/2016	7,750.21	87,405	96	0	291	3	294	N	99	195	15,117	1,080
THU	9/8/2016	7,749.76	87,001	87	0	291	3	294	N	91	203	15,521	1,005
FRI	9/9/2016	7,749.30	86,590	84	0	291	3	294	N	87	207	15,932	990
SAT	9/10/2016	7,748.85	86,188	88	0	290	3	293	N	91	202	16,333	932
SUN	9/11/2016	7,748.39	85,778	84	0	290	3	293	N	87	206	16,742	916
MON	9/12/2016	7,747.93	85,369	85	0	291	3	294	N	88	206	17,150	907
TUE	9/13/2016	7,747.45	84,944	76	0	290	3	293	N	79	214	17,575	894
WED	9/14/2016	7,746.99	84,537	85	0	290	3	293	N	88	205	17,981	892
THU	9/15/2016	7,746.53	84,133	89	0	293	3	296	Y	92	182	18,342	872
FRI	9/16/2016	7,746.06	83,720	87	0	295	3	297	Y	89	186	18,711	878
SAT	9/17/2016	7,745.56	83,282	74	0	294	3	297	Y	77	197	19,102	816
SUN	9/18/2016	7,745.08	82,863	82	0	293	3	296	Y	84	189	19,477	805
MON	9/19/2016	7,744.57	82,420	70	0	293	3	295	Y	72	201	19,875	787
TUE	9/20/2016	7,744.07	81,986	78	0	296	3	299	Y	80	196	20,264	766
WED	9/21/2016	7,743.57	81,555	83	0	300	3	302	Y	85	195	20,651	754
THU	9/22/2016	7,743.05	81,107	74	0	299	3	302	Y	77	202	21,051	757
FRI	9/23/2016	7,742.55	80,679	83	0	299	3	302	Y	86	193	21,434	898
SAT	9/24/2016	7,742.04	80,242	78	0	298	3	301	Y	81	197	21,825	960
SUN	9/25/2016	7,741.54	79,817	84	0	298	3	301	Y	87	191	22,204	1,034
MON	9/26/2016	7,741.03	79,384	80	0	298	3	301	Y	83	195	22,591	1,015
TUE	9/27/2016	7,740.51	78,944	77	0	299	3	302	Y	80	199	22,985	1,004
WED	9/28/2016	7,740.02	78,530	79	0	287	3	290	Y	82	186	23,354	961
THU	9/29/2016	7,739.63	78,203	77	0	241	3	244	Y	80	143	23,638	995
FRI	9/30/2016	7,739.25	77,885	76	0	236	3	239	Y	79	138	23,912	947
Averages		7,746.12	83,823	88	0	290	3	293			192		955
Totals (acft)				5,249	18	17,238	177	17,415			11,425	23,912	56,834

NOTES: Releases of water to support 15-Mile Reach target started 7/18 and ceased 10/13. A total of 27,412.5 acre-feet was released to support Recovery Program target flows.

FRYINGPAN-ARKANSAS PROJECT
RUEDI RESERVOIR
RELEASES FOR ENDANGERED FISH
WATER YEAR 2016
October

DAY	DATE	ELEV. (FT)	STORAGE (AC-FT)	INFLOW (CFS)	EVAP. (CFS)	TOTAL RESERVOIR RELEASE (CFS)	ROCKY FORK CREEK (CFS)	FRYINGPAN RIVER GAGE BELOW DAM (CFS)	RUEDI CALLED OUT? (Y= YES) (N= NO)	REQUIRED MIN FLOW BELOW RUEDI w/o FISH REL (CFS)	ENDANGERED FISH RELEASE (CFS)	CUMULATIVE FISH RELEASE (AC-FT)	PALISADE GAGE (CFS)
SAT	10/1/2016	7,738.87	77,567	75	0	236	3	238	Y	78	142	24,193	950
SUN	10/2/2016	7,738.49	77,250	77	0	236	3	239	Y	79	141	24,473	946
MON	10/3/2016	7,738.08	76,909	64	0	236	3	239	Y	67	153	24,776	1,035
TUE	10/4/2016	7,737.66	76,561	60	0	235	3	238	Y	63	156	25,086	1,098
WED	10/5/2016	7,737.27	76,238	73	0	236	3	238	Y	76	144	25,371	1,097
THU	10/6/2016	7,736.89	75,925	77	0	235	3	238	Y	80	139	25,647	1,128
FRI	10/7/2016	7,736.51	75,613	77	0	235	3	238	Y	80	139	25,923	1,142
SAT	10/8/2016	7,736.12	75,293	74	0	235	3	238	Y	77	143	26,207	1,111
SUN	10/9/2016	7,735.74	74,982	80	0	236	3	239	Y	83	138	26,480	1,128
MON	10/10/2016	7,735.36	74,672	81	0	237	3	240	Y	84	138	26,754	1,125
TUE	10/11/2016	7,735.01	74,387	92	0	236	3	239	Y	95	125	27,002	1,121
WED	10/12/2016	7,734.70	74,136	82	0	208	3	211	N	85	126	27,252	1,149
THU	10/13/2016	7,734.46	73,942	80	0	178	3	181	N	83	81	27,413	1,203
FRI	10/14/2016	7,734.30	73,812	70	0	135	3	138	N	72	0	27,413	1,167
SAT	10/15/2016	7,734.22	73,747	54	0	87	3	90	N	57	0	27,413	1,159
SUN	10/16/2016	7,734.16	73,699	55	0	79	3	82	N	58	0	27,413	1,072
MON	10/17/2016	7,734.08	73,634	47	0	79	3	82	N	50	0	27,413	1,039
TUE	10/18/2016	7,734.04	73,601	63	0	79	3	82	N	66	0	27,413	989
WED	10/19/2016	7,733.98	73,553	55	0	79	3	82	N	58	0	27,413	1,001
THU	10/20/2016	7,733.92	73,505	55	0	79	3	82	N	58	0	27,413	1,006
FRI	10/21/2016	7,733.87	73,464	59	0	79	3	82	N	61	0	27,413	1,042
SAT	10/22/2016	7,733.83	73,432	62	0	78	3	81	N	65	0	27,413	1,025
SUN	10/23/2016	7,733.77	73,384	54	0	78	3	81	N	57	0	27,413	1,007
MON	10/24/2016	7,733.73	73,352	62	0	78	3	81	N	65	0	27,413	1,042
TUE	10/25/2016	7,733.67	73,303	54	0	78	3	81	N	57	0	27,413	1,116
WED	10/26/2016	7,733.63	73,271	62	0	78	3	81	N	65	0	27,413	1,161
THU	10/27/2016	7,733.57	73,223	54	0	78	3	81	N	57	0	27,413	1,135
FRI	10/28/2016	7,733.54	73,199	67	0	79	3	82	N	70	0	27,413	1,217
SAT	10/29/2016	7,733.48	73,150	55	0	79	3	82	N	58	0	27,413	1,271
SUN	10/30/2016	7,733.44	73,118	63	0	79	3	82	N	66	0	27,413	1,220
MON	10/31/2016	7,733.34	73,038	45	0	85	3	88	N	47	0	27,413	1,659
Averages		7,734.96	74,354	65	0	144	3	147			57		1,115
Totals (acft)				4,018	6	8,858	176	9,034			3,501	27,412.5	68,552

NOTES: Releases of water to support 15-Mile Reach target started 7/18 and ceased 10/13. A total of 27,412.5 acre-feet was released to support Recovery Program target flows.

4. Fryingpan-Arkansas Project Transmountain Diversions WY 2016

Fryingpan-Arkansas Project
Unit: AF

	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
South Fork		1,229	6,864	1,130			9,222
No Name		349	1,455	0			1,804
Midway		600	4,058	416			5,074
Hunter		504	2,713	305			3,522
Sawyer (recorder failed)	No data recorded						
Chapman[1]		2,095	12,748	1,658			16,501
Subtotal		4,778	27,837	3,510			36,124
Carter		537	2,077	439			3,052
North Fork		172	904	119			1,195
Mormon		604	2,516	295			3,415
North Cunningham		309	1,263	91			1,663
Middle Cunningham		205	1,660	142			2,008
Ivanhoe		1,121	4,210	101			5,432
Granite		505	1,487	241			2,233
Fryingpan		1,544	9,138	1,400			12,082
Lily Pad		116	755	58	6		936
Subtotal		5,113	24,009	2,887	6		32,015
Total		9,891	51,846	6,396	6	0	68,139
Boustead Tunnel	Oct-Apr 1,211	8,396	44,751	6,127	432	134	61,050

[1] Does not include No Name, Hunter and Midway. Sawyer is included this year because of the recorder failure

[2] Includes South Cunningham

[3] The difference between total diversion and Charles H. Boustead Tunnel results from the accuracy limitations of the measurement, measured leakage and rounding

5. Fryingpan-Arkansas Project Imports - Charles H. Boustead Tunnel Outlet

Fryingpan-Arkansas Project

Unit: 1,000 AF

Water Year	Imports	Accumulated Imports	Twin Lakes Exchange	Available to SECWCD
1972	32.0	32.0	0	0.0
1973	36.8	68.8	0	16.0
1974	34.1	102.9	0	18.6
1975	37.2	140.1	0	25.0
1976	26.9	167.0	0	24.0
1977	11.4	178.4	0	25.0
1978	49.2	227.6	0	25.0
1979	53.7	281.3	0	25.6
1980	55.7	337.0	0	70.0
1981	34.6	371.6	0	25.0
1982	75.2	446.8	2.7	68.0
1983	90.8	537.6	0.3	125.0
1984	110.1	647.7	1.9	210.0
1985	70.2	717.9	1.7	289.9
1986	30.3	748.2	1.5	300.3
1987	2.2	750.4	1.1	288.0
1988	13.4	763.8	2.0	247.8
1989	36.2	800.0	1.7	197.6
1990	46.6	846.6	1.7	142.1
1991	59.1	905.7	1.5	58.7
1992	54.8	960.5	1.2	32.9
1993	86.6	1047.1	2.3	70.1
1994	52.2	1099.3	1.3	51.7
1995	90.5	1189.8	2.3	55.0
1996	36.9	1226.7	1.8	110.0
1997	78.6	1305.3	1.8	116.0
1998	51.3	1356.6	2.6	102.0
1999	40.8	1397.4	2.1	127.5
2000	44.8	1442.2	1.7	171.6
2001	45.3	1487.5	2.1	67.5
2002	13.2	1500.7	1.5	8.5
2003	54.9	1555.6	2.4	37.5
2004	27.4	1583.0	1.3	15.3
2005	54.6	1637.6	3.0	40.8
2006	61.2	1698.8	3.0	49.2

. Fryingpan-Arkansas Project Imports - Charles H. Boustead Tunnel Outlet

Fryingpan-Arkansas Project

Unit: 1,000 AF

Water Year	Imports	Accumulated Imports	Twin Lakes Exchange	Available to SECWCD
2007	54.2	1753.0	3.0	40.4
2008	90.0	1843.0	3.0	83.0
2009	82.7	1925.7	3.0	78.0
2010	56.5	1982.2	3.0	44.0
2011	98.9	2081.1	2.3	75.0
2012	13.4	2094.5	1.5	9.9
2013	46.7	2141.2	2.8	37.6
2014	80.3	2221.5	3.0	56.0
2015	72.2	2293.7	1.9	67.9
2016	59.2	2352.9	2.5	45.3

Restriction: Not to exceed 120 KAF in 1 year
Not to exceed 2,352.8 KAF AF in 34 consecutive years.
The imports between 1982 and 2015 are 1922.1 KAF
1983 includes 3,120 AF imported through the Twin Lakes Tunnel

6. Turquoise Lake Operations WY 2016

Fryingpan-Arkansas Project

Unit: 1,000 AF

Month	Busk-Ivanhoe Imports through Carlton Tunnel	Busk-Ivanhoe Imports through Boustead Tunnel	Imports through Homestake Tunnel	Project Imports	Native Inflow	Total Inflow	Evap	Total Outflow	End of Month Content	Water Surface Elevation (feet)
OCT 2015	0.1	--	0.0	0.1	0.2	0.8	0.4	1.4	119.9	9864.01
NOV 2015	0.1	--	0.0	0.1	1.2	1.3	0.2	14.3	106.7	9856.38
DEC 2015	0.0	--	0.0	0.0	1.4	1.8	0.0	16.3	91.9	9847.41
JAN 2016	0.0	--	0.0	0.0	1.5	1.9	0.0	16.3	77.2	9838.08
FEB 2016	0.0	--	0.0	0.0	1.2	1.0	0.0	14.9	63.5	9828.76
MAR 2016	0.0	--	0.0	0.1	0.4	1.5	0.0	1.0	63.1	9828.46
APR 2016	0.0	--	0.0	0.1	1.3	2.2	0.0	1.4	63.1	9828.47
MAY 2016	0.3	--	4.5	8.2	4.6	12.6	0.1	1.9	78.6	9839.00
JUN 2016	2.6	--	0.0	44.4	15.7	71.5	0.7	22.2	118.2	9863.07
JUL 2016	1.3	--	0.0	6.0	4.0	18.2	0.8	13.5	115.3	9861.36
AUG 2016	0.2	--	0.0	0.2	1.5	1.6	0.4	1.7	115.1	9861.26
SEP 2016	0.0	--	0.0	0.0	.02	0.4	0.5	1.3	113.6	9860.41
Total* (AF)	**4,811**	**0**	**4,605**	**59,228**	**33,016**	**114,911**	**3,017**	**106,211**		

*Rounding may introduce discrepancies between monthly and yearly totals

7. Twin Lakes/Mt. Elbert Forebay WY 2016 Operations

Fryingpan-Arkansas Project
Unit: 1,000 AF

	Twin Lakes Canal Company			Mt. Elbert Conduit				Twin Lakes					
Date	**Imports**	**Winter Water**	**Priority/ Native**	**Leadville Fish Hatchery[4]**	**Halfmoon**	**Sugarloaf Bypass**	**Sugarloaf Powerplant**	**Native Inflow**	**Total Inflow**	**Evap[2]**	**Total Outflow**	**End of Month Content[2]**	**Water Elevation[3] (feet)**
OCT 2015	0.1	--	0.0	0.3	0.0	0.6	0.0	2.2	2.9	0.7	12.2	121.9	9189.06
NOV 2015	0.6	--	0.0	0.3	0.0	0.6	13.1	0.3	14.5	0.3	14.4	121.8	9188.90
DEC 2015	0.5	2.7	0.0	0.3	0.0	0.4	15.4	0.5	16.7	0.0	17.1	121.3	9188.80
JAN 2016	0.3	1.4	0.0	0.3	0.0	0.4	15.4	0.5	16.6	0.0	17.3	120.6	9188.45
FEB 2016	0.3	1.2	0.0	0.3	0.0	0.3	14.1	0	14.6	0.0	13.6	121.6	9188.65
MAR 2016	0.3	0.6	0.3	0.3	0.0	0.5	0.0	0.7	1.4	0.0	5.8	117.3	9187.06
APR 2016	0.4	--	0.8	0.3	0.0	0.5	0.0	1.8	2.8	0.2	8.2	111.6	9184.45
MAY 2016	6.1	--	0.0	0.3	0.7	0.6	0.0	8.7	16.0	0.9	23.3	103.5	9180.51
JUN 2016	17.4	--	17.8	0.3	2.0	0.5	20.4	38.1	78.4	1.3	47.2	133.3	9193.92
JUL 2016	5.8	--	0.0	0.3	3.2	0.5	11.6	10.5	31.7	1.4	35.6	128.1	9192.29
AUG 2016	1.9	--	0.0	0.3	1.3	0.5	0.0	6.9	10.6	0.7	24.6	113.4	9185.73
SEP 2016	0.6	--	0.0	0.3	0.6	0.4	0.2	3.8	5.7	0.8	4.0	114.3	9184.80
TOTAL[1] (AF)	**34,160**	**5,934**	**18,904**	**3,587**	**7,814**	**5,848**	**90,127**	**73,871**	**211,928**	**6,286**	**223,316**		

[1] Rounding may introduce discrepancies between monthly and yearly totals
[2] Both Twin Lakes and Mt. Elbert Forebay
[3] Elevation of Twin Lakes
[4] Leadville Fish Hatchery diverts from Mt Elbert Conduit

8. Mt. Elbert Pumped-Storage Power Plant WY 2016 Operations

Fryingpan-Arkansas Project

	Net Generation mWh	Gross Generation mWh	Inflow to Mt. Elbert 1,000 AF	Water Through Generator 1,000 AF	Water Pumped From Twin Lakes To Forebay 1,000 AF
OCT 2015	19,702	19,956.737	492	59,267	58,747
NOV 2015	20,792	21,082.465	13,488	62,456	49,137
DEC 2015	21,721	22,103.012	15,856	65,729	50,008
JAN 2016	21,891	22,324.190	15,684	66,265	50,989
FEB 2016	21,805	22,207.992	14,476	65,468	51,655
MAR 2016	15,926	16,282.951	491	50,751	49,667
APR 2016	18,315	18,653.388	476	57,558	57,104
MAY 2016	19,032	19,301.172	1,114	57,579	56,157
JUN 2016	28,404	28,615.466	22,957	83,414	60,526
JUL 2016	26,818	27,019.789	15,327	80,164	63,789
AUG 2016	34,225	34,446.998	1,793	100,937	99,454
SEP 2016	13,586	13,791.798	1,261	40,833	42,725
Total	**262,217**	**265,785.958**	**103,415**	**790,421**	**689,958**

9. Pueblo Reservoir WY 2016 Operations

Fryingpan-Arkansas Project

Unit: 1,000 AF

Month	Inflow				Evap	Total Outflow	End of Month Content	Water Surface Elevation (feet)
	Project	Contract	Native[2]	Total				
OCT 2015	1.1	4.8	17.5	23.4	1.2	29.0	182.4	4864.58
NOV 2015	8.2	19.6	9.1	36.9	0.7	19.9	198.6	4868.97
DEC 2015	12.6	29.8	0.0	37.3	0.5	9.0	226.3	4875.95
JAN 2016	12.7	28.7	0.0	33.8	0.5	7.7	251.9	4881.84
FEB 2016	9.6	25.2	0.0	31.6	0.8	11.7	271.0	4885.88
MAR 2016	0.4	7.0	17.1	24.5	1.5	32.3	261.6	4883.92
APR 2016	0.0	3.4	25.7	29.1	1.8	51.4	237.6	4878.60
MAY 2016	0.0	7.5	52.0	59.5	2.4	62.7	231.9	4877.29
JUN 2016	6.3	17.1	152.7	176.1	3.4	166.6	238.0	4878.71
JUL 2016	3.0	15.8	39.9	58.7	3.2	76.5	217.1	4873.70
AUG 2016	3.8	13.3	24.7	41.8	2.4	62.4	194.2	4867.80
SEP 2016	0.0	4.8	17.7	22.5	2.3	28.4	186.0	4865.59
Total[1] (AF)	**57,918**	**176,944**	**340,309**	**575,171**	**20,568**	**557,641**		

[1] Rounding may introduce discrepancies

[2] Native inflows are the total inflows less the account and project inflow. If the result is negative because of exchanges and/or winter water storage, 0 is recorded.

10. Reservoir Storage Allocation Data

Fryingpan-Arkansas Project
Unit: AF

Reservoir	Dead	Inactive	Active Conservation	Joint Use	Exclusive Flood Control	Total Capacity Storage
Ruedi [1]	63	1,095	101,278	0	0	102,373
Turquoise [1]	2,810	8,920	120,478	0	0	129,398
Twin Lakes [1]	63,324	72,938	67,917	0	0	140,855 [2]
Mt. Elbert [1] Forebay	561	3,825	3,493	0	0	11,143
Pueblo [3]	1,895	25,601	219,772	66,011	26,990	469,878

[1] Area Capacity Table from 1984
[2] The top of the active conservation pool at Twin Lakes corresponds to 140,855 AF. A tilted morning glory spillway reduces the actual storage available to 140,357 AF
[3] Area Capacity Table from 2012

Note: Inactive includes dead storage

11. Monthly Evaporation Factors

Fryingpan-Arkansas Project

Month	Ruedi	Turquoise	Twin Lakes	Pueblo
OCT	0.0530	0.1217	0.1217	0.1366
NOV	0	0.0566	0.0566	0.0886
DEC	0	0.0171	0.0171	0.0735
JAN	0	0.0274	0.0274	0.07078
FEB	0	0.0497	0.0497	0.10592
MAR	0	0.0771	0.0771	0.1548
APR	0	0.1337	0.1337	0.1760
MAY	0.1470	0.2006	0.2006	---
JUN	0.3605	0.2554	0.2554	---
JUL	0.3244	0.2246	0.2246	---
AUG	0.2332	0.1766	0.1766	---
SEP	0.1419	0.1663	0.1663	---

Note: These factors are used only when the pan is frozen.
Factor is derived from ((the average monthly evaporation volume*12)/0.7)/(# days in month)
Evaporation in AF=monthly factor*surface area of the lake*(1-percent ice cover)

12. Monthly Evaporation

Fryingpan-Arkansas Project
Unit=AF

Month	Ruedi		Turquoise		Twin Lakes and Mt. Elbert		Pueblo	
	AVG	WY 2016	AVG	WY 2016	AVG	WY 2016	AVG	WY 2016
OCT 2015	52	79	360	373	579	699	1,076	1,166
NOV 2015	0	0	160	170	252	252	542	715
DEC 2015	0	0	15	25	28	39	437	530
JAN 2016	0	0	0	0	1	2	397	464
FEB 2016	0	0	0	0	3	6	585	811
MAR 2016	0	0	0	0	26	22	1,235	1,474
APR 2016	7	0	13	2	205	199	1,688	1,776
MAY 2016	154	213	267	112	949	904	2,115	2,418
JUN 2016	452	574	724	710	1,348	1,302	2,622	3,360
JUL 2016	503	581	608	751	1,098	1,354	2,465	3,233
AUG 2016	98	401	473	409	850	689	1,978	2,338
SEP 2016	168	218	420	466	773	816	1,629	2,283

Average between 1996 and 2016

13. Monthly Precipitation

Fryingpan-Arkansas Project
Unit=Inches

MONTH	CHAPMAN [1] NEAR RUEDI		TURQUOISE		TWIN LAKES		PUEBLO	
	AVG	WY 2016	AVG	WY 2016	AVG	WY 2016	AVG	WY 2016
OCT 2015	2.4	1.8	1.09	1.00	0.84	0.56	0.82	0.91
NOV 2015	2.0	3.1	1.28	1.47	0.48	0.32	0.34	0.01
DEC 2015	7.6	2.9	1.34	1.50	0.45	0.86	0.32	0.34
JAN 2016	2.6	2.2	1.55	1.72	0.44	0.58	0.33	0.54
FEB 2016	3.2	2.5	1.48	0.82	0.48	0.15	0.37	0.09
MAR 2016	3.0	3.3	1.40	1.66	0.59	0.56	0.81	0.74
APR 2016	3.7	4.2	1.69	2.11	0.83	1.53	1.80	3.17
MAY 2016	3.5	2.6	1.53	1.76	0.90	0.73	1.40	0.96
JUN 2016	1.0	1.6	0.87	0.68	0.78	0.93	0.91	0.87
JUL 2016	3.3	2.7	2.07	0.67	1.83	0.74	1.76	2.34
AUG 2016	2.3	2.6	2.15	3.43	1.60	2.65	2.31	1.41
SEP 2016	2.2	1.4	1.51	0.52	1.15	0.36	0.67	0.08
TOTAL	36.8	30.9	16.87	17.34	10.38	9.97	11.85	11.46
Max. Annual	42.5	(2008)	25.95	(1957)	17.27	(1952)	20.32	(2007)

[1] The USGS weather station at Ruedi was out of service for WY2015. The precipitation totals from the Chapman Snotel have been substituted. The Snotel has been in operation since 2008.

14. Flood Control Benefits

Fryingpan-Arkansas Project

WY	Ruedi Benefits WY2016	Ruedi Benefits Cumulative	Pueblo Benefits WY2016	Pueblo Benefits Cumulative
1976			$320,000	$320,000
1979			$90,000	$410,000
1980			$86,000	$496,000
1981			$111,000	$607,000
1982			$836,000	$1,443,000
1983	$80,000	$80,000	$47,000	$1,490,000
1984	$330,000	$410,000	$1,039,000	$2,529,000
1985	$91,000	$501,000	$234,000	$2,763,000
1986	$70,000	$571,000	$0	$2,763,000
1987	$0	$571,000	$90,000	$2,853,000
1988	$0	$571,000	$0	$2,853,000
1989	$0	$571,000	$0	$2,853,000
1990	$0	$571,000	$0	$2,853,000
1991	$0	$571,000	$482,000	$3,335,000
1992	$0	$571,000	$266,000	$3,601,000
1993	$4,000	$575,000	$496,000	$4,097,000
1994	$280,000	$855,000	$290,000	$4,387,000
1995	$1,770,000	$2,625,000	$832,000	$5,219,000
1996	$1,550,000	$4,175,000	$0	$5,219,000
1997	$1,207,000	$5,382,000	$320,200	$6,539,200
1998	$0	$5,382,000	$0	$6,539,200
1999	$116,000	$5,498,000	$4,778,000	$11,317,200
2000	$1,061,000	$6,559,000	$0	$11,317,200
2001	$0	$6,559,000	$0	$11,317,200
2002	$0	$6,559,000	$0	$11,317,200
2003	$1,515,100	$8,074,100	$0	$11,317,200
2004	$0	$8,074,100	$0	$11,317,200
2005	$970,200	$9,044,300	$0	$11,317,200
2006	$799,000	$9,843,300	$20,159,000	$31,476,200
2007	$103,000	$9,946,300	$0	$31,476,200
2008	$1,635,000	$11,581,300	$0	$31,476,200
2009	$740,100	$12,321,400	$0	$31,476,200
2010	$2,993,000	$15,314,400	$0	$31,476,200

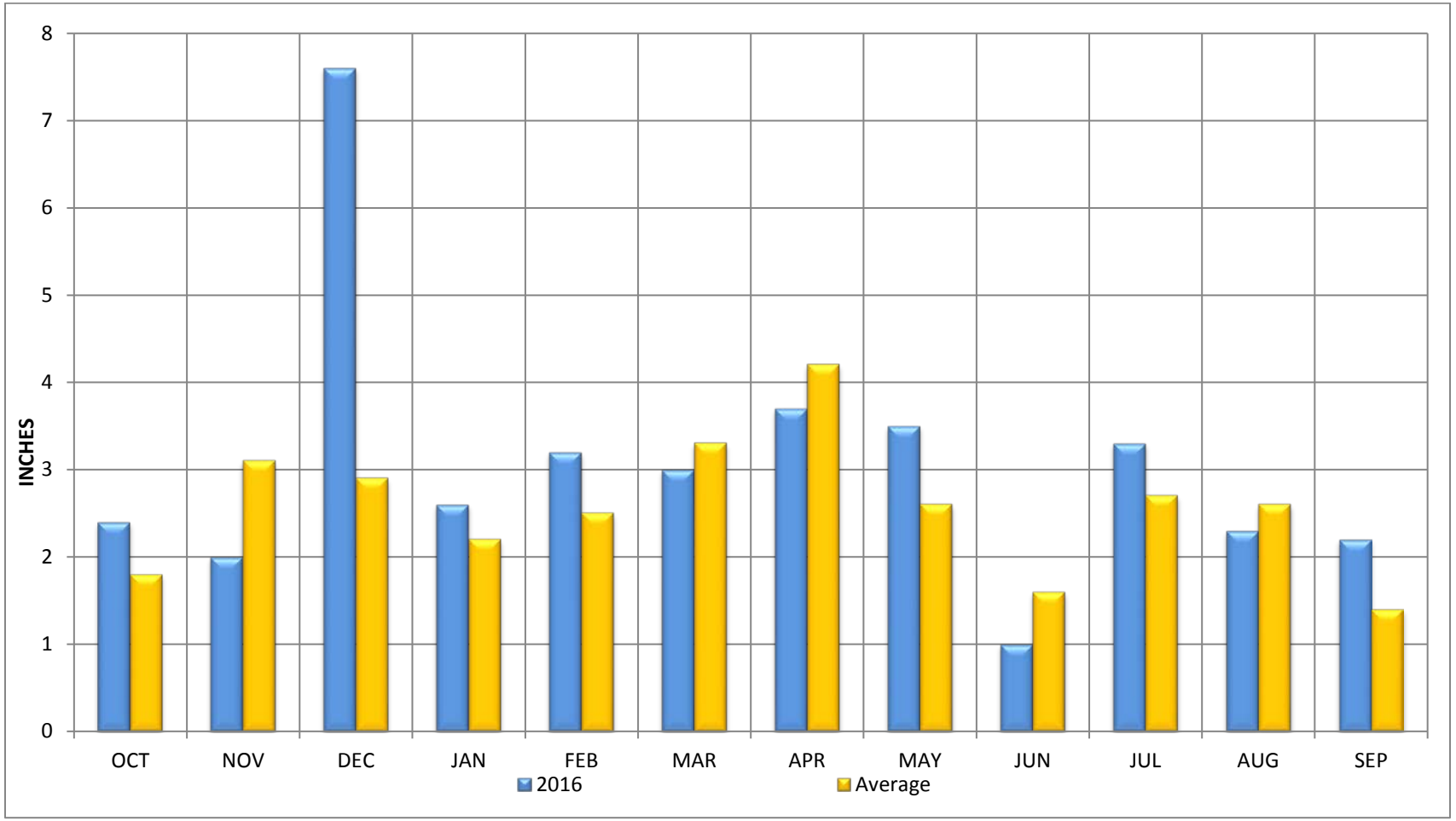
14. Flood Control Benefits

Fryingpan-Arkansas Project

WY	Ruedi Benefits WY2016	Ruedi Benefits Cumulative	Pueblo Benefits WY2016	Pueblo Benefits Cumulative
2011	$3,002,000	$18,316,400	$0	$31,476,200
2012	$0	$18,316,400	$0	$31,476,200
2013	$0	$18,316,400	$383,900	$31,860,100
2014	$0	$18,316,400	$431,900	$32,292,000
2015	$1,402,300	$19,718,700	$4,493,000	$36,785,000
2016	$0	$19,718,700	$0	$36,785,000

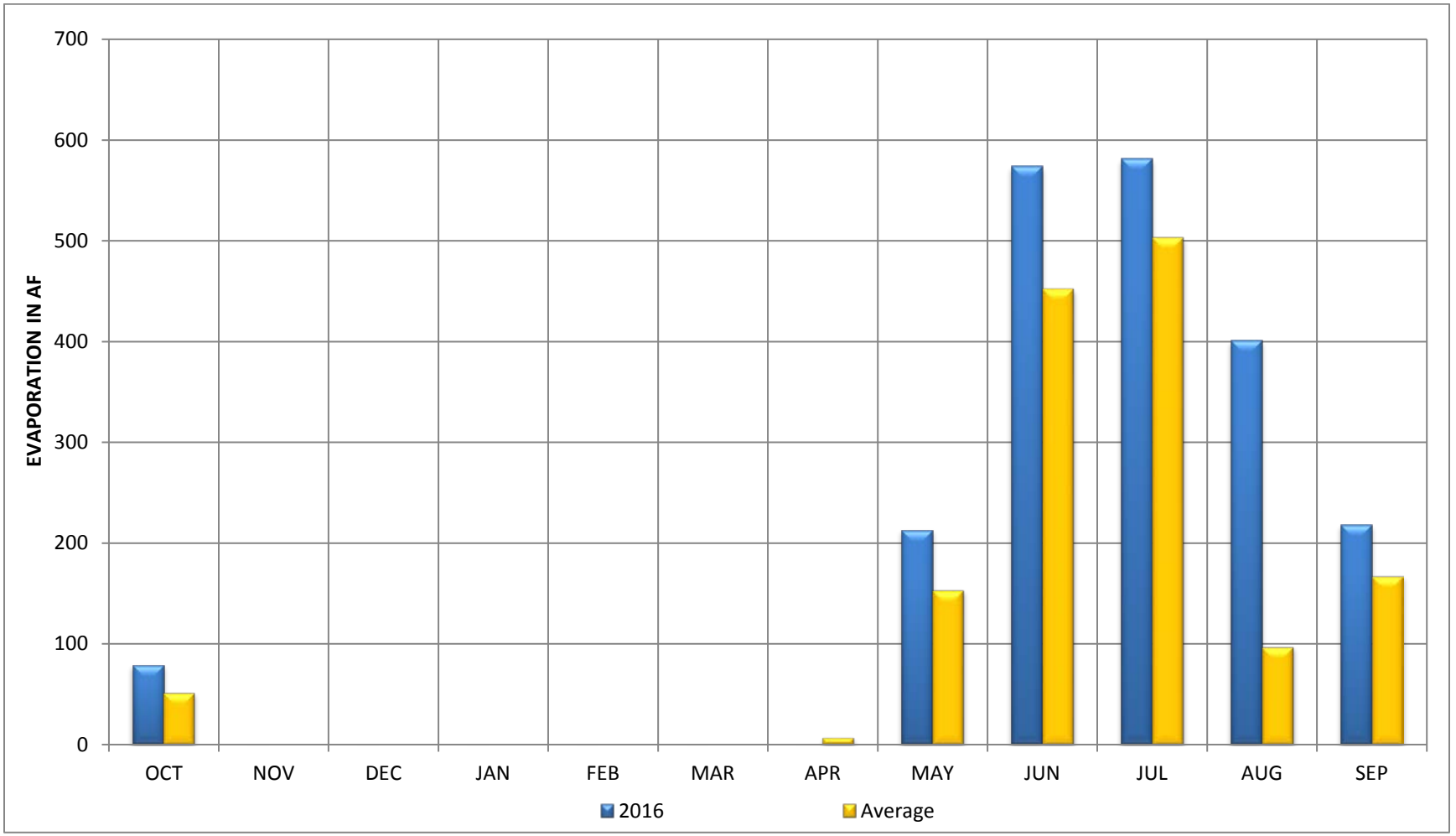
APPENDIX B: EXHIBITS

1. Chapman CO Monthly Precipitation WY 2016

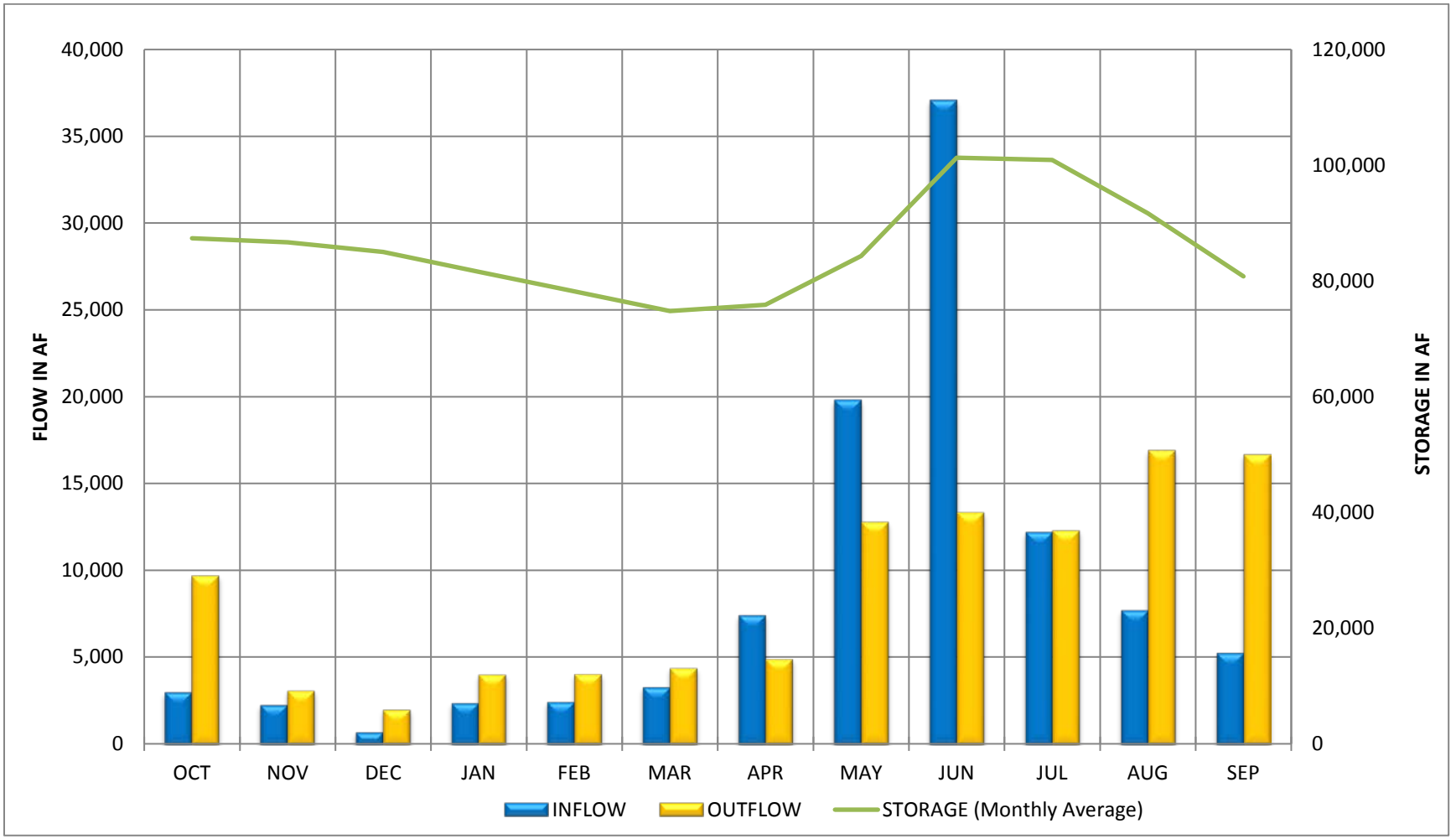


The weather station at Ruedi was out of service for the year. These precipitation values are from the nearby gage at the Chapman SNOTEL site

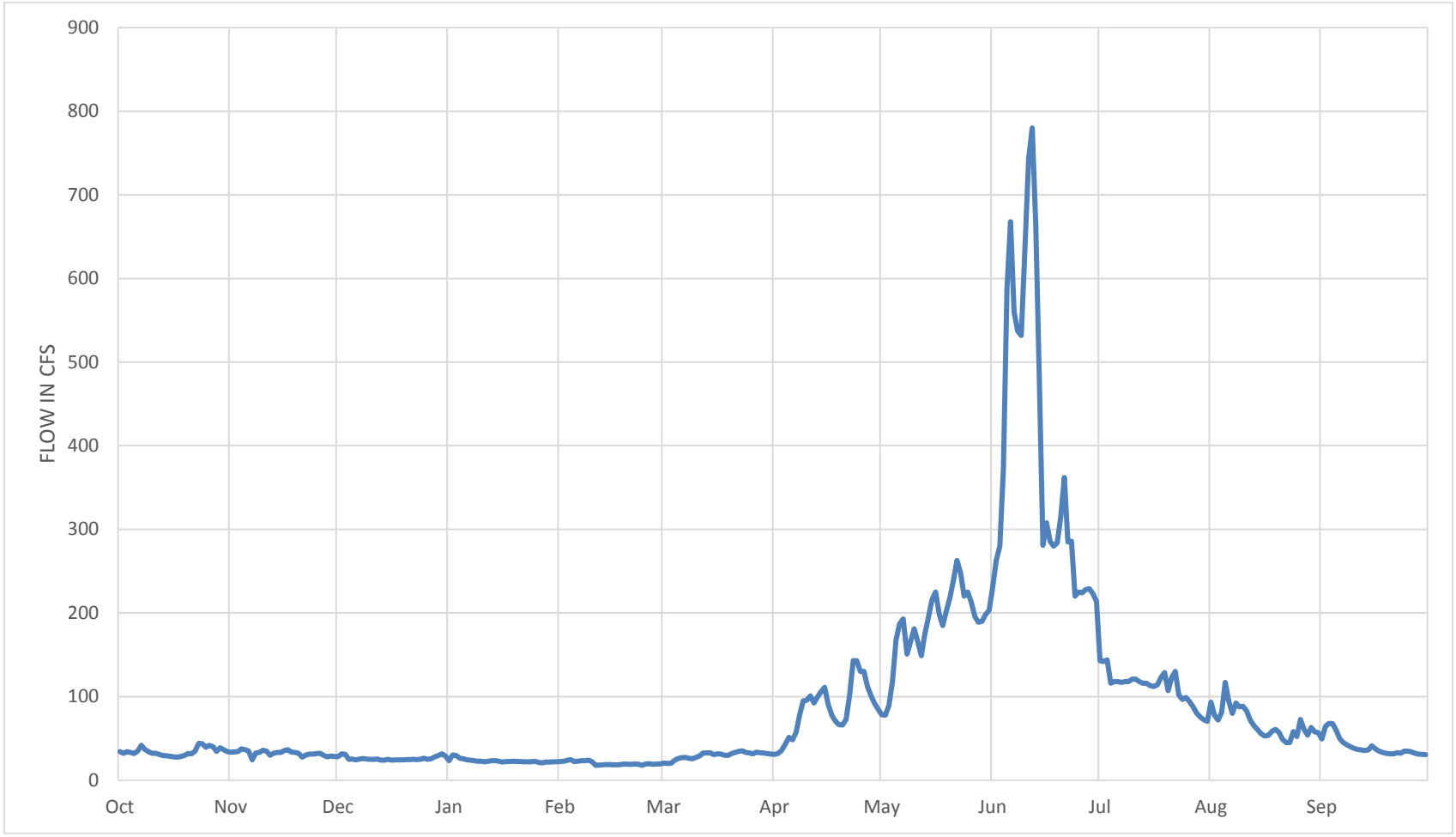
2. Ruedi Reservoir Monthly Evaporation WY 2016



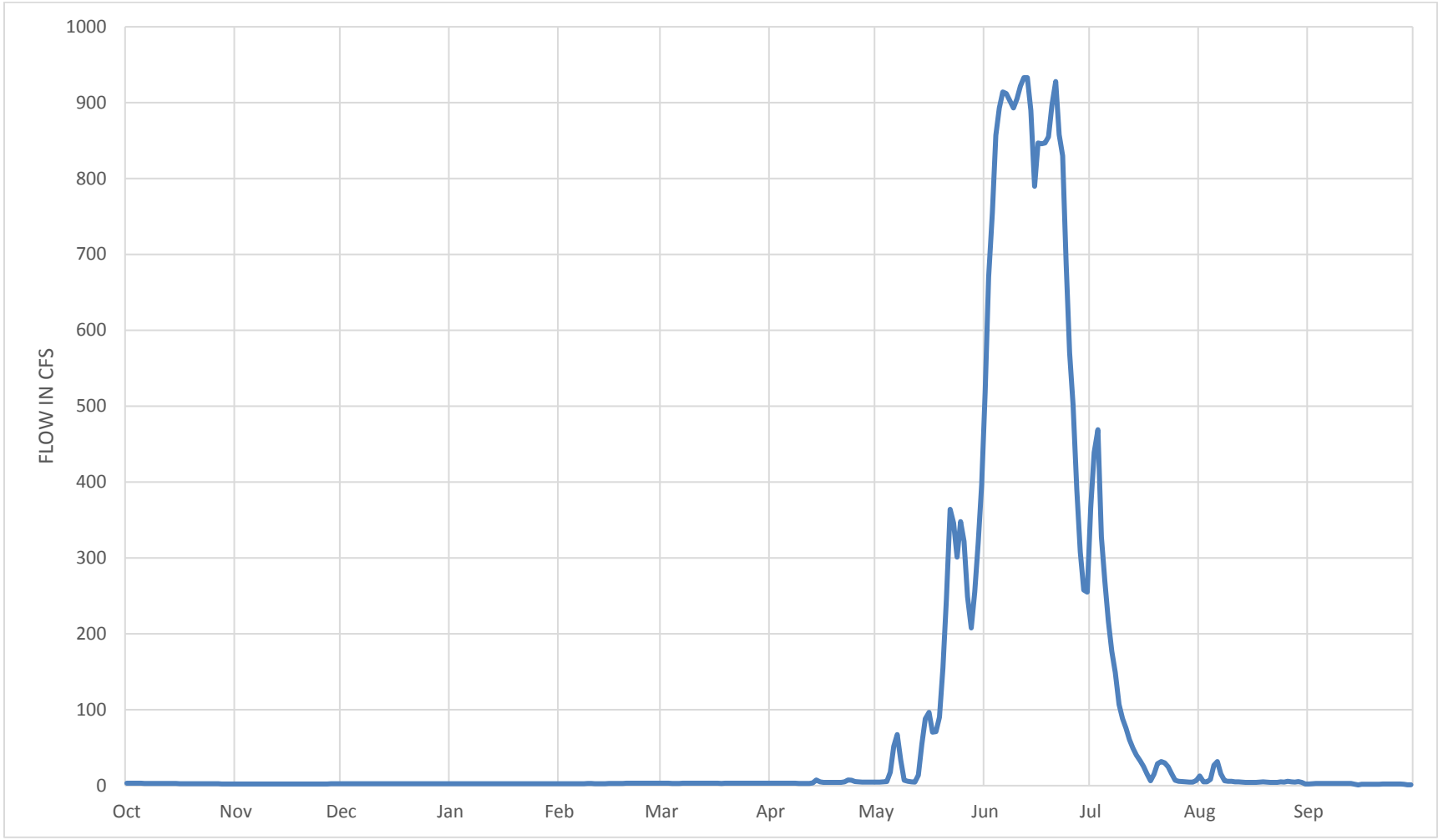
3. Ruedi Reservoir Actual Operations WY 2016



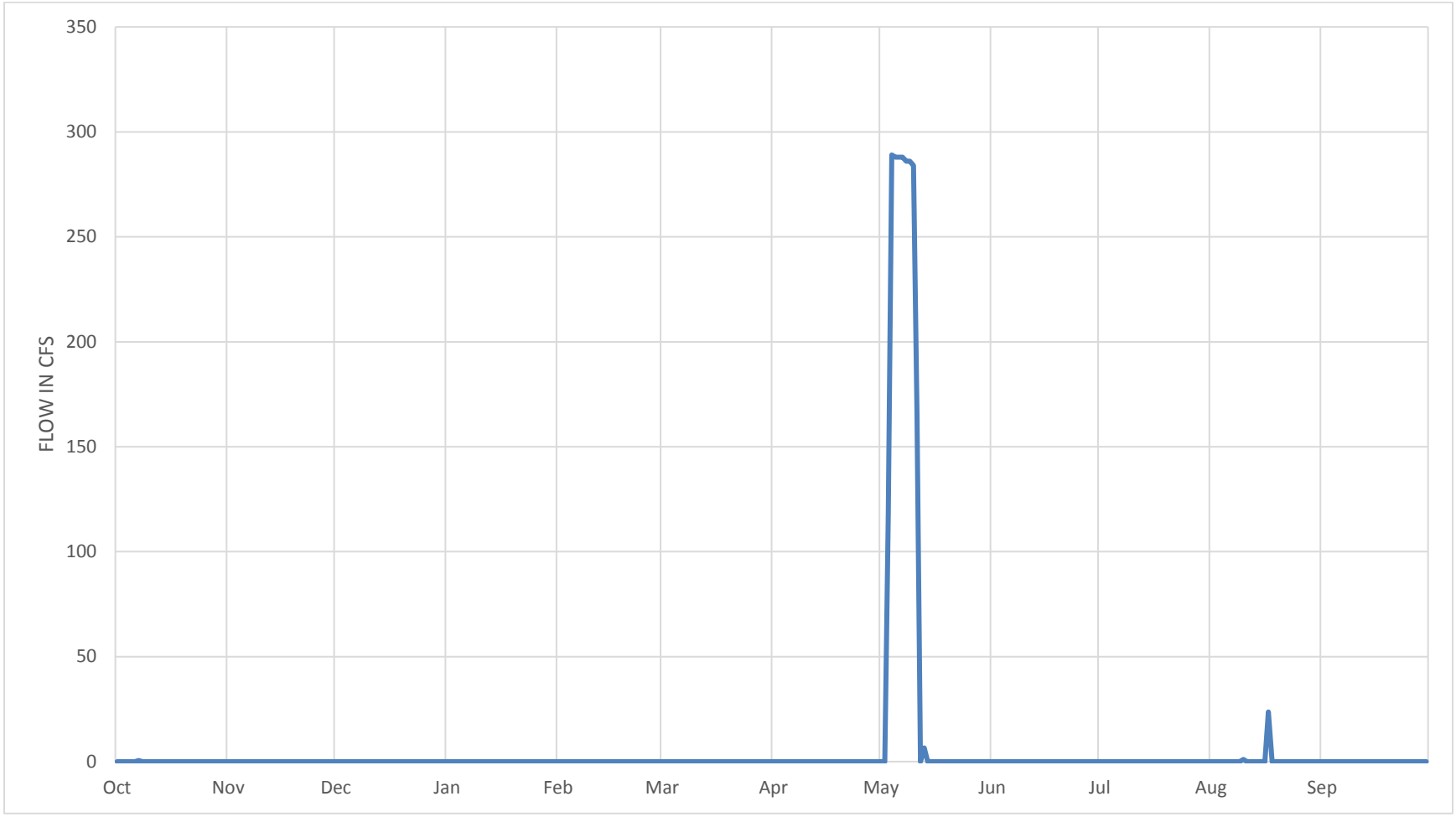
4. Fryingpan River near Thomasville Daily Discharge WY 2016



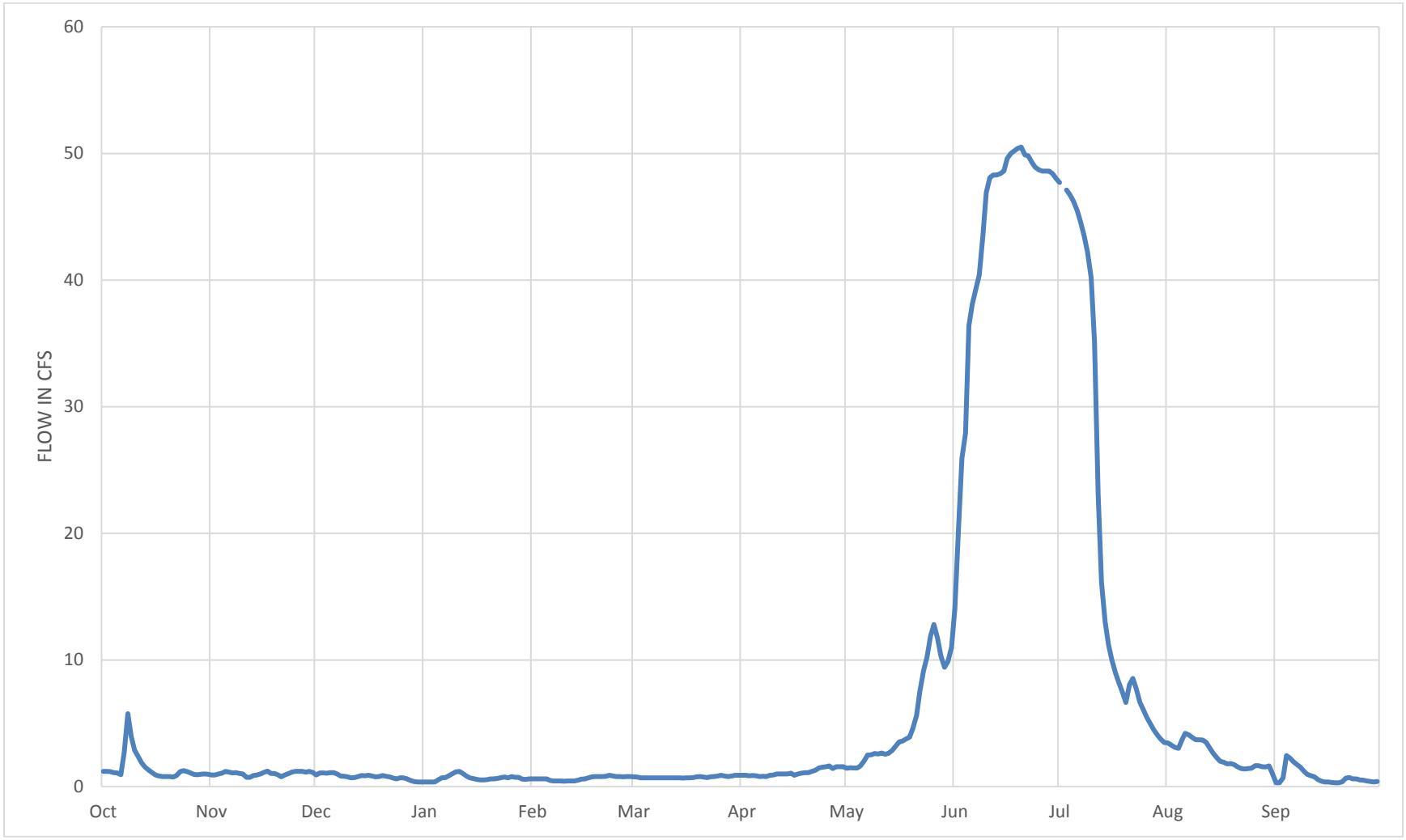
5. Boustead Tunnel Actual Operations WY 2016



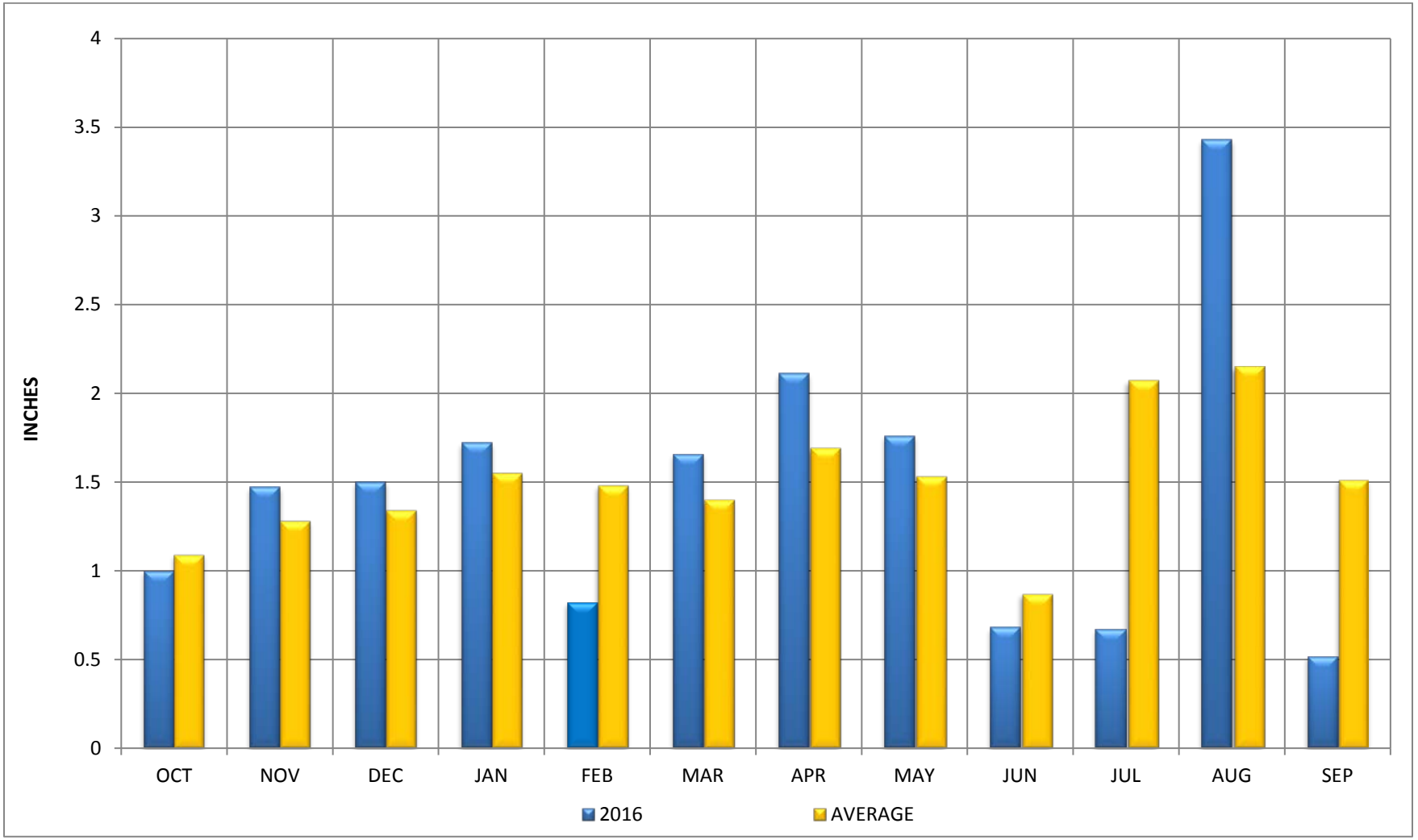
6. Homestake Tunnel Actual Operations WY 2016



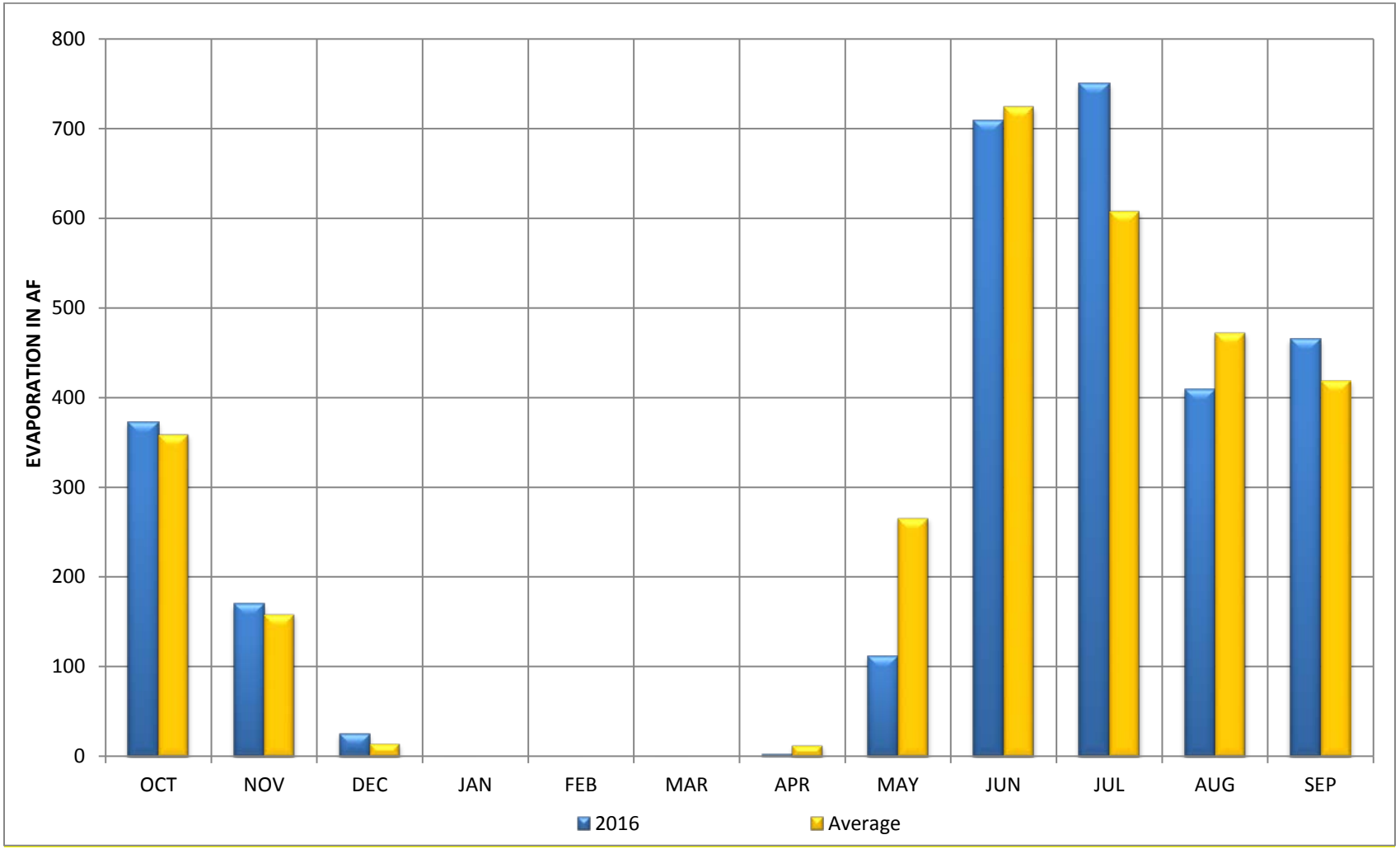
7. Busk-Ivanhoe Tunnel Actual Operations WY 2016



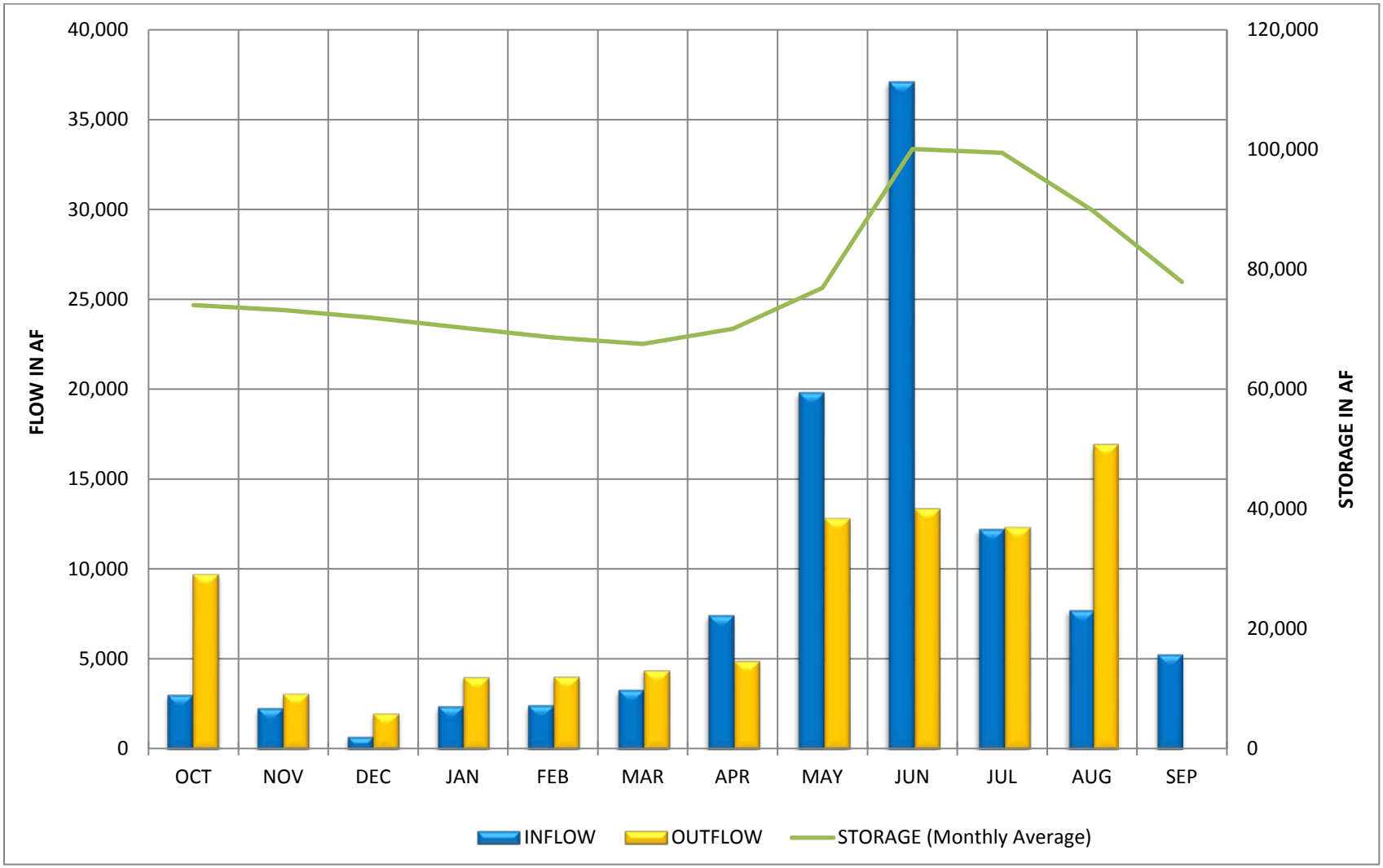
8. Turquoise Lake (Sugar Loaf Dam) Monthly Precipitation WY 2016



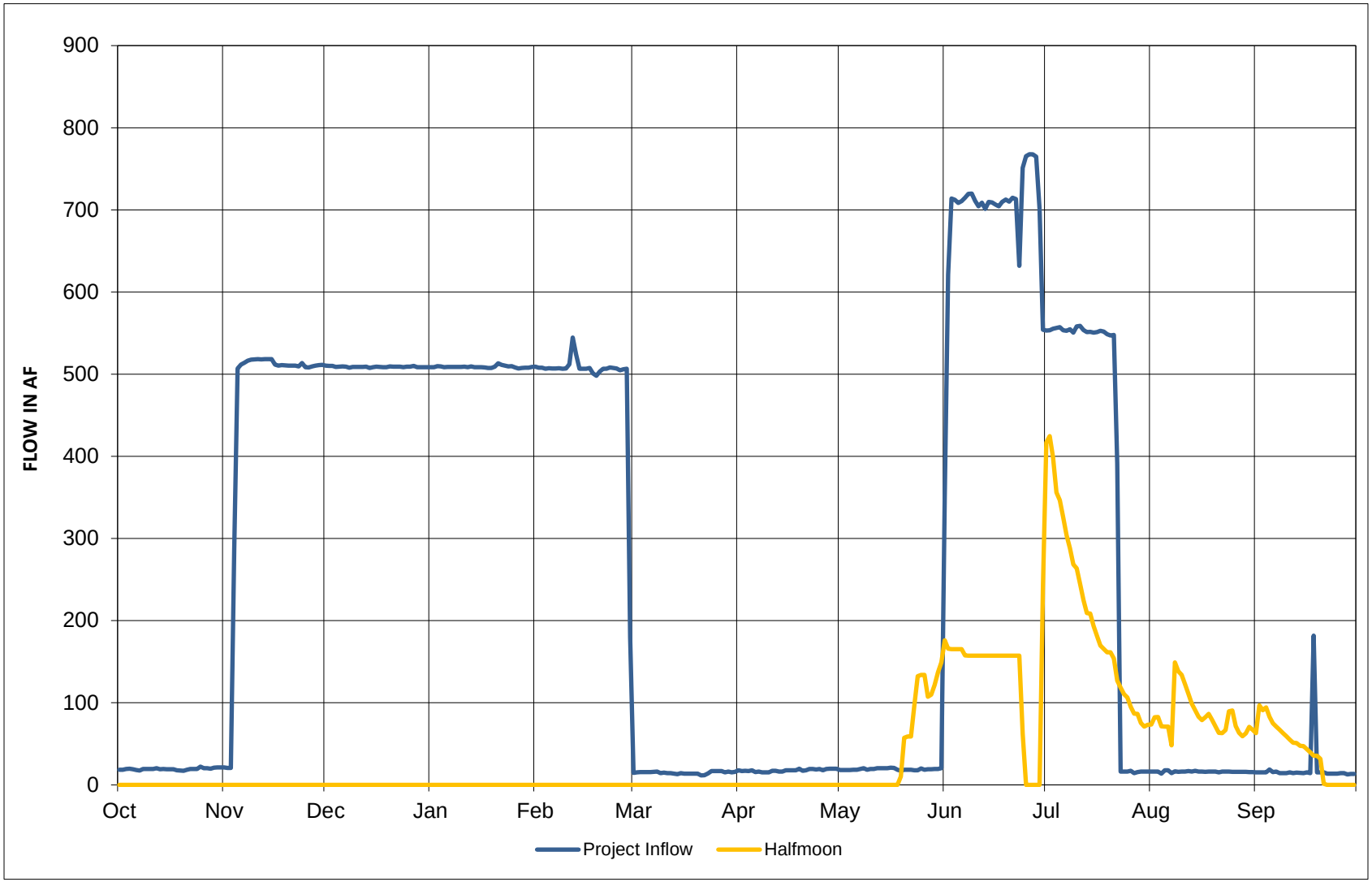
9. Turquoise Lake (Sugar Loaf Dam) Monthly Evaporation WY 2016



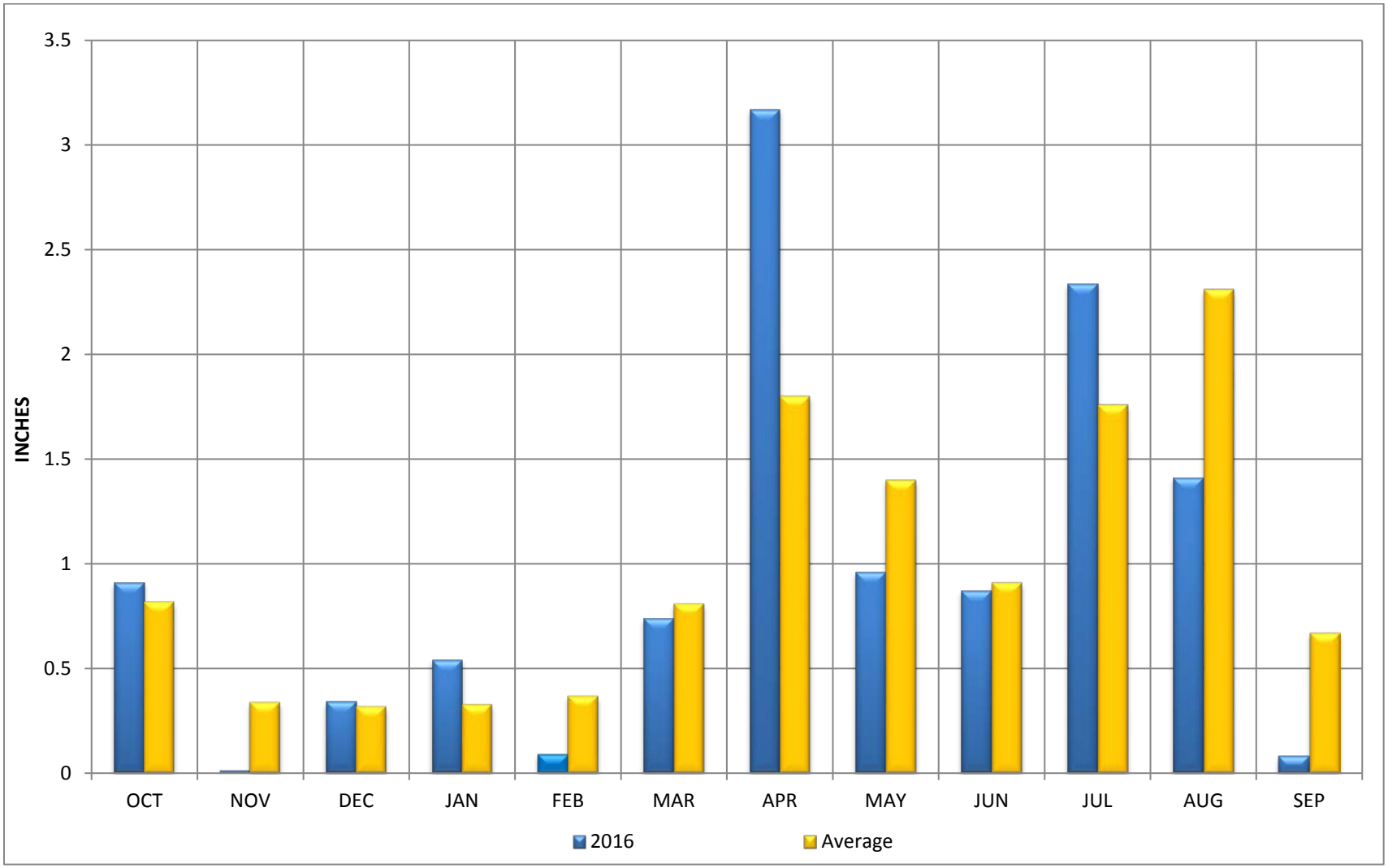
10. Turquoise Lake (Sugarloaf Dam) Actual Operations WY 2016



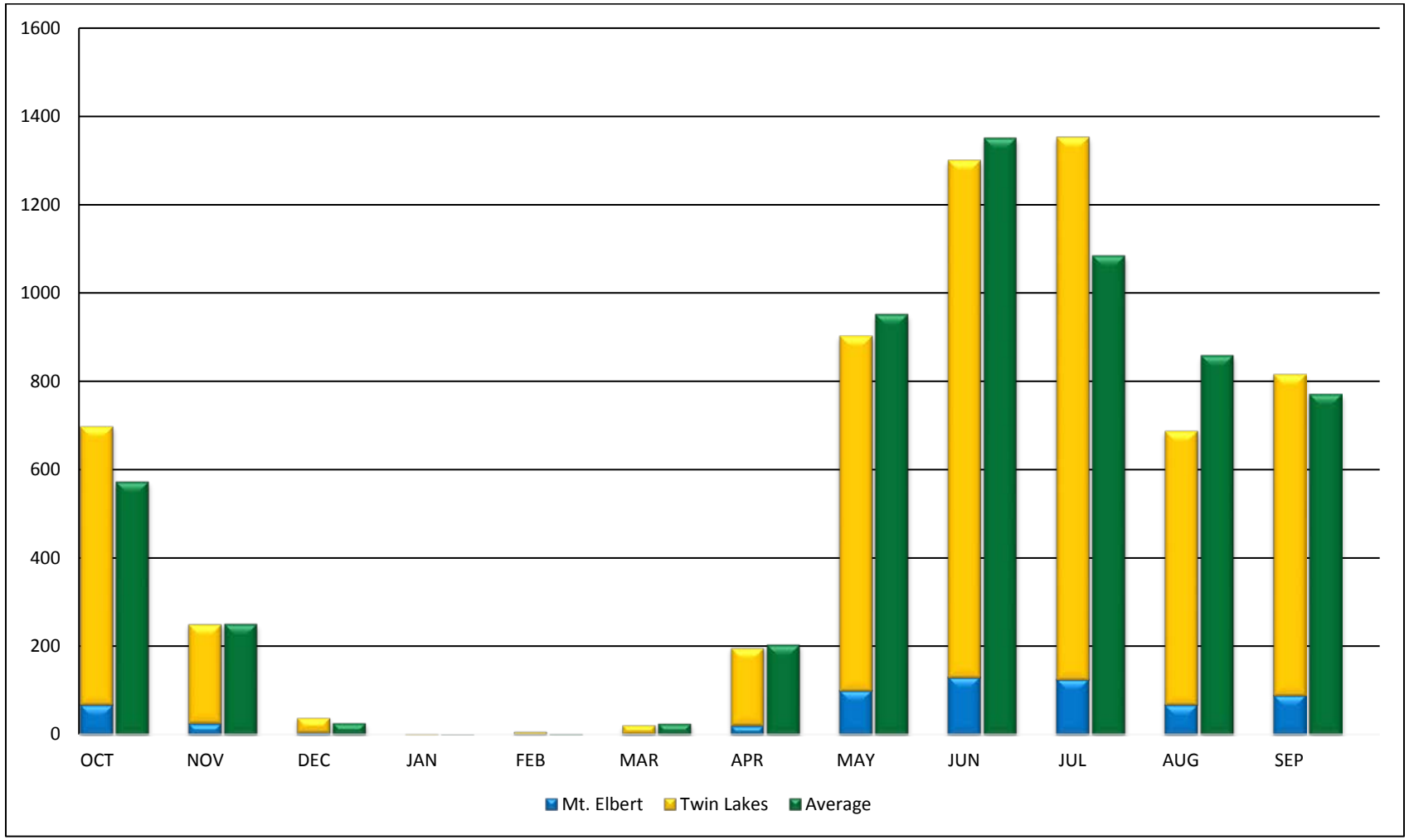
11. Elbert Conduit Inflow Actual Operations WY 2016



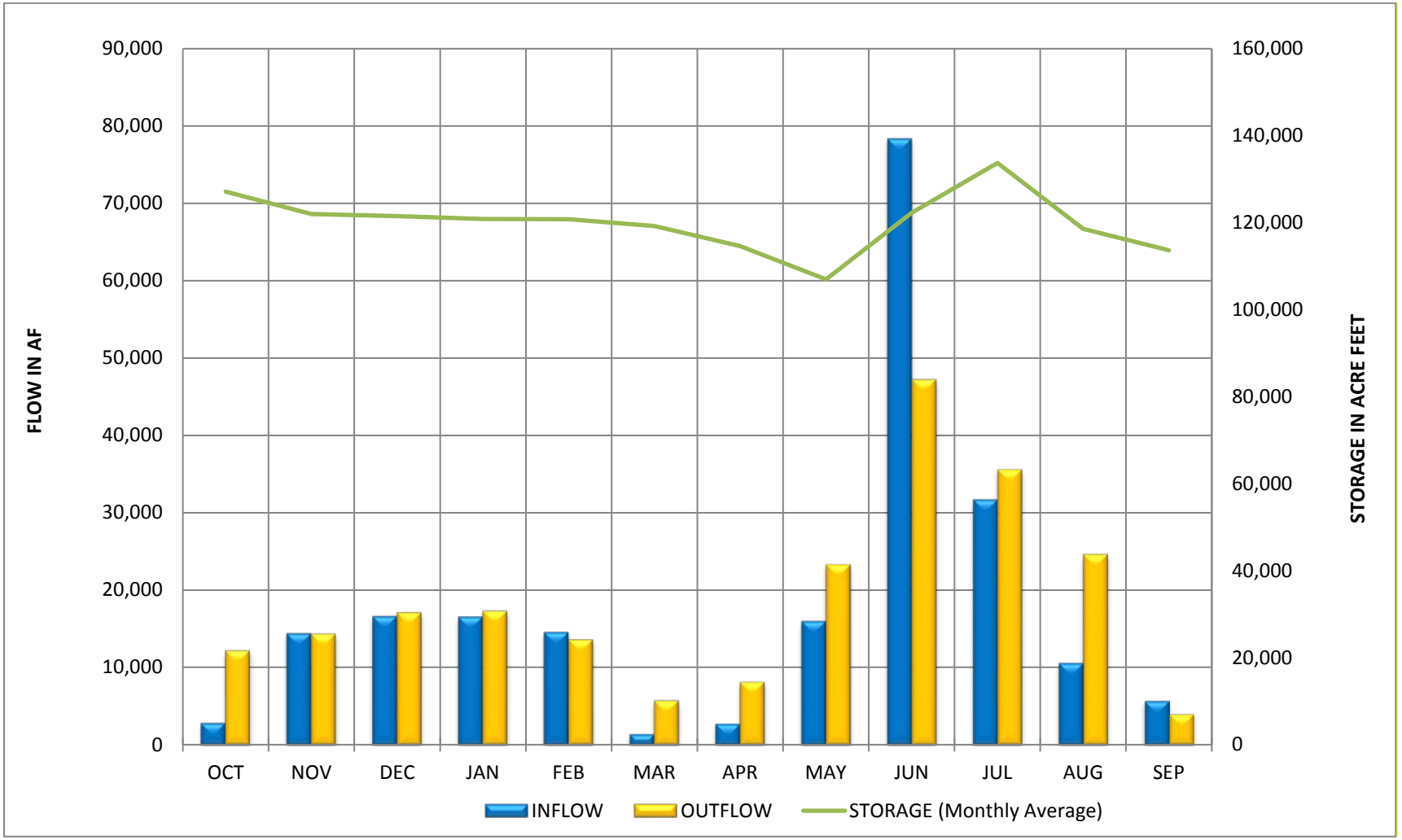
12. Twin Lakes Monthly Precipitation WY 2016



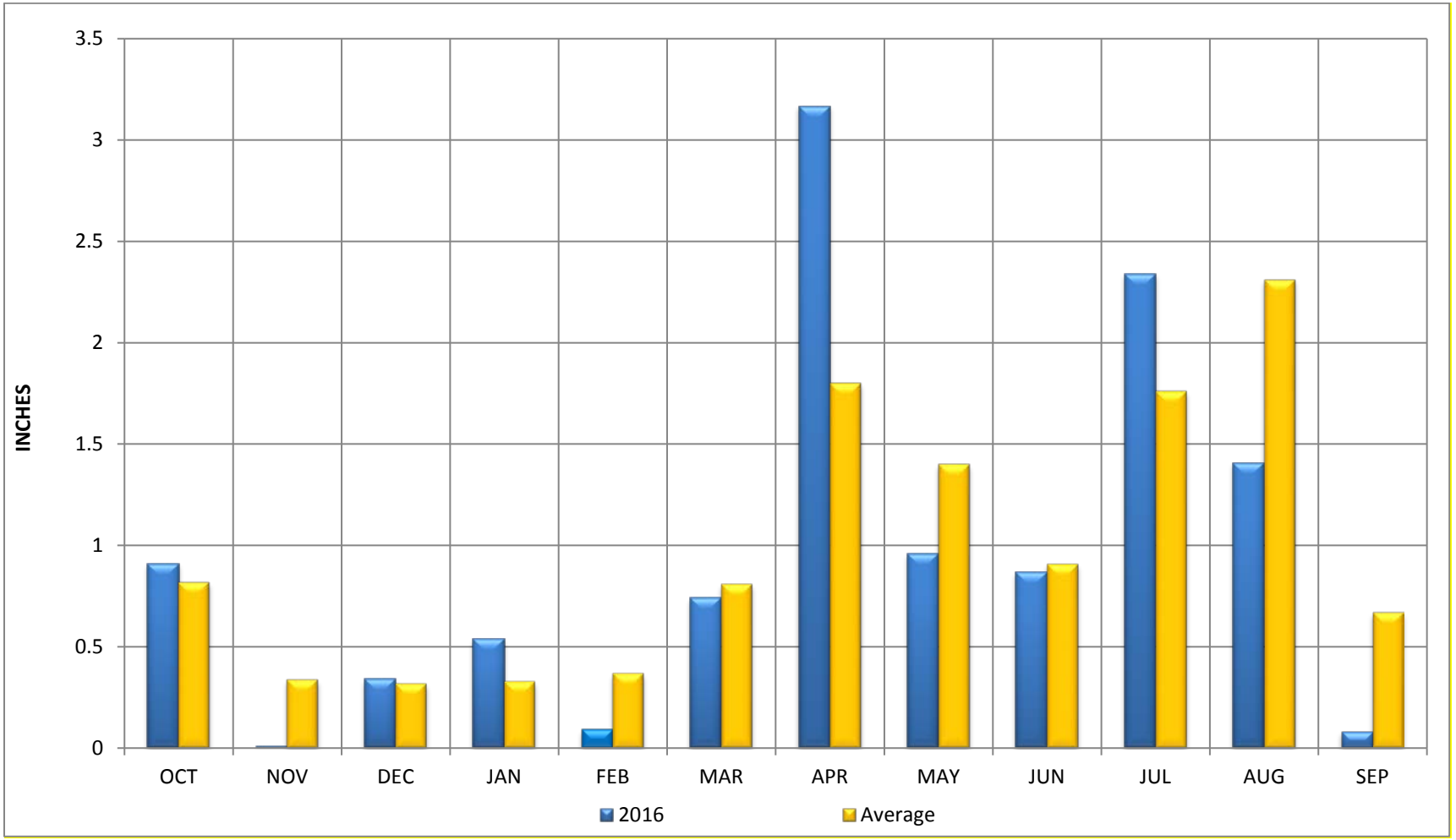
13. Twin Lakes Dam and Mt. Elbert Forebay Monthly Evaporation WY 2016



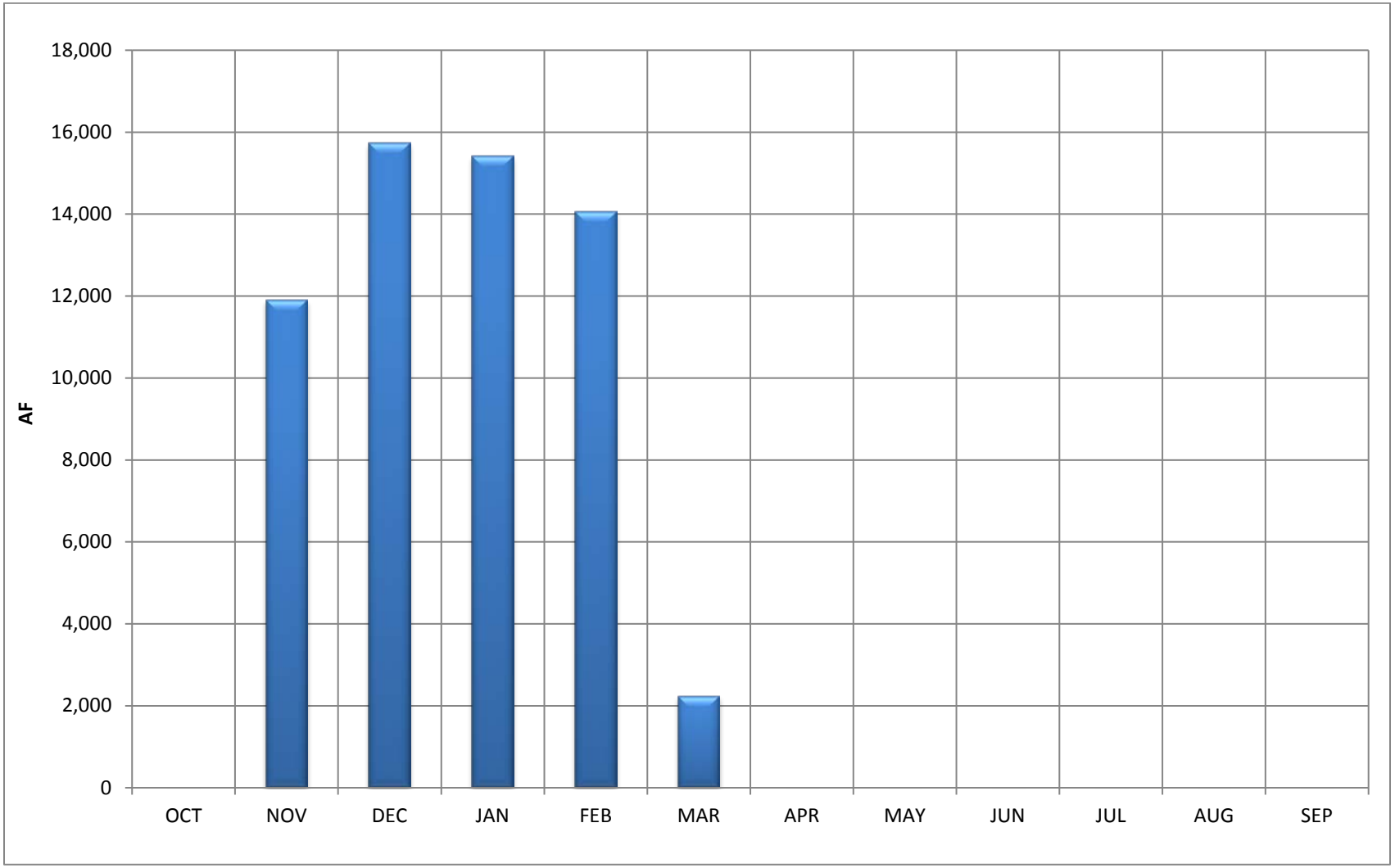
14. Twin Lakes/Mt. Elbert Forebay Actual Operations WY 2016



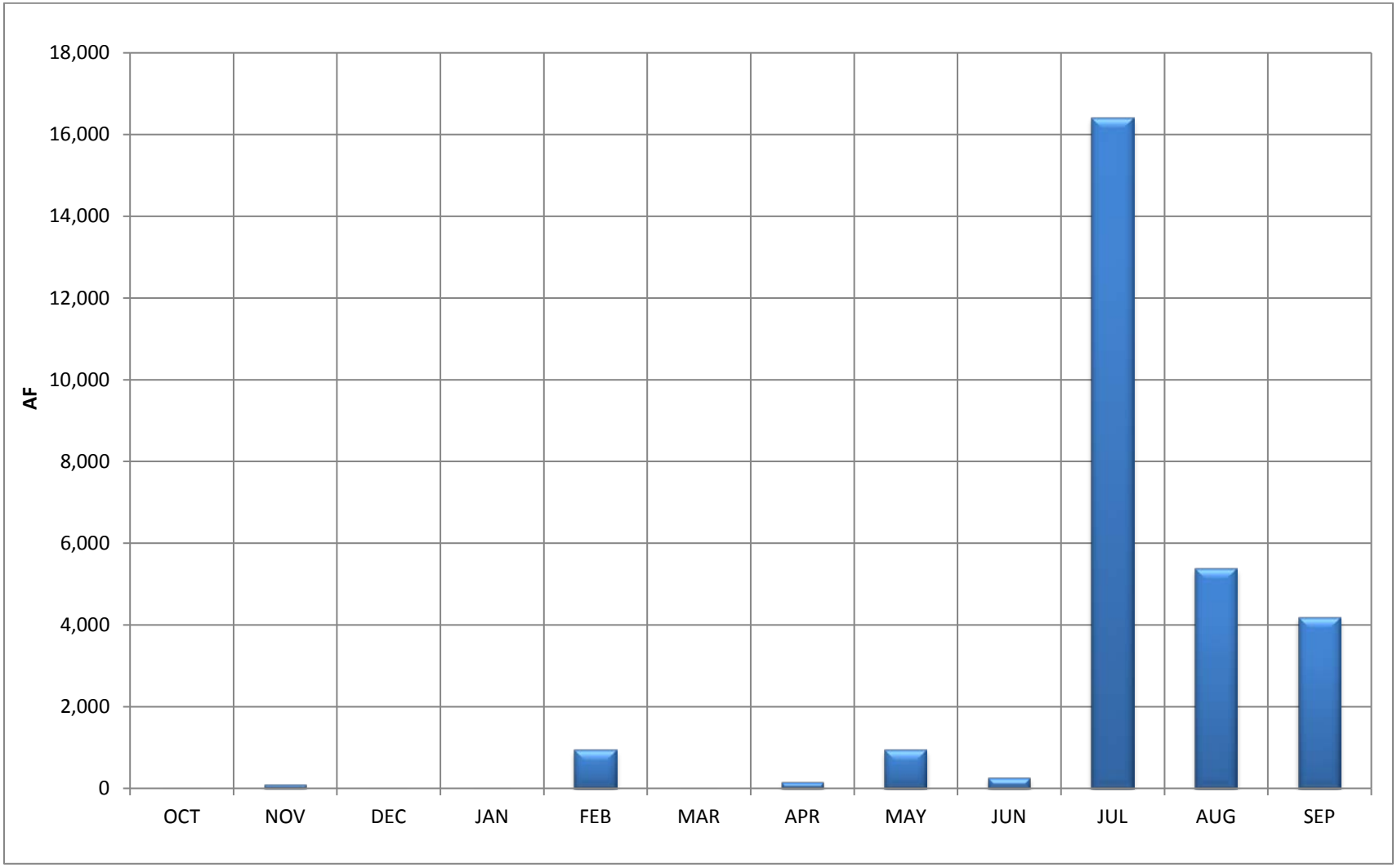
15. Pueblo Dam Monthly Precipitation WY 2016



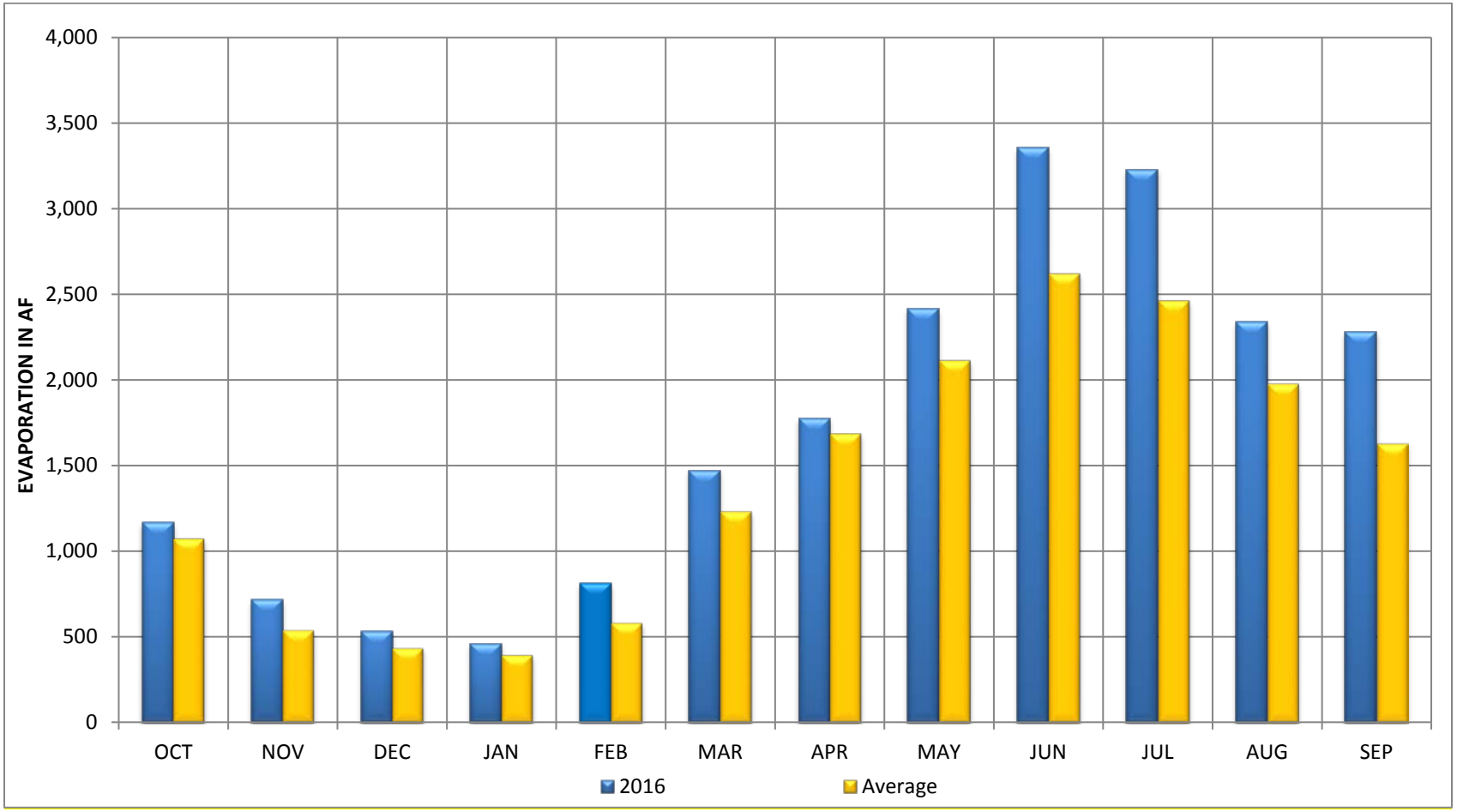
16. Pueblo Reservoir Winter Water Inflow WY 2016



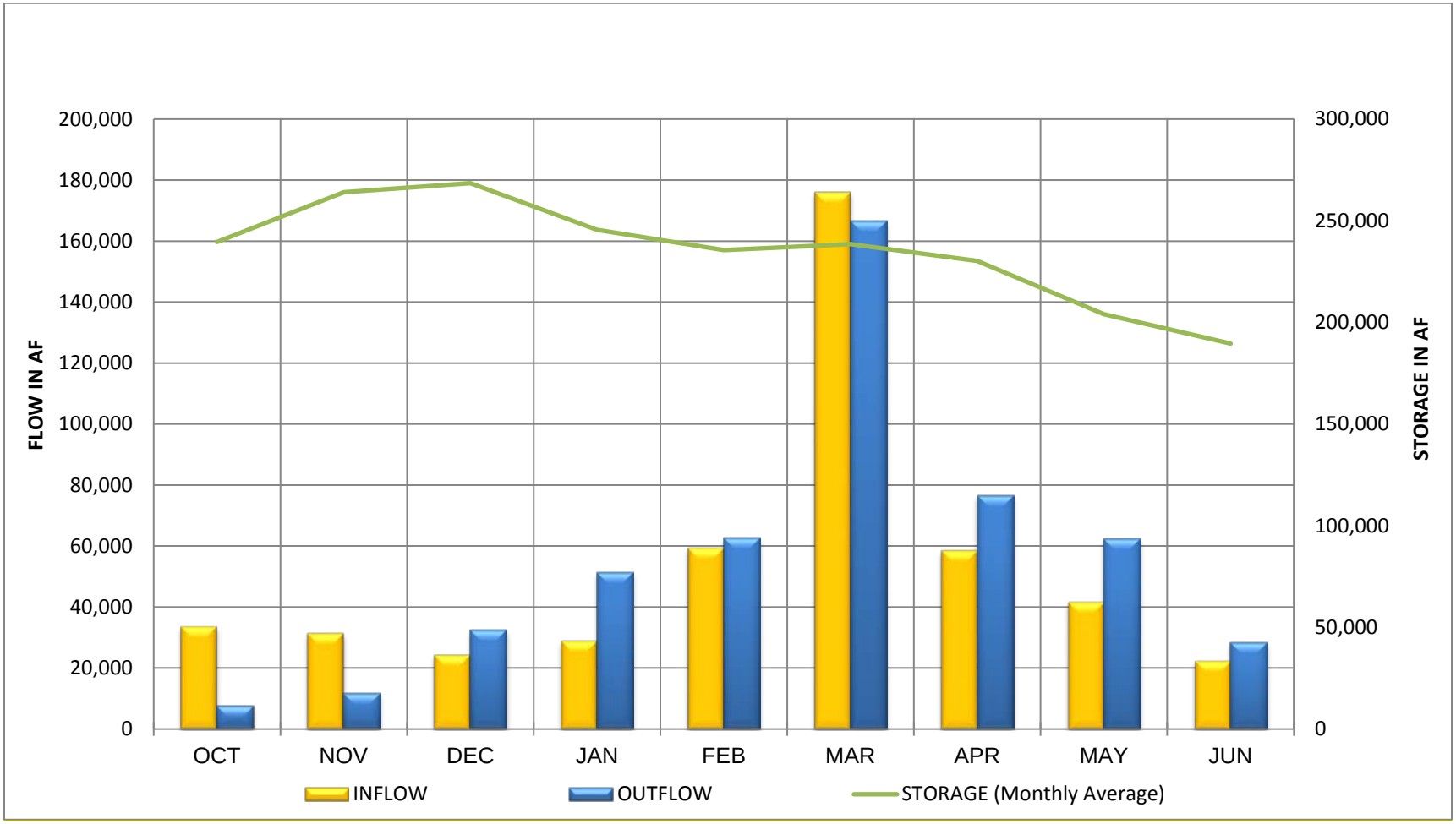
17. Releases of Pueblo Reservoir Winter Water WY 2016



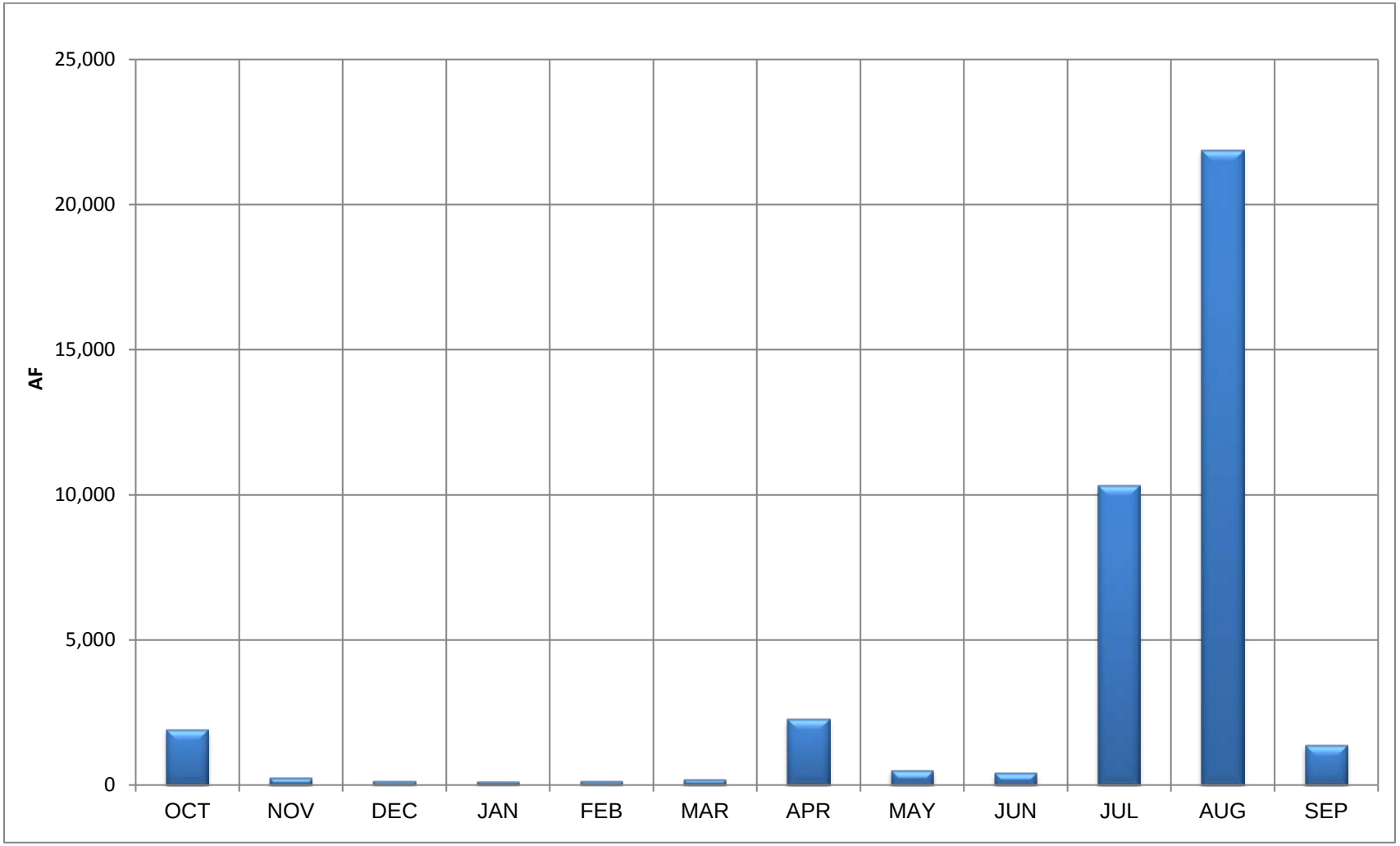
18. Pueblo Dam Monthly Evaporation WY 2016



19. Pueblo Reservoir Actual Operations WY 2016



20. Releases of Fryingpan-Arkansas Project Water from Pueblo Reservoir WY 2016



APPENDIX C: TWIN LAKES RESERVOIR AND CANAL COMPANY EXCHANGE WITH FRYINGPAN-ARKANSAS PROJECT WATER

1. Twin Lakes Canal Company Exchange with Fryingpan-Arkansas Project Water WY 2016

Units = AF

	Lincoln Creek below Grizzly Reservoir (1)	Roaring Fork River above Lost Man (2)	Total Exchanged (3)	Twin Lakes Storage (3) x 0.9913[1]
Oct 2015	33.32	0	33.32	33.03
Nov 2015	154.00	0	154.00	152.66
Dec 2015	159.16	0	159.16	157.78
Jan 2016	157.76	0	157.76	156.39
Feb 2016	143.44	0	143.44	142.19
Mar 2016	154.16	0	154.16	152.82
Apr 2016	153.17	0	153.17	151.84
May 2016	168.20	0	168.20	166.74
Jul 2016	231.38	234.64	466.02	461.97
Aug 2016	236.14	233.08	469.22	465.14
Sep 2016	113.75	112.12	225.87	223.90
Total	**1,864.68**	**684.85**	**2,531.53**	**2,509.52**

[1] Transit loss from the outlet of Twin Lakes Tunnel to Twin Lakes normally taken on all Twin Lakes Reservoir and Canal Company imported water.

Operating Criteria may prevent the total 3000 x 0.9913 from being stored

Please see the discussion in Chapter IV, Paragraph C for a full discussion of the Twin Lakes Canal Company Exchange in WY16

1. Operating Criteria

1. The water exchange will be implemented October 1 through September 30.

2. The releases to the Roaring Fork River at the Roaring Fork Diversion Dam and Lincoln Creek at the Grizzly Diversion Dam shall be accounted as follows[1]:

Month	Grizzly Diversion (cfs)	Roaring Fork Diversion (cfs)
October	3.0	0.0
November	3.0	0.0
December	3.0	0.0
January	3.0	0.0
February	3.0	0.0
March	3.0	0.0
April	3.0	0.0
May	3.0	0.0
June	4.0	4.0
July	4.0	4.0
August	4.0	4.0*
September	4.0	4.0*

* Roaring Fork diversions in August-September are usually limited to 3.0 cfs. This year, they were set at 4.0 cfs to allow TLCC to recover water lost when the account was full in June

3. At any time the Twin Lakes Reservoir and Canal Company (TLCC) is bypassing water, in addition to that designated above, it will be assumed that the Company could not have diverted that water and will not receive any credit for exchange in excess of the above amounts.

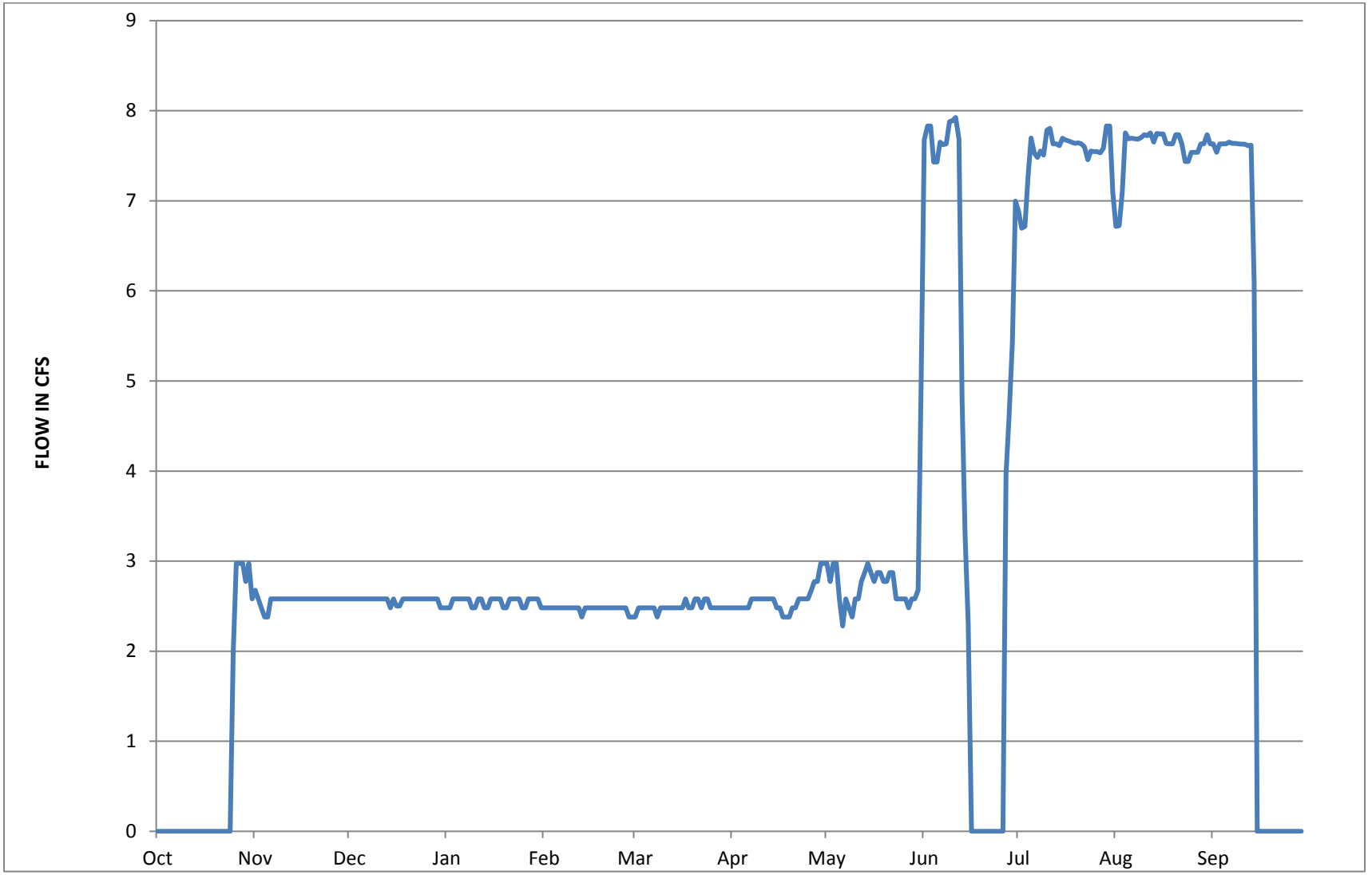
4. In the event less water than the above amounts is bypassed, only the amount actually bypassed will be credited.

5. The total volume of the release at both gages combined shall not exceed 3,000 AF in any one water year.

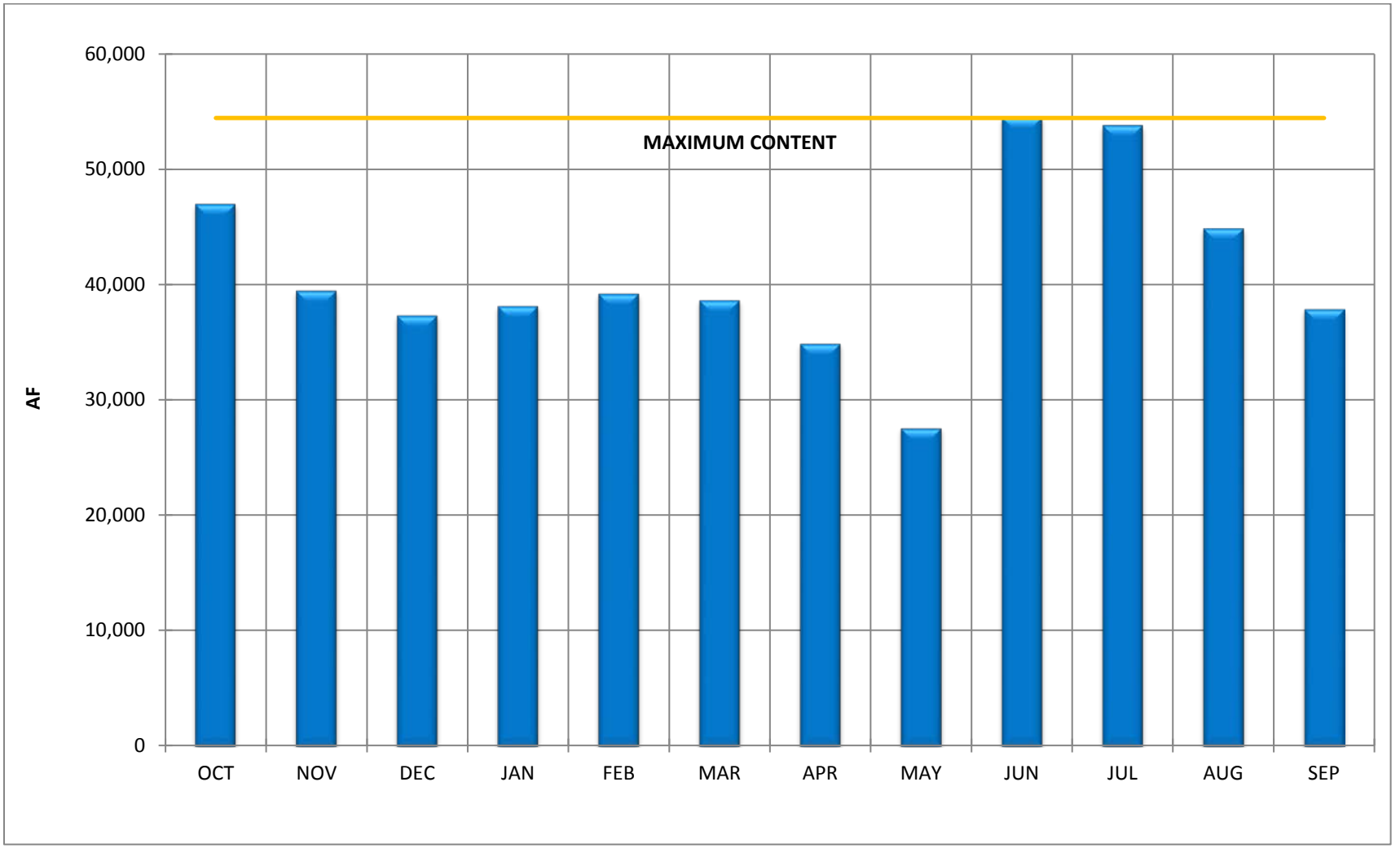
6. No credit for exchange will be made on days when there is no documentation of such bypasses.

7. No credit will be given for water bypassed when diversions are called out by the State Engineer

3. Twin Lake Tunnel Imports WY 2016



4. Twin Lakes Canal Company Storage WY 2016



APPENDIX D: DAILY DISCHARGE RECORDS, FRYINGPAN-ARKANSAS PROJECT COLLECTION SYSTEM

1. Carter Feeder Conduit near Norrie, CO

WY2016
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1			23.1	25.3		
2			32.5	25.4		
3			35.9	25.7		
4			35.9	18.5		
5			41.7	18.4		
6			43.5	18.7		
7		10.3	41.1	16.0		
8		3.8	41.3	14.4		
9		0.8	39.6	13.1		
10		M	39.6	12.4		
11		M	36.8	11.4		
12		M	39.6	7.6		
13		2.9	41.6	7.4		
14		9.1	M	6.9		
15		12.4	35.9			
16		10.1	37.5			
17		6.3	35.2			
18		6.5	33.5			
19		9.5	38.8			
20		13.4	44.9			
21		20.2	43.4			
22		25.6	38.6			
23		19.5	38.8			
24		15.1	37.7			
25		17.6	36.9			
26		15.5	34.8			
27		11.4	29.1			
28		9.5	26.4			
29		12.3	22.2			
30		19.3	20.9			
31		19.4				
TOTAL		**270.5**	**1047**	**221.3**		
AVERAE		**12.3**	**36.1**	**15.8**		
MAX		**25.6**	**44.9**	**25.7**		

WY2016 Total: 3,052.3 AF
Maximum Instantaneous Peak: 44.9 on 20 Jun 16
Blank: Recorder not operated. No water diverted
M: Missing Data

2. North Fork Fryingpan River Feeder Conduit near Norrie, CO

WY2016
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1			6.3	6.6		
2			8.7	7.3		
3			11.2	7.6		
4			14.7	6.2		
5			18.5	5.4		
6			19.6	4.9		
7		2.0	19.0	4.5		
8		1.6	19.1	4.1		
9		1.6	18.9	3.7		
10		1.6	18.8	3.3		
11		1.3	19.1	2.9		
12		1.1	20.2	2.7		
13		1.4	20.0	0.9		
14		2.0	M			
15		2.6	17.4			
16		2.8	18.7			
17		2.4	18.4			
18		2.3	18.3			
19		2.5	18.8			
20		3.6	20.9			
21		4.9	21.4			
22		6.4	18.4			
23		6.1	17.0			
24		5.4	14.8			
25		5.6	13.1			
26		5.1	11.7			
27		4.5	10.1			
28		3.9	8.6			
29		4.2	7.3			
30		6.0	6.6			
31		5.4				
TOTAL		86.5	455.6	60.2		
AVERAE		3.5	15.7	4.6		
MAX		6.4	21.4	7.6		

WY2016 Total: 1194.7 AF
Maximum Instantaneous Peak: 21.4 cfs on 21 Jun 16
Blank: Recorder not operated. No water diverted
M: Missing Data

3. South Fork Fryingpan River Feeder Conduit near Norrie, CO

WY2016
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1			67.2	77.3		
2			89.8	90.2		
3			110.5	94.2		
4		2.3	128.2	73.3		
5		2.5	141.2	61.6		
6		7.0	148.6	50.8		
7		12.0	146.1	42.9		
8		5.4	142.7	32.9		
9		1.7	143.6	23.1		
10		1.8	159.0	13.0		
11		1.7	167.5	7.3		
12		1.7	159.0	3.1		
13		1.7	149.3			
14		5.5	M			
15		13.0	146.4			
16		13.4	148.5			
17		12.2	147.4			
18		12.6	148.5			
19		16.9	155.9			
20		25.9	167.0			
21		36.7	174.4			
22		50.7	137.3			
23		48.6	119.7			
24		46.8	95.6			
25		50.4	73.3			
26		45.0	62.5			
27		36.4	45.8			
28		33.5	30.3			
29		39.2	22.0			
30		44.8	33.2			
31		50.4				
TOTAL		619.6	3460.3	569.7		
AVERAE		22.1	119.3	47.5		
MAX		50.7	174.4	94.2		

WY2016 Total: 9222.7 AF
Maximum Instantaneous Peak: 174.4 cfs on 21 Jun 16
Blank: Recorder not operated. No water diverted
M: Missing Data

4. Mormon Feeder Conduit near Norrie, CO

WY2016
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1			33.5	20.2		
2			38.6	22.5		
3			41.5	20.4		
4			47.8	15.7		
5			55.0	13.9		
6			57.8	12.0		
7		7.3	55.9	10.1		
8		3.4	55.7	8.3		
9		0.0	56.0	7.3		
10		0.0	56.7	6.5		
11		0.0	59.2	5.7		
12		0.0	58.3	4.7		
13		2.8	55.5	1.5		
14		7.3	M			
15		10.5	48.8			
16		10.1	49.9			
17		7.4	47.8			
18		7.1	48.0			
19		9.2	M			
20		14.8	54.6			
21		21.4	57.7			
22		25.8	46.8			
23		21.0	46.4			
24		19.8	40.3			
25		21.9	36.2			
26		19.1	32.2			
27		14.9	26.7			
28		13.9	23.3			
29		18.0	19.9			
30		21.7	18.3			
31		26.9				
TOTAL		304.5	1268.4	148.9		
AVERAE		12.2	45.3	11.5		
MAX		26.9	59.2	22.5		

WY2016 total: 3415.4 AF
Maximum Instantaneous Peak 59.2 cfs on 11 Jun 16
Blank: Recorder not operated. No water diverted
M: Missing Data

5. North Cunningham Feeder Conduit near Norrie, CO

WY2016
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1			18.9	8.0		
2			21.2	8.8		
3			20.9	8.1		
4			23.4	5.5		
5			27.0	4.5		
6			28.1	3.5		
7			26.9	2.6		
8			26.6	2.0		
9			26.7	1.5		
10			26.8	1.1		
11			28.7	0.4		
12			28.3	0.1		
13			26.9	0.1		
14		3.6	M			
15		5.2	22.8			
16		5.1	23.8			
17		3.5	21.9			
18		3.4	22.9			
19		5.1	24.1			
20		8.4	25.7			
21		12.1	28.0			
22		14.8	22.5			
23		12.1	23.6			
24		11.2	19.5			
25		12.7	17.4			
26		10.6	15.6			
27		7.7	12.5			
28		6.4	10.3			
29		8.2	8.4			
30		11.0	7.4			
31		14.6				
TOTAL		155.8	636.7	46.0		
AVERAE		8.7	22.0	3.5		
MAX		14.8	28.7	8.8		

WY2016 Total: 1663.3 AF
Maximum Instantaneous Peak: 28.7 cfs on 11 Jun 16
Blank: Recorder not operated. No water diverted
M: Missing Data

6. Middle Cunningham Feeder Conduit near Norrie, CO

WY2016
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1			17.9	10.5		
2			23.7	10.9		
3			26.0	10.4		
4			31.7	7.9		
5			31.2	6.5		
6			29.7	5.6		
7		0.4	37.0	4.7		
8		0.0	36.2	4.0		
9		0.0	36.8	3.5		
10		0.0	37.8	2.9		
11		0.0	38.9	2.4		
12		0.0	38.2	1.9		
13		0.2	M	0.6		
14		0.5	M			
15		1.5	33.0			
16		1.5	34.3			
17		1.0	33.9			
18		1.0	34.6			
19		1.8	38.0			
20		3.9	41.5			
21		6.3	41.7			
22		9.0	35.5			
23		8.8	34.1			
24		8.3	28.3			
25		9.9	23.8			
26		8.4	20.4			
27		6.0	16.6			
28		5.3	13.7			
29		6.2	11.8			
30		10.0	10.4			
31		13.5				
TOTAL		103.6	836.8	71.8		
AVERAE		4.1	29.9	5.5		
MAX		13.5	41.7	10.9		

WY2016 Total: 2007.8 AF
Maximum Instantaneous Peak: 41.7 cfs on 21 Jun 16
Blank: Recorder not operated. No water diverted
M: Missing Data

7. Ivanhoe Creek Feeder Conduit near Norrie, CO

WY2016
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1			64.9	7.2		
2			77.3	9.5		
3			86.7	9.4		
4			107.1	6.1		
5			97.8	4.2		
6			97.3	3.1		
7		13.9	90.3	2.4		
8		7.0	76.5	1.9		
9		1.4	68.6	1.5		
10		1.4	76.8	1.4		
11		1.4	113.3	1.4		
12		1.4	120.4	1.4		
13		5.7	125.7	1.3		
14		12.0	M			
15		16.5	49.0			
16		18.1	68.6			
17		14.9	79.4			
18		14.9	84.1			
19		19.3	89.4			
20		26.5	97.0			
21		37.7	113.8			
22		48.3	87.6			
23		43.3	94.6			
24		40.6	58.9			
25		42.3	29.1			
26		35.4	24.6			
27		27.7	18.0			
28		23.3	11.6			
29		27.2	7.9			
30		36.1	6.4			
31		48.8				
TOTAL		565.1	2122.6	50.8		
AVERAE		22.6	73.2	3.9		
MAX		48.8	125.7	9.5		

WY2016 total: 5431.7 AF
Maximum Instantaneous Peak 125.7 cfs on 13 Jun 16
Blank: Recorder not operated. No water diverted
M: Missing Data

8. Lily Pad Creek Feeder Conduit near Norrie, CO

WY2016
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1			7.7	3.6	0.2	
2			9.3	4.7	0.1	
3			11.4	4.2	0.0	
4			16.6	2.5	0.3	
5			20.4	1.8	0.7	
6			23.9	1.4	0.5	
7			21.5	1.1	0.2	
8			20.3	0.9	0.2	
9			20.1	0.8	0.3	
10			21.3	0.6	0.3	
11			23.9	0.5	0.1	
12			21.6	0.5	0.1	
13			18.4	0.4		
14			14.4	0.3		
15			15.0	0.3		
16			13.7	0.3		
17			12.1	0.2		
18			11.0	0.2		
19			10.7	0.4		
20		1.5	10.7	0.9		
21		4.1	10.4	1.4		
22		5.6	9.1	0.8		
23		5.9	8.1	0.4		
24		5.9	6.6	0.4		
25		6.1	5.6	0.3		
26		5.9	4.6	0.2		
27		5.0	3.7	0.2		
28		3.9	3.1	0.1		
29		3.9	2.8	0.1		
30		4.8	2.6	0.1		
31		6.1		0.1		
TOTAL		58.7	380.5	29.4	3.1	
AVERAE		4.9	12.7	0.9	0.3	
MAX		6.1	23.9	4.7	0.7	

WY2016 Total: 935.62 AF
Maximum Instantaneous Peak: 29.72 cfs on 10 Jun 16
Blank: Recorder not operated. No water diverted
M: Missing Data

9. Granite Creek Feeder Conduit near Norrie, CO

WY2016
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1			14.5	12.9		
2			18.8	15.8		
3			22.6	15.4		
4			28.2	11.2		
5			32.8	10.4		
6			33.3	9.1		
7		0.0	32.3	7.9		
8		0.0	32.2	7.1		
9		0.0	33.7	6.5		
10		10.0	36.2	6.1		
11		0.7	37.4	5.5		
12		2.0	37.7	4.8		
13		6.2	35.0	4.4		
14		18.1	M	4.1		
15		50.4	29.9			
16		49.1	29.3			
17		19.4	29.1			
18		2.4	28.3			
19		2.8	28.7			
20		4.2	29.3			
21		5.5	29.1			
22		7.8	24.8			
23		7.8	23.0			
24		8.1	20.1			
25		9.0	17.9			
26		8.3	16.0			
27		7.2	14.3			
28		6.9	13.0			
29		7.7	11.5			
30		9.6	10.8			
31		11.4				
TOTAL		254.4	749.9	121.3		
AVERAE		102.	25.9	8.7		
MAX		50.4	37.7	15.8		

WY2016 Total: 2232.5 AF
Maximum Instantaneous Peak: 37.7 cfs on 12 Jun 16
Blank: Recorder not operated. No water diverted
M: Missing Data

10. No Name Creek Feeder Conduit near Norrie, CO

WY2016
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1			27.2			
2			37.2			
3			44.2			
4			49.1			
5			48.5			
6			27.1			
7			46.1			
8			51.0			
9			40.1			
10			15.4			
11			21.2			
12			50.1			
13			52.7			
14			M			
15			9.8			
16			19.9			
17			19.8			
18			19.8			
19			19.8			
20		8.2	19.9			
21		11.0	19.8			
22		18.0	19.6			
23		16.6	19.5			
24		16.2	19.2			
25		19.2	18.9			
26		16.6	17.2			
27		10.0				
28		8.9				
29		12.5				
30		18.7				
31		20.2				
TOTAL		176.2	733.3			
AVERAE		14.7	29.3			
MAX		20.2	52.7			

WY2016 Total: 1804.0 AF.
Maximum Instantaneous Peak: 52.7 on 13 Jun 16
Blank: Recorder not operated. No water diverted
M: Missing Data

11. Midway Creek Feeder Conduit near Norrie, CO

WY2016
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1			44.0	36.5		
2			60.0	37.4		
3			62.1	41.5		
4			54.2	27.1		
5			61.1	22.5		
6		2.9	83.8	20.6		
7		3.3	84.9	16.8		
8		M	84.3	8.0		
9		M	82.1			
10		M	84.4			
11		M	84.6			
12		M	83.0			
13		0.5	83.6			
14		3.2	83.5			
15		7.0	82.1			
16		6.0	82.5			
17		3.7	82.1			
18		3.0	82.7			
19		5.1	83.2			
20		11.5	84.9			
21		20.5	84.9			
22		28.1	84.7			
23		25.5	81.7			
24		25.3	72.2			
25		28.6	62.3			
26		24.3	56.4			
27		16.6	46.4			
28		15.7	40.3			
29		19.4	34.9			
30		22.9	32.1			
31		29.7				
TOTAL		302.6	2128.9	210.7		
AVERAE		14.4	71.0	26.3		
MAX		29.7	84.9	41.5		

WY2016 Total: 5074.3 AF. No diversions
Maximum Instantaneous Peak: 85.0 on 7 Jun 16
Blank: Recorder not operated. No water diverted
M: Missing Data

12. Hunter Creek Feeder Conduit near Norrie, CO

WY2016
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1			46.0	29.4		
2			63.2	32.4		
3			65.4	36.5		
4			67.4	26.9		
5			61.8	22.2		
6			64.9	6.6		
7			56.0			
8			49.6			
9			47.1			
10			39.3			
11			25.1			
12			46.5			
13			57.6			
14			M			
15			61.4			
16			54.7			
17			49.8			
18			46.5			
19			51.0			
20			45.0			
21		21.4	37.6			
22		33.7	44.0			
23		28.3	47.5			
24		25.6	44.3			
25		29.4	42.3			
26		21.6	38.5			
27		11.6	32.2			
28		9.6	29.3			
29		17.5	26.8			
30		23.2	27.2			
31		32.1				
TOTAL		254.1	1367.8	154.0		
AVERAE		23.1	47.2	25.7		
MAX		33.7	67.4	36.5		

WY2016 Total: 3522.6AF
Maximum Instantaneous Peak: 67.4 cfs on 4 Jun 16
Blank: Recorder not operated. No water diverted
M: Missing Data

13. Sawyer Creek Feeder Conduit near Norrie, CO

WY2016
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
TOTAL						
AVERAE						
MAX						

WY2016 Total: M
Maximum Instantaneous Peak: M
Blank: **Recorder not operated. No water diverted**
M: Missing Data

14. Chapman Gulch Feeder Conduit near Norrie, CO

WY2016
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1			155.0	107.4		
2			210.8	127.4		
3			239.7	146.8		
4			263.9	102.9		
5		2.0	267.4	82.8		
6		3.8	272.9	61.5		
7		7.3	282.0	45.5		
8		M	279.9	34.5		
9		0.0	270.4	22.6		
10		0.0	254.3	20.8		
11		0.0	239.0	18.0		
12		0.0	278.6	15.7		
13		1.6	294.6	13.9		
14		7.0	M	12.3		
15		18.2	232.4	10.8		
16		17.9	246.9	9.8		
17		9.1	243.2	3.3		
18		9.2	243.2			
19		12.1	238.1			
20		34.1	246.2			
21		69.6	243.9			
22		104.5	232.0			
23		96.4	230.4			
24		88.6	201.1			
25		103.3	181.9			
26		90.2	162.1			
27		59.7	126.9			
28		52.3	104.6			
29		70.8	94.2			
30		85.3	91.2			
31		113.2				
TOTAL		1056.3	6426.9	836.0		
AVERAE		40.6	221.6	49.2		
MAX		113.2	294.6	146.8		

WY2016 Total: 16501.0 AF
Maximum Instantaneous Peak: 294.6 cfs on 13 Jun 16
Blank: Recorder not operated. No water diverted
M: Missing Data

15. Fryingpan River Feeder Conduit near Norrie, CO

WY2016
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1			79.5	94.0		
2			110.9	108.7		
3			138.9	103.8		
4			175.1	73.2		
5			204.5	63.1		
6			206.7	51.2		
7		5.5	200.7	41.6		
8		1.2	197.5	35.5		
9		0.0	210.7	30.1		
10		0.0	230.5	26.9		
11		0.0	235.8	23.1		
12		0.0	236.8	17.4		
13		1.4	211.5	13.2		
14		9.1	M	9.9		
15		17.7	169.7	7.3		
16		16.4	172.7	5.0		
17		16.0	173.1	1.7		
18		17.6	172.9			
19		25.8	177.3			
20		37.8	195.2			
21		48.4	210.7			
22		65.0	184.5			
23		64.8	155.9			
24		63.6	130.5			
25		67.9	107.4			
26		59.5	87.2			
27		47.6	68.9			
28		42.4	57.5			
29		49.6	47.9			
30		55.8	56.5			
31		65.3				
TOTAL		778.5	4607.1	705.7		
AVERAE		31.1	158.9	41.5		
MAX		67.9	236.8	108.7		

WY2016 Total: 12082.0 AF
Maximum Instantaneous Peak: 236.8 cfs on 12 Jun 16
Blank: Recorder not operated. No water diverted
M: Missing Data

APPENDIX E: FRYINGPAN-ARKANSAS PROJECT OPERATING PRINCIPLES

Eighty-Seventh Congress, First Session----------House Document No. 130

OPERATING PRINCIPLES

FRYINGPAN-ARKANSAS PROJECT

ADOPTED BY THE STATE OF COLORADO

APRIL 30, 1959

(As amended December 30, 1959,

and December 9, 1960)

MARCH 15, 1961----Ordered to be printed

U. S. GOVERNMENT PRINTING OFFICE

WASHINGTON: 1961

H. RES. 91

In the House of Representatives, U. S., March 15, 1961.

Resolved, That there be printed as a House document the publication entitled "Operating Principles, Fryingpan-Arkansas Project, Adopted by the State of Colorado, April 30, 1959 (as amended December 30, 1959, and December 9, 1960)", and that there be printed for the use of the Committee on Interior and Insular Affairs one thousand additional copies.

Attest:

Ralph R. Roberts, Clerk.

OPERATING PRINCIPLES, FRYINGPAN-ARKANSAS PROJECT

ADOPTED BY THE STATE OF COLORADO, APRIL 30, 1959

(As Amended December 30, 1959, and December 9, 1960)

The construction and operation of the project involve the diversion of water from the headwaters of the Fryingpan River and other tributaries of the Roaring Fork River to the Arkansas River Basin. The project contemplates—

(a) The maximum conservation and use of water;
(b) The protection of western Colorado water uses, both existing and potential, in accordance with the declared policy of the State of Colorado; and
(c) The preservation of recreational values.

In order to accomplish such purposes, the project shall be operated by the United States in compliance with the Federal reclamation laws, the laws of the State of Colorado relating to the appropriation, use, or distribution of water, and the following operating principles:

1. As used herein:
   (a) "Project" means that certain enterprise planned and designed by the Bureau of Reclamation, Department of the Interior, for the transmountain diversion of water from the headwaters of the Fryingpan River and other tributaries of the Roaring Fork River to the basin of the Arkansas River, together with all of its appurtenant works and facilities in both eastern and western Colorado.
   (b) "Eastern Colorado" means that portion of the State of Colorado lying within the natural drainage basin of the Arkansas River.
   (c) "Western Colorado" means that portion of the State of Colorado lying within the natural drainage basin of the Colorado River and served by diversions made from the Colorado River, or its tributaries, above its confluence with the Gunnison River.
   (d) "Southeastern Colorado Water Conservancy District" means that entity created to contract for payment to the United States of an appropriate portion of project cost allocated to certain water uses in eastern Colorado.
   (e) "Colorado River Water Conservation District" means that entity created by Colorado Revised Statutes 1953, 149-8, as amended.
   (f) "Southwestern Water Conservation District" means that entity created by Colorado Revised Statutes 1953, 149-9, as amended.
   (g) "Ruedi Reservoir" means the reservoir presently planned for construction on the Fryingpan River above the town of Basalt as part of the project.
   (h) "Ashcroft Reservoir" means not only the reservoir contemplated for construction on Castle Creek, a tributary of the Roaring Fork River, but also, unless the context

requires otherwise, any other reservoir that may be constructed in the Roaring Fork basin above the town of Aspen in lieu of that reservoir.

(i) "cfs" means cubic feet of water per second of time.

2. The Ruedi Reservoir shall be constructed and maintained on the Fryingpan River above the town of Basalt with an active capacity of not less than 100,000 AF. In addition thereto and in order to offset adverse streamflow conditions on the Roaring Fork River above the town of Aspen which might occur as a result of the project enlargement of the Twin Lakes Reservoir, the Ashcroft Reservoir on Castle Creek, or some reservoir in lieu thereof, shall be constructed on the Roaring Fork drainage above Aspen to a capacity of approximately 5,000 AF: Providing, However, That the Ashcroft Reservoir shall be constructed only if the Secretary of the Interior after appropriate study shall determine that its benefits exceed the costs: And providing further, That no part of the construction, operation, or maintenance of said Ashcroft Reservoir shall be chargeable to the Fryingpan-Arkansas project. All of such stored water shall be released under the conditions and limitations hereinafter set forth.

3. The receipts from the sale of water from Ruedi Reservoir, as permitted in paragraph 6(b) hereof, shall be applied solely to the operation and maintenance costs and to those reimbursable construction costs of said reservoir which exceed $7,600,000. The cost of perpetual operation and maintenance of the Ruedi Reservoir shall be borne by users of project water and users of water stored in Ruedi Reservoir in such proportion as may be determined by the Secretary of the Interior.

4. The inclusion of the Ruedi Reservoir in the project shall not preclude the construction of any other replacement or regulatory reservoirs on the Colorado River or its tributaries above Cameo gaging station.

5. The Ruedi Reservoir shall be completed and in operation before any water is diverted to eastern Colorado by means of the project.

6. (a) The replacement capacity of Ruedi Reservoir, and any reservoir constructed in addition thereto, is that portion of the total reservoir capacity required to permit project diversions at times when such diversions could not otherwise be made because of simultaneous demands of senior diversions in western Colorado existing at the time of the adoption of these operating principles, and shall be so operated to accomplish this purpose. Water stored in such capacity shall be released by the United States, upon the request of the Colorado State engineer, to the extent that water would have been available to said decreed rights except for stream depletion resulting from diversions by this project to the Arkansas Valley.

(b) The regulatory capacity of Ruedi Reservoir, and any reservoir constructed in addition thereto, is that portion of the total reservoir capacity not needed for replacement purposes. Water stored in such category may be sold or leased by the United States to water users in Colorado for any purpose recognized by the laws of

the United States: Provided, That the sale of water for use outside the natural basin of the Colorado River can only be made with the consent of the Colorado River Water Conservation District. Charges for the use of such water shall be established by the Secretary of the Interior by appropriate contract in accordance with the payment ability of such water users.

7. The primary purpose of Ruedi Reservoir, and any reservoir constructed in addition thereto, is to furnish, to the extent of its capacity, in like manner as if the project were constructed by a water conservancy district organized pursuant to the laws of the State of Colorado, the water required for the protection of western Colorado water users by the provisions of Colorado Revised Statutes 1953, 149-6-13, reading as follows:

However, any works or facilities planned and designed for the exportation of water from the natural basin of the Colorado River and its tributaries in Colorado, by any district created under this article, shall be subject to the provisions of the Colorado River Compact and the Boulder Canyon Project Act. Any such works or facilities shall be designed, constructed and operated in such a manner that the present appropriations of water, and in addition thereto prospective uses of water for irrigation and other beneficial consumptive use purposes, including consumptive uses for domestic, mining, and industrial purposes, within the natural basin of the Colorado River in the State of Colorado, from which water is exported, will not be impaired nor increased in cost at the expense of the water users within the natural basin. The facilities and other means for the accomplishment of said purpose shall be incorporated in, and made a part of any project plans for the exportation of water from said natural basin in Colorado.

8. Project diversions from Lime Creek shall be made only in the months of May and June of each year, unless the Colorado River Water Conservation District shall, by written communication, advise the Colorado State engineer that additional diversions can be made.

9. The respective decrees which may be or have been awarded to the parties hereto as a part of the Fryingpan-Arkansas project and Basalt project shall be administered by the proper officials of the State of Colorado, in accordance with the applicable laws of the State of Colorado, and with the following principles and procedures, to wit:

(1) That the demand on the waters available under such decrees shall be allocated in the following sequence:

(a) For diversion to the Arkansas Valley through the collection system and the facilities of the Fryingpan-Arkansas project in an amount not exceeding an aggregate of 120,000 AF of water in any year, but not to exceed a total aggregate of 2,352,800 AF in any period of 34 consecutive years reckoned in continuing progressive series starting with the first full year of diversions, both limitations herein being exclusive of Roaring Fork exchanges as provided in (c) below, and exclusive of diversions for the Busk-Ivanhoe decree; and with the further and absolute limitation that in order to protect existing and future beneficial uses of water in Western Colorado, including recreational and fishing values, the State engineer shall so regulate the

transmountain diversions above referred to, to the end that no diversions shall be made which will reduce the remaining aggregate streamflows to less than either of the following minimum standards:

(i) The Fryingpan collection system at the points of diversion collectively, exclusive of Lime Creek: 15 cfs October 1 through March 31; 30 cfs April 1 through September 30.

(ii) Near Norrie (immediately below the junction of North Fork and Fryingpan River): 30 cfs October 1 through March 31; 100 cfs April 1 through April 30; 150 cfs May 1 through May 31; 200 cfs June 1 through June 30; 100 cfs July 1 through July 31; 75 cfs August 1 through August 31; 65 cfs September 1 through September 30.

In maintaining the above minimum standards, the project diversions shall be regulated, so far as is practicable, in such a manner that the North Fork of the Fryingpan River, the Fryingpan River, and each of the tributaries of those streams, shall contribute to the residual streamflows required by those minimum standards quantities of water in proportion to their natural contributions.

(b) For storage in Ruedi Reservoir to the extent of its actual capacity, which is to be not less than 100,000 AF.

(c) For 3,000 AF annually, to the extent that it is available in excess of (a) and (b) above, or such part thereof as may be required, to be delivered to the Twin Lakes Reservoir and Canal Company in exchange for equivalent releases from the headwaters of the Roaring Fork River which would otherwise be diverted through such Twin Lakes Reservoir and Canal Company collection and diversion system.

(d) For any other beneficial use in western Colorado in accordance with court decree, but not herein contemplated.

(2) The effectuation of the above principles requires concurrent Fryingpan-Arkansas project diversion and Ruedi Reservoir storage to be accomplished in the manner following: The State engineer annually shall collect pertinent data, including information pertaining to snowpack and all other available evidence, and shall thereafter so divide and apportion the surface runoff as to achieve, as nearly as possible, the foregoing division of water and the maximum of concurrent diversions and storage. The diversions herein contemplated shall be on the basis of a water year hereby defined as that interim of October 1 through the following September 30.

10. For the protection of recreational values, including fishing, on the Fryingpan River below Ruedi Reservoir, releases of water from said reservoir, not to exceed the stream inflow, shall be made so that the streamflow immediately below the junction of the Fryingpan River and Rocky Fork shall not be reduced below 39 cfs from November 1 to April 30, and 110 cfs from May 1 to October 30, or as actual experience or court decree hereafter dictate.

11. An appropriate written contract may be made whereby Twin Lakes Reservoir and Canal Company shall refrain from diverting water whenever the natural flow of the Roaring Fork River and its tributaries shall be only sufficient to maintain a flow equal to or less than that required to maintain the recommended average flows in the Roaring Fork River immediately above its confluence with Difficult Creek in a quantity proportionate to the respective natural flow of the Roaring Fork River. The recommended average flows above mentioned are flows in quantities equal to those recommended as a minimum immediately above its confluence with Difficult Creek according to the following schedule submitted by the United States Fish and Wildlife Service and the Colorado Game and Fish Commission:

Month	Average Second-feet	AF (thousands)	Month	Average Second-feet	AF (thousands)
October	44	2.7	May	100	6.2
November	35	2.1	June	120	7.1
December	29	1.8	July	100	6.2
January	26	1.6	August	63	3.9
February	25	1.4	September	44	2.6
March	24	1.5			
April	64	3.8	Total	----	40.9

In maintaining the above averages, at no time shall the flow be reduced below 15 cfs during the months of August to April, inclusive, or below 60 cfs during the months of May to July, inclusive, providing the natural flow during said period is not less than these amounts. The obligation to supply the minimum streamflow as set forth in the above table on the Roaring Fork River shall, to the extent of 3,000 AF annually, be a project obligation to be supplied from any waters diverted from the south tributaries of Hunter Creek, Lime Creek, Last Chance Creek, or any of them.

The Twin Lakes Reservoir and Canal Company shall not be required to refrain from diverting water under its existing decrees from the Roaring Fork River except to the extent that a like quantity of replacement water is furnished to said company without charge therefore through and by means of project diversions and storage.

If by reason of storage capacity in the Ruedi Reservoir, or any reservoir constructed in addition thereto, the Twin Lakes Reservoir and Canal Company derives additional water or other benefits or advantages it would not have realized had this project not been constructed, then nothing herein contained shall prevent the project from making appropriate charges for such water or other benefits or advantages. All revenues derived from the use of water stored in Ashcroft Reservoir shall be used to assist in the repayment of the construction, operation, and maintenance costs of that reservoir, or any reservoir constructed in lieu thereof, as may be determined by the Secretary of the Interior.

12. All lands acquired and held for project construction and operation and water surfaces of project reservoirs will be open to the public for recreational purposes, excepting those areas reserved by the operating agency.

13. The project will be operated in such a manner that those in eastern Colorado using project water imported from the Colorado River Basin for domestic purposes shall have preference over those claiming or using water for any other purpose.

14. The project is to be operated in such a manner as to secure the greatest benefit from the use and reuse of imported project waters within project boundaries in the State of Colorado

15. Any and all benefits and rights of western Colorado water users in and to water stored in Green Mountain Reservoir, as described and defined in Senate Document 80, seventy-fifth Congress, first session, shall not be impaired or diminished by this project.

16. The project, its operation, maintenance, and use shall be subject to the provisions of the Upper Colorado River Basin Compact of October 11, 1948 (Public Law 37, eighty-first Congress, first session), and the Colorado River Compact of November 24, 1922 (House Document 605, sixty-seventh Congress, fourth session).

17. The Colorado River Water Conservation District of the State of Colorado shall acquire title to storage of water in Ruedi Reservoir and any reservoir constructed in addition thereto, by appropriate proceedings in the courts of the State of Colorado. The Southeastern Colorado Water Conservancy District of the State of Colorado shall likewise acquire title to the water required by the project for diversion to the Arkansas Valley. The Secretary of the Interior shall at any time after the authorization of the project have the option to obtain or require the transfer to the United States of any and all rights initiated or acquired by appropriation as herein set forth: Provided, however, That the rights so taken shall be subject to a beneficial use of such water as may be provided in the repayment contract or contracts, and subject to all the operating principles herein set forth.

18. No transmountain diversion of water shall ever be made through the collection and diversion system of the Fryingpan-Arkansas Project in excess of the quantitative limitations and conditions established by this document: Provided, however, That when under the laws of the State of Colorado, there may be additional water available for such

collection and diversion which is not at the time of diversion required for beneficial use in western Colorado or for filling interstate water compact agreements, then such water may be collected and diverted for beneficial use in the Arkansas Valley: Provided further, That such additional diversion shall only be made with the mutual consent of each of the following agencies of the State of Colorado, to wit: the Colorado Water Conservation Board, the Southwestern Water Conservation District, the Colorado River Water Conservation District, and the Southeastern Colorado Water Conservancy District.

19. To assure project operation in conformity with the operating principle heretofore stated, to provide a means for the collection and interchange of information, and to provide a method for the continued study of project operations to the end that, if the stated operating principles may be improved upon, recommendations for changes may be made to the contracting parties, a commission shall be created in an appropriate manner to be composed of one representative of the Southeastern Colorado Water Conservancy District, one representative of the Colorado River Water Conservation District, two representatives of the United States, and one representative of the State of Colorado appointed by the Colorado Water Conservation Board after consultation with the Colorado Game and Fish Commission. The powers of such commission shall be limited to the collection of data, the making of findings of fact, and the suggestion of changes in operating principles.

These operating principles shall be deemed to have amended and take the place of those operating principles signed and executed on April 30, 1959. These operating principles shall be and do constitute a contract between the signatory parties, and shall inure to the benefit of and shall be and remain binding upon said parties, their respective successors and assigns.

Executed as amended at Denver, Colorado, December 9, 1960.

COLORADO WATER CONSERVATION BOARD

Steve McNichols, Chairman;

Governor, State of Colorado

Attest:

Felix L. Sparks,

Director and Secretary

SOUTHEASTERN COLORADO WATER CONSERVANCY DISTRICT

By J. Selby Young, President

Attest:

J. G. Shoun,

Secretary

COLORADO RIVER WATER CONSERVATION DISTRICT

By A. Allen Brown, President

Attest:

Philip P. Smith,

Secretary

SOUTHWESTERN WATER CONSERVATION DISTRICT

By Ira E. Kelly, President

Attest:

Archie B. Toner,

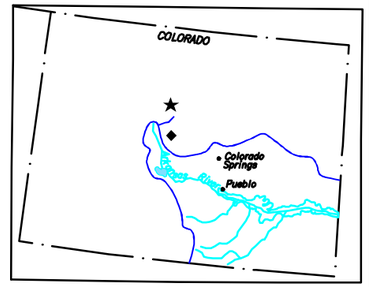
Secretary

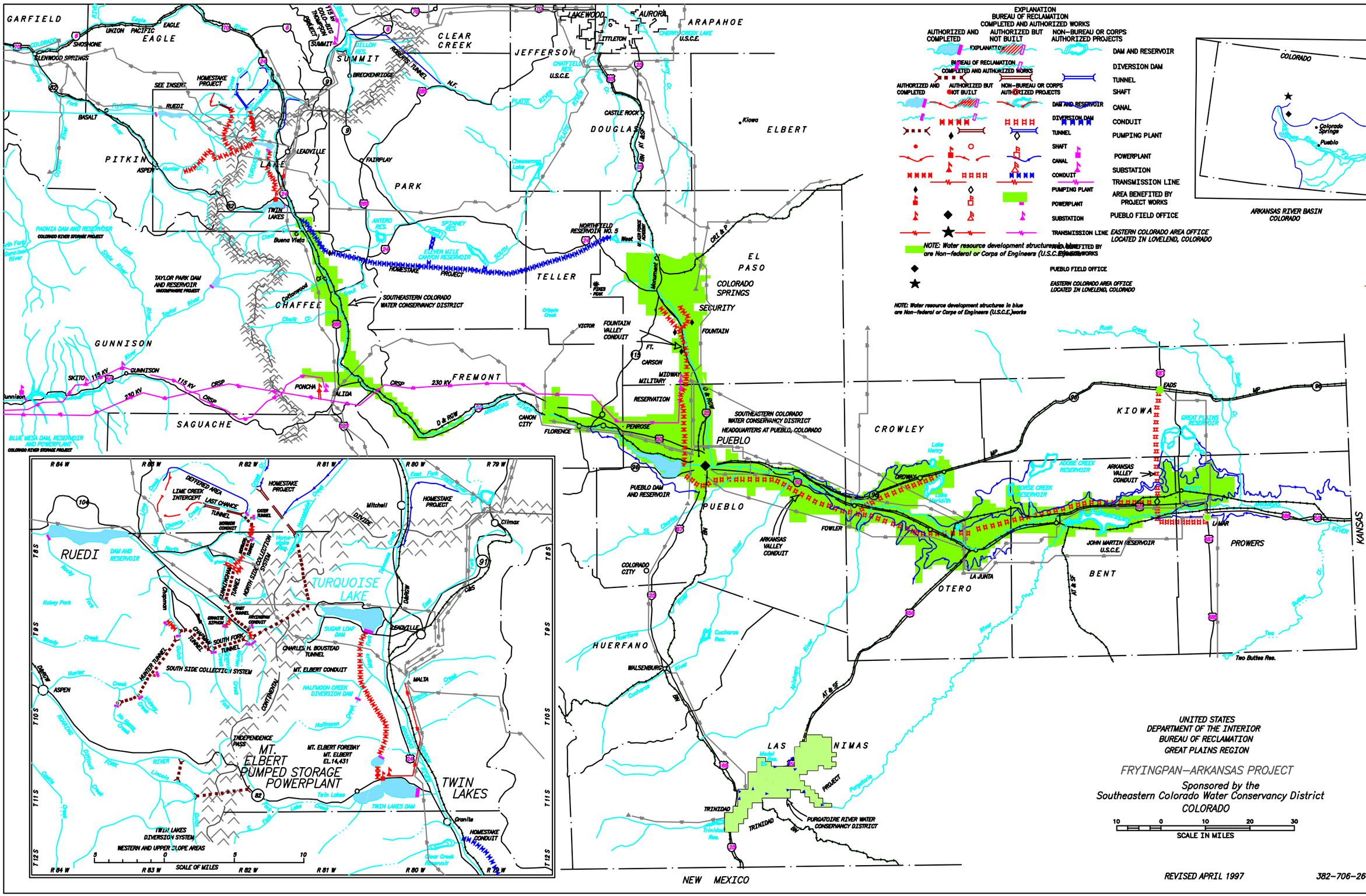
EXPLANATION
BUREAU OF RECLAMATION
COMPLETED AND AUTHORIZED WORKS

AUTHORIZED AND COMPLETED | AUTHORIZED BUT NOT BUILT | NON-BUREAU OR CORPS AUTHORIZED PROJECTS

- DAM AND RESERVOIR
- DIVERSION DAM
- TUNNEL
- SHAFT
- CANAL
- CONDUIT
- PUMPING PLANT
- POWERPLANT
- SUBSTATION
- TRANSMISSION LINE
- AREA BENEFITED BY PROJECT WORKS
- PUEBLO FIELD OFFICE
- EASTERN COLORADO AREA OFFICE LOCATED IN LOVELAND, COLORADO

NOTE: Water resource development structures in blue are Non-federal or Corps of Engineers (U.S.C.E.)works





UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
GREAT PLAINS REGION

FRYINGPAN-ARKANSAS PROJECT

Sponsored by the
Southeastern Colorado Water Conservancy District
COLORADO

10 0 10 20 30
SCALE IN MILES

REVISED APRIL 1997

382-706-2648