BUREAU OF RECLAMATION

Fryingpan-Arkansas Project

Water Year 2019
Annual Operating Plans

Pueblo Dam

U.S. Department of the Interior

28 February 2020

Contents

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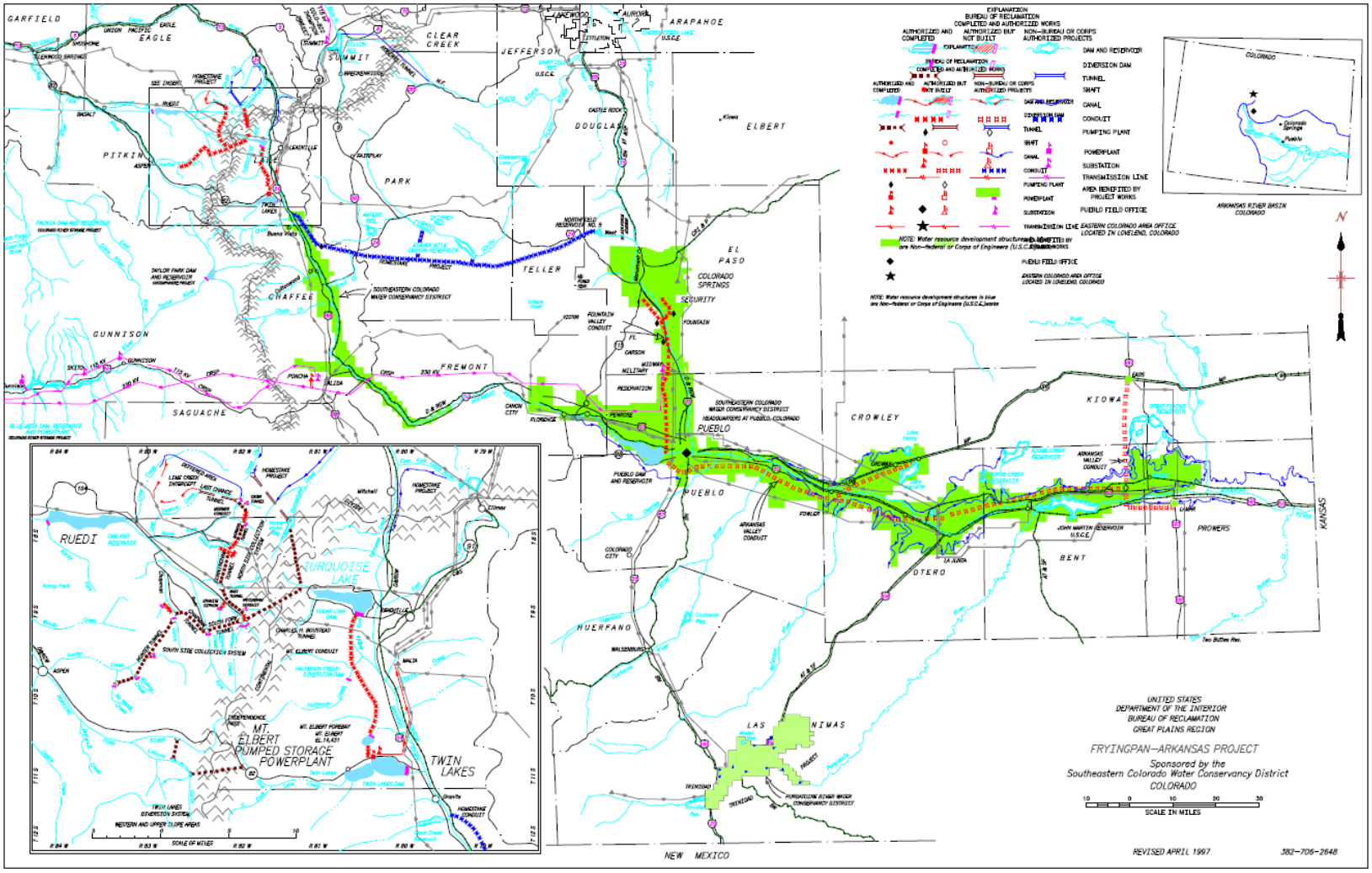
Map of Fryingpan-Arkansas Project



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 from Chapman, South Fork, and Fryingpan diversion sites.
June 7, 1972	Initial diversion from Sawyer Creek.
July 1972	Construction began on Pueblo Dam - second contract.
July 1972	First sale of Project trans-mountain water.
January 9, 1974	Began storing water in Pueblo Reservoir.
May 6, 1974	Initial diversion from Lily Pad Creek.
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.

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	All Project space filled with Project water. Imports curtailed.
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	Pueblo 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.
April 28, 2016	Southern Delivery System began water deliveries.
August 10, 2016	Lease of Power Privilege signed with SECWCD for the construction, operation, maintenance and replacement associated with hydropower at Pueblo Dam.
October 1, 2016	If and When Master Contract in effect.
May 14, 2019	Southeastern Colorado Conservancy District's James W. Broderick Hydropower Plant begins production of electricity at Pueblo Dam.

Annual Operating Plan Fryingpan-Arkansas Project Water Year 2019 Operation

General

This is the 51st 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 (87th Congress, 1st Session), and are included in Appendix E Appendix E.

This annual operating plan is a summary of the actual project operation in Water Year (WY) 2019 (October 1, 2018 through September 30, 2019). All tables can be found in Appendix A and all exhibits can be found in Appendix B.

Project Features in Operation during Water Year 2019

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 acre-feet 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 acre-feet 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 acre-foot 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 (WAPA), 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 acre-feet at a maximum water surface elevation of 9,200 feet. Water surface elevations are measured with respect to mean sea level. The morning glory spillway is slightly tilted which reduces the active storage space by 498 acre-feet. During construction, the dead pool (the elevation below which water cannot physically be released) was determined to be 9,157.5 feet (54,955 acre-feet). In the 1980's, a 24" bypass line used during construction was grouted. At that time, the dead pool was increased to 9,162.8 feet (63,324 acre-feet). The inactive pool has remained at the same elevation of 9,168.7 feet (72,939 acre-feet) so there has not been a change in operations.

The 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 acre-feet at a water surface elevation of 4,898.7 feet. The upper 26,990 acre-feet of storage space are reserved exclusively for flood control at all times, while an additional 66,011 acre-feet 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.

Non-project water may be stored in the 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 next water year.

Most water deliveries are made from the 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 (SDS) in the north outlet works delivers water to the Fountain Valley Authority and Pueblo West. 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.

Southeastern Colorado Water Conservancy District (SECWCD) signed a Lease of Power Privilege contract with the Bureau to construct, operate, maintain and replace the James W. Broderick Hydroelectric Power Plant below Pueblo Dam. The design uses an existing hydropower bifurcation at the North Outlet Works Southern Delivery System connection. Initial construction began in 2017 and power production began in 2019.

Hydrologic Conditions and Weather Events in Water Year 2019

Precipitation over the Fryingpan watershed above Ruedi Reservoir was above average for almost every month of WY2019. Cumulative precipitation started out the year slightly above average in October and continued that way until the end of February. Then in March the basin saw significant gains in precipitation. March received 6.3 inches of precipitation which was over three times the average value for the month. In April, precipitation accumulation returned to average and then in May to early June

precipitation returned to above average accumulation rates. From May through mid-June precipitation was about 1.5 inches above average accumulation for the period. Then from July until September precipitation tapered off slightly and the total precipitation for the year finished out at 115% of average at the end of September.

Snowpack in the watershed above Ruedi followed precipitation, in that, it remained above average for the entire snow accumulation season. Snow accumulation began above average in October but melted slightly in early November before returning to above average accumulation. The following group of SNOTEL sites were used to forecast undepleted inflow to Ruedi: Fremont Pass, Ivanhoe, Nast Lake, and Kiln. The SNOTEL sites were at 168% of average by the end of November. Snow accumulation remained in the 120% of average range from December through February and climbed to 148% of average in March. The snowpack in the basin persisted longer in WY2019 than previous years due to a cooler and wetter May and June. On average, all the SNOTEL sites in the forecast group melted out 8 days later than the normal melt out date.

The average monthly temperatures measured at the group of SNOTEL sites in the upper Fryingpan River basin were above average for over half of the months in WY2019. The average temperature in October was closest to average and only about half a degree above average. May was the farthest below average month with an average monthly temperature of 2.9 degrees Fahrenheit below average. November and June were also cooler than average with temperature deviations of 2.7 and 1.4 degree below average. August and September were well above average having deviations of 3.3 and 4.4 degrees above average. The seasons of the year averaged the following temperature deviations from average: autumn -1, winter 0.6, spring 0.4, and summer 1.1 degrees above average. Overall, the year averaged 0.7 degrees above average.

The combined Snow Water Equivalents (SWE) compared to average is shown in Exhibit 1.

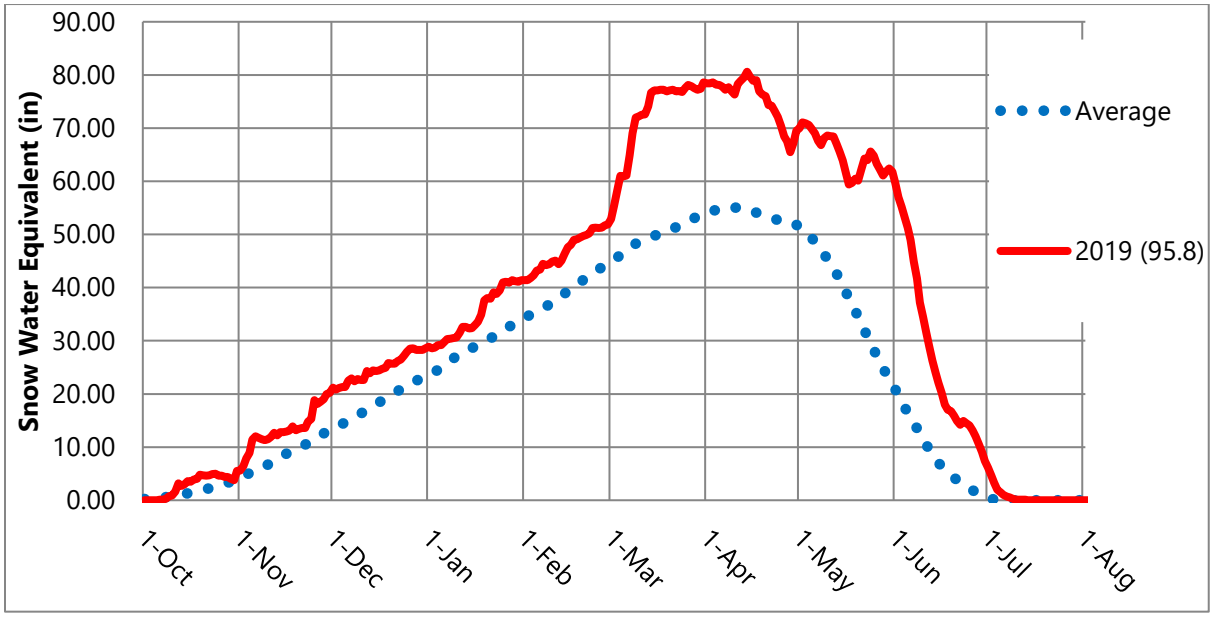


Exhibit 1: Combined Snow Water Equivalent of Fremont Pass, Independence Pass, Ivanhoe Lake and Nast SNOTEL sites.

Import forecasts were made using the VIPER software package developed for the FryArk Project by the National Weather Service. The forecasts for 2019 were: February 70,320 AF; March 67,900 AF; April 91,540 AF; May 84,000 AF. The total water through the Boustead Tunnel was 97,118 AF. Total imports in WY 2019 were 95,772 AF.

The collection system began diverting April 19. Flows above seepage began on April 24 and runoff began May 5 although below average temperature kept runoff low until June 1. See Exhibit 6.

The flows through Boustead Tunnel can only be stored when the flow at the Fryingpan River near Thomasville gage is above a minimum flow. When flows are below the minimum, any imports from seepage are considered developed water and treated as native. Water is diverted from the collection system to the Fryingpan to keep the flow above minimum. See Exhibit 5 for flows at the Thomasville gage.

Report on Operations during Water Year 2019

A. Ruedi Reservoir

Ruedi Reservoir started out WY2019 with a storage content of 64,125 acre-feet, which was 73% of average. Over the winter months Ruedi Reservoir was drafted down to its lowest storage content for the year of 55,822 acre-feet on March 28th. In Mid-October the release from Ruedi was decreased to the winter flow target of 40 cfs and was held at this rate until January when it was increased to 60 cfs for a few months. This increase in flow was because the Colorado Water Conservation Board (CWCB) leased water to be released during the coldest months of the winter to alleviate anchor ice in the lower Frying Pan River. All releases during the winter months were made through the city of Aspen's hydroelectric powerplant. See Table 1 and Exhibit 4 for a summary of Ruedi operations.
On April 17th, the annual conference call took place as required under stipulation 1.7.b of Case Numbers 02CW324 & 02CW365 between the following parties: Reclamation, SECWCD, Colorado Division of Water Resources (CODWR) Division 5, and the Colorado River District. A consensus was reached which allowed Reclamation to divert an additional 45 cfs through the Boustead Tunnel. The total water conveyance through Boustead Tunnel is not to exceed 945 cfs in accordance with Stipulation 5 of the above-mentioned case numbers. The representatives for the parties were the following; Reclamation: Tim Miller and Terry Dawson, Southeastern: Garrett Markus, Division 5: Edward Rubin, Colorado River District: Don Meyer.

Runoff continued to increase in early May and releases from the reservoir were increased from 120 cfs to 175 cfs. The most probable forecast of undepleted inflow predicted 161,000 af or 124% of average over the May to July period. This forecast still indicated that the reservoir would fill under all three modeling scenarios and it also suggested that there would be enough water to make Coordinated Reservoir Operations (CROS) releases for the 15-Mile reach of the Colorado River.

Depleted inflows to Ruedi Reservoir during the runoff season were above average for almost every month of WY 2019 except May, when temperatures dipped below average and slowed the snow melt rate. The total depleted inflow volume for the April through July runoff period was 112,155 acre-feet which was 125% of average and was the 9th largest runoff for the period of record starting in 1975.

Reservoir storage reached a maximum physical content of 101,785 acre-feet on August 5th. This storage content was 99% of the total capacity of the reservoir.

Ruedi Reservoir was in priority and allowed to store all inflow from the first of the water year through September 24th, and also at the end of the year from October 16th through October 31st. Outside this period, Ruedi was required to pass all inflow, make contract releases, and provide replacement releases to the Colorado River. Ruedi Reservoir released 4 acre-feet of water for out-of-priority diversions and 4,251 acre-feet for regular contracts. Included in the total regular contract water released were releases made to the Fryingpan River for anchor ice prevention. The Colorado Water Conservation Board (CWCB) leased 3,500 acre-feet of water from the Colorado River Districts accounts in Ruedi and allowed the Roaring Fork River Conservancy to manage the release during the coldest winter months to prevent anchor ice formation. A total of 3,201 acre-feet was released between January 1st and March 7th for this purpose. In addition, the Colorado Water Trust (CWT) leased 327 acre-feet from the Colorado River District. This water was released between September 4th and September 10th for the Grand Valley Powerplant located above the 15-Mile reach of the Colorado River. This non-consumptive water used by the powerplant also provided additional flow in the 15-Mile Reach of the Colorado River for endangered fish recovery purposes. See Table 2 for a summary of releases for contracts.

Ruedi Reservoir participated in CROS for WY2019 and released 6,360 acre-feet from June 16th through June 26th. Then beginning on August 19th, contracted water was released to support fish recovery efforts in the 15-Mile reach of the Colorado River. Both CROS and these later season contract releases are designed to enhance habitat for endangered fish in the Colorado River. A total of 20,399 acre-feet was released between August 19th and October 15th in 2019. This total includes 5,000 acre-feet from the firm endangered fish pool, 5,412.5 acre-feet from the mitigation water pool, 5000 acre-feet from 4-out-of-5 fish pool, 4,687 acre-feet of Ute rental water, and 299 acre-feet from the water leased for anchor ice prevention. See Table 3 for a summary of releases for endangered fish.

Ruedi ended the water year at a water surface elevation of 7,740.80 feet which equates to 79,188 acre-feet of storage. This storage content was 95% of average for October 31st.

Monthly precipitation data and evaporation data for Ruedi can be found in Exhibit 2 and Exhibit 3 respectively.

B. West Slope Collection System and Project Diversions

The most probable forecasts for the first of February, March, April, and May were 70,320 acre-feet, 67,900 acre-feet, 91,540 acre-feet, and 84,000 acre-feet, respectively. A total of 97,118 acre-feet of the water diverted through the Boustead Tunnel and 95,722 acre-feet of water was stored during the WY2019, which is 180% of average for the period from WY1972 to WY2019 and 114%of the May 2019 forecast.

The import of project water from the west slope collection system through the Boustead Tunnel began on May 5. The water conveyed reached a maximum mean daily import of 948 cfs on July 3. The diversion system was shut down in late August. Boustead Tunnel seepage was recorded whenever the Fry-Ark Project when minimum flows were met at the FRYTHCO (Fryingpan River at Thomasville)

gage. Busk-Ivanhoe water was not conveyed through the Boustead Tunnel. The daily discharge record for the diversion structures is included as Appendix D. An aggregated discharge record is shown on Table 4. The 48 years of accumulated imports total 2,555,000 acre-feet, for an unimpeded average of 55,217 acre-feet per year, shown on Table 5. A plot of the Boustead Tunnel imports during WY2019 is shown on Exhibit 6.

Ruedi Reservoir was forecast to fill this year. In accordance with stipulations in Cases 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.

C. 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). The extremely wet year kept TLCC in priority on the east slope for most of the year and the Shoshone Call on the Colorado River kept it out of priority on the west slope for most of the rest of the year. There were 3 days in September when the exchange was able to occur. The total amount of the TLCC exchange was 62 acre-feet with a net credit to TLCC of 61 acre-feet. The operating criteria and the monthly summary of the exchange are shown in Appendix C.

D. Turquoise Lake

On September 30, 2018, there was 99,960 acre-feet of water (elevation 9852.33 feet) stored in Turquoise Lake, 92% of average. The high point for storage was 124,456 acre-feet of water (elevation 9866.62 feet) on August 29. Releases made down Lake Fork Creek and to Twin Lakes drafted Turquoise Lake to 42,816 acre-feet (9812.84 feet), the lowest storage of the water year, on May 29. At the end of the water year on 30 September 2019 Turquoise Lake contained 123,167 acre-feet (9865.89 feet) which is 114% of average. Exhibit 9 and Exhibit 10 show the precipitation and pan evaporation at Turquoise Lake. Table 6 and Exhibit 11 depict the monthly operation of Turquoise Lake during WY2019.

There was 33,966 acre-feet imported through Homestake Tunnel to the account in Turquoise Reservoir.

Busk-Ivanhoe imports through the Carlton Tunnel totaled 4,219 acre-feet. Pueblo Water received 2.379 acre-feet and the City of Aurora received 1,749 acre-feet.

Project water imports through the Boustead Tunnel totaled 95,722 acre-feet.

Exhibit 6, Exhibit 7, and Exhibit 8 show the monthly imports through the Boustead, Homestake, and Busk- Ivanhoe Tunnels, respectively.

E. Mt. Elbert Conduit/Halfmoon Creek Diversion

Between October 1 and May 20, 45,978 acre-feet of water was released from Turquoise Lake through the Sugarloaf Powerplant. On May 10, the Sugarloaf Powerplant was taken offline to make repairs. Repairs were tested and failed on May 18. The high snowpack meant water that needed to be released from Turquoise. Since the normal release through the Sugarloaf Powerplant was not possible, existing sleeve valves out of Sugarloaf Dam were used. The valves are not gaged or rated. In order to determine the amount of water being passed through the sleeve valves, the conduit was filled to capacity which amounted to 400 cubic feet per second (cfs). There is a constant release from Turquoise Dam of around 15 cfs that bypasses the Sugarloaf Powerplant through the existing sleeve values and rejoins the Mt. Elbert release before entering the conduit so the remaining 385 cfs came from the sleeve valves. Repairs were attempted again between May 29 and June 2. After the second failure, repairs were put off until after runoff and the sleeve valves were used. There was 23,606 acre-feet released through the sleeve valves between May 18 and September 30. There was 14,948 acre-feet of water bypassed around the powerplant. There was 4,735 acre-feet of water diverted from Halfmoon Creek and conveyed through the Mt. Elbert Conduit to the Mt. Elbert Forebay, and subsequently to Twin Lakes through the Mt. Elbert Power Plant. An additional 3,909 acre-feet 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 12.

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

On September 30, 2018, Twin Lakes had 97,407 acre-feet of water stored (elevation 9181.74 feet) and Mt. Elbert Forebay had 8,638 acre-feet in storage (elevation 9636.28 feet). The Twin Lakes/Mt. Elbert Forebay combined water storage reached a low point of 86,791 acre-feet on June 2 and was at its high point of 140,536 on July 12. The storage in Twin Lakes was 125,622 acre-feet and in Mt. Elbert Forebay was 8,469 acre-feet of water (Twin Lakes elevation 9194.23 feet and Mt. Elbert Forebay elevation 9635.62 feet) on 30 September 2019, which was 109% of average.

Twin Lakes releases to Lake Creek were made throughout the winter 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 3,428 acre-feet was stored in the Twin Lakes Canal Company (TLCC) storage space from 15 November through 15 March as winter water storage. A total of 56,852 acre-feet of project water was released to Lake Creek during this time.

Exhibit 13 and Exhibit 14 show the precipitation and pan evaporation at Twin Lakes. Table 7 and Exhibit 15 depict the monthly operation of Twin Lakes during WY2019.

A total of 10,000 acre-feet of Fry-Ark Project water was made available at the beginning of the season to the Upper Arkansas Voluntary Flow Management Program (VFMP) to augment flows at the gage Arkansas River at Wellsville. No VFMP water was called for this year. While the Bureau of Reclamation is not a party to the 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 1 July to 15 August if the flow at Wellsville is below 700 cfs. This year, flows were maintained well under 700 cfs to allow rafting to continue throughout the entire time frame. The flows may be ramped down to prevent streambank erosion after August 15.

A total of 235,516 megawatt hours of energy was generated at the power plant, with 655,200 acre-feet of water; 125,000 acre-feet came through the Mt. Elbert Conduit; and 530,200 acre-feet 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 WY2019.

G. Pueblo Reservoir

The water storage content of Pueblo Reservoir was 189,469 acre-feet (elevation 4866.53 feet) on September 30, 2018. The reservoir reached a high point in storage of 244,219 acre-feet (elevation 4880.12 feet) on July 2 and a low point on October 29 of 185,809 (elevation 4865.53). At the end of the water year on 30 September 2019 there was 194,289 acre-feet, an elevation 4867.83 feet, which is 123% of average.

A total of 41,801 acre-feet of native inflow was stored in the reservoir under the Pueblo Reservoir winter water storage program between November 15, 2018 and March 14, 2019. This program allows agricultural entities to store native flows during the winter to be used during irrigation season. On March 15, it was distributed to agricultural entities.

Table 9 and Exhibit 19 depict Pueblo Reservoir monthly operations during the 2019 Water Year. The 2018-2019 winter water releases are shown on Exhibit 17. The precipitation and evaporation at the reservoir are shown on Exhibit 16 and Exhibit 18. Project water releases are shown on Exhibit 20.

H. Storage Contracts

There were four long term storage contracts for a total of 57,416 acre-feet of non-project storage in Turquoise Lake, one for 54,452 acre-feet in Twin Lakes and eight for 55,061.5 acre-feet in Pueblo Reservoir.

There were five short-term if-and-when contracts totaling 4,290 acre-feet for 1-year contracts in Pueblo Reservoir. Sixteen contracts totaling 6,565 acre-feet under the Master Contract were used for “if-and-when” storage. Under "if-and-when" contracts, non-project water may be stored in project storage space if that storage space is not required for project water.

I. Project Water Sales and Deliveries

There were 42,588 acre-feet of Fryingpan-Arkansas Project water made available to the Southeastern Colorado Water Conservancy District (SECWCD) during WY2019 for allocation based on an expected import of 84,000 acre-feet. SECWCD allocates less than the forecast project yield in May. Municipal and industrial accounts received a total of 14,332 acre-feet and agricultural accounts received 28,256 acre-feet. After it was determined the import forecast would be met, SECWCD

released an additional 20,412 for allocation to agricultural entities. Entities called for 34,531 acre-feet of project water and 3,281 acre-feet of project carryover water during the year.

Evaporation reduced the project carryover water in storage by 8,832 acre-feet. By the end of the water year (30 September 2019), the District had 29,518 acre-feet of 2019 allocated water and 118,629 acre-feet of carryover water remaining in storage. The monthly release of project water from Pueblo Reservoir is shown on Exhibit 20.

J. Reservoir Storage Allocation Data

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

K. Reservoir Evaporation and Precipitation

Table 12 and Table 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.

L. Flood Control Benefits

The Army Corps of Engineers estimated that the operations at Ruedi Reservoir during WY2019 did not prevent flood damages.

The Army Corps of Engineers estimated that the operations at Pueblo Reservoir prevented $189,000 during WY2019.

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

Appendix A: Tables

Table 1: Ruedi Reservoir Operations WY2019 Fryingpan-Arkansas Project (Units = 1,000 AF).

Month	Inflow	Evaporation	Outflow	End of Month Content	Water Surface Elevation (feet)
OCT 18	2.80	0.10	6.50	60.80	7,717.20
NOV 18	2.20	0.00	2.40	60.60	7,716.94
DEC 18	2.00	0.00	2.60	60.00	7,716.10
JAN 19	2.00	0.00	3.80	58.20	7,713.46

FEB 19	1.70	0.00	3.40	56.50	7,710.98
MAR 19	2.20	0.00	2.80	55.90	7,710.07
APR 19	10.00	0.00	6.00	59.80	7,715.81
MAY 19	19.40	0.20	13.10	66.00	7,724.31
JUN 19	53.20	0.50	25.10	93.60	7,756.95
JUL 19	30.50	0.60	21.90	101.50	7,765.17
AUG 19	9.70	0.40	12.20	98.60	7,762.16
SEP 19	4.90	0.20	19.20	84.00	7,746.43
Total* (acre-feet)	140,372	2,021	118,919		

*Rounding may introduce discrepancies between monthly and yearly totals

Table 2: Ruedi Reservoir Releases for Contracts WY 2019 (Units = AF).

Month	Round 1	Round 2 Non-fish	Round 2 Fish
OCT 18			
NOV 18			
DEC 18			
JAN 19		1,622	
FEB 19		1,391	
MAR 19		188	
APR 19			
MAY 19			
JUN 19			
JUL 19			
AUG 19			2,837
SEP 19	49	507	13,809
OCT 18	86	409	3,753
Total	**135**	**4,117**	**20,398**

Table 3: Ruedi Reservoir Releases for Endangered Fish WY2019.

FRYINGPAN-ARKANSAS PROJECT
RUEDI RESERVOIR
RELEASES FOR ENDANGERED FISH
WATER YEAR 2019
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)
MON	4/1/2019	7,710.08	55,863	53	-	49	3	52	N	39	-	-	1,785
TUE	4/2/2019	7,710.10	55,877	56	-	49	3	52	N	39	-	-	1,641
WED	4/3/2019	7,710.10	55,877	50	-	50	3	53	N	39	-	-	1,562
THU	4/4/2019	7,710.13	55,897	60	-	50	4	53	N	39	-	-	1,287
FRI	4/5/2019	7,710.17	55,924	63	-	49	4	54	N	39	-	-	1,467
SAT	4/6/2019	7,710.25	55,979	77	-	50	5	54	N	39	-	-	1,522
SUN	4/7/2019	7,710.37	56,061	91	-	50	5	55	N	39	-	-	1,430
MON	4/8/2019	7,710.55	56,184	112	-	50	6	55	N	39	-	-	1,425
TUE	4/9/2019	7,710.74	56,314	153	-	88	6	94	N	39	-	-	1,543
WED	4/10/2019	7,710.86	56,396	142	-	100	7	107	N	39	-	-	1,852
THU	4/11/2019	7,710.87	56,403	121	-	117	6	124	N	39	-	-	2,165
FRI	4/12/2019	7,710.81	56,362	100	-	121	6	127	N	39	-	-	1,750
SAT	4/13/2019	7,710.71	56,293	87	-	121	6	127	N	39	-	-	1,400
SUN	4/14/2019	7,710.59	56,211	80	-	121	6	127	N	39	-	-	1,081
MON	4/15/2019	7,710.48	56,136	83	-	121	6	127	N	39	-	-	973
TUE	4/16/2019	7,710.40	56,081	94	-	121	6	128	N	39	-	-	877
WED	4/17/2019	7,710.34	56,040	101	-	122	7	128	N	39	-	-	948
THU	4/18/2019	7,710.35	56,047	125	-	121	7	128	N	39	-	-	1,298
FRI	4/19/2019	7,710.44	56,109	152	-	121	7	128	N	39	-	-	1,569
SAT	4/20/2019	7,710.68	56,273	204	-	121	8	129	N	39	-	-	1,751
SUN	4/21/2019	7,710.96	56,464	218	-	122	8	129	N	39	-	-	2,290
MON	4/22/2019	7,711.18	56,615	198	-	121	8	130	N	39	-	-	2,691
TUE	4/23/2019	7,711.42	56,780	205	-	122	9	130	N	39	-	-	2,802
WED	4/24/2019	7,711.76	57,014	240	-	122	9	131	N	39	-	-	3,085
THU	4/25/2019	7,712.12	57,263	247	-	122	10	132	N	39	-	-	3,497
FRI	4/26/2019	7,712.67	57,643	314	-	122	10	132	N	39	-	-	3,941
SAT	4/27/2019	7,713.43	58,172	389	-	122	12	134	N	39	-	-	4,853
SUN	4/28/2019	7,713.52	58,234	154	-	122	14	136	N	39	-	-	6,172
MON	4/29/2019	7,715.05	59,306	663	-	122	17	139	N	39	-	-	6,543
TUE	4/30/2019	7,715.81	59,843	392	-	121	21	142	N	39	-	-	7,595
Averages		7,711.23	56,655	167	-	100	8	108		39	-	-	2,426
Totals (acft)				9,960	-	5,973	454	6,427		2,321	-	-	144,385

NOTES: Releases of water to support 15-Mile Reach target started 8/19 and ceased 10/15. A total of 20,399 acre-feet was released to support Recovery Program target flows.

FRYINGPAN-ARKANSAS PROJECT
RUEDI RESERVOIR
RELEASES FOR ENDANGERED FISH
WATER YEAR 2019
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)
WED	5/1/2019	7,716.40	60,261	335	3	121	21	142	N	110	-	-	7,351
THU	5/2/2019	7,716.76	60,517	271	3	139	21	160	N	110	-	-	6,298
FRI	5/3/2019	7,716.92	60,631	233	3	173	19	191	N	110	-	-	5,121
SAT	5/4/2019	7,717.09	60,753	237	3	173	17	190	N	110	-	-	4,507
SUN	5/5/2019	7,717.29	60,896	248	3	173	15	188	N	110	-	-	4,313
MON	5/6/2019	7,717.60	61,118	287	3	172	15	186	N	110	-	-	4,457
TUE	5/7/2019	7,717.94	61,361	298	3	172	15	186	N	110	-	-	4,795
WED	5/8/2019	7,718.38	61,678	336	3	173	15	187	N	110	-	-	5,282
THU	5/9/2019	7,718.76	61,952	316	3	175	15	189	N	110	-	-	5,542
FRI	5/10/2019	7,718.99	62,118	261	3	174	15	190	N	110	-	-	5,238
SAT	5/11/2019	7,719.16	62,241	239	3	174	15	189	N	110	-	-	4,683
SUN	5/12/2019	7,719.31	62,350	231	3	173	14	187	N	110	-	-	4,248
MON	5/13/2019	7,719.61	62,567	286	3	173	14	187	N	110	-	-	4,107
TUE	5/14/2019	7,720.06	62,895	343	3	175	13	188	N	110	-	-	4,485
WED	5/15/2019	7,720.63	63,311	389	3	176	14	190	N	110	-	-	5,313
THU	5/16/2019	7,721.40	63,875	465	3	177	16	193	N	110	-	-	6,506
FRI	5/17/2019	7,722.35	64,575	534	3	177	20	197	N	110	-	-	8,532
SAT	5/18/2019	7,723.05	65,094	442	3	177	24	201	N	110	-	-	8,904
SUN	5/19/2019	7,723.54	65,458	364	3	177	24	201	N	110	-	-	7,613
MON	5/20/2019	7,723.94	65,757	331	3	178	22	199	N	110	-	-	6,601
TUE	5/21/2019	7,724.22	65,966	321	3	213	19	232	N	110	-	-	6,300
WED	5/22/2019	7,724.39	66,093	293	3	225	18	243	N	110	-	-	6,218
THU	5/23/2019	7,724.42	66,116	283	3	269	16	285	N	110	-	-	5,870
FRI	5/24/2019	7,724.30	66,026	262	3	304	15	320	N	110	-	-	5,697
SAT	5/25/2019	7,724.24	65,981	291	3	311	15	325	N	110	-	-	5,375
SUN	5/26/2019	7,724.24	65,981	314	3	311	14	325	N	110	-	-	5,251
MON	5/27/2019	7,724.28	66,011	329	3	311	14	325	N	110	-	-	5,471
TUE	5/28/2019	7,724.33	66,048	334	3	312	15	327	N	110	-	-	5,684
WED	5/29/2019	7,724.36	66,071	326	3	311	16	327	N	110	-	-	5,803
THU	5/30/2019	7,724.34	66,056	307	3	311	16	327	N	110	-	-	5,704
FRI	5/31/2019	7,724.31	66,033	303	3	311	16	327	N	110	-	-	5,586
Averages		7,721.18	63,735	316	3	213	17	229		110	-	-	5,705
Totals (acft)				19,456	195	13,071	1,025	14,096		6,764	-	-	350,791

NOTES: Releases of water to support 15-Mile Reach target started 8/19 and ceased 10/15. A total of 20,399 acre-feet was released to support Recovery Program target flows.

FRYINGPAN-ARKANSAS PROJECT
RUEDI RESERVOIR
RELEASES FOR ENDANGERED FISH
WATER YEAR 2019
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)
SAT	6/1/2019	7,724.46	66,146	376	8	312	16	327	N	110	-	-	5,758
SUN	6/2/2019	7,724.86	66,446	471	8	312	17	329	N	110	-	-	6,787
MON	6/3/2019	7,725.30	66,777	488	8	313	22	335	N	110	-	-	8,202
TUE	6/4/2019	7,725.88	67,215	540	8	311	28	339	N	110	-	-	9,290
WED	6/5/2019	7,726.63	67,785	618	8	323	34	357	N	110	-	-	10,298
THU	6/6/2019	7,727.70	68,604	753	8	332	42	374	N	110	-	-	11,688
FRI	6/7/2019	7,729.03	69,632	897	8	371	49	420	N	110	-	-	13,875
SAT	6/8/2019	7,730.50	70,781	973	8	386	54	440	N	110	-	-	16,201
SUN	6/9/2019	7,732.41	72,293	1,154	8	383	62	445	N	110	-	-	17,840
MON	6/10/2019	7,733.77	73,383	909	9	351	59	410	N	110	-	-	17,141
TUE	6/11/2019	7,735.04	74,411	878	9	351	57	408	N	110	-	-	15,244
WED	6/12/2019	7,736.38	75,506	913	9	353	57	410	N	110	-	-	14,839
THU	6/13/2019	7,738.12	76,942	1,090	9	356	63	419	N	110	-	-	16,254
FRI	6/14/2019	7,740.31	78,775	1,293	9	361	69	429	N	110	-	-	18,407
SAT	6/15/2019	7,742.16	80,344	1,162	9	362	68	430	N	110	-	-	19,942
SUN	6/16/2019	7,743.60	81,580	1,056	9	423	68	492	N	110	-	-	19,325
MON	6/17/2019	7,744.90	82,706	1,062	9	485	69	553	N	110	-	-	18,606
TUE	6/18/2019	7,746.09	83,746	1,101	9	567	69	637	N	110	-	-	18,989
WED	6/19/2019	7,746.97	84,520	1,010	9	611	70	681	N	110	-	-	19,890
THU	6/20/2019	7,747.89	85,333	1,124	9	705	75	780	N	110	-	-	20,407
FRI	6/21/2019	7,748.84	86,178	1,144	9	709	75	783	N	110	-	-	20,826
SAT	6/22/2019	7,749.56	86,821	1,061	9	727	73	799	N	110	-	-	21,656
SUN	6/23/2019	7,749.78	87,018	760	10	651	65	716	N	110	-	-	19,231
MON	6/24/2019	7,749.96	87,180	614	10	523	58	581	N	110	-	-	16,141
TUE	6/25/2019	7,750.34	87,522	560	10	379	54	433	N	110	-	-	13,703
WED	6/26/2019	7,750.84	87,972	578	10	342	54	396	N	110	-	-	12,801
THU	6/27/2019	7,751.69	88,742	703	10	305	57	363	N	110	-	-	13,465
FRI	6/28/2019	7,753.07	90,001	951	10	306	64	371	N	110	-	-	15,239
SAT	6/29/2019	7,754.95	91,735	1,192	10	308	69	377	N	110	-	-	17,152
SUN	6/30/2019	7,756.95	93,603	1,262	10	310	73	383	N	110	-	-	18,799
Averages		7,740.60	79,323	890	9	418	56	474		110	-	-	15,600
Totals (acft)				52,947	533	24,845	3,355	28,200		6,546	-	-	928,264

NOTES: Releases of water to support 15-Mile Reach target started 8/19 and ceased 10/15. A total of 20,399 acre-feet was released to support Recovery Program target flows.

FRYINGPAN-ARKANSAS PROJECT
RUEDI RESERVOIR
RELEASES FOR ENDANGERED FISH
WATER YEAR 2019
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)
MON	7/1/2019	7,759.21	95,745	1,514	9	426	83	508	N	110	-	-	19,982
TUE	7/2/2019	7,760.44	96,924	1,295	9	691	78	769	N	110	-	-	21,764
WED	7/3/2019	7,761.31	97,764	1,278	9	845	75	920	N	110	-	-	20,788
THU	7/4/2019	7,761.77	98,210	1,089	9	855	70	925	N	110	-	-	19,523
FRI	7/5/2019	7,761.96	98,394	823	9	721	64	785	N	110	-	-	18,467
SAT	7/6/2019	7,762.38	98,803	733	9	518	59	577	N	110	-	-	17,152
SUN	7/7/2019	7,762.84	99,252	683	9	448	55	503	N	110	-	-	15,720
MON	7/8/2019	7,763.27	99,673	606	9	385	52	437	N	110	-	-	14,782
TUE	7/9/2019	7,763.66	100,056	555	9	353	47	400	N	110	-	-	14,450
WED	7/10/2019	7,763.94	100,331	501	9	353	43	396	N	110	-	-	13,102
THU	7/11/2019	7,764.17	100,558	477	9	354	40	394	N	110	-	-	12,118
FRI	7/12/2019	7,764.37	100,756	463	9	354	38	392	N	110	-	-	11,844
SAT	7/13/2019	7,764.45	100,835	403	9	354	36	389	N	110	-	-	10,964
SUN	7/14/2019	7,764.49	100,874	386	9	357	34	390	N	110	-	-	10,705
MON	7/15/2019	7,764.53	100,913	388	9	359	31	390	N	110	-	-	10,986
TUE	7/16/2019	7,764.54	100,923	374	9	359	30	390	N	110	-	-	11,264
WED	7/17/2019	7,764.56	100,943	352	9	332	28	360	N	110	-	-	11,114
THU	7/18/2019	7,764.58	100,963	333	9	313	26	339	N	110	-	-	10,749
FRI	7/19/2019	7,764.59	100,973	299	9	284	24	308	N	110	-	-	9,800
SAT	7/20/2019	7,764.65	101,032	299	9	260	22	282	N	110	-	-	8,850
SUN	7/21/2019	7,764.66	101,042	275	9	260	21	281	N	110	-	-	8,325
MON	7/22/2019	7,764.69	101,072	258	9	234	19	254	N	110	-	-	7,788
TUE	7/23/2019	7,764.73	101,111	250	9	220	18	238	N	110	-	-	7,343
WED	7/24/2019	7,764.75	101,131	240	9	221	17	238	N	110	-	-	6,949
THU	7/25/2019	7,764.80	101,180	221	9	187	16	203	N	110	-	-	6,598
FRI	7/26/2019	7,764.90	101,279	229	9	170	16	186	N	110	-	-	6,358
SAT	7/27/2019	7,764.99	101,369	222	9	168	16	184	N	110	-	-	6,032
SUN	7/28/2019	7,765.06	101,438	213	9	168	15	183	N	110	-	-	5,867
MON	7/29/2019	7,765.11	101,487	202	9	168	14	182	N	110	-	-	5,718
TUE	7/30/2019	7,765.13	101,507	187	9	168	13	181	N	110	-	-	5,236
WED	7/31/2019	7,765.17	101,547	197	9	167	13	181	N	110	-	-	5,029
Averages		7,763.86	100,261	495	9	357	36	392		110	-	-	11,463
Totals (acft)				30,443	577	21,922	2,206	24,128		6,764	-	-	704,870

NOTES: Releases of water to support 15-Mile Reach target started 8/19 and ceased 10/15. A total of 20,399 acre-feet was released to support Recovery Program target flows.

FRYINGPAN-ARKANSAS PROJECT
RUEDI RESERVOIR
RELEASES FOR ENDANGERED FISH
WATER YEAR 2019
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)
THU	8/1/2019	7,765.22	101,597	200	7	168	13	180	N	110	-	-	5,012
FRI	8/2/2019	7,765.23	101,607	179	7	168	12	180	N	110	-	-	4,712
SAT	8/3/2019	7,765.25	101,626	185	7	168	12	180	N	110	-	-	4,488
SUN	8/4/2019	7,765.37	101,746	236	7	169	12	181	N	110	-	-	4,181
MON	8/5/2019	7,765.41	101,786	226	7	199	13	212	N	110	-	-	4,165
TUE	8/6/2019	7,765.37	101,746	203	7	217	12	228	N	110	-	-	4,421
WED	8/7/2019	7,765.32	101,696	198	7	216	11	228	N	110	-	-	3,968
THU	8/8/2019	7,765.30	101,676	214	7	217	11	229	N	110	-	-	3,686
FRI	8/9/2019	7,765.22	101,597	184	7	217	11	227	N	110	-	-	3,619
SAT	8/10/2019	7,765.13	101,507	178	7	216	10	227	N	110	-	-	3,410
SUN	8/11/2019	7,765.04	101,418	179	7	217	10	227	N	110	-	-	3,159
MON	8/12/2019	7,765.02	101,398	174	7	178	10	187	N	110	-	-	3,003
TUE	8/13/2019	7,764.99	101,369	160	7	168	10	178	N	110	-	-	2,942
WED	8/14/2019	7,764.98	101,359	170	7	168	9	178	N	110	-	-	2,670
THU	8/15/2019	7,764.94	101,319	156	7	169	9	178	N	110	-	-	2,401
FRI	8/16/2019	7,764.92	101,299	153	7	156	9	165	N	110	-	-	2,059
SAT	8/17/2019	7,764.90	101,279	149	7	152	8	160	N	110	-	-	1,800
SUN	8/18/2019	7,764.87	101,250	144	7	152	8	160	N	110	-	-	1,595
MON	8/19/2019	7,764.83	101,210	139	7	152	8	160	N	110	25	50	1,428
TUE	8/20/2019	7,764.81	101,190	148	7	152	8	160	N	110	25	99	1,279
WED	8/21/2019	7,764.77	101,151	139	7	152	8	160	N	110	25	149	1,188
THU	8/22/2019	7,764.69	101,072	142	7	175	7	183	N	110	73	293	999
FRI	8/23/2019	7,764.53	100,913	124	7	197	8	204	N	110	94	480	917
SAT	8/24/2019	7,764.38	100,765	129	7	196	7	204	N	110	94	666	953
SUN	8/25/2019	7,764.21	100,598	119	7	197	7	204	N	110	94	852	974
MON	8/26/2019	7,763.94	100,331	123	7	250	7	257	N	110	147	1,144	978
TUE	8/27/2019	7,763.59	99,987	107	7	274	7	281	N	110	171	1,483	915
WED	8/28/2019	7,763.23	99,634	102	7	273	7	280	N	109	171	1,823	906
THU	8/29/2019	7,762.88	99,291	107	7	273	7	280	N	110	170	2,160	858
FRI	8/30/2019	7,762.52	98,940	103	7	274	7	280	N	110	171	2,499	865
SAT	8/31/2019	7,762.16	98,589	104	7	274	7	280	N	110	170	2,837	924
Averages		7,764.61	100,998	157	7	198	9	208		110	46	484	2,402
Totals (acft)				9,662	417	12,202	566	12,769		6,762	2,837	28,830	147,723

NOTES: Releases of water to support 15-Mile Reach target started 8/19 and ceased 10/15. A total of 20,399 acre-feet was released to support Recovery Program target flows.

FRYINGPAN-ARKANSAS PROJECT
RUEDI RESERVOIR
RELEASES FOR ENDANGERED FISH
WATER YEAR 2019
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)
SUN	9/1/2019	7,761.79	98,229	96	4	273	7	280	N	102	177	3,188	1,088
MON	9/2/2019	7,761.41	97,861	91	4	272	6	279	N	97	182	3,549	1,131
TUE	9/3/2019	7,760.99	97,455	97	4	298	6	304	N	104	201	3,948	1,170
WED	9/4/2019	7,760.51	96,991	90	4	320	6	326	N	96	211	4,366	1,166
THU	9/5/2019	7,760.02	96,520	101	4	335	6	341	N	107	209	4,781	1,140
FRI	9/6/2019	7,759.54	96,060	109	4	337	6	343	N	110	208	5,193	1,097
SAT	9/7/2019	7,759.10	95,640	128	4	336	6	342	N	110	207	5,604	1,181
SUN	9/8/2019	7,758.62	95,182	108	4	335	6	340	N	110	206	6,012	1,291
MON	9/9/2019	7,758.13	94,717	104	4	335	6	340	N	110	206	6,421	1,441
TUE	9/10/2019	7,757.62	94,234	95	4	334	6	340	N	101	214	6,845	1,543
WED	9/11/2019	7,757.11	93,753	95	4	334	6	340	N	101	236	7,314	1,560
THU	9/12/2019	7,756.59	93,264	91	4	333	6	339	N	97	242	7,794	1,649
FRI	9/13/2019	7,756.05	92,759	81	4	332	6	338	N	87	251	8,291	1,613
SAT	9/14/2019	7,755.50	92,246	78	4	332	6	338	N	83	254	8,795	1,588
SUN	9/15/2019	7,754.95	91,735	78	4	331	6	337	N	83	253	9,297	1,538
MON	9/16/2019	7,754.41	91,235	82	4	331	6	336	N	88	249	9,791	1,502
TUE	9/17/2019	7,753.86	90,727	78	4	331	5	336	N	84	253	10,293	1,438
WED	9/18/2019	7,753.31	90,221	79	4	330	5	335	N	84	251	10,791	1,363
THU	9/19/2019	7,752.73	89,690	65	4	329	5	335	N	70	264	11,314	1,287
FRI	9/20/2019	7,752.18	89,188	79	4	328	5	333	N	84	249	11,808	1,217
SAT	9/21/2019	7,751.58	88,642	57	4	328	5	333	N	62	271	12,346	1,159
SUN	9/22/2019	7,751.00	88,117	67	4	328	5	333	N	72	261	12,863	1,095
MON	9/23/2019	7,750.41	87,585	64	4	328	5	333	N	68	264	13,387	1,169
TUE	9/24/2019	7,749.82	87,054	64	4	328	5	333	N	69	264	13,911	1,158
WED	9/25/2019	7,749.21	86,508	68	4	339	5	344	Y	73	252	14,411	1,176
THU	9/26/2019	7,748.58	85,946	66	4	345	5	350	Y	70	260	14,926	1,134
FRI	9/27/2019	7,748.01	85,439	59	4	311	5	316	Y	64	233	15,388	1,161
SAT	9/28/2019	7,747.50	84,988	70	4	294	5	298	Y	74	205	15,795	1,190
SUN	9/29/2019	7,746.98	84,529	65	4	293	5	298	Y	70	208	16,208	1,163
MON	9/30/2019	7,746.43	84,045	53	4	293	5	298	Y	58	221	16,646	1,128
Averages		7,754.46	91,352	82	4	322	5	328		86	232	9,709	1,285
Totals (acft)				4,875	230	19,190	325	19,515		5,136	13,809	577,744	76,439

NOTES: Releases of water to support 15-Mile Reach target started 8/19 and ceased 10/15. A total of 20,399 acre-feet was released to support Recovery Program target flows.

FRYINGPAN-ARKANSAS PROJECT
RUEDI RESERVOIR
RELEASES FOR ENDANGERED FISH
WATER YEAR 2019
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)
TUE	10/1/2019	7,745.84	83,527	34	1	294	5	299	Y	39	243	17,128	1,129
WED	10/2/2019	7,745.26	83,020	41	1	295	5	300	Y	45	237	17,598	1,151
THU	10/3/2019	7,744.72	82,550	60	1	296	4	300	Y	65	219	18,032	1,158
FRI	10/4/2019	7,744.24	82,133	42	1	250	4	255	Y	46	191	18,411	1,161
SAT	10/5/2019	7,743.85	81,796	50	1	219	4	223	Y	54	152	18,713	1,192
SUN	10/6/2019	7,743.46	81,459	50	1	219	4	223	Y	55	152	19,014	1,086
MON	10/7/2019	7,743.08	81,132	56	1	220	4	224	Y	61	147	19,306	1,118
TUE	10/8/2019	7,742.75	80,849	49	1	190	4	194	Y	53	125	19,554	1,158
WED	10/9/2019	7,742.48	80,618	56	1	171	4	175	Y	60	99	19,750	1,148
THU	10/10/2019	7,742.22	80,395	43	1	153	4	158	Y	47	94	19,937	1,153
FRI	10/11/2019	7,742.05	80,250	58	1	130	4	134	Y	62	56	20,048	1,141
SAT	10/12/2019	7,741.89	80,114	63	1	130	4	134	Y	67	51	20,149	1,164
SUN	10/13/2019	7,741.74	79,986	67	1	130	4	134	Y	71	46	20,240	1,132
MON	10/14/2019	7,741.58	79,850	63	1	130	4	134	Y	67	51	20,341	1,132
TUE	10/15/2019	7,741.47	79,756	61	1	106	4	110	Y	65	29	20,399	1,118
WED	10/16/2019	7,741.43	79,722	63	1	79	4	83	N	67	-	20,399	1,150
THU	10/17/2019	7,741.38	79,680	58	1	79	4	83	N	63	-	20,399	1,084
FRI	10/18/2019	7,741.33	79,637	58	1	78	4	83	N	63	-	20,399	1,091
SAT	10/19/2019	7,741.27	79,586	55	1	80	4	84	N	59	-	20,399	1,143
SUN	10/20/2019	7,741.24	79,561	69	1	80	4	84	N	73	-	20,399	1,193
MON	10/21/2019	7,741.18	79,510	55	1	79	4	84	N	60	-	20,399	1,235
TUE	10/22/2019	7,741.15	79,485	67	1	79	4	84	N	72	-	20,399	1,267
WED	10/23/2019	7,741.09	79,434	55	1	79	4	83	N	59	-	20,399	1,291
THU	10/24/2019	7,741.06	79,408	68	1	79	4	83	N	72	-	20,399	1,287
FRI	10/25/2019	7,741.01	79,366	59	1	79	4	83	N	63	-	20,399	1,348
SAT	10/26/2019	7,740.98	79,341	68	1	79	4	83	N	72	-	20,399	1,337
SUN	10/27/2019	7,740.91	79,281	51	1	79	4	83	N	55	-	20,399	1,308
MON	10/28/2019	7,740.86	79,239	46	1	67	4	71	N	51	-	20,399	1,414
TUE	10/29/2019	7,740.84	79,222	44	1	52	4	56	N	49	-	20,399	1,611
WED	10/30/2019	7,740.82	79,205	44	1	51	4	56	N	48	-	20,399	1,689
THU	10/31/2019	7,740.80	79,188	44	1	51	4	56	N	48	-	20,399	2,096
Averages		7,742.06	80,268	55	1	132	4	137		59	61	19,929	1,248
Totals (acft)				3,364	82	8,139	263	8,402		3,628	3,753	1,219,848	76,732

NOTES: Releases of water to support 15-Mile Reach target started 8/19 and ceased 10/15. A total of 20,399 acre-feet was released to support Recovery Program target flows.

Table 4: Fryingpan- Arkansas Project Transmountain Diversions WY2019 (Units = AF).

	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
South Fork	19.0	588.9	6875.4	6339.5	1035.0	0.0	**14857.8**
No Name	0.0	37.1	2299.7	669.0	0.0	0.0	**3005.8**
Midway	0.0	160.5	3424.5	3144.0	820.8	0.0	**7549.8**
Hunter	0.0	114.1	3283.9	3114.1	113.1	0.0	**6625.1**
Sawyer	12.5	93.4	1359.5	1130.6	246.2	26.0	**2868.1**
Chapman[1]	0.0	167.2	4608.3	4777.1	593.9	52.6	**10199.0**
Subtotal	**31.5**	**1161.1**	**21851.2**	**19174.3**	**2808.8**	**78.5**	**45105.6**
Carter	50.8	274.9	2182.2	2226.5	475.4	0.0	**5209.9**
North Fork	68.4	897.1	883.3	114.1	0.0	0.0	**1962.9**
Mormon	0.0	0.0	917.2	2102.9	84.5	0.0	**3104.6**
North Cunningham	27.8	146.2	1364.6	993.3	15.3	0.0	**2547.2**
Middle Cunningham[2]	0.0	160.5	3424.5	3181.3	820.8	0.0	**7587.1**
Ivanhoe	94.2	716.6	5868.0	4249.5	382.6	34.3	**11345.2**
Granite	0.0	43.8	1513.6	1222.0	244.0	34.3	**3057.8**
Fryingpan	50.6	862.6	10297.1	9255.6	943.6	0.0	**21409.5**
Lily Pad	117.8	470.7	1458.9	478.4	38.7	1.8	**2566.3**
Subtotal	**409.6**	**3572.5**	**27909.4**	**23823.6**	**3004.8**	**70.4**	**58790.3**
Total	**441.1**	**4733.6**	**49760.7**	**42997.9**	**5813.6**	**149.0**	**103895.9**
Boustead Tunnel[3]	**Oct-Apr 410.9**	**3796.1**	**46273.7**	**40432.3**	**4806.6**	**52.2**	**95771.7**

[1] Does not include No Name, Hunter, Sawyer and Midway

[2] Includes South Cunningham

[3] The difference between the west slope diversion and Charles H. Boustead Tunnel diversion results from the accuracy limitations of the measurement, rounding and seepage

Table 5: Fryingpan-Arkansas Project Imports - Charles H. Boustead Tunnel Outlet (Units = 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[1]	70.2	717.9	1.7	289.9
1986[1]	30.3	748.2	1.5	300.3
1987[1]	2.2	750.4	1.1	288.0
1988[1]	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[1]	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[1]	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

Water Year	Imports	Accumulated Imports	Twin Lakes Exchange	Available to SECWCD
2005	54.6	1637.6	3.0	40.8
2006	61.2	1698.8	3.0	49.2
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

Water Year	Import	Accumulated Imports	Twin Lakes Exchange	Available to SECWCD
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	2353.0	2.5	39.1
2017	67.0	2420.0	2.0	46.3
2018	39.2	2459.2	3.0	41.3
2019	95.8	2555.0	0.1	42.6

[1]Imports impeded
Restriction: Not to exceed 120 KAF in 1 year
Not to exceed 2,352.8 KAF acre-feet in 34 consecutive years.
The imports between 1985 and 2019 are 1837.1 KAF
1983 includes 3,120 acre-feet imported through the Twin Lakes Tunnel

Table 6: Turquoise Lake Operations WY2019 (Units = 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 2018	0.0	0	0.0	0.0		0.4	0.3	1.1	98.9	9,851.7
NOV 2018	0.0	0	0.0	0.0		1.0	0.2	8.8	90.9	9,846.8
DEC 2018	0.0	0	0.0	0.0		1.4	0.0	16.4	76.0	9,837.3
JAN 2019	0.0	0	0.0	0.0		1.4	0.0	16.5	60.8	9,826.8
FEB 2019	0.0	0	7.7	0.0		9.0	0.0	16.4	53.4	9,821.3
MAR 2019	0.0	0	15.3	0.0		17.5	0.0	21.9	49.0	9,817.9
APR 2019	0.5	0	9.0	0.4		12.4	0.0	15.9	45.4	9,815.0
MAY 2019	0.4	0	0.0	3.8		9.1	0.0	11.3	43.2	9,813.2
JUN 2019	1.7	0	0.0	46.1		67.3	0.5	33.8	76.2	9,837.4
JUL 2019	0.8	0	1.0	40.4		54.6	0.6	10.6	119.6	9,863.8
AUG 2019	0.6	0	1.0	4.8		8.4	0.6	3.0	124.4	9,866.6
SEP 2019	0.1	0	0.0	0.1		0.7	0.5	1.4	123.2	9,865.9
Total* (acre-feet)	4,219	0	33,966	95,772		183,114	2,742	157,165		

*Rounding may introduce discrepancies between monthly and yearly totals

Table 7: Twin Lakes/Mt. Elbert Forebay Water Year 2019 Operations (Units = 1,000 Acre-feet).

	Twin Lakes Canal Company			Mt. Elbert Conduit				Twin Lakes					
Date	**Imports**	**Winter Water**	**Priority/ Native**	**Leadville Fish Hatchery[4]**	**Halfmoon**	**Sugarloaf Bypass**	**Sugarloaf Powerplant/ Sleeve Valve**	**Native Inflow**	**Total Inflow**	**Evap[2]**	**Total Outflow**	**End of Month Content[2]**	**Water Elevation[3] (feet)**
OCT 18	0.6	0.0	0.0	0.3	0.0	0.5	0.4	1.2	2.3	0.4	1.2	106.7	9,182.05
NOV 18	0.5	0.4	0.0	0.3	0.0	0.5	4.3	0.2	9.0	0.2	10.4	105.1	9,181.09
DEC 18	0.5	2.2	0.0	0.3	0.0	0.5	8.2	0	15.9	0.0	11.9	109.2	9,183.07
JAN 19	0.4	0.0	0.0	0.3	0.0	0.5	8.2	0	15.7	0.0	11.8	113.1	9,185.01
FEB 19	0.3	0.2	0.0	0.3	0.0	0.5	8.2	0	15.7	0.0	15.1	113.7	9,185.37
MAR 19	0.4	0.6	0.0	0.3	0.0	0.5	10.9	0	21.1	0.0	30.4	104.4	9,181.00
APR 19	0.6	0.0	0.0	0.3	0.0	0.8	7.7	1.3	16.9	0.1	26.8	94.3	9,175.93
MAY 19	3.2	0.0	1.3	0.3	0.4	1.0	5.2	6.0	19.6	0.7	26.1	87.1	9,172.18
JUN 19	26.1	0.0	7.5	0.3	0.1	6.3	11.1	40.6	88.6	1.0	46.4	128.4	9,191.62
JUL 19	4.5	0.0	8.7	0.3	4.2	2.2	3.8	34.1	49.9	1.1	38.3	138.9	9,196.65
AUG 19	0.2	0.0	0.1	0.3	0.0	0.9	1.1	9.0	11.1	1.0	14.8	134.2	9,194.27
SEP 19	0.2	0.0	0.0	0.3	0.0	0.7	0.4	2.5	3.3	0.9	2.6	134.1	9,194.23
TOTAL[1] (acre-feet)	37,579	3,428	17,551	3,909	4,735	14,948	69,584	92,824	269,249	5,522	235,682		

[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

Table 8: Mt. Elbert Pumped-Storage Power Plant WY2019 Operations.

Month	Year	Station Service (MWH)	Net Generation (MWH)	Gross Generation (MWH)	Inflow to Mt. Elbert (KAF)	Water Through Generator (KAF)	Water Pumped From Twin Lakes To Forebay (KAF)
OCT	2018	230.4	13,190.0	13,420.4	0.5	39.1	38.3
NOV	2018	299.6	1,836.9	18,668.6	8.3	51.8	44.4
DEC	2018	295.2	20,798.0	21,093.2	15.9	56.5	44.4
JAN	2019	303.1	23,828.0	24,131.1	15.9	67.2	52.0
FEB	2019	310.9	20,654.0	20,964.9	15.9	59.3	43.6
MAR	2019	277.8	25,874.0	26,151.8	21.1	71.5	50.3
APR	2019	236.5	17,330.0	17,566.5	14.8	47.4	34.3
MAY	2019	221.0	12,896.0	13,117.0	3.3	38.1	30.3
JUN	2019	198.9	16,847.0	17,045.9	21.6	54.8	34.2
JUL	2019	196.5	35,652.0	35,848.5	10.6	98.3	86.6
AUG	2019	176.4	7,837.0	8,013.4	1.6	15.5	16.1
SEP	2019	187.8	19,307.0	19,494.8	0.5	55.9	55.6
	Totals	2,934.0	216,049.9	235,516.0	130.1	655.4	530.2

Table 9: Pueblo Reservoir WY2019 Operations (Units = 1,000 AF).

Month	Inflow				Evap	Total Outflow	End of Month Content	Water Surface Elevation (feet)
	Project	Contract	Native[2]	Total				
OCT 18		2.8	7.2	10.0	1.0	12.2	186.4	4,865.68
NOV 18		2.1	11.9	14.0	0.6	8.4	191.4	4,867.05
DEC 18		0.0	12	12.0	0.5	3.8	199.1	4,869.11
JAN 19		0.1	12.6	12.7	0.5	4.2	207.2	4,871.21
FEB 19		0.1	15	15.1	0.7	3.8	217.8	4,873.89
MAR 19		2.2	33	35.2	1.3	13.9	237.9	4,878.68
APR 19		5.2	24.3	29.5	2.1	25.5	239.9	4,879.13
MAY 19	20.5	9.1	23.8	53.4	2.1	54.5	236.6	4,878.39
JUN 19	13.4	9.3	232.5	255.2	2.7	246.4	242.8	4,879.79
JUL 19	29.1	13.2	174.6	216.9	3.2	214	242.5	4,879.73
AUG 19		10.9	73.7	84.6	3.1	107.5	216.5	4,873.56
SEP 19		4.8	35.3	40.1	2.6	59.7	194.3	4,867.83
Total[1] (acre-feet)	**63,000**	**59,747**	**656,044**	**778,791**	**20,107**	**753,864**		

[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, 0 is recorded.

Table 10: Reservoir Storage Allocation Data (Unit = Acre-feet).

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 acre-feet. A tilted morning glory spillway reduces the actual storage available to 140,357 acre-feet
[3] Area Capacity Table from 2012

Note: Inactive includes dead storage

Table 11: Monthly Evaporation Factors.

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 or unavailable. Ruedi doesn't have a pan.
Factor is derived from ((the average monthly evaporation volume*12)/0.7)/(# days in month)
Evaporation in acre-feet=monthly factor*surface area of the lake*(1-% ice cover)

Table 12: Monthly Evaporation for Fryingpan-Arkansas Project (Unit = Acre-feet).

Month	Ruedi		Turquoise		Twin Lakes and Mt. Elbert		Pueblo	
	AVG	WY 2019	AVG	WY 2019	AVG	WY 2019	AVG	WY 2019
Oct-18	54	69	360	308	517	395	1,088	951
Nov-18	0	0	161	163	229	201	567	605
Dec-18	0	0	15	4	25	7	449	496
Jan-19	0	0	0	0	2	5	411	468
Feb-19	0	0	0	0	3	9	604	652
Mar-19	0	0	0	0	23	15	1,267	1,258
Apr-19	6	0	11	0	200	107	1,740	2,072
Mav-19	161	195	263	11	834	650	2,147	2,111
Jun-19	466	533	720	462	1,214	853	2,699	2,677
Jul-19	511	577	602	648	975	1,026	2,523	3,209
Aug-19	311	417	479	598	772	919	2,060	3,055
Sep-19	175	230	428	548	698	774	1,702	2,553

Average between 1996 and 2019

Table 13: Monthly Precipitation Data for Fryingpan-Arkansas Project (Unit = Inches).

MONTH	CHAPMAN [1] NEAR RUEDI		TURQUOISE		TWIN LAKES		PUEBLO	
	AVG	WY 2019	AVG	WY 2019	AVG	WY 2019	AVG	WY 2019
Oct 18	2.34	3.1	1.13	2.05	0.87	1.5	0.85	2.16
Nov 18	1.98	3.9	1.32	2.75	0.49	0.81	0.34	0.29
Dec 18	3.25	1.9	1.41	0.96	0.48	0.04	0.29	0.04
Jan 19	3.05	3.2	1.68	1.54	0.51	0.55	0.35	0.56
Feb 19	2.80	2.8	1.48	1.2	0.49	0.7	0.36	0.2
Mar 19	2.80	6.7	1.52	5.71	0.59	1.62	0.85	1.01
Apr 19	3.72	3.2	1.75	2.17	0.91	1.75	1.77	0.28
May 19	3.08	5.0	1.53	2.14	0.91	0.89	1.46	2.1
Jun 19	1.02	1.3	0.83	0.92	0.72	0.42	0.92	1.69
Jul 19	3.01	0.3	2.02	0.66	1.81	0.66	1.87	2.98
Aug 19	2.57	2.4	2.06	1.37	1.52	1.05	2.13	0.67
Sep 19	1.95	1.2	1.48	0.33	1.14	0.77	0.73	0.33
TOTAL	31.57	35.1	18.05	13.91	10.44	9.95	11.91	7.50
Max. Annual	40.9	(2011)	25.95	(1957)	17.27	(1952)	20.32	(2007)

[1] The USGS weather station at Ruedi was out of service for WY2019. The precipitation averages and totals from the Chapman SNOTEL have been substituted. The SNOTEL has been in operation since 2008

Table 14: Flood Control Benefits of the Fryingpan-Arkansas Project.

WY	Ruedi Benefits WY2019	Ruedi Benefits Cumulative	Pueblo Benefits WY2019	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

WY	Ruedi Benefits WY2019	Ruedi Benefits Cumulative	Pueblo Benefits WY2019	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
2017	$0	$19,718,700	$0	$36,785,000
2018	$0	$19,718,700	$0	$36,785,000
2019	$0	$19,718,700	$189,100	$36,974,100

Appendix B: Exhibits

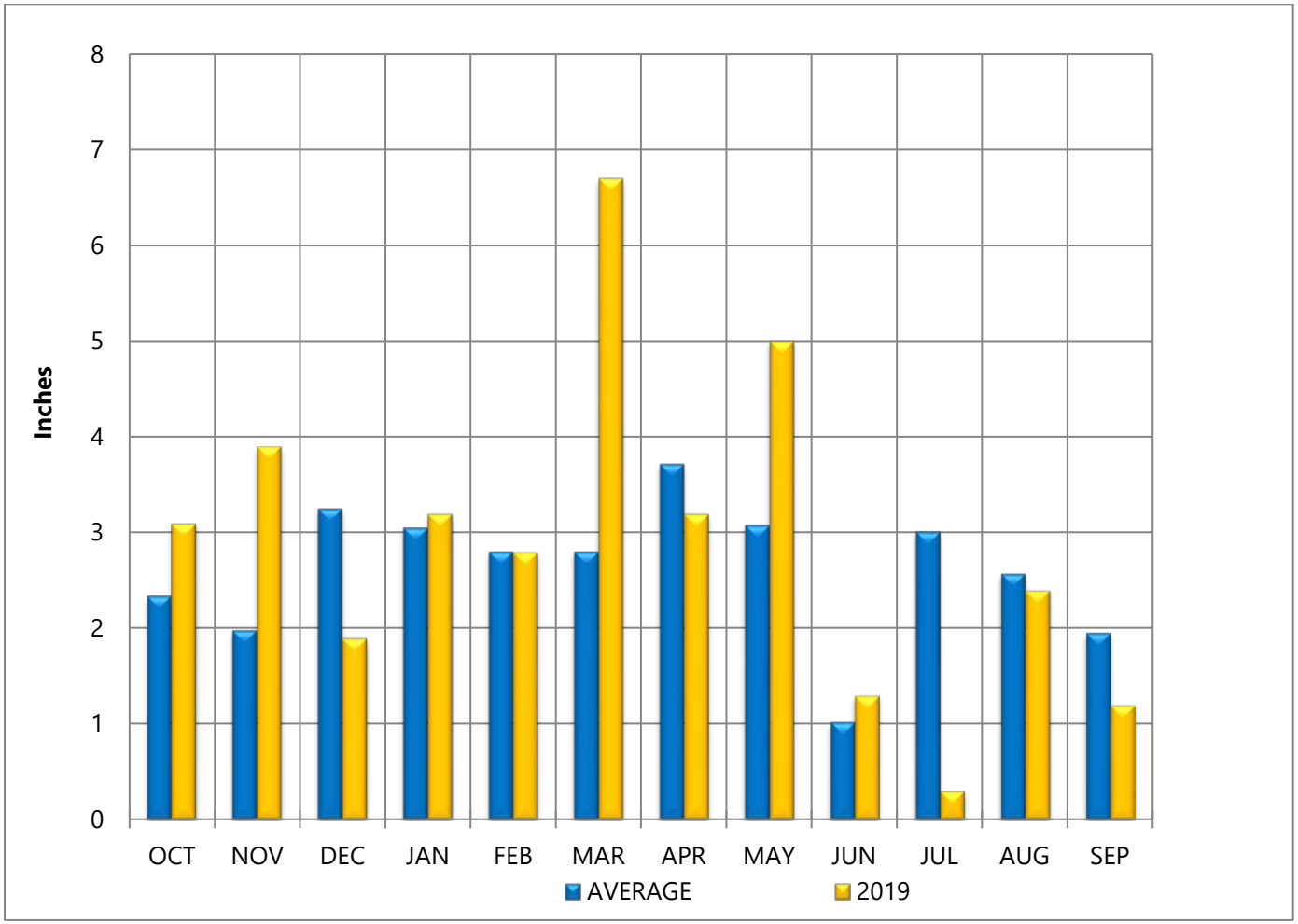


Exhibit 2: Chapman SNOTEL Monthly Precipitation WY2019.

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

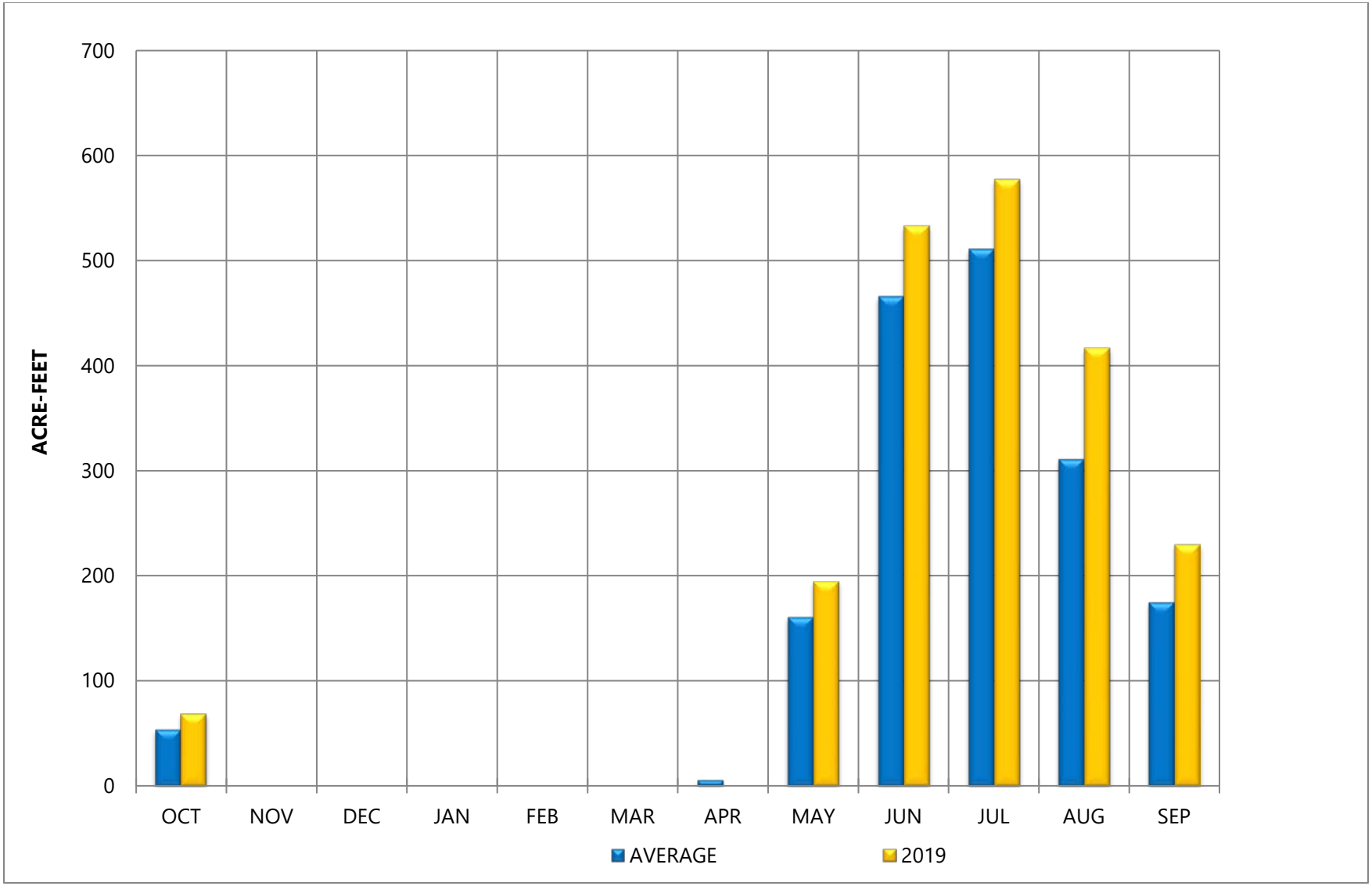


Exhibit 3: Ruedi Reservoir Monthly Evaporation WY2019.

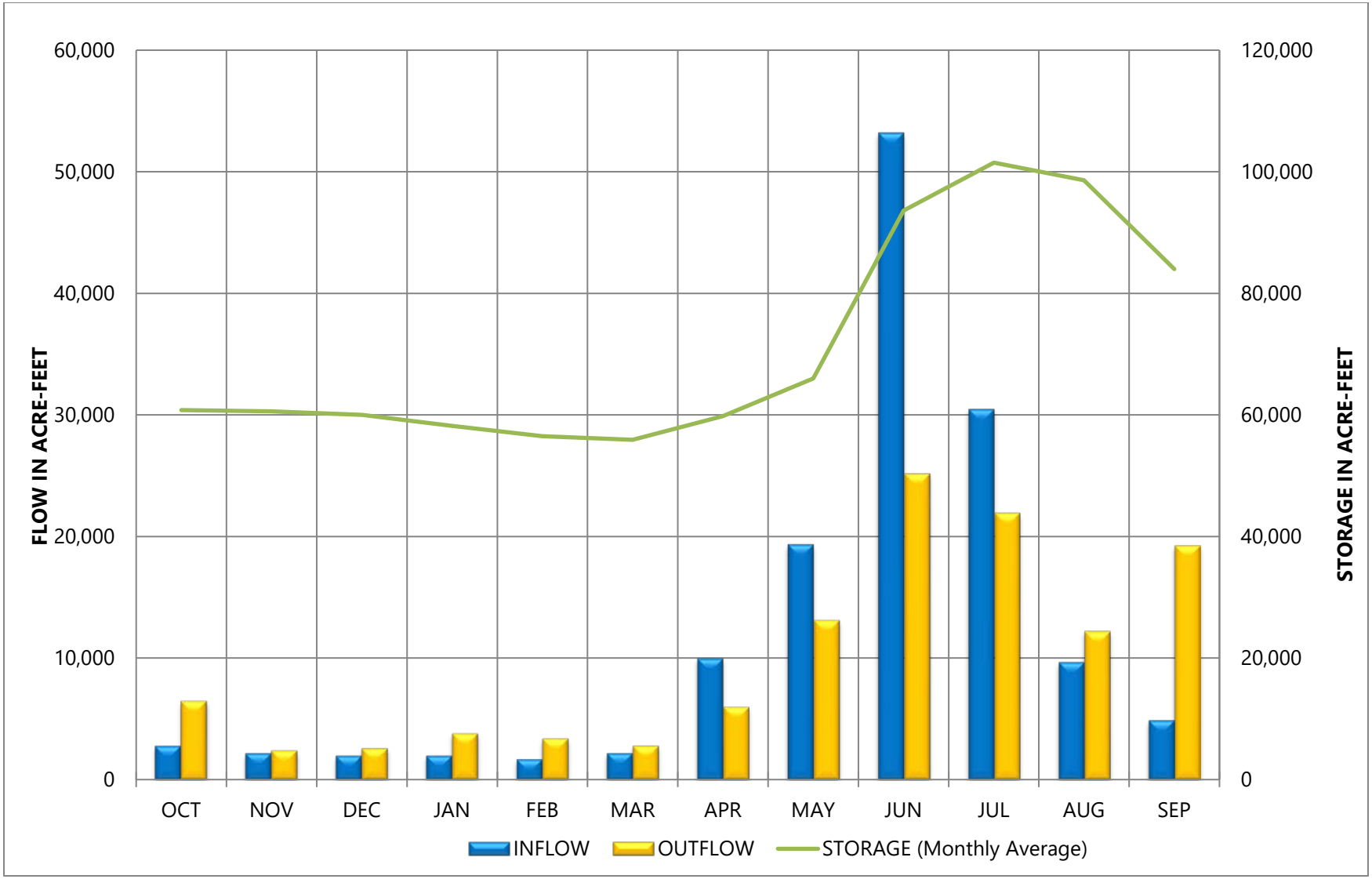


Exhibit 4: Ruedi Reservoir Actual Operations WY2019.

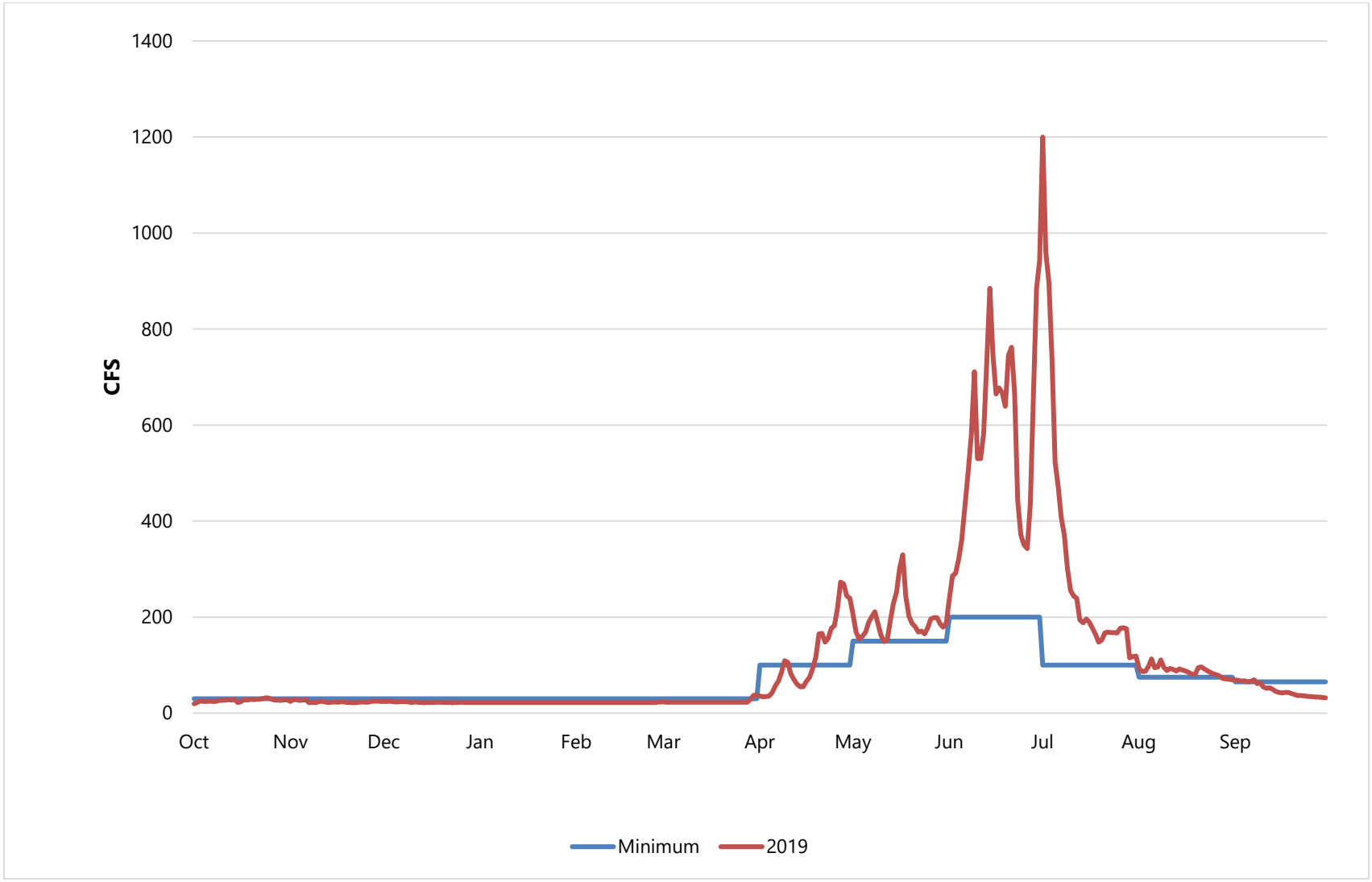


Exhibit 5: Fryingpan River near Thomasville Daily Discharge WY2019.

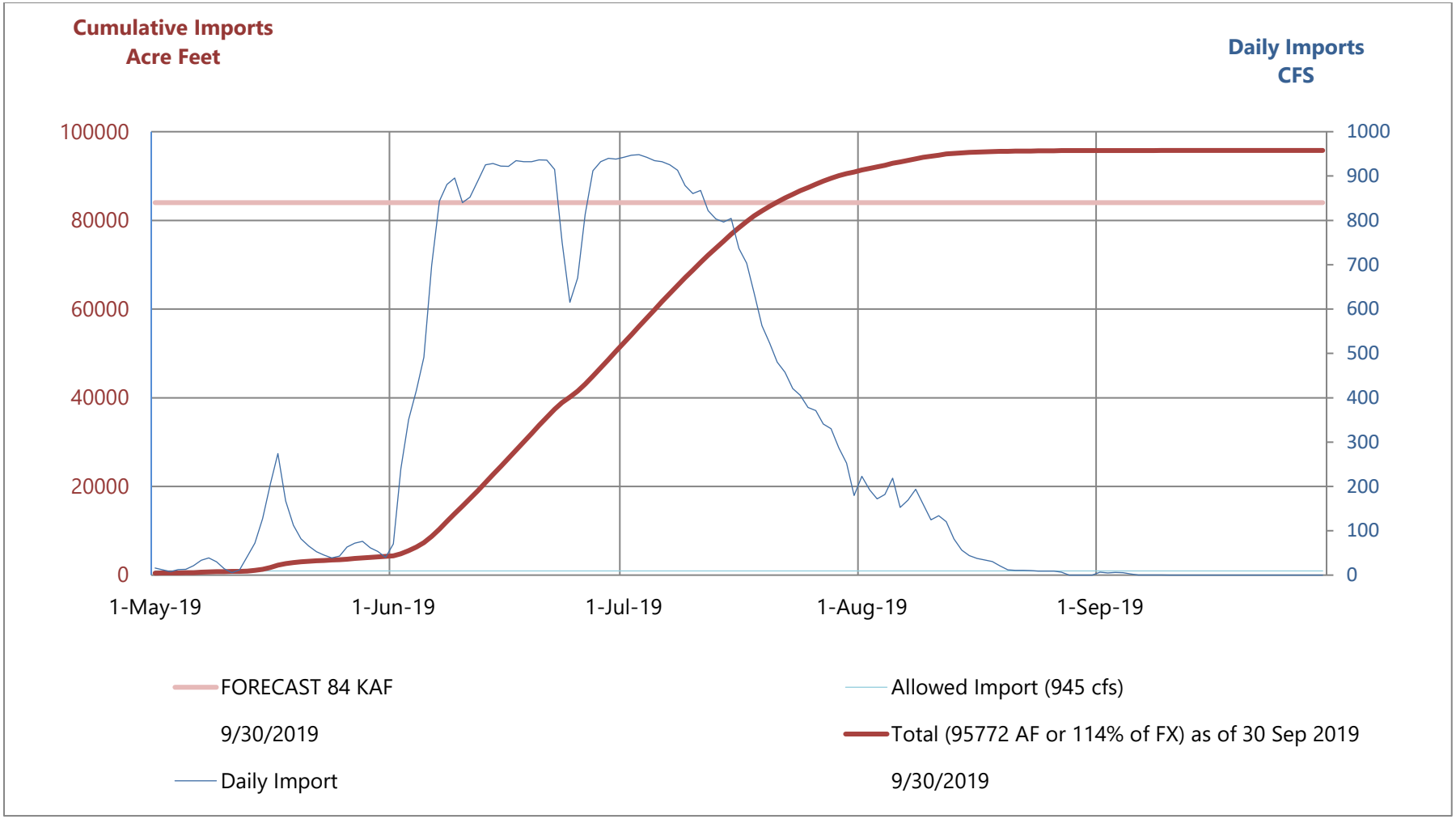


Exhibit 6: Boustead Tunnel Actual Operations WY2019.

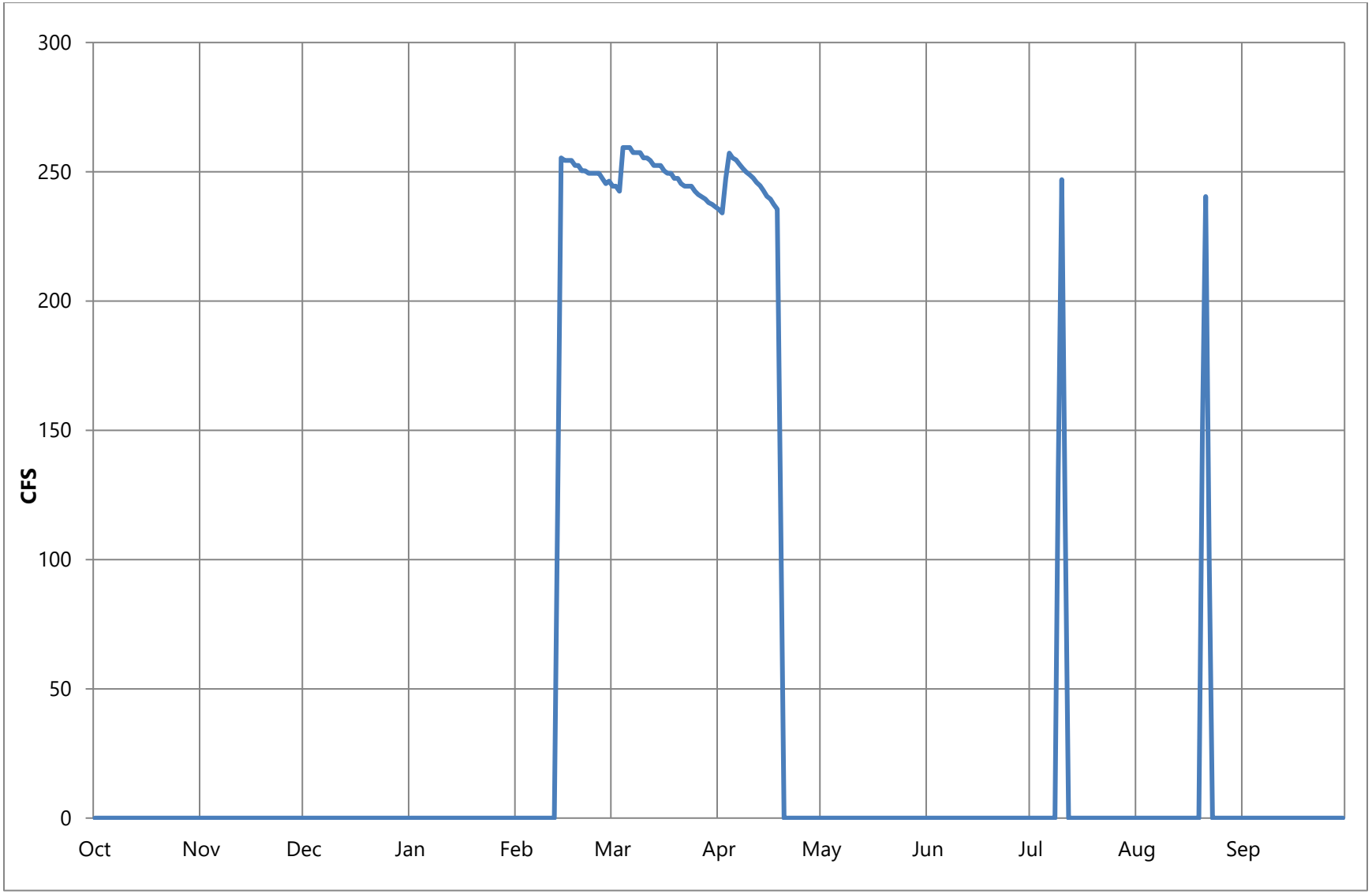


Exhibit 7: Homestake Tunnel Actual Operations WY2019.

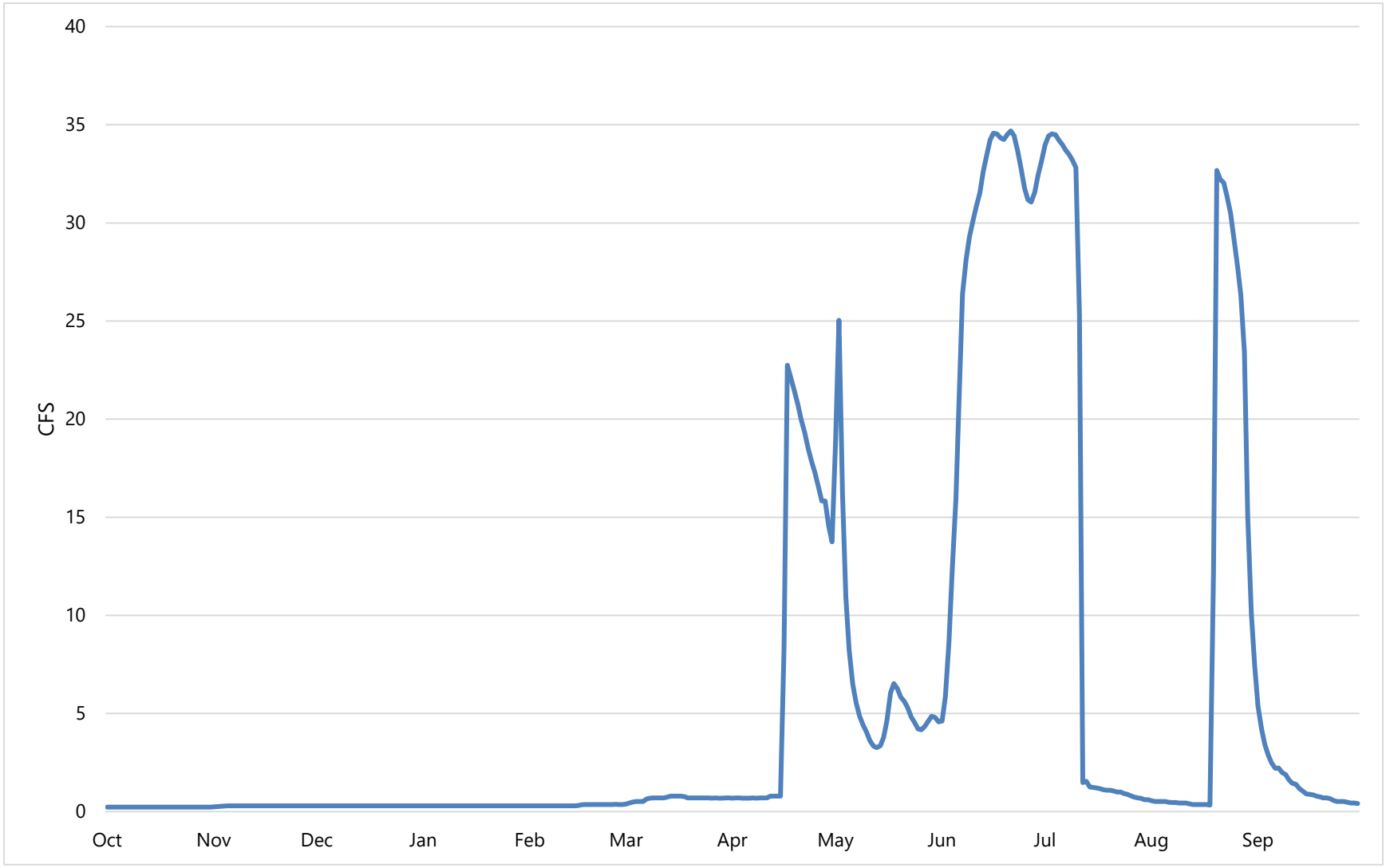


Exhibit 8: Busk-Ivanhoe Tunnel Actual Operations WY2019.

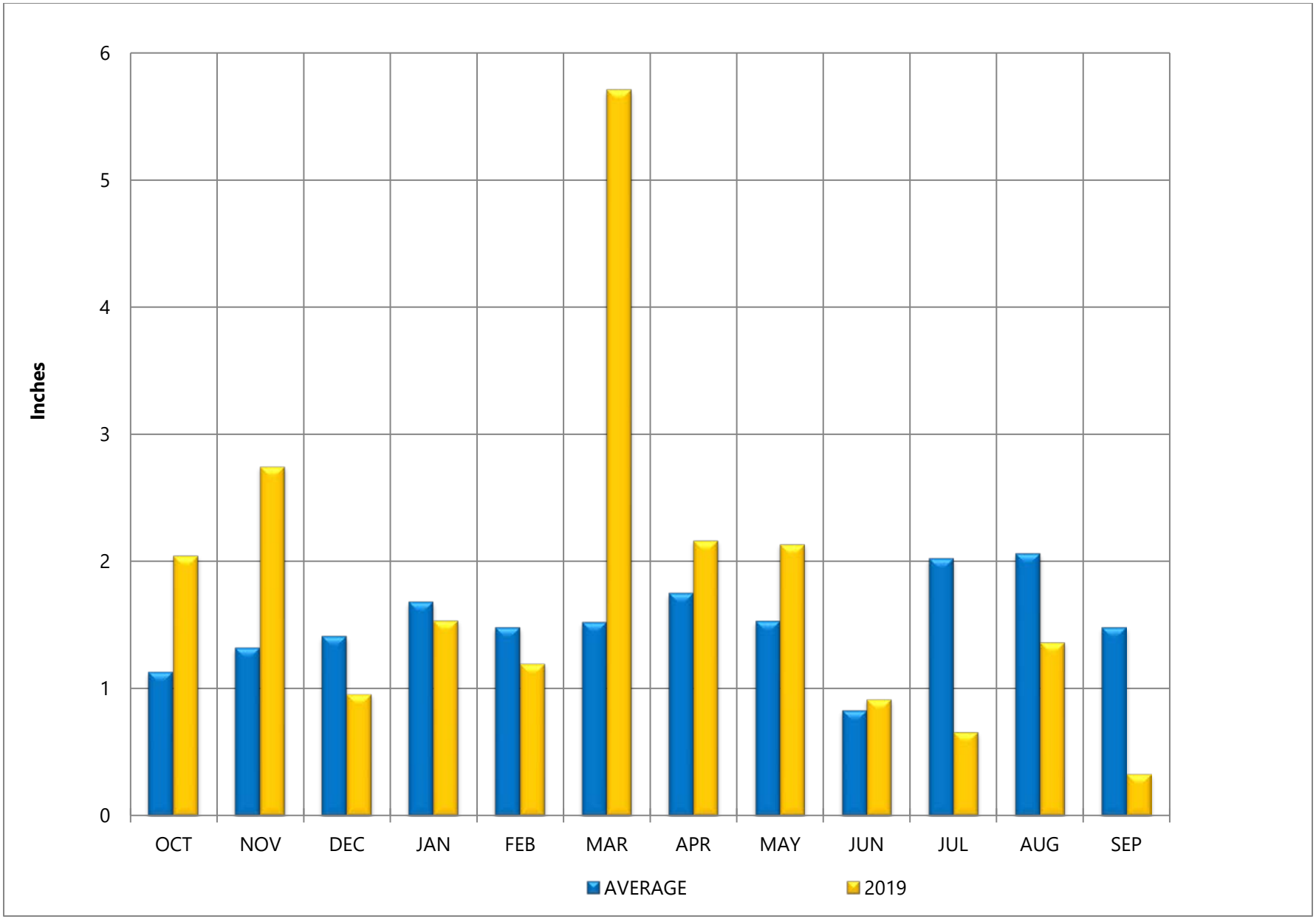


Exhibit 9: Turquoise Lake (Sugar Loaf Dam) Monthly Precipitation WY2019.

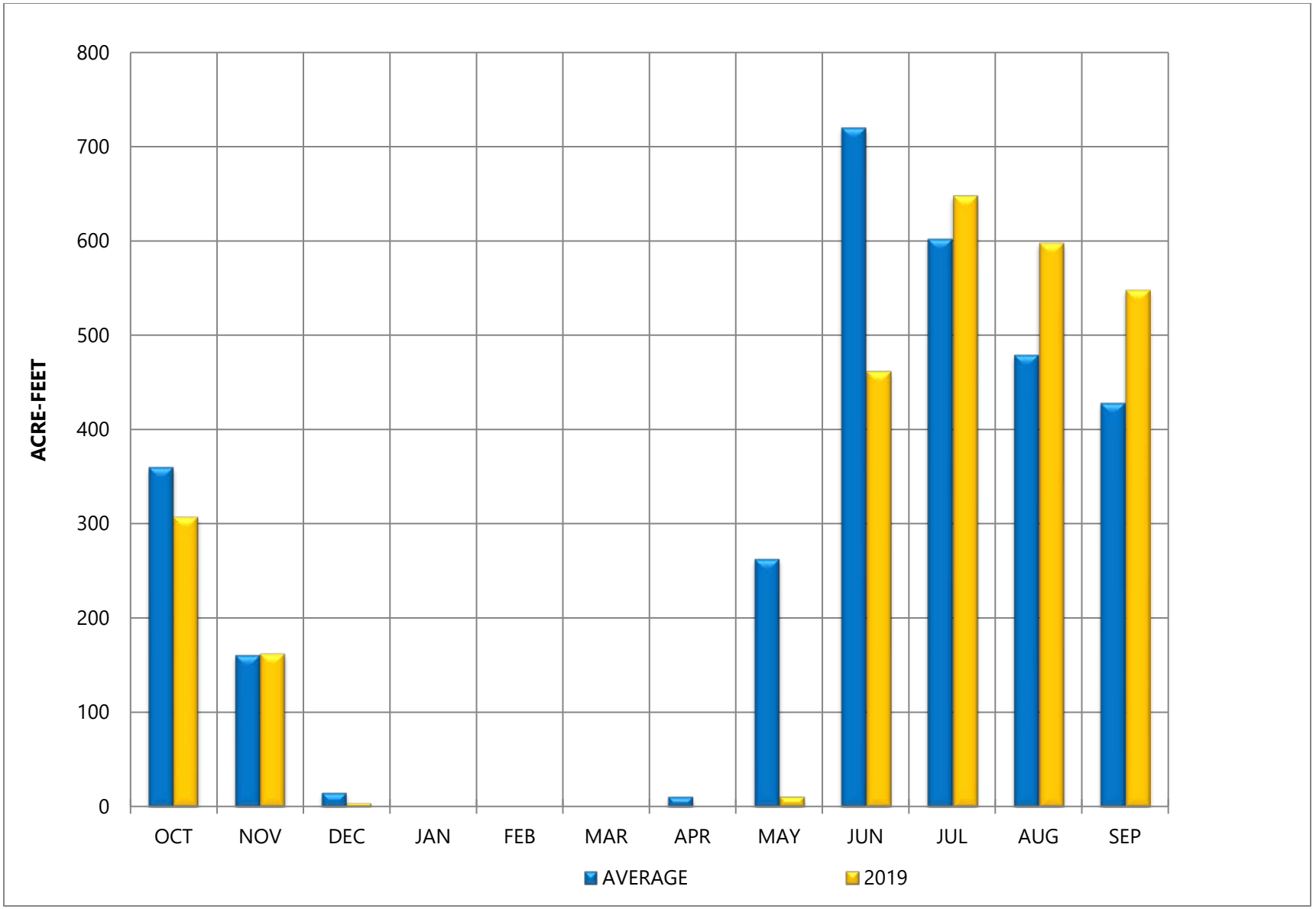


Exhibit 10: Turquoise Lake (Sugar Loaf Dam) Monthly Evaporation WY2019.

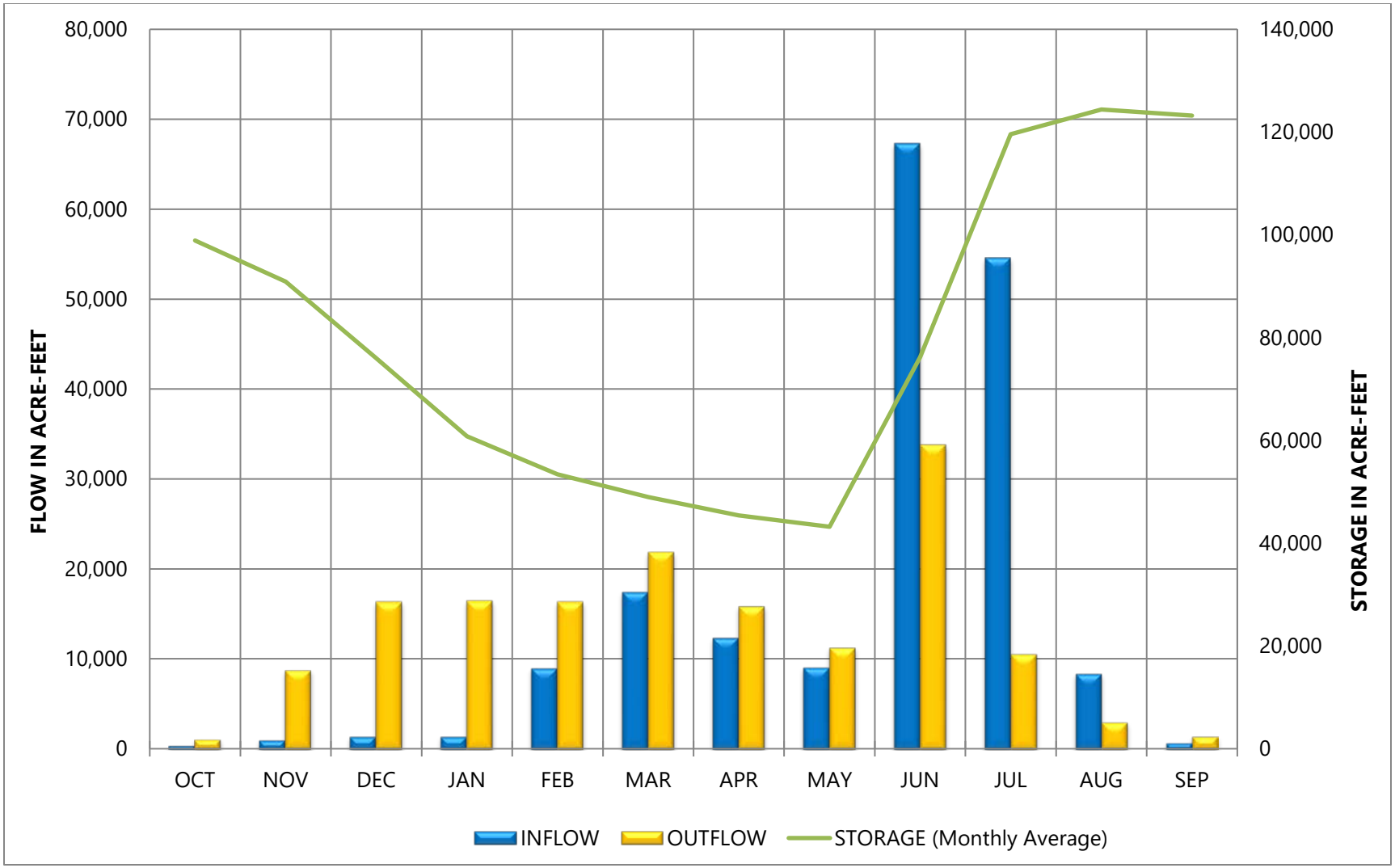


Exhibit 11: Turquoise Lake (Sugarloaf Dam) Actual Operations WY2019.

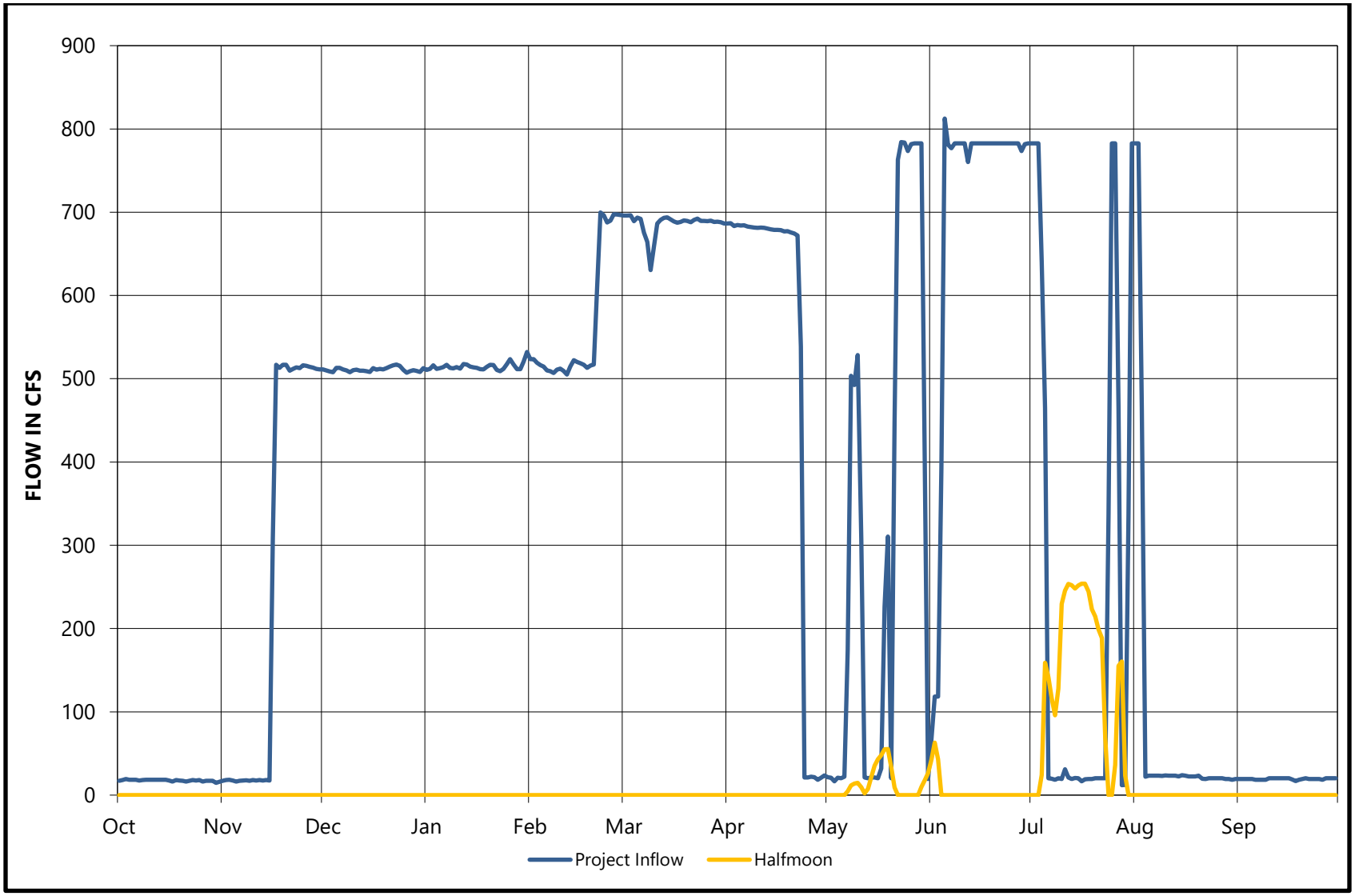


Exhibit 12: Mt. Elbert Conduit Inflow Actual Operations WY2019.

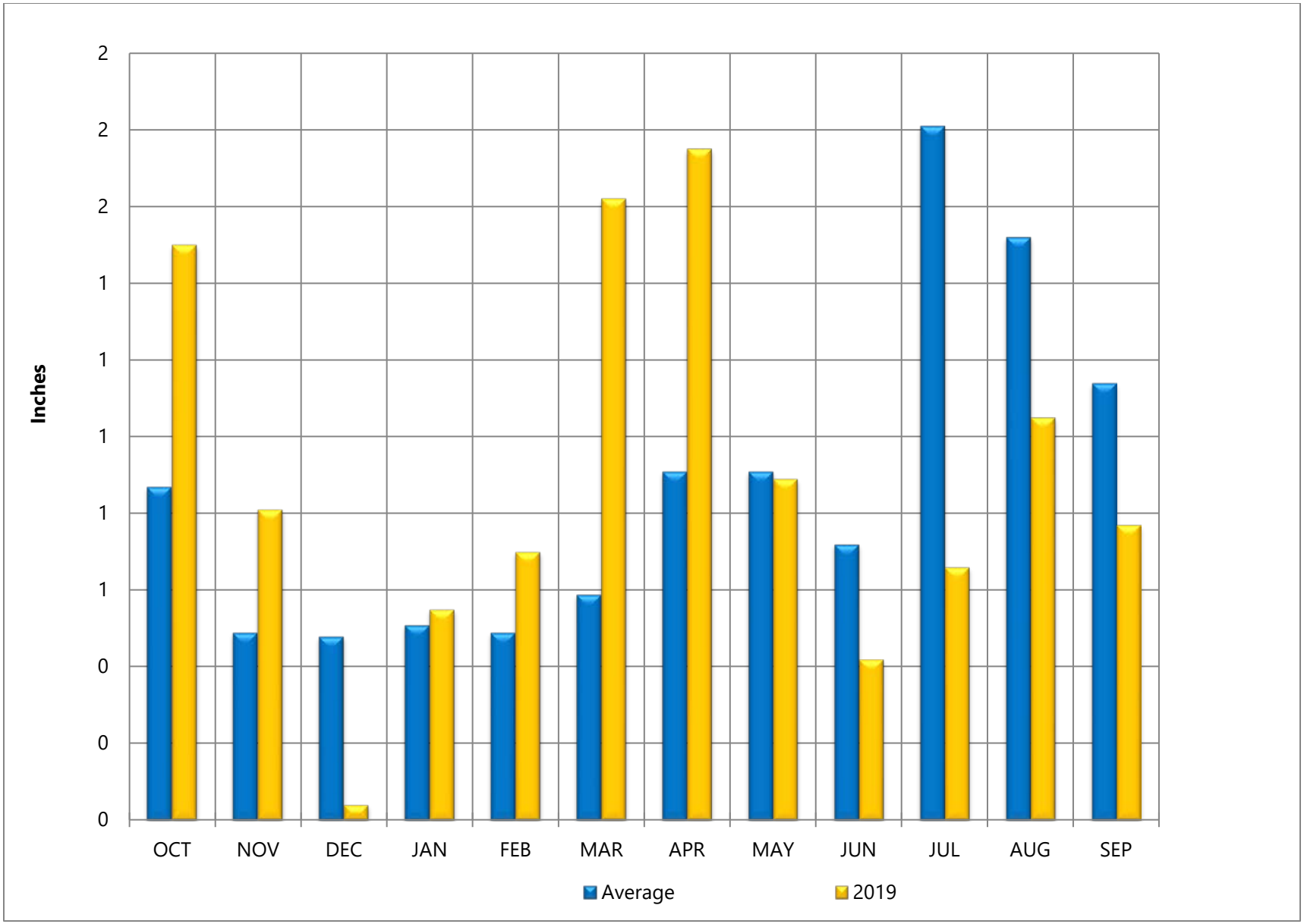


Exhibit 13: Twin Lakes Monthly Precipitation WY2019.

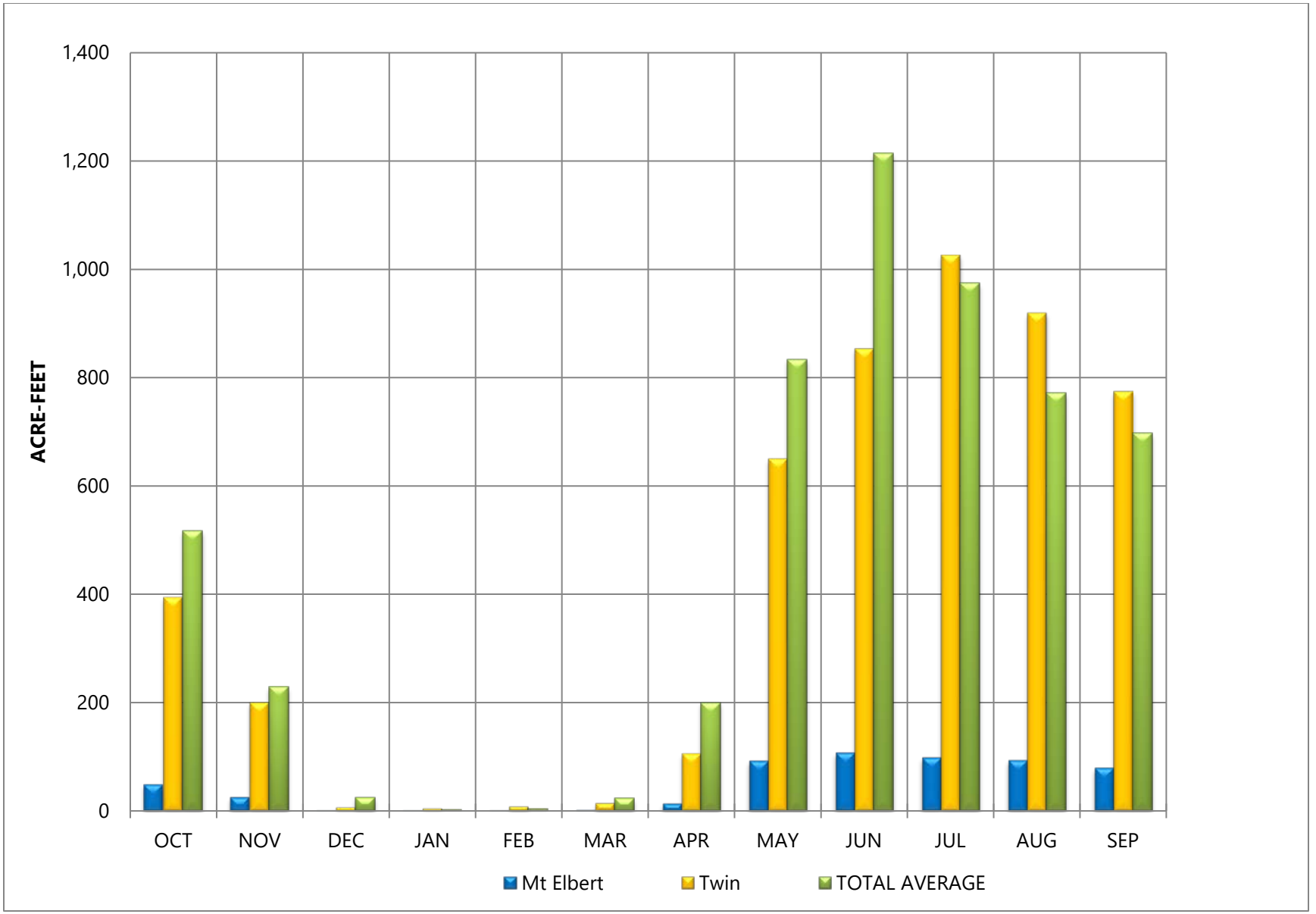


Exhibit 14: Twin Lakes Dam and Mt. Elbert Forebay Monthly Evaporation WY2019.

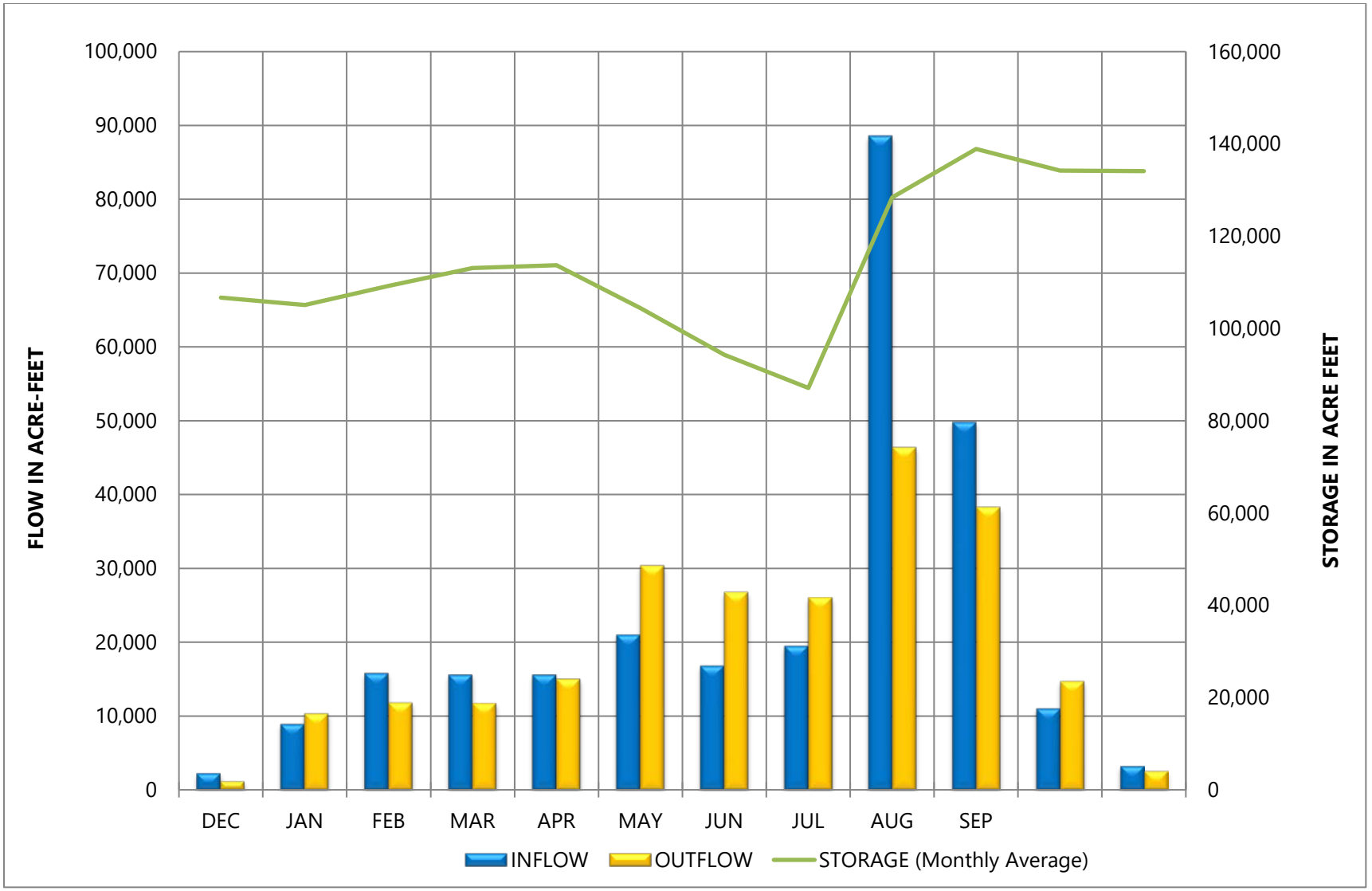


Exhibit 15: Twin Lakes/Mt. Elbert Forebay Actual Operations WY2019.

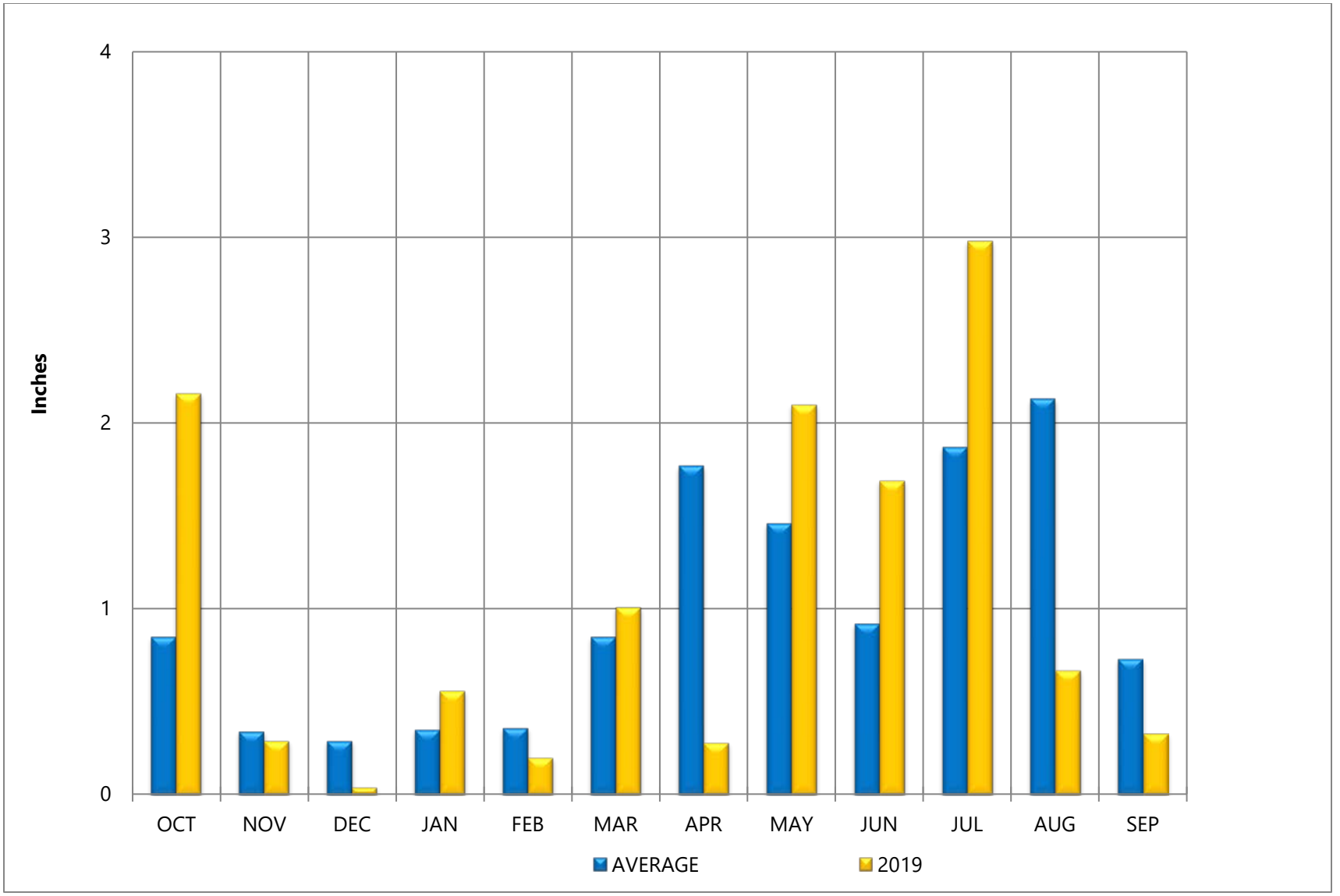


Exhibit 16: Pueblo Dam Monthly Precipitation WY2019.

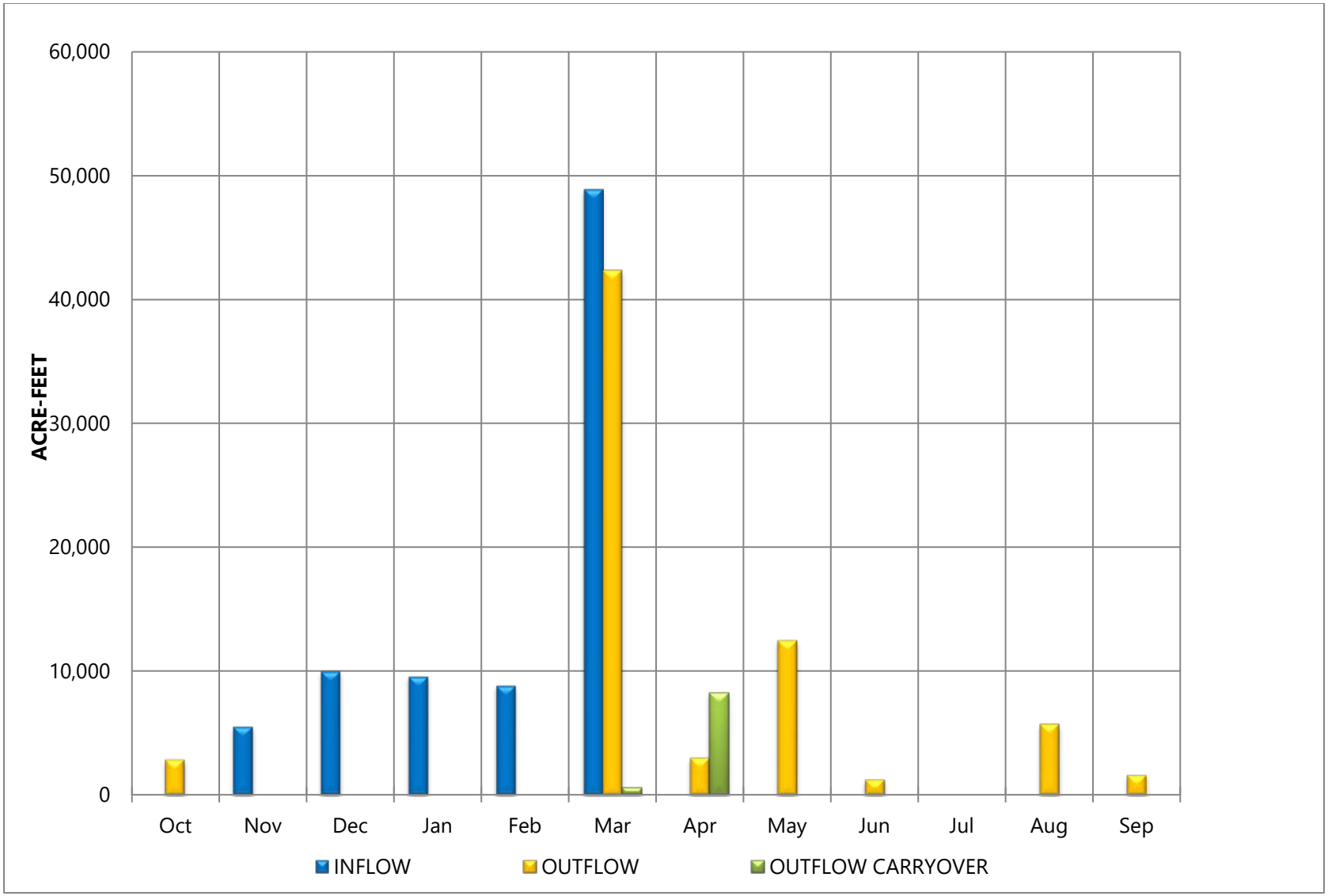


Exhibit 17: Pueblo Reservoir Winter Water WY2019.

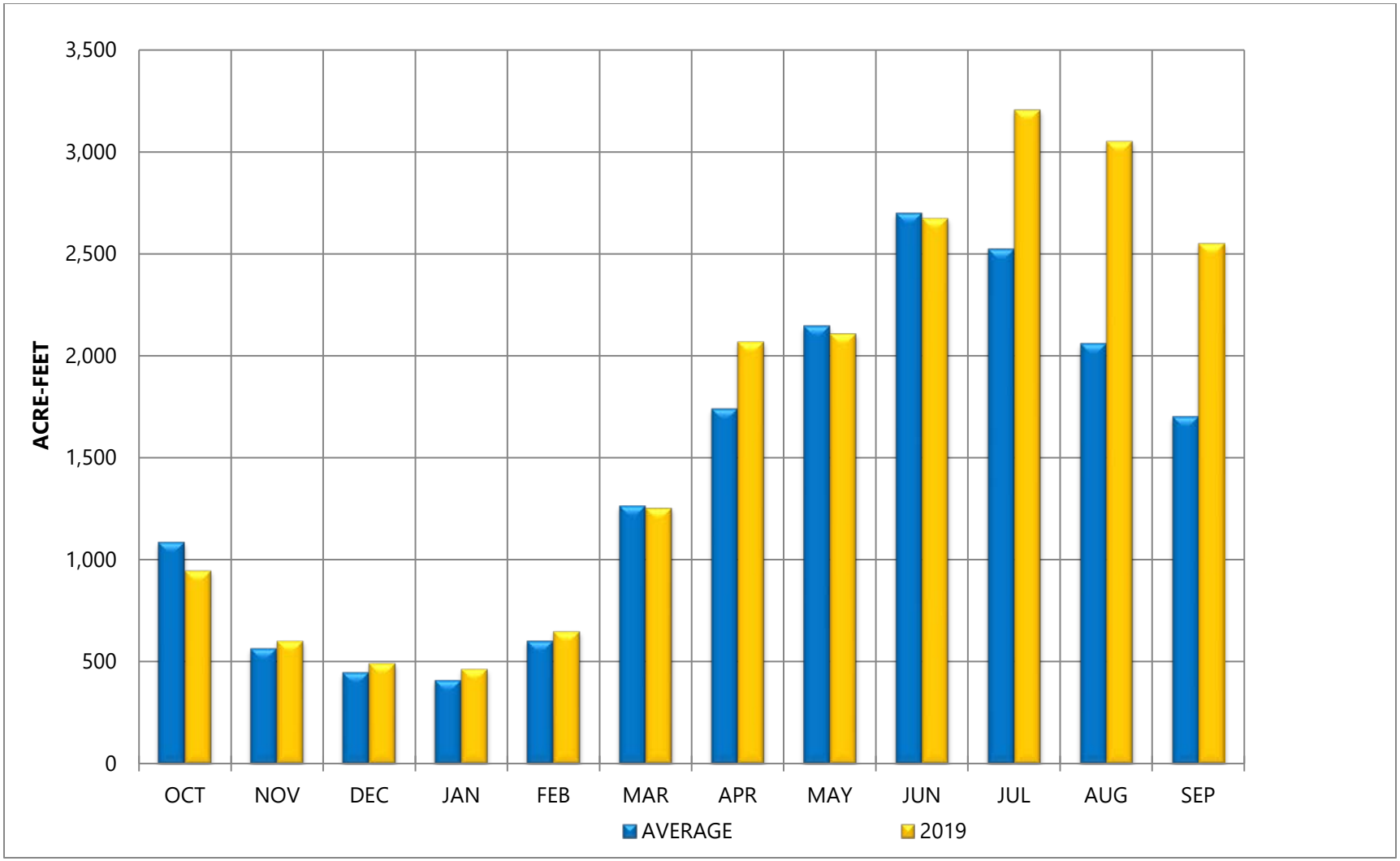


Exhibit 18: Pueblo Dam Monthly Evaporation WY2019.

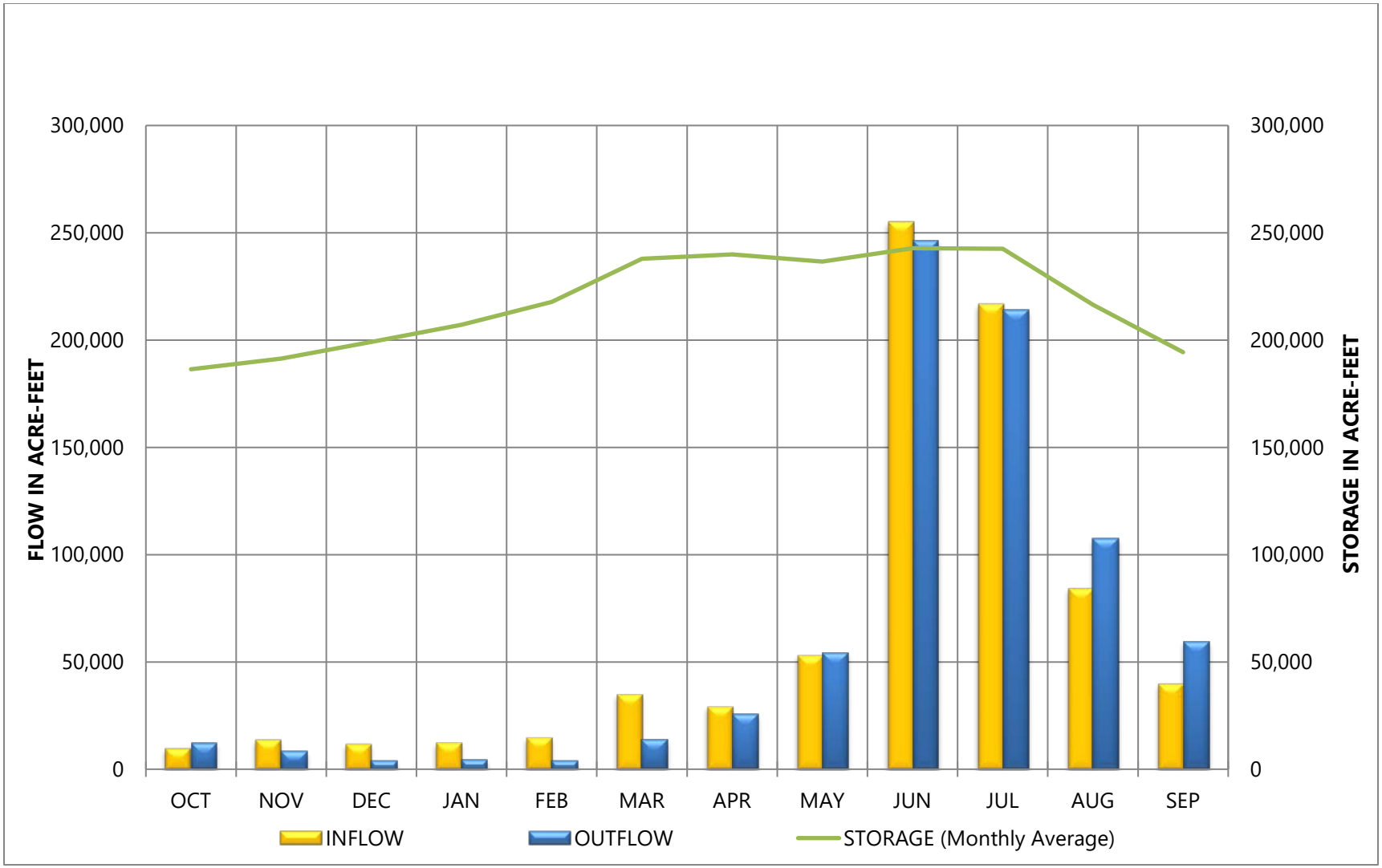


Exhibit 19: Pueblo Reservoir Actual Operations WY2019.

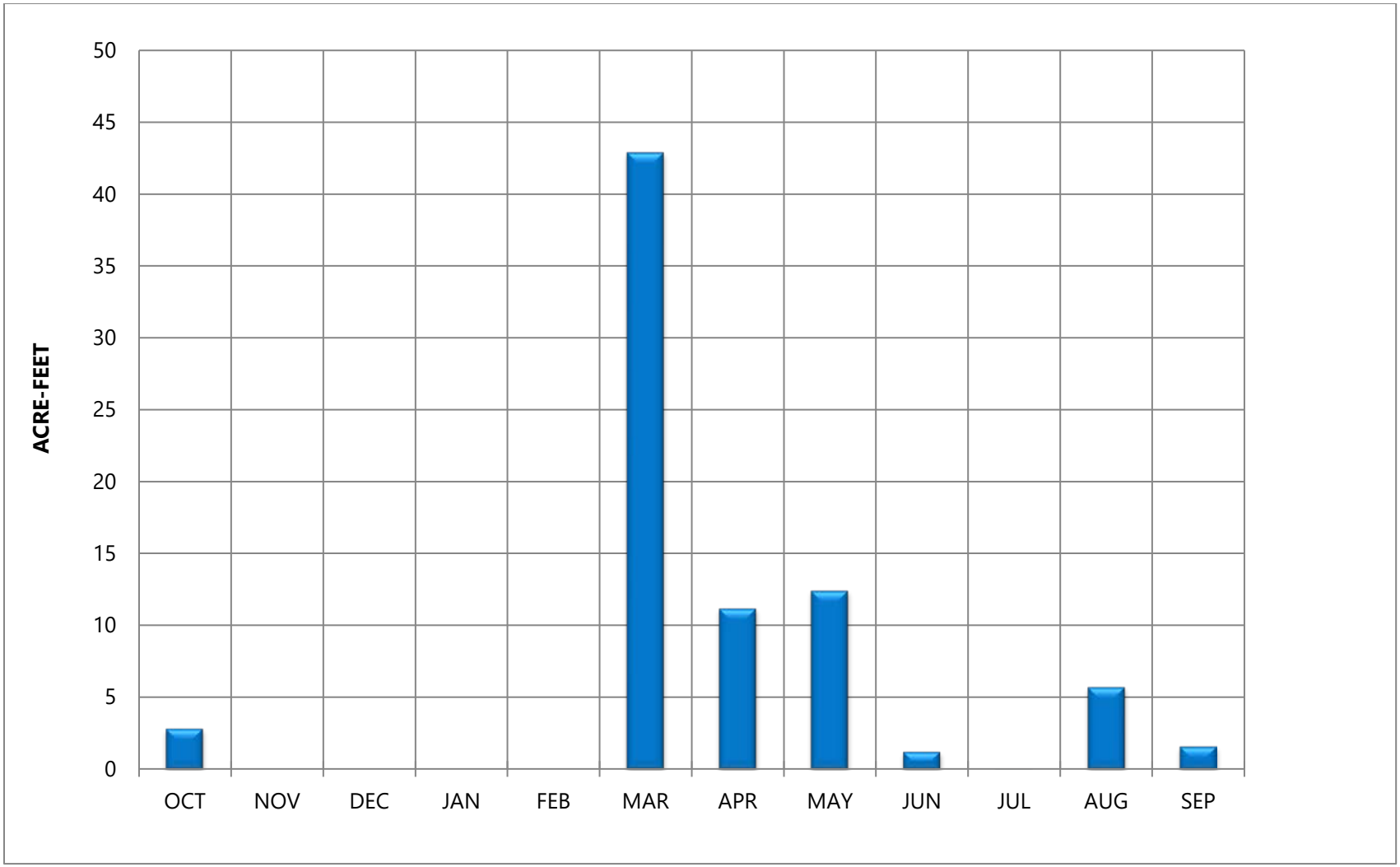


Exhibit 20: Releases of Fryingpan-Arkansas Project Water WY2019.

Appendix C: Twin Lakes Reservoir and Canal Company Exchange with Fryingpan-Arkansas Project Water

Twin Lakes Canal Company Exchange with Fryingpan-Arkansas Project Water WY2019

Units = Acre-Feet

	Lincoln Creek below Grizzly Reservoir (1)	Roaring Fork River above Lost Man (2)	Total Exchanged (3)	Twin Lakes Storage (3) x [1]
Oct 2018	0	0	0	0
Nov 2018	0	0	0	0
Dec 2018	0	0	0	0
Jan 2019	0	0	0	0
Feb 2019	0	0	0	0
Mar 2019	0	0	0	0
Apr 2019	0	0	0	0
May 2019	0	0	0	0
Jun 2019	0	0	0	0
Jul 2019	0	0	0	0
Aug 2019	0	0	0	0
Sep 2019	61.58	0	61.58	61.04
Total	**61.58**	**0**	**61.58**	**61.04**

[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 WY18

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.

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	3.0
September	4.0	3.0

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.

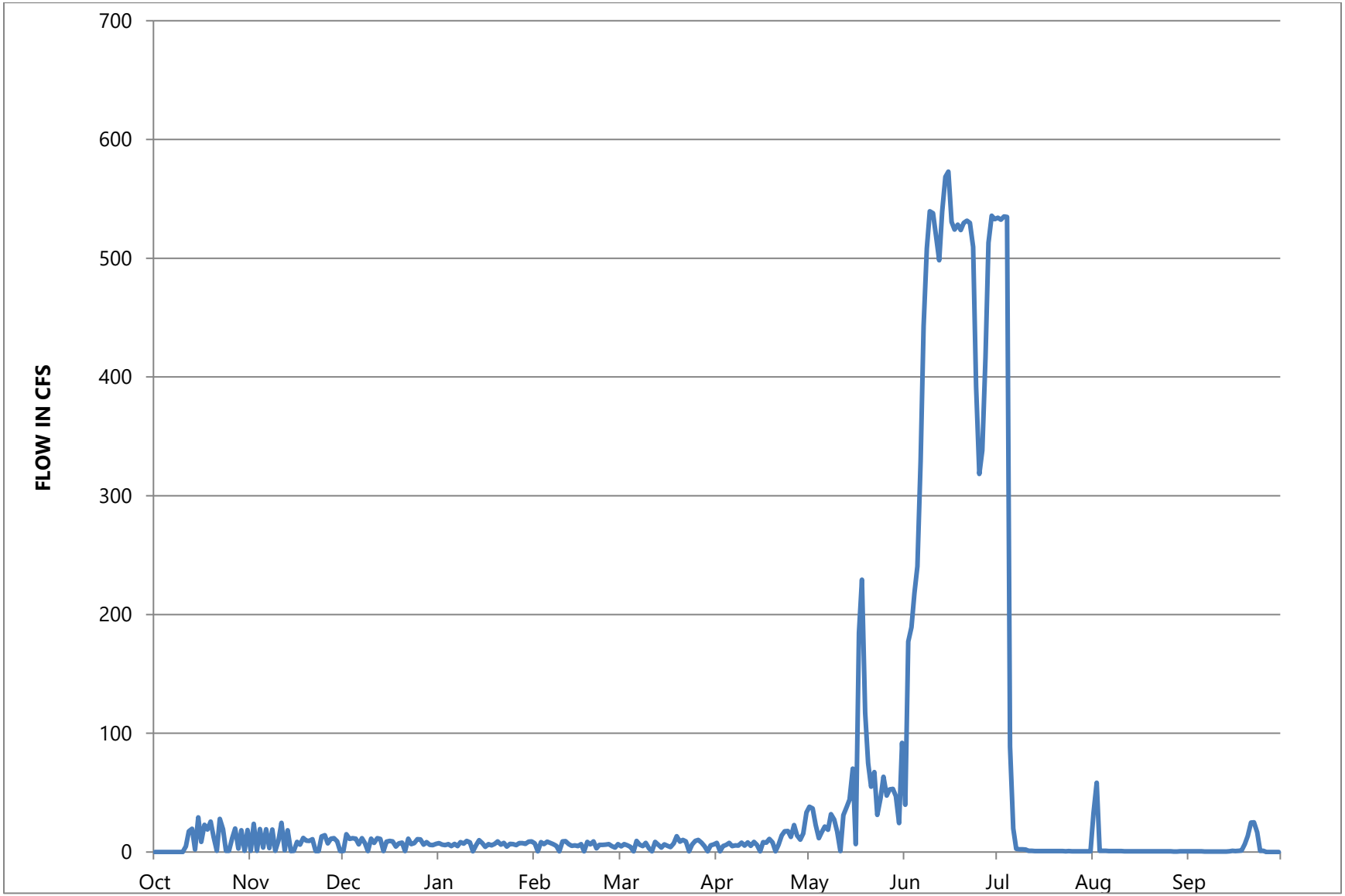
4. In the event less water than the above amounts is bypassed, only the amount actually bypassed will be credited.

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

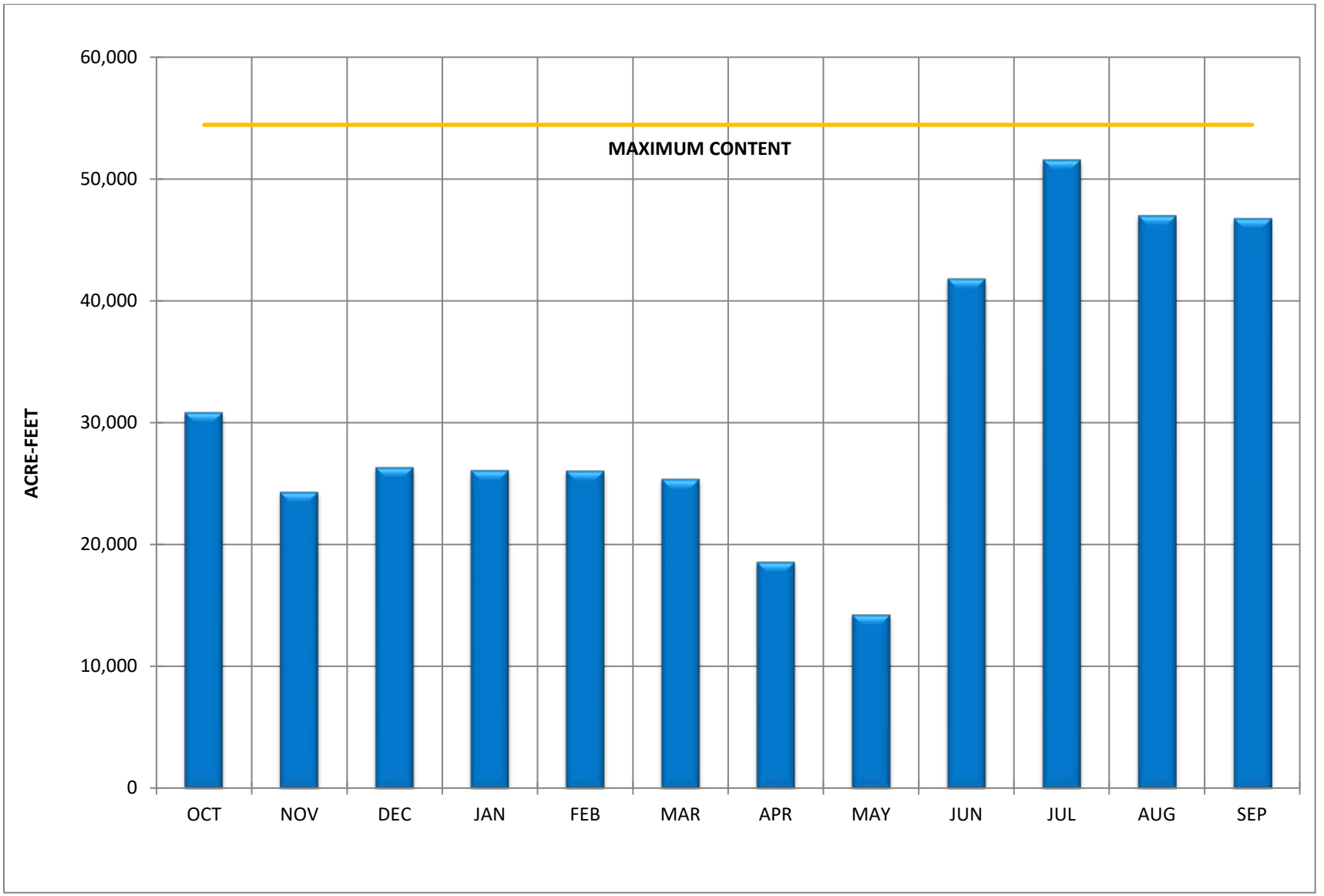
6. No credit for exchange will be made on days when there is no documentation of such bypasses.

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

Twin Lake Tunnel Imports WY2019



Twin Lakes Canal Company Storage WY2019



Appendix D: Daily Discharge Records, Fryingpan-Arkansas Project Collection System

Carter Feeder Conduit near Norrie, CO

WY2019
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1		0.7	6	41.6	16.9	
2		0.2	12.6	40.2	17.5	
3		0	15	40	20.1	
4		0.3	21.3	39.9	18.3	
5		0.7	31.5	40	21.9	
6		2	45	40	18.1	
7		3.6	47.5	40.3	15.1	
8		3.4	47.6	42.6	14.6	
9		2.4	46.6	45	15.4	
10		1.6	40.6	43.6	13.6	
11		1.1	41.9	44.3	11.3	
12		1.4	46.6	41.5	12.7	
13		4.7	50.7	38.1	11.4	
14		5.9	48.6	42	7.8	
15		12.6	46.6	46.4	6	
16		19.2	46.2	48.7	5.6	
17		20	53	50.8	5.8	
18		11.5	50.7	46.6	5.6	
19		6.5	44.7	38.9	2	
20		4.5	40.1	37.4		
21		3.6	40	35.3		
22		2.6	38.9	31.5		
23	0.6	2.2	27	29		
24	2.4	1.9	18	29.1		
25	3.1	2.4	19.6	28.3		
26	4.9	4.1	28.5	24.3		
27	5.7	5.2	37.8	23.2		
28	4.9	4.4	34.9	28.2		
29	2.5	3.5	35	24.1		
30	1.5	3	37.7	21.6		
31		3.4				
TOTAL	25.6	138.6	1,100.2	1,122.5	239.7	
AVERAGE	3.2	4.5	36.7	37.4	12.6	

MAX	5.7	20.0	53.0	50.8	21.9

WY2019 Total: 5209.9 acre-feet
Maximum Instantaneous Peak: 65.7 cfs on 17 Jun 19
Blank: Recorder not operated. No water diverted
M: Missing Data

North Fork Fryingpan River Feeder Conduit near Norrie, CO

WY2019
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1			1.8	22.7	4.7	
2			2.7	21.1	4.4	
3			3.9	21.4	4.1	
4			5.7	20.2	4.1	
5			8.4	18.7	4.2	
6			12.3	18.9	3.8	
7			14	17.9	3.6	
8			16.6	16.7	3.5	
9			17.3	18.3	3.5	
10			14.3	19.3	3.2	
11			14.5	19.2	3	
12			16	17.8	2.8	
13			18.9	17	2.5	
14		0.5	21.5	17.2	2.3	
15		2	18.8	18	2	
16		3	17.8	17.5	1.9	
17		4	19.4	17.4	1.7	
18		3.2	18.4	16.8	1.6	
19		2.5	16.8	14.4	0.6	
20		2.2	16.8	13		
21		2.2	16.9	11.8		
22		1.9	16.4	10.6		
23		1.7	12.8	9.8		
24		1.6	9.8	8.9		
25		1.5	9.8	8.3		
26		1.6	12.7	7.3		
27		1.7	17.1	6.7		
28		1.7	21.8	6.7		
29		1.7	24.2	6.1		
30		1.5	24.5	5.6		
31		1.4				
TOTAL		34.5	452.3	445.3	57.5	
AVERAGE		2.0	14.6	14.8	3.0	
MAX		4.0	24.5	22.7	4.7	

WY2019 Total: 1962.9 acre-feet
Maximum Instantaneous Peak: 29.2 cfs on 30 Jun 19
Blank: Recorder not operated. No water diverted
M: Missing Data

South Fork Fryingpan River Feeder Conduit near Norrie, CO

WY2019
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1		1.5	17.3	164	45.5	
2		1.5	34.1	164.6	42.4	
3		1.5	48.4	162.7	36.8	
4		1.5	57.8	159.1	36.4	
5		1.5	62.7	154.6	40.7	
6		2.4	88.6	152.2	29.9	
7		4.7	117.5	143.3	37.6	
8		5.1	127.6	135	43.4	
9		4.1	129.3	126.7	34.3	
10		3.4	118.3	125.2	27.2	
11		3	119.4	129.4	28.6	
12		3.3	126.6	124.7	25.9	
13		5.5	136.4	118.2	20.8	
14		8.2	158.1	119.1	17.5	
15		13.9	156.5	117.5	15.3	
16		24.7	155.9	110.3	13.5	
17		37.9	151.9	107.3	12	
18		30.5	144.7	96.1	10.3	
19		19.5	139	86.2	3.7	
20		15	138.4	80.5		
21		13	140.3	74.4		
22		10.8	132.9	71.3		
23		8.9	101	66.6		
24		7.5	84.4	66.3		
25	0.9	7.3	95.6	63.5		
26	1.5	9.4	118	63.8		
27	1.5	10.7	132.2	59.3		
28	1.9	11.7	139.1	56.3		
29	1.9	9.8	141.3	50		
30	1.9	8.7	153	47.9		
31		10.4				
TOTAL	9.6	296.9	3466.3	3196.1	521.8	
AVERAGE	1.6	9.6	115.5	106.5	27.5	
MAX	1.9	37.9	158.1	164.6	45.5	

WY2019 Total: 14857.8 acre-feet
Maximum Instantaneous Peak: 185.2 cfs on 14 Jun 19
Blank: Recorder not operated. No water diverted
M: Missing Data

Mormon Creek Feeder Conduit near Norrie, CO

WY2019
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1				45	5.2	
2				60	4.5	
3				59.9	3.9	
4				56.7	3.9	
5				52.1	4.2	
6				54.9	2.7	
7				55.2	3.3	
8				50.1	4.6	
9				46.2	2.9	
10				44.7	1.8	
11				48.6	2.2	
12				43.6	1.8	
13				40.8	1	
14				43.5	0.5	
15				44.2	0.1	
16				40.8		
17				38.8		
18				33		
19				28.6		
20			18.9	25		
21			48.3	22.8		
22			44.9	22.7		
23			30.8	18.3		
24			23.3	16.7		
25			27.6	14.2		
26			41.1	12.9		
27			51.9	12.4		
28			57.8	12.8		
29			59.9	9		
30			57.9	6.7		
31						
TOTAL			462.4	1060.2	42.6	
AVERAGE			42.0	35.3	2.8	
MAX			59.9	60.0	5.2	

WY2019 total: 3104.6 acre-feet
Maximum Instantaneous Peak 164.3 cfs on 1 Jul 19
Blank: Recorder not operated. No water diverted
M: Missing Data

North Cunningham Feeder Conduit near Norrie, CO

WY2019
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1		0.8	3.5	25.1	1.4	
2		0.5	9	31.4	0.9	
3		0.3	12.9	28.7	0.5	
4		0.6	14.6	24.6	0.5	
5		0.6	17.9	24.7	0.9	
6		0.9	23.8	26.2	0.2	
7		1.3	27	25.7	0.9	
8		2.1	26	24.5	1.5	
9		1.6	25.1	22.8	0.5	
10		1.1	21.9	22.4	0	
11		0.9	23.2	23.7	0.3	
12		0.9	25.4	20.8	0.1	
13		2.5	28.2	19.5		
14		4	29.3	21.6		
15		5.3	27.1	22.3		
16		8.4	25.4	19.8		
17		10.2	39.3	18.6		
18		5.3	30.3	15.9		
19		3.4	26.2	13.7		
20		2.4	27.8	11.8		
21		1.8	26.8	10.2		
22		1.3	23	9.5		
23		1	15.2	7.6		
24		0.8	11.9	6.5		
25	1	1.4	14.3	5.3		
26	3.1	3.1	21.1	4.5		
27	3.5	3.1	25.4	3.9		
28	3.2	2.8	27.9	3.7		
29	1.9	2	29.1	2.5		
30	1.3	1.6	29.4	1.7		
31		1.7		1.6		
TOTAL	14	73.7	688	500.8	7.7	
AVERAGE	2.3	2.4	22.9	16.2	0.6	
MAX	3.5	10.2	39.3	31.4	1.5	

WY2019 Total: 2547.2 acre-feet
Maximum Instantaneous Peak: 90.7 cfs on 17 Jun 19
Blank: Recorder not operated. No water diverted
M: Missing Data

Middle Cunningham Feeder Conduit near Norrie, CO

WY2019
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1			4.5	61.3	15.2	
2			13.8		13.2	
3			20.1	67.6	11.8	
4			24.5	60.5	12.5	
5			29.5	63.9	13	
6			50.4	69.8	8.6	
7			61.4	78.4	10.6	
8			71.2	83.8	11.4	
9			77.4	85.1	8.8	
10			77.4	79	294.5	
11			76.1	80.2	7.7	
12			76.1	79.1	6.5	
13			71.3	76.8		
14		6.3	49.6	75.1		
15		11.1	50	73.4		
16		16.6	66.1	66.5		
17		20	66.5	61.9		
18		9.2	68.9	52		
19		5.1	68.1	44.6		
20		3.4	64	39.1		
21		2.1	63.7	35.6		
22		1.2	68.4	33.3		
23		0.7	64	31.1		
24		0.2	54	29.9		
25			60.8	28.4		
26		1.3	70.5	36.9		
27		1.4	65.8	28.2		
28		1	59.8	24.2		
29		0.3	64.5	19.9		
30			68.1	19.5		
31		1		18.8		
TOTAL		80.9	1726.5	1603.9	413.8	
AVERAGE		5.1	57.6	53.5	34.5	
MAX		20.0	77.4	85.1	294.5	

WY2019 Total: 7587.1 acre-feet
Maximum Instantaneous Peak:
Blank: Recorder not operated. No water diverted
M: Missing Data

Ivanhoe Creek Feeder Conduit near Norrie, CO

WY2019
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1		6.2	9.3	128.9	15	1.4
2		4.8	36.3	129.8	12.7	1.4
3		4.4	49.1	130.3	10.8	1.4
4		5	57.1	133	10	1.4
5		5.1	65.8	130	10.7	1.4
6		5.9	86.2	125	9.3	1.4
7		8	94.1	120.5	10.3	1.4
8		9.5	101.5	114.1	13.4	1.4
9		7.8	97.3	107.5	11	1.4
10		6.3	81.1	103.1	9.3	1.4
11		5.2	84.2	101.7	9.3	1.3
12		5.9	95.7	97	8.8	1.2
13		9.8	103.3	92.2	7.3	0.8
14		15.5	110.2	93.9	5.9	
15		21.9	96.4	92.3	4.9	
16		29.7	90.5	59.1	4	
17		37	129	35.6	3.3	
18		23	127.9	36.3	2.7	
19		16.5	130.2	38.7	2	
20		13	134	38.7	1.7	
21		11	134.9	35.9	1.6	
22		9.7	128.3	33.9	1.5	
23		9	106.4	31.5	1.5	
24	0.9	8.3	93.4	24.4	1.5	
25	4.4	10.1	96.3	19.1	1.5	
26	6.6	14.1	110.7	20.6	1.5	
27	8.9	14.9	121	19.3	1.5	
28	9.7	15.1	127.4	18.3	1.5	
29	8.9	12.7	129.9	16.7	1.5	
30	8.1	10.9	130.9	15	1.5	
31		5			15.4	
TOTAL	47.5	361.3	2958.4	2142.4	192.9	17.3
AVERAGE	6.8	11.7	98.6	71.4	6.2	1.3
MAX	9.7	37.0	134.9	133.0	15.4	1.4

WY2019 total: 11345.2 acre-feet
Maximum Instantaneous Peak 155.0 on 17 Jun 19
Blank: Recorder not operated. No water diverted
M: Missing Data

Lily Pad Creek Feeder Conduit near Norrie, CO

WY2019
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1		5.5	9.5	27.2	1	0.2
2		5.5	12.6	23.5	0.9	0.2
3		5.6	14.6	21.8	0.8	0.2
4		5.6	15.6	17.1	0.9	0.2
5		5.7	16.1	14.6	1.3	0.1
6		6.2	18.8	13.2	0.7	
7		6.9	21.4	11.5	1.4	
8		7	25.5	10.1	1.9	
9		6.6	28.7	8.9	1.1	
10		6.4	27.1	8.4	0.8	
11		6.2	27.1	8.4	1.1	
12		6.3	29.2	8.2	1	
13		7.1	33	7.5	0.7	
14		8.2	35.5	7.3	0.6	
15		9.2	33.6	7.4	0.5	
16		11.1	28.9	6.7	0.5	
17		12.2	28.6	5.7	0.4	
18		11.1	26.7	4.8	0.4	
19	1.9	10	29.5	3.9	0.4	
20	4	9	33.4	3.4	0.4	
21	4.3	7.9	30.7	2.9	0.3	
22	4.7	7.4	24.2	2.9	0.3	
23	5.2	7.5	18	2.6	0.3	
24	4.9	7.1	15.9	2.1	0.3	
25	5.3	7.3	17.3	2.2	0.3	
26	5.7	8	20.5	2.1	0.2	
27	6.1	8.3	25.7	1.8	0.2	
28	6	8.5	28.9	1.7	0.2	
29	5.7	8	30.5	1.2	0.2	
30	5.6	7.9	28.4	1.1	0.2	
31		8		1	0.2	
TOTAL	59.4	237.3	735.5	241.2	19.5	0.9
AVERAGE	5.0	7.7	24.5	7.8	0.6	0.2
MAX	6.1	12.2	35.5	27.2	1.9	0.2

WY2019 Total: 2566.3 acre-feet
Maximum Instantaneous Peak: 38.2 on 20 Jun 19
Blank: Recorder not operated. No water diverted
M: Missing Data

Granite Creek Feeder Conduit near Norrie, CO

WY2019
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1			1.3	62.6	6.7	1.6
2			3.5	43.8	6.1	1.6
3			5.8	41	5.7	1.5
4			7.9	33.4	6.8	1.5
5			9.5	31	7.8	1.4
6			13.5	28.9	5.7	1.3
7			19.2	27	6.9	1.3
8			23.1	25.8	7.9	1.3
9			23.2	24.1	6.3	1.3
10			20.8	23.1	5.3	1.3
11			21.5	22.5	5.7	1.3
12		0	24	20.9	5	1.3
13		0.1	28.3	20	4.3	0.6
14		0.4	31.6	19.6	3.8	
15		0.7	29.2	18.2	3.5	
16		1.6	28.4	17.6	3.3	
17		2.3	41.6	17.5	3.1	
18		1.4	37.4	15.5	2.8	
19		0.9	32.4	13.8	2.7	
20		0.7	37.3	12.7	2.6	
21		0.6	37.9	11.7	2.5	
22		0.5	33.8	11.2	2.4	
23		0.4	26.9	10.6	2.2	
24		0.4	23.8	10.5	2.2	
25		0.4	24.8	10.5	2.1	
26		0.6	28.4	9.6	2.1	
27		0.8	32.9	8.7	2	
28		0.9	36	8.6	1.8	
29		0.8	38.7	7.7	1.8	
30		0.6	40.4	7	1.7	
31		0.7		7.3	1.6	
TOTAL		22.1	763.1	616.1	123	17.3
AVERAGE		1.1	25.4	19.9	4.0	1.3
MAX		8.0	41.6	62.6	7.9	1.6

WY2019 Total: 3057.8 acre-feet
Maximum Instantaneous Peak: 206.4 cfs on 1 Jul 19
Blank: Recorder not operated. No water diverted
M: Missing Data

No Name Creek Feeder Conduit near Norrie, CO

WY2019
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1			2.5	40.1		
2			9.2			
3			13.1	39.9		
4			16.2	31.2		
5			18.3	30		
6			32.2	28.8		
7			41	28.6		
8			39.2	27.1		
9			44.8	24		
10			46.4	17.4		
11			47.3	10.8		
12			47.8	10.6		
13			48	5.3		
14			32	0.2		
15			45.1	0.2		
16		5.6	47.3	0.2		
17		8.6	50	6.9		
18		3.3	51.6	8.9		
19		1.2	51.6	6.8		
20			50.1	5.6		
21			49.8	4.1		
22			41	3.1		
23			38.6	2.2		
24			38.2	1.4		
25			42.9	0.8		
26			48.6	1.8		
27			49.3	1.3		
28			49.7			
29			34.4			
30			33.2			
31						
TOTAL		18.7	1159.4	337.3		
AVERAGE		4.7	38.6	13.0		
MAX		8.6	51.6	40.1		

WY2019 Total: 3005.8 acre-feet.
Maximum Instantaneous Peak:
Blank: Recorder not operated.
M: Missing Data

Midway Creek Feeder Conduit near Norrie, CO

WY2019
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1			4.5	61.3	15.2	
2			13.8		13.2	
3			20.1	67.6	11.8	
4			24.5	60.5	12.5	
5			29.5	63.9	13	
6			50.4	69.8	8.6	
7			61.4	78.4	10.6	
8			71.2	83.8	11.4	
9			77.4	85.1	8.8	
10			77.4	79	294.5	
11			76.1	80.2	7.7	
12			76.1	79.1	6.5	
13			71.3	76.8		
14		6.3	49.6	75.1		
15		11.1	50	73.4		
16		16.6	66.1	66.5		
17		20	66.5	61.9		
18		9.2	68.9	52		
19		5.1	68.1	44.6		
20		3.4	64	39.1		
21		2.1	63.7	35.6		
22		1.2	68.4	33.3		
23		0.7	64	31.1		
24		0.2	54	29.9		
25			60.8	28.4		
26		1.3	70.5	36.9		
27		1.4	65.8	28.2		
28		1	59.8	24.2		
29		0.3	64.5	19.9		
30			68.1	19.5		
31		1		18.8		
TOTAL		80.9	1726.5	1585.1	413.8	
AVERAGE		6.4	56.5	59.7	34.5	
MAX		20.0	77.4	85.1	294.5	

WY2019 Total: 7549.8 acre-feet.
Maximum Instantaneous Peak:
Blank: Recorder not operated.
M: Missing Data

Hunter Creek Feeder Conduit near Norrie, CO

WY2019
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1				40.2	15.8	
2			18.4		7.9	
3			28.5	50.5		
4			33.7	56.1		
5			39.4	59.9	18.7	
6			68.8	59.9	5.4	
7			80	68.3		
8			71.9	78.2		
9			74.8	78.3	6.8	
10			10.5	78.4		
11			78.6	79.9		
12			74.4	76.7	2.4	
13			66	74.5		
14			59.3	73		
15		8.5	59.9	70.4		
16		18.1	88.3	66.7		
17		25.5	66.3	65		
18		5.4	70.9	55.7		
19			72.1	49		
20			62.9	44.5		
21			60.4	40.7		
22			60	40.3		
23			54.4	36.7		
24			42.2	37.2		
25			49.9	33.2		
26			62.6	36.2		
27			59.8	30.2		
28			50.1	27.9		
29			50	21.7		
30			41.5	18.8		
31				21.9		
TOTAL		57.5	1655.6	1570	57	
AVERAGE		14.4	57.1	52.3	9.5	
MAX		25.5	88.3	79.9	18.7	

WY2019 Total: 6625.1 acre-feet
Maximum Instantaneous Peak:
Blank: Recorder not operated. No water diverted
M: Missing Data

Sawyer Creek Feeder Conduit near Norrie, CO

WY2019
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1		1	2.6	29.1	6.6	1.5
2		0.9	3.8	28	6.2	1.4
3		0.8	4.8	30.7	5.8	1.4
4		0.8	6.2	30.5	6.1	1.3
5		0.9	8.1	29	6.6	1.4
6		1	13	27.5	5.6	1.6
7		1.1	18.6	25.9	6.9	1.9
8		1.2	23.4	25.6	7.4	1.6
9		1.1	26.2	23.8	6.3	1
10		1	24.4	22.8	5.6	
11		0.9	26.4	23	6.2	
12		1	28.8	22.3	5.5	
13		1.1	31.7	21.2	4.8	
14		1.3	31.8	20.5	4.3	
15		1.8	30	19.9	3.9	
16		2.6	30	19.1	3.6	
17		3.4	29.8	18.3	3.4	
18		2.5	28.9	16.9	3.1	
19		2.1	29.3	15.3	2.9	
20		1.9	30.5	14.2	2.7	
21		2	30.2	13	2.6	
22		1.9	26.6	12.1	2.4	
23		1.7	21	11.2	2.3	
24	0.2	1.7	18.6	10.6	2.2	
25	0.6	1.8	19.7	9.9	2.1	
26	0.9	1.9	24.3	9.6	2	
27	1.2	2	28.9	9.1	1.9	
28	1.2	2	31.4	8.7	1.8	
29	1.1	1.9	29.5	7.8	1.7	
30	1.1	1.8	26.9	7.4	1.6	
31		1.9		7	1.6	
TOTAL	6.3	47.1	685.4	570	124.1	13.1
AVERAGE	0.9	1.6	22.8	18.4	4.1	1.5
MAX	1.2	3.4	31.8	30.7	7.4	1.9

WY2019 Total: 2868.1 acre-feet
Maximum Instantaneous Peak: 36.1 cfs on 14 Jun 19
Blank: Recorder not operated. No water diverted
M: Missing Data

Chapman Gulch Feeder Conduit near Norrie, CO

WY2019
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1			12.1	272.9	64.5	3.3
2			54.3	262.2	52.9	3.1
3			82.5	274.5	43.7	2.8
4			102	260.2	56.4	2.4
5			118.7	256.7	75.5	1.8
6		0.1	193.2	257.2	43.5	1.8
7		0.9	247.6	263.3	47.2	1.9
8		1.4	260.4	279.9	53.8	1.8
9		0.6	272	271.9	47.5	1.9
10		0.2	263.1	266.5	34	1.7
11		0.1	270.7	264.7	42.7	1.7
12		0.1	282.3	253.8	36.5	1.7
13		1.1	293.9	242.3	23.7	0.6
14		8.4	254.6	233.8	18	
15		23.5	258.1	228.2	15	
16		46.7	271.2	213.9	12.4	
17		72.5	281.6	211.5	11.3	
18		28.8	285.5	187.9	10.3	
19		12.5	292	164.2	9.6	
20		7.5	287.6	150	8.8	
21		5.2	280.8	136.7	8.2	
22		3.6	257.3	130	7.7	
23		2.5	216.6	120	7.1	
24		1.7	177.9	117.3	6.4	
25		1.9	200.9	109	6.3	
26		4.3	253.5	119.3	5.9	
27		4.9	280.8	106.1	5.2	
28		4.4	274.1	95.5	4.4	
29		3.1	282.1	79.6	4.1	
30		2.2	257.4	71.7	3.9	
31		3.2		79.6	3.7	
TOTAL		241.4	6864.8	5900.8	770.2	26.5
AVERAGE		9.3	228.8	196.7	24.8	2.0
MAX		72.5	293.9	279.9	75.5	3.3

WY2019 Total: 27379.6 acre-feet
Maximum Instantaneous Peak: 308.3 cfs on 11 Jun 19
Blank: Recorder not operated. No water diverted
M: Missing Data

Fryingpan River Feeder Conduit near Norrie, CO

WY2019
Unit: Cubic Feet per Second
Source: Bureau of Reclamation

	April	May	June	July	August	September
1		9.9	243.9	53.7	53.7	
2		1.2	49.1	254.6	45.6	
3		1	78.6	240.7	41.3	
4		1.1	87.1	235	41.8	
5		1.1	98.6	222.8	43.7	
6		3.8	135.3	212.1	35.3	
7		8.1	168.6	195.4	40.4	
8		8.3	193.5	183.1	43	
9		5	187.4	171.8	34.7	
10		3.3	168.9	169.3	27.8	
11		2.6	171	174.3	29.5	
12		4.9	186.4	168.3	25	
13		11.4	215	159.8	10.8	
14		18.3	239.5	159.7	2.4	
15		29	226	162.5	0.7	
16		41.6	219.2	156.1		
17		46.2	218	154.3		
18		35.2	205.4	143		
19		31.6	208.7	129.3		
20		22.4	231.5	123.2		
21		17	232.9	114.9		
22		13.5	204.9	111.9		
23		11.7	153.3	105.3		
24		9.8	126.3	105.7		
25	1.4	10.9	127.8	100.8		
26	5	15.3	149.7	91.6		
27	7	20.2	187.6	87.1		
28	6.2	21.1	224	85.8		
29	3.6	16.5	242.5	79.1		
30	2.3	15	244.7	66		
31		6.7		58.9		
TOTAL	25.5	434.9	5191.4	4666.3	475.7	
AVERAGE	4.3	14.0	173.0	150.5	31.7	
MAX	7.0	46.2	244.7	254.6	53.7	

WY2019 Total: 21409.5 acre-feet
Maximum Instantaneous Peak: 297.9 on 2 Jul 19
Blank: Recorder not operated. No water diverted
M: Missing Data

Appendix E: Fryingpan-Arkansas Project Operating Principles

87th Congress, 1st 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 acre-feet. 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 acre-feet: 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 acre-feet of water in any year, but not to exceed a total aggregate of 2,352,800 acre-feet 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 acre-feet.

(c) For 3,000 acre-feet 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	Acre-feet (thousands)	Month	Average Second-feet	Acre-feet (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 acre-feet 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, 75th Congress, 1st 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, 81st Congress, 1st session), and the Colorado River Compact of November 24, 1922 (House Document 605, 67th Congress, 4th 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, this 9th day of December 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