BUREAU OF RECLAMATION

Fryingpan-Arkansas Project

Summary of Actual Operations
Water Year 2022

Annual Operating Plans

Ruedi Reservoir, Colorado

Eastern Colorado Area Office
Missouri Basin Region

U.S. Department of the Interior **April 2021**

Mission Statements

The U. S. Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated Island Communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Cover Photo – Pueblo Reservoir in Colorado. Photo credit: Stan Core

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Project Highlights

Date	Event
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.
June 14, 1979	Initial diversion from North Cunningham Creek.
May 8, 1980	Initial diversion from Hunter, Midway and No Name Creeks.
June 4, 1980	Initial diversion from North Fork and South Cunningham Creeks.
December 8, 1980	Federal Register notification of availability of water from Ruedi Reservoir.
April 28, 1981	Initial diversion from Carter Creek.

Date	Event
May 6, 1981	Initial diversion from Granite Creek.
June 1, 1981	Assume operation at Twin Lakes Dam.
June 23, 1981	Mt. Elbert Forebay filled.
September 29, 1981	Mt. Elbert Power Plant dedicated.
October 1, 1981	Mt. Elbert Unit #1 was made commercially available to Western Area Power Administration (WAPA) for their use.
May 5, 1982	Initial diversion from Halfmoon Creek.
July 29, 1982	Turquoise Lake filled for first time.
September 14, 1983	Initial diversion from south outlet works at Pueblo Dam for Pueblo West, CO.
August 9, 1984	Mt. Elbert Unit #2 was made commercially available to WAPA for their use.
May 24, 1985	Began storing water under Arkansas River Decree.
July 1, 1985	Initial diversion through Fountain Valley Conduit.
August 1985	Ruedi Hydroplant began operations.
November 27, 1985	Twin Lakes pipeline began operations.
May 7, 1986	Sugar Loaf Hydroplant began operations.
June 1986	Imports restricted due to high east slope storage.
November 10, 1987	Winter water storage decree approved and signed.
November 17, 1989	Initial release from Twin Lakes Reservoir for recreational benefits on the Arkansas River.
August 14, 1990	Initial release from Ruedi Reservoir for endangered fish (conservation flows pursuant to the biological opinion) in the Colorado River's "15-mile reach" for the U. S. Fish & Wildlife Service from water leased by the Colorado Water Conservation Board.
September 28, 1990	Dedication of Pueblo Fish Hatchery and the completion of construction on the Fryingpan-Arkansas Project ceremony.
November 1990	Final winter storage decree signed by court.
July 21, 1992	Dedication of Leadville Mine Drainage Tunnel Water Treatment Plant.
September 29, 1994	Transfer of Phase II of the Pueblo Fish Hatchery at Pueblo Reservoir to Colorado Division of Wildlife.
May 15, 1995	Final transfer of recreational facilities at Pueblo to the Department of Parks and Outdoor Recreation.

Date	Event
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 2022 Operation

General Overview

This is the fifty-fourth annual operating plan (AOP) for the Bureau of Reclamation's (Reclamation) 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 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, First Session), and are included in Appendix E.

This annual operating plan is a summary of the actual project operation in Water Year (WY) 2022 (October 1, 2021, through September 30, 2022). All tables can be found in Appendix A and all exhibits can be found in Appendix B.

Project Features in Operation during Water Year 2022

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 (AF) at a water surface elevation of 7,766.0 feet. The reservoir is operated on an annual cycle. Steady winter releases draft the reservoir such that it can be 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 five 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 reservoir has a total capacity of 129,398 AF at a water surface elevation of 9,869.4 feet and 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 reservoir 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 reservoir and returned to the Arkansas River via the Mt. Elbert Conduit, the Mt. Elbert Power Plant, and Twin Lakes. There is a small hydroelectric powerplant above Mt. Elbert Conduit. The reservoir is also operated to provide for recreation and wildlife habitat.

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

The Mt. Elbert Powerplant is a pumped-storage facility located on the shore of Twin Lakes. It has two 100-megawatt turbine generators, which can be reversed and used as 340,000 horsepower pumps. In addition to being used to generate energy with the Mt. Elbert Conduit flow, the plant is used to follow daily peak power loads. This load following is accomplished by pumping water to the Mt. Elbert Forebay, an 11,143 AF regulating pool at the terminus of the Mt. Elbert Conduit, from Twin Lakes during off-peak load hours using surplus or low-cost energy. That water is then returned to Twin Lakes through the turbines during peak load hours, along with the Mt. Elbert Conduit flow. The energy generated at the plant is transmitted and marketed by the Western Area Power Administration (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 AF 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 AF. During construction, the dead pool (the elevation below which water cannot physically be released) was determined to be 9,157.5 feet (54,955 AF).

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 AF at a water surface elevation of 4,898.7 feet. The upper 26,990 AF of storage space are always reserved exclusively for flood control, while an additional 66,011 AF of space are reserved for flood control seasonally from April 15 through November 1. Pueblo Reservoir is also operated to provide for recreation, wildlife habitat, and flood control.

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. Power production began in 2019.

Hydrologic Conditions and Weather Events in Water Year 2022

Annual precipitation in the Fryingpan River Basin above Ruedi Reservoir was below average for more than half the months in WY2022. Precipitation started out the year slightly above average in October and then in November decreased to below average accumulation. December was the only winter month in which precipitation was above average, with 164 percent of average. January precipitation was 71 percent of average. February precipitation continued to decrease, ending the month at 66 percent of average. March also received below average precipitation but slightly improved over February, finishing the month at 79 percent of average. During March and April both months were about 80 percent of average. May precipitation showed considerable improvement from the winter trend and ended the month at 95 percent of average. June through August returned to above average precipitation. June improved up to 126 percent of average and July and August saw significant increases from monsoonal rain events and recorded 139 and 210 percent of average precipitation, respectively. September precipitation was 65 percent of average precipitation in the basin. Total annual precipitation accumulation for WY2022 was 103 percent of average.

Snowpack accumulation in the watershed above Ruedi Reservoir remained very close to the historical median snowpack accumulation for most of the accumulation season. Snow accumulation started out above median in October but declined quickly in November. December saw significant increases in snow accumulation with the year's first significant series of storms. At the end of December, snowpack in the Fryingpan River Basin was 171 percent of median. Then from January to March, snow accumulation returned to below median accumulation. February was the worst month of the winter for snowpack accumulation, receiving only 57 percent of median. April snow accumulation was 129 percent of median. This trend was reversed in May, with snowpack accumulation only 84 percent of median. May temperatures increased resulting in quicker snowpack. The snowpack melt-out rate was very close to median rates, losing about 5 inches of snow water equivalent for the month. On average, all the SNOTEL sites in the basin group melted out by June 17, two days earlier than the normal melt out date for June.

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

The average temperature in October was one degree above average, increasing in November and December to six degrees above average. February and March temperatures were closer to normal. February was 1.5 degrees below average and March was right at average temperature for the basin. After March, basin temperatures increased and every month except June was above average for the remainder of the year. The summer months exhibited above-average temperatures. September, the relatively warmest month, was 4.1 degrees above average. The seasons of the year averaged the following temperature deviations above average: autumn 4.0, winter 2.2, spring 0.9, and summer 1.4 degrees above average. Overall, the year averaged 1.9 degrees above average.

Import forecasts were made using the PyForecast software package. The forecasts for 2021 were: February: 59,100 AF, March: 47,400 AF, April: 42,300 AF, and May: 45,300 AF. The total water through the Boustead Tunnel was 51,684 AF. Total imports in WY2021 were 47,232 AF.

The collection system began diverting in mid-April. Runoff began April 22.

The flows through Boustead Tunnel can only be stored when the flow at the Fryingpan River near Thomasville gage is above a specified 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 B-5 for flows at the Thomasville gage.

Report on Operations during Water Year 2022

Ruedi Reservoir

Ruedi Reservoir started out WY2022 with a storage content of 61,743 AF, 72 percent of average. During the winter months Ruedi Reservoir was drawn down to its lowest storage content for the year of 54,880 AF on March 25. In Late-October and early November the release from Ruedi Reservoir was lowered to the winter flow target of 45 cfs and was held at this rate until February

when it was increased to 70 cfs for a few months. This winter flow increase was in response to the Colorado Water Conservation Board (CWCB) leasing water to be released during the coldest months of the winter to alleviate anchor ice in the lower Fryingpan River. All releases during the winter months were made through the city of Aspen's hydroelectric powerplant.

In January the first forecast of undepleted inflow to Ruedi Reservoir was computed by the Colorado Basin River Forecast Center. This forecast indicated that the runoff resulting from snowpack melt in the basin would be 104 percent of average. This would result in an April through July runoff volume of 140 kaf. Reservoir storage was below average at the beginning of the month and modeling of reservoir futures based on the January undepleted inflow forecast suggested that continuing at the then-current release of 45 cfs would fill the reservoir by early July.

On the first day of February the release to the Fryingpan River was increased from 45 to 70 cfs for anchor ice mitigation. The first statistical forecast of undepleted inflow was computed by Reclamation in February. This undepleted inflow forecast decreased from the previous month to 128 kaf for the April through July period, 95 percent of average. Reservoir storage remained below average and the release from the reservoir was held constant at 70 cfs throughout the month. Modeling of reservoir futures based on the February undepleted inflow forecast indicated that the reservoir would fill by early July.

On the first day of March the release to the Fryingpan River was decreased from 70 cfs to 55 for anchor ice mitigation. Reclamation's statistical forecast of undepleted inflow to Ruedi Reservoir calculated on March 1 decreased to 124 kaf for the April through July period, 92 percent of average. The reservoir release was decreased from 55 cfs to 42 cfs on March 20, after all the anchor ice mitigation water was released. With this flow reduction and the new forecast of undepleted inflow modeling of reservoir futures indicated that the reservoir would fill under the most probable assumptions. Modeling of reservoir futures further predicted that inflow in July, after the reservoir filled, would not be above the downstream safe channel capacity of 850 cfs. Therefore, no further changes were made to the reservoir release in March.

In April the forecast of undepleted inflow for the April through July period decreased to 121 kaf, 90 percent of average. This forecast projected that Ruedi Reservoir would fill under all three scenarios: most probable, minimum reasonable and the maximum reasonable hydrologic conditions. Reservoir modeling using this forecast determined that there was no risk of exceeding the safe channel capacity once the reservoir filled in early July, thus releases remained at 42 cfs for the entire month of April.

Runoff increased in early May and releases from the reservoir were increased to the minimum required flow of 110 cfs on May 1. The most probable forecast of undepleted inflow dropped from the April forecast of 121 kaf to 109 kaf, 81 percent of average over the April to July period. This forecast indicated that the reservoir would not fill under all three modeling scenarios. With this lower runoff forecast volume operations modeling projected that there would not be enough water to make Coordinated Reservoir Operations (CROS) releases for 15-mile reach of the Colorado River. On May 13, Reclamation's annual meeting took place as required under stipulation 1.7.b of case numbers 02CW324 & 02CW365 between the following parties: Reclamation, Southeastern, Division 5, and the Colorado River District. A consensus was reached that Ruedi Reservoir would

not fill under all three operational modeling scenarios which would disallow Reclamation from diverting the additional 45 cfs of Fryingpan River Basin water through the Boustead Tunnel in accordance with stipulation 5 of the above-mentioned case numbers. The representatives for each of the parties were Bureau of Reclamation: Tim Miller, Terry Dawson, and Michael Holmberg; Southeastern Colorado Water Conservancy District: Garrett Markus; Colorado Division of Water Resources: James Heath, Caleb Foy, and Bill Blakeslee; Colorado River District: Don Meyer. As a result of this consensus, on May 13 the Colorado River District placed a call requesting enforcing the Ruedi Reservoir senior fill right with the State of Colorado Division of Natural Resources, Division 5. After this consensus and reservoir fill call placed, the Boustead Tunnel was limited to the maximum rate of 900 cfs from Fryingpan River diversions.

In June the forecast of remaining inflow continued to decrease, with the April through July volume dropping to 108 kaf, 80 percent of average. This forecast projected that Ruedi Reservoir would still not fill under all three modeling scenarios. The reservoir release remained constant for the month of June at the lesser of the operating principle minimum flow of 110 cfs.

Ruedi Reservoir was in priority to fill and store inflow from the first of the water year through July 29, August 3 through 4, August 17 through 26, October 1 through 12, and from October 24 through 31. Outside these periods, Ruedi Reservoir was required to release all inflow, make scheduled contract releases, and provide Boustead Tunnel replacement releases to the Colorado River. Ruedi Reservoir released 186 AF of water for out of priority Boustead Tunnel diversions and 2,371.6 AF for regular scheduled contracts. Ruedi Reservoir did not participate in the Coordinated Reservoir Operations (CROS) operations for WY2022 and beginning on July 22 contracted water was released to support endangered fish recovery efforts in the 15-mile reach of the Colorado River. A total of 21,262.5 AF of water was released between July 22 and October 22 for endangered fish. This total includes the following: 10,850 AF water leased from Ute Water, Caerus Piceance LLC, and Garfield County; 10,412.5 AF of water which includes both 5000 AF from the firm endangered fish pool and 5,412.5 AF from the mitigation fish pool. The 5000 AF of the 4-out-of-5 fish pool was not available in WY2022 because Ruedi Reservoir did not physically fill. Ruedi Reservoir also released 1,750 AF for anchor ice prevention in the lower Fryingpan River from February 1 through March 19. This water was leased from the Colorado River District by the Colorado Water Conservation Board. Ruedi Reservoir further released 850 AF of water in late July for temperature mitigation in the lower Roaring Fork River. Most of this water is owned by Cities along the Roaring Fork River that have M&I contracts in Ruedi Reservoir and was released to reduce Roaring Fork River water temperatures in support of non-native fisheries. In addition to this, Ruedi Reservoir released 1,479.6 AF from the Ruedi Insurance Pool to supplement impacts from the dry up of some of the properties irrigated by the Red Top Valley Ditch for the East Slope contribution to the 10,825 AF of water in Lake Granby. The dry up of the ditch properties resulted in reduced Colorado River base flows and increased the Green Mountain Reservoir replacement obligations. The Ruedi Insurance Pool mitigates this injury by providing up to 2,000 AF of contracted water annually during years when the Cities of Denver and Colorado Springs owe water towards Green Mountain Reservoir's storage water right.

Depleted inflows to Ruedi Reservoir (inflow after upstream diversions) were below average for every month of WY2022. The total depleted inflow volume for the April through July runoff period was 61,159 AF which was 72 percent of average and was the fourteenth smallest runoff volume

for the period of record starting in 1975. Ruedi Reservoir storage reached a maximum physical content of 83,255 AF on July 11. This storage content represented 81 percent of the total capacity of the reservoir. Ruedi Reservoir ended the water year at a water surface elevation of 7,727.14 feet which equates to 68,175 AF of storage and is 83 percent of average for October 31.

Ruedi releases for contracts are shown in Table A-2. Releases for endangered fish are shown in Table A-3. Monthly precipitation data and evaporation data for Ruedi can be found in Exhibit B-2 and Exhibit B-3 respectively. Table A-1 and Exhibit B-4 depict the monthly operation of Ruedi Reservoir during WY2022.

West Slope Collection System and Project Diversions

The most probable forecasts for the first of February, March, April, and May were 59,100 AF, 47,400 AF, 42,300 AF, and 45,3000 AF, respectively. Runoff peaked in mid-June. A total of 49,806 AF of the water diverted through the Boustead Tunnel and 47,232 AF of water was stored during the WY2022. The imports were 88 percent of average for the period from WY1972 to WY2021 and 104 percent of the May 2022 forecast.

The import of project water through the Boustead Tunnel began on April 20. The maximum mean daily import through Boustead Tunnel was 825 cfs on May 19. The diversion system was shut down in early August. Boustead Tunnel seepage was recorded whenever the Fry-Ark Project water rights were in priority. There was 3,010 AF of Busk-Ivanhoe water conveyed through the Boustead Tunnel. The daily discharge record for the diversion structures is included as Appendix D. An aggregated discharge record is shown on Table A-4. The 50 years of accumulated imports total 2,685,100 AF, for an unimpeded average of 55,360 AF per year, shown on Table A-5. A plot of the Boustead Tunnel imports during WY2022 is shown on Exhibit B-6.

Since Ruedi Reservoir was not forecast to fill this year imports through the Boustead Tunnel were constrained to a maximum of 900 cfs plus half of the daily flow from the Hunter system.

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 authorizing legislation of the project. This is accomplished through an exchange of water with the Twin Lakes Reservoir and Canal Company (TLCC). The total amount of the TLCC exchange was 3,000 AF. The operating criteria and the monthly summary of the exchange are shown in Appendix C.

Turquoise Lake

On September 30, 2021, there was 79,153 AF of water (elevation 9,810.96 feet) stored in Turquoise Lake, 75 percent of average. The high point for storage was 110,762 AF of water (elevation 9,858.74 feet) on August 1. Releases made down Lake Fork Creek and to Twin Lakes drafted Turquoise Lake to 40,612 AF (9,810. 96 feet), the lowest storage of the water year, on

April 3. On September 30, 2022, there was 86,030 AF, at elevation 9,843.77 feet, 81 percent of average. Exhibits B-8 and B-9 show the precipitation and pan evaporation at Turquoise Lake. Table A-6 and Exhibit B-10 depict the monthly operation of Turquoise Lake during WY2022.

There was 23,543 AF imported through Homestake Tunnel to the account in Turquoise Reservoir.

Busk-Ivanhoe imports through the Carlton Tunnel stored 2,309 AF. Pueblo Water received 485 AF and the City of Aurora received 1,771 AF. Pueblo Water imported 3,010 AF from Ivanhoe Reservoir through the Boustead Tunnel.

Project water imports through the Boustead Tunnel totaled 47,232 AF.

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

Mt. Elbert Conduit/Halfmoon Creek Diversion

Between October 1 and September 30 there was 13,588 AF of water released from Turquoise Lake through the sleeve valves and into Mt. Elbert Conduit. The Sugarloaf Powerplant was not in operation this year. There was 11,440 AF 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 AF of water were released into the conduit from Turquoise Lake for use by the Leadville Federal Fish Hatchery. The water was diverted from the conduit and delivered to the hatchery. It was then returned to the Arkansas River and stored in Pueblo Reservoir. The conduit operations are shown on Exhibit B-11. Exhibit B-12 depicts the monthly operation of Mt. Elbert Conduit during WY2022.

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

On September 30, 2021, Twin Lakes had 112,038 AF of water stored (elevation 9,188.51 feet) and Mt. Elbert Forebay had 9,091 AF in storage (elevation 9,638.03 feet). The Twin Lakes/Mt. Elbert Forebay combined water storage reached a low point of 101,088 AF on May 6 and was at its high point of 128,087 on June 23. The storage in Twin Lakes was 119,120 AF and in Mt. Elbert Forebay was 8,229 AF of water (Twin Lakes elevation 9,191.59 feet and Mt. Elbert Forebay elevation 9,634.68 feet) on September 30, 2022, 104 percent 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 4,296 AF was stored in the TLCC storage space from November 15 through March 15 as winter water storage. A total of 20,705 AF of project water was released to Lake Creek during this time.

Exhibits B-13 and B-14 show the precipitation and pan evaporation at Twin Lakes. Table A-7 and Exhibit B-15 depict the monthly operation of Twin Lakes during WY2022.

A total of 10,000 AF 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. Colorado Parks and Wildlife called for 10,000 AF. 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 July 1 to August 15 if the flow at Wellsville is below 700 cfs. The flows may be ramped down to prevent streambank erosion after August 15.

A total of 246,967 megawatt hours of energy were generated at the power plant, with 620,239 AF of water; 89,837AF came through the Mt. Elbert Conduit; and 537,408 AF were first pumped to the Mt. Elbert Forebay from Twin Lakes during off-peak electric demand hours. Table A-8 depicts the monthly power plant operation for WY2022.

Pueblo Reservoir

The water storage content of Pueblo Reservoir was 181,798 AF (elevation 4,864.42 feet) on September 30, 2021. The reservoir reached a high point in storage of 227,173 AF (elevation 4,876.16 feet) on March 30 and a low point on September 30, 2022, of 178,121 AF (elevation 4,863.39) which was 111 percent of average.

A total of 32,667 AF of native inflow was stored in the reservoir under the Pueblo Reservoir winter water storage program between November 15, 2021, and March 14, 2022. This program allows agricultural entities to store native flows during the winter to be used during irrigation season. On March 14, it was distributed to agricultural entities.

Table A-9 and Exhibit B-19 depict Pueblo Reservoir monthly operations during Water Year 2022. The WY2022 winter water storage is shown on Exhibit B-16, and the winter water releases are shown on Exhibit B-17. The precipitation and evaporation at the reservoir are shown on Exhibits B-15 and B-18. Project water releases are shown on Exhibit B-20.

Storage Contracts

There were four long term storage contracts for a total of 57,416 AF of non-project storage in Turquoise Lake, one for 54,452 AF in Twin Lakes and eight for 59,525 AF in Pueblo Reservoir.

There were five short-term if-and-when contracts totaling 3,740 AF for one-year contracts in Pueblo Reservoir. Sixteen contracts totaling 6,595 AF 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.

Project Water Sales and Deliveries

There was 32,848 AF of Fryingpan-Arkansas Project water made available to the Southeastern Colorado Water Conservancy District (SECWCD) during WY2022 for allocation based on an expected import of 45,300 AF. Municipal and industrial accounts received a total of 12,525 AF and agricultural accounts received 14,916 AF. Entities called for 14,512 AF of project and 10,043 AF of project carryover water during the year.

Evaporation reduced the project carryover water in storage by 8,859 AF. By the end of the water year, the district had 15,498 AF of WY2022 allocated water and 106,037 AF of carryover water remaining in storage. The monthly release of project water from Pueblo Reservoir is shown on Exhibit B-19.

Reservoir Storage Allocation Data

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

Reservoir Evaporation and Precipitation

Tables A-12 and A-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 A-11. The assumption is that there is no evaporation from a reservoir water surface when ice completely covers the reservoir.

Flood Control Benefits

The Army Corps of Engineers determined that the operations at Ruedi Reservoir and Pueblo Reservoir during WY2022 did not prevent flood damages.

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

Appendix A

Tables

Table A-1.—Ruedi Reservoir Operations WY2022 Fryingpan-Arkansas Project (Units = 1,000 AF)

Month	Inflow	Evaporation	Outflow	End of Month Content	Water Surface Elevation (feet)
OCT 21	3.30	0.10	7.00	58.30	7,713.60
NOV 21	2.80	0.00	2.70	58.40	7,713.79
DEC 21	2.40	0.00	2.60	58.20	7,713.46
JAN 22	2.10	0.00	2.60	57.70	7,712.80
FEB 22	1.70	0.00	3.60	55.80	7,709.94
MAR 22	2.50	0.00	3.10	55.20	7,709.07
APR 22	6.40	0.00	2.60	59.30	7,715.04
MAY 22	21.60	0.20	6.00	74.70	7,735.42
JUN 22	22.70	0.50	5.60	91.90	7,755.15
JUL 22	9.70	0.60	8.40	92.70	7,756.00
AUG 22	6.70	0.40	15.40	83.60	7,745.89
SEP 22	3.40	0.20	14.70	72.10	7,732.17
Total* (acre-feet)	**85,481**	**1,939**	**74,522**	----	-------

*Rounding may introduce discrepancies between monthly and yearly totals

Table A-2.—Ruedi Reservoir Releases for Contracts WY 2022 (Units = AF)

Month	Round 1: Non-Fish	Round 1: Fish	Round 2: Non-fish	Round 2: Fish
Oct 21	--	--	--	--
Nov 21	--	--	--	--
Dec 21	--	--	--	--
Jan 22	--	--	--	--
Feb 22	--	--	1388	--
Mar 22	--	--	362	--
Apr 22	--	--	--	--
May 22	--	--	--	--
Jun 22	--	--	--	--
Jul 22	27	--	805	982
Aug 22	282	--	548	8532
Sep 22	431	1668	1861	7258
Oct 22	100	2832	647	--
Total	**840**	**4500**	**5611**	**16763**

Table A-3.—Ruedi Reservoir Releases for Endangered Fish WY2022

FRYINGPAN-ARKANSAS PROJECT
RUEDI RESERVOIR
RELEASES FOR ENDANGERED FISH
WATER YEAR 2022
April

DAY	DATE	ELEV. (FT)	STORAGE (AC-FT)	INFLOW (CFS)	EVAP. (CFS)	TOTAL RESERVOIR RELEASE (CFS)	ROCKY FORK CREEK (CFS)	FRYINGPAN RIVER GAGE BELOW DAM (CFS)	RUEDI CALLED OUT? (Y= YES) (N= NO)	REQUIRED MIN FLOW BELOW RUEDI w/o FISH REL (CFS)	REQUIRED FISH RELEASE (CFS)	CUMULATIVE FISH RELEASE (AC-FT)	PALISADE GAGE (CFS)
FRI	4/1/2022	7,709.19	55,258	86	-	45	2	47	N	39	-	-	1,986
SAT	4/2/2022	7,709.26	55,306	69	-	45	3	48	N	39	-	-	1,869
SUN	4/3/2022	7,709.36	55,373	79	-	45	3	48	N	39	-	-	1,829
MON	4/4/2022	7,709.44	55,428	73	-	45	3	48	N	39	-	-	1,687
TUE	4/5/2022	7,709.50	55,469	66	-	45	3	48	N	39	-	-	1,574
WED	4/6/2022	7,709.56	55,509	66	-	45	3	48	N	39	-	-	1,442
THU	4/7/2022	7,709.60	55,537	59	-	45	3	48	N	39	-	-	1,248
FRI	4/8/2022	7,709.67	55,584	69	-	45	3	48	N	39	-	-	1,087
SAT	4/9/2022	7,709.77	55,652	79	-	45	3	48	N	39	-	-	985
SUN	4/10/2022	7,709.86	55,713	76	-	45	3	48	N	39	-	-	1,022
MON	4/11/2022	7,709.97	55,788	83	-	45	3	48	N	39	-	-	1,086
TUE	4/12/2022	7,710.09	55,870	86	-	45	3	48	N	39	-	-	1,202
WED	4/13/2022	7,710.14	55,904	62	-	45	3	48	N	39	-	-	1,160
THU	4/14/2022	7,710.21	55,952	69	-	45	3	48	N	39	-	-	1,130
FRI	4/15/2022	7,710.27	55,993	66	-	45	3	48	N	39	-	-	877
SAT	4/16/2022	7,710.33	56,034	66	-	45	3	48	N	39	-	-	643
SUN	4/17/2022	7,710.40	56,081	69	-	45	3	48	N	39	-	-	594
MON	4/18/2022	7,710.49	56,143	76	-	45	4	48	N	39	-	-	642
TUE	4/19/2022	7,710.69	56,279	114	-	45	4	49	N	39	-	-	757
WED	4/20/2022	7,711.02	56,506	159	-	45	4	49	N	39	-	-	919
THU	4/21/2022	7,711.47	56,815	201	-	45	4	50	N	39	-	-	1,171
FRI	4/22/2022	7,712.11	57,256	268	-	45	4	50	N	39	-	-	1,641
SAT	4/23/2022	7,712.75	57,699	269	-	46	5	50	N	39	-	-	2,486
SUN	4/24/2022	7,713.18	57,997	196	-	45	5	50	N	39	-	-	2,546
MON	4/25/2022	7,713.51	58,227	161	-	45	5	50	N	39	-	-	1,919
TUE	4/26/2022	7,713.78	58,415	140	-	45	6	51	N	39	-	-	1,646
WED	4/27/2022	7,714.06	58,611	144	-	46	6	51	N	39	-	-	1,232
THU	4/28/2022	7,714.36	58,821	151	-	45	6	51	N	39	-	-	1,066
FRI	4/29/2022	7,714.72	59,074	172	-	45	6	51	N	39	-	-	1,146
SAT	4/30/2022	7,715.04	59,299	159	-	45	6	51	N	39	-	-	1,460
Averages		7,711.13	56,586	114	-	45	4	49		39	-	-	1,335
Totals (acft)				6,807	-	2,684	231	2,915		2,321	-	-	79,445

NOTES: Releases of water to support 15-Mile Reach target started 7/22 and ceased 10/22. A total of 21,262.5 acre-feet was released to support Recovery Program target flows.

Table A-3.—Ruedi Reservoir Releases for Endangered Fish WY2022 (Continued)

FRYINGPAN-ARKANSAS PROJECT
RUEDI RESERVOIR
RELEASES FOR ENDANGERED FISH
WATER YEAR 2022
May

DAY	DATE	ELEV. (FT)	STORAGE (AC-FT)	INFLOW (CFS)	EVAP. (CFS)	TOTAL RESERVOIR RELEASE (CFS)	ROCKY FORK CREEK (CFS)	FRYINGPAN RIVER GAGE BELOW DAM (CFS)	RUEDI CALLED OUT? (Y= YES) (N= NO)	REQUIRED MIN FLOW BELOW RUEDI w/o FISH REL (CFS)	ENDANGERED FISH RELEASE (CFS)	CUMULATIVE FISH RELEASE (AC-FT)	PALISADE GAGE (CFS)
SUN	5/1/2022	7,715.39	59,546	198	-	74	6	80	N	110	-	-	1,505
MON	5/2/2022	7,715.66	59,737	208	3	109	6	115	N	110	-	-	1,762
TUE	5/3/2022	7,715.95	59,942	215	3	108	6	114	N	110	-	-	1,963
WED	5/4/2022	7,716.26	60,162	220	3	107	6	113	N	110	-	-	1,890
THU	5/5/2022	7,716.53	60,354	206	3	106	7	113	N	110	-	-	1,719
FRI	5/6/2022	7,716.81	60,553	210	3	106	7	113	N	110	-	-	1,558
SAT	5/7/2022	7,717.25	60,867	268	3	106	7	114	N	110	-	-	1,845
SUN	5/8/2022	7,717.79	61,254	304	3	106	8	114	N	110	-	-	3,198
MON	5/9/2022	7,718.46	61,736	353	3	107	10	117	N	110	-	-	4,644
TUE	5/10/2022	7,719.10	62,198	339	3	103	15	118	N	110	-	-	5,303
WED	5/11/2022	7,719.89	62,771	393	3	100	19	120	N	110	-	-	5,856
THU	5/12/2022	7,720.81	63,442	439	3	98	22	120	N	110	-	-	6,795
FRI	5/13/2022	7,721.57	64,000	377	3	93	21	115	N	110	-	-	6,971
SAT	5/14/2022	7,722.27	64,516	357	3	93	21	114	N	110	-	-	6,482
SUN	5/15/2022	7,723.08	65,116	399	3	93	22	115	N	110	-	-	6,921
MON	5/16/2022	7,724.12	65,891	486	3	92	25	117	N	110	-	-	7,902
TUE	5/17/2022	7,725.11	66,634	467	3	90	25	115	N	110	-	-	8,243
WED	5/18/2022	7,726.17	67,435	498	3	91	26	117	N	110	-	-	8,385
THU	5/19/2022	7,727.44	68,404	584	3	92	28	119	N	110	-	-	9,002
FRI	5/20/2022	7,728.77	69,430	613	3	93	29	122	N	110	-	-	9,489
SAT	5/21/2022	7,729.65	70,115	440	3	92	26	117	N	110	-	-	8,868
SUN	5/22/2022	7,730.33	70,647	363	3	91	22	113	N	110	-	-	7,015
MON	5/23/2022	7,730.90	71,096	326	3	97	19	116	N	110	-	-	5,294
TUE	5/24/2022	7,731.42	71,506	309	3	98	17	115	N	110	-	-	4,188
WED	5/25/2022	7,731.83	71,832	267	3	100	15	115	N	110	-	-	3,637
THU	5/26/2022	7,732.24	72,158	267	3	99	15	114	N	110	-	-	3,394
FRI	5/27/2022	7,732.79	72,596	323	3	98	18	116	N	110	-	-	3,869
SAT	5/28/2022	7,733.40	73,085	348	3	98	20	119	N	110	-	-	5,323
SUN	5/29/2022	7,734.11	73,657	390	3	98	22	121	N	110	-	-	6,358
MON	5/30/2022	7,734.84	74,248	400	4	98	23	121	N	110	-	-	6,461
TUE	5/31/2022	7,735.42	74,720	338	4	97	21	118	N	110	-	-	5,631
Averages		7,724.69	66,440	352	3	98	17	115		110	-	-	5,209
Totals (acft)				21,633	195	6,017	1,060	7,078		6,764	-	-	320,278

NOTES: Releases of water to support 15-Mile Reach target started 7/22 and ceased 10/22. A total of 21,262.5 acre-feet was released to support Recovery Program target flows.

Table A-3.—Ruedi Reservoir Releases for Endangered Fish WY2022 (Continued)

FRYINGPAN-ARKANSAS PROJECT
RUEDI RESERVOIR
RELEASES FOR ENDANGERED FISH
WATER YEAR 2022
June

DAY	DATE	ELEV. (FT)	STORAGE (AC-FT)	INFLOW (CFS)	EVAP. (CFS)	TOTAL RESERVOIR RELEASE (CFS)	ROCKY FORK CREEK (CFS)	FRYINGPAN RIVER GAGE BELOW DAM (CFS)	RUEDI CALLED OUT? (Y= YES) (N= NO)	REQUIRED MIN FLOW BELOW RUEDI w/o FISH REL (CFS)	ENDANGERED FISH RELEASE (CFS)	CUMULATIVE FISH RELEASE (AC-FT)	PALISADE GAGE (CFS)
WED	6/1/2022	7,736.05	75,235	361	9	93	20	114	N	110	-	-	4,611
THU	6/2/2022	7,736.67	75,744	358	9	93	20	113	N	110	-	-	3,934
FRI	6/3/2022	7,737.35	76,305	384	9	92	21	113	N	110	-	-	4,156
SAT	6/4/2022	7,738.07	76,901	402	9	92	21	114	N	110	-	-	5,152
SUN	6/5/2022	7,738.84	77,542	424	9	92	23	115	N	110	-	-	5,889
MON	6/6/2022	7,739.65	78,219	443	9	93	24	117	N	110	-	-	6,420
TUE	6/7/2022	7,740.55	78,977	479	9	89	26	115	N	110	-	-	6,951
WED	6/8/2022	7,741.39	79,688	455	9	87	26	114	N	110	-	-	7,502
THU	6/9/2022	7,742.30	80,464	487	9	88	27	114	N	110	-	-	7,657
FRI	6/10/2022	7,743.32	81,339	539	9	88	28	116	N	110	-	-	8,088
SAT	6/11/2022	7,744.30	82,185	525	9	89	29	118	N	110	-	-	8,364
SUN	6/12/2022	7,745.20	82,968	494	9	90	29	119	N	110	-	-	8,869
MON	6/13/2022	7,745.98	83,650	443	9	90	29	119	N	110	-	-	8,919
TUE	6/14/2022	7,746.75	84,326	440	9	90	27	117	N	110	-	-	8,246
WED	6/15/2022	7,747.44	84,935	406	9	90	25	115	N	110	-	-	7,184
THU	6/16/2022	7,748.11	85,528	398	9	90	22	112	N	110	-	-	6,479
FRI	6/17/2022	7,748.70	86,053	365	9	90	21	111	N	110	-	-	5,780
SAT	6/18/2022	7,749.32	86,606	382	9	94	20	114	N	110	-	-	5,616
SUN	6/19/2022	7,749.95	87,171	388	10	94	20	114	N	110	-	-	5,927
MON	6/20/2022	7,750.54	87,702	372	10	95	18	112	N	110	-	-	6,182
TUE	6/21/2022	7,751.06	88,171	342	10	96	16	112	N	110	-	-	5,202
WED	6/22/2022	7,751.56	88,624	336	10	98	15	113	N	110	-	-	4,204
THU	6/23/2022	7,752.03	89,051	319	4	100	14	114	N	110	-	-	3,674
FRI	6/24/2022	7,752.50	89,480	329	10	103	13	116	N	110	-	-	3,233
SAT	6/25/2022	7,752.92	89,864	306	10	103	12	116	N	110	-	-	3,212
SUN	6/26/2022	7,753.39	90,295	330	10	103	12	115	N	110	-	-	3,004
MON	6/27/2022	7,753.91	90,773	355	10	104	11	115	N	110	-	-	2,977
TUE	6/28/2022	7,754.34	91,170	313	10	103	11	114	N	110	-	-	2,778
WED	6/29/2022	7,754.70	91,500	280	10	104	10	114	N	110	-	-	2,443
THU	6/30/2022	7,755.15	91,920	326	10	104	10	114	N	110	-	-	2,428
Averages		7,746.73	84,413	393	9	95	20	115		110	-	-	5,503
Totals (acft)				23,375	544	5,632	1,188	6,820		6,546	-	-	327,437

NOTES: Releases of water to support 15-Mile Reach target started 7/22 and ceased 10/22. A total of 21,262.5 acre-feet was released to support Recovery Program target flows.

Table A-3.—Ruedi Reservoir Releases for Endangered Fish WY2022 (Continued)

FRYINGPAN-ARKANSAS PROJECT
RUEDI RESERVOIR
RELEASES FOR ENDANGERED FISH
WATER YEAR 2022
July

DAY	DATE	ELEV. (FT)	STORAGE (AC-FT)	INFLOW (CFS)	EVAP. (CFS)	TOTAL RESERVOIR RELEASE (CFS)	ROCKY FORK CREEK (CFS)	FRYINGPAN RIVER GAGE BELOW DAM (CFS)	RUEDI CALLED OUT? (Y= YES) (N= NO)	REQUIRED MIN FLOW BELOW RUEDI w/o FISH REL (CFS)	ENDANGERED FISH RELEASE (CFS)	CUMULATIVE FISH RELEASE (AC-FT)	PALISADE GAGE (CFS)
FRI	7/1/2022	7,755.44	92,190	249	9	104	10	114	N	110	-	-	2,527
SAT	7/2/2022	7,755.62	92,358	198	9	105	9	114	N	110	-	-	2,452
SUN	7/3/2022	7,755.79	92,516	193	9	104	9	113	N	110	-	-	2,207
MON	7/4/2022	7,756.04	92,750	231	9	105	8	113	N	110	-	-	1,824
TUE	7/5/2022	7,756.20	92,899	190	9	105	8	113	N	110	-	-	1,760
WED	7/6/2022	7,756.37	93,058	195	9	105	8	113	N	110	-	-	1,723
THU	7/7/2022	7,756.51	93,189	180	9	105	7	112	N	110	-	-	1,691
FRI	7/8/2022	7,756.62	93,293	166	9	105	7	112	N	110	-	-	1,564
SAT	7/9/2022	7,756.73	93,396	170	9	109	7	116	N	110	-	-	1,414
SUN	7/10/2022	7,756.83	93,490	165	9	109	7	115	N	110	-	-	1,264
MON	7/11/2022	7,756.95	93,603	175	9	109	6	115	N	110	-	-	1,113
TUE	7/12/2022	7,757.04	93,687	160	9	109	6	115	N	110	-	-	977
WED	7/13/2022	7,757.14	93,782	165	9	108	6	114	N	110	-	-	905
THU	7/14/2022	7,757.27	93,904	178	9	107	7	114	N	110	-	-	780
FRI	7/15/2022	7,757.39	94,017	173	9	107	7	114	N	110	-	-	725
SAT	7/16/2022	7,757.54	94,159	188	9	107	7	114	N	110	-	-	777
SUN	7/17/2022	7,757.66	94,272	174	9	107	7	114	N	110	-	-	832
MON	7/18/2022	7,757.72	94,329	145	9	108	7	114	N	110	-	-	752
TUE	7/19/2022	7,757.79	94,395	151	9	109	6	115	N	110	-	-	686
WED	7/20/2022	7,757.84	94,442	142	9	109	5	114	N	110	-	-	565
THU	7/21/2022	7,757.88	94,480	135	9	107	7	114	N	110	-	-	597
FRI	7/22/2022	7,757.83	94,433	130	9	144	6	150	N	110	38	74	543
SAT	7/23/2022	7,757.69	94,300	117	9	175	6	181	N	110	50	174	476
SUN	7/24/2022	7,757.51	94,130	117	9	193	6	199	N	110	50	273	545
MON	7/25/2022	7,757.35	93,980	131	9	198	6	204	N	110	50	372	584
TUE	7/26/2022	7,757.13	93,772	111	9	207	6	213	N	110	50	471	646
WED	7/27/2022	7,756.89	93,546	102	9	207	6	213	N	108	50	570	761
THU	7/28/2022	7,756.65	93,321	103	9	208	5	213	N	108	50	669	681
FRI	7/29/2022	7,756.45	93,134	122	9	208	5	213	N	110	50	769	632
SAT	7/30/2022	7,756.23	92,927	113	9	208	6	214	Y	119	50	868	556
SUN	7/31/2022	7,756.00	92,712	109	9	208	6	214	Y	114	58	982	635
Averages		7,756.91	93,563	157	9	135	7	142		110	16	174	1,071
Totals (acft)				9,674	552	8,330	410	8,740		6,782	982	10,357	65,846

NOTES: Releases of water to support 15-Mile Reach target started 7/22 and ceased 10/22. A total of 21,262.5 acre-feet was released to support Recovery Program target flows.

Table A-3.—Ruedi Reservoir Releases for Endangered Fish WY2022 (Continued)

FRYINGPAN-ARKANSAS PROJECT
RUEDI RESERVOIR
RELEASES FOR ENDANGERED FISH
WATER YEAR 2022
August

DAY	DATE	ELEV. (FT)	STORAGE (AC-FT)	INFLOW (CFS)	EVAP. (CFS)	TOTAL RESERVOIR RELEASE (CFS)	ROCKY FORK CREEK (CFS)	FRYINGPAN RIVER GAGE BELOW DAM (CFS)	RUEDI CALLED OUT? (Y= YES) (N= NO)	REQUIRED MIN FLOW BELOW RUEDI w/o FISH REL (CFS)	ENDANGERED FISH RELEASE (CFS)	CUMULATIVE FISH RELEASE (AC-FT)	PALISADE GAGE (CFS)
MON	8/1/2022	7,755.78	92,507	126	6	224	5	228	Y	131	95	1,170	656
TUE	8/2/2022	7,755.60	92,339	156	6	234	4	238	Y	160	95	1,359	645
WED	8/3/2022	7,755.34	92,097	118	6	234	4	238	N	110	95	1,547	1,044
THU	8/4/2022	7,755.09	91,864	100	6	211	5	216	N	105	95	1,736	938
FRI	8/5/2022	7,754.85	91,642	91	6	197	4	201	Y	95	95	1,924	767
SAT	8/6/2022	7,754.64	91,447	114	6	206	4	210	Y	118	95	2,112	588
SUN	8/7/2022	7,754.38	91,207	125	6	240	4	243	Y	128	127	2,364	480
MON	8/8/2022	7,753.98	90,838	80	6	259	4	263	Y	83	150	2,662	466
TUE	8/9/2022	7,753.59	90,478	87	6	262	3	265	Y	90	150	2,960	465
WED	8/10/2022	7,753.18	90,102	78	6	261	3	264	Y	81	150	3,257	454
THU	8/11/2022	7,752.76	89,717	73	6	261	3	264	Y	76	150	3,555	479
FRI	8/12/2022	7,752.35	89,343	78	6	261	3	264	Y	81	150	3,852	545
SAT	8/13/2022	7,751.93	88,960	74	6	260	3	263	Y	77	150	4,150	589
SUN	8/14/2022	7,751.53	88,597	83	6	260	3	263	Y	86	150	4,447	662
MON	8/15/2022	7,751.20	88,298	116	6	261	3	263	Y	119	150	4,745	927
TUE	8/16/2022	7,750.92	88,045	137	6	259	3	261	Y	140	150	5,042	1,057
WED	8/17/2022	7,750.69	87,837	158	6	257	3	260	N	110	150	5,340	1,384
THU	8/18/2022	7,750.42	87,594	140	6	256	3	259	N	110	150	5,637	1,316
FRI	8/19/2022	7,750.12	87,324	126	6	256	3	259	N	110	150	5,935	1,108
SAT	8/20/2022	7,749.78	87,018	108	6	256	3	259	N	110	150	6,232	1,047
SUN	8/21/2022	7,749.47	86,741	122	6	255	3	258	N	110	150	6,530	990
MON	8/22/2022	7,749.22	86,517	148	6	255	3	258	N	110	150	6,827	1,050
TUE	8/23/2022	7,748.92	86,249	119	6	248	3	251	N	110	150	7,125	903
WED	8/24/2022	7,748.56	85,929	100	6	255	3	259	N	103	150	7,422	896
THU	8/25/2022	7,748.19	85,599	95	6	255	3	259	N	99	150	7,720	879
FRI	8/26/2022	7,747.88	85,324	123	6	256	3	259	N	110	150	8,017	713
SAT	8/27/2022	7,747.57	85,050	123	6	255	3	259	Y	126	150	8,315	824
SUN	8/28/2022	7,747.24	84,758	115	6	255	3	258	Y	118	150	8,613	781
MON	8/29/2022	7,746.82	84,388	90	6	270	4	274	Y	93	150	8,910	734
TUE	8/30/2022	7,746.36	83,983	85	6	283	3	286	Y	88	150	9,208	734
WED	8/31/2022	7,745.89	83,571	80	6	282	3	285	Y	84	150	9,505	693
Averages		7,751.10	88,238	109	6	251	3	254		105	139	5,235	800
Totals (acft)				6,678	382	15,437	207	15,645		6,487	8,523	9,505	49,220

NOTES: Releases of water to support 15-Mile Reach target started 7/22 and ceased 10/22. A total of 21,262.5 acre-feet was released to support Recovery Program target flows.

Table A-3.—Ruedi Reservoir Releases for Endangered Fish WY2022 (Continued)

FRYINGPAN-ARKANSAS PROJECT
RUEDI RESERVOIR
RELEASES FOR ENDANGERED FISH
WATER YEAR 2022
September

DAY	DATE	ELEV. (FT)	STORAGE (AC-FT)	INFLOW (CFS)	EVAP. (CFS)	TOTAL RELEASE (CFS)	ROCKY FORK CREEK (CFS)	FRYINGPAN RIVER GAGE BELOW DAM (CFS)	RUEDI CALLED OUT? (Y= YES) (N= NO)	REQUIRED MIN FLOW BELOW RUEDI w/o FISH REL (CFS)	ENDANGERED FISH RELEASE (CFS)	CUMULATIVE FISH RELEASE (AC-FT)	PALISADE GAGE (CFS)
THU	9/1/2022	7,745.48	83,212	70	4	247	3	250	Y	73	150	9,803	627
FRI	9/2/2022	7,745.13	82,907	75	4	226	3	229	Y	78	150	10,100	531
SAT	9/3/2022	7,744.76	82,584	66	4	225	3	228	Y	69	150	10,398	471
SUN	9/4/2022	7,744.39	82,263	67	4	225	3	228	Y	69	150	10,695	480
MON	9/5/2022	7,744.01	81,934	63	4	225	3	228	Y	66	150	10,993	674
TUE	9/6/2022	7,743.62	81,597	60	4	226	3	229	Y	63	150	11,290	633
WED	9/7/2022	7,743.22	81,253	56	4	226	3	229	Y	59	150	11,588	643
THU	9/8/2022	7,742.78	80,874	62	4	249	3	253	Y	66	150	11,885	581
FRI	9/9/2022	7,742.30	80,464	60	4	264	3	266	Y	63	150	12,183	637
SAT	9/10/2022	7,741.81	80,046	57	4	264	3	267	Y	60	150	12,480	659
SUN	9/11/2022	7,741.23	79,552	20	4	265	3	267	Y	22	150	12,778	604
MON	9/12/2022	7,740.71	79,112	46	4	264	3	267	Y	48	150	13,075	644
TUE	9/13/2022	7,740.21	78,690	55	4	264	3	267	Y	58	150	13,373	682
WED	9/14/2022	7,739.73	78,287	64	4	264	2	267	Y	67	150	13,670	731
THU	9/15/2022	7,739.30	77,926	85	3	263	4	267	Y	89	150	13,968	1,216
FRI	9/16/2022	7,738.85	77,550	76	3	262	3	265	Y	79	150	14,265	1,120
SAT	9/17/2022	7,738.37	77,150	63	3	261	2	263	Y	65	150	14,563	1,152
SUN	9/18/2022	7,737.87	76,735	54	3	260	3	263	Y	57	150	14,861	1,136
MON	9/19/2022	7,737.35	76,305	46	3	259	4	263	Y	49	150	15,158	966
TUE	9/20/2022	7,736.86	75,900	57	3	257	5	262	Y	62	150	15,456	949
WED	9/21/2022	7,736.37	75,498	59	3	259	3	262	N	62	150	15,753	915
THU	9/22/2022	7,736.01	75,202	64	3	209	3	213	Y	67	150	16,051	897
FRI	9/23/2022	7,735.65	74,908	76	3	220	3	223	Y	78	150	16,348	762
SAT	9/24/2022	7,735.18	74,525	60	3	249	3	252	Y	62	150	16,646	636
SUN	9/25/2022	7,734.68	74,119	51	3	252	3	255	Y	53	150	16,943	690
MON	9/26/2022	7,734.17	73,706	47	3	252	3	255	Y	50	150	17,241	756
TUE	9/27/2022	7,733.66	73,295	48	3	252	3	255	Y	51	150	17,538	801
WED	9/28/2022	7,733.16	72,893	52	3	251	3	255	Y	55	150	17,836	776
THU	9/29/2022	7,732.66	72,493	53	3	251	3	254	Y	56	150	18,133	840
FRI	9/30/2022	7,732.17	72,102	57	3	251	3	254	Y	61	150	18,431	896
Averages		7,739.06	77,769	59	3	248	3	251		62	150	14,117	770
Totals (acft)				3,503	208	14,765	179	14,944		3,682	8,926	18,431	45,827

NOTES: Releases of water to support 15-Mile Reach target started 7/22 and ceased 10/22. A total of 21,262.5 acre-feet was released to support Recovery Program target flows.

Table A-3.—Ruedi Reservoir Releases for Endangered Fish WY2022 (Continued)

RUEDI RESERVOIR
RELEASES FOR ENDANGERED FISH
WATER YEAR 2022
October

DAY	DATE	ELEV. (FT)	STORAGE (AC-FT)	INFLOW (CFS)	EVAP. (CFS)	TOTAL RESERVOIR RELEASE (CFS)	ROCKY FORK CREEK (CFS)	FRYINGPAN RIVER GAGE BELOW DAM (CFS)	RUEDI CALLED OUT? (Y= YES) (N= NO)	REQUIRED MIN FLOW BELOW RUEDI w/o FISH REL (CFS)	ENDANGERED FISH RELEASE (CFS)	CUMULATIVE FISH RELEASE (AC-FT)	PALISADE GAGE (CFS)
SAT	10/1/2022	7,731.77	71,784	92	1	251	3	254	N	95	150	18,728	1,371
SUN	10/2/2022	7,731.44	71,522	120	1	251	3	254	N	110	150	19,026	1,488
MON	10/3/2022	7,731.08	71,238	108	1	251	3	254	N	110	150	19,323	2,186
TUE	10/4/2022	7,730.80	71,017	84	1	194	3	197	N	87	96	19,514	1,471
WED	10/5/2022	7,730.61	70,867	83	1	157	3	160	N	86	50	19,613	1,343
THU	10/6/2022	7,730.42	70,718	84	1	158	3	161	N	87	50	19,712	1,139
FRI	10/7/2022	7,730.23	70,569	84	1	158	3	161	N	87	50	19,811	997
SAT	10/8/2022	7,730.02	70,404	76	1	158	3	161	N	79	50	19,910	932
SUN	10/9/2022	7,729.79	70,224	69	1	158	3	161	N	72	50	20,009	886
MON	10/10/2022	7,729.56	70,045	69	1	158	3	161	N	72	50	20,109	802
TUE	10/11/2022	7,729.32	69,857	65	1	158	3	161	N	68	50	20,208	799
WED	10/12/2022	7,729.07	69,663	61	1	158	3	161	N	64	50	20,307	812
THU	10/13/2022	7,728.84	69,484	61	1	150	3	154	Y	65	50	20,406	763
FRI	10/14/2022	7,728.63	69,322	60	1	141	3	144	Y	63	50	20,505	758
SAT	10/15/2022	7,728.42	69,159	60	1	141	3	144	Y	63	50	20,604	673
SUN	10/16/2022	7,728.21	68,997	60	1	141	3	144	Y	63	50	20,704	733
MON	10/17/2022	7,728.01	68,842	59	1	135	3	138	Y	62	50	20,803	821
TUE	10/18/2022	7,727.85	68,719	57	1	117	3	120	Y	60	50	20,902	799
WED	10/19/2022	7,727.69	68,596	57	1	118	2	120	Y	59	50	21,001	850
THU	10/20/2022	7,727.54	68,481	61	1	118	2	120	Y	63	50	21,100	846
FRI	10/21/2022	7,727.38	68,358	50	1	110	2	113	Y	52	50	21,199	766
SAT	10/22/2022	7,727.27	68,274	51	1	92	2	95	Y	53	32	21,263	775
SUN	10/23/2022	7,727.28	68,282	76	1	71	2	73	Y	78	-	21,263	1,320
MON	10/24/2022	7,727.24	68,251	49	1	63	3	66	N	52	-	21,263	1,493
TUE	10/25/2022	7,727.20	68,221	48	1	63	3	66	N	52	-	21,263	1,329
WED	10/26/2022	7,727.19	68,213	60	1	63	3	66	N	63	-	21,263	1,290
THU	10/27/2022	7,727.25	68,259	88	1	63	3	66	N	90	-	21,263	1,467
FRI	10/28/2022	7,727.21	68,228	49	1	64	2	66	N	52	-	21,263	1,418
SAT	10/29/2022	7,727.19	68,213	57	1	64	2	66	N	59	-	21,263	1,302
SUN	10/30/2022	7,727.17	68,197	57	1	63	3	66	N	59	-	21,263	1,214
MON	10/31/2022	7,727.14	68,175	44	1	54	3	56	N	46	-	21,263	1,419
Averages		7,728.67	69,361	68	1	130	3	133		70	46	20,580	1,105
Totals (acft)				4,162	74	8,015	172	8,187		4,305	2,832	21,263	67,961

NOTES: Releases of water to support 15-Mile Reach target started 7/22 and ceased 10/22. A total of 21,262.5 acre-feet was released to support Recovery Program target flows.

Table A-4.—Fryingpan- Arkansas Project Transmountain Diversions WY2022 (Units = AF)

	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
South Fork	0	3,014	2,898	556	17	0	6,485
No Name	0	838	485	3	0	0	1,326
Midway	0	1,504	2,070	126	0	0	3,700
Hunter	0	1,817	2,305	64	0	0	4,187
Sawyer	0	564	1,145	250	74	0	2,033
Chapman[1]	0	1,325	2,251	7,818	0	0	11,394
Subtotal	**0**	**13,786**	**17,160**	**9,258**	**98**	**0**	**29,124**
Carter	19	1,069	1,380	106	0	0	2,575
North Fork	0	342	497	0	0	0	839
Mormon	72	1,384	1,554	1	0	0	3,012
North Cunningham	0	650	801	0	0	0	1,451
Middle Cunningham[2]	1	678	1,142	0	0	0	1,820
Ivanhoe[4]	131	2,610	2,962	324	0	0	3016
Granite	0	453	1,017	306	0	0	1,775
Fryingpan	15	4,586	3,709	886	0	0	9,196
Lily Pad[5]	0	1,289	516	0	0	0	1,805
Subtotal	**238**	**13,062**	**13,577**	**1,623**	**0**	**0**	**25,490**
Total	**238**	**26,846**	**30,738**	**10,881**	**98**	**0**	**54,614**
Boustead Tunnel[3,4]	**Oct-Apr 1468**	**22402**	**25717**	**208**	**101**	**0**	**52,043**

[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
[4] Includes water conveyed from Ivanhoe Lake through the Boustead Tunnel
[5] Lily Pad gauge may not have been rated correctly. Table 4 has been adjusted

Table A-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	32	0	0
1973	36.8	68.8	0	16
1974	34.1	102.9	0	18.6
1975	37.2	140.1	0	25
1976	26.9	167	0	24
1977	11.4	178.4	0	25
1978	49.2	227.6	0	25
1979	53.7	281.3	0	25.6
1980	55.7	337	0	70
1981	34.6	371.6	0	25
1982	75.2	446.8	2.7	68
1983	90.8	537.6	0.3	125
1984	110.1	647.7	1.9	210
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
1988[1]	13.4	763.8	2	247.8
1989	36.2	800	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
1996[1]	36.9	1226.7	1.8	110
1997	78.6	1305.3	1.8	116
1998	51.3	1356.6	2.6	102
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	1.3	15.3
2005	54.6	1637.6	3	40.8
2006	61.2	1698.8	3	49.2

Table A-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
2007	54.2	1753	3	40.4
2008	90	1843	3	83
2009	82.7	1925.7	3	78
2010	56.5	1982.2	3	44
2011	98.9	2081.1	2.3	75
2012	13.4	2094.5	1.5	9.9
2013	46.7	2141.2	2.8	37.6
2014	80.3	2221.5	3	56
2015	72.2	2293.7	1.9	67.9
2016	59.2	2353	2.5	39.1
2017	67	2420	2	46.3
2018	39.2	2459.2	3	41.3
2019	95.8	2555	0.1	42.6
2020	51	2606	2.7	62.9
2021	31.9	2637.9	3	25.8
2022	47.2	2685.1	3	32.8

[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 1988 and 2021 are 1887.4 KAF

1983 includes 3,120 acre-feet imported through the Twin Lakes Tunnel

Table A-6.—Turquoise Lake Operations WY2022 (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 2021	0.1	0	0.0	0.1	0.3	0.5	0.3	1.1	78.2	9,838.8
NOV 2021	0.0	0	0.0	0.1	0.3	0.4	0.2	1.1	77.3	9,838.2
DEC 2021	0.0	0	0.0	0.0	0.8	0.8	0.0	1.1	77.0	9,838.0
JAN 2022	0.0	0	0.0	0.0	0	-0.2	0.0	10.0	66.8	9,831.1
FEB 2022	0.0	0	0.0	0.0	0	-2.1	0.0	18.0	46.7	9,816.1
MAR 2022	0.0	0	14.5	0.0	-1.6	12.9	0.0	18.9	40.8	9,811.1
APR 2022	0.2	0	9.1	0.3	1.4	11.0	0.0	2.4	49.4	9,818.2
MAY 2022	1.1	0	0.0	22.2	7	30.3	0.4	1.8	77.6	9,838.4
JUN 2022	0.8	0	0.0	24.8	7.4	33.0	0.6	1.8	108.2	9,857.2
JUL 2022	0.0	0	0.0	2.3	2.4	4.7	0.6	1.7	110.7	9,858.7
AUG 2022	0.0	0	0.0	0.1	2.5	2.6	0.5	19.6	93.1	9,848.2
SEP 2022	0.0	0	0.0	0.0	1	1.0	0.4	7.7	86.0	9,843.8
Total* (acre-feet)	**2,256**	**0**	**23,543**	**47,233**	**21,500**	**95,006**	**2,969**	**85,160**	--	--

*Rounding may introduce discrepancies between monthly and yearly totals.

Table A-7.—Twin Lakes/Mt. Elbert Forebay Water Year 2022 Operations (Units = 1,000 Acre-feet)

Date	TLCC Imports	TLCC Winter Water	TLCC Priority/ Native	MEC Leadville Fish Hatchery [4]	MEC Halfmoon	MEC Sugarloaf Bypass	MEC Sugarloaf Powerplant/ Sleeve Valve	TL Native Inflow	TL Total Inflow	TL Evap.[2]	TL Total Outflow	TL End of Month Content[2]	TL Water Elevation[3] (feet)
OCT 21	0.4	0.0	0.0	0.3	0.0	0.6	0.0	1.3	2.3	0.6	1.1	121.7	9,188.63
NOV 21	0.8	0.1	0.0	0.3	0.0	0.6	0.0	0.9	2.2	0.2	6.3	117.3	9,186.75
DEC 21	0.6	0.9	0.0	0.3	0.0	0.6	0.0	0.9	2.1	0.1	8.3	111.0	9,184.10
JAN 22	0.5	2.2	0.0	0.3	0.0	0.6	8.8	2.3	12.1	0.0	17.8	105.3	9,181.20
FEB 22	0.3	0.4	0.0	0.3	0.0	0.5	16.9	2.1	19.9	0.0	17.7	107.6	9,182.22
MAR 22	0.4	0.3	0.0	0.3	0.0	0.6	17.8	2.2	21.0	0.0	18.6	109.9	9,183.60
APR 22	1.0	0.1	0.6	0.3	0.0	0.6	1.4	1.7	4.6	0.2	11.9	102.5	9,180.04
MAY 22	13.2	0.1	10.4	0.3	3.3	0.9	0.0	12.5	29.6	0.9	13.8	117.3	9,186.90
JUN 22	13.8	0.1	6.6	0.3	4.9	0.8	0.0	18.7	38.0	1.0	27.5	126.8	9,191.13
JUL 22	2.0	0.0	0.6	0.3	1.7	0.8	0.0	9.4	13.6	0.8	27.7	111.8	9,185.23
AUG 22	2.1	0.0	0.3	0.3	1.2	0.1	19.2	4.2	26.4	0.6	17.4	120.2	9,188.92
SEP 22	0.1	0.0	0.3	0.3	0.3	0.0	7.5	1.5	9.2	0.7	1.4	127.4	9,191.59
Total[1] Acre Feet	**35,214**	**4,296**	**18,871**	**3,909**	**11,440**	**6,662**	**71,624**	**57,785**	**180,998**	**5,220**	**169,558**	--	--

[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
Twin Lakes Canal Company = TLCC; Mt. Elbert Conduit = MEC; Twin Lakes = TL

Table A-8.—Mt. Elbert Pumped-Storage Power Plant WY2022 Operations

Month	Year	Net Generation (MWH)	Gross Generation (MWH)	Inflow to Mt. Elbert (KAF)	Water Through Generator (KAF)	Water Pumped from Twin Lakes to Forebay (KAF)
OCT	2021	0.0	0.6	0.0	0.0	0.0
NOV	2021	-139.0	0.5	0.4	0.0	0.4
DEC	2021	143,629.0	0.6	38.3	0.0	38.3
JAN	2022	211,029.0	9.7	58.2	0.0	58.2
FEB	2022	229,279.0	17.8	61.5	0.0	61.5
MAR	2022	247,849.0	18.7	67.7	0.0	67.7
APR	2022	103,609.0	2.3	28.6	0.0	28.6
MAY	2022	162,699.0	3.8	45.2	0.0	45.2
JUN	2022	210,169.0	5.5	55.0	0.0	55.0
JUL	2022	363,479.0	2.5	93.9	0.0	93.9
AUG	2022	424,539.0	19.8	75.5	0.0	75.5
SEP	2022	348,409.0	8.1	96.1	0.0	96.1
Totals		**244,321.2**	**89.8**	**537.4**	**620.2**	**537.4**

Table A-9.—Pueblo Reservoir WY2022 Operations (Units = 1,000 AF)

Month	Project Inflow	Contract Inflow	Native[2] Inflow	Total Inflow	Evap.	Total Outflow	End of Month Content	Water Service Elevation (Feet)
OCT 21	.3	3.7	12.8	16.8	1.5	17.8	179.3	4,863.73
NOV 21	.8	3.1	16.5	20.4	0.7	15.3	183.8	4,864.97
DEC 21	1.3	2.9	15.3	19.5	0.5	11.3	191.4	4,867.06
JAN 22	6.8	.4	16.2	23.4	0.5	9.7	204.7	4,870.58
FEB 22	7.4	.1	15.6	23.1	0.6	9.7	217.5	4,873.81
MAR 22	7.6	2.4	20.2	30.2	1.1	19.5	227.1	4,876.15
APR 22	1	3.5	20.5	25	2.2	30.4	219.6	4,874.31
MAY 22	.3	11.6	73.6	85.5	2.5	96.5	206	4,870.92
JUN 22	.3	7.7	109	117	2.7	123.3	197.1	4,868.57
JUL 22	4.7	6.6	50.5	61.8	2.6	71.8	184.4	4,865.15
AUG 22	4.9	8.1	22.2	35.2	2.6	34.8	182.2	4,864.54
SEP 22	.3	2.9	15.4	18.6	2.1	20.6	178.1	4,863.39
Total[1] (acre-feet)	**35519**	**88455**	**352427**	**476401**	**19387**	**460690**	----------	

[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 A-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 A-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 does not have a pan. Factor is derived from ((the average monthly evaporation volume times 12) divided by 0.7) divided (by the number of days in month) Evaporation in acre feet=monthly factor times surface area of the lake times (1minus percent of ice cover).

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

Month	Ruedi AVG.	Ruedi WY 2021	TQ AVG	TQ WY 2021	TL AVG.	TL WY 2021	Pueblo AVG.	Pueblo WY 2021
OCT 2021	57	67	362	315	524	577	1,125	1,472
NOV 2021	0	0	161	152	228	219	581	659
DEC 2021	0	0	15	21	26	46	455	487
JAN 2022	0	0	0	0	2	4	420	463
FEB 2022	0	0	0	0	3	8	607	590
MAR 2022	0	0	0	0	22	15	1,273	1,108
APR 2022	6	0	10	13	191	145	1,770	2,172
MAY 2022	166	195	266	358	828	795	2,179	2,548
JUN 2022	476	554	709	619	1,182	929	2,724	2,658
JUL 2022	514	552	600	576	953	758	2,539	2,558
AUG 2022	319	382	487	493	764	534	2,140	2,560
SEP 2022	178	208	432	422	695	651	1,749	2,112

Average between 1996 and 2021.
Turquoise = TQ
Twin Lakes = TL

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

Month	CNR[1] AVG.	CNR[1] WY 2022	TQ AVG.	TQ WY 2022	TL AVG.	TL WY 2022	Pueblo AVG	Pueblo WY 2022
OCT 21	2.5	2.4	1.14	0.88	0.86	0.55	0.82	0.21
NOV 21	2.2	2.4	1.24	0.46	0.49	0.10	0.31	0.00
DEC 21	3.1	5.3	1.39	0.73	0.46	0.21	0.27	0.01
JAN 22	3.0	2.5	1.66	2.97	0.51	1.12	0.35	0.29
FEB 22	2.8	1.9	1.55	1.32	0.52	1.28	0.40	0.62
MAR 22	3.0	2.1	1.50	1.47	0.62	0.67	0.88	1.80
APR 22	3.7	3.4	1.68	1.06	0.87	0.47	1.62	0.49
MAY 22	3.1	2.7	1.49	0.91	0.91	0.84	1.64	3.54
JUN 22	1.0	1.5	0.85	0.71	0.78	1.66	0.89	0.34
JUL 22	2.7	2.2	2.02	2.84	1.89	3.53	1.99	3.56
AUG 22	2.5	4.6	2.09	4.08	1.56	4.03	1.99	1.58
SEP 22	2.5	1.8	1.42	0.92	1.11	0.95	0.74	0.63
Total	**29.6**	**32.8**	**18.03**	**18.35**	**10.58**	**15.41**	**11.9**	**13.07**
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 WY2022. The precipitation averages and totals from the Chapman SNOTEL have been substituted. The SNOTEL has been in operation since 2008.

Chapman Near Ruedi = CNR
Turquoise = TQ
Twin Lakes =TL

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

WY	Ruedi Benefits	Ruedi Benefits Cumulative	Pueblo Benefits	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

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

WY	Ruedi Benefits	Ruedi Benefits Cumulative	Pueblo Benefits	Pueblo Benefits Cumulative
2010	$2,993,000	$15,314,400	$0	$31,476,200
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
2020	$0	$19,718,700	$0	$36,974,100
2021	$0	$19,718,700	$0	$36,974,100
2022	$0	$19,718,700	$0	$36,974,100

Appendix B

Exhibits

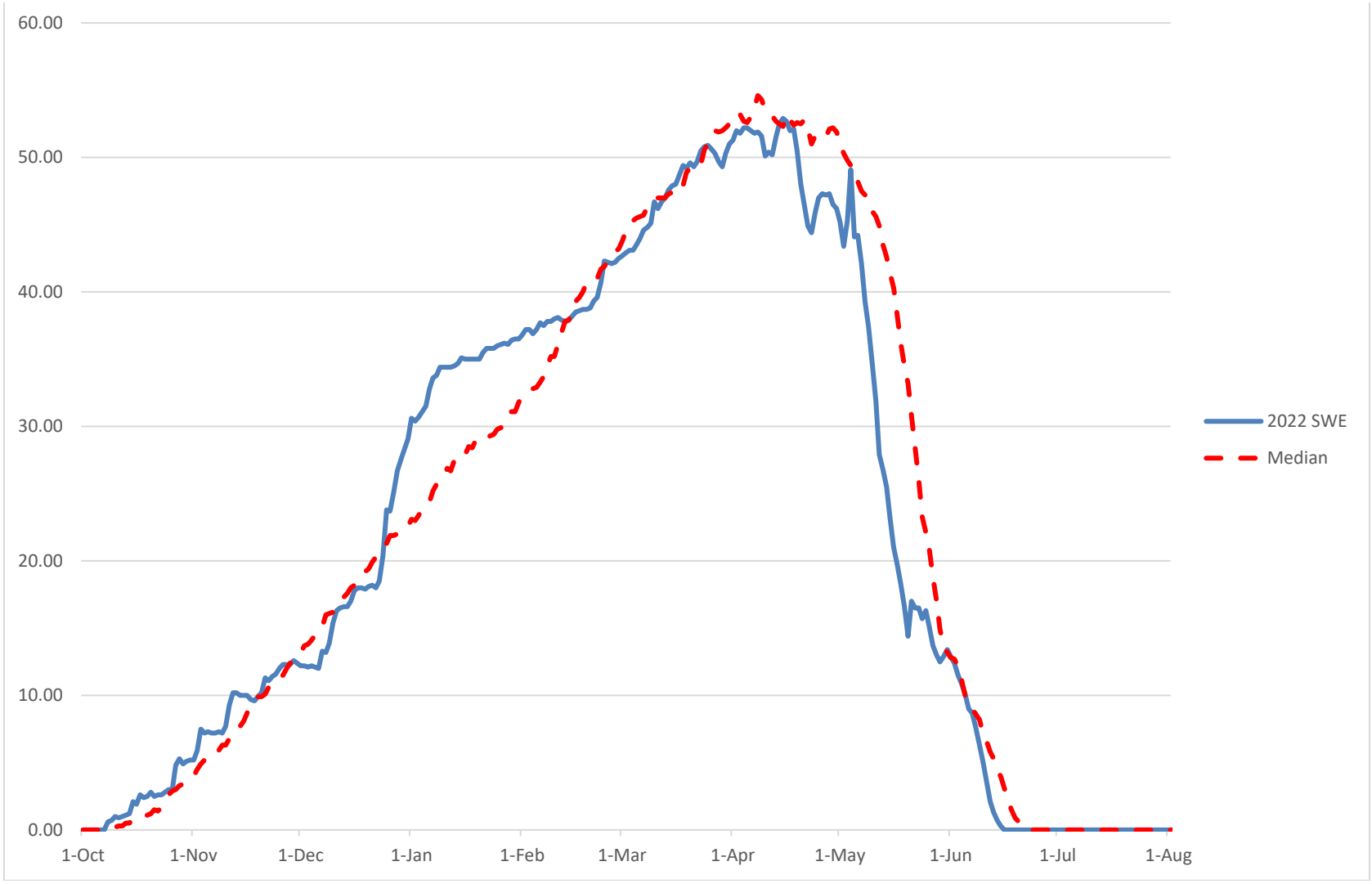

Exhibit B-1.—Combined Snow Water Equivalent of Fremont Pass, Independence Pass, Ivanhoe Lake, and Nast SNOTEL sites.

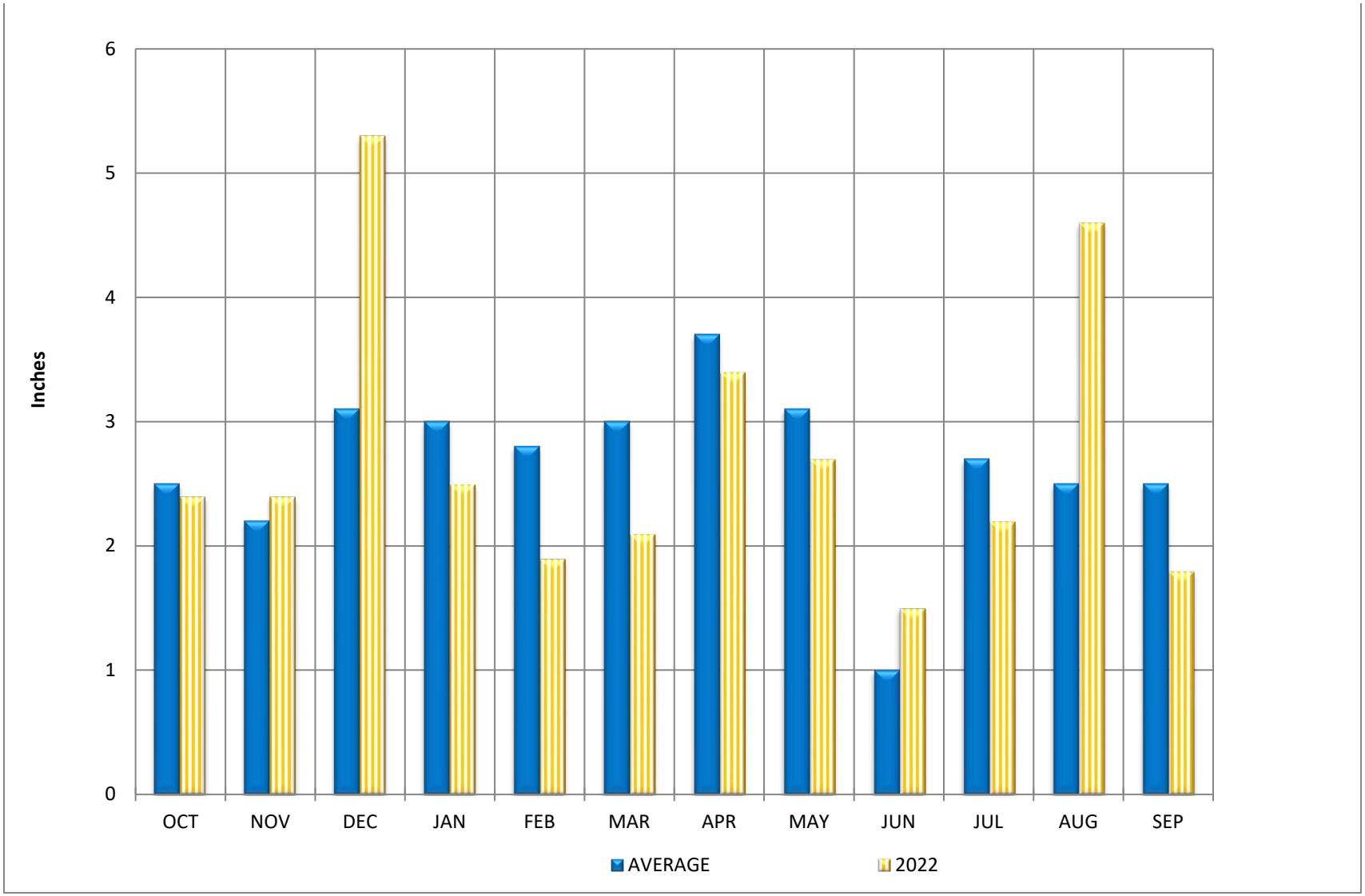

Exhibit B-2.—Chapman SNOTEL Monthly Precipitation WY2022. The weather station at Ruedi was out of service for the year. These precipitation values are from the Chapman SNOTEL gage.

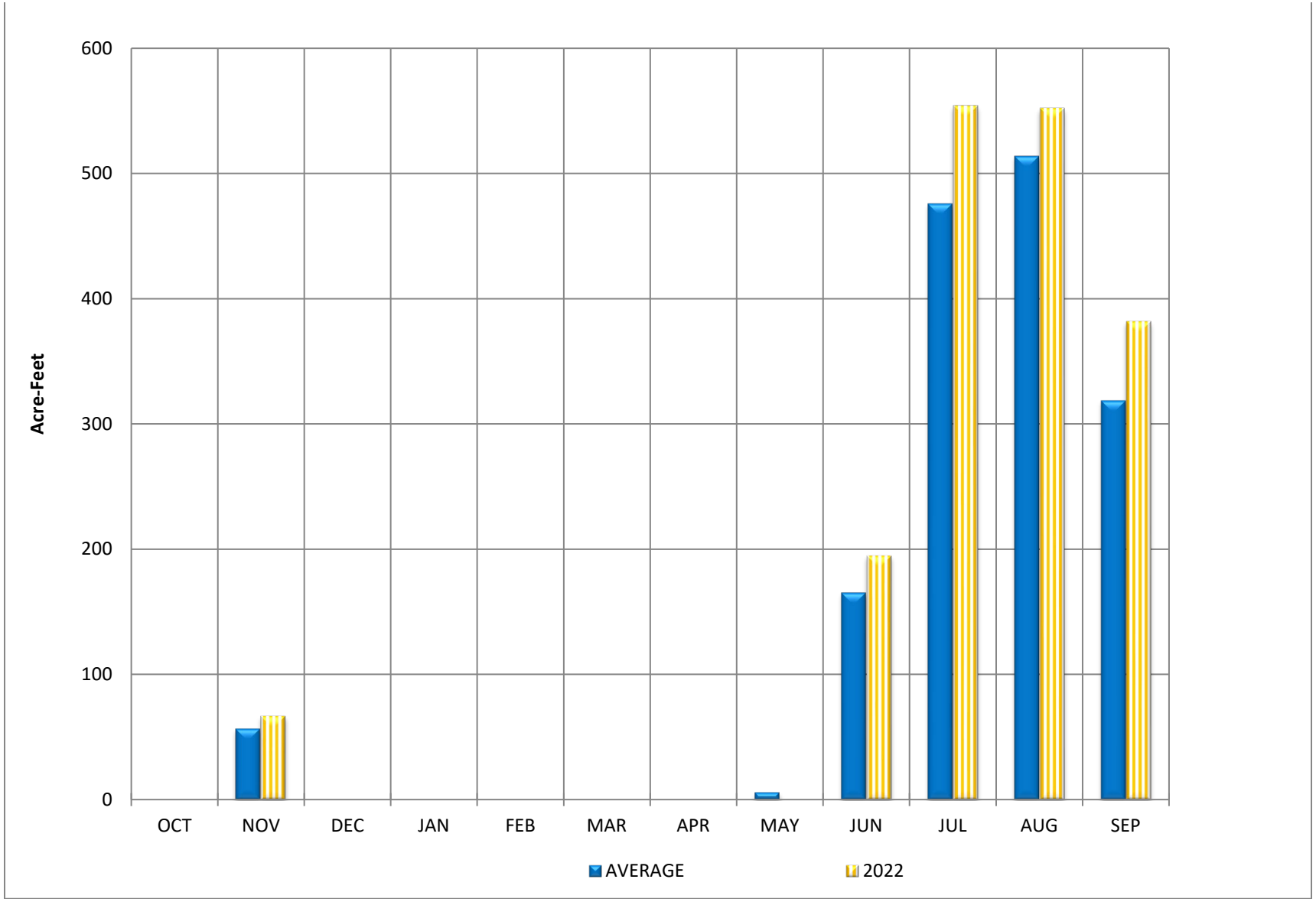

Exhibit B-3.—Ruedi Reservoir Monthly Evaporation WY2022.

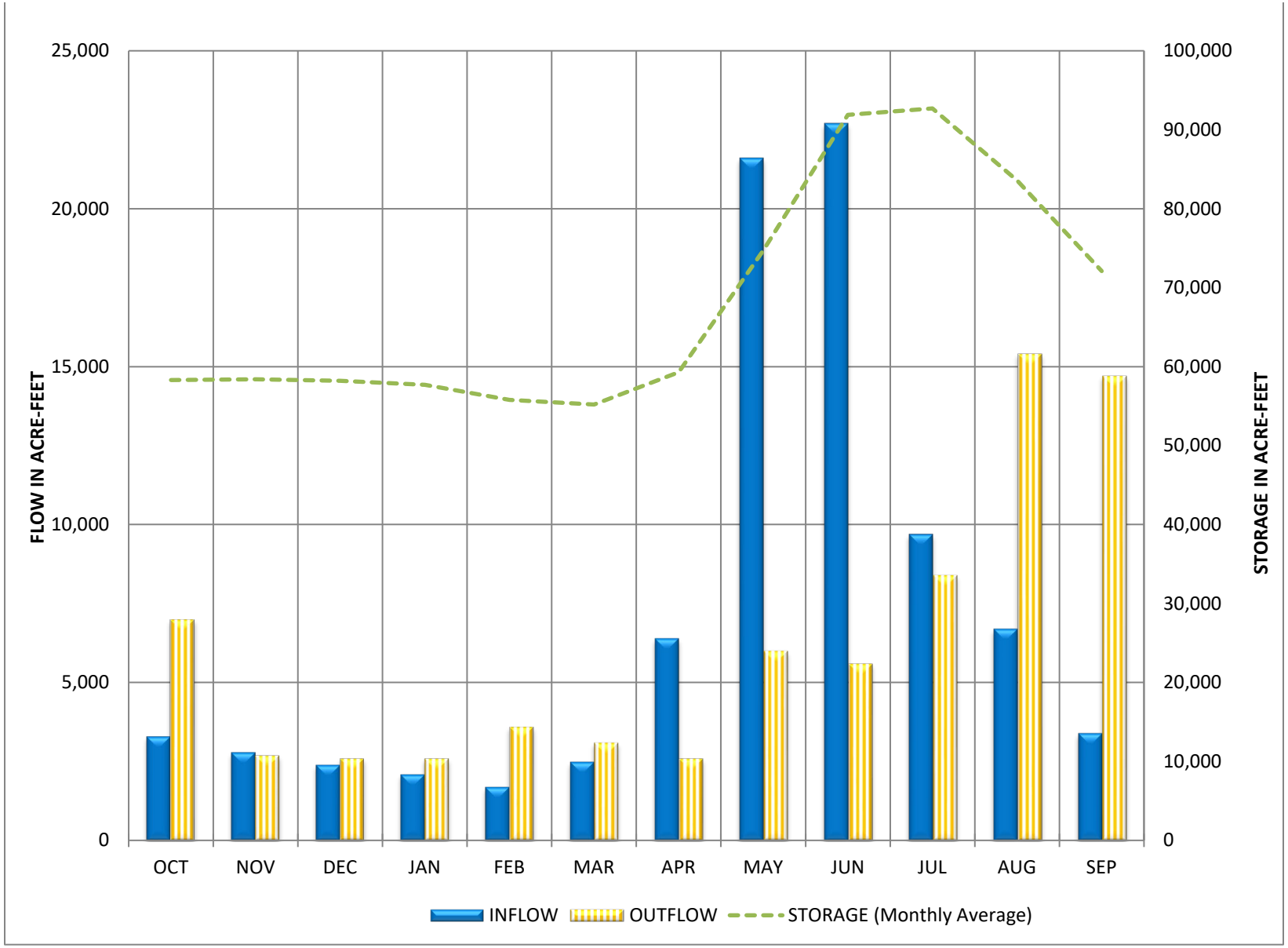

Exhibit B-4.—Ruedi Reservoir Actual Operations WY2022.

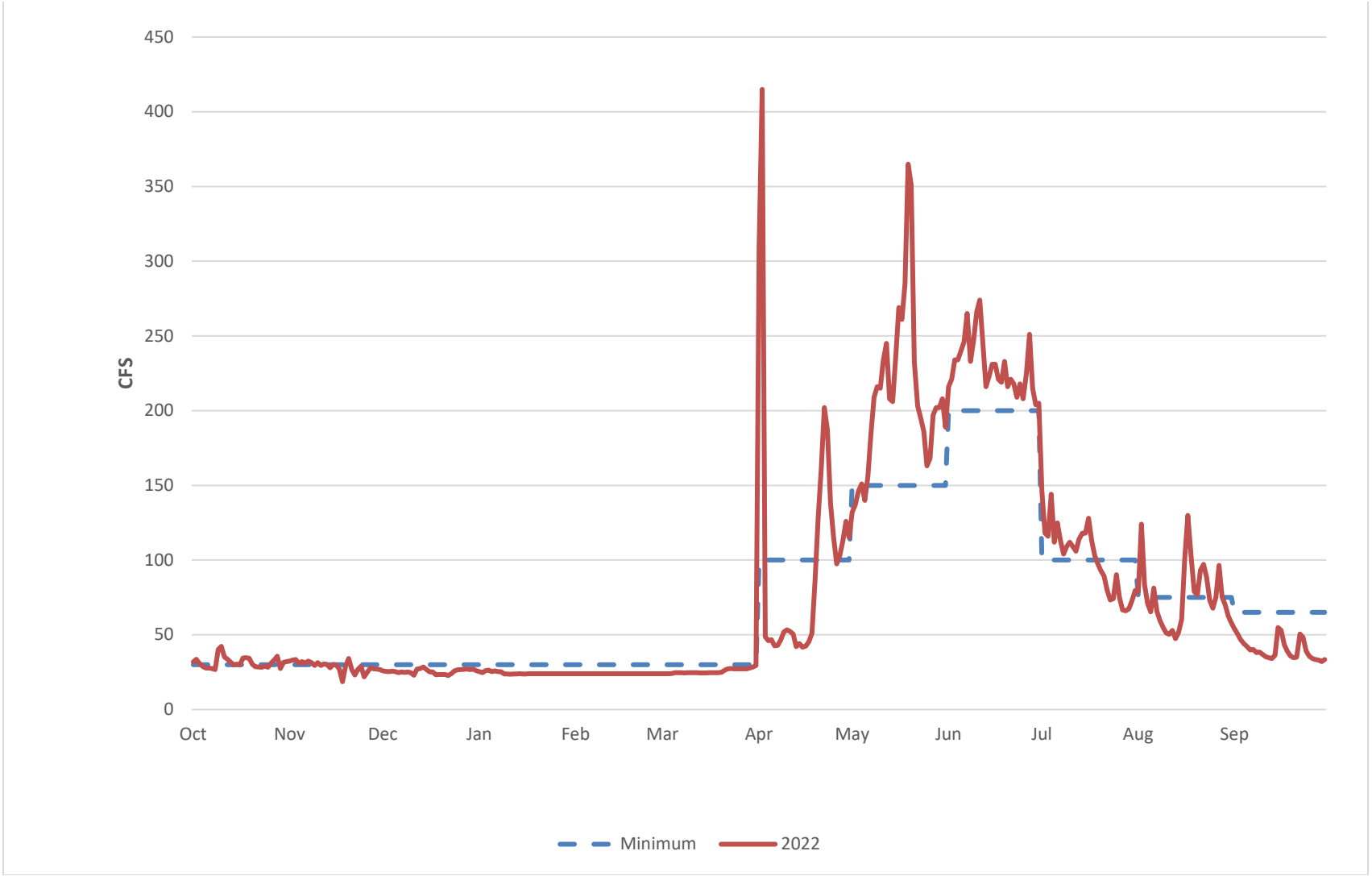

Exhibit B-5.—Fryingpan River near Thomasville Daily Discharge WY2022.

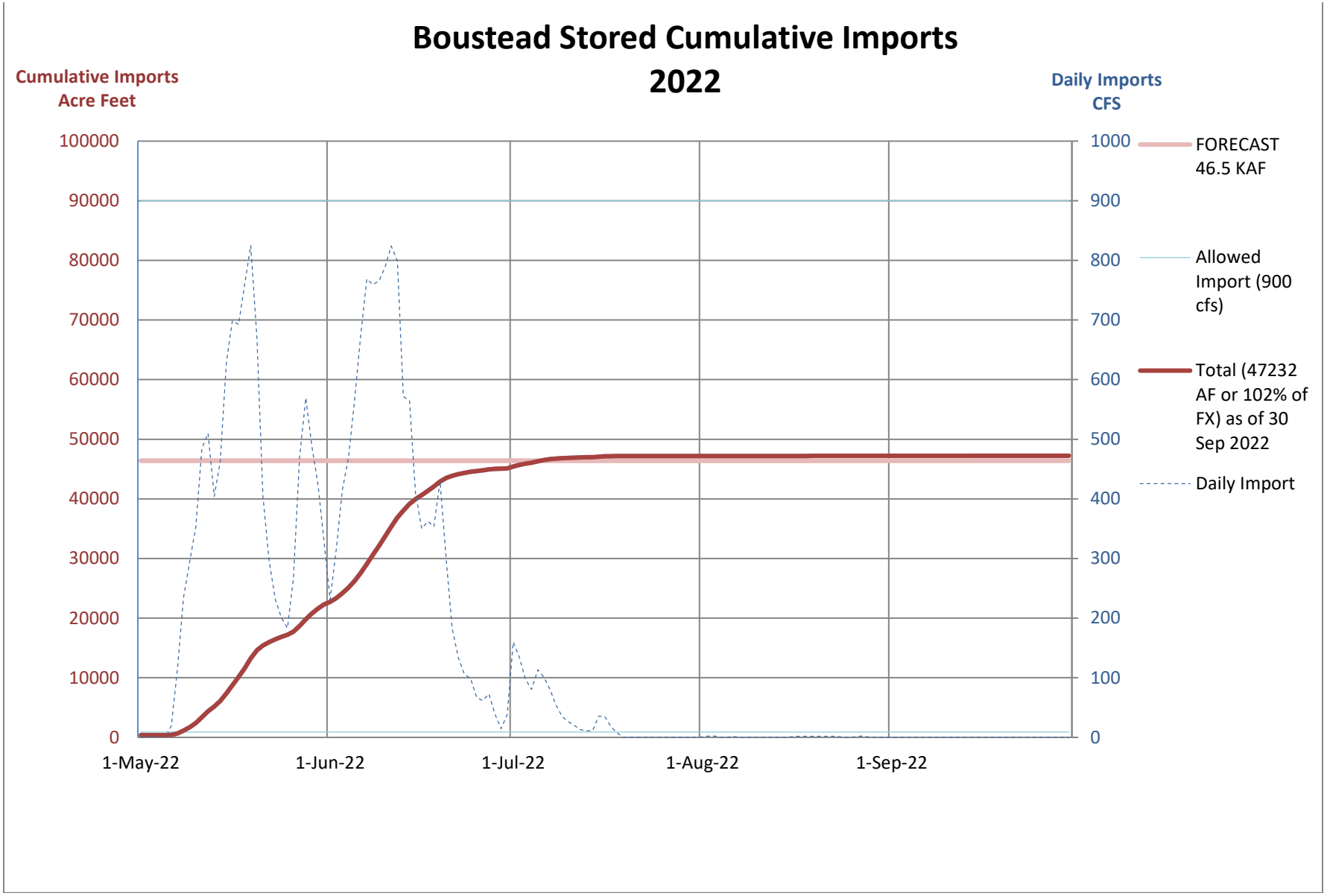

Exhibit B-6.—Boustead Tunnel Actual Operations WY2022.

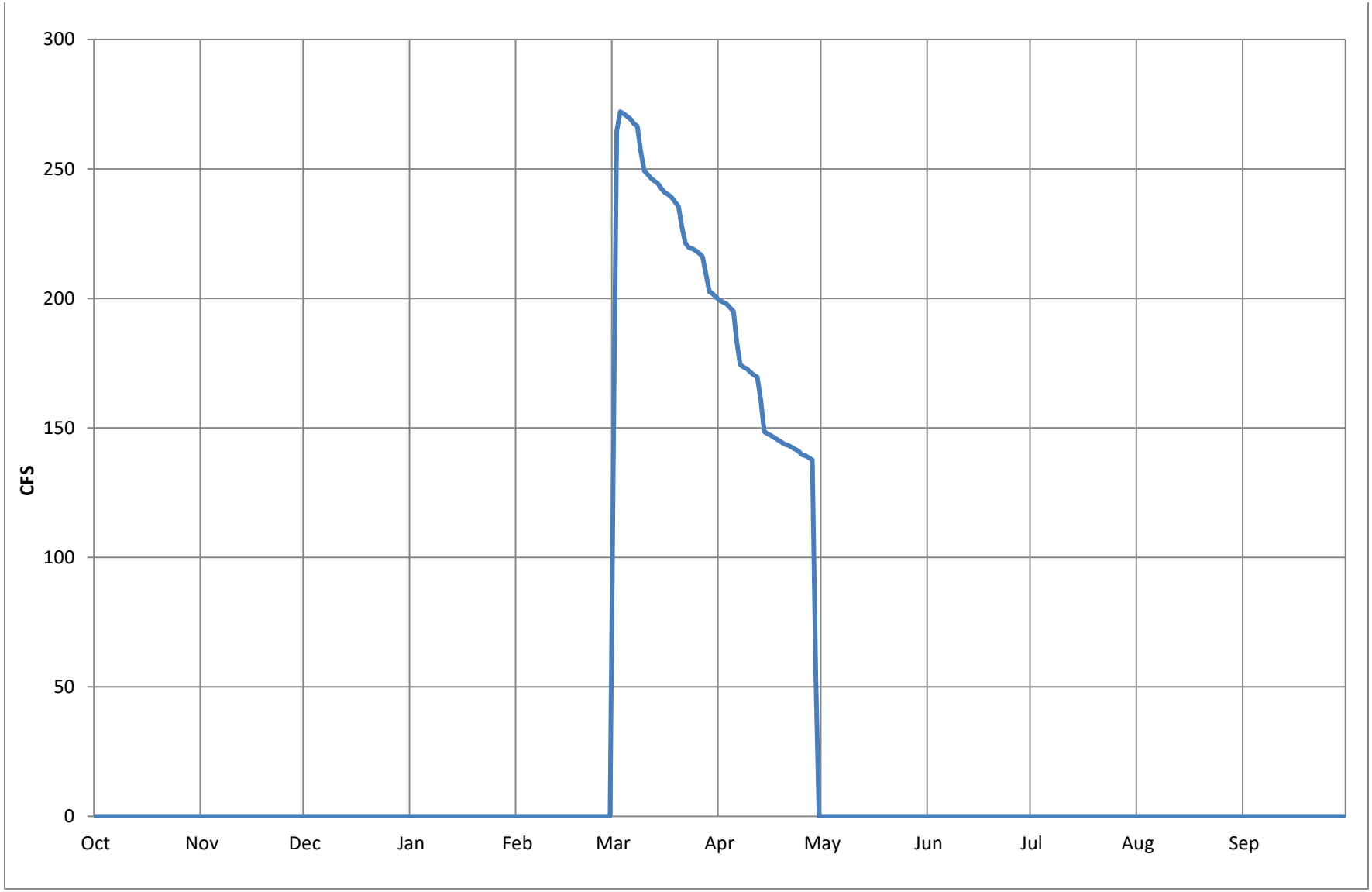

Exhibit B-7.—Homestake Tunnel Actual Operations WY2022.

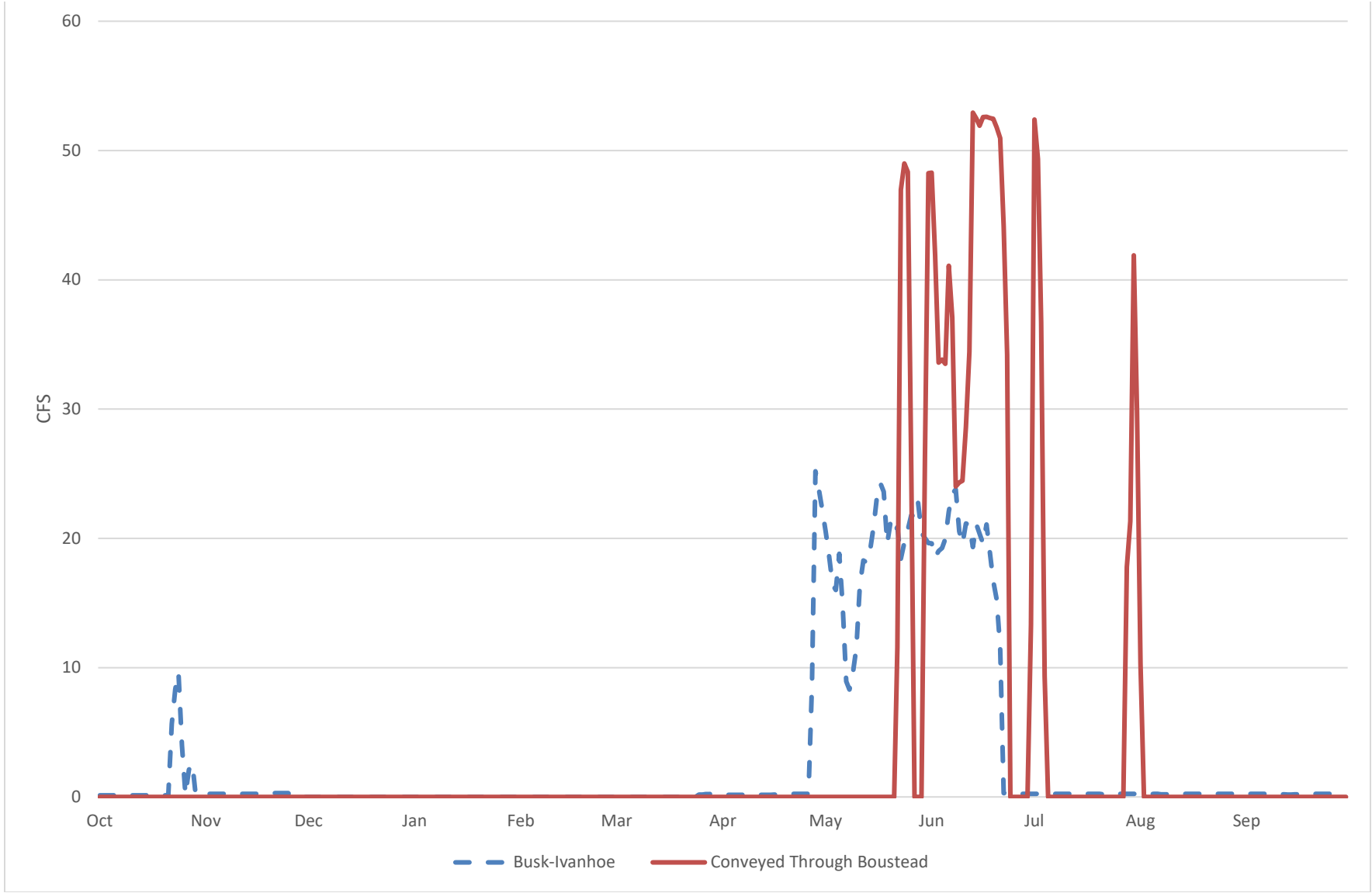

Exhibit B-8.—Busk-Ivanhoe Tunnel Actual Operations WY2022.

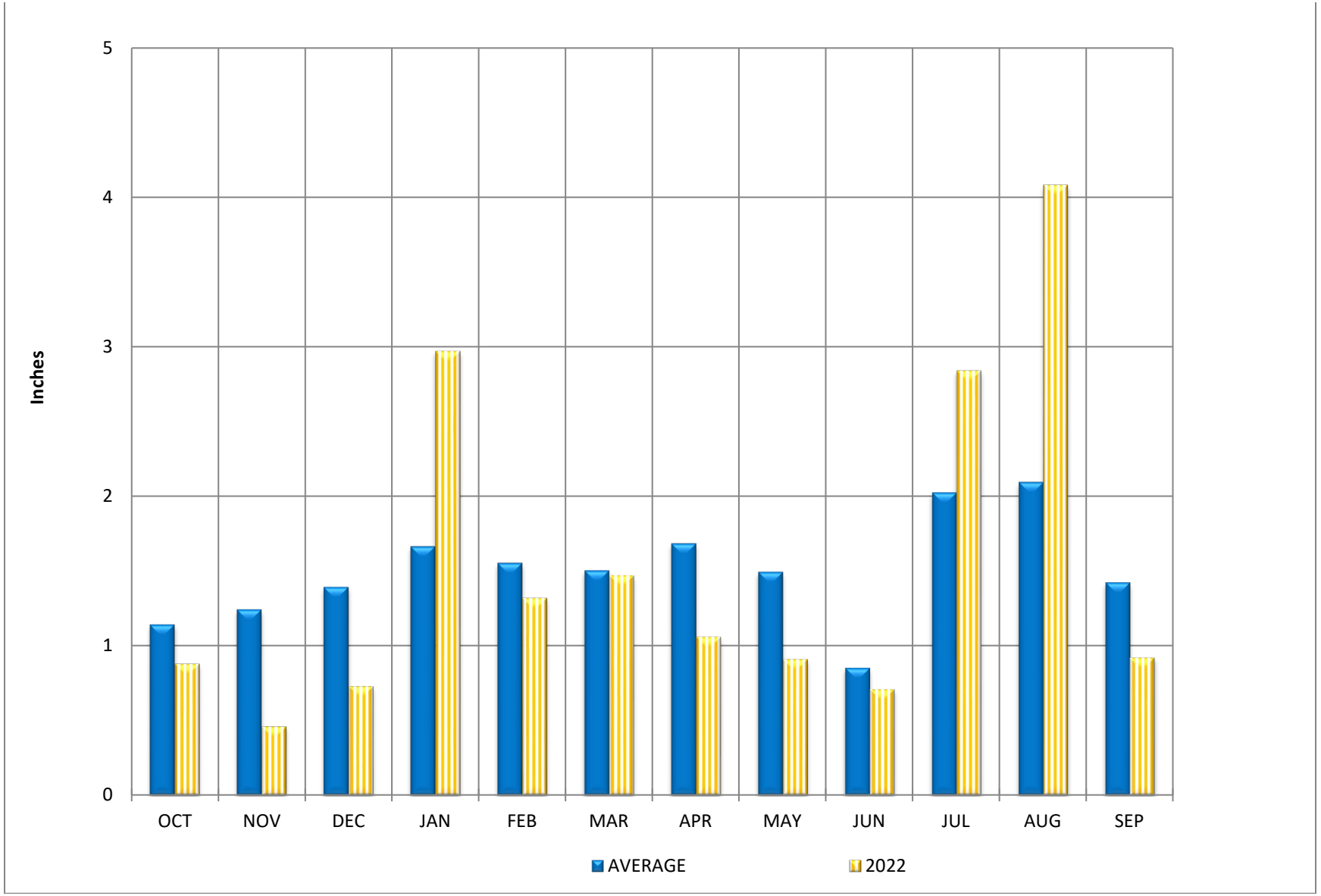

Exhibit B-9.—Turquoise Lake (Sugar Loaf Dam) Monthly Precipitation WY2022.

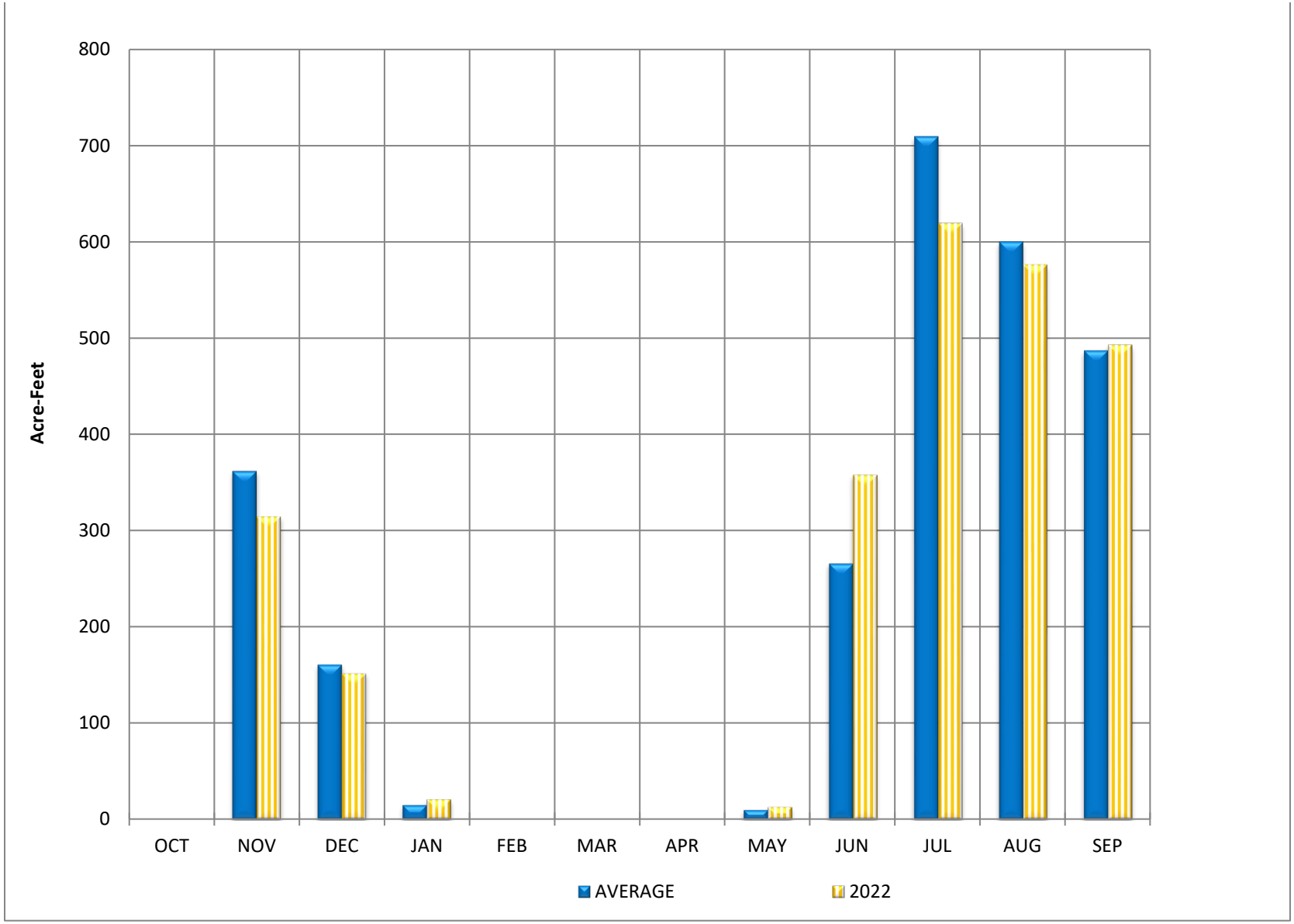

Exhibit B-10.—Turquoise Lake (Sugar Loaf Dam) Monthly Evaporation WY2022.

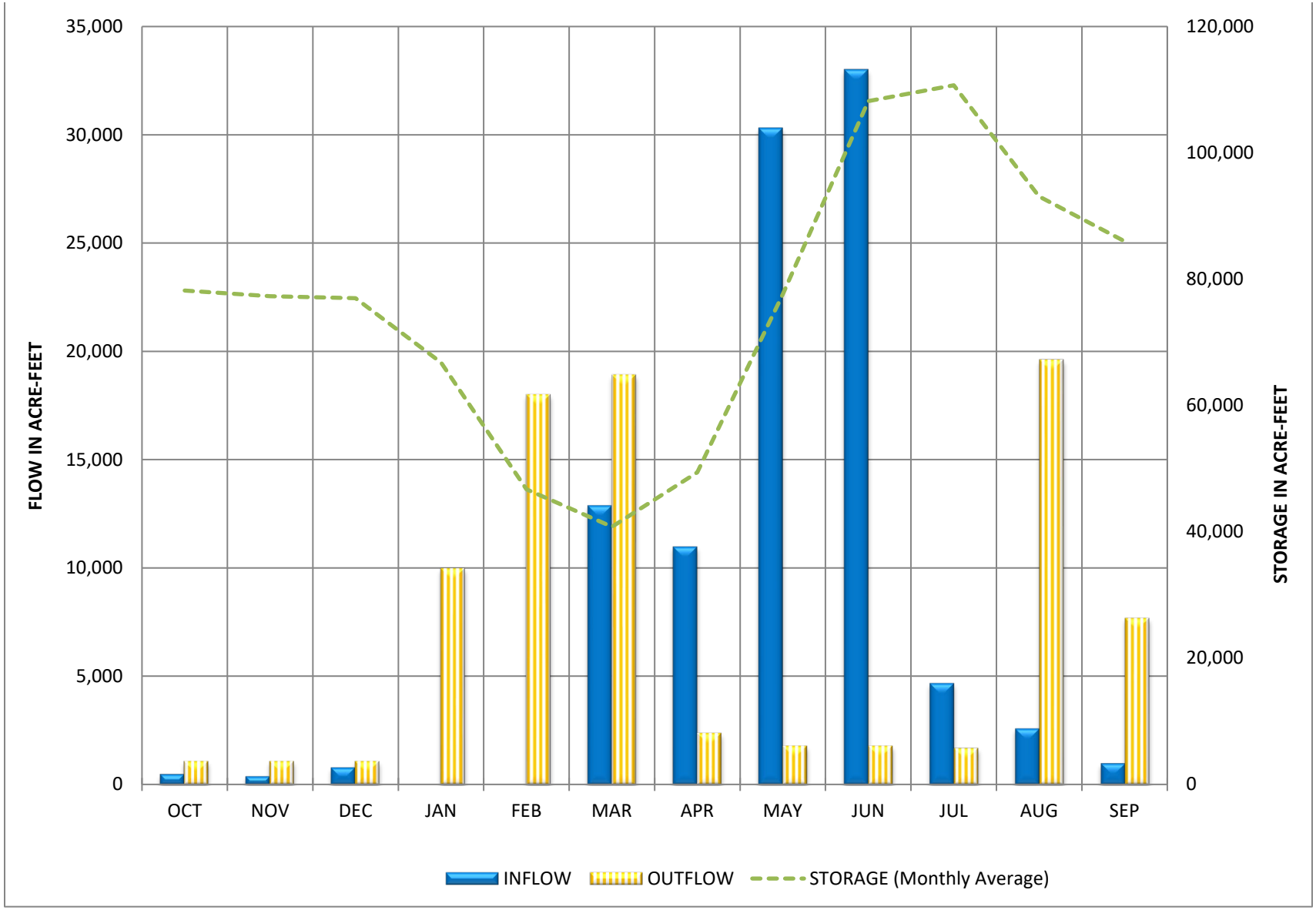

Exhibit B-11.—Turquoise Lake (Sugarloaf Dam) Actual Operations WY2022.

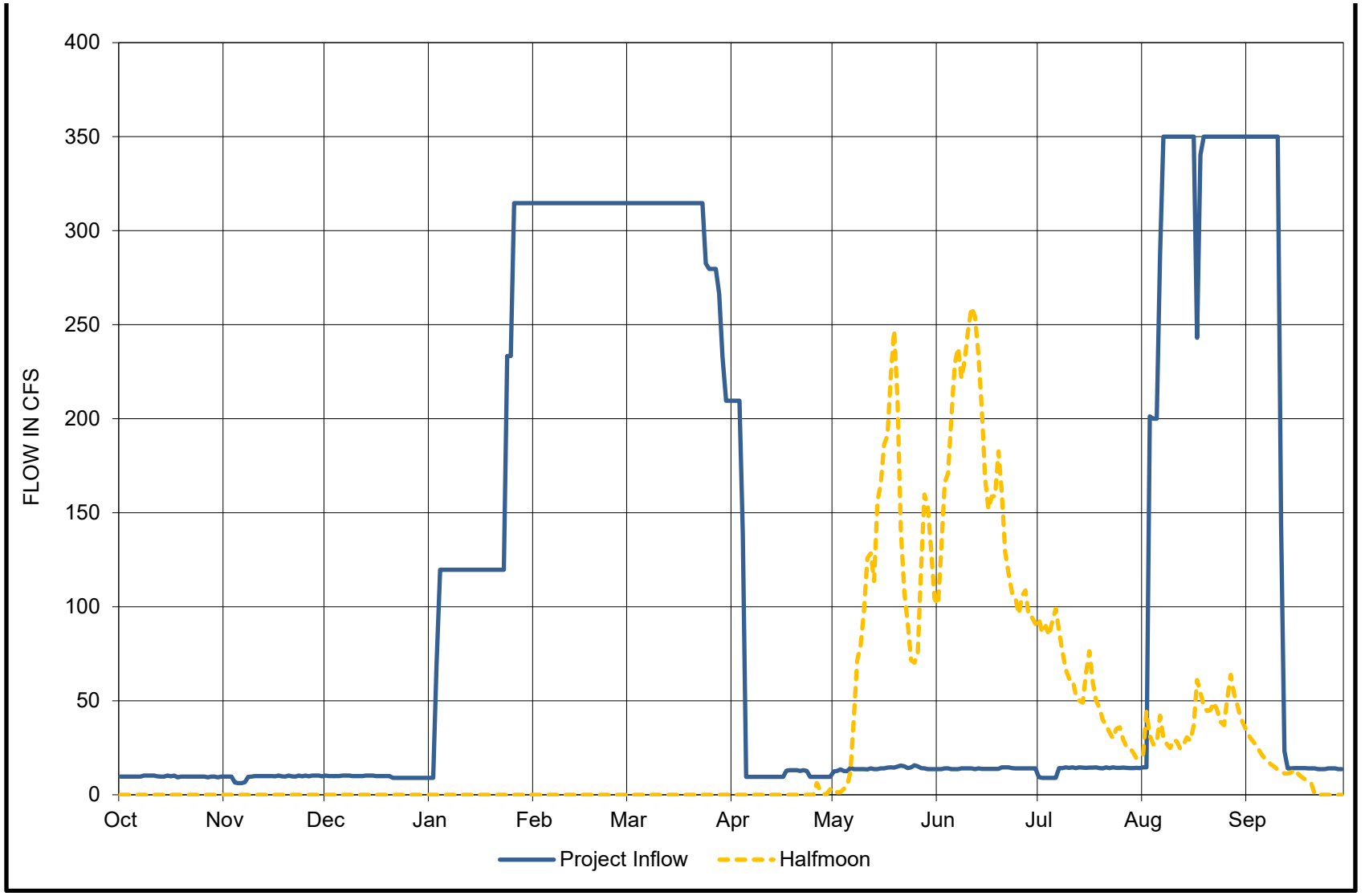

Exhibit B-12.—Mt. Elbert Conduit Inflow Actual Operations WY2022.

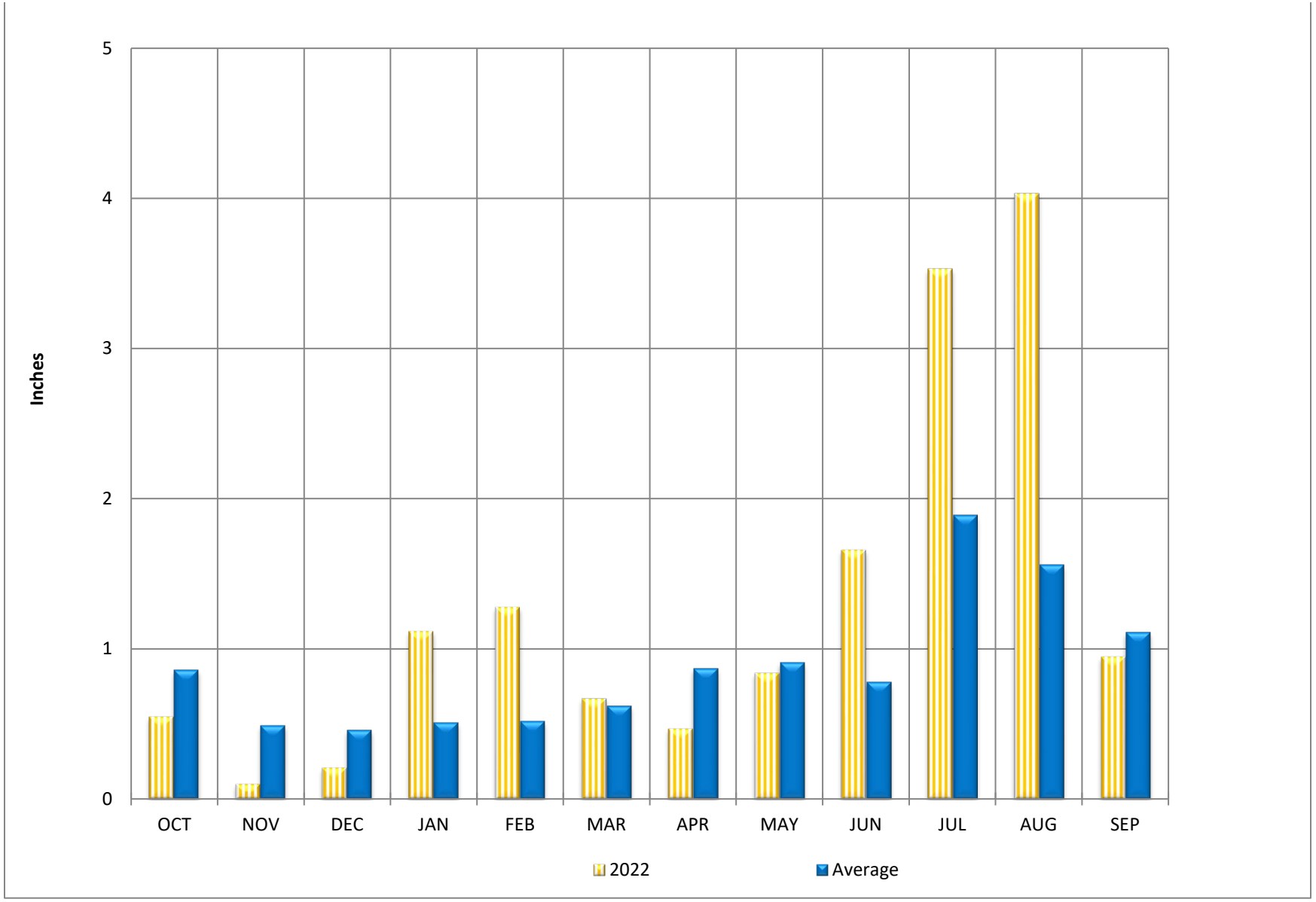

Exhibit B-13.—Twin Lakes Monthly Precipitation WY2022.

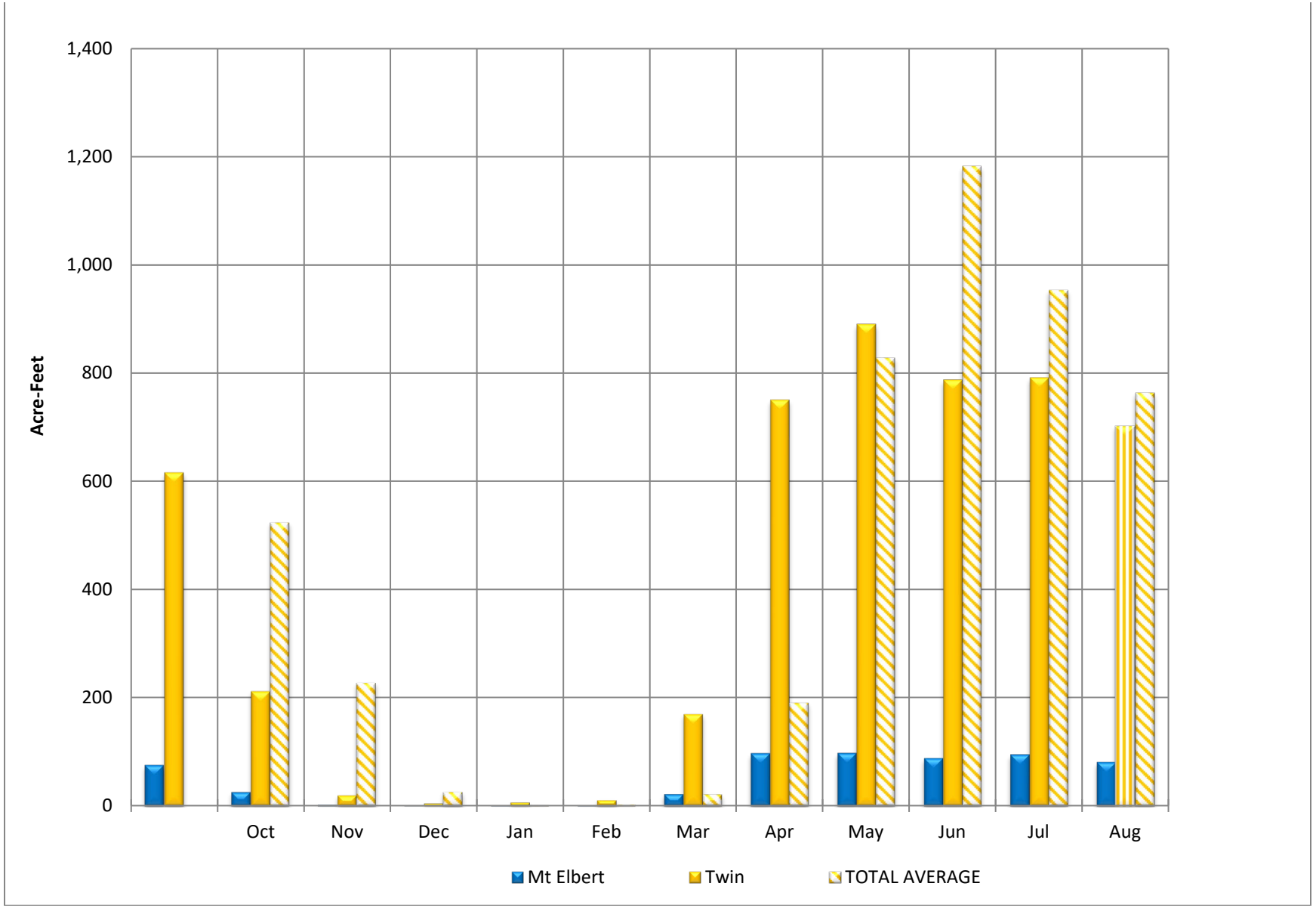

Exhibit B-14.—Twin Lakes Dam and Mt. Elbert Forebay Monthly Evaporation WY2022.

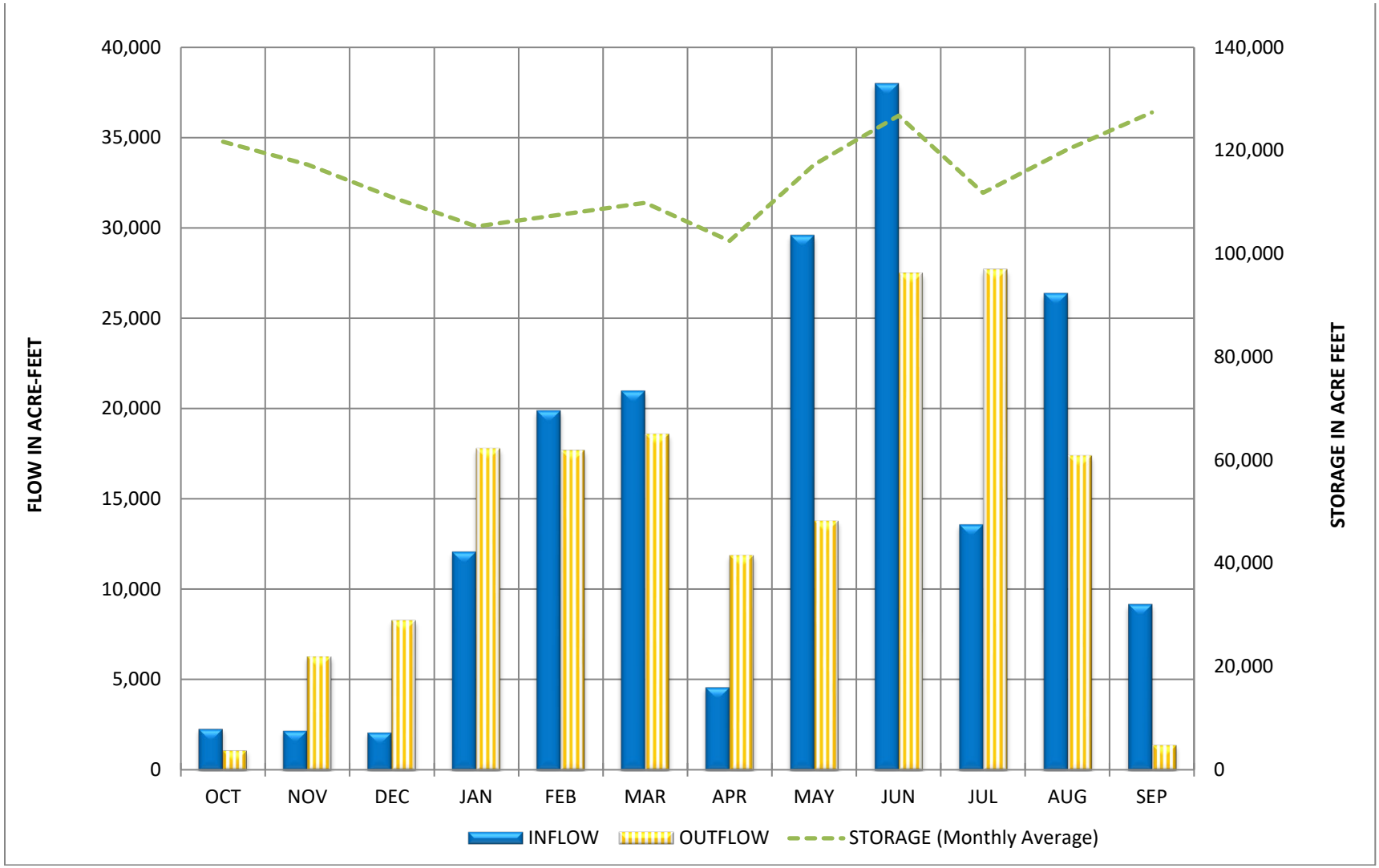

Exhibit B-15.—Twin Lakes/Mt. Elbert Forebay Actual Operations WY2022.

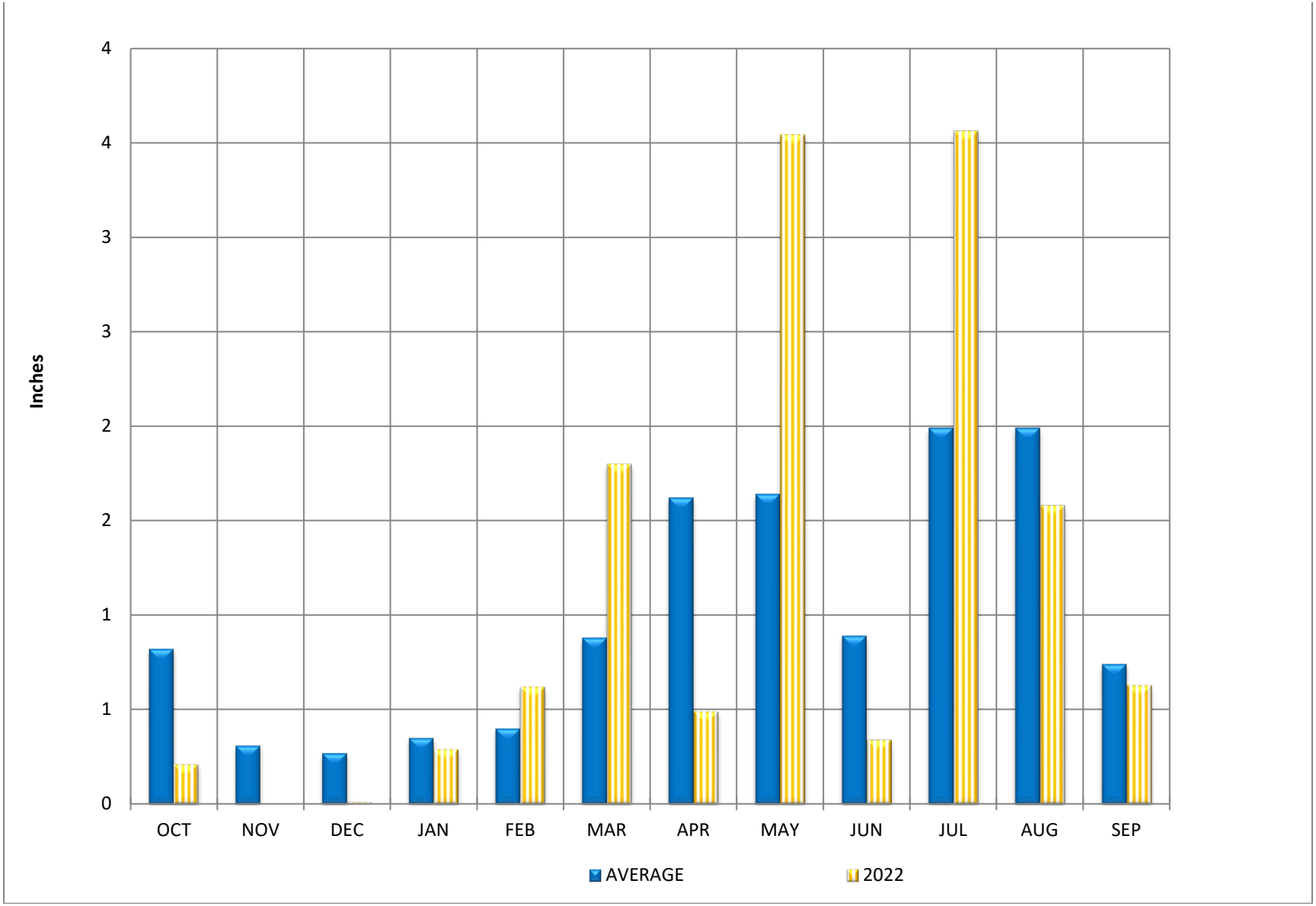

Exhibit B-16.—Pueblo Dam Monthly Precipitation WY2022.

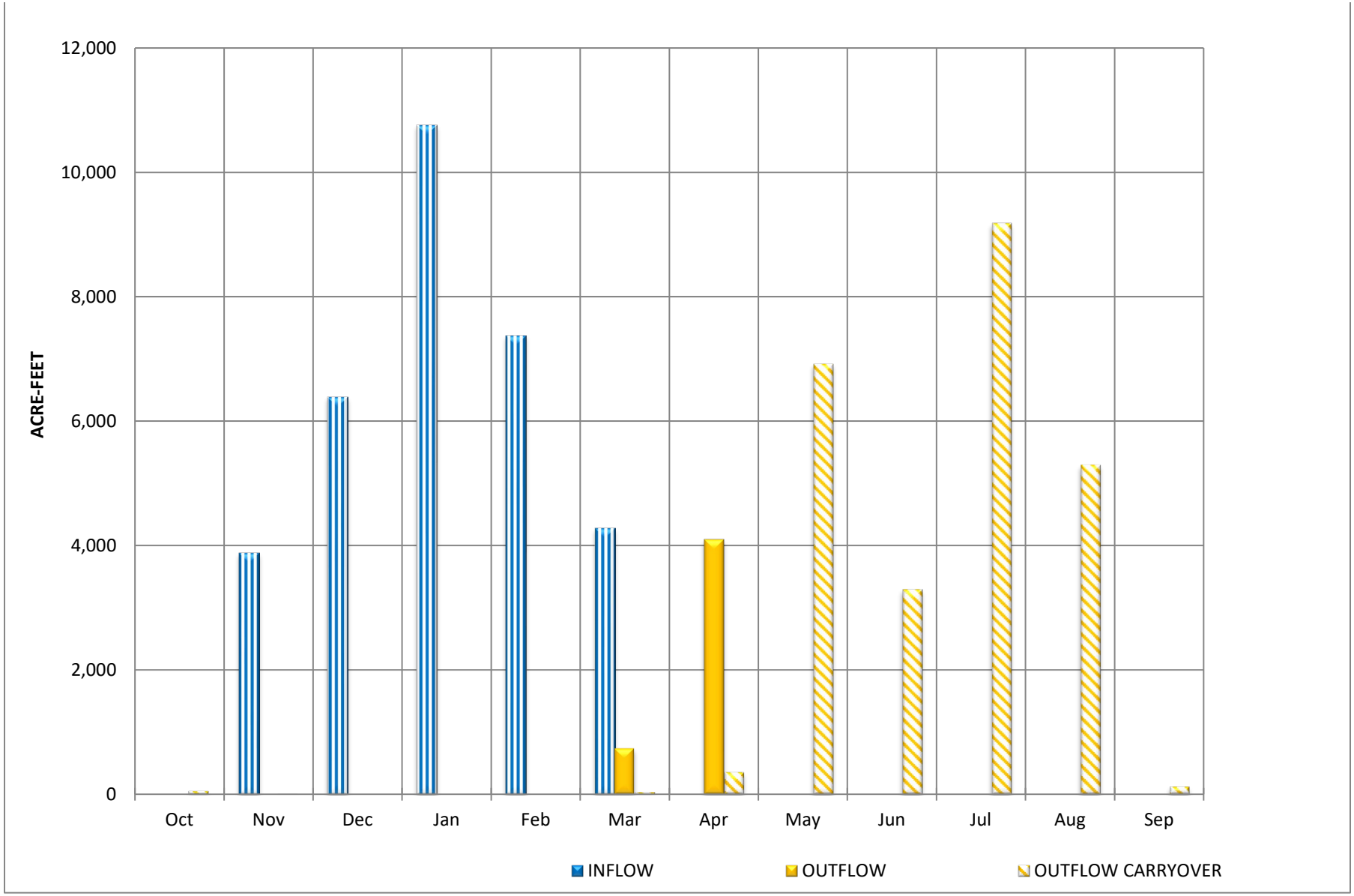

Exhibit B-17.—Pueblo Reservoir Winter Water WY2022.

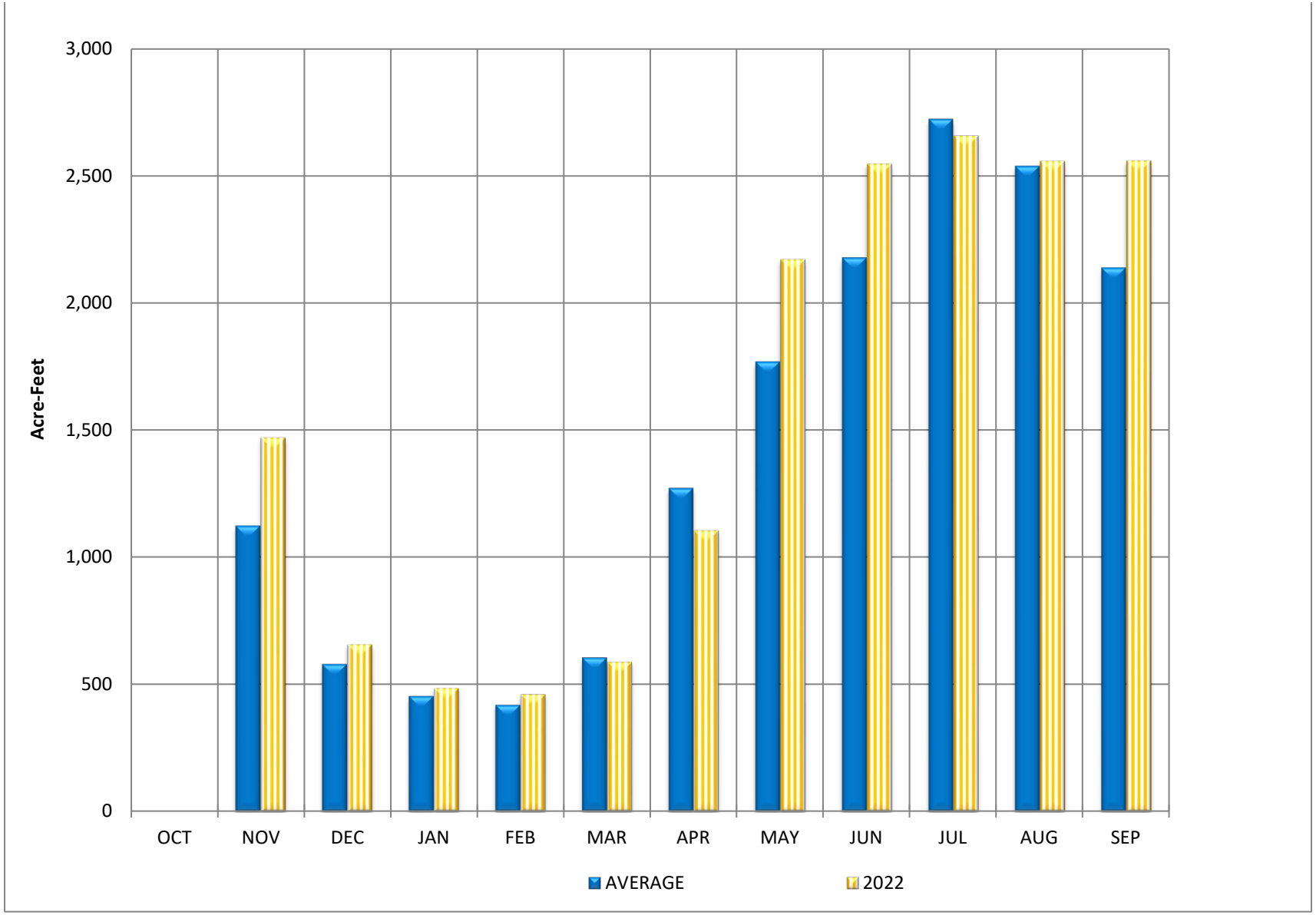

Exhibit B-18.—Pueblo Dam Monthly Evaporation WY2022.

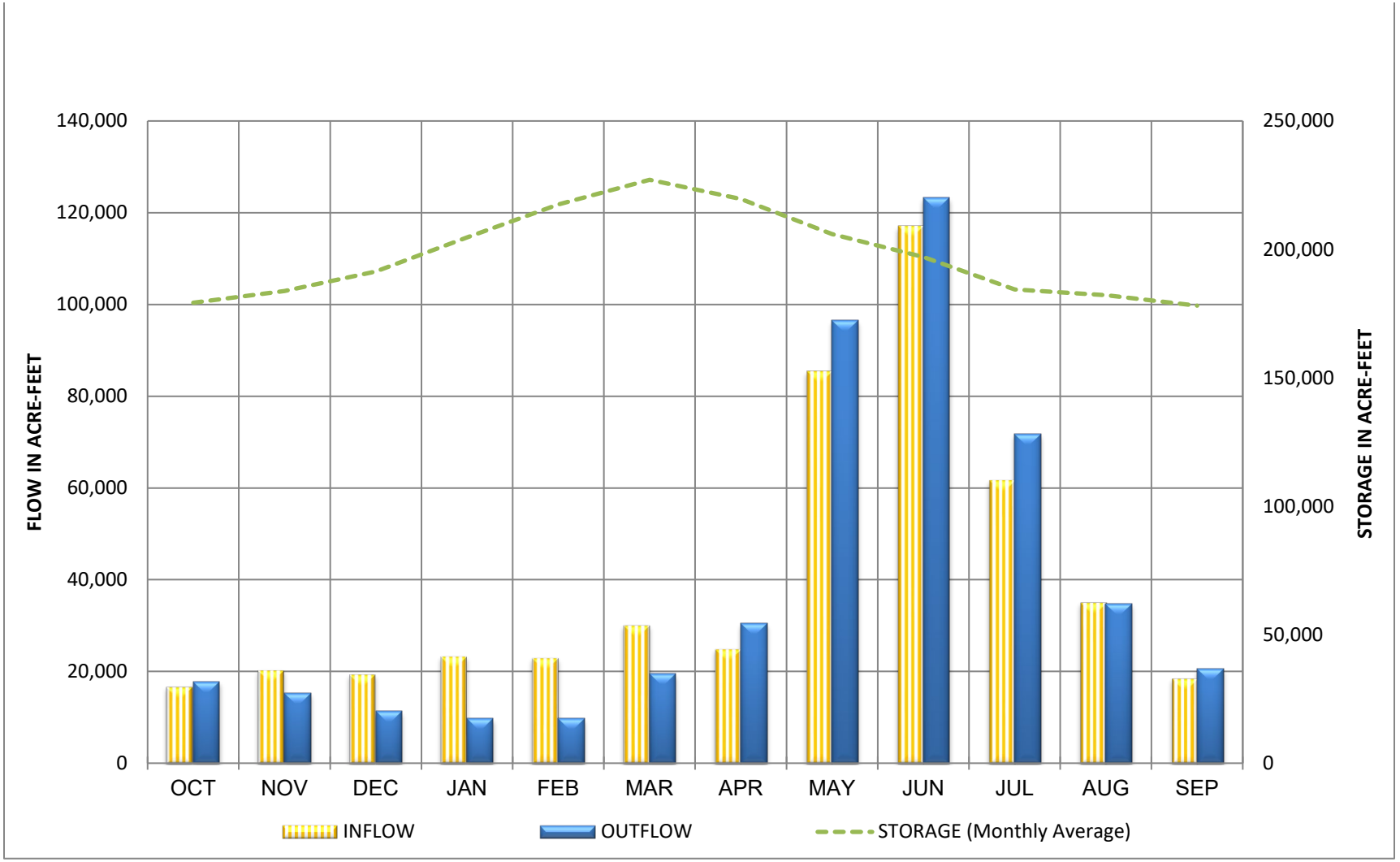

Exhibit B-19.—Pueblo Reservoir Actual Operations WY2022.

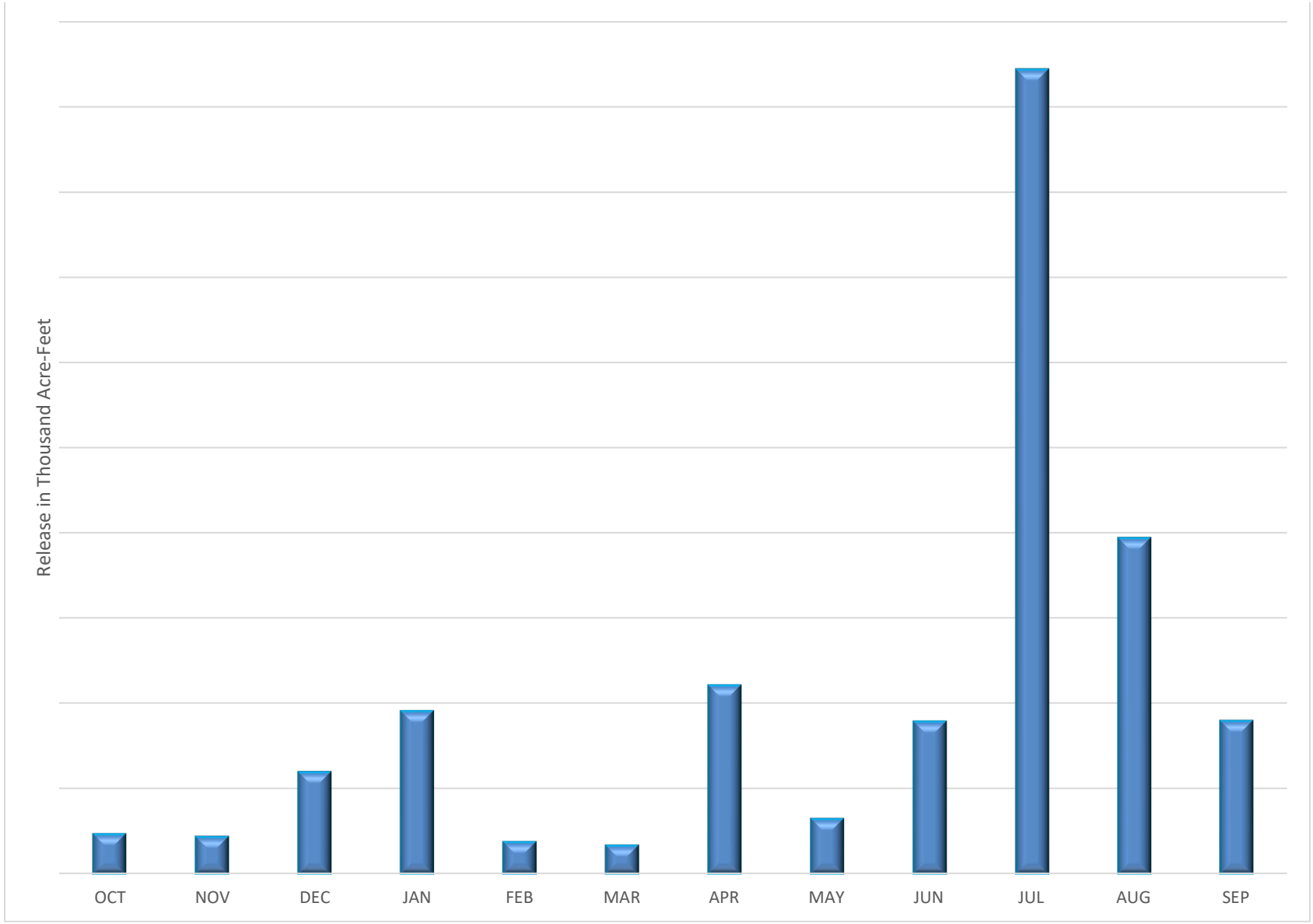

Exhibit B-20.—Releases of Fryingpan-Arkansas Project Water WY2022.

Appendix C

Twin Lakes Reservoir and Canal Company Exchange with Fryingpan-Arkansas Project Water WY2022

Twin Lakes Reservoir and Canal Company Exchange with Fryingpan-Arkansas Project Water WY2022

Table C-1.—Twin Lakes Reservoir Canal Company Exchanges with Fryingpan-Arkansas Project Water (Units = Acre-ft)

Month	Lincoln Creek below Grizzly Reservoir	Roaring Fork above Lost Man	Total Exchanged	Twin Lakes Storage (3) x 0. 9913[1]
Oct-21	0	0	0.0	0.0
Nov-21	0	0	0.0	0.0
Dec-21	0	0	0.0	0.0
Jan-22	0	0	0.0	0.0
Feb-22	0	0	0.0	0.0
Mar-22	0	0	0.0	0.0
Apr-22	0	0	0.0	0.0
May-22	0	0	0.0	0.0
Jun-22	1,175.4	159.3	1334.7	1323.1
Jul-22	1,442.8	243.5	1686.3	1671.7
Aug-22	5.1	0.0	5.1	5.0
Sep-22	0	0	0.0	0.0
Total	**2,623**	**403**	**3,026**	**3,000**

[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 3 KAF from being stored

Please see the discussion in Chapter IV, Paragraph C for a full discussion of the Twin Lakes Canal Company Exchange in WY2022.

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	45.0	4.0
July	45.0	4.0
August	45.0	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 more than the above amounts.

4. In the event less water than the above amounts are 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.

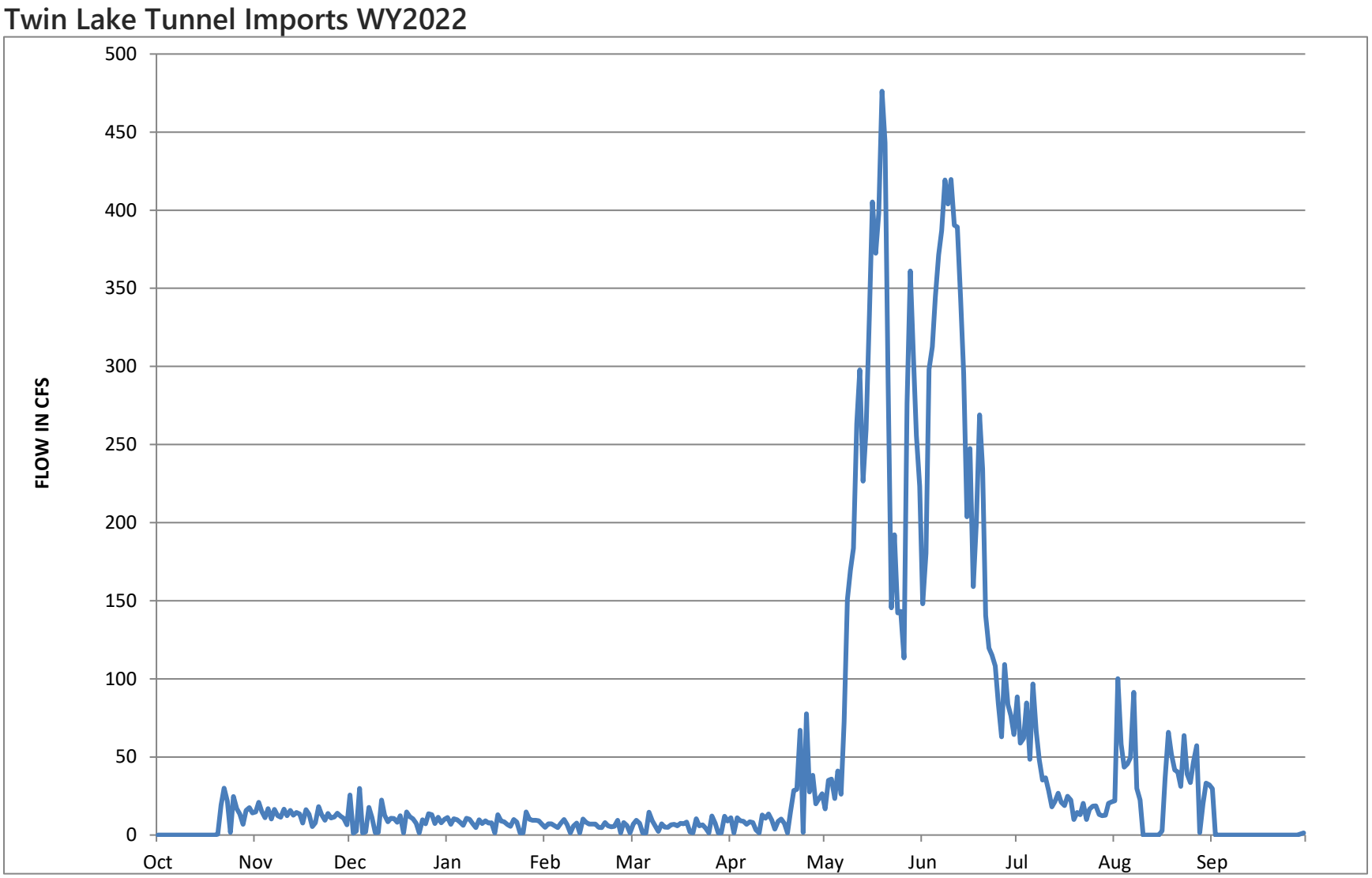

Figure C-1.—Graph of Twin Lakes Tunnel Imports for Water Year 2022.

Twin Lakes Reservoir Canal Company Storage WY2022

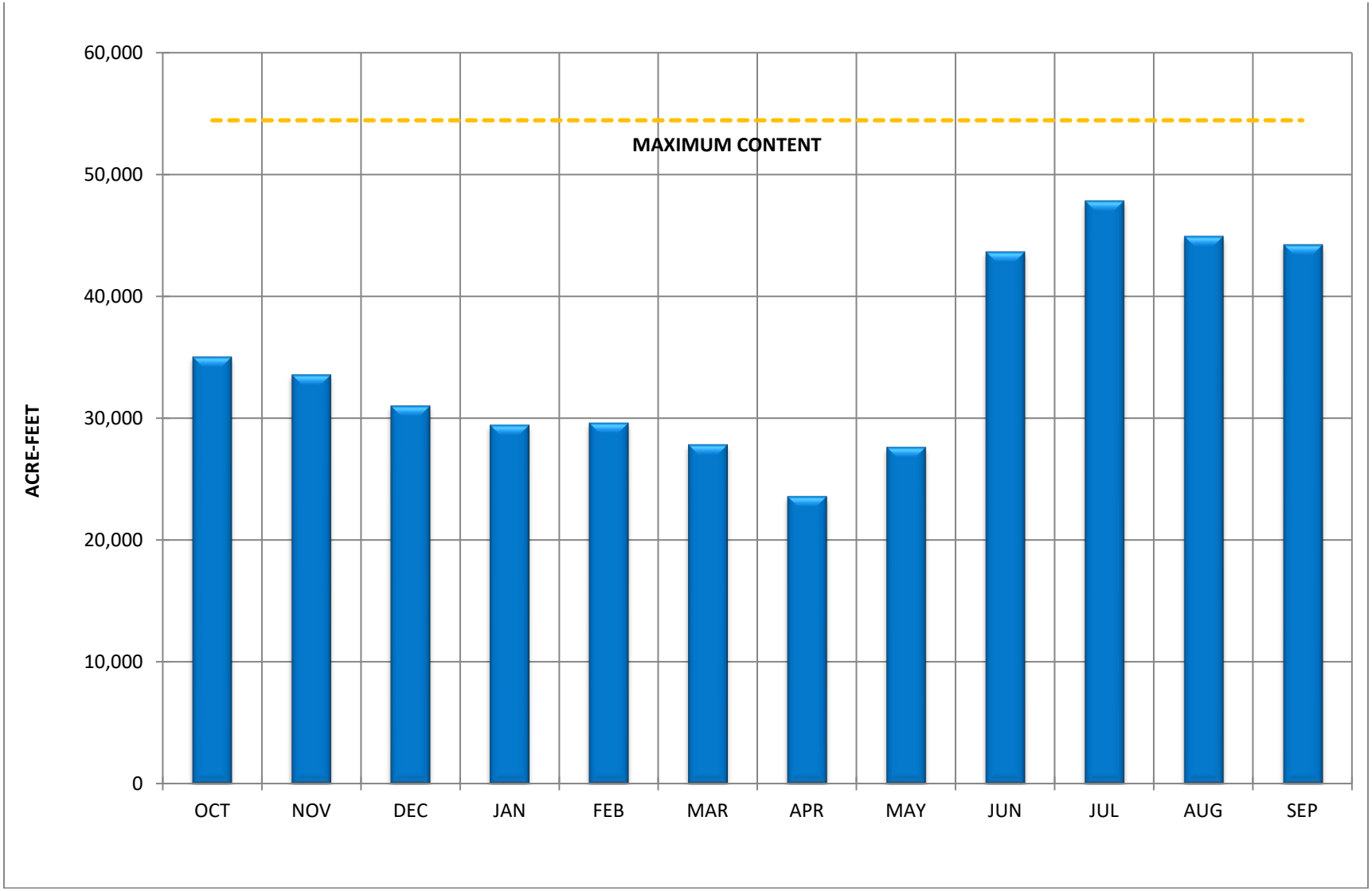

Figure C-2.—Graph of Twin Lakes Canal Company Storage for Water Year 2022.

Appendix D

Daily Discharge Records
Fryingpan-Arkansas Project Collection System

Carter Feeder Conduit near Norrie, CO

Table D-1.—Water Year 2022 daily data for Carter Feeder Conduit near Norrie, CO (Units: Cubic Feet per Second, Source: Bureau of Reclamation)

	April	May	June	July	August	September
1	--	3.2	13.3	14.3	--	--
2	--	1.2	18.1	13.2	--	--
3	--	0	24.6	11.5	--	--
4	--	0	29.5	10.1	--	--
5	--	0	33.2	4.2	--	--
6	--	1.1	38	--	--	--
7	--	7	43.6	--	--	--
8	--	11	43.9	--	--	--
9	--	11.5	44.5	--	--	--
10	--	15.6	44.1	--	--	--
11	--	24	45.9	--	--	--
12	--	26.7	44.7	--	--	--
13	--	18	40.3	--	--	--
14	--	20.4	33.9	--	--	--
15	--	31	25.8	--	--	--
16	--	35.2	23.6	--	--	--
17	--	37	26.3	--	--	--
18	--	43.6	25.9	--	--	--
19	--	45.4	28.6	--	--	--
20	--	37.7	21.2	--	--	--
21	--	18.5	7.3	--	--	--
22	--	11.6	11.5	--	--	--
23	--	8.3	7.8	--	--	--
24	--	6.7	9.2	--	--	--
25	0.7	6	6.7	--	--	--
26	1.3	10.1	0.1	--	--	--
27	1	21.9	0	--	--	--
28	1.6	26.9	0	--	--	--
29	3.1	24.4	0	--	--	--
30	2.1	21.1	4.3	--	--	--
31	--	14	--	--	--	--
TOTAL	**9.8**	**539.1**	**695.9**	**53.3**	**--**	**--**
AVERAGE	**1.6**	**17.4**	**23.2**	**1.8**	**--**	**--**
MAX	**3.1**	**45.4**	**45.9**	**14.3**	**--**	**--**

WY20221 Total: 2574.8 acre-feet
Maximum Instantaneous Peak: 65.7 cfs on 11 Jun 22

North Fryingpan River Feeder Conduit near Norrie, CO

Table D-2.—Water Year 2022 daily data for North Fryingpan River Feeder Conduit near Norrie, CO (Units: Cubic Feet per Second, Source: Bureau of Reclamation)

	April	May	June	July	August	September
1	--	0	5.9	--	--	--
2	--	0	5.8	--	--	--
3	--	0	8.5	--	--	--
4	--	0	11	--	--	--
5	--	0	12.7	--	--	--
6	--	0	15	--	--	--
7	--	0.2	17.1	--	--	--
8	--	0.9	16.1	--	--	--
9	--	1.6	15.9	--	--	--
10	--	2.7	16.8	--	--	--
11	--	4.5	16	--	--	--
12	--	7.3	15.7	--	--	--
13	--	6.6	14.1	--	--	--
14	--	6.5	12.2	--	--	--
15	--	8.1	9.9	--	--	--
16	--	11.8	7.9	--	--	--
17	--	11.1	7	--	--	--
18	--	12.4	7	--	--	--
19	--	15.5	7.4	--	--	--
20	--	15.8	6.9	--	--	--
21	--	10.8	5.7	--	--	--
22	--	6.8	4.8	--	--	--
23	--	4.9	4.2	--	--	--
24	--	3.8	3.8	--	--	--
25	--	3.2	3.3	--	--	--
26	--	3.2	0	--	--	--
27	--	5.3	0	--	--	--
28	--	8.8	0	--	--	--
29	--	10.6	0	--	--	--
30	--	9.8	0	--	--	--
1	--	0	5.9	--	--	--
TOTAL	**--**	**172.2**	**250.7**	**--**	**--**	**--**
AVERAGE	**--**	**5.7**	**8.4**	**--**	**--**	**--**
MAX	**--**	**15.8**	**17.1**	**--**	**--**	**--**

WY2022 Total: 838.8 acre-feet
Maximum Instantaneous Peak: 19.3 cfs on June 7, 2022

South Fork Fryingpan River Feeder Conduit near Norrie, CO

Table D-3.—Water Year 2022 daily data for South Fork Fryingpan River Feeder Conduit near Norrie, CO (Units: Cubic Feet per Second, Source: Bureau of Reclamation)

	April	May	June	July	August	September
1	--	0	22.1	42.7	1	--
2	--	0	40.4	36.5	0.9	--
3	--	0	52.8	32.3	0.8	--
4	--	0	63.1	23.7	0.8	--
5	--	0	81.1	27.9	0.9	--
6	--	0.6	94.7	25.2	0.9	--
7	--	6.8	107.2	20.8	0.8	--
8	--	19.8	109	10.9	0.8	--
9	--	27.1	116.6	2.4	0.8	--
10	--	49.5	124.2	1	0.8	--
11	--	74.7	125.9	1	0.3	--
12	--	74.2	120.3	1	--	--
13	--	63.3	99.3	1	--	--
14	--	70.9	73.7	1.4	--	--
15	--	93.3	42.8	15.1	--	--
16	--	99.8	28.9	16.3	--	--
17	--	100.4	30.3	6.1	--	--
18	--	113.3	29	1.8	--	--
19	--	125.6	42.7	0.9	--	--
20	--	95.4	22.5	0.9	--	--
21	0	57.7	7	1	--	--
22	0	36.1	1.7	1	--	--
23	0	14.6	1	1	--	--
24	0	14.3	1	1.4	--	--
25	0	21.2	1	1	--	--
26	0	34.1	1	1	--	--
27	0	67.4	0.9	1	--	--
28	0	89.9	0.9	1	--	--
29	0	74.7	1	1	--	--
30	0	58.6	18.8	1	--	--
31	--	36.2	--	--	--	--
TOTAL	**0**	**1519.5**	**1460.9**	**280.3**	**8.8**	**--**
AVERAGE	**0.0**	**49.0**	**48.7**	**9.0**	**0.8**	**--**
MAX	**0**	**125.6**	**125.9**	**42.7**	**1**	**--**

WY2022 Total: 6485.1 acre-feet
Maximum Instantaneous Peak: 165.8 cfs on May 19, 2022

Mormon Creek Feeder Conduit near Norrie, CO

Table D-4.—Water Year 2022 daily data for Mormon Creek Feeder Conduit near Norrie, CO (Units: Cubic Feet per Second, Source: Bureau of Reclamation).

	April	May	June	July	August	September
1	--	3.7	17.8	0.1	--	--
2	--	3.8	18.6	0.1	--	--
3	--	0	29.5	0.1	--	--
4	--	0	35.4	0.3	--	--
5	--	0	38.4	--	--	--
6	--	0	55.4	--	--	--
7	--	5.7	51.9	--	--	--
8	--	11.1	47.3	--	--	--
9	--	15.3	49.1	--	--	--
10	--	16.3	52	--	--	--
11	--	22.9	52.3	--	--	--
12	--	33	50.6	--	--	--
13	--	25.7	46.3	--	--	--
14	--	24.7	39.2	--	--	--
15	--	32.9	30.8	--	--	--
16	--	46.9	24.5	--	--	--
17	--	40	25	--	--	--
18	--	46.3	25.1	--	--	--
19	--	62.2	26.6	--	--	--
20	--	52.4	21.8	--	--	--
21	--	29.7	15.7	--	--	--
22	4.1	19	8.1	--	--	--
23	5.9	14.2	5.4	--	--	--
24	5.6	11.9	10.3	--	--	--
25	4.5	10.3	5.6	--	--	--
26	3.4	12.6	0.2	--	--	--
27	3.1	24.6	0.2	--	--	--
28	3	42.9	0.1	--	--	--
29	3.5	38.5	0.1	--	--	--
30	3.3	30.4	0.1	--	--	--
31	--	21	--	--	--	--
TOTAL	**36.4**	**698**	**783.4**	**0.6**	**--**	**--**
AVERAGE	**4.0**	**22.5**	**26.1**	**0.0**	**--**	**--**
MAX	**5.9**	**62.2**	**55.4**	**0.3**	**--**	**--**

WY2022 total: 3011.7 acre-feet
Maximum Instantaneous Peak 96.6 cfs on May 19, 2022

North Cunningham Feeder Conduit near Norrie, CO

Table D-5.—Water Year 2022 daily data for North Cunningham Feeder Conduit near Norrie, CO (Units: Cubic Feet per Second, Source: Bureau of Reclamation)

	April	May	June	July	August	September
1	--	0	6.9	--	--	--
2	--	0.6	7.3	--	--	--
3	--	0	13.5	--	--	--
4	--	0	15.7	--	--	--
5	--	0	16.4	--	--	--
6	--	0	23.2	--	--	--
7	--	3.3	25.3	--	--	--
8	--	6.4	23.3	--	--	--
9	--	9.1	24.8	--	--	--
10	--	10.5	25.9	--	--	--
11	--	14.1	25.8	--	--	--
12	--	18	25.7	--	--	--
13	--	14.1	24.2	--	--	--
14	--	13.2	22	--	--	--
15	--	16.5	17.6	--	--	--
16	--	23.2	14.5	--	--	--
17	--	17.9	15.1	--	--	--
18	--	21.8	15.1	--	--	--
19	--	24.9	15.2	--	--	--
20	--	23.8	12.3	--	--	--
21	0	13.2	8.7	--	--	--
22	0	8	6.8	--	--	--
23	0	5.6	5.4	--	--	--
24	0	4.4	8.1	--	--	--
25	0	3.6	5	--	--	--
26	0	4.5	--	--	--	--
27	0	11.3	--	--	--	--
28	0	20.4	--	--	--	--
29	0	17.2	--	--	--	--
30	0	13.3	--	--	--	--
31	--	8.6	--	--	--	--
TOTAL	0	327.5	403.8	0	2.5	--
AVERAGE	0.0	10.6	13.5	0.1	0.1	--
MAX	0	24.9	25.9	0.1	0.1	--

WY2022 Total: 1451 acre-feet
Maximum Instantaneous Peak: 36.1 cfs on May 19, 2022

Middle Cunningham Feeder Conduit near Norrie, CO

Table D-6.—Water Year 2022 daily data for Middle Cunningham Feeder Conduit near Norrie, CO (Units: Cubic Feet per Second, Source: Bureau of Reclamation)

	April	May	June	July	August	September
1	--	--	11.2	--	--	--
2	--	--	11.2	--	--	--
3	--	--	17.5	--	--	--
4	--	--	21	--	--	--
5	--	--	23.5	--	--	--
6	--	--	30.3	--	--	--
7	--	1.3	34.7	--	--	--
8	--	2.8	33	--	--	--
9	--	4.3	36.9	--	--	--
10	--	5.9	37.7	--	--	--
11	--	8.8	40.9	--	--	--
12	--	13.1	42.2	--	--	--
13	--	11.4	38.1	--	--	--
14	--	10.9	33.5	--	--	--
15	--	14	27.7	--	--	--
16	--	21	21.9	--	--	--
17	--	19.4	21.4	--	--	--
18	--	22.5	21.4	--	--	--
19	--	29.5	20.8	--	--	--
20	--	30.9	17.5	--	--	--
21	--	17.7	13.2	--	--	--
22	--	11.5	10.6	--	--	--
23	--	8.8	8.8	--	--	--
24	--	7.2	0.5	--	--	--
25	--	6	--	--	--	--
26	--	6.3	--	--	--	--
27	--	11.7	--	--	--	--
28	--	23.1	--	--	--	--
29	--	23.1	--	--	--	--
30	--	17.9	--	--	--	--
31	--	12.8	--	--	--	--
TOTAL	**--**	**341.9**	**575.5**	**--**	**--**	**--**
AVERAGE	**--**	**11.0**	**19.2**	**--**	**--**	**--**
MAX	**--**	**30.9**	**42.2**	**--**	**--**	**--**

WY2022 Total: 1819.7 acre-feet
Maximum Instantaneous Peak: 54.6 cfs on June 12, 2022

Ivanhoe Creek Feeder Conduit near Norrie, CO

Table D-7.—Water Year 2022 daily data for Ivanhoe Creek Feeder Conduit near Norrie, CO (Units: Cubic Feet per Second, Source: Bureau of Reclamation)

	April	May	June	July	August	September
1	--	7.4	68.1	56.2	--	--
2	--	4.3	66.4	51.5	--	--
3	--	1.4	61.3	39.3	--	--
4	--	1.4	62.2	11.6	--	--
5	--	1.4	68.1	2.5	--	--
6	--	4.6	77.7	2.4	--	--
7	--	18.2	71	--	--	--
8	--	30.7	58.1	--	--	--
9	--	39.9	58.2	--	--	--
10	--	48.1	58.9	--	--	--
11	--	63	62.4	--	--	--
12	--	61.5	64.9	--	--	--
13	--	49.7	76.8	--	--	--
14	--	53.7	71.6	--	--	--
15	--	71	66.5	--	--	--
16	--	70	63.6	--	--	--
17	--	65.4	63.4	--	--	--
18	--	74.5	62.9	--	--	--
19	--	73	64	--	--	--
20	--	46.4	59.8	--	--	--
21	2.5	27.5	56.8	--	--	--
22	7.3	32	50	--	--	--
23	8.3	69.8	39.4	--	--	--
24	9.2	68.9	6.4	--	--	--
25	7.5	61.7	3.9	--	--	--
26	6.6	45.6	4.2	--	--	--
27	6.1	33.8	4.5	--	--	--
28	6	38	3.1	--	--	--
29	5.9	31.4	2.2	--	--	--
30	6.4	53.3	17.9	--	--	--
31	--	68.2	--	--	--	--
TOTAL	**65.8**	**1315.8**	**1494.3**	**163.5**	**--**	**--**
AVERAGE	**6.6**	**42.4**	**49.8**	**10.1**	**--**	**--**
MAX	**9.2**	**74.5**	**77.7**	**56.2**	**--**	**--**

WY2022 total: 6026.1 acre-feet

Maximum Instantaneous Peak 103.8 on May 15, 2022

Includes Ivanhoe Lake releases conveyed through the Boustead Tunnel

Lily Pad Creek Feeder Conduit near Norrie, CO

Table D-8.—Water Year 2022 daily data for Lily Pad Creek Feeder Conduit near Norrie, CO (Units: Cubic Feet per Second, Source: Bureau of Reclamation)

	April	May	June	July	August	September
1	--	20.4	24.7	--	--	--
2	--	20.8	26.7	--	--	--
3	--	21.7	31.3	--	--	--
4	--	22.7	31.9	--	--	--
5	--	23.6	32	--	--	--
6	--	24.4	33.7	--	--	--
7	--	25.5	35	--	--	--
8	--	27.2	39.5	--	--	--
9	--	32.7	40.1	--	--	--
10	--	39.3	40.2	--	--	--
11	--	44.5	39.5	--	--	--
12	--	49.8	39.2	--	--	--
13	--	59.9	38.8	--	--	--
14	--	67.5	38.5	--	--	--
15	--	75.1	38.4	--	--	--
16	--	90	--	--	--	--
17	--	90.9	--	--	--	--
18	--	91.6	--	--	--	--
19	--	95.2	--	--	--	--
20	--	84.9	--	--	--	--
21	--	31	--	--	--	--
22	--	23.7	--	--	--	--
23	--	20.4	--	--	--	--
24	--	23.3	--	--	--	--
25	0.1	21.9	--	--	--	--
26	15	23	--	--	--	--
27	18.6	27.5	--	--	--	--
28	19.5	35.1	--	--	--	--
29	20	35	--	--	--	--
30	20.3	30.1	--	--	--	--
31	--	26.2	--	--	--	--
TOTAL	**93.5**	**1304.8**	**529.5**	**--**	**--**	**--**
AVERAGE	**15.6**	**42.1**	**35.3**	**--**	**--**	**--**
MAX	**20.3**	**95.2**	**40.2**	**--**	**--**	**--**

WY2022 Total: 3823.8 acre-feet
Maximum Instantaneous Peak: 108.0 on May 18, 2022
The gauge rating may not be correct this year

Granite Creek Feeder Conduit near Norrie, CO

Table D-9.—Water Year 2022 daily data for Granite Creek Feeder Conduit near Norrie, CO (Units: Cubic Feet per Second, Source: Bureau of Reclamation)

	April	May	June	July	August	September
1	--	--	8.3	9.5	--	--
2	--	--	11.2	7.6	--	--
3	--	--	14.1	7.6	--	--
4	--	--	15.7	6.9	--	--
5	--	--	18.3	8.3	--	--
6	--	0.1	21.1	7.4	--	--
7	--	0.4	25.2	6.3	--	--
8	--	1.1	28.4	5.7	--	--
9	--	1.8	29.8	5.2	--	--
10	--	2.8	30.5	4.8	--	--
11	--	4.8	29.9	4.3	--	--
12	--	6.3	28.3	4.1	--	--
13	--	5.5	25.4	5.1	--	--
14	--	6.7	22.5	5.2	--	--
15	--	10.2	19.1	8.2	--	--
16	--	14.3	17.5	7.9	--	--
17	--	15.2	17.3	5.9	--	--
18	--	17.1	16.9	5	--	--
19	--	20.1	18.4	4.6	--	--
20	--	17.2	15	4.3	--	--
21	--	10.6	12.5	4.1	--	--
22	--	7.9	11	3.6	--	--
23	--	6.3	10.3	3.4	--	--
24	--	5.3	10.1	4.8	--	--
25	--	4.9	9	4.9	--	--
26	--	6.7	10.8	3.8	--	--
27	--	12.2	10.4	3.3	--	--
28	--	16.1	8.5	2.4	--	--
29	--	14.2	7.7	--	--	--
30	--	11.6	9.4	--	--	--
31	--	8.9	--	--	--	--
TOTAL	**--**	**228.3**	**512.6**	**154.2**	**--**	**--**
AVERAGE	**--**	**7.4**	**17.1**	**5.1**	**--**	**--**
MAX	**--**	**20.1**	**30.5**	**9.5**	**--**	**--**

WY2022 Total: 1800.2 acre-feet

Maximum Instantaneous Peak: 39.5 cfs on June 10, 2022

No Name Creek Feeder Conduit near Norrie, CO

Table D-10.—Water Year 2022 daily data for No Name Creek Feeder Conduit near Norrie, CO (Units: Cubic Feet per Second, Source: Bureau of Reclamation)

	April	May	June	July	August	September
1	--	0	6.6	1.4	--	--
2	--	0	6.9	--	--	--
3	--	0	6.8	--	--	--
4	--	0	6.9	--	--	--
5	--	0	6.9	--	--	--
6	--	0	7.5	--	--	--
7	--	1.6	7.7	--	--	--
8	--	9.8	7.9	--	--	--
9	--	13.6	8.8	--	--	--
10	--	16.4	9	--	--	--
11	--	25	9	--	--	--
12	--	26.8	6.3	--	--	--
13	--	23.1	18	--	--	--
14	--	26.8	22.9	--	--	--
15	--	33.9	16.9	--	--	--
16	--	27.1	13.6	--	--	--
17	--	21.1	12.6	--	--	--
18	--	31.3	12.4	--	--	--
19	--	38.6	16.4	--	--	--
20	--	17	9.8	--	--	--
21	--	13	6.5	--	--	--
22	--	12.5	4.7	--	--	--
23	--	11.6	3.8	--	--	--
24	--	10.2	3.4	--	--	--
25	--	9.3	2.2	--	--	--
26	--	12.1	3.1	--	--	--
27	--	11.5	3.9	--	--	--
28	--	8.6	1.9	--	--	--
29	--	7.7	0.8	--	--	--
30	--	7.2	1.2	--	--	--
31	--	6.8	--	--	--	--
TOTAL	**--**	**422.6**	**244.4**	**1.4**	**--**	**--**
AVERAGE	**--**	**13.6**	**8.1**	**0.0**	**--**	**--**
MAX	**--**	**38.6**	**22.9**	**1.4**	**--**	**--**

WY2022 Total: 1325.9 acre-feet.
Maximum Instantaneous Peak: 62.7 cfs on May 18, 2022

Midway Creek Feeder Conduit near Norrie, CO

Table D-11.—Water Year 2022 daily data for Midway Creek Feeder Conduit near Norrie, CO (Units: Cubic Feet per Second, Source: Bureau of Reclamation)

	April	May	June	July	August	September
1	--	--	18.1	11.1	--	--
2	--	--	18.8	9.2	--	--
3	--	--	18.9	8	--	--
4	--	--	18.6	6.7	--	--
5	--	--	18.7	7.8	--	--
6	--	--	46.6	6.7	--	--
7	--	7.9	70.3	5.3	--	--
8	--	15.2	62.8	3.8	--	--
9	--	19	41.2	2.7	--	--
10	--	23.6	48.6	2.1	--	--
11	--	34.4	71.5	--	--	--
12	--	36.1	73.7	--	--	--
13	--	31	68.7	--	--	--
14	--	37.4	56.6	--	--	--
15	--	53	44.8	--	--	--
16	--	59.3	40.1	--	--	--
17	--	59.2	38.9	--	--	--
18	--	57.5	41.1	--	--	--
19	--	47.6	51.2	--	--	--
20	--	33.8	34.1	--	--	--
21	--	30.5	25.1	--	--	--
22	--	25.8	20.5	--	--	--
23	--	21	18.5	--	--	--
24	--	18	16.9	--	--	--
25	--	16.7	14.3	--	--	--
26	--	24.1	16.4	--	--	--
27	--	28.8	15.5	--	--	--
28	--	21.5	11.7	--	--	--
29	--	19.7	9.9	--	--	--
30	--	18.9	11.7	--	--	--
31	--	18.4	--	--	--	--
TOTAL	**--**	**758.4**	**1043.8**	**63.4**	**--**	**--**
AVERAGE	**--**	**30.3**	**34.8**	**6.3**	**--**	**--**
MAX	**--**	**59.3**	**73.7**	**11.1**	**--**	**--**

WY2022 Total: 3706.3 acre-feet.
Maximum Instantaneous Peak: 88.8 cfs on June 6, 2022

Hunter Creek Feeder Conduit near Norrie, CO

Table D-12.—Water Year 2022 daily data for Hunter Creek Feeder Conduit near Norrie, CO (Units: Cubic Feet per Second, Source: Bureau of Reclamation)

	April	May	June	July	August	September
1	--	--	19.1	11.4	--	--
2	--	--	30.6	6.3	--	--
3	--	--	40.3	5	--	--
4	--	--	43	3	--	--
5	--	--	55.2	4.1	--	--
6	--	--	64.5	2.4	--	--
7	--	--	69.9	--	--	--
8	--	21.2	67.1	--	--	--
9	--	27.5	68.8	--	--	--
10	--	32.7	75.5	--	--	--
11	--	46.1	69.6	--	--	--
12	--	43.9	65.9	--	--	--
13	--	45	64.1	--	--	--
14	--	45	53.7	--	--	--
15	--	46.6	41.7	--	--	--
16	--	61.8	38.5	--	--	--
17	--	62.7	37.9	--	--	--
18	--	69.8	40	--	--	--
19	--	63.1	54.8	--	--	--
20	--	56.8	33.6	--	--	--
21	--	27.2	22.1	--	--	--
22	--	17.8	15.7	--	--	--
23	--	12.2	14.5	--	--	--
24	--	9.1	14.3	--	--	--
25	--	8.3	10.8	--	--	--
26	--	25	13.9	--	--	--
27	--	46.1	13.6	--	--	--
28	--	51.8	7.6	--	--	--
29	--	43.3	5.6	--	--	--
30	--	32.1	10.4	--	--	--
31	--	21.1	--	--	--	--
TOTAL	**--**	**916.2**	**1162.3**	**32.2**	**--**	**--**
AVERAGE	**--**	**38.2**	**38.7**	**5.4**	**--**	**--**
MAX	**--**	**69.8**	**75.5**	**11.4**	**--**	**--**

WY2022 Total: 4008.5 acre-feet
Maximum Instantaneous Peak: 108 CFS on May 18, 2022

Sawyer Creek Feeder Conduit near Norrie, CO

Table D-13.—Water Year 2022 daily data for Sawyer Creek Feeder Conduit near Norrie, CO (Units: Cubic Feet per Second, Source: Bureau of Reclamation)

	April	May	June	July	August	September
1	--	--	12.3	8.7	2.5	--
2	--	--	12.3	7.8	7.1	--
3	--	--	16.9	7.1	4.8	--
4	--	--	19.7	6.5	4.1	--
5	--	--	24.9	6.1	3.5	--
6	--	--	28	6.3	3.9	--
7	--	--	31.7	5.6	3.3	--
8	--	--	31.8	5	2.9	--
9	--	--	32.8	4.7	2.7	--
10	--	3	33.5	4.3	2.4	--
11	--	4.1	33.3	4.1	--	--
12	--	5.9	30.7	3.8	--	--
13	--	6.3	27.6	3.5	--	--
14	--	6.9	25.2	3.5	--	--
15	--	9.1	21.8	3.5	--	--
16	--	13.5	18.6	4	--	--
17	--	14.5	17.7	3.9	--	--
18	--	18.8	17.7	3.3	--	--
19	--	25.4	18.2	3.1	--	--
20	--	26.1	17	2.9	--	--
21	--	18.7	14.7	3.9	--	--
22	--	13.1	13.2	3.2	--	--
23	--	10.2	11.7	2.8	--	--
24	--	8.9	10.8	2.6	--	--
25	--	7.8	10.3	2.6	--	--
26	--	7.4	9.5	2.4	--	--
27	--	10.1	10.6	2.2	--	--
28	--	18.4	9.1	2.1	--	--
29	--	21.6	8.2	2.1	--	--
30	--	19.2	7.7	2.3	--	--
31	--	15.1	--	2.1	--	--
TOTAL	**--**	**284.1**	**577.5**	**126**	**37.2**	**--**
AVERAGE	**--**	**12.9**	**19.3**	**4.1**	**3.7**	**--**
MAX	**--**	**26.1**	**33.5**	**8.7**	**7.1**	**--**

WY2022 Total: 2032.7 acre-feet
Maximum Instantaneous Peak: 40.8 cfs on Jun 11, 2022

Chapman Gulch Feeder Conduit near Norrie, CO

Table D-14.—Water Year 2022 daily data for Chapman Gulch Feeder Conduit near Norrie, CO (Units: Cubic Feet per Second, Source: Bureau of Reclamation)

	April	May	June	July	August	September
1	--	--	73.5	73.5	3.2	--
2	--	--	94.8	94.8	--	--
3	--	--	120.6	120.6	--	--
4	--	--	136.4	136.4	--	--
5	--	--	165.8	165.8	--	--
6	--	1.9	217	217	--	--
7	--	26.4	257.5	257.5	--	--
8	--	60.3	246.8	246.8	--	--
9	--	80.8	233.1	233.1	--	--
10	--	95.4	245.1	245.1	--	--
11	--	135.7	271.7	271.7	--	--
12	--	145	262.2	262.2	--	--
13	--	101.3	236.7	236.7	--	--
14	--	125.1	199.8	199.8	--	--
15	--	180.8	157.8	157.8	--	--
16	--	203.3	149.6	149.6	--	--
17	--	196.6	150.7	150.7	--	--
18	--	220.3	150.8	150.8	--	--
19	--	234.6	190.4	190.4	--	--
20	--	181.7	131.6	131.6	--	--
21	--	111.2	90.6	90.6	--	--
22	--	87	65.8	65.8	--	--
23	--	69.7	54.6	54.6	--	--
24	--	59.6	49.9	49.9	--	--
25	--	50.8	38.7	38.7	--	--
26	--	80.5	48.5	48.5	--	--
27	--	135.7	58.6	58.6	--	--
28	--	149.8	30.5	30.5	--	--
29	--	129.1	11.9	11.9	--	--
30	--	105	21.7	21.7	--	--
31	--	81	--	1.7	--	--
TOTAL	**--**	**3048.6**	**4162.7**	**4164.4**	**3.2**	**--**
AVERAGE	**--**	**98.4**	**138.8**	**134.3**	**3.2**	**--**
MAX	**--**	**234.6**	**271.7**	**271.7**	**3.2**	**--**

WY2022 Total: 22600.8 acre-feet
Maximum Instantaneous Peak: 344.6 cfs on June 10, 2022

Fryingpan River Feeder Conduit near Norrie, CO

Table D-15.—Water Year 2022 daily data for Fryingpan River Feeder Conduit near Norrie, CO (Units: Cubic Feet per Second, Source: Bureau of Reclamation)

	April	May	June	July	August	September
1	--	4.8	33.9	51.8	--	--
2	--	6.9	34.4	48.2	--	--
3	--	1.0	61.4	43.9	--	--
4	--	1.0	67.2	8.7	--	--
5	--	1.0	80.5	39.9	--	--
6	--	1.0	100.3	57.3	--	--
7	--	18.2	130.7	45.1	--	--
8	--	39.9	139.5	40.0	--	--
9	--	56.8	149.1	30.5	--	--
10	--	66.9	155.4	20.4	--	--
11	--	85.3	159.6	18.3	--	--
12	--	107.3	160.6	8.7	--	--
13	--	89.5	145.3	3.2	--	--
14	--	84.8	122.6	3.1	--	--
15	--	109.6	76.7	3.1	--	--
16	--	141.9	38.7	16.8	--	--
17	--	134.8	38.0	5.9	--	--
18	--	148.1	38.5	1.7	--	--
19	--	171.2	47.6	--	--	--
20	--	177.6	43.2	--	--	--
21	--	110.5	24.8	--	--	--
22	--	79.4	7.5	--	--	--
23	--	63.2	2.0	--	--	--
24	--	56.2	2.2	--	--	--
25	--	47.5	1.0	--	--	--
26	0.9	49.2	1.0	--	--	--
27	1.0	69.4	5.1	--	--	--
28	1.1	110.2	1.0	--	--	--
29	3.0	111.7	1.0	--	--	--
30	1.8	94.1	1.0	--	--	--
31	--	73.3	--	--	--	--
TOTAL	**7.8**	**2312.3**	**1869.8**	**446.6**	**--**	**--**
AVERAGE	**1.6**	**74.6**	**62.3**	**14.9**	**--**	**--**
MAX	**3**	**177.6**	**160.6**	**57.3**	**--**	**--**

WY2022 Total: 9234.6 acre-feet
Maximum Instantaneous Peak: 218.3 on May 20, 2022

Appendix E

Fryingpan-Arkansas Project Operating Principles

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

OPERATING PRINCIPLES

FRYINGPAN-ARKANSAS PROJECT

ADOPTED BY THE STATE OF COLORADO

APRIL 30, 1959

(As amended December 30, 1959,

and December 9, 1960)

MARCH 15, 1961, - Ordered to be printed

U. S. GOVERNMENT PRINTING OFFICE

WASHINGTON: 1961

H. RES. 91

In the House of Representatives, U. S. ,

March 15, 1961.

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

Attest:

Ralph R. Roberts, Clerk.

OPERATING PRINCIPLES, FRYINGPAN-ARKANSAS PROJECT

ADOPTED BY THE STATE OF COLORADO, APRIL 30, 1959

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

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

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

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
   (b) River to the basin of the Arkansas River, together with all its appurtenant works and facilities in both eastern and western Colorado.
   (c) "Eastern Colorado" means that portion of the State of Colorado lying within the natural drainage basin of the Arkansas River.
   (d) "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.

(e) "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.

(f) "Colorado River Water Conservation District" means that entity created by Colorado Revised Statutes 1953, 149-8, as amended.

(g) "Southwestern Water Conservation District" means that entity created by Colorado Revised Statutes 1953, 149-9, as amended.

(h) "Ruedi Reservoir" means the reservoir presently planned for construction on the Fryingpan River above the town of Basalt as part of the project.

(i) "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.

(j) "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 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 streamflow 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.

(iii) 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 streamflow 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 more than (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 based on 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	Acre-feet Second feet (thousands)	Month	Average	Acre-feet Second 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, Seventy-fifth Congress, first session, shall not be impaired or diminished by this project.

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

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

18. No transmountain diversion of water shall ever be made through the collection and diversion system of the Fryingpan-Arkansas Project in excess of the quantitative limitations and conditions established by this document: Provided, however, That when under the laws of the State of Colorado, there may be additional water available for such collection and diversion which is not at the time of diversion required for

beneficial use in western Colorado or for filling interstate water compact agreements, then such water may be collected and diverted for beneficial use in the Arkansas Valley: Provided further, That such additional diversion shall only be made with the mutual consent of each of the following agencies of the State of Colorado, to wit: the Colorado Water Conservation Board, the Southwestern Water Conservation District, the Colorado River Water Conservation District, and the Southeastern Colorado Water Conservancy District.

19. To assure project operation in conformity with the operating principle heretofore stated, to provide a means for the collection and interchange of information, and to provide a method for the continued study of project operations to the end that, if the stated operating principles may be improved upon, recommendations for changes may be made to the contracting parties, a commission shall be created in an appropriate manner to be composed of one representative of the Southeastern Colorado Water Conservancy District, one representative of the Colorado River Water Conservation District, two representatives of the United States, and 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.

OPERATING PRINCILPLES, FRYINGPAN-ARKANSAS PROJECT

Executed as amended at Denver, Colorado, this Ninth 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