

ANNUAL OPERATING PLAN
FRYINGPAN-ARKANSAS PROJECT
WATER YEAR 2003 OPERATIONS

I. GENERAL

This is the 34th Annual Operating Plan for the Fryingpan-Arkansas Project (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 powerplant, electric transmission lines, substations, and recreation facilities. These features are located in the Fryingpan River and Hunter Creek watersheds of the Upper Colorado River Basin, and in the Arkansas River Basin in central and southeastern Colorado. The Project provides water for irrigation, municipal and industrial use, hydroelectric power generation, recreation, and wildlife habitat. The Project also provides for flood control.

The Project was authorized under Public Law 87-590 on August 16, 1962. This law provides that the Project will be operated under the Operating Principles adopted by the State of Colorado on April 30, 1959, as amended on December 30, 1959, and on December 9, 1960. These Operating Principles were published as House Document 130 (87th Congress, 1st Session), and are included in Appendix E.

This Annual Operating Plan is a summary of the actual project operation in water year 2003 (October 1, 2002, through September 30, 2003).

II. PROJECT FEATURES IN OPERATION DURING WATER YEAR 2003

Ruedi Dam and Reservoir are located on the Fryingpan River, a tributary of the Roaring Fork River, on Colorado's West Slope about 13 miles east of Basalt, Colorado. Ruedi Reservoir has a total capacity of 102,373 acre-feet at a water surface elevation of 7766.0 feet. The reservoir is operated on an annual cycle. Steady winter releases draft the reservoir such that it is filled with the spring snowmelt 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, wildlife habitat, and flood control.

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 (Boustead

Tunnel). The Boustead Tunnel conveys water collected by the West Slope Collection System under the Continental Divide and into Turquoise Lake on the East Slope. The tunnel is 5 miles long and has a water conveyance capacity of 945 cubic feet per second (cfs).

Sugarloaf Dam and Turquoise Lake are located on Lake Fork Creek, a tributary of the Arkansas River, about 5 miles west of Leadville, Colorado. The lake has a total capacity of 129,398 acre-feet at a water surface elevation of 9869.4 feet. The lake is operated to provide regulation of both project and non-project water imported from the West Slope. Turquoise Lake is operated on an annual cycle, as is Ruedi Reservoir. The lake is drafted through the Mt. Elbert Conduit during the winter to provide adequate space for the spring imports of West Slope water. Most of the native inflow from Lake Fork Creek is impounded in the lake and returned to the Arkansas River via the Mt. Elbert Conduit, the Mt. Elbert Powerplant, and Twin Lakes. The lake is also operated to provide for recreation and wildlife habitat.

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

The Mt. Elbert Powerplant is a pumped-storage facility located on the shore of Twin Lakes. It has two 100-megawatt turbine generators, which can be reversed and used as 340,000-horsepower pumps. In addition to being used to generate energy with the Mt. Elbert Conduit flow, the plant is used to follow daily peak power loads. This load following is accomplished by pumping water to the Mt. Elbert Forebay, an 11,143-acre-foot regulating pool at the terminus of the Mt. Elbert Conduit, from Twin Lakes during off-peak load hours using surplus or low cost energy. That water is then returned to Twin Lakes through the turbines during peak load hours, along with the Mt. Elbert Conduit flow. The energy generated at the plant is transmitted and marketed by the Western Area Power Administration, 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 capacity of 140,855 acre-feet at a maximum water surface elevation of 9200 feet. 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 the Otero Pipeline. The operation of Twin Lakes also provides for recreation and wildlife habitat.

Pueblo Dam and Reservoir is 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 349,940 acre-feet at a water surface elevation of 4898.7 feet. The upper 26,991 acre-feet of storage space are reserved for flood control at all times, and an additional 66,000 acre-feet of space are reserved from April 15 through November 1. Non-project water may be stored in the reservoir under temporary contract. 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. The majority of project water deliveries is made from the reservoir. The Fountain Valley Authority, the Pueblo West Metropolitan District, and the Pueblo Board of Water Works take direct delivery of municipal water through the south outlet works and joint-use manifold. A direct irrigation delivery is made to the Bessemer Ditch. Other project deliveries are made as releases to the Arkansas River for diversion downstream. Pueblo Reservoir is also operated to provide for recreation and wildlife habitat.

III. HYDROLOGIC CONDITIONS AND MAJOR WEATHER EVENTS – WATER YEAR 2003

The precipitation measured at Ruedi Reservoir was well below average during the fall and winter of water year 2003, with the total October through March precipitation being just 60 percent of average for the period. Even with the below average measured precipitation, the snowpack in the watershed above Ruedi Reservoir was near normal by April 1, at 94 percent of average. April precipitation continued to be well below average at just 69 percent of average. However, the snowpack continued to remain just below normal, at 90 percent of average by May 1. Warm and dry conditions prevailed during May, resulting in a snowpack of only 51 percent of average by June 1. June and July continued dry with about 59 percent of average precipitation for the period. Monsoonal rains brought above average precipitation back to the basin during August (130 percent of average) and September (134 percent of average). However, even with the wet August and September, the annual precipitation measured at Ruedi Reservoir was just 74 percent of average for the water year.

The dry conditions in the watershed resulted in below average inflows to Ruedi Reservoir. Cumulative reservoir inflow for the October through March period was just 84 percent of average. Due to the warm and dry conditions experienced in April and May, the basin runoff occurred early, resulting in near-normal reservoir inflow for the April-May period, at 93 percent of average. However, reservoir inflow

dropped significantly during the remainder of the runoff season, with June and July inflows being just 66 percent, and 52 percent of average, respectively. Overall, the April through July runoff season produced 73,800 acre-feet of inflow to the reservoir, while the average April-July inflow is 101,200 acre-feet. The wet August and September resulted in slightly above-normal reservoir inflows, at 109 percent of average for that period. Even with the above average inflows during August and September, the total inflow to Ruedi Reservoir during water year 2003 was just 78 percent of average.

IV. REPORT ON OPERATIONS DURING WATER YEAR 2003

A. Ruedi Reservoir

On October 1, 2002, Ruedi Reservoir's content was 47,800 acre-feet, or approximately 51 percent of average for that date. With the much-below average starting reservoir content and below average inflow and precipitation for the October through March period, the reservoir releases were maintained near the minimum allowable release rate of 39 cfs through the winter. This resulted in the reservoir being drafted to 46,300 acre-feet by February 28, 2003, or 68 percent of average for that date. By March 13, the reservoir had reached its minimum storage for the water year of 46,100 acre-feet (water surface elevation 7694.95 feet).

The snowpack in the Fryingpan River basin was just slightly below normal, at 94 percent of average, on April 1. However, due to the extremely low starting reservoir content, the April 1 runoff forecast indicated that the reservoir would probably not fill this year. Therefore, in an effort to store as much water as possible, reservoir releases were maintained at the minimum allowable rates from March 13, when the reservoir started to fill, through July 26, when the reservoir ceased to be in priority to store. By maintaining the minimum allowable releases, Ruedi Reservoir was able to fill to a maximum storage content of 98,160 acre-feet (water surface elevation 7761.72 feet) on July 24, just 4,200 acre-feet short of full.

Ruedi Reservoir is one of the participating reservoirs in the Coordinated Reservoir Operations (CRO) effort of the Upper Colorado River Endangered Fish Recovery Program (RIP). The effort is directed at augmenting peak flows in the 15-Mile Reach of the Colorado River to benefit habitat improvement and spawning for two of the endangered Colorado River fishes. The 15-Mile Reach is the 15-mile stretch of the Colorado River above the confluence with the Gunnison River in Grand Valley.

Due to the extremely low carryover storage in the Upper Colorado River Basin reservoirs, water supply forecasts indicated that most of the CRO participating reservoirs were not likely to fill. For this reason, the CRO effort was cancelled for water year 2003.

Ruedi Reservoir has 5,000 acre-feet firm and 5,000 acre-feet of water four out of five years through re-regulation obligated for release to assist with recovery of the endangered Colorado River fishes. In water year 2003, Reclamation contracted with the Colorado Water Conservation Board to provide an additional 10,825 acre-feet of water to the Fish and Wildlife Service, to assist in meeting target flows in the 15-Mile Reach. Due to the low carryover storage in the Upper Colorado River basin reservoirs and generally drier than average conditions, the target flow for the 15-Mile Reach was initially set at 250 cfs. However, this target was increased to 450 cfs on August 7, 810 cfs on August 28, and finally to 1240 cfs on September 18, as hydrologic conditions improved in the basin and it became evident that additional flow augmentation water was available from Green Mountain Reservoir. With the exception of a 100 acre-foot release from Ruedi Reservoir on April 12 and 13, Ruedi Reservoir releases for the endangered fish began on July 25, continued through July 28, and then briefly terminated. The releases for the endangered fish resumed on August 6 and continued at a rate of about 135 cfs through September 2. The endangered fish flow releases were increased to a maximum for the year of 185 cfs between September 4 and 7. The releases were then reduced to 35 cfs during the second week of September in response to wetter conditions in the basin. Endangered fish flow releases were increased again to 135 cfs during the last week of September and the first week of October. The releases were further increased back to the year's maximum of 185 cfs during the second week of October and then gradually reduced for the remainder of the irrigation year, terminating on October 27. A total of 20,534 acre-feet was released during the year from Ruedi Reservoir to benefit the endangered fish. With the exception of about three days, the flows in the Fryingpan River below Ruedi Reservoir were maintained at less than 300 cfs throughout the irrigation/flow augmentation season.

Water right calls were placed by senior water right holders on the Colorado River at the Cameo gauge beginning July 25 and continuing through the remainder of the irrigation season. This resulted in contract releases from Ruedi Reservoir of 112 acre-feet in July, 559 acre-feet in August, 457 acre-feet in September, and 400 acre-feet in October. There were no out-of-priority project diversions through the Boustead Tunnel during water year 2003, and thus no releases were required to replace project depletions.

Due to the relatively warm and dry conditions within the basin and the relatively large endangered fish flow releases, Ruedi Reservoir finished the water year with 83,615 acre-feet in storage on September 30. This end-of-year storage represents 89 percent of average and is at an elevation of about 7745.94 feet. The total inflow to the reservoir from April through September was 86,700 acre-feet, or about 77 percent of average.

Exhibits 1 and 2 show the precipitation and pan evaporation at Meredith, Colorado, near Ruedi Reservoir. Table 1 and Exhibit 3 depict the monthly operation of the reservoir during water year 2003.

B. West Slope Collection System and Project Diversions

The import of project water through the Boustead Tunnel began on April 14, 2003, and concluded on August 4, 2003. The daily discharge record for the diversion structures is included as Appendix D. A total of 54,855 acre-feet was imported during the 2003 water year, which was 113 percent of average. There were 1,262 acre-feet of Busk-Ivanhoe water imported through the Boustead Tunnel. The maximum mean daily import was 890 cfs on June 1, 2003. The most probable forecasts for the first of February, March, April, and May were 39,000 acre-feet, 42,100 acre-feet, 54,200 acre-feet, and 53,000 acre-feet, respectively.

The total imports for the water year, the accumulated imports to the Arkansas River, the water used for the Twin Lakes Reservoir and Canal Company exchange, and the import water available for allocations by the Southeastern Colorado Water Conservancy District, are shown on Table 4. The 32 years of accumulated imports total 1,555,600 acre-feet, for an average of 48,410 acre-feet per year. A plot of the Boustead Tunnel imports during water year 2003 is shown on Exhibit 5.

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

The Bureau of Reclamation is obligated to maintain minimum streamflows in the Roaring Fork River by the authorizing legislation of the Project. This is accomplished through an exchange of water with the Twin Lakes Reservoir and Canal Company (Company). On October 1, 2002, the Company began bypassing water into the Roaring Fork River on the West Slope in exchange for project water stored in Twin Lakes on the East Slope. The exchange was performed per the operating criteria as shown in Appendix C. The total amount of the exchange at Twin Lakes Reservoir was 2,424 acre-feet. The monthly summary of the exchange is also shown in Appendix C.

D. Turquoise Lake

On September 30, 2002, there were 58,846 acre-feet (elevation 9825.40 feet) of water stored in Turquoise Lake, which was 61 percent of average. Releases to Twin Lakes through the Mt. Elbert Conduit drafted Turquoise Lake to 25,894 acre-feet (elevation 9796.58 feet), the lowest storage of the water year, by May 13, 2003. There were 88,362 acre-feet (elevation 9845.23 feet) of water in storage at the end of the water year, which was 90 percent of average.

Homestake Tunnel imports totaled 9,816 acre-feet during the water year and were 40 percent of average. Busk-Ivanhoe imports totaled 5,001 acre-feet, which were 96 percent of average, and were divided equally between the Pueblo Board of Water Works and the City of Aurora. Project water imports through the Boustead Tunnel totaled 54,855 acre-feet and were 113 percent of average.

Exhibits 8 and 9 show the precipitation and pan evaporation at Turquoise Lake. Exhibits 5, 6, and 7 show the monthly imports through the Boustead, Homestake, and Busk-Ivanhoe Tunnels, respectively. Table 5 and Exhibit 10 depict the monthly operation of Turquoise Lake during the 2003 water year.

E. Mt. Elbert Conduit/Halfmoon Creek Diversion

During water year 2003, 67,222 acre-feet of water released from Turquoise Lake and 13,926 acre-feet of water diverted from Halfmoon Creek were conveyed through the Mt. Elbert Conduit to the Mt. Elbert Forebay, and subsequently to Twin Lakes through the Mt. Elbert Powerplant. An additional 3,607 acre-feet of water were released into the conduit from Turquoise Lake for use by the Leadville Federal Fish Hatchery. The water delivered to the hatchery was returned to the Arkansas River and stored in Pueblo Reservoir.

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

The storage in Twin Lakes was 101,583 acre-feet (elevation 9183.75 feet) on September 30, 2002. The combined storage of Twin Lakes and the Mt. Elbert Forebay was 110,664 acre-feet. Twin Lakes releases to Lake Creek were made throughout the winter to pass the entire flow of the Mt. Elbert Conduit, and to transfer the Project water stored in the reservoir to Pueblo Reservoir. The native inflow was stored in the Twin Lakes Reservoir and Canal Company storage space from November 15 through March 15. A total of 3,845 acre-feet of project water was released to Lake Creek during this time. This water was released such that the flow in the Arkansas River at the Wellsville gage was maintained as close to the average October 15 to November 15 trout-spawning flow as practically possible. The combined reservoir and forebay storage reached a low point of 85,097 acre-feet on April 28, 2003, and was at its high point at the beginning of the water year. A total of 13,109 a/f of project water was released beginning on July 13 and ending on August 15, to augment rafting flows in the Arkansas River.

At least one generating/pumping unit was available at the Mt. Elbert Powerplant throughout the 2003 water year. The capacity of one unit is greater than the capacity of the Mt. Elbert Conduit. A total of 355,304 megawatt-hours of energy was generated at the powerplant, with 971,189 acre-feet of water; 77,025 acre-feet came through the Mt. Elbert Conduit; and 902,283 acre-feet were first pumped to the Mt. Elbert Forebay from Twin Lakes during off-peak electric demand hours. Table 7 depicts the monthly powerplant operation for the 2003 water year.

G. Pueblo Reservoir

The storage content of Pueblo Reservoir was 79,143 acre-feet (elevation 4826.75 feet) on September 30, 2002, which was 58 percent of average. Project water

released from Turquoise Lake, through the Leadville Federal Fish Hatchery, and from Twin Lakes, was stored in Pueblo Reservoir through the winter and spring. A total of 31,871 acre-feet of native inflow was stored in the reservoir under the Winter Water Storage Program from November 15, 2002, through March 14, 2003. Of that 31,871 acre-feet of winter water stored, 29,219 acre-feet were released upon request, and 1,586 acre-feet evaporated. A total of 1,143 acre-feet was carried over to the next water year. The reservoir reached a high point in storage of 114,211 acre-feet (elevation 4840.70 feet) on March 19, 2003. There were 66,640 acre-feet (elevation 4820.88 feet) in storage on September 30, 2003. This was 49 percent of average, and 190,309 acre-feet less than a full conservation pool.

Table 8 and Exhibit 20 depict Pueblo Reservoir monthly operations during the 2003 water year. The 2002-2003 winter water storage is shown on Exhibit 17, and the winter water releases are shown on Exhibit 18. The pan evaporation at the reservoir is shown on Exhibit 19.

H. Storage Contracts

There were eight contracts for storage of non-project water in project storage space on the East Slope in effect in water year 2003. Six of those were long-term contracts: the Twin Lakes Reservoir and Canal Company for 54,452 acre-feet; the City of Colorado Springs for 17,416 acre-feet; the City of Aurora for 5,000 acre-feet; the Pueblo Board of Water Works for 5,000 acre-feet; Busk-Ivanhoe, Inc., for 10,000 acre-feet; and the Homestake Project for 30,000 acre-feet. The remaining contracts were interim one-year contracts for "if-and-when" storage space. Under "if-and-when" contracts, non-project water may be stored in project storage space as long as that storage space is not required for project water.

I. Project Water Sales and Deliveries

The Project made available 37,500 acre-feet of water to the Southeastern Colorado Water Conservancy District (District) during water year 2003. The District purchased 35,378 acre-feet and called for 32,296 acre-feet of project and project carryover water during the year. Evaporation reduced the project water in storage by 4,198 acre-feet. By the end of the water year (September 30, 2003), the District had 27,019 acre-feet of 2003 allocated water and 38,527 acre-feet of carryover water remaining in storage. Of the 32,296 acre-feet of project water released, 17,840 acre-feet were for municipal and industrial use, and 14,456 acre-feet were for irrigation. The monthly release of project water from Pueblo Reservoir is shown on Exhibit 21.

J. Reservoir Storage Allocation Data

Table 9 presents the reservoir storage allocations for the five project reservoirs.

K. Reservoir Evaporation and Precipitation

Tables 11 and 12 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 10. It is assumed that there is no evaporation from a reservoir water surface when the reservoir is completely covered by ice.

L. Flood Control Benefits

The operation of Pueblo Reservoir did not prevent any flood damage in the Arkansas River basin in water year 2003.

The Corps of Engineers estimated that the operation of Ruedi Reservoir, the Boustead Tunnel, and Turquoise Lake did not prevent any flood damage in the Colorado River basin. Table 13 shows the historic flood control benefits provided by Pueblo and Ruedi Dams.

Table 1

Ruedi Reservoir
Water Year 2003 Operations
Unit: 1,000 Acre-Feet

Year	Month	Inflow	Evaporation	Outflow	End of month content	Water surface elevation (FEET)
2002	Sep				47.8	7697.75
	Oct	3.6	0.1	3.9	47.3	7696.96
	Nov	3.0	0	2.6	47.8	7697.63
	Dec	2.3	0	2.6	47.5	7697.15
2003	Jan	1.9	0	2.5	46.9	7696.20
	Feb	1.6	0	2.1	46.3	7695.35
	Mar	2.4	0	2.5	46.2	7695.12
	Apr	6.6	0	2.7	50.2	7701.51
	May	27.6	0.1	6.6	71.2	7730.98
	Jun	29.9	0.3	4.9	95.8	7759.31
	Jul	9.7	0.5	7.9	97.2	7760.72
	Aug	6.5	0.3	13.2	90.2	7753.34
	Sep	6.4	0.2	12.8	83.6	7745.94
Total		101.5	1.5	64.3		

FRYINGPAN-ARKANSAS PROJECT
 RUEDI RESERVOIR
 RELEASES FOR ENDANGERED FISH
 WATER YEAR 2003
 July-03

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? (1= YES) (0= NO)	REQUIRED MIN FLOW BELOW RUEDI w/o FISH REL (CFS)	ENDANGERED FISH RELEASE (CFS)	CUMULATIVE FISH RELEASE (AC-FT)	PALISADE GAGE (CFS)
TUE	7/1/2003	7,759.78	96,291	338	8	103	13	116	0	110	0	100	2,400
WED	7/2/2003	7,760.08	96,579	264	10	108	13	121	0	110	0	100	2,180
THU	7/3/2003	7,760.53	97,011	337	10	108	13	121	0	110	0	100	2,080
FRI	7/4/2003	7,760.63	97,108	168	10	109	12	121	0	110	0	100	2,070
SAT	7/5/2003	7,760.78	97,252	193	10	109	12	121	0	110	0	100	1,880
SUN	7/6/2003	7,760.91	97,378	183	10	109	11	120	0	110	0	100	1,650
MON	7/7/2003	7,760.46	96,944	-99	10	109	11	120	0	-89	0	100	1,490
TUE	7/8/2003	7,760.58	97,060	181	14	109	10	119	0	110	0	100	1,330
WED	7/9/2003	7,760.68	97,156	170	12	109	10	119	0	110	0	100	1,180
THU	7/10/2003	7,760.82	97,291	186	9	109	10	119	0	110	0	100	1,120
FRI	7/11/2003	7,760.94	97,407	177	9	110	9	119	0	110	0	100	1,030
SAT	7/12/2003	7,760.94	97,407	119	9	110	9	119	0	110	0	100	866
SUN	7/13/2003	7,761.13	97,590	211	9	110	8	119	0	110	0	100	806
MON	7/14/2003	7,761.15	97,610	129	9	111	8	119	0	110	0	100	837
TUE	7/15/2003	7,761.23	97,687	158	8	110	8	118	0	110	0	100	747
WED	7/16/2003	7,761.34	97,794	171	7	111	8	118	0	110	0	100	657
THU	7/17/2003	7,761.42	97,871	157	7	111	8	119	0	110	0	100	710
FRI	7/18/2003	7,761.49	97,939	157	11	111	7	118	0	110	0	100	734
SAT	7/19/2003	7,761.56	98,007	157	11	111	7	118	0	110	0	100	751
SUN	7/20/2003	7,761.60	98,046	143	11	112	7	119	0	110	0	100	718
MON	7/21/2003	7,761.64	98,085	137	6	112	7	119	0	110	0	100	698
TUE	7/22/2003	7,761.68	98,124	132	1	112	7	119	0	110	0	100	625
WED	7/23/2003	7,761.69	98,133	117	0	112	7	119	0	110	0	100	704
THU	7/24/2003	7,761.72	98,162	122	0	108	11	119	0	110	0	100	529
FRI	7/25/2003	7,761.70	98,143	135	6	139	11	150	1	154	25	150	404
SAT	7/26/2003	7,761.42	97,871	136	6	268	19	286	1	163	125	398	359
SUN	7/27/2003	7,761.04	97,504	159	6	339	3	342	1	170	113	621	617
MON	7/28/2003	7,760.74	97,214	138	4	280	6	286	1	152	38	695	1,070
TUE	7/29/2003	7,760.72	97,195	109	3	116	6	122	1	123	0	695	981
WED	7/30/2003	7,760.75	97,224	122	11	97	7	103	1	137	0	695	766
THU	7/31/2003	7,760.72	97,195	94	5	104	6	109	1	108	0	695	620
Averages		7,761.03	97,493	158	8	128	9	137			10		1,052
Totals (acft)				9,718	482	7,882	561	8,443			595	695	64,680

NOTES: 100 acre-feet was released on April 12 and 13 to support Recovery Program 15-Mile Reach target flows.
 Recovery Program 15 Mile Reach target flow releases resumed Friday, July 25.

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 RUEDI RESERVOIR
 RELEASES FOR ENDANGERED FISH
 WATER YEAR 2003
 August-03

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? (1= YES) (0= NO)	REQUIRED MIN FLOW BELOW RUEDI w/o FISH REL (CFS)	ENDANGERED FISH RELEASE (CFS)	CUMULATIVE FISH RELEASE (AC-FT)	PALISADE GAGE (CFS)
FRI	8/1/2003	7,760.72	97,195	136	8	128	6	134	1	153	0	695	456
SAT	8/2/2003	7,760.66	97,137	107	8	129	6	134	1	124	0	695	437
SUN	8/3/2003	7,760.65	97,127	132	8	129	5	135	1	149	0	695	478
MON	8/4/2003	7,760.54	97,021	83	6	130	5	135	1	99	0	695	495
TUE	8/5/2003	7,760.46	96,944	99	9	130	6	135	1	116	0	695	535
WED	8/6/2003	7,760.36	96,848	93	6	135	5	140	1	109	13	721	582
THU	8/7/2003	7,760.26	96,751	119	4	163	5	168	1	135	50	820	516
FRI	8/8/2003	7,760.10	96,598	105	4	178	5	184	1	122	63	945	506
SAT	8/9/2003	7,759.73	96,239	45	4	222	6	228	1	62	100	1,143	509
SUN	8/10/2003	7,759.56	96,080	145	4	221	6	227	1	163	100	1,342	507
MON	8/11/2003	7,759.29	95,822	91	0	221	5	227	1	108	100	1,540	481
TUE	8/12/2003	7,759.04	95,583	110	0	231	5	236	1	126	100	1,739	405
WED	8/13/2003	7,758.76	95,316	117	0	252	5	256	1	133	135	2,006	353
THU	8/14/2003	7,758.42	94,993	88	4	246	5	251	1	104	135	2,274	342
FRI	8/15/2003	7,758.08	94,670	88	4	246	5	251	1	104	135	2,542	408
SAT	8/16/2003	7,757.78	94,386	107	4	246	5	251	1	123	135	2,810	584
SUN	8/17/2003	7,757.50	94,122	117	4	245	5	251	1	133	135	3,077	467
MON	8/18/2003	7,757.32	93,952	165	4	246	5	251	1	181	135	3,345	586
TUE	8/19/2003	7,757.08	93,726	136	4	246	5	251	1	152	135	3,613	857
WED	8/20/2003	7,756.82	93,481	129	8	245	5	250	1	146	135	3,881	1,130
THU	8/21/2003	7,756.52	93,200	111	8	245	5	250	1	127	135	4,148	852
FRI	8/22/2003	7,756.22	92,919	106	2	245	5	251	1	122	135	4,416	650
SAT	8/23/2003	7,755.94	92,657	115	2	245	5	251	1	132	135	4,684	662
SUN	8/24/2003	7,755.66	92,396	116	2	245	5	251	1	132	135	4,952	678
MON	8/25/2003	7,755.35	92,107	104	4	246	5	251	1	120	135	5,220	784
TUE	8/26/2003	7,755.03	91,809	99	4	246	5	251	1	115	135	5,487	821
WED	8/27/2003	7,754.68	91,485	87	4	246	5	251	1	103	135	5,755	759
THU	8/28/2003	7,754.36	91,189	102	4	247	5	252	1	118	135	6,023	828
FRI	8/29/2003	7,754.02	90,875	91	4	245	5	250	1	107	135	6,291	817
SAT	8/30/2003	7,753.68	90,562	89	4	243	5	247	1	105	135	6,558	751
SUN	8/31/2003	7,753.34	90,249	88	4	242	5	247	1	104	135	6,826	711
Averages		7,757.68	94,304	107	4	216	5	221			100		611
Totals (acft)				6,585	271	13,259	317	13,577			6,131	6,826	37,581

NOTES: The first 5,000 acre-feet was released as of Monday, August 25.

FRYINGPAN-ARKANSAS PROJECT
 RUEDI RESERVOIR
 RELEASES FOR ENDANGERED FISH
 WATER YEAR 2003
 September-03

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? (1= YES) (0= NO)	REQUIRED MIN FLOW BELOW RUEDI w/o FISH REL (CFS)	ENDANGERED FISH RELEASE (CFS)	CUMULATIVE FISH RELEASE (AC-FT)	PALISADE GAGE (CFS)
MON	9/1/2003	7,753.00	89,938	90	4	243	5	248	1	104	135	7,094	750
TUE	9/2/2003	7,752.63	89,599	72	0	243	5	248	1	87	135	7,362	747
WED	9/3/2003	7,752.10	89,116	102	0	346	5	351	1	117	160	7,679	622
THU	9/4/2003	7,751.63	88,688	79	0	294	5	299	1	94	185	8,046	579
FRI	9/5/2003	7,751.12	88,226	74	0	307	5	312	1	89	185	8,413	619
SAT	9/6/2003	7,750.65	87,802	84	0	298	5	303	1	99	185	8,780	784
SUN	9/7/2003	7,750.34	87,522	158	0	299	4	303	1	172	185	9,147	933
MON	9/8/2003	7,750.12	87,325	161	0	261	3	264	1	174	125	9,395	1,120
TUE	9/9/2003	7,750.04	87,253	143	0	180	3	183	1	156	50	9,494	1,419
WED	9/10/2003	7,750.18	87,379	201	0	138	3	141	1	214	35	9,563	1,760
THU	9/11/2003	7,750.30	87,486	194	2	137	3	140	1	206	35	9,633	1,910
FRI	9/12/2003	7,750.36	87,540	166	2	137	3	140	1	179	35	9,702	1,729
SAT	9/13/2003	7,750.49	87,658	200	2	138	3	142	1	213	35	9,772	1,409
SUN	9/14/2003	7,750.51	87,675	149	2	138	4	141	1	162	35	9,841	1,180
MON	9/15/2003	7,750.51	87,675	144	6	138	4	142	1	157	35	9,911	1,150
TUE	9/16/2003	7,750.46	87,630	118	3	138	4	142	1	132	35	9,980	1,080
WED	9/17/2003	7,750.34	87,522	102	7	150	4	153	1	115	60	10,099	987
THU	9/18/2003	7,750.08	87,289	113	8	223	3	227	1	127	100	10,297	945
FRI	9/19/2003	7,749.84	87,073	135	8	236	3	239	1	148	135	10,565	1,050
SAT	9/20/2003	7,749.56	86,822	117	8	236	3	239	1	130	135	10,833	1,170
SUN	9/21/2003	7,749.14	86,446	55	8	236	3	239	1	67	135	11,101	1,180
MON	9/22/2003	7,748.82	86,161	95	4	235	3	238	1	107	135	11,368	1,160
TUE	9/23/2003	7,748.48	85,858	85	4	234	3	237	1	98	135	11,636	1,110
WED	9/24/2003	7,748.14	85,556	87	5	234	3	236	1	99	135	11,904	1,060
THU	9/25/2003	7,747.78	85,236	79	7	234	3	236	1	92	135	12,172	1,019
FRI	9/26/2003	7,747.42	84,918	79	7	233	3	236	1	92	135	12,440	991
SAT	9/27/2003	7,747.06	84,600	80	6	233	2	236	1	92	135	12,707	1,080
SUN	9/28/2003	7,746.70	84,283	80	6	233	2	236	1	92	135	12,975	1,060
MON	9/29/2003	7,746.32	83,948	69	4	233	2	236	1	81	135	13,243	1,010
TUE	9/30/2003	7,745.94	83,615	69	4	233	2	236	1	81	135	13,511	1,019
Averages		7,749.67	86,928	113	4	221	3	224			112		1,088
Totals (acft)				6,705	211	13,129	202	13,330			6,684	13,511	64,726

NOTES: The second 5,000 acre-feet was released as of Wednesday, September 17.

FRYINGPAN-ARKANSAS PROJECT
 RUEDI RESERVOIR
 RELEASES FOR ENDANGERED FISH
 WATER YEAR 2003
 October-03

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? (1= YES) (0= NO)	REQUIRED MIN FLOW BELOW RUEDI w/o FISH REL (CFS)	ENDANGERED FISH RELEASE (CFS)	CUMULATIVE FISH RELEASE (AC-FT)	PALISADE GAGE (CFS)
WED	10/1/2003	7,745.54	83,265	63	7	233	2	235	1	72	135	13,778	1,000
THU	10/2/2003	7,745.20	82,969	82	1	230	2	232	1	90	135	14,046	997
FRI	10/3/2003	7,744.86	82,672	80	1	229	2	231	1	89	135	14,314	1,030
SAT	10/4/2003	7,744.50	82,359	71	1	228	2	230	1	80	135	14,582	1,110
SUN	10/5/2003	7,744.14	82,047	72	1	229	2	231	1	81	135	14,849	1,130
MON	10/6/2003	7,743.76	81,718	76	4	238	2	240	1	85	140	15,127	1,140
TUE	10/7/2003	7,743.32	81,339	65	4	252	2	254	1	73	156	15,437	1,120
WED	10/8/2003	7,742.88	80,961	75	4	262	2	264	1	84	165	15,764	1,120
THU	10/9/2003	7,742.38	80,532	68	4	280	2	282	1	76	185	16,131	1,090
FRI	10/10/2003	7,741.90	80,123	78	0	284	2	286	1	86	185	16,498	1,100
SAT	10/11/2003	7,741.42	79,714	78	0	284	2	286	1	87	185	16,865	1,100
SUN	10/12/2003	7,740.94	79,307	77	0	282	2	284	1	85	185	17,232	1,120
MON	10/13/2003	7,740.42	78,868	60	0	281	2	283	1	68	185	17,599	1,170
TUE	10/14/2003	7,739.90	78,430	60	0	280	2	282	1	68	185	17,966	1,140
WED	10/15/2003	7,739.40	78,010	69	0	280	2	282	1	77	185	18,332	1,130
THU	10/16/2003	7,738.94	77,626	63	0	257	2	259	1	72	150	18,630	1,120
FRI	10/17/2003	7,738.54	77,292	63	0	232	2	234	1	72	135	18,898	1,110
SAT	10/18/2003	7,738.14	76,960	64	0	232	2	234	1	73	135	19,166	1,090
SUN	10/19/2003	7,737.72	76,611	56	0	232	2	234	1	65	135	19,433	1,060
MON	10/20/2003	7,737.30	76,264	56	0	231	2	233	1	64	135	19,701	1,050
TUE	10/21/2003	7,736.92	75,950	57	0	215	2	217	1	65	115	19,929	1,070
WED	10/22/2003	7,736.62	75,703	57	0	182	2	184	1	66	80	20,088	1,070
THU	10/23/2003	7,736.32	75,457	57	0	182	2	184	1	66	80	20,247	1,010
FRI	10/24/2003	7,736.03	75,219	43	0	163	2	165	1	52	55	20,356	1,030
SAT	10/25/2003	7,735.83	75,056	37	0	119	2	121	1	45	30	20,415	1,080
SUN	10/26/2003	7,735.62	74,884	32	0	119	2	121	1	41	30	20,475	1,040
MON	10/27/2003	7,735.46	74,753	39	0	105	2	107	1	48	30	20,534	1,040
TUE	10/28/2003	7,735.40	74,705	49	0	74	2	76	1	58	0	20,534	1,120
WED	10/29/2003	7,735.28	74,607	34	0	84	2	85	1	43	0	20,534	963
THU	10/30/2003	7,735.16	74,509	35	0	84	2	85	1	43	0	20,534	1,000
FRI	10/31/2003	7,735.04	74,411	34	0	83	2	85	1	42	0	20,534	1,080
Averages		7,739.51	78,139	60	1	209	2	211			114		1,078
Totals (acft)				3,673	53	12,824	121	12,945			7,024	20,534	66,308

NOTES: Releases of water to support 15 Mile Reach target flows ceased on Monday, October 27.
 A total of 20,534 acre feet were released to support Recovery Program target flows in the 15 Mile Reach.

Table 3

Fryingpan-Arkansas Project Transmountain Diversions Water Year 2003 Unit: Acre-Feet						
Diversion	Apr	May	Jun	Jul	Aug	Total
No Name		551	946			1,497
Hunter		1,375	2,886	119	50	4,430
Sawyer		710	6			716
Midway						
Chapman'		2,029	6,474	1,388		9,891
South Fork		2,033	4,090			6,123
Subtotal		6,698	14,402	1,507	50	22,657
Carter						
North Fork			444	42		486
Mormon		875	159	450		1,484
N. Cunningham ²						
M. Cunningham		442	1,208	48		1,698
Ivanhoe			553			553
Lily Pad						
Granite			341	111		452
Fryingpan		4,602	7,488	1,285		13,375
Subtotal		5,919	10,193	1,936		18,048
Total		12,617	24,595	3,443	50	40,705
Boustead Tunnel'	77	17,781	32,222	4,753	22	54,855

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

² Includes South Cunningham

³ The difference between total diversion and Charles H. Boustead Tunnel results from the accuracy limitations of the measurement

Table 4

Fryingpan-Arkansas Project Imports
Charles H. Boustead Tunnel Outlet
Unit: 1,000 Acre-feet

Year	Imports	Accumulated Imports	Twin Lakes Exchange	Available for Allocations
1972	32.0	32.0	0	0.0
1973	36.8	68.8	0	16.0
1974	34.1	102.9	0	18.6
1975	37.2	140.1	0	25.0
1976	26.9	167.0	0	24.0
1977	11.4	178.4	0	25.0
1978	49.2	227.6	0	25.0
1979	53.7	281.3	0	25.6
1980	55.7	337.0	0	70.0
1981	34.6	371.6	0	25.0
1982	75.2	446.8	2.7	68.0
1983	90.84	537.6	0.3	125.0
1984	110.10	647.7	1.9	210.0
1985	70.2	717.9	1.7	289.9
1986	30.3	748.2	1.5	300.3
1987	2.2	750.4	1.1	288.0
1988	13.4	763.8	2.0	247.8
1989	36.2	800.0	1.7	197.6
1990	46.6	846.6	1.7	142.1
1991	59.1	905.7	1.5	58.7
1992	54.8	960.5	1.2	32.9
1993	86.6	1,047.1	2.3	70.1
1994	52.2	1,099.3	1.3	51.7
1995	90.5	1,189.8	2.3	55.0
1996	36.9	1,226.7	1.8	110.0
1997	78.6	1,305.3	1.8	116.0
1998	51.3	1,356.6	2.6	102.0
1999	40.8	1,397.4	2.1	127.5
2000	44.8	1,442.2	1.7	171.6
2001	45.3	1,487.5	2.1	67.5
2002	13.2	1,500.7	1.5	8.5
2003	54.9	1,555.6	2.4	37.5

Restriction: Not to exceed 120,000 acre-feet in 1 year but not to exceed 2,352,800 acre-feet
in 34 consecutive years.

⁴ Includes 3,120 acre-feet imported through Twin Lakes Tunnel

⁵ Includes 2,080 acre-feet imports through Boustead Tunnel in October and 420 acre-feet in November. All other years are water year totals.

Turquoise Lake
Water Year 2003 Operations
Unit: 1,000 Acre-Feet

Inflow

Busk-Ivanhoe
Imports

Year	Month	Through Carlton	Through Boustead	Homestake Imports	Project Imports	Native Inflow	Total Inflow	Evap	Total Outflow	End of Month Content (FEET)	Water Surface Elevation
2002	Sep									58.8	9825.40
	Oct	0.1	0	0	0	1.2	1.3	0.3	12.1	47.7	9816.87
	Nov	0	0	0	0	0.8	0.8	0.1	3.6	44.8	9814.47
	Dec	0	0	0	0	0.5	0.5	0	0.9	44.4	9814.15
2003	Jan	0	0	0	0	0.5	0.5	0	0.9	44.0	9813.82
	Feb	0	0	0	0	0.7	0.7	0	4.7	39.9	9810.35
	Mar	0	0	0	0	0.6	0.6	0	5.5	35.1	9806.00
	Apr	0.1	0	0	0.1	1.5	1.7	0	4.6	32.2	9803.20
	May	1.1	0	0	17.8	9.8	28.7	0.2	14.3	46.3	9815.75
	Jun	2.6	1.3	9.8	32.2	12.9	58.8	0.6	16.4	88.2	9845.10
	Jul	1.0	0	0	4.7	2.6	8.3	0.7	5.8	89.9	9846.19
	Aug	0.1	0	0	0.1	0.8	1.0	0.4	1.3	89.2	9845.75
	Sep	0	0	0	0	0.4	0.4	0.4	0.9	88.4	9845.23
Subtotal		5.0	1.3								
Total		6.3		9.8	54.9	32.3	103.3	2.7	71.0		

Twin Lakes/Mt. Elbert Forebay
Water Year 2003 Operations
Unit: 1,000 Acre-Feet

INFLOW

Year	Month	Twin Lakes Canal Company		Mt. Elbert Conduit		Project Water	Native Inflow	Total Inflow	Evap	Total Outflow	End of Month Content ⁶	Water Surface Elevation' (FEET)
		Imports	Other	Halfmoon								
2002	Sep										110.7	9183.75
	Oct	0.3	0	0		11.6	0.4	12.3	0.5	9.2	113.2	9184.96
	Nov	0.3	0.6	0		3.2	0.1	4.2	0.2	6.3	110.8	9184.40
	Dec	0.1	0.8	0		0.4	0.1	1.4	0	7.7	103.8	9181.12
2003	Jan	0.1	0.6	0		0.4	0.1	1.2	0	7.7	97.0	9177.07
	Feb	0	0.5	0		4.3	0.1	4.9	0	6.9	94.8	9176.06
	Mar	0.1	0.2	0		5.0	0.2	5.5	0	8.0	92.2	9174.93
	Apr	0.2	0.1	0		4.1	0.6	5.0	0.2	11.8	85.2	9170.58
	May	13.4	9.6	2.7		13.4	6.7	45.8	0.9	21.9	108.2	9182.63
	Jun	22.7	5.9	6.6		15.2	18.4	68.8	1.1	42.7	133.1	9194.12
	Jul	5.3	1.4	2.8		4.6	8.5	22.6	1.4	28.3	126.1	9191.48
	Aug	0.8	1.0	0.9		0.4	3.5	6.6	0.7	16.9	115.1	9186.70
	Sep	1.1	2.2	1.0		0.4	2.2	6.9	0.7	4.4	117.0	9187.56
Subtotal		44.4	22.9	14.0		63.0						
Total		67.3		77.0		40.9		185.2	5.7	171.8		

⁶ Contents of both Twin Lakes and Mt. Elbert Forebay

⁷ Elevation of Twin Lakes

Mt. Elbert Pumped-Storage Powerplant Operations
Water Year 2003

Table 7

Year	Month	Mt. Elbert Conduit Inflow to Mt. Elbert Forebay (acre-ft)	Water Pumped from Twin Lakes to Mt. Elbert Forebay (acre-ft)	Water through Generator (acre-ft)	Megawatt- Hours Net Generation* (mWh)
2002	Oct	11,704	78,486	88,389	33,019
	Nov	3,064	65,335	68,915	24,807
	Dec	310	84,116	84,719	31,248
2003	Jan	308	81,277	78,215	29,629
	Feb	4,294	73,907	78,468	29,368
	Mar	4,978	72,370	76,448	30,189
	Apr	4,382	53,529	57,225	22,117
	May	16,256	50,807	68,459	23,993
	Jun	21,896	52,310	70,310	25,320
	Jul	7,225	85,456	92,797	31,995
	Aug	1,233	108,070	109,165	38,635
	Sep	1,375	96,620	98,079	34,984
Total		77,025	902,283	971,189	355,304

*Net Generation is gross plant generation less station service.

Pueblo Reservoir
 Water Year 2003 Operations
 Unit: 1,000 Acre-Feet

		Inflow							End of month	Water surface
Year	Month	Project Water	Other	Native	Total Inflow	Evapo- ration	Outflow	content	elevation (FEET)	
2002	Sep							78.1	4826.27	
	Oct	0.3	1.6	8.7	10.6	0.7	10.1	77.8	4826.16	
	Nov	0.7	2.1	10.3	13.1	0.3	8.8	81.8	4827.93	
	Dec	1.5	2.2	10.6	14.3	0.3	3.8	92.0	4832.24	
2003	Jan	1.3	2.3	10.0	13.6	0.3	3.9	101.4	4835.94	
	Feb	1.1	2.1	8.9	12.1	0.4	3.9	109.3	4838.89	
	Mar	1.0	2.6	11.1	14.7	0.8	9.5	113.7	4840.52	
	Apr	4.3	2.9	6.8	14.0	1.0	21.2	105.5	4837.48	
	May	0.3	3.4	46.1	49.8	1.5	62.0	91.8	4832.15	
	Jun	0.3	7.7	102.7	110.7	1.2	123.6	77.6	4826.07	
	Jul	5.9	3.9	30.1	39.9	2.0	43.1	72.4	4823.66	
	Aug	5.0	5.6	12.4	23.0	1.5	26.4	67.5	4821.32	
	Sep	0.3	4.0	14.4	18.7	1.0	19.0	66.2	4820.66	
Subtotal		22.0	40.4	272.1						
Total					334.5	11.0	335.3			

Table 9

Fryingpan-Arkansas Project
Reservoir Storage Allocation Data
Unit: Acre-Feet

Reservoir	Dead	Inactive	Active conservation	Joint use	Flood control	Total capacity storage
Ruedi	63	1,095	101,278	0	0	102,3731
Turquoise	2,810	8,920	120,478	0	0	129,3981
Pueblo	2,329	28,121	228,828	66,000	26,991	349,9402
Twin Lakes	63,324	72,938	67,917	0	0	140,855
Mt. Elbert Forebay	561	3,825	7,318	0	0	11,1431

¹ New area-capacity tables (1984)

² New area-capacity table (1994)

Note: Inactive includes dead storage

Table 10

Fryingpan-Arkansas Project
Monthly Evaporation Factors

Meredith		Sugar Loaf	Twin Lakes	Pueblo
Month	Factor	Factor	Factor	Factor
Oct	1/	.220	.220	.247
Nov		.100	.100	.155
Dec		.030	.030	.133
Jan		.050	.050	.128
Feb		.080	.080	.173
Mar		.140	.140	.280
Apr		.233	.233	.308
May		.363	.363	-
Jun		.448	.448	-
Jul		.405	.405	-
Aug		.318	.318	-
Sep		.290	.290	-

Note: Factor is used when pan is not in operation. Factor divided by number of days in the month times reservoir area not covered by ice equals daily water surface evaporation in acre-feet.

1/ Factors have not been determined for Meredith. Factors from Twin Lakes are used for Meredith.

Table 11

Fryingpan-Arkansas Project
 Monthly Average vs. Current Water Year Evaporation
 (Unit = Inches)

Month	Meredith		Sugar Loaf		Twin Lakes		Pueblo	
	Ave Pan (In.)	WY 03	Ave Pan (In.)	WY 03	Ave Pan (In.)	WY 03	Ave Pan (In.)	WY 03
Oct	0.84	1.76	2.16	3.72	2.56	3.80	5.29	5.62
Nov	0	0	1.70	1.70	1.70	1.70	2.62	2.66
Dec	0	0	0.27	0.53	0.35	0.53	2.28	2.28
Jan	0.24	0	0	0	0	0	2.19	2.19
Feb	0	0	0	0	0	0	2.97	2.97
Mar	0	0	0	2.40	0.22	2.40	4.86	4.80
Apr	0.18	0	0.14	3.99	1.49	3.99	6.19	6.75
May	2.35	1.84	0.96	6.18	4.08	7.15	8.57	9.94
Jun	7.50	6.34	5.25	5.75	7.24	6.71	10.02	9.51
Jul	7.70	8.83	5.14	7.54	6.90	8.05	10.71	16.27
Aug	6.24	5.52	4.21	3.93	5.67	3.81	8.78	12.36
Sep	4.16	4.12	3.46	3.40	4.97	4.18	7.12	8.43

Table 12

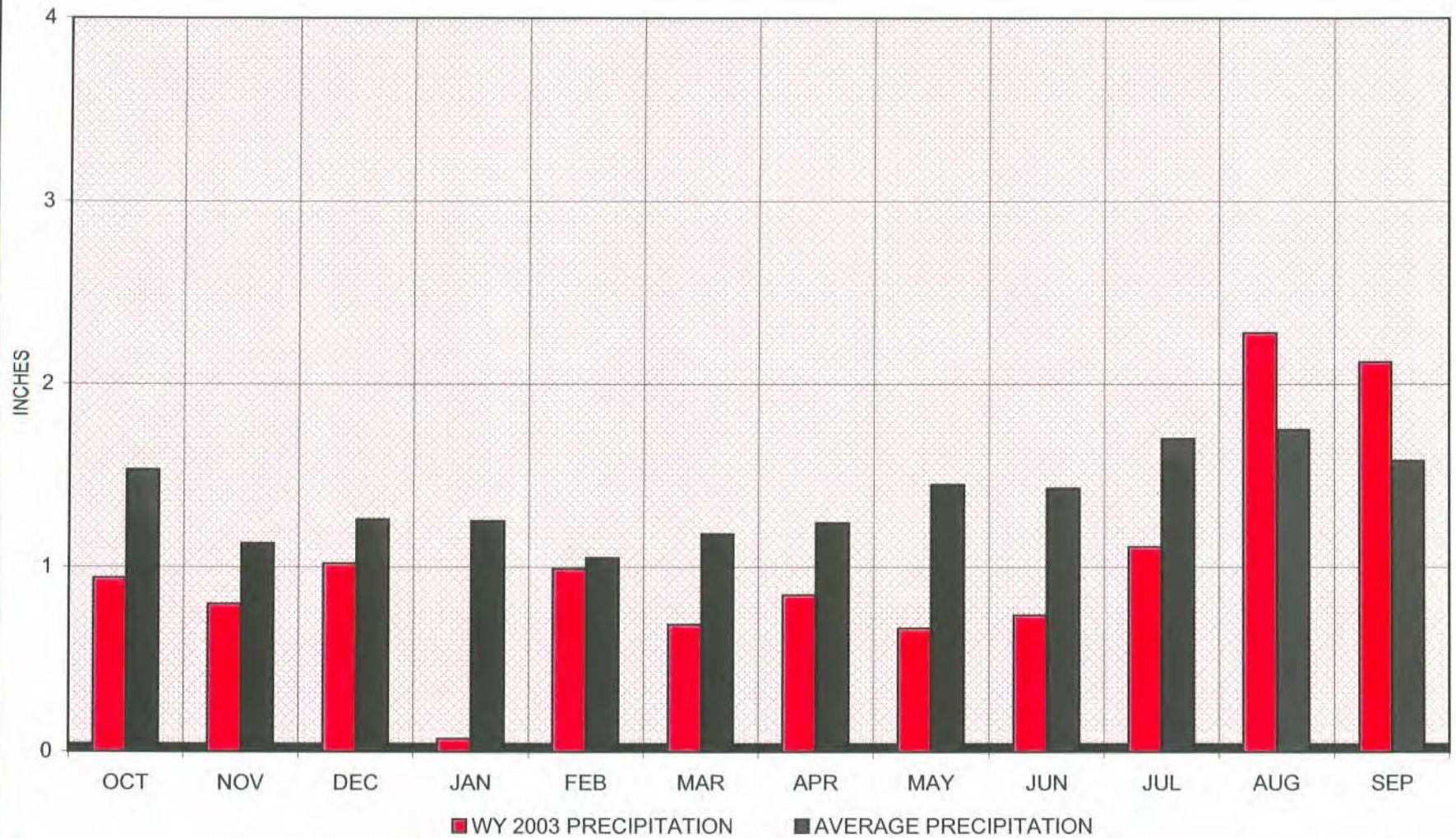
Fryingpan-Arkansas Project
 Monthly Average Vs. Current Water Year Precipitation
 (Unit = Inches)

Month	Meredith		Sugar Loaf		Twin Lakes		Pueblo		Rocky Ford	
	Avg.	WY 03	Avg.	WY 03	Avg.	WY 03	Avg.	WY 03	Avg.	WY 03
Oct	1.53	0.94	1.01	0.98	0.67	0.72	0.99	0.66	0.78	0.36
Nov	1.13	0.80	1.30	1.80	0.52	0.92	0.91	0.03	0.45	0.08
Dec	1.26	1.02	1.29	0.76	0.51	0.06	0.52	0.28	0.33	0.47
Jan	1.25	0.07	1.50	0.52	0.40	0.06	0.39	0.02	0.26	0.01
Feb	1.05	0.99	1.23	1.79	0.48	0.45	0.34	0.77	0.29	0.50
Mar	1.18	0.69	1.46	1.34	0.72	1.48	0.72	1.59	0.64	0.89
Apr	1.24	0.85	1.40	1.57	0.78	0.51	0.94	1.28	1.31	2.31
May	1.45	0.67	1.33	0.88	0.96	0.43	1.39	1.12	1.84	1.24
Jun	1.43	0.74	1.14	1.73	0.85	1.66	1.43	1.23	1.38	2.28
Jul	1.70	1.11	1.98	1.08	1.49	1.52	2.12	0.39	1.95	0.51
Aug	1.75	2.28	1.98	1.57	1.51	2.36	1.92	1.31	1.52	0.54
Sep	1.58	2.12	1.32	1.99	0.93	1.64	1.04	0.57	0.92	0.44
Total	16.55	12.28	16.94	16.01	9.82	11.81	12.71	9.25	11.67	9.63
Max. Annual	26.70	(1984)	25.95	(1957)	17.27	(1952)	17.73	(1995)	22.75	(1999)

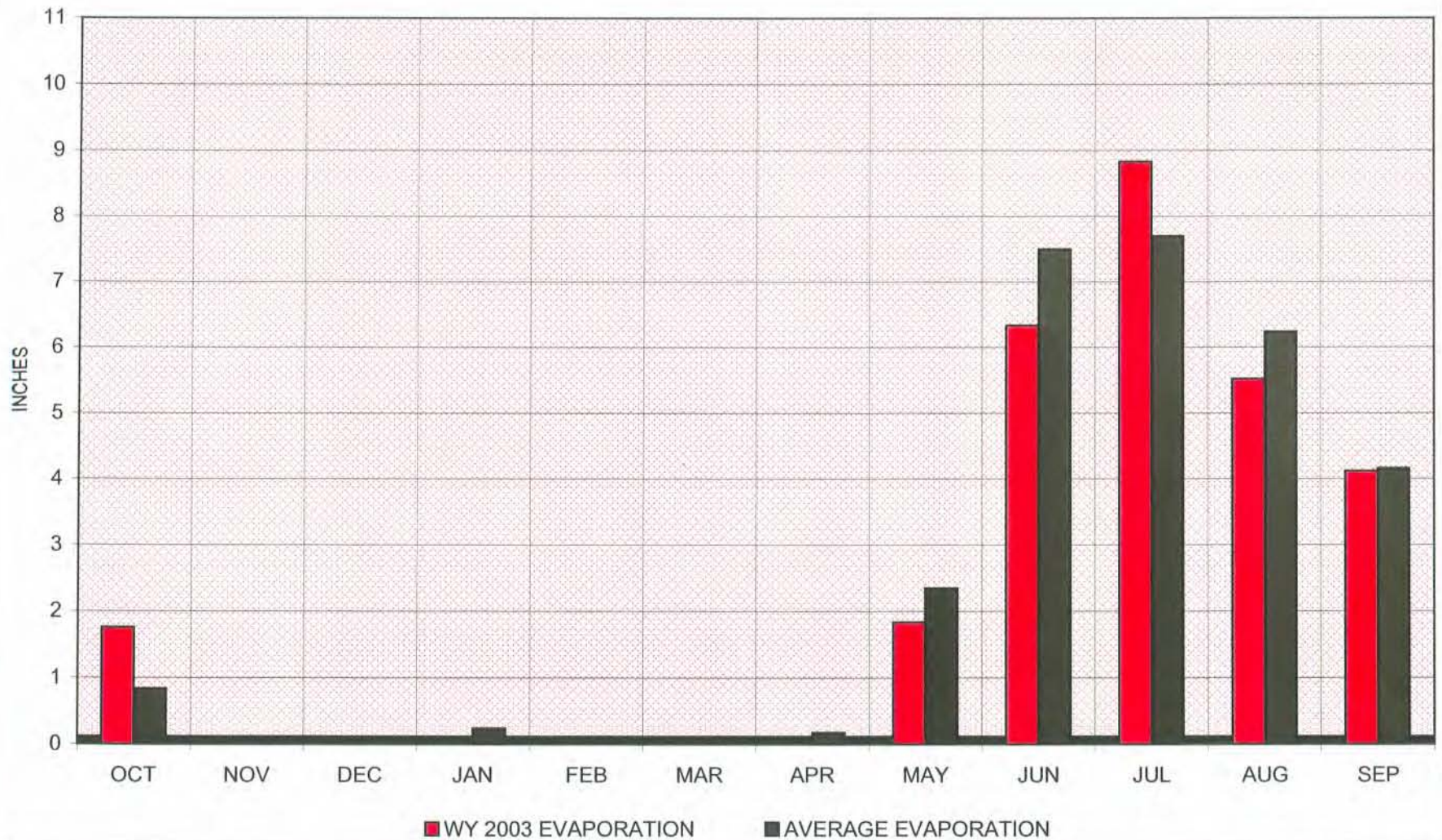
Fryingpan-Arkansas Project
Flood Control Benefits in Dollars

	Ruedi Reservoir		Pueblo Reservoir	
	Benefits	Accumulated Benefits	Benefits	Accumulated Benefits
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	11,317,000
2002	0	6,559,000	0	11,317,000
2003	0	6,559,000	0	11,317,000

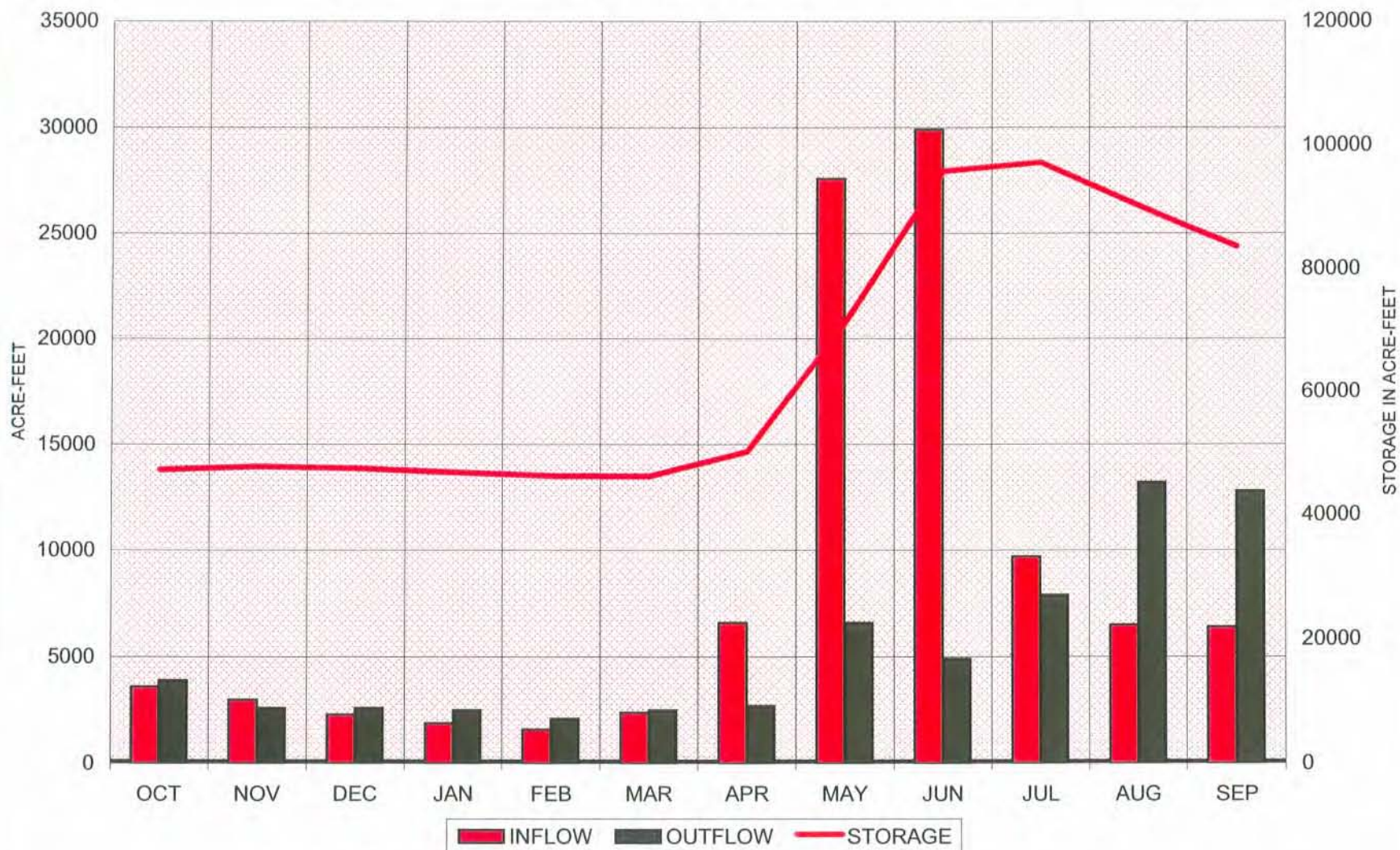
MONTHLY PRECIPITATION AT MEREDITH, CO WATER YEAR 2003



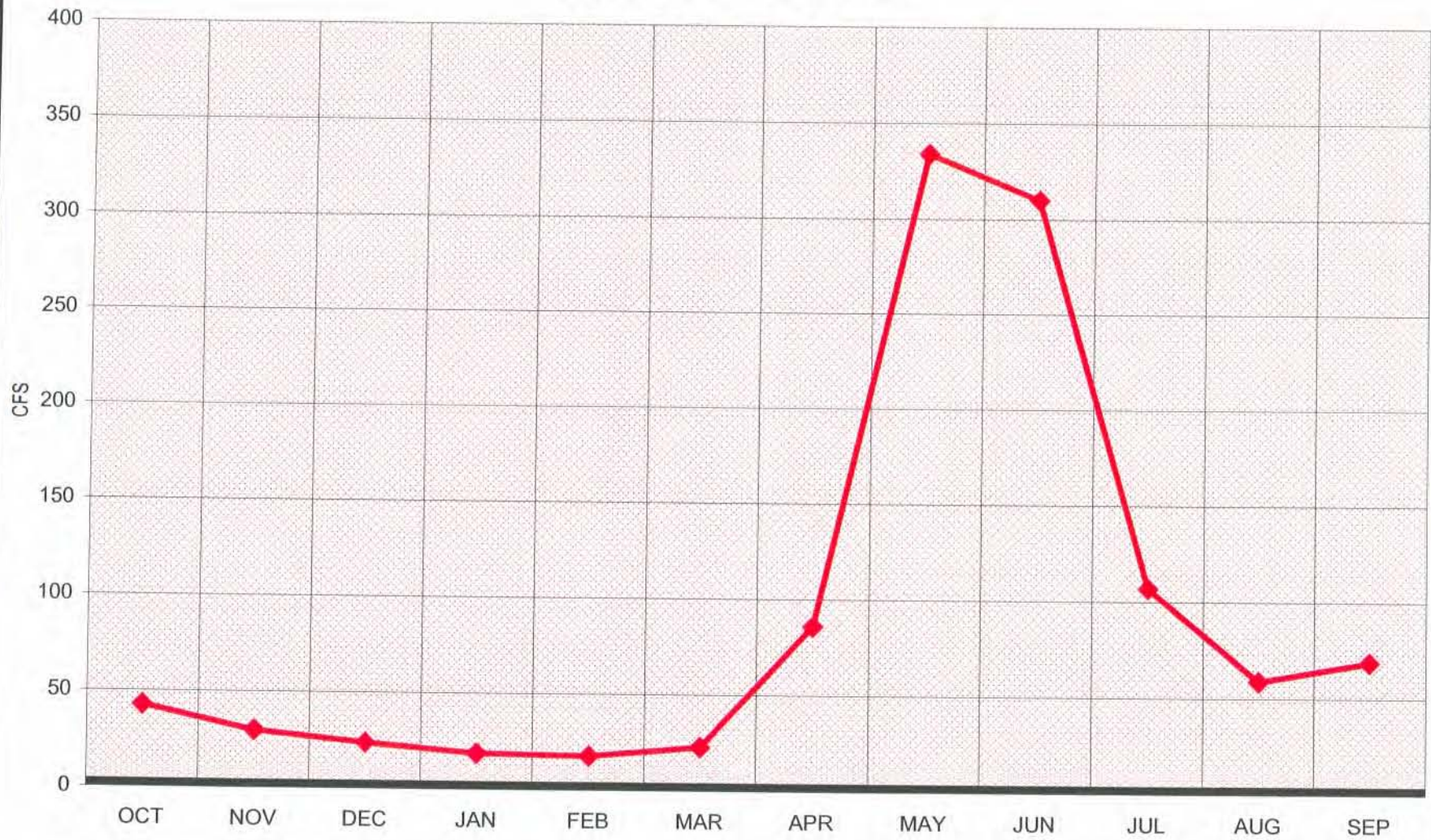
MONTHLY EVAPORATION AT MEREDITH, CO WATER YEAR 2003



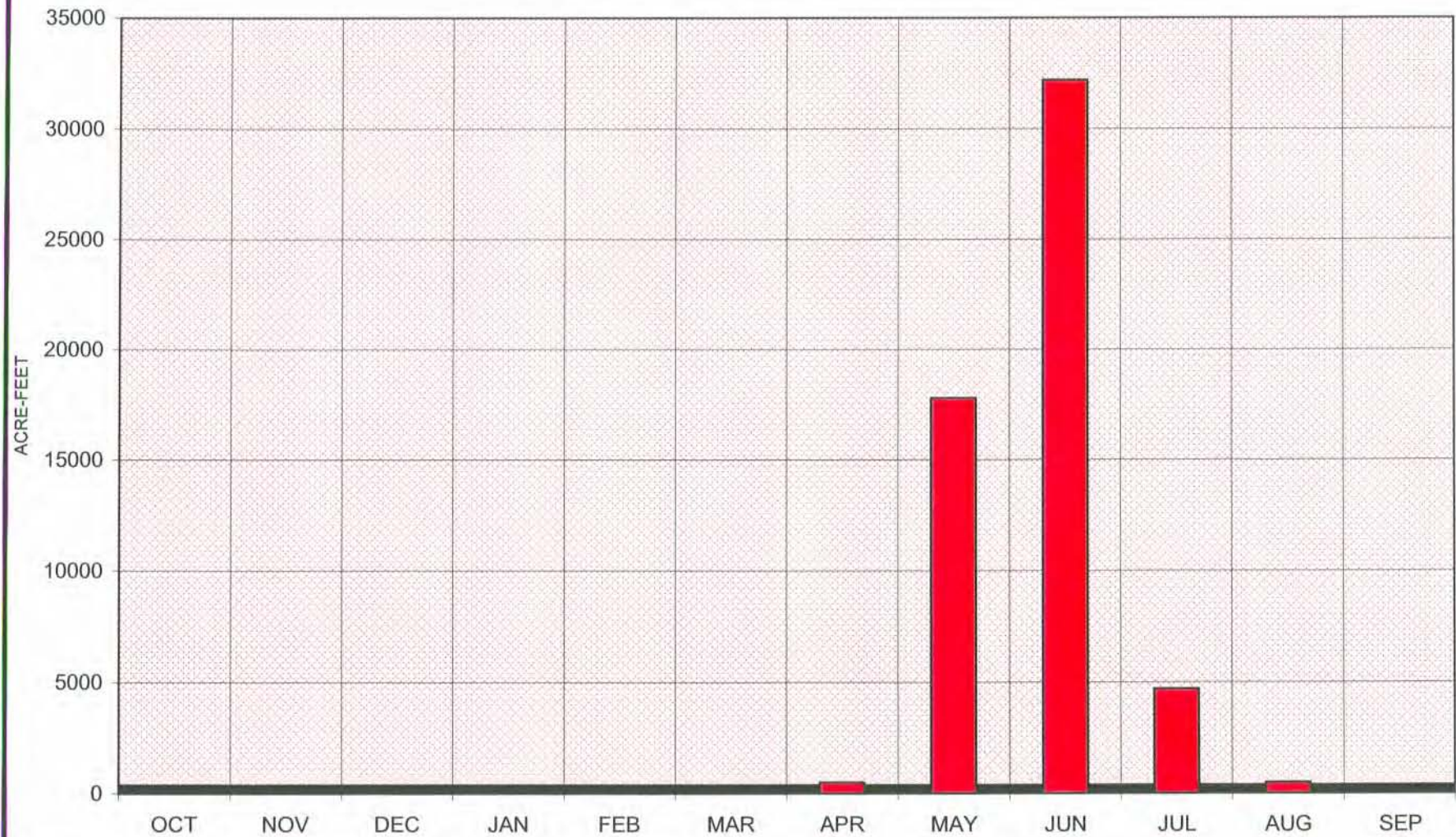
RUEDI RESERVOIR WATER YEAR 2003 ACTUAL OPERATIONS



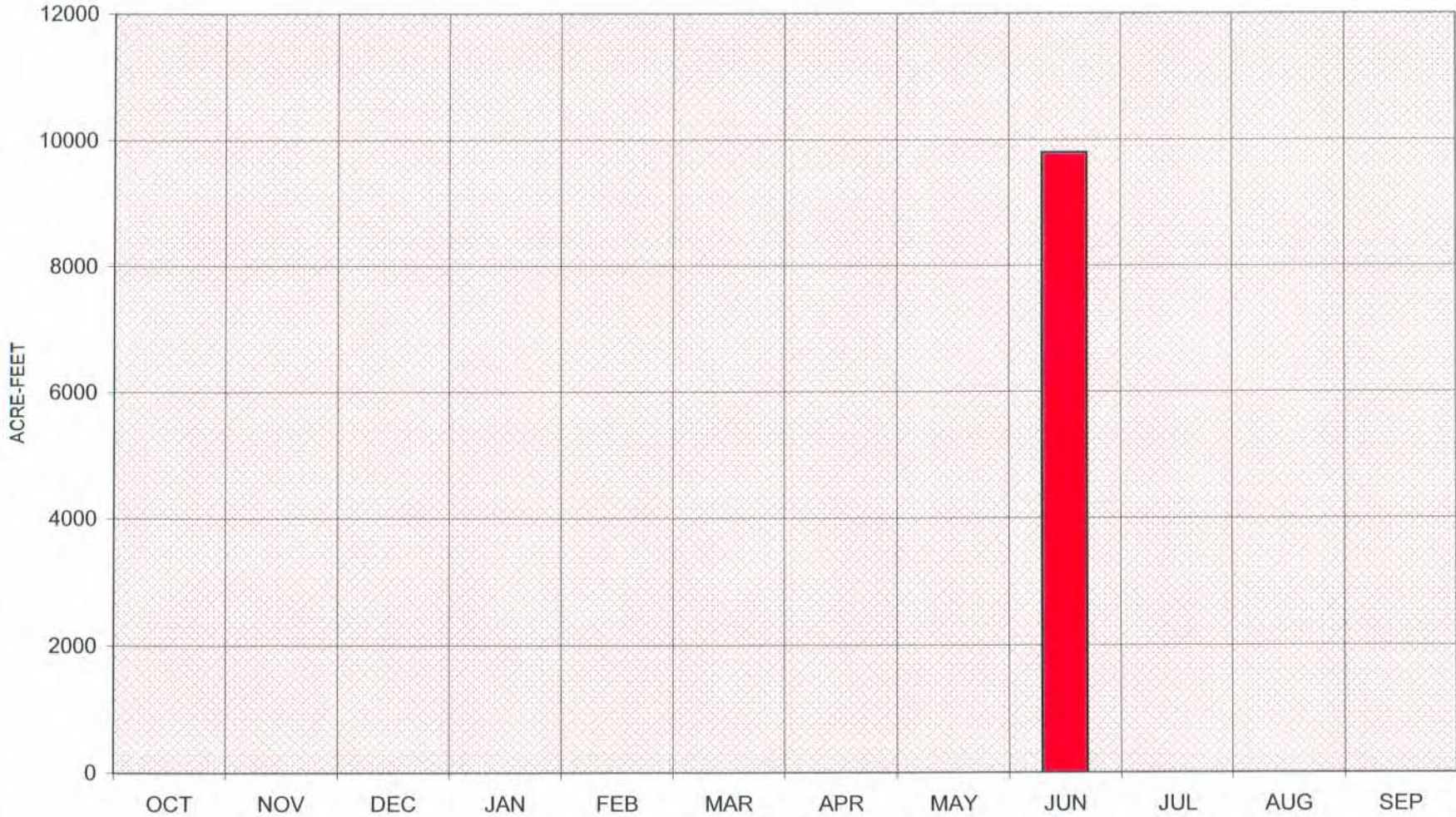
FRYPAN RIVER NEAR THOMASVILLE WATER YEAR 2003



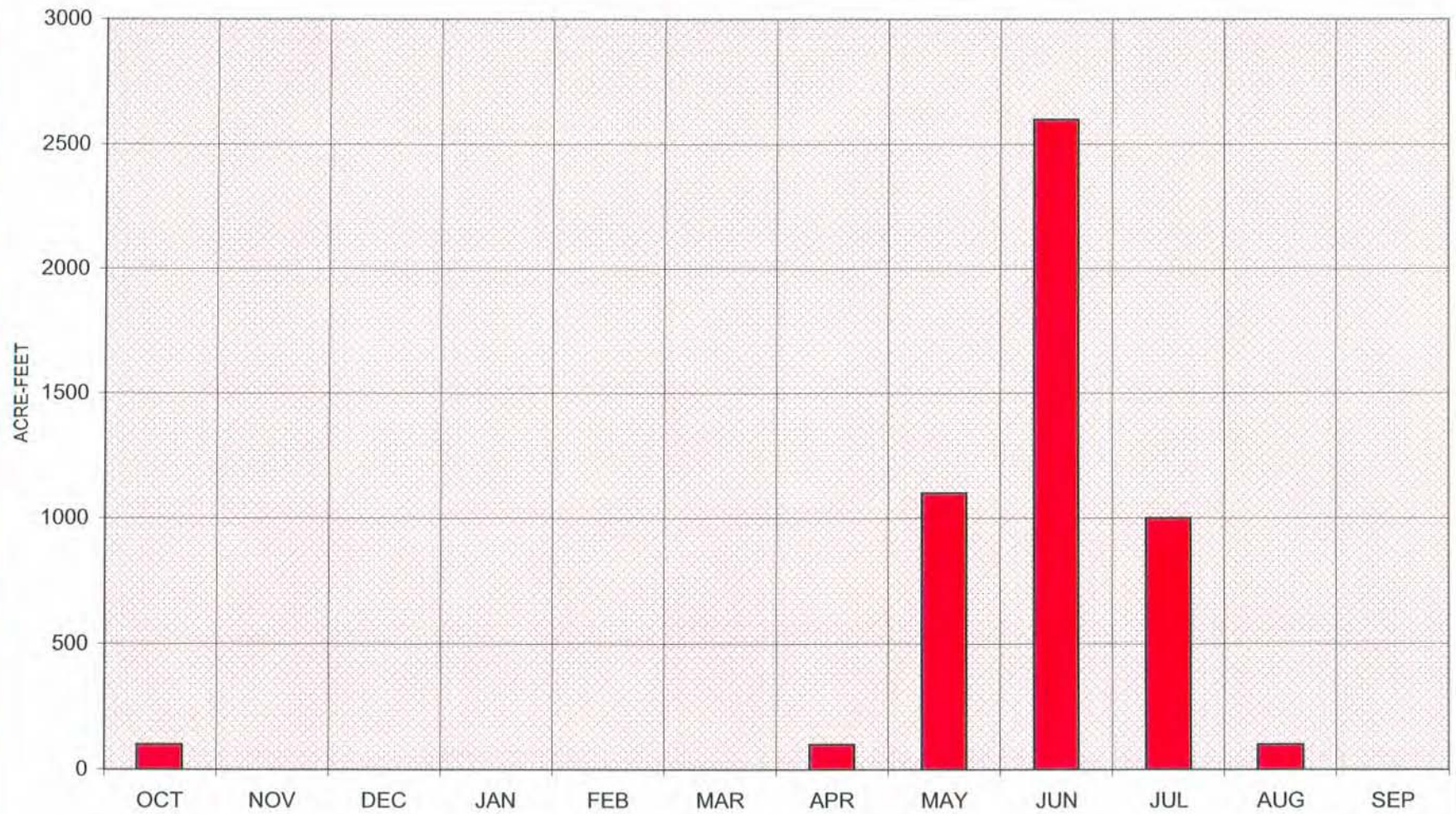
BOUSTEAD TUNNEL IMPORTS WATER YEAR 2003



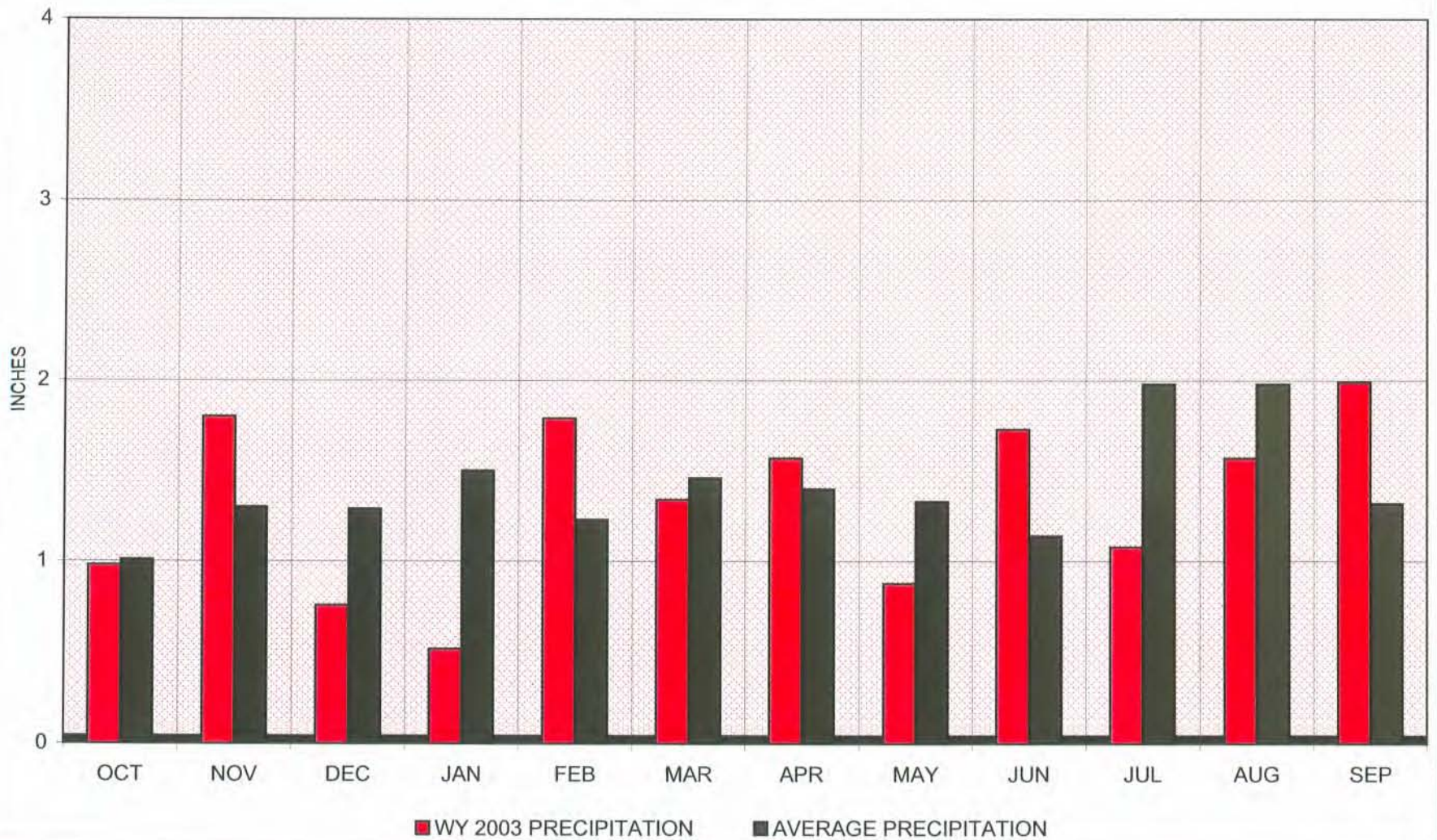
HOMESTAKE TUNNEL IMPORTS WATER YEAR 2003



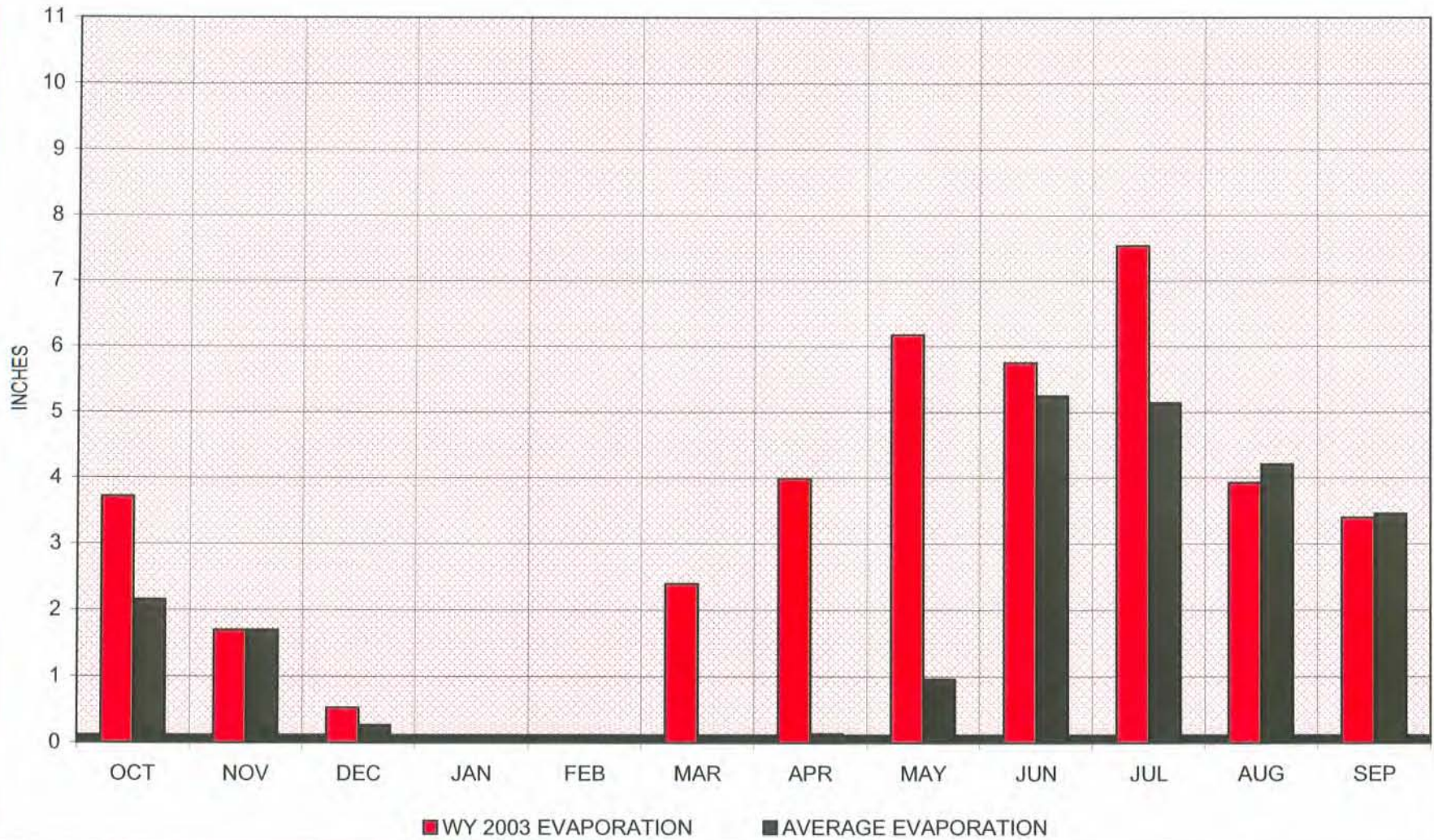
BUSK-IVANHOE TUNNEL IMPORTS WATER YEAR 2003



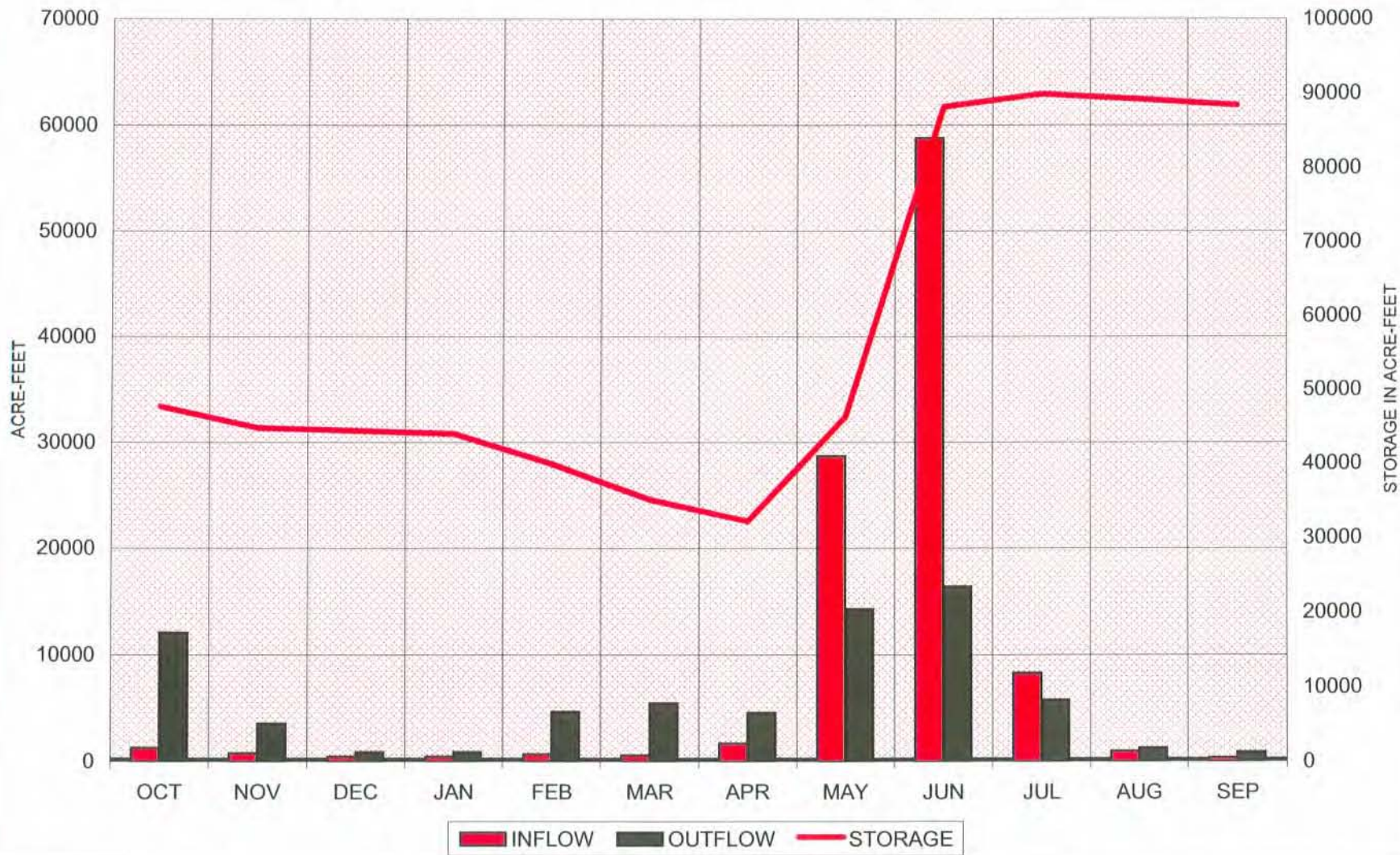
MONTHLY PRECIPITATION AT SUGAR LOAF DAM WATER YEAR 2003



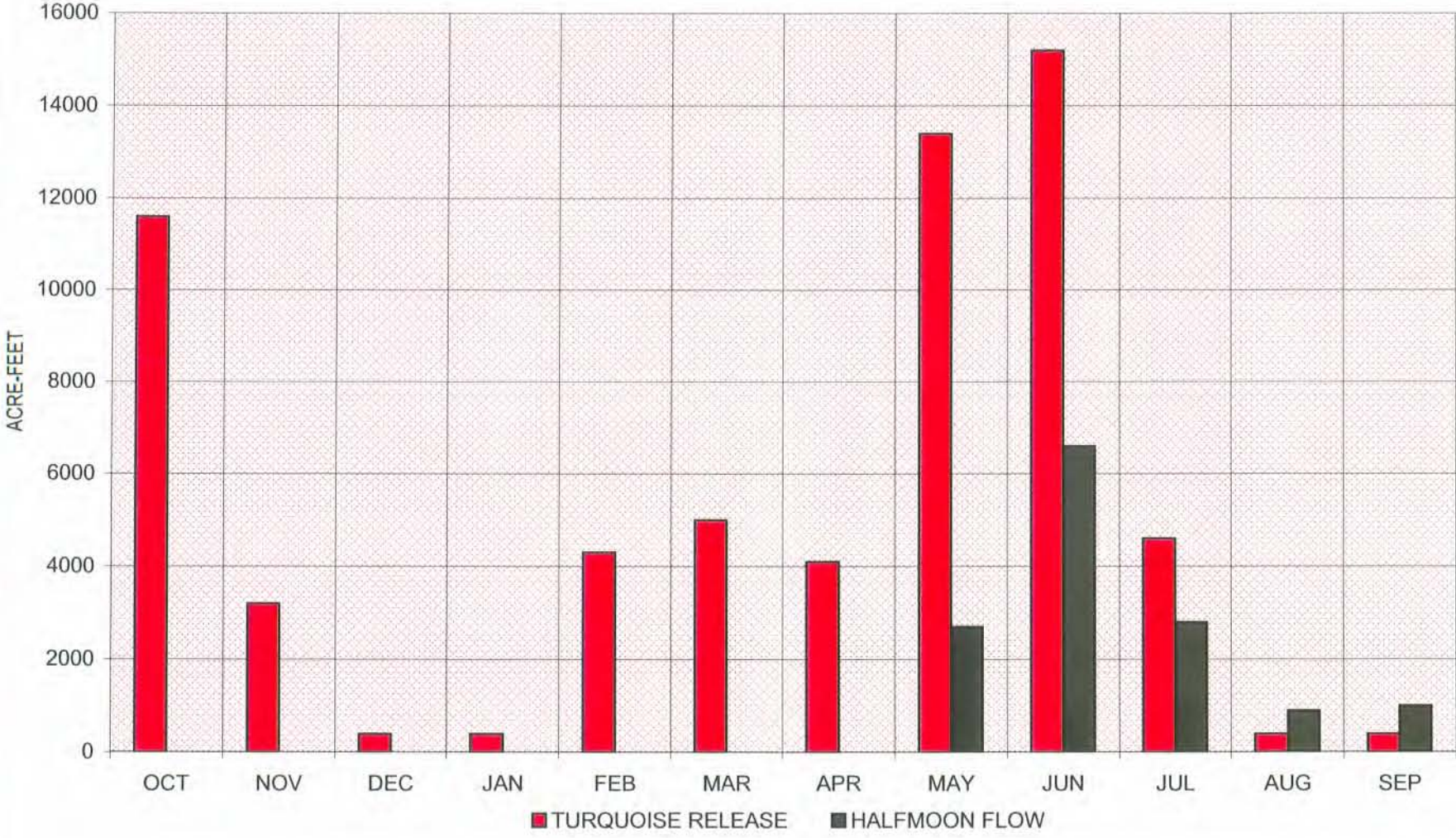
MONTHLY EVAPORATION AT SUGARLOAF DAM WATER YEAR 2003



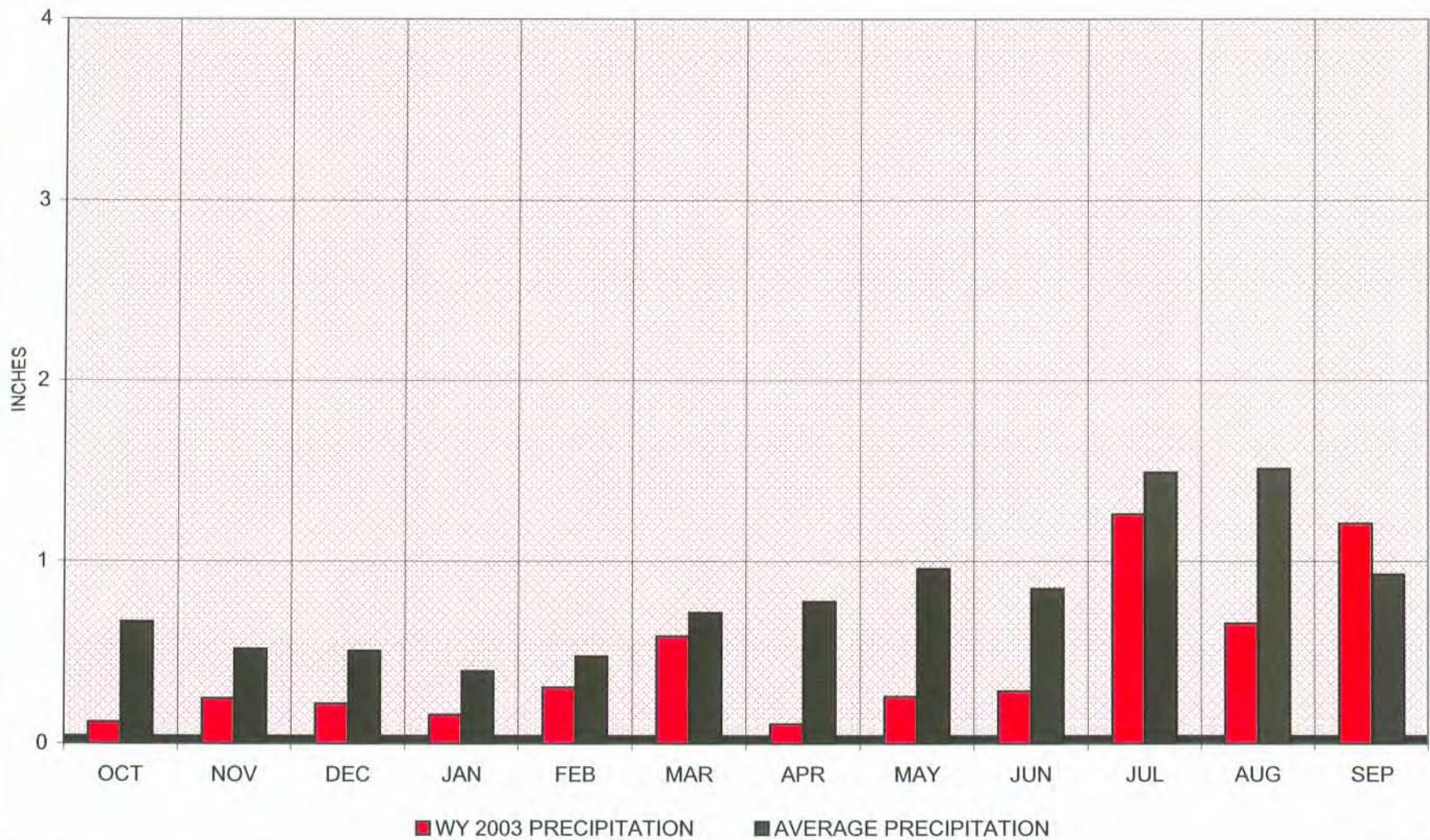
TURQUOISE LAKE WATER YEAR 2003 ACTUAL OPERATIONS



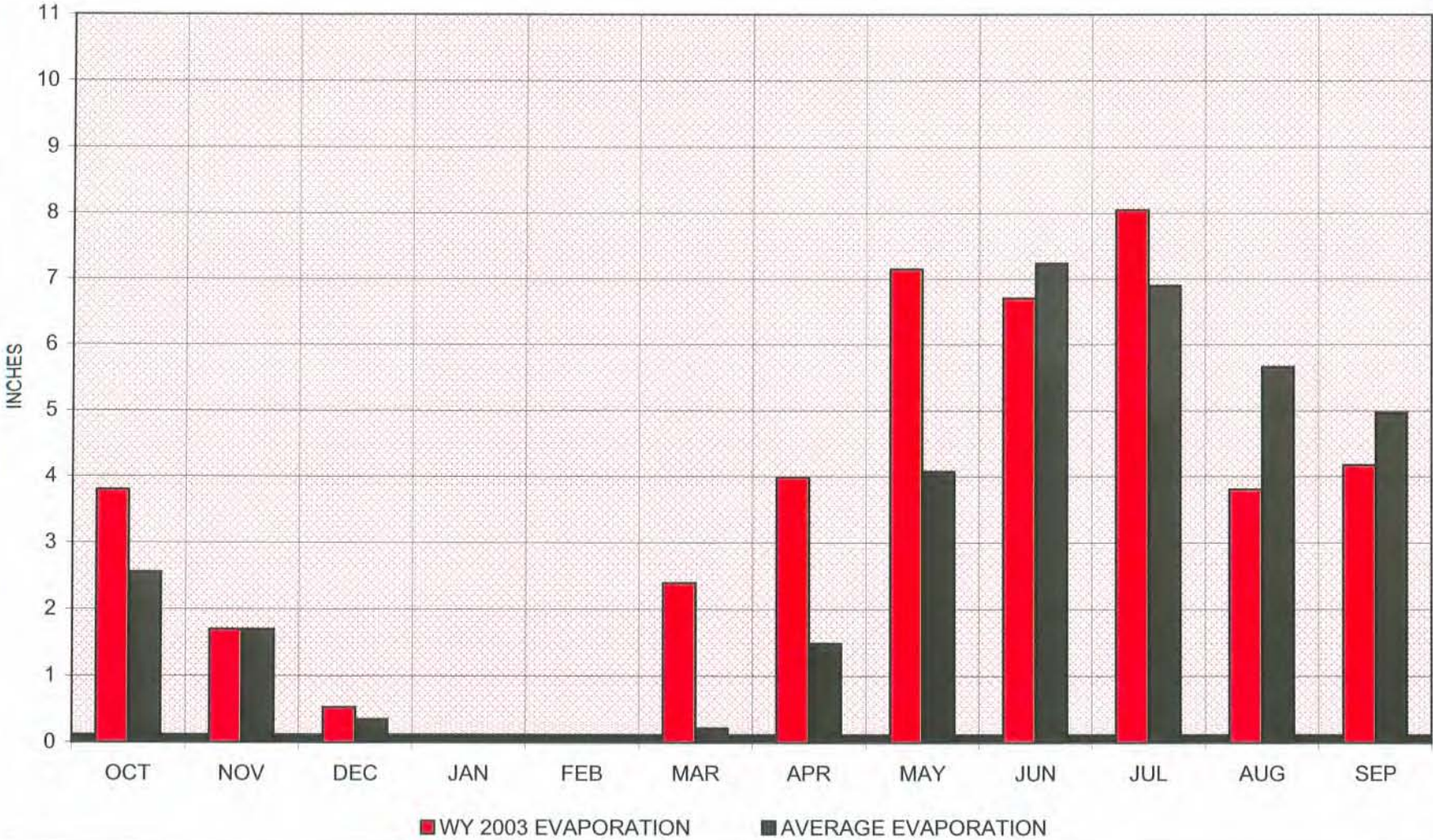
MT. ELBERT CONDUIT FLOW WATER YEAR 2003 ACTUAL OPERATIONS



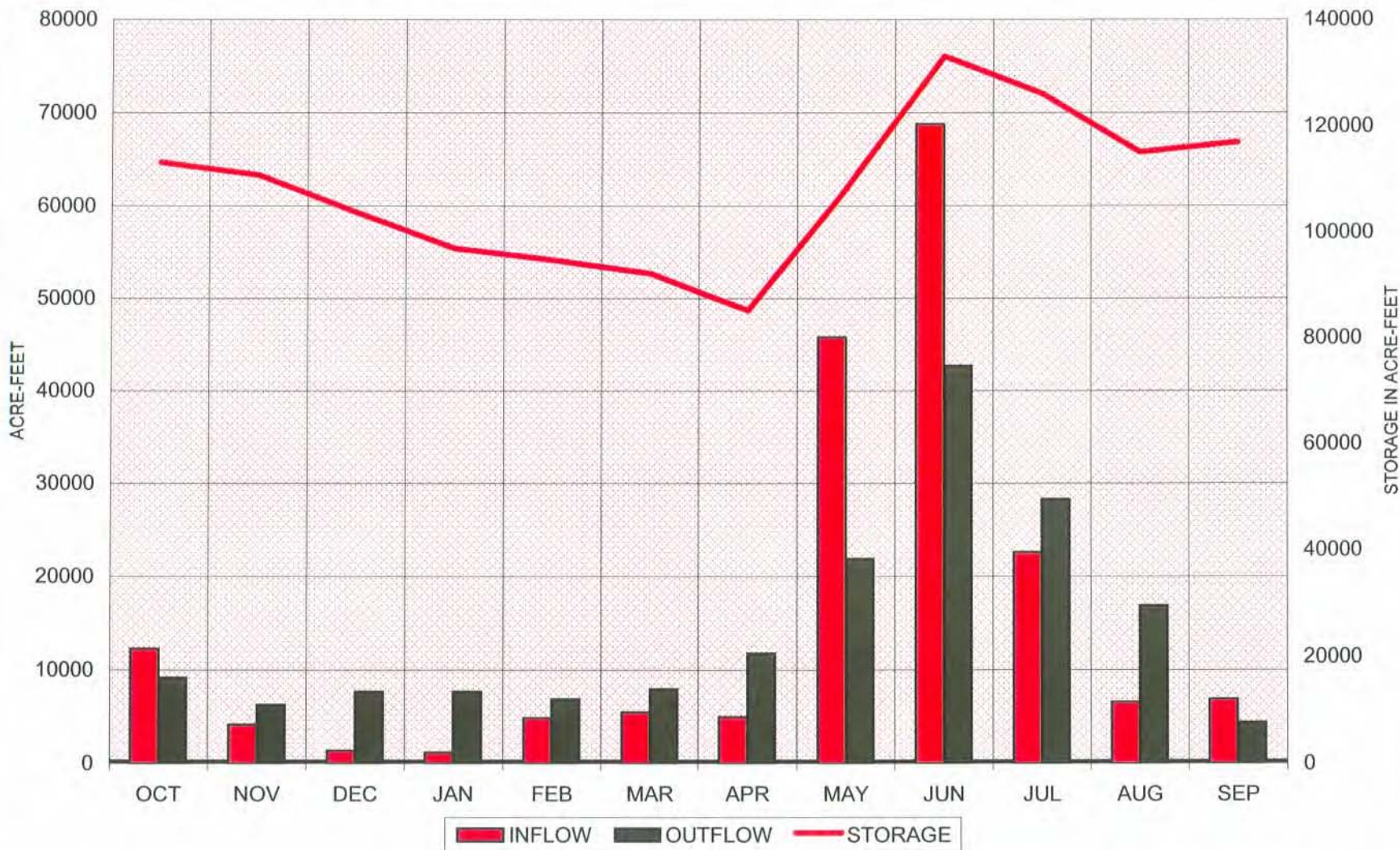
MONTHLY PRECIPITATION AT TWIN LAKES DAM WATER YEAR 2003



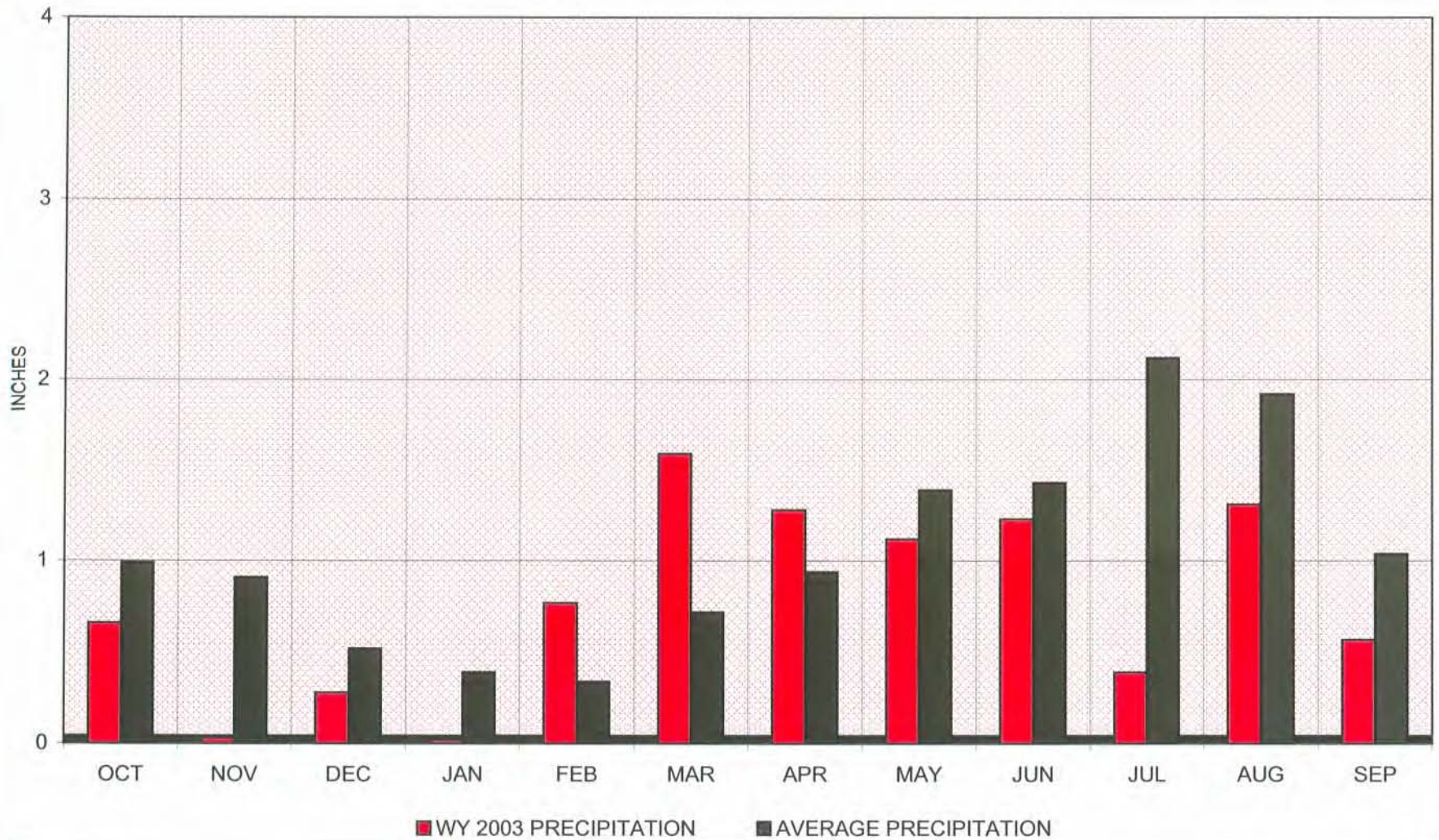
MONTHLY EVAPORATION AT TWIN LAKES DAM WATER YEAR 2003



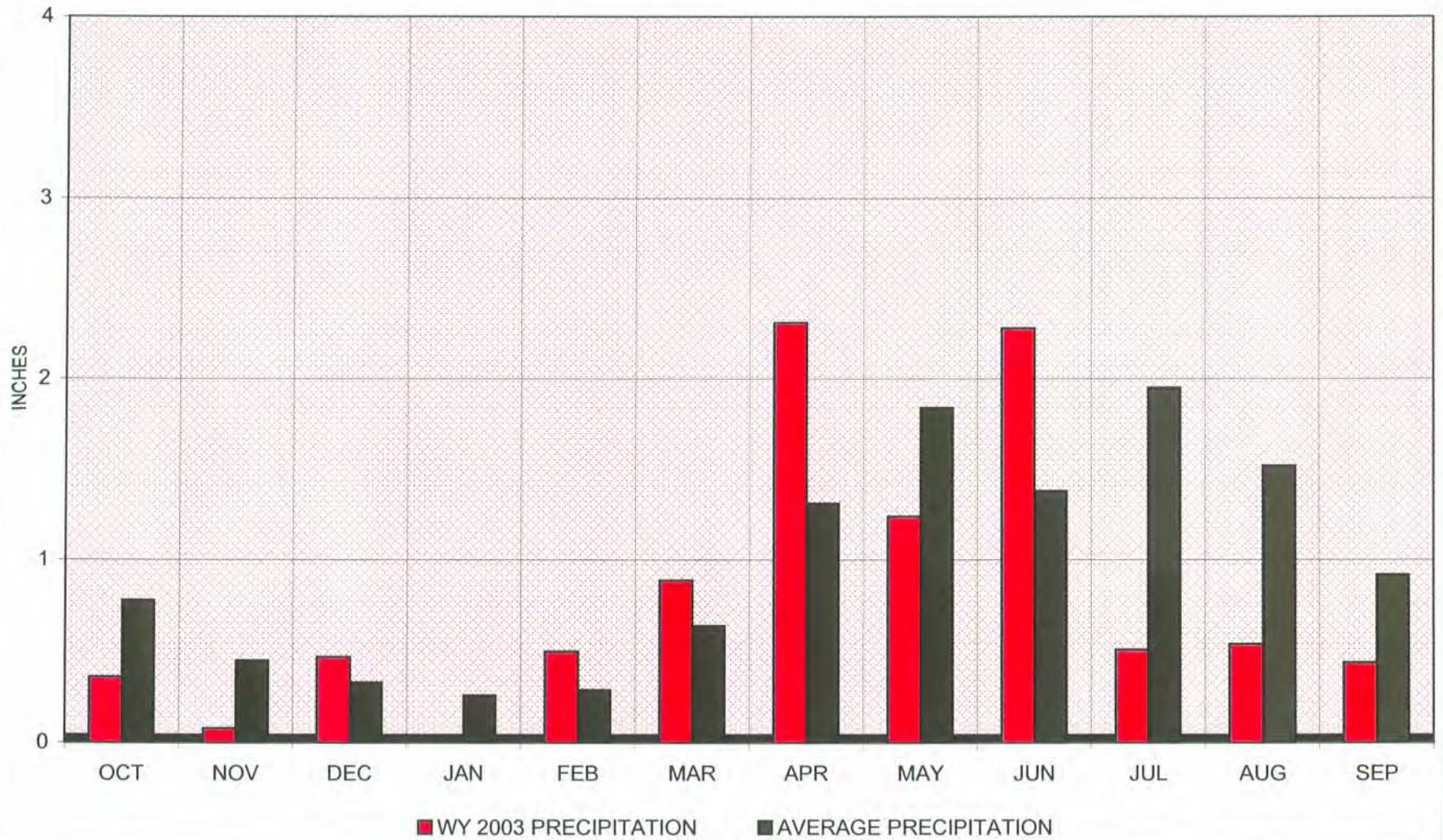
TWIN LAKES WATER YEAR 2003 ACTUAL OPERATIONS



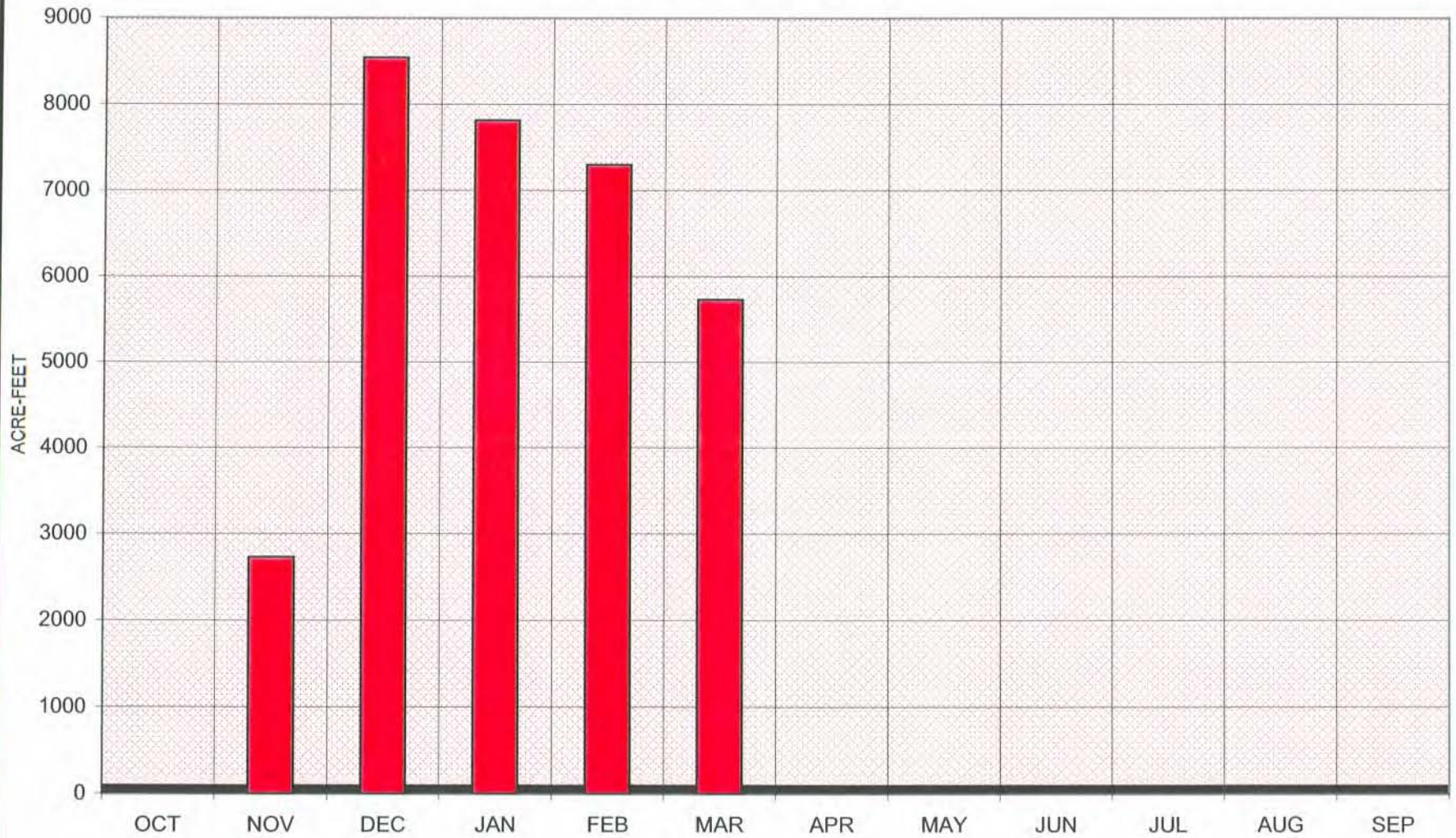
MONTHLY PRECIPITATION AT PUEBLO DAM WATER YEAR 2003



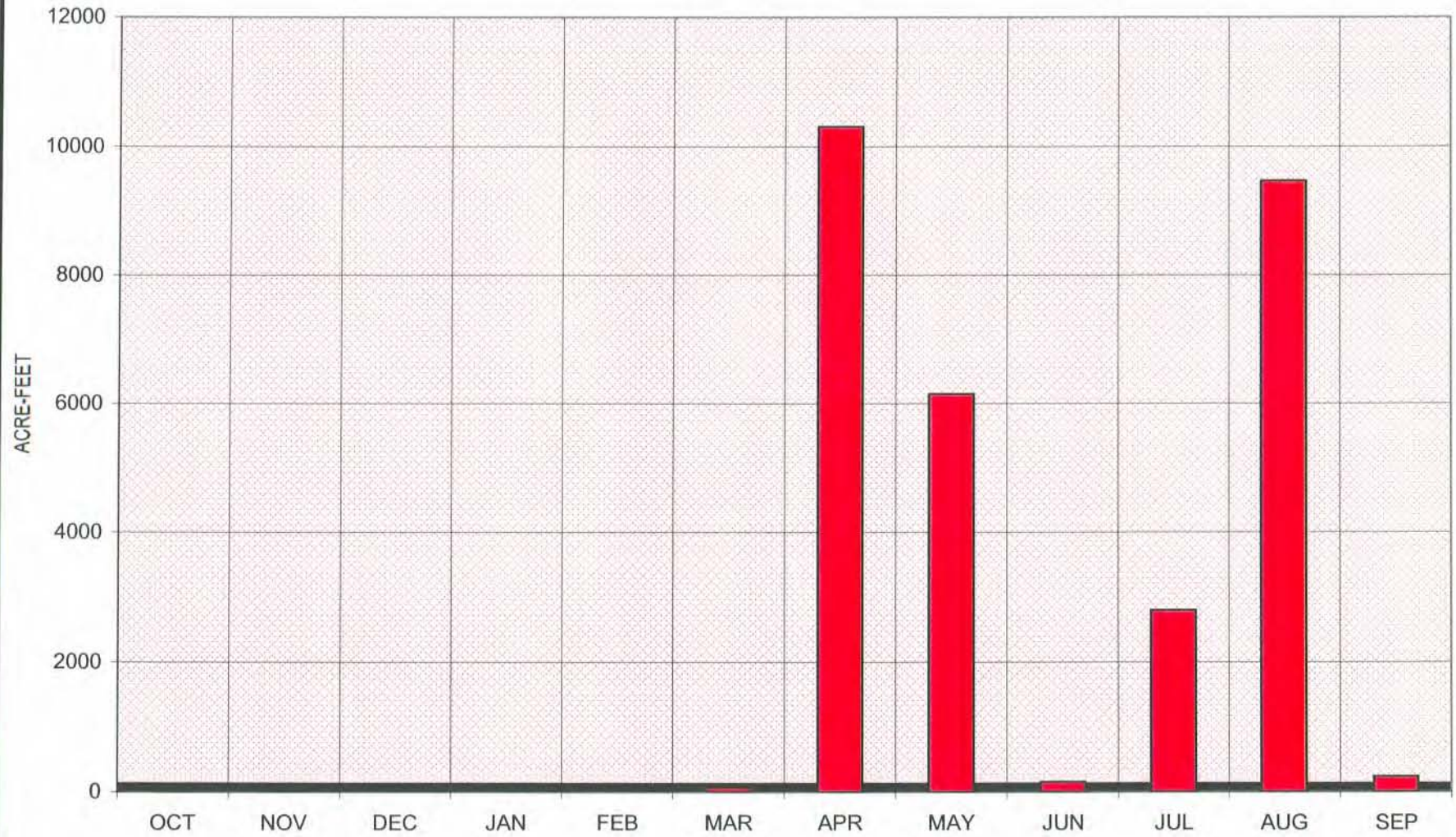
MONTHLY PRECIPITATION AT ROCKY FORD WATER YEAR 2003



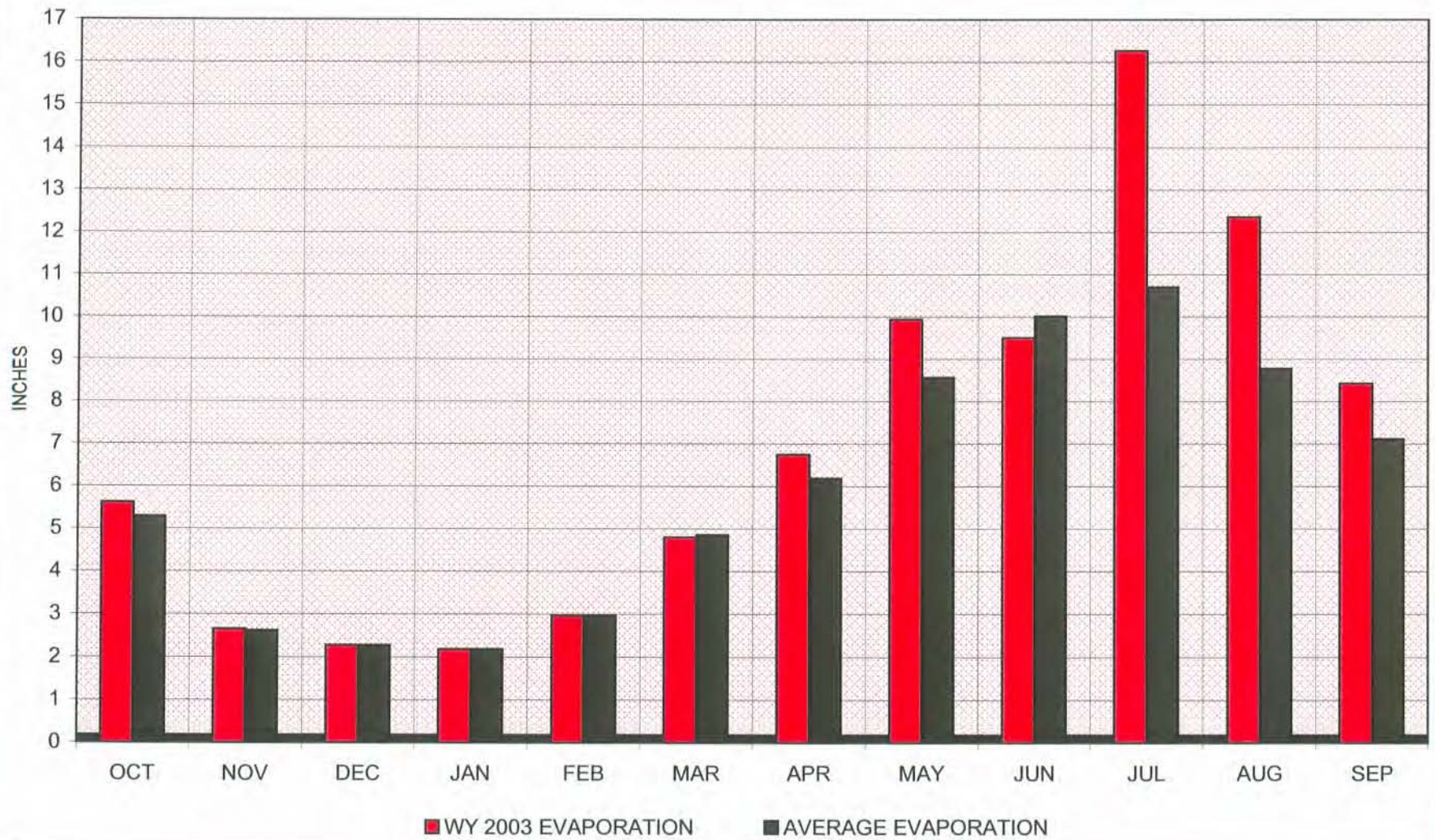
PUEBLO RESERVOIR WINTER WATER STORAGE WATER YEAR 2003



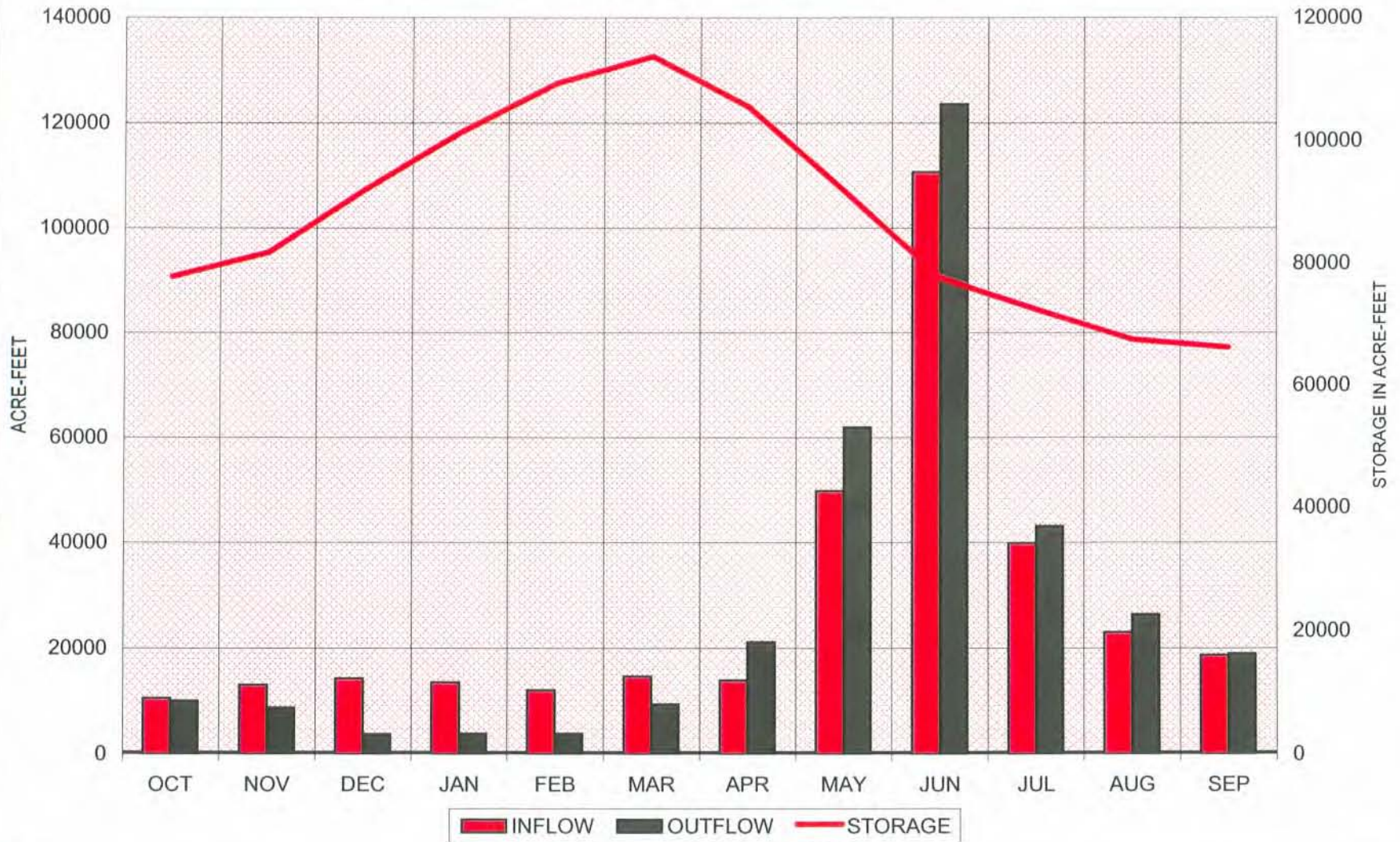
PUEBLO RESERVOIR WINTER WATER RELEASES WATER YEAR 2003



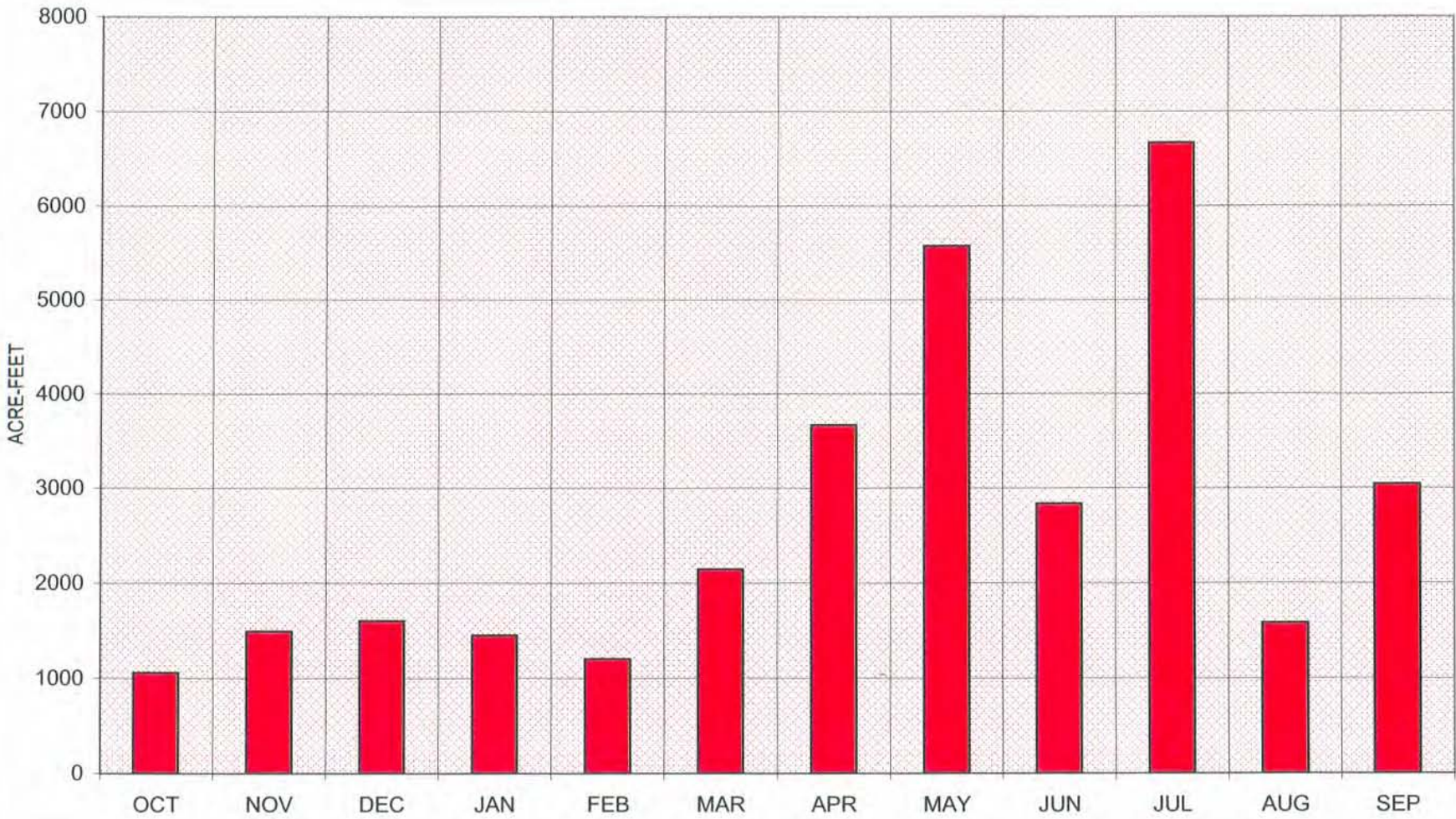
MONTHLY EVAPORATION AT PUEBLO DAM WATER YEAR 2003



PUEBLO RESERVOIR WATER YEAR 2003 ACTUAL OPERATIONS



PUEBLO RESERVOIR PROJECT WATER RELEASES WATER YEAR 2003



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:

<u>Month</u>	<u>Grizzly Diversion</u>	<u>Roaring Fork Diversion</u>
	(ft ³ /s)	(ft ³ /s)
October	3.0	4.0
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	1.0
June	2.0	1.5
July	2.0	1.5
August	3.0	4.0
September	3.0	4.0

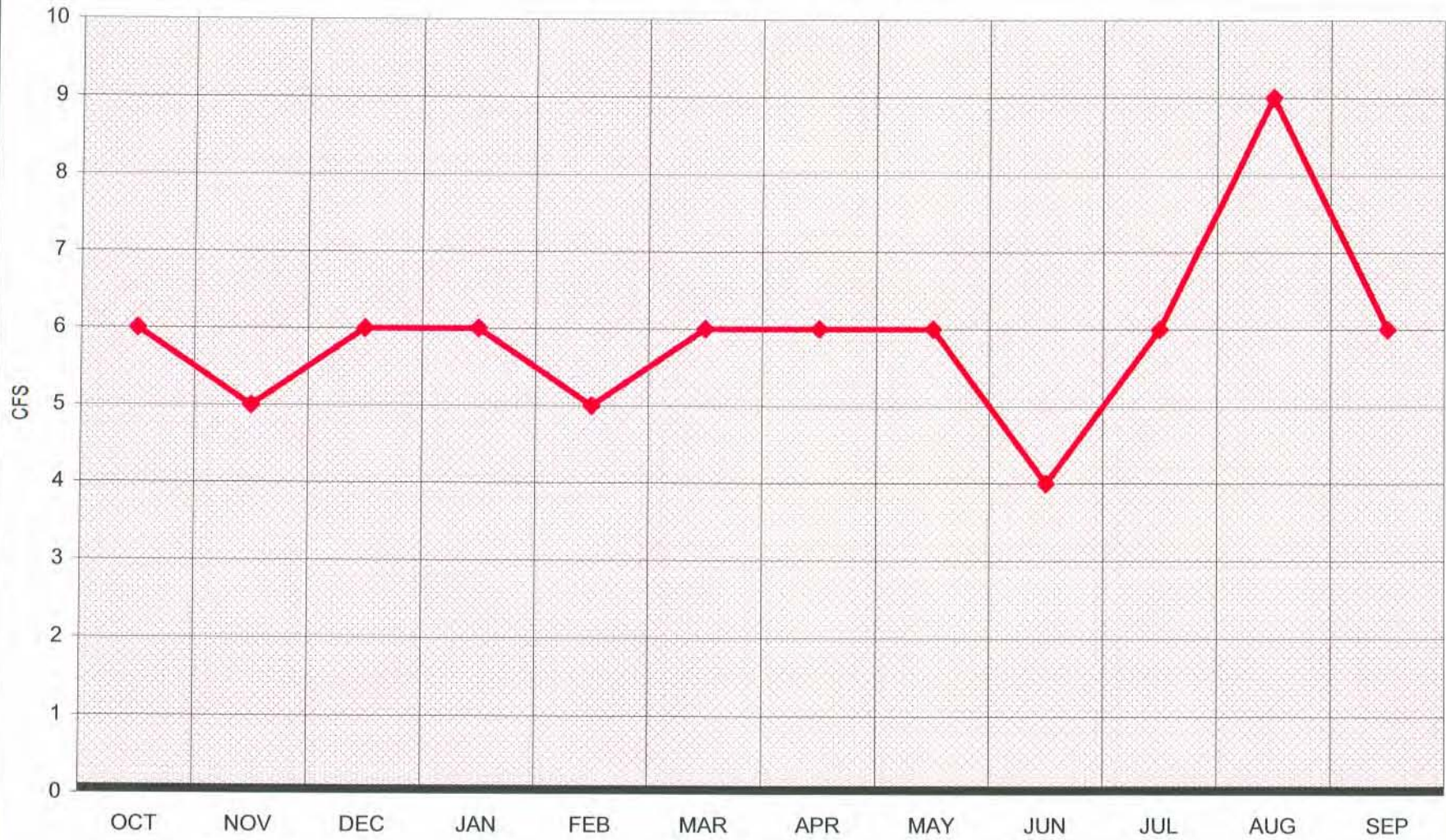
3. At any time the Twin Lakes Reservoir and Canal Company (Company) is bypassing water, in addition to that designated above, it will be assumed that the Company could not have diverted that water and will not receive any credit for exchange in excess of the above amounts.
4. In the event less water than the above amounts is bypassed, only the amount actually bypassed will be credited.
5. The total volume of the release at both gages combined shall not exceed 3,000 acre-feet in any one water year.
6. No credit for exchange will be made on days when there is no documentation of such bypasses.
7. No credit will be given for water bypassed when diversions are called out by the State Engineer.

Twin Lakes Reservoir and Canal Company Exchange
with Fryingpan-Arkansas Project Water
2002-2003
Units = Acre-Feet

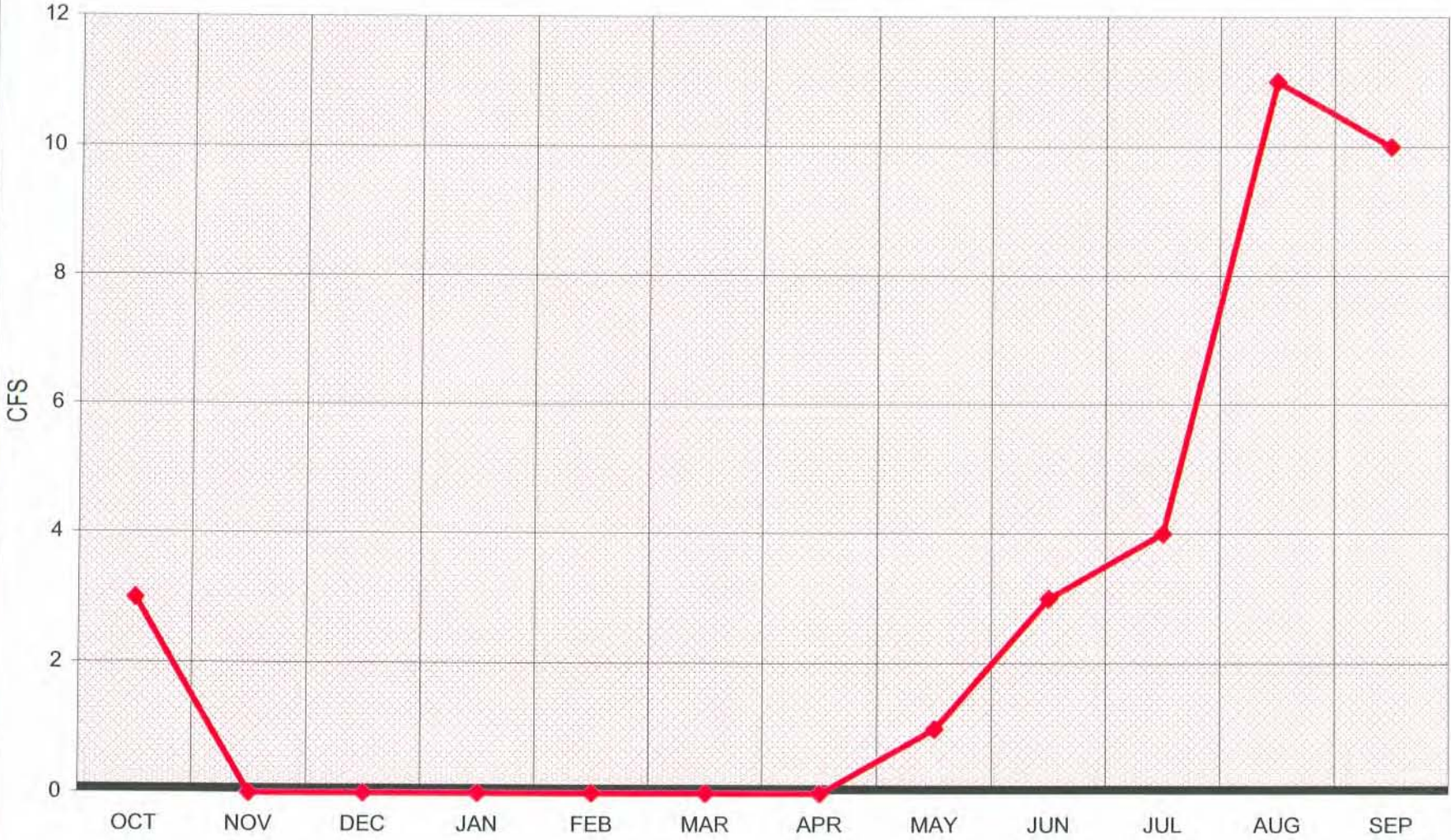
	Lincoln Creek below Grizzly Reservoir (1)	Roaring Fork River above Lost Man Creek (2)	Total (1 + 2) (3)	Twin Lakes storage (3) x 0.99138 (4)
October	149	210	359	356
November	165	0	165	163
December	169	0	169	168
January	171	0	171	170
February	152	0	152	151
March	172	0	172	171
April	166	0	166	164
May	172	27	199	197
June	104	89	193	191
July	123	92	215	213
August	113	150	263	260
September	95	127	222	220
Total	1,751	695	2,446	2,424

⁸ .87% transit loss from the outlet of Twin Lakes Tunnel to Twin Lakes normally taken on all Twin Lakes Reservoir and Canal Company imported water

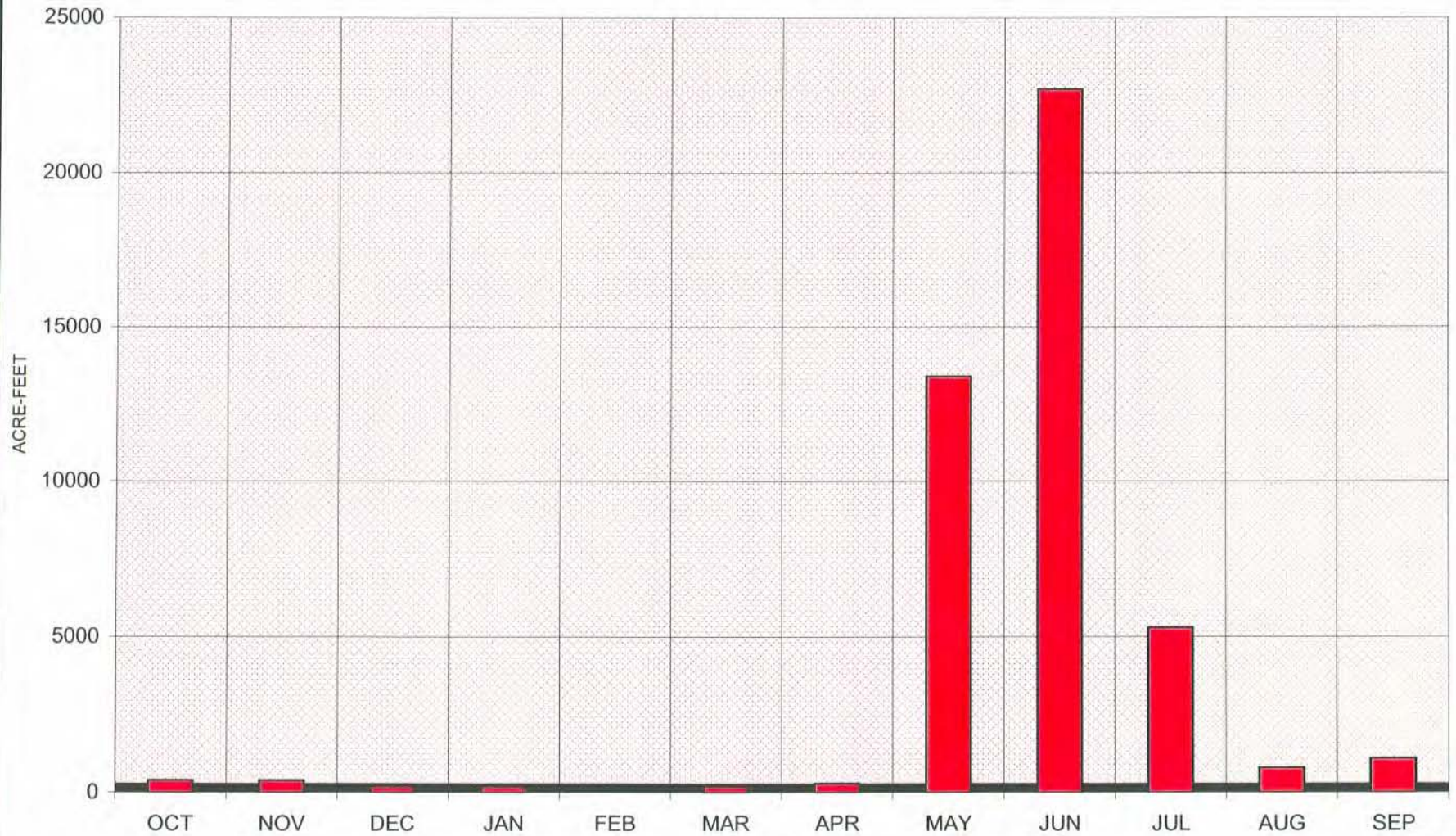
LINCOLN CREEK BELOW GRIZZLY RESERVOIR WATER YEAR 2003



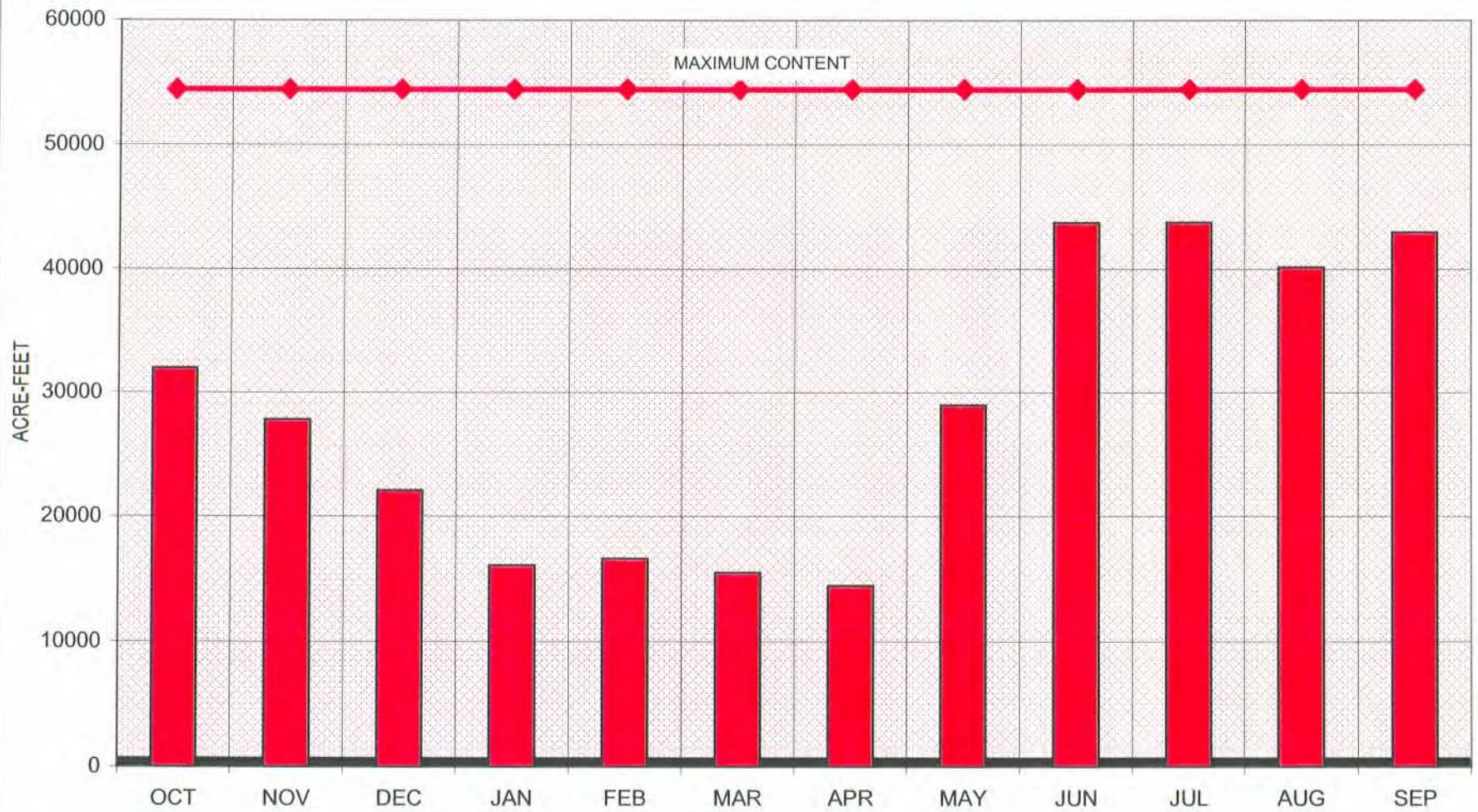
ROARING FORK ABOVE LOST MAN WATER YEAR 2003



TWIN LAKES TUNNEL IMPORTS WATER YEAR 2003



TWIN LAKES CANAL COMPANY STORAGE WATER YEAR 2003



Appendix D (1 of 15)
Carter Creek Feeder Conduit near Norrie, CO
Water Year 2003
Unit: Cubic Feet Per Second
Source: U.S. Bureau of Reclamation

Day	April	MAY	June	July	August	September
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
Total						
Mean						
Max						
Min						
Acre-Feet						

Note: Numbers unavailable, chart malfunctioned.

Appendix D (2 of 15)
 North Fork Fryingpan River Feeder Conduit near Norrie, CO
 Water Year 2003
 Unit: Cubic Feet Per Second
 Source: U.S. Bureau of Reclamation

Day	April	May	June	July	August	September
1			4	4		
2			10	4		
3			9	3		
4			8	2		
5			6	2		
6			6	1		
7			8	1		
8			9	1		
9			9	1		
10			10	1		
11			10	1		
12			9			
13			9			
14			9			
15			9			
16			9			
17			9			
18			9			
19			8			
20			9			
21			8			
22			8			
23			6			
24			5			
25			5			
26			5			
27			5			
28			5			
29			4			
30			4			
31						
Total			224	21		
Mean			7	2		
Max			10	4		
Min			4	1		
Acre-Feet			444	42		

Water year total - 486 acre-feet

Maximum instantaneous peak - 10 cubic feet per second - June 3

Note: All blank spaces: Recorder was not operated. No water was diverted.

Appendix D (3 of 15)
Mormon Creek Feeder Conduit near Norrie, CO
Water Year 2003
Unit: Cubic Feet Per Second
Source: U.S. Bureau of Reclamation

Day	April	May	June	July	August	September
1			24	7		
2			8	6		
3			6	7		
4			4	9		
5			1	11		
6				12		
7				14		
8			1	15		
9			1	16		
10			2	19		
11			2	20		
12			2	21		
13			3	22		
14			1	23		
15			1	25		
16			1			
17						
18		23				
19		23				
20		19	1			
21		27				
22		33				
23		40				
24		43	1			
25		47	2			
26		47	2			
27		54	3			
28		23	3			
29		27	5			
30		14	6			
31		21				
Total		441	80	227		
Mean		32	4	15		
Max		54	24	25		
Min		14	1	6		
Acre-Feet		875	159	450		

Water year total - 1,484 acre-feet

Maximum instantaneous peak - 122 cubic feet per second – May 27

Note: All blank spaces: Recorder was not operated. No water was diverted.

Appendix D (4 of 15)
North Cunningham Feeder Conduit near Norrie, CO
Water Year 2003
Unit: Cubic Feet Per Second
Source: U.S. Bureau of Reclamation

Day	April	May	June	July	August	September
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
Total						
Mean						
Max						
Min						
Acre-Feet						

Note: Numbers unavailable, chart malfunctioned.

Appendix D (5 of 15)
 Middle Cunningham Feeder Conduit near Norrie, CO
 Water Year 2003
 Unit: Cubic Feet Per Second
 Source: U.S. Bureau of Reclamation

Day	April	May	June	July	August	September
1			49	2		
2			38	4		
3			36	4		
4			32	3		
5			27	4		
6			24	2		
7			23	2		
8			23	1		
9			27	1		
10			31	1		
11			29			
12			30			
13			33			
14			30			
15			30			
16			27			
17		2	22			
18		9	16			
19		9	16			
20		9	17			
21		11	1			
22		13	11			
23		5	19			
24		16	16			
25		17	2			
26		17				
27		18				
28		18				
29		21				
30		13				
31		45				
Total		223	609	24		
Mean		15	24	2		
Max		45	49	4		
Min		2	1	1		
Acre-Feet		442	1,208	48		

Water year total - 1,698 acre-feet

Maximum instantaneous peak - 70 cubic feet per second – May 31

Note: All blank spaces: Recorder was not operated. No water was diverted.

Appendix D (6 of 15)
 Ivanhoe Creek Feeder Conduit near Norrie, CO
 Water Year 2003
 Unit: Cubic Feet Per Second
 Source: U.S. Bureau of Reclamation

Day	April	May	June	July	August	September
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12			71			
13			81			
14			40			
15			14			
16			12			
17			10			
18			9			
19			8			
20			9			
21			6			
22			5			
23			4			
24			3			
25			2			
26			2			
27			1			
28			1			
29			1			
30						
31						
Total			279			
Mean			16			
Max			81			
Min			1			
Acre-Feet			553			

Water year total - 553 acre-feet

Maximum instantaneous peak - 109 cubic feet per second – June 3

Note: All blank spaces: Recorder was not operated. No water was diverted.

Appendix D (7 of 15)
Lily Pad Creek Feeder Conduit near Norrie, CO
Water Year 2003
Unit: Cubic Feet Per Second
Source: U.S. Bureau of Reclamation

Day	April	May	June	July	August	September
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
Total						
Mean						
Max						
Min						
Acre-Feet						

Note: Numbers unavailable, chart malfunctioned.

Appendix D (8 of 15)
 Granite Creek Feeder Conduit near Nome, CO
 Water Year 2003
 Unit: Cubic Feet Per Second
 Source: U.S. Bureau of Reclamation

Day	April	May	June	July	August	September
1				6		
2				6		
3				5		
4				5		
5				4		
6				4		
7				3		
8				3		
9				3		
10				2		
11				2		
12				2		
13				2		
14				1		
15			4	1		
16			17	1		
17			14	1		
18			15	1		
19			14	1		
20			14	1		
21			13	1		
22			12	1		
23			11			
24			10			
25			9			
26			8			
27			8			
28			8			
29			8			
30			7			
31						
Total			172	56		
Mean			11	3		
Max			17	6		
Min			4	1		
Acre-Feet			341	111		

Water year total - 452 acre-feet

Maximum instantaneous peak - 23 cubic feet per second — June 15

Note: All blank spaces: Recorder was not operated. No water was diverted.

Appendix D (9 of 15)
 No Name Creek Feeder Conduit near Norrie, CO
 Water Year 2003
 Unit: Cubic Feet Per Second
 Source: U.S. Bureau of Reclamation

Day	April	May	June	July	August	September
1						
2						
3						
4						
5						
6			27			
7			26			
8			26			
9			31			
10			32			
11			32			
12			27			
13			36			
14			28			
15		3	28			
16		14	25			
17		13	23			
18		12	23			
19		17	21			
20		21	19			
21		31	18			
22		40	13			
23		39	12			
24		34	9			
25		31	7			
26		23	5			
27			4			
28			3			
29			2			
30						
31						
Total		278	477			
Mean		23	20			
Max		40	36			
Min		3	2			
Acre-Feet		551	946			

Water year total - 1,497 acre-feet

Maximum instantaneous peak - 56 cubic feet per second - June 19

Note: All blank spaces: Recorder was not operated. No water was diverted.

Appendix D (10 of 15)
Midway Creek Feeder Conduit near Norrie, CO
Water Year 2003
Unit: Cubic Feet Per Second
Source: U.S. Bureau of Reclamation

Day	April	May	June	July	August	September
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
Total						
Mean						
Max						
Min						
Acre-Feet						

Note: All blank spaces: Recorder was not operated. No water was diverted.

Appendix D (11 of 15)
 Hunter Creek Feeder Conduit near Norrie, CO
 Water Year 2003
 Unit: Cubic Feet Per Second
 Source: U.S. Bureau of Reclamation

Day	April	May	June	July	August	September
1			63	11	5	
2			82	9	6	
3			79	8	4	
4			84	7	6	
5			85	6	4	
6			69	4		
7			76	4		
8			76	4		
9			61	4		
10			67	1		
11			60	2		
12			62			
13			55			
14		1	55			
15		1	52			
16		17	43			
17		35	41			
18		31	39			
19		25	40			
20		29	37			
21		51	38			
22		72	30			
23		76	29			
24		76	28			
25		73	21			
26		19	21			
27		37	19			
28		25	16			
29		23	14			
30		51	13			
31		51				
Total		693	1,455	60	25	
Mean		39	49	5	5	
Max		76	85	11	6	
Min		1	13	1	4	
Acre-Feet		1,375	2,886	119	50	

Water year total - 4,430 acre-feet

Maximum instantaneous peak - 123 cubic feet per second – May 23

Note: All blank spaces: Recorder was not operated. No water was diverted.

Appendix D (12 of 15)
 Sawyer Creek Feeder Conduit near Norrie, CO
 Water Year 2003
 Unit: Cubic Feet Per Second
 Source: U.S. Bureau of Reclamation

Day	April	May	June	July	August	September
1			1			
2			1			
3		5	1			
4		32				
5		29				
6		29				
7		30				
8		26				
9		24				
10		21				
11		9				
12		5				
13		5				
14		4				
15		4				
16		6				
17		21				
18		19				
19		20				
20		17				
21		17				
22		16				
23						
24						
25		2				
26		1				
27		4				
28		4				
29		3				
30		3				
31		2				
Total		358	3			
Mean		13	1			
Max		32	1			
Min		1	1			
Acre-Feet		710	6			

Water year total — 716 acre-feet

Maximum instantaneous peak - 36 cubic feet per second — May 4

Note: All blank spaces: Recorder was not operated. No water was diverted.

Appendix D (13 of 15)
 Chapman Gulch Feeder Conduit near Norrie, CO
 Water Year 2003
 Unit: Cubic Feet Per Second
 Source: U.S. Bureau of Reclamation

Day	April	May	June	July	August	September
1			141	82		
2			116	79		
3			108	74		
4			103	67		
5			81	61		
6			180	54		
7			174	47		
8			179	42		
9			216	39		
10			227	33		
11			276	29		
12			256	27		
13			275	24		
14		3	229	21		
15		22	290	18		
16		43	246	18		
17		98	195	15		
18		103	201	13		
19		80	198	12		
20		96	188	5		
21		114	175			
22		164	167			
23		221	156			
24		224	173			
25		207	122			
26		194	114			
27		194	110			
28		129	106			
29		168	103			
30		150	94			
31		142				
Total		2,352	5,199	760		
Mean		131	173	38		
Max		224	290	82		
Min		3	81	5		
Acre-Feet		4,665	10,312	1,507		

Water year total - 16,484 acre-feet

Maximum instantaneous peak - 382 cubic feet per second – June 11

Note: All blank spaces: Recorder was not operated. No water was diverted.

Appendix D (14 of 15)
 South Fork Fryingpan River Feeder Conduit near Norrie, CO
 Water Year 2003
 Unit: Cubic Feet Per Second
 Source: U.S. Bureau of Reclamation

Day	April	May	June	July	August	September
1			152			
2			145			
3			122			
4			120			
5			112			
6			90			
7			70			
8			66			
9			72			
10			73			
11			103			
12			103			
13			100			
14			102			
15			93			
16			100			
17			92			
18			87			
19		6	86			
20		29	87			
21		33	87			
22		21				
23		57				
24		76				
25		84				
26		86				
27		87				
28		107				
29		129				
30		150				
31		160				
Total		1,025	2,062			
Mean		79	98			
Max		160	152			
Min		6	66			
Acre-Feet		2,033	4,090			

Water year total - 6,123 acre-feet

Maximum instantaneous peak - 212 cubic feet per second – May 30

Note: All blank spaces: Recorder was not operated. No water was diverted.

Appendix D (15 of 15)
 Fryingpan River Feeder Conduit near Norrie, CO
 Water Year 2003
 Unit: Cubic Feet Per Second
 Source: U.S. Bureau of Reclamation

Day	April	May	June	July	August	September
1			246	84		
2			202	84		
3			189	82		
4			177	78		
5			148	74		
6			119	56		
7			111	42		
8			106	39		
9			129	36		
10			144	26		
11			153	16		
12			156	14		
13		1	164	12		
14			136	3		
15		33	142			
16		40	137			
17		67	120			
18		82	122			
19		73	115			
20		74	113			
21		85	110			
22		111	111			
23		134	107			
24		154	100			
25		160	90			
26		160	76			
27		188	74	2		
28		216	62			
29		244	55			
30		251	61			
31		247				
Total		2,320	3,775	648		
Mean		129	126	43		
Max		251	246	84		
Min		1	55	2		
Acre-Feet		4,602	7,488	1,285		

Water year total - 13,375 acre-feet

Maximum instantaneous peak - 301 cubic feet per second – May 31

Note: All blank spaces: Recorder was not operated. No water was diverted.

OPERATING PRINCIPLES
FRYINGPAN-ARKANSAS PROJECT

ADOPTED BY THE STATE OF COLORADO

APRIL 30, 1959

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

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

U. S. GOVERNMENT PRINTING OFFICE
WASHINGTON: 1961

H. RES. 91

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

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

Attest:

Ralph R. Roberts, Clerk.

OPERATING PRINCIPLES, FRYINGPAN-ARKANSAS PROJECT

ADOPTED BY THE STATE OF COLORADO, APRIL 30, 1959

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

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

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

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

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

2. The Ruedi Reservoir shall be constructed and maintained on the Fryingpan River above the town of Basalt with an active capacity of not less than 100,000 acre-feet. In addition thereto and in order to offset adverse streamflow conditions on the Roaring Fork River above the town of Aspen which might occur as a result of the project enlargement of the Twin Lakes Reservoir, the Ashcroft Reservoir on Castle Creek, or some reservoir in lieu thereof, shall be constructed on the Roaring Fork drainage above Aspen to a capacity of approximately 5,000 acre-feet: Providing, However, That the Ashcroft Reservoir shall be constructed only if the Secretary of the Interior after appropriate study shall determine that its benefits exceed the costs: And providing further, That no part of the construction, operation, or maintenance of said Ashcroft Reservoir shall be chargeable to the Fryingpan-Arkansas project.
All of such stored water shall be released under the conditions and limitations hereinafter set forth.
3. The receipts from the sale of water from Ruedi Reservoir, as permitted in paragraph 6(b) hereof, shall be applied solely to the operation and maintenance costs and to those reimbursable construction costs of said reservoir which exceed \$7,600,000. The cost of perpetual operation and maintenance of the Ruedi Reservoir shall be borne by users of project water and users of water stored in Ruedi Reservoir in such proportion as may be determined by the Secretary of the Interior.
4. The inclusion of the Ruedi Reservoir in the project shall not preclude the construction of any other replacement or regulatory reservoirs on the Colorado River or its tributaries above Cameo gaging station.
5. The Ruedi Reservoir shall be completed and in operation before any water is diverted to eastern Colorado by means of the project.
6. (a) The replacement capacity of Ruedi Reservoir, and any reservoir constructed in addition thereto, is that portion of the total reservoir capacity required to permit project diversions at times when such diversions could not otherwise be made because of simultaneous demands of senior diversions in western Colorado existing at the time of the adoption of these operating principles, and shall be so operated to accomplish this purpose. Water stored in such capacity shall be released by the United States, upon the request of the Colorado State engineer, to the extent that water would have been available to said decreed rights except for stream depletion resulting from diversions by this project to the Arkansas Valley.
(b) The regulatory capacity of Ruedi Reservoir, and any reservoir constructed in addition thereto, is that portion of the total reservoir capacity not needed for replacement purposes. Water stored in such category may be sold or leased by the United States to water users in Colorado for any purpose recognized by the laws of the United States: Provided, That the sale of water for use outside the natural basin of the Colorado River can only be made with the consent of the Colorado River Water Conservation District. Charges for the use of such water shall be established by the Secretary of

the Interior by appropriate contract in accordance with the payment ability of such water users.

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

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

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

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

- (1) That the demand on the waters available under such decrees shall be allocated in the following sequence:
 - (a) For diversion to the Arkansas Valley through the collection system and the facilities of the Fryingpan-Arkansas project in an amount not exceeding an aggregate of 120,000 acre-feet of water in any year, but not to exceed a total aggregate of 2,352,800 acre-feet in any period of 34 consecutive years reckoned in continuing progressive series starting with the first full year of diversions, both limitations herein being exclusive of Roaring Fork exchanges as provided in (c) below, and exclusive of diversions for the Busk-Ivanhoe decree; and with the further and absolute limitation that in order to protect existing and future beneficial uses of water in Western Colorado, including recreational and fishing values, the State engineer shall so regulate the transmountain diversions above referred to, to the end that no diversions shall be made which will reduce the remaining aggregate streamflows to less than either of the following minimum standards:

- (i) The Fryingpan collection system at the points of diversion collectively, exclusive of Lime Creek: 15 cfs October 1 through March 31; 30 cfs April 1 through September 30.
- (ii) Near Norrie (immediately below the junction of North Fork and Fryingpan River): 30 cfs October 1 through March 31; 100 cfs April 1 through April 30; 150 cfs May 1 through May 31; 200 cfs June 1 through June 30; 100 cfs July 1 through July 31; 75 cfs August 1 through August 31; 65 cfs September 1 through September 30.

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

- (b) For storage in Ruedi Reservoir to the extent of its actual capacity, which is to be not less than 100,000 acre-feet.
- (c) For 3,000 acre-feet annually, to the extent that it is available in excess of (a) and (b) above, or such part thereof as may be required, to be delivered to the Twin Lakes Reservoir and Canal Company in exchange for equivalent releases from the headwaters of the Roaring Fork River which would otherwise be diverted through such Twin Lakes Reservoir and Canal Company collection and diversion system.
- (d) For any other beneficial use in western Colorado in accordance with court decree, but not herein contemplated.

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

- 10. For the protection of recreational values, including fishing, on the Fryingpan River below Ruedi Reservoir, releases of water from said reservoir, not to exceed the stream inflow, shall be made so that the streamflow immediately below the junction of the Fryingpan River and Rocky Fork shall not be reduced below 39 cfs from November 1 to April 30, and 110 cfs from May 1 to October 30, or as actual experience or court decree hereafter dictate.
- 11. An appropriate written contract may be made whereby Twin Lakes Reservoir and Canal Company shall refrain from diverting water whenever the natural flow of the Roaring Fork River and its tributaries shall be only sufficient to maintain a flow equal to or less than that required to maintain the recommended average flows in the Roaring Fork River immediately above its confluence with Difficult

Creek in a quantity proportionate to the respective natural flow of the Roaring Fork River. The recommended average flows above mentioned are flows in quantities equal to those recommended as a minimum immediately above its confluence with Difficult Creek according to the following schedule submitted by the United States Fish and Wildlife Service and the Colorado Game and Fish Commission:

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

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

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

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

12. All lands acquired and held for project construction and operation and water surfaces of project reservoirs will be open to the public for recreational purposes, excepting those areas reserved by the operating agency.
13. The project will be operated in such a manner that those in eastern Colorado using project water imported from the Colorado River Basin for domestic purposes shall have preference over those claiming or using water for any other purpose.

14. The project is to be operated in such a manner as to secure the greatest benefit from the use and reuse of imported project waters within project boundaries in the State of Colorado
15. Any and all benefits and rights of western Colorado water users in and to water stored in Green Mountain Reservoir, as described and defined in Senate Document 80, 75th Congress, 1st session, shall not be impaired or diminished by this project.
16. The project, its operation, maintenance, and use shall be subject to the provisions of the Upper Colorado River Basin Compact of October 11, 1948 (Public Law 37, 81st Congress, 1st session), and the Colorado River Compact of November 24, 1922 (House Document 605, 67th Congress, 4th session).
17. The Colorado River Water Conservation District of the State of Colorado shall acquire title to storage of water in Ruedi Reservoir and any reservoir constructed in addition thereto, by appropriate proceedings in the courts of the State of Colorado. The Southeastern Colorado Water Conservancy District of the State of Colorado shall likewise acquire title to the water required by the project for diversion to the Arkansas Valley. The Secretary of the Interior shall at any time after the authorization of the project have the option to obtain or require the transfer to the United States of any and all rights initiated or acquired by appropriation as herein set forth: Provided, however, That the rights so taken shall be subject to a beneficial use of such water as may be provided in the repayment contract or contracts, and subject to all the operating principles herein set forth.
18. No transmountain diversion of water shall ever be made through the collection and diversion system of the Fryingpan-Arkansas project in excess of the quantitative limitations and conditions established by this document: Provided, however, That when under the laws of the State of Colorado, there may be additional water available for such collection and diversion which is not at the time of diversion required for beneficial use in western Colorado or for filling interstate water compact agreements, then such water may be collected and diverted for beneficial use in the Arkansas Valley: Provided further, That such additional diversion shall only be made with the mutual consent of each of the following agencies of the State of Colorado, to wit: the Colorado Water Conservation Board, the Southwestern Water Conservation District, the Colorado River Water Conservation District, and the Southeastern Colorado Water Conservancy District.
19. To assure project operation in conformity with the operating principle heretofore stated, to provide a means for the collection and interchange of information, and to provide a method for the continued study of project operations to the end that, if the stated operating principles may be improved upon, recommendations for changes may be made to the contracting parties, a commission shall be created in an appropriate manner to be composed of one representative of the Southeastern Colorado Water Conservancy District, one representative of the Colorado River Water Conservation District, two representatives of the United States, and one representative of the State of Colorado appointed by the Colorado Water Conservation Board after

consultation with the Colorado Game and Fish Commission. The powers of such commission shall be limited to the collection of data, the making of findings of fact, and the suggestion of changes in operating principles.

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

Executed as amended at Denver, Colorado, this 9th day of December 1960.

COLORADO WATER CONSERVATION BOARD

Steve McNichols, Chairman;
Governor, State of Colorado

Attest:

Felix L. Sparks,
Director and Secretary

SOUTHEASTERN COLORADO WATER CONSERVANCY
DISTRICT

By J. Selby Young, President

Attest:

J. G. Shoun,
Secretary

COLORADO RIVER WATER CONSERVATION DISTRICT

By A. Allen Brown, President

Attest:

Philip P. Smith,
Secretary

SOUTHWESTERN WATER CONSERVATION DISTRICT

By Ira E. Kelly, President

Attest:

Archie B. Toner,
Secretary