BUREAU OF RECLAMATION

Annual Operating Plans

Seventy-Second Annual Report Colorado – Big Thompson Project and Western Division Systems Power Operations

Water Year 2023
Summary of Actual Operations

Water Year 2024
Annual Operating Plans

August 9, 2023: Colorado-Big Thompson Project Reservoir Storages

Eastern Colorado Area Office
Missouri Basin Region

US Department of interior

May 2024

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, Native Hawaiians, 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 – The Colorado – Big Thompson Project water storage overview on August 9, 2023. Granby, Carter Lake, Horsetooth and Green Mountain Reservoirs spent nearly eight weeks, from the middle of June through early August 2023, at or near capacity during WY2023 (Bureau of Reclamation).

Seventy-Second Annual Report
Colorado – Big Thompson Project and Western Division Systems Power Operations

Water Year 2023
Summary of Actual Operations

Water Year 2024
Annual Operation Plans

Eastern Colorado area Office
Missouri Basin Region

Prepared by:

Bureau of Reclamation
Technical Service Center
Denver, Colorado

U.S. Department of the Interior **May 2024**

Acronyms and Abbreviations

AF	acre-feet (foot)
AOP	Annual Operating Plan
C-BT	Colorado – Big Thompson Project
ft^3/s	cubic feet per second
CHFC	Charles Hansen Feeder Canal
CROs	Coordinated Reservoir Operations
ECAO	Eastern Colorado Area Office
Fry-Ark	Fryingpan Arkansas River Project
GMR	Green Mountain Reservoir
GWh	gigawatt-hours
HP	horsepower
HUP	Historic Users Pool (Green Mountain Reservoir)
in	inch(s)
KAF	thousand acre-feet
LAP	Loveland Area Power
Northern Water	Northern Colorado Water Conservancy District
Reclamation	Bureau of Reclamation
ShOP	Shoshone Outage Protocol (Green Mountain Reservoir)
SNOTEL	Snow Telemetry
SOP	Standard Operating Procedures
SWE	Snow Water Equivalent
WAPA	Western Area Power Administration
WD System	Western Division System
WY	water year

Contents

Page

Executive Summary ES-1
General Description of the Colorado – Big Thompson Project 1
Collection System and East Slope Colorado-Big Thompson Project 1
Overview 1
Planning and Control 8
Irrigation Requirements 9
East Slope Diversion Operations 10
Flow Requirements Below Project Facilities 10
Annual Operating Plan 12
Green Mountain Reservoir 12
Reservoir Administration 12
Green Mountain Historic Users Pool and the Orchard Mesa Check Case Settlement 13
Reservoir Operation 14
Operational Summary: Water Year (WY) 2023 16
Summary of System-wide Conditions 16
Weather and Inflow Hydrology 16
System Demands and Deliveries 19
Maintenance and System Outages 22
Operations and Outcomes 23
Colorado – Big Thompson Project Operations by Facility 25
Collection System 25
East Slope 33
Green Mountain Reservoir 41
2024 Annual Operation Plan 48
Collection System and East Slope Colorado-Big Thompson Project 48
Green Mountain Reservoir 49
References 51

Tables

1.—Recommended minimum release schedule for Lake Estes 11
2.—Snow-water content for April 1, 2023 17
3.—Reclamation runoff forecast for C-BT locations 18
4.—Colorado – Big Thompson Project west slope collection system water balance 21
5.—Colorado – Big Thompson Project east slope water balance 22

Figures

1.—A summer release through the spillway at Green Mountain Dam and Reservoir. Green Mountain Powerplant, located just below the dam, is also generating power. 2
2.—Marys Lake Penstock (left), Powerplant (center) and Marys Lake (background)..... 5
3.—Olympus Dam and Lake Estes, along with the Big Thompson River gage below Olympus Dam. Part of the Town of Estes Park and Rocky Mountain National Park can be seen in the background. 6
4.—North Inlet near Grand Lake. Stream gaging house is shown on left side of photo. 9
5.—Water Year 2023 air temperature and 30-year average air temperature. 19
6.—Big Thompson River gages above and below Lake Estes: April–August 2023 discharge (ft^3/s). 25
7.—Water year 2023 and 35-year average SWE for the Willow Creek Reservoir drainage area. 27
8.—Computed inflow to Willow Creek Reservoir during water year 2023. 27
9.—Water year 2023 versus 35-year average SWE for the Granby Reservoir drainage area. 29
10.—Granby Reservoir spill; approximately 2,400 ft^3/s, June 13 through June 21, 2015. 30
11.—Granby Reservoir storage content, water year 2023 versus the 30-year average storage content. 31
12.—Seasonal Secchi depths in Grand Lake for 2023 clarity season. 33
13.—Water year 2023 and 35-year average SWE for the Olympus Dam drainage area. 34
14.—Computed cumulative native inflow for Lake Estes during water year 2023 versus 30-year average. 35
15.—Big Thompson River above Lake Estes, water year 2023 gage flow vs. distribution of 15-year daily flows. 36
16.—Olympus Tunnel mean daily flow during WY23. 38
17.—Carter Lake Reservoir storage content during water year 2023 versus its 30-year average. 40
18.—Horsetooth Reservoir storage content during water year 2023 versus its 30-year average. 41
19.—Water year 2023 and 30-year average SWE for the Green Mountain Reservoir drainage area. 42
20.—Green Mountain Reservoir monthly content during water year 2023 and 30-year average content. 45

Appendices

A Daily Records for Water Year 2023 and Tables
B Exhibits and Tables
C Exhibits
D Seventy-Second Annual Report of the Western Division System Power Operations

Executive Summary

The purpose of the annual report for the Colorado – Big Thompson Project (C-BT) is to inform interested parties of the coordinated operation of the project. The report has two main parts. The first describes the actual operation of the project during the previous water year and the plan of operation for the upcoming water year. The second presents the hydropower operations for the previously completed water year and the forecast for the next.

This report in part fulfills requirements included within decree stipulations. These include the Stipulation dated October 5, 1955, as amended October 12, 1955, and filed with the United States District Court for the District of Colorado in Civil Action Nos. 2782, 5016, and 5017 for an annual report of the Green Mountain Reservoir (GMR) Operations and the Agreements in the Stipulation and Agreement of the Orchard Mesa Check Case (Colorado Water Div. 5, 91CW247) dated September 6, 1996, to produce a Historic Users Pool (HUP) Annual Operating Plan (AOP).

Collection system reservoirs started water year (WY) 2023 with mildly above average storage and ended WY 2023 with greater than average storage. East slope reservoirs, in the case of Horsetooth Reservoir, started with nearly average storage and ended with greater than average storage, while Carter Lake Reservoir started the water year with greater than average storage and ended WY 2023 with the largest storage content recorded in the last thirty years. On the west slope, snowpack was greater than average for Willow Creek and Granby Reservoirs for the WY and runoff mirrored snowpack. The GMR snowpack and runoff were mildly less than average. On the east slope, snowpack was mildly greater than average, and runoff was also mildly greater than average. West slope peak runoff was near normal in magnitude, typical in terms of peak runoff timing, and longer in duration. East slope runoff was normal in magnitude, typical in terms of peak flow timing, and longer in duration. Daily air temperatures were near average throughout the growing season and precipitation was slightly greater than average by end the WY.

The C-BT diversions totaled 232,073 acre-feet (AF) through Adams Tunnel for WY 2023. Deliveries of C-BT water totaled 186,379 AF. The GMR delivered a total of 74,487 AF from storage in WY2023. The GMR deliveries included 6,577 AF released from other reservoirs to fulfill substitution replacement obligations acquired by the City of Denver and City of Colorado Springs to satisfy the 2022 GMR First Fill Storage Right.

The natural inflow to Lake Estes reached its WY 2023 peak flow with a daily average flow of 827 cubic feet per second (ft^3/s) on June 9. The maximum mean daily release from Olympus Dam to the Big Thompson River was 713 ft^3/s and occurred on May 27.

GMR achieved a physical fill in WY2023. Granby Reservoir also achieved a physical fill in WY2023. Carter Lake Reservoir was filled four times in WY2023, and Horsetooth Reservoir was full from June 22 through July 16 in WY 2023. Sufficient storage in Carter Lake and Horsetooth Reservoirs existed to satisfy all demands for WY 2023.

For the Grand Lake clarity season, the running average clarity goal qualifier of 3.8 meters Secchi depth was met (2023 clarity season running average was 4.23 meters). The minimum goal qualifier of 2.5 meters Secchi depth was also achieved (2023 clarity season minimum was 2.99 meters). A few short excursions of surface pH exceeding the water quality indicator were noted during the first thirteen days of July, one day in the middle of August and then the last thirteen days of the clarity season which ends on September 11. Excursions of pH were generally short-term daily oscillations above and below the threshold during the period. The Shadow Mountain Reservoir bottom dissolved oxygen threshold was not met from July 12 through July 18, 2023. Pumping started at Farr Pumping Plant for the clarity season on July 18, after which time the threshold was met for the remainder of the season

General Description of the Colorado – Big Thompson Project

The Colorado-Big Thompson Project (C-BT) is one of the largest and most complex natural resource developments undertaken by the Bureau of Reclamation (Reclamation). It consists of over 100 structures integrated into a transmountain water diversion and delivery system which provides water and power benefits across the state of Colorado from Nebraska to the Utah state lines. The project was authorized for construction in the 1930's and completed in the 1950s.

The C-BT facilities span over approximately 100 miles within north-central Colorado. The project stores, regulates, and diverts water from the Colorado River west of the Continental Divide to provide supplemental irrigation water for 615,000 acres of land east of the Rocky Mountains. It supplements municipal and industrial water supplies while providing water-oriented recreation for a growing population of more than 1 million residents in Northeastern Colorado. Approximately 3,000 feet of elevation drop allows for hydroelectric generation of the electricity required for project pumping and produces enough surplus electricity for nearly 68,000 households. Additionally, the project provides water storage within the upper Colorado River basin for agricultural, municipal, industrial, recreational, and environmental uses. Major features of the C-BT include dams, dikes, reservoirs, powerplants, pumping plants, pipelines, tunnels, transmission lines, substations, and other associated structures.

Historically, the C-BT diverts approximately 230,000 AF of water, annually, (310,000 AF maximum) from the Colorado River headwaters on the western slope to the South Platte River basin on the eastern slope, for distribution to project lands and communities. The Northern Colorado Water Conservancy District (Northern Water) apportions the water used for irrigation to more than 120 ditches and 60 reservoirs. Thirty-three communities receive municipal and industrial water from the C-BT. The Western Area Power Administration (WAPA) markets and transmits the electric power produced at the six powerplants associated with the project.

Collection System and East Slope Colorado-Big Thompson Project

Overview[1]

The C-BT is often grouped by which side of the Continental Divide a subsystem is located. Facilities within the Colorado River Basin (on the west slope) include a replacement and

[1] A diagram and map of the C-BT system can be found in Appendix C.1 and Appendix C.2.

compensatory storage reservoir and a water collection and diversion system. East slope facilities are located within the South Platte River Basin and include a power and delivery system and a water distribution system.

The GMR provides replacement water for out-of-priority collection system diversion and storage water for other beneficial uses. GMR is located on the Blue River, a tributary of the Colorado River approximately 30 miles southwest and downstream of the collection system. This reservoir allows for year-round diversion at the collection system by providing replacement water during periods when senior downstream water users would otherwise require the collection system to bypass inflow. GMR also provides water storage for the benefit of water users within the Colorado River basin. Green Mountain Dam includes a powerplant for hydropower generation.

The Colorado River collection and diversion system captures snowmelt runoff from the high mountains and diverts water to the eastern slope. The system stores, regulates, and conveys Colorado River water through Grand Lake to a transmountain diversion tunnel for delivery to the east slope. This system includes three reservoirs, two pumping stations, several conveyance canals, and the transmountain diversion tunnel.

Authorization of the project included improvements and operational requirements to mitigate anticipated lower flows downstream of the collection system. The project included installation of pumping systems for existing irrigators upstream of the Blue River confluence. The project also required a release schedule downstream of the collection system to maintain the Colorado River fishery downstream of Granby Dam.

Figure 1.—A summer release through the spillway at Green Mountain Dam and Reservoir. Green Mountain Powerplant, located just below the dam, is also generating power.

The west slope water collection system for the project is comprised of three reservoirs (Granby, Willow Creek, and Shadow Mountain Reservoirs), one natural lake (Grand Lake) and two pumping plants (Farr and Willow Creek Pumping Plants). Granby Reservoir is located on the Colorado River and is the largest reservoir within the C-BT. Granby provides multiyear storage of Colorado River water. The Farr Pumping Plant lifts water from Granby to Shadow Mountain Reservoir. Shadow Mountain Reservoir impounds the Colorado River upstream of Granby and allows for gravity conveyance of Colorado River water through Grand Lake to the Adams Tunnel. The largest natural lake in Colorado, Grand Lake is hydraulically connected to Shadow Mountain Reservoir. The two are operated as a single regulatory reservoir. Willow Creek Reservoir is used to regulate and divert water from Willow Creek, a tributary of the Colorado River. Willow Creek Pumping Plant lifts water diverted from Willow Creek Reservoir for storage in Granby Reservoir.

Completed in 1950, Granby Dam is located on the upper Colorado River. The dam's river outlet is comprised of a 30-inch jet valve and a 12-inch gate; and has a combined capacity of 430 cubic feet per second (ft^3/s). Northern Water installed two 600 Kilowatt turbines under a Lease of Power Privilege contract in 2016. The Granby Hydropower Plant can divert a maximum of 70 ft^3/s from the outlet works. The dam spillway is controlled by two radial gates with a combined total release capacity of 11,500 ft^3/s. The reservoir stores the flow of the Colorado River and water pumped from Willow Creek Reservoir. The reservoir has a total storage capacity of 539,800 AF.

Farr Pump Plant lifts water from Granby Reservoir to Granby Pump Canal for conveyance to Shadow Mountain Reservoir. The Farr Pump Plant has three 6,000 horsepower units with a combined installed capacity of 600 ft^3/s when lifting the maximum head of 186 feet. The lifting head depends upon the storage level in Granby Reservoir and ranges between 88 feet to 186 feet. The combined lifting capacity for the 88 feet head differential is 1,200 ft^3/s. The Granby Pump Canal conveys pumped water 1.8 miles to Shadow Mountain Reservoir and has a maximum capacity of 1,100 ft^3/s.

Completed in 1953, Willow Creek Dam is located on Willow Creek, a tributary to the Colorado River below Granby Reservoir. Willow Creek Dam stores and diverts water to Granby. The dam has a river outlet with a capacity of 2,080 ft^3/s, a diversion outlet capacity of 400 ft^3/s and an uncontrolled spillway located on the left abutment with a maximum flow capacity of 3,200 ft^3/s. The reservoir has a total storage capacity of 10,600 AF. The Willow Creek Pumping Plant has two 5,000 horsepower units that lift water 175 feet with a combined capacity of 400 ft^3/s.

Completed in 1946, Shadow Mountain Dam impounds the Colorado River upstream of Granby Reservoir. The dam has an outlet with 50 ft^3/s capacity and a radial gate-controlled spillway with a capacity of 10,000 ft^3/s. The reservoir provides regulatory storage and the hydraulic head necessary for gravity conveyance to the Adams Tunnel. The reservoir has a total storage capacity of 18,400 AF including one foot of regulatory storage in Grand Lake. The dam maintains the reservoir water surface elevation well within the historic water surface elevation of Grand Lake as required under the project authorization.

Completed in 1947, the Adams Tunnel was constructed to divert water from the Colorado River watershed to the Big Thompson River watershed. The 13.1-mile, 9.75-foot diameter tunnel is concrete lined with a capacity of 550 ft^3/s. Tunnel flow is control by a radial gate inlet at a diversion structure called Adams Tunnel West Portal on the east end of Grand Lake. The tunnel passes under the Continental Divide and Rocky Mountain National Park and daylights at East Portal Reservoir approximately 4.5 miles southwest of Estes Park.

The east slope power and delivery system includes four regulatory reservoirs, five powerplants, one pumping station, multiple conveyance, and diversions structures and two terminal storage reservoirs[2]. The system is typically divided into three components including an Upper Power Arm above Olympus Dam, a Lower Power Arm above Flatiron Dam, and the terminal storage reservoirs. Water delivery may occur at multiple delivery points between Adams Tunnel and the two terminal storage reservoirs. Primary delivery to the terminal reservoirs occurs through the power arms.

The Upper Power Arm begins at the Adams Tunnel East Portal and ends at Olympus Dam. East Portal Dam is constructed on Wind River. It directs a portion of the natural runoff from Wind River and C-BT water exiting Adams Tunnel into a siphon under Aspen Creek and a tunnel under Rams Horn Mountain. Continuing from Rams Horn Tunnel, a penstock conducts pressurized flow to Marys Lake Powerplant and Marys Lake.

Marys Lake Powerplant and Marys Lake is the first powerplant and regulatory reservoir on the Upper Power Arm. The powerplant has a single generator with a nameplate capacity of 8.1 megawatts at 210 feet of head. The powerplant is a "run-of-the-river" type generator that follows flow diverted at East Portal Dam between 200 ft^3/s and 550 ft^3/s. All flow bypasses the powerplant over a flip-bucket spillway when generation is not available or when flows are below generation capacity of Marys Lake Powerplant. Marys Lake is a natural lake that was enhanced by a construction of dikes. Marys Lake has a storage of 927 AF and regulatory capacity of 593 AF. The outlet has a capacity of 1,300 ft^3/s and no spillway. The reservoir serves as the afterbay for Marys Lake Powerplant and the forebay for Estes Powerplant. Prospect Mountain Conduit and Tunnel convey water from Marys Lake to Estes Powerplant.

[2] Significant delivery occurs from these terminal storage reservoirs through various Colorado-Big Thompson Project transferred works. These transferred works are operated and cared for by Northern Colorado Water Conservancy District and are not a focus of this operational report.

Figure 2.—Marys Lake Penstock (left), Powerplant (center) and Marys Lake (background).

Estes Powerplant and Lake Estes is the second powerplant and regulatory reservoir on the Upper Power Arm. The powerplant has three generators with a combined nameplate capacity of 45 megawatts at 572 feet of head. The powerplant is a "peaking plant" which allows load demand followed by balancing storage contents between Marys Lake and Lake Estes. Olympus Dam impounds the Big Thompson River east of the town of Estes Park to form Lake Estes. Olympus Dam includes a gated river outlet, a gated diversion outlet and radial-gated spillway. Lake Estes has a total capacity of 3,100 AF and a regulatory capacity of 740 AF. The reservoir regulates discharge from Estes Powerplant and natural runoff from the Big Thompson River and Fish Creek. Olympus Dam diverts up to 550 ft^3/s to the Lower Power Arm via Olympus Tunnel and controls release to the Big Thompson River.

Figure 3.—Olympus Dam and Lake Estes, along with the Big Thompson River gage below Olympus Dam. Part of the Town of Estes Park and Rocky Mountain National Park can be seen in the background.

The Lower Power Arm begins at Olympus Dam and ends at Flatiron Reservoir. Water from Lake Estes and the Big Thompson River is conveyed by Olympus Siphon and Tunnel to Pole Hill Tunnel and Canal and on to the Pole Hill Powerplant forebay.

The Pole Hill Powerplant is the first powerplant in the Lower Power Arm. The powerplant is a single unit with a net head of 815 feet. The unit nameplate generation is 33.25 megawatts. The powerplant discharges into a small afterbay that diverts water into Rattlesnake Siphon and Tunnel to Pinewood Reservoir. The powerplant forebay has no storage, and generation follows release from Olympus Dam to Olympus Tunnel. When required, flow from the Pole Hill forebay can bypass the powerplant by falling into Little Hell Creek Canyon where it flows until it is rediverted to the Pole Hill Afterbay.

Rattlesnake Tunnel conveys water from the Pole Hill Afterbay to Pinewood Reservoir. Rattlesnake Dam impounds water from Rattlesnake Tunnel in Pinewood Reservoir. The reservoir has a storage capacity of 2,180 AF with regulatory capacity of 1,422 AF and provides regulatory storage for Flatiron Powerplant. Rattlesnake Dam has an outlet for releasing native flow to Cottonwood Creek and an uncontrolled spillway. The Bald Mountain Pressure Tunnel inlet supplies water from Pinewood Reservoir to the two Flatiron Penstocks and Flatiron Powerplant.

Flatiron Powerplant is the second powerplant on the Lower Power Arm. The powerplant includes three units. Two units have nameplates of 31.5 Megawatts with a maximum head of 1,118 feet. They receive water from Pinewood Reservoir. The two turbines discharge into Flatiron

Reservoir. Flatiron Powerplant Unit 1 and 2 are operated as load-following generators. The third unit is a pump-generator connected to Carter Lake Reservoir and has a 13,000-horsepower motor with a maximum lift of 297 feet. When generating Unit 3 is rated at 8.5 megawatts.

Flatiron Reservoir is a regulatory reservoir that controls flow to the Charles Hansen Feeder Canal (CHFC) and maintains head as an afterbay for Flatiron Powerplant generation and a forebay for Unit 3 pumping to Carter Lake Reservoir. Flatiron Dam impounds Chimney Hollow and the ephemeral tributary of Dry Creek. The reservoir stores 760 AF of water with 399 AF of regulatory storage. The dam has an uncontrolled spillway with 23,600 ft^3/s capacity and an outlet to the CHFC with a design capacity of 930 ft^3/s.

The terminal storage and delivery component of the C-BT conveys water for user delivery and provides water storage for high demand periods. The two terminal reservoirs that have not been transferred to Northern Colorado Water Conservancy District (Northern Water) are Carter Lake Reservoir and Horsetooth Reservoir. Under typical operation they receive water from Flatiron Reservoir. Carter Lake Reservoir supplies water to the project service area south of the Big Thompson River. Horsetooth Reservoir supplies water to the Cache La Poudre River project service area. The CHFC conveys water to Horsetooth Reservoir and delivers water to the Big Thompson River at the mouth of the Big Thompson Canyon and water users along the canal.

The Dille Diversion Dam and Tunnel, located one mile upstream from the Big Thompson Canyon mouth, provides a redundant feature for rediverting project water from the Big Thompson River when the Lower Power Arm is unavailable. Additionally, non-project water from the Big Thompson River can be diverted into the tunnel. Tunnel water is conveyed to the CHFC and used for power generation at Big Thompson Powerplant or conveyed by the CHFC toward Horsetooth Reservoir.

Carter Lake Reservoir is impounded by three dams on ephemeral streams. Carter Lake Reservoir has a storage capacity of 112,200 AF with an active capacity of 108,900 AF. Carter Lake Reservoir receives water either from Flatiron Powerplant Unit 3 or a bypass gravity conduit. Deliveries are made through outlet works located in Dam number 1 to the Saint Vrain Supply Canal or to Flatiron Reservoir through the Flatiron Powerplant.

The CHFC transports water from Flatiron Reservoir to the Big Thompson River and Horsetooth Reservoir. CHFC has a nominal capacity of 930 ft^3/s from Flatiron Reservoir to the Big Thompson River (930 Section). The CHFC can make water deliveries at the Big Thompson River and several turnouts along the canal. Deliveries from the canal to the river are made through a controlled wasteway or the Big Thompson Powerplant. The CHFC has a nominal capacity of 550 ft^3/s from the Big Thompson River to Horsetooth Reservoir (550 Section).

Big Thompson Powerplant is the last federal powerplant in the C-BT system. The powerplant is used to make deliveries from the CHFC or to return non-project Big Thompson River water, obligated to users downstream of the Big Thompson Powerplant and used for non-consumptive power generation known as “skim” power operations, to the river. The powerplant’s nameplate is

4.5 megawatts with an operational head of 183 feet. The powerplant has a maximum flow rate of about 400 ft^3/s. The CHFC wasteway makes river deliveries when demand exceeds 400 ft^3/s or when the powerplant is unavailable. It has a maximum flow rate of 600 ft^3/s and is also used to deliver water to users between the wasteway outfall and powerplant tailrace. Big Thompson Powerplant is typically operated only during the snowmelt runoff and delivery season.

Horsetooth Reservoir is located west of Fort Collins, Colorado. The reservoir includes four dams and a dike with a storage capacity of 151,800 AF and an active capacity of 143,500 AF. Outlet works are located in two of the dams, Horsetooth Dam and Soldier Canyon Dam. Dixon and Spring Canyon Dams and Satanka Dike do not have outlet works. The reservoir has no spillway. The Soldier Canyon Dam outlet supplies water to the city of Fort Collins, three rural water districts, Colorado State University, and the Dixon Feeder Canal for irrigation. Horsetooth Dam outlet discharges to the Charles Hansen Supply Canal for water delivery to the Cache la Poudre River and water users north of the Cache la Poudre River.

Additional water delivery and power transmission features were constructed under the project authorization. These features include supply canals, diversion structures, transmission lines and substations. All water delivery features below Horsetooth Reservoir and Carter Lake Reservoir were transferred to Northern Water Conservancy District upon repayment. Northern Water maintains and operates these features. Power transmission features are maintained and operated by WAPA. These features are not further described in this document.

Planning and Control

The C-BT was authorized, constructed, and is operated to provide supplemental municipal and industrial water supply, irrigation water supply, and hydroelectric power production.

The integrated operation of the C-BT is planned and coordinated by the Water Resources Group at Eastern Colorado Area Office (ECAO) in Loveland, Colorado. Staff collects and analyzes information daily and makes the decisions necessary for successful operation of the C-BT. This continuous water management function involves coordination between the Colorado Division of Water Resources, Northern Water, WAPA, U.S. Bureau of Reclamation's Upper Colorado and Missouri Basin Regions, other U.S. Bureau of Reclamation groups, and many other local, state, and Federal agencies.

Experience has proven that proper use of the available water resource in a multipurpose project, such as the C-BT, can be achieved only through careful budgeting and management of the anticipated water supply. One product of this budgeting and management process is an Annual Operating Plan (AOP).

The C-BT water operations are routinely planned on a twelve-month basis. The first AOP of the new water year is prepared in early October and covers the fiscal year October 1 to September 30 period. AOPs are prepared for reasonable maximum, most probable, and reasonable minimum

runoff conditions of water supply and associated requirements. The C-BT is operated to optimize the most probable water supply, without jeopardizing the operational position should either the reasonable maximum or the reasonable minimum water supply conditions occur. The plan is reviewed and revised monthly, or as needed during the year as new information becomes available or conditions change. Computer programs and models are used by ECAO to develop the AOPs and water supply forecasts. Tables B-5, B-6, and B-7 include the first AOP for the upcoming water year for the most probable, minimum reasonable, and maximum reasonable plans, respectively. Appendix B-8 also provides a summary view of features of interest within the project for the planned C-BT operations in the upcoming water year.

Irrigation Requirements

The amount of C-BT water made available each water year for irrigation is determined by Northern Water. This determination is subject to change by agreement throughout the remainder of the irrigation season. Adaptations may occur as a result of substantial changes in the prevailing climatic demand or operational conditions. Irrigation requirements for the three runoff conditions; 1) most probable, 2) reasonable maximum, and 3) reasonable minimum, are estimated by analyzing actual use under a variety of actual runoff conditions.

Estimated supplemental irrigation deliveries from GMR to irrigators in the Colorado River Basin are included in the release from GMR, according to the "Operating Criteria for GMR".

Figure 4.—North Inlet near Grand Lake. Stream gaging house is shown on left side of photo.

East Slope Diversion Operations

Olympus Dam, East Portal Dam and the Dille Diversion Dam can divert Big Thompson River watershed flows for beneficial use. These operations include carriage contracts for decreed water, diversion and storage of decreed east slope project water, and non-consumptive diversion for power generation. Carriage contracts allow for the project to divert and deliver decreed water for water users when unused capacity within the system is available. The C-BT will divert and store Big Thompson water rights when those rights are in priority as long as doing so does not adversely impact attainment of the project's objectives. The project also diverts Big Thompson River watershed flow that is obligated downstream of the Big Thompson Powerplant for non-consumptive power generation. This diversion operation is referred to as a "skim" operation. Big Thompson River water availability for diversion depends on the flow in the Big Thompson River and its tributaries above Lake Estes, C-BT water diverted through the Adams Tunnel, and its power arm capacity. Skim operations and determination of unused system capacity is managed according to the AOP and as prescribed by the ECAO Water Resources Group staff.

Flow Requirements Below Project Facilities

Many of the C-BT dams include downstream flow recommendations or requirements. Release of water from project dams for maintaining downstream river flow was one of the primary purposes included within the project authorization and a stipulation of the project's water rights. This obligation for instream flow requirements preceded recognition of instream flow as a beneficial use within the State of Colorado. Granby Dam, Green Mountain Dam, Willow Creek Dam, Shadow Mountain Dam, East Portal Dam and Olympus Dam operations include some guidance or actual obligations for meeting stream flow targets.

The Secretary of the Department of Interior issued a release schedule for Granby and Willow Creek dams to define monthly flows for the time of the year, location, and hydrology. This schedule, titled "Principles to Govern the Release of Water at Granby Dam to Provide Fishery Flows Immediately Downstream in the Colorado River," was signed on January 19, 1961, by the Secretary of the Department of the Interior as directed by the project authorization. During the irrigation season, a Colorado River target flow is maintained downstream of senior irrigation diversions below Granby Dam. During the remainder of the year, the target flow is maintained immediately below Granby Dam. Scheduled flows for the Colorado River range between 20 ft^3/s and 75 ft^3/s. Willow Creek Dam only releases water for this purpose during the non-irrigation season, between October and April. Willow Creek Dam release is limited to the lesser of seven ft^3/s or reservoir inflow. The schedule also allows for flow adjustments based on revised forecasts and consideration of actual flows during May through July. A copy of the document is included in the Standard Operating Procedures (SOP) for Granby Dams and Reservoir, as appendix A, Exhibit 4.

In accordance with the SOP for Shadow Mountain Reservoir, Chapter 4 Section D, minimum releases from Shadow Mountain Reservoir are to be whichever is less between inflow and the

following seasonal flows: September through October: 35 ft^3/s; November through December: 45 ft^3/s; January through May: 20 ft^3/s; June through July: 50 ft^3/s; and August: 40 ft^3/s. The purpose of these flows is to maintain the fishery within the Colorado River above Granby Reservoir.

The GMR minimum release is determined by senior adjudicated water rights downstream from the reservoir. Inflow to GMR is released, as required, to meet these downstream rights. The State of Colorado has established instream flow rights for the Blue River downstream of Green Mountain Dam including a 60 ft^3/s flow from May 1 through July 15 and an 85 ft^3/s flow from July 16 through April 30. Instream flow rights are junior to the project. The State Engineer has determined that GMR must bypass 60 ft^3/s to meet downstream senior irrigation water rights during the irrigation season from May 1 through October 31.

The United States Fish and Wildlife Service and the State of Colorado Department of Natural Resources, Parks and Wildlife Division have recommended a minimum release schedule for Lake Estes, shown in table 1 below. Although no official decision record (i.e., contract, memorandum of understanding, intergovernmental agreement) is available, Reclamation has cooperatively adopted the recommendations when inflow to Lake Estes meets or exceeds these values. Releases in excess of inflows are not required. When the minimum release objective conflicts with service of Carriage Contracts, recent practice has prioritized meeting the minimum release flows over diverting water into Olympus Tunnel in service of the contracts. Likewise, diversion of flows from the Big Thompson River at Olympus Dam for power production (skim operation) is of lower priority than meeting the recommended minimum flows.

The State of Colorado decreed a direct flow water right for power generation at Olympus Dam with a water rights priority date of December 29, 2016. A minimum instream flow decreed to the State of Colorado is senior to this direct flow water right and requires Olympus Dam to bypass the lesser of reservoir inflow or 40 ft^3/s between May 1 and October 31 and 15 ft^3/s between November 1 and April 30.

Table 1.—Recommended minimum release schedule for Lake Estes

Period	Minimum release (ft^3/s)
November 1–April 15	25
April 16–April 30	50
May 1–May 15	100
May 16–August 15	125
August 16–August 31	100
September 1–September 15	75
September 16–October 31	50

Minimum release schedule for Lake Estes. Recommended by the U.S. Fish and Wildlife Service and the Colorado Department of Natural Resources, Parks and Wildlife Division.

Annual Operating Plan

The C-BT Most Probable AOP is developed considering the effects of historical average runoff values, the expected demands and depletions of Northern Water and Denver Water, the project's initial states (e.g., pool levels/reservoir storages), other average values, special operations such as previously planned system outages and maintenance schedules, and an assumed Northern Water quota for their water users of 70 percent.

The operations at Granby Reservoir are highly dependent on the runoff conditions on both sides of the Continental Divide. The conditions on the east slope have a direct effect on the diversions through the Adams Tunnel. The diversions through the Adams Tunnel affect the pumping operations at the Farr Pump Plant, and consequently the reservoir levels at Granby.

The GMR operational plan was developed considering the effects of upstream operations at Dillon Reservoir, forecasted depletions provided by Denver Water and Colorado Springs Utilities, average runoff values, anticipated system outages and planned special operations.

Green Mountain Reservoir

Reservoir Administration

Provisions guiding GMR operations are contained within multiple contractual and legally binding documents (referenced cited above). Paragraph six of the October 1955 Decree (Consolidated Cases: Stipulation and Decree, 1955) stipulates that Reclamation periodically develop operational plans for GMR. This report partially fulfills this requirement.

Colorado Springs Utilities and Denver Water Board (Cities) operate transmountain water projects upstream of GMR that substantially influence the timing and volume of reservoir filling and water available for power generation. The Denver Water Board's water project includes 255 thousand acre-feet (KAF) Dillon Reservoir and a transbasin diversion tunnel. Colorado Springs Utilities' project includes a direct-flow collection system, small regulatory reservoirs, and a transbasin diversion tunnel. Combined, the Cities divert approximately 80 KAF annually from the basin which would otherwise be available for GMR storage and power generation. The right for these water projects to divert against GMR's senior water rights and how the Cities compensate the Project for diversions junior to the Project is stipulated within the Project's and Cities water rights (Consolidated Cases 2782, 5016 and 5017 (commonly referred to as the "Blue River Decree"), 1955, 1964, 1978). The Cities and the Project have established agreements to fulfill these stipulations. The Green Mountain Administrative Protocol (Green Mountain Administrative Protocol, 2013) provides procedures for quantifying water owed to GMR.

GMR was authorized and constructed to store and deliver two pools of water. Senate Document 80 (Manner of Operation of Project Facilities and Auziliary Features (Senate Document 80), 1937) identified a 52,000 AF pool designated for the singular purpose of replacement of water

diverted or stored out-of-priority by the Colorado River Collection System. The remainder of reservoir storage and refill storage are designated as the “100,000 AF power pool”. This pool is primarily for power generation and can be delivered for the beneficial use of water users located within the Upper Colorado River basin above the confluence with the Gunnison River in Grand Junction. The Project water rights include these two pools within the decree (Consolidated Cases 2782, 5016 and 5017 (commonly referred to as the "Blue River Decree"), 1955, 1964, 1978).

Additional agreements and directives have further subdivided the “100,000 AF power pool”. The subdivisions include, replacement losses for GMR (Manner of Operation of Project Facilities and Auziliary Features (Senate Document 80), 1937), a 5,000 AF allocation for the Silt Project replacement (Director, Secretary of Interior, 1964), the HUP and water contract allocations (1984 Operating Policy for Green Mountain Reservoir, Colorado - Big Thompson River Project, 1983), and storage available for Shoshone Powerplant outage operations (Shoshone Outage Protocol (ShOP), 2016).

The Colorado State Engineer has administered GMR water rights in accordance with the Green Mountain Administrative Protocol since 2014 (Green Mountain Administrative Protocol, 2013). This protocol is currently under appeal with the Colorado Supreme Court.

Green Mountain Historic Users Pool and the Orchard Mesa Check Case Settlement

GMR’s largest single purpose allocation is the Historic User Pool (HUP) and is designated for Upper Colorado River Basin beneficiary use. The HUP allocation is composed of 66,000 AF of the “100 KAF Power Pool”. This allocation is defined within the 1984 Operating Policy (1984 Operating Policy for Green Mountain Reservoir, Colorado - Big Thompson River Project, 1983). The intent is that the HUP allocation is delivered in most years.

The HUP operating criteria is stipulated under the 1996 Orchard Mesa Check Case Decree (Stipulation and Agreement, 1996). The stipulations include a variety of criteria for how and when GMR can deliver HUP. The operating criteria also identifies a group of irrigation, state, and federal stakeholders responsible for cooperative management the HUP allocation. The HUP Managing Entities include Orchard Mesa Irrigation District, Grand Valley Irrigation Company, Grand Valley Water Users Association, the Colorado Water Conservation Board, the Colorado State Engineer, the U.S Fish and Wildlife Service and the Bureau of Reclamation. Regular meetings for cooperatively managing the HUP are a requirement of the operating criteria.

A primary purpose of the HUP allocation is to provide replacement water and irrigation water for HUP beneficiaries. This water is provided at no cost to the water users from the HUP allocation. In dryer years nearly the entire HUP allocation is delivered during the irrigation season. This delivery may include both replacement water for consumptive use by a beneficiary or delivered directly to Grand Valley irrigators. 500 AF of the HUP allocation is reserved for consumptive use replacement during the non-irrigation season.

Providing water for supporting the recovery of Colorado River endangered fish is a secondary beneficial use of the HUP allocation. In most years the entire HUP allocation is not required for irrigation and replacement. In these years the HUP managing entities can declare that surplus HUP allocation is available (Recovery Implementation Program, 1996). The managing entities will collaboratively determine the timing and volume of water for delivery to the 15-mile Colorado River reach between the Grand Valley Irrigation Company diversion dam and the confluence with the Gunnison River.

The HUP managing entities have established standing weekly conference call meetings for coordination of Colorado River operations. These meeting are open to the public and provides a forum for coordination of reservoir and diversion operations within the Colorado River basin. Regular participants on the call include: the HUP managing entities, Denver Water, Northern Water, Colorado River Water Conservation District, the National Weather Service, Colorado Basin River Forecast Center, and others.

Reservoir Operation

GMR operations are controlled by water rights administration, authorizing documentation, litigation stipulations, agreements, facility limitations, and safety of dam directives. Normal reservoir operations generally focus on three goals: not harming downstream senior water rights, enhancing the beneficial use of the waters of the Colorado River, and maximizing power generation.

Administration of downstream Colorado River water rights and GMR storage and direct flow for power generation water rights guide GMR operations. [3] GMR stored water is largely allocated as replacement water for consumptive use of Project beneficiary junior water right users. The State Engineer curtails junior water use without this replacement water. GMR stored water replacement releases allow for out-of-priority diversion of the Colorado River Collection System, HUP beneficiaries, Silt Project, GMR evaporative losses and most GMR water contract release. The storage release flow rate is dependent upon the priority and location of the calling right. In addition, GMR is obligated to bypass reservoir inflow as needed to not injure calling water rights senior to the GMR's water rights. Simultaneous administration and exercise of GMR's storage and Green Mountain Powerplant's direct flow for power water right results in nearly perpetual water rights administration for water users upstream of GMR.

[3] The Colorado State Engineer is responsible to administer water rights under the Prior Appropriation Doctrine. When a downstream water right is not satisfied by existing river flow, the State Engineer will determine an administrative priority that will require upstream water users, junior to the administrative priority, to curtail diversion or replace diversion with an equivalent stored replacement source. The establishment of this administrative priority is commonly referred to as a water right's administrative "call."

Conserving and making use of Colorado River water to create the greatest benefit is one of the primary purposes of the Project (Manner of Operation of Project Facilities and Auziliary Features (Senate Document 80), 1937). Reclamation plans reservoir operations to increase the probability that GMR's first-fill storage water right is satisfied each year. In drier years managing GMR fill demands reduction of reservoir release below the powerplant capacity. In addition, operation plans usually avoid reservoir release exclusive for power generation. In most years, GMR operation plans substantially reduce power generation to allow Denver and Colorado Springs to exercise their upstream junior water rights as stipulated in the Blue River Decree (Consolidated Cases 2782, 5016 and 5017 (commonly referred to as the "Blue River Decree"), 1955, 1964, 1978).

Reclamation schedules GMR operations in a manner to maximize Green Mountain Powerplant power production. The powerplant is the principal mechanism for release of stored water and bypass of inflow. Reclamation schedules powerplant release to fulfill obligations for storage delivery and inflow bypass, control reservoir fill rate, and minimize the volume of water that will bypass the powerplant. Stored water release generation often provides other beneficial uses including Shoshone Outage Protocol operations, direct delivery of HUP water for irrigation, and HUP surplus delivery to the 15-Mile Reach for the benefit of Colorado River Endangered Fish recovery efforts.

Coordinated Reservoir Operations (CROs) are an example of special power generation operations. When GMR participates in CROs efforts, Reclamation designs reservoir operations that reshape and times powerplant release to help enhance river peak flow for the benefit of Colorado River Endangered Fish recovery efforts. Design of GMR CROs cannot impact the project yield and do not require bypass of the Green Mountain Powerplant.

GMR typical operations results in three operational seasons: Winter Delivery (November–April), Spring Runoff/Fill (April–August) and Irrigation Delivery (August–October).

During the Winter Delivery Season, GMR storage decreases are made to avoid harming downstream senior water rights. Native winter flow within the Colorado River is typically less than the Shoshone Powerplant senior water right of 1,250 ft^3/s. During this period, reservoir storage releases replace water for the Project, HUP beneficiaries, and most GMR contractors out of priority diversions. On average, GMR delivers 23 KAF from storage during the winter season while passing all reservoir inflow. Storage release for Colorado River Collection System Replacement constitutes the largest portion of winter storage delivery.

The Spring Runoff/Fill Season normally begins when river flow exceeds plant capacity at the Shoshone Powerplant. Colorado River flow typically exceeds 1,250 ft^3/s between the last week of March and the second week of April. The Blue River Decree obligates Reclamation to declare the Start of Fill for the Senior First Fill Storage Water Right between April 1 and May 15. On average, Green Mountain reaches a minimum fill of 64 KAF in mid-April. Once the Reclamation declares Start of Fill, GMR will simultaneously exercise storage and direct flow for power water rights and adjust operations to maximize stored water while optimizing power generation. GMR

normally reaches its maximum fill during the first two weeks of July. After satisfying GMRs Senior Storage water right, refill storage rights and power generation direct flow rights will be used to maintain reservoir storage until an administrative call is placed on the Colorado River. The Colorado State Engineer typically places the Colorado River under water rights administration between the third week of August and the second week of September. Colorado River water rights administrative calls may occur in June during drier years. The Colorado State Engineer's placement of a senior administrative water right's call ends the Spring Runoff/Fill Season.

Irrigation Delivery Season begins once Colorado River flows decrease below water rights administrative levels. The senior administrative calling right may be at the Shoshone Powerplant, a Grand Junction Area irrigation water right or both. During Irrigation Delivery Season, GMR delivers approximately 20 KAF per month. HUP deliveries constitute the largest portion of the storage releases during the Irrigation Delivery Season. Irrigation Delivery Season ends with the ceasing of irrigation operations around October 31.

Operational Summary: Water Year (WY) 2023

Summary of System-wide Conditions

WY 2023's AOP was summarized in the previous Annual Operating Report of the Colorado-Big Thompson Project[4]. The following four subsections summarize actual operations for WY 2023.

Weather and Inflow Hydrology

Precipitation was less than average over the mountains for October 2022 but greater than average from November through January 2023. From February through May 2023 precipitation was less than average while the remainder of the water year was mildly greater than or near normal. The monsoonal moisture season, typically from late July through mid-August, in the Northern Colorado Mountains near Granby, Green Mountain, and the east slope of the project area was mildly above normal. Precipitation events boosted summer streamflow from mid-June to mid-August 2023. Total precipitation for the water year was mildly greater than average.

On the east slope, snow accumulation at the start of WY 2023 was near normal until mid-December 2022, at which point accumulation increased to above average and stay above average throughout the snow accumulation season. On the west slope, Granby Reservoir drainage and Willow Creek Reservoir drainage generally followed the same trend as east slope accumulations

[4] Available online at https://www.usbr.gov/gp/aop/cbt/22cbt_23forecast.pdf.pdf (accessed December 1, 2023).

throughout the season with higher-than-normal snowpack after mid-December. The GMR drainage snowpack was mildly less than normal throughout the snow accumulation season. For GMR, although accumulation was slightly less than normal, the snow melt followed the long-term average in terms of timing. For Granby and Willow Creek, initial melt was a few days earlier than normal in WY 2023. As snow melt progressed, Granby and Willow Creek snow accumulation reported less than the long-term average by about mid-May 2023. By early June 2023, most sites where snow was measured reported zero accumulation. On the east slope, snow melt timing was typical for the season.

Table 2 provides an overview of the snowpack condition on April 1, 2023 for some of the contributing watersheds within the C-BT project. The first column in table 2 is the average snow water equivalent (SWE) of the snow telemetry (SNOTEL) sites contributing to each reservoir on April 1, 2023. For a historical comparison to the April 1, 2023 condition the average April 1 SWE of the same SNOTEL sites for the 1988–2022 period was calculated and then a combined site average was calculated for those sites. The west slope runoff forecast for April 1, 2023 was generally above the typical condition over the last 30 years for most locations within the C-BT region, while the Green Mountain forecast was less than average. The east slope runoff forecast was greater than the typical condition.

Table 2.—Snow-water content for April 1, 2023

Watershed	Snow-water content		
	2023 (in.)	30-yr. average (in.)	Percent of average
Green Mountain Reservoir	14.6	15.9	92
Willow Creek Reservoir	13.7	9.7	141
Granby Reservoir	16.7	13.2	127
Lake Estes Reservoir	20.8	16.6	126

Table 3 (below) contains the April 1, 2023 runoff forecasts for several C-BT facilities across intervals of predicted probabilities of occurrence.

Table 3.—Reclamation runoff forecast for C-BT locations

April 1, 2023, forecast of April–July volume (KAF) Chance of exceeding						
Forecast point	**90 percent reasonable min[1]**	**75 percent**	**50 percent most probable**	**25 percent**	**10 percent reasonable max[1]**	**50 percent most probable (as percent of avg runoff)**
Green Mountain. Res	210	233	259	284	307	92
Willow Creek Res	67.9	74.1	78.0	87.7	93.9	153
Granby Res	216	236	261	280	300	124
Big Thompson River above Lake Estes	70.8	78.4	84.0	95	103	115
Big Thompson River at Canyon Mouth	82.2	92.6	103	115	126	118

[1] The probability is *estimated* to be eight chances in ten that the actual runoff volume will fall between the reasonable minimum and reasonable maximum forecast.

The coldest temperatures in the project area were recorded during late January into early February 2023 (figure 5). Temperatures when compared to the thirty-year average, were mostly normal for the year. March 2023 temperatures were well below normal and mid-July through the end of September temperatures were mildly above normal. By mid-April the area temperatures began to rise rapidly, and snow at lower elevations began to melt. The Northern Mountains of Colorado showed signs that runoff had begun slightly earlier than normal. Most locations began to experience rising inflows by May. By mid-May 2023, the snowpack at higher elevations began to melt. Willow Creek Reservoir, with greater than average snowpack reached peak runoff near mid-May. While inflows to Lake Estes, Granby and Green Mountain reached their peaks during the second week of June. East and west slope peaks were near average in magnitude, yet runoff volume was greater and runoff duration was longer than typical. The exception was Green Mountain which had a slightly lower peak flow during runoff season and a slightly lower runoff volume than typical.

On the east slope, with slightly less than normal precipitation in May, slightly greater than normal precipitation in June, July, and August, greater than normal snowpack by May 1, and with warming temperatures the runoff seasonal peak timing was near normal for the water year. Rainfall events from early June into mid-August reduced irrigation demands on east slope terminal reservoirs' storage. The C-BT was in priority on the east slope sporadically from mid-May through the end of the month, then constantly in priority in June through mid-July during WY 2023. The monsoon season was hard to identify in WY 2023 because June, July, and August had greater than average precipitation. Near normal temperatures were experienced from mid-April through mid-July, after which temperatures were slightly above normal for the remainder of the water year.

Most Northern Colorado reservoirs throughout the spring season were near average in storage content to slightly less than average. By the beginning of June, most were approaching full. Irrigation season precipitation was above average, temperatures were near normal through mid-July and only slightly above normal from mid-July through the end of the season. As a result, demands for water stayed low. Since so little pressure was put on reservoir storage by the end of the season nearly seventy-five percent of total area reservoir capacity remained. Most reservoirs in the area ended WY 2023 with substantially more storage than they started the year and with much more water in storage than typical.

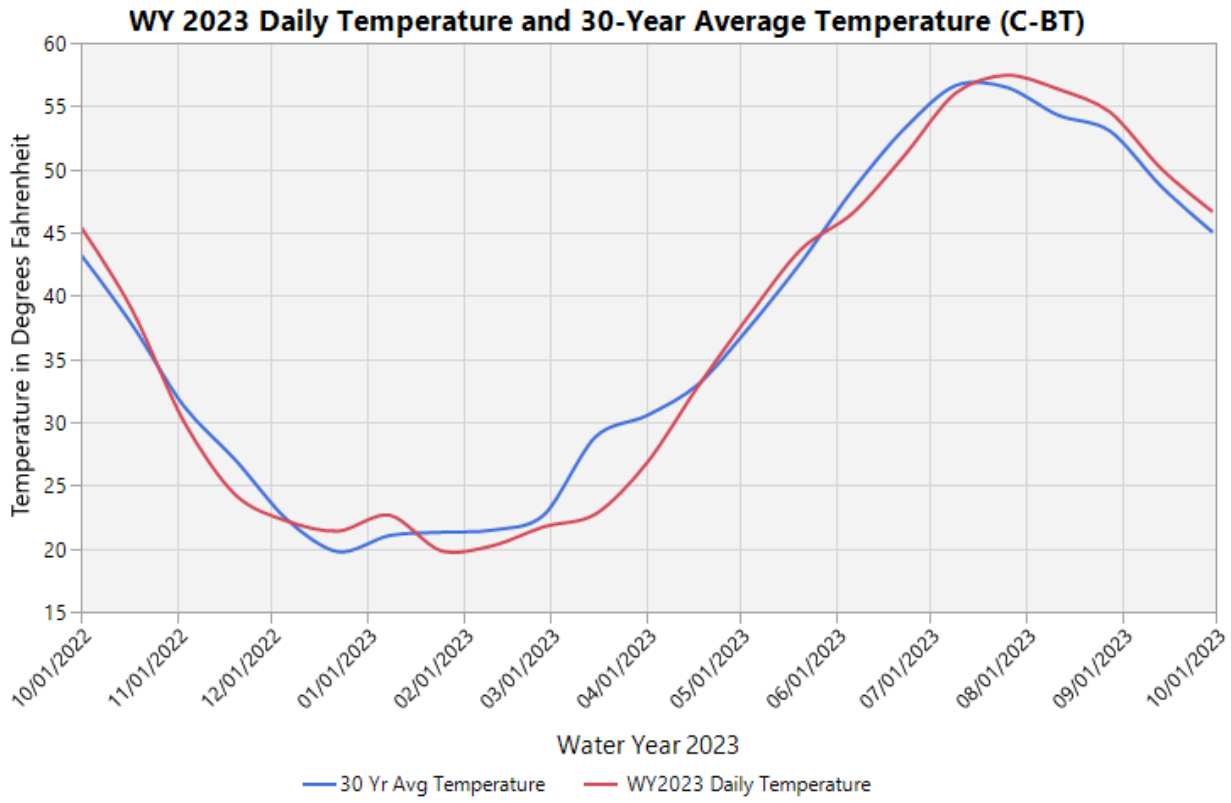


Figure 5.—Water Year 2023 air temperature and 30-year average air temperature.

(daily data have been smoothed for trend display purposes)

System Demands and Deliveries

Northern Water established a quota of 40 percent in October 2022, and then revisited that quota in April 2023, increasing it from 40 percent to 70 percent. No further quota adjustments were made by Northern Water for the remainder of the year. The quota assumed for the AOP 2023 prepared in October 2022 was 70 percent. AOP "most-probable" scenario monthly updates used a quota of 70 percent throughout WY 2023.

A pair of major wildfires occurred in late WY 2020 into early WY 2021 within portions of the C-BT project area. The East Troublesome Creek wildfire, mostly on the west slope, burned substantial portions of the Willow Creek Reservoir drainage and smaller portions of Shadow Mountain Reservoir and Grand Lake drainages. Although precipitation events during the monsoon season may have changed turbidity patterns in those waterbodies from historical observations (inorganic suspended sediment was a persistent source of clarity degradation after larger, precipitation driven runoff events in the 2022 and 2023 clarity season), the East Troublesome Creek fire did not substantially impact west slope project operations during WY2023. However, for the second year in a row, Willow Creek snowmelt runoff peak flows were observed to be earlier than the average peak flows prior to East Troublesome Creek fire. On the east slope, the Cameron Peak fire burned a portion of the North Fork Big Thompson drainage area. Precipitation events that occurred on the burn scar caused the turbidity of the Big Thompson River to increase to very high levels. Dille skim operations were typically halted during these events to reduce delivery of this poor-quality water to the Big Thompson Powerplant and the Charles Hanson Feeder Canal, which impacted the volume of Dille skim compared to years prior to the Cameron Peak wildfire.

An accounting summary of the C-BT west slope collection system in WY 2023 shows there were 240,867 AF available for diversion to the east slope. Adams Tunnel diversions were 237,294 AF, a difference of 1.5 percent when comparing available collection system diversions versus reported diversions. That percent difference was well within the tolerance associated with the various measurements for the data used to create the accounting terms summarized in table 4. The formula for determining the collection system volume available for diversion to the east slope is shown below:

West Slope Collection Made Available for Diversion = Natural Inflow (Granby, Shadow Mountain, Grand Lake) + Windy Gap Pumping + Willow Creek Pumping - Change in Storage (Granby, Shadow Mountain, Grand Lake) - Granby Spill - Granby Releases - Net Evaporation (Granby, Shadow Mountain, Grand Lake) - Granby Seepage

The Granby Release term (above) includes both scheduled releases plus any over-releases reported, as operations attempted to meet downstream flow targets.

Table 4.—C-BT west slope collection system water balance

Volume available for diversion from west slope collection system and reported diversions through Adams Tunnel for Water Year 20233 (acre-feet)	
Combined 3 lakes natural inflow	292,705
Willow Creek pumping	48,634
Windy Gap pumping	0
Combined 3 Lakes change in storage	3,961
Granby spill	48,005
Granby releases	31,652
Combined 3 Lakes net evaporation	14,577
Granby seepage	2,277
Volume available for diversion	**240,867**
Reported Adams Tunnel Diversion	**237,294**
Percent difference	**1.5 percent**

On the east slope, total supplies were compared to total deliveries for WY 2023. Total supplies were calculated to be 203,077 AF and total deliveries were calculated to be 190,910 AF (table 5). The difference was 6 percent. That difference is similar to previous years and can be explained by delivery system transit losses and measurement error on the terms that went into the calculations. The formula for determining total east slope supplies is shown below:

$$
\begin{aligned}
&\textit{East Slope Supplies} \\
&\quad = \textit{Adams Tunnel diversions} + \textit{East Slope Priority Water} \\
&\quad - \textit{Net Evaporation (Carter and Horsetooth Reservoir)} \\
&\quad - \textit{End of WY East Slope Reservoirs' Change in Storage} \\
&\quad - \textit{Tridistrict Excess Capacity Account Change in Storage at Horsetooth} \\
&\quad - \textit{Predetermined CBT River Delivery Losses}
\end{aligned}
$$

During CHFC 550 and 930 Section outages, project demands were met via a release to the Big Thompson River from Olympus Dam. A predetermined delivery loss is applied when that method of delivery occurs. The 'Predetermined C-BT River Delivery Losses' term in the supplies equation (table 5) includes any assigned delivery losses in the east slope system. For WY 2023, a 2.1 percent delivery loss was established for those Big Thompson River deliveries of C-BT water. Supply releases had to be greater than the requested deliveries by 2.1 percent to offset the loss and that known difference was subtracted from the supply term in table 5.

The formula for determining total deliveries is as follows:

$$\begin{aligned} &Total\ Deliveries \\ &\quad = Total\ CBT\ Deliveries + Total\ Windy\ Gap\ Deliveries\ (east\ slope) \\ &\quad + Eureka\ Replacement\ Delivery \end{aligned}$$

The results of the supplies versus east slope deliveries are shown in table 5 below.

Table 5.—C-BT east slope water balance

Volume available for supply vs. reported East Slope deliveries for WY 2023	
Supply	**(acre-feet)**
Adams Tunnel Diversion	237,294
East Slope priority water	25,243
Carter Lake + Horsetooth Reservoir net evaporation	1,251
Total East Slope Reservoir change in storage	58,200
Tridistrict excess capacity change in storage	15
Predetermined C-BT River delivery loss	7
Total supply	203,077
Delivery	
Total C-BT deliveries[5]	169,826
Total Windy Gap deliveries (east slope)	20,904
Eureka replacement delivery	180
Total deliveries	**190,910**
Percent difference (of total supply)	**6.0 percent**

Maintenance and System Outages

Five major projects or system limitations in the C-BT impacted the typical operations during WY 2023. The East Portal spillway repair project began on September 18, 2022 shortly before the start of the water year. Diversions ceased through Adams Tunnel in support of the repair work and would not resume until December 20, 2022. The second major project, which began in October 2022, was the turbine overhaul of the Marys Lake Powerplant bottom end. Marys Lake Powerplant was under an outage the entire water year. The Marys Lake Powerplant overhaul project is expected to be complete in May 2024. The GMR Powerplant Unit 2 penstock recoating project began on November 1, 2022 and continued throughout most of the water year ending in September 2023. Only one unit at Green Mountain Powerplant was available during the recoating project, limiting generation during a portion of the water year. The fourth system

[5] Includes non-charge water delivered, which was zero AF in WY 2023.

limitation was an operation restriction put in place at Pole Hill Powerplant in March of 2023. Due to cracks and missing material discovered on the runner blade, operation of the powerplant was limited to the zone of low stress on the runner. This lower stress zone was determined to be 24 megawatts per hour to full capacity load or approximately 425 to 550 ft^3/s of flow. The final major outage for the water year began on September 25, 2023, near the end of the water year on Carter Lake Reservoir pressure conduit of Flatiron Powerplant Unit 3 for Northern Water to perform encasement of the section of the pressure conduit which will run under the location of the to-be-built Chimney Hollow Reservoir spillway.

Starting in WY 2023, the timing for annual maintenance of project powerplants was altered with the purpose of enhancing power values during the water year. Powerplant outages were scheduled (outside east slope power skim months) in months of historically lower power values to optimize total project power value.

Estes Powerplant Units 1 and 3 had their maintenance performed in the spring and fall of 2023, respectively. Two units were always available for generation as Estes Powerplant staff performed annual maintenance.

The Flatiron Powerplant staff completed the maintenance of the Pole Hill Powerplant unit from late October 2022 through early January 2023. The maintenance of Flatiron Powerplant Unit 2 occurred from early March to mid-April 2023. The CHFC trifurcation wasteway and Big Thompson Powerplant were winterized during the first week of November 2022. Maintenance of the CHFC 550 Section occurred during the last three weeks of October 2023, just after the end of the water year.

C-BT water deliveries were met throughout WY 2023 in coordination with outage work. Fall 2022 deliveries to the CHFC continued as planned, using water from Carter Lake Reservoir during the thirteen-week East Portal spillway repair to refill Flatiron Reservoir and meet CHFC demands during the outage. Maintenance outages at Flatiron and Estes Powerplants did not impact planned water operations.

Operations and Outcomes

Generally, starting around the middle of December, the project begins to divert water through Adams Tunnel at full capacity to refill Carter Lake and Horsetooth Reservoirs for the upcoming season. The first refill is planned prior to when skim and priority water typically become available in mid to late May through late June to maximize use of east slope skim and priority water by the project. In most cases, a small amount of space is left open in Horsetooth Reservoir to store unanticipated priority water that may become available at Dille Diversion on the Big Thompsons River. This operation was generally implemented as planned in WY 2023. Carter Lake Reservoir was first filled to within 4,000 AF of capacity by mid-April 2023 and filled four more times (early June, early July, mid-July and early August) to maximize use of storage as the project attempted to utilize all available east slope priority water and minimize west slope

collection system spill. Horsetooth Reservoir was filled later in June 2023 and generally held near full through the third week of July 2023. Over 25,000 AF of east slope priority water was diverted and delivered to storage in Horsetooth or Carter Lake Reservoirs.

April 1, May 1, and June 1 east and west slope runoff forecasts were somewhat variable in their predicted runoff volumes for the season but maintained their greater than average forecast throughout the period. The exception was GMR forecast with relatively stable but mildly less than average forecast for the period. Willow Creek and Granby Reservoir's forecasted runoff volume increased substantially from May to June. By early June, with greater than average carryover storage at Granby Reservoir and greater than average runoff forecasted, it was evident that the potential for a spill at Granby Reservoir was extremely high. Willow Creek pumping to Granby ceased in early June, much greater than average east slope priority water became available for the project in June and July 2023, and Granby spilled about 48,000 AF in June and July 2023. The Granby spill ceased by the third week of July and Willow Creek pumping resumed a few days thereafter.

Carter Lake Reservoir was filled to 4,000 AF of capacity by April 19, 2023. Pumping to Carter resumed on May 9 and continued until June 2 as Carter filled to capacity. Carter was filled again on June 30, July 11, and August 6, 2023. The final pumping period to Carter started on August 15 and continued support of Grand Lake clarity operations, ending on September 24, 2023, shortly after the clarity operations wound down for the season for an outage on the Carter Lake pressure conduit for work related to Chimney Hollow Reservoir construction. Adams Tunnel diversions were mildly decreased with the first near fill of Carter Lake Reservoir in April 2023 to maximize east slope skim throughout runoff. However, since over 25 KAF priority water became available during the WY 2023 season, east slope skim operations were largely supplanted by the objective of moving available priority water into storage at Horsetooth and Carter Lake Reservoirs from late May to mid-July 2023. As a result, Adams Tunnel diversion decreased in early June through mid-July to take full advantage of east slope priority available to the project during WY 2023. By July 15, the project moved out of priority on the east slope and Adams Tunnel diversion were increased as pumping to Carter Lake reservoir resumed on July 20 to begin support of Grand Lake clarity operations for the season.

In late December 2022, Horsetooth Reservoir had just under 78,100 AF of free space. It was within 54,000 AF of fill by mid-March 2023. From that point, Horsetooth Reservoir storage increased to capacity by June 29. Throughout the season, Horsetooth and Carter Lake Reservoir demands were lower than projected mainly due to greater than normal rainfall from early June through late August during the irrigation season. Horsetooth Reservoir ended the WY 2023 with nearly 121,500 AF in storage. Carter Lake reservoir ended the year with over 105,200 AF in storage. Both storages were significantly greater than typical for the end of the water year.

C-BT project operations, skim operations, and east slope priority water availability for the season kept daily mean releases from Olympus Dam to the Big Thompson River at or below 713 cubic feet per second (ft^3/s) during runoff. Figure 7 illustrates how the Olympus Dam instantaneous

releases were managed during the runoff from mid-April through August 2023. The peak instantaneous release from Olympus Dam was 725 ft^3/s and occurred on May 27, 2023. Maximum instantaneous inflow to Lake Estes was 895 ft^3/s and occurred on June 8 and 9.

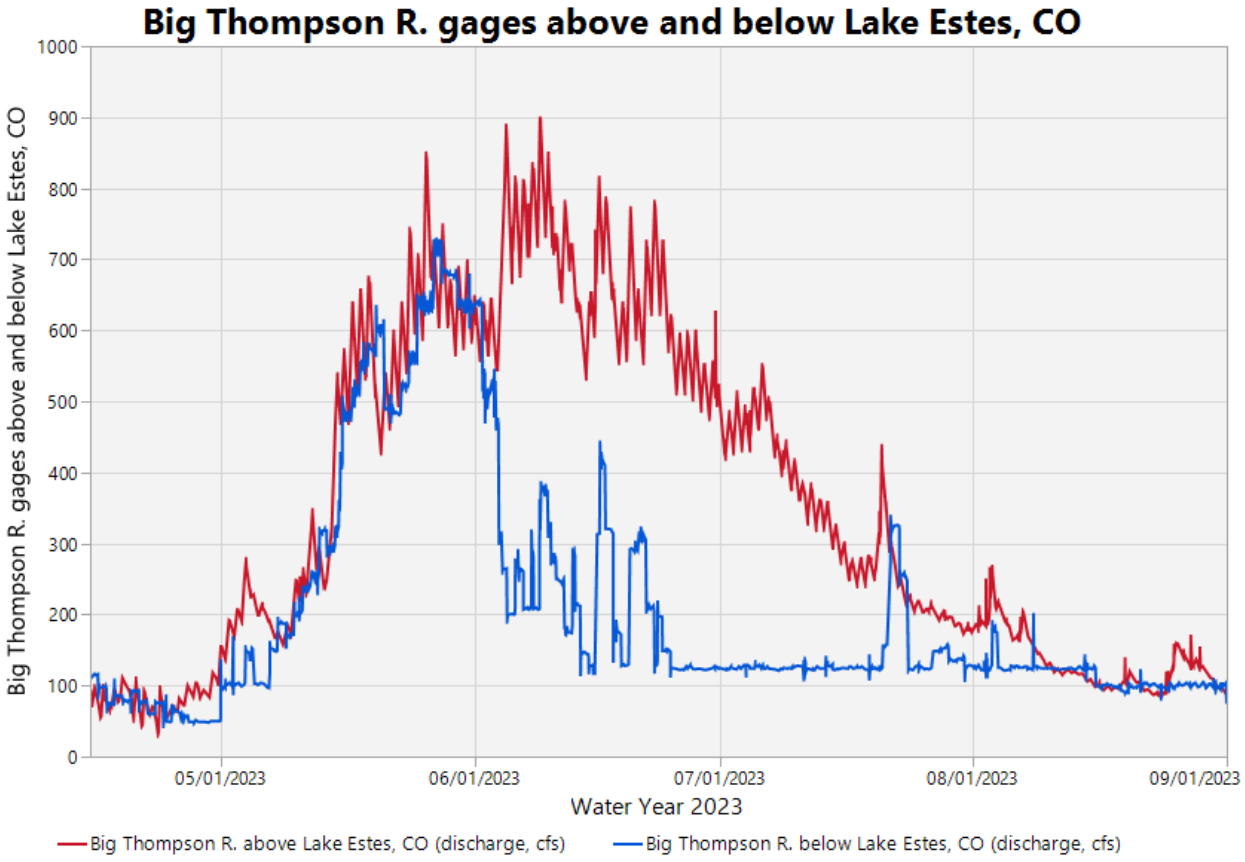


Figure 6.—Big Thompson River gages above and below Lake Estes: April–August 2023 discharge (ft^3/s).

Colorado – Big Thompson Project Operations by Facility

Collection System

Willow Creek Reservoir

October through March: Figure 7 shows snow accumulation in the Willow Creek Reservoir basin was mildly below average starting in November 2022. However, accumulations were greater than average from late December 2022 throughout the remainder of the snow accumulation season.

Reservoir release operations followed standing operating procedures. Winter reservoir release was maintained near seven ft^3/s for Colorado River fishery maintenance as directed by the Secretary of Interior schedule of release.

April: The first signs of runoff in the Willow Creek watershed began in early April 2023 (figure 8). Pumping to Granby Reservoir also began in earnest April 2023. The pump ran three times in April for a monthly total volume of 9,810 AF.

May: The WY2023 computed daily peak inflow of 1,292 ft^3/s was reached on May 12, 2023 (figure 8). Both Willow Creek pumps ran daily from April 28 to June 7. During the month of May 26,635 AF was pumped from Willow Creek Reservoir to Granby Reservoir.

June: Willow Creek Reservoir pumping continued through noon on June 7. The June runoff forecast (completed on that same day) projected the probability of a spill at Granby was extremely high. Pumping ceased throughout the remainder of June as well as much of July. The total volume of water pumping in June was 5,644 AF.

July: Pumping resumed on July 26. For the season, about 12 KAF was spilled at Willow Creek during WY2023.

August and September: Three more short pumping operations occurred during the last two months of the year for an additional 3,162 AF pumped to Granby.

The observed April-July runoff to Willow Creek Reservoir was nearly 84 KAF, significantly more than the long-term seasonal runoff average of 51 KAF. The April 1 most probable forecast (forecasts are from table 3, presented earlier in this report) was 78 KAF. May 1 most probable forecast was 72.8 KAF and June 1 most probable forecast was 85.6 KAF, very close to the observed April-July runoff.

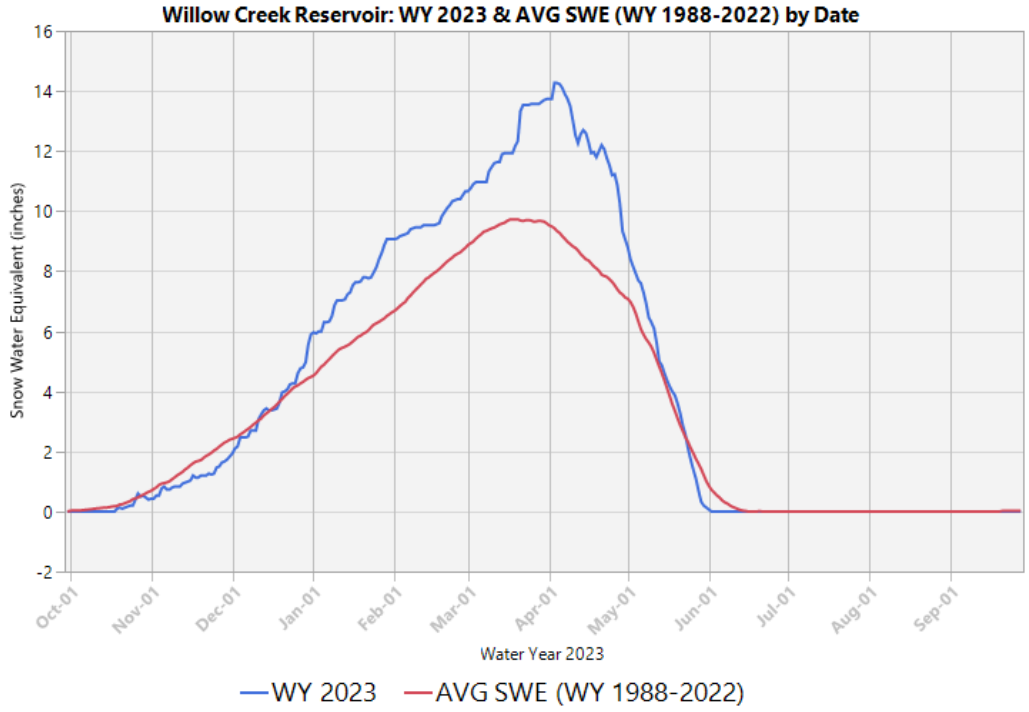


Figure 7.—Water year 2023 and 35-year average SWE for the Willow Creek Reservoir drainage area.

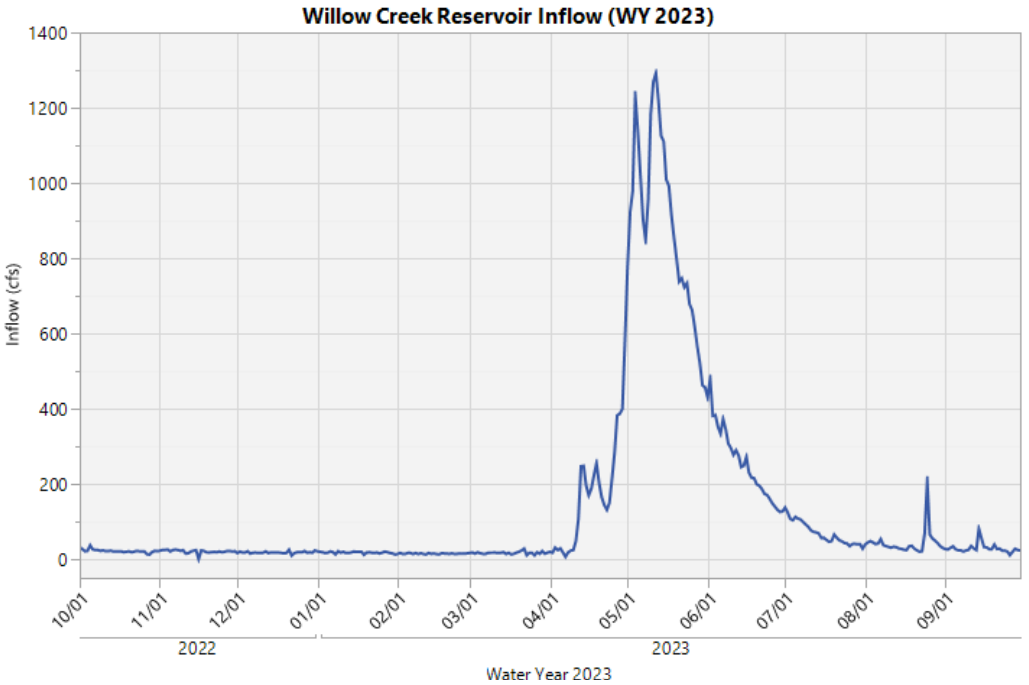


Figure 8.—Computed inflow to Willow Creek Reservoir during water year 2023.

Granby Reservoir and Shadow Mountain Reservoir/Grand Lake

Granby Reservoir, Shadow Mountain Reservoir, and Grand Lake are located on the Upper Colorado River. Grand Lake and Shadow Mountain Reservoir are hydraulically connected and function, operationally, as a single body of water with the water surface elevation controlled by Shadow Mountain Dam. Operations maintain water surface elevation between 8,366 and 8,367 feet. The two water bodies provide approximately 1,700 AF of regulatory storage and function as the forebay for Adams Tunnel and an afterbay for the Farr Pump Plant. The Farr Pump Plant moves water from Granby to Shadow Mountain Reservoir as needed to augment Adams Tunnel diversion of Shadow Mountain Reservoir and Grand Lake native flow. During spring runoff native flow usually exceeds Adams Tunnel diversion, and excess water is released from Shadow Mountain Reservoir down the Colorado River for storage within Granby Reservoir. During WY 2023 Shadow Mountain Dam maintained minimum flows to the Colorado River and maintained water surface elevation as described within the SOP.

Unless otherwise noted, the balance of this section emphasizes Granby Reservoir operations which are considerably more variable, and therefore, of more operational interest than that of Shadow Mountain Reservoir and Grand Lake.

October through February: The carryover content from WY2022 for Granby Reservoir was 481,116 AF or 115 percent of the thirty-year average start of year content (416,750 AF). At full capacity Granby storage is 539,758 AF. As diversions through the Adams Tunnel resumed in December 2022, Granby content began to steadily fall. However, the reservoir content remained above the thirty-year average until early March 2023. Figure 9 shows snow accumulation in the Granby basin was mildly below average starting in early November, increased to above average accumulation in late December and stayed above average through early May.

March through April: Snow accumulation reached its peak in early April and was well above average. Adams Tunnel diversions continued from mid-December until the first near fill of Carter Lake Reservoir on April 16, 2023. Mean Adams Tunnel diversion from March through the end of April were 512 ft^3/s.

April/May through June: Throughout April, snow conditions on the west slope indicated that the potential for a project spill at Granby Reservoir was likely, although not a certainty. Snow accumulation remained above average through the end of April. By June 1 Granby, Horsetooth and Carter Lake Reservoirs' combined storage was 726.5 KAF, nearly 108 KAF greater than the average combined storage for the preceding thirty years for that date, however, Granby Reservoir storage was only 480 KAF by that point in time. The lack of available storage at Carter and Horsetooth Reservoirs and the storage condition for Granby continued to indicate a project spill was likely but not imminent. Average temperatures for the start of June coupled with the above average snowpack created a mildly greater than average runoff peak, near average timing of that peak, and a runoff duration that was greater than normal. Computed mean daily natural inflow to Granby, which peaked on June 23 was 928 ft^3/s. That observed peak was rainfall runoff

enhanced. The snowmelt peak likely occurred on June 10 and was 908 ft^3/s. Adams Tunnel diversions averaged 488 ft^3/s during May as pumping to Carter Lake Reservoir occurred during most of the month.

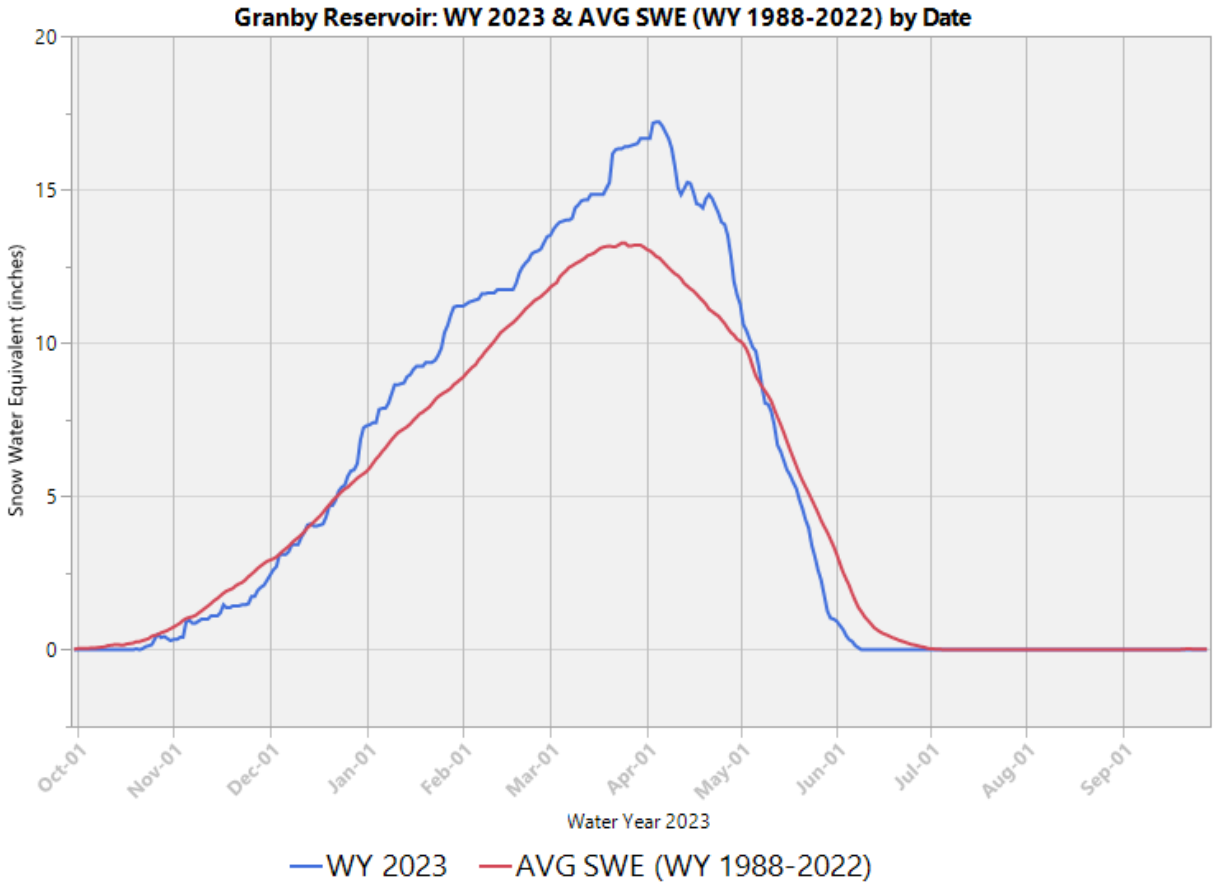


Figure 9.—Water year 2023 versus 35-year average SWE for the Granby Reservoir drainage area.

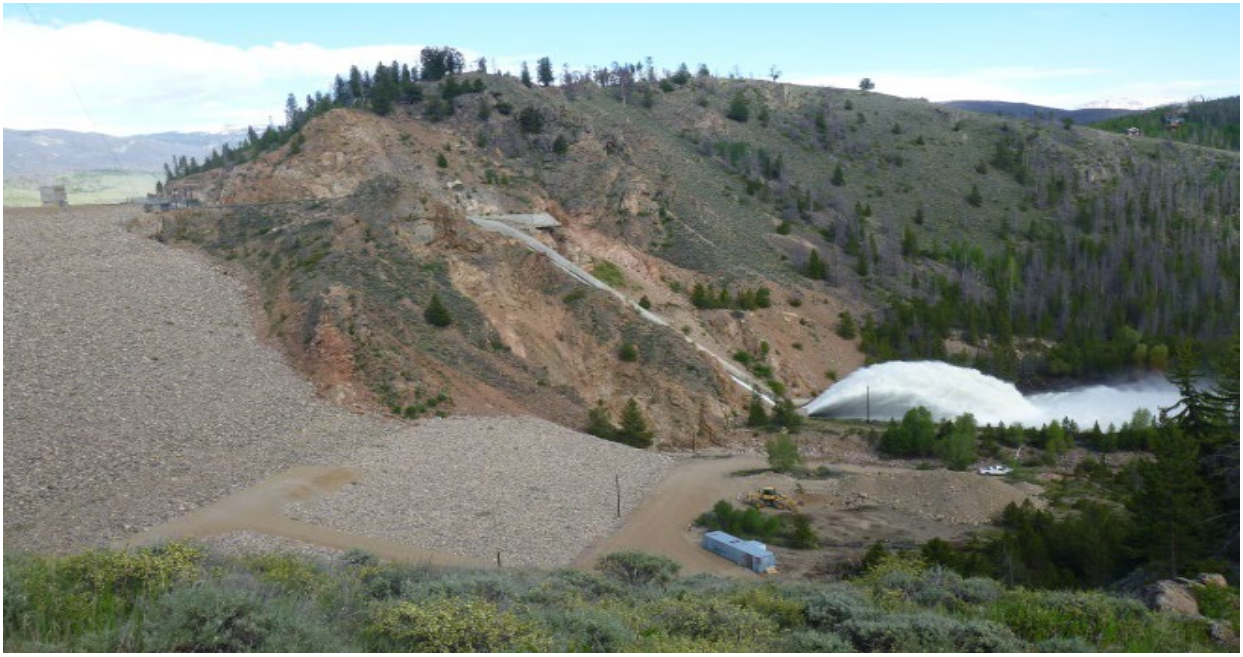


Figure 10.—Granby Reservoir spill; approximately 2,400 ft^3/s, June 13 through June 21, 2015.

July through September: Adams Tunnel diversions were slowly increased throughout July as Big Thompson River demands increased, and available storage space slowly increased in Horsetooth and Carter Lake Reservoirs. Pumping to Carter Lake Reservoir resumed on July 20 and continued until August 6, 2023, as Carter Lake Reservoir was filled for the fifth time for the season. According to the available operational records back to the 1950s, WY 2023 was the first ever fill of Carter during the month of August in the project's history. Typically, demands for water from Carter far outpace the pumping supply starting in late July through the end of the water year.

Throughout the runoff forecast season there was strengthening indication that a spill was likely at Granby Reservoir for WY 2023. Above average snowpack created above average peak runoff and inflows to Granby Reservoir. Couple that with very little available storage in the east slope's terminal reservoirs, plentiful east slope priority water and the potential for spill became a near certainty. By end of the first week of June the daily marginal rate of Granby fill continued to increase, pointing toward an imminent project spill at Granby in WY 2023. Preemptive releases from Granby in excess of the minimum required release for June and July began on June 12 and continued until July 17. Granby reached its maximum storage of 536,133 AF on July 20, 2023. About 48 KAF was spilled from Granby during the water year. The maximum daily average release from Granby during spill was 2,004 ft^3/s and occurred on June 23, 2023.

Pumping to Carter Lake Reservoir continued through the end of the Grand Lake clarity season (September 9) until the start of the Flatiron Unit 3 pressure conduit outage for Chimney Hollow work on September 25. Adams Tunnel diversions averaged 456 ft^3/s from July 21 through the

end of the water year. Granby Reservoir finished WY 2023 with 484,991 AF of water in storage. Granby storage remained above the end of month thirty-year average storage during the entire year (figure 11).

The observed April-July runoff to Granby and Shadow Mountain Reservoirs and Grand Lake was approximately 253 KAF. The April 1 most probable forecast (displayed previously in table 3) was 261 KAF, May 1 was 242 KAF and June 1 was 229 KAF.

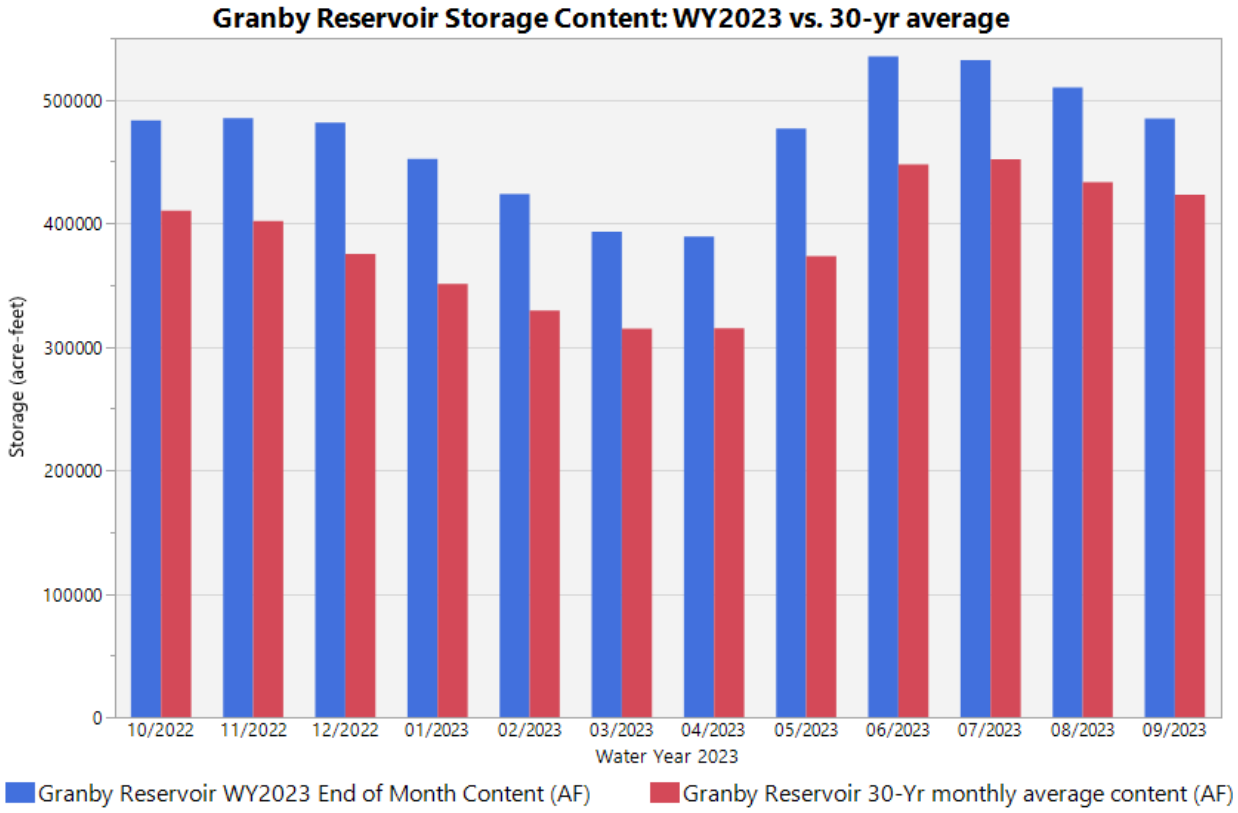


Figure 11.—Granby Reservoir storage content, water year 2023 versus the 30-year average storage content.

Grand Lake Water Clarity operational plan for WY 2023 was fashioned after the successful 2018 and 2019 plans. The plan included a pre-clarity operation in mid to late June to reduce Adams Tunnel diversions to slightly less than Grand Lake natural inflow, in an attempt to enhance total suspended solids from settling and minimizing introduction of Shadow Mountain Reservoir water into Grand Lake during the period. As is typically observed, Grand Lake Secchi depth was better than Shadow Mountain clarity at the end of the pre-settling period of Grand Lake Clarity operations. Once Granby Reservoir spill ceased in mid-July and based upon the consensus recommendation of the Grand Lake Advisement Committee, Adams Tunnel diversions started

and Farr Plant pumping began on July 18, slightly later than the planned date of July 6, 2023. The average Grand Lake Secchi depth declined sharply with the start of pumping (5.25 m to 4.0 m). Following mild clarity improvement from late July into mid-August, Grand Lake Secchi depths declined again primarily due to rain driven runoff events the third week of August 2023, and continued to generally decline at a slower pace through to the end of the clarity season (4.85 m to 3.1 m). Shortly after Farr Pumping began and again by the end of the season, Grand Lake Secchi's depth had synchronized with Shadow Mountain Reservoir's clarity, as is typically observed. The plan to increase Adams Tunnel diversions during the workdays and reduce diversions on weekends was generally unattainable due to a lack of available storage space in Carter Lake and Horsetooth Reservoirs during the clarity season. Demands on storage at Carter Lake and Horsetooth Reservoirs were substantially less than projected throughout the 2023 clarity season.

For the WY 2023 season, both the minimum clarity goal of 2.5 meters and the seasonal running average clarity goal qualifier of 3.8 meter were met during Grand Lake Clarity operations. The minimum clarity was 2.99 meters, and the running average was 4.23 meters for the season (figure 12).

A full description of the planned clarity operations and actual operations for the WY 2023 clarity period can be found in the 2023 Grand Lake Clarity Adaptive Management Final Report[6].

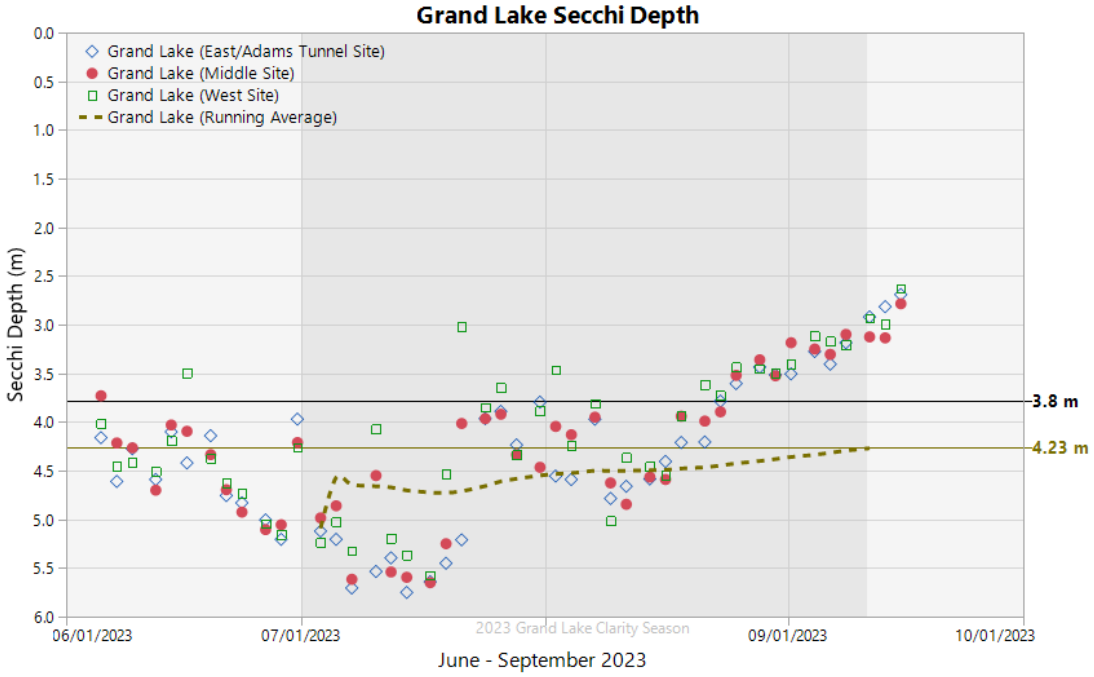


Figure 12.—Seasonal Secchi depths in Grand Lake for 2023 clarity season.

[6] 2023 Grand Lake Clarity Report available online from Northern Water website (accessed January 23, 2024).

East Slope

Adams Tunnel, Marys Lake and Lake Estes

November through December 2022: Starting in WY 2023, the annual maintenance schedule timing for project powerplants was altered with the intent of enhancing power values during the water year. WY 2023 started in October with East Portal spillway repairs already underway. Numerous inspections took place at different facilities during the East Portal outage period from mid-September through late December 2022. Water diversions from the west slope were suspended for about thirteen weeks to accommodate the East Portal repairs. The snowpack in the Lake Estes watershed was near normal in this period until the end of December 2022 when it rapidly increased to above normal.

December 20: Water began to flow through the Adams Tunnel once again as storages in the power arm reservoirs were adjusted to operational elevations prior to pumping to Carter Lake Reservoir.

December 28: Winter fill of terminal east slope resevoir operations began with the start of pumping to Carter Lake Reservoir.

January through March 2023: The snowpack above Olympus Dam started the calendar year above average and maintained its above average accumulation throughout the season (figure 13). Estes Powerplant Unit 1 maintanence started in mid-March and ended in mid-May. Two units were always available for generation during the period.

March 20: Maintenance of Estes Powerplant Unit 1 began.

April: Temperatures increased gradually throughout the month and by the second week of April began to melt some of the snow at lower elevations. The inflow to Lake Estes generally increased during the same period.

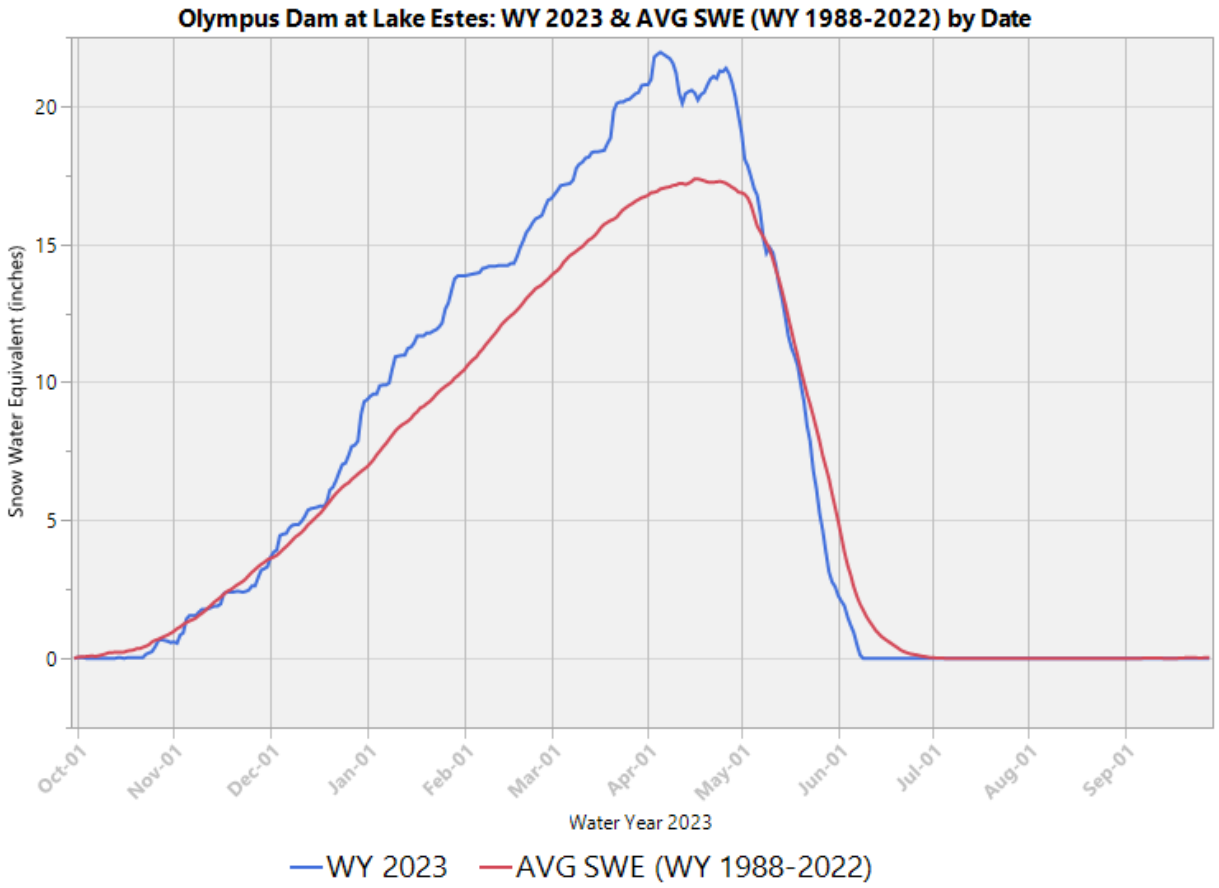


Figure 13.—Water year 2023 and 35-year average SWE for the Olympus Dam drainage area.

May: Mean daily temperatures over the Front Range were two to three degrees above normal during much of May. The natural inflow to Lake Estes continued to increase. However, temperatures for the last week of May cooled and inflows temporarily slowed. For the water year the cumulative natural inflow to Lake Estes was slightly less than the thirty-year average, until May when cumulative inflow became substantially greater than the thirty-year average (figure 14). This trend continued throughout the remainder of the water year. By the end of the water year Lake Estes cumulative inflows were just over 18 KAF greater than the thirty-year average.

May 11: Maintenance of Estes Powerplant Unit 1 was completed and the unit was brought online and back to service.

May 18: The project came into priority for the first time. Cooler weather moved the project out of priority by May 22 as runoff slowed. Near normal temperatures returned a few days later and the project was back in priority by May 27. After that, the project remained in priority all the way through mid-July.

May 19: Wind River skim operations began for the water year. A total of 283 AF for the year was skimmed for power generation at Marys and Estes Powerplants between May 19 and June 20, 2023. This value is lower than typical and was the result of the project needing all available conveyance space in Rams Horn Tunnel to reduce west slope spill during runoff.

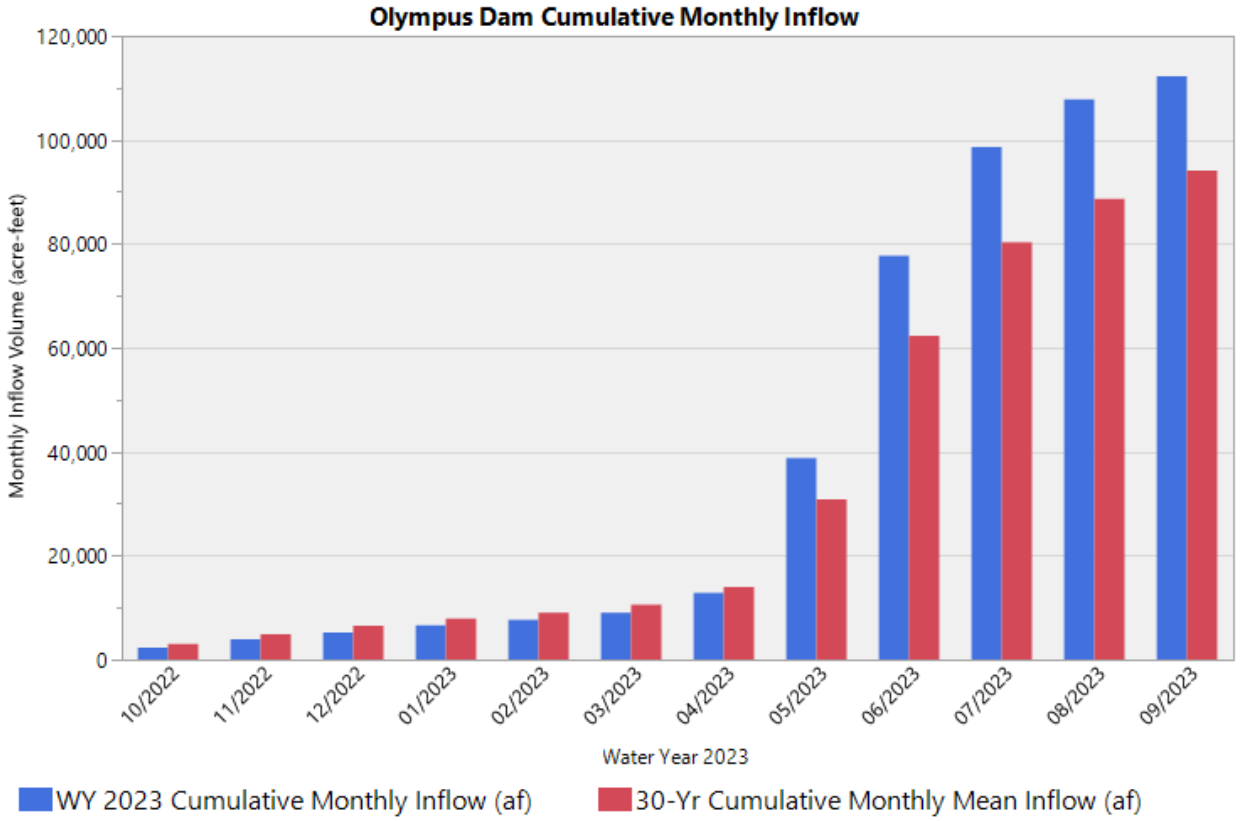


Figure 14.—Computed cumulative native inflow for Lake Estes during water year 2023 versus 30-year average.

June: Mean daily temperatures over the Front Range continued to increase but remained slightly below normal for the month. Big Thompson River above Lake Estes flows peaked on June 9, slightly before the fifteen-year average date of June 11. Adams Tunnel diversion remained well below capacity as the project took full advantage of available east slope priority water throughout the month. Adams Tunnel diversions averaged 106 ft^3/s in June.

June 9: Mean daily flow for the Big Thompson River above Lake Estes peaked at 815 ft^3/s. The instantaneous peak flow, recorded on June 8 and 9 was 895 ft^3/s. The maximum mean daily release to the Big Thompson River below Lake Estes, 713 ft^3/s, occurred May 27, 2023.

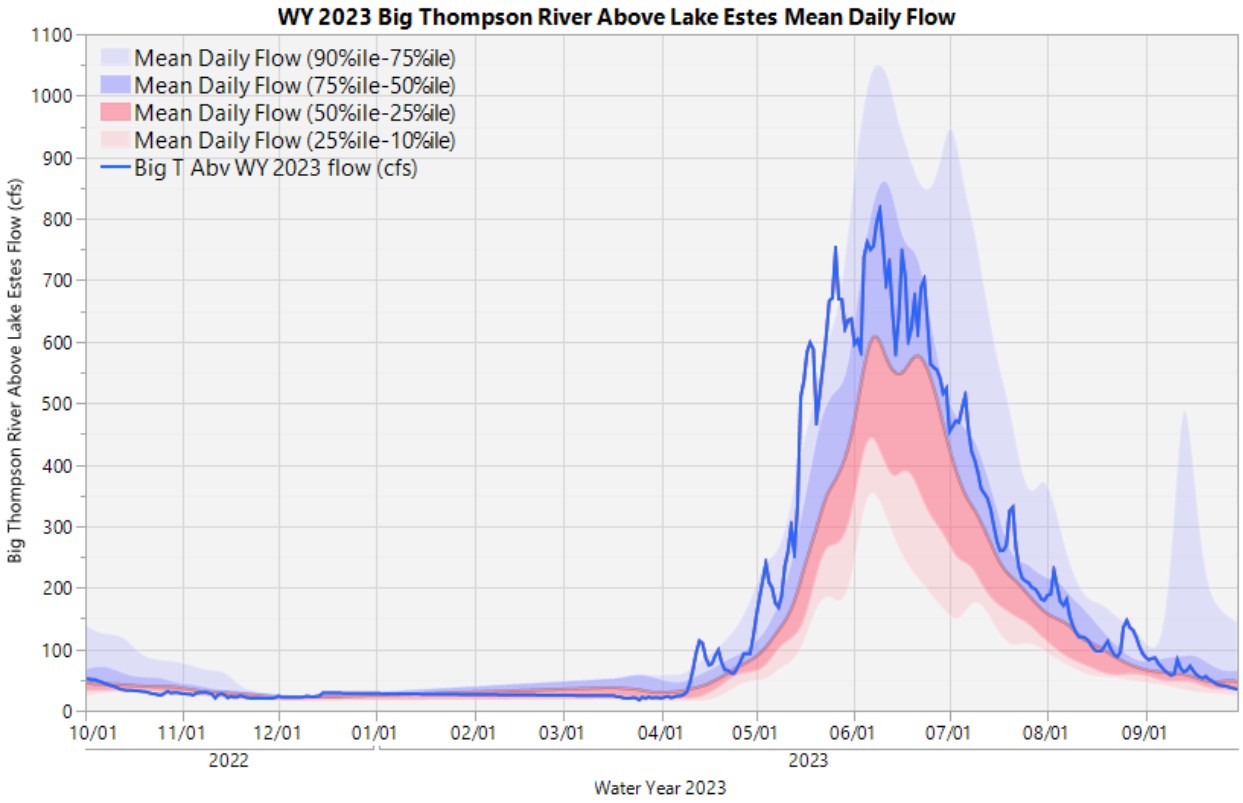


Figure 15.—Big Thompson River above Lake Estes, water year 2023 gage flow vs. distribution of 15-year daily flows.

July through September: Adams Tunnel diversions averaged 255 ft^3/s for July and a bit over 450 ft^3/s for August and September. Big Thompson inflows to Lake Estes generally stayed above the 15-year median inflows throughout the entire runoff season (figure 15).

The observed April - July runoff to Lake Estes was approximately 89.5 KAF. The April 1 most probable forecast (table 3, above) was 84 KAF. May 1 most probable forecast was 80.6 KAF, and June 1 most probable forecast was 73.4 KAF.

Lower Power Arm, Carter Lake and Horsetooth Reservoirs

October through November 2022: Concurrent planned outages occurred at the start of the water year. Adams Tunnel East Portal spillway repairs began a couple of weeks prior to October 2022, and the lower power arm started the year under an outage for Northern Water to install a wye connection to Bald Mountain Tunnel for their Chimney Hollow Reservoir project. Pinewood Reservoir was drained and Flatiron Unit 3 was used in generation mode multiple times from October through December to divert water from Carter Lake Reservoir filling Flatiron Reservoir to meet Charles Hansen Feeder Canal demands during the outage. Pole Hill Powerplant underwent its scheduled maintenance starting on October 24 and ending in early

January 2023. The Big Thompson Powerplant and Trifurcation Wasteway were winterized in early November 2022.

December 2022: With repairs complete and outages lifted, flows in Olympus Tunnel began. Pinewood was filled back to operational elevation and pumping to Carter Lake Reservoir began. Since maintenance continued on Pole Hill Powerplant, Olympus Tunnel flows bypassed the powerplant during the month.

December 28: Pumping to Carter Lake Reservoir from Flatiron Powerplant unit #3 commenced at 0800 hours.

January and February 2023: Pole Hill Powerplant was returned to service as scheduled, following its maintenance, in early January. Both Adams and Olympus Tunnels diversions increased to capacity throughout January and February as pumping to Carter Lake Reservoir continued. Horsetooth Reservoir fill remained on its target fill rate.

January 5: Generation at Pole Hill Powerplant began for the season.

March and April: Flatiron Powerplant unit #2 maintanence began in early March and ended in mid-April. A planned outage on the Carter Lake Reservoir pressure conduit began on April 17 and pumping to Carter Lake Reservoir ceased. It was just 3,500 acre-feet short of its first fill for season. Diversions from the west slope and Olympus Tunnel (figure 16) were reduced to the CHFC 550 Section capacity as efforts switched to adding water to storage at Horsetooth Reservoir. Horsetooth storage remained on target through March and April.

An early January inspection and report revealed cracks and missing material on the Pole Hill Powerplant runner blade. To minimize stress on the runner blade, an operation restriction was placed on Pole Hill Powerplant in March limiting generation to loads between 24 megawatts and full load (flows of approximately 425 ft^3/s or greater). The restriction will remain in place until the issue is resolved.

March 6: The maintenance of Flatiron Powerplant Unit 2 began.

April 14: Maintenance of Flatiron Powerplant Unit 2 completed. Unit brought online and back into service on April 17.

April 27: Olympus Tunnel lower power arm skim operations began for the season.

May: Olympus Tunnel skim of excess to Big Thompson River flows continued until pumping to Carter Lake Reservoir resumed during the second week of May. Dille diversion was brought online in early May. Dille power skim and generation at Big Thompson Powerplant began in mid-May.

May 9: Pumping to Carter Lake Reservoir resumed and continued through June 2, as Carter Lake Reservoir was refilled this time to capacity prior to the spring runoff peak. Adam Tunnel diversions averaged 326 ft^3/s in May, while pumping to Carter Lake Reservoir averaged 273 ft^3/s during its May pumping period.

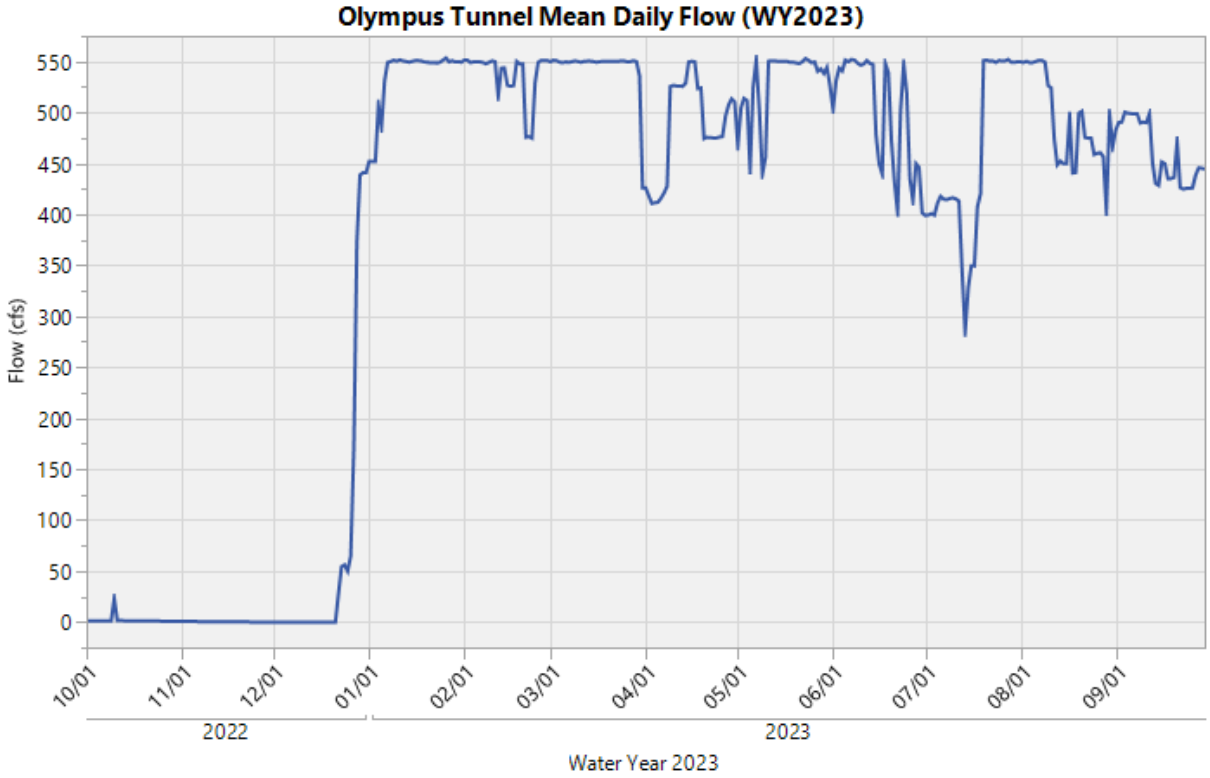


Figure 16.—Olympus Tunnel mean daily flow during WY23.

May 15: Big Thompson Powerplant began generation using flow from the water skimmed at Dille diversion.

May 18: The project came into priority for the first time. All priority water during the month of May (876 AF) was diverted from the Big Thompson River at Dille for storage at Horsetooth Reservoir.

June: Timely and beneficial rains began the second week of June and kept demands for Big Thompson River water low during the month. As a result, the project remained in priority on the east slope throughout June. Olympus Tunnel skim volumes for the month were much lower than typical because most of the available priority water was diverted through Olympus Tunnel. Even though skim volumes were low, the lower power arm still made optimal use of the priority water for generation as Olympus Tunnel remained near capacity through much of the month. For the

month a total of 20,524 AF of priority water was diverted to Olympus Tunnel, and an additional 871 AF diverted at Dille. Adams Tunnel diversions were reduced averaging 106 ft^3/s for the month mainly because of the availability of east slope priority water. Carter Lake Reservoir was topped off twice during the month and Horsetooth Reservoir was filled to capacity by the third week of June.

June 21: Pumping to Carter Lake Reservoir resumed and Carter was filled for the second time for the month on June 30, as the Granby Reservoir spill continued on the west slope. Horsetooth Reservoir was filled on June 23.

July through September: In July the timely precipitation events continued from June and carried into mid to late August. These rains made it difficult to determine when the monsoonal moisture season began in the mountains of northern Colorado. The rains from June through August reduced demands on Carter Lake and Horsetooth Reservoirs. Even by the second week of August, the storage in Granby, Carter Lake and Horsetooth Reservoirs remained nearly full (front cover of report). Pumping to Carter Lake Reservoir resumed in early July. East slope priority water declined but remained available through the first half of the month. Dille skim for the season was intermittent, once again hampered throughout the skim season by poor water quality issues in the Big Thompson River from runoff events originating from the North Fork Big Thompson River drainage area on the burn scar left by the Cameron Peak fire in 2020.

July 6: Pumping to Carter Lake Reservoir resumed and it was quickly filled to capacity again by July 10.

July 20: Pumping to Carter resumed for the second time in July.

August 6: Carter was filled again, and pumping ceased until it resumed on August 20. A review of the project history reveals this was the first time Carter Lake Reservoir was filled to capacity in the month of August. Once pumping to Carter resumed on August 20, it continued until the Flatiron Unit 3 outage began on September 25.

September 24: Pumping to Carter Lake Reservoir ended as the Northern Water outage began. Northern Water needed to encase a section of Carter Lake pressure conduit which will run under the Chimney Hollow Reservoir spillway.

September 30: Dille skim operations continued through the end of the water year. About 14,950 AF were skimmed into Dille Tunnel for the season, which is less than average but better than previous years. By comparison, Olympus Tunnel skim operations totaled 16,900 AF for the season. This volume is much lower than typical, but was impacted by the large volume of east slope priority water diverted though Olympus Tunnel.

Throughout WY 2023: Carter Lake and Horsetooth Reservoirs elevations supported all boat ramps during the recreation season. Sufficient supplies met all water demands. A total of 123,132 AF was delivered to Carter Lake Reservoir; 131,028 AF were delivered to Horsetooth

Reservoir and customers along the CHFC 550 Section. Carter Lake Reservoir ended the year with 105,239 AF in storage which was substantially greater than average and about 30,500 AF more than it started with. Horsetooth Reservoir had 121,476 AF in storage at the end of the year, also substantially above average and about 27,000 AF more than it started with.

Carter Lake and Horsetooth Reservoir demands were considerably lower than projected. Precipitation from early June through late August, especially along the front range and eastern Colorado served to greatly reduce demands. Carter Lake Reservoir end of month content remained above the thirty-year average content from February through September (figure 17). In fact, Carter's end of water year storage (105,239 AF) is the largest end of year volume in project history at Carter. Horsetooth Reservoir content remained above its thirty-year average from April through September (figure 18).

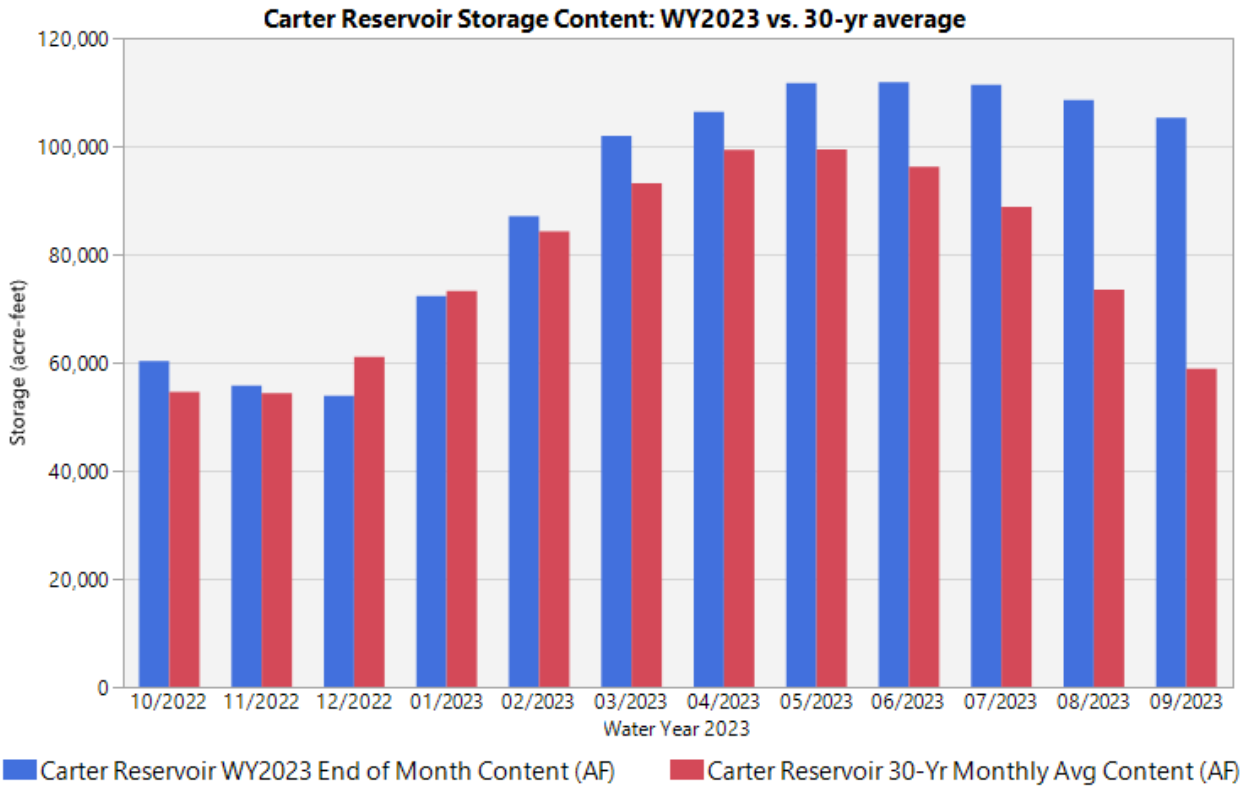


Figure 17.—Carter Lake Reservoir storage content during water year 2023 versus its 30-year average.

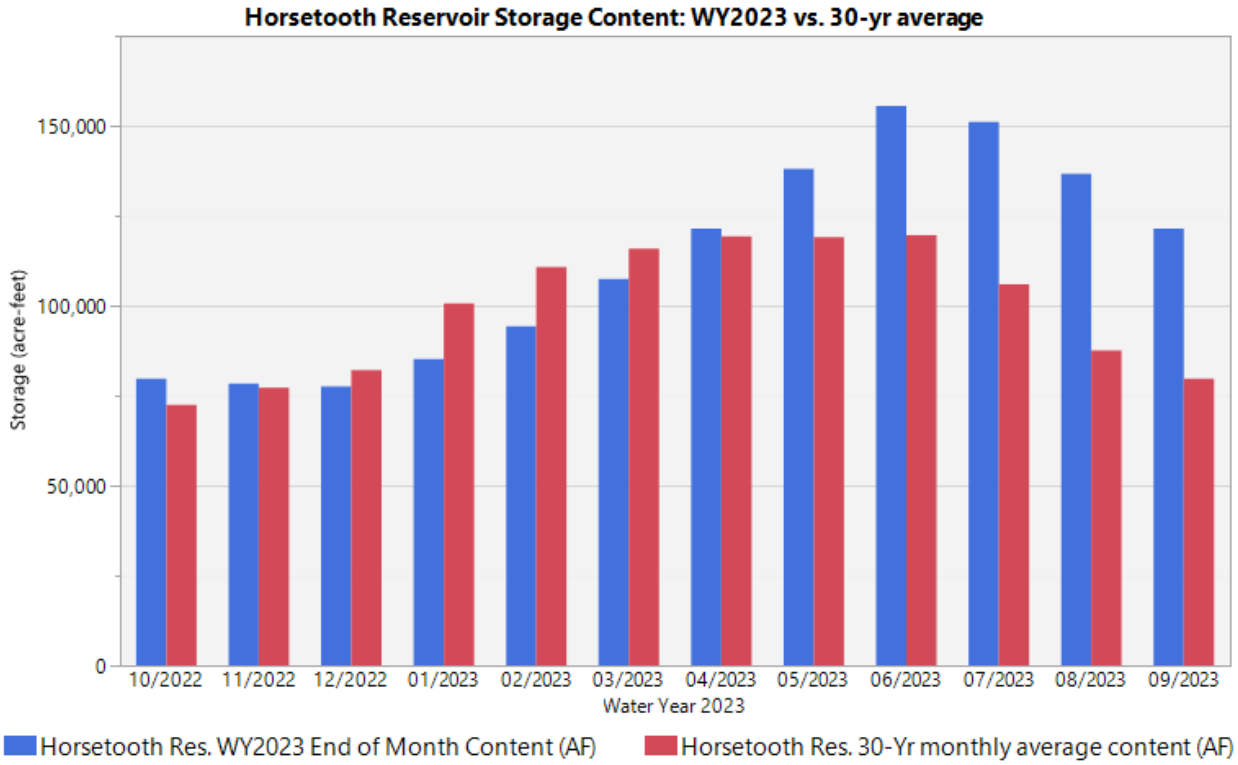


Figure 18.—Horsetooth Reservoir storage content during water year 2023 versus its 30-year average.

Green Mountain Reservoir

Climate and Hydrology WY 2023: Hydrologic conditions within the Upper Colorado River basin were mildly below normal for GMR operations during the winter delivery season. Mildly below normal snow accumulation was also observed for the season (figure 19). Excluding heavy storage release for GMR in October 2023, main stem Colorado River flow was near to below normal from October through March. By the time of the average peak snow accumulation date of April 27, the observed accumulation was 93.5 percent of the seasonal average. The April 1 runoff forecast projected an undepleted runoff volume to GMR of 259 KAF, approximately 92 percent of normal (table 3, shown previously). The May 1 runoff forecast was again 238 KAF and the June 1 forecast was 256 KAF. The observed April through July runoff was 275 KAF, 97 percent of average.

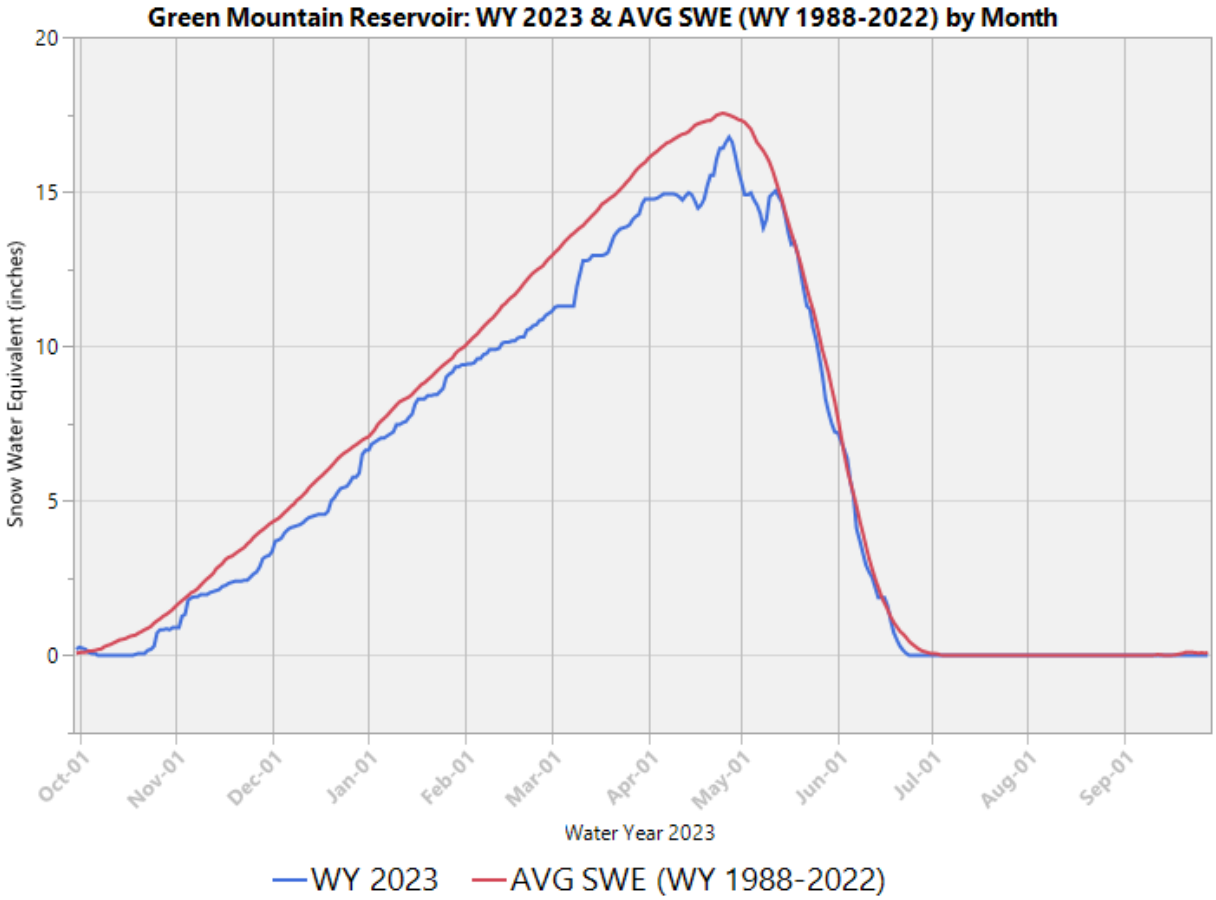


Figure 19.—Water year 2023 and 30-year average SWE for the Green Mountain Reservoir drainage area.

Blue River basin above GMR 2023 snow accumulation and melt resulted in a near average April-July runoff volume, aided by mildly higher than normal precipitation in May and June. Snow accumulation tracked with the mildly below average runoff years of 1989, 1991, and 2005 on April 1. Average daily inflow to GMR peaked at 1,981 ft^3/s on June 23, 2023, with lower-than-normal upstream diversion by the cities of Denver and Colorado Springs, due to the heavy spring precipitation within the South Platte basin that reduced demand for Blue River and Colorado River water. The total observed April–July runoff was 275 KAF, 5.7 percent greater than the April 1 forecast for the most probable plan. The total April–July runoff volume was only three percent less than the forty-year average April–July runoff volume.

The near average runoff and lower than normal upstream diversion operations by the Cities of Colorado Springs and Denver combined to allow GMR to reach a physical fill. South Platte Basin's peak snow accumulation was slightly above normal for seasonal average accumulation. Dillon Reservoir April 1 carryover storage was at the twentieth percentile and increased storage 52.7 KAF between April 1 and July 31. Dillon Reservoir began uncontrolled spill release on June 15. During this period, Roberts Tunnel diversion was 12.7 KAF, 46 percent of normal due,

in part, to lower demands for Blue River sources, because of exceptional late spring precipitation within Denver's service area. Colorado Spring Utilities April-July east slope diversion was above normal with 8.3 KAF. The Shoshone Power Plant remained offline, and Colorado Springs Utilities continued to divert a total of 9.7 KAF for the WY2023 diversion season.

Upper Colorado River basin's 127 percent of normal April 1 SWE combined with wetter than normal April through June precipitation which resulted in an above average April-July runoff hydrology. Mainstem Colorado River flow remained near average leading into snowmelt runoff. The Division 5 Engineer implemented Colorado River main stem water rights administration on September 7, 2023 with a senior Grand Valley irrigation call. Mainstem water rights administration remained in effect intermittently through September 30, 2023. The Colorado River at Cameo reached a runoff peak on May 24, 2023, of 17,300 ft^3/s which is near average in magnitude but within the earliest twenty-five percent of eighty-eight years.

An extended outage at the Shoshone Powerplant substantially affected mainstem river hydrology and water rights. The Shoshone Powerplant lost ability to generate power on February 28, 2023 and remained offline for the remainder of the water year. ShOP operations remained in effect while mainstem flow remained below 1,250 ft^3/s in Glenwood Canyon. This permitted additional diversion upstream of Glenwood Canyon that Shoshone Powerplant administrative water rights call would otherwise curtail or require replacement with stored water. As a result, water rights administration was delayed until the Cameo irrigation water rights administrative call became first effective on September 8, 2023 and remained intermittently in effect at various priorities through the remainder of the water year.

October through April Delivery Operations: GMR continued stored water delivery through the end of the irrigation season and throughout the winter delivery season. Colorado River mainstem water rights administration was in effect for most of the period starting October 1, 2022 until February 28, 2023. ShOP operations were in effect from October 24 to November 4, 2022. The Shoshone Powerplant returned to service on November 4 and the Shoshone water rights call remained in effect until the end of February. ShOP operations resumed on February 28, 2023 with a shutdown of one of the two Shoshone Powerplant units, and remained in effect until flows within Glenwood Canyon exceed the 1,250 ft^3/s ShOP flow target in mid-April 2023. GMR delivered 5,071 AF of stored water, including 229 AF of HUP allocation for ShOP operations during the period from October 01, 2022 to April 10, 2023.

HUP water delivery operations continued through the end of the 2022 irrigation season. GMR delivered 14,677 AF of HUP water in October 2022. This delivery included 1,235 AF for HUP beneficiaries' replacement. This replacement release included 110 AF of HUP water release to fulfill ShOP obligations. Direct delivery for Grand Valley irrigation included 685 AF for Grand Valley Irrigation Company junior irrigation water right. The HUP entities declared HUP Surplus for the 2022 fill year on September 02, 2022, and began Surplus delivery. A total HUP surplus

delivery of 12,866 AF between October 01 and October 31 in support of the Colorado River Endangered Fish Recovery Program occurred. HUP storage was 22,829 AF at the end of the irrigation season.

GMR delivered HUP stored water for winter replacement and ShOP operations from November 1, 2022, through April 10, 2023. A total of 477 AF of HUP allocated storage was delivered during this period which included 119 AF for ShOP operations. The HUP Management Entities elected to not deliver additional HUP Surplus water in April 2023. Colorado River stream flow exceeded irrigation demand without substantially impacting flow within the 15 Mile Reach. HUP allocation carry over storage was 22,344 AF at the declared Start of Fill on May 05, 2023.

GMR provided stored replacement water between October 1, 2022 and Declaration of start of fill on May 5, 2023. The Silt Project continued to divert out of priority in October 2022 while exchanging 175 AF of replacement water from GMR. The C-BT project remained out-of-priority for 139 days from October 1, 2022 through February 28, 2023. GMR delivered 20,450 AF of C-BT stored collection system replacement water, 323 AF of GMR evaporation loss replacement, and 2,324 AF of contracted stored water during this period. The Cities of Denver and Colorado Springs delivered 6,577 AF in substitution replacement during this period toward satisfaction of the 1935 First Fill Storage Water Right for the 2022 fill year.

The ShOP Agreement parties agreed to implement ShOP for 52 days during the October 1, 2022 to April 10, 2023 delivery season. Green Mountain Powerplant exercised the direct flow power right generating power during ShOP operations, while releasing reservoir inflow plus 4,843 AF from storage for discretionary power generation.

On April 10, 2023, GMR reached the water year's minimum storage of 73,871 AF, with a water surface elevation of 7,902.48 feet. GMR was not impacted by operating restrictions during the winter delivery season. The Heeney Slide operating restriction applies below 7,865 feet (36,957 AF) where drawdown cannot exceed 0.5 feet per day. End of month storage contents for the reservoir during WY 2023 are compared to the thirty-year average below (figure 20). There were no other operating restrictions for GMR in WY 2023.

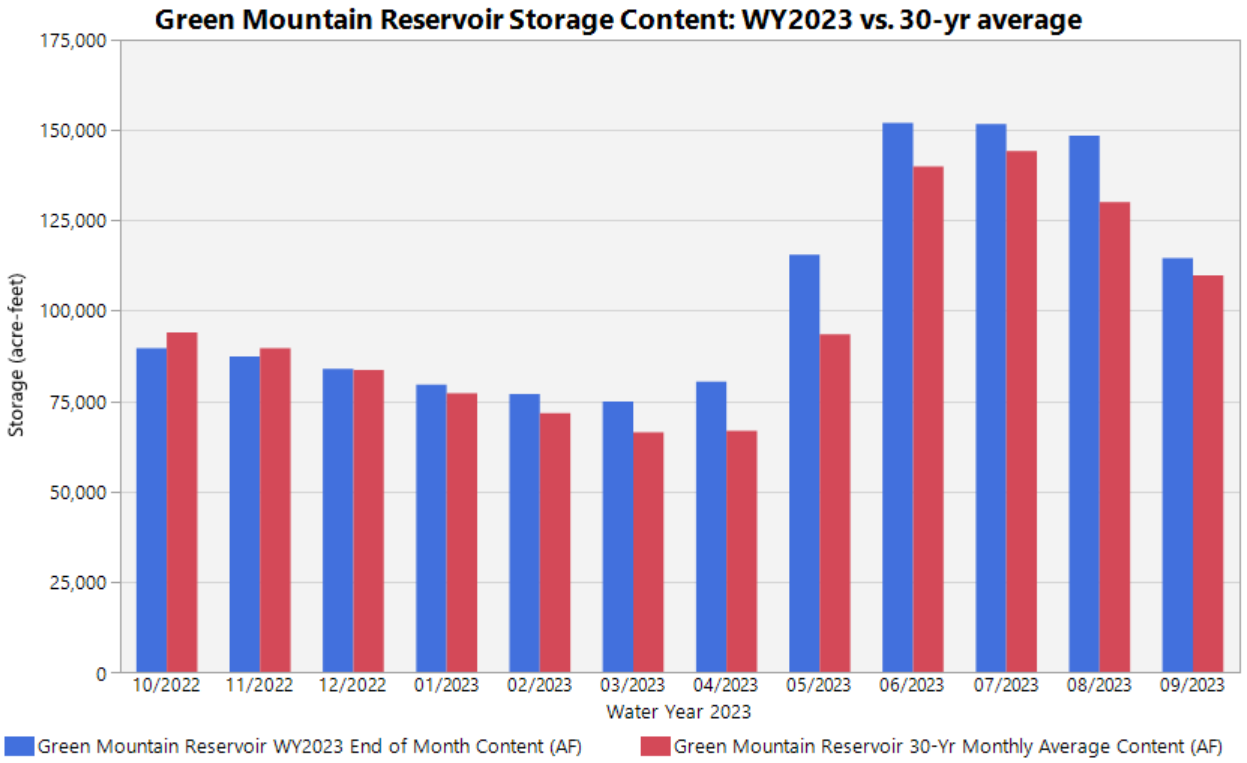


Figure 20.—Green Mountain Reservoir monthly content during water year 2023 and 30-year average content.

March 8, 2023: The HUP managing entities held the 2022 HUP Operations Wrap Up meeting at the Colorado River Water Conservation District, Glenwood Springs, CO. The agenda included reports on total HUP deliveries and GMR Operations for the 2022 Irrigation Year and Endangered Fish Recovery 2022 Operations. Reclamation informed the entities that GMR was forecasted to have a physical fill with a low probability of substitution operations, due to a near average forecasted runoff and above average storage. Reclamation informed meeting participants that the HUP allocation was expected to refill the full 66,000 AF. Reclamation also discussed the status of the Heeney Slide operation restriction informing participants that the restriction is not expected to become effective during the 2023 irrigation season.

March 9, 2023: GMR Administrative Protocol Agreement parties and other stakeholders met at the State Engineer's, Division 5 office to discuss the Protocol accounting and implementation in the 2023 fill season.

April 5, 2023: The HUP managing entities held the 2023 Irrigation Startup Planning meeting to discuss potential HUP operations. Hydrologic conditions and forecasted flows indicated that spring snowmelt runoff would develop normally with low chance of 15 Mile Reach flows requiring augmentation during irrigation diversion startup. GMR did not deliver HUP stored water for surplus or direct delivery in April 2023.

April through July Fill Operations: GMR exercised refill storage rights on April 10, 2023 until declaration of fill. GMR satisfied 1935 Refill Storage Water Right by storing 6,316 AF while simultaneously exercising the GM Powerplant Direct Flow for Power Generation Water Right. GMR stored and additional 2,620 AF within the Junior Refill Storage Water Right before declaration of the WY2023 Start of Fill. Reclamation declared Start-of-Fill on May 5, 2023 as required by the Blue River Decree. Reservoir storage was 82,355 AF at Start of Fill, near the ninety-fifth percentile of the historical average storage for that date.

Reclamation forecasted that GMR would obtain a physical fill in WY 2023 with no substitution replacement volume owed by the Cities for out of priority diversion. The slightly below average May 1, 2023, runoff projections indicated a reservoir physical fill in more than 90 percent of possible hydrologic scenarios. The Denver Water Board and Colorado Springs Utilities were permitted to divert out of priority since the most probable forecasts projected a volume of runoff available for power generation.

The Colorado State Engineer office administered GMR fill operations under the Green Mountain Administrative Protocol (Protocol) for the 2023 fill season. Green Mountain Powerplant maintained power generation for the entire fill season.

May 5: Reclamation declared start of fill for Green Mountain First Fill Storage Right for WY 2023. Reallocation of the carry over storage replenished the 52,000 AF collection system replacement pool and a portion of 100 KAF Power Pool. The runoff forecast provided adequate confidence in refill of contract water for the 2023 fill season. Reclamation placed no limitation on Water Contract release during the fill season.

May 11: The below average forecasted runoff and availability of a single powerplant unit for release did not support conducting the Colorado River Endangered Fish Recovery Program CROs for 2023. Reclamation informed the Colorado Water Conservation Board and Endangered fish recovery program that a bypass of storable inflow to increase GMR release above 750 ft^3/s would potentially impact the project storage yield.

June 7: The HUP Managing Entities held their initial meeting at Western Colorado Area Office to consider hydrologic conditions and to plan for Irrigation Year 2023 operations. A total of 12 weekly conference calls were held between July 26 and October 1, 2023, to manage releases from Green Mountain, Ruedi, Granby, Wolford Mountain, and Williams Fork Reservoirs to coordinate irrigation diversions in the Grand Valley and attempt to maintain the mean monthly target flows in the 15-Mile Reach. The U.S. Fish and Wildlife Service proposed a wet year target flow of 1,400 ft^3/s due to wetter than normal runoff forecast.

June 21: GMR begins spillway bypass to manage reservoir fill rate. The GMR Powerplant at capacity flow with one generator is available for power production. With the available generation capacity satisfied, the Division Engineer relaxed GM Powerplant water rights administration call. First Fill Storage Water Right remains in effect. GMR continued spillway release until July 18 and

intermittently between July 21 and August 8. GMR spillway release bypassed 28 KAF of water that resulted in approximately 5,880 MWH of lost power generation had both GM Powerplant units been available.

June 25: GMR obtains an administrative fill of the 1935 First Fill Storage Right under Protocol Section II.A.3.a. GMR starts accounting against 1935 Senior Refill Storage Right to obtain physical fill. Reclamation notifies Blue River Decree parties that the Cities will not owe any replacement water for GMR First Fill Storage Right.

July 5: GMR obtained the 2023 fill level of 7,949.50 feet.

July 21: GMR obtains maximum fill level of 7,949.57 feet for the 2023 fill year.

August 11: ShOP parties declare to participate in ShOP operations with the Shoshone Powerplant remaining unavailable, and Colorado River flow at the Shoshone Powerplant in Glenwood Canyon decreasing below the 1,250 ft^3/s target. GMR commences release of stored water while exercising the GM Powerplant Direct Flow for Power Generation water right.

August 30: HUP managing entities make surplus declaration with Grand Valley Irrigation Company opposing. GMR commences HUP Surplus release for 15 Mile Reach flow augmentation.

September 7: Colorado River Water Rights Administration became effective with the Grand Valley Irrigation Canal Junior water right at a 1948 priority. ShOP continued to be in effect to maintain the 1,250 ft^3/s ShOP Colorado River flow target at the Shoshone Powerplant. The GVIC administrative water rights call remain in effect intermittently at various priority dates for the remainder of September.

May through September: GMR made storage releases from May 5 through the end of the water year. The Colorado River mainstem was under water rights administration for only 18 days. GMR operated under ShOP for an additional 34 days during the 2023 fill and delivery period. GMR delivered 36,598 AF from reservoir storage including delivered storage: 1,143 AF for Colorado River Collection System replacement, 27,367 AF for HUP beneficiary replacement, irrigation direct delivery, and surplus, 806 AF for Silt Project Replacement, 806 AF for contracts, 1,235 AF for GMR evaporation losses, and 5,739 AF for ShOP operations. Since GMR did physically fill in 2023, the reservoir stored and delivered 13.8 AF for the Colorado River District Moser Ditch Excess Capacity Contract.

2024 Annual Operation Plan

Collection System and East Slope Colorado-Big Thompson Project

The 2024 C-BT Most-Probable Annual Operating Plan (2024 AOP)[7] is developed considering the effects of historical average runoff values, the expected demands and depletions of Northern Water and Denver Water (including an assumed Northern Water quota of 70 percent), the project's initial states (e.g., pool levels, storage), other average values, special operations such as previously planned system outages and maintenance schedules. Included in the 2024 AOP are two significant C-BT outages. The first, which began in September 2023 and extends through mid-December 2023, is related to Chimney Hollow Reservoir; a Northern Water outage to pour an encasement on a section of Flatiron Unit 3 pressure conduit which will be under the Chimney Hollow spillway. The other occurs toward the end the water year and is also for Chimney Hollow Reservoir; a Northern Water outage for installation of a wye connection to Flatiron Unit 3 pressure conduit and runs from the end of August 2024 through mid-December 2024. In both cases, pumping to Carter Lake Reservoir is not available during the outages.

The 2024 AOP used a projected 260,112 AF total inflow to the west slope collection system during WY 2024. It simulated annual pumping of 27,900 AF from Willow Creek Reservoir and spill at Granby Reservoir of 26,400 AF. No Windy Gap water was expected to be pumped to Granby in WY 2024.

The 2024 AOP projected diversions totaling 215,200 AF through the Adams Tunnel. A third of the projected diversions were planned between December 2023 and March 2024. Sufficient capacity remained and is simulated to convey 20,900 AF of Big Thompson River skim water at Olympus Tunnel, and 49,300 AF of skim at Dille Tunnel for power generation. The 2024 AOP includes 9,000 AF priority water from the Big Thompson River.

The 2024 AOP simulated a fill of Horsetooth Reservoir in late June 2024, and multiple fills of Carter Lake Reservoir between February and July 2024 as the simulation attempts to minimize west slope spill. Carter Lake Reservoir was expected to reach fill in early February, late May, mid-June and late July. Demands were projected to exceed supplies starting in August at Carter, with an associated reservoir drawdown through September to an ending elevation of about 5,751.8 feet. Horsetooth Reservoir maximum content was achieved by the end of June 2024 and maintain fill through mid-July, after which time demands are expected to exceed supplies and the

[7] Graphs summarizing C-BT Most-Probable, Minimum Reasonable and Maximum Reasonable AOPs are provided in Appendix B-8. Only the Most-Probable AOP is summarized in the text of this section.

reservoir elevation will decline to a minimum 5,411.3 feet at the end of the water year. Total deliveries from Carter Lake and Horsetooth Reservoirs were simulated as 99,600 and 93,600 AF,

respectively. Initial storage content of Carter Lake Reservoir is 105,000 AF and simulated ending content is 104,700 AF. Horsetooth Reservoir's initial content is 121,000 AF and the simulated ending content is also 121,000 AF.

Green Mountain Reservoir

The GMR Most-Probable 2024 AOP[8] used a projected 293,869 AF total (depleted) reservoir inflow. With that inflow, plans forecast GMR to fill in 2024, achieving maximum content in early July. Total GMR releases are simulated as 290,347 AF all through the powerplant. The most probable scenario required no substitution obligation for Denver and Colorado Springs because the reservoir obtained a physical fill. The Green Mountain 2024 AOP included refill of all GMR allocations for delivery during the 2023–2024 delivery season. The simulated minimum reservoir water surface elevation was about 7,888.1 feet in early May before refill begins, which is over twenty-three feet above the Heeney Slide operational restriction of 7,865.0 feet.

The GMR 2024 AOP assumed that Denver and Colorado Springs would deplete a total of 75,379AF. Per the Blue River decree the cities would be required to replace water obligated toward the senior storage right should a fill shortage occur in GMR, due to the cities' out-of-priority diversion.

[8] Graphs summarizing Green Mountain Reservoir Most Probable, Minimum Reasonable and Maximum Reasonable AOPs are provided in Appendix B-8. Only the Most-Probable AOP is summarized in the text of this section.

References

Green Mountain Reservoir Operation References

1984 Operating Policy for Green Mountain Reservoir, Colorado - Big Thompson River Project. (1983, December 22). Federal Register, Vol 48, No. 247.

Consolidated Cases 2782, 5016 and 5017 (commonly referred to as the "Blue River Decrees"). 955, 1964, 1978).

Consolidated Cases: Stipulation and Decree (October 12, 1955).

Consolidated Cases: Stipulation and Decree (April 16, 1964).

Consolidated Cases: Supplemental Judgement and Decree (February 9, 1978).

Director, Secretary of Interior. (1964, December 15). Certain Green Mountain Reservoir Storage, Colorado - Big Thompson Project. *Reservation for Silt Project, Colorado Storage Project*. Federal Register Document 64-12867, Filed.

Green Mountain Administrative Protocol. (2013, February 22).

Manner of Operation of Project Facilities and Auziliary Features (Senate Document 80). (1937, June 15). *Senate Document No. 80, 75th Congress, 1st Session* .

Recovery Implementation Program. (1996, October 15). *Recovery Action Plan, Colorado Endangered Fish Recovery Program*.

Shoshone Outage Protocol (ShOP). (2016, June 27). *Agreement Number 13XX6C0129*.

Stipulation and Agreement, 91CW247 (Orchard Mesa Check Case) and attached Historic Users Pool Operating Criteria (Colorado Water Division

Appendix A

Daily Records for Water Year 2023

Tables

The following thirty-eight pages of Appendix A summarize the daily operations by primary feature of Green Mountain Reservoir and the Colorado-Big Thompson Project for WY 2023.

Green Mountain Reservoir, Colorado

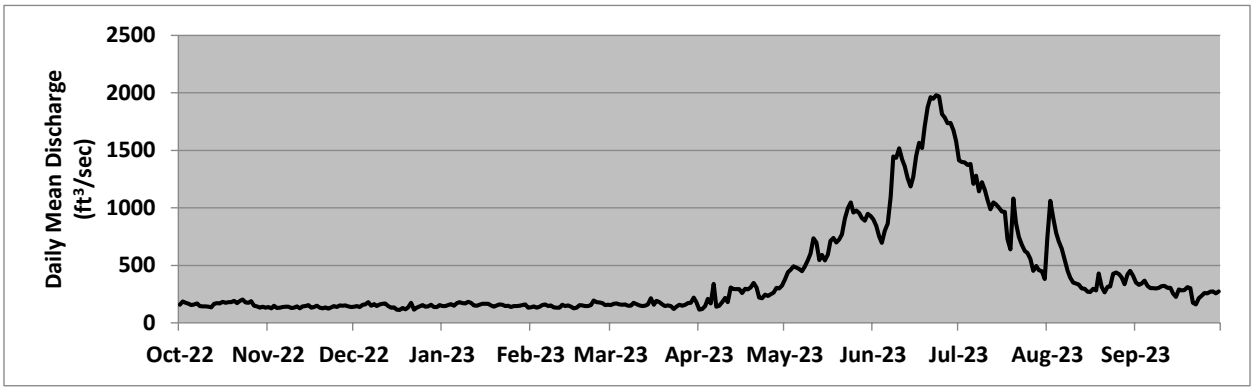
Location --Latitude 39°52'42", longitude 106°19'42", Summit County, Hydrologic Unit 14010002, on Green Mountain Dam, 13 miles southeast of Kremmling, Colorado, on the Blue River.

Gage –Water level recorder with satellite telemetry. Elevation of gage is 7,960 feet (m.s.l.) from topographic map.

Remarks -- Inflow computed daily based on change in content from midnight to midnight, and on the 24-hour average releases from Green Mountain Reservoir. Recorders were operated from October 1, 2022 to September 30, 2023. Records are complete and fair. This record consists of operational data which could be subject to future revisions and changes.

Inflow, ft^3/s, daily mean values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	157	137	140	145	136	156	116	379	900	1,414	740	350
2	186	126	147	146	145	166	121	441	845	1,398	1.061	332
3	174	148	137	154	133	169	146	460	750	1.397	912	342
4	166	130	159	162	140	161	209	491	695	1.374	782	368
5	154	132	161	149	156	158	169	481	802	1.383	708	321
6	162	137	180	171	160	161	338	470	863	1.210	645	301
7	169	141	150	180	145	150	141	451	1,096	1.281	548	303
8	147	142	164	172	151	148	149	493	1,446	1.145	451	300
9	143	130	146	169	134	174	181	547	1,435	1.222	393	305
10	143	132	159	182	132	163	218	604	1,517	1.156	352	318
11	139	144	165	174	132	151	180	735	1,421	1.071	343	323
12	135	126	169	153	159	148	307	698	1,361	987	334	305
13	165	145	148	149	148	149	293	547	1,257	1.047	300	306
14	172	147	132	157	151	160	294	591	1,186	1.030	296	257
15	168	154	134	165	140	213	294	542	1,268	1.002	272	227
16	182	132	116	166	127	158	261	594	1,452	967	268	291
17	176	137	113	167	133	191	296	714	1,565	966	295	282
18	180	150	129	153	156	181	292	738	1,520	731	282	287
19	180	131	119	140	151	161	309	698	1,709	639	430	311
20	191	127	134	151	145	145	348	726	1,874	1.080	314	301
21	172	134	176	161	145	152	308	771	1,964	869	267	174
22	192	123	115	158	155	146	221	906	1,949	747	313	160
23	204	134	133	145	196	120	213	997	1,981	679	317	213
24	176	147	145	150	181	141	245	1,048	1,968	624	426	236
25	174	137	154	139	178	157	235	960	1,815	609	439	259
26	189	151	140	146	171	148	248	975	1,786	558	423	257
27	150	148	144	148	155	158	262	953	1,736	451	395	270
28	143	152	157	148	158	172	306	913	1,739	496	337	274
29	133	142	138	154		175	300	888	1,674	457	421	257
30	141	137	137	161		220	326	947	1,579	451	452	274
31	131		154	131		181		929		380	411	
Min.	131	123	113	131	127	120	116	379	695	380	267	160
Max.	204	154	180	182	196	220	348	1,048	1,981	1.414	1.061	368
Mean	164	138	145	156	150	162	244	700	1,438	930	449	283
AF	10,104	8,239	8,915	9,614	8,358	9,981	14,536	43,012	85,592	57,163	27,625	16,866



Elliot Creek Canal near Green Mountain Reservoir, Colorado

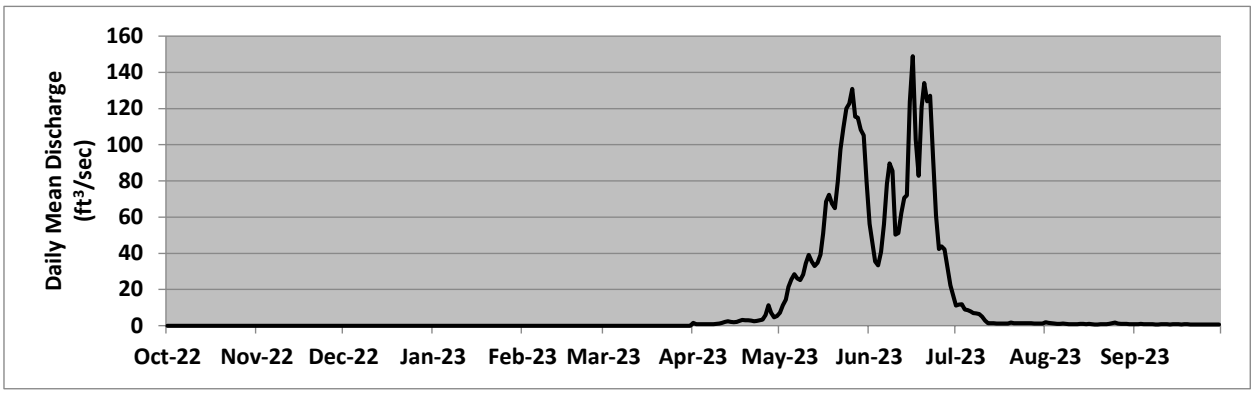
Location --Latitude 39°52'25", longitude 106°19'49", Summit County, Hydrologic Unit 14010002, on left bank at concrete flume structure, and 1.1 mi west of Heeney.

Gage--Water-stage recorder with satellite telemetry. Elevation of gage is 8,050 ft (m.s.l.) from topographic map.

Remarks—This is a diversion from Elliot Creek in the Blue River Basin to Green Mountain Reservoir. Recorder was winterized on October 1, 2022. The station was put back into service from April 1, 2023 to September 30, 2023. Values for the off-season were set to zero. Records are reliable while recorder is operated. This record contains operational data which could be subject to future revisions and changes. Official data is published by the United States Geological Survey as site #09056500.

Discharge, ft^3/s, daily mean values

	Oct.	Nov	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	0	0	0	0	0	0	1	7	56	11	2	1
2	0	0	0	0	0	0	1	11	47	12	2	1
3	0	0	0	0	0	0	1	14	35	12	1	1
4	0	0	0	0	0	0	1	21	33	9	1	1
5	0	0	0	0	0	0	1	26	41	9	1	1
6	0	0	0	0	0	0	1	28	56	8	1	1
7	0	0	0	0	0	0	1	26	79	7	1	1
8	0	0	0	0	0	0	1	25	90	7	1	1
9	0	0	0	0	0	0	1	28	86	6	1	1
10	0	0	0	0	0	0	1	34	50	5	1	1
11	0	0	0	0	0	0	2	39	51	3	1	1
12	0	0	0	0	0	0	2	35	62	1	1	1
13	0	0	0	0	0	0	2	33	71	1	1	1
14	0	0	0	0	0	0	2	35	72	1	1	1
15	0	0	0	0	0	0	2	39	124	1	1	1
16	0	0	0	0	0	0	2	51	149	1	1	1
17	0	0	0	0	0	0	3	68	103	1	1	1
18	0	0	0	0	0	0	3	72	83	1	1	1
19	0	0	0	0	0	0	3	67	121	1	1	1
20	0	0	0	0	0	0	3	65	134	2	1	1
21	0	0	0	0	0	0	3	80	124	1	1	1
22	0	0	0	0	0	0	2	97	127	1	1	1
23	0	0	0	0	0	0	3	109	93	1	1	1
24	0	0	0	0	0	0	3	120	61	1	1	1
25	0	0	0	0	0	0	3	123	42	1	2	1
26	0	0	0	0	0	0	6	131	44	1	1	1
27	0	0	0	0	0	0	11	115	42	1	1	1
28	0	0	0	0	0	0	7	115	32	1	1	1
29	0	0	0	0		0	5	108	22	1	1	1
30	0	0	0	0		0	5	105	16	1	1	1
31	0		0	0		0		79		1	1	
Min.	0	0	0	0	0	0	1	7	16	1	1	1
Max.	0	0	0	0	0	0	11	131	149	12	2	1
Mean	0	0	0	0	0	0	3	62	72	4	1	1
AF	0	0	0	0	0	0	163	3,792	4,256	226	64	45



Green Mountain Reservoir, Colorado

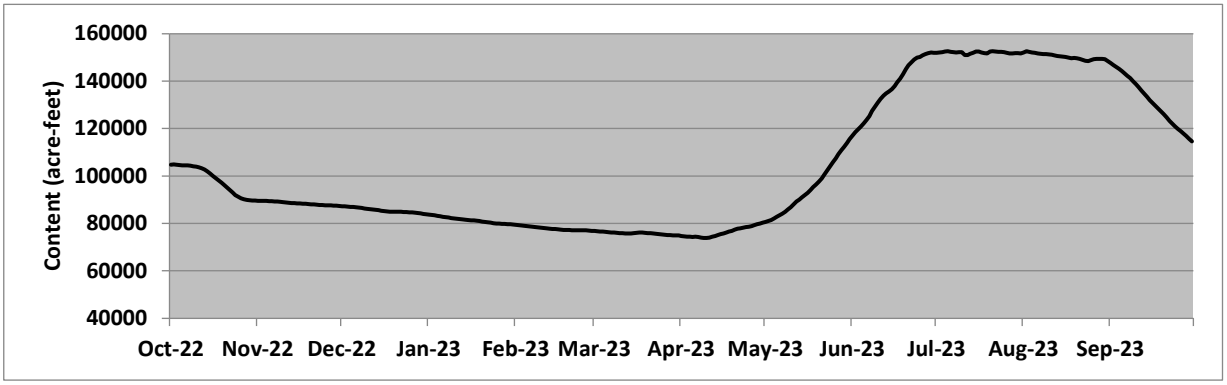
Location --Latitude 39°52'42", longitude 106°19'42", Summit County, Hydrologic Unit 14010002, on Green Mountain Dam, 13 miles southeast of Kremmling, Colorado, on the Blue River.

Gage --Water level recorder with satellite telemetry. Elevation of gage is 7,960 ft (m.s.l.) from topographic map.

Remarks--Reservoir is formed by an earth-fill dam. Construction completed in 1943. Impoundment began on November 16, 1942. Green Mountain Reservoir provides storage used for replacement water of the C-BT diversions. Recorder was operated from October 1, 2022 to September 30, 2023. Maximum capacity is 153,639 AF at elevation 7,950.00 ft, with 146,779 AF of active capacity. Records are complete and fair, but the data has not been revised. This record consists of operational data which could be subject to future revisions and changes.

Storage, AF, 2400-hour values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	104,770	89,593	87,294	83,750	79,416	76,796	74,730	80,656	117,055	151,989	152,116	147,663
2	104,835	89,536	87,209	83,599	79,284	76,706	74,551	81,057	118,483	152,137	152,688	146,796
3	104,737	89,521	87,082	83,435	79,125	76,628	74,425	81,489	119,728	152,285	152,306	145,952
4	104,623	89,463	86,997	83,229	78,967	76,537	74,413	82,071	120,870	152,434	152,116	145,151
5	104,542	89,391	86,927	82,997	78,848	76,434	74,299	82,805	122,220	152,582	151,989	144,254
6	104,493	89,333	86,870	82,805	78,742	76,331	74,476	83,517	123,582	152,348	151,736	143,296
7	104,429	89,275	86,700	82,641	78,610	76,215	74,261	84,191	125,287	152,264	151,503	142,306
8	104,300	89,218	86,545	82,463	78,491	76,112	74,047	84,966	127,345	152,053	151,461	141,255
9	104,138	89,132	86,349	82,273	78,334	76,037	73,909	85,845	129,160	152,200	151,356	140,014
10	103,927	89,033	86,181	82,125	78,176	75,946	73,871	86,828	130,934	152,285	151,230	138,777
11	103,651	88,918	86,027	82,003	78,020	75,874	73,959	88,074	132,511	151,042	151,083	137,489
12	103,231	88,761	85,901	81,841	77,915	75,802	74,362	89,247	133,827	151,021	150,917	136,092
13	102,717	88,646	85,747	81,665	77,811	75,730	74,743	90,115	134,800	151,524	150,665	134,742
14	101,903	88,560	85,565	81,543	77,720	75,712	75,113	91,073	135,620	151,989	150,476	133,340
15	100,983	88,503	85,384	81,449	77,615	75,879	75,483	91,922	136,603	152,434	150,329	131,952
16	100,053	88,403	85,202	81,354	77,484	75,983	75,789	92,865	137,945	152,434	150,140	130,763
17	99,101	88,317	85,049	81,260	77,367	76,112	76,163	94,054	139,513	152,137	149,952	129,577
18	98,185	88,260	84,966	81,138	77,315	76,137	76,524	95,299	140,995	151,778	149,722	128,384
19	97,262	88,174	84,911	80,990	77,275	76,073	76,911	96,467	142,851	151,651	149,785	127,233
20	96,301	88,074	84,911	80,829	77,223	75,970	77,380	97,677	145,029	152,518	149,617	126,071
21	95,208	87,988	84,993	80,669	77,171	75,879	77,759	98,976	146,755	152,624	149,324	124,656
22	94,084	87,889	84,938	80,495	77,132	75,776	77,968	100,542	147,891	152,476	149,012	123,269
23	92,998	87,804	84,869	80,294	77,171	75,610	78,163	102,286	149,095	152,391	148,556	122,073
24	92,009	87,747	84,800	80,147	77,171	75,470	78,425	104,138	149,931	152,306	148,431	120,979
25	91,219	87,676	84,731	80,014	77,145	75,368	78,663	105,819	150,224	152,179	148,826	119,925
26	90,607	87,634	84,606	79,907	77,106	75,240	78,927	107,524	150,854	152,010	149241	118,880
27	90,173	87,591	84,482	79,840	77,028	75,126	79,231	109,183	151,440	151,715	149,386	117,858
28	89,883	87,549	84,371	79,773	76,911	75,049	79,627	110,762	151,842	15,1736	149,345	116,842
29	89,738	87,479	84,205	79,720		74,972	80,014	112,289	152,053	151,757	149,386	115,744
30	89,694	87,394	84,039	79,680		74,985	80,375	113,920	152,010	151,757	149,220	114,548
31	89,636		83,901	79,561		74,921		115,515		151,630	148,494	
Min.	89,636	87,394	83,901	79,561	76,911	74,921	73,871	80,656	117,055	151,021	148,431	114,548
Max.	104,835	89,593	87,294	83,750	79,416	76,796	80,375	115,515	152,053	152,624	152,688	147,663
Mean	98,498	88,495	85,540	81,403	77,878	75,852	76,285	94,877	137,215	152,054	150,336	131,529
AF	89,636	87,394	83,901	79,561	76,911	74,921	80,375	11,5515	152,010	151,630	148,494	114,548



Blue River below Green Mountain Reservoir, Colorado

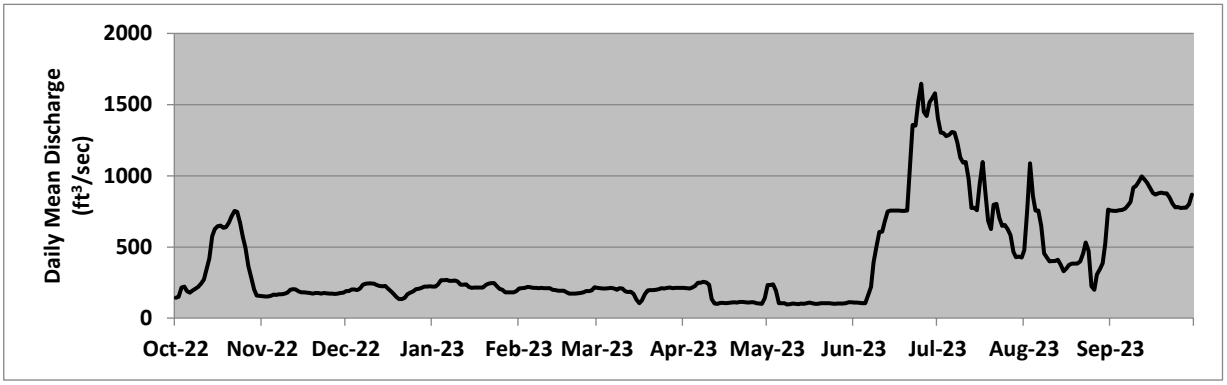
Location--Latitude 39°52'49", longitude 106°20'00", Summit County, Hydrologic Unit 14010002, on left bank 0.3 miles upstream from Elliot Creek, 0.3 miles downstream from Green Mountain Reservoir and 13 miles southeast of Kremmling, Colorado.

Gage-- Water-stage recorder with satellite telemetry. Datum of gage is 7,682.66 feet (levels by U.S. Bureau of Reclamation).

Remarks--Drainage area is 599 sq. mi. including 15.3 sq. mi. of Elliot Creek above the diversion for Elliot Creek feeder canal. Flow regulated by Green Mountain Reservoir since 1942. Diversions for irrigation of 5,000 acres upstream from station. Trans-mountain diversions upstream from station. Recorder was operated from October 1, 2022 to September 30, 2023. Recorded values are complete and reliable. This record consists of operational data which could be subject to future revisions and changes. Official record is published by the United States Geological Survey.

Discharge, ft^3/s, daily mean values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	144	155	191	221	209	214	212	233	109	1,405	478	755
2	150	152	190	222	211	211	211	234	110	1,303	755	755
3	215	153	201	237	213	208	209	237	107	1,302	1088	754
4	221	156	202	266	220	207	215	192	104	1,279	860	758
5	191	166	196	266	216	210	226	105	106	1,289	755	759
6	180	164	208	268	214	213	249	105	161	1,308	756	771
7	194	168	236	262	212	209	249	105	221	1,304	649	789
8	206	169	242	262	211	200	256	97	392	1,232	456	817
9	219	171	244	265	213	212	250	98	503	1,128	429	918
10	243	180	244	257	211	209	236	102	606	1,094	398	929
11	272	200	243	235	210	187	135	100	609	1,098	400	959
12	340	204	232	235	212	184	102	99	681	978	402	997
13	418	201	225	238	200	185	100	102	749	775	411	975
14	576	189	224	219	197	169	106	100	755	776	375	952
15	626	182	226	213	193	129	107	106	755	759	330	915
16	645	181	207	214	193	105	105	109	757	949	348	879
17	650	179	190	214	192	126	106	105	756	1,097	374	868
18	636	177	171	214	182	168	108	101	754	894	382	877
19	640	173	147	215	171	194	112	100	754	685	383	881
20	671	177	134	232	172	197	109	106	756	625	383	877
21	718	176	134	242	171	198	115	106	1,075	797	399	877
22	754	172	143	246	175	198	113	105	1,357	804	455	849
23	747	177	167	246	176	204	112	106	1,354	704	532	806
24	671	175	180	224	181	211	110	103	1,526	649	474	778
25	568	172	189	206	191	208	112	100	1,648	655	225	781
26	494	172	203	200	190	213	112	103	1,449	626	199	775
27	365	170	207	181	194	216	105	104	1,421	582	307	777
28	286	173	213	182	217	211	103	103	1,516	468	343	777
29	202	177	222	181		213	101	104	1,548	429	385	802
30	160	180	221	181		213	140	111	1,581	433	521	868
31	157		223	191		213		111		427	763	
Min.	144	152	134	181	171	105	100	97	104	427	199	754
Max.	754	204	244	268	220	216	256	237	1,648	1,405	1,088	997
Mean	405	175	202	227	198	195	151	119	807	898	484	842
AF	24,910	10,396	12,405	13,954	11,008	11,968	8,985	7,323	48,040	55,246	29,778	50,129



Willow Creek Reservoir, Colorado

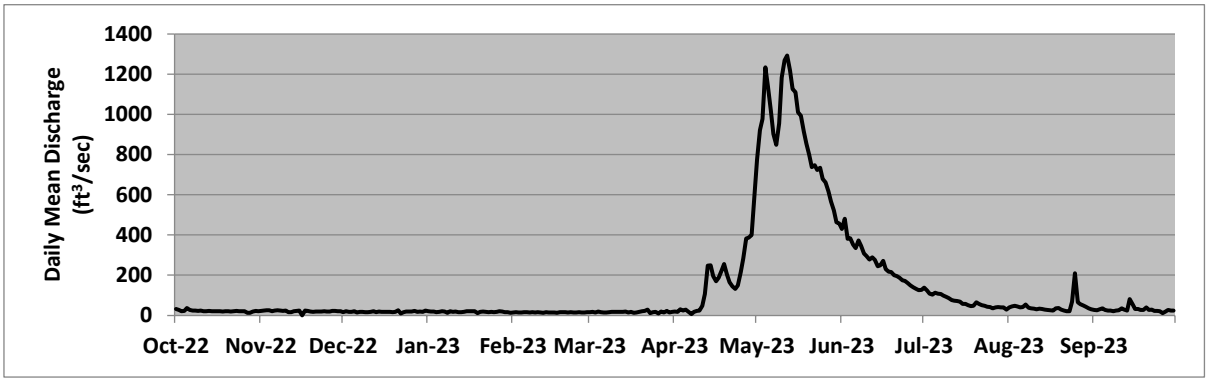
Location. –- Latitude 40°08'52", longitude 105°56'28", Grand County, Hydrologic Unit 14010001, at Willow Creek Dam, four miles north of Granby, Colorado, on Willow Creek, a tributary of the Colorado River.

Gage— Water level recorder with satellite telemetry. Elevation of gage is 8,130 ft (m.s.l.) from topographic map.

Remarks—Inflow computed daily using change in content from midnight to midnight, plus the 24-hour average releases through the Willow Creek Pump Canal and the reservoir outlet works. Recorders were operated from October 1, 2022 to September 30, 2023. Records are complete. Negative values are based on accounting procedures and mass balances. This record consists of operational data which could be subject to future revisions and changes.

Inflow, ft^3/s, Daily Mean Values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	32	23	16	21	14	17	20	776	430	137	39	27
2	27	25	20	20	17	18	17	922	480	124	44	26
3	21	25	18	19	14	15	31	978	381	107	48	30
4	22	26	18	16	14	19	24	1,234	383	104	45	34
5	37	20	21	17	17	16	29	1,139	352	113	40	26
6	26	24	15	21	16	14	18	1,020	334	108	42	24
7	24	26	17	19	14	14	6	902	373	106	53	23
8	24	25	18	13	16	17	18	849	346	99	38	21
9	22	22	16	21	14	17	23	955	307	92	35	23
10	24	24	16	18	16	17	24	1,184	296	86	33	25
11	21	15	17	20	14	17	48	1,269	277	77	31	35
12	21	16	21	16	13	17	106	1,292	289	73	33	29
13	23	21	16	17	17	17	247	1,218	275	71	32	24
14	20	23	18	18	14	19	248	1,125	245	69	29	81
15	21	24	18	20	15	14	195	1,111	249	57	28	55
16	21	0	18	20	14	17	170	1,010	272	57	25	32
17	21	23	18	20	13	13	188	992	230	51	24	31
18	19	22	17	20	15	15	223	916	217	46	34	27
19	20	18	16	12	16	17	255	854	216	48	36	27
20	21	18	17	18	15	20	203	797	199	66	28	39
21	19	19	25	19	14	23	165	738	195	57	24	27
22	20	20	10	17	16	28	144	747	187	50	20	28
23	22	19	16	17	14	11	131	723	174	48	21	23
24	21	21	18	18	14	17	150	734	171	43	68	23
25	21	19	19	15	15	17	214	678	161	42	209	21
26	21	20	18	17	14	10	284	662	149	35	66	11
27	13	22	22	20	15	19	382	618	140	40	55	19
28	12	22	17	19	16	14	387	566	132	41	50	28
29	19	21	19	17		22	400	522	126	40	43	24
30	22	21	17	15		15	577	462	127	40	35	23
31	21		23	13		17		457		28	30	
Min.	12	0	10	12	13	10	6	457	126	28	20	11
Max.	37	26	25	21	17	28	577	1,292	480	137	209	81
Mean	22	21	18	18	15	17	164	885	257	69	43	29
AF	1,352	1,232	1,105	1,095	825	1,037	9,773	54,445	15,301	4,272	2,656	1,723



Willow Creek Reservoir, Colorado

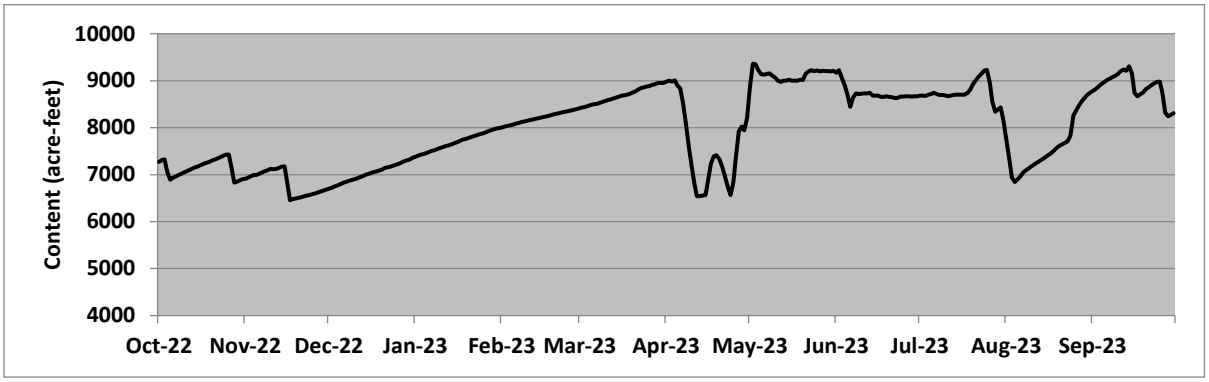
Location –-Latitude 40° 08'52", longitude 105° 56'28", Grand County, Hydrologic Unit 14010001, at Willow Creek Dam, four miles north of Granby, Colorado, on Willow Creek, a tributary of the Colorado River.

Gage— Water level recorder with satellite telemetry. Elevation of gage is 8,130 ft (m.s.l.) from topographic map.

Remarks—Reservoir is formed by an earth-fill dam. Construction completed in 1953. Impoundment began on April 2, 1953. Willow Creek Reservoir stores water from Willow Creek for diversion to Granby Reservoir via the Willow Creek Canal. Maximum capacity is 10,600 AF at elevation 8,130.00 ft, with 9,100 AF of active capacity between elevations 8,077.00 and 8,130.00 feet. Recorder was operated from October 1, 2022 to September 30, 2023. Record is complete and fair. This record consists of operational data which could be subject to future revisions and changes.

Storage, AF, 2400-hour Values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	7,275	6,913	6,701	7,381	8,007	8,416	8,979	8,882	9,172	8,680	7,725	8,783
2	7,316	6,938	6,725	7,405	8,025	8,433	8,999	9,360	9,227	8,680	7,328	8,823
3	7,323	6,965	6,746	7,427	8,038	8,446	8,985	9,357	9,056	8,675	6,942	8,871
4	7,046	6,995	6,768	74,45	8,051	8,468	9,007	9,227	8,902	8,705	6,846	8,925
5	6,895	6,993	6,798	7,464	8,067	8,484	8,902	9,140	8,688	8,714	6,902	8,970
6	6,931	7,020	6,824	7,489	8,086	8,498	8,840	9,131	8,444	8,747	6,961	9,010
7	6,963	7,048	6,844	7,511	8,099	8,509	8,515	9,143	8,644	8,716	7,044	9,045
8	6,995	7,078	6,866	7,523	8,117	8,528	8,072	9,157	8,730	8,700	7,095	9,073
9	7,023	7,092	6,884	7,550	8,133	8,547	7,640	9,111	8,719	8,700	7,139	9,105
10	7,050	7,123	6,902	7,570	8,149	8,567	7,208	9,071	8,722	8,691	7,180	9,143
11	7,076	7,114	6,922	7,593	8,162	8,586	6,818	9,002	8,727	8,672	7,215	9,207
12	7,102	7,123	6,947	7,610	8,172	8,603	6,542	8,973	8,733	8,686	7,256	9,236
13	7,130	7,144	6,970	7,627	8,191	8,622	6,546	9,005	8,741	8,697	7,294	9,213
14	7,154	7,170	6,993	7,647	8,204	8,644	6,551	9,002	8,683	8,702	7,335	9,307
15	7,177	7,177	7,013	7,673	8,218	8,663	6,563	9,022	8,683	8,702	7,376	9,157
16	7,203	6,846	7,034	7,695	8,231	8,683	6,882	9,005	8,683	8,705	7,415	8,741
17	7,230	6,456	7,053	7,720	8,242	8,691	7,239	8,999	8,652	8,705	7,452	8,669
18	7,251	6,478	7,071	7,746	8,258	8,705	7,391	9,005	8,652	8,739	7,508	8,711
19	7,275	6,493	7,088	7,761	8,274	8,725	7,415	9,025	8,666	8,809	7,568	8,753
20	7,299	6,507	7,107	7,781	8,287	8,750	7,330	9,016	8,655	8,922	7,610	8,820
21	7,321	6,522	7,142	7,801	8,300	8,781	7,170	9,149	8,650	9,010	7,645	8,862
22	7,345	6,536	7,154	7,822	8,316	8,820	6,981	9,198	8,630	9,082	7,678	8,905
23	7,374	6,551	7,170	7,840	8,330	8,843	6,757	9,224	8,636	9,149	7,708	8,939
24	7,401	6,569	7,192	7,860	8,343	8,862	6,569	9,204	8,661	9,210	7,832	8,973
25	7,425	6,584	7,213	7,878	8,357	8,882	6,835	9,216	8,663	9,230	8,252	8,979
26	7,425	6,601	7,234	7,896	8,370	8,888	7,384	9,195	8,672	8,962	8,370	8,753
27	7,156	6,619	7,261	7,922	8,384	8,910	7,924	9,210	8,666	8,553	8,468	8,319
28	6,829	6,640	7,285	7,945	8,400	8,925	8,028	9,204	8,663	8,338	8,564	8,239
29	6,851	6,661	7,306	7,966		8,953	7,942	9,204	8,672	8,389	8,638	8,276
30	6,879	6,685	7,326	7,984		8,956	8,215	9,195	8,666	8,430	8,694	8,311
31	6,906		7,357	7,994		8,956		9,210		8,138	8,741	
Min.	6,829	6,456	6,701	7,381	8,007	8,416	6,542	8,882	8,444	8,138	6,846	8,239
Max.	7,425	7,177	7,357	7,994	8,400	8,956	9,007	9,360	9,227	9,230	8,741	9,307
Mean	7,149	6,821	7,029	7,694	8,208	8,689	7,608	9,124	8,725	8,737	7,606	8,871
AF	6,906	6,685	7,357	7,994	8,400	8,956	8,215	9,210	8,666	8,138	8,741	8,311



Willow Creek below Willow Creek Reservoir, Colorado

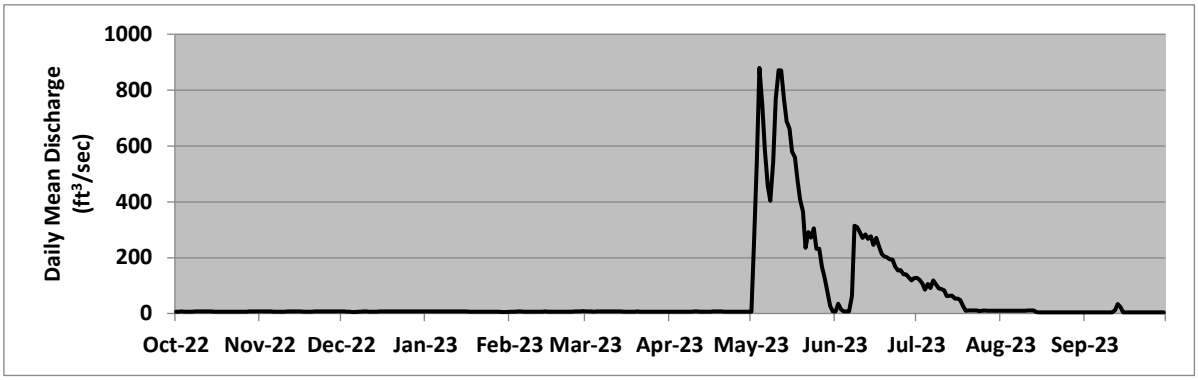
Location.—Latitude 40°08'50", longitude 105°56'16", Grand County, Hydrologic Unit 14010001, at Willow Creek Dam, four miles north of Granby, Colorado, on Willow Creek, a tributary of the Colorado River.

Gage.--Water-stage recorder with satellite telemetry. Elevation of gage is 8,040 feet (m.s.l.) from topographic map.

Remarks.-- Drainage area is 127 square miles. Recorder was operated from October 1, 2022 to September 30, 2023. Records are complete and reliable. The official record is published by the Division of Water Resources, State of Colorado. This record contains operational data which could be subject to future revisions and changes.

Discharge, ft^3/s, daily mean values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	7	7	8	7	7	8	7	7	8	128	11	4
2	7	7	8	7	7	8	7	249	36	121	11	4
3	7	7	7	7	7	8	7	546	15	108	10	4
4	7	7	7	7	7	7	7	879	8	86	10	4
5	7	7	6	7	8	7	7	746	8	106	10	4
6	7	7	6	7	7	7	7	587	8	91	10	4
7	7	7	6	7	7	7	7	457	62	119	11	4
8	7	7	7	7	7	7	7	403	315	105	11	4
9	7	7	7	7	7	7	7	542	309	90	11	4
10	8	7	7	7	7	8	7	769	291	88	11	4
11	7	7	7	7	7	7	7	872	271	84	11	4
12	8	7	7	7	7	7	7	870	283	63	11	13
13	8	7	7	8	7	7	7	765	268	63	11	34
14	8	7	7	8	7	7	7	689	276	64	6	23
15	7	7	7	8	7	7	7	662	245	54	4	4
16	7	7	7	7	7	7	7	580	271	53	4	4
17	7	7	7	7	7	7	7	559	242	49	4	4
18	7	7	7	7	7	7	7	478	213	27	4	4
19	7	7	7	7	7	7	7	409	205	11	4	4
20	7	7	7	7	7	7	8	366	201	11	4	4
21	7	7	8	7	7	7	7	236	195	11	4	4
22	7	7	7	7	7	7	7	292	193	11	4	4
23	7	7	7	7	7	7	7	272	168	12	4	4
24	7	7	7	7	7	7	7	305	155	10	4	4
25	7	7	8	7	7	7	7	232	156	10	4	4
26	7	7	7	7	7	7	7	232	141	11	4	4
27	7	7	7	7	8	7	7	169	140	11	4	4
28	7	7	7	7	9	7	7	127	130	11	4	4
29	7	7	7	6		7	7	80	119	11	4	4
30	7	8	7	6		7	7	28	127	11	4	4
31	7		7	6		7		8		11	4	
Min.	7	7	6	6	7	7	7	7	8	10	4	4
Max.	8	8	8	8	9	8	8	879	315	128	11	34
Mean	7	7	7	7	7	7	7	433	169	53	7	6
AF	446	438	447	442	403	452	430	26,603	10,034	3,247	422	365



Willow Creek Pump Canal, Colorado

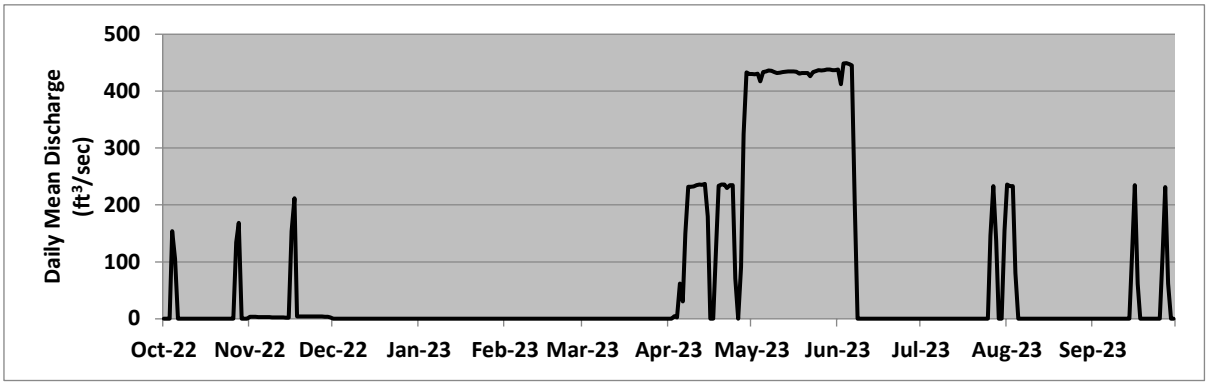
Location –-Latitude 40°08'39", longitude 105°54'10", Grand County, Hydrologic Unit 14010001, at Willow Creek Pump Canal, four miles north of Granby, Colorado, on Willow Creek, a tributary of the Colorado River.

Gage— Water-stage recorder with satellite telemetry at 15-foot Parshall Flume. Elevation of gage is 8,300 feet (m.s.l.) from topographic map.

Remarks—Canal is used to divert water from Willow Creek Reservoir to Granby Reservoir. Diversions are seasonal, mainly during late spring and early summer. Construction completed in 1953. Length of the canal is 3.4 miles. Recorder was operated from October 1, 2022 to September 30, 2023. Records are complete and reliable. This record consists of operational data which could be subject to future revisions and changes.

Discharge, ft^3/s, daily mean values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	0	3	0	0	0	0	0	430	438	0	236	0
2	0	3	0	0	0	0	0	429	412	0	233	0
3	0	3	0	0	0	0	5	431	449	0	233	0
4	154	3	0	0	0	0	2	417	449	0	80	0
5	105	3	0	0	0	0	62	434	448	0	0	0
6	0	3	0	0	0	0	30	435	445	0	0	0
7	0	3	0	0	0	0	150	436	205	0	0	0
8	0	3	0	0	0	0	232	436	0	0	0	0
9	0	3	0	0	0	0	232	433	0	0	0	0
10	0	3	0	0	0	0	232	432	0	0	0	0
11	0	2	0	0	0	0	235	433	0	0	0	0
12	0	2	0	0	0	0	236	433	0	0	0	0
13	0	2	0	0	0	0	235	434	0	0	0	0
14	0	2	0	0	0	0	237	435	0	0	0	0
15	0	2	0	0	0	0	179	435	0	0	0	108
16	0	154	0	0	0	0	0	435	0	0	0	235
17	0	212	0	0	0	0	0	434	0	0	0	61
18	0	4	0	0	0	0	125	431	0	0	0	0
19	0	4	0	0	0	0	233	432	0	0	0	0
20	0	4	0	0	0	0	236	432	0	0	0	0
21	0	4	0	0	0	0	236	431	0	0	0	0
22	0	4	0	0	0	0	230	426	0	0	0	0
23	0	4	0	0	0	0	235	434	0	0	0	0
24	0	4	0	0	0	0	235	435	0	0	0	0
25	0	4	0	0	0	0	71	437	0	0	0	0
26	0	4	0	0	0	0	0	436	0	146	0	115
27	134	4	0	0	0	0	91	437	0	233	0	231
28	168	4	0	0	0	0	324	438	0	136	0	62
29	0	4	0	0		0	433	438	0	0	0	0
30	0	2	0	0		0	430	437	0	0	0	0
31	0		0	0		0		437		155	0	
Min	0	2	0	0	0	0	0	417	0	0	0	0
Max	168	212	0	0	0	0	433	438	449	233	236	235
Mean	18	15	0	0	0	0	165	433	95	22	25	27
AF	1,114	899	4	12	11	12	9,810	26,635	5,644	1,329	1,552	1,611



Windy Gap Pumping Plant, Colorado

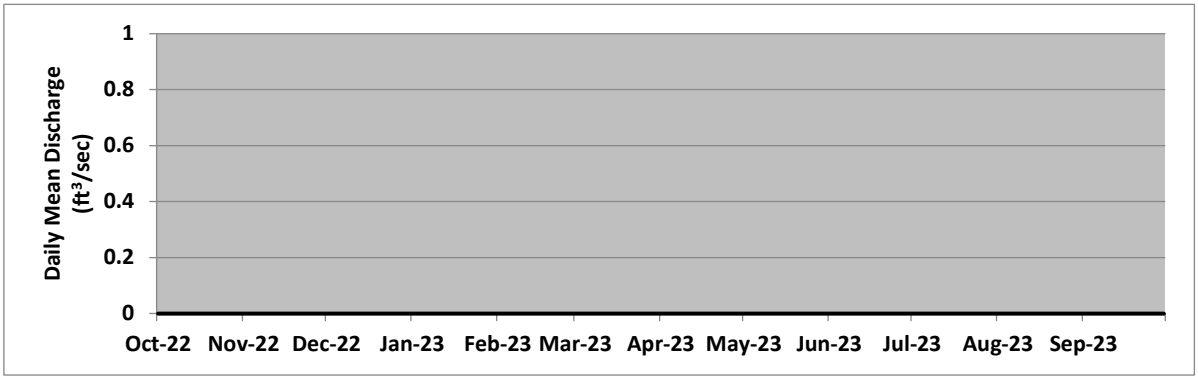
Location --Latitude 40°06'24", longitude 105°58'48", Grand County, Hydrologic Unit 14010001, 5.5 miles northeast of Granby, Colorado, on the Colorado River.

Gage-- Reading taken directly from the pumps. Elevation of the pumping plant is 7,823 (m.s.l.) from topographic map.

Remarks-- Water is pumped from Windy Gap Reservoir to Granby Reservoir. Water is stored at Granby Reservoir before delivery through Adams Tunnel. Data was provided by Farr Pumping Plant operators each morning. Data was collected from October 1, 2022 to September 30, 2023. Records are complete and reliable, but the data has not been reviewed. This record consists of operational data which could be subject to future revisions and changes. Readings were provided by the Northern Water.

Windy Gap pump discharge, ft^3/s, daily mean values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0		0	0	0	0	0	0	0
30	0	0	0	0		0	0	0	0	0	0	0
31	0		0	0		0		0		0	0	
Min.	0	0	0	0	0	0	0	0	0	0	0	0
Max.	0	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0
AF	0	0	0	0	0	0	0	0	0	0	0	0



Granby Reservoir, Colorado

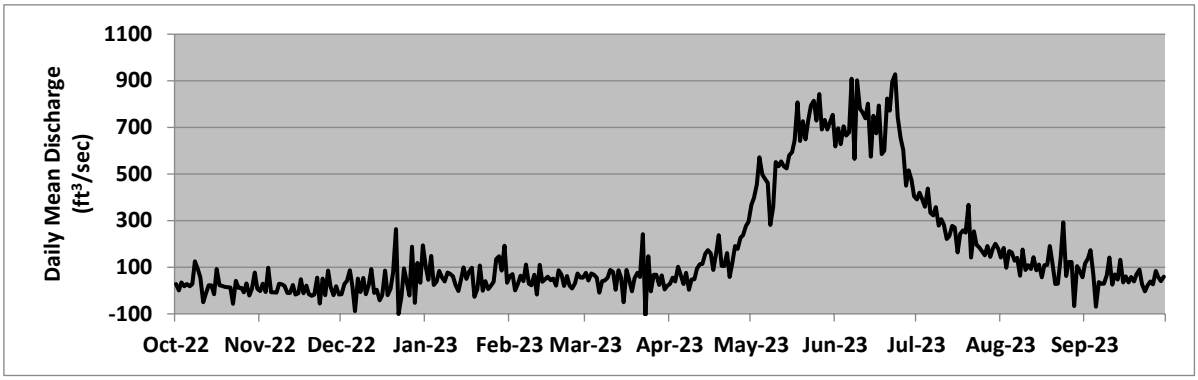
Location --Latitude 40°08'54", longitude 105°51'48", Grand County, Hydrologic Unit 14010001, on Granby Dam, 5.5 miles northeast of Granby, Colorado, on the Colorado River.

Gage-- Water level recorder with satellite telemetry. Elevation of gage is 8,300 (m.s.l.) from topographic map.

Remarks-- Inflow computed daily based on change in content from midnight to midnight, and on the average daily releases through the reservoir outlet works. Recorders were operated from October 1, 2022 to September 30, 2023. Records are complete. Negative values occur as a result of procedures and mass balances. This record consists of operational data which could be subject to future revisions and changes.

Inflow, ft^3/s, daily mean values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	28	-2	-16	102	63	76	30	368	618	391	142	116
2	1	29	28	45	71	44	55	398	697	420	183	138
3	35	-6	42	149	0	73	39	455	627	390	98	173
4	19	98	87	23	29	67	102	571	704	359	169	66
5	29	-7	17	39	64	56	68	497	665	437	164	-70
6	18	-8	-88	84	40	-9	28	480	678	333	129	36
7	28	-9	51	56	111	41	76	462	909	322	140	30
8	126	29	-7	40	29	43	4	282	565	358	64	29
9	92	26	54	78	22	56	48	359	901	279	176	66
10	57	20	-16	72	68	89	48	552	780	306	89	142
11	-50	-10	24	61	-18	80	94	534	765	283	108	25
12	-14	-11	93	25	110	4	113	553	739	221	93	69
13	23	24	-11	-3	37	87	115	533	802	233	143	47
14	22	-17	3	48	49	56	159	524	575	278	86	132
15	-15	-12	-42	99	59	-50	173	580	749	270	112	35
16	93	49	-19	50	44	89	159	594	674	164	57	61
17	22	-11	86	80	51	48	88	644	794	243	109	34
18	21	21	-20	98	21	-4	161	808	585	258	110	58
19	15	-15	7	-27	86	53	238	641	600	248	191	38
20	14	-23	78	7	68	75	105	727	823	367	119	71
21	14	-17	263	108	20	58	104	648	772	142	28	89
22	-57	55	-101	-1	63	241	161	735	897	254	29	27
23	42	-55	-26	41	21	-105	58	794	928	197	144	-3
24	12	51	95	6	9	147	116	814	743	184	293	21
25	11	-19	42	20	31	-4	190	730	654	170	62	38
26	-7	85	-21	38	73	68	178	844	604	151	122	26
27	31	15	188	135	56	67	226	692	450	191	122	84
28	-21	-20	-53	148	55	24	238	732	516	145	-66	57
29	8	19	119	85		65	278	691	474	180	104	41
30	78	-18	34	192		5	296	724	404	200	86	60
31	7		193	34		20		754		179	57	
Min.	-57	-55	-101	-27	-18	-105	4	282	404	142	-66	-70
Max.	126	98	263	192	111	241	296	844	928	437	293	173
Mean	22	9	35	62	48	50	125	604	690	263	112	58
AF	1,351	518	2,151	3,827	2,644	3,096	7,434	37,129	41,044	16,173	6,871	3,446



Granby Reservoir, Colorado

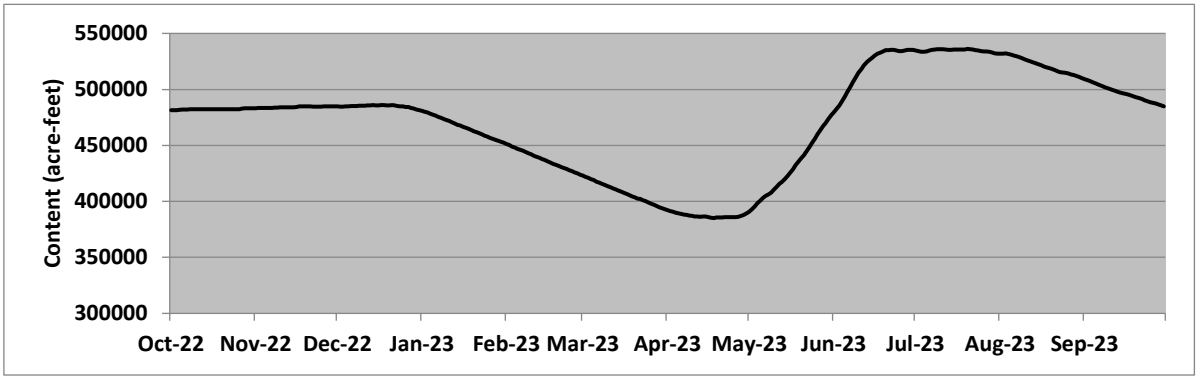
Location --Latitude 40°08'54", longitude 105°51'48", Grand County, Hydrologic Unit 14010001, on Granby Dam, 5.5 miles northeast of Granby, Colorado, on the Colorado River.

Gage-- Water level recorder with satellite telemetry. Elevation of gage is 8,300 (m.s.l.) from topographic map.

Remarks--Reservoir is formed by an earth-fill dam and four earth-fill dikes. Construction completed in 1950. Impoundment began on September 14, 1949. Granby Reservoir provides west-slope storage for the C-BT project. Maximum capacity is 539,800 AF at elevation 8,280.00, with 463,300 AF of active capacity between elevations 8,186.90 and 8,280.00 feet. Recorder was operated from October 1, 2022 to September 30, 2023. Records are complete and reliable. This record consists of operational data which could be subject to future revisions and changes.

Storage, AF, 2400-hour values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	481,324	483,264	485,001	480,835	451,225	422,894	392,206	390,840	479,591	534,831	532,088	509,102
2	481,393	483,333	484,655	480,006	450,220	421,864	391,398	393,013	482,703	534,109	532,016	508,255
3	481,462	483,333	484,655	479,384	449,058	420,899	390,654	395,317	485,616	533,603	532,161	507478
4	481,739	483,541	484,863	478,280	447,994	419,871	389,972	398,315	489,374	533,603	531,656	506,420
5	482,018	483,541	484,932	477,384	447,000	418,844	389,353	400,822	493,705	533,964	531,008	505,363
6	482,018	483,541	485,071	476,489	445,941	417,690	388,610	403,085	498,055	534,831	530,288	504,322
7	482,018	483,541	485,210	475,527	445,081	416,666	388,178	404,913	502,355	535,337	529,640	503,414
8	482,227	483,679	485,280	474,496	443,959	415,643	387,808	406,238	506,702	535,771	528,777	502,355
9	482,366	483,748	485,420	473,535	442,970	414621	387,375	407,883	510,871	535,988	527,843	501,366
10	482,435	483,888	485,420	472,575	441,982	413,664	386,881	410,482	514,700	535,988	526,910	500,520
11	482,296	483,888	485,490	471,616	440,797	412,708	386,573	413,091	518,043	535,916	525,976	499,674
12	482,227	483,888	485,699	470,590	439,942	411,627	386,327	415,579	521,539	535,699	525,116	498,759
13	482,227	483,958	485839	469,495	438,892	410,673	386,265	417,626	524,257	535,481	524,257	497,915
14	482,227	483,958	485,908	468,471	437,843	409,658	386,450	419,871	526,263	535,481	523,326	497,142
15	482,296	483,958	485,699	467,652	436,860	408,580	386,327	422,636	528,202	535,699	522,467	496,651
16	482,435	484,377	485,699	466,698	435,813	407,630	385,833	425,476	530,288	535,699	521,610	496,089
17	482,435	484,794	485,908	465,745	434,767	406,618	385,279	428,713	531,872	535,699	520,681	495,458
18	482,435	484,863	485,908	464,861	433,657	405,544	385,095	432,354	532,810	535,699	519,825	494,616
19	482,435	484,863	485,699	463,841	432,679	404,534	385,648	435,486	533,964	535,699	519,183	493,775
20	482,435	484,863	485,699	462,755	431,703	403,526	385,648	438,498	535,192	536,133	518,399	493,005
21	482,435	484,863	485,908	461,874	430,726	402,519	385,648	441,323	535,192	535,988	517,331	492,236
22	482,296	484,586	485,699	460,790	429,946	402,016	385,956	444,685	535,481	535,699	516,263	491,327
23	482,366	484,516	485,280	459,775	428,973	400,885	385,833	448,391	535,265	535,192	515,481	490,280
24	482,366	484,586	485,001	458,693	427,935	400,007	385,833	452,164	534,759	534,831	514,984	489,374
25	482,366	484,586	484,863	457,681	426,898	398,879	385,956	455,726	534,181	534,326	514,842	488,468
26	482,366	484,794	484,447	456,601	425,928	397,877	385,833	459,910	534,181	533,964	514,274	487,910
27	482,850	484,863	484,377	45,5793	424,894	396,877	386,265	463,366	534,687	533,892	513,493	48,7423
28	483,126	484,863	483,541	454,986	423,861	395,753	387,005	466,766	535,337	533,676	512,713	486,658
29	483,126	485,001	482,850	454,044		394,756	387,993	469,974	535,481	532,954	512,075	485,685
30	483,264	485,001	482,018	453,305		393,822	389,353	473,329	535,265	532,377	511,083	484,991
31	483,264		481,526	452,231		393,137		476,765		532,088	510,022	
Min.	481,324	483,264	481,526	452,231	423,861	393,137	385,095	390,840	479,591	532,088	510,022	484,991
Max.	483,264	485,001	485,908	480835	451,225	422,894	392,206	476,765	535,481	536,133	532,161	509,102
Mean	482,331	484,216	484,954	466,645	437,412	407,751	387,252	429,440	519,864	534,846	521,800	496,534
EOM	483,264	485,001	481,526	452,231	423,861	393,137	389,353	476,765	535,265	532,088	510,022	484,991



Granby Reservoir, Colorado

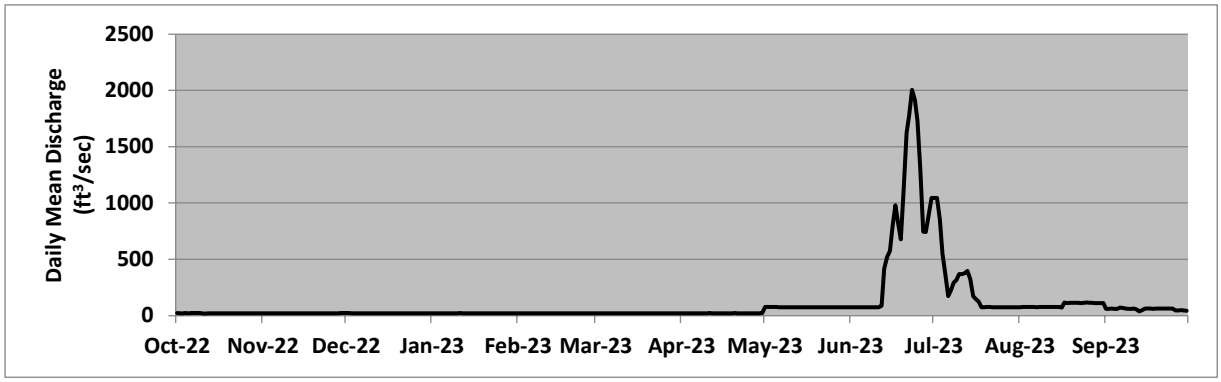
Location --Latitude 40°08'54", longitude 105°51'48", Grand County, Hydrologic Unit 14010001, on Granby Dam, 5.5 miles northeast of Granby, Colorado, on the Colorado River.

Gage-- Water level recorder with satellite telemetry. Elevation of gage is 8,300 feet (m.s.l.), from topographic map.

Remarks--Reservoir is formed by an earth-fill dam and four earth-fill dikes. Construction completed in 1950. Impoundment began on September 14, 1949. Granby Reservoir provides west-slope storage for the C-BT project. Data was provided by personnel from the Northern Water. The stream gage directly below the dam is used to measure flows during winter. A USGS station further downstream is used to measure flows between spring and fall. Data was recorded from October 1, 2022 to September 30, 2023. Records are complete and fair. This record contains operational data which could be subject to future revisions and changes.

Discharge, ft^3/s, 2400-hour values

	Oct.	Nov.	Dec..	Jan	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	23	21	22	21	21	21	21	76	75	1,046	75	60
2	22	21	22	21	21	21	21	77	75	1,046	77	61
3	22	21	21	21	21	21	21	75	75	852	77	62
4	22	21	21	21	21	21	21	78	75	554	76	61
5	22	21	21	21	21	21	21	76	75	368	76	61
6	22	21	22	21	21	21	21	75	75	174	76	71
7	23	21	22	20	21	21	21	75	75	220	75	67
8	23	21	22	20	21	21	21	75	75	291	76	61
9	23	22	21	20	21	21	21	75	75	318	76	60
10	19	21	21	20	21	21	21	75	75	368	76	61
11	18	21	21	22	21	21	22	75	75	368	76	62
12	19	21	21	20	21	21	20	75	88	378	76	55
13	22	21	20	20	21	21	20	75	417	396	76	37
14	21	21	20	20	21	21	20	75	520	324	76	48
15	21	20	20	20	20	21	20	75	576	173	76	62
16	21	22	20	20	21	21	20	75	787	147	71	61
17	21	22	20	20	21	21	20	75	979	125	115	62
18	21	22	20	20	21	21	20	75	813	75	112	61
19	21	21	20	20	21	21	20	75	678	75	113	62
20	21	21	20	20	21	20	22	75	1,128	76	114	61
21	21	21	21	20	21	21	20	75	1,623	76	112	61
22	21	21	21	20	21	21	20	75	1,780	75	113	62
23	21	21	21	20	21	21	20	75	2,004	75	112	64
24	21	21	21	20	21	21	20	75	1,914	75	114	63
25	21	21	21	21	21	21	20	75	1,731	75	115	63
26	21	21	21	21	21	21	20	75	1,291	75	113	45
27	21	21	21	21	21	21	20	75	744	75	114	46
28	21	20	21	21	22	21	20	75	741	75	112	47
29	21	22	21	21		21	21	75	893	75	110	47
30	21	22	21	21		21	24	75	1,046	75	110	42
31	21		21	21		21		75		75	110	
Min.	18	20	20	20	20	20	20	75	75	75	71	37
Max.	23	22	22	22	22	21	24	78	2,004	1,046	115	71
Mean	21	21	21	21	21	21	21	75	686	265	93	58
AF	1,302	1,248	1,284	1,264	1,154	1,277	1,229	4,625	40,819	16,265	5,747	3,442



Farr Pumping Plant, Granby Reservoir, Colorado.

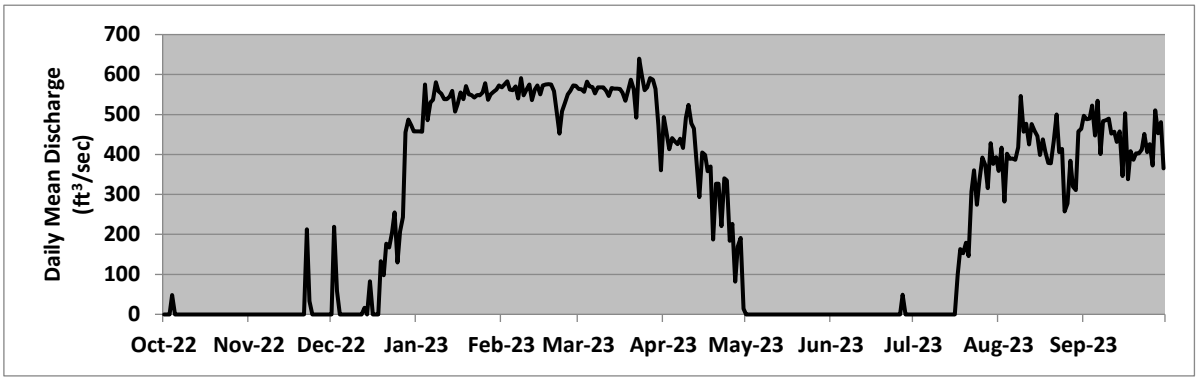
Location --Latitude 40°11'30", longitude 105°52'52", Grand County, Hydrologic Unit 14010001, at Farr Pumping Plant on the north end of Granby Reservoir, eight miles northeast of Granby, Colorado, on the Colorado River.

Gage-- Reading taken directly from the pumps, based on conduit pressure and Granby Reservoir's elevation. Elevation of the pumping plant is 8,320 ft. from topographic map.

Remarks-- Water is pumped from Granby to the Granby Pump Canal which discharges into Shadow Mountain Reservoir. The operation keeps Shadow Mountain Reservoir/Grand Lake at a steady water surface level (within 0.72 feet for this period) when trans-mountain diversions via Adams Tunnel are taking place. Data was provided by Farr Pumping Plant operators, Northern Water, each morning. Data was collected from October 1, 2022 to September 30, 2023. Records are complete and reliable. This record contains operational data which could be subject to future revisions and changes.

Discharge, ft^3/s, daily mean values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	0	0	0	458	568	564	494	0	0	0	359	497
2	0	0	219	458	575	563	456	0	0	0	417	488
3	0	0	59	457	583	557	413	0	0	0	282	490
4	48	0	0	575	562	582	441	0	0	0	402	522
5	0	0	0	486	561	570	433	0	0	0	389	447
6	0	0	0	530	570	569	426	0	0	0	390	534
7	0	0	0	537	540	553	439	0	0	0	387	401
8	0	0	0	581	591	568	416	0	0	0	418	483
9	0	0	0	558	548	568	492	0	0	0	546	486
10	0	0	0	552	562	568	524	0	0	0	457	490
11	0	0	0	538	575	559	478	0	0	0	477	452
12	0	0	0	538	536	546	465	0	0	0	425	457
13	0	0	16	545	562	566	373	0	0	0	476	431
14	0	0	0	559	573	565	293	0	0	0	459	458
15	0	0	83	507	550	565	405	0	0	0	446	346
16	0	0	0	526	573	564	399	0	0	0	399	503
17	0	0	0	555	575	554	358	0	0	99	438	338
18	0	0	0	538	576	534	370	0	0	163	406	408
19	0	0	133	571	575	558	187	0	0	153	379	387
20	0	0	98	550	558	587	327	0	0	179	378	403
21	0	0	177	549	509	563	327	0	0	146	433	403
22	0	213	167	542	452	492	221	0	0	307	500	412
23	0	33	205	549	508	640	340	0	0	360	406	451
24	0	0	255	548	529	600	335	0	0	274	414	406
25	0	0	130	555	550	561	184	0	0	336	257	426
26	0	0	207	578	559	568	226	0	0	392	277	372
27	0	0	243	537	573	591	82	0	49	374	384	510
28	0	0	455	550	572	587	170	0	0	316	320	453
29	0	0	487	557		564	191	0	0	428	311	481
30	0	0	473	562		473	14	0	0	376	458	365
31	0		458	573		360		0		393	464	
Min.	0	0	0	457	452	360	14	0	0	0	257	338
Max.	48	213	487	581	591	640	524	0	49	428	546	534
Mean	2	8	125	539	556	557	343	0	2	139	405	443
AF	95	488	7,666	33,162	30,873	34,233	20,388	0	97	8,521	24,900	26,380



Shadow Mountain/Grand Lake, Colorado

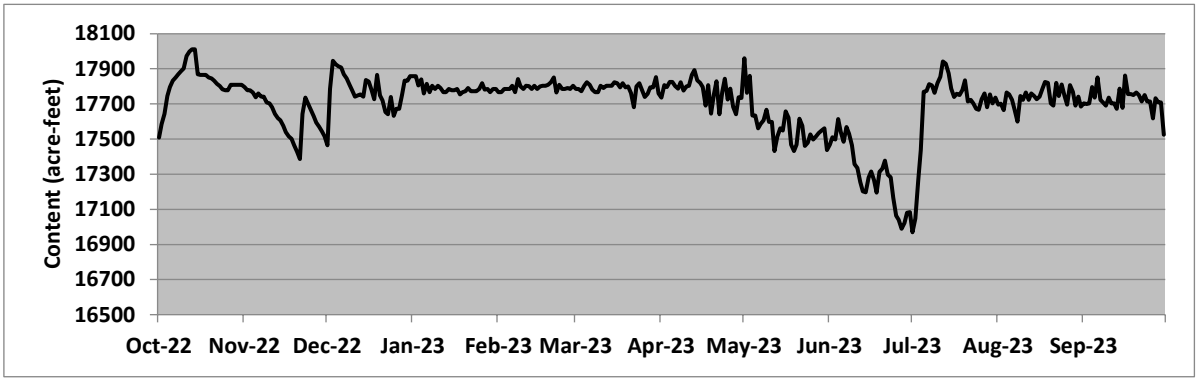
Location --Latitude 40°12'26", longitude 105°50'28", Grand County, Hydrologic Unit 14010001, on the Colorado River at the Shadow Mountain outlet works structure, ten miles northeast of Granby, Colorado.

Gage--Water-stage recorder with satellite telemetry. Elevation of gage is 8,375 feet (m.s.l.) from topographic map.

Remarks—Shadow Mountain/Grand Lake was constructed between 1944 and 1946. Impoundment began in 1946. Active capacity between elevations 8,366 and 8,367 is 1,800 AF. Grand Lake is used as forebay storage for Adams Tunnel. Recorder was operated from October 1, 2022 to September 30, 2023. Some data were provided by Farr Pumping Plant personnel during down time. Records are complete and fair. This record contains operational data which could be subject to future revisions and changes.

Storage, AF, 2400-hour values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	17,508	17,796	17,465	17,858	17,767	17,786	17,736	17,960	17,469	16,969	17,696	17,704
2	17,584	17,777	17,785	17,858	17,767	17,786	17,806	17,763	17,511	17,048	17,701	17,699
3	17,643	17,777	17,946	17,805	17,786	17,772	17,796	17,860	17,498	17,264	17,664	17,704
4	17,746	17,764	17,925	17,840	17,786	17,804	17,824	17,634	17,614	17,437	17,764	17,796
5	17,796	17,738	17,914	17,759	17,786	17,822	17,824	17,634	17,540	17,768	17,754	17,736
6	17,833	17,759	17,906	17,814	17,804	17,809	17,801	17,561	17,485	17,773	17,722	17,851
7	17,851	17,741	17,869	17,767	17,767	17,780	17,788	17,587	17,569	17,813	17,667	17,722
8	17,869	17,741	17,846	17,804	17,841	17,767	17,822	17,606	17,529	17,805	17,599	17,709
9	17,888	17,709	17,809	17,786	17,799	17,767	17,775	17,666	17,464	17,763	17,746	17,691
10	17,901	17,704	17,777	17,804	17,786	17,804	17,799	17,598	17,357	17,818	17,722	17,736
11	17,973	17,680	17,741	17,791	17,804	17,791	17,804	17,598	17,336	17,855	17,764	17,704
12	17,998	17,644	17,749	17,767	17,801	17,804	17,864	17,432	17,254	17,942	17,722	17,704
13	18,011	17,620	17,754	17,767	17,786	17,804	17,893	17,514	17,202	17,929	17,759	17,672
14	18,011	17,607	17,741	17,786	17,804	17,804	17,835	17,561	17,197	17,873	17,746	17,788
15	17,869	17,575	17,836	17,777	17,786	17,822	17,819	17,548	17,281	17,787	17,727	17,677
16	17,864	17,538	17,828	17,777	17,799	17,817	17,796	17,658	17,315	17,740	17,741	17,861
17	17,864	17,515	17,777	17,786	17,804	17,794	17,691	17,621	17,266	17,758	17,788	17,756
18	17,864	17,502	17,727	17,754	17,804	17,817	17,806	17,469	17,195	17,750	17,824	17,756
19	17,851	17,465	17,865	17,767	17,809	17,794	17,646	17,432	17,313	17,779	17,819	17,751
20	17,846	17,428	17,749	17,772	17,822	17,799	17,756	17,469	17,331	17,835	17,704	17,764
21	17,833	17,386	17,720	17,791	17,851	17,762	17,830	17,616	17,378	17,714	17,691	17,751
22	17,814	17,643	17,654	17,772	17,764	17,680	17,641	17,576	17,296	17,722	17,819	17,714
23	17,801	17,736	17,641	17,772	17,809	17,799	17,769	17,461	17,283	17,704	17,746	17,751
24	17,783	17,704	17,739	17,772	17,786	17,817	17,843	17,479	17,165	17,672	17,811	17,714
25	17,777	17,667	17,632	17,786	17,786	17,775	17,724	17,526	17,063	17667	17,746	17,714
26	17,777	17,630	17,672	17,817	17,791	17,739	17,788	17,498	17,040	17,727	17,696	17,617
27	17,809	17,594	17,672	17,780	17,786	17,757	17,682	17,516	16,990	17,759	17,806	17,732
28	17,809	17,570	17,752	17,786	17,804	17,794	17,641	17,534	17,021	17,680	17,769	17,709
29	17,809	17,544	17,832	17,767		17,794	17,738	17,548	17,080	17,754	17,691	17,709
30	17,809	17,515	17,832	17,786		17,853	17,735	17,561	17,085	17,704	17,741	17,525
31	17,809		17,858	17,786		17,759		17,437		17,736	17,685	
Min	17508	17,386	17,465	17,754	17,764	17,680	17,641	17,432	16,990	16,969	17,599	17,525
Max	18,011	17,796	17,946	17,858	17,851	17,853	17,893	17,960	17,614	17,942	17,824	17,861
Mean	17,826	17,636	17,775	17,789	17,796	17,789	17,776	17,578	17,304	17,695	17,736	17,724
EOM	17,809	17,515	17,858	17,786	17,804	17,759	17,735	17,437	17,085	17,736	17,685	17,525



Alva B. Adams Tunnel at East Portal, near Estes Park, Colorado

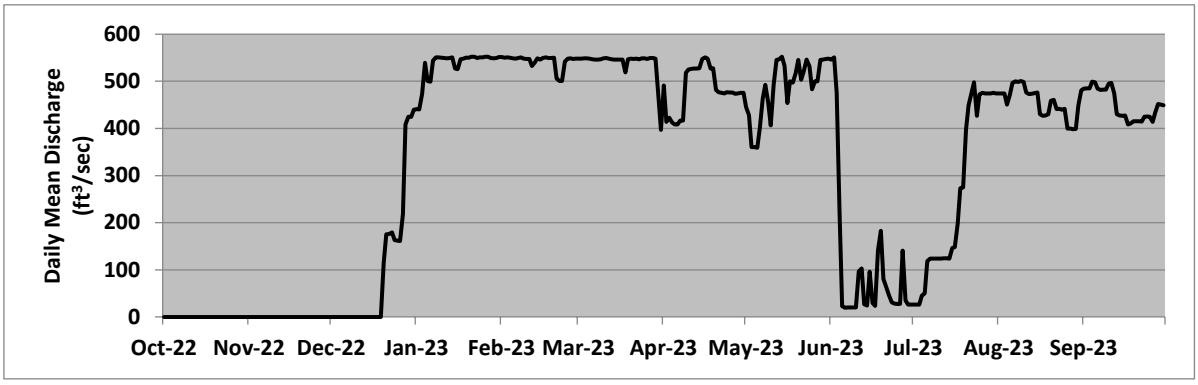
Location --Latitude 40°19'40", longitude 105°34'39", Larimer County, Hydrologic Unit 10190006, 4.5 miles southwest of Estes Park, Colorado.

Gage-- Water-stage recorder with satellite telemetry at 15-foot Parshall flume. Elevation of gage is 8,250 ft (m.s.l.) from topographic map.

Remarks-- Constructed between 1940 and 1947. Tunnel is 13.1 miles long and extends between Grand Lake and East Portal approximately four miles southwest of Estes Park. Its maximum capacity is 550 ft^3/s. Recorder was operated from October 1, 2022 to September 30, 2023. Records are complete and reliable. This record contains operational data which could be subject to future revisions and changes. Official record published by the Colorado Division of Water Resources.

Discharge, ft^3/s, daily mean values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	0	0	0	441	551	548	491	445	546	26	474	485
2	0	0	0	441	550	548	414	428	551	26	474	485
3	0	0	0	474	551	549	422	361	475	26	474	485
4	0	0	0	539	550	549	412	360	221	45	450	499
5	0	0	0	500	548	548	409	359	23	50	471	498
6	0	0	0	499	548	547	408	402	19	119	497	484
7	0	0	0	544	549	546	417	463	21	124	500	482
8	0	0	0	551	551	546	417	493	21	124	499	483
9	0	0	0	551	548	547	519	455	21	124	501	482
10	0	0	0	550	547	549	525	407	20	124	499	495
11	0	0	0	549	547	550	526	492	97	124	477	496
12	0	0	0	549	532	548	527	545	103	124	473	474
13	0	0	0	550	540	547	527	547	27	124	474	430
14	0	0	0	551	549	546	528	552	24	124	475	427
15	0	0	0	527	546	546	548	533	96	146	476	427
16	0	0	0	526	550	546	551	454	30	148	430	427
17	0	0	0	546	551	546	548	500	23	198	427	409
18	0	0	0	548	550	519	527	497	141	273	427	410
19	0	0	0	550	549	546	528	517	183	275	430	415
20	0	0	115	550	550	548	481	546	81	398	459	416
21	0	0	175	552	506	548	477	504	63	449	461	415
22	0	0	176	552	501	548	475	521	47	475	441	415
23	0	0	180	549	501	547	474	546	31	498	441	424
24	0	0	163	551	542	549	477	532	28	427	440	426
25	0	0	162	551	548	549	477	483	28	472	442	425
26	0	0	161	552	549	548	476	500	28	475	399	414
27	0	0	218	552	547	550	474	500	141	474	400	433
28	0	0	409	550	548	550	474	546	35	474	398	452
29	0	0	425	549		548	476	546	26	474	399	451
30	0	0	425	550		469	476	548	26	476	449	449
31	0		440	552		397		548		475	481	
Min.	0	0	0	441	501	397	408	359	19	26	398	409
Max.	0	0	440	552	551	550	551	552	551	498	501	499
Mean	0	0	98	535	543	539	483	488	106	255	456	450
AF	0	0	5,173	31,823	30,148	32,377	28,723	28,922	6,296	14,716	27,089	26,804



Marys Lake, Colorado

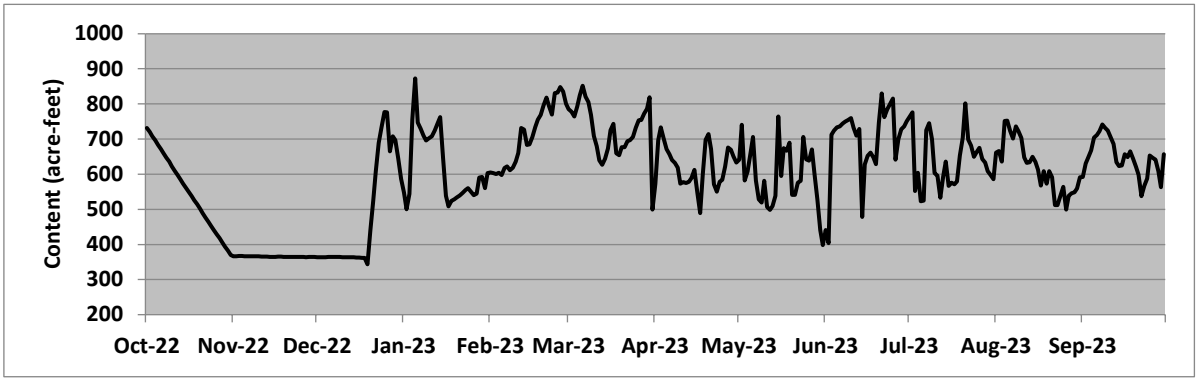
Location --Latitude 40°22'40", longitude 105°31'50", Larimer County, Hydrologic Unit 10190006, two miles southwest of Estes Park, Colorado.

Gage-- Water-level recorder with satellite telemetry. Elevation of gage is 8,060 feet (m.s.l.) from topographic map.

Remarks-- Constructed between 1947 and 1949. Impoundment began in August 1950. Active capacity between elevations 8,025 and 8,040 is 500 AF. Used as a forebay storage for Estes Powerplant. The only measurable inflow into the reservoir comes from Adams Tunnel. Recorder was operated from October 1, 2022 to September 30, 2023. Record is complete and reliable. The gage does not record water surface levels below elevation 8,022.62 feet, content of 322 AF. Values reported as less than 322 AF are estimates. These are operational data which could be subject to further revisions and changes.

Storage, AF, 2400-hour values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	731	366	364	548	605	785	572	641	441	763	661	592
2	720	366	364	501	603	778	697	740	404	776	666	630
3	708	367	364	544	601	764	734	582	713	552	635	647
4	697	368	364	756	604	792	701	608	724	604	752	667
5	684	367	364	872	597	824	671	658	733	523	752	704
6	671	367	365	747	617	851	657	706	736	525	723	711
7	659	366	364	730	622	820	641	582	744	725	702	723
8	647	366	364	709	611	805	632	528	750	745	736	741
9	636	366	364	696	619	768	619	519	754	699	723	731
10	622	366	364	703	635	709	573	581	760	603	703	725
11	610	366	363	708	660	680	577	506	733	596	648	705
12	597	365	364	724	731	640	575	498	709	533	632	686
13	585	365	364	742	727	627	578	509	729	594	634	634
14	573	365	363	763	683	644	589	538	479	635	650	623
15	561	365	363	647	685	673	612	764	628	567	635	625
16	550	365	363	538	706	725	549	595	652	576	613	657
17	538	365	362	508	734	744	489	674	662	571	568	648
18	526	365	362	524	755	660	598	667	648	579	609	665
19	514	365	343	529	769	654	698	690	628	653	573	644
20	502	365	440	534	796	677	714	541	746	703	609	621
21	489	365	525	540	818	677	671	541	830	801	592	598
22	477	364	608	546	794	694	571	575	763	699	512	538
23	465	364	689	555	770	697	550	581	784	681	512	567
24	452	364	734	560	831	706	578	706	800	649	539	588
25	441	364	777	550	832	732	584	643	815	662	564	653
26	429	364	776	540	848	754	622	638	641	675	499	647
27	418	364	665	545	835	754	676	671	699	643	539	641
28	406	364	707	591	801	772	669	601	727	633	546	608
29	394	365	697	592		786	650	528	736	609	548	563
30	383	364	645	560		819	633	441	750	597	560	657
31	370		587	603		499		399		586	591	
Min.	370	364	343	501	597	499	489	399	404	523	499	538
Max.	731	368	777	872	848	851	734	764	830	801	752	741
Mean	550	365	475	620	710	726	623	595	697	637	620	648
EOM	370	364	587	603	801	499	633	399	750	586	591	657



Big Thompson River above Lake Estes, Colorado

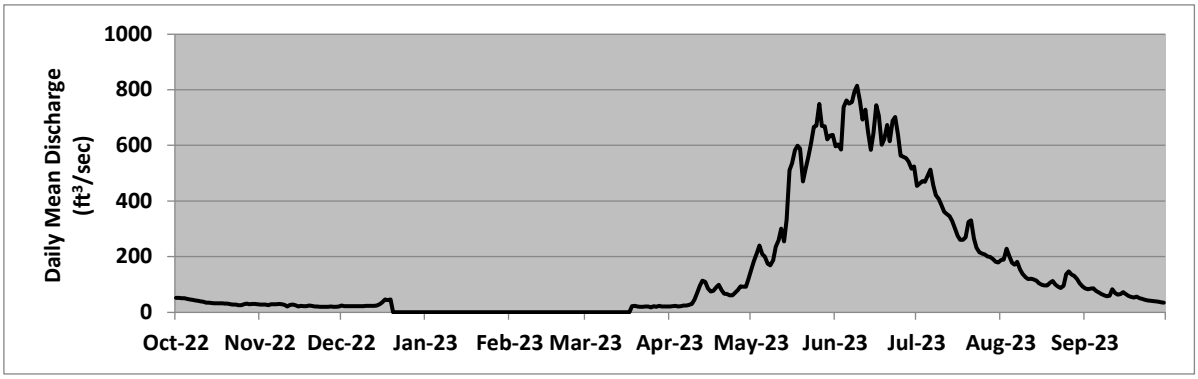
Location --Lat 40°22'42", long 105°30'48", Larimer County, Hydrologic Unit 10190006, 600 feet downstream from bridge on state highways 7 and 36 in Estes Park, Colorado, downstream from Black Canyon Creek, and 0.3 miles northwest of Estes Powerplant.

Gage-- Water-stage recorder with satellite telemetry. 15-foot Parshall flume with overflow weirs and supplemental outside gage. Datum of gage at 7492.5 feet.

Remarks— Drainage area is 137 mi2. Station consists of an automated data collection platform. Recorder was operated from 01-Oct-2021 until 19-Dec-2022, before it was winterized. The station was put back into service from 18-Mar-2023 to 30-Sep-2023. Values for the off-season are marked as zero, but winter month flows normally fluctuate between 10 and 30 ft3/s. This record contains operational data which could be subject to future revisions and changes. The official record for this station is published by the Colorado Division of Water Resources.

Discharge, ft^3/s, daily mean values

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	52	28	24	0	0	0	20	155	596	454	188	87
2	52	27	22	0	0	0	22	185	604	462	190	83
3	50	27	22	0	0	0	23	212	584	471	228	85
4	51	25	22	0	0	0	21	240	738	469	203	86
5	48	29	22	0	0	0	22	209	762	492	178	77
6	47	29	22	0	0	0	24	200	750	512	171	71
7	44	29	22	0	0	0	24	175	755	457	181	65
8	43	30	22	0	0	0	26	168	794	421	154	61
9	41	29	22	0	0	0	30	187	815	407	138	58
10	40	27	24	0	0	0	45	235	759	387	127	60
11	38	21	23	0	0	0	68	260	693	361	120	83
12	35	26	23	0	0	0	95	301	728	353	120	69
13	34	28	23	0	0	0	114	255	650	346	118	63
14	33	26	24	0	0	0	109	333	584	328	113	66
15	33	21	29	0	0	0	86	510	642	301	105	73
16	33	23	35	0	0	0	74	536	745	276	98	65
17	33	22	46	0	0	0	77	583	707	260	97	59
18	32	22	44	0	0	22	90	598	602	261	97	55
19	31	25	46	0	0	23	99	588	622	269	105	53
20	31	23	0	0	0	21	79	471	673	325	113	56
21	29	21	0	0	0	20	67	514	615	331	100	51
22	28	20	0	0	0	20	66	560	688	265	92	48
23	27	20	0	0	0	21	61	606	702	231	88	45
24	26	20	0	0	0	21	61	666	636	215	95	42
25	25	20	0	0	0	18	70	671	564	211	136	41
26	28	20	0	0	0	22	81	749	558	208	147	40
27	31	21	0	0	0	20	93	669	554	201	135	39
28	29	20	0	0	0	23	92	669	541	199	131	37
29	30	20	0	0		21	92	622	516	191	120	36
30	30	21	0	0		21	120	635	524	181	105	35
31	28		0	0		21		637		180	93	
Min.	25	20	0	0	0	0	20	155	516	180	88	35
Max.	52	30	46	0	0	23	120	749	815	512	228	87
Mean	36	24	17	0	0	9	65	432	657	323	132	60
AF	2,206	1,427	1,026	0	0	581	3,871	26,574	39,077	19,884	8,101	3,544



Olympus Dam, Colorado

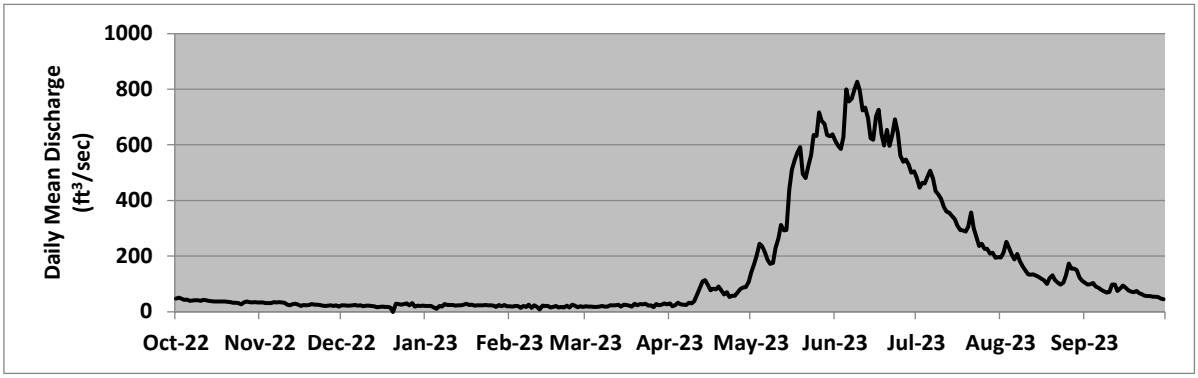
Location. --Latitude 40°22'31", longitude 105°29'15", Larimer County, Hydrologic Unit 10190006, 1.5 miles east of Estes Park, Colorado, on the Big Thompson River.

Gage—Water-stage recorders with satellite telemetry. Inflow computed daily based on the change in content from midnight to midnight at Marys Lake and Lake Estes, daily average releases from Olympus Dam, and daily average discharge at Olympus Tunnel and Adams Tunnel.

Remarks— Olympus dam was constructed between 1947 and 1949. Impoundment began in November 1948. Total capacity at maximum water surface elevation of 7,475.0 feet is 2,579 AF. System start up can create computation errors in the calculated inflows. No adjustments to the record were required for the period. This record contains operational data which could be subject to future revisions and changes.

Computed Inflow, ft^3/s, daily mean values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	47	34	23	21	20	20	30	141	614	482	195	104
2	50	34	23	21	19	19	19	171	598	447	212	97
3	48	32	21	21	21	19	24	202	585	463	252	99
4	43	31	22	15	20	17	33	244	629	462	230	103
5	44	31	23	11	14	17	27	236	799	487	206	91
6	39	35	24	21	20	19	25	216	756	507	189	86
7	41	33	22	19	18	20	24	187	766	478	207	79
8	42	35	23	27	25	19	32	172	798	433	182	74
9	41	34	20	24	14	19	30	175	827	421	163	69
10	39	32	21	24	23	24	38	229	796	406	149	71
11	43	25	22	24	17	23	62	264	724	377	135	97
12	41	24	21	22	8	23	84	312	734	360	134	97
13	39	28	20	23	22	25	109	292	695	356	134	75
14	39	29	17	23	21	18	114	294	624	344	129	84
15	37	26	18	25	20	26	96	440	619	333	125	95
16	37	21	18	29	16	24	77	510	702	310	118	86
17	37	24	18	24	18	22	83	546	725	293	112	77
18	37	23	18	26	21	18	80	571	639	293	100	72
19	37	25	16	22	15	29	91	592	597	288	120	70
20	36	28	-1	23	17	23	76	495	654	306	131	74
21	34	26	29	23	15	27	63	481	597	356	114	66
22	33	25	28	23	22	26	70	521	638	301	104	64
23	32	24	26	24	16	29	53	564	692	266	98	57
24	32	22	28	23	26	22	58	635	642	236	104	56
25	27	21	29	23	22	24	57	632	561	245	130	57
26	34	22	23	22	17	16	70	717	539	227	173	55
27	37	23	31	18	20	28	81	686	547	226	155	54
28	35	20	18	24	18	23	87	675	529	209	155	53
29	34	23	21	20		25	88	636	500	212	150	47
30	35	19	21	24		31	107	631	505	194	121	45
31	34		22	20		27		638		196	111	
Min.	27	19	-1	11	8	16	19	141	500	194	98	45
Max.	50	35	31	29	26	31	114	717	827	507	252	104
Mean	38	27	21	22	19	23	63	423	654	339	150	75
AF	2,344	1,599	1,322	1,369	1,041	1,391	3,745	25,996	38,938	20,853	9,202	4,473



Olympus Dam, Colorado

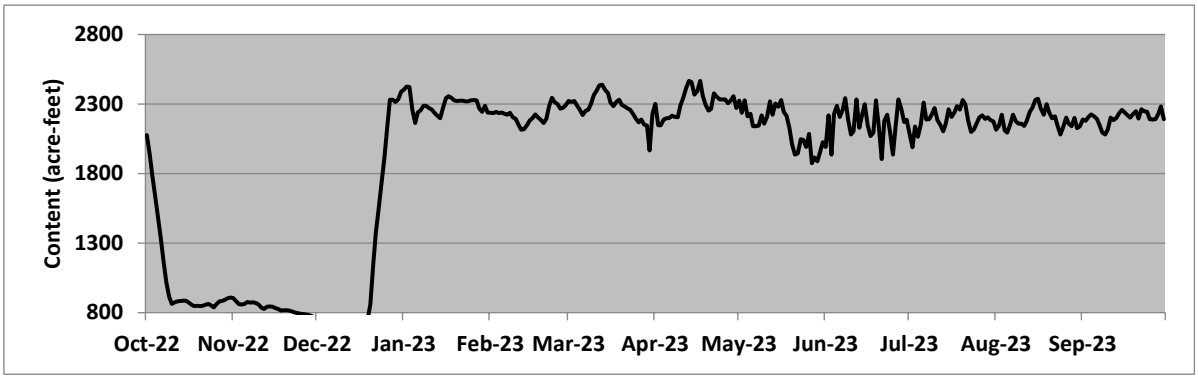
Location --Latitude 40°22'31", longitude 105°29'19", Larimer County, Hydrologic Unit 10190006, 1.5 miles east of Estes Park, Colorado, on the Big Thompson River.

Gage -- Water-level recorder with satellite telemetry. Elevation of gage is 7,490 feet (m.s.l.) from topographic map.

Remarks -- Constructed between 1947 and 1949. Impoundment began in November 1948. Active capacity between elevations 7,450.25 and 7,474.00 is 2,259 AF. Used as afterbay storage for Estes Powerplant and forebay for Olympus Tunnel. Recorder was operated from October 1, 2022 to September 30, 2023. Records are complete and reliable. This record contains operational data which could be subject to future revisions and changes.

Storage, AF, 2400-hour values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	2,076	905	768	2,404	2,237	2,323	2,302	2,325	1,991	2,085	2,116	2,190
2	1,936	882	765	2,426	2,234	2,314	2,148	2,238	2,218	1,990	2,143	2,180
3	1,788	862	762	2,423	2,244	2,323	2,148	2,328	1,937	2,139	2,224	2,205
4	1,637	859	761	2,259	2,234	2,289	2,188	2,213	2,229	2,066	2,111	2,225
5	1,484	863	761	2,163	2,239	2,259	2,198	2,230	2,288	2,154	2,094	2,213
6	1,327	876	760	2,240	2,229	2,221	2,199	2,140	2,208	2,310	2,153	2,193
7	1,171	872	758	2,256	2,223	2,251	2,216	2,142	2,257	2,190	2,222	2,151
8	1,016	875	758	2,287	2,237	2,261	2,207	2145	2,342	2,191	2,174	2,094
9	912	870	753	2,289	2,206	2,300	2,204	2,218	2,188	2,227	2,159	2,081
10	863	860	759	2,272	2,195	2,366	2,289	2,159	2,082	2,271	2,159	2,119
11	874	835	760	2,261	2,155	2,398	2,345	2,210	2,107	2,185	2,143	2,202
12	881	827	757	2,234	2,116	2,435	2,413	2,320	2,332	2,150	2,179	2,184
13	884	843	746	2,218	2,121	2,438	2,467	2,222	2,130	2,105	2,241	2,201
14	887	846	741	2,198	2,148	2,402	2,457	2,304	2,225	2,159	2276	2,232
15	887	842	744	2,275	2,179	2,379	2,368	2,280	2,299	2,261	2,331	2,258
16	872	833	744	2,343	2,198	2,311	2,393	2,329	2,150	2,207	2,337	2,240
17	858	827	744	2,356	2,226	2,285	2,466	2,244	2,070	2,240	2,268	2,218
18	847	816	744	2,345	2,206	2,314	2,361	2,215	2,096	2,285	2,222	2,202
19	849	818	744	2,326	2,186	2,331	2,295	2,125	2,326	2,260	2,299	2,227
20	848	817	862	2,323	2,165	2,294	2,254	2,010	2,137	2,329	2,240	2,249
21	851	815	1,149	2,324	2,196	2,283	2,265	1,937	1,904	2,299	2,199	2,196
22	858	808	1,372	2,324	2,283	2,269	2,376	1,947	2,180	2,180	2,211	2,261
23	863	803	1,550	2,319	2,345	2,261	2,353	2,046	2,224	2,100	2146	2,249
24	853	797	1,735	2,319	2,312	2,231	2,335	2,043	2,097	2,119	2,081	2,244
25	839	791	1,917	2,328	2,299	2,196	2,335	1,993	1,937	2,160	2,136	2,191
26	863	790	2,119	2,329	2,267	2,168	2,333	2,085	2,131	2,205	2,202	2,188
27	881	788	2,331	2,326	2,275	2,188	2,306	1,875	2,332	2,218	2,159	2,191
28	884	782	2,331	2,269	2,295	2,153	2,326	1,915	2,268	2,193	2,142	2,230
29	893	776	2,314	2,244		2,146	2,356	1,888	2,170	2,205	2,201	2,282
30	905	767	2,335	2,287		1,967	2,272	1,960	2,187	2,184	2,126	2,191
31	910		2,390	2,239		2,231		2,027		2,176	2,142	
Min.	839	767	741	2,163	2,116	1,967	2,148	1,875	1,904	1,990	2,081	2,081
Max.	2,076	905	2,390	2,426	2,345	2,438	2,467	2,329	2,342	2,329	2,337	2,282
Mean	1,048	831	1,185	2297	2,223	2,277	2,306	2,133	2,168	2,188	2,188	2,203
EOM	910	767	2,390	2,239	2,295	2,231	2,272	2,027	2,187	2,176	2,142	2,191



Big Thompson River below Olympus Dam, Colorado

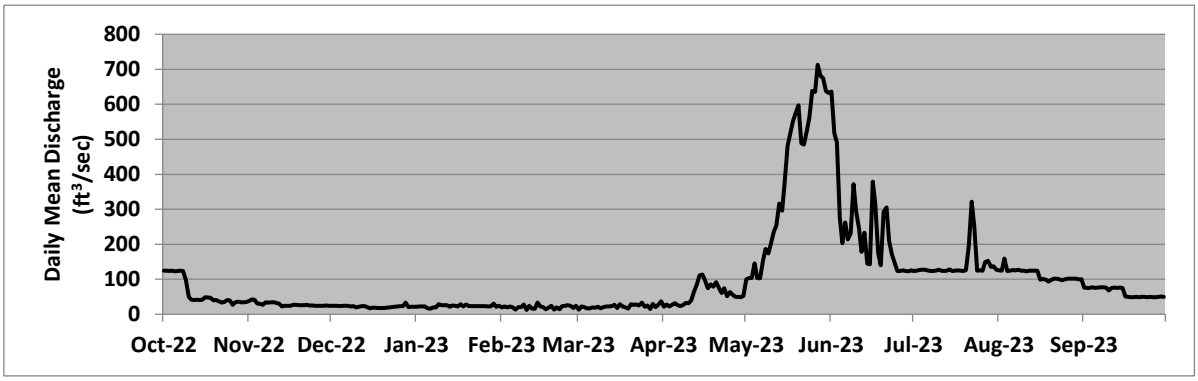
Location --Latitude 40°22'35", longitude 105°29'06", Larimer County, Hydrologic Unit 10190006, 620 feet downstream from Olympus Dam and 100 feet upstream of Dry Gulch, two miles east of Estes Park.

Gage -- Water-stage recorder with satellite telemetry. 15-foot Parshall flume with overflow weirs in a concrete shelter with a supplemental outside gage. Datum of gage at 7,422.50 feet.

Remarks— Drainage area is 155 square miles. Area at site used between January 29, 934 and March 21, 951 was 162 square miles. Station consists of automated data collection platform and digital recorder as primary record. Recorder was operated from OCTOBER 1, 2022 to September 30, 2023. Record is complete. Flow calculations during peak runoff could lose accuracy as the water begins to flow over the outside boards. This record contains operational data which could be subject to future revisions and changes. The official record for this station is published by the Colorado Division of Water Resources.

Discharge, ft^3/s, daily mean values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	124	38	24	22	19	13	21	100	636	124	125	76
2	124	42	24	22	22	22	27	103	516	124	124	75
3	124	42	23	22	19	20	23	103	492	126	159	75
4	124	30	23	22	22	17	27	145	277	127	123	77
5	122	30	23	17	20	17	32	103	202	127	124	75
6	123	27	24	16	13	19	25	102	262	125	126	76
7	125	34	24	19	20	19	23	152	214	123	126	77
8	123	33	22	19	21	21	26	187	231	123	127	77
9	97	34	23	29	27	17	32	173	371	125	125	76
10	49	34	19	26	12	21	31	202	294	127	125	68
11	41	32	21	26	23	22	39	236	246	124	123	75
12	40	30	23	26	16	23	65	254	179	123	124	76
13	41	23	23	21	16	23	86	316	233	124	124	75
14	40	24	21	25	33	27	110	296	145	128	125	76
15	41	24	16	24	22	18	114	378	143	124	124	75
16	49	24	18	22	21	29	97	481	379	125	99	50
17	48	26	18	28	14	22	74	515	315	125	101	49
18	46	27	18	23	19	19	85	552	174	125	99	48
19	39	26	17	27	24	16	79	575	140	124	93	49
20	41	26	18	23	13	29	91	597	292	126	98	50
21	37	26	19	23	19	26	76	488	306	197	101	48
22	33	27	20	23	14	28	61	485	209	321	102	50
23	34	25	20	23	23	25	74	524	170	251	100	49
24	40	24	21	23	24	33	51	563	148	125	97	49
25	39	24	22	23	25	21	64	639	124	126	100	49
26	27	24	23	23	24	25	56	635	123	124	102	49
27	34	24	23	22	17	15	49	713	125	149	101	49
28	36	24	33	22	24	30	49	682	123	153	101	50
29	34	25	20	31		20	49	675	123	135	102	50
30	34	24	21	21		27	53	638	125	137	100	49
31	35		22	24		37		633		127	100	
Min.	27	23	16	16	12	13	21	100	123	123	93	48
Max.	125	42	33	31	33	37	114	713	636	321	159	77
Mean	63	28	21	23	20	23	56	395	244	140	113	62
AF	3,858	1,687	1,321	1,420	1,124	1,386	3,350	2,4287	14,515	8,613	6,938	3,702



Olympus Tunnel near Estes Park, Colorado

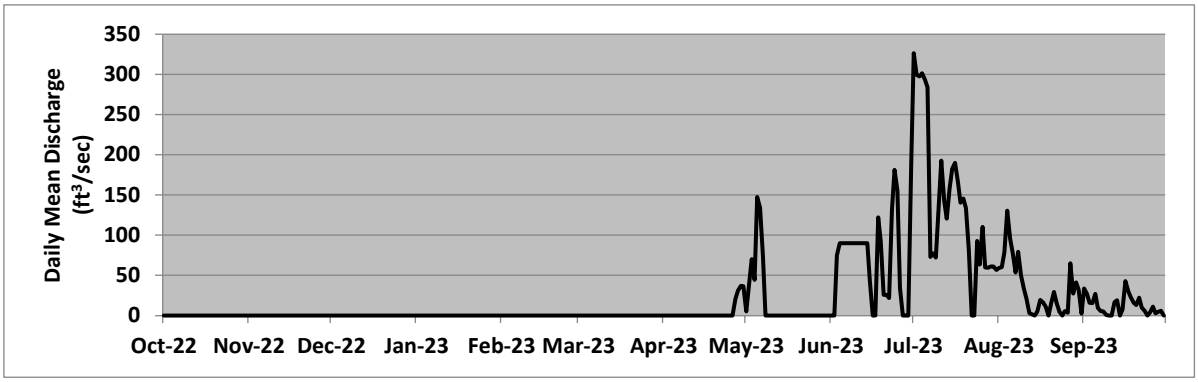
Location --Latitude 40°22'24", longitude 105°29'00", Larimer County, Hydrologic Unit 10190006, southeast of Estes Park, Colorado.

Gage -- Water-stage recorder and satellite telemetry. Elevation of gage is 7,460 ft (m.s.l.) from topographic map.

Remarks— Constructed between 1949 and 1952. The tunnel is 7.2 miles long, between Estes Park and the Pole Hill Canal. Its diameter is 9.75 feet and maximum design capacity is 550 ft3/s. The hydropower diversion operation, also known as the skim operation, diverts water from the Big Thompson River through Olympus Tunnel for power generation at three power plants down the foothills, before returning it to the Big Thompson River near the canyon mouth. The skim daily value is determined based on the data from the stream gages in the system. Period of record includes October 1, 2022 through September 30, 2023. Records are complete and reliable. This record contains operational data which could be subject to future revisions and changes.

Hydropower diversion (skim), ft^3/s, daily mean values

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	0	0	0	0	0	0	0	5	0	326	59	34
2	0	0	0	0	0	0	0	40	0	299	60	27
3	0	0	0	0	0	0	0	70	75	298	79	16
4	0	0	0	0	0	0	0	44	90	302	131	16
5	0	0	0	0	0	0	0	148	90	293	96	27
6	0	0	0	0	0	0	0	134	90	284	78	10
7	0	0	0	0	0	0	0	74	90	73	54	5
8	0	0	0	0	0	0	0	0	90	77	79	5
9	0	0	0	0	0	0	0	0	90	72	50	1
10	0	0	0	0	0	0	0	0	90	137	33	0
11	0	0	0	0	0	0	0	0	90	193	21	0
12	0	0	0	0	0	0	0	0	90	143	3	17
13	0	0	0	0	0	0	0	0	90	121	2	19
14	0	0	0	0	0	0	0	0	90	158	0	0
15	0	0	0	0	0	0	0	0	43	182	5	7
16	0	0	0	0	0	0	0	0	0	190	20	43
17	0	0	0	0	0	0	0	0	0	166	16	30
18	0	0	0	0	0	0	0	0	122	141	11	23
19	0	0	0	0	0	0	0	0	92	145	0	16
20	0	0	0	0	0	0	0	0	26	134	15	13
21	0	0	0	0	0	0	0	0	26	82	29	22
22	0	0	0	0	0	0	0	0	22	0	16	10
23	0	0	0	0	0	0	0	0	132	0	5	6
24	0	0	0	0	0	0	0	0	181	93	0	0
25	0	0	0	0	0	0	0	0	156	63	5	4
26	0	0	0	0	0	0	0	0	34	110	4	11
27	0	0	0	0	0	0	21	0	0	60	65	3
28	0	0	0	0	0	0	31	0	0	60	27	5
29	0	0	0	0		0	37	0	0	61	41	6
30	0	0	0	0		0	36	0	186	61	32	0
31	0		0	0		0		0		57	3	
Min.	0	0	0	0	0	0	0	0	0	0	0	0
Max.	0	0	0	0	0	0	37	148	186	326	131	43
Mean	0	0	0	0	0	0	4	17	69	141	34	13
AF	0	0	0	0	0	0	249	1,023	4,135	8,685	2,063	745



Olympus Tunnel, Colorado

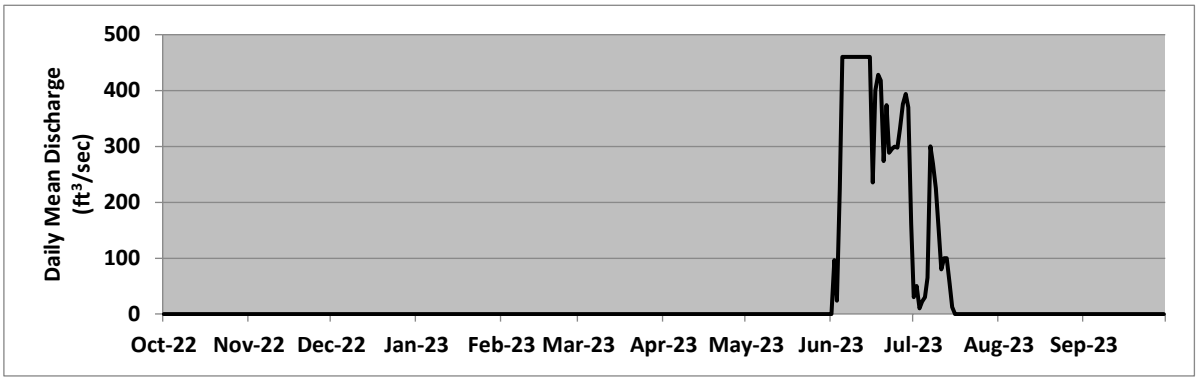
Location --Latitude 40°22'24", longitude 105°29'00", Larimer County, Hydrologic Unit 10190006, southeast of Estes Park, Colorado.

Gage -- Water-stage recorder and satellite telemetry. Elevation of gage is 7,460 ft (m.s.l.) from topographic map.

Remarks.— Constructed between 1949 and 1952. The tunnel is 7.2 miles long, between Estes Park and the Pole Hill Canal. Its diameter is 9.75 feet and maximum design capacity is 550 ft3/s. The right to divert native runoff is determined by the Colorado Division of Water Resources. Period of record from October 1, 2022 through September 30, 2023. Record is complete and reliable.

Priority diversion flow, ft^3/s, daily mean values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	0	0	0	0	0	0	0	0	0	30	0	0
2	0	0	0	0	0	0	0	0	97	50	0	0
3	0	0	0	0	0	0	0	0	24	10	0	0
4	0	0	0	0	0	0	0	0	223	22	0	0
5	0	0	0	0	0	0	0	0	460	30	0	0
6	0	0	0	0	0	0	0	0	460	65	0	0
7	0	0	0	0	0	0	0	0	460	300	0	0
8	0	0	0	0	0	0	0	0	460	269	0	0
9	0	0	0	0	0	0	0	0	460	225	0	0
10	0	0	0	0	0	0	0	0	460	150	0	0
11	0	0	0	0	0	0	0	0	460	80	0	0
12	0	0	0	0	0	0	0	0	460	100	0	0
13	0	0	0	0	0	0	0	0	460	100	0	0
14	0	0	0	0	0	0	0	0	460	55	0	0
15	0	0	0	0	0	0	0	0	460	13	0	0
16	0	0	0	0	0	0	0	0	235	0	0	0
17	0	0	0	0	0	0	0	0	400	0	0	0
18	0	0	0	0	0	0	0	0	428	0	0	0
19	0	0	0	0	0	0	0	0	418	0	0	0
20	0	0	0	0	0	0	0	0	274	0	0	0
21	0	0	0	0	0	0	0	0	374	0	0	0
22	0	0	0	0	0	0	0	0	289	0	0	0
23	0	0	0	0	0	0	0	0	296	0	0	0
24	0	0	0	0	0	0	0	0	300	0	0	0
25	0	0	0	0	0	0	0	0	298	0	0	0
26	0	0	0	0	0	0	0	0	332	0	0	0
27	0	0	0	0	0	0	0	0	376	0	0	0
28	0	0	0	0	0	0	0	0	394	0	0	0
29	0	0	0	0		0	0	0	370	0	0	0
30	0	0	0	0		0	0	0	161	0	0	0
31	0		0	0		0		0		0	0	
Min.	0	0	0	0	0	0	0	0	0	0	0	0
Max.	0	0	0	0	0	0	0	0	460	300	0	0
Mean	0	0	0	0	0	0	0	0	345	48	0	0
AF	0	0	0	0	0	0	0	0	20,524	2,972	0	0



Olympus Tunnel, Colorado

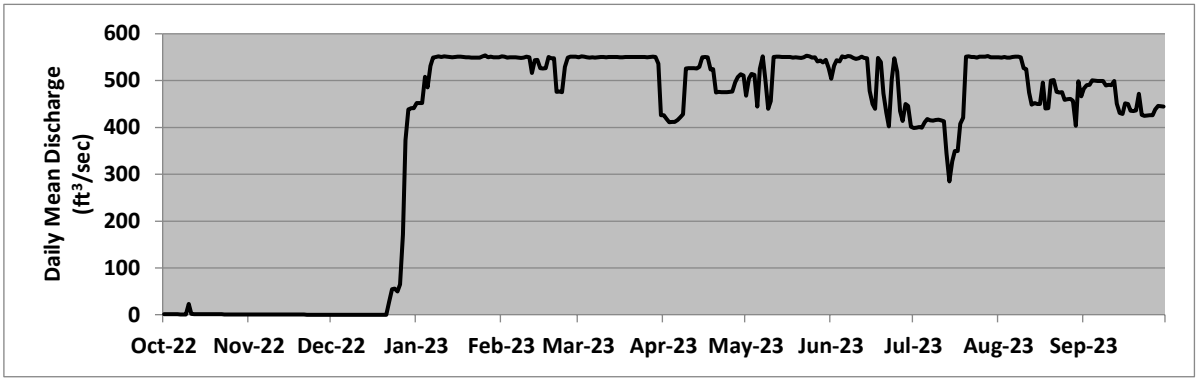
Location --Latitude 40°22'24", longitude 105°29'00", Larimer County, Hydrologic Unit 10190006, southeast of Estes Park, Colorado, on the Big Thompson River.

Gage -- Water-stage recorder with satellite telemetry. Elevation of gage is 7,460 ft (m.s.l.) from topographic map.

Remarks— Constructed between 1949 and 1952. The tunnel is 7.2 miles long, between Estes Park and the Pole Hill Canal. Its diameter is 9.75 feet and maximum design capacity is 550 ft3/s. Recorder was operated from October 1, 2022 to September 30, 2023. Records are complete and reliable. This record contains operational data which could be subject to future revisions and changes. Official record is published by the Colorado Division of Water Resources.

Discharge, ft^3/s, daily mean values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	1	1	0	452	552	550	426	468	504	399	550	483
2	1	1	0	452	551	551	418	504	532	399	549	490
3	1	1	0	452	549	551	411	514	544	401	550	491
4	1	1	0	508	550	549	412	512	541	399	549	500
5	1	1	0	485	550	549	412	444	551	411	549	499
6	1	1	0	531	550	550	416	525	550	418	550	499
7	1	0	0	549	549	549	421	552	552	415	551	499
8	1	0	0	550	548	550	428	503	552	415	551	499
9	1	0	0	551	549	551	526	440	548	416	549	490
10	23	0	0	550	551	550	527	456	546	416	526	491
11	2	0	0	552	550	549	526	550	548	415	524	490
12	1	0	0	551	516	550	526	551	551	413	474	499
13	1	0	0	550	543	550	526	551	548	345	449	450
14	1	0	0	549	544	550	529	550	547	285	452	430
15	1	0	0	550	527	550	550	550	478	328	450	429
16	1	0	0	551	526	549	550	550	450	350	450	451
17	1	0	0	551	526	550	550	550	440	349	496	450
18	1	0	0	551	550	550	523	549	548	408	441	435
19	1	0	0	550	548	550	524	549	539	420	441	435
20	1	0	0	549	548	550	474	549	473	551	499	436
21	1	0	0	549	476	550	476	548	432	551	501	472
22	1	0	28	549	476	550	475	550	402	550	476	426
23	1	0	54	549	475	550	475	553	503	551	475	425
24	1	0	56	549	529	551	475	551	547	549	475	426
25	1	0	50	551	549	551	476	549	519	551	459	426
26	1	0	65	553	551	550	476	550	435	551	460	426
27	1	0	171	550	551	550	497	540	414	551	461	438
28	1	0	373	551	551	551	507	543	450	552	457	446
29	1	0	439	550		550	513	538	446	549	403	445
30	1	0	441	550		536	510	544	402	549	498	445
31	1		441	549		426		526		550	466	
Min.	1	0	0	452	475	426	411	440	402	285	403	425
Max.	23	1	441	553	552	551	550	553	552	552	551	500
Mean	2	0	68	537	537	546	485	529	503	452	493	461
AF	108	19	4,201	32,993	29,820	33,549	28,870	32,548	29,930	27,783	30,310	27,413



Pinewood Reservoir near Loveland, Colorado

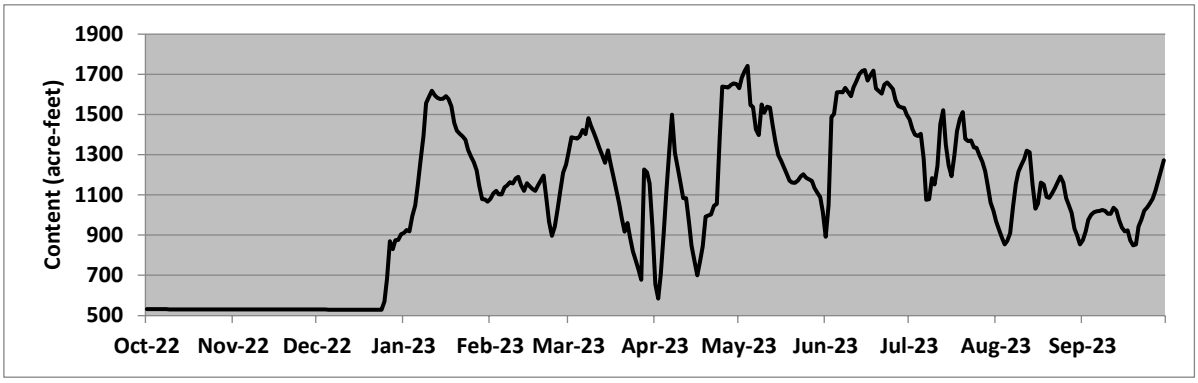
Location --Latitude 40°22', longitude 105°17.9', Larimer County, Hydrologic Unit 10190006, Ten miles southwest of Loveland, Colorado.

Gage -- Water-level recorder with satellite telemetry. Elevation of gage is 6,600 feet (m.s.l.) from topographic map.

Remarks -- Constructed between 1951 and 1952. Impoundment began on January 4, 1954. Active capacity between elevations 6,550.00 and 6,580.00 is 1,570 AF. The gage is capable of measuring the water surface elevation down to 6,555.70 feet, a content of 604 AF. Used as the forebay storage for Flatiron Powerplant. Recorder was operated from October 1, 2022 to September 30, 2023. Record is complete and reliable. This record contains operational data which could be subject to future revisions and changes.

Storage, AF, 2400-hour values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	531	530	530	911	1,081	1,312	656	1,631	892	1,475	969	875
2	531	530	530	925	1,108	1,387	584	1,683	1,049	1,427	929	918
3	531	530	530	918	1,120	1,383	706	1,717	1,487	1,400	889	977
4	531	530	530	995	1,103	1,380	906	1,742	1,503	1,394	854	1,001
5	531	530	529	1,047	1,103	1,391	1,129	1,547	1,610	1,404	871	1,014
6	531	530	529	1,147	1,137	1,423	1,331	1,538	1,612	1,280	910	1,019
7	531	530	529	1,275	1,147	1,402	1,499	1,427	1,610	1,076	1,041	1,020
8	531	530	529	1,395	1,164	1,481	1,310	1,398	1,633	1,079	1,156	1,025
9	531	530	529	1,556	1,156	1,444	1,235	1,550	1,612	1,183	1,215	1,021
10	531	530	529	1,588	1,181	1,409	1,164	1,509	1,591	1,151	1,248	1,006
11	531	530	529	1,617	1,190	1,371	1,084	1,539	1,635	1,245	1,278	1,006
12	531	530	529	1,596	1,148	1,334	1,084	1,535	1,666	1,454	1,320	1,037
13	531	530	529	1,583	1,120	1,298	964	1,451	1,701	1,522	1,312	1,022
14	531	530	529	1,576	1,158	1,260	847	1,364	1,716	1,352	1,152	975
15	531	530	529	1,578	1,143	1,322	773	1,299	1,722	1,247	1,031	937
16	531	530	529	1,592	1,130	1,257	700	1,269	1,669	1,193	1,057	918
17	531	530	529	1,577	1,120	1,191	773	1,239	1,696	1,299	1,161	923
18	531	530	529	1,540	1,146	1,125	844	1,205	1,718	1,416	1,151	874
19	531	530	529	1,458	1,171	1,057	992	1,171	1,629	1,478	1,090	849
20	531	530	529	1,420	1,196	986	998	1,161	1,617	1,512	1,085	854
21	531	530	529	1,405	1,078	917	1,003	1,159	1,604	1,379	1,107	943
22	531	530	529	1,391	967	960	1,045	1,171	1,648	1,367	1,134	978
23	531	530	529	1,375	897	889	1,055	1,191	1,660	1,371	1,161	1,022
24	531	530	529	1,324	943	819	1,385	1,203	1,643	1,336	1,191	1,037
25	531	530	570	1,291	1,032	773	1,639	1,184	1,626	1,334	1,162	1,057
26	531	530	682	1,263	1,118	725	1,637	1,177	1,573	1,297	1,084	1,081
27	531	530	869	1,221	1,210	677	1,634	1,169	1,543	1,266	1,051	1,122
28	530	530	831	1,145	1,250	1,226	1,647	1,134	1,535	1,218	1,010	1,174
29	530	530	875	1,078		1,212	1,655	1,111	1,532	1,148	931	1,220
30	530	530	875	1,077		1,156	1,651	1,088	1,499	1,061	900	1,273
31	530		905	1,066		937		1,015		1,020	854	
Min.	530	530	529	911	897	677	584	1,015	892	1,020	854	849
Max.	531	530	905	1,617	1,250	1,481	1,655	1,742	1,722	1,522	1,320	1,273
Mean	531	530	590	1,320	1,118	1,178	1,131	1,341	1,574	1,303	1,074	1,006
EOM	530	530	905	1,066	1,250	937	1,651	1,015	1,499	1,020	854	1,273



Flatiron Reservoir, Colorado

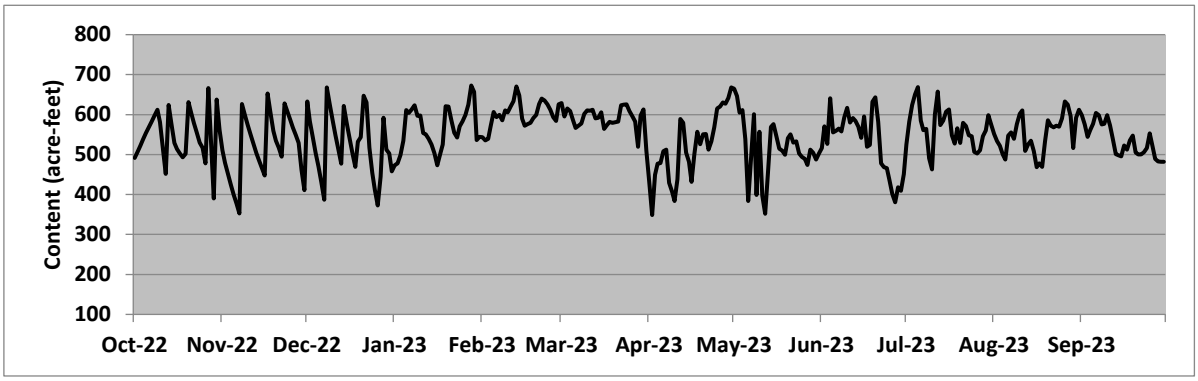
Location--Latitude 40°22.1', longitude 105°13.3', Larimer County, Hydrologic Unit 10190006, eight miles southwest of Loveland, Colorado.

Gage -- Water-level recorder with satellite telemetry. Elevation of gage is 5,600 feet (m.s.l.) from topographic map.

Remarks -- Constructed between 1951 and 1953. Impoundment began in January 1954. Active capacity between elevations 5,462.00 and 5,472.80 is 436 AF. Used as the afterbay storage for Flatiron Powerplant. Recorder was operated from October 1, 2022 to September 30, 2023. Record is complete and reliable. This record contains operational data which could be subject to future revisions and changes.

Storage, AF, 2400-hour values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	491	511	633	473	544	629	431	665	516	525	551	598
2	507	480	584	478	535	595	348	647	571	583	534	576
3	523	452	545	499	539	615	449	605	526	624	522	545
4	538	425	504	535	572	608	477	611	640	650	501	561
5	553	400	470	611	607	586	479	539	555	669	487	577
6	568	377	430	604	594	566	508	384	559	585	547	604
7	583	353	387	612	599	572	512	493	565	561	555	598
8	597	626	668	623	586	578	429	601	557	564	540	576
9	612	599	626	597	610	602	407	399	593	491	576	577
10	581	574	587	597	606	610	383	557	617	462	602	599
11	515	550	548	554	620	610	438	397	580	600	610	573
12	452	527	513	551	633	612	589	352	591	658	509	538
13	624	503	478	539	670	590	580	458	584	574	525	501
14	576	486	622	525	648	592	505	569	569	585	534	498
15	529	466	580	503	589	606	482	576	542	607	508	496
16	514	447	541	473	572	564	432	546	595	612	468	523
17	503	653	503	501	576	573	502	514	519	548	478	512
18	493	605	469	525	579	582	557	510	524	528	469	536
19	502	559	532	620	591	580	526	499	632	566	533	547
20	631	535	543	620	599	581	550	541	643	529	586	505
21	602	517	647	586	627	582	551	550	582	579	572	500
22	578	495	631	555	640	623	512	530	478	572	568	500
23	554	628	517	543	635	625	533	533	468	548	572	506
24	530	607	454	571	625	625	568	503	466	546	570	516
25	517	587	412	584	612	609	615	494	437	507	590	553
26	478	567	373	599	594	596	620	489	401	503	633	520
27	666	549	445	625	584	583	631	474	381	511	625	489
28	538	529	592	672	625	520	627	512	418	546	596	483
29	390	461	512	657		598	641	505	409	560	516	482
30	638	411	503	536		613	668	487	451	599	592	482
31	562		458	544		509		503		575	612	
Min.	390	353	373	473	535	509	348	352	381	462	468	482
Max.	666	653	668	672	670	629	668	665	643	669	633	604
Mean	547	516	526	565	600	591	518	517	532	567	551	536
EOM	562	411	458	544	625	509	668	503	451	575	612	482



Flatiron Powerplant Unit #3 Pump, Colorado

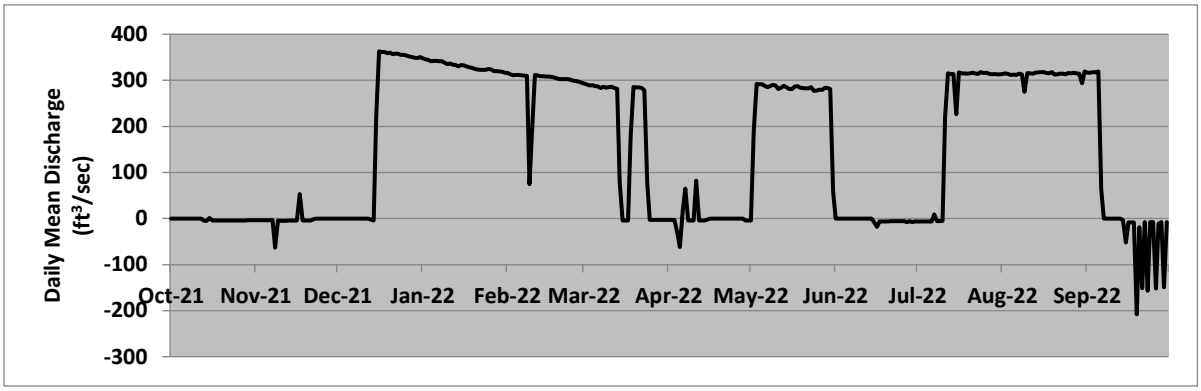
Location. --Latitude 40°21'53", longitude 105°14'09", Larimer County, Hydrologic Unit 10190006, Nine miles west of Loveland, Colorado.

Gage. -- There is a flow meter in place.

Remarks. -- Constructed between 1951 and 1953. The Powerplant consists of three generating units. Unit #3 can be used to pump water from Flatiron Reservoir to Carter Lake Reservoir, or to generate power. For the purpose of this table, any negative values indicate power generation or leakage through the conduit from Carter Lake Reservoir into Flatiron Reservoir. The maximum capacity of the pump is approximately 480 ft3/s, but the efficiency varies according to the water surface levels at Carter Lake and Flatiron Reservoirs. Discharges are measured using a flow meter inside the pressure conduit. Recorder was operated from October 1, 2022 to September 30, 2023. Record is complete and reliable. This record contains operational data which could be subject to future revisions and changes.

Discharge, ft^3/s, daily mean values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	-8	-7	-141	376	339	323	291	0	274	-4	274	281
2	-8	-7	-6	375	338	321	285	0	67	-4	274	280
3	-8	-7	-6	374	337	319	285	0	-4	-4	272	277
4	-8	-7	-6	374	339	316	286	0	-4	-4	274	280
5	-8	-7	-6	373	282	316	286	0	-1	-4	268	280
6	-8	-7	-6	372	226	305	286	0	0	139	119	278
7	-8	-7	-6	371	340	317	288	0	0	275	-5	281
8	-8	-159	-169	371	342	316	282	0	0	271	-5	282
9	-8	-7	-6	370	340	316	279	157	0	271	-5	280
10	-7	-7	-6	367	340	316	275	145	0	264	-5	283
11	-7	-7	-6	365	338	315	275	286	0	-2	-5	282
12	-7	-7	-7	362	337	315	284	282	0	0	-5	284
13	-117	-7	-7	360	337	313	287	280	0	0	-5	283
14	-7	-7	-99	359	339	312	283	285	0	0	190	284
15	-7	-7	-7	358	337	312	279	286	0	0	279	284
16	-7	-7	-7	356	334	309	275	282	0	0	273	279
17	-7	-131	-7	357	333	308	59	285	0	0	275	284
18	-7	-7	-7	356	332	308	0	281	0	0	273	284
19	-7	-7	-6	356	332	307	0	283	0	0	274	285
20	-82	-7	-6	357	331	306	0	277	0	197	283	286
21	-7	-7	-97	355	330	305	0	285	92	276	282	283
22	-7	-7	-69	353	329	306	0	279	275	279	279	281
23	-7	-84	-7	352	329	305	0	277	274	282	281	281
24	-7	-7	-7	352	328	304	0	278	271	279	280	268
25	-7	-7	-7	349	326	303	0	277	271	279	284	0
26	-7	-7	-7	347	324	301	0	275	273	275	283	0
27	-129	-7	-8	347	322	300	0	269	264	273	284	0
28	-7	-7	252	348	321	45	0	276	264	275	284	0
29	-7	-7	381	348		212	0	276	263	279	280	0
30	-250	-7	379	347		299	0	277	186	281	279	0
31	-41		376	343		296		275		279	280	
Min.	-250	-159	-169	343	226	45	0	0	-4	-4	-5	0
Max.	-7	-7	381	376	342	323	291	286	275	282	284	286
Mean	-26	-19	22	360	328	298	153	199	92	144	206	225
AF	-1609	-1105	1,323	22,114	18,211	18,337	9,096	12,245	5,485	8,828	12,674	13,390



CHFC 930 Section, Colorado

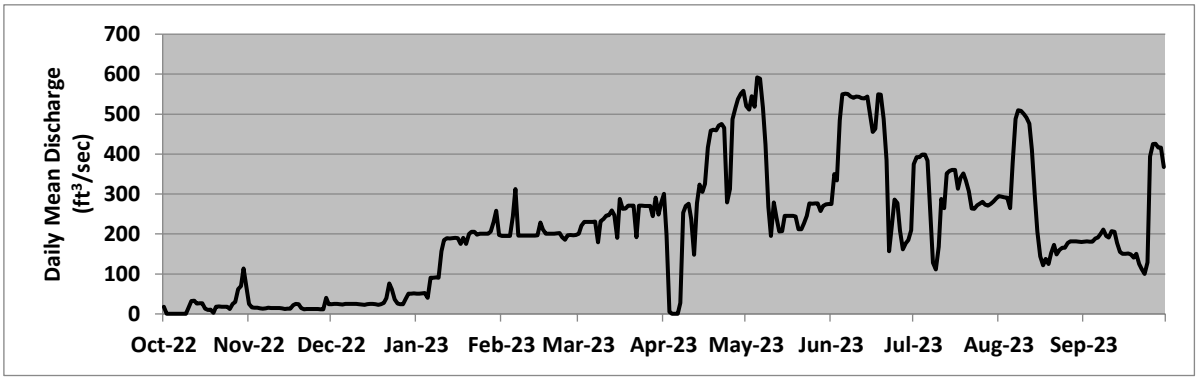
Location --Latitude 40°22'26", longitude 105°13'52", Larimer County, Hydrologic Unit 10190006, eight miles southwest of Loveland, Colorado.

Gage -- Water-stage recorder with satellite telemetry. Elevation of gage is 5,470 feet from topographic map.

Remarks -- Constructed between 1949 and 1953. The canal is 3.8 miles long and has a maximum capacity of 930 ft3/s. The canal is used to move C-BT water and diverted native water to the Big Thompson River and/or Horsetooth Reservoir. Recorder was operated from October 1, 2022 to September 30, 2023. Canal algae growth can create accuracy issues. The record is complete and fair. This record contains operational data which could be subject to future revisions and changes.

Flow, ft^3/s, daily mean values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	18	25	24	50	195	201	300	520	275	375	295	181
2	0	16	25	51	195	221	197	511	350	392	293	182
3	0	16	25	52	195	230	5	545	334	393	292	181
4	0	15	25	53	195	230	0	518	485	398	291	180
5	0	14	24	41	244	231	0	592	549	399	265	189
6	0	13	25	91	312	230	0	589	551	384	378	191
7	0	14	25	90	196	231	28	516	550	248	488	201
8	0	16	25	91	196	179	253	423	544	128	510	211
9	0	15	26	91	196	232	270	268	541	111	508	196
10	17	15	25	157	196	238	276	195	544	168	500	192
11	32	15	25	185	196	246	237	279	543	288	491	207
12	33	15	24	190	196	247	148	242	540	265	476	206
13	26	14	23	189	196	259	277	206	539	351	410	178
14	27	12	25	190	197	247	324	207	544	358	296	156
15	26	13	26	190	229	191	306	246	502	361	207	150
16	13	13	25	190	211	288	325	245	455	361	144	151
17	10	22	24	175	201	263	417	245	463	314	122	151
18	11	25	23	191	201	263	459	245	550	341	137	149
19	3	24	24	175	201	271	461	244	549	352	125	141
20	18	15	27	200	201	271	460	212	488	333	152	150
21	19	12	39	205	201	271	472	212	385	307	173	125
22	18	12	76	205	202	192	475	226	157	264	149	112
23	18	13	61	198	192	271	466	245	224	263	160	101
24	18	12	36	201	186	271	279	276	286	272	165	129
25	13	12	26	200	197	270	313	276	277	276	165	394
26	25	12	25	201	197	270	487	276	209	280	178	425
27	30	12	25	201	197	270	515	277	162	273	182	426
28	62	12	37	206	197	245	538	258	176	271	182	416
29	70	40	50	231		291	551	270	185	275	182	416
30	113	25	50	258		249	559	274	210	281	181	368
31	66		52	197		277		275		289	180	
Min.	0	12	23	41	186	179	0	195	157	111	122	101
Max.	113	40	76	258	312	291	559	592	551	399	510	426
Mean	22	16	31	159	204	247	313	320	406	302	267	215
AF	1,365	970	1,929	9,805	11,343	15,161	18,640	19,666	24,131	18,585	16,417	12,796



Dille Tunnel near Drake, Colorado

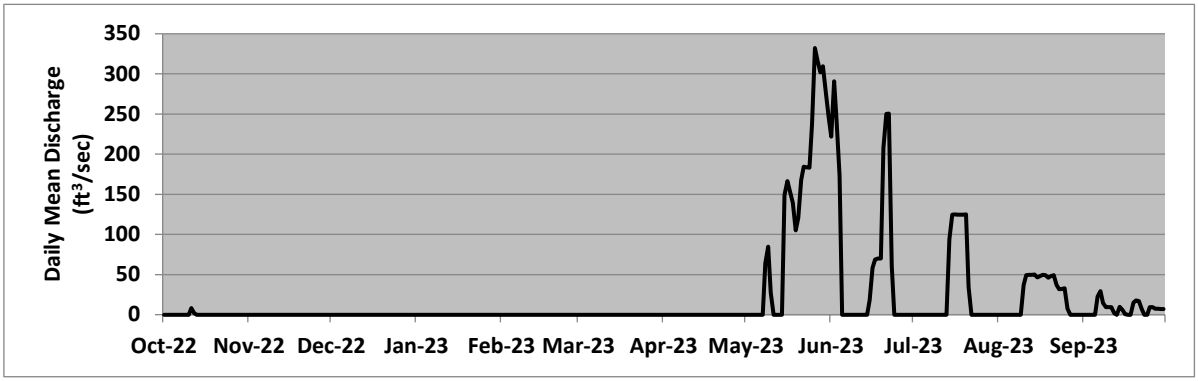
Location --Latitude 40°25'02", longitude 105°14'35", Larimer County, Hydrologic Unit 10190006, 11miles west of Loveland, Colorado, on the Big Thompson River.

Gage -- Water-stage recorder with satellite telemetry at Parshall Flume. Elevation of gage is 5,520 feet (m.s.l.) from topographic map.

Remarks -- Constructed in 1950. Maximum capacity is 600 ft3/s, but only 400 ft3/s can be measured accurately. Dille Tunnel diverts water from the Big Thompson River for power generation and water supply. The hydropower diversion operation, also known as the skim operation, diverts water from the Big Thompson River through Dille Tunnel for power generation at the Big Thompson Powerplant, where the diverted water is returned to the river. The skim daily value is determined based on the data from the gage. Record is complete and accurate.

Hydropower diversion flow (skim), ft^3/s, daily mean values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	0	0	0	0	0	0	0	0	222	0	0	0
2	0	0	0	0	0	0	0	0	291	0	0	0
3	0	0	0	0	0	0	0	0	239	0	0	0
4	0	0	0	0	0	0	0	0	173	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	23
7	0	0	0	0	0	0	0	0	0	0	0	30
8	0	0	0	0	0	0	0	64	0	0	0	15
9	0	0	0	0	0	0	0	85	0	0	0	9
10	0	0	0	0	0	0	0	27	0	0	37	10
11	8	0	0	0	0	0	0	0	0	0	49	9
12	2	0	0	0	0	0	0	0	0	0	50	2
13	0	0	0	0	0	0	0	0	0	0	50	0
14	0	0	0	0	0	0	0	0	0	94	50	10
15	0	0	0	0	0	0	0	149	18	125	46	6
16	0	0	0	0	0	0	0	166	59	125	48	1
17	0	0	0	0	0	0	0	153	69	125	50	0
18	0	0	0	0	0	0	0	139	70	124	49	0
19	0	0	0	0	0	0	0	105	70	125	46	15
20	0	0	0	0	0	0	0	121	208	125	48	18
21	0	0	0	0	0	0	0	167	250	35	49	17
22	0	0	0	0	0	0	0	184	250	0	37	7
23	0	0	0	0	0	0	0	183	61	0	32	0
24	0	0	0	0	0	0	0	183	0	0	32	0
25	0	0	0	0	0	0	0	238	0	0	33	10
26	0	0	0	0	0	0	0	332	0	0	7	9
27	0	0	0	0	0	0	0	316	0	0	0	8
28	0	0	0	0	0	0	0	302	0	0	0	7
29	0	0	0	0		0	0	309	0	0	0	7
30	0	0	0	0		0	0	277	0	0	0	7
31	0		0	0		0		246		0	0	
Min.	0	0	0	0	0	0	0	0	0	0	0	0
Max.	8	0	0	0	0	0	0	332	291	125	50	30
Mean	0	0	0	0	0	0	0	121	66	28	23	7
AF	20	0	0	0	0	0	0	7,434	3,925	1,739	1,416	435



Dille Tunnel near Drake, Colorado

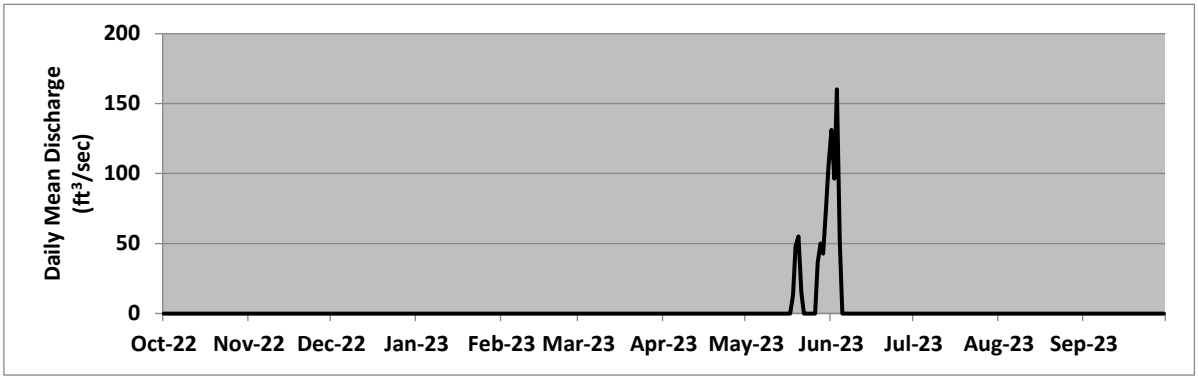
Location --Latitude 40°25'02", longitude 105°14'35", Larimer County, Hydrologic Unit 10190006, 11 miles west of Loveland, Colorado, on the Big Thompson River.

Gage -- None.

Remarks -- Constructed in 1950. Maximum capacity is 600 ft3/s. Dille Tunnel diverts water from the Big Thompson River for power generation and water supply. The right to divert native runoff is determined by the State of Colorado. The numbers presented in this table are based on gaged flows and available priority water. Record is complete and reliable. This record contains operational data which could be subject to future revisions and changes.

Priority diversion flow, ft^3/s, daily mean values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug..	Sep
1	0	0	0	0	0	0	0	0	131	0	0	0
2	0	0	0	0	0	0	0	0	96	0	0	0
3	0	0	0	0	0	0	0	0	160	0	0	0
4	0	0	0	0	0	0	0	0	51	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	13	0	0	0	0
19	0	0	0	0	0	0	0	48	0	0	0	0
20	0	0	0	0	0	0	0	55	0	0	0	0
21	0	0	0	0	0	0	0	15	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	36	0	0	0	0
28	0	0	0	0	0	0	0	50	0	0	0	0
29	0	0	0	0		0	0	43	0	0	0	0
30	0	0	0	0		0	0	75	0	0	0	0
31	0		0	0		0		106		0	0	
Min.	0	0	0	0	0	0	0	0	0	0	0	0
Max.	0	0	0	0	0	0	0	106	160	0	0	0
Mean	0	0	0	0	0	0	0	14	15	0	0	0
AF	0	0	0	0	0	0	0	876	871	0	0	0



Dille Tunnel near Drake, Colorado

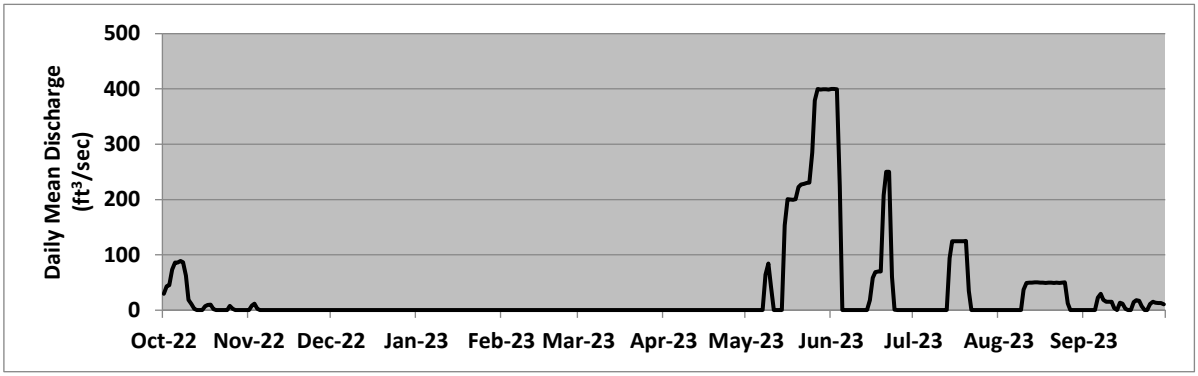
Location --Latitude 40°25'02", longitude 105°14'35", Larimer County, Hydrologic Unit 10190006, 11 miles west of Loveland, Colorado, on the Big Thompson River.

Gage -- Water-stage recorder with satellite telemetry at Parshall Flume. Elevation of gage is 5,520 feet from topographic map.

Remarks — Constructed in 1950. The Dille Tunnel has a maximum capacity is 600 ft^3/s, but only 400 ft^3/s can be measured accurately. Dille Tunnel diverts water from the Big Thompson River for power generation and water supply. Record is complete and reliable. This record contains operational data which could be subject to future revisions and changes. The official record is published by the Colorado Division of Water Resources.

Discharge, ft^3/s, daily mean values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	30	0	0	0	0	0	0	0	400	0	0	0
2	43	8	0	0	0	0	0	0	400	0	0	0
3	45	12	0	0	0	0	0	0	399	0	0	0
4	73	3	0	0	0	0	0	0	225	0	0	0
5	86	0	0	0	0	0	0	0	0	0	0	0
6	86	0	0	0	0	0	0	0	0	0	0	23
7	89	0	0	0	0	0	0	0	0	0	0	30
8	87	0	0	0	0	0	0	64	0	0	0	19
9	62	0	0	0	0	0	0	85	0	0	0	15
10	19	0	0	0	0	0	0	43	0	0	37	15
11	11	0	0	0	0	0	0	0	0	0	49	15
12	3	0	0	0	0	0	0	0	0	0	50	3
13	0	0	0	0	0	0	0	0	0	0	50	0
14	0	0	0	0	0	0	0	0	0	94	50	14
15	0	0	0	0	0	0	0	153	18	125	50	12
16	7	0	0	0	0	0	0	200	59	125	50	2
17	9	0	0	0	0	0	0	200	69	125	50	0
18	10	0	0	0	0	0	0	200	70	124	49	0
19	2	0	0	0	0	0	0	200	70	125	49	15
20	0	0	0	0	0	0	0	223	208	125	50	18
21	0	0	0	0	0	0	0	227	250	35	49	17
22	0	0	0	0	0	0	0	229	250	0	50	7
23	0	0	0	0	0	0	0	230	61	0	49	0
24	0	0	0	0	0	0	0	230	1	0	50	0
25	8	0	0	0	0	0	0	285	0	0	50	11
26	2	0	0	0	0	0	0	379	0	0	12	15
27	0	0	0	0	0	0	0	400	0	0	0	13
28	0	0	0	0	0	0	0	399	0	0	0	13
29	0	0	0	0		0	0	399	0	0	0	13
30	0	0	0	0		0	0	399	0	0	0	11
31	0		0	0		0		399		0	0	
Min.	0	0	0	0	0	0	0	0	0	0	0	0
Max.	89	12	0	0	0	0	0	400	400	125	50	30
Mean	22	1	0	0	0	0	0	160	83	28	26	9
AF	1,333	45	0	0	0	0	0	9,810	4,919	1,739	1,576	556



Big Thompson Power Plant, Colorado

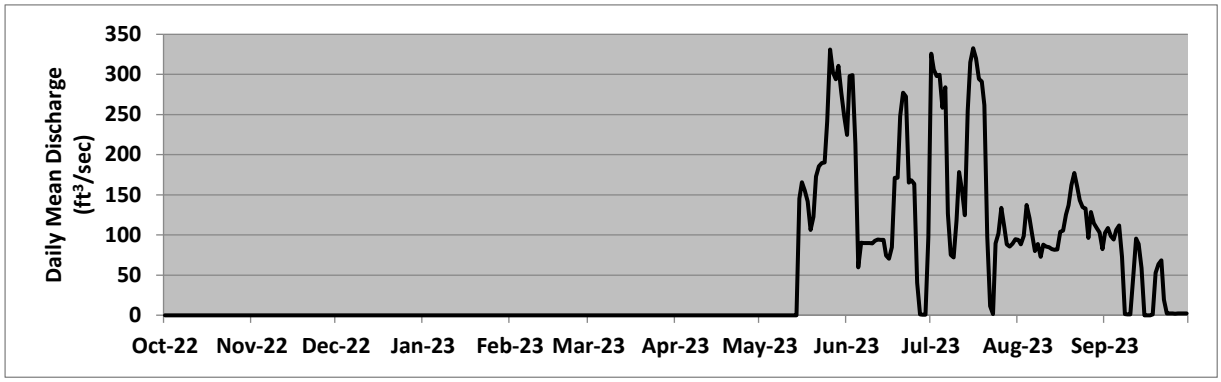
Location --Latitude 40°25'16", longitude 105°13'26", Larimer County, Hydrologic Unit 10190006, nine miles west of Loveland, Colorado, on the Big Thompson River.

Gage -- Flow meter with satellite telemetry. Elevation of gage is 5,280 feet (m.s.l.) from topographic map.

Remarks -- Initial operation in 1959. Maximum capacity is 400 ft^3/s. Power plant returns hydropower diversions to the Big Thompson River downstream of the Big Thompson River canyon mouth. The plant is also used to deliver C-BT project and Windy Gap Project water to the Big Thompson River. Depending on weather, the plant is generally winterized from November through April, each year. This record contains data recorded between October 1, 2022 and September 30, 2023. Record is complete and fair. This record contains operational data which could be subject to future revisions and changes.

Discharge, ft^3/s, daily mean values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul..	Aug	Sep.
1	0	0	0	0	0	0	0	0	225	326	94	103
2	0	0	0	0	0	0	0	0	298	306	89	109
3	0	0	0	0	0	0	0	0	299	298	99	99
4	0	0	0	0	0	0	0	0	213	300	137	94
5	0	0	0	0	0	0	0	0	60	258	121	106
6	0	0	0	0	0	0	0	0	90	284	101	112
7	0	0	0	0	0	0	0	0	90	126	80	73
8	0	0	0	0	0	0	0	0	90	75	89	2
9	0	0	0	0	0	0	0	0	90	72	73	1
10	0	0	0	0	0	0	0	0	90	118	88	1
11	0	0	0	0	0	0	0	0	93	178	86	47
12	0	0	0	0	0	0	0	0	94	156	85	96
13	0	0	0	0	0	0	0	0	94	124	82	89
14	0	0	0	0	0	0	0	0	94	255	82	59
15	0	0	0	0	0	0	0	145	74	315	82	0
16	0	0	0	0	0	0	0	166	70	332	104	0
17	0	0	0	0	0	0	0	155	85	320	105	0
18	0	0	0	0	0	0	0	142	171	294	125	1
19	0	0	0	0	0	0	0	106	171	291	137	53
20	0	0	0	0	0	0	0	123	248	261	162	64
21	0	0	0	0	0	0	0	173	277	98	177	68
22	0	0	0	0	0	0	0	185	273	12	160	19
23	0	0	0	0	0	0	0	189	165	1	143	2
24	0	0	0	0	0	0	0	190	168	90	135	2
25	0	0	0	0	0	0	0	242	164	102	133	2
26	0	0	0	0	0	0	0	331	40	134	96	2
27	0	0	0	0	0	0	0	302	1	111	129	2
28	0	0	0	0	0	0	0	294	1	88	115	2
29	0	0	0	0		0	0	311	1	85	109	2
30	0	0	0	0		0	0	277	98	89	103	2
31	0		0	0		0		248		95	83	
Min.	0	0	0	0	0	0	0	0	1	1	73	0
Max.	0	0	0	0	0	0	0	331	299	332	177	112
Mean	0	0	0	0	0	0	0	115	131	180	110	40
AF	0	0	0	0	0	0	0	7,099	7,785	11,096	6,746	2,406



CHFC Wasteway, Colorado

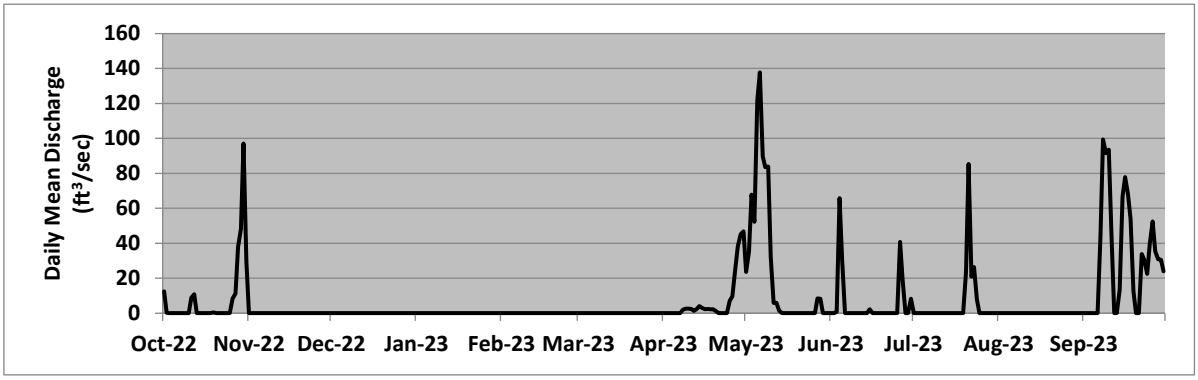
Location --Latitude 40°25'13", longitude 105°13'28", Larimer County, Hydrologic Unit 10190006, nine miles west of Loveland, Colorado, on the Big Thompson River.

Gage -- Water-stage recorder with satellite telemetry at 15-foot Parshall Flume. Elevation of gage is 5,465 feet (m.s.l.) from Designer's Operating Criteria.

Remarks -- Constructed between 1949 and 1953. Maximum capacity is 400 ft^3/s. The structure is used to return diverted water and to deliver C-BT and Windy Gap Project water to the Big Thompson River. Depending on weather, the facility is generally winterized between November and April. Recorder was operated from October 1, 2022 until October 31, 2022, before it was winterized. The station was put back into service from April 8, 2023 to September 30, 2023. Record is complete and reliable. These data are provisional operations data and are subject to further revision and change. The official record is published by the Colorado Division of Water Resources.

Discharge, ft^3/s, daily mean values

	Oct.	Nov.	Dec..	Jan	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	12	0	0	0	0	0	0	24	0	0	0	0
2	0	0	0	0	0	0	0	35	0	0	0	0
3	0	0	0	0	0	0	0	68	1	0	0	0
4	0	0	0	0	0	0	0	52	66	0	0	0
5	0	0	0	0	0	0	0	122	31	0	0	0
6	0	0	0	0	0	0	0	138	0	0	0	0
7	0	0	0	0	0	0	0	90	0	0	0	44
8	0	0	0	0	0	0	2	83	0	0	0	99
9	0	0	0	0	0	0	3	84	0	0	0	92
10	0	0	0	0	0	0	3	32	0	0	0	94
11	9	0	0	0	0	0	2	6	0	0	0	47
12	11	0	0	0	0	0	1	6	0	0	0	0
13	0	0	0	0	0	0	2	2	0	0	0	0
14	0	0	0	0	0	0	4	0	0	0	0	13
15	0	0	0	0	0	0	3	0	2	0	0	67
16	0	0	0	0	0	0	2	0	0	0	0	78
17	0	0	0	0	0	0	2	0	0	0	0	68
18	0	0	0	0	0	0	2	0	0	0	0	54
19	0	0	0	0	0	0	2	0	0	0	0	13
20	0	0	0	0	0	0	1	0	0	24	0	0
21	0	0	0	0	0	0	0	0	0	85	0	0
22	0	0	0	0	0	0	0	0	0	21	0	34
23	0	0	0	0	0	0	0	0	0	26	0	30
24	0	0	0	0	0	0	0	0	0	8	0	22
25	0	0	0	0	0	0	7	0	0	0	0	40
26	9	0	0	0	0	0	10	0	41	0	0	52
27	11	0	0	0	0	0	25	8	19	0	0	35
28	38	0	0	0	0	0	38	8	0	0	0	31
29	48	0	0	0		0	45	0	0	0	0	31
30	97	0	0	0		0	47	0	8	0	0	24
31	29		0	0		0		0		0	0	
Min	0	0	0	0	0	0	0	0	0	0	0	0
Max	97	0	0	0	0	0	47	138	66	85	0	99
Mean	9	0	0	0	0	0	7	24	6	5	0	32
ac-ft	526	0	0	0	0	0	401	1,502	332	325	0	1,919



CHFC 550 Section, Colorado

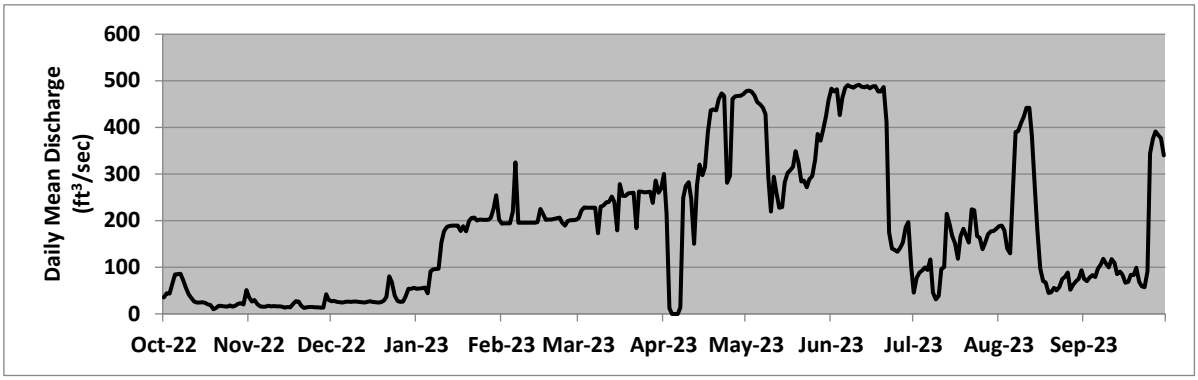
Location --Latitude 40°25'25", longitude 105°13'34", Larimer County, Hydrologic Unit 10190006, nine miles west of Loveland, Colorado.

Gage -- Water-stage recorder with satellite telemetry. Elevation of gage is 5,460 feet (m.s.l.) from topographic map.

Remarks -- Constructed between 1949 and 1953. The canal is 9.4 miles long and has a maximum design capacity of 550 ft3/s. The canal is used to move C-BT water and Big Thompson River priority water to Horsetooth Reservoir. Recorder was operated from October 1, 2022 to September 30, 2023. Algae growth in canal can create accuracy issues. Record is complete and reliable. This record contains operational data which could be subject to future revisions and changes.

Discharge, ft^3/s, daily mean values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	35	36	27	54	194	206	300	478	483	46	188	75
2	44	26	28	54	194	222	216	479	477	77	189	70
3	44	30	26	55	194	228	12	476	482	88	179	78
4	64	21	25	56	194	228	0	468	426	93	140	83
5	85	16	24	44	219	228	0	454	463	99	130	79
6	85	15	26	92	325	228	0	449	485	94	254	97
7	86	15	26	96	196	228	14	442	490	117	390	106
8	73	17	26	96	195	173	249	428	487	46	392	118
9	56	16	26	97	196	230	274	292	485	31	409	107
10	42	17	26	154	195	233	283	219	489	39	424	100
11	34	16	25	177	195	239	247	294	491	97	442	118
12	26	16	25	187	196	240	150	261	487	100	442	109
13	25	15	24	189	196	252	276	228	486	215	381	85
14	25	13	25	189	197	240	320	229	488	192	272	91
15	25	14	27	189	225	179	298	281	484	168	180	84
16	24	14	26	189	214	279	314	302	488	151	98	67
17	21	22	25	178	202	253	390	308	489	118	70	69
18	19	27	24	188	202	253	436	315	477	166	68	84
19	10	26	25	177	202	259	439	349	477	183	45	83
20	13	18	28	199	204	259	437	324	487	169	47	99
21	18	13	36	206	205	260	460	284	411	153	56	69
22	17	14	80	207	206	184	473	286	175	224	51	59
23	16	14	68	200	196	262	467	272	140	222	58	57
24	16	14	40	202	190	262	281	289	138	167	75	91
25	18	14	28	201	199	261	296	296	133	163	79	344
26	15	14	26	202	201	261	461	330	140	139	89	375
27	18	14	26	202	201	262	467	386	153	153	52	392
28	22	13	38	206	201	238	468	371	186	171	63	383
29	23	42	54	226		286	468	395	197	177	70	377
30	20	30	54	254		260	471	424	102	178	75	340
31	51		56	202		269		459		182	93	
Min.	10	13	24	44	190	173	0	219	102	31	45	57
Max.	86	42	80	254	325	286	473	479	491	224	442	392
Mean	34	19	33	160	205	241	299	351	380	136	177	143
AF	2,117	1,139	2,023	9,854	11,374	14,796	17,783	21,552	22,608	8,366	10,908	8,508



Horsetooth Reservoir near Fort Collins, Colorado

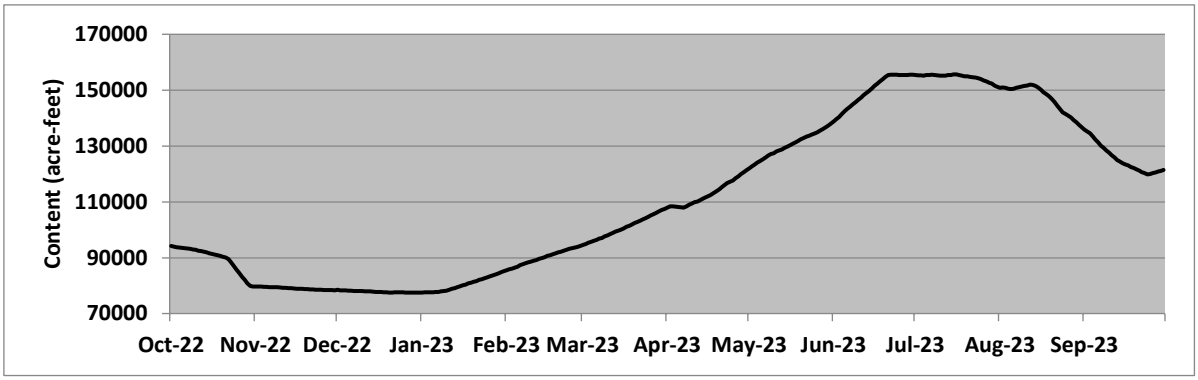
Location –-Latitude 40°36'00", longitude 105°10'05" , Larimer County, Hydrologic Unit 10190007, at Horsetooth Dam outlet works, 4.8 miles west of Fort Collins, Colorado.

Gage — Water level recorder with satellite telemetry. Elevation of gage is 5,300 feet (m.s.l.) from topographic map.

Remarks — Reservoir is formed by four earth-fill dams. Construction completed in 1949. Impoundment began in 1951. Horsetooth Reservoir is one of two terminal reservoirs for C-BT diversions. Trans-mountain diversions are stored at Horsetooth Reservoir before final delivery. Maximum capacity is 156,735 AF at elevation 5,430.00 ft, with 142,038 AF of active storage. Recorder was operated from October 1, 2022 to September 30, 2023. Record is complete and reliable. This record contains operational data which could be subject to future revisions and changes.

Storage, AF, 2400-hour values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	94,224	79,702	78,556	77,574	85,542	94,615	107,999	121,992	138,816	155,453	150,881	135,802
2	94,037	79,688	78,300	77,631	85,855	94,913	108,434	122,670	139,618	155,330	150,901	135,181
3	93,803	79,673	78,285	77,659	86,168	95,337	108,367	123,368	140,442	155,290	150,801	134,543
4	93,615	79,645	78,285	77,688	86,467	95,684	108,300	124,049	141,480	155,209	150,541	133,440
5	93,506	79,545	78,257	77,603	86,766	96,094	108,199	124,625	142,465	155,432	150,401	132,341
6	93,398	79,530	78,199	77,773	87,382	96,457	108,099	125,220	143,299	155,351	150,541	131,266
7	93,273	79,473	78,128	77,816	87,698	96,900	107,999	125,925	144,134	155,494	150,841	130,177
8	93,164	79,458	78,114	77,958	88,061	97,122	108,434	126,631	144,934	155,392	15,1041	129,295
9	92,993	79,458	78,085	78,057	88,363	97,631	108,955	127,105	145,715	155,330	151,300	128,435
10	92,838	79,329	78,085	78,228	88,651	97,950	109,427	127,377	146,500	155,189	151,480	127,578
11	92,527	79,301	78,014	78,528	88,969	98,444	109,933	128,034	147,308	155,189	151,661	126,650
12	92,388	79,243	78,000	78,913	89,243	98,876	110,135	128,472	148,157	155,148	151,941	125,871
13	92,141	79,171	78,000	79,157	89,609	99,341	110,592	128,801	148,950	155,351	151,901	125,004
14	91,894	79,099	77,830	79,473	89,914	99,743	111,202	129,277	149,704	155,432	151,540	124,391
15	91,647	79,014	77,773	79,788	90,266	100,016	111,610	129,774	150,581	155,575	150,941	123,870
16	91,416	78,928	77,816	80,120	90,632	100,533	112,037	130,196	151,540	155,595	150,162	123,440
17	91,186	78,913	77,759	80,438	90,924	101,049	112,566	130,768	152,342	155,371	149,267	122,992
18	90,939	78,856	77,702	80,799	91,293	101,488	113,200	131,248	153,127	155,148	148,513	122,509
19	90,694	78,799	77,631	81,031	91,570	101,943	113,784	131,877	153,914	154,986	147,782	122,081
20	90,388	78,813	77,574	81,380	91,910	102,414	114,472	132,415	154,682	154,946	146,796	121,618
21	90,128	78,728	77,546	81,699	92,141	102,773	115,284	132,862	155,392	154,722	145,696	121,174
22	89,502	78,685	77,631	82,078	92,527	103,247	116,065	133,309	155,514	154,601	144,465	120,607
23	88,363	78,599	77,645	82,385	92,838	103,673	116,812	133663	155555	154459	143202	120253
24	87,066	78,556	77,659	82,722	93,164	104,183	117,214	134,093	155,514	154,277	142,001	119,864
25	85,795	78,528	77,603	83,058	93,413	104,677	117,651	134,487	155,392	153,914	141,423	120,006
26	84,532	78,457	77,574	83,352	93,678	105,172	118,438	134,918	155,392	153,450	140,845	120,253
27	83,308	78,485	77,546	83,735	93,943	105,717	119,212	135,519	155,351	153,067	140,174	120,571
28	82,108	78,428	77,532	84,015	94,255	106,149	119,917	136,122	155,412	152,624	139,332	120,856
29	80,842	78,400	77,574	84,429		106,663	120,660	136,651	155,534	152,302	138,473	121,103
30	79,904	78,357	77,532	84,858		107,147	121,369	137,352	155,534	151,661	137,523	121,476
31	79,716		77,588	85,215		107,496		138,016		151,121	136,613	
Min.	79,716	78,357	77,532	77,574	85,542	94,615	107,999	121,992	138,816	151,121	136,613	119,864
Max.	94,224	79,702	78,556	85,215	94,255	107,496	121,369	138,016	155,555	155,595	151,941	135,802
Mean	89,720	79,029	77,865	80,489	90,044	100,756	112,879	130,220	149,743	154,594	147,064	125,422
EOM	79,716	78,357	77,588	85,215	94,255	107,496	121,369	138,016	155,534	151,121	136,613	121,476



Charles Hansen Supply Canal below Horsetooth Reservoir, Colorado

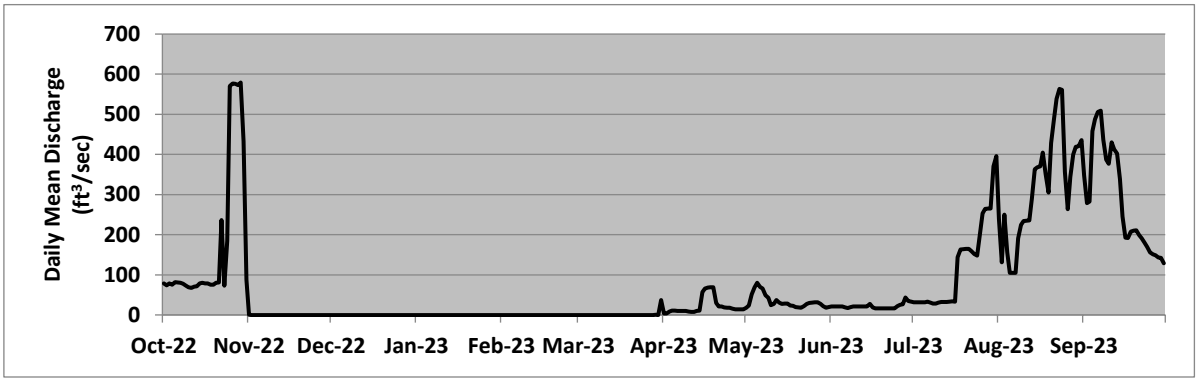
Location --Latitude 40°36'01", longitude 105°10'18", Larimer County, Hydrologic Unit 10190007, four miles west of Fort Collins, Colorado.

Gage -- Two flow meters with satellite telemetry measure the flow for each conduit leading toward the hollow jet valves.

Remarks -- Constructed between 1950 and 1952. The canal is 5.1 miles long and has a maximum capacity of 1,500 ft3/s. The canal is used to deliver C-BT and Windy Gap Project water stored at Horsetooth Reservoir. Recorder was operated from October 1, 2022 to September 30, 2023 by the Northern Water and the Colorado Division of Water Resources. Record is complete and fair. This record contains operational data which could be subject to future revisions and changes.

Discharge, ft^3/s, daily mean values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	79	1	0	0	0	0	4	18	21	32	239	348
2	74	0	0	0	0	0	4	24	21	32	131	279
3	79	0	0	0	0	0	9	51	21	31	250	283
4	76	0	0	0	0	0	11	69	21	31	156	458
5	82	0	0	0	0	0	11	81	21	31	105	488
6	82	0	0	0	0	0	11	70	19	34	105	506
7	80	0	0	0	0	0	11	66	18	31	105	509
8	78	0	0	0	0	0	11	49	20	28	191	437
9	74	0	0	0	0	0	11	43	21	28	225	387
10	69	0	0	0	0	0	9	25	22	31	234	377
11	68	0	0	0	0	0	8	28	22	32	235	430
12	71	0	0	0	0	0	8	37	21	32	235	413
13	72	0	0	0	0	0	10	31	22	32	291	402
14	79	0	0	0	0	0	11	28	21	34	363	339
15	80	0	0	0	0	0	57	28	28	34	368	246
16	79	0	0	0	0	0	66	28	19	34	370	192
17	78	0	0	0	0	0	68	24	17	144	405	192
18	76	0	0	0	0	0	69	23	17	163	351	208
19	75	0	0	0	0	0	70	20	17	164	305	210
20	80	0	0	0	0	0	30	19	17	164	428	211
21	81	0	0	0	0	0	21	18	17	165	488	199
22	236	0	0	0	0	0	21	22	17	159	538	191
23	73	0	0	0	0	0	19	28	17	152	563	180
24	185	0	0	0	0	0	18	30	17	148	561	170
25	570	0	0	0	0	0	18	31	23	198	357	156
26	577	0	0	0	0	0	16	32	26	253	264	151
27	576	0	0	0	0	0	14	32	27	264	344	149
28	573	0	0	0	0	0	14	28	44	266	399	143
29	579	0	0	0		1	14	22	35	265	419	143
30	433	0	0	0		0	14	19	33	370	420	129
31	88		0	0		38		20		396	436	
Min.	68	0	0	0	0	0	4	18	17	28	105	129
Max.	579	1	0	0	0	38	70	81	44	396	563	509
Mean	177	0	0	0	0	2	22	34	22	122	319	284
AF	10,914	19	19	18	16	93	1,305	2,072	1,308	7,500	19,603	16,906



Carter Lake near Berthoud, Colorado, Colorado

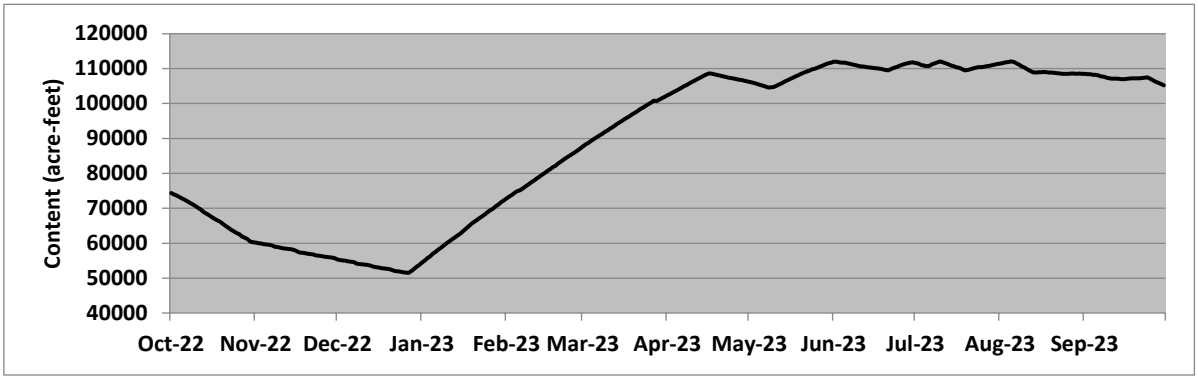
Location --Latitude 40°19' 28" , longitude 105°12' 41" , Larimer County, Hydrologic Unit 10190006, on Dam #1, seven miles northwest of Berthoud, Colorado, and ten miles west of Loveland, Colorado.

Gage --Water level recorder with satellite telemetry. Elevation of gage is 5,770 feet (m.s.l.) from topographic map.

Remarks --Reservoir is formed by three earth-fill dams. Construction completed in 1952. Carter Lake Reservoir is one of two terminal reservoirs for C-BT water diversions. Trans-mountain water diversions are stored at Carter Lake Reservoir before final delivery. Maximum capacity is 112,200 AF at elevation 5,759.00 feet, with 108,900 AF of active capacity. Recorder was operated from October 1, 2022 to September 30, 2032. Record is complete and fair. This record contains operational data which could be subject to future revisions and changes.

Storage, AF, 2400-hour values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	74,397	60,190	55,394	54,458	72,829	87,777	102,412	106,225	111,989	111,589	111,463	108,499
2	74,058	60,070	55,197	55,126	73,344	88,292	102,778	106,035	111,943	111,395	111,600	108,432
3	73,691	59,905	55,072	55,707	73,879	88,777	103,200	105,832	111,783	111,110	111,760	108,387
4	73,274	59,794	55,019	56,300	74,457	89,306	103,611	105,609	111,737	110,905	111,886	108,262
5	72,869	59,655	54,806	56,993	74,926	89,824	104,033	105,307	111,680	110,699	112,034	108,228
6	72,463	59,573	54,752	57,545	75,236	90,333	104,480	105,116	111,543	110,825	111,920	108,002
7	72,010	59,417	54,663	58,173	75,777	90,822	104,949	104,871	111,383	111,212	111,532	107,799
8	71,568	58,995	54,184	58,766	76,279	91,354	105,318	104,536	111,190	111,520	111,098	107,675
9	71,116	58,921	54,086	59,343	76,874	91,844	105,787	104,669	110,984	111,829	110,608	107,405
10	70,646	58,775	53,989	60,033	77,408	92,357	106,203	104,770	110,791	112,114	110,199	107,247
11	70,119	58,601	53,900	60,606	77,974	92,839	106,607	105,127	110,608	111,829	109,779	107,090
12	69,613	58,473	53,767	61,145	78,503	93,354	107,011	105,508	110,597	111,554	109,371	107,135
13	68,866	58,373	53,661	61,685	79,061	93,913	107,394	105,866	110,471	111,247	108,918	107,101
14	68,420	58,273	53,388	62,217	79,612	94,375	107,822	106,303	110,335	110,916	108,861	107,079
15	67,957	58,127	53,176	62,788	80,164	94,915	108,217	106,696	110,244	110,665	108,986	106,988
16	67,446	57,763	53,079	63,427	80,727	95,391	108,623	107,056	110,153	110,358	108,997	107,079
17	67,004	57,419	52,929	64,098	81,241	95,900	108,612	107,405	110,074	110,244	109,087	107,113
18	66,553	57,283	52,806	64,799	81,817	96,345	108,409	107,788	109,926	109,881	108,929	107,236
19	66,113	57,210	52,710	65,474	82,291	96,845	108,217	108,127	109,790	109,495	108,861	107,202
20	65,493	57,038	52,614	66,056	82,869	97,357	108,025	108,488	109,609	109,575	108,861	107,202
21	64,979	56,939	52,342	66,572	83,407	97,815	107,822	108,839	109,541	109,824	108,816	107,236
22	64,420	56,822	52,044	67,119	83,987	98,405	107,675	109,155	109,835	110,017	108,725	107,326
23	63,880	56,542	51,956	67,716	84,527	98,832	107,529	109,439	110,222	110,210	108,567	107,394
24	63,399	56,425	51,869	68,275	85,005	99,347	107,360	109,745	110,471	110,380	108,466	107,540
25	62,957	56,327	51,730	68,856	85,526	99,797	107,191	109,983	110,825	110,471	108,488	107,090
26	62,592	56,201	51,581	69,409	86,027	100,280	107,068	110,267	111,110	110,563	108,466	106,663
27	61945	56,129	51,486	69,944	86,549	100,842	106,876	110,574	111,304	110,722	108,589	106,259
28	61,582	55,985	51,974	70,510	87,073	100,765	106,730	1108,82	111,543	110,779	108,578	105,922
29	61,256	55,914	52,614	71,107		101,063	106,596	111,212	111,748	110,973	108,533	105,587
30	60,486	55,707	53,220	71,705		101,527	106,404	111,497	111,829	111,121	108,578	105,239
31	60,292		53,847	72,266		101,913		111,703		111,361	108,522	
Min.	60,292	55,707	51,486	54,458	72,829	87,777	102,412	104,536	109,541	109,495	108,466	105,239
Max.	74,397	60,190	55,394	72,266	87,073	101,913	108,623	111,703	111,989	112,114	112,034	108,499
Mean	67,467	57,895	53,350	63,491	79,906	95,242	106,432	107,569	110,842	110,819	109,648	107,247
EOM	60,292	55,707	53,847	72,266	87,073	101,913	106,404	111,703	111,829	111,361	108,522	105,239



Saint Vrain Canal below Carter Reservoir, Colorado

Location --Latitude 40°19'27", longitude 105°12'35", Larimer County, Hydrologic Unit 10190006, downstream from Carter Reservoir Dam #1, seven miles northwest of Berthoud, Colorado, and ten miles west of Loveland, Colorado.

Gage -- Water-stage recorder with telephone telemetry. Data provided by the Northern Water. Elevation of gage is 5,590 feet from topographic map.

Remarks -- Constructed between 1952 and 1954. The canal is 9.8 miles long and has a maximum capacity of 625 ft3/s. The canal is used to deliver C-BT and Windy Gap Project water, as well as diverted native water from conveyance contract holders. Record was provided by the Northern Water for the period October 1, 2022 to September 30, 2023. Record is complete and fair. This record contains operational data which could be subject to future revisions and changes.

Flow, ft^3/s, daily mean values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	159	45	52	46	51	50	53	89	121	106	190	270
2	147	53	50	44	57	54	54	92	92	105	198	272
3	178	58	51	47	53	60	59	96	91	125	190	271
4	180	54	47	53	47	48	55	113	85	118	183	269
5	186	46	47	50	51	44	53	128	82	92	181	275
6	191	50	44	46	49	46	56	118	81	77	183	340
7	200	52	46	46	49	45	55	124	86	85	186	350
8	213	50	52	44	51	45	57	135	93	87	191	347
9	221	46	44	55	51	47	58	142	96	92	215	357
10	226	52	46	72	50	45	51	131	93	111	195	341
11	242	56	47	73	49	47	51	126	83	122	192	319
12	242	51	48	74	52	43	66	102	82	130	193	285
13	243	47	46	72	53	45	64	94	78	132	190	292
14	240	48	44	73	54	47	54	92	82	134	199	270
15	232	51	47	70	53	47	58	89	80	132	210	252
16	232	51	48	25	47	46	56	90	76	153	245	236
17	221	52	47	6	47	46	70	98	63	153	272	236
18	220	53	46	9	47	44	71	104	71	160	300	249
19	232	49	46	11	46	43	72	95	86	163	296	252
20	248	50	45	46	48	45	76	95	100	148	278	249
21	254	49	46	69	49	47	82	96	102	123	288	235
22	254	51	48	64	49	46	76	106	93	166	299	211
23	242	57	48	60	51	46	73	119	89	173	316	200
24	219	51	52	55	53	48	80	124	96	192	314	194
25	187	42	56	51	55	45	81	120	101	200	285	201
26	177	48	52	50	53	43	78	114	113	200	247	199
27	171	49	50	49	53	44	82	104	118	192	256	201
28	164	57	46	49	51	45	80	97	135	190	268	166
29	156	53	45	49		48	86	108	124	182	268	150
30	129	52	45	46		52	91	121	116	181	267	146
31	67		47	48		84		129		185	269	
Min.	67	42	44	6	46	43	51	89	63	77	181	146
Max.	254	58	56	74	57	84	91	142	135	200	316	357
Mean	202	51	48	50	51	48	67	109	94	142	238	255
AF	12,446	3,018	2,929	3,072	2,813	2,941	3,968	6,717	5,570	8,742	14,607	15,150

Colorado-Big Thompson Project, Colorado

Location -- Larimer, Grand, Summit, Boulder, Weld counties in Colorado, hydrologic units 14010001, 14010002, 10190006, and 10190007, on the Colorado River, Big Thompson River, and Cache La Poudre River basins.

Remarks— This table presents a summation of all the daily deliveries of C-BT and Windy Gap Project water through the Saint Vrain Canal, the Charles Hansen Supply Canal, the Dixon Canal, the Charles Hansen Feeder Canal, and small deliveries upstream from Flatiron Reservoir. These values include metered water. The water diverted is used for agricultural, municipal, and industrial purposes to generate hydroelectric power and to provide recreation for the public. This record contains operational data which could be subject to future revisions and changes. Period of record is between October 1, 2022 and September 30, 2023. Data were provided by the Northern Water. Record is complete and reliable.

Total daily water deliveries, ft^3/s, daily mean values

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1	336	91	88	91	86	86	94	200	168	192	548	798
2	316	89	88	86	95	87	99	181	145	194	449	728
3	350	91	86	89	91	93	103	189	145	225	537	724
4	323	86	84	96	82	81	93	240	139	206	454	895
5	322	81	86	93	88	77	87	250	138	170	379	955
6	322	84	83	90	86	81	92	232	137	156	378	1017
7	330	87	85	92	85	80	95	223	137	161	395	1034
8	332	82	91	86	86	77	89	225	146	157	469	960
9	340	79	82	99	85	81	96	226	153	162	530	929
10	348	86	83	111	83	78	88	215	157	188	523	926
11	367	90	84	110	84	80	89	220	148	204	527	915
12	367	96	86	110	87	78	103	204	156	217	542	839
13	373	94	83	111	88	80	109	160	147	220	594	826
14	372	96	80	109	92	80	97	149	153	240	690	732
15	359	88	80	106	90	81	154	142	150	239	705	625
16	357	94	81	56	79	79	168	149	143	259	737	542
17	342	93	87	38	80	79	190	157	128	361	792	537
18	343	92	85	34	81	75	200	158	139	403	808	560
19	349	89	85	46	82	77	206	145	158	405	767	566
20	379	88	87	79	83	80	175	140	167	384	867	568
21	382	86	86	105	83	82	171	135	170	376	957	539
22	510	88	90	99	83	78	163	166	150	396	1002	513
23	747	99	89	95	86	79	159	189	147	401	1046	485
24	808	89	95	92	83	81	169	194	153	430	1041	467
25	766	75	98	89	83	76	174	188	162	472	817	471
26	761	81	94	88	82	76	166	172	183	538	650	466
27	759	83	101	85	88	78	172	163	197	548	724	458
28	781	97	95	88	90	71	169	151	212	538	802	416
29	801	88	86	85		75	180	159	207	527	823	388
30	677	97	89	82		78	215	166	221	624	834	438
31	317		99	88		127		219		779	1,018	
Min.	316	75	80	34	79	71	87	135	128	156	378	388
Max.	808	99	101	111	95	127	215	250	221	779	1,046	1,034
Mean	459	89	88	88	85	81	139	184	159	335	690	677
AF	28,238	5,272	5,382	5,414	4,745	4,980	8,265	11,322	9,435	20,570	42,456	40,299

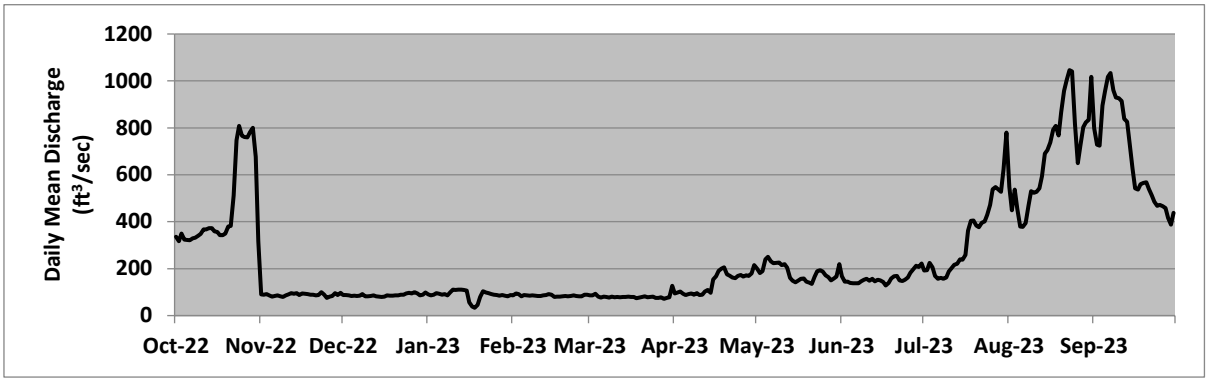


Table A-1.—Western division system generation for water year 2023

Powerplant	Accumulative gross generation		
	WY2023 (GWH)	Average [9] (GWH)	Percent of average
Green Mountain	44.7	51.9	86
Marys Lake	0.0	37.2	0
Estes	107.1	100.3	107
Pole Hill	186.7	172.3	108
Flatiron 1 and 2	240.1	226.9	106
Big Thompson	4.4	10.9	40
Seminoe	136.1	132.5	103
Kortes	147.0	140.4	105
Freemont	174.4	239.6	73
Alcova	67.9	118	58
Glendo	69.1	80.1	86
Guernsey	18.6	19.4	96
Boysen	75.0	69.3	108
Heart Mountain [10]	19.8	15.8	125
Buffalo Bill[2]	70.3	68.3	103
Shoshone[2]	20.5	20.2	101
Spirit Mountain[2]	16.7	14.7	114
Mt. Elbert [11]	173.7	169	103
Yellowtail [12]	780.6	959	81
Total	**1,962.4**	**2,166.3**	**91**

[9] 1976–2005 average unless noted otherwise.
[10] Average gross generation for 1995–2012
[11] Gross pump/storage generation reported. Average is for 1990–1999
[12] Half of average gross generation of 1971–1990. In general, half of Yellowtail energy is dedicated the Western Division System through marketing arrangement; the other half is marketed in Eastern Division System.

Table A-2.—Pump energy used during water year 2023

Pumping plant	October 2022-September 2023 pump energy		
	WY2023 (GWH)	Average[13] (GWH)	Percent of Average
Willow Creek	10.2	5.8	176
Farr	27.6	30.7	90
Flatiron Unit 3	29.3	26.7	110
Mt. Elbert[14]	198.8	182.1	109
Total	**265.9**	**245.3**	**108**

[13] 1976–2005 average unless noted otherwise.
[14] Average pump energy for 1990–1999

Pick-Sloan Missouri Basin Program Western Division Power System
Water Year 2022 Operations

Table A-3.—Gross generation less pumping in Gigawatt-hours for water year 2023

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Total
Mt. Elbert[15]	0.3	0.0	0.0	0.1	2.1	5.0	3.3	0.0	4.2	6.6	6.7	4.0	31.6
Green Mountain	4.3	1.4	1.8	2	1.5	1.6	1	0.8	6.8	8.9	5.6	9	44.7
Willow Cr. pump	0.2	0.1	0.0	0.0	0.0	0.0	2.0	5.8	1.2	0.3	0.3	0.3	10.2
Farr pump	0.0	0.1	1.1	4.8	4.6	5.2	3.3	0.0	0.0	1.2	3.5	3.8	27.6
Marys Lake	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Estes	0.0	0.0	2.4	14.9	13.8	15.7	13.3	13.4	2.2	6.8	12.5	12.1	107.1
Pole Hill	0.0	0.0	0.0	20.6	19.8	23.9	20.8	23.5	21.2	17.3	20.5	19.1	186.7
Flatiron 1 and 2	0.0	0.0	2.9	28.2	26.0	30.7	25.0	29.1	26.0	23.9	25.7	22.6	240.1
Flatiron 3	0.2	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
Flatiron 3 pump	0.0	0.0	0.2	6.8	0.0	0.0	3.3	4.4	2.0	3.2	4.6	4.8	29.3
Big Thompson	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.5	0.7	0.2	4.4
Seminoe	0.9	3.8	3.9	4.1	3.9	4.2	15.7	26.1	26.9	22.8	14.3	9.5	136.1
Kortes	5.5	5.3	5.4	5.4	5.0	5.4	18.6	29.4	21.1	19.2	15.6	11.1	147.0
Fremont Canyon	0.2	5.7	6.3	5.8	4.8	11.2	12.8	23.9	20.7	33.1	32.7	17.2	174.4
Alcova	2.7	2.5	2.6	1.9	2.2	5.3	2.9	10.9	9.0	9.2	13.3	5.4	67.9
Glendo	0.0	0.0	0.0	0.0	0.0	0.0	3.6	8.8	6.2	21.2	21.6	7.7	69.1
Guernsey	0.0	0.0	0.0	0.0	0.0	0.0	2.2	4.3	3.3	2.0	4.2	2.6	18.6
Pilot Butte[16]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Boysen	2.7	2.3	4.8	4.8	4.4	5.2	10.3	10.1	6.4	7.0	10.3	6.7	75.0
Shoshone	1.8	0.0	0.0	0.0	0.0	3.4	10.2	12.4	12.1	12.9	10.2	7.3	70.3
Buffalo Bill	1.6	1.4	1.7	1.7	1.6	1.3	1.7	1.8	1.9	2.0	2.0	1.8	20.5
Spirit Mountain	1.8	0.0	0.0	0.0	0.0	0.0	0.6	2.6	3.0	3.0	2.9	2.8	16.7
Diamond Cr. pump	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Heart Mtn.	1.9	0.0	0.0	0.0	0.0	0.0	1.6	3.7	1.6	3.7	3.7	3.6	19.8
Yellowtail[17]	55.2	54.9	51.0	50.4	49.5	64.7	105.8	85.2	63.0	76.5	73.5	50.9	780.6
Fry-Ark	0.3	0.0	0.0	0.1	2.1	5.0	3.3	0.0	4.2	6.6	6.7	4.0	32.3
C-BT	4.3	1.3	6.0	54.1	56.5	66.7	51.5	57.6	54.0	53.7	56.6	54.1	516.4
North Platte	9.3	17.3	18.2	17.2	15.9	26.1	55.8	103.4	87.2	107.5	101.7	53.5	613.1
Bighorn	37.4	31.2	32.0	31.7	30.8	42.3	77.3	73.2	56.5	66.9	65.9	47.7	592.6
Total gen	51.3	49.8	56.2	103.1	105.2	140.0	187.9	234.2	201.9	234.6	230.9	159.2	1,754.4
Total load	162.4	162.2	177	172.8	137	149.7	176.1	184.5	211.2	262.5	211.6	156.8	2,163.8
Surplus/deficit	-111.1	-112.5	-120.8	-69.7	-31.8	-9.7	11.8	49.7	-9.3	-27.9	19.3	2.4	-409.4

[15] Flow through energy reported, not pump/storage energy as reported in table A-1
[16] Marketed energy
[17] Total Yellowtail reported in row but only half of total generation of Yellowtail used for Bighorn and Total Gen row of Western Division Power Generation Calculations. In general, half of Yellowtail energy is dedicated to the Western Division System through marketing arrangement. The other half is marketed in Eastern Division System.

Pick-Sloan Missouri Basin Program Western Division Power System
Water Year 2024 Forecasted Operations
***Most Probable* Water Supply Condition**
Gross Generation and Pumping in Gigawatt-Hours

Table A-4.—Most probable inflow projected gross generation and pumping for water year 2024

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Total
Mt. Elbert[18]	0.3	0.0	2.7	3.3	4.9	4.5	3.0	2.9	2.3	1.4	5.3	2.4	33.7
Green Mountain	5.0	2.0	2.0	2.0	1.8	1.9	1.7	2.8	4.4	5.6	6.4	8.5	28.3
Willow Cr. pump	0.0	0.1	0.1	0.1	0.1	0.1	0.8	4.2	3.4	0.6	0.3	0.2	7.5
Farr pump	0.0	0.0	2.1	4.7	4.2	4.1	1.8	0.4	0.0	1.7	3.8	4.3	29.6
Marys Lake	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	5.8	6.0	45.9
Estes	0.0	0.0	6.7	16.0	13.9	13.3	7.4	11.8	12.2	11.0	14.6	15.1	119.5
Pole Hill	0.0	0.0	10.8	25.8	22.5	21.5	11.3	19.3	24.9	24.9	24.5	24.7	201.7
Flatiron 1 and 2	0.0	0.0	12.0	32.2	27.4	24.4	12.9	23.6	31.1	30.5	29.9	30.7	252.9
Flatiron 3	1.0	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1
Flatiron 3 pump	0.0	0.0	2.2	6.8	4.3	0.0	0.0	3.2	5.6	4.7	6.6	6.4	37.1
Big Thompson	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	3.6	3.0	1.6	1.2	8.8
Seminoe	0.0	4.9	5.0	5.0	4.5	5.0	13.9	25.4	25.6	26.9	19.9	5.0	164
Kortes	5.6	5.4	5.6	5.6	5.1	5.6	15.4	27.5	26.6	27.5	20.9	5.4	166.7
Fremont Canyon	0.0	5.1	5.8	5.8	5.2	11.2	11.7	22.1	34.6	43.1	42.0	34.9	218.9
Alcova	3.8	3.7	3.8	3.8	3.4	6.7	3.7	11.2	17.1	20.9	20.9	18.4	123
Glendo	0.0	0.0	0.0	0.0	0.0	0.0	1.2	11.8	13.0	24.3	19.4	11.2	88.1
Guernsey	0.0	0.0	0.0	0.0	0.0	0.0	0.7	3.8	3.7	3.8	3.8	3.4	19.1
Pilot Butte[19]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Boysen	4.8	4.7	4.8	4.8	4.3	4.7	5.0	10.3	11.5	8.5	7.3	6.9	86.7
Shoshone	1.1	2.2	1.1	1.1	1.0	1.1	1.1	2.2	2.2	2.2	1.2	1.1	12.5
Buffalo Bill	4.1	0.0	1.7	1.7	1.5	1.9	10.9	13.4	13.0	13.4	13.1	12.8	97.3
Spirit Ountain	2.3	0.0	0.0	0.0	0.0	0.0	0.0	2.8	3.0	3.3	3.3	3.1	17.3
Diamond Cr. pump	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Heart Mountain	3.5	0.0	0.0	0.0	0.0	0.0	0.0	4.5	4.3	4.5	4.1	1.6	13.6
Yellowtail[20]	30.2	28.1	28.9	28.6	25.6	30.3	30.5	50.4	57.2	39.4	36.4	33.1	418.4
Fry-Ark	0.3	0.0	2.7	3.3	4.9	4.5	3.0	2.9	2.3	1.4	5.3	2.4	33.1
C-BT	6.0	2.5	27.4	64.4	57.0	56.9	30.7	50.8	67.2	70.8	72.1	75.3	582.9
North Platte	9.4	19.0	20.2	20.2	18.2	28.5	46.5	101.8	120.6	146.4	126.8	78.4	779.8
Bighorn	46.1	34.9	36.5	36.2	32.4	38.1	47.5	83.6	91.1	71.2	65.4	58.7	641.6
Total gen	61.9	56.4	86.7	124.1	112.5	128.0	127.7	239.1	281.1	289.7	269.6	214.9	2,038.5
Total load	156.6	162.4	162.2	177.1	172.6	137.0	149.3	176.4	184.7	211.0	262.0	211.2	2,162.5
Surplus/deficit	-94.7	-106.0	-75.5	-53.0	-60.1	-9.0	-21.6	62.7	96.4	78.7	7.6	3.7	-124.0

[18] Project values are historic average flow through energy.
[19] Projected values are marketed energy.
[20] Half of total Yellowtail generation reported in row. In general, half of Yellowtail energy is dedicated to the Western Division System through marketing arrangement. The other half is marketed in Eastern Division System.

Colorado-Big Thompson and Fryingpan-Arkansas Projects
Estimated Maintenance Schedule for Water Year 2024[21]

Table A-5.—Estimated maintenance schedule for water year 2024—Colorado-Big Thompson and Fryingpan-Arkansas Projects

Feature	Task name	Start	Finish
Big T Unit 1	Minor Maintenance 2024	Mon. 1/8/24	Fri. 2/2/24
Big T XFMR KW1A	WAPA Work on 115kV Line	Wed. 2/14/24	Thu. 2/15/24
Adams Tunnel	2023 Winter Waterway Inspection	Mon. 11/27/23	Fri. 12/8/23
Marys Lake Powerplant	2023 Winter Waterway Inspection	Mon. 11/27/23	Thu. 12/14/23
Marys Lake Powerplant	2022 Bottom End Turbine Overhaul	Mon. 10/3/22	Fri. 5/17/24
Marys Lake Powerplant	Major Maintenance 2024	Mon. 9/30/24	Fri. 10/25/24
Estes Blackstart	2024 Capability Test	TBD	TBD
Estes Unit 1 and KY1A	WAPA/BOR Relay Swapover	Mon. 5/17/24	Fri. 5/17/24
Estes Unit 1	No Minor/Major Maintenance in 2024		
Estes Unit 2	Major Maintenance 2024	Mon. 3/18/24	Fri. 5/10/24
Estes Unit 3	No Minor/Major Maintenance in 2024		
Flatiron Unit 1	Minor Maintenance 2024	Mon. 3/4/24	Fri. 4/12/24
Flatiron XMFR KW1A	WAPA/BOR Relay Swapover	Thu. 3/7/24	Mon. 3/18/24
Flatiron Unit 2	No Minor/Major Maintenance in 2024		
Flatiron XMFR KW2A	WAPA/BOR Relay Swapover	Mon. 2/26/24	Fri. 3/1/24
Flatiron Unit 3	Major Maintenance 2024	Mon. 9/16/24	Fri. 10/18/24
Flatiron Unit 3 and Carter Lake Pressure Conduit (CLPC)	Northern Water encasement of section of CLPC running under Chimney Hollow spillway	Mon. 9/25/23	Mon .12/18/23
Flatiron Unit 3 and Carter Lake Pressure Conduit (CLPC)	Northern Water to install wye in CLPC from Chimney Hollow Project	Thu. 8/29/24	Sun. 12/15/24
Pole Hill Unit G1	Emergency repairs to Pole Hill Siphon Bathtub	Thu. 12/14/23	Sun. 3/31/24
Pole Hill Unit G1	No Minor/Major Maintenance in 2024		
Pole Hill XFMR K1A	No Minor/Major Maintenance in 2024		
Green Mtn. Unit 1	Penstock Recoat, Replace Tube Valve and Relay Upgrade	Tue 11/7/23	Thu. 4/11/24
Green Mtn. Unit 2	Testing of Jet Flow Gate No. 2	Mon. 10/23/23	Fri. 10/27/23
Mt Elbert Unit 1	Extended outage for various tasks	Mon. 12/4/23	Thu. 2/29/24
Mt Elbert Unit 2	Extended outage for various tasks	Mon. 12/4/23	Fri. 3/8/24
Mt Elbert Unit 1	2024 Annual Maintenance and Shaft Seal Replacement	Mon. 3/11/24	Fri. 5/3/24
Mt Elbert Unit 2	2024 Annual Maintenance and Shaft Seal Replacement	Mon. 9/9/24	Fri. 11/8/24
CHFC 930 Section	2024 Northern Water Inspection and Repairs	TBD	TBD

[21] Maintenance schedule information accurate as of February 1, 2024

Western Division - Pick-Sloan Missouri Basin Program
Powerplant Data

Table A-6.—Powerplant data

Facility	No. units	Capacity each unit (kWh)	Total installed capacity (kWh)	Normal operating head (ft)	Output at rated head (ft^3/s)
Green Mountain	2	13,000	26,000	192–262	1,660
Marys Lake	1	8,100	8,100	202–217	550
Estes	3	16,500	49,500	551–571	1,300
Pole Hill	1	33,250	33,250	830–838	550
Flatiron Units 1 and 2	2	43,000	86,000	1,096–1,118	1,070
Flatiron Unit 3 [22]	1	8,500	8,500	158–287	440
Big Thompson	1	5,300	5,300	183–184	350
Seminoe	3	15,000	45,000	97–227	2,850
Kortes	3	12,000	36,000	192–204	2,700
Fremont Canyon	2	33,000	66,000	247–363	2,200
Alcova	2	18,000	36,000	153–165	2,200
Glendo	2	19,000	38,000	73–156	2,800
Guernsey	2	2,400	4,800	89–91	820
Pilot Butte	2	800	1,600		
Boysen	2	7,500	15,000	72–112	2,415
Shoshone	1	3,000	3,000		
Buffalo Bill	3	6,000	18,000		
Heart Mountain	1	5,000	5,000	265-275	355
Mt. Elbert	2	103,000	206,000	447–477	6,400
Yellowtail	4	72,000	288,000	327–440	8,500
Total	**34**		**979,050**		

[22] Pumping plant which may be operated in reverse to generate energy.

Western Division - Pick-Sloan Missouri Basin Program
Pumping Plant Data

Table A-7.—Pumping plant data

Facilities	Number	Capacity (ft^3/s)	Normal operating head (ft)	Installed (HP)	Kwh to Pump 1 acre-foot at maximum head
Granby	3	600	92-186	18,000	227
Willow Creek	2	400	167-169	18,000	227
Flatiron Unit 3[23]	1	440	173-287	13,000	391
Mt. Elbert	2	5,690	447-477	340,000	620

[23] Pumping plant which may be operated in reverse to generate energy.

Appendix B

Exhibits

Tables

Exhibit B-1: Western Division Water Resource Map

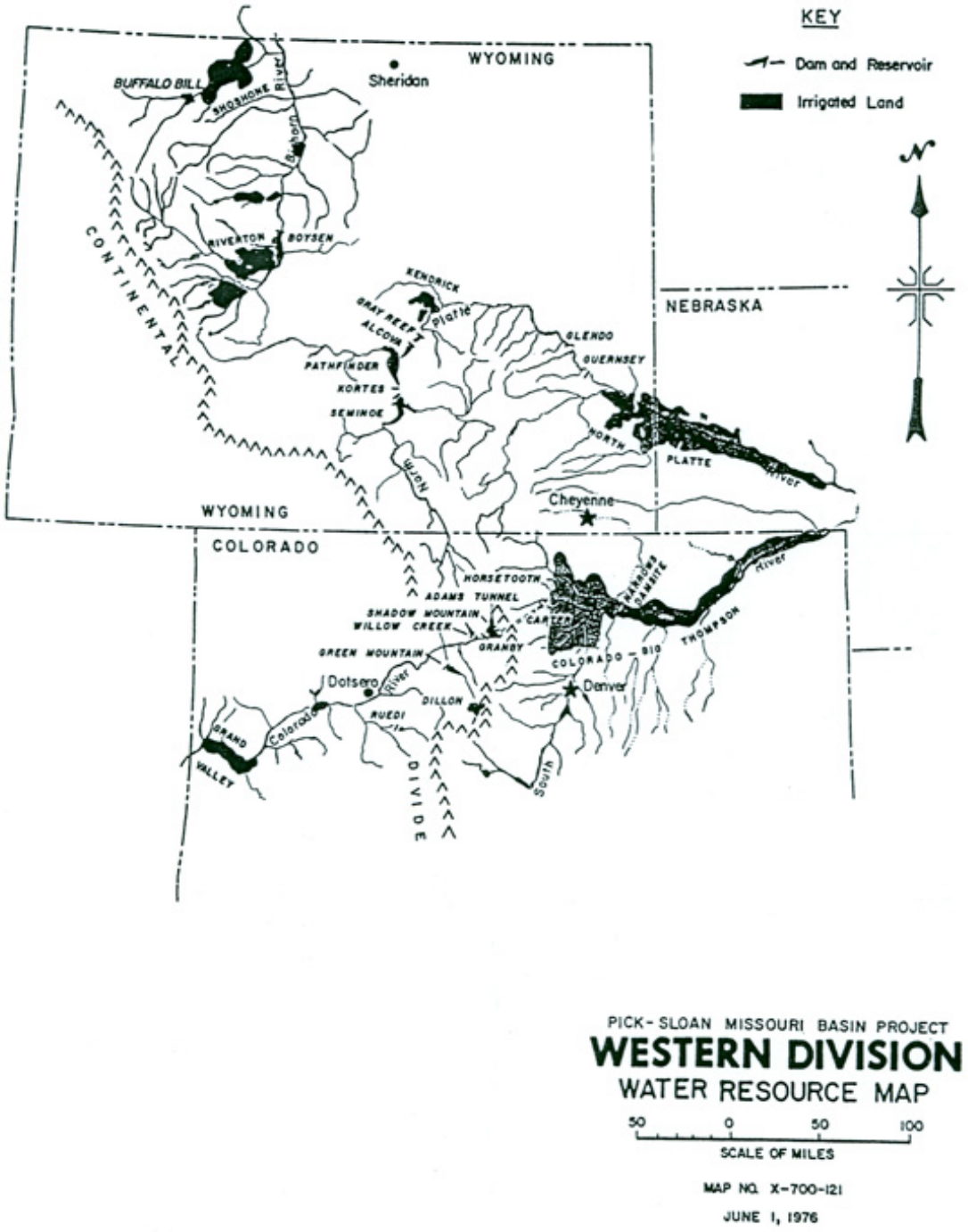


Figure B-1.—Water resource map of irrigated land and dam/reservoirs of the Western Division serving them.

Exhibit B-2: Lap Gross Generation Less Pumping for Water Year 2023

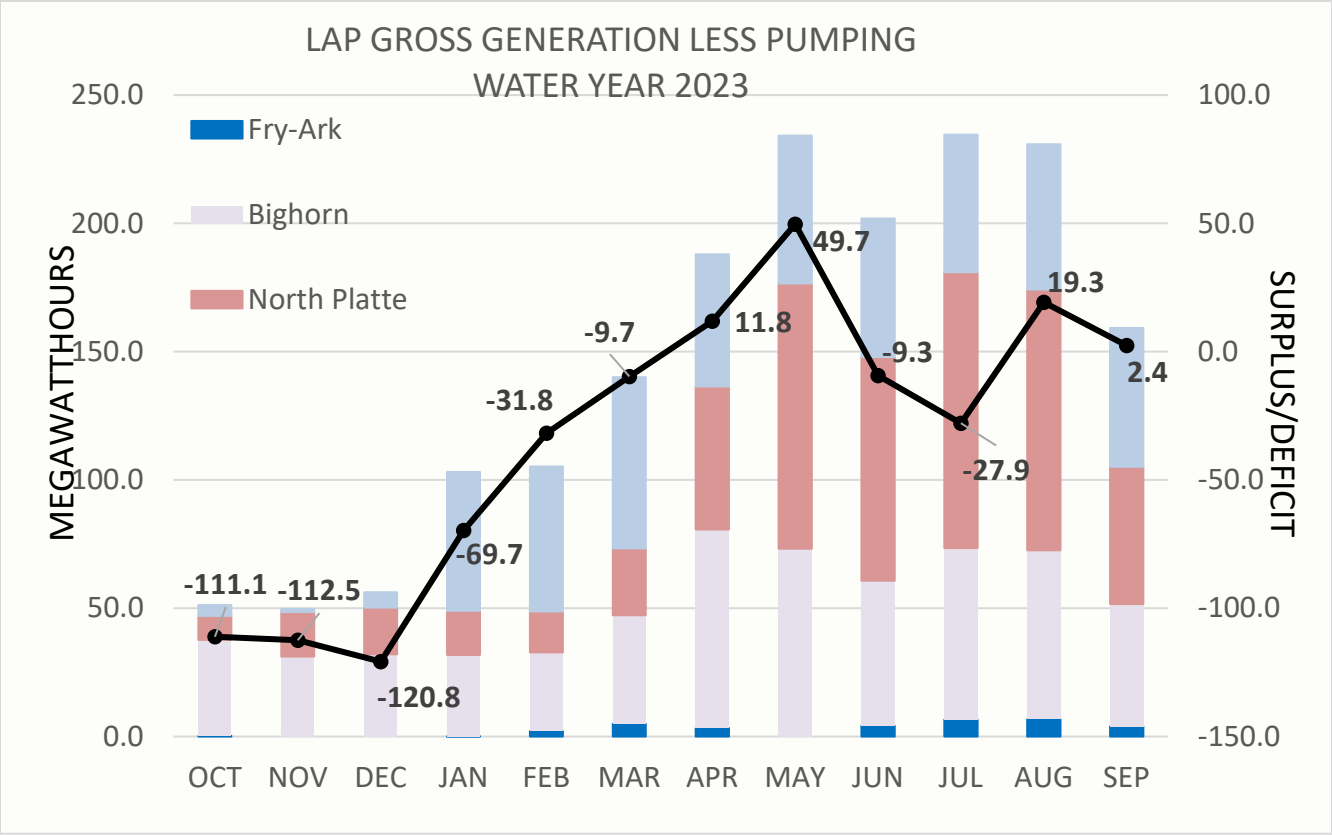


Figure B-2.—Monthly Loveland Area Power (LAP) Generation Less Pumping for WY2023 by Reclamation projects in Western Division System. Monthly surplus and deficits are shown as overlay plot.

B-3: Most Probable Inflow Projected Lap Gross Generation Less Pumping for Water Year 2024

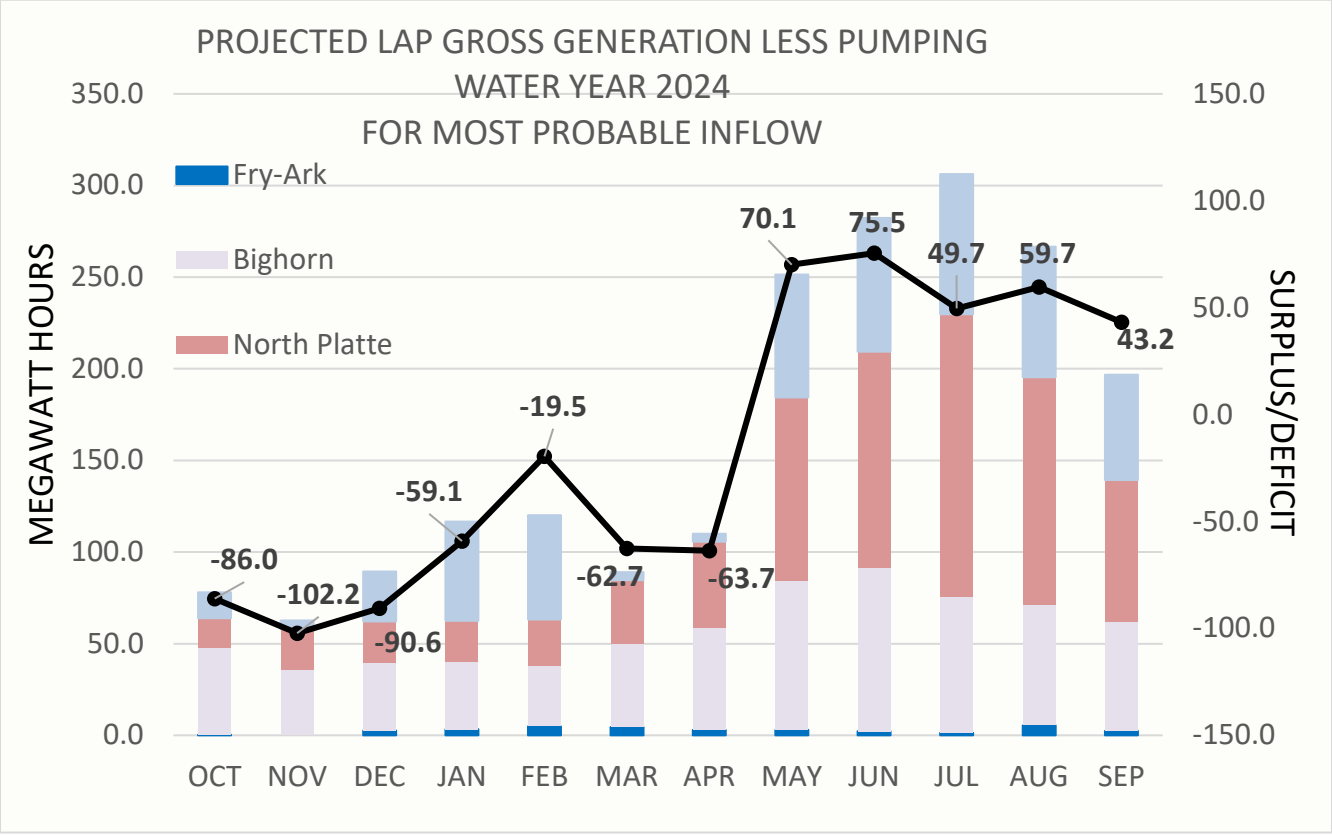


Figure B-3.—Monthly Loveland Area Power (LAP) Generation Less Pumping for WY 2024 from October 2023 AOP Most Probable Scenario by Reclamation projects in Western Division System. Monthly surplus and deficits are shown as overlay plot.

Table B-1.—Western Division–Pick-Sloan Missouri Basin Program pertinent reservoir data

Western Division – Pick-Sloan Missouri Basin Program pertinent reservoir data (Data in acre-feet)					
Reservoir	**Dead storage** [1]	**Active storage** [2]	**Total storage**	**Normal minimum storage**	**Limitation on normal minimum storage**
Green Mountain	6,860	146,779	153,639	47,684	Minimum elevation for rated power output
Willow Creek	1,486	9,067	10,553	6,675	Elevation of pump canal headworks
Granby	74,190	465,568	539,758	74,190	Lowest outlet elevation
Shadow Mountain	506	16,848	17,354	16,026	Minimum permissible Grand Lake elevation; 8,366 ft.
Grand Lake	NA [3]	511	1,015	504	Legislation limits fluctuation
Marys Lake	42	885	927	308	Minimum elevation for power generation
Lake Estes	409	2,659	3,068	740	Minimum elevation to release 550 ft^3/s
Pinewood Lake	416	1,765	2,181	613	Minimum elevation for power generation
Flatiron	125	635	760	324	Minimum elevation to release 550 ft^3/s
Carter Lake	3,306	108,924	112,230	306	Lowest outlet elevation
Horsetooth	7,003	149,732	156,735	17,600	Elevation on highest delivery works
Total	**94,343**	**907,085**	**998,220**	**167,970**	

[1] Storage capacity below elevation of lowest outlet
[2] Total storage minus dead storage
[3] Not determined

Table B-2.—C-BT monthly summary Of Blue River operations
WY2023 C-BT Monthly Summary of Blue River Operations

	Initial	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Total or Avg %
Undepleted Runoff Above Green Mountain Reservoir		14,842	9,584	9,587	9,689	9,059	10,463	17,535	79,831	117,145	60,810	33,249	19,284	391,079
Undepleted Runoff Above Dillon Reservoir		8,167	5,549	5,522	5,666	5,541	5,781	8,731	43,019	66,969	29,122	15,106	8,664	207,838
Percent Of Total Undepleted Runoff Above Dillon Reservoir		55.0	57.9	57.6	58.5	61.2	55.3	49.8	53.9	57.2	47.9	45.4	44.9	53.1
Depletions By 1929 Colorado Springs Right		0	0	0	0	0	0	26	185	465	204	97	78	1056
Depletions By 1948 Colorado Springs Right		18	51	0	0	0	0	25	1,589	2,234	1,439	1,131	132	6,619
Inflow To Dillon Reservoir		9,370	6,390	5,522	5,666	5,541	5,781	8,662	40,762	63,018	27,141	13,878	8,454	200,187
Dillon Reservoir Storage (1,000 AF)	222.5	224.9	218.7	214.2	211.2	209.1	206.4	203.1	234.4	261.2	259.1	249.9	236.8	
Roberts Tunnel Diversions		2,481	7,543	5,159	3,094	2,793	3,148	6,224	2,799	0	3,669	12,478	14,053	63,441
Dillon Reservoir Outflow to The River		3,429	4,204	4,850	5,591	4,840	5,299	5,731	6,200	35,416	24,323	9,482	6,247	115,611
Total Depletions by Denver		5,942	2,186	672	76	702	482	2,931	34,562	27,602	2,819	4,395	2,208	84,576
Runoff Between Dillon Reservoir & Green Mountain Reservoir		6,674	4,049	4,064	4,030	3,524	4,670	8,822	36,819	50,684	31,409	18,091	10,619	183,455
Actual Inflow To Green Mountain Reservoir		10,104	8,239	8,915	9,614	8,358	9,981	14,536	43,012	85,592	56,011	27,626	16,866	298,853
Green Mountain Reservoir End of Month Storage (1,000 AF)	104.8	89.6	87.4	83.9	79.6	76.9	74.9	80.4	115.5	152.0	151.6	148.5	114.5	
Total Green Mountain Outflow		24,910	10,396	12,405	13,954	11,008	11,968	8,985	7,323	48,040	55,246	29,778	50,129	284,143

Table B-3.—Pick-Sloan Missouri Basin Program 2023 summary actual operations (Part 1 of 3)
2023 Actual Operations. Water in 1,000 Acre-Feet. Energy in Gigawatt hours

Green Mountain Reservoir	Initial or total	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
Depleted Watershed Inflow	298.9	10.1	8.2	8.9	9.6	8.4	10.0	14.5	43.0	85.6	56.0	27.6	16.9
Turbine Release	255.6	24.6	10.4	12.4	14.0	11.0	12.0	9.0	7.3	34.2	42.0	28.8	49.9
Bypass	27.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.2	13.0	0.9	0.2
Spill	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.2	0.0	0.0
End of Month Content	104.8	89.6	87.4	83.9	79.6	76.9	74.9	80.4	115.5	152.0	151.6	148.5	114.5
Kwh/AF		171.3	122.7	129.7	139.8	122.4	118.9	105.7	95.6	195.7	210.7	194.0	179.8
Generation	43.6	4.2	1.3	1.6	2.0	1.3	1.4	0.9	0.7	6.7	8.8	5.6	9.0
Willow Creek Reservoir		**Oct.**	**Nov.**	**Dec.**	**Jan.**	**Feb.**	**Mar.**	**Apr.**	**May**	**Jun.**	**Jul.**	**Aug.**	**Sep.**
Inflow	94.8	1.4	1.2	1.1	1.1	0.8	1.0	9.8	54.4	15.3	4.3	2.7	1.7
Release to River	43.7	0.4	0.4	0.4	0.4	0.4	0.5	0.4	26.6	10.0	3.2	0.4	0.4
Pumped to Granby	48.6	1.1	0.9	0.0	0.0	0.0	0.0	9.8	26.6	5.6	1.3	1.6	1.6
End of Month Content	7.2	6.9	6.7	7.4	8.0	8.4	9.0	8.2	9.2	8.7	8.1	8.7	8.3
Pump Energy	10.5	0.2	0.2	0.0	0.0	0.0	0.0	2.1	5.8	1.2	0.3	0.3	0.3
Granby - Shadow Mountain - Grand Lake		**Oct.**	**Nov.**	**Dec.**	**Jan.**	**Feb.**	**Mar.**	**Apr..**	**May**	**Jun.**	**Jul**	**Aug.**	**Sep.**
Natural Watershed Inflow	297.0	4.7	2.7	4.6	5.1	3.2	3.9	17.2	97.9	104.2	32.9	14.0	6.6
Total Inflow into Granby	286.5	4.9	4.2	5.0	5.2	3.8	4.4	18.5	94.3	102.4	25.4	11.0	7.3
Granby Fish Release	31.2	1.3	1.2	1.3	1.2	1.1	1.2	1.2	4.6	4.5	4.6	5.6	3.3
Granby Seepage	4.5	0.5	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.4	0.5	0.6	0.5
Granby Spill	48.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.4	11.7	0.1	0.1
Adams Tunnel	237.8	0.0	0.0	6.0	32.9	30.1	33.2	28.7	30.0	6.3	15.7	28.0	26.8
Granby End of Month content	481.1	483.3	485.0	481.5	452.2	423.9	393.1	389.4	476.8	535.3	532.1	510.0	485.0
SM-GL End of Month Content	17.4	17.8	17.5	17.9	17.8	17.8	17.8	17.7	17.4	17.1	17.7	17.7	17.5
Pumped from Granby	186.8	0.1	0.5	7.7	33.2	30.9	34.2	20.4	0.0	0.1	8.5	24.9	26.4
Granby Pump Kwh/AF		1057.8	420.7	163.3	150.9	153.8	156.9	166.4	0.0	727.2	144.2	139.0	145.6
Granby Pump Energy	28.7	0.1	0.2	1.3	5.0	4.7	5.4	3.4	0.0	0.1	1.2	3.5	3.8

(Part 2 of 3)

2023 Actual Operations. Water in 1,000 Acre-Feet. Energy in Gigawatt Hours

Marys Lake – Estes – Flatiron	**Initial or total**	**Oct.**	**Nov.**	**Dec.**	**Jan.**	**Feb.**	**Mar.**	**Apr.**	**May**	**Jun.**	**Jul.**	**Aug.**	**Sep.**
Adams Tunnel Water	237.8	0.0	0.0	6.0	32.9	30.1	33.2	28.7	30.0	6.3	15.7	28.0	26.8
Marys Lake Generation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Estes Generation	105.6	-0.1	-0.1	2.3	14.7	13.6	15.5	13.1	13.3	2.1	6.7	12.4	12.0
Divertible Big-Thompson	42.1	0.0	0.0	0.8	6.8	5.9	6.2	3.3	4.4	2.0	3.2	4.6	4.8
Diverted Big-Thompson Water	16.9	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.0	4.1	8.7	2.1	0.7
Olympus Tunnel	277.5	0.1	0.0	4.2	33.0	29.8	33.5	28.9	32.5	29.9	27.8	30.3	27.4
Pole Hill Generation	186.1	0.0	0.0	-0.1	20.6	19.7	23.8	20.7	23.5	21.1	17.3	20.5	19.1
Flatiron 1 & 2 Generation	239.5	0.0	0.0	2.9	28.1	25.9	30.6	25.0	29.1	25.9	23.8	25.6	22.6
Flatiron 3 Turbine Release		1.1	0.7	1.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Flatiron 3 Kwh/AF Generation		-	-	-	-	-	-	-	-	-	-	-	-
Flatiron 3 Generation		0.2	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Flatiron 3 Pumping	123.4	0.0	0.0	2.8	22.5	18.3	18.1	9.1	12.3	5.5	8.8	12.7	13.3
Flatiron 3 Kwh/AF Pump		0.0	0.0	0.0	303.3	324.2	343.8	0.0	361.7	365.2	364.9	0.0	0.0
Flatiron 3 Pump Energy	42.1	0.0	0.000	0.8	6.8	5.9	6.2	3.3	4.4	2.0	3.2	4.6	4.8
Carter Lake		**Oct.**	**Nov.**	**Dec.**	**Jan.**	**Feb.**	**Mar.**	**Apr.**	**May**	**Jun.**	**Jul.**	**Aug.**	**Sep.**
Pumped from Flatiron	123.4	0.0	0.0	2.8	22.5	18.3	18.1	9.1	12.3	5.5	8.8	12.7	13.3
Release to Flatiron	3.0	1.1	0.7	1.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Irrigation Delivery	123.4	0.0	0.0	2.8	22.5	18.3	18.1	9.1	12.3	5.5	8.8	12.7	13.3
Evaporation & Seepage	2.7	0.2	0.1	0.0	0.0	0.0	0.1	0.3	0.4	0.4	0.4	0.4	0.3
End of Month Content	74.8	60.3	55.7	53.8	72.3	87.1	101.9	106.4	111.7	111.8	111.4	108.5	105.2
Big Thompson Powerplant		**Oct.**	**Nov.**	**Dec.**	**Jan.**	**Feb.**	**Mar.**	**Apr.**	**May**	**Jun.**	**Jul.**	**Aug.**	**Sep.**
Diverted Dille Tunnel Water	20.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	9.8	4.9	1.7	1.6	0.6
Irrigation Delivery	8.8	0.8	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	1.1	3.4	3.1
Turbine Release	35.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1	7.8	11.1	6.7	2.4
Generation	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.9	1.5	0.7	0.2
Horsetooth Reservoir		**Oct.**	**Nov.**	**Dec.**	**Jan.**	**Feb.**	**Mar.**	**Apr.**	**May**	**Jun.**	**Jul.**	**Aug.**	**Sep.**
Hansen Feeder Canal Inflow	122.9	1.7	1.0	2.0	9.8	11.3	14.7	16.6	19.9	21.1	7.4	9.9	7.6
Irrigation Delivery	91.0	14.9	2.1	2.4	2.3	1.9	2.0	2.9	4.1	3.4	10.6	23.5	21.0
Evaporation	4.5	0.3	0.2	0.0	0.0	0.0	0.2	0.5	0.6	0.6	0.7	0.7	0.6
End of Month Content	94.4	79.7	78.4	77.6	85.2	94.3	107.5	121.4	138.0	155.5	151.1	136.6	121.5

(Part 3 of 3)
2023 Actual Operations Summary. Energy in Gigawatt hours.

Base Generation	Initial or total	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
Green Mountain	43.6	4.2	1.3	1.6	2.0	1.3	1.4	0.9	0.7	6.7	8.8	5.6	9.0
Flatiron 3	0.6	0.2	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Big Thompson	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.9	1.5	0.7	0.2
Total	**48.3**	**4.4**	**1.4**	**1.8**	**1.9**	**1.3**	**1.4**	**0.9**	**1.7**	**7.6**	**10.3**	**6.3**	**9.2**
Load Following Generation	**Initial or total**	**Oct.**	**Nov.**	**Dec.**	**Jan.**	**Feb.**	**Mar.**	**Apr.**	**May.**	**Jun.**	**Jul.**	**Aug.**	**Sep.**
Marys Lake	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Estes	105.8	0.0	0.0	2.3	14.7	13.6	15.5	13.1	13.3	2.1	6.7	12.4	12.0
Pole Hill	186.2	0.0	0.0	0.0	20.6	19.7	23.8	20.7	23.5	21.1	17.3	20.5	19.1
Flatiron 1 and 2	239.5	0.0	0.0	2.9	28.1	25.9	30.6	25.0	29.1	25.9	23.8	25.6	22.6
Total	**531.7**	**0.0**	**0.0**	**5.1**	**63.4**	**59.3**	**69.9**	**58.8**	**65.9**	**49.2**	**47.8**	**58.5**	**53.7**
Pump Energy	**Initial or total**	**Oct.**	**Nov.**	**Dec.**	**Jan.**	**Feb.**	**Mar.**	**Apr.**	**May**	**Jun.**	**Jul.**	**Aug.**	**Sep.**
Willow Creek	10.6	0.2	0.2	0.0	0.0	0.0	0.0	2.1	5.8	1.2	0.3	0.3	0.3
Granby	28.7	0.1	0.2	1.3	5.0	4.7	5.4	3.4	0.0	0.1	1.2	3.5	3.8
Flatiron 3	29.4	0.0	0.0	0.2	6.8	0.0	0.0	3.3	4.4	2.0	3.2	4.6	4.8
Total	**68.6**	**0.3**	**0.4**	**1.5**	**11.9**	**4.8**	**5.4**	**8.7**	**10.2**	**3.3**	**4.7**	**8.4**	**9.0**
Total Generation	**580.0**	**4.4**	**1.4**	**6.9**	**65.3**	**60.6**	**71.3**	**59.8**	**67.6**	**56.8**	**58.1**	**64.8**	**62.9**
Total Generation Minus Pump	**511.4**	**4.1**	**1.0**	**5.4**	**53.5**	**55.8**	**65.9**	**51.1**	**57.4**	**53.5**	**53.4**	**56.4**	**53.9**

Table B-4.—Colorado-Big Thompson 2023 Flood damage prevented in water year 2023

	Cumulative total prior to WY2023	WY2023	Cumulative total current
Granby, Willow Creek, Shadow Mountain, and Grand Lake	$790,069	$63,490	$853,559
Green Mountain	$338,402	$31,305	$369,707
Total	**$1,128,471**	**$94,795**	**$1,223,266**

Table B-5.—C-BT October 2023 most probable plan for water year 2024

HYDROLOGY OPERATIONS

Dillon Reservoir

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Dillon Inflow	kaf	6.1	5.2	4.8	4.3	3.9	4.4	7.1	32.3	83.7	31.3	12.6	9.0	204.7
DL to GM Gain	kaf	10.5	10.6	7.1	5.0	3.8	3.4	7.0	41.0	39.8	15.3	11.8	8.1	163.4

Green Mountain Reservoir

Init Cont. 115.00 kaf Elev. 7929.8 ft | Maximum Cont. 154.60 kaf Elev. 7950.4 ft | Minimum Cont. 8.00 kaf Elev. 7804.7 ft

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Depletion	kaf	0.0	-0.3	-1.2	-1.6	-1.7	-1.5	1.3	12.5	40.2	14.1	6.8	3.4	72.0
Depleted Inflow	kaf	16.7	16.1	13.1	10.9	9.4	9.4	12.9	62.0	86.4	34.3	17.9	14.0	303.1
Turbine Release	kaf	49.0	19.0	19.6	15.0	14.1	15.1	12.7	27.7	28.8	30.1	31.4	37.1	299.6
Spill/Waste	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total River Release	Ft3/s	797	319	319	244	245	245	214	451	484	490	511	624	
Total River Release	kaf	49.0	19.0	19.6	15.0	14.1	15.1	12.7	27.7	28.8	30.1	31.4	37.1	299.6
Evaporation	kaf	0.2	0.1	0.0	0.0	0.0	0.1	0.2	0.3	0.6	0.7	0.5	0.4	3.1
End-Month Targets	kaf	82.0	72.5	72.5	57.5	57.5	57.5	58.0	92.0	149.0	152.5	138.5	115.0	
End-Month Contents	kaf	82.0	79.1	72.5	68.4	63.7	58.0	58.0	92.0	149.0	152.5	138.5	115.0	
End-Month Elevation	ft	7908.69	7906.50	7901.37	7898.01	7893.96	7888.65	7888.65	7915.77	7947.79	7949.46	7942.63	7930.06	

Willow Creek Reservoir

Init Cont. 8.00 kaf Elev. 8124.8 ft | Maximum Cont. 10.20 kaf Elev. 8128.8 ft | Minimum Cont. 7.20 kaf Elev. 8116.9 ft

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Native Inflow	kaf	2.0	1.7	1.3	1.2	1.0	1.0	3.1	25.9	18.7	3.6	1.9	1.3	62.7
Spill/Bypass	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.7	18.3	1.3	0.0	0.0	29.3
Total River Release	kaf	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	4.8
Pumped to Granby	kaf	1.7	1.3	0.9	0.8	0.6	0.6	2.6	13.9	0.0	3.4	1.3	0.8	27.9
Evaporation	kaf	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.7
End-Month Contents	kaf	8.2	8.2	8.2	8.2	8.2	8.2	8.2	10.0	9.9	8.2	8.2	8.2	
End-Month Elevation	ft	8124.40	8124.40	8124.40	8124.40	8124.41	8124.41	8124.41	8130.53	8130.21	8124.40	8124.40	8124.40	

Granby Reservoir

Init Cont. 485.00 kaf Elev. 8272.3 ft | Maximum Cont. 539.80 kaf Elev. 8280.0 ft | Minimum Cont. 76.50 kaf Elev. 8186.9 ft

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Native Inflow	kaf	2.6	2.4	2.4	2.0	1.7	2.0	4.4	29.7	45.8	11.3	4.4	3.2	111.9
Release from Shadow Mtn	kaf	2.2	2.7	2.9	1.2	1.2	1.2	2.8	15.2	42.2	3.3	2.5	2.1	79.5
Pump from Windy Gap	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump from Willow Creek	kaf	1.7	1.3	0.9	0.8	0.6	0.6	2.6	13.9	0.0	3.4	1.3	0.8	27.9
Total Inflow	kaf	6.4	6.4	6.2	4.0	3.5	3.8	9.8	58.9	88.0	18.0	8.2	6.0	219.2
Spill/Bypass	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.8	2.6	0.0	0.0	26.4
Total River Release	kaf	1.2	1.2	1.2	1.2	1.2	1.2	1.2	4.6	4.5	4.6	2.5	1.2	25.8
Pumped to Shadow Mtn	kaf	4.7	2.5	14.9	27.9	25.8	2.4	0.8	2.0	0.0	18.6	27.7	23.9	151.2
Evaporation	kaf	1.6	0.7	0.0	0.0	0.0	0.9	1.5	2.4	3.2	2.9	2.3	2.0	17.5
Seepage loss	kaf	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	3.6
End-Month Contents	kaf	483.5	485.3	475.0	449.7	426.0	424.9	430.9	480.4	536.7	525.7	501.2	479.8	
End-Month Elevation	ft	8272.07	8272.32	8270.84	8267.09	8263.49	8263.33	8264.25	8271.62	8279.58	8278.05	8274.60	8271.53	

Shadow Mountain Reservoir

Init Cont. 17.00 kaf Elev. 8366.6 ft | Maximum Cont. 18.40 kaf Elev. 8367.0 ft | Minimum Cont. 16.60 kaf Elev. 8366.0 ft

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Native Inflow	kaf	3.5	3.1	3.1	2.7	2.3	2.6	5.9	39.4	60.7	14.9	5.9	4.2	148.3
Pumped from Granby	kaf	4.7	2.5	14.9	27.9	25.8	2.4	0.8	2.0	0.0	18.6	27.7	23.9	151.2
Total Inflow	kaf	8.2	5.6	18.0	30.6	28.0	5.1	6.6	41.4	60.7	33.5	33.6	28.1	299.4
Spill/Bypass	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total River Release	kaf	2.2	2.7	2.9	1.2	1.2	1.2	2.8	15.2	42.2	3.3	2.5	2.1	79.5
Adams Tunnel Flow	kaf	5.6	2.7	15.0	29.3	26.9	3.6	3.4	25.5	17.7	29.5	30.5	25.5	215.2
Evaporation	kaf	0.3	0.1	0.0	0.0	0.0	0.2	0.3	0.5	0.6	0.5	0.4	0.4	3.3
End-Month Contents	kaf	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.8	16.8	16.8	

End-Month Elevation	**ft**	8366.62	8366.62	8366.62	8366.62	8366.63	8366.62	8366.62	8366.62	8366.62	8366.62	8366.62	8366.62	

Adams Tunnel

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Maximum Tunnel Capacity	**kaf**	6.4	2.9	15.0	29.3	29.4	3.6	3.4	25.5	18.1	31.5	30.5	25.5	221.1
Actual Diversion	**kaf**	5.6	2.7	15.0	29.3	26.9	3.6	3.4	25.5	17.7	29.5	30.5	25.5	215.2
Percent Maximum Delivery	**Percent**	87	93	100	100	91	100	100	100	98	93	100	100	

Lake Estes

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Big Thompson Inflow	**kaf**	3.2	2.0	1.4	1.0	0.7	0.9	2.4	19.2	28.4	21.0	8.3	4.5	93.0
Actual River Release	**kaf**	3.0	1.5	1.4	1.0	0.7	0.9	1.7	13.2	13.2	16.6	6.9	3.7	63.8
Max Diversion Available	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Priority Water Diverted	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	4.1	2.7	0.0	0.0	9.0
Skim Water Diverted	**kaf**	0.2	0.5	0.0	0.0	0.0	0.0	0.6	4.1	11.1	2.2	1.4	0.8	20.9
Irrigation Demand	**kaf**	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.3	0.2	1.4
Irrigation Delivery	**kaf**	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.3	0.2	1.4
Total River Release	**kaf**	3.0	1.5	1.4	1.0	0.7	0.9	1.7	13.2	13.2	16.6	6.9	3.7	63.8

Olympus Tunnel

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Bal gloMaximum Tunnel Capacity	**kaf**	33.8	32.7	33.8	33.8	31.6	33.8	32.7	33.8	32.7	33.8	33.8	32.7	399.0
Actual Delivery	**kaf**	5.8	3.1	15.0	29.3	26.8	3.5	4.0	31.4	32.7	33.5	31.7	26.1	242.9
Percent Maximum Delivery	**Percent**	17	10	44	87	85	10	12	93	100	99	94	80	
Inflow to Flatiron	**kaf**	5.8	3.1	15.0	29.3	26.8	3.5	4.0	31.4	32.7	33.5	31.7	26.1	242.9

Carter Lake

Init Cont. 105.00 kaf **Maximum Cont.** 112.20 kaf **Minimum Cont.** 6.00 kaf
Elev. 5752.8 ft **Elev.** 5759.0 ft **Elev.** 5626.8 ft

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Pumped from Flatiron	**kaf**	0.0	0.0	8.3	17.7	2.0	0.0	0.0	16.3	8.9	16.7	17.0	16.9	103.8
Flatiron Bifurcation	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Carter to Flatiron	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Evaporation Loss	**kaf**	0.3	0.1	0.0	0.0	0.0	0.2	0.3	0.4	0.5	0.5	0.4	0.3	3.0
Seepage Loss	**kaf**	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	2.2
End-Month Contents	**kaf**	93.9	90.3	95.6	110.7	110.2	106.9	102.1	111.8	111.8	112.2	107.0	104.7	
End-Month Elevation	**ft**	5742.53	5739.16	5743.50	5757.14	5757.21	5754.28	5750.01	5758.66	5758.19	5758.49	5753.91	5751.79	
Priority Water Diverted to Carter	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	2.7	2.5	0.0	0.0	7.3
Irrigation & Metered Demand	**kaf**	10.5	2.6	2.1	1.9	1.8	2.5	4.0	5.5	7.1	14.7	20.8	18.0	91.5
Windy Gap demand	**kaf**	0.4	0.7	0.8	0.7	0.5	0.5	0.4	0.5	1.2	1.0	0.9	0.8	8.4
Total Demand	**kaf**	10.9	3.3	2.9	2.5	2.3	3.0	4.3	6.0	8.3	15.8	21.6	18.7	99.6
Total Delivery	**kaf**	10.9	3.3	2.9	2.5	2.3	3.0	4.3	6.0	8.3	15.8	21.6	18.7	99.6
Percent Required Delivery	**Percent**	100	100	100	100	100	100	100	100	100	100	100	100	
Shortage	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Hansen Canal 930

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Maximum Flow	**kaf**	57.2	55.3	57.2	57.2	53.5	57.2	55.3	57.2	55.3	57.2	57.2	55.3	675.1
Actual Flow	**kaf**	5.8	3.1	6.7	11.6	24.9	3.5	4.0	15.1	23.8	16.8	14.7	9.3	139.3

Dille Tunnel

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Big Thompson River Below Lake Estes	**kaf**	3.0	1.5	1.4	1.0	0.7	0.9	1.7	13.2	13.2	16.6	6.9	3.7	63.8
North Fork Big Thompson River at Drake	**kaf**	0.8	0.6	0.5	0.4	0.4	0.4	0.5	4.3	3.9	1.9	1.0	0.7	15.4
Dille Skim Water Diverted	**kaf**	1.3	0.0	0.0	0.0	0.0	0.0	0.4	12.9	12.4	14.8	5.5	2.0	49.3
Dille Priority Water Diverted	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
water available	**kaf**	3.8	2.1	1.9	1.4	1.0	1.3	2.2	17.5	17.1	18.5	7.9	4.4	79.1
water diverted	**kaf**	1.3	0.0	0.0	0.0	0.0	0.0	0.4	13.2	12.4	15.3	5.5	2.0	50.1

Percent Diverted	**Percent**	24	0	0	0	0	0	7	244	229	283	101	37	
Big T @ Canyon Mouth	**kaf**	2.5	2.1	1.9	1.4	1.0	1.3	1.9	4.3	4.7	3.1	2.5	2.4	29.1

Trifurcation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Release from Flatiron	**kaf**	5.8	3.1	6.7	11.6	24.9	3.5	4.0	15.1	23.8	16.8	14.7	9.3	139.3
Release to 550 Canal	**kaf**	0.6	2.6	6.7	11.5	24.8	3.5	3.2	10.8	12.2	13.6	8.7	1.8	100.0
Dille Tunnel	**kaf**	1.3	0.0	0.0	0.0	0.0	0.0	0.4	13.2	12.4	15.3	5.5	2.0	50.1
Total release to river	**kaf**	4.9	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.2	1.2	4.2	6.1	17.0
Irrigation demand	**kaf**	4.9	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.2	1.2	4.1	6.0	16.8
Windy Gap demand	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Total requirement	**kaf**	4.9	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.2	1.2	4.2	6.1	17.0
Total delivery	**kaf**	4.9	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.2	1.2	4.2	6.1	17.0
Percent Required Delivery	**Percent**	100	100	100	100	100	100	100	100	100	100	100	100	
Shortage	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Hansen Canal 550

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Inflow from Flatiron	**kaf**	0.6	2.6	6.7	11.5	24.8	3.5	3.2	10.8	12.2	13.6	8.7	1.8	100.0
Maximum flow	**kaf**	10.8	26.2	29.4	29.4	27.5	29.4	28.5	29.4	28.5	29.4	29.4	28.5	326.4
Irrigation demand	**kaf**	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.3	0.4	0.6	1.9
Irrigation delivery	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.3	0.4	0.6	1.8
Release to Horsetooth	**kaf**	0.6	2.6	6.7	11.5	24.8	3.5	3.2	10.8	12.2	13.6	8.7	1.8	100.0

Horsetooth Reservoir

Init Cont. 121.00 kaf **Maximum Cont.** 157.00 kaf **Minimum Cont.** 13.00 kaf
Elev. 5411.5 ft **Elev.** 5430.0 ft **Elev.** 5316.8 ft

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Inflow	**kaf**	0.6	2.6	6.7	11.5	24.8	3.5	3.2	10.8	12.2	13.6	8.7	1.8	100.0
Total irrigation delivery	**kaf**	10.9	2.3	2.5	2.3	2.0	2.2	2.7	5.3	6.8	16.4	24.7	15.5	93.6
Evaporation loss	**kaf**	0.4	0.2	0.0	0.0	0.0	0.3	0.5	0.7	0.9	0.8	0.6	0.5	4.9
Seepage loss	**kaf**	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	2.4
End-Month Content	**kaf**	110.6	110.6	114.6	123.7	146.3	147.2	147.0	151.7	156.0	152.2	135.5	121.1	
End-Month Elevation	**ft**	5405.23	5405.23	5407.59	5412.73	5424.79	5425.24	5425.16	5427.49	5429.64	5427.74	5419.14	5411.27	
Priority water diverted to Horsetooth	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.2	0.1	0.0	0.0	1.4
Irrigation demand	**kaf**	7.5	0.0	0.0	0.0	0.0	0.0	0.1	1.4	1.8	10.6	18.9	10.3	50.6
Metered Demand	**kaf**	2.8	1.9	2.1	1.9	1.7	1.8	2.0	3.4	4.2	5.0	4.6	4.2	35.6
Windy Gap demand	**kaf**	0.6	0.4	0.4	0.4	0.3	0.4	0.6	0.6	0.8	0.8	1.2	1.0	7.5
Total demand	**kaf**	10.9	2.3	2.5	2.3	2.0	2.2	2.7	5.3	6.8	16.4	24.7	15.5	93.6
Percent Required Delivery	**Percent**	100	100	100	100	100	100	100	100	100	100	100	100	
Shortage	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CBT Project Summary

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Total CBT Delivery	**kaf**	25.8	4.6	4.2	3.9	3.6	4.3	6.4	10.8	13.7	32.2	49.0	39.3	197.8

Windy Gap

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Pumping	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Losses	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spill	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delivery	**kaf**	1.0	1.1	1.2	1.0	0.8	0.9	0.9	1.1	2.1	1.9	2.1	1.8	15.9

PUMPING AND GENERATION OPERATIONS

Green Mountain Generation

	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total

Maximum Generation	**gwh**	18.600	18.000	18.600	18.600	17.400	18.600	18.000	18.600	18.000	18.600	18.600	18.000	219.600
Generation	**gwh**	9.000	3.300	3.300	2.500	2.300	2.400	2.000	4.500	5.700	6.400	6.500	7.400	55.300
Percent Maximum Generation	**Percent**	49	18	18	13	13	13	11	24	32	34	35	41	
Average	**kwh/af**	184	173	170	166	163	159	157	162	199	211	209	200	

Willow Creek Pumping

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Maximum Pumping	**kaf**	24.6	23.8	24.6	24.6	23.0	24.6	23.8	19.4	0.0	16.9	24.6	23.8	253.7
Actual Pumping	**kaf**	1.7	1.3	0.9	0.8	0.6	0.6	2.6	13.9	0.0	3.4	1.3	0.8	27.9
Pump Energy	**gwh**	0.400	0.300	0.200	0.200	0.100	0.100	0.500	3.000	0.000	0.700	0.300	0.200	6.000
Percent Maximum Pumping	**Percent**	7	5	4	3	3	2	11	72	0	20	5	3	135
Average	**kwh/af**	213	213	213	213	213	213	213	213	0	213	213	213	

Lake Granby Pumping

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Maximum Pumping	**kaf**	36.9	35.7	36.9	36.9	34.5	36.9	35.7	36.9	35.7	36.9	36.9	35.7	435.6
Actual Pumping	**kaf**	4.7	2.5	14.9	27.9	25.8	2.4	0.8	2.0	0.0	18.6	27.7	23.9	151.2
Pump Energy	**gwh**	0.700	0.400	2.100	4.000	3.700	0.400	0.100	0.300	0.000	2.600	3.900	3.400	21.600
Percent Maximum Pumping	**Percent**	13	7	40	76	75	7	2	6	0	50	75	67	
Average	**kwh/af**	143	143	143	144	145	145	145	145	0	140	141	142	

Marys Lake Generation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Adams Tunnel Flow	**kaf**	5.6	2.7	15.0	29.3	26.9	3.6	3.4	25.5	17.7	29.5	30.5	25.5	215.2
Maximum Generation	**gwh**	0.000	0.000	0.000	0.000	3.000	6.400	6.200	6.400	6.200	6.400	6.400	6.200	47.200
Generation	**gwh**	0.000	0.000	0.000	0.000	2.500	0.000	0.000	4.600	3.000	5.500	5.700	4.700	26.000
Percent Maximum Generation	**Percent**	0	0	0	0	9	0	0	18	17	19	19	18	
Average	**kwh/af**	0	0	0	0	93	0	0	182	172	186	186	182	

Lake Estes Generation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Adams Tunnel Flow	**kaf**	5.6	2.7	15.0	29.3	26.9	3.6	3.4	25.5	17.7	29.5	30.5	25.5	215.2
Maximum Generation	**gwh**	16.000	15.500	16.000	16.000	15.000	16.000	15.500	16.000	15.500	16.000	16.000	15.500	189.000
Generation	**gwh**	1.900	0.500	6.900	13.900	12.700	0.800	0.700	11.600	7.700	13.700	14.300	11.700	96.400
Percent Maximum Generation	**Percent**	12	3	43	87	85	5	5	72	50	86	89	75	
Average	**kwh/af**	333	192	457	473	472	211	206	455	437	466	467	457	

Pole Hill Generation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Olympus Tunnel Flow	**kaf**	33.8	32.7	33.8	33.8	31.6	33.8	32.7	33.8	32.7	33.8	33.8	32.7	399.0
Maximum Generation	**gwh**	0.000	0.000	10.800	25.800	24.100	0.000	0.000	25.800	25.000	25.800	25.800	25.000	188.100
Generation	**gwh**	0.000	0.000	9.300	22.300	20.500	0.000	0.000	23.900	25.000	25.600	24.100	19.900	170.600
Percent Maximum Generation	**Percent**	0	0	86	87	85	0	0	93	100	99	93	80	
Average	**kwh/af**	0	0	275	661	649	0	0	708	763	756	713	608	

Flatiron Units 1 and 2 Generation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Inflow to Flatiron	**kaf**	5.8	3.1	15.0	29.3	26.8	3.5	4.0	31.4	32.7	33.5	31.7	26.1	242.9
Maximum Generation	**gwh**	32.200	31.200	32.200	32.200	30.200	32.200	31.200	32.200	31.200	32.200	32.200	31.200	380.400
Generation	**gwh**	3.600	1.700	12.700	25.800	23.400	1.800	2.200	29.000	31.200	31.800	29.300	22.200	214.700
Percent Maximum Generation	**Percent**	11	5	39	80	78	6	7	90	100	99	91	71	
Average	**kwh/af**	627	525	846	880	872	519	560	922	953	949	926	850	

Project Generation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Total Generation	**gwh**	15.200	5.500	32.200	64.500	61.400	5.000	5.000	76.300	76.400	85.700	81.500	67.000	575.700
Total Max Generation	**gwh**	70.700	68.400	81.500	96.500	93.300	77.100	74.600	102.900	99.600	102.900	102.900	99.600	1070.000

Flatiron Unit 3 Pump/Generation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Maximum Pumping	**kaf**	0.0	0.0	8.3	17.7	2.4	0.0	0.0	16.3	8.9	16.7	17.0	16.9	104.2
Pump from Flatiron	**kaf**	0.0	0.0	8.3	17.7	2.0	0.0	0.0	16.3	8.9	16.7	17.0	16.9	103.8
Pump Energy	**gwh**	0.000	0.000	2.800	6.300	0.700	0.000	0.000	5.900	3.300	6.100	6.100	6.000	37.200
Percent Maximum Pumping	**Percent**	0	0	100	100	81	0	0	100	100	100	100	100	
Average	**kwh/af**	0	0	340	354	365	0	0	359	365	366	362	357	
Maximum Turbine release	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Carter to Flatiron	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maximum Generation	**gwh**	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Actual Generation	**gwh**	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Big Thompson Generation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Total release	**kaf**	6.5	0.5	0.0	0.0	0.0	0.0	1.1	17.3	23.8	18.2	11.0	8.9	87.3
Turbine release	**kaf**	6.5	0.5	0.0	0.0	0.0	0.0	1.1	17.3	23.8	18.2	11.0	8.9	87.3
Wasteway release	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maximum Generation	**gwh**	3.800	3.700	3.800	3.800	3.600	3.800	3.700	3.800	3.700	3.800	3.800	3.700	45.000
Generation	**gwh**	0.700	0.000	0.000	0.000	0.000	0.000	0.000	2.600	3.700	2.800	1.600	1.200	12.600
Percent Maximum Generation	**Percent**	19	0	0	0	0	0	1	69	100	74	41	32	
Average	**kwh/af**	110	0	0	0	0	0	41	152	156	156	142	133	

Project Pump Energy

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Granby	**gwh**	0.700	0.400	2.100	4.000	3.700	0.400	0.100	0.300	0.000	2.600	3.900	3.400	21.600
Willow Creek	**gwh**	0.400	0.300	0.200	0.200	0.100	0.100	0.500	3.000	0.000	0.700	0.300	0.200	6.000
Flatiron Unit 3	**gwh**	0.000	0.000	2.800	6.300	0.700	0.000	0.000	5.900	3.300	6.100	6.100	6.000	37.200
Total Pump Energy	**gwh**	1.000	0.600	5.100	10.500	4.600	0.500	0.700	9.100	3.300	9.500	10.300	9.600	64.800

Table B-6.—Colorado-Big Thompson October 2023 minimum reasonable plan for water year 2024

HYDROLOGY OPERATIONS

Dillon Reservoir

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Dillon Inflow	kaf	5.7	5.2	5.0	4.4	4.1	4.1	9.4	39.2	46.1	10.9	9.5	6.4	150.0
DL to GM Gain	kaf	6.2	5.0	4.4	4.0	3.5	4.3	5.6	20.2	25.8	20.2	8.6	5.0	112.8

Green Mountain Reservoir

Init Cont. 115.00 kaf Maximum Cont. 154.60 kaf Minimum Cont. 8.00 kaf
Elev. 7929.8 ft Elev. 7950.4 ft Elev. 7804.7 ft

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Depletion	kaf	-0.5	-0.4	-1.0	-1.5	-1.5	-1.8	3.6	34.2	34.7	-1.5	3.8	0.5	68.6
Depleted Inflow	kaf	12.4	10.6	10.4	9.9	9.0	10.3	11.6	26.4	40.3	34.3	14.7	11.0	200.9
Turbine Release	kaf	44.7	14.9	15.5	14.5	13.6	14.5	20.5	4.6	4.5	23.6	24.3	27.6	222.8
Spill/Waste	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total River Release	Ft3/s	727	251	251	235	236	236	345	75	75	384	395	465	
Total River Release	kaf	44.7	14.9	15.5	14.5	13.6	14.5	20.5	4.6	4.5	23.6	24.3	27.6	222.8
Evaporation	kaf	0.2	0.1	0.0	0.0	0.0	0.1	0.2	0.3	0.5	0.6	0.5	0.3	2.8
End-Month Targets	kaf	82.0	72.5	72.5	57.5	57.5	57.5	50.0	152.5	152.5	117.0	107.0	90.0	
End-Month Contents	kaf	82.0	77.6	72.5	68.0	63.4	59.1	50.0	71.5	106.8	117.0	107.0	90.0	
End-Month Elevation	ft	7908.69	7905.36	7901.37	7897.62	7893.67	7889.74	7880.54	7900.56	7925.26	7931.20	7925.37	7914.40	

Willow Creek Reservoir

Init Cont. 8.00 kaf Maximum Cont. 10.20 kaf Minimum Cont. 7.20 kaf
Elev. 8124.8 ft Elev. 8128.8 ft Elev. 8116.9 ft

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Native Inflow	kaf	1.4	1.2	1.3	1.2	1.1	1.2	4.3	11.4	5.3	2.0	1.2	1.0	32.6
Spill/Bypass	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total River Release	kaf	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	4.8
Pumped to Granby	kaf	1.0	0.8	0.8	0.8	0.7	0.8	3.8	10.9	4.8	1.5	0.7	0.5	27.1
Evaporation	kaf	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.7
End-Month Contents	kaf	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	
End-Month Elevation	ft	8124.40	8124.40	8124.40	8124.40	8124.41	8124.41	8124.41	8124.41	8124.40	8124.40	8124.40	8124.40	

Granby Reservoir

Init Cont. 485.00 kaf Maximum Cont. 539.80 kaf Minimum Cont. 76.50 kaf
Elev. 8272.3 ft Elev. 8280.0 ft Elev. 8186.9 ft

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Native Inflow	kaf	2.6	2.2	2.1	1.9	1.6	3.7	10.0	21.5	20.3	11.4	5.5	3.3	86.1
Release from Shadow Mtn	kaf	2.2	2.7	2.8	1.2	1.2	2.6	9.4	6.8	16.6	3.6	2.5	2.1	53.7
Pump from Windy Gap	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0	0.0	15.0
Pump from Willow Creek	kaf	1.0	0.8	0.8	0.8	0.7	0.8	3.8	10.9	4.8	1.5	0.7	0.5	27.1
Total Inflow	kaf	5.7	5.7	5.8	3.9	3.5	7.1	23.3	39.2	56.7	16.5	8.6	5.9	181.9
Spill/Bypass	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total River Release	kaf	1.2	1.2	1.2	1.2	1.2	1.2	1.2	4.6	4.5	4.6	2.5	1.2	25.8
Pumped to Shadow Mtn	kaf	4.8	2.6	17.0	31.1	26.4	1.5	0.0	2.4	1.0	18.2	26.8	27.1	158.9
Evaporation	kaf	1.6	0.7	0.0	0.0	0.0	0.9	1.5	2.4	3.1	2.9	2.2	2.0	17.3
Seepage loss	kaf	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	3.6
End-Month Contents	kaf	482.8	483.7	470.9	442.2	417.9	421.1	441.3	470.8	518.6	509.1	486.0	461.2	
End-Month Elevation	ft	8271.96	8272.09	8270.23	8265.96	8262.23	8262.73	8265.84	8270.22	8277.06	8275.73	8272.42	8268.82	

Shadow Mountain Reservoir

Init Cont. 17.00 kaf Maximum Cont. 18.40 kaf Minimum Cont. 16.60 kaf
Elev. 8366.6 ft Elev. 8367.0 ft Elev. 8366.0 ft

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Native Inflow	kaf	3.4	2.9	2.8	2.5	2.2	4.9	13.3	28.6	26.9	15.1	7.3	4.4	114.3
Pumped from Granby	kaf	4.8	2.6	17.0	31.1	26.4	1.5	0.0	2.4	1.0	18.2	26.8	27.1	158.9
Total Inflow	kaf	8.2	5.6	19.8	33.6	28.6	6.4	13.3	31.0	27.9	33.3	34.1	31.5	273.3
Spill/Bypass	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Total River Release	**kaf**	2.2	2.7	2.8	1.2	1.2	2.6	9.4	6.8	16.6	3.6	2.5	2.1	53.7
Adams Tunnel Flow	**kaf**	5.6	2.7	17.0	32.4	27.4	3.6	3.4	23.5	10.4	28.9	31.0	28.9	214.8
Evaporation	**kaf**	0.3	0.1	0.0	0.0	0.0	0.2	0.3	0.5	0.6	0.5	0.4	0.4	3.3
End-Month Contents	**kaf**	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.8	16.8	16.8	16.8	
End-Month Elevation	**ft**	8366.62	8366.62	8366.62	8366.62	8366.63	8366.62	8366.62	8366.62	8366.62	8366.62	8366.62	8366.62	

Adams Tunnel

		Oct-23	**Nov-23**	**Dec-23**	**Jan-24**	**Feb-24**	**Mar-24**	**Apr-24**	**May-24**	**Jun-24**	**Jul-24**	**Aug-24**	**Sep-24**	**Total**
Maximum Tunnel Capacity	**kaf**	6.4	2.9	17.0	32.4	30.2	3.6	3.4	23.5	10.4	28.9	31.0	28.9	218.6
Actual Diversion	**kaf**	5.6	2.7	17.0	32.4	27.4	3.6	3.4	23.5	10.4	28.9	31.0	28.9	214.8
Percent Maximum Delivery	**Percent**	87	92	100	100	91	100	100	100	100	100	100	100	

Lake Estes

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Big Thompson Inflow	kaf	3.0	1.9	1.3	0.9	0.6	0.6	2.1	16.2	20.1	10.4	5.7	3.2	66.0
Actual River Release	kaf	2.9	1.5	1.3	0.9	0.6	0.6	1.7	8.4	7.5	7.7	5.7	3.2	42.0
Max Diversion Available	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Priority Water Diverted	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skim Water Diverted	kaf	0.1	0.4	0.0	0.0	0.0	0.0	0.4	7.9	12.6	2.8	0.0	0.0	24.2
Irrigation Demand	kaf	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.3	0.2	0.1	1.5
Irrigation Delivery	kaf	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.3	0.2	0.1	1.5
Total River Release	kaf	2.9	1.5	1.3	0.9	0.6	0.6	1.7	8.4	7.5	7.7	5.7	3.2	42.0

Olympus Tunnel

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Maximum Tunnel Capacity	kaf	33.8	32.7	33.8	33.8	31.6	33.8	32.7	33.8	32.7	33.8	33.8	32.7	399.0
Actual Delivery	kaf	5.7	3.1	17.0	32.3	27.4	3.5	3.8	31.1	22.7	31.4	30.8	28.8	237.6
Percent Maximum Delivery	Percent	17	9	50	96	87	10	12	92	69	93	91	88	
Inflow to Flatiron	kaf	5.7	3.1	17.0	32.3	27.4	3.5	3.8	31.1	22.7	31.4	30.8	28.8	237.6

Carter Lake

Init Cont. 105.00 kaf **Maximum Cont.** 112.20 kaf **Minimum Cont.** 6.00 kaf
Elev. 5752.8 ft **Elev.** 5759.0 ft **Elev.** 5626.8 ft

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Pumped from Flatiron	kaf	0.0	0.0	8.2	17.6	0.7	0.0	0.0	17.4	1.5	16.6	19.9	19.6	101.5
Flatiron Bifurcation	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Carter to Flatiron	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Evaporation Loss	kaf	0.3	0.1	0.0	0.0	0.0	0.2	0.3	0.4	0.5	0.4	0.3	0.3	2.8
Seepage Loss	kaf	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	2.1
End-Month Contents	kaf	93.9	91.1	96.8	111.7	110.2	107.0	101.7	107.0	93.2	87.9	81.2	83.3	
End-Month Elevation	ft	5742.49	5739.86	5744.58	5758.05	5757.21	5754.35	5749.67	5753.88	5741.81	5736.84	5730.35	5732.43	
Priority Water Diverted to Carter	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Irrigation & Metered Demand	kaf	10.5	1.8	1.5	1.8	1.5	2.3	4.4	11.0	13.3	20.2	25.3	16.1	109.7
Windy Gap demand	kaf	0.5	0.8	0.9	0.7	0.5	0.6	0.4	0.6	1.3	1.1	0.9	0.8	9.1
Total Demand	kaf	10.9	2.6	2.4	2.5	2.0	2.9	4.8	11.6	14.7	21.3	26.2	17.0	118.9
Total Delivery	kaf	10.9	2.6	2.4	2.5	2.0	2.9	4.8	11.6	14.7	21.3	26.2	17.0	118.9
Percent Required Delivery	Percent	100	100	100	100	100	100	100	100	100	100	100	100	
Shortage	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Hansen Canal 930

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Maximum Flow	kaf	57.2	55.3	57.2	57.2	53.5	57.2	55.3	57.2	55.3	57.2	57.2	55.3	675.1
Actual Flow	kaf	5.7	3.1	8.7	14.7	26.7	3.5	3.8	13.7	21.3	14.8	10.8	9.3	136.1

Dille Tunnel

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Big Thompson River Below Lake Estes	kaf	2.9	1.5	1.3	0.9	0.6	0.6	1.7	8.4	7.5	7.7	5.7	3.2	42.0
North Fork Big Thompson River at Drake	kaf	0.8	0.6	0.5	0.4	0.3	0.3	0.4	1.2	2.2	1.4	0.8	0.5	9.4
Dille Skim Water Diverted	kaf	1.2	0.0	0.0	0.0	0.0	0.0	0.2	7.0	6.9	6.6	4.0	1.3	27.2
Dille Priority Water Diverted	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
water available	kaf	3.6	2.0	1.8	1.3	0.9	0.9	2.1	9.6	9.7	9.0	6.5	3.7	51.1
water diverted	kaf	1.2	0.0	0.0	0.0	0.0	0.0	0.2	7.0	6.9	6.6	4.0	1.3	27.2
Percent Diverted	Percent	22	0	0	0	0	0	4	129	127	122	75	25	

Big T @ Canyon Mouth	**kaf**	2.5	2.0	1.8	1.3	0.9	0.9	1.9	2.6	2.8	2.5	2.5	2.4	24.1

Trifurcation

		Oct-23	**Nov-23**	**Dec-23**	**Jan-24**	**Feb-24**	**Mar-24**	**Apr-24**	**May-24**	**Jun-24**	**Jul-24**	**Aug-24**	**Sep-24**	**Total**
Release from Flatiron	**kaf**	5.7	3.1	8.7	14.7	26.7	3.5	3.8	13.7	21.3	14.8	10.8	9.3	136.1
Release to 550 Canal	**kaf**	0.6	2.6	8.6	14.5	26.5	3.3	3.0	4.7	6.5	8.7	4.7	2.9	86.6
Dille Tunnel	**kaf**	1.2	0.0	0.0	0.0	0.0	0.0	0.2	7.0	6.9	6.6	4.0	1.3	27.2
Total release to river	**kaf**	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.6	2.6	5.0	5.5	20.2
Irrigation demand	**kaf**	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.6	2.6	5.0	5.4	20.1
Windy Gap demand	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Total requirement	**kaf**	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.6	2.6	5.0	5.5	20.2
Total delivery	**kaf**	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.6	2.6	5.0	5.5	20.2
Percent Required Delivery	**Percent**	100	100	100	100	100	100	100	100	100	100	100	100	
Shortage	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Hansen Canal 550

		Oct-23	**Nov-23**	**Dec-23**	**Jan-24**	**Feb-24**	**Mar-24**	**Apr-24**	**May-24**	**Jun-24**	**Jul-24**	**Aug-24**	**Sep-24**	**Total**
Inflow from Flatiron	**kaf**	0.6	2.6	8.6	14.5	26.5	3.3	3.0	4.7	6.5	8.7	4.7	2.9	86.6
Maximum flow	**kaf**	10.8	26.2	29.4	29.4	27.5	29.4	28.5	29.4	28.5	29.4	29.4	28.5	326.4
Irrigation demand	**kaf**	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.6	0.6	0.7	1.1	0.8	5.1
Irrigation delivery	**kaf**	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.6	0.6	0.7	1.1	0.8	4.9
Release to Horsetooth	**kaf**	0.6	2.6	8.6	14.5	26.5	3.3	3.0	4.7	6.5	8.7	4.7	2.9	86.6

Horsetooth Reservoir

Init Cont. 121.00 kaf
Elev. 5411.5 ft
Maximum Cont. 157.00 kaf
Elev. 5430.0 ft
Minimum Cont. 13.00 kaf
Elev. 5316.8 ft

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Inflow	kaf	0.6	2.6	8.6	14.5	26.5	3.3	3.0	4.7	6.5	8.7	4.7	2.9	86.6
Total irrigation delivery	kaf	11.4	1.9	1.9	2.3	2.2	2.4	4.4	12.7	16.8	26.9	27.9	9.6	120.4
Evaporation loss	kaf	0.4	0.2	0.0	0.0	0.0	0.3	0.5	0.7	0.8	0.7	0.5	0.4	4.5
Seepage loss	kaf	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	2.3
End-Month Content	kaf	110.0	110.4	117.0	129.1	153.3	153.7	151.7	142.8	131.4	112.3	88.4	81.2	
End-Month Elevation	ft	5404.91	5405.14	5408.97	5415.70	5428.28	5428.50	5427.49	5422.97	5416.98	5406.25	5391.42	5386.52	
Priority water diverted to Horsetooth	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Irrigation demand	kaf	7.5	0.1	0.0	0.0	0.0	0.0	1.0	7.8	9.9	18.9	20.5	4.2	69.9
Metered Demand	kaf	3.3	1.3	1.4	1.9	1.9	2.0	2.8	4.2	6.0	7.1	6.2	4.4	42.5
Windy Gap demand	kaf	0.6	0.4	0.4	0.4	0.3	0.4	0.6	0.6	0.9	0.9	1.3	1.1	7.9
Total demand	kaf	11.4	1.9	1.9	2.3	2.2	2.4	4.4	12.7	16.8	26.9	27.9	9.6	120.4
Percent Required Delivery	Percent	100	100	100	100	100	100	100	100	100	100	100	100	
Shortage	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CBT Project Summary

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Total CBT Delivery	kaf	26.3	3.3	3.1	4.0	3.6	4.6	8.6	24.5	31.7	49.8	58.2	31.0	248.7

Windy Gap

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Pumping	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0	0.0	15.0
Losses	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	1.5
Spill	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delivery	kaf	1.1	1.2	1.3	1.1	0.8	1.0	1.0	1.2	2.3	2.0	2.2	2.0	17.2

PUMPING AND GENERATION OPERATIONS

Green Mountain Generation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Maximum Generation	gwh	18.600	18.000	18.600	18.600	17.400	18.600	18.000	18.600	18.000	18.600	18.600	18.000	219.600
Generation	gwh	8.200	2.600	2.600	2.400	2.200	2.300	3.200	0.700	0.800	4.600	4.700	5.100	39.400
Percent Maximum Generation	percent	44	14	14	13	13	12	18	4	4	25	25	28	
Average	kwh/af	185	173	169	166	162	159	155	157	178	195	193	185	

Willow Creek Pumping

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Maximum Pumping	**kaf**	24.6	23.8	24.6	24.6	23.0	24.6	23.8	24.6	23.8	24.6	24.6	23.8	290.4
Actual Pumping	**kaf**	1.0	0.8	0.8	0.8	0.7	0.8	3.8	10.9	4.8	1.5	0.7	0.5	27.1
Pump Energy	**gwh**	0.200	0.200	0.200	0.200	0.200	0.200	0.800	2.300	1.000	0.300	0.100	0.100	5.800
Percent Maximum Pumping	**Percent**	4	3	3	3	3	3	16	44	20	6	3	2	110
Average	**kwh/af**	213	213	213	213	213	213	213	213	213	213	213	213	

Lake Granby Pumping

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Maximum Pumping	**kaf**	36.9	35.7	36.9	36.9	34.5	36.9	35.7	36.9	35.7	36.9	36.9	35.7	435.6
Actual Pumping	**kaf**	4.8	2.6	17.0	31.1	26.4	1.5	0.0	2.4	1.0	18.2	26.8	27.1	158.9
Pump Energy	**gwh**	0.700	0.400	2.400	4.500	3.800	0.200	0.000	0.400	0.100	2.600	3.800	3.900	22.800
Percent Maximum Pumping	**Percent**	13	7	46	84	76	4	0	7	3	49	73	76	
Average	**kwh/af**	143	143	143	144	145	146	0	144	143	141	142	143	

Marys Lake Generation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Adams Tunnel Flow	**kaf**	5.6	2.7	17.0	32.4	27.4	3.6	3.4	23.5	10.4	28.9	31.0	28.9	214.8
Maximum Generation	**gwh**	0.000	0.000	0.000	0.000	3.000	6.400	6.200	6.400	6.200	6.400	6.400	6.200	47.200
Generation	**gwh**	0.000	0.000	0.000	0.000	2.600	0.000	0.000	4.200	1.200	5.300	5.800	5.300	24.400
Percent Maximum Generation	**Percent**	0	0	0	0	9	0	0	18	12	18	19	18	
Average	**kwh/af**	0	0	0	0	93	0	0	180	115	184	187	185	

Lake Estes Generation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Adams Tunnel Flow	**kaf**	5.6	2.7	17.0	32.4	27.4	3.6	3.4	23.5	10.4	28.9	31.0	28.9	214.8
Maximum Generation	**gwh**	16.000	15.500	16.000	16.000	15.000	16.000	15.500	16.000	15.500	16.000	16.000	15.500	189.000
Generation	**gwh**	1.900	0.500	7.800	15.300	13.000	0.700	0.700	10.500	4.100	13.500	14.500	13.700	96.200
Percent Maximum Generation	**Percent**	12	3	49	96	87	5	5	65	26	84	91	88	
Average	**kwh/af**	333	198	460	472	474	209	206	445	394	465	468	472	

Pole Hill Generation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Olympus Tunnel Flow	**kaf**	33.8	32.7	33.8	33.8	31.6	33.8	32.7	33.8	32.7	33.8	33.8	32.7	399.0
Maximum Generation	**gwh**	0.000	0.000	10.800	25.800	24.100	0.000	0.000	25.800	10.000	25.800	25.800	25.000	173.100
Generation	**gwh**	0.000	0.000	10.800	24.700	21.000	0.000	0.000	23.700	9.300	23.900	23.400	22.000	158.800
Percent Maximum Generation	**Percent**	0	0	100	96	87	0	0	92	93	93	91	88	
Average	**kwh/af**	0	0	319	730	664	0	0	701	285	708	692	671	

Flatiron Units 1 and 2 Generation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Inflow to Flatiron	**kaf**	5.7	3.1	17.0	32.3	27.4	3.5	3.8	31.1	22.7	31.4	30.8	28.8	237.6
Maximum Generation	**gwh**	32.200	31.200	32.200	32.200	30.200	32.200	31.200	32.200	31.200	32.200	32.200	31.200	380.400
Generation	**gwh**	3.500	1.600	15.500	30.200	24.100	1.800	2.100	28.700	19.600	28.700	27.800	25.500	209.100
Percent Maximum Generation	**Percent**	11	5	48	94	80	6	7	89	63	89	86	82	
Average	**kwh/af**	624	525	913	932	879	518	546	922	863	916	904	884	

Project Generation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Total Generation	**gwh**	14.300	4.700	36.700	72.600	62.800	4.900	6.000	70.200	38.400	77.800	77.400	72.300	538.100
Total Max Generation	**gwh**	70.700	68.400	81.500	96.500	93.300	77.100	74.600	102.900	84.600	102.900	102.900	99.600	1055.000

Flatiron Unit 3 Pump/Generation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Maximum Pumping	**kaf**	0.0	0.0	8.2	17.6	0.8	0.0	0.0	17.4	1.5	16.6	19.9	19.6	101.6
Pump from Flatiron	**kaf**	0.0	0.0	8.2	17.6	0.7	0.0	0.0	17.4	1.5	16.6	19.9	19.6	101.5
Pump Energy	**gwh**	0.000	0.000	2.800	6.300	0.200	0.000	0.000	6.200	0.500	5.600	6.600	6.400	34.600
Percent Maximum Pumping	**Percent**	0	0	100	100	83	0	0	100	100	100	100	100	
Average	**kwh/af**	0	0	341	356	366	0	0	356	359	336	330	327	
Maximum Turbine release	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Carter to Flatiron	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maximum Generation	**gwh**	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Actual Generation	**gwh**	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Big Thompson Generation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Total release	**kaf**	6.2	0.4	0.0	0.0	0.0	0.0	0.6	15.5	21.1	12.0	9.1	6.8	71.7
Turbine release	**kaf**	6.2	0.4	0.0	0.0	0.0	0.0	0.6	15.5	21.1	12.0	9.1	6.8	71.7
Wasteway release	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maximum Generation	**gwh**	3.800	3.700	3.800	3.800	3.600	3.800	3.700	3.800	3.700	3.800	3.800	3.700	45.000
Generation	**gwh**	0.700	0.000	0.000	0.000	0.000	0.000	0.000	2.300	3.300	1.700	1.200	0.800	10.000
Percent Maximum Generation	**Percent**	17	0	0	0	0	0	1	61	90	46	31	21	
Average	**kwh/af**	107	0	0	0	0	0	36	151	159	146	132	116	

Project Pump Energy

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Granby	**gwh**	0.700	0.400	2.400	4.500	3.800	0.200	0.000	0.400	0.100	2.600	3.800	3.900	22.800
Willow Creek	**gwh**	0.200	0.200	0.200	0.200	0.200	0.200	0.800	2.300	1.000	0.300	0.100	0.100	5.800
Flatiron Unit 3	**gwh**	0.000	0.000	2.800	6.300	0.200	0.000	0.000	6.200	0.500	5.600	6.600	6.400	34.600
Total Pump Energy	**gwh**	0.900	0.500	5.400	10.900	4.200	0.400	0.800	8.900	1.700	8.500	10.500	10.400	63.100

Table B-7.—Colorado-Big Thompson October 2023 maximum reasonable plan for water year 2024

HYDROLOGY OPERATIONS

Dillon Reservoir

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Dillon Inflow	kaf	6.2	5.5	5.0	4.5	3.8	4.7	6.1	46.3	110.1	51.2	18.1	9.7	271.2
DL to GM Gain	kaf	5.8	5.3	4.8	4.2	3.6	5.3	8.5	39.8	69.2	38.2	16.6	8.5	209.8

Green Mountain Reservoir

Init Cont. 115.00 kaf Elev. 7929.8 ft | Maximum Cont. 154.60 kaf Elev. 7950.4 ft | Minimum Cont. 8.00 kaf Elev. 7804.7 ft

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Depletion	kaf	0.0	-0.1	-0.9	-1.5	-1.8	-1.2	-9.2	10.3	47.3	9.9	3.3	3.8	59.9
Depleted Inflow	kaf	12.0	10.8	10.8	10.2	9.2	11.3	24.0	77.1	135.1	81.3	31.8	14.4	428.0
Turbine Release	kaf	44.3	15.3	15.8	15.3	14.4	15.4	31.9	51.8	79.5	57.4	39.5	44.0	424.6
Spill/Waste	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total River Release	Ft3/s	721	257	257	249	250	250	536	843	1337	934	642	740	
Total River Release	kaf	44.3	15.3	15.8	15.3	14.4	15.4	31.9	51.8	79.5	57.4	39.5	44.0	424.6
Evaporation	kaf	0.2	0.1	0.0	0.0	0.0	0.1	0.2	0.3	0.5	0.7	0.6	0.4	3.1
End-Month Targets	kaf	82.0	72.5	72.5	57.5	57.5	57.5	50.0	75.0	130.0	152.5	145.0	115.0	
End-Month Contents	kaf	82.0	77.5	72.5	67.4	62.2	58.0	50.0	75.0	130.0	153.2	145.0	115.0	
End-Month Elevation	ft	7908.69	7905.30	7901.37	7897.12	7892.55	7888.69	7880.54	7903.36	7938.26	7949.80	7945.85	7930.06	

Willow Creek Reservoir

Init Cont. 8.00 kaf Elev. 8124.8 ft | Maximum Cont. 10.20 kaf Elev. 8128.8 ft | Minimum Cont. 7.20 kaf Elev. 8116.9 ft

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Native Inflow	kaf	1.4	1.3	1.3	1.2	1.0	1.7	4.8	44.5	31.5	5.2	2.7	2.7	99.3
Spill/Bypass	kaf	0.0	0.0	0.0	0.0	0.0	0.0	2.2	43.7	31.1	4.7	0.5	0.0	82.2
Total River Release	kaf	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	4.8
Pumped to Granby	kaf	1.0	0.8	0.8	0.8	0.6	1.2	0.5	0.0	0.0	0.0	3.3	2.2	11.2
Evaporation	kaf	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.7
End-Month Contents	kaf	8.2	8.2	8.2	8.2	8.2	8.2	9.9	10.1	9.9	9.8	8.2	8.2	
End-Month Elevation	ft	8124.40	8124.40	8124.40	8124.40	8124.41	8124.41	8130.23	8130.84	8130.26	8130.10	8124.40	8124.40	

Granby Reservoir

Init Cont. 485.00 kaf **Elev.** 8272.3 ft | **Maximum Cont.** 539.80 kaf **Elev.** 8280.0 ft | **Minimum Cont.** 76.50 kaf **Elev.** 8186.9 ft

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Native Inflow	kaf	2.8	2.6	2.2	2.0	1.8	2.7	3.7	20.1	69.4	42.7	9.4	4.9	164.3
Release from Shadow Mtn	kaf	2.2	2.7	2.8	1.2	1.2	1.3	1.9	10.8	87.6	41.7	2.5	2.1	158.0
Pump from Windy Gap	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump from Willow Creek	kaf	1.0	0.8	0.8	0.8	0.6	1.2	0.5	0.0	0.0	0.0	3.3	2.2	11.2
Total Inflow	kaf	5.9	6.2	5.9	4.0	3.6	5.2	6.1	31.0	157.0	84.4	15.2	9.2	333.7
Spill/Bypass	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.5	78.6	0.5	0.0	135.6
Total River Release	kaf	1.2	1.2	1.2	1.2	1.2	1.2	1.2	4.6	4.5	4.6	2.5	1.2	25.8
Pumped to Shadow Mtn	kaf	4.5	2.2	15.3	28.6	25.6	1.6	0.8	5.6	0.0	0.4	21.3	23.9	129.8
Evaporation	kaf	1.6	0.7	0.0	0.0	0.0	0.9	1.5	2.4	3.2	2.9	2.3	2.1	17.6
Seepage loss	kaf	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	3.6
End-Month Contents	kaf	483.3	485.1	474.1	448.0	424.6	425.8	428.1	446.2	538.8	536.3	524.7	506.5	
End-Month Elevation	ft	8272.03	8272.29	8270.71	8266.84	8263.27	8263.46	8263.82	8266.57	8279.87	8279.53	8277.92	8275.35	

Shadow Mountain Reservoir

Init Cont. 17.00 kaf **Elev.** 8366.6 ft | **Maximum Cont.** 18.40 kaf **Elev.** 8367.0 ft | **Minimum Cont.** 16.60 kaf **Elev.** 8366.0 ft

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Native Inflow	kaf	3.7	3.5	2.9	2.6	2.4	3.6	5.0	26.7	92.0	56.7	12.5	6.5	218.1
Pumped from Granby	kaf	4.5	2.2	15.3	28.6	25.6	1.6	0.8	5.6	0.0	0.4	21.3	23.9	129.8
Total Inflow	kaf	8.2	5.6	18.2	31.2	27.9	5.1	5.7	32.3	92.0	57.1	33.7	30.4	347.4
Spill/Bypass	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total River Release	kaf	2.2	2.7	2.8	1.2	1.2	1.3	1.9	10.8	87.6	41.7	2.5	2.1	158.0
Adams Tunnel Flow	kaf	5.6	2.7	15.4	30.0	26.8	3.6	3.4	20.8	3.7	14.7	30.7	27.7	185.1
Evaporation	kaf	0.3	0.1	0.0	0.0	0.0	0.2	0.3	0.5	0.6	0.5	0.4	0.4	3.3
End-Month Contents	kaf	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.8	16.8	16.8	
End-Month Elevation	ft	8366.62	8366.62	8366.62	8366.62	8366.63	8366.62	8366.62	8366.62	8366.62	8366.62	8366.62	8366.62	

Adams Tunnel

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Maximum Tunnel Capacity	kaf	6.4	2.9	15.4	30.0	27.4	3.6	3.4	20.8	17.8	31.5	30.7	27.7	217.6
Actual Diversion	kaf	5.6	2.7	15.4	30.0	26.8	3.6	3.4	20.8	3.7	14.7	30.7	27.7	185.1
Percent Maximum Delivery	Percent	87	92	100	100	98	100	100	100	20	47	100	100	

Lake Estes

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Big Thompson Inflow	kaf	3.5	2.2	1.5	1.0	0.6	0.7	3.3	15.4	50.2	35.0	11.7	6.4	131.5
Actual River Release	kaf	3.1	1.5	1.4	1.0	0.6	0.7	2.1	8.0	21.2	16.6	9.4	3.7	69.3
Max Diversion Available	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Priority Water Diverted	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.6	5.3	0.0	0.0	12.9
Skim Water Diverted	kaf	0.5	0.7	0.1	0.0	0.0	0.0	1.2	7.5	21.4	13.1	2.3	2.6	49.4
Irrigation Demand	kaf	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.3	0.1	1.3
Irrigation Delivery	kaf	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.3	0.1	1.3
Total River Release	kaf	3.1	1.5	1.4	1.0	0.6	0.7	2.1	8.0	21.2	16.6	9.4	3.7	69.3

Olympus Tunnel

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Maximum Tunnel Capacity	kaf	33.8	32.7	33.8	33.8	31.6	33.8	32.7	33.8	32.7	33.8	33.8	32.7	399.0
Actual Delivery	kaf	6.0	3.4	15.4	30.0	26.7	3.5	4.6	28.1	32.4	32.8	32.7	30.3	245.9
Percent Maximum Delivery	Percent	18	10	46	89	85	10	14	83	99	97	97	92	
Inflow to Flatiron	kaf	6.0	3.4	15.4	30.0	26.7	3.5	4.6	28.1	32.4	32.8	32.7	30.3	245.9

Carter Lake

Init Cont. 105.00 kaf **Maximum Cont.** 112.20 kaf **Minimum Cont.** 6.00 kaf

Elev. 5752.8 ft **Elev.** 5759.0 ft **Elev.** 5626.8 ft

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Pumped from Flatiron	kaf	0.0	0.0	8.2	17.6	0.3	0.0	0.0	12.5	5.0	10.8	16.8	16.8	88.0
Flatiron Bifurcation	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Carter to Flatiron	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Evaporation Loss	kaf	0.3	0.1	0.0	0.0	0.0	0.2	0.3	0.4	0.5	0.5	0.4	0.3	3.0
Seepage Loss	kaf	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	2.2
End-Month Contents	kaf	94.0	91.2	97.0	112.1	110.2	107.3	103.1	111.1	109.9	112.2	109.3	103.6	
End-Month Elevation	ft	5742.57	5739.95	5744.78	5758.39	5757.22	5754.65	5750.91	5758.02	5757.00	5758.50	5755.93	5750.79	
Priority Water Diverted to Carter	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	3.9	0.0	0.0	7.7
Irrigation & Metered Demand	kaf	10.5	1.9	1.5	1.7	1.6	2.1	3.4	3.4	4.4	7.1	18.4	21.4	77.4
Windy Gap demand	kaf	0.4	0.6	0.8	0.6	0.4	0.5	0.3	0.5	1.1	0.9	0.8	0.7	7.6
Total Demand	kaf	10.8	2.5	2.3	2.3	2.0	2.6	3.8	3.9	5.5	8.0	19.2	22.0	84.9
Total Delivery	kaf	10.8	2.5	2.3	2.3	2.0	2.6	3.8	3.9	5.5	8.0	19.2	22.0	84.9
Percent Required Delivery	Percent	100	100	100	100	100	100	100	100	100	100	100	100	
Shortage	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Hansen Canal 930

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Maximum Flow	kaf	57.2	55.3	57.2	57.2	53.5	57.2	55.3	57.2	55.3	57.2	57.2	55.3	675.1
Actual Flow	kaf	6.0	3.4	7.2	12.4	26.4	3.5	4.6	15.7	27.4	21.9	15.8	13.5	157.8

Dille Tunnel

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Big Thompson River Below Lake Estes	**kaf**	3.1	1.5	1.4	1.0	0.6	0.7	2.1	8.0	21.2	16.6	9.4	3.7	69.3
North Fork Big Thompson River at Drake	**kaf**	0.8	0.6	0.5	0.4	0.3	0.5	0.7	3.0	12.9	8.4	3.1	1.6	32.8
Dille Skim Water Diverted	**kaf**	1.4	0.0	0.0	0.0	0.0	0.0	0.8	8.0	4.2	10.6	10.0	2.9	37.9
Dille Priority Water Diverted	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
water available	**kaf**	3.8	2.1	1.9	1.4	1.0	1.2	2.8	11.0	34.1	25.1	12.5	5.3	102.2
water diverted	**kaf**	1.4	0.0	0.0	0.0	0.0	0.0	0.8	8.0	4.2	10.6	10.0	2.9	37.9
Percent Diverted	**Percent**	25	0	0	0	0	0	15	148	77	195	185	54	
Big T @ Canyon Mouth	**kaf**	2.5	2.1	1.9	1.4	1.0	1.2	2.1	2.9	29.9	14.5	2.5	2.4	64.4

Trifurcation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Release from Flatiron	**kaf**	6.0	3.4	7.2	12.4	26.4	3.5	4.6	15.7	27.4	21.9	15.8	13.5	157.8
Release to 550 Canal	**kaf**	0.6	2.7	7.1	12.4	26.4	3.5	3.3	8.2	5.9	8.5	10.6	5.4	94.6
Dille Tunnel	**kaf**	1.4	0.0	0.0	0.0	0.0	0.0	0.8	8.0	4.2	10.6	10.0	2.9	37.9
Total release to river	**kaf**	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.7	5.3	13.1
Irrigation demand	**kaf**	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.7	5.3	13.1
Windy Gap demand	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Total requirement	**kaf**	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.7	5.3	13.1
Total delivery	**kaf**	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.7	5.3	13.1
Percent Required Delivery	**Percent**	100	100	100	100	100	100	100	100	100	100	100	100	
Shortage	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Hansen Canal 550

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Inflow from Flatiron	**kaf**	0.6	2.7	7.1	12.4	26.4	3.5	3.3	8.2	5.9	8.5	10.6	5.4	94.6
Maximum flow	**kaf**	10.8	26.2	29.4	29.4	27.5	29.4	28.5	29.4	28.5	29.4	29.4	28.5	326.4
Irrigation demand	**kaf**	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.2	0.9
Irrigation delivery	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.2	0.8
Release to Horsetooth	**kaf**	0.6	2.7	7.1	12.4	26.4	3.5	3.3	8.2	5.9	8.5	10.6	5.4	94.6

Horsetooth Reservoir

Init Cont. 121.00 kaf
Elev. 5411.5 ft
Maximum Cont. 157.00 kaf
Elev. 5430.0 ft
Minimum Cont. 13.00 kaf
Elev. 5316.8 ft

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Inflow	kaf	0.6	2.7	7.1	12.4	26.4	3.5	3.3	8.2	5.9	8.5	10.6	5.4	94.6
Total irrigation delivery	kaf	10.3	2.6	2.0	2.0	1.9	2.1	2.5	2.9	4.7	7.5	22.0	17.3	77.8
Evaporation loss	kaf	0.4	0.2	0.0	0.0	0.0	0.3	0.5	0.7	0.9	0.8	0.6	0.6	5.0
Seepage loss	kaf	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	2.4
End-Month Content	kaf	111.1	110.9	115.8	126.1	150.4	151.4	151.5	155.9	156.0	156.0	143.8	131.1	
End-Month Elevation	ft	5405.56	5405.43	5408.28	5414.05	5426.87	5427.35	5427.43	5429.59	5429.64	5429.64	5423.49	5416.79	
Priority water diverted to Horsetooth	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	1.4	0.0	0.0	5.2
Irrigation demand	kaf	7.5	0.6	0.0	0.0	0.0	0.0	0.0	0.4	0.1	2.7	17.1	13.4	41.8
Metered Demand	kaf	2.3	1.6	1.7	1.7	1.6	1.8	2.0	1.9	3.9	4.0	3.9	3.1	29.5
Windy Gap demand	kaf	0.5	0.4	0.3	0.3	0.3	0.3	0.5	0.5	0.8	0.8	1.1	0.9	6.7
Total demand	kaf	10.3	2.6	2.0	2.0	1.9	2.1	2.5	2.9	4.7	7.5	22.0	17.3	77.8
Percent Required Delivery	Percent	100	100	100	100	100	100	100	100	100	100	100	100	
Shortage	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CBT Project Summary

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Total CBT Delivery	kaf	25.3	4.1	3.2	3.4	3.3	3.9	5.6	6.0	8.7	14.4	42.6	43.3	163.8

Windy Gap

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Pumping	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Losses	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spill	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delivery	kaf	0.9	1.0	1.1	0.9	0.7	0.8	0.8	1.0	1.9	1.7	1.9	1.7	14.4

PUMPING AND GENERATION OPERATIONS

Green Mountain Generation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Maximum Generation	**gwh**	18.600	18.000	18.600	18.600	17.400	18.600	18.000	18.600	18.000	18.600	18.600	18.000	219.600
Generation	**gwh**	8.200	2.600	2.700	2.500	2.300	2.400	4.900	8.000	14.800	12.100	8.300	8.900	77.700
Percent Maximum Generation	**Percent**	44	15	14	14	13	13	27	43	82	65	45	49	
Average	**kwh/af**	185	173	169	165	162	158	154	155	186	210	211	202	

Willow Creek Pumping

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Maximum Pumping	**kaf**	24.6	23.8	24.6	24.6	23.0	24.6	4.0	0.0	0.0	0.0	18.6	23.8	191.6
Actual Pumping	**kaf**	1.0	0.8	0.8	0.8	0.6	1.2	0.5	0.0	0.0	0.0	3.3	2.2	11.2
Pump Energy	**gwh**	0.200	0.200	0.200	0.200	0.100	0.300	0.100	0.000	0.000	0.000	0.700	0.500	2.500
Percent Maximum Pumping	**Percent**	4	3	3	3	3	5	11	0	0	0	18	9	59
Average	**kwh/af**	213	213	213	213	213	213	213	0	0	0	213	213	

Lake Granby Pumping

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Maximum Pumping	**kaf**	36.9	35.7	36.9	36.9	34.5	36.9	35.7	36.9	35.7	36.9	36.9	35.7	435.6
Actual Pumping	**kaf**	4.5	2.2	15.3	28.6	25.6	1.6	0.8	5.6	0.0	0.4	21.3	23.9	129.8
Pump Energy	**gwh**	0.600	0.300	2.200	4.100	3.700	0.200	0.100	0.800	0.000	0.100	3.000	3.400	18.500
Percent Maximum Pumping	**Percent**	12	6	41	78	74	4	2	15	0	1	58	67	
Average	**kwh/af**	143	143	143	144	145	146	145	145	0	140	140	141	

Marys Lake Generation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Adams Tunnel Flow	**kaf**	5.6	2.7	15.4	30.0	26.8	3.6	3.4	20.8	3.7	14.7	30.7	27.7	185.1
Maximum Generation	**gwh**	0.000	0.000	0.000	0.000	3.000	6.400	6.200	6.400	6.200	6.400	6.400	6.200	47.200
Generation	**gwh**	0.000	0.000	0.000	0.000	2.500	0.000	0.000	3.700	0.200	2.100	5.700	5.100	19.300
Percent Maximum Generation	**Percent**	0	0	0	0	9	0	0	18	6	14	19	18	
Average	**kwh/af**	0	0	0	0	93	0	0	177	58	142	186	184	

Lake Estes Generation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Adams Tunnel Flow	**kaf**	5.6	2.7	15.4	30.0	26.8	3.6	3.4	20.8	3.7	14.7	30.7	27.7	185.1
Maximum Generation	**gwh**	16.000	15.500	16.000	16.000	15.000	16.000	15.500	16.000	15.500	16.000	16.000	15.500	189.000
Generation	**gwh**	1.900	0.500	7.100	14.300	12.600	0.800	0.700	9.200	1.400	6.400	14.300	13.000	82.200
Percent Maximum Generation	**Percent**	12	4	44	89	84	5	4	57	9	40	89	84	
Average	**kwh/af**	333	202	461	476	472	212	203	442	394	437	466	470	

Pole Hill Generation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Olympus Tunnel Flow	**kaf**	33.8	32.7	33.8	33.8	31.6	33.8	32.7	33.8	32.7	33.8	33.8	32.7	399.0
Maximum Generation	**gwh**	0.000	0.000	10.800	25.800	24.100	0.000	0.000	24.100	25.000	25.800	25.800	25.000	186.400
Generation	**gwh**	0.000	0.000	9.600	22.900	20.500	0.000	0.000	21.000	24.700	25.000	24.900	23.100	171.700
Percent Maximum Generation	**Percent**	0	0	89	89	85	0	0	87	99	97	97	92	
Average	**kwh/af**	0	0	283	678	647	0	0	621	756	739	737	705	

Flatiron Units 1 and 2 Generation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Inflow to Flatiron	**kaf**	6.0	3.4	15.4	30.0	26.7	3.5	4.6	28.1	32.4	32.8	32.7	30.3	245.9
Maximum Generation	**gwh**	32.200	31.200	32.200	32.200	30.200	32.200	31.200	32.200	31.200	32.200	32.200	31.200	380.400
Generation	**gwh**	3.800	1.900	13.100	26.600	23.300	1.800	2.700	25.000	30.800	30.800	30.500	27.300	217.600
Percent Maximum Generation	**Percent**	12	6	41	82	77	6	9	77	99	95	95	87	
Average	**kwh/af**	633	540	851	887	871	519	588	887	949	938	935	902	

Project Generation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Total Generation	**gwh**	14.600	5.000	32.400	66.300	61.200	5.000	8.400	69.200	75.700	80.000	86.100	78.900	582.800
Total Max Generation	**gwh**	70.700	68.400	81.500	96.500	93.300	77.100	74.600	101.200	99.600	102.900	102.900	99.600	1068.300

Flatiron Unit 3 Pump/Generation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Maximum Pumping	**kaf**	0.0	0.0	8.2	17.6	0.7	0.0	0.0	12.5	5.1	10.9	16.8	16.8	88.6
Pump from Flatiron	**kaf**	0.0	0.0	8.2	17.6	0.3	0.0	0.0	12.5	5.0	10.8	16.8	16.8	88.0
Pump Energy	**gwh**	0.000	0.000	2.800	6.300	0.100	0.000	0.000	4.500	1.800	4.000	6.100	6.000	31.600
Percent Maximum Pumping	**Percent**	0	0	100	100	40	0	0	100	99	100	100	100	
Average	**kwh/af**	0	0	342	356	367	0	0	360	364	365	364	358	
Maximum Turbine release	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Carter to Flatiron	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maximum Generation	**gwh**	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Actual Generation	**gwh**	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Big Thompson Generation

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Total release	**kaf**	6.8	0.7	0.1	0.0	0.0	0.0	2.0	15.5	25.7	23.8	15.0	10.9	100.5
Turbine release	**kaf**	6.8	0.7	0.1	0.0	0.0	0.0	2.0	15.5	23.8	23.7	15.0	10.9	98.5
Wasteway release	**kaf**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	1.9
Maximum Generation	**gwh**	3.800	3.700	3.800	3.800	3.600	3.800	3.700	3.800	3.700	3.800	3.800	3.700	45.000
Generation	**gwh**	0.800	0.000	0.000	0.000	0.000	0.000	0.100	2.300	3.700	3.700	2.300	1.600	14.500
Percent Maximum Generation	**Percent**	20	0	0	0	0	0	3	61	100	97	60	42	
Average	**kwh/af**	113	0	0	0	0	0	60	151	156	156	154	143	

Project Pump Energy

		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Total
Granby	**gwh**	0.600	0.300	2.200	4.100	3.700	0.200	0.100	0.800	0.000	0.100	3.000	3.400	18.500
Willow Creek	**gwh**	0.200	0.200	0.200	0.200	0.100	0.300	0.100	0.000	0.000	0.000	0.700	0.500	2.500
Flatiron Unit 3	**gwh**	0.000	0.000	2.800	6.300	0.100	0.000	0.000	4.500	1.800	4.000	6.100	6.000	31.600
Total Pump Energy	**gwh**	0.900	0.500	5.200	10.500	3.900	0.500	0.200	5.300	1.800	4.000	9.800	9.800	52.400

B-8: Water year 2024 plan summary charts

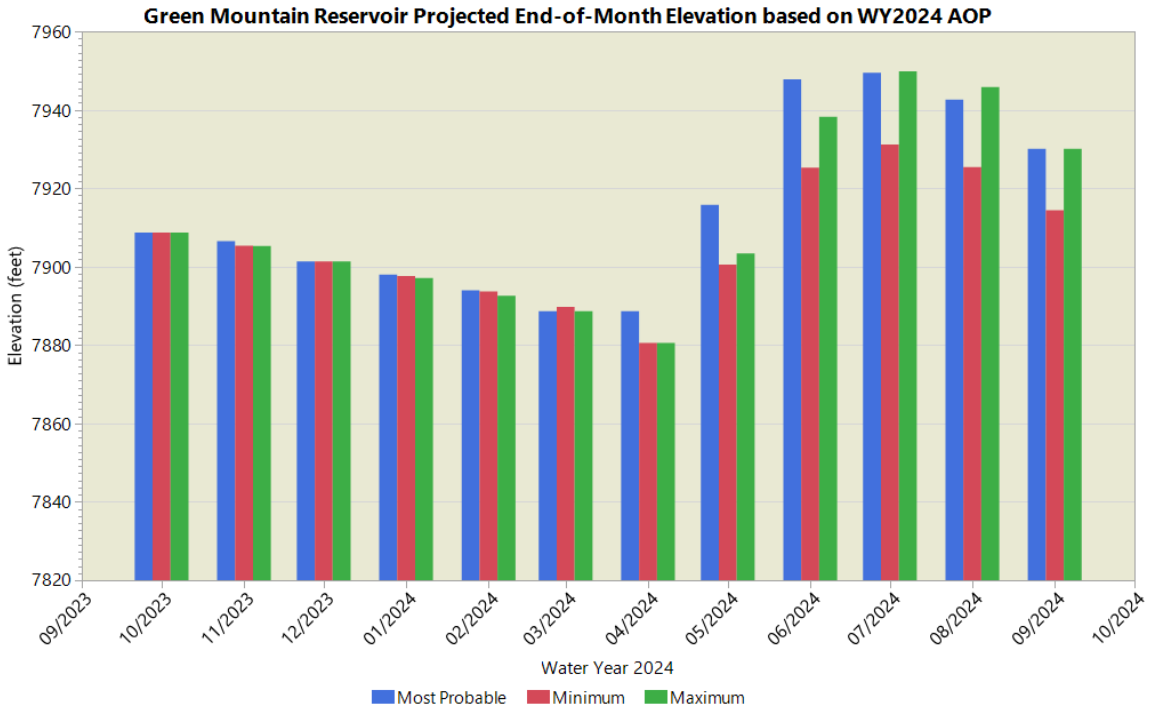


Figure B-8A.—Water year 2024 operation plan, Green Mountain Reservoir elevations.

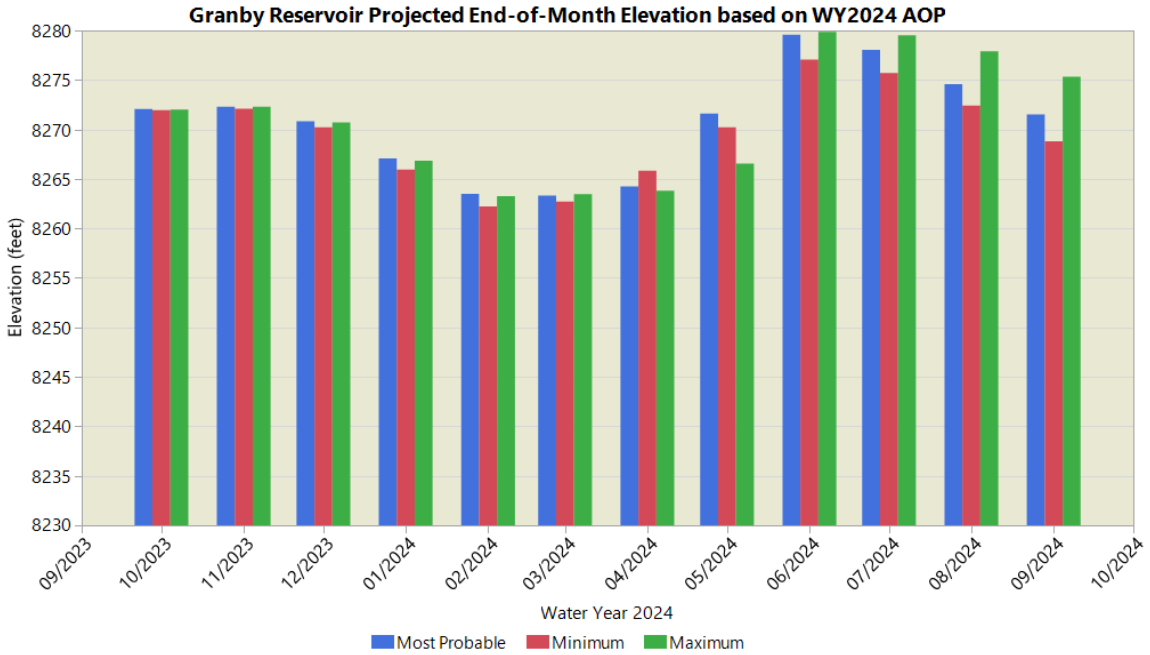


Figure B-8B.—Water year 2024 operation plan, Granby Reservoir elevations.

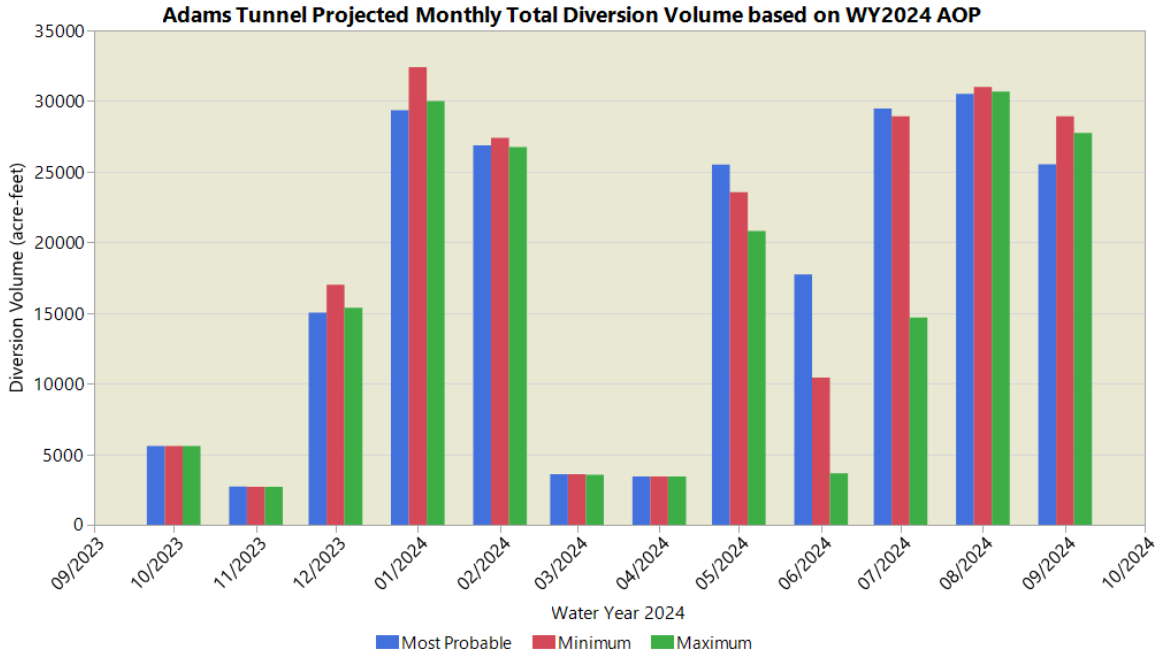


Figure B-8C.—Water year2024 operation plan, Adams Tunnel diversions.

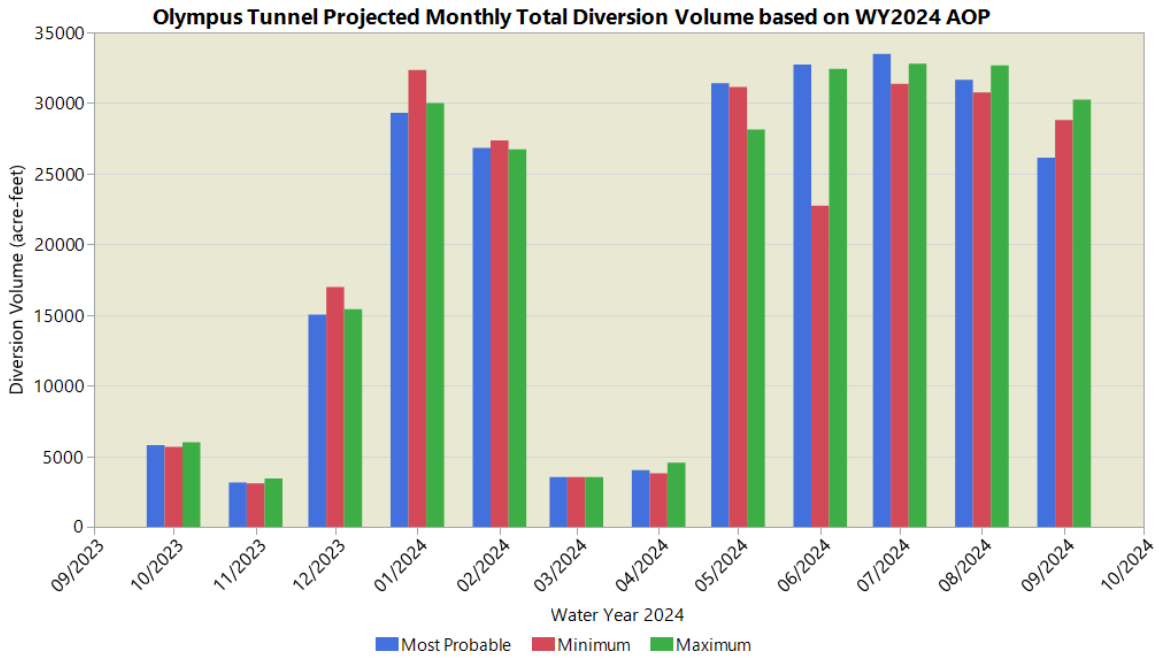


Figure B-8D.—Water year 2024 operation plan, Olympus Tunnel diversions.

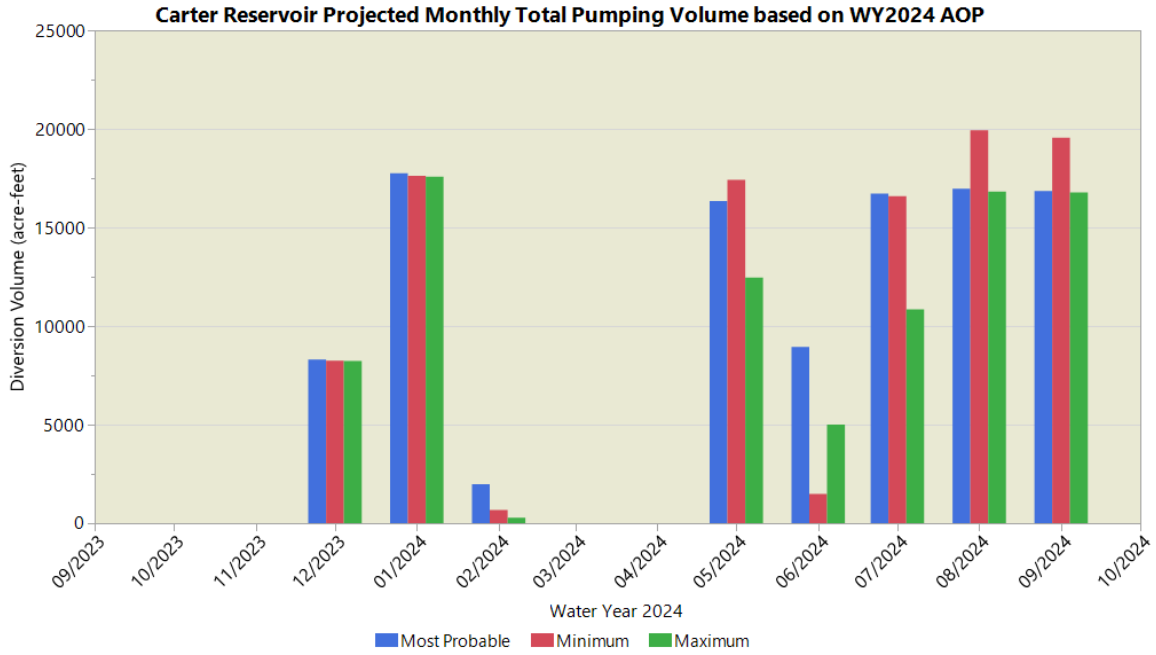


Figure B-8E.—Water year 2024 operation plan, Flatiron Unit 3 pump volume to Carter Lake Reservoir.

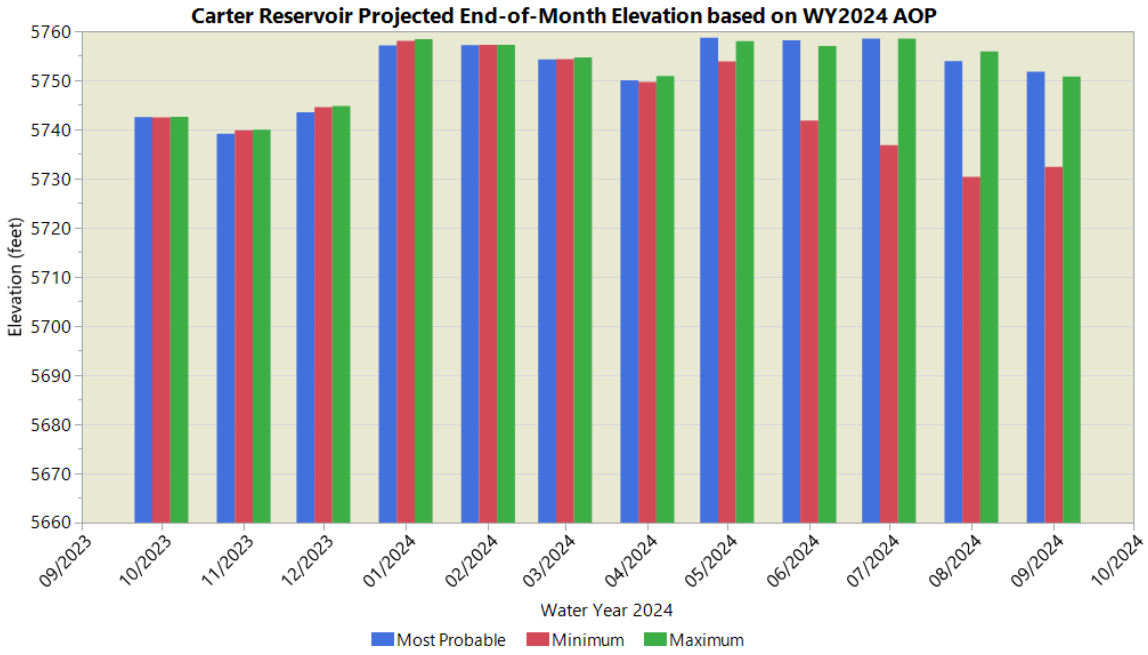


Figure B-8F.—Water year 2024 operation plan, Carter Lake Reservoir elevations.

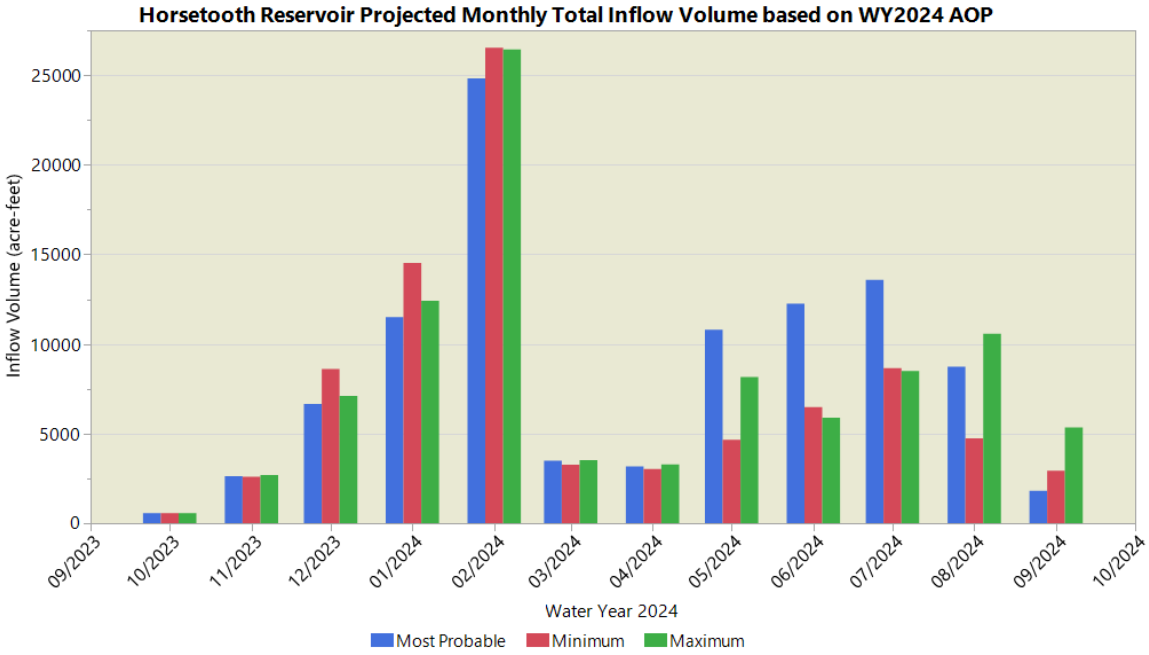


Figure B-8G: Water year 2024 operation plan, Hansen Feeder Canal inflow to Horsetooth Reservoir.

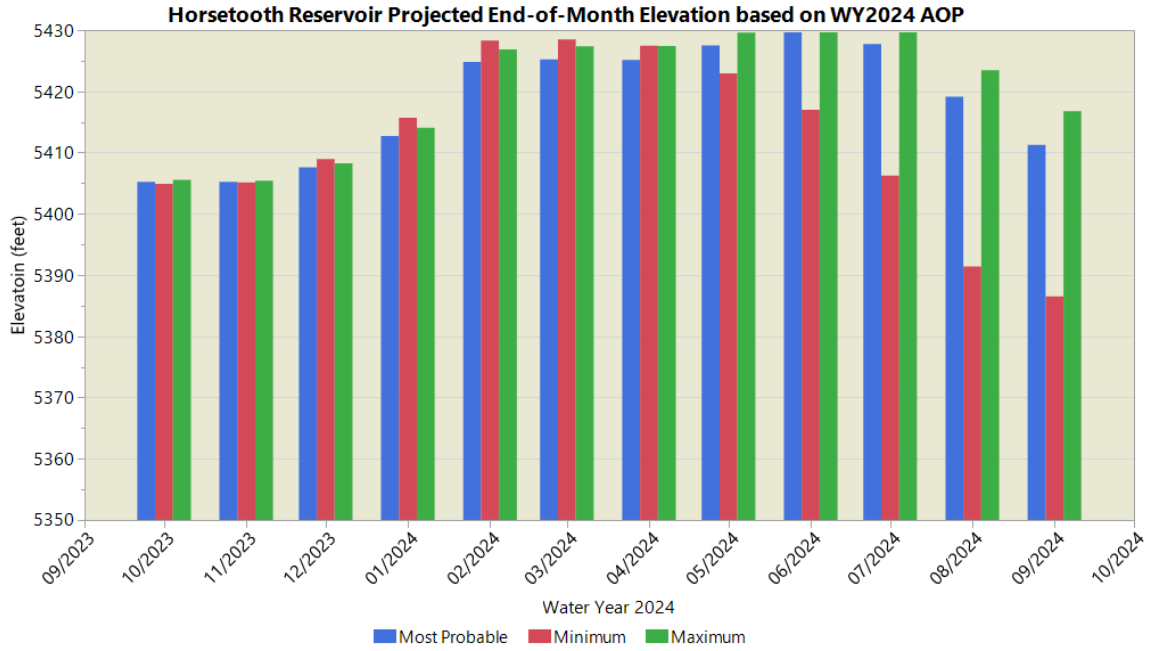


Figure B-8H.—Water year2024 operation plan, Horsetooth Reservoir elevations.

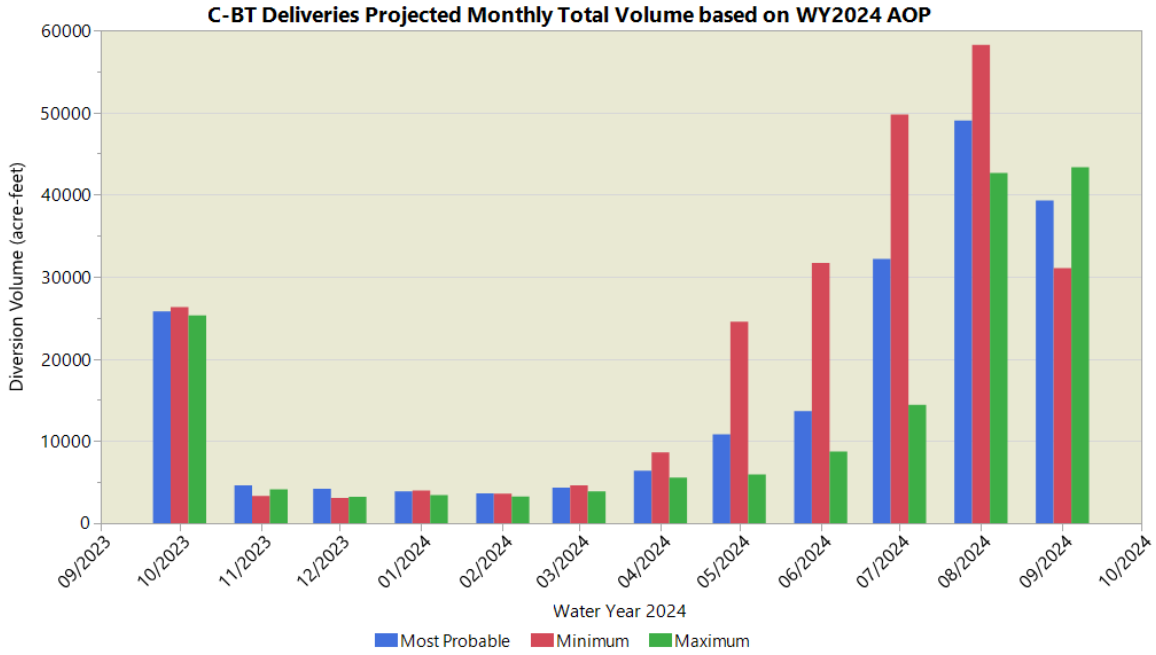


Figure B-8I.—Water year2024 operation plan, C-BT monthly delivery volumes.

Appendix C

Exhibits

Exhibit C-1: Publicity Map, Extents, Facts and Connectivity Schematic of the Colorado-Big Thompson Project

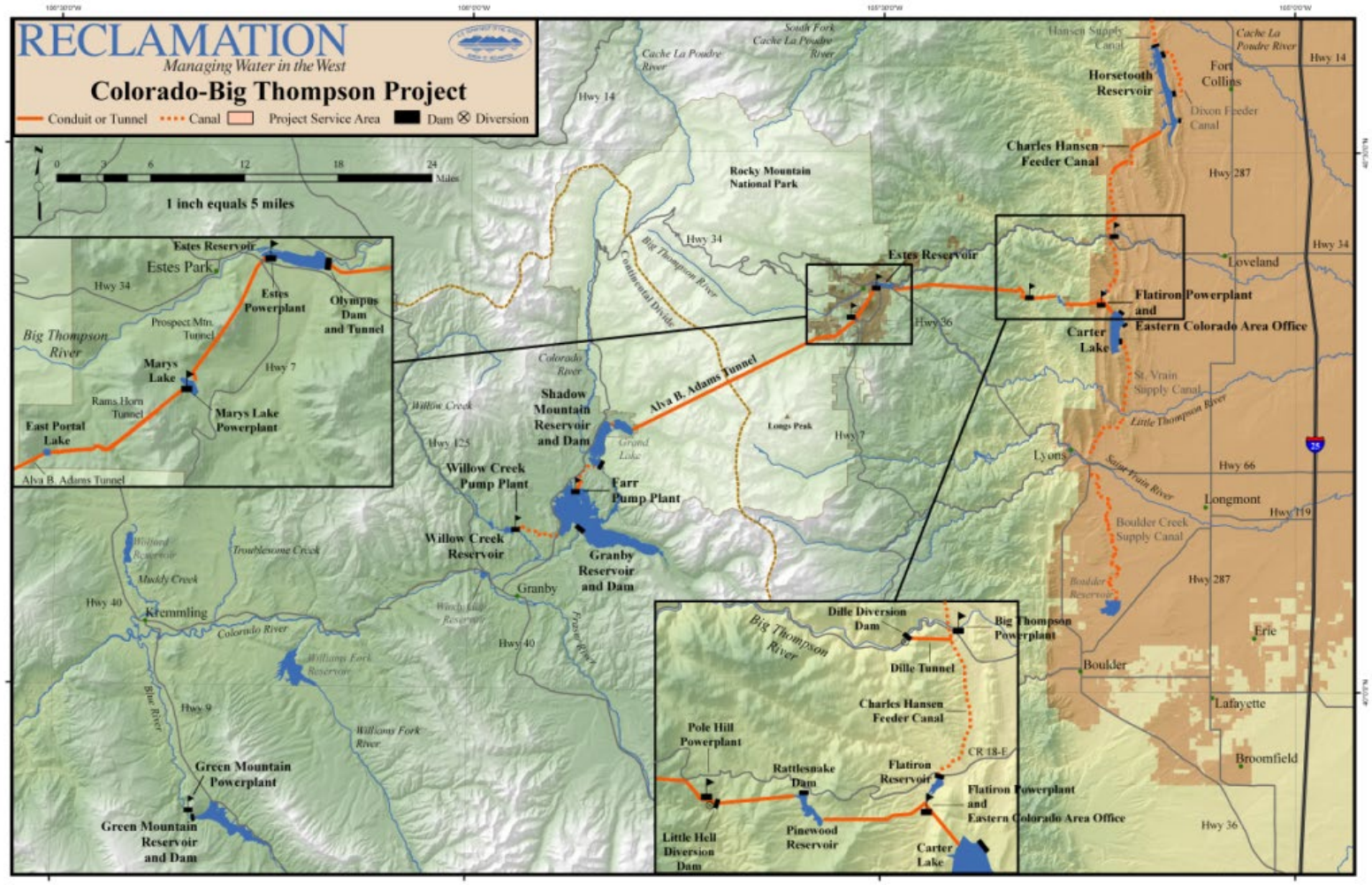


Figure C-1A.—Colorado-Big Thomson Project.

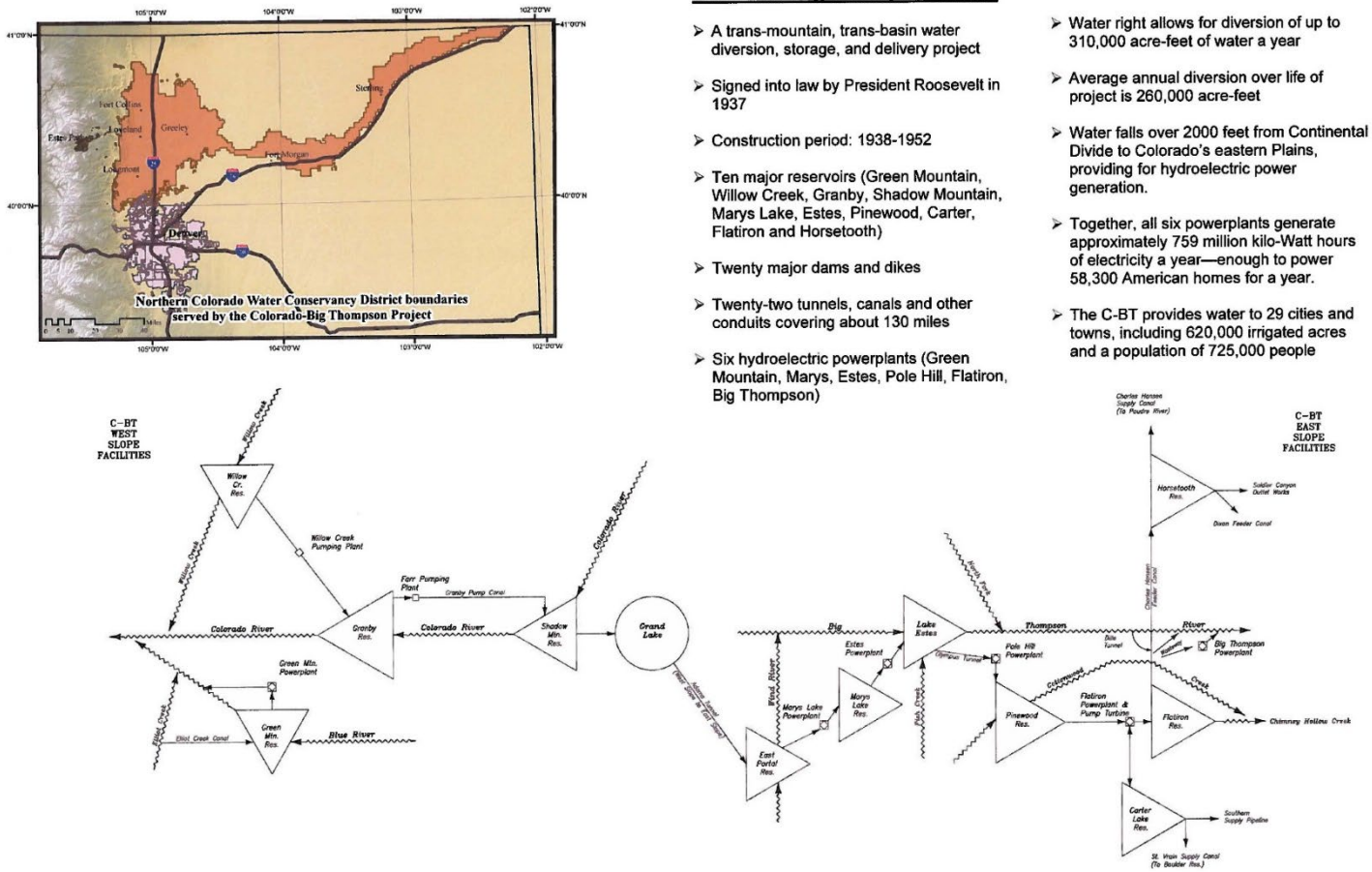


Figure C-1B.—Schematic of the Colorado-Big Thompson Project

Exhibit C-2: Profile View of the Colorado-Big Thompson Project

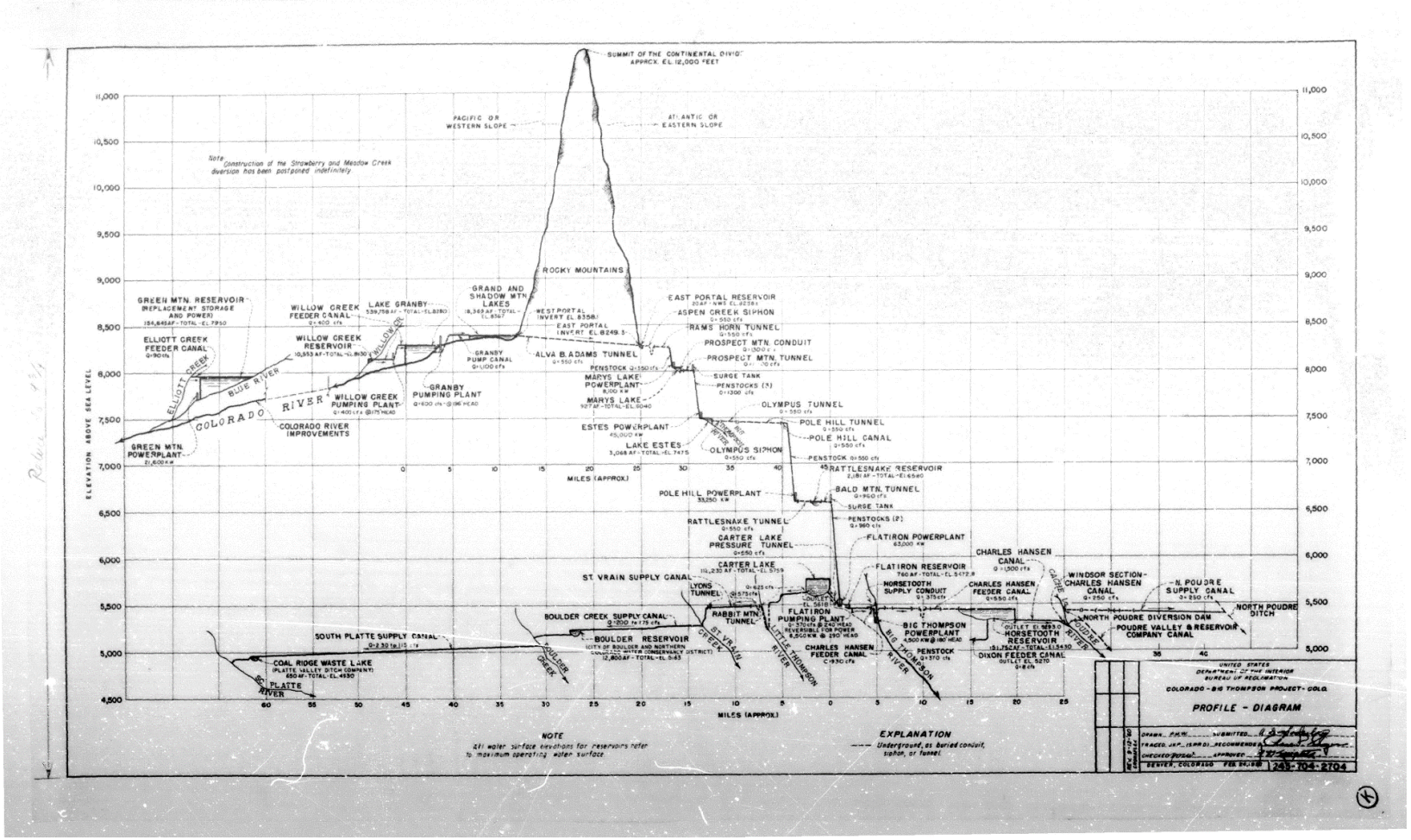


Figure C-2.—Profile view of Colorado-Big Thompson Project

Appendix D

Seventy-Second Annual Report of the Western Division System Power Operations

Preface

This is the seventy-second annual report for the Pick-Sloan Missouri Basin Program, Western Division System (WD System) power operations. For the purpose of this report, the WD System also includes the Yellowtail Powerplant Units 1 and 2 and the generating facilities of the Fryingpan Arkansas Project (Fry-Ark). The function of the report is to inform interested parties of the generation and pump energy requirements of the hydropower system. The report consists of two parts: One part describes the actual generation and pumping operations for water year (WY) 2023, and the second part presents the plan of generation and pumping operations for WY 2024.

Water Year 2023—Generation and Pump Energy Summary

Power generation for the Colorado – Big Thompson Project (C-BT) during WY 2023 was slightly less than the thirty-year average. The Fry-Ark generation was slightly greater than the thirty-year average for WY 2023. The North Platte project was less than the thirty-year average and the Big Horn project was less than average. Overall, WD System power generation during WY 2023 was less than average. In the C-BT Estes, Pole Hill, and Flatiron powerplants on the power arm powerplants produced greater than average power, while Green Mountain produced eighty-six percent of average, the Big Thompson powerplant forty percent of average, and Marys powerplant produced no power during the water year.

In the case of the C-BT, observed demands for water were less than average for WY 2023. The declared quota was 70 percent by April of 2023. However, timely precipitation events starting in the second week of June through mid to late August during the growing season reduced annual demands to less than average. Adams Tunnel diversions were nearly average. Snowpack on the east slope of the C-BT was slightly above average but the Marys powerplant bottom end overhaul outage, which began prior to the start of WY2023, caused project generation to be mildly less than average.

From the generation data in table A-1, the C-BT powerplants produced an accumulated gross generation total of 583.0 gigawatt (GWh) of electricity representing 97 percent of its thirty-year average and 24.8 percent of gross WD System generation. The gross generation produced by the entire WD System was 1,962.4 GWh or 90.6 percent of the thirty-year average. Gross generation includes one-half of the Yellowtail Powerplant generation. Net generation is the gross generation less the energy used for pumping at Farr Plant, Willow Creek Pump, Flatiron Unit 3, and the two Mount Elbert units. Using tables A-1 and A-2, WD System net generation for WY 2023 was 1,694.4 GWh. The average for a water year is 1,921.0 GWh. The total WD System load includes firm energy deliveries, C-BT use energy, support energy, plant station service, and an estimate of transmission system losses.

Table A-1 in appendix A includes the gross generation for every powerplant in the WD System. Table A-2 reports the total energy required to operate the pumps in the WD System. Some of the numbers included in this section were provided by Western Area Power Administration (WAPA). Table A-3 shows monthly generation and pumping energy, by plant, and monthly WD System loads. The WD System boundaries are illustrated in appendix B-1. Figure B-2 graphically summarizes table A-3 including the C-BT contribution to the WD System.

In WY2023, the Willow Creek Pumping Station pumped to Granby Reservoir less than the total volume pumped during WY 2022. The Willow Creek Pumping Station used 10.2 GWh of power during its WY 2023 operation. Meanwhile, the Farr Pumping Plant and the Flatiron Powerplant Unit 3 required 27.6 and 29.3 GWh, respectively. Both the Farr Pumping Plant and Flatiron Powerplant Unit 3 operations required slightly less energy than the thirty-year average. All three pumps had a combined power requirement of 67.7 GWh, 106 percent of the thirty-year average and 3.4 percent of gross WD System generation. Pumping electrical demand is defined primarily by how much water is pumped and secondarily by how high the pump lifts that water.

According to the figures provided by WAPA, sales of electric power in the Western Division System totaled 2,402 GWh during WY 2023, with a revenue of $83,548,507, an increase from the previous year. The increase is due primarily to a 16.5 percent rate increase to the Loveland Area Projects Firm Electric Service rate, effective January 1, 2023. Energy deficits were covered by a combination of scheduled interchange energy, use of the Mount Elbert pumped storage plant, and power purchases. The power purchases totaled 780 GWh during WY 2023 for which WAPA paid a total of $78,721,245, a notable increase from the previous water year. This increase is primarily due to extended maintenance on several Loveland Area Power (LAP) units during WY 2023, as well as increased pricing seen during WY 2023.

Water Year 2023—Generation and Pump Energy Forecast

Under the most-probable runoff condition plan (2023 AOP), the gross generation for the C-BT powerplants is projected to be 658.1 GWh during WY2024, while pump energy requirements from the C-BT Power System are expected to reach 74.2 GWh. The result creates a projected gross generation with less pumping of 583.9 GWh for the C-BT in WY 2024 (table A-4). The total generation for the entire WD System is expected to be 1,969.0 GWh, with a total load of 2,135.0 GWh, leaving a power deficit of 185.8 GWh for WY 2024 (includes station service use). The WD System generation includes one-half of the total Yellowtail Powerplant generation and the Mount Elbert Powerplant generation resulting from the Fry-Ark Project water deliveries. The total load includes energy deliveries under firm contracts, seasonal support energy deliveries, energy dedicated for C-BT use, estimates of station service energy, and estimates of transmission WD System losses.

Table A-4 summarizes the projected monthly WD System generation, pump energy, and loads for the most probable forecasted runoff conditions for WY 2024. Figure B-3 is a graphical summary of the WD System gross generation less pumping, including the C-BT contribution for the most probable inflow conditions. Table A-5 lists the scheduled maintenance for the various facilities in the C-BT as anticipated when the AOP simulation was completed. Tables A-6 and A-7 summarize the capacity data for the powerplants and pumping plants within the WD System, including the Yellowtail and Mount Elbert Units.