



G R A N D C O U N T Y

LEARNING BY DOING

DRAFT LBD 2022 ANNUAL OPERATIONS PLAN

April 20, 2022

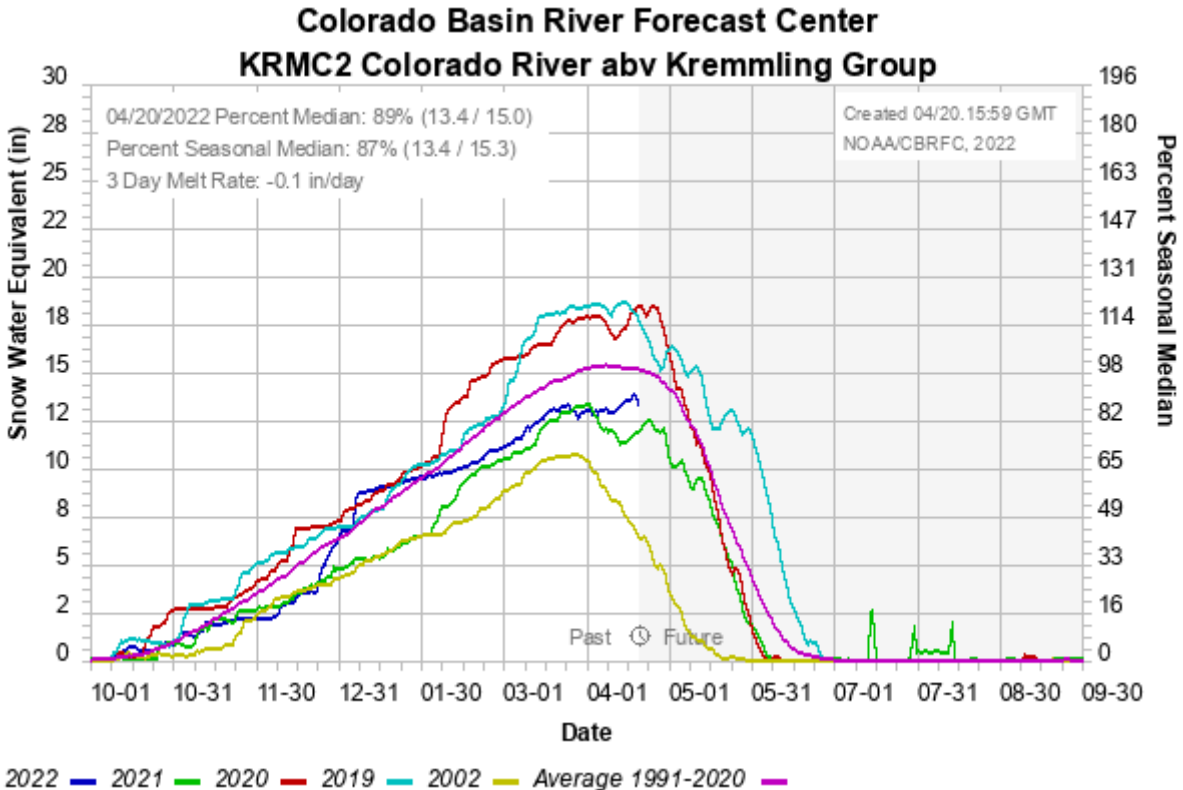
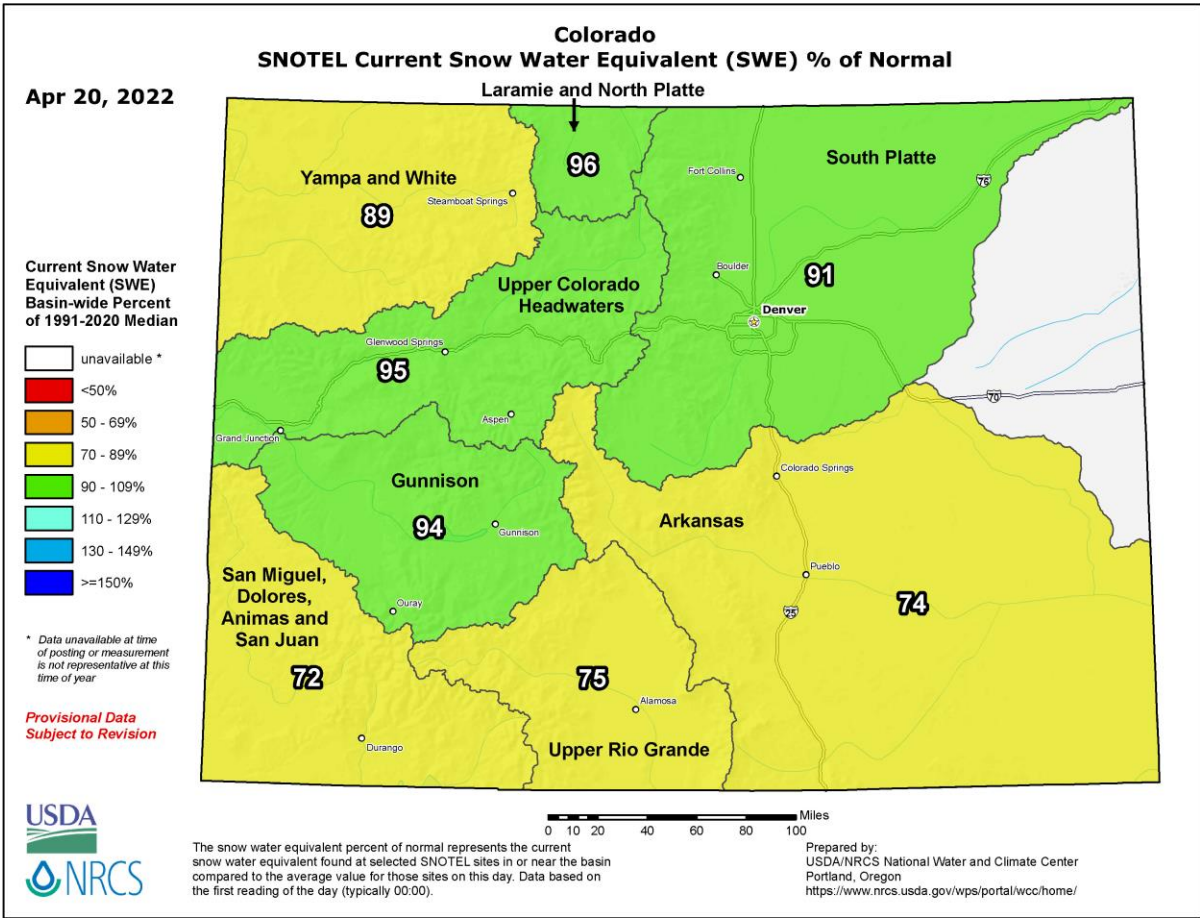
Introduction

The Learning By Doing Cooperative Effort (LBD) is a partnership of East and West Slope stakeholders that emerged from the Colorado River Cooperative Agreement (CRCA) and Windy Gap Firing Project (WGFP) IGA. The goal of this partnership is to maintain, and where reasonably possible, restore and enhance conditions of the aquatic environment in the Colorado, Fraser, and Williams Fork River basins in Grand County (Cooperative Effort Area). The LBD Operations Plan Guidelines specify that an Annual Operations Plan (AOP) be developed to maximize the stream environmental benefits using resources available to LBD within the Cooperative Effort Area (Appendix 1) and prescribes operating procedures and timelines for LBD activities in support of operations (Appendix 2). The primary focus will be on streams and rivers located within the Fraser and Upper Colorado River watersheds and impacted by trans-mountain diversion (TMD) projects.

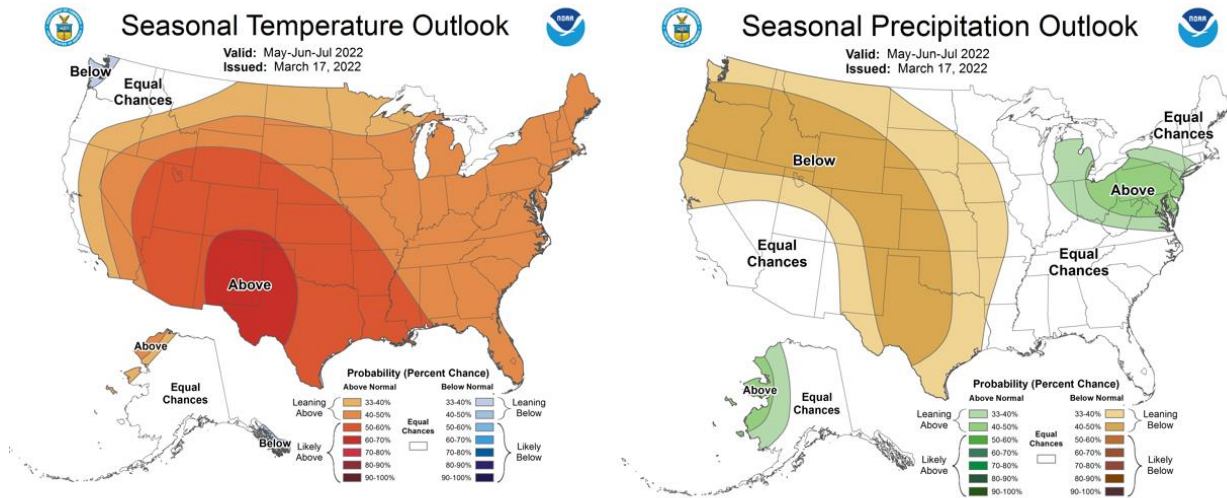
The 2022 Annual Operations Plan draws on the AOP Guidelines, guiding documents including the CRCA, the Grand County Stream Management Plan (GCSMP), hydrologic and water supply forecasts, water supply system conditions, past LBD efforts, and monitoring results to outline expected opportunities for operations consistent with the LBD Cooperative Effort.

2022 Snowpack and Water Supply Forecasts

Below is an NRCS map, updated April 20 2022, depicting Snow Water Equivalent (SWE) for major basins and SNOTEL sites in Colorado. Snowpack in the Colorado River basin is 95 percent of average and in the South Platte River basin 91 percent of average. Snowpack above Kremmling is tracking just above 2022 SWE levels after a very wet late December and early January, see Kremmling Group Snow Water Equivalent (SWE) time series plot below. The Colorado Basin River Forecast Center (CBRFC) April 20, 2022 ESP Most Probable runoff forecast at Kremming is 83 percent of average (694 thousand acre-feet or kaf, average 870 kaf, see graph below). The highest April 20 runoff forecast in Grand County is in the Willow Creek basin at 96 percent of average, and the lowest forecast is in the Muddy Creek basins at 57 percent of average. The 3 month climate outlook for Grand County is 55 percent chance for higher than average temperatures and 45 percent chance for lower than average precipitation, see Climate Prediction Center maps below.



Climate Prediction Center Seasonal Outlook



Runoff Operations

The 2022 CBT AOP April 1 Most Probable Forecast model predicts that Granby reservoir will not attain a fill and is projected to be about 51 kaf short. Approximately 50 kaf is expected to be pumped to Granby from Willow Creek and about 30 kaf pumped from Windy Gap under this scenario. In 2020, approximately 46% of the C-BT project watershed burned in the East Troublesome Fire. Uncertainty in 2022 C-BT and Windy Gap operations exists due to the ongoing threat of higher storm flows and sediment or debris-laden post-fire runoff. Although the Blue River basin is outside of the LBD CEA, runoff conditions there will impact in-season operations within the CEA. The CBT AOP April 1 Most Probable Forecast predicts that Green Mountain reservoir will be short of a fill by about 15 kaf, and that a substantial volume of water will be substituted by Denver Water and Colorado Springs from Williams Fork and Wolford reservoirs for in-season releases that are typically delivered from Green Mountain reservoir in other year types.

In collaboration with Colorado Parks and Wildlife (CPW), the Municipal Subdistrict of Northern Water reduced flow out of Windy Gap Reservoir to the minimum 90 cfs on May 2 and 5. This allowed CPW to wade the river and conduct an electrofishing survey downstream of Windy Gap. Initial plans indicated an increased release and bypass of yield (since Windy Gap was in priority at the time) to get boats in that stretch of the river. But since inflows to the reservoir were low during that period, making it difficult for boats to operate at that time, CPW decided to lower flows and wade the river instead.

The Windy Gap Firming Project Record of Decision has a flushing flow requirement that must be met to pursue Windy Gap Firming. The requirement is as follows:

“Flushing flows from the original Windy Gap Project (1980 MOU) would be modified to increase from 450 cfs to 600 cfs. In any year when flows below Windy Gap Reservoir

have not exceeded 600 cfs for at least 50 consecutive hours in the previous two years, and total Subdistrict water supplies in Chimney Hollow and Granby Reservoirs exceed 60,000 AF on April 1, the Subdistrict would cease all Windy Gap pumping for at least 50 consecutive hours to enhance peak flows below Windy Gap Reservoir.”

This flushing flow of 600 cfs was achieved from May 8, 2022 at 12:00 PM to May 10, 2022 at 3:00 PM, for a total duration of 51 hours. The previous flushing flow occurred during the 2020 runoff season.

In addition, the Grand County 1041 Resolution for Windy Gap Firming, Condition 29, states:

“If, during a five (5) year period, natural conditions meet or exceed flows of 600 c.f.s. required by the Fish and Wildlife Mitigation Plan so that the Subdistrict is not required to make releases or bypass water to achieve the required flow, and a flow of 1200 c.f.s. has not occurred for 72 consecutive hours, then in the sixth year, Subdistrict shall provide a 1200 c.f.s. flow for 72 consecutive hours.”

Since operations at Willow Creek Reservoir allowed for the 2022 flushing flow, this 1200 cfs flush will not be required until at least 2028.

CBT Project operations will be limited by upcoming maintenance as follows:

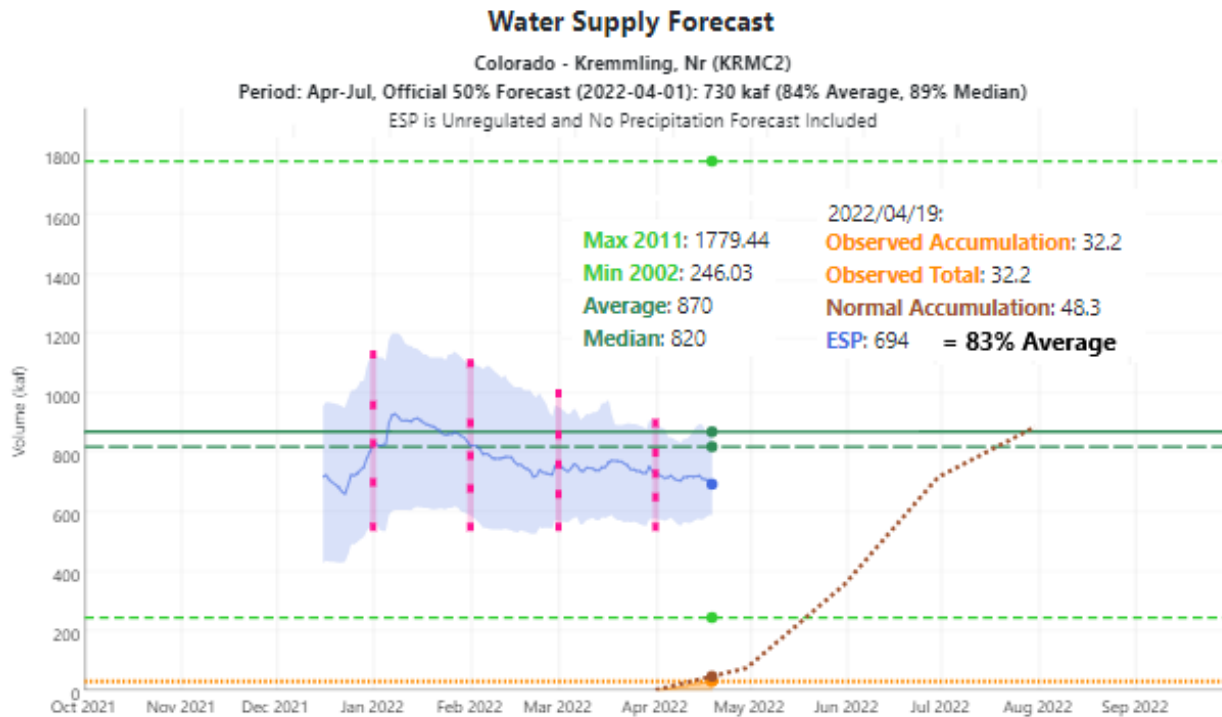
1. Adams Tunnel outage from 9/18/22 to 12/19/22 for work on the East Portal spillway
2. Flatiron Unit 3, which is the only pump to Carter Lake, will be out from 2/21/23 to 5/16/23 for the installation of a wye for the Chimney Hollow Interconnect

Because of these two outages, Northern Water and Reclamation will work hard to keep the Adams Tunnel and Carter Lake as full as possible around the time of these outages so that Carter Lake does not draw too low during the Spring and Summer of 2023.

Controlled spills have occurred at Granby Reservoir in 2011, 2014, 2015, 2016, 2017 and 2019 (see graph below). These spills occur during wet periods when east slope CBT demands are met.

Moffat System undiverted flows have occurred in every year since 2005, except 2012 (see graph below). These undiverted bypasses include spills when Denver’s east slope facilities are satisfied, for maintenance activities, and voluntary bypasses. Denver Water will have limited flexibility for Moffat Tunnel operations (2022-2027) due to storage at Gross Reservoir being limited to around 60% of full capacity for the Gross Reservoir Expansion Project. While this will increase bypass flows in the spring due to the reduced capacity of Gross Reservoir, flexibility the remainder of the year will be severely limited. Fraser River diversions are expected to be limited to fill 4,000 to around 6,000 AF of storage space in Ralston Reservoir and to meet demands. Maximum diversions via the Moffat Tunnel are expected to be around 150 to 200 cfs. Diversions for the Upper Williams Fork system will be limited during runoff to help fill Williams Fork Reservoir, which is not expected to fill. Since Cabin Creek has not meet its flushing flow requirement in recent years and the upper Williams Fork did not have a flushing flow last year – these two streams will be the first to receive bypass flows if available. The LBD subcommittee will work with Denver Water to

identify other streams for additional bypass flows (flushing flows) during the spring. A table of the annual flushing flows completed by Denver Water since 2018 is provided on the following page.

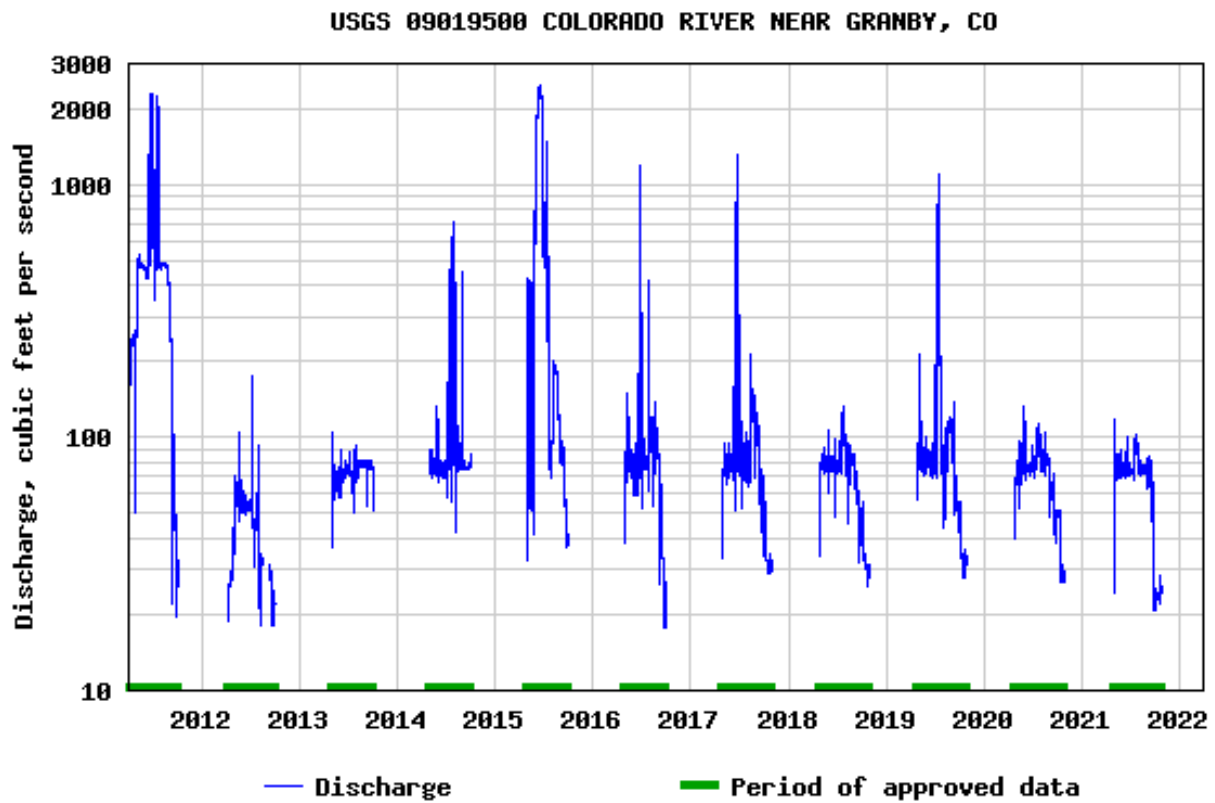


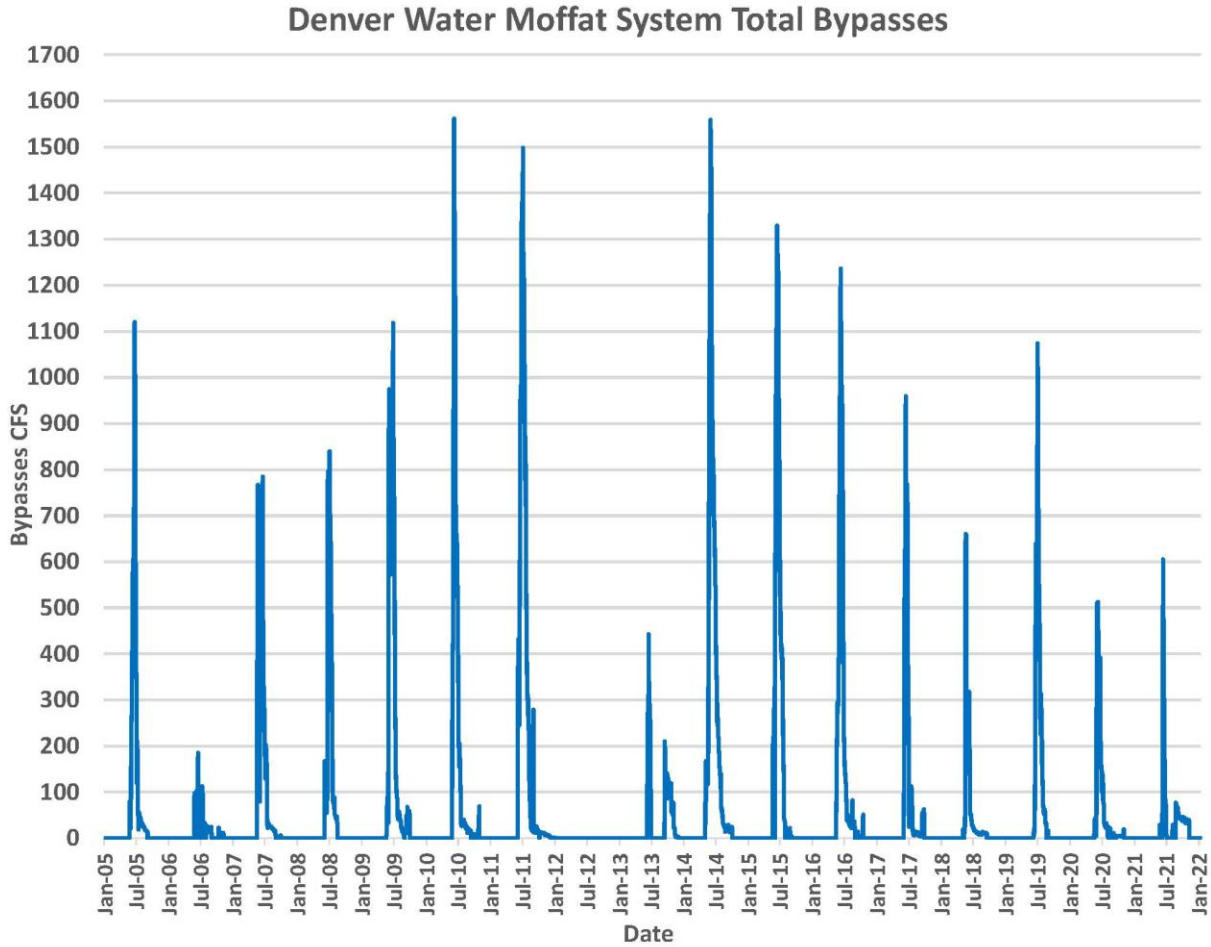
A fire in the upper Williams Fork River Basin in 2020 caused concern by the USFS and Denver Water regarding sedimentation and impacts to streams and infrastructure. Denver Water and the USFS have been monitoring the situation above Denver Water facilities near the West Portal of Gumlick Tunnel and to date have not had to adapt operations due to the 2020 fire. While the recovery and monitoring is still ongoing, Denver Water believes that operations will not be substantially impacted in 2022 and will operate the upper Williams Fork collection system as it has done in the past and will coordinate operational flexibility with LBD.

Fraser and Upper Williams Fork River Basins
FLUSHING FLOW MONITORING (2018-2021)
Cumulative Reporting (Target: 4 out of 10 years)

Waterbody	Flushing Flow Mean Daily Discharge (cfs)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Summary
		Flushing Flow Achieved?											
Year Type		Dry	Wet	Norm	Dry								
		Fraser River Basin											
Fraser River at Winter Park	80	YES	YES	YES	YES								4 of 4 years
Vasquez Creek at DW Diversion	50	YES	YES	YES	YES								4 of 4 years
Ranch Creek near Fraser	40	YES	YES	YES	YES								4 of 4 years
Cabin Creek near Fraser	40	NO	YES	NO	NO								1 of 4 years
St. Louis Creek near Fraser	70	YES	YES	YES	YES								4 of 4 years
		Williams Fork River Basin											
Steelman Creek	At least 35	YES	YES	NO	YES								3 of 4 years
Bobtail Creek	At least 80	YES	YES	NO	YES								3 of 4 years
McQueary Creek	At least 25	YES	YES	NO	YES								3 of 4 years

Beginning in early May the Operations Subcommittee will hold weekly meetings to track and discuss conditions as runoff operations progress. Of particular concern will be water temperatures during June and early July. Streamflow conditions will likely be similar to 2021, when water temperatures increased to critical levels in the Colorado River and in Ranch and St. Louis Creeks.





In-Season Operations

In-Season flows below Granby Reservoir are generally dictated by minimum streamflow criteria per the 1961 Principles. However, late season flexibility is provided through the availability of 5,412.5 acre-feet in Granby Reservoir to the Endangered Fish Recovery Program in the 15-mile reach extending from the GVIC diversion structure to the confluence of the Gunnison River. If target flows in the 15-mile reach do not require additional water, this water can be released to provide benefits in Grand County on the Colorado River and the water exchanged into Williams Fork and / or Woford Reservoir for later use by the Fish and Wildlife Service when additional water is needed for target flows in the 15-mile reach. The typical release schedule maintains 75 cfs at the USGS Granby gage in August and September when the 1961 Principles would have flows reduced to 40 and 20 cfs respectively in each of those months, but there is flexibility to alter the schedule based on local stream conditions and water needs for endangered fish.

The CRCA states that each year after the Moffat Project becomes operational, Denver Water will provide the Fraser 1,000 af of water for environmental purposes. Prior to the Moffat Project becoming operational per Denver Water’s 401 Certification, Denver Water will provide up to 1,000 af of voluntary releases in the Fraser Basin. Water temperatures will

be monitored at locations throughout the Fraser River watershed to anticipate conditions detrimental to aquatic life. Denver Water will provide operational flexibility and voluntary water depending on runoff conditions and reservoir storage. If voluntary water is made available for bypass during 2022 In-Season operations, the Operations Subcommittee will work with Denver Water to identify an operational release schedule to reduce the likelihood of temperature exceedances on impacted reaches during late summer and early fall.

Denver Water is not planning any maintenance projects on the Fraser River or Upper Williams Fork Collection systems for summer and fall 2022 which will impact Denver Water operations.

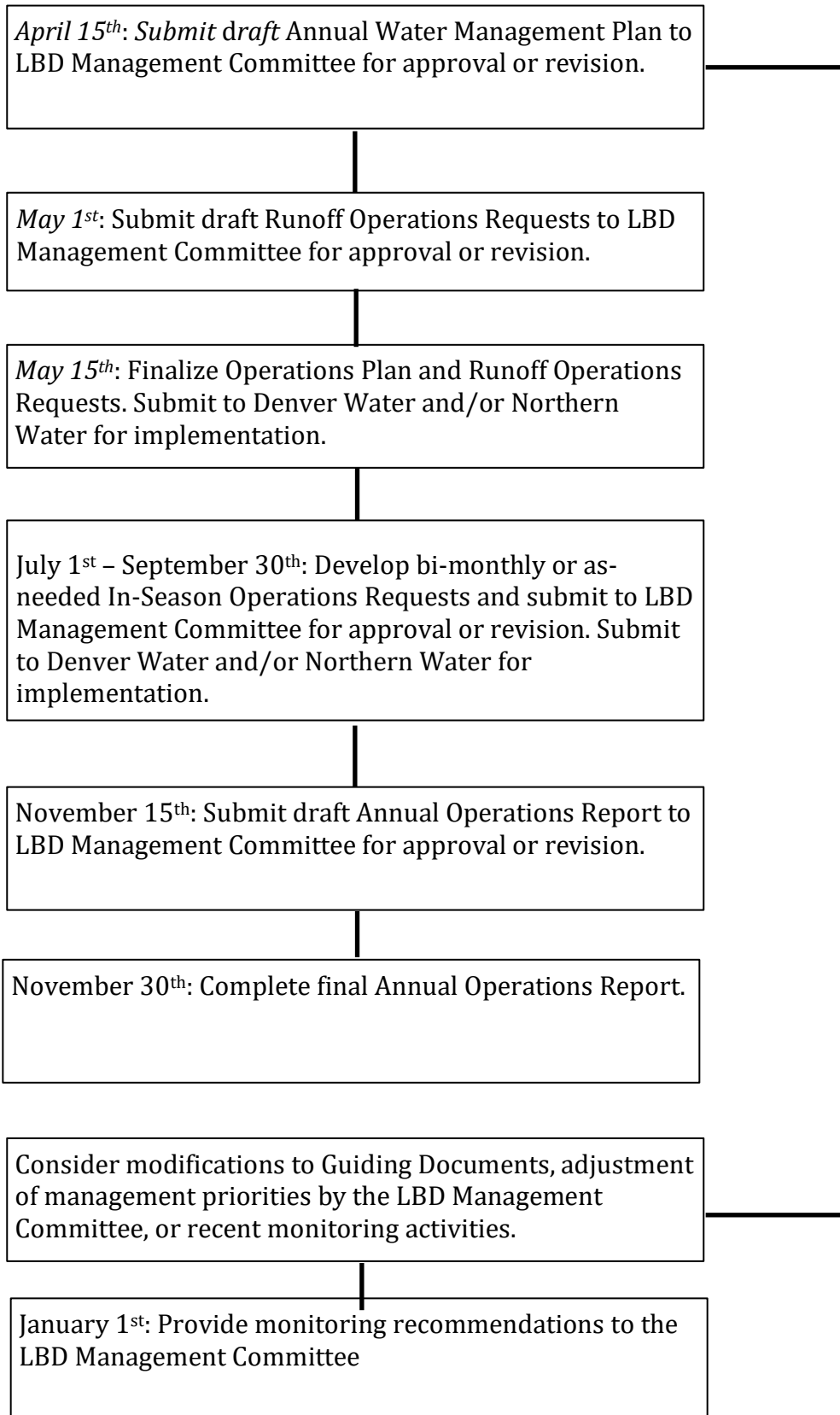
The Gross Reservoir Expansion Project will limit storage at Gross Reservoir to around 60% of full capacity during construction activities. This will limit diversions during runoff and operational flexibility later in the season to maintain carryover storage in Gross Reservoir.

If Denver Water notifies LBD of availability of voluntary water in the Fraser Basin, LBD should provide recommendations on how to use flexibility and stream temperature water as soon as possible, in order to aid Denver Water in planning. At this time, it is unlikely Denver Water will be able to provide voluntary releases in 2022 due to Gross Reservoir storage restrictions and projected dry conditions.

After the 2022 data collection is complete, the Operations Subcommittee will review streamflow and temperature data collected in the LBD Cooperative Effort Area (CEA) and will work with the Monitoring Subcommittee to determine appropriate data collection strategies for 2023.

APPENDIX A

LBD Operations Planning Schedule (*Recommended revisions to Guidelines in italics*)



APPENDIX B

LBD Water Sources and Quantities Offering Flexibility

1. Moffat Collection System Voluntary/Enhancement Water

- Grand County's Water
 - 1,000 af environmental bypass made available from within the Moffat Collection System.
 - Surplus water not needed by Denver Water in a given year.

2. Northern/Subdistrict Water stored in Granby Reservoir

- Grand County's Water Supply
 - Variable Supply - 3.8% of Windy Gap Pumping in excess of 15,000 af, up to 1,500 af.
 - MPWCD transfer water – Potential for August 1 transfer equal to unused portion of Middle Park's Annual Water Supply, up to 2,300 af, from the prior Windy Gap accounting year (only half of the unused water is available for transfer prior to completion of Chimney Hollow Reservoir).
 - End of year pumping if the Subdistrict's pumping is complete. Grand County must pay power costs for pumping. Denver Water has allocated \$1 million to a pumping fund.
 - Storage Capacity:
 - Before Chimney Hollow completion – 7,500 af, if unused capacity in Granby Reservoir is available.
 - After Chimney Hollow completion - 4,500 af, if unused capacity in Granby Reservoir is available, with the ability to share MPWCD's storage if both Grand County and MPWCD agree.
- MPWCD's Water Supply
 - Variable Supply - 3.8% of Windy Gap Pumping in excess of 15,000 af, up to 1,500 af (potential average of 700 af).
 - Storage capacity of 3,000 af in Granby Reservoir, if unused capacity is available.

3. Endangered Fish Water

- 5,412.5 af for endangered fish: The U.S. Fish and Wildlife Service (FWS) officially calls for this water, but Grand County can ask that the water be released from Granby after August 1st during wet years and exchanged into Williams Fork and/or Wolford Reservoir, until FWS asks for the release to the 15-mile reach. Releases depend on the type of hydrologic year and the targeted streamflow in the Colorado

River in the 15-mile reach. These releases are coordinated with Grand County and other interested parties during the Historic User Pool (HUP) calls and benefit the Colorado River below Granby Reservoir. The typical release schedule aids in maintaining a 75 cfs flow at USGS Granby gage from August 1 through mid-September.

4. Williams Fork Reservoir Storage

- Grand County's Water
 - 1,000 af environmental water (CRCA) stored when 1,000 af environmental water is bypassed during a mainstem Colorado River Call. 2,500 af maximum carryover, first to spill, notification of anticipated spill. [See Section III.E.10-11 of CRCA]