BUREAU OF RECLAMATION

Flaming Gorge Operation Plan - May 2022 through April 2023

Concurrence by

Kathleen Callister

Digitally signed by KATHLEEN CALLISTER
Date: 2022.05.03 11:04:02 -06'00'

Kathleen Callister, Resources Management Division Manager

KENT KOFFORD

Digitally signed by KENT KOFFORD
Date: 2022.05.03 10:17:41 -06'00'

Kent Kofford, Provo Area Office Manager

CHRISTOPHER CUTLER

Digitally signed by CHRISTOPHER CUTLER
Date: 2022.04.27 15:11:17 -06'00'

Christopher Cutler, Acting Upper Colorado Basin Power Manager

Approved by

WAYNE PULLAN

Digitally signed by WAYNE PULLAN
Date: 2022.05.04 06:43:07 -06'00'

Wayne Pullan, Upper Colorado Basin Regional Director

U.S. Department of the Interior
Bureau of Reclamation • Interior Region 7
Upper Colorado Basin • Power Office
Salt Lake City, Utah

May 2022

Purpose

The development of the Flaming Gorge Operation Plan (FG-Ops) completes the 2006 Flaming Gorge Record of Decision (ROD) process and the 4-step process outlined in the Flaming Gorge Standard Operation Procedures for May 2022 through April 2023. The Upper Colorado Basin Power Office (UCPO) operators will fulfill the FG-Ops within the boundaries of the operations defined below; however, Reclamation reserves the right to adjust the FG-Ops and the implementation of study flows based on hydrologic conditions and other considerations. The Upper Colorado River Endangered Fish Recovery Program (Recovery Program), Flaming Gorge Technical Working Group (FGTWG), Flaming Gorge Working Group (FGWG), United States Fish and Wildlife Service (FWS), and Western Area Power Administration (WAPA) provided input that was considered in the development of the FG-Ops.

The FG-Ops describes the current hydrologic classification of the Green River Basin, the hydrologic conditions in the Yampa River Basin, and identifies the Reach 2 peak flow magnitude and duration that is most likely to be targeted for the upcoming spring flows. Multiple hydrologic conditions were considered in the development of FG-Ops, such that it contains a range of operating strategies that could be implemented. Flow and duration targets for these strategies consider dry, moderately dry, average (above / below median), and moderately wet scenarios as these are most likely classifications to occur this year. As of the approval date of this document, the most likely hydrologic classification is moderately dry.

Reclamation and the Upper Division States will finalize the Drought Response Operations Plan in April 2022 in accordance with the provisions in the Upper Basin Drought Response Operation Agreement[1,2] (DROA). A primary goal of DROA is to protect hydropower generation ability by protecting a target elevation of 3,525 feet at Lake Powell**.** DROA planning with the Upper Basin Divisions was incorporated into the development of the FG-Ops. After the Drought Response Operations (DRO) Plan is finalized, the FG-Ops may be amended to adjust releases. These releases are a general representation to illustrate releases for DRO and could increase or decrease pending the Yampa contributions. Also, these releases will remain within the confines of the FEIS/ROD. The Drought Response Operations Plan allows for adjustments and the DROA Partners will meet monthly to review various aspects of the DRO Plan including the hydrology and effectiveness and adjust releases accordingly. Adjustments will remain within the flexibility of the 2006 Flaming Gorge ROD and within the constraints of the Flaming Gorge compliance documents in coordination with the FWS (i.e. Biological Opinion, Final Environmental Impact Statement (FEIS), DCP, DROA, Drought Response Operations Plan).

---

[1] DROA is one element of the package of documents known as the 2019 Colorado River Drought Contingency Plan (DCP). The DCP agreements in both the Upper Basin and Lower Basin provide tools to address the ongoing historic drought in the Colorado River Basin. The seven Colorado River Basin States submitted the DCP agreements to Congress, resulting in the "Colorado River Drought Contingency Plan Authorization Act," 2019 DCP Act, Pub. L. No. 116-14, 133 Stat. 850 (Apr. 16, 2019) ("the 2019 DCP Act"). Consistent with the 2019 DCP Act, the DCP agreements were executed in May of 2019, and the various DCP agreement parties have been implementing the agreements in the Upper and Lower Colorado River Basins since their execution. 2022 Drought Response Operations Plan (usbr.gov)

[2] The DROA coordination (see section II.A.4.a) will continue until either (i) the minimum probable projected elevation remains above3,525 feet for 24 months or (ii) the process moves to the next step when the most probable projected elevationindicates Powell elevations below 3,525 feet and a Drought Response Operations Plan is developed.

General Operation Criteria for No Drought Response Operation, May 2022 through April2023

The expected hydrology condition is moderately dry, and this scenario is presented below, without Drought Response Operation actions (Proposed Plan no DRO). An additional section regarding potential DRO actions is included below in a section titled "Drought Response Operation Considerations". Additional details for moderately dry and other hydrologic classifications (dry, average [below/above median], and moderately wet) are also presented later in this document.

- Per the FGTWG Proposal, Larval Trigger Study Plan (LTSP) experimental objectives for the moderately dry hydrologic classification will be attempted for spring operation and timed with a biological trigger. As part of experiments, ramp-down rates will be 1000 cubic feet per second (cfs)/day.
- A smallmouth bass (SMB) flow spike release will occur in mid-June to early July and will include the use of the selective withdrawal structure (SWS) to influence temperature. The SMB flow spike release will consist of a one day ramp up to full power plant capacity (4,600 cfs), three consecutive days at power plant capacity, and a ramp down at the rate of 2,000 cfs/day.
- The summer, autumn, and winter base flows period will use the lower flow values that are within therange the 2000 Flow and Temperature recommendations to achieve Reach 2 flows.

FEIS, Page 9 -- Reclamation continually coordinates release schedules with Western. Occasionally, Western will request that Reclamation consider modifying scheduled releases at Flaming Gorge Dam due to power market conditions. Reclamation considers all requests from Western for modified releases. Requests for modified operations by Western are usually met, although it is common for Reclamation and Western to negotiate a compromise solution that may alleviate pressure on other resources.

Current Hydrologic Classification

Green River Basin Hydrology

To implement the 2006 Flaming Gorge ROD in 2022, an evaluation has been made of the current hydrologic conditions in the Upper Green River *(i.e.,* above Flaming Gorge Dam). The evaluation is centered on the historical unregulated inflow statistics for Flaming Gorge Dam during the period from 1963 through 2021. The 2022 April 1st Colorado Basin River Forecast Center (CBRFC) April to July unregulated spring inflow forecast (current forecast) for Flaming Gorge Reservoir is 520,000 acre-feet (54% of 30-year average$_{1991\text{-}2020}$). This forecast falls at 86% exceedance based on the historic unregulated inflow record (1963-2021). Figure 1 shows the current forecast in relation to the historic unregulated inflow volumes.

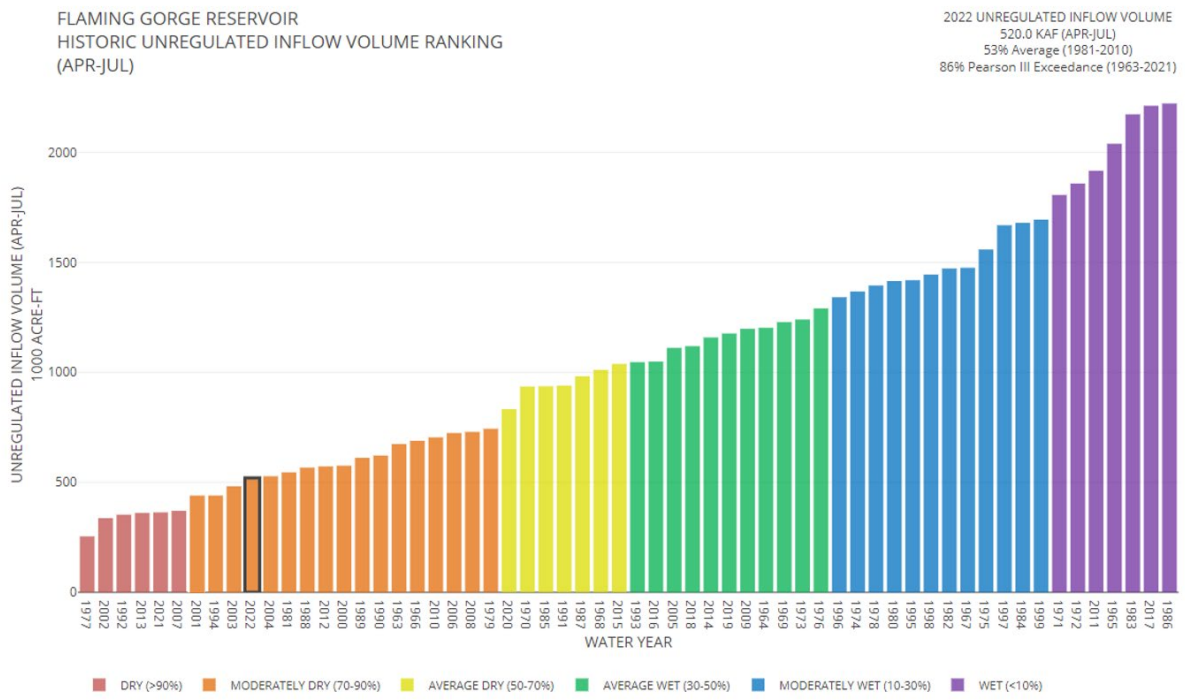

FIGURE 1 - Flaming Gorge Reservoir 2022 April spring forecast and ranked historic unregulated April through July inflow volume for years 1963-2021.

As of April 18, 2022, Flaming Gorge Reservoir's current water surface elevation is 6018.75 feet above sea level. There is 2,937,700acre-feet of live storage (78% live storage) in Flaming Gorge with 814,300 acre-feet of space in live storage.

Yampa River Basin Hydrology

The current April 2022 April to July forecast for the Little Snake River and Yampa River combined (Little Snakeat Lily plus Yampa at Maybell) is 920,000 acre-feet (77% of 30-year average$_{1991\text{-}2020}$). This spring forecast falls above 74% exceedance based on a ranking of the historic record (1922-2021). Figure 2 below shows the current spring forecast in relation to historic flow volumes.

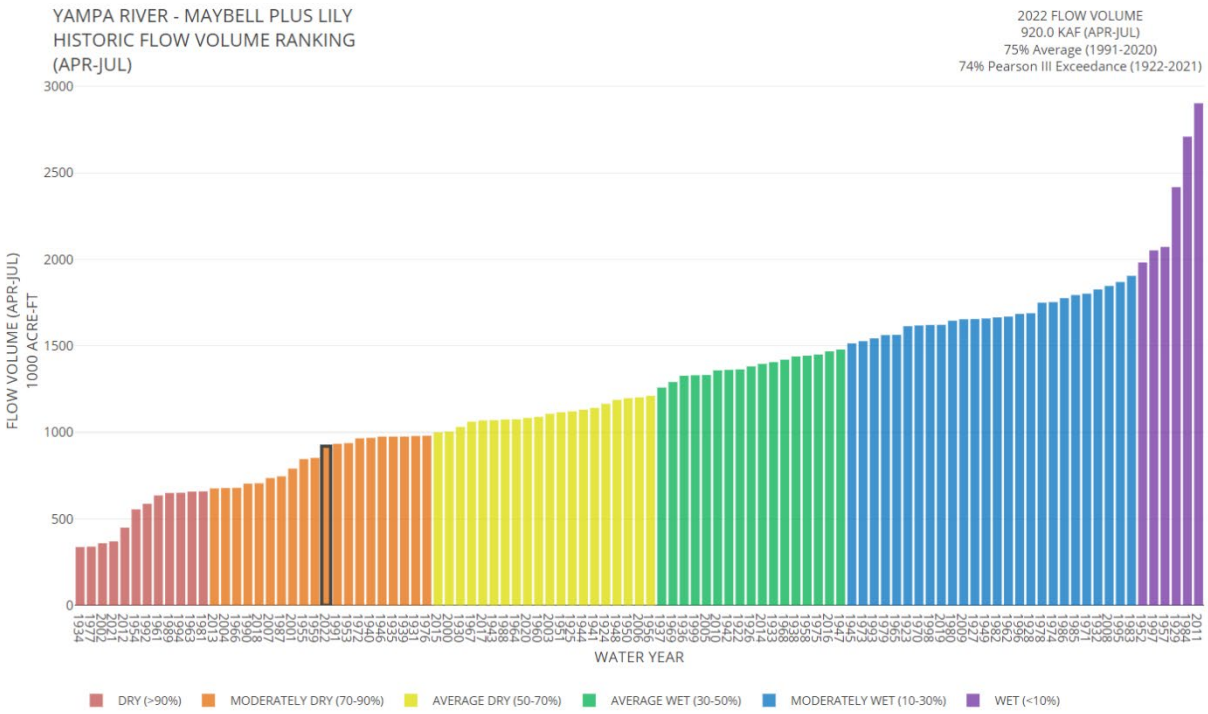

FIGURE 2 - Yampa River Basin (Maybell plus Lily) 2022 April spring April to July forecast and ranked historic unregulated April through July inflow volume for years 1922-2021.

Probabilities of Flow Events for Spring 2022

According to the hydrologic classifications defined in the Flaming Gorge FEIS table 2-4 page 31, the Flaming Gorge Reservoir is currently in the moderately dry hydrologic classification and the Yampa River Basin is in the moderately dry hydrologic condition. Table 1 (below) shows the predicted number of days that the Yampa River at Deerlodge Park USGS Gage will exceed various mean daily flow thresholds. The predictions in Table 1 are based on the CBRFC mid-April spring forecast.

Table 1. The number of days the Yampa River will exceed various mean daily flow thresholds.

Daily Mean Peak (cfs)	90% Exceedance Probability	75% Exceedance Probability	50% Exceedance Probability	25% Exceedance Probability	10% Exceedance Probability
6,000	17 days	23 days	29 days	36 days	46 days
8,000	4 days	7 days	14 days	20 days	28 days
10,000	0 days	2 days	4 days	8 days	12 days
11,000	0 days	0 days	1 days	4 days	9 days
12,000	0 days	0 days	0 days	2 days	3 days

Spring Releases[3] (no DRO)

April – July Forecast May 1st forecast Exceedance Value Less than 30% (Moderately Wet Hydrologic conditions)

For moderately wet hydrologic classification the 2000 Flow and Temperature Recommendations spring peak flow will be attempted. Peak releases will be timed to coincide with peak and immediate post-peak spring flows in the Yampa River. The moderately wet ramp-down rate is 1000 cfs/day. For moderately wet scenarios refer to table 8 and figure 7. Spring releases will be dependent on Yampa River flows and other factors. The UCPO will continue to monitor the CBRFC forecast to determine full power plant and possible bypass releases to be timed to coincide with Yampa peak and immediate post-peak spring flows.

April – July Forecast May 1st forecast Exceedance Value Equal or Greater than 30% (Average above/below median, Moderately Dry, and Dry Hydrologic condition)

For LTSP hydrologic conditions average above/below median, moderately dry, and dry LTSP target flows per the LSTP matrix will be used (Table 2).

Range of Past Spring Peak Triggers

The mean calendar date of the first capture of razorback sucker larvae (i.e., the "larval trigger") is May 28 (median May 27) and ranges from May 7 to June 24. Historically, 50% of first captures occurred between May 21 and June 2; 75% occurred between May 16 and June 4. In general, first capture of larvae is earliest in years characterized by low flows and/or warmer conditions, and latest in years characterized by high flows and/or cooler conditions.

Spring Peak Pre-trigger Coordination

The UCPO operator will call in as a participant to any coordination, update, and scheduling activities on the pre-trigger LTSP experiment. During mid-May, a coordination meeting with the Recovery Program, Reclamation, Colorado State University (CSU; Dr. Kevin Bestgen), FWS, National Park Service, WAPA, CBRFC, Utah Division of Wildlife Resources (UDWR) among others will convene to coordinate activities such as monitoring, modeling, and forecasting of Yampa hydrology/temperature.

Spring Peak Trigger

Timing of LTSP releases is based on the date of capture and/or significant emergence of the razorback sucker larvae observed through light trap sampling in the middle Green River which begins in early May of each year. Typically, larval sampling is conducted every morning and evaluation of each morning's sample is completed by mid-morning. When the LTSP study can be initiated a Recovery Program representative

[3] Pending the hydrologic condition of the Upper Green River and Yampa River, per the FEIS 2.5.3.1 page 32, either one or two classifications higher (wetter) or one classification lower (drier) than the actual classification established for the Green River could be recommended for operations. Table 2-5 page 32 from the FEIS will be considered.

The duration of spring sustained flows will depend on the type of hydrologic classification and whether hydrology is wetter or drier within that classification range. Pending the Yampa being in a dryer/wetter condition, durations could be extended or reduced regardless of Green River hydrologic classification.

will notify the Resources Management Division (RMD) Manager with a courtesy copy to the Provo Area Office Manager and UCPO Manager. The UCPO will determine the exact timing, magnitude, and duration of the releases and will notify stakeholders. If the timing of release coincides with high recreation use, such as Memorial Day weekend,UCPO may delay releases to minimize risk to the public. If LTSP releases are anticipated to initiate just prior to Memorial Day weekend, notification will be provided Tuesday or early Wednesday at the latest to provide time to initiate LTSP releases. The maximum LTSP releases can range between 4,600 cfs to 8,600 cfs. The goal is to have minimal changes in releases over the weekend for public safety purposes.

Spring Peak Release Period

Once river flows in Reach 2 begin to peak, the UCPO operators and the wetland biologists in the field will be in close contact to share information about forecasted flows, floodplain inundation and larvae entrainment monitoring.

End of Spring Peak Releases

During high releases, the UCPO operator will monitor Yampa River flows in conjunction with Green River flows measured at the Jensen. In a moderately dry classification, the following scenario provides an example. For dry, moderately dry, and average (below/above median) scenarios, refer to tables 5, 6, and 7. When it is determined that contributions from Flaming Gorge releases, combined with the Yampa, cannot achieve 8,300 cfs or above then releases from Flaming Gorge will be reduced. To limit temperature variations in Reach 2 and as part of experiments, the release ramp down rate will follow a schedule which reduces flows by 1,000 cfs per day. The dam will be operated to attain Reach 2 peak flow magnitudes and durations that will vary depending on hydrologic conditions (see Table 2 below, and planned optional Tables 5, 6, and 7. To meet ROD objectives and if conditions are such, 18,600 cfs will be attempted in the Average condition.

Table 2. LTSP design matrix.

Peak Flow as Measured at Jensen, Utah	$1 \leq x < 7$*	$7 \leq x < 14$*	$x \geq 14$*
≥8,300 cfs, <14,000 cfs	Dry	Moderately dry	Moderately dry
≥14,000 cfs, <18,600 cfs	Average below	Average below	Average below
≥18,600 cfs, <20,300 cfs	Average above	Average above	Average above / Moderately wet
≥20,300 cfs, <26,400 cfs	Moderately wet	Moderately wet	Moderately wet / Wet
≥ 26,400 cfs	Wet	Wet	Wet
**Number of Days (x) Corresponding Hydrologic Conditions*			

The LTSP flow targets in Reach 2 will likely require the use of the bypass to supplement flows above maximum power plant releases. The use of bypass will be minimized to meet Reach 2 goals.

Smallmouth Bass Flow Spike (no DRO)

When the SMB flow spike can be initiated a Recovery Program representative will notify the RMD Manager with a courtesy copy to the Provo Area Office Manager and UCPO Manager. The UCPO will determine the exact timing, magnitude, and duration of the releases. The timing of the SMB is to be initiated on either a Monday, Tuesday, or only Tuesday during the week of Juneteenth (The June 19th Federal Holiday).

April – July Forecast May 1st forecast Exceedance Value equal or greater than 50% (Dry, Moderately Dry, and Average above/below median Hydrologic Conditions)

A SMB spike release will consist of a one-day ramp up to full power plant capacity (4,600 cfs), three consecutive days (72 hours) at power plant capacity, and a ramp down at the rate of 2,000 cfs/day). This could occur in mid-June to early-July.

In 2022 the SWS unit 2 and unit 3 on Flaming Gorge Dam will be operated as it has previously (raise gates to 60' below the surface by April 15, raise to 50' by May 15, and finally raise to 40' by June 15). However, during the flow spike experiment the SWS gate elevations on units 2 and 3 will be adjusted to 50' below the reservoir surface after full powerplant releases are attained. The SWS unit 2 and unit 3 gates will be returned to 40' below the surface when full powerplant releases conclude. Unit 1 (inoperable SWS) will be the last unit to be online and the first to be offline before and after full powerplant releases. After first hatching date (predicted) and an estimated 10-14 days later, the experimental spike may commence. A Recovery Program representative will provide the RMD Manager, the Provo Area Office Manager and UCPO Manager a notice to initiate the experiment as well as the dates and duration of the experiment.

April – July Forecast May 1st forecast Exceedance Value between 30% and 50% (Average above median Hydrologic Conditions)

The Recovery program can coordinate on stopping or adjusting the LTSP spring peak release to accommodate the start of the SMB flow spike before the CPM base flow or to consider a longer duration LTSP in lieu of a SMB flow spike.

Colorado Pikeminnow experimental base flows (no DRO)

The summer CPM base flow experiment (Bestgen and Hill 2016) will attempt to achieve Reach 2 target flows several days prior to the predicted first presence of Colorado pikeminnow. Average and Moderately Wet conditions are the only scenarios where CPM flows could be achieved. These flows will be maintained at the target level (table 3) throughout the base flow period, if possible. Achieving this targeted base flow depends on the Yampa River flows in Reach 2, which may be during spring runoff prior to the detection of CPM spawn. When CPM spawning is confirmed (or expected to occur in the very near future) in the Yampa River, a Recovery Program representative will notify the RMD Manager, the Provo Area Office Manager and UCPO Manager to proceed with the experiment. Past investigations indicate the average date of first presence is July 4 (range June 20 to July 24), and is earlier in warmer and lower flow conditions, and later in cooler and higher flow conditions.

Per the FEIS 2.5.3.3 page 35, objectives considered during all base flow periods, the 3% change between consecutive mean daily flows and 0.1-m stage change at Jensen within a day, will be targeted.

Table 3. Reproduction of Table 10 from Bestgen Hill 2016, illustrating Reach 2 experimental base flows (listed as proposed)

Hydrologic classification	2000 (Muth et al.) (cfs)	Proposed (cfs) (Bestgen and Hill 2016
Dry (10% of years, 0 to 10% exceedance)	900 – 1,100	1,700 – 1,800
Moderately dry (20% of years)	1,100 – 1,500	1,800 – 2,000
Average (40% of years)	1,500 – 2,400	2,000 – 2,600
Moderately Wet (20% of years)	2,400 – 2,800	2,200 – 2,800
Wet (10% of years, 90 to 100% exceedance)	2,800 -3,000	2,400 – 3,000

Summer, Autumn, and Winter Base Flow Period

Objectives considered during all base flow periods are the 3% change (~50 cfs) between consecutive mean daily flows and 0.1-m stage change at Jensen within a day as recommended in the 2000 Flow and Temperature Recommendations.

Dry and moderately dry classification

The summer, autumn, and winter base flows period will use the lower flow values that are within the range the 2000 Flow and Temperature recommendations to achieve Reach 2 flows. The range of acceptable base flows for Reach 2 would be selected from the 2000 Flow and Temperature Recommendations for the hydrologic classification set for the current month. Reclamation would make releases to achieve flows in Reach 2 that are within the acceptable range that also assure that the reservoir elevation on March 1 would be no higher than 6027 feet above sea level.

For average and moderately wet

The start of the summer base flow period will be determined through a combination of hydrologic conditions on the Yampa River and Upper Green River and ends on September 30. The summer base flow period will fully implement the CPM as discussed above.

Autumn base flows period will use the lower flow values that are within the range the 2000 Flow and Temperature recommendations to achieve Reach 2 flows. This period is from October 1 through November 30.

The winter +25% base flow will be used for this season to the maximum extent practicable. This period is from December 1st through February 28th.

Utah Division of Wildlife Resources Monitoring Program

UDWR has a long-term fish monitoring program immediately downstream of Flaming Gorge Dam. Each April and September, the agency submits a flow request for two nights of 1,600 cfs, allowing them to electrofish the river at two 1-mile-long study sites, Spillway (Tailrace) and Little Hole. The goal of this request is to ensure that the river is navigable by jet boat and to maintain a consistent flow across sampling events. This request will be considered and approved if conditions are warranted. The UCPO operator will coordinate with WAPA to implement dam releases that meet the flow request.

Other Considerations

Regularly scheduled and/or emergency maintenance activities as well as other activities (i.e. search and rescue, drought operations, power system emergency (reserves) etc.) may affect reservoir operations. Releases may need to be reduced or increased to accommodate such events. Such interruptions will be

remedied, as determined by Reclamation, and operations returned to target flow rates upon work completion.

Drought Response Operation (DRO) Considerations

Located in Figures 3 through 7 are the upper and lower releases that could be implemented for each hydrologic classification for DRO. These releases are a general representation to illustrate releases for DRO and could increase or decrease pending the Yampa contributions. Also, these releases will be within the confines of the FEIS/ROD.

The DRO scenario is provided in Figures 3 through 7. These scenarios were developed as a part of coordination with the Upper Division States for the 2022 DRO planning process. This is a tentative plan that only considers the ROD/EIS and is presented for planning purposes. In the event this scenario is implemented, the potential magnitude and durations can be more or less than presented. See the 2022 Drought Response Operation Plan Attachment C for more information on DRO operations (https://www.usbr.gov/dcp/droa.html).

Before Spring Releases (May)

As part of transition period and before the LTSP spring flow peak, unregulated inflow will be used to determine similar release. For the Moderately Dry scenario this will initially start releases at 1,800 cfs.

Spring Releases

If the DRO Plan is implemented, this could include an LTSP scenario for dry, moderately dry, and average below/above median hydrologic condition and sustained for multiple days until targets are no longer obtainable. This could include the use of bypass depending on reach 2 targets, see graphs below. In a DRO scenario that implements LTSP, the corresponding CPM releases could be used.

Smallmouth Bass flow spike

Included in the average below median scenario (or drier), the Recovery program can coordinate on stopping or adjusting the LTSP spring peak release to accommodate the start of the SMB flow spike before the CPM base flow. This may necessitate ramp-down rates as high as 2000 cfs/day for the LTSP experiment.

Base Flows Period

During a dry hydrologic classification, the CPM base flow is an approved experimental study plan and therefore can be +64% of the base flow range per adaptive management provisions in the ROD.

Pending the LTSP spring peak release, the CPM base flow Reach 2 targets will be associated to the corresponding LTSP spring peak and magnitude. The CPM early summer Reach 2 targets will be in the lower range and the later summer spring Reach 2 target will be in CPM higher range. Finally, the autumn and winter releases can also achieve the higher range of the associated CPM range.

Transition Period (March through middle to late May)

March releases can match DRO February established releases. April releases can match the unregulated median unregulated inflow at 2,000 cfs. May releases can mirror the unregulated inflow into Flaming Gorge.

Table 4. Operation Matrix for Dry Hydrologic Conditions (No DRO)[4]

Period Name / End of Objective	Date and Description
Pre-spring peak / ends at the start of LTSP - Biological Trigger	May 1 to spring peak release, ~850 cfs.
Spring peak / ends when < 8,300 cfs is predicted or observed at Jensen Gage.	Estimated middle-late May to early June, pending Yampa Flows and LTSP trigger date. Achieve a flow equal or greater than 8,300 cfs in Reach 2 for 2 to less than 7 days. Bypass can be used. In the case of extremely dry years (> 98% exceedance), less than 1 day at >8,300 cfs can be achieved.
End of spring peak. Ends before the SMB bass spike flow	Ramp-down, end of spring peak period – estimated early June. 1000 cfs/day ramp down,to ~850 cfs average daily release.
SMB spike flow / mid-June to early July	One-day ramp up to full power plant capacity (4,600 cfs) for three consecutive days (72 hours) with a ramp down rate of 2,000 cfs/day. SWS units 2 and 3 will be adjusted to 50' below the reservoir surface after full powerplant releases are attained. The SWS units 2 and 3 will be returned to 40' below the surface when full powerplant releases conclude. SWS unit 1 will be the last unit to be online and the first to be offline before and after full powerplant releases.
Summer, autumn, and winter base flow / mid-July to February 28	Average daily releases are estimated to be 850 cfs.
End of FG Operation Plan and Transition Period / April 30	Average daily releases are increased or decreased to achieve Upper Limit Drawdown (EIS Table 2-3).

Table 5. Operation Matrix for Moderately Dry Hydrologic Condition (No DRO)[4]

Period Name / End of Objective	Date and Description
Pre-spring peak / ends at the start of spring peak releases	May 1 to spring peak release, ~850 cfs
Spring peak / ends when < 8,300 cfs is predicted or observed at Jensen Gage.	Estimated middle-late May to early June, pending Yampa Flows and LTSP trigger date. Achieve a flow equal or greater than 8,300 cfs and less 14,000 cfs in Reach 2 for at least 7 days and more than 14 days. Bypass can be used.
End of spring peak. Ends before the SMB bass flow spike	Ramp down, end of spring peak period – estimated early June. 1,000 cfs/day ramp-down,to ~850 cfs average daily release.
SMB spike flow / mid-June to early-July	One -day ramp up to full power plant capacity (4,600 cfs) for three consecutive days (72 hours) with a ramp down rate of 2,000 cfs/day). SWS units 2 and 3 will be adjusted to 50' below the reservoir surface after full powerplant releases are attained. The SWS units 2 and 3 will be returned to 40' below the surface when full powerplant releases conclude. SWS unit 1 will be the last unit to be online and the first to be offline before and after full powerplant releases.
Summer, autumn, and winter base flow / mid-July to February 28	Average daily releases are estimated to be 850 cfs.
End of FG Operation Plan and Transition Period / End of April 30	Average daily releases are increased or decreased to achieve Upper Limit Drawdown (EIS Table 2-3).

[4] See the 2022 Drought Response Operation Plan Attachment C for more information DRO operations (https://www.usbr.gov/dcp/droa.html).

Table 6. Operation Matrix for Average, below median, Hydrologic Conditions (No DRO)[4]

Period Name / End of Objective	Date and Description
Pre-spring peak / ends at the start of LTSP - Biological Trigger	May 1 to LTSP Trigger. ~1,000 cfs to full power generation (pending operation)
Spring peak (average-below median) ends when < 14,000 cfs is predicted at the Jensen Gage else ends 8,300 – 14,000 cfs is no longer attainable for greater than 14 days.	Estimated middle-late May to early June, pending Yampa Flows and LTSP trigger date. Increase from full power plant capacity in one day and increase 4,000 cfs / day during bypass to meet Reach 2 peak Target (near 18,600 cfs). Pending Yampa flows, the target is to have ≥14,000 cfs in Reach 2 for greater 7 days. To meet the ROD for an average condition if 18,600 cfs is obtainable (pending Yampa) this will be targeted
End of spring peak, ends before the SMB spike flow	Ramp down, end of spring peak period – estimated middle to late June. ~1000 cfs/day ramp-down from bypass and below power plant releases, until summer base flow period begins; releases in the ~850 cfs range.
SMB spike flow / mid-June to early-July (latitude to sustain LTSP or initiate the SMB flow spike will be considered)	One -day ramp up to full power plant capacity (4,600 cfs) for three consecutive days (72 hours) with a ramp down rate of 2,000 cfs/day). SWS units 2 and 3 will be adjusted to 50' below the reservoir surface after full powerplant releases are attained. The SWS units 2 and 3 will be returned to 40' below the surface when full powerplant releases conclude. SWS unit 1 will be the last unit to be online and the first to be offline before and after full powerplant releases.
Summer CPM base flows / ends on September 30	Sustaining Pikeminnow base flow (2,000-2,600 cfs) ~2000 cfs in Reach 2 until September 30. Average daily releases will be ~1,700 cfs.
Autumn base flows Oct 1 to -Nov 30 / ends on November 30	Autumn base flow target in Reach 2 is 1,500-2,400 cfs. Average daily base flows ~850 cfs (+/- 40% period) in Reach 2. Average daily releases will be ~850 cfs, pending the Yampa River. Early October decreases @ 50 cfs/day to achieve 850 cfs in Reach 2. Late November increase @ 50 cfs/day to achieve +25% base flow by December 1.
Winter Base Flow Dec 1 to Feb 28 / Ends on February 28	The+25% base flow period, not to exceed ~3,000 cfs in Reach 2. Average daily releases will be 850 cfs pending the Yampa River.
End of FG Operation Plan and Transition Period / End April 30	Average daily releases are increased or decreased to achieve Upper Limit Drawdown (EIS Table 2-3)

Table 7. Operation Matrix for Average, above median, Hydrologic Conditions (No DRO)

Period Name / End of Objective	Date and Description
Pre-spring peak / ends at the start of LTSP - Biological Trigger	May 1 to LTSP Trigger. ~850 cfs to Full Power Generation (pending operation)
Spring peak (average-above median) / ends when < 18,600 cfs is predicted or observed at Jensen Gage.	Estimated middle-late May to early June, pending Yampa Flows and LTSP trigger dates. Increase from full power plant capacity in one day and increase 4,000 cfs / day during bypass to meet Reach 2 Target (<20,300 cfs). Pending wetter or dryer hydrologic classification at least 1 days to > 14 days at ≥ 18,600 cfs, pending Yampa flows will be targeted. To meet the ROD for an average condition if 18,600 cfs is obtainable (pending Yampa) this will be targeted
End of spring peak / ends when ramp down begins.	Ramp down, end of spring peak period – estimated middle to late June. ~1,000 cfs/day ramp down from bypass and below power plant releases, until summer base flow begins; releases in the ~1,100 cfs range.
Summer CPM base flows / ends on September 30	Sustaining Pikeminnow base flow (2,000-2,600 cfs) within 2000 Flow and Temperature Recommendations, ~2,000 cfs in Reach 2 until September 30. Average daily releases will be ~1,700 cfs, pending the Yampa River.
Autumn base flows Oct 1 to -Nov 30 / ends on November 30	Autumn base flow target in Reach 2 is 1,500-2,400 cfs. Average daily base flows ~1,500 cfs (+/- 40% period) in Reach 2. Average daily releases will be ~1200 cfs, pending the Yampa River. Early October decreases @ 50 cfs/day to achieve 1,500 cfs in Reach 2. Late November increase @ 50 cfs/day to achieve +25% base flow by December 1.
Winter Base Flow Dec 1 to Feb 28 / Ends on February 28	Base flows increased to +25% to not exceed ~3,000 cfs in Reach 2 (+/- 25% period). Average daily releases at ~2,200 cfs pending the Yampa River.
End of FG Operation Plan and Transition Period / End April 30	Average daily releases are increased or decreased to achieve Upper Limit Drawdown (EIS Table 2-3)

Table 8. Operation Matrix for Moderately Wet Hydrologic Conditions (No DRO)

Period Name / End of Objective	Date and Description
Pre-spring peak / ends at the start of spring peak releases	May 1 to spring releases. Close to Full Power Generation (4,600 cfs) (pending operation)
Spring peak ends when < 20,300 cfs is predicted or observed at Jensen Gage	Peak release will be timed to coincide with peak and immediate post peak spring flows in the Yampa River. Estimated late May to early/late June, pending Yampa River flows. Increase from full power plant capacity in one day and increase 4,000 cfs / day during bypass to meet Reach 2 Target (>20,300 cfs). Bypass could be used for 1-7 weeks. Per Muth et al. > 2 weeks @ >18,600 cfs at Reach 2 will be attempted and this may include the LTSP target of > 20,300 cfs for 1 to ~2 weeks. Reach 2 flows will be attempted to be below flood stage of 24,100 cfs.
End of spring peak / ends when ramp down begins.	Ramp down, end of spring peak period – estimated middle to late June or later. ~1,000 cfs/day ramp down from bypass and power plant releases, until summer base flows begin; releases in the ~1,600 cfs range.
Summer CPM base flows / ends on September 30	Sustaining Pikeminnow base flow (2,200-2,800 cfs) within 2000 Flow and Temperature Recommendations, ~2,200 cfs in Reach 2 until September 30th. Releases will be in 1,700 cfs range, pending the Yampa River.
Autumn base flows Oct 1 to -Nov 30 / ends on November 30	Autumn base flow target in Reach 2 is 2,400-2,800 cfs. Average daily base flows ~2,400 cfs (+/- 40% period) in Reach 2. Average daily releases will be ~1,800 cfs, pending the Yampa River. Early October decreases @ 50 cfs/day to achieve 2,400 cfs in Reach 2. Late November increase @ 50 cfs/day to achieve +25% base flow by December 1.
Winter Base Flow Dec 1 to Feb 28 / Ends on February 28	Base flows increased to +25% to not exceed ~3,500 cfs in Reach 2 (+/- 25% period). Average daily releases at approximately ~2,400 cfs pending the Yampa River.
End of FG Operation Plan and Transition Period / End April 30	Average daily releases are increased or decreased to achieve Upper Limit Drawdown (EIS Table 2-3)

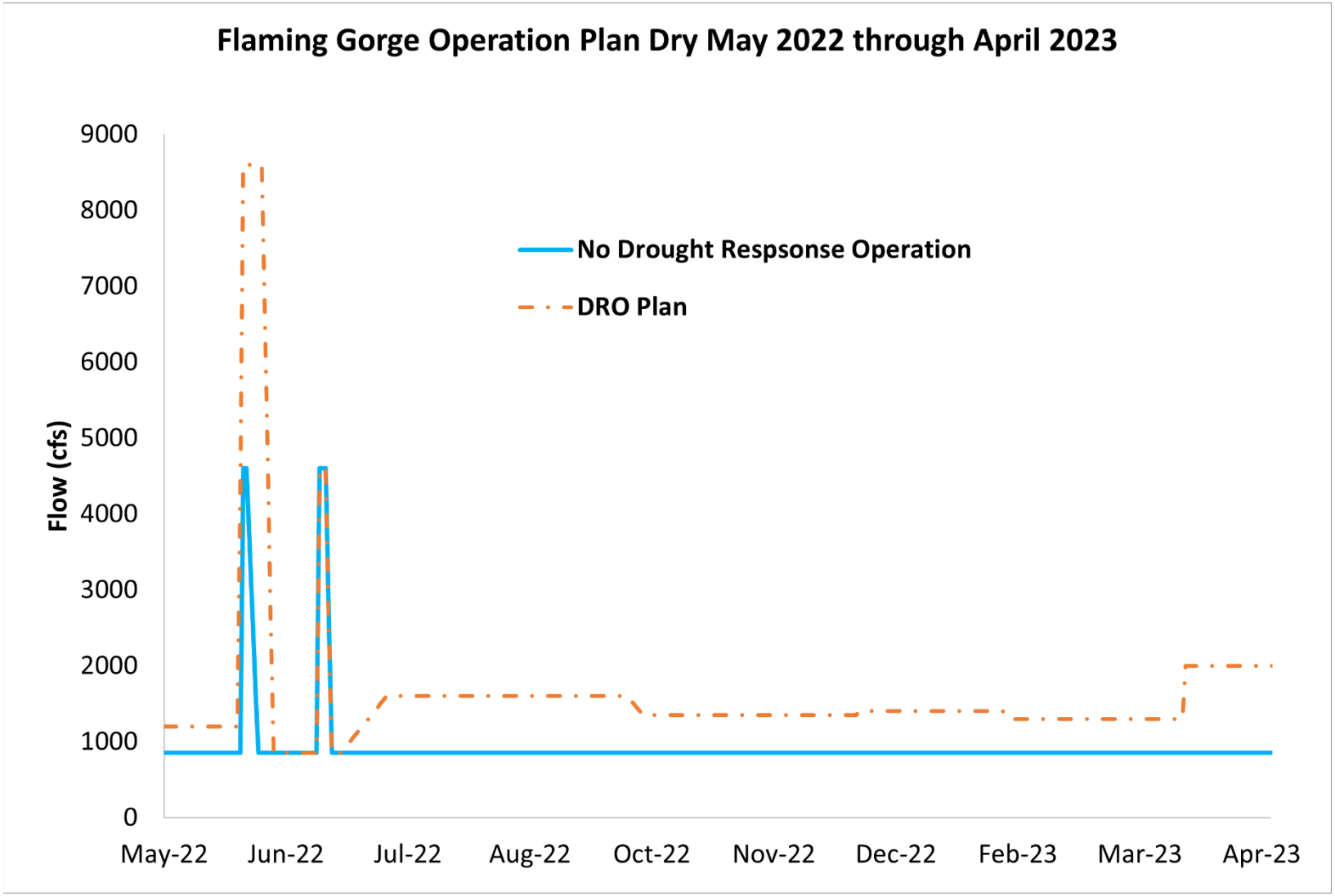

FIGURE 3 – Proposed flow regime for Dry Hydrology. For the Proposed Plan no DROA Plan, bypass can be used.

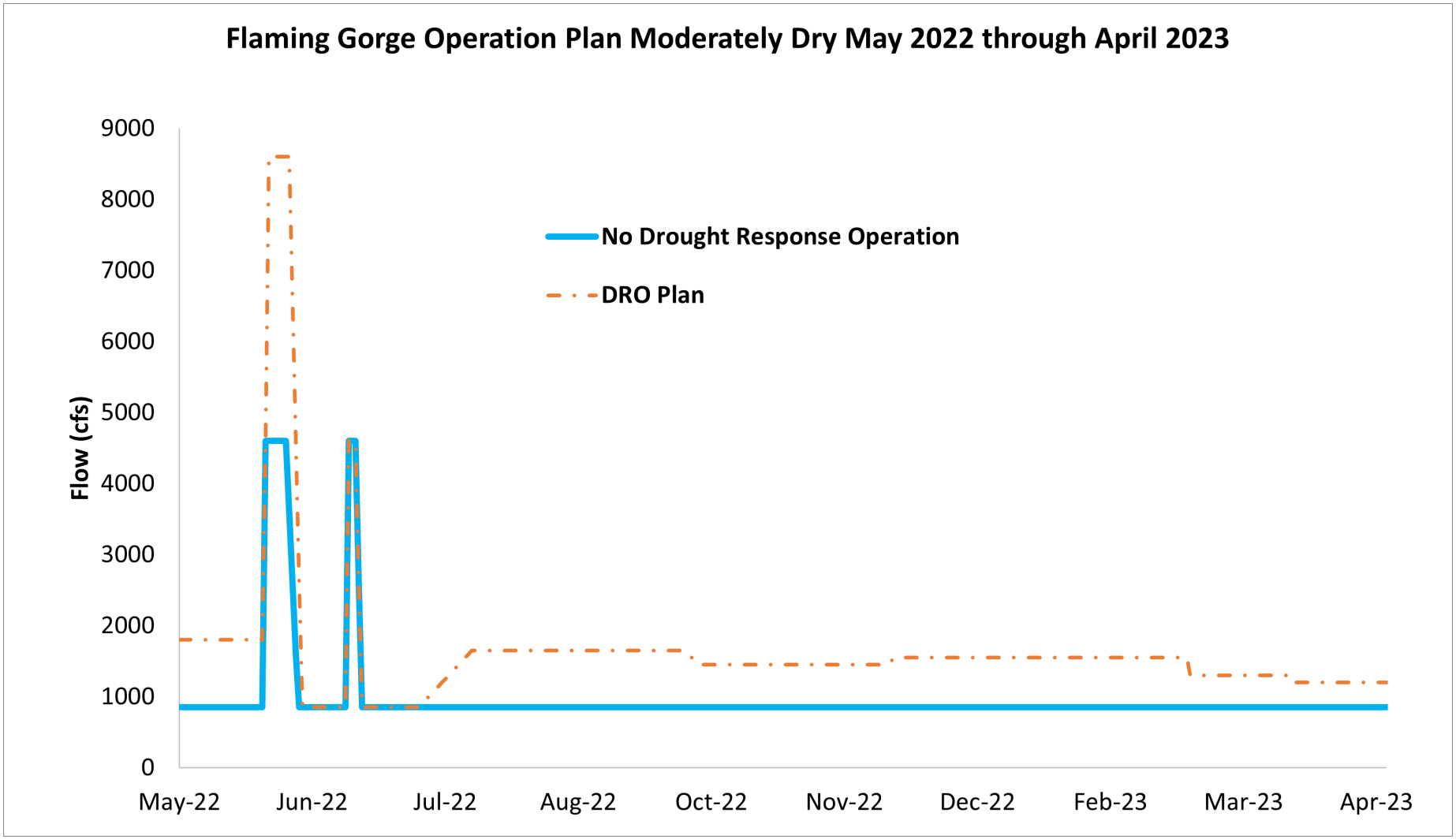

FIGURE 4 – Proposed flow regime for Moderately Dry Hydrology. For the Proposed Plan no DROA, bypass can be used.

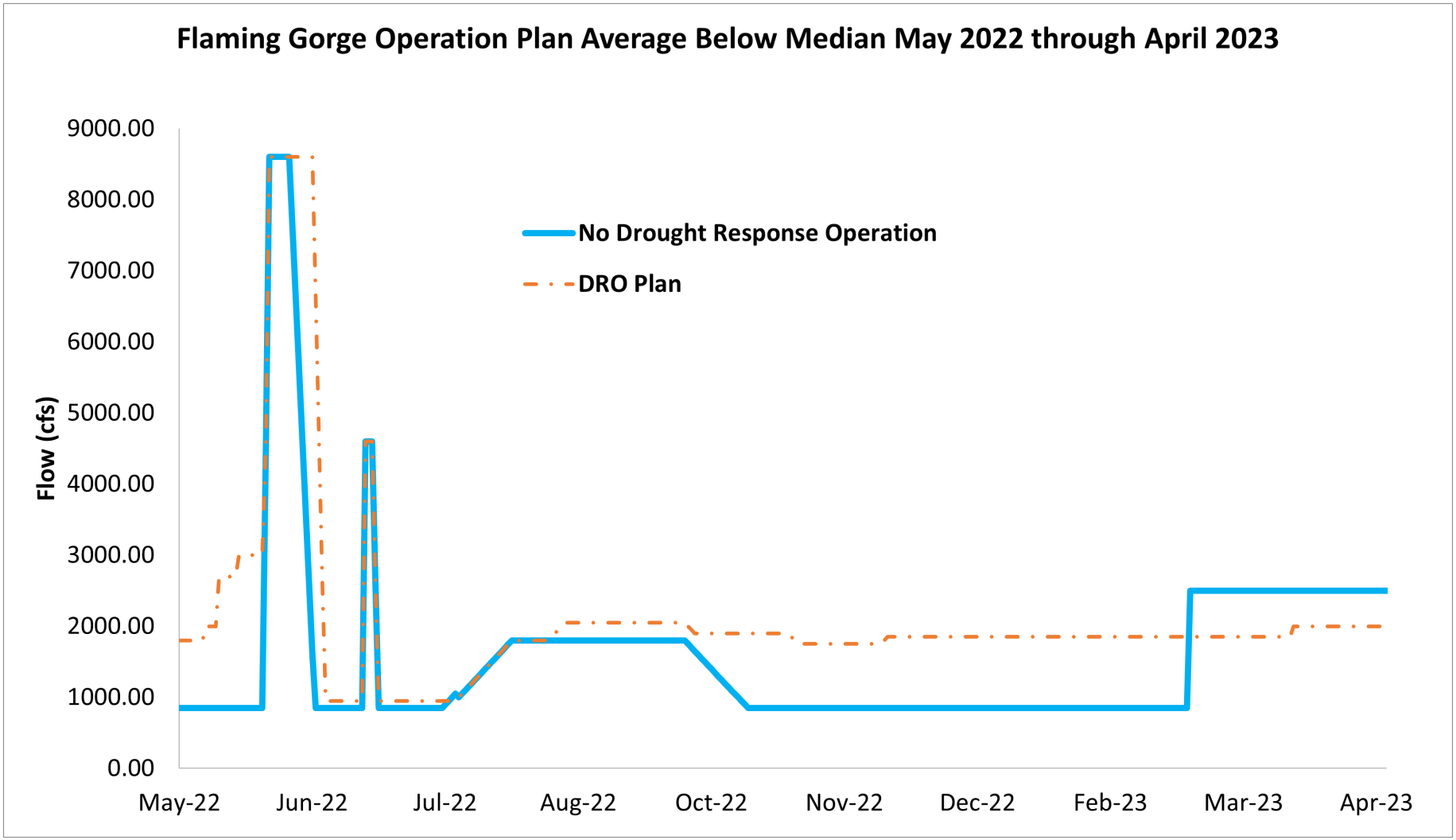

FIGURE 5 – Proposed flow regime for Average (below median) Hydrology.

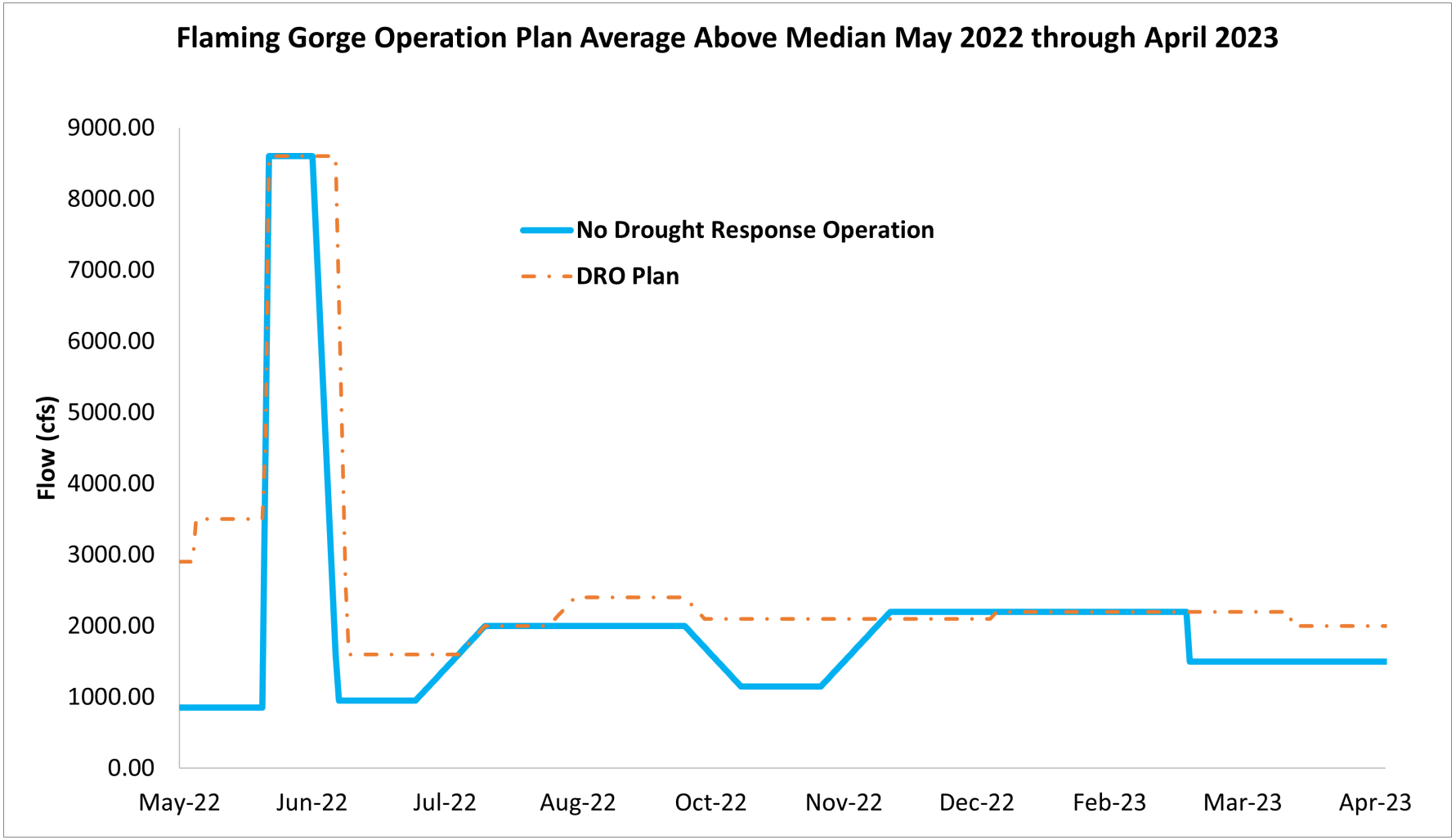

FIGURE 6 – Proposed flow regime for Average (above median) Hydrology.

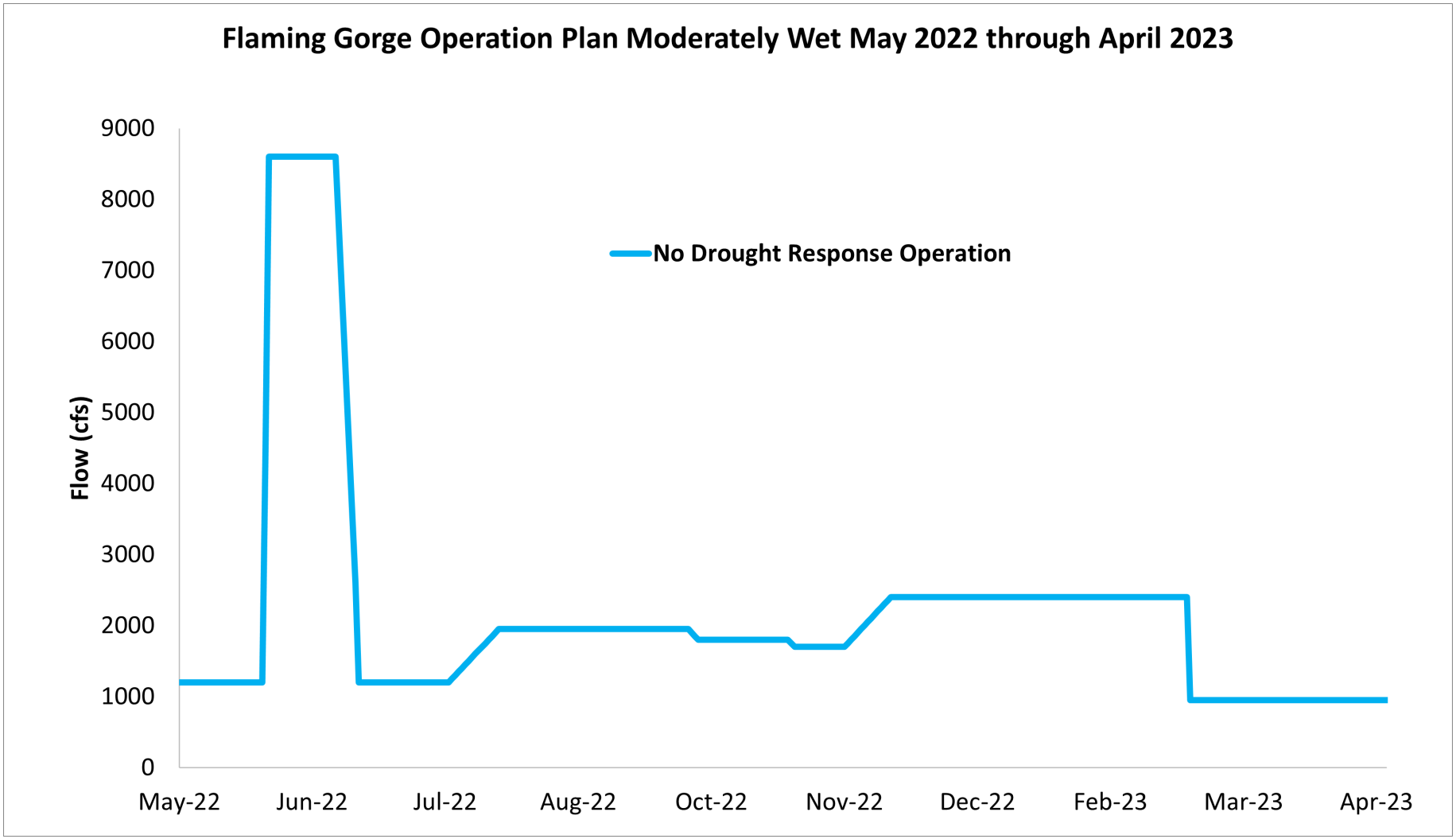

FIGURE 7 – Proposed flow regime for Moderately Wet Hydrology.