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Annual Report of Operations For Flaming Gorge Dam Water Year 2020

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Annual Report of Operations for Flaming Gorge Dam Water Year 2020

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Introduction

This report details the operations of Flaming Gorge Dam during water year 2020 and is produced pursuant to the February 2006 Record of Decision for the Operation of Flaming Gorge Dam (ROD) (USBR, 2006), the Operation of Flaming Gorge Dam Final Environmental Impact Statement (FEIS) (USBR, 2005) and the United States Fish and Wildlife Service (USFWS) 2005 Final Biological Opinion (BO) on the Operation of Flaming Gorge Dam (USFWS, 2005). This report will also include hydrologic conditions to support flow regimes. This is the fifteenth year of operations of Flaming Gorge Dam under the ROD.

In water year 2020, Reclamation operated Flaming Gorge Dam and Reservoir in compliance with the 2006 ROD and, to the extent possible, meet the goals and objectives of the Flow Recommendations and the approved study plan, the Larval Trigger Study Plan (LTSP). The Flow Recommendations divide the Green River below Flaming Gorge Dam into three river reaches. Reach 1 begins directly below the dam and extends to the confluence with the Yampa River. Reach 2 begins at the Yampa River confluence and continues to the White River confluence. Reach 3 is between the White River and Colorado River confluences (Muth et. al, 2000).

As described in ROD (USBR, 2006): *“The administrative record referenced in Section 2.5.3 of the EIS and on page 4 above will include*

- *an annual report to document the technical working group’s [known as the Flaming Gorge Technical Working Group (FGTWG)] recommendations and discussions;*
- *Reclamation’s target flow regimes on a season by season basis;*
- *analysis of previous operations as related to recommendations and targets;*
- *a long term analysis of the frequency of achieving the flow thresholds described in the 2000 Flow and Temperature Recommendations (Muth et al., 2000).”*

and stated in the FEIS (USBR, 2005)

- *“An administrative record of the operational decisionmaking would be maintained and available to the public. This record would include analysis of previous operations and the effectiveness of achieving desired targets on a year-by-year basis.*
- *Technical Working Group [FGTWG] meetings would also provide an opportunity to discuss historic operations in terms of the accomplishments and shortcomings of meeting the 2000 Flow and Temperature Recommendations. Reclamation would maintain an administrative record of these meetings to document the planning process.”*

Finally, the USFWS 2005 BO (USFWS, 2005) has requirements for an annual report. It is as follows: *“Reclamation will provide to the Service and Recovery Program a concise annual operations report. A primary purpose of the annual report is to provide an assessment of how well operations at Flaming Gorge Dam contributed to meeting flow targets. In addition, the annual report will provide a record of operations as identified under the incidental take statement. Basic information that should be summarized includes the following:*

- *A review of the April-July unregulated inflow forecasts provided by the National Weather Service via the River Forecast Center [known as the Colorado River Basin Forecast Center (CBRFC)] that were used to classify Green River hydrology.*

- *Additional factors that were used to determine which flow recommendation hydrologic category was targeted (e.g. Flaming Gorge Reservoir elevation, Yampa hydrology, past operations, power needs, Technical Working Group conversations, etc.),*
- *An accounting of actual flows and operations: spring flows and baseflows (reference [United States Geological Service (USGS)] gages at Yampa River at Deerlodge, Green River at Greendale, Utah Jensen, Ut, and near Green River, Ut),*
- *Results from Reclamation's spillway inspections,*
- *A summary of daily and seasonal fluctuations at Jensen, Utah,*
- *An overview of Reclamation's operations to meet thermal targets,*
- *An accounting of the actual thermal regime in upper and lower Lodore Canyon and the lower Yampa River based on available information.*
- *Recommendations to refine operations.*

Operational Plan Development and Process for Water Year 2020

In 2020, the operational process developed in 2006 was used to operate Flaming Gorge Dam. The operational plan development was based on the FEIS (Section 2.5.3) (USBR, 2005) and the commitments in the ROD (Sections VI, and VII) (USBR, 2006). The four-step process is described below.

4-Step Process of developing and finalizing the Annual Operation Plan

The four step process is a term used to describe, development and finalization of the Flaming Gorge Operation Plan. This process will concurrently fulfill informal consultation and coordination requirements of the Endangered Species Act for the action agencies. Below is a brief description of the four-step process.

1. The Upper Colorado River Endangered Fish Recovery Program (Recovery Program) may provide a request for studies to test the outcomes of modifying the flows and release temperatures.
2. A technical working group, known as FGTWG, consisting of biologists and hydrologists from Reclamation, Western Area Power Administration (WAPA) and the USFWS), will annually propose an initial flow regime to the Flaming Gorge Working Group.
3. The Flaming Gorge Working Group will then provide comments and input on the proposed flows relative to all resource concerns.
4. Reclamation will then make a determination on how to incorporate the additional information into the annual operational plan.

Pertinent dates of 4-Step Process 2020

The Recovery Program request was received on February 13, 2020. The key portion of the request is presented below. The LTSP refers to the final Study Plan to Examine the Effects of Using Larval Razorback Sucker Occurrence in the Green River as a Trigger for Flaming Gorge Dam Peak Releases (ad hoc Committee, March 2012 (LTSP) (2012)).

THE RECOVERY PROGRAM'S 2020 GREEN RIVER FLOW REQUEST:

Similar to the Recovery Program's 2019 Green River Flow Request, this request for 2020 has two components: a Larval Trigger Study Plan (LTSP)[LTSP, 2012] spring

peak, and experimentation with alternative Reach 2 base flow target ranges as can be accomplished with the ROD seasonal base flow variability. The Recovery Program is committed to evaluating the biological effects of these experiments as well as the potential effects to river dynamics and other resources. The Recovery Program believes all aspects of this request are supported by sound science, and we understand that achieving all components may not be possible based on water availability and operational considerations. The Recovery Program assumes that our 2020 flow requests will be refined in concert with the Flaming Gorge Technical Work Group (FGTWG) using the best available flow forecast information, status and biological needs of the species, the readiness of necessary data collection activities, and other information. To assist Reclamation and the FGTWG, should such deliberations be necessary, the Recovery Program prioritizes these flow experiments as follows:

- *Priority 1 - Experimental revised Reach 2 base flow ranges (as per Bestgen and Hill 2016a), as feasible within existing authority under the 2006 ROD, and subject to the limitations described above in 2020.*
- *Priority 2- Experimental LTSP spring peak (as per LTSP ad hoc committee 2012)*

The FGTWG met on the week of March 2, 2020 and finalized the proposal on March 16, 2020.

Flaming Gorge Work Group Meetings were held on March 19, 2020 via WebEx and on April 16, 2020 via WebEx.

The Flaming Gorge Operation Plan - May 2020 through April 2021 (FG-Ops 2020) was concurred by Kathleen Callister, Resources Management Division (RMD) Manager, Kent Kofford, Provo Area Office Manager, and Nicholas Williams, Action Upper Colorado Basin Power Manager and approved by the Upper Colorado Basin Regional Director Brent Esplin on April 30, 2020.

Biologists with USFWS collected larval razorback sucker from the Green River on May 19, 2020 and notified Reclamation and other members of the FGTWG. On May 22, 2020 Kathleen Callister sent notice per the FG-Ops 2020 to initiate the LTSP (2012) spring operation flows via email to the Power Office. After public notification, releases from Flaming Gorge Dam were increased to full powerplant capacity on May 26, 2020.

On June 30, 2020 George Weekley from the Utah Ecological Services Office of the USFWS sent notice to the RMD manager (per the FG-Ops 2020) that larval Colorado pikeminnow presence was anticipated to occur as early as July 1. On June 30, 2020, the RMD manager, provided this notification of anticipated larval Colorado pikeminnow presence to the Power Office. On July 1, 2020 targeted base flows were first achieved in Reach 2. Colorado Pikeminnow larvae were detected on July 12.

Operation Decision

The Recovery Program request, FGTWG proposal and FG-Ops 2020 all had the same two elements concerning the flow regimes for the LTSP (2012) spring peak and alternative Reach 2 base flow target ranges for use with the ROD seasonal base flow variability.

The Recovery Program's 2020 Summer Base Flow Request is to use the seasonal base flow flexibility identified in the 2006 ROD to achieve revised range of summer base flows (Bestgen and Hill, 2016) intended to improve survival of age-0 Colorado pikeminnow (*Ptychocheilus*

lucius). While this request from the Recovery Program did not include an approved study plan , it was determined that the requested summer base flows could be achieved for all hydrologic conditions within the +/-40% flexibility allowed in the 2000 Flow and Temperature Recommendations (Muth et al., 2000). Therefore, to the maximum extent possible, the objective flows in Reach 2 were attempted between the request and 2000 Flow and Temperature Recommendations (Muth et al., 2000).

The second flow regime request was the 2020 spring flow request to establish a release regime that facilitated further research under the LTSP. The LTSP's primary research objective was the request that "Reclamation use the occurrence of razorback sucker larvae in channel margin habitats (as determined by real-time monitoring) as the 'trigger' to determine when peak releases should occur from Flaming Gorge Dam." The LTSP specifies the peak and duration for different hydrological conditions at Reach 2. Releases from the Flaming Gorge Dam were used to supplement spring runoff from the Yampa River to achieve targets flow at Reach 2 at the Jensen USGS gage.

The FG-Ops 2020 was developed and approved by Reclamation. The FG-Ops 2020 detailed operational hydrograph descriptions for moderately dry, average (below and above median) and moderately wet scenarios for the spring peak and the summer-autumn and winter base flow periods. The summer-autumn and winter base flows periods followed the 2000 Flow and Temperature Recommendations (Muth et al., 2000).

The State of Utah Department of Natural Resources Division of Wildlife Resources (DNR-DWR) tailwater fishery assessment flows, a semi-annual event, occurred on April 20-21, 2020 and September 1-2, 2020. The assessment requires a 1600 cfs releases during specified hours to conduct the tailwater water fishery assessment.

Hydrology

Reservoir storage in Flaming Gorge decreased slightly during water year 2020. At the beginning of water year 2020, Flaming Gorge storage was 91 percent of live capacity at elevation 6,031.57 feet, with 3,410,000-acre feet in storage. The unregulated inflow to Flaming Gorge during water year 2020 was 1,250,000-acre feet which was 86 percent of average. At the end of the water year, Flaming Gorge storage was at 85 percent of live capacity at elevation 6,025.93 feet, with 3,190,000-acre feet resulting in a net decrease during water year 2020 of 215,00-acre feet. Located in Table 1 is the forecasted and observed unregulated April through July inflow. The spring operations for 2020 operated in an average (below median) hydrologic classification. The autumn initial operations for 2020 operated in an average hydrologic classification. Note, not all spring hydrologic classifications in table 1 were the identified hydrologic classification for operations.

Table 1 –April – July Forecasts and Spring and Base Flow Hydrologic Classifications Upper Green

| Year | May 1st A-J Unreg Inflow Forecast (1000 AF) | Spring Hydrologic Classification | Observed A-J Unreg Inflow (1000 AF) | Base Flow Hydrologic Classification |
|-------------|--|---|--|--|
| 2006 | 1,100 | Average (Abv Median) | 724 | Moderately Dry |
| 2007 | 500 | Moderately Dry | 370 | Dry |
| 2008 | 820 | Average (Blw Median) | 728 | Moderately Dry |
| 2009 | 890 | Average (Blw Median) | 1,197 | Average (Abv Median) |
| 2010 | 515 | Moderately Dry | 705 | Moderately Dry |
| 2011 | 1,660 | Moderately Wet | 1,925 | Wet |
| 2012 | 630 | Moderately Dry | 570 | Moderately Dry |
| 2013 | 480 | Moderately Dry | 361 | Dry |
| 2014 | 1,320 | Average (Abv Median) | 1,159 | Average (Blw Median) |
| 2015 | 570 | Moderately Dry | 1,035 | Average (Blw Median) |
| 2016 | 770 | Moderately Dry | 1,047 | Average (Blw Median) |
| 2017 | 2,260 | Wet | 2,214 | Wet |
| 2018 | 1,000 | Average (Blw Median) | 1,118 | Average (Abv Median) |
| 2019 | 1,050 | Average (Blw Median) | 1,179 | Average (Abv Median) |
| 2020 | 880 | Average (Blw Median) | 833 | Average (Blw Median) |

Autumn and Winter Base Flow for Water Year 2020

Base Flow Calculation Autumn and Winter Water Year 2020 -- The autumn and winter base flow targets were established using October 2019 Most Probable 24-Month Study and December 2019 Most 24-Month Study. Starting at a pool elevation of 6,031.57 feet, autumn base flows to achieve a 6,027 feet elevation by March 1 were calculated to be approximately 1,800 cfs. Reach 2 target for the average hydrologic classification according to the 2000 Flow and Temperature Recommendations (Muth et al., 2000) is 1,500 cfs to 2,400 cfs. Reach 2 flows were 2,210 cfs in early October, then lowered to 1,470 cfs by late October, then increased to 2,500 cfs at the end of November. Releases ranged from 1075 cfs to near 1950 cfs, which is -22% and +8% of the base flow release at the dam, which is within +/-40% of the targeted flow allowed by the ROD during the autumn period.

Starting at a pool elevation of 6,031.01 feet in December, winter releases to achieve a 6,027 feet elevation by March 1 were approximately 2,055 cfs. Releases in December 2019, January 2020, and February 2020 were near 2,150 cfs which was approximately 5% above the daily average release base flow target which is allowed under the Flaming Gorge ROD. As a result of this elevated base flow the pool elevation on March 1, 2020 was 6,026.75 feet. In the month of December 2019 flows ranged in Reach 2 from approximately 2,500 cfs to 2,950 cfs and flows in January and February ranged from approximately 2,650 cfs to 2,800 cfs.

Two base flow objectives were targeted during water year 2020 per the 2006 ROD.

3% Daily Flow Changes -- As described in the FEIS, flow changes no greater than 3% of the total river flow are to occur during the base flow period. During water year 2020 autumn and winter base flow period, release changes during the base flow periods were limited to no more

than 50 cfs per day which was within the 3% daily change limit described in the FEIS. This largely achieved the daily flow change restriction throughout the base flow periods during water year 2020. A total of 4 days was at differences larger than 50 cfs and greater than 100 cfs differences. This is due to dam facility issues.

Jensen 0.1- stage change -- As described in the 2000 Flow and Temperature Recommendations (Muth et al., 2000) “*Flow variation resulting from hydropower generation at Flaming Gorge Dam should be limited to produce no more than a 0.1-m stage change within a day at the USGS gage near Jensen, Utah.*”

In water year 2020, during the base flow periods Reclamation coordinated with WAPA to establish Flaming Gorge release patterns for power production. This is to meet the requirement that hydropower generation at Flaming Gorge dam should produce no more than 0.1-m stage change at the USGS Jensen Gage. To estimate the impact of proposed release patterns, a routing model called the SSARR model was used to predict stage changes under various steady flow conditions for the Yampa River. Based on results from the SSARR model, a release pattern was developed which optimized power production that also met the stage change requirement of the FEIS. As conditions changed, the release pattern was modified to attempt to maintain this daily stage change restriction.

During the months of October through February in water year 2020 (152 days), 10 days were at or above 0.15 meters of stage change over 24 hours. It was observed that Yampa flows changed about 100 cfs per day for half those stage changes. During the same period 76 days observed 24-hour stage changes remained below 0.12 meters while the other 66 days were between 0.12-m and 0.15-m.

Autumn and Winter flows targets -- USGS Gage – Greendale, UT – The autumn and winter base flow at Reach 1 targets per the 2000 Flow and Temperature Recommendations for the average condition is 800 – 2,200 cfs. The maximum and minimum at a +/- 25% of this range is 600 – 2,750 cfs. Flows ranged from October through February to approximately 1,100 cfs to 2,150 cfs which was measured at the USGS gage Greendale, UT.

USGS Gage – Yampa at Deerlodge Park, CO – The Yampa at Deerlodge Park (aka Yampa) gage supplements Reach 2 Targets. For the autumn and winter base flow the Yampa provided approximately 200 cfs to 690 cfs with an average near 500 cfs.

USGS Gage – Jensen, UT -- The autumn and winter base flow at Reach 2 targets per the 2000 Flow and Temperature Recommendations for the average condition is 1,500 – 2,400 cfs. The maximum and minimum at a +/- 25% of the targeted range is 1,125 – 3,000 cfs. Flows ranged from October through February to approximately 1,500 cfs to 2,930 cfs which was measured at the USGS gage Green River near Jensen, UT. Two distinct averages were observed first the autumn near 1,800 cfs and for the winter near 2,750 cfs.

USGS Gage – Green River, UT -- The autumn and winter base flow at Reach 3 targets per the 2000 Flow and Temperature Recommendations for the average condition is 1,800 – 4,200 cfs. The maximum and minimum at a +/- 25% of the targeted range is 1,350 – 5,250 cfs. Flows ranged from October through February to approximately 1,700 cfs to 4,000 cfs which was measured at the USGS gage Green River near Jensen, UT. The bulk of the flows range from 2,750 cfs to 3,700 cfs.

Spring Operations

Flaming Gorge Dam operations in 2020 were conducted in compliance with the 2006 Flaming Gorge ROD (USBR, 2006). Razorback sucker larvae were initially detected on May 19, 2020. After public notification, releases from Flaming Gorge Dam were increased to full powerplant capacity on May 26, 2020. Bypass releases were utilized to bring the total release from Flaming Gorge Dam to 8,600 cfs for 4 days, starting on May 27, 2020, to enhance floodplain operations in the middle Green River for the benefit of endangered species. Full powerplant capacity releases ended on June 9, 2020.

In total, Flaming Gorge Dam released at or above powerplant capacity releases of 4,600 cfs for 13 days during the April through July runoff period. Yampa River flows at the Deerlodge gage during the LTSP peaked at 11,400 cfs on June 3, 2020. The peak release from Flaming Gorge Dam occurred before the Yampa River peak to support larval entrainment and reservoir management during the high spring inflows. Flows measured on the Green River at the Jensen, Utah gage reached levels at or above 14,000 cfs for 12 days between May 29 and June 9, 2020 with a peak of 17,800 cfs on June 4, 2020. The LTSP target for this average (below median) hydrologic classification is greater than or equal to 14,000 cfs and a peak magnitude of up to 18,600 cfs for 7 days or more days.

Hydrologic conditions in the Upper Green River Basin above Flaming Gorge were below average in water year 2020. Snowpack development tracked just above median with average fall conditions maintaining soil moisture resulting in near average runoff forecasts. Peak snow water equivalent reached 113 percent of seasonal median on April 18, 2020. The May forecast for the April through July unregulated inflow into Flaming Gorge Reservoir was 880,000-acre feet or 85 percent of average. The observed unregulated inflow during the April through July season was 833,000-acre feet or 85 percent of average, 67% exceedance value (average [below median] hydrologic classification).

Observed flow volumes from the Yampa River Basin and Upper Green River Basin fell into the below average hydrologic condition. The Flaming Gorge ROD hydrologic classification for the Upper Green in 2020 was characterized as average. It was determined that the hydrologic classification was average and the LTSP hydrologic classification was average (below median) based on the May forecast. Flows at Jensen met 2006 Flaming Gorge ROD flow targets in Reach 2 for the ROD Flow Recommendation of at least 14,000 cfs for 12 days.

The flexibility in the ROD allows for a change in hydrology classification two higher and one lower than that designated by the forecasted unregulated inflow volume on May 1 depending upon Yampa River conditions. Ramp down rates were consistent with 2000 Flow and Temperature Recommendations (Muth et al., 2000) at 350 cfs/day (moderately dry and dry hydrologic classification) while below power plant capacity. The June first CBRFC April through July forecast was 740,000-acre feet, which is a moderately dry hydrologic classification. A ramp down rate of 1,000 cfs/day was used the release rate from 8,600 to 4,600 cfs, which has historically been used to ramp down above power plant capacity to reduce the duration of colder water releases from bypass.

Base Flow Summer 2020

Base Flow Summer 2020 -- Hydrologic summer base flows for water year 2020 started in the mid July 2020. From the 2000 Flow and Temperature Recommendations (Muth et al., 2000) for an average condition the beginning of the base flow season is typically about mid-July and for a

moderately wet condition the base flow season typically starts about August 1. The water year 2020 base flow was determined using both unregulated flow on the Green River and Yampa River at Deerlodge. The unregulated daily inflow for the Upper Green River transitioned from spring runoff to summer base flow around early August that is the unregulated inflow declined below 1,000 cfs and continued to decrease. Consistent flows less than 500 cfs started on August 10, 2020. Summer base flow on the Upper Green River began after August 10, 2020. Flow on the Yampa River transitioned from spring runoff to summer base flow around early July that is the unregulated inflow were less than 1,000 cfs. Flow remained below 450 cfs, average daily July CBRFC forecasted inflow, after July 12, 2020. The start of the base flow season was determined to start based on flows measured at the USGS Yampa Deerlodge gage when flows measured between 400 cfs and 500 cfs, about July 12.

The CBRFC forecast August 1st August unregulated inflow, 65,000-acre feet an average hydrologic classification, changed significantly when compared the observed August unregulated inflow, 35,000-acre feet a moderately dry hydrologic classification. This resulted in a September operation change from an average condition operation per the Flaming Gorge Operation Plan – May 2020 through April 202 to a moderately dry condition operation.

Based on the April through July observed unregulated inflow being an average condition, the initial summer base flow was operated as an average condition as defined in the 2000 Flow and Temperature Recommendations. The proposed flow targets from the Colorado Pikeminnow proposed study for an average condition is 2,000 - 2,600 cfs and targets from the 2000 Flow and Temperature Recommendations (Muth et al., 2000) is 1,500 - 2,400 cfs. The upper range of Colorado Pikeminnow study proposed flow was first achieved on July 1, 2020, at least 11 days before the hydrologic base flow period, based on the Yampa River. The end of spring releases and ramp down occurred on June 19, 2020 and sustained flow started on July 19, 2020 at 1790 cfs and later increased to 1,855 cfs by August 15, which resulted in a +40% of the calculated base flow at Reach 2. Targeted Colorado pikeminnow base flows of 2,000 cfs to 2,600 cfs were achieved in July and August. A few days of daily average flows at the USGS Jensen gage were below 2,000 cfs but this is still within the 2000 Flow and Temperature Recommendations (Muth et al., 2000) of 1,500 - 2,400 cfs, average hydrologic condition.

The August unregulated inflow was 32,000 cfs which in 40% of average and corresponds to an 84% exceedance value, a moderately dry hydrologic classification. Operations changed from an average to a moderately dry hydrologic condition operation. The proposed flow targets from the Colorado Pikeminnow proposed study for a moderately dry condition is 1,800 - 2,000 cfs and targets from the 2000 Flow and Temperature Recommendations (Muth et al., 2000) is 1,100 - 1,500 cfs. Releases were reduced at 50 cfs/day increments on September 3, 2020 and sustained releases at 1,600 cfs was made on September 7, 2020. Reach 2 flows ranged from about 1,820 cfs to 1,950 cfs with most flows near 1,880 cfs.

Summer 2020 base flow calculation -- The April through July 2020 unregulated inflow was 833,000-acre feet (85 percent of average) which fell into an average hydrologic condition. Using the August 2020 Most Probable 24 Month Study, the average release rate from Flaming Gorge Dam required to achieve the March 1 upper level drawdown target pool elevation of 6,027 feet was 1,285 cfs. This release rate also achieved a base flow in Reach 2 that was within the desired base flow range for the average hydrological classification. The August 2020 average daily

release rate was near 1,855 cfs. The Yampa flow used in the base flow calculation was predicted to 150 cfs, average daily flow. Calculating base flow in Reach 2 (1,285 cfs + 150 cfs = 1,435 cfs) and determining releases with a +40% base flow at Reach 2 is 2,009 cfs (1,435 cfs * 1.40 = 2,009 cfs), then subtracting Yampa flow indicated that a release from Flaming Gorge Dam near 1,855 cfs would meet the Colorado pikeminnow base flow targets in Reach 2.

Using the September 2020 Most Probable 24 Month Study the average releases rate from Flaming Gorge Dam to achieve the March 1 upper level drawdown target pool elevation of 6,027 feet was near 1,100 cfs. The Yampa base flow calculation for September was near 150 cfs. Calculating base flow in Reach 2 (1,100 cfs + 150 cfs = 1,250 cfs) and determining releases with a +40% base flow at Reach 2 is 1,750 cfs (1,250 cfs * 1.40 = 1,750 cfs), then subtracting Yampa flow indicated a release near 1,600 cfs would be necessary to sustain Colorado pikeminnow base flows.

3% changes – As described in the FEIS, flow changes no greater than 3% of the total river flow are to occur during the base flow period. During water year 2020 summer base flow period, release changes during the base flow periods were limited to no more than 50 cfs per day which was within the 3% daily change limit described in the FEIS. In most of July the supervisory control and data acquisition (SCADA) computer system was largely unavailable. This resulted in difficult operation, in total 4 days resulted in daily average releases being larger than 100 cfs or 8 to 14% changes in releases. During the release change in early September from 1,855 cfs to 1,600 at change two days were greater than 50 cfs/day change.

Jensen 0.1-stage change – In water year 2020, during the base flow periods Reclamation coordinated with WAPA to establish Flaming Gorge release patterns for power production. This is to meet the requirement that hydropower generation at Flaming Gorge dam should produce no more than 0.1-m stage change at the USGS Jensen Gage. Most of the observed summer base daily stage change at the USGS Jensen gage were at or below 0.12-m stage change and values greater than 0.12-m stage change occurred in July at no greater than 0.14-m stage change.

Spillway Inspection

The use of the spillway will only be used for extreme dam safety situations.

Inspections of the structure would be made after each spill event. The spillway was not used in water year 2020. The USFWS expects Reclamation to report the results of their post-spill spillway inspections in their annual operations report. The spillway was inspected on October 24, 2019. The spillway, inlet, chute, walls, pier, floor, spillway tunnel, aeration slot, flip bucket walls and basin were inspected. These components of the spillway were noted as Satisfactory (will fulfill the intended purpose, like new condition), Fair (will fulfill intended purpose with signs of wear), and No (an issue was not observed), except the Spillway Tunnel. The spillway tunnel rated Poor (may not fulfill intended purpose), with the following comment “*Cracking, spalls and calcite deposits are found throughout leading to a generally rough surface*”. Also concerning the spillway notes was made that incomplete Operation and Maintenance was made and this is described as follows:

- **2018-2-B** Repair the two deteriorated areas along the left portion of the aeration slot as well as the spalls located 254-feet and 315-feet downstream of the spillway gates in the spillway tunnel.

- Status: **Incomplete**
- **2018-2-C** Repair and prevent further erosion on the river bank/hillside up to the powerplant access road, just downstream of the spillway flip bucket.
 - Status: **Incomplete**- A value planning study was conducted in December 2018 to address this issue. Repair work has not yet begun but is planned for the Spring of 2020.

For the Flaming Gorge Dam - Annual Site Inspection (ASI) FY 2020 Colorado River Storage Project report there is a New Operation and Maintenance Recommendation. This recommendation is as follows: Repair the coating failure on the downstream side of the bottom of the spillway gates.

Long Term Analysis of the Frequency of Achieving the Flow Thresholds

Spring Peak Targets -- Per the ROD (USBR, 2006) long term thresholds described in the 2000 Flow and Temperature Recommendations (Muth et al., 2000) are described below. Due to the implementation of the LTSP (2012), two additional hydrologic conditions were evaluated, average (below median) and average (above median). The May 2020 CBRFC forecasted April through July had a volume of 880,000-acre feet which was an average (below median) hydrologic condition as described by the 2012 LTSP. The August 2020 observed April through July volume was 833,000-acre feet which was an average (below median) hydrologic condition as described by the 2012 LTSP. According to the 2012 LTSP, for average (below median) hydrological condition, flows in Reach 2 are recommended to be at least 14,000 cfs but less than 18,600 cfs for different durations, at least 1 day but less than 7 days, at least 7 days but less than 14 days, or equal or greater than 14 days. Also, for this average (below median) hydrological condition, flows in Reach 2 are recommended to be at least 8,300 cfs but less than 14,000 cfs for equal or greater than 14 days.

Peak flow greater than 18,600 cfs in Reach 2 did not occur in water year 2020. Peak flows greater than 8,300 cfs did occur. This is consistent with the expected result of this occurring in other average years, per the 2000 Flow and Temperature Recommendations (Muth et al., 2000).

After detection of razorback sucker larvae on May 19, flows measured on the Green River at Jensen, Utah reached levels at or above 8,300 cfs for 27 days and at levels at or above 14,000 cfs for 12 days with a peak of 17,800 cfs for one day. The LTSP targets that were achieved as an average (below median) condition was (1) at least 8,300 cfs but less than 14,000 cfs for greater than 14 days and (2) at least 14,000 cfs but less than 18,600 cfs for 12 days.

Reaches 1, 2 and 3 ROD Flow Recommendation spring objectives and the desired frequency of achievement are described in Tables 2, 3 and 4. Water year 2020 is the 15th year of operations under the ROD.

Table 2 – Reach 1 ROD Flow Objectives Achievements in 2020

| Spring Peak Flow Objective | Hydrologic Classification | Desired Frequency Percent of Achievement | Achieved in 2020 | Achievement Rate to Date (Cumulative Frequency %) * |
|---|---------------------------|--|------------------|---|
| Peak \geq 8,600 cfs, \geq 1 day | Wet | 10 % | Yes | 40 % |
| Peak \geq power plant capacity \geq 1 day | Moderately Wet - Dry | 100% | Yes | 100 % |

*Based on 15 years of operation under the ROD and spring hydrologic classification (2006-2020)

Table 3 – Reach 2 ROD Flow Objectives Achievements in 2020

| Spring Peak Flow Objective | Hydrologic Classification | Desired Frequency Percent of Achievement | Achieved in 2020 | Achievement Rate to Date (Cumulative Frequency %) * |
|--|---------------------------|--|------------------|---|
| Peak \geq 26,400, cfs \geq 1 day | Wet | 10 % | No | 7 % |
| Peak \geq 22,700, cfs \geq 2 weeks | Wet | 10 % | No | 7 % |
| Peak \geq 18,600, cfs \geq 4 weeks | Wet | 10 % | No | 7 % |
| Peak \geq 20,300, cfs \geq 1 day | Moderately Wet | 30 % | No | 27 % |
| Peak \geq 18,600, cfs \geq 2 weeks | Average | 40 % | No | 13 % |
| Peak \geq 18,600, cfs \geq 1 day | Average | 50 % | No | 40 % |
| Peak \geq 8,300, cfs \geq 1 day | Average | 100 % | Yes | 100 % |
| Peak \geq 8,300, cfs \geq 1 week | Moderately Dry | 90 % | Yes | 93 % |
| Peak \geq 8,300, cfs \geq 2 days except in extreme dry years | Dry | 98 % | Yes | 100 % |

*Based on 15 years of operation under the ROD and spring hydrologic classification (2006-2020)

Table 4 – Reach 3 ROD Flow Objectives Achievements in 2020

| Spring Peak Flow Objective | Hydrologic Classification | Desired Frequency Percent of Achievement | Achieved in 2020 | Achievement Rate to Date (Cumulative Frequency %) * |
|--|---------------------------|--|------------------|---|
| Peak \geq 39,000, cfs \geq 1 day | Wet | 10 % | No | 7 % |
| Peak \geq 24,000, cfs \geq 2 weeks | Wet | 10 % | No | 13 % |
| Peak \geq 22,000, cfs \geq 4 weeks | Wet | 10 % | No | 7 % |
| Peak \geq 24,000, cfs \geq 1 day | Moderately Wet | 20 % | No | 33 % |
| Peak \geq 22,000, cfs \geq 2 weeks | Average | 40 % | No | 13 % |
| Peak \geq 22,000, cfs \geq 1 day | Average | 50 % | No | 33 % |
| Peak \geq 8,300, cfs \geq 1 day | Moderately Dry | 100 % | Yes | 100 % |
| Peak \geq 8,300, cfs \geq 1 week | Moderately Dry | 90 % | Yes | 93 % |
| Peak \geq 8,300, cfs \geq 2 days except in extreme dry years | Dry | 98 % | Yes | 100 % |

*Based on 15 years of operation under the ROD and spring hydrologic classification (2006-2020)

Base flow targets -- Summer base flow targets for July and August (water year 2020) was operated under average hydrology classification. This is due to the April through July forecasted and observed unregulated inflow being an average hydrologic classification. The September operation changed to a moderately dry operation, which was due to the August unregulated inflow being a moderately dry hydrologic classification. The August and September operations

utilized the full +40% flexibility around Reach 2 flow objectives listed in the 2000 Flow and Temperature Recommendations (Muth et al., 2000) to achieve Colorado pikeminnow proposed flow targets. Summer flows for the month of August under average hydrologic conditions were 2,021 cfs at the USGS Jensen gage in Reach 2. Hydrology declined to moderately dry conditions during September, and observed flows averaged 1,890 cfs at the USGS Jensen gage in Reach 2. The August operation is consistent with both the 2000 Flow and Temperature Recommendations (Muth et al., 2000) average base flow (1,500-2,000 cfs, +/-40% of base flow in Reach 2) as well as the Colorado Pikeminnow study proposed average base flows (2,000-2,600 cfs) in Reach 2. The September operation is consistent with both the 2000 Flow and Temperature Recommendations (Muth et al., 2000) moderately dry base flow (1,100-1,500 cfs, +/-40% of base flow in Reach 2) as well as the Colorado Pikeminnow study proposed moderately dry base flows (1,800-2,000 cfs).

Concerning base flow during the autumn period (water year 2020) for an average condition (based on 2019 April-July observed unregulated inflow) this year's observed base flow for October and November averaged 1,855 cfs at the USGS Jensen gage in Reach 2. This is consistent with the 2000 Flow and Temperature Recommendations (Muth et al., 2000) base flow for an average condition (1,500 cfs to 2,400 cfs).

Concerning base flows during the winter period (water year 2020) for an average condition (based on 2019 April-July observed unregulated inflow) this year's observed base flow for December, January, and February predominately averaged 2,740 cfs at the USGS Jensen gage in Reach 2. The flows ranged around 2,500 to 2,950 cfs in December and for January and February flows were closer to 2,700 cfs. The observed flows in Reach 2 is consistent with the 2000 Flow and Temperature Recommendations (Muth et al., 2000) base flow for an average condition (1,500 cfs to 2,400 cfs, +/-25% of base flow at Reach 2).

Temperature Objectives Achieved in Water Year 2020

An operational plan for the selective withdrawal system (SWS) on Flaming Gorge Dam was completed by a subset of the FGTWG in June 2007 and revised in June 2012. The operational plan provides guidelines for implementation of the 2006 ROD temperature objectives below Flaming Gorge Dam (Table 1). Operational guidelines direct operators to achieve maximum gate elevation (40 feet below reservoir surface) by June 15 of each year in order to deliver target outflow temperatures of 15-16 °C (59 - 61 °F) during the summer months. In this analysis, we rounded all daily mean temperature measurements to the nearest whole degree Celsius.

On June 15 of water year 2020, SWS gates were elevated to 41 feet below the reservoir surface, however target dam release temperatures (15 °C or 59 °F at the Greendale gauge, USGS 09234500) were not fully achieved until July 31 (Figure 1). On August 8, high temperature stator alarms on the dam's unit 2 and 3 generators prompted operators to lower SWS gates by 2.5 feet to 40.5 feet below the reservoir surface in order to release cooler water.

Table 5 – Temperature objectives for the Green River below Flaming Gorge Dam pursuant to the 2005 EIS and 2006 ROD and results from water year 2020 summer base flow period.

| Temperature Objectives | Reach | Desired Frequency % | Was objective achieved in Water Year 2020? |
|--|-------|---------------------|---|
| Temperatures ≥ 18 °C (64 °F) for 3-5 weeks ¹ starting in June (dry-average years) or August (moderately wet-wet years) | 1 | 100% | Yes (25 days at or above 18°C during CPM larval drift; 63 days total) |
| Green River should be no more than 5 °C (9 °F) colder than the Yampa River during the base flow period in order to minimize thermal shock to drifting Colorado pikeminnow larvae | 2 | 100% | No (1 day) in excess of 5 °C during CPM larval drift) |

Average daily temperatures at Gates of Lodore (USGS 404417108524900) in 2020 intermittently equaled or exceeded Reach 1 objectives (18 °C or 64 °F; Figure 1) for 63 days between June 22 and September 7. Colorado pikeminnow (CPM) larval drift occurred from June 28 through July 26 (K. Bestgen, Colorado State University, unpublished data), during which time water temperatures at Gates of Lodore equaled or exceeded 18 °C for 25 days. This exceeds the minimum duration of such temperatures as specified in the 2006 ROD (21 days¹).

Data from the Green and Yampa river confluence were obtained from thermographs deployed about a kilometer upstream from the confluence on both rivers (<https://www.fws.gov/mountain-prairie/riverdata/>) (USFWS, 2020); data for this report was available from June 1 through September 15, 2020. Green River mean daily water temperatures were more than 5 °C cooler than those of the Yampa River on one day (July 21) which occurred during the base flow period as defined in the ROD (commencing on or about July 15 in an average hydrologic year) and coincided with CPM larval drift. Despite increasing temperature of dam releases during the first half of July (Figure 1), increasing discharge in the Green River and declining discharge in the Yampa River during the same period caused the difference in temperature between the two rivers to reach 5 C on July 21(Figure 2).

¹ The U.S. Fish and Wildlife Service (K. McAbee, personal communication, 2012) has advised Reclamation to observe the target duration of the Lodore temperature objective specified in the 2005 Biological Opinion, which is 3-5 weeks at or above 18°C.

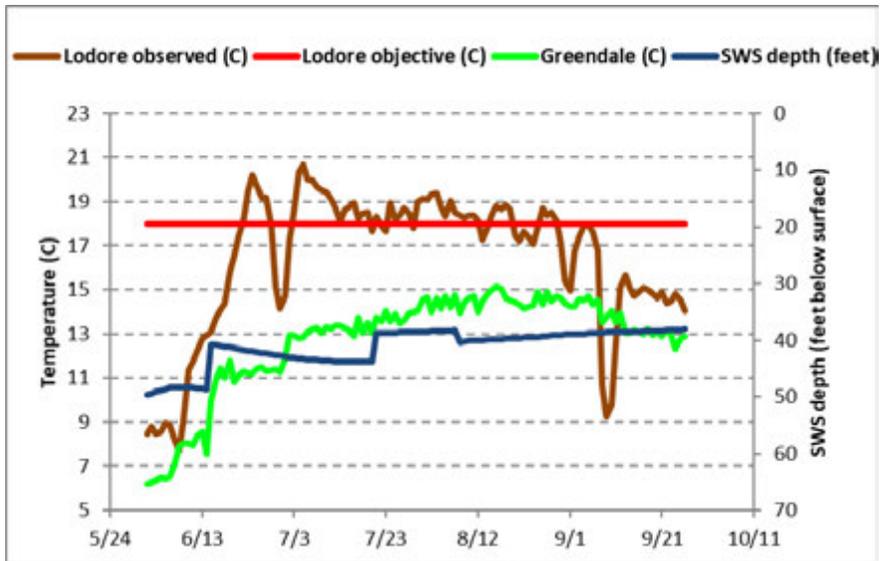


Figure 1 - Average daily temperatures recorded at the Gates of Lodore gage (brown series, left axis), Greendale gage (green series, left axis; USGS 09234500), Reach 1 (Gates of Lodore) objective (red line), and SWS gate depth below reservoir surface (blue series, right axis), June-September 2020. SWS gate depths are the average of two units

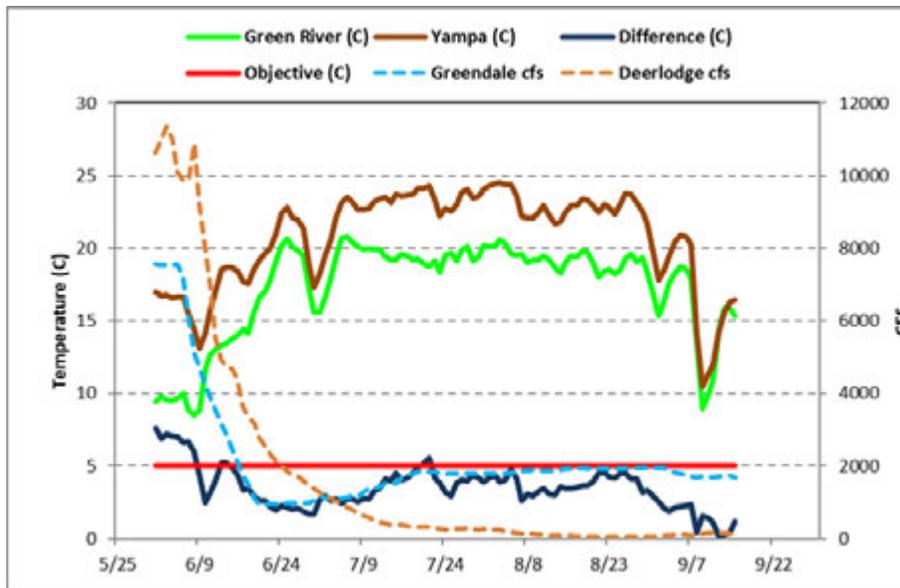


Figure 2 - Temperature of the Green River (green series, left axis) at the Yampa River confluence and of the Yampa River (brown series, left axis), the difference between the two rivers (dark blue series, left axis), and the maximum temperature difference (5 °C) specified in the 2006 ROD (red line, left axis), June 1-September 15, 2020. Temperature data is from <https://www.fws.gov/mountain-prairie/riverdata/>, accessed January 2021). Also shown are discharge (right axis) of the Green and Yampa rivers (light blue and tan series, respectively) as measured at Greendale and Deerlodge (USGS 9260050).

Recommendations to Refine Operations

Recommendations are limited as the operation plan guided well.

- The Recovery Request prioritized the CPM summer base flow over the LTSP Spring Peak Release. The duration of spring sustained flows should 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.

- Managers should continue to be cognizant of the inverse flow and temperature relationships in both systems during future implementation of ROD flows. While the 5°C maximum difference between the Green and Yampa rivers has occasionally been exceeded under a range of conditions, the cause of the exceedance is always due mostly to differences in flows in the Green and Yampa rivers. The 2018 Annual Report on Flaming Gorge Dam Operations suggested that one means to minimize frequency of extreme differences between Yampa and Green river temperatures would be to select Green River base flow levels which would allow relatively rapid warming, especially in years when the Yampa River is flowing at comparatively lower levels. Of course, at the same time, flow levels themselves need to be consistent with ROD objectives and allowable flexibility (i.e., allowance of flows within 40% of the ROD recommended flows) and also experiments such as base flow elevations prescribed by Bestgen and Hill (2016) for optimizing habitat for larval Colorado pikeminnow.

Flaming Gorge Technical Working Group recommendations and discussions to document planning process

A FGTWG proposal was signed by FGTWG representatives from USBR, USFWS, and WAPA on March 16, 2020. The FGTWG proposal was used to refine the draft operation plan. Included in the Appendix is a summary of events and meeting minutes from the February 24, March 2, and March 5, 2020 FGTWG meetings. The February 24 and March 2 were only attended by the FGTWG representatives. These were primarily planning meetings for the March 5, 2020 meeting.

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Appendix -- Summary of events and meeting minutes 2020 FGTWG meeting.

FGTWG Meeting Minutes / Date: February 24, 2020

Location: Utah Ecological Services Field Office
2369 West Orton Circle, Suite 50
West Valley City, Utah

Attendees:

Nathaniel Todea, USBR / FGTWG Co-Chair
Mark Delorey, USBR / FGTWG Co-Chair
George Weekley, USFWS / FGTWG Representative
Derek Fryer, WAPA / FGTWG Representative – Via telephone

Note Taker: Mark Delorey

Meeting Minutes:

I. FGTWG Proposal Discussion:

FGTWG reviewed the draft proposal

- a) The Recovery request priorities for this year are (1) The Pike Meadow and (2) The LTSP
 - b) USFWS recommended focusing on the lower range targets for Reach 2; e.g. if the target range is 2,000-2,600 cfs aim for 2,000. The reason is because the Yampa River typically melts off quicker than the green and this would help keep the 5-degree Celsius temp difference requirement at the confluence.
 - c) USFWS no ESA issue with the +25% in December.
- The GREAT recommendations will not be taken into consideration in this year's plan.
 - Within the document we should specify the dates of the Autumn period (Sept 30th – Dec 1st)
 - Subject Matter Experts to comment on plan to keep releases low between the spring runoff and the beginning of the Summer Base Flow.
 - Either staff from USFWS or the Recovery Program will notify the USBR's RMD's Manager when the Spring Peak Trigger occurs.

Action Items:

FGTWG decided to draft a recommendation letter/memo in lieu of the Proposal document

- USFWS to reword bypass section

II. FG Operation Plan

Discussion:

Plan is to keep the releases from Flaming Gorge low during the period after the Spring Peak and prior to the Summer base flow. After the Spring Peak the flows will be released as quick as possible.

- Current forecasted hydrology will likely not allow us to reach 14 days of 18,600 cfs during the LTSP.
- Last year the Pike Meadow larvae trigger occurred on July 11th. It was noted that until the Yampa reaches its hydrologic base flow it will be difficult to meet the 3% change in daily flow at Reach 2 and a daily change of 0.1 meters at the Jensen gage.
- We should minimize situations where the Yampa drops down quickly when the Flaming Gorge releases are low. This could cause thermal shock on the fish.
- The operations plan includes the following hydrologic conditions; (1) Average below Median; (2) Average above Median; and (3) Moderately Wet.
- Use of bypass will be discussed with the FGTWG volunteer qualified individuals during the March 5th meeting. EIS limits its use and some stakeholders have issues with the use of bypass. Bypass has been used every year since 2012.
- The memorandum and the operation plan should match each other.

Action Items:

- USBR to provide maintenance schedule for Flaming Gorge's unit 1

III. RSC Forecast

Discussion: The next forecast is expected around March 3rd.

IV. Next Meetings:

- A. **Date:** March 2nd (7:30am-9am) FGTWG Meeting via conference call
Action Item: George to send out invite to the group.
- B. **Date:** March 5th

FGTWG Meeting Minutes / Date: March 2, 2020

Location: Conference Call

Attendees:

Nathaniel Todea, USBR / FGTWG Co-Chair
Mark Delorey, USBR / FGTWG Co-Chair
George Weekley, USFWS / FGTWG Representative
Derek Fryer, WAPA / FGTWG Representative – Via telephone

Note Taker: Mark Delorey

Meeting Minutes:

- During this meeting the Flaming Gorge Initial Draft Operation Plan and FGTWG memo were reviewed and edited by FGTWG members.
- It was recommended that both the draft Initial Draft Operation Plan and FGTWG memo be sent out to the volunteer qualified individuals prior to the March 5th meeting.
- Draft email and memo should clearly summarize the recommendations based on the three hydrologic conditions; Avg Below, Avg Above, and Moderately Wet. It was recommended that there be at least two sentences per scenario.
- WAPA provided some formatting suggestions on the documents.
- Calendar dates will be added for the Autumn and Winter operation periods.
- The operations plan was converted into a PDF with numbered lines and pages for easy commenting by the volunteer qualified individuals.
- Fatal flaw review of the documents to be performed by FGTWG over email with a thumbs up or thumbs down.
- The drafts were finalized at the end of the meeting.

II. Next Meetings:

- **Date:** March 5th
- **Location:** Utah Ecological Services Field Office, 2369 West Orton Circle, Suite 50, West Valley City, Utah

FGTWG Meeting Minutes / Date: March 5, 2020

Location: Utah Ecological Services Field Office
2369 West Orton Circle, Suite 50
West Valley City, Utah

Attendees: *Todea, Nathaniel-USBR/Co-chair FGTWG; *Delorey, Mark J-USBR/Co-chair FGTWG; *Weekley, George M-USFWS/FGTWG Representative; Freyer, Derek-WAPA//FGTWG Representative; Capron, Shane-WAPA; Morton, John R-USBR; Speas, David W-USBR; Feltrop, Preston D-USBR; Hamilton, Dale T-USBR; Breen, Matt-Utah Division Wildlife Resources; Badame, Paul-Utah Division of Wildlife Resources; Partlow, Mike-Utah Division of Wildlife Resources; Kevin Bestgen-Colorado State

University; *Brenda Alcorn-NOAA; *Jones, Tildon-USFWS; Chart, Tom-USFWS; Anderson, Donald M-USFWS; Billerbeck, Rob P-NPS; Trammell, Melissa-NPS; Fisk, Terry-NPS; Ludwick, Tim-NPS.

**People present versus calling in.*

Note Taker: Mark Delorey

Meeting Minutes:

Historic Operations – Water Year 2019:

There were 9 days with flows over 18,600 cfs in early July. This is the second time in the history of operations that we've had 9 days meeting the LTSP flow targets. Two days were barely missed due to the Yampa River Forecast. During the two days that were missed there were concerns that farmers could have been flooded out. (Nathaniel Todea, USBR)

This past year was more successful than typical in getting Razorbacks into the floodplain. Survival and Retention of the Razorback was successful due to the magnitude and duration of flows. (Tildon Jones, USFWS).

Operational flexibility during the first detection of Colorado Pikeminnow larvae, considering Yampa River flows and Memorial Day, was appreciated. (Tom Chart, USFWS)

Stakeholders, such as fly fishermen, appreciated the increased coordination. (Dale Hamilton, USBR)

The notice to begin the Colorado Pikeminnow summer baseflows was received on July 11, 2019. The Yampa River and Green River did not reach the hydrologic base flow period until August 11, 2019. (Nathaniel Todea, USBR).

USFWS recognized concerns that flow was too high for the Colorado Pikeminnow. As a result, USBR lowered flows in responds to the Yampa River high flows for this time of year. (Tildon Jones, USFWS)

This year we're proposing refinements to the Flaming Gorge operation plan in lieu of a proposal.

Selective Withdrawal Update:

Flaming Gorge's Unit 1 was damaged and can no longer control temperature releases. At the current elevation the Unit is cold and can created temperature spikes downstream. To help with temperature control, Unit 3's maintenance has been moved to March instead of October. Along with Unit 3, Unit 2 also provides two selective structures to help control temperature. USBR is working on a proposal to fix Unit 1's selective gate, but it will take some time. (John Morton, USBR)

USBR is developing an SOP for temperature control that would have Unit 1 be the first unit on and the first unit off. A three-legged approach is being drafted for specific situations. The intent is to use Unit 1 in the winter but try to avoid it as much as possible in the summer. (Nathaniel Todea, USBR).

Endangered Fish Status:

Last year both the Razorback and LTSP were a good success. Stewart Lake had over 500 Razorbacks. For the first time in long time there were over 200 fish in the Old Charlie Wash. This success was attributed to the duration and intensity of flows. (George Weekley, USFWS)

The Colorado Pikeminnow is continuing downward population trend in the middle Green River. A lot thought went into summer base flows in the operations manual and FGTWG recommended staying on the lower side of Bestgen and Hill to keep temperature differences in the lower end. (George Weekley, USFWS)

Weather Forecast:

The Water Year precipitation for the upper Green is at 90% which is near average. The current SNOTEL is below average for the upper Green and above average for the Yampa. The March forecast for April through July for Fontenelle and Flaming Gorge are in the mid 80% of average and for the Yampa it's 111% of average. It is important to note that March is a significant month which make the April-July forecast skill not great currently. (Brenda Alcon, CBRFC)

Most SNOTEL sites are at an elevation below 9,500 feet, with the majority being at 7,500 feet. CBRFC is researching the possibility of adding more SNOTEL sites. Once SNOTEL sites are installed it take between 10 to 20 years to be used in the CBRFC model. (Brenda Alcon, CBRFC)

Recovery Request:

This year Recovery is focusing on the on larvae trigger, revised baseflow target consistent with 2006 ROD, and exploring the opportunity to examine bug flows (not part of request). (Tom Chart, USFWS)

As part of the Recovery Request the priorities have changed. The Colorado Pikeminnow has been in decline for the past two decades. There is a need for good flow conditions to help CPM and stressed Razorback Sucker larvae which will require a review of the summer baseflow based on predictions. As we experienced last year, we seem to see more larvae during the period when Pikeminnow begin to arrive. A main point of request are the early summer baseflows when larvae show up at the confluence of the Green River and Yampa. (Tom Chart, USFWS)

USBR acknowledge the change in priority from last year and the need to assist the CPM. USBR is more concerned with the temperature than the 3% change or the 0.1-meter stage change at Jensen. It was also noted that last year when the CPM request was received on July 11th, when flows on the Yampa were too high to hit the Jensen 0.1-meter daily stage target (Nathaniel Todea, USBR)

The ideal temperature is critical for setting up conditions in reach 2 to stabilize backwater habitat. It's understood that last year was an anomaly with the high flows on the Yampa. There is also a greater concern with ramping down instead of ramping up to get to summer base flows which will help us be prepared for the first emergence of CPM. (Tildon Jones, USFWS)

Razorback typically emerge at the end of May but may run late if the Yampa flows are low. The LTSP flows can be pushed back to later June, typically by 7 to 14 days. Then you start setting up the flows taking into consideration that the average first emergence of CPM occurs on July 3. It's important to track the temperature of Flaming Gorge and the Yampa to help predict the date of first emergence. It is also recommended that we should aim to a little earlier to set up backwater habitats. (Kevin Bestgen, Colorado State University)

July would be landing patterned. It is also important to note that the LTSP has a study Plan, but CPM does note. (Nathaniel Todea, USBR)

Initial Draft Operation Plan Review:

The Operation Plan concentrates on the Flow and Temperature recommendations only. (Nathaniel Todea, USBR)

On Page 10, the Initial Draft Operation Plan shows the current plan for Average below median as well as the lower and upper bounds. Using the current forecast to estimate baseflows from the Green and Yampa Rivers. The plan includes ramping down shortly after September 30 in order to conserve water. Then added +25% for WAPA on or around December 1. (Nathaniel Todea, USBR)

For the average hydrologic condition LTSP flows, Flaming Gorge releases will range from 4,600 to 8,600 cfs. Then ramping down to 1000cfs/day to keep water warmer until hitting 4,600 cfs, at which point we will ramp down 500 cfs/day. This is currently a draft and we won't know the exact release schedule until we get closer to late May. (Nathaniel Todea, USBR)

USFWS will alert USBR as soon as they identify the first emergency of the larvae on the middle of the Green River. At that point, it will be time for the LTSP high flows. (George Weekley, USFWS)

On Page 11, the Initial Draft Operation Plan shows the current plan for average above median plan. In this scenario, the LTSP would be conducted for greater than 7 days. Then 3,000 cfs on Dec 1 to provide WAPA with +25%. (Nathaniel Todea, USBR)

For this scenario we are still trying to hit 2,000 cfs on Reach 2 for CPM, which is in the lower range. Tildon: above median scenario – still 2,000 as Reach 2 for CPM – trying to hit lower range. During this time the Yampa is expected to contribute approximately 500 cfs. (Tildon Jones, USFWS).

On Page 12, the Initial Draft Operation Plan shows the current plan for moderately wet plan. In this scenario, there would be a lot of water therefore larger releases would be foreseen, but currently uncertain. This could include either 33 days of 4,600 cfs or 17 days of 8,600 cfs. The increase in bypass is to evacuate water for the next year and avoids using spillway. (Nathaniel Todea, USBR)

In addition to these scenarios, USBR will also look at the Moderately Dry Scenario.

Memorandum:

FGTWG has decided to move forward with a memorandum instead of a proposal. The memorandum includes background, bypass, and the recommended flow regime.

The extent to how bypass should be used this year is included in the memorandum. From EIS and Muth et al. should not be used for more than 14 days. It is important to note that in the past, bypass has been used frequently, even in Moderately Dry years.

Kevin Bestgen will provide guidance CPM emergence depending on historic figures and hydrologic conditions

Summary:

The Recovery request's priority is CPM over the Razorback sucker. FGTWG appreciated getting the request by late February.

USBR is working on the second operation plan for Flaming Gorge. This is a work in progress and will be an improvement over last year's operation plan.

The first deadline for comments on the Memorandum is March 11. With a second comment period after the initial revisions by COB March 13. The plan is to finalize the memorandum by March 16 unless there is a fatal flaw.

The final memorandum will go out to the FG working group by March 19 so that it can be reviewed by the public prior to the April working group meeting.

The first workgroup meeting is planned for March 19 in Vernal with the second one taking place in April in Price.

Staff from the power office might be available throughout the year for calls that occur prior to LTSP, post-LTSP and prior to CPM, but these meeting will not be consider part of the FGTWG.