Colorado River Storage Project
Flaming Gorge Working Group
Meeting Minutes
April 15, 2021

Participation

This meeting was held Thursday, April 15, 2021 from 10:00 am to 12:00 noon. Due to the ongoing COVID-19 (Coronavirus) pandemic, the meeting was held via WebEx virtual meeting. Attendees are listed below.

Purpose of Meeting

The purpose of these working group meetings is to inform the public and other interested parties of Reclamation's current and future operational plans and to gather information from the public regarding specific resources associated with Flaming Gorge Reservoir and the river corridor below it. In addition, the meetings are used to coordinate activities and exchange information among agencies, water users, and other interested parties concerning the Green River.

The March and April working group meetings represent the third step of the four-step process Reclamation uses to adaptively manage Flaming Gorge Dam: to receive input and comments from the working group on the annual Flaming Gorge operation plan. As stated in the 2006 Record of Decision Operation of Flaming Gorge Dam Final Environmental Impact Statement (commonly referred to as 'the Record of Decision'), "…a technical working group…will annually propose an initial flow regime to the existing Flaming Gorge Working Group. …The Flaming Gorge Working Group will then provide comments and input on the proposed flows relative to all resource concerns. Reclamation will then make a determination on how to incorporate the additional information into the annual operational plan."

General

Dale Hamilton (U. S. Bureau of Reclamation) called the meeting to order at 10:00 a.m., discussed virtual meeting logistics, and introduced the meeting agenda and presenters: Ashley Nielson, Tildon Jones, and Nathaniel Todea. To avoid audio feedback, attendees were asked to introduce themselves via the chat function in the virtual meeting (attendees who identified themselves or were identified by their meeting attendee name were included in the list of attendees below).

Green and Yampa Rivers: Current Conditions and Forecasts – Ashley Nielson

Ashley Nielson, Senior Hydrologist, National Weather Service, Colorado Basin River Forecast Center

Ashley presented information on 2021 weather, snow, soil moisture, and runoff forecasts, as well as upcoming weather.

Upper Green River basin water year precipitation thru March is below average overall (85% of average) but is somewhat variable, with the Wind River Range being a little lower and the Wyoming Range being a little higher. Yampa River basin water year precipitation thru March is below average overall. Average high temperatures were above normal from November through January, below normal in February, and March was below normal in the Yampa Basin and near to slightly above normal in the Upper Green. For the first half of April, precipitation has been below normal, and temperatures have been above normal.

Snowpack is currently below to much below median in the Upper Green and Yampa River basins and has started to melt somewhat earlier than normal. It is important to note that the snow water equivalent vs runoff is not necessarily a one-to-one relationship; spring weather and soil moisture will play a role in final runoff volumes. Model snow (Colorado Basin River Forecast Center model) includes areas above and below SNOTEL sites and indicates upper elevation snow (which typically peaks in early May) is currently much below normal. On average, over half the unregulated runoff volume for Flaming Gorge comes from the Wind River Range which is currently much below median snowpack levels.

Modeled soil moisture is generally quite dry, due to the extended dry period that started last April. Of the 40-years data has been collected, we're generally in the bottom 3 years in the Yampa and bottom 5 years in the Upper Green.

Mid-month runoff forecasts will be coming out soon. Current runoff forecast guidance for Flaming Gorge is 463,000 acre-feet (47% of average, 56% of median) with the potential to increase to ~68% of average with wet future conditions or decrease to ~30% of average with dry future conditions. Current runoff guidance for Yampa at Deerlodge is 620,000 acre-feet (50% of average) with the potential to increase (67% of average) or decrease (35% of average) depending on future conditions. On average, Flaming Gorge and Yampa River (Maybell) April 1 runoff volume forecasts contain +/-24% and +/-20% error, respectively, with error decreasing as the season progresses. Using current snow, soil, and streamflow conditions and 35 future weather scenarios (based on 1981-2015 historical data) peak streamflow forecasts are generated; Yampa at Deerlodge is currently forecasted to peak at ~8,000 cfs, and probabilistic model guidance indicates late May to early June could be the timing of the peak, but ultimately the timing will be determined by this year's weather. Errors in volume and peak runoff forecasts are primarily due to future weather (uncertainty, extreme events), model snow states (verified as possible by satellite images and SNOTEL sites, new technologies are being investigated), and demand/diversion assumptions (for peak flows).

Weather is forecasted to be cool through the weekend with showers through Friday and again early next week. The 8 to 14-day outlook indicates increased chances for below normal precipitation and near to above normal temperatures.

In summary, Upper Green snow conditions are below normal, especially in important runoff-producing areas of the Wind Rivers, with some earlier than normal melt already occurring. Yampa snow conditions are below median, some earlier than normal snowmelt has begun. Runoff volumes are expected to be much below normal. Peak flows will be below normal. Weather forecasts for the remainder of April indicate chances for additional precipitation. There is still a lot of uncertainty in forecasts; spring weather can have a significant impact.

The Colorado Basin River Forecast Center provides monthly water supply briefings this time of year. See the 'News' banner at the top of their website (https://www.cbrfc.noaa.gov) for more information or to join the their email list.

Responding to a question about what new technologies are being investigated, Ashley stated that they are investigating incorporating Airborne Snow Observatory flight information and that there is a lot of snow modeling and research going on right now that the Colorado Basin River Forecast Center is investigating.

Recovery Program 2021 Green River Flows – Tildon Jones

Tildon Jones, U. S. Fish & Wildlife Service, Upper Colorado River Endangered Fish Recovery Program

Tildon presented information on the listed fish and Recovery Program, smallmouth bass flows, summer base flows, and spring operations.

There are four endangered fish in the Colorado River that are all native to the basin and found nowhere else: Colorado pikeminnow (*Ptychochelius lucius*), Razorback sucker (*Xyrauchen texanus*), Bonytail (*Gila elegans*), and Humpback chub (*Gila cypha*). They all live up to 40+ years and the Colorado pikeminnow and the Razorback sucker are highly migratory. The Upper Colorado River Endangered Fish Recovery Program was established in 1988 among a number of partners with the goal to recover the endangered fish while water development proceeds by balancing Endangered Species Act compliance with the Law of the River. The Recovery Program provides Endangered Species Act compliance in a holistic way instead of individual entities being required to manage recovery efforts in smaller areas; the Program covers over 2,000 projects and over 2.8 million acre-feet of water used in Colorado, Utah, and Wyoming. There are five recovery elements: Habitat/Flow Management, Habitat Development, Stocking Endangered Fish, Managing Nonnative Fish, and Research and Monitoring. Flow management occurs throughout the Upper Colorado River Basin—Flaming Gorge is one of six points of flow control in the basin and is an important area as it impacts 300 to 400 miles of habitat. Different parts of the runoff hydrograph provide different benefits: substrate cleansing, sand transport, and migration cues as flows rise; floodplain access and channel maintenance as flows peak; spawning and emergence as flows reside; and early growth and survival as flows are low and temperatures are warmer.

The Recovery Program's 2021 Flow Request consisted of two sets of priorities, one for Dry or Moderately Dry conditions, and one for Average or wetter conditions. Priorities for Dry or Moderately Dry conditions were the focus of the presentation as that is the most likely scenario. Priorities are to: 1) conduct a flow spike experiment to disadvantage smallmouth bass reproduction in Reaches 1 and 2, 2) exercise flexibility in the 2006 record of decision to achieve preferred summer base flow range at the correct time for Colorado pikeminnow, and 3) spring releases consistent with flow recommendations of Muth et al. timed with Yampa peak flows.

A flow spike experiment to disadvantage smallmouth bass reproduction has been discussed in the past, but this is the first year it has been requested. The flow spike experiment is designed to negatively impact smallmouth bass which is an invasive species that affects native fish. Bass show better spawning success in drier years (like this year) and they have reached high numbers in some reaches. The hope is that the flow spike can have river-wide benefit. Smallmouth bass build nests in calm, warm water—timing is closely linked to temperature and flow—and males guard the fry on the nests. Bass eggs and larvae are susceptible to increased river currents due to their nests being on top of the river substrate, their low swimming ability, and their reliance on being guarded/protected. Higher flows can connect channels and increase water velocity and hopefully sweep the eggs out of the nests, and cooler water can also help disrupt bass spawning. It is anticipated that the flow spike will have impacts mostly in Dinosaur National Monument and downstream. The spike will likely occur in mid- to late-June, mid-week to avoid weekends, with a three-day duration at powerplant capacity (~4600 cfs). There will be extra monitoring to evaluate the response of both native and nonnative fish. The water temperatures will be within previously observed changes and are not expected to negatively affect native fish or insects. There will be creel surveys to assess potential fishery changes and vegetation monitoring.

Base flows are requested with the goal to improve survival and recruitment of young Colorado pikeminnow by reaching base flows by the time pikeminnow emerge (average July 3). Improved numbers of juveniles have been observed when mean August–September flows are between 1,700 and 3,000 cfs at Jensen (Reach 2). Historically, Colorado pikeminnow larvae start drifting out of the Yampa River between mid-June and mid- to late-July (average July 3). The Flaming Gorge Technical Working

Group will work with Reclamation to provide Reach 2 base flows in the preferred range when larvae are present through September. The flow request is for higher base flows than would be requested under the record of decision/Muth et al. Dam releases would be dependent on Yampa flows and available water.

Spring releases are being requested to be according to the record of decision and Muth et al. with the Flaming Gorge peak releases timed to coincide with the Yampa peak, with a peak at powerplant capacity, with the peak duration dependent on Yampa flows to achieve the target at Jensen.

The priorities for Average or wetter conditions (should conditions turn dramatically wetter than they are) are to provide: 1) Larval Trigger Study Plan spring release, 2) revised base flows for Colorado pikeminnow, and 3) smallmouth bass flow spike. Smallmouth bass spawning and juvenile survival is less successful in years with higher, cooler flows like we generally see in years with Average or wetter conditions.

There were a few questions regarding the smallmouth bass flow spike experiment. Tildon responded that if temperatures drop below a certain threshold, male smallmouth bass are more likely to abandon the nest and stop spawning activity, eggs are likely to be swept away and spawning will be delayed, with the later spawning leading to lower winter survival rates. Colorado State University plans to look for bass fry or larvae nests and also plans to set up nets downstream of known spawning areas to catch and identify fry that were swept off the nests; bass can also be collected in the fall and those less than a year old can be aged down to the day to determine if there is a gap in bass survival that occurred during the flow spike. The flow spike probably won't have significant impacts on bass in Reach 3 as flows attenuate; but there is generally less reproduction and lower density of bass in Reach 3. The main area of interest is lower Lodore Canyon and below the Yampa confluence, with Island Park specifically having some known reproduction areas. There will be pre- and post-spike vegetation surveys, and bug monitoring and other activities as well.

Flaming Gorge Hydrology & Forecasted Operations – Nathaniel Todea

Nathaniel Todea, Hydraulic Engineer, U. S. Bureau of Reclamation

Nathaniel presented background information on Flaming Gorge operations, and the 2021 forecasted hydrology, Recovery Program request, Flaming Gorge Technical Working Group proposal, and operations plan.

The 1956 Colorado River Storage Project Act authorized construction of Flaming Gorge Dam and other projects for: allowing Upper Basin States to utilize their 1922 Colorado River Compact apportionments, regulating Colorado River (and main tributaries) flow, storing water for beneficial consumptive use, reclamation of arid and semiarid lands, flood control, and hydroelectric power generation.

For operations, the Green River below Flaming Gorge is divided into three reaches: Reach 1 from Flaming Gorge Dam to the Yampa River confluence, Reach 2 from the Yampa River confluence to the White River confluence, and Reach 3 from the White River confluence to the confluence with the Colorado River.

The water supply conditions as currently forecasted, put Flaming Gorge near the lower end of the Moderately Dry hydrologic classification. The Yampa is also in the lower half of the Moderately Dry hydrologic condition. Conditions have worsened since the March 18 working group meeting, and forecasts indicate that the Yampa at Deerlodge is likely to exceed 6,000 cfs for ~8 days (down from the ~21 days forecasted in March), 8,000 cfs for ~0 days (down from the ~6 days forecasted in March), and likely will not exceed 10,000 cfs (same as forecasted in March).

The Record of Decision calls for adaptive management of operations to maintain or improve conditions for the four endangered fish species while minimizing negative effects to the authorized purposes of the dam. The adaptive management (four-step) process includes the Recovery Program requesting a flow regime, the Flaming Gorge Technical Working Group (FGTWG) proposing operations, the Flaming Gorge Working Group (this group) providing input and comments on the proposed operations, and finalizing the Flaming Gorge Operations Plan. Generally, operations consist of spring releases and ramp down rates timed with the Yampa, base flow ranges, summer temperature targets, release changes, and river stage change limits at the Jensen Gage.

The 2021 Recovery Program request consisted of two scenarios: one for dry or moderately dry conditions and one for average or wetter conditions. Our current hydrology indicates we'll most likely have moderately dry conditions this year which would align with the dry or moderately dry condition request for a smallmouth bass flow spike, Colorado pikeminnow summer base flows, and Muth et al. spring releases (not Larval Trigger Study Plan spring releases) timed to coincide with the Yampa peak. For average or wetter conditions, the request would be for spring releases consistent with the Larval Trigger Study Plan, Colorado pikeminnow summer base flows, and a smallmouth bass flow spike (the smallmouth bass flow spike was not proposed in the Flaming Gorge Technical Working Group's proposal).

The Flaming Gorge Technical Working Group proposed operations (dry and moderately dry conditions) include timing spring releases with the Yampa (not Larval Trigger Study Plan spring peak), likely releasing at least a one-day peak of ~4,600 cfs (no bypass releases) with a 350 cfs per day ramp down at the dam in an attempt to achieve Reach 2 flows of 8,300 cfs for 7 days. After the spring releases and before Colorado pikeminnow releases, there is planned a smallmouth bass flow spike consisting of a one-day ramp up, three days of full power plant capacity (~4,600 cfs) releases, and a 2,000 cfs per day ramp down. This smallmouth bass flow spike is anticipated to occur sometime from mid-June to early July. Based on conditions at the dam, it is anticipated that during the smallmouth bass flow spike release, water temperatures below the dam will decrease from ~11.8°C to ~8.1°C, it is not anticipated that this temperature change will have significant impacts on fish or other species. Releases for the Colorado pikeminnow summer base flows are now estimated to be about 900 cfs, which will likely result in approximately 1,300 cfs in Reach 2 for the moderately dry (current) condition, and 850 cfs releases, which would result in approximately 1,150 cfs in Reach 2 if conditions worsen to the dry hydrologic condition. Autumn and winter base flows are estimated to be 850 cfs.

The Flaming Gorge Operation Plan for May 2021 through April 2022 will be approved and posted online in early May. One item to note is that for the Moderately Dry hydrologic condition (the currently forecasted condition) the Reach 2 Colorado pikeminnow base flow target of 1,800-2,000 cfs from the 2000 Flow and Temperature Recommendations cannot be achieved. Average daily releases are estimated to be 900 cfs (+/-40% period).

Moving forward, we'll continue to monitor CBRFC forecasts. Current average daily releases are at 860 cfs to achieve the target of less than 6027 feet pool elevation by May 1st. The state is conducting a fishery assessment (electro fishing) April 26-27. The Flaming Gorge Operation Plan will be finalized in early May after considering any comments from this meeting.

There were several questions and comments following Nathaniel's presentation.

In response to a question about Flaming Gorge elevation projections, Nathaniel stated that Flaming Gorge is currently at about elevation 6025.4 and given current forecasts and projections, it will be at about 6025.5 by March 1, 2022.

In response to a question about the purpose of the 1-day spring peak, Nathaniel responded that the spring peak is normal operations to benefit the Razorback sucker, and Tildon noted that the peak also helps to maintain the channel.

In response to a request for an update on the question/request from the March 18 working group meeting that Reclamation model or study potential impacts from the flow spike on hydropower, there was a lengthy discussion. Nathaniel noted that he hadn't seen a written request since the March 18 meeting and wasn't aware of any modelling or studies being done, but did note that the flow spike was equivalent to an additional approximate 27,000 acre-feet or the equivalent of about 150 cfs per day for 90 days. Western Area Power Administration mentioned that they had initially estimated the financial impact due to the loss of power production due to the flow spike experiment to be roughly $600,000 and with recent cost changes, the impact could now be about 50% higher. They had made their estimates based on mass-balancing spring peak, smallmouth bass flow spike, and summer base flow numbers, but weren't sure the mass balance numbers added up. Reclamation stated that the draft operation plan would be an appropriate place to provide a formal written comment, it appeared that the first comment hadn't been received or had somehow been missed.

[Update following the April 15 Flaming Gorge Working Group Meeting: When reviewing emails following the March 18 Flaming Gorge Working Group meeting, Reclamation did receive a request via email from the Colorado River Energy Distributors Association to model the proposed smallmouth bass flow spike so they can have an understanding of the hydropower impacts. Although Flaming Gorge operators had completed modeling of the various release scenarios, the technicality and depth of the question was misunderstood by Reclamation managers. Reclamation managers believed this request was fulfilled with the then-current modeling. Subsequent conversations with the Colorado River Energy Distributors Association and Western Area Power Administration further clarified their request and Reclamation was able to provide the requested modeling.]

In response to a question from the rafting community about what base flows and daily fluctuations in flows would be, Nathaniel stated that base flows are anticipated to be at a daily average of 900 cfs with spikes occurring due to Western Area Power Administration power demands—likely spiking higher in the evening and lower, probably near ~850 cfs, during the day. It was expressed that flows this low will make for a rough summer for the rafting community.

In response to a question about the timing of the spring peak, Nathaniel stated that the peak will be timed to coincide with the peak of the Yampa.

In response to a question about if and when the transfer of water to Lake Powell will take place, Paul Davidson (Reclamation), mentioned that we are only in the early stages of discussing and nothing is being planned. Heather Patno (Reclamation), stated that Reclamation has begun enhanced communication and monitoring and is now performing monthly (instead of four times a year) maximum and minimum probable 24-month study model runs to ensure the most probable scenario does not go below elevation 3525 feet. The state of Utah and Upper Colorado River Commission are involved in these discussions with Reclamation.

General Discussion, Comments, Questions

Dale opened the meeting for any discussion, comments, or questions. No discussion items, comments, or questions were brought up.

Following the meeting, Reclamation received a comment via email informing of the negative impacts that low flows have on the rafting industry. Dam releases below 900 cfs make trips in each reach much more difficult, impact trip timelines, increase hazards for employees, and negatively impact the visitor experience. Every 50 cfs lower dramatically compounds the issues. If it's possible to avoid low flows, the rafting community would be grateful. The flows proposed by the endangered fish recovery program would provide for a much better rafting experience.

Next Meeting

- Thursday, August 12, 2021 at 10:00 am via WebEx (tentative)

Attendees

Woody Bair	Flaming Gorge Resort
Cody Perry	Friends of the Yampa
Hattie Johnson	American Whitewater
Tim Gaylord	Holiday River Expeditions
Bruce Lavoie	OARS
T. Wright Dickinson	Vermillion Ranch
Grizz Oleen	Occidental Petroleum
Boyd Kitchen	Utah State University
Jack Lytle	Daggett Co. Commissioner
Kirk Robbins	Uintah County Mosquito Abatement Dist.
Jason Palmer	City of Green River
William Merkley	Uintah Water Cons. District
Gawain Snow	Unknown Affiliation
Clyde Watkins	Duchesne Co. Water Cons. District
Andy Mueller	Colorado River District
Todd Adams	Utah Div. Water Resources
Darrell Gillman	Utah Dept. Ag. and Food
Ryan Jones	Utah Dept. Ag. and Food
Chris Keleher	Utah Div. Wildlife Resources
Mike Partlow	Utah Div. Wildlife Resources
Lowell Marthe	Utah Div. Wildlife Resources
Ryan Mosley	Utah Div. Wildlife Resources Dutch John
John Walrath	Wyo. Game and Fish Dept.
Leslie James	Col. Riv. Energy Dist. Assoc.
George Weekley	U. S. Fish & Wildlife Service
Tildon Jones	U. S. Fish & Wildlife Service
Kevin McAbee	U. S. Fish & Wildlife Service
Tom Chart	U. S. Fish & Wildlife Service
Danielle Fujii-Doe	U. S. Fish & Wildlife Service Browns Park Nat. Wildlife Refuge
Mark Silver	U. S. Fish & Wildlife Service Browns Park Nat. Wildlife Refuge
Dan Schaad	U. S. Fish & Wildlife Service Ouray Nat. Wildlife Refuge
Chrystal Dean	Western Area Power Admin.
Craig Ellsworth	Western Area Power Admin.
Derek Fryer	Western Area Power Admin.
Shane Capron	Western Area Power Admin.
Ashley Nielson	Nat. Weather Service, Col. Basin Riv. Forecast Center
Aldis Strautins	Nat. Weather Service
Paul Scolari	Nat. Park Service, Dinosaur Nat. Monument
Rob Billerbeck	Nat. Park Service
Melissa Trammell	Nat. Park Service
Kevin Clegg	U. S. Forest Service
Aaron Selig	U. S. Forest Service, Ashley Nat. Forest
Chris Watt	U. S. Bureau of Reclamation
Dale Hamilton	U. S. Bureau of Reclamation
Dave Speas	U. S. Bureau of Reclamation
Gary Henrie	U. S. Bureau of Reclamation
Heather Patno	U. S. Bureau of Reclamation
Jared Baxter	U. S. Bureau of Reclamation
John Morton	U. S. Bureau of Reclamation
Kent Kofford	U. S. Bureau of Reclamation
Nathaniel Todea	U. S. Bureau of Reclamation
Paul Davidson	U. S. Bureau of Reclamation
Peter Crookston	U. S. Bureau of Reclamation
Rick Baxter	U. S. Bureau of Reclamation
Ryan Christianson	U. S. Bureau of Reclamation
Scott Elliott	U. S. Bureau of Reclamation