



Upper Colorado River Endangered Fish Recovery Program

Noreen Walsh, Chairman
Implementation Committee

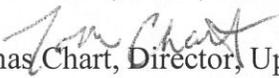
Thomas E. Chart
Program Director

U.S. Fish and Wildlife Service - P.O. Box 25486 - Denver Federal Center - Denver, CO 80225 - (303) 969-7322 - Fax (303) 969-7327

FWS/CRRP
K3a1
Mail Stop 65115
Memorandum

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To: Larry Walkoviak, Regional Director, Upper Colorado Region, Bureau of Reclamation
Heather Patno, Chair, Flaming Gorge Technical Working Group, Bureau of Reclamation

From:  Thomas Chart, Director, Upper Colorado River Endangered Fish Recovery Program

Subject: Recovery Program's Research Request for 2014 Green River Spring Flows

The Upper Colorado River Endangered Fish Recovery Program (Recovery Program) supports the Bureau of Reclamation's (Reclamation) operations at Flaming Gorge Dam in 2014 consistent with the 2005 biological opinion (U.S. Fish and Wildlife Service 2005) and 2006 record of decision (ROD; U.S. Department of Interior 2006). As in the past three years, the objective of our request this year is to build on past research (Bestgen et al. 2011) to benefit the razorback sucker population throughout the Green River by timing the river-floodplain connection with the presence of wild-produced razorback sucker larvae.

The Recovery Program's 2014 spring flow request is based on objectives outlined in our *Study Plan to Examine the Effects of Using Larval Sucker Occurrence in the Green River as a Trigger for Flaming Gorge Dam* (LTSP; Larval Trigger Study Plan Ad Hoc Committee 2012). In the LTSP we describe a desired range of experimental floodplain connection scenarios and studies we would implement to evaluate those scenarios. More specifically, our study design matrix (Table 2 in the LTSP) details the range of experimental conditions we would like to assess with recognition that more than one cell of that matrix could be accomplished in a single year. Minimally, to complete the experiment, the Recovery Program requests three years with flows < 18,600 cfs and three years with flows \geq 18,600 cfs and with connecting flows in each of these years of at least seven days duration. However, spring peak flow magnitude requests will be driven by hydrologic conditions in the upper Green River Basin and to some extent the Yampa River basin; therefore, it may not be possible to complete the experiment in six consecutive years. The LTSP experiment began

officially in 2012, however, the Recovery Program was able to gather some LTSP related information during 2011. Results from 2012 and 2013 are summarized below.

LTSP-Related Operations and Findings: 2011

In 2011, the Recovery Program identified two spring flow objectives: a) to provide floodplain connection after larval razorback sucker were detected in the Green River and secondarily, b) to connect the Stirrup floodplain as outlined in Recovery Program Project No. C6 RZ-RECR. Therefore the Recovery Program requested: a) that Reclamation's spring 2011 operations be timed to coincide with the presence of larval razorback sucker in Reach 2 habitats, and b) that if the hydrology remains wet-average, moderately wet, or wet that Reclamation release flows that maintained 18,600 cfs or greater for two weeks or more in Reach 2 (post-larval detection). The Recovery Program's request also considered scenarios in the event that the hydrology trended drier; it did not.

The May final forecast of April-July unregulated inflow volume to Flaming Gorge Reservoir was classified moderately wet. The Yampa River forecast was wet. All of the wet hydrologic classification peak flow targets for Reach 2 under the ROD were met in 2011 (Reclamation 2013). Razorback sucker larvae were detected on June 24, 2011. The following spring flows conditions were recorded post-larval detection: ten days \geq 22,700 cfs; 19 days \geq 18,600 cfs; and 21 days \geq 15,000 cfs.

USFWS field crews sampled 14 wetland habitats during September, October, and November 2011. Juvenile razorback sucker were collected in Wyasket Lake (n=15; size range 106-161mm total length) and in Leota Unit 4 (n=3; size range 85-110mm total length). This was the first evidence of over-summer survival of wild produced razorback sucker larvae since 1996 (Webber and Jones 2011). Breen (2011) reported 1,216 unique endangered fish detections at stationary PIT tag antennas set in the Stirrup floodplain levee breach during the extended period of riverine connection.

LTSP Operations and Findings: 2012

In 2012, hydrologic classifications for the Yampa River and Upper Green River basins were categorized as 'dry'. The Recovery Program and the Flaming Gorge Technical Work Group (FGTWG) ultimately agreed to focus the 2012 spring flow request on the driest category of experimental conditions outlined in the LTSP, i.e. a peak flow between 8,300 and 14,000 cfs for 1 to 7 days. The Recovery Program detected wild produced razorback sucker larvae on May 16, 2012 (Bestgen et al. 2012). Reclamation ramped up Flaming Gorge releases to a peak of 7,420 cfs, which resulted in a peak flow at Jensen, Utah of 10,200 cfs on May 24, 2012 (Reclamation 2013). Flows at Jensen, Utah were sustained above 8,300 cfs for 5 days after larvae were detected. Floodplain connection occurred at Stewart Lake and Old Charley Wash. Utah Division of Wildlife Resources (UDWR) crews documented larval entrainment into Stewart Lake and described physical conditions at that floodplain site (Breen and Skorupski 2012). Similarly, USFWS field crews documented larval entrainment into the Old Charley site. Unfortunately, all fish entrained at both locations likely perished, because water quality deteriorated quickly after flows declined. During the spring

and summer months of 2012, USFWS crews (Webber and Jones 2012) sampled fish and monitored water quality at a variety of other floodplains that still held water from the extensive period of connection in 2011, but did not connect in 2012.

Personnel from Western Area Power Administration (Western), Argonne National Laboratory (funded by Western), and the Recovery Program surveyed Reach 2 levee breach elevations in Autumn 2012 to better assess connection flows for future LTSP experiments. Those data, in preliminary form, were available for FGTWG discussions in Spring 2013.

LTSP Operations and Findings: 2013

In 2013, the spring hydrologic classification started off 'dry' but turned 'moderately dry'. Reclamation reviewed the FGTWG recommendation and decided to implement the LTSP recommendations for moderately dry hydrologic conditions and to increase releases when larvae were detected (Reclamation 2014; Draft Report). The Recovery Program and the Flaming Gorge Technical Work Group (FGTWG) ultimately agreed to focus the 2013 spring flow request on the moderately dry category of experimental conditions outlined in the LTSP, i.e. a peak flow between 8,300 and 14,000 cfs for 7 to 14 days. The Recovery Program detected wild produced razorback sucker larvae on May 26, 2013 (Bestgen et al. 2013). Flaming Gorge Dam releases were increased to full power plant capacity (~4,500 cfs) on May 29, 2013. Yampa River flows dropped below 4,000 cfs and Flaming Gorge Dam releases were increased 1,000 cfs on June 4th above power plant capacity for a total release of ~5,500 cfs to maintain flows in Reach 2 above 8,300 cfs. Releases returned to power plant capacity on June 5, 2013. The Green River measured at Jensen, Utah reached its peak of 10,700 cfs on June 6, 2013. Flows at Jensen, Utah were above 8,300 cfs for 25 days total and above 8,300 cfs during larval presence for 18 consecutive days. Prior to, during, and after floodplain connection, Stewart Lake proper and the Stewart Lake drain were sampled using an assortment of techniques to monitor the fish community. UDWR biologists documented that razorback sucker larvae were entrained into Stewart Lake and grew quickly (~1mm/day) during the ~2 month inundation period. On July 31, 2013, UDWR began draining Stewart Lake because of declining water quality. A total of 613 Age-0 razorback sucker were collected, of which 592 were released alive to the Green River (Skorupski et al. 2013). This is the largest number of juvenile razorback suckers ever documented in the Colorado River Basin, demonstrating the importance of appropriately timed connections between the river and floodplain wetlands. The Recovery Program hopes that Stewart Lake water levels can be maintained in 2014 at least as long as they were in 2013, recognizing that prolonged favorable conditions for razorback sucker growth in late summer months results in larger fish with a higher probability of surviving their first winter. Razorback sucker larvae were not detected in the Escalante Ranch wetland; the only other wetland identified in the LTSP that connected to the Green River in 2013 (Webber and Jones 2013).

THE RECOVERY PROGRAM'S SPRING 2014 GREEN RIVER FLOW REQUEST:

Implement the LTSP. The Recovery Program requests that the FGTWG match Recovery Program research needs identified in the LTSP with the best available spring flow forecast information to develop a specific middle Green River floodplain connection scenario. The Recovery Program

Director's office will distribute the pertinent FGTWG recommendation to the Biology and Management Committees and Principal Investigators as quickly as possible.

The Recovery Program will provide a real-time assessment of razorback sucker larval presence (i.e., the 'larval trigger') through ongoing Recovery Program Project No. 22f. Based on information provided in Bestgen et al. (2011), waiting for this larval trigger will likely cause Reclamation to make spring releases from Flaming Gorge Dam after the Yampa River has peaked, which may necessitate releases in excess of power plant capacity to meet the flow magnitude thresholds needed for river-floodplain connections. As addressed in the LTSP, the Recovery Program is prepared to direct sampling efforts each year to the appropriate floodplain habitats based on hydrologic forecasting and the FGTWG request. The Recovery Program is poised and properly funded to follow through on specific LTSP field investigations again in 2014 (e.g., Project Nos. 22F, 164 and 165; Scopes of Work available at: <http://www.coloradoriverrecovery.org/documents-publications/work-plan-documents/project-scopes-of-work.html>) ; sampling protocols and rationale are discussed further in Bestgen et al. (2012).

The Recovery Program remains concerned about possible release of nonnative burbot from Flaming Gorge Reservoir, particularly during the spring when release volumes increase. Accordingly, the Recovery Program, the National Park Service, UDWR, and Western committed to initiating a risk assessment of burbot entrainment associated with Flaming Gorge spring operations (Trammell et al. 2014; also referenced in the LTSP). The Recovery Program considers the risk of entraining burbot to be reasonably low at this time.

That conclusion is based on the following:

- The incidence of adult burbot in the portion of Flaming Gorge Reservoir nearest the dam is currently very low.
- The risk of entraining adults and juveniles through the spillway will always be fairly low based on the species' behavior.
- The risk of entraining larvae is of moderate concern. According to the literature and known water temperatures in the reservoir in late May-June, Age-0 burbot would likely range in size from 10 to 40 mm (total length). Young burbot of 30-40 mm should be entering a "settlement period", i.e. transitioning from using the full water column in near shore habitats to a primarily benthic behavior, remaining near the shoreline but on the substrate, and largely unavailable for entrainment. In June 2013, burbot larvae with lengths of 10-20mm were captured in the Sheep Creek inflow area, about 20 miles upstream of the dam (Carl Saunders, pers. comm.); thus, a portion of a larval cohort could still be found in open water during the spring runoff period. Therefore if Reclamation is considering using the spillway¹ the Recovery Program will sample for burbot larvae in the reservoir near the entrance to the spillway. This type of sampling could be accomplished quickly and on short notice.
 - If larvae are captured, the Recovery Program would determine if additional monitoring / management would be needed below the dam.

¹ As noted in Section 2.5.3.2 of the Flaming Gorge EIS, there were concerns regarding damage to the spillway and it was stated that excessive spillway damage would limit its use to cases of hydrologic necessity. Inspections since issuance of the ROD in 2006 have verified continued deterioration of the air slot in the spillway. As a result, Reclamation cannot support use of the spillway unless absolutely necessary for flood control or dam safety reasons.

The Recovery Program assumes that a specific 2014 LTSP spring flow request will be developed in concert with the FGTWG using the best available flow forecast information.

Base Flow Requests

The Recovery Program will pursue experimentation outlined in the LTSP for the foreseeable future. We understand that spring operations could affect water availability for base flow operations. We reserve the right to discuss 2014 base flow operations at a later time.

In closing, the Recovery Program appreciates Reclamation's efforts in the past to achieve the flow and temperature recommendations and assist in recovery of the endangered fishes. We recognize that greater reliance on the biological trigger (presence of larval razorback sucker) may require greater volumes of water during the spring in some years, but we believe this experiment is consistent with the biological intent of Muth et al (2000) and is research essential to the recovery of the endangered fish. The Recovery Program's sampling results from the past two years, and particularly the large number of juvenile razorback suckers collected at Stewart Lake in 2013, clearly demonstrate the effectiveness of the LTSP operations. Thank you for considering this Recovery Program request for spring flows.

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Cc: Malcolm Wilson, Chief, Water Resources Group, USBR, 125 So. State, Salt Lake City, Utah

Beverley Heffernan, Manager, Environmental Resources Division, USBR, 125 So. State, Salt Lake City, Utah

Bridget Fahey, Endangered Species Branch Chief, Ecological Services, USFWS, Lakewood, Colorado

Henry Maddux, Chairman, UCREFRP - Management Committee, Utah Department of Natural Resources, 1594 W. North Temple Salt Lake City, UT 84114-5610

David Speas, Chairman, UCREFRP - Biology Committee, USBR, 125 So. State, Salt Lake City, Utah

Larry Crist, Field Supervisor, Ecological Service, USFWS, Utah Field Office, 2369 West Orton Circle, Suite 50, West Valley City, Utah 84119-7603

Lynn Jeka, Manager, Western Area Power Administration, 12155 West Alameda Parkway Lakewood, CO 80228

Clayton Palmer, Environmental Specialist, Western Area Power Administration, 150 East Social Hall Avenue, Suite 300, Salt Lake City, UT 84111-1580