

SYSTEM OPERATIONAL REQUEST: FWS #1

TO:

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FROM: Gregory Hughes, State Supervisor, U.S. Fish and Wildlife Service, Idaho Fish and Wildlife Office, on behalf of the Libby BO Policy Group

DATE: May 7, 2018

SUBJECT: 2018 Libby Dam Releases for Sturgeon and Bull Trout Augmentation Flows

SPECIFICATIONS:

Based on the U.S. Fish and Wildlife Service's (Service) February 2006 Biological Opinion (2006 BO) on operations of Libby Dam, and the May final April-August volume runoff forecast of 7.35 million acre-feet (MAF), we are within a Tier 4 operations year for Kootenai River white sturgeon. The minimum recommended release volume for sturgeon conservation in a Tier 4 year is 1.2 MAF and we recommend the following procedures for discharge of at least this minimum volume from Libby Dam:

The precise means that will be utilized to meet these objectives are largely dependent on real-time conditions and in-season management. It is not possible to develop a single definitive recommendation for a sturgeon operation at this time due to the uncertainties in the forecast, and shape and volume of inflow. Given these uncertainties, the Service has developed the following guidelines for sturgeon operations in 2018:

- The 2018 sturgeon operations at Libby Dam will consist of one period of ramp-up/pre-peak/ascending limb flows, one period of peak flow (~20,000 cubic feet per second (cfs) or higher to provide a minimum flow of ~32,000 cfs at Bonners Ferry), and one period of ramp-down/post-peak/receding limb flows. The ramp-up and ramp-down will occur within 2006 BO ramping rates.
- Selective withdrawal gates at Libby Dam above elevation 2,326 mean sea level will be installed gradually prior to, and during, the augmentation operations, with the objective of passing the warmest water available in the forebay as it becomes available. Minimum submergence of selective withdrawal gates at Libby Dam is 30 feet, and gates will be installed to keep withdrawal elevations within 30-40 feet until all gates are installed.
- Release of the warmest water possible from Libby Dam, in combination with lower volume of release, will allow the Kootenai River temperature to increase to appropriate spawning temperatures at Bonners Ferry (8-10°C) during the receding limb of the hydrograph.
- Based on the Service's 2006 BO on operations of Libby Dam, and the May final April-August volume runoff forecast of 7.35 MAF, we are within a Tier 4 operations year for Kootenai River white sturgeon. The minimum recommended release volume for sturgeon conservation in a Tier 4 year is 1.2 MAF, and we recommend the following procedures for discharge of at least this minimum volume:
 - Increase discharge from Libby Dam to ~20,000 (peak) cubic feet per second (cfs) over a 7-day period (pre-peak flows) when the Regional Team of Biologists determines that high elevation tributary run-off is peaking.
 - Maintain peak discharge (~20,000 cfs, depending on head of the forebay and river stage at Bonners Ferry) for as long as possible (~ 25 days of peak flows), taking into account the shape and volume of the ascending and descending limbs of the hydrograph and the total sturgeon flow augmentation volume available (i.e. 1.2 MAF). Although ~20,000 cfs is requested for sturgeon operations, under current conditions dam managers may need to increase outflows from Libby Dam to full powerhouse for flood risk management purposes.
 - After peak flows, gradually decrease discharge at Libby Dam (post-

peak), adhering to ramping rates in the 2006 BO, and exhaust the total sturgeon volume to maintain a river flow that will result in a gradually receding stage at Bonners Ferry (Figure 3).

- After the sturgeon flow augmentation volume has been exhausted, continue to decrease discharge at Libby Dam towards stable summer flows, to no less than bull trout minimum flows (9,000 cfs in Tier 4).
- Total number of days at peak discharge will depend on real time conditions and the shape of the inflow hydrographs.
- Current modeling indicates that the intended flow objective at Bonners Ferry of 30+kcfs will be sustained for approximately 33 days.

As always, flood risk reduction operations supersede sturgeon flow augmentation, and dam managers will coordinate operations with regional sturgeon managers.

Sturgeon augmentation discharge may be extended for additional days if the Corps elects to provide volume in excess of the minimum volume requirement in the 2006 BO and to control the refill rate of Libby Dam.

Provide stable or gradually declining discharge through the end of September following ramping rates and minimum flow guidelines in the 2006 BO for bull trout and white sturgeon.

Additional recommendations may be provided as water supply forecasts are updated.

JUSTIFICATION:

The objective of the 2018 sturgeon augmentation operation described in this SOR is to provide, and maximize the duration of, peak river stages/flows during the spring run-off period. Preliminary analysis of sturgeon telemetry data by the Idaho Department of Fish and Game indicates that the number of days at or above 30,000 cfs at Bonners Ferry plays a role in increasing the likelihood that spawning sturgeon will migrate upstream of Bonners Ferry. Overall, the goal of this operation is to provide conditions that will enable sturgeon to migrate to, and spawn over, rocky substrates that exist upstream of Bonners Ferry.

Table 1. Kootenai Sturgeon Habitat Attributes from 2008 Libby Dam BO RPA Clarification.

Attribute	Measure	Objective
Area: RM 141.4 to RM 159.7		
Timing of Augmentation Flows	May into July (triggered by sturgeon spawning condition), in all years except for Tier 1.	Provide conditions for normal migration and spawning behavior.
Duration of Peak Augmentation Flows for Adult Migration and Spawning	Maximize peak augmentation flows with available water for as many days as possible, up to 14 days during the peak of the spawning period with pulses ¹ , in all years except for Tier 1.	Through in-season management, provide peak augmentation flows that lead to a biological benefit for sturgeon to maximize migration and spawning behavior via a normalized hydrograph.
Duration of Post-Peak Augmentation Flows for Incubation and Rearing	Maximize post-peak augmentation flows with available water for as many days as possible, up to 21 days, in all years except for Tier 1.	Through in-season management, provide post-peak augmentation flows that lead to a biological benefit for sturgeon to maximize embryo/free-embryo incubation and rearing via descending limb of a normalized hydrograph.
Minimum Flow Velocity ²	3.3 ft/s and greater in approximately 60% of the area of rocky substrate in the area of RM 152 to RM 157 during post-peak augmentation flows.	Provide conditions for spawning and embryo/free-embryo incubation and rearing.
Temperature Fluctuation	Optimize temperature releases at Libby Dam to maintain 50° F with no more than a 3.6° F drop.	Provide conditions for normal migration and spawning behavior via a normalized thermograph.

¹ Kootenai sturgeon spawn on the descending limb of the hydrograph. “Pulses” refer to slight reductions in flow during this two-week period to initiate spawning.

² In order to develop an agreed-upon estimate and measurement of the areal extent of the velocity and depth attributes, the Action Agencies shall, together with the Service and in collaboration with other involved parties as needed, develop appropriate assessment tools (e.g., hydrologic models) of the braided reach.

Depth at Spawning Sites	Intermittent depths of 16.5 to 23 ft or greater in 60% of the area of rocky substrate from RM 152 to RM 157 during peak augmentation flows.	Provide conditions for normal migration and spawning behavior.
Substrate Extent/Spawning Structures	Approximately 5 miles of continuous rocky substrate; create conditions/features that improve the likelihood of recruitment success.	Provide habitat for embryo/free-embryo incubation and rearing.
Minimum Frequency of Occurrence	<p>To facilitate meeting the attributes via: <u>powerhouse plus up to 10,000 cfs flow test</u>: a flow test will occur 2010 through 2012 (or until the Kootenai River Restoration Project is implemented) if the Service determines in 2008 and 2009 that the success criteria described in Action 1.3(b) have not been met.</p> <p><u>Habitat improvement projects and other options</u>: through adaptive management, as noted in RPA Components 2 and 5, implement the Kootenai River Restoration Project by the aspirational date of 2012-2016.</p>	

The operating parameters outlined in this SOR are intended to provide some guidance on how to achieve the attributes listed in Table 1 of the 2006 BO, given the current water supply forecast. Previous years operations have shown that conditions at Libby Dam and in the Kootenai River basin can change rapidly. Recognizing this, the start date and exact shape of the operation will need to be developed and modified in-season as more is known. The in-season coordination will occur in the sturgeon technical team and with a final recommendation coordinated through the action agencies and the Technical Management Team.