SYSTEM OPERATIONAL REQUEST: FWS #1

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

DATE: May 5, 2015

SUBJECT: **2015 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 5.4 million acre-feet, we are within a Tier 2 operations year for Kootenai River white sturgeon. The minimum recommended release volume for sturgeon conservation in a Tier 2 year is 0.8 million acre-feet 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 2015:

- The 2015 sturgeon operations at Libby Dam will consist of one period of peak flow, followed by a hydrograph that gradually recedes towards the anticipated stable summer flow at Libby Dam (Figure 1).

- Begin sturgeon augmentation flow when the Regional Team of Biologists determines that high elevation tributary run-off downstream of Libby Dam is peaking.

- Increase discharge (according to ramping rates in 2006 BO) from Libby Dam up to full powerhouse capacity, depending on local conditions, e.g. river stage at Bonners Ferry.

- Maintain peak discharge (20,000-25,000 cubic feet per second (cfs)) for a period of 7 days.

- After 7 days of peak discharge, decrease discharge at Libby Dam towards stable summer flows until the sturgeon volume is exhausted to no less than bull trout minimum flows (7,000 cfs in Tier 2).

- Selective withdrawal gates at Libby Dam above elevation 2,326 mean sea level will remain uninstalled during this peak, allowing for conservation of warmer surface water that will be targeted for release during the descending limb of the hydrograph, described below.

- Selective withdrawal gates at Libby Dam above elevation 2,326 mean sea level will be placed to within 30' of the surface of the reservoir prior to the end peak operation, described above, allowing for release of warmer surface water as the descending limb of the hydrograph commences. Release of warmer water 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 descending limb of the hydrograph.

- Total number of days at peak discharge will depend on real time conditions and the shape of the inflow hydrographs.

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 2015 sturgeon augmentation operation described in this SOR is to provide peak river stages/flows during the spring run-off period. This peak, timed to high elevation run-off below Libby Dam, is intended to first provide sturgeon cues to begin upstream migration and staging, then as river temperatures warm to 8-10° C, provide sturgeon cues to migrate further upstream from their staging areas and spawn on the descending limb. Overall, the goal is to provide conditions that will enable sturgeon to migrate to, and spawn over, rocky substrates that exist upstream of Bonners Ferry.

Although a two-peak approach was successfully implemented in 2013 and 2014, lower water supply conditions in the Kootenai River basin preclude a repeat in 2015. Therefore, sturgeon managers will manage river temperatures as they did in 2013-2014, just with a single peak. Telemetry data for spawning Kootenai sturgeon females from 2013-2014 indicate that a higher proportion migrated just upstream of Bonners Ferry than in previous years. The single-peak operation will allow sturgeon managers to test whether those results are due to the two-peak approach, temperature management, a combination of the two, or another factor.

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.

[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.

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.
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	To facilitate meeting the attributes via: powerhouse plus up to 10,000 cfs flow test: 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.	

[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.

	Habitat improvement projects and other options: through adaptive management, as noted in RPA Components 2 and 5, implement the Kootenai River Restoration Project by the aspirational date of 2012-2016.	

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 USFWS 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.