

## **SYSTEM OPERATIONAL REQUEST: FWS #2010-1**

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**FROM:**        **Rich Torquemada, Assistant Field Supervisor, U.S. Fish and Wildlife Service, Northern Idaho Field Office, on behalf of the Libby BO Policy Group**

**DATE:**        **May 18, 2010**

**SUBJECT:**    **2010 Libby Dam Releases for Sturgeon and Bull Trout Augmentation Flows**

### **SPECIFICATIONS:**

Based on the May final April-August volume runoff forecast of 4.887 million acre-feet, we are within a Tier 2 operations year for Kootenai River white sturgeon as defined in the Fish and Wildlife Service's February 2006 Biological Opinion (2006 BO) on operations of Libby Dam. The minimum recommended release volume for sturgeon conservation under these circumstances is 0.80 million acre-feet, and we recommend the following procedures for discharge of at least this minimum volume from Libby Dam:

Ascending Limb/Peak: Once Kootenai River temperatures at Bonners Ferry reach 8° C, and Koocanusa Reservoir elevation reaches at least 2,415', and at least one tagged F4 sturgeon is positioned at Ambush Rock, and the forebay of Koocanusa Reservoir warms such that 20-35,000 cubic feet per second (cfs) can be released through the turbines and over the spillway without decreasing Libby Dam release temperatures by more than 1.5° C, increase discharge from Libby Dam (according to ramping rates in the 2006 BO) to 20,000 cfs for one day. The discharge increase should begin at 6:00 AM on the initial day. After one day at 20,000 cfs, increase discharge to full powerhouse capacity.

Peak: After one day of flow at powerhouse capacity, begin spill of up to 10,000 cfs above powerhouse capacity. Spill of up to 10,000 cfs above powerhouse capacity may be sustained for up to 7 days, within the constraints of the Montana Total Dissolved Gas (TDG) waiver. Maintain at least full powerhouse flow at Libby Dam for 216 hours (9 days). Outflow from Libby Dam may be reduced to maintain river stage of less than 1764 ft at Bonners Ferry. No load following should occur during this period of peak

flows. Discharge at powerhouse capacity may be extended if necessary to reduce the rate of reservoir refill. Note: The intent of extending flow at this rate is to delay reservoir refill until inflows recede to below turbine discharge capacity.

Descending Limb: At about 6:00 AM, following 7 days of peak outflow, reduce discharge from Libby Dam to full powerhouse capacity for 1 day, then to 20,000 cfs for at least 1 day, following 2006 BO ramping rates. This discharge period of 20,000 cfs may be extended if necessary to reduce the rate of reservoir refill. Note: The intent of extending flow at this rate is to delay reservoir refill until inflows recede to below turbine discharge capacity.

At about 6:00 AM, following the period of 20,000 cfs discharge, reduce Libby Dam discharge to 17,000 cfs for 1 to 5 days.

- If the modeled summer flat flow (targeting reservoir elevation of 2,439' at the end of September) is 15,000 cfs or greater, maintain discharge of 17,000 cfs until the sturgeon volume is exhausted.
- If the modeled summer flat flow is less than 15,000 cfs, then starting at about 6:00 AM, following the period of 17,000 cfs discharge, reduce Libby Dam discharge to 15,000 cfs, then maintain 15,000 cfs discharge until the sturgeon volume is exhausted, or gradually reduce discharge to the summer flat flow. During this gradual discharge reduction, the Corps should avoid a double peak in outflow between sturgeon and summer operations.

Spring operations at Libby Dam were adjusted to provide higher reservoir elevations in order to increase the likelihood of conducting a spill test for sturgeon in 2010. Consequently, approximately 260 KAF was stored in Kootenai Reservoir, some of which may cause outflow to be higher than what is described above during sturgeon flow augmentation. Only the flows stated under this SOR will be accounted for against the sturgeon volume of 0.8 MAF.

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.

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:**

A continued effort is needed to provide spawning and incubation flows to meet habitat attributes for depth, velocity and temperature in the Kootenai River as defined in the 2008 BO Clarified Reasonable and Prudent Alternative (RPA) for Kootenai River white sturgeon (Table 1). The

clarified RPA states that if 2008 and 2009 sturgeon operations at Libby Dam are determined to be “not successful”, the action agencies (the Corps and BPA) will operate Libby Dam in 2010 through 2012 to provide additional flows by spilling in excess of powerhouse capacity consistent with a waiver of the TDG water quality standard provided by the State of Montana. The Service issued its determination of “not successful” for 2008 sturgeon operations on April 20, 2009, and issued a “not successful” determination for 2009 operations on December 16, 2009, thus triggering the action agencies to implement provisions to provide flows in excess of powerhouse capacity in operating years 2010 through 2012. The USGS performed data analysis of the 2006 through 2009 sturgeon augmentation flows in order to assess depth attribute attainment as per the 2006 BO. Kootenay Lake backwater extent varied, but in general a flow of roughly 35,000 cfs at Bonners Ferry provided river depth in the braided reach (RM 152 to RM 157) that met or exceeded the minimum 16.5 ft depth attribute.

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

| <b>Attribute</b>                                                     | <b>Measure</b>                                                                                                                                                                                      | <b>Objective</b>                                                                                                                                                                                                        |
|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 <sup>1</sup> , 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. |

<sup>1</sup> 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.

|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                             |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| Minimum Flow Velocity <sup>2</sup>   | 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: <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.<br><br><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. |                                                                                             |

<sup>2</sup> 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.

Operation of Libby Dam for sturgeon flow augmentation and temperature management during 2008 may have influenced the timing, extent, and duration of sturgeon pre-spawning migration. Discharge temperatures during 2008 warmed later than usual and IDFG documented that one tagged sturgeon migrated further upstream than had been previously observed. The 2010 sturgeon pulse and thermograph will be managed to maximize the upstream migration of adults and to optimize conditions during the egg incubation and embryonic stages. Additional flows from spill will coincide with discharges through the powerhouse to ensure release temperatures can be sustained at or above 50° F at Bonners Ferry. The operation will attempt to avoid a sudden decline in temperature during the spawning and incubation phase.

If spill isn't physically possible due to insufficient forebay elevation when the other commencement criteria exist, the default operation will be to provide maximum flows for up to 14 days within powerhouse capacity followed by a gradually receding hydrograph of up to 21 days, as in previous operations. The target temperature operation during a Tier 2 water year without spill will be similar to 2009 operations; cooler release temperature will be maintained.

The operations described in this document are intended to provide the best opportunity to achieve the attributes listed in Table 1, given the water supply conditions predicted in 2010. We recognize that no firm start date is given in this request. This is due to the desire of sturgeon managers and dam operators to allow for in-season management of dam operations in response to evolving conditions. Previous years' operations have shown that conditions at Libby Dam and the Kootenai River can change rapidly. Therefore allowing for flexibility in operations should aid in achieving the sturgeon habitat attributes.