

SYSTEM OPERATIONAL REQUEST #2003-03

TO: General.Grisoli COE-NPD
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FROM: Susan Martin, Supervisor, Upper Columbia Fish and Wildlife Office, U. S. Fish and Wildlife Service, on behalf of the following cooperating agencies and tribe: Idaho Office of Species Conservation, the Kootenai Tribe of Idaho, Idaho Department of Fish and Game, the City of Bonners Ferry and Boundary County, Idaho.

DATE: December 15, 2003

SUBJECT: Request for releases from Libby Dam for migration, spawning, incubation and larval development of burbot in the Kootenai River.

SPECIFICATIONS: Beginning December 1, 2003 and continuing through December 22, 2003, to the extent feasible, limit releases from Libby Dam to 15,000 cfs, while maintaining established ramping rates. Beginning December 18, 2003 and continuing through January 30, 2004, maintain releases between 4,000 and 10,000 cfs, and preferably less than 7300 cfs to the extent possible. If, subsequent to this request it becomes necessary to release more than 10,000 cfs, it is recommended that the new release rate be the lowest stable flow which can be sustained through January 30. We acknowledge that unforeseen circumstances such as local or system flood control or power emergencies may supersede this recommendation.

Secondly, throughout this operation utilize the selective withdrawal system at Libby Dam to release the coldest water available. The objective is to maintain water temperatures in the Kootenai River between Bonners Ferry and the U. S. - Canada border below 4.0 degrees C, and as near to 1.5 degrees C as possible through operations of Libby Dam.

PURPOSE and JUSTIFICATION:

The intent of this request is to define the upper flow and temperature thresholds for burbot migration and spawning, and encourage the fish to move into and utilize its historic spawning areas in the Kootenai River. Monitoring of this operation will be conducted by the Idaho Department of Fish and Game and Bonneville Power Administration.

The burbot (*Lota lota*) population in the lower Kootenai River in Idaho and in Kootenay Lake, British Columbia, is very depressed. Harvest has been discontinued, but the burbot population has not responded as expected based on the exceptional fecundity characteristic of this species (Becker 1983; Jakob Kjellman, University of Helsinki, pers. com. in The Kootenai River Burbot

Recovery Committee 2001). Available information suggests that the most significant remaining environmental stressor is the altered flow regime during the late fall and winter. Researchers have suggested that these unnaturally high flows, associated changes in water temperature, and rapid fluctuations in flow resulting from hydroelectric load following may be altering normal burbot migration and or spawning behavior (The Kootenai River Burbot Committee 2001).

During the winter 2000, agreement was reached to curtail load following from Libby Dam for conservation of bull trout and sturgeon. In addition, 2001 flows were generally low in response to the drought and the need to retain water high in the system for a possible extended power emergency. With a couple of exceptions, releases from Libby Dam during the fall/winter migration and spawning period remained below 10,000 cfs, with the lowest flows in the 4,000 to 6,000 cfs range. During winter 2001, under these low flow conditions, some burbot did migrate to the Bonners Ferry area, and for the first time in recent years, there was evidence that spawning occurred there. Successful recruitment from that spawning event has yet to be verified (Vaughn Paragamian, IDFG. 2001, Pers. Com.).

Secondly, burbot historically were believed to have spawned when water temperatures were near 1.0 °C. Prior to operations of Libby Dam, spawning may have occurred some years beneath the ice that commonly covered the Kootenai River in Kootenai Flats during the winter. In 2003, during the third week of January when burbot were believed to have spawned in the Kootenai River, water temperatures at Bonners Ferry ranged from slightly below freezing to 3.3°C. Since Libby Dam operations began, typical winter river water temperatures have been increased from about 1.0 °C to about 4.0 °C during the same time periods (Partridge 1983). Burbot would be expected to spawn when water is only about 1.5 °C (Becker 1983; MacKay 1963). It is not known whether change of this magnitude in river water temperature is affecting burbot migration, spawning behavior, egg development, larval development, the timing of any of these events, or possibly the efficiency of egg or larval predators.

We believe that the river has not frozen over in any major way since Libby Dam became operational. This is a result of unseasonally high flow releases from Libby Dam during the winter months, with associated high energy from increased velocity and friction. In addition the water released is often warmer, as a result of heat retention and delayed release from the reservoir. We believe that these effects on water temperature will be diminished when releases are within the flow range recommended above, because of increased travel time allowing for more cooling of water. The selective withdrawal structure in place at the Libby Project may be used to a limited extent to manage winter water temperature in the Kootenai River with relatively little cost. The intent here is to reduce temperature to the extent possible within constraints of the Libby Project.

REFERENCES:

- Becker, G. 1983. Fishes of Wisconsin. The University of Wisconsin Press. Madison, Wisconsin.
- MacKay, M. A. 1963. Fishes of Ontario. the Bryant Press limited. Toronto.

Partridge, F. 1983. Kootenai River fisheries investigations. Idaho Department of Fish and Game. Federal Aid in Sport Fish Restoration. Project F-73-R-5, Completion Report. Boise, Idaho.

The Kootenai River Burbot Recovery Committee. 2001. Draft Transboundary Recovery Strategy for the Kootenai River and Kootenay Lake Burbot *Lota lota* in Idaho and British Columbia. 25pp.