System Operational Request #2002-B1

To:	General Fastabend	COE-NPD
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From: The Kootenai Tribe of Idaho; The Idaho Office of Species Conservation; Idaho Department of Fish and Game; Boundary County Commissioners; the City of Bonners Ferry; and the U. S. Fish and Wildlife Service.

Date: September 25, 2002

Subject: Request for limited releases from Libby Dam for migration and spawning of burbot in the Kootenai River

Specifications:

Maintain low flows in the lower Kootenai River below Bonners Ferry for 45 days between December 15 and January 31.

Flows would be the combination of local runoff and releases from Libby Dam ranging between 4,000 and 10,600 cfs.

Preferably, the releases from Libby Dam would remain below 7,300 cfs, the median.

Operate the selective withdrawal system at Libby Dam to release the coldest available water during December and January if a temperature gradient exists within the reservoir.

The requested operation will be implemented within flood control constraints.

Through written declaration by the regional managers the power system will continue to be operated to assure system stability and public safety. The follow definition and protocol for power emergencies as outlined by the ACOE, BOR, and BPA in "Cold Snap Operating Procedures" will be used for this purpose: **http://www.nwd-wc.usace.army.mil/TMT/1998/docs/coldsnap_1210.htm**

The existing biological opinion ramping rates will remain in effect, except during emergency conditions.

This request is subject to favorable analysis of the affects on listed species, and in-season mitigation or adjustments to satisfy their needs.

Consideration should be given to the latest forecasting procedures which will include November and December, and VarQ if adopted on an interim basis in January.

This request will be fine tuned in-season through the TMT.

Justification:

The burbot (*Lota lota*) population in the lower Kootenai River in Idaho and in Kootenay Lake, British Columbia, is at risk of extinction and a listing decision will be made by the USFWS by March 2003. Available information suggests that the most significant environmental stressor is the altered flow regime during the late fall and winter. Researchers have suggested that 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 (Paragamian 2000; Kootenai River Burbot Committee 2002).

Operation of Libby Dam for hydropower and flood control has changed the natural hydrograph and created warmer winter water temperatures (Partridge 1983; Paragamian et al. 2000). Winter flows are now more erratic and three to four times greater than pre-dam conditions. Burbot are winter spawners and are known to travel over 125 km (77.7 mi) to spawn (Breeser et al. 1988). Burbot in the Kootenai River have traveled up to 120 km (75 mi) from Kootenay Lake to spawn in tributaries in Idaho (Paragamian 2000). Winter was the most environmentally stable period of the year prior to Libby Dam, when flows in the Kootenai River were at their lowest seasonal level. Burbot have low swimming stamina (compared to 19 other species) and velocities in excess of 24 cm/s (9.4 in/s) affected sustained swimming endurance when subjected for more than 10 minutes (Jones et al. 1974); thus it is reasonable to believe increased flow could affect spawning migration.

During the 2000/2001-water year, agreement was reached to curtail load following for conservation of bull trout and sturgeon. In addition, 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 in the 2000/2001 water year remained below 10,000 cfs, with the lowest flows in the 4,000 to 6,000 cfs range. 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 has yet to be verified (Vaughn Paragamian, IDFG. 2001, Pers. Com.).

Burbot historically were believed to have spawned when water temperatures were near 1.0 ^{o}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. Last year 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^{o}C. Since Libby Dam, typical winter river water temperatures have been increased from about 1.0 ^{o}C to about 4.0 ^{o}C (Partridge 1983). Burbot would be expected to spawn when water is only about 1.5 ^{o}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.

The river has not frozen over in any major way since Libby Dam became operational. This is a result of seasonally high releases from Libby Dam with unnaturally high water temperatures, warmed through heat retention and delayed release from the reservoir, and additional energy released from increased velocity and friction of these unseasonably high flows. We believe that these effects on water temperature will be diminished when releases are within the flow range recommended above. However, there may be opportunity to slightly lower water temperatures through operations at Libby Dam. Typically, winter water temperature in Lake Koocanusa is nearly isothermal. However, the selective withdrawal structure in place at the Libby Project may be beneficial to a limited extent to manage winter water temperature in the Kootenai River.

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