U.S. Fish and Wildlife Service
SYSTEM OPERATIONAL REQUEST: #2006-FWS-1

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FROM: for Susan Martin, Supervisor, Upper Columbia Fish and Wildlife Office, U.S. Fish and Wildlife Service, on behalf of the Kootenai Valley Resource Initiative – Burbot Recovery sub-committee. Richard S. Torgnemada, Acting

DATE: 10/13/06

SUBJECT: Winter Temperature Operation of Libby Dam for Kootenai River burbot

SPECIFICATIONS:

U.S. Fish and Wildlife Service staff and others, as members of the Kootenai Valley Resource Initiative (KVRI) burbot sub-committee, request that the Corps of Engineers use the selective withdrawal system at Libby Dam to release the coolest water possible in November and December, 2006 before temperature stratification limits the temperature control capability. The purpose of this operation is to provide cooler river temperatures downstream of Bonners Ferry, and also to determine how radio-tagged burbot in the Kootenai River respond to these temperatures. This will likely result in November and December temperatures slightly cooler than the existing selective withdrawal temperature rule curve (Figure 1). This deviation from the temperature rule curve has been coordinated with Montana Fish, Wildlife & Parks (MFWP). MFWP asked that the selective withdrawal gates be removed incrementally to assure that daily temperature change remains within 2 degrees F per day; gates should be removed systematically during the last 2 weeks of October (17th through 31st) to slowly lower river temperature to the minimum by November 1 (on average, a span of about 5 degrees C, or 9 degrees F; Figure 1).

JUSTIFICATION:

The request is designed to cool the river (Bonners Ferry vicinity) during the burbot migration period (November to mid-December) and to the extent possible during spawning season (Dec 15 – end of Feb), when temperatures of 1 to 4° C are preferable. Burbot spawning migrations may be affected by water temperature conditions much earlier in the winter/late autumn (Paragamian 2005, pers. comm.), particularly when combined with higher flows.

Lengthy migrations have been documented in the late fall/early winter and again in late winter/early spring that coincide with spawning (Robins and Deubler 1955, McCrimmon 1959, Percy 1975, Morrow 1980, Johnson 1981, Breeser et al. 1988, Evenson 2000, Paragamian 2000, Schram 2000). These migrations were often temporally correlated with changes in water temperatures, although movement appeared to be minimal immediately prior to spawning (Evenson 2000).

The following excerts of actions to be implemented are from the widely agreed upon Kootenai River burbot conservation strategy (KVRI Burbot Committee, 2005):

9.4 Hydro Operations

> 9.4.1 Develop an experimental Kootenai River flow/water temperature operation to evaluate the effectiveness of restoring natural spawning and recruitment by reducing winter temperatures and velocities. Implement experimental operations when conditions allow to evaluate burbot spawning requirements while preserving flexibility in needed hydropower production and flood control operations. Annual operations will be coordinated through the Regional Forum Technical Management Team (TMT). The KVRI Burbot Committee will coordinate with the U.S. Fish and Wildlife Service to develop System Operations Requests (SOR) to the TMT to request flow conditions or temperature requirements in any given year.
>
> 9.4.4 Evaluate use of selective withdrawal during migratory pre-spawning periods to affect thermograph at Bonners and downstream to benefit burbot, and monitor water temperature at Porthill.

The principal migration monitoring method involves implanting radio transmitters in larger animals, and the then tracking their behavior with an array of fixed, continuously recording receivers along the Kootenai (y) River and at some tributary mouths. Last year there was a total of seven burbot with active transmitters (Paragamian and others, 2006). However, only one of these animals received a transmitter prior to the period (November through mid-December, 2005) during which water temperature was effectively manipulated through operations of Libby Dam, and we do not know what became of that fish (Paragamian and others, 2006). Since we expect to have six or more active transmitters during this requested operation, we anticipate gaining some information on early season migration, during November and early December 2006. Since there are so few burbot available to tag it may take several years of observation to gain enough data to objectively evaluate effectiveness of this fall water temperature management operation.

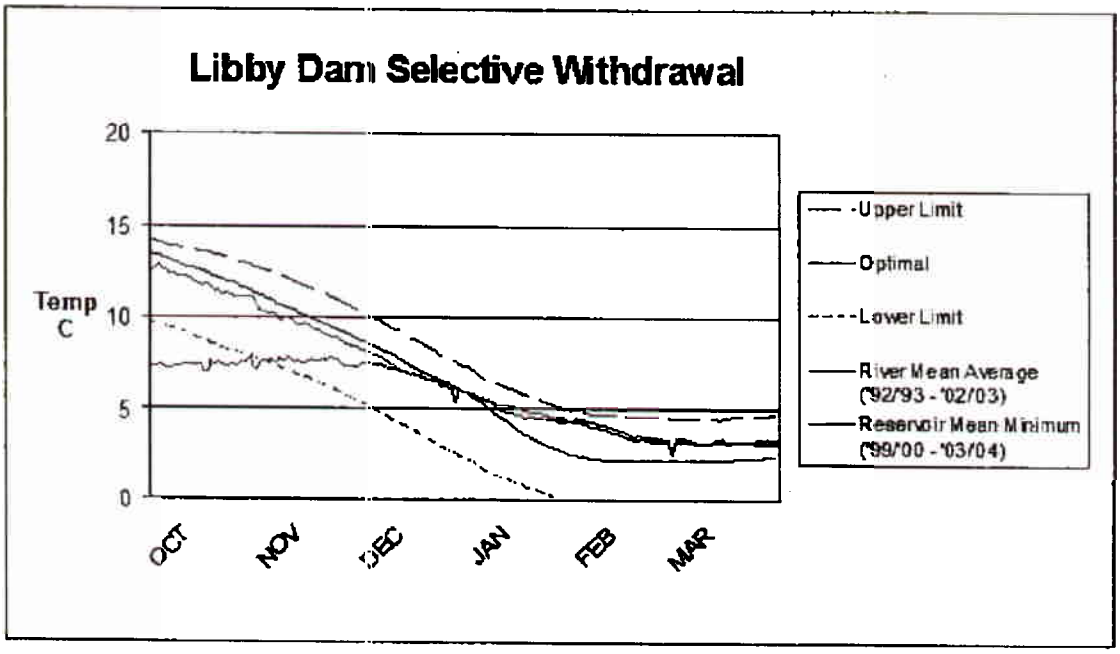

Figure 1. Selective withdrawal temperature guidelines for the Kootenai River below Libby Dam. The mean average release temperature was within the guidelines for the period displayed, with means slightly less than optimal early in the winter, and slightly higher than optimal later in the winter. There is water much cooler than optimal available for release during the early winter period until the reservoir becomes isothermic about mid-December.

Prior to Libby Dam, winter water temperature both below the current Libby Dam site and near Bonners Ferry was substantially cooler than post-Dam temperatures. The Kootenai River gradually warmed slightly as it flowed downstream, whereas current conditions allow atmospheric cooling of the river, though still not to pre-dam levels (Figure 2). The committee would like to continue to investigate the possibility of influencing ambient river temperatures during the late fall and early winter migration period, as there is water available for release during this time that is substantially cooler than previous, post-dam release temperatures, and also cooler than the minimum temperature specified by the selective withdrawal temperature curve (Figure 1).

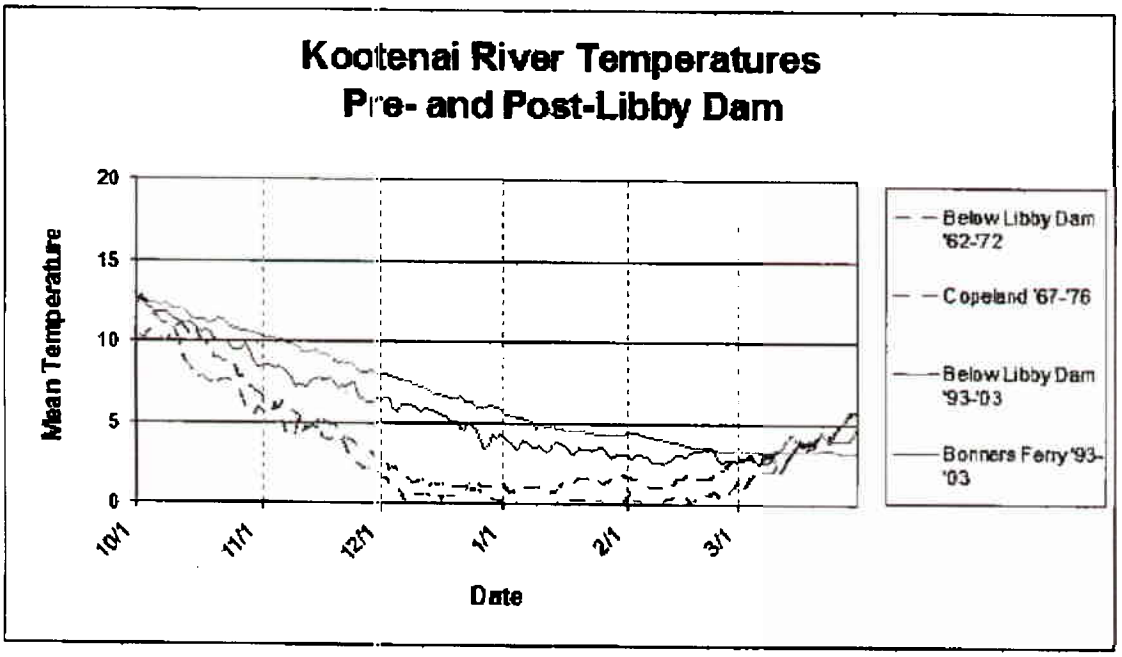

Figure 2. The thermograph in the Kootenai River before and after installation of Libby Dam is reversed to the point of the now-warmer river cooling with ambient air conditions as it reaches the Bonners Ferry vicinity, rather than warming.

The committee will continue to review future forecasts and may issue additional SOR's related to flow should this season's conditions warrant. The committee is also pursuing methods for reintroducing burbot into the Kootenai River, and anticipates that in future years flow requests may be made to enhance spawning conditions for these fish, should they survive and persist. The committee hopes that results of seasonal temperature experiments carried out in the interim would enable the Action Agencies to implement discharge-related SOR's in future years, with less regard to seasonal conditions, should population numbers increase to a point where temperature and flow optimization would benefit the resultant migratory spawning population.

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