DAMES & MOORE

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July 12, 1979

Port of Vancouver
P.O. Box 1180
Vancouver, Washington 98666

Attention: Mr. Richard F. Gorini,
Director, Planning and Government Relations

Gentlemen:

Re: Fisheries - Vancouver Lake Operations Plan

After many discussions with officials and experts in the salmonids fisheries field, and an extensive review of the literature, we would urge the following considerations be put before the Washington State Department of Fisheries.

Basically, the prime concern expressed by WDF is that the proposed flushing channel with an unscreened opening to the Columbia River at about RM 100.8 and with a nominal flow of 600 cfs could entrain juvenile salmonids. The implication was that juveniles thus entrained would suffer unacceptable losses due to predation or residualism in passing through the lake and Lake River in transit back to the Columbia River. Several facts and/or results of past research indicate that there may be a course of action that will allow completion and operation of the project, with a reduced flow of 300 cfs instead of 600 cfs, in the manner compatible with protection of juvenile and adult salmonids.

1. Research results from the Columbia River and elsewhere indicate that beach seining is among the best techniques for sampling presence of small fish, including pre- and post-yearling salmonids, in near-shore waters (e.g., C. Sims NMFS, C. Simenstad, University of Washington Fisheries Research Institute, personal communications, Dames & Moore 1975).

2. Results of beach seining by Bauersfeld (1977) at RM 97 across from the proposed Vancouver Lake flushing channel mouth during 1975 and by Dawley et al. (1978) at Jones Beach (RM 46.5 during 1977 and 1978; C. Sims NMFS personal communications) indicate that recent out-migrations of 0-age chinook have peaked during the April to June period. Markedly fewer fish were captured at

other times of the year. Juvenile chum salmon out-migrations have a relatively minor peak in late March and April. Thus, it appears that by current patterns the majority of smaller subyearling salmonid out-migrants pass the proposed flushing channel mouth during the period from late March through June. We estimate that the goals of the lake rehabilitation project can be met with closure of the gates during this period, thus virtually eliminating the possibility of entrainment of these highly vulnerable out-migrants.

3. Juvenile salmonids passing the mouth of the channel in the July through September period are expected to be primarily upriver spring chinook and steelhead that migrate as larger yearlings. These fish are reported to spend most of their time in deeper channels offshore (Buchanan 1977) where they would be far less vulnerable to entrainment in the open flushing channel.

4. Juvenile salmonids that did enter the channel and passed into Vancouver Lake would be subjected to predation by squawfish, large mouth bass, perch, etc. Zero-age out-migrants that are poor swimmers and frequent shallow waters could suffer substantial mortalities. Larger out-migrants including races migrating as yearlings or later in the summer as subyearlings will be better swimmers and will tend to prefer the deeper dredged channels. They will therefore be far less vulnerable to predation than would spring subyearling out-migrants.

5. Juvenile salmonids entering the lake in response to "downstream currents" and escaping predation will be free to continue migrating downstream through the lake and Lake River back to the Columbia River. The trip through the lake via the east or west channels will add about 5 or 3 miles, respectively, to their downstream journey as compared with the distance down the Washington shoreline. This should not add more than a half a day to the expected transit time to the estuary according to recorded travel rates (Sims 1978).

Concern has also been raised by WDF regarding the potential for attraction of adult salmon into and up Lake River to Vancouver Lake because of the flow of Columbia River water through the Lake. Several factors seem likely to reduce the chances of this to a very low level.

1. Under the proposed mode of operation, no Columbia River water would be entering the lake through the flushing channel during the March to June period when many of the threatened upriver spring chinook and summer chinook and steelhead are passing

this part of the river (Buchanan 1977, Coutant and Becker 1968). Thus, there should be no attraction to these fish beyond what has been existance for many years.

2. When the flushing channel is in operation the time for complete replacement of lake water will be on the order of 20 days. In this time the water will undergo a number of chemical and physical changes that will make it quite unlike unaltered Columbia River water. The water will pick up nutrients and dissolved organic matter from the sediments in the lake and from runoff from surrounding residential and agricultural lands. Water exiting Lake River will also be warmer in the summer and usually carry a greater sediment load than the Columbia River.

3. Any fish that do enter the mouth of Lake River will be given a second choice between relatively "pure" Columbia River water flowing through Bachelor Island Slough and the distinctly less pure Lake River water where that slough joins Lake River at about 1.5 miles from its mouth. Various experiments have shown that adult salmon will usually make the correct choice of their home stream under such circumstances.

4. Adult fish that chose to continue up Lake River into Vancouver Lake would have free access through the flushing channel back to the Columbia River unless acreens are installed at the entrance to the flushing channel. The delay resulting from such a detour again is expected to be minimal (1 day or less) but we are aware that such delays in upstream migration can reduce spawning success.

In light of the above and the anticipated high cost of installing and maintaining screens on the intake to the flushing channel and associated adult bypass of such screens, we request that WDF consider granting approval of the project as currently conceived (without the immediate requirement for screens and adult bypass facilities) subject to the following stringent conditions to ensure protection of the salmonid resources of the river.

1. Gates in the channel would be shut from approximately March 15 to June 30 to protect the great majority of underyearling out-migrants and adults of threatened upstream runs.

2. Studies would be conducted to determine:

   a. presence of fish near the mouth of the channel (e.g., weekly beach seining from mid-June through October).

b. entrance of fish into the channel (e.g., fyke nets fished in the channel to assess numbers of fish entering the channel per unit time).

c. time of passage through the lake and river back to the Columbia River (e.g., fyke nets or traps fished at the outlet of Lake River to determine time for marked fish to transit the system).

d. loss rate to predation (e.g., stomach analysis of potential predators captured by gill net or electrofishing).

e. numbers of adults entering Vancouver Lake (e.g., monitoring a temporary trap at the lake outlet).

3. Gates would be closed until vulnerable fish were no longer present along the shoreline near the channel entrance if:

a. large numbers of juvenile salmonids were found to be entering the channel.

b. significant losses of juvenile salmonids were documented in the system.

4. Conceptual engineering design would be completed for screening and adult bypass facilities which would be installed by the Port if studies described in Item 2 showed there to be a real need for them.

We stand ready to discuss this matter in substantial detail with WDF, but it is critical that we get a response to the solution outlined above so that we can proceed with the engineering of the flushing channel consistent with our contract provisions.

Yours very truly,

DAMES & MOORE

K. C. Robbins,
Partner

KCR:JH:111
8799-004-04

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