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To: Richard D. Beland Date: July 16, 1984

From: Department of Fish and Game - Glenn/Colusa Fish Screen

Subject: River Configuration near Glenn/Colusa Fish Screen

The Glenn/Colusa Fish Screen located 3.5 miles north of Hamilton City, Glenn County, was put into opeartion during March 1972. The design requirements for the proper operation of the screen were based upon river elevations during the pumping season which historically varied between 137.38 feet and 142.42 feet. These elevations allowed adequate flows for the bypass of the outmigrant salmon. River flows from 1972 to 1979 generally fell within the design requirements. Beginning in July 1980 flows below the historic minimum began to be evident. The net effect was to reverse the flow of bypass water carrying the migrant salmon back into the Sacramento River.

The Glenn/Colusa Irrigation District has historically begun diverting water about April 1 and ceased operation during November. The average daily flows for the 1972-1984 period are as follows:

Flow (c.f.s.)*	April	May	June	July	August	Sept.	Oct
RIVER ($\bar{X}$ 1972-1984)	18,301	13,788	12,214	11,678	10784	8,141	7,528
G.C.I.D. ($\bar{X}$ 1972-1984)	1,398	1,835	2,084	2,064	2,097	945	448
River (1984)	9,904	9,779	10,025				
G.C.I.D. (1984)	904	1434	1,872				

* Based upon data taken from Bureau of Reclamation and Glenn/Colusa Irrigation District records for the period 1972-1984.

The diversions for April-June 1984 were well below historic levels and also below desired levels. Because the District was diverting the maximum possible, reverse flow conditions existed almost continuously since April 2, 1984.

Irrigation District records reveal that several significant changes have occurred in the river adjacent to the pumping plant. Prior to 1970 the river made a small sweep to the east near the mouth of the intake channel and a larger sweep to the east near the outlet of the channel. During the period 1970-1974 the river cut through the District's island at the mouth of the intake channel and then cut through the larger eastern sweep at the base. The effect was to create a long straight chute which caused severe degradation of the river channel. District records show the following elevation changes for a given flow:

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Elevation (ft.)	FLOW (c.f.s.) 4000	6000	8000	10,000	12,000	14,000
Pre 1980	137.3	138.4	139.0	139.6	140.2	140.8
1981	137.0	137.8	138.5	139.1	139.8	140.4
1983-84	136.8	137.1	137.4	137.8	138.2	138.7

The District figures show that there has been a degradation in the river elevation of approximately 2 feet since the pre 1980 figures. Further complications have resulted from a shift of the river channel from west to east, diverting water away from the mouth of the intake channel. This shift has caused considerable amounts of gravel to be deposited directly into the mouth of the channel.

Complicating the river changes has been the District's limited intake channel maintenance program. For the period 1972-1983 debris has been allowed to accumulate within the channel and also in the mouth opening. The result has been a deterioration of the channel and the formation of several gravel bars. This blockage has caused further on the river causing it to move away from the mouth of the intake channel.

The net effect of changes in flow and elevation has been river elevations at the Fish Screen which are below the design minimum. The average elevation during the April-June 1984 was 135.81 feet, well below the historic design minimum of 137.38 feet. This has resulted in the near continuous lack of bypass water for outmigrant salmon. Without major modifications there is every reason to believe that the current situation will not change in the near future.

The Irrigation District has recognized the implications for their diversions and has implemented a more vigorous intake channel maintenance program. They have additionally suggested the possibility of modifications to the river channel such as dredging and/or installation of a low barrier. They are also considering widening the intake channel throughout its' entire length.

Implications for the operation of the Fish Screen include the following:

1. The elevation and flow conditons will not change resulting in the Fish Screen being totally ineffective.
2. Modifications by the Irrigation District will result in either temporary or permanent changes which will make the Fish Screen once again effective.
3. The River will further change course and once again make the Fish Screen effective.
4. The river will further change course with the potential for damage to or isolation of the Fish Screen.

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