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# United States Department of the Interior

FISH AND WILDLIFE SERVICE
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May 11, 1994

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Mr. Tom Howard
State Water Resources Control Board
901 P Street
Sacramento, CA 95814

Dear Mr. Howard:

This letter is in response to the SWRCB Public Workshop on May 16, 1994 to review standards for the San Francisco Bay/Sacramento - San Joaquin Delta Estuary. The following comments are technical in nature. A policy statement on behalf of the Service via the "Club Fed" presentation on May 16, will be given by Wayne White.

Endangered Species Issues:

We will not comment directly on Endangered Species issues and refer you to our Endangered Species office in Sacramento but welcome the opportunity to comment on the effects of Bay-Delta diversions on beneficial uses, including diversions other than the Central Valley Project (CVP) and the State Water Project (SWP) and the methods available to analyze water supply and environmental effects of draft standards.

Diversion Effects on Chinook Salmon:

Our Exhibit 7 (WRINT-FWS-7), from our testimony of July, 1992 for the D-1630 hearings continues to represent our basic understanding of the impacts of the CVP and SWP diversions on juvenile salmon. We have also documented our understanding of these effects in past annual reports, the most recent being our 1991 and 1992 annual report. We anticipate our 1993 annual report to be completed by September and results of our 1994 season soon after which will also include specific effects of the SWP and CVP diversions on salmon smolt survival through the Delta. We have also included an article (IEP Newsletter, dated spring, 1994) on the results of a coded wire tag experiment conducted in November of 1993, on the differential survival of late fall run salmon smolts migrating through the Central Delta versus those migrating down the mainstem Sacramento River at low temperatures. This data implies that survival is much lower when smolts are diverted into the Central Delta even at low temperatures and at a relatively large size. Presumably much of the mortality in this area of the Delta is due to the direct and indirect impacts of project pumping.

Methods to analyze environmental effects:

During the SWRCB hearings in July of 1992, we provided copies of our Sacramento smolt survival model and believe that it can be useful in the standard setting process for juvenile salmon migrating through the Delta. It can be used to evaluate different operational scenarios relative to their impact on salmon smolt survival. Our model was updated in May of 1992, and the most recent equations are provided in our 1991 annual report.

In our Exhibit 7, we also described two models for use in evaluating various operational actions for San Joaquin fall run smolts migrating through the Delta. We are now in the process of refining those two models into one comprehensive model that will reflect the use of the Upper Old River barrier as an implementation measure to improve San Joaquin delta smolt survival and rely solely on smolt survival indices generated from various coded wire tag smolt experiments. We will provide our refined model to your staff as soon as it receives review by other salmon biologists. We believe it should be available by early summer (June, 1994).

We applaud California Urban Water Associations (CUWA) desire to work with the fishery agencies to identify solutions to Delta fishery problems. However, in reviewing their document ("A Review of the salmon smolt survival index as proposed by the U.S. Environmental Protection Agency as water Quality Standards for the San Francisco Bay Estuary")on smolt survival for the EPA water quality standard setting process, we found certain inaccuracies. We have met with them to clarify errors in their analyses and correct misconceptions. We will provide the Board (and CUWA) a copy of our written review of their document as soon as possible (June, 1994). Following our meeting with CUWA, they have agreed to make some inquires with their contract statistician to clarify questions we had and to specify areas where we could improve our models.

Our office (Sacramento-San Joaquin Estuary Fishery Resource Office in Stockton) has the lead in the anadromous fish restoration program (section 3406 (b)(1) of the Central Valley Project Improvement Act of 1992. In cooperation with other State and Federal agencies we will develop a program to double anadromous fish in the Central Valley to include restoration actions in the Delta. We enclose several copies of the Plan of Action for the Board's information.

We continue to be available to provide technical information to the Board. Please feel free to call my assistant Pat Brandes or myself if we can be of further assistance at 209-946-6400.

Patricia [illegible] Brandes

for Martin A. Kjelson
Project Leader

Interagency Ecological Studies Program for the Sacramento-San Joaquin Estuary

# Newsletter

Spring 1994

Readers are encouraged to submit brief articles or ideas for articles. Correspondence, including requests for changes in the mailing list, should be addressed to Randy Brown, California Department of Water Resources, 3251 S Street, Sacramento, CA 95816-7017.

EDITORS' NOTE: The following is an unsolicited article and does not necessarily reflect the opinions of Interagency Program managers and coordinators. Written comments on this or other *Newsletter* articles are welcome and will be presented, along with the author's responses, in the summer edition.

## The Disastrous Decline of the San Joaquin River and Its Ecology

*Alex Hildebrand*

*Farmer, engineer, member of the Bay-Delta Oversight Council, and a director of South Delta Water Agency*

For more than 40 years I have watched the enormous decline of the San Joaquin River and its water-related ecology. For more than 20 years I have listened to biologists and others debate the causes of decline of harvestable fish and fowl, and more recently the survival of listed species. But I hear very little about the interrelationships of impacts of various kinds of fish, aquatic plants, wading birds, frogs, redwing blackbirds, and turtles. And how is the delta's ecology affected by whatever is causing the ecological declines in and along the San Joaquin River upstream of its inflow to the delta's channel network?

My family has owned a farm in the South Delta along the east bank of the San Joaquin River for almost 50 years, and has resided on it for more than 30 years. It is located downstream of the mouth of the Stanislaus River and upstream of Mossdale. We have frontage on the main channel of the river and on an oxbow.

In the early years of our ownership and residence, we swam and boated in the river and the oxbow. We listened to the chorus of big frogs croaking at night, and we saw the turtles that basked on logs in the sun, and the weasels, the muskrats and beavers, the egrets and cranes, and visiting flights of white pelicans. Native fish of many varieties were abundant, and river flows provided ample depths for these activities and these species even at low tides.

Now the water is shallow and so choked with water hyacinth and other non-native aquatic plants that swimming and boating in the oxbow is impossible. The river channel is also no longer attractive. The frogs and turtles and weasels are gone. And the population of fish, muskrats, raccoons, cranes and other water-related creatures is greatly diminished.

What are the causes of this drastic decline? Is it possible to restore this beautiful place and, if so, how?

We can plausibly identify a number of causes, but may not yet know all of them, or which causes are dominant,

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## Estimating Winter Run Survival with Late-Fall Run Fish

*John Wullschleger, USFWS*

Knowledge of Chinook salmon smolt survival in the Sacramento River and the delta is primarily based on studies using fall run fish. Factors found to affect survival include temperature, export rate, size of fish, percent diversion, and the path taken to the ocean. In general, smolts diverted into the central delta exhibit lower survival than those that remain in the main river channel. Recently, attention has become focused on Sacramento winter run salmon, which has been listed federally as an endangered species. The National Marine Fisheries Service Biological Opinion includes criteria for protection of winter run smolts, which are believed to be less vulnerable than fall run fish to predation and temperature factors due to their greater size and the relatively cool water temperatures during their outmigration. An Interagency study in December 1993 by the USFWS Stockton Office was designed to acquire information on mortality of winter run smolts in the delta by using late-fall run instead of fall run smolts. Late-fall run smolts are considered reasonable surrogates for winter run fish because of their similar size, and because overlap in their migration periods exposes them to similar, cool water temperatures.

Late-fall run Chinook smolts (1993 brood year) from Coleman National Hatchery were released in the Sacramento River at Ryde ($N_R$=33,668) and in Georgiana Slough ($N_G$=34,929) on December 2. All fish were fin clipped to facilitate recognition and implanted with coded wire tags indicating release site and date. Tagged fish were recovered by midwater trawl at Chipps Island and by sampling at the SWP and CVP fish salvage facilities in the southern delta. Methods for estimating survival were identical to those used for studies using fall run fish. Descriptions of field and data analysis methods can be obtained from the USFWS Stockton Office and from Interagency Program annual reports.

Salmon smolts were recovered from December 6 through March 16 at Chipps Island, from December 8 through March 16 at the SWP, and from December 6 through March 19 at the CVP. Peak recovery was December 12 at Chipps Island and December 9-11 at the SWP. For the CVP, most smolts were recovered in December, but no clear peak was observed. Survival indices for both Ryde and Georgiana Sough release groups and the survival index ratio (Ryde:Georgiana Slough) were within ranges observed during previous studies using fall run fish (Table 1). As documented for fall run fish, the survival index was lower for smolts released in Georgiana Slough than for those released at Ryde. Numbers of Georgiana Slough smolts recovered at SWP and CVP fish salvage facilities were among the highest recorded. Further, six smolts (expanded number = 9) released in the Sacramento River at Ryde were diverted to the southern delta and recovered at the SWP fish salvage facility. This occurred even though QWEST was slightly positive, although exports were very high.

As expected, water temperatures at time of release were lower than during studies with fall run fish (Table 2). Flow variables are reported from the release date through peak recovery at Chipps Island. Although 14-day running averages for QWEST flow (QWEST14) were slightly less positive relative to those during fall run survival studies, exports were an order of magnitude higher. Delta Cross Channel gates were open during December and the beginning of January but were closed during the rest of the recovery period.

Low survival of fall run Chinook salmon smolts in the central delta is well documented and has been attributed in part to predation and the adverse effects of high water temperature. Results of this study suggest that despite cooler water and the presumed reduced vulnerability to predation, survival for winter run smolts diverted into the central delta is similarly low. Although the expanded recovery rate of late-fall run is considerably higher than for fall run, our results suggest

**Table 1**
**Release Data, Estimated Survival, Number Counted at SWP and CVP Facilities, and Survival Ratio for Experiments with Tagged Fall Run and Late-Fall Run Chinook Salmon Smolts, April 6, 1992, through December 2, 1993**

| | | Sacramento River at Ryde Releases | | | | Georgiana Slough Releases | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Release Date | Race | Water Temp. (°F) | Mean Fork Length (mm) | Estimated Survival | Expanded Number Counted CVP/SWP | Water Temp. (°F) | Mean Fork Length (mm) | Estimated Survival | Expanded Number Counted CVP/SWP | Ryde: Georgiana Survival Ratio |
| 04/06/92 | Fall | 64 | 77 | 1.36 | 0 / 34 | 64 | 74 | 0.13 | 10 / 4 | 3.30 |
| 04/14/92 | Fall | 63 | 82 | 2.15 | 0 / 0 | 64 | 81 | 0.29 | 12 / 8 | 3.00 |
| 04/27/92 | Fall | 67 | 81 | 1.67 | 0 / 0 | 67 | 83 | 0.41 | 1 / 4 | 8.30 |
| 04/14/93 | Fall | 58 | 61 | 0.41 | 0 / 0 | 58 | 63 | 0.71 | 0 / 24 | 3.15 |
| 05/10/93 | Fall | 59 | 75 | 0.86 | 0 / 0 | 65 | 75 | 0.20 | 15 / 36 | 2.96 |
| 12/02/93 | Late-Fall | 57 | 129 | 1.19 | 0 / 9 | 57 | 119 | 0.31 | 92 /135 | 3.80 |