

Quarter 1 Progress Report Submitted to CALFED

for

Role of Contaminants in the Decline of Delta Smelt in the Sacramento-San Joaquin Estuary

Agreement No. B81650

April 15, 1999

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Background: This report constitutes a summary of work in progress intended as partial fulfillment of the progress report requirements requested by CALFED. Due to various delays in the contractual process, we have only recently received funding for our project (effective January 15, 1999) proposed in the 1997 RFP. As a result, the official budget summary for Quarter 1 will not provide an adequate reflection of our progress to date. The required report is currently being processed by University officials and will arrive soon at CALFED.

Scope of Project: The goal of our 2-year project is to evaluate the overall health, condition, and growth rate of delta smelt collected from various habitats encompassed by the Interagency Ecological Program (IEP) monitoring surveys. Our investigation of these samples employs evaluation of: (1) *histopathology biomarkers* of exposure and organ/tissue condition, and (2) *biomarkers of DNA damage*, with (3) *otolith growth rate analyses* of individual smelt. Integration of these state-of-the-art techniques will quantify potential contaminant effects on individuals that can be related to consequences for the delta smelt population.

General Description of Tasks for Year 1: Our initial objective will be to examine the year-class failure in 1996, using samples archived by IEP surveys (Sweetnam), and IEP Entrapment Zone Studies (Bennett). We will (1) develop and apply histopathologic, genetic, and otolith analyses to evaluate potential relationships between tissue or genetic condition and growth rate. We will next (2) coordinate field sampling at key locations/times with DFG/USGS/USBR to obtain specimens for evaluations requiring special fixatives or fresh specimens for specific biomarkers. (3) Depending on the availability of cultured specimens, we will conduct preliminary laboratory experiments exposing young delta smelt to chemicals commonly found in the Bay/Delta system. Cultured specimens will also be evaluated to validate growth rates measured from otoliths.

Progress on Specific Tasks (as described in the Scope of Services):

Task One- Dr. William A. Bennett: Task Responsibilities/Progress.

Subtask 1- Analyses of IEP monitoring data.

Dr. Bennett has completed a variety of analyses which are providing new insights into the factors regulating the delta smelt population that we are using to sharpen the focus of our project. Many of these analyses have been presented at several recent CALFED and IEP

sponsored workshops.

Subtask 2- Cataloging of specimens and coordinating field and laboratory research.

Bennett's laboratory has been coordinating with IEP to identify all sources and suitability of archived delta smelt specimens. We are developing a common database to facilitate tracking of individual specimens during processing in the different tasks. In addition, we have established collaborative efforts with IEP monitoring surveys and culturing projects to obtain appropriate specimens. We have recently conducted our first specialized sampling cruise.

Subtask 3- Preparation and analysis of delta smelt otoliths.

Bennett's laboratory has developed methodology and completed surgery to remove otoliths on over 400 delta smelt specimens. He is currently setting-up and evaluating a computer assisted imaging system for the evaluation of growth information in the delta smelt otoliths. Growth rate has been evaluated on over 50 specimens.

Task 2- Dr. Swee J. Teh: Task Responsibilities/Progress.

Subtask 1- Standard operating procedure (SOP) document

Dr. Teh's laboratory is developing specific methodology for archived delta smelt eggs, larvae and juveniles to be included in the SOP document.

Subtask 2- Sampling, processing, sectioning, and staining of tissues.

Dr Teh has participated in one field sampling cruise, and is currently processing, sectioning, and staining delta smelt tissues. In addition, Dr. Teh has completed a laboratory experiment in which delta smelt eggs and young larvae were exposed to diazinon.

Subtask 3- Histopathologic analysis.

Dr Teh has completed initial analysis of over 60 delta smelt liver and pancreas samples, for which Bennett (above) has evaluated growth. Dr Teh has also completed evaluation of specimens from his diazinon exposure experiment.

Task 3- Dr. Susan Anderson: Task Responsibilities/Progress.

Subtask 1- Development of anaphase aberration and comet assay techniques.

Dr Anderson's laboratory has completed development of the comet assay, and is currently working on application of the anaphase aberration technique for archived delta smelt eggs, larvae and juveniles.

Subtask 2- Analyze 1996 archived specimens, field sampling, and analysis of blood samples for the comet assay.

Dr Anderson has participated in a field sampling cruise and is currently applying the comet assay to over 30 blood samples taken during that cruise.