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CLIFFORD W. SCHULZ

March 9, 2007

VIA HAND DELIVERY

Gita Kapahi, Chief
Bay Delta/Special Projects Unit
1001 "I" Street, Second Floor
Sacramento, CA 95814

Re: Comments of the Kern County Water Agency and State Water
Contractors for the March 22-23, 2007 Pelagic Organism Decline Workshop

Dear Ms. Kapahi:

Enclosed are written comments prepared by Dr. Charles Hanson on behalf of the Kern County Water Agency ("Kern") and the State Water Contractors ("SWC") for the March 22-23, 2007, public workshops on the Pelagic Organism Decline (POD). In addition to these comments, Kern and the SWC will provide oral statements based on the recently released POD action plan document which has been submitted to the State Board by the Department of Water Resources

Kern and the State Water Contractors look forward to working with the State Board on this evolving topic.

Sincerely,

KRONICK, MOSKOVITZ, TIEDEMANN & GIRARD
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CWS
Attachment

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**Comments of the State Water Contractors
and the Kern County Water Agency
Regarding the Pelagic Organism Decline (POD)***

Results of fishery surveys conducted by the California Department of Fish and Game (CDFG) documented a substantial decline in the indices of abundance of several pelagic fish species inhabiting the estuary beginning in 2002 and continuing to date. The State Water Contractors (SWC) have been actively engaged in collaborative discussions with State and Federal resource agencies, water interests, environmental interests, and representatives of academia in the investigation of factors affecting the pelagic organism decline (POD) within the Bay-Delta estuary. The primary pelagic species of concern include delta smelt, longfin smelt, striped bass, and threadfin shad, although concern has also been expressed regarding changes in phytoplankton, zooplankton, and other fish species inhabiting the estuary. The most recent information available on the status and findings of these POD investigations has been summarized in a series of presentations made at the March 1-2, 2007 Interagency Ecological Program (IEP) Asilomar conference. As part of the pelagic organism decline investigations, there has been a expansion of fishery monitoring programs within the estuary as well as a substantial expansion of the data analyses on water quality, aquatic resources, population dynamics, stressors, and various other factors that may be affecting the reproductive success and survival of pelagic fish. Through the expansion of monitoring and data analyses, a number of hypotheses have emerged regarding the potential stressors and mechanisms that may be affecting the population dynamics of these pelagic species. The primary focus of these emerging hypotheses includes:

- Changes in hydrodynamics within the estuary including seasonal and interannual variability in freshwater inflow and outflow from the Delta, flow dynamics (e.g., reverse flows) within Old and Middle Rivers affected by State Water Project (SWP) and Central Valley

* Prepared for the State Water Resources Control Board POD workshop, March 22-23, 2007.

Project (CVP) export operations, location of the low salinity zone (X₂), Sacramento and San Joaquin River flows, seasonal export rates, and changes (declines) in the indices of habitat quality for pelagic species;

- Effects of contaminants and water quality conditions on habitat suitability within the estuary as well as direct effects on the overall health and survival of pelagic fish species, changes in salinity intrusion, frequency of lesions and multiple infections/tissue damage, effects of toxic algae on pelagic species, effects of turbidity and water temperature, changes in recent years in the fall distribution of salinity intrusion;
- Vulnerability and magnitude of direct entrainment/salvage losses for various life-history stages of pelagic organisms as a result of direct entrainment and salvage at the SWP and CVP export facilities including consideration of the percentage of the population of various lifestages of pelagic species that may be vulnerable to export operations, as well as changes in the management of export operations that have occurred since the mid-1990s;
- Influence of non-native introduced species on the trophic dynamics, food availability, predation, and competition between non-native fish, benthic organisms (e.g., *Corbula*), zooplankton, and aquatic plants on pelagic fish species, the importance of the co-occurrence of suitable zooplankton and pelagic fish species temporally and spatially within the estuary, and the importance of predation mortality (e.g., by striped bass or largemouth bass); and
- Information on the population dynamics for the pelagic fish species including stock-recruitment trends, differential contribution to successful reproduction by different age or size fish, growth rates, disease, diet, health and condition, and the contribution of various life-history stages to the subsequent adult population.

The POD investigators are using a variety of tools and techniques for testing and evaluating these various emerging hypotheses which include, but are not limited to:

- Application of the particle tracking model to assess the potential fate of planktonic lifestages of pelagic species and their distribution within the estuary under various hydrodynamic and operational conditions;

- The allocation of Environmental Water Account (EWA) resources and monitoring of the biological response of pelagic species to these operational changes;
- Statistical analyses of trends in abundance and the spatial distribution of various lifestages of pelagic fish species within the estuary; and
- Correlation and regression analyses, in addition to other statistical analyses, to investigate potential associations between observed changes in population trends with various physical and biological parameters that may be affecting pelagic fish species, with particular attention on both the long-term trends as well as the identification of any changes in estuarine habitat conditions occurring during approximately the 2001-2002 period when the pelagic organism decline was first detected.

Although a large number of statistical analyses have been performed, typically with coefficients of determination (r^2) of less than approximately 0.6, there is a relatively high degree of uncertainty regarding the cause-effect relationships and potential interactions among the wide variety of environmental and biological factors that affect the population dynamics and response of pelagic species to the potential range of stressors being examined. Histological examinations are also being performed on individual fish to assess their health and condition as well as age, growth, and mortality investigations and analyses based on otolith age determinations and the application of other analytical tools (e.g., life-cycle and individual-based population models, species-specific conceptual models). There has also been an increase in the sophistication of both water quality and hydrodynamic modeling of conditions within the estuary for use as an analytical tool in assessing potential changes in habitat quality and suitability for various pelagic fish species in response to a range of hydrologic and operating conditions affecting the estuary.

Preliminary findings from these investigations, which are continuing to be developed and refined, include:

- Multiple factors (stressors) appear to be affecting the population dynamics of pelagic fish species and no single "smoking gun" factor has been identified as the cause of the pelagic organism decline.
- Cause-effect mechanisms for the pelagic organism decline have been hypothesized, however testing and evaluation of these various alternatives is ongoing and incomplete.
- Management implications and strategies that would address the factors contributing to the POD are currently unclear.
- Results of many of the POD investigations have not been formally written or formally reviewed.
- Many of the POD investigations are currently incomplete and research/analyses are continuing.
- The technical and scientific understanding of the physical and biological processes affecting conditions within the estuary for pelagic species is complex and continuing to evolve as new information and analyses are developed through the POD investigations.
- POD investigations are being integrated with the National Center for Ecological Analysis and Synthesis (NCEAS) to provide a broader perspective and new insight into identifying and evaluating factors affecting pelagic species in the estuary.
- There is currently a lack of confidence in the available scientific evidence and results of analyses to support modifying long-term management actions at this time.

KCWA and the SWC support the continued collaborative investigations initiated by the POD workgroup and others and continue to support the identification and evaluation of alternative hypotheses regarding the factors and stressors affecting pelagic organisms within the estuary, expanded testing and monitoring of the response of these pelagic organisms to various environmental conditions, and the identification of long-term cost-effective management actions that would benefit to pelagic fish species and other aquatic resources inhabiting the estuary.