October 15, 2010

VIA E-MAIL AND U.S. MAIL

Department of Fish and Game
Attn: Chad Dibble - Water Branch
1416 Ninth Street, 12th Floor
Sacramento, CA 95814

Re: California Department of Fish and Game's Draft Quantifiable Biological Objectives and Flow Criteria for Aquatic and Terrestrial Species of Concern Dependent on the Delta (Sept. 21, 2010).

Dear Mr. Dibble,

The Coalition for a Sustainable Delta (Coalition)[1] is writing in response to the Department of Fish and Game's (DFG or the Department) request for comments on the Draft Quantifiable Biological Objectives and Flow Criteria for Aquatic and Terrestrial Species of Concern Dependent on the Delta dated September 21, 2010 (Draft Biological Objectives and Flow Criteria or Draft BO&FC). We urge you to give due consideration to the comments that follow and request that this letter be included in the administrative record for the Final Biological Objectives and Flow Criteria.

I. Introduction

Scientific data and analyses strongly suggest that the declines of the Delta's pelagic and anadromous fishes – and the Delta ecosystem that supports those fishes – are attributable to multiple factors including changes to the food web in the Delta, which is now dominated by non-native species, agriculture in the Delta that both diverts water and returns agricultural flows to the estuary containing pesticides and other pollutants, urban development within the Delta that destroys fish habitats and results in stormwater runoff, leaching of contaminants into the Delta and into waterways that run into the Delta, predation of native fishes by non-natives such as striped bass and black bass, thousands of water diversions of varying sizes and subject to varying degrees of regulation, and climate change. In combination over a period of decades, these factors precipitated the current crisis, as is well documented in *The State of Bay-Delta Science 2008* (Michael Healey, ed. 2008) and *Envisioning Futures for the Sacramento-San Joaquin Delta* (Jay Lund et al. 2007).

[1] The Coalition for a Sustainable Delta is a not-for-profit organization comprised of water users who depend on the Delta for conveyance of a large portion of their water supplies and individuals who utilize the Delta for aesthetic and recreational enjoyment.

In view of the current crisis, the Legislature passed SB 1, finding and declaring it to be the goal of the state to

> [a]chieve the two coequal goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place.

Cal. Pub. Resources Code § 29702(a) (2010).

DFG's Biological Objectives and Flow Criteria are therefore of the utmost importance, both for the ecological well being of the Delta, and for the health and welfare of the people of California, who depend upon the estuary to provide a reliable water supply. Accordingly, the Legislature required that biological objectives and flow criteria be determined based upon a scientifically defensible analysis of the best scientific and commercial data available. Cal. Water Code § 85084.5 (2010). In addition, the objectives and criteria must be directed to protection of "species of concern" native to, and dependent upon, the Delta. *Id*. The draft should include objectives and criteria for species that are listed under the California Endangered Species Act (CESA) or the Federal Endangered Species Acts (ESA) as threatened or endangered, or designated as "species of special concern" by the Department or "species of concern" by the National Marine Fisheries Service (NMFS).[2] It is improper for the Department to make a purely political decision to develop objectives and criteria for species that are not native to the Delta in light of the explicitly science-driven mandate provided by the Legislature. Additionally, it is inconsistent with the Department's position that species can be designated as species of special concern only if they are native to California.

Unfortunately, as explained in detail below, the Draft Biological Objectives and Flow Criteria are not based on the best scientific and commercial data available, and in several critical instances, the analyses DFG did consider are not scientifically defensible. For

[2] DFG defines "Species of Special Concern" as "a species, subspecies, or distinct population of an[y fish, amphibian, reptile, bird, or mammal] native to California that currently satisfies one or more of the following (not necessarily mutually exclusive) criteria: is extirpated from the State or, in the case of birds, in its primary seasonal or breeding role; is listed as Federally-, but not State-, threatened or endangered; meets the State definition of threatened or endangered but has not formally been listed; is experiencing, or formerly experienced, serious (noncyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify it for State threatened or endangered status; has naturally small populations exhibiting high susceptibility to risk from any factor(s), that if realized, could lead to declines that would qualify it for State threatened or endangered status." Cal. Dept. of Fish & Game, *Species of Special Concern*, http://www.dfg.ca.gov/wildlife/nongame/ssc/ (last visited Oct. 14, 2010) (emphasis added). NMFS defines "Species of Concern" as "those species about which NOAA's National Marine Fisheries Service (NMFS) has some concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species under the Endangered Species Act (ESA)." NOAA Fisheries Office of Protected Resources, *Proactive Conservation Program: Species of Concern*, http://www.nmfs.noaa.gov/pr/species/concern/ (last visited Oct. 14, 2010).

example, fall X2 flow criteria and Old and Middle River (OMR) flow criteria are unsupported by reliable scientific data or analysis. And, by omitting consideration of certain native aquatic species of concern, DFG appears to assume that the aquatic species for which it has established biological objectives and flow criteria are adequate surrogates for the native species of concern that DFG omitted. The use of surrogate species is warranted under certain limited circumstances. But if DFG intends to use surrogates, it must validate its choice of surrogates using one or more of the validation procedures described in the scientific literature on surrogates. Here, it has not.

Moreover, the draft violates Water Code section 85084.5 because it includes biological objectives and flow criteria for species that DFG has unilaterally deemed to be of "commercial and recreational importance," while it fails to include objectives and criteria for certain species of concern. Specifically, it includes biological objectives and flow criteria for American shad and Starry flounder. Likewise, it provides as a justification for certain of the biological objectives and flow criteria the contention that those objectives and criteria may improve conditions for non-native striped bass. But these non-native species are not listed under CESA or the ESA, or even designated as a "species of concern" by NMFS or "species of special concern" by the Department. At the same time, the draft fails to include biological objectives and flow criteria for native species of concern such as the Southern Distinct Population Segment of North American green sturgeon, River lamprey, and Central Valley steelhead. Thus, the draft includes species that are not "of concern," while it fails to include several species that clearly <u>are</u> of concern. This violates the Legislature's express mandate set forth in Water Code § 85084.5, and must be corrected.

II. The Draft Flow Criteria Are Not Supported by the Best Scientific and Commercial Data Available and Are Not Based Upon Scientifically Defensible Analysis

DFG admits that "[t]o the extent possible, DFG will use the flow criteria record developed by the Water Board during [its] 2010 Informational Proceeding." Draft BO&FC at 12. Not only does the draft document rely on the record developed during the State Water Resources Control Board's (Water Board's) Informational Proceeding, it also relies heavily on the Water Board's final report, which includes the Water Board's flow criteria for the Sacramento-San Joaquin Delta Ecosystem.[3] *Id.*, Executive Summary (ES) at ii.

Reliance on the Water Board's final flow criteria is misplaced. As commenters pointed out during the Informational Proceedings, many of the assumptions and conclusions drawn by the Water Board were not based upon the best scientific and commercial data available. Indeed, the State and Federal Contractors Water Agency (SFCWA) submitted a detailed technical review of the Water Board's final flow criteria that DFG should consider in

[3] State Water Resources Control Board, California Environmental Protection Agency, *Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem Prepared Pursuant to the Sacramento-San Joaquin Delta Reform Act of 2009* (Aug. 3, 2010) (Water Board Flow Criteria).

revising its draft objectives and flow criteria.[4] Moreover, the Department should base its own objectives and criteria on the best available scientific data and analyses rather than a document that had to be drafted to withstand the litmus test imposed by a Board composed of political appointees.

Both the Water Board Flow Criteria and DFG's Draft Biological Objectives and Flow Criteria rely heavily on biological opinions (BiOps) issued by NMFS and the U.S. Fish and Wildlife Service (USFWS) for impacts of the operations of the Central Valley Project (CVP) and State Water Project (SWP) on salmonids, green sturgeon, and southern resident killer whale (NMFS OCAP BiOp (2009)) and the delta smelt (USFWS OCAP BiOp (2008)).

Unfortunately, as demonstrated below, DFG ignores a large body of scientific studies and analyses that have been brought to light in the course of litigation over the validity of NMFS's and USFWS's respective BiOps.[5] DFG also fails to address the criticisms of the scientific validity of a number of conclusions drawn in the BiOps that were based on studies that it and the Water Board have relied upon, and completely ignores the court's findings of fact regarding the same. Furthermore, DFG mischaracterizes a key conclusion that the National Research Council (NRC) Committee on Sustainable Water and Environmental Management in the California Bay-Delta made in its report titled *A Scientific Assessment of Alternatives for Reducing Water Management Effects on Threatened and Endangered Fishes in California's Bay Delta* (March 19, 2010) (NRC Report) (attached to email transmitting this comment letter).

A. The Use of Fall X2 Criteria for Delta Smelt Is Not Supported by the Best Scientific and Commercial Data Available

DFG states that "The NAS (2010) review panel concluded that the fall X2 criteria is conceptually sound, but expressed concern about the uncertainty associated with its potential benefits." Draft BO&FC at 71 (using the abbreviation "NAS (2010)" to refer to the NRC Report). This is a mischaracterization of the panel report. The NRC Committee on Sustainable Water and Environmental Management in the California Bay-Delta (Committee) called the relationship between delta smelt populations and the position of X2 "poor and sometimes confounding," and stated that "[t]he weak statistical relationship between the location of X2 and the size of smelt populations makes the justification for this action difficult to understand." NRC Report at 40-41. The Committee goes on to state:

> The action is based on a series of linked statistical analyses (e.g., the relationship of presence/absence data to environmental variables, the relationship of environmental variables to habitat, the relationship of habitat to X2, the relationship of X2 to smelt abundance), with each step being

[4] *See* Letter from James M. Beck, Director, SFCWA, to Messrs. Charlie Hoppin, Chair, State Water Resources Control Board, and Philip Isenberg, Chair, Delta Stewardship Council (Oct. 1, 2010) (attached to email transmitting this comment letter).

[5] *See, e.g.*, *The Consolidated Salmonid Cases*, 1:09-cv-1053 OWW DLB (E.D. Cal.); *The Delta Smelt Cases*, 1:09-cv-00480-OWW-GSA (E.D. Cal.).

> uncertain. The relationships are correlative with substantial variance being left unexplained at each step.

Id. at 41. The Committee recommended the use of adaptive management, further study, and a review to determine "whether the action should be continued, modified, or terminated." *Id*.

Instead of conducting its own analysis in accordance with the NRC Committee's recommendation, DFG simply adopts the flow criteria relating to fall X2 in the USFWS OCAP BiOp as a kind of "floor," concluding that:

> Until additional studies are conducted demonstrating the importance of fall X2 to the survival of delta smelt, additional fall flows, beyond those stipulated in the fall X2 criteria, for the protection of delta smelt are not recommended if they will compete with preservation of cold water pool resources needed for the protection of winter-run salmon.

Draft BO&FC at 71 (emphasis added). Thus, DFG has incorporated the same faulty scientific analysis of fall X2 flow criteria for the protection of delta smelt employed by USFWS.

DFG ignores the serious criticisms of the science underlying the fall X2 flow criteria raised by the plaintiffs in *The Delta Smelt Cases* in February 2010, including plaintiff the State of California.[6] There, plaintiffs demonstrated that USFWS used an erroneous DAYFLOW-CALSIM comparison to establish that the operations of the CVP and SWP (Project Operations) are the primary driver affecting the location of fall X2. Then—based on the fundamentally flawed assumption that X2 is a surrogate for delta smelt habitat—USFWS concluded that Project Operations would appreciably reduce the amount of delta smelt habitat. To reach this conclusion, which is unsupported by any of the peer reviewed literature, USFWS relied on a single unpublished paper (Fred Feyrer et al., *Modeling the Effects of Water Management Actions on Suitable Habitat and Abundance of a Critically Imperiled Estuarine Fish* (Delta Smelt *Hypomesus transpacificus*) (unpublished manuscript) (2008)) and defined delta smelt "habitat" in a manner inconsistent with conservation biology.

USFWS also used the flawed DAYFLOW-CALSIM comparison and an inherently flawed model to reach the conclusion that the Project Operations primarily affect the position of X2. On the basis of this conclusion, USFWS concluded that Project Operations would appreciably reduce delta smelt abundance. The methodological approach used by USFWS to reach the conclusion that Project Operations appreciably reduce delta smelt habitat and, consequently, delta smelt abundance does not constitute the best available science; nor does USFWS's reliance on the underlying primary research, Fred Feyrer et al., *Multidecadal*

[6] *See* PLAINTIFFS' MEMORANDUM OF POINTS AND AUTHORITIES IN SUPPORT OF MOTION FOR SUMMARY JUDGMENT at 33-46 (Doc. No. 551, filed Feb. 4, 2010) (Pls.' Mem. P. & A. in Supp. of Mot. for Summ. J.), *The Delta Smelt Cases*, Case No. 1:09-CV-004070 OWW-GSA (E.D. Cal.)(attached to email transmitting this comment letter).

Trends for Three Declining Fish Species: Habitat Patterns and Mechanisms in the San Francisco Estuary, California, USA, Canadian Journal of Fisheries and Aquatic Sciences 64 (2007), and Feyrer et al. (2008).

These papers do not represent the best available science because the correlation they claimed to find was driven by the presence of a single unrepresentative data point. Moreover, even assuming the scientific validity of the 2007 and 2008 Feyrer analysis, USFWS overextended their findings far beyond what the articles can and do support.

Feyrer et al. (2008) found a correlation between fall X2 and delta smelt abundance by comparing historical X2 data from 1987-2007 with the results of the following year's Summer TOWNET survey. However, in doing so, Feyrer et al. (2008) ignored the fact that the data point for 1999 appears to be an extreme outlier. Simply removing this one year from the 21 years analyzed in the article causes the model to collapse: without the 1999 year, the relationship between X2 and delta smelt abundance becomes statistically insignificant. It was unreasonable for USFWS to rely on a study driven by a single, unrepresentative data point; it is similarly unreasonable for DFG to rely on USFWS's same analysis, which the Water Board relied upon to formulate flow criteria for delta smelt. *See, e.g.*, *Water Board Flow Criteria* at 32, 44, 71.

That there was no statistically significant relationship between X2 and delta smelt abundance during the 1987-2007 period should not have been surprising given that Feyrer et al. found no statistically significant relationship between the two factors for the 1968-1986 period or for the entire 1968-2007 period. Feyrer et al. (2008) at 14. Nor was it surprising considering that—as the Feyrer et al. (2008) article conceded—the existing best available science on delta smelt showed no direct correlation between the location of fall X2 and delta smelt abundance. Feyrer et al. (2008) at 8 ("[P]revious analyses have not shown simple relationships between X2 and delta smelt abundance.").

DFG's continued reliance on the Feyrer et al. (2008) model runs counter to the substantive evidence before DFG. The model's results linking X2 and delta smelt abundance is flawed because it is based on an anomalous data set dominated by a single data point. Therefore, use of the Feyrer et al. (2008) model fails to satisfy the best available science requirement and, thus, violates the requirements of Water Code § 85084.5. Indeed, use of X2 as a "surrogate" for suitable delta smelt habitat ignores all of the other habitat factors that are essential to delta smelt survival, reproduction, and population persistence—most notably, biotic factors such food supply and predation.[7]

The Plaintiffs in *The Delta Smelt Cases* also presented evidence that the best scientific data available undermines USFWS's comparison of CALSIM Modeled X2 estimates with DAYFLOW modeled "historical" X2 estimates, which led USFWS to erroneously conclude that Project Operations will cause an upstream migration of the median X2 location by 8 to

[7] Pls.' Mem. P. & A. in Supp. of Mot. for Summ. J. at 39-41.

12 kilometers when actual scientific data show that the average location of X2 in the fall (September-October) has actually shifted upstream only about 3 km over the past 50 years.[8]

Thus, by ignoring the scientific evidence already set forth in painstaking detail and rigorously analyzed in *The Delta Smelt Cases*, DFG has simply turned a blind eye to the best scientific information available in violation of Water Code § 85084.5. At a minimum, DFG should explain why it has chosen to simply accept, without question, data and analysis that has come under heavy criticism from the NRC Committee and other members of the scientific community.

B. The OMR Criteria Are Not Supported by the Best Scientific and Commercial Data Available

By ignoring the extensive body of scientific evidence and analysis available in *The Delta Smelt Cases*, DFG also fails to take into account that the best scientific information available demonstrates that (i) OMR flows and entrainment have no statistically significant effect on the delta smelt population growth rate from one year to the next; and (ii) with respect to the adult population, only OMR flows more negative than -6100 cfs will correlate to an increase in entrainment.

As the plaintiffs in *The Delta Smelt Cases* demonstrated, USFWS committed two scientifically indefensible errors to arrive at its conclusion, accepted by DFG, that negative OMR flows and entrainment have a significant population-level effect on delta smelt: (1) FWS used raw (or absolute) salvage data—a meaningless source of information in this context—instead of using cumulative salvage (more accurately referred to as relative salvage), thereby failing to measure population level effects of entrainment; and (2) FWS addressed the delta smelt as a single life-stage, employing a linear model to estimate salvage losses, despite the fact that accepted fisheries management practices, the best available science, and common sense all call for a multiple life-stage approach using an exponential model to evaluate the effects of environmental stressors on the population size and trajectory of the species.[9]

There are two primary reasons why the use of raw salvage numbers is not valid for determining population-level effects on delta smelt. First, without correlating the number of individuals salvaged with an estimate of the total delta smelt population, there is no way to tell if the salvage number is significant or not. For example, entrainment of 100 delta smelt is a demographic disaster if the total population consists of 101 delta smelt, but it is negligible if the total population size is 100,000. Second, use of absolute salvage numbers during a single stage in the delta smelt life cycle to determine the effects on the total subsequent population size ignores the significant differences in contributions to subsequent population size from the different delta smelt life stages, which has been thoroughly established in the peer reviewed literature. *See, e.g.*, Wim J. Kimmerer, *Losses of Sacramento River Chinook Salmon and Delta Smelt to Entrainment in Water Diversion in*

[8] *Id.* at 41-43.
[9] *Id.* at 13-30.

the Sacramento-San Joaquin Delta, 6 San Francisco Estuary & Watershed Science 1 (2008) (observing 50-fold variability in population for delta smelt).

In order to have any meaningful understanding of the population-level effect of entrainment, one needs to divide the total raw salvage by some measure of delta smelt abundance. For this reason, the United States District Court for the Eastern District of California made the following finding:

> FWS presented no credible, scientifically based explanation for the decision to use gross salvage numbers instead of normalized salvage data in Figures B-13 and B-14, either in the BiOp or at the hearing. Other than endeavoring to structure a result, there is no explanation for this departure from best available science. This raises the specter of bad faith.

Findings of Fact and Conclusions of Law, *The Delta Smelt Cases*, 1:09-cv-00480-OWW-GSA at 43 (E.D. Cal. May 27, 2010).

Furthermore, in the OCAP BiOp for delta smelt, USFWS chose to focus its entire analysis on a single portion of the delta smelt life cycle—the period from the Fall Midwater Trawl Survey (FMWT) to the Summer Tow Net Survey (TNS)—effectively assuming that the rest of the delta smelt's life cycle was irrelevant. As USFWS conceded in the BiOp, it simply "assumed" that any mortality caused by entrainment during this single period would translate directly into adverse population-level effects on the delta smelt. USFWS OCAP BiOp at 203 ("Our analysis also assumes that any of these three major categories of effects described above [including entrainment] will adversely affect delta smelt").

USFWS should have used a population-level analysis to determine to what extent, if any, salvage has a population-level impact on delta smelt abundance, rather than just affecting individual members of that species. Such an analysis—performed using some variety of recruitment or life stage model—looks beyond individual mortality rates at a single stage of life to consider whether that mortality has any effect on the size and trajectory of the population through time. USFWS or DFG could have performed a basic life-cycle analysis using readily available population index data from surveys that track delta smelt through their entire life history. Even in the absence of a rigorously tested, peer-reviewed model that is customized specifically for delta smelt, USFWS, and so too DFG, could have, and should have, begun with a standard stock-recruit model, as is standard fisheries practice.[10] At least one such model was specifically developed for delta smelt by renowned scientists and is available for use by DFG.

[10] DFG acknowledges that "[d]evelopment of a comprehensive life-cycle model for delta smelt would be valuable in that it would allow for an assessment of population level impacts associated with entrainment." Draft BO&FC. Nevertheless, it ignores the availability of a standard stock-recruit model that can and should be used, and it cites the USFWS OCAP BiOp, claiming that it "supports a recommendation that OMR flows be more positive than -5,000 cfs during the period between December and March." Draft BO&FC at 76.

The best available scientific methods, and use of a quantitative population dynamics model that incorporates the entire delta smelt life cycle rather than a single portion of it, demonstrates no statistically significant relationship between salvage and the population growth rate.[11] It also establishes that entrainment does not have a "sporadically significant" effect on long term abundance.[12] Accordingly, such a result would have been entirely consistent with the best available science cited in the USFWS OCAP BiOp itself: "[C]urrently published analyses of long-term associations between delta smelt salvage and subsequent abundance do not support the hypothesis that entrainment is driving population dynamics year in and year out." USFWS OCAP BiOp at 210.

When OMR flows are tested to see if they have any impact to the delta smelt population from one year to the next, the analysis shows that there is no effect on the population growth rate.[13] As Dr. Deriso explained, "there is no statistical basis to conclude that the OMR flows cause a negative population level effect within the range of December-March average OMR flows historically observed."[14] In other words, limiting OMR flows will not make a difference to the survival and recovery of the delta smelt population.

The significance of this conclusion is profound. It establishes that there is no science that demonstrates that the Project Operations will appreciably reduce the likelihood of survival and recovery of the delta smelt. Yet DFG accepts the conclusion reached by USFWS and others, and bases its own OMR flow criteria for delta smelt on a conclusion that is contradicted by the best available science. Draft BO&FC at 76, 78.

C. DFG's Use of Surrogate Species Is Not Supported by the Best Scientific and Commercial Data Available

In its Draft Biological Objectives and Flow Criteria, DFG fails to establish flow criteria for several "species of concern" in the Delta, namely, the Southern Distinct Population Segment of North American green sturgeon, River lamprey, Sacramento perch, and Central Valley steelhead.[15] Instead, DFG "assumed that improved stream flow conditions for fall-run Chinook salmon will benefit juvenile or some life stages of [Central Valley] steelhead." Draft BO&FC at 33. For other omitted species of concern, it appears that DFG implicitly assumes that establishing flow criteria for the aquatic species it did include will also benefit the omitted species of concern such as green sturgeon, Sacramento perch, and River lamprey.

DFG's failure to validate its decision to use surrogates constitutes a failure to use the best scientific and commercial data available, as required by Water Code § 85084.5, because

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[11] Pls.' Mem. P. & A. in Supp. of Mot. for Summ. J. at 22 (citing the Declaration of Dr. Richard B. Deriso (Deriso Decl.) (Doc. 401); ¶¶ 71-76).
[12] *Id*. (citing Declaration of Dr. Bryan Manly (Manly Decl.) (Doc. 397) at ¶ 31).
[13] *Id*. at 23 (citing Deriso Decl. ¶ 74).
[14] *Id*.
[15] As demonstrated in section III, below, this failure is a violation of the legislative mandate in Water Code § 85084.5.

there is widespread agreement in the scientific community regarding the need to validate the use of surrogates before attempting to rely on their behavior to predict that of the target species. DFG's failure to validate the use of surrogates therefore renders DFG's Draft Biological Objectives and Flow Criteria inadequate.

The use of one species as a surrogate for another species is extraordinary. *See* Declaration of Dr. Kenneth Cummins (Cummins Decl.) ¶¶ 8, 9.[16] This is the case since species differ from one another, both because they are reproductively isolated and because they are by definition, at some measurable level, biologically distinct. *Id.* ¶ 14. As a result, there is a consensus in the scientific community that, whenever possible, the use of surrogate species should be avoided. *Id.* ¶ 8. As Dr. Tim Caro and his co-authors have explained, this is so because "the assumptions required to use substitute species in conservation biology are too onerous when applied to trying to predict population responses to anthropogenic disturbance. Where at all possible, we advocate making every possible effort to examine the target species directly before resorting to substitute species." Tim Caro et al., *Use of Substitute Species in Conservation Biology*, 19 Conservation Biology 1821, 1825 (2005) (attached to email transmitting this comment letter).

There are limited circumstances in which the use of surrogate species may be warranted. Specifically, when it is necessary to attempt to understand the response of a target species to one or more changing environmental conditions and data are unavailable on the response of that species to such conditions, it may be appropriate to use data on a surrogate species to predict the response. But even in such circumstances, the use of a surrogate is only appropriate if it can be demonstrated that the surrogate and target species will respond to the relevant environmental conditions in the same way and to the same extent. For this reason, it is imperative to validate the surrogate species prior to using it to predict target species responses to environmental conditions. Cummins Decl. ¶¶ 10, 14. The use of surrogates absent prior validation results in poor resource management decisions and has led a number of prominent experts in the field to condemn the practice altogether as conceptually inappropriate and empirically unsupported. *E.g.*, Peter B. Landres. *Ecological Indicators: Panacea or Liability?*, in Ecological Indicators, Vol. 2. (1992); S.J. Andelman and W.F. Fagan, *Umbrellas and flagships: Efficient conservation surrogates or expensive mistakes?*, 97 PNAS 5954 (2000).

Failing to undertake such a validation process constitutes clear error, and no competent scientist would proceed to use surrogate data without such validation. Cummins Decl. ¶¶ 19, 22, 23. Indeed, the validation process is especially critical when a surrogate species is used to predict the response of another species to an environmental disturbance. In such a circumstance, it is vital to ensure that the surrogate and target species have similar responses to the same suite of environmental conditions. Choosing a surrogate simply because it is taxonomically similar to the target species or because it co-occurs in the same habitat as the target species does not ensure that the surrogate will provide accurate information on the

[16] The Cummins Declaration and exhibits thereto were filed in support of the plaintiffs' motion for summary judgment in *The Consolidated Salmon Cases*, 1:09-CV-1053-OWW-DLB (E.D. Cal.), Doc. No. 445 (filed Aug. 6. 2010) (attached to email transmitting this comment letter).

target species. *Id.* ¶¶ 13, 14, 24. "[S]pecies that are ecologically similar and share the same environments, but exhibit significant genetic differences cannot be used as surrogates at the individual species level absent validation." *Id.* ¶ 13.

The appropriate validation process requires not only identifying how the surrogate species will respond to specific environmental disturbances, but also establishing that the viability of the surrogate in response to that disturbance matches the viability of the target species in response to the environmental disturbance. *Id.* ¶¶ 15-18. There are various approaches to validation, but it is critical to undertake some type of validation process to ensure that management decisions are based on sound science and not mere speculation. Consistent in the various approaches to validation is the need to determine whether there is an adequate correlation between how the surrogate will respond to the environmental disturbance and how the target might respond to the environmental disturbance. This can be done through modeling the surrogate and target response to the disturbance or identifying the significant traits that affect survival in response to an environmental disturbance and examining that correlation. *Id.* Without establishing that a correlation between surrogate and target response exists, using one species as a surrogate for another becomes a mere guessing game based on speculation and surmise – a violation of the requirement to use the best scientific and commercial data available. *See Bennett v. Spear*, 520 U.S. 154, 176 (1997).

DFG's use of Chinook as a surrogate for Central Valley steelhead with respect to the effect of negative OMR flows and flow-to-export ratios is, in fact, misguided. There are significant differences between the species and their populations, such as dramatic differences in physical size, maturity, swimming ability and behavior. Cummins Decl. ¶¶ 23, 29-32. Whereas Chinook typically spend one year in freshwater, steelhead spend on average two years in freshwater before smolting and migrating to the ocean. *Id.* ¶¶ 29- 30. Steelhead are approximately 15 to 20 cm (6 - 8 inches) when they migrate, as opposed to Chinook, which are 4-8 cm (1.6 - 3 inches). *Id.* ¶ 30. During this lifestage, steelhead have actually been observed to prey on juvenile Chinook, an obvious testament to their size and strength differential. *Id.* ¶ 31. This difference in size means that steelhead are much stronger swimmers, are physiologically different from Chinook at this stage, and can navigate through flows differently because they are able to swim against stronger currents. *Id.* It also means they may feed on distinct prey items and be subject to predation by different species. The differences in size, behavior, and swimming ability are the traits most likely to affect steelhead survival as they migrate through the Delta.

DFG fails to explain how any of these significant differences affect the accuracy of using Chinook data to predict the effect of migration through the Delta on steelhead survival or how such differences create uncertainty in the conclusions being drawn about steelhead survival. Moreover, DFG makes no attempt whatsoever to justify any implication that the flow criteria it has established will be beneficial to the omitted species of concern.

Indeed, setting biological objectives and flow criteria to benefit American shad is known to be in conflict with the biological objectives DFG has set for salmonids. It is well established that "the introduced striped bass and American shad . . . are competitors with and predators

on native salmonids." U.S. Bureau of Reclamation and U.S. Fish and Wildlife Service, *Listen to the River: An Independent Review of the CVPIA Fisheries Program* 5 (Dec. 2008) (*Listen to the River*) (attached to email transmitting this comment letter). Thus, "[t]he stated goal to increase the production of both native salmonids and exotic predators/competitors (e.g., striped bass and shad) is internally inconsistent." *Id*. at 22 (emphasis added). Nevertheless, the draft biological objectives and flow criteria for American shad aim to increase the shad population that migrates through or is resident in the Delta. Draft BO&FC at 82. Clearly, American shad cannot be used as a surrogate for Central Valley steelhead.

Simply put, these failures to validate amount to clear scientific error, and DFG's Draft Biological Objectives and Flow Criteria fall short of the requirements of Water Code § 85084.5.

III. The Draft Biological Objectives and Flow Criteria for Aquatic Species Ignores Key Native Species and Improperly Includes Consideration of Invasive Species That Compete With and/or Prey Upon Native Species

Water Code § 85084.5, enacted in 2009 as part of the Delta Reform Act (Senate Bill No. 1), mandates that:

> The Department of Fish and Game, in consultation with the United States Fish and Wildlife Service and the National Marine Fisheries Service and based on the best available science, shall develop and recommend to the board Delta flow criteria and quantifiable biological objectives for aquatic and terrestrial <u>species of concern</u> dependent on the Delta.

Cal. Water Code § 85084.5 (2010) (emphasis added).

Furthermore, in the Draft Biological Objectives and Flow Criteria, DFG correctly recognizes that "[a]s [the] trustee agency for the fishery resources in the State, . . . DFG . . . has an interest in assuring that water flow into and out of the Delta is maintained at levels which are adequate for long-term viability of <u>native</u> fish and the aquatic resources they depend on." Draft BO&FC, Executive Summary (ES) at ii (emphasis added).

However, DFG improperly sets the following biological goal for aquatic species: "Halt species population declines and increase populations of ecologically important native species, <u>as well as species of commercial and recreational importance</u>, by providing sufficient water flow and water quality at appropriate times to propagate species life stages that use the Delta." *Id*., ES at iii (emphasis added). Indeed, DFG erroneously sets forth its first step for developing the data and information necessary to establish biological objectives and flow criteria as: "Identify species of concern to include [in the document] based on listing status, ecological, recreational, or commercial importance." DFG cites no legal authority for defining "species of special concern" to encompass species that it unilaterally deems to have "recreational or commercial importance" because there is none.

The Legislature expressly charged DFG with developing "flow criteria and quantifiable biological objectives for aquatic and terrestrial species of concern . . ." (Water Code § 85084.5 (emphasis added)), not for undefined "species of commercial and recreational importance." "Species of concern" is not defined in the Water Code, but the Department has adopted the term "species of special concern" and NMFS uses the term "species of concern." Moreover, if a species has been listed as threatened or endangered under ESA or CESA, then a species is clearly "of concern." Thus, all consideration of species of undefined "commercial and recreational importance" should be removed from the aquatic species biological goal and DFG's "step 1," and the remainder of the document should be revised accordingly.

Thus, the Biological Objectives and Flow Criteria should exclude consideration of the flows purportedly required to increase populations of American shad, a non-native, invasive species (*id*. at 80), and Starry flounder because neither is a "species of concern." Neither species is listed under CESA or the ESA as threatened or endangered, and neither is designated as a "species of special concern" or "species of concern." Thus, there is no legally defensible sense in which either species is a "species of concern," and including the objectives and criteria for either of them constitutes a violation of the express mandate in Water Code § 85084.5.

The inclusion of species that are not of concern is no mere technical violation. It is well established that copepods such as *Eurytemora affinis* are an important food source for delta smelt, a species listed under the ESA as threatened, and for which listing as endangered has been found to be warranted but precluded. U.S. Fish & Wildlife Serv., *12-Month Finding on a Petition to Reclassify the Delta Smelt from Threatened to Endangered Throughout Its Range*, 75 Fed. Reg. 17,667-17,680 (Apr. 7, 2010). During migration to the ocean, "young [American shad] feed upon zooplankton, including copepods . . ." Draft BO&FC at 81 (citing Stevens (1966) and Moyle (2002)). In addition, it is well established that "the introduced striped bass and American shad . . . are competitors with and predators on native salmonids." *Listen to the River* at 5; *see also* id. at 22 ("The stated goal to increase the production of both native salmonids and exotic predators/competitors (e.g., striped bass and shad) is internally inconsistent" (emphasis added)). Yet the draft biological objectives and flow criteria for American shad aim to increase the shad population that migrates through or is resident in the Delta. Draft BO&FC at 82.

At the same time, the draft fails to include biological objectives and flow criteria for native species of concern such as the Southern Distinct Population Segment of North American green sturgeon (listed as threatened under the ESA), River lamprey (a species of special concern), Sacramento perch (a species of special concern), and Central Valley steelhead (listed as threatened under the ESA). Importantly, all of these omitted species of concern are covered under the Bay Delta Conservation Plan (BDCP), but neither American shad nor Starry flounder are BDCP covered species. One of the main purposes of the Draft Biological Objectives and Flow Criteria is to "inform the BDCP goals and objectives and help to ensure the BDCP Conservation Strategy includes measures that will provide for the conservation of

terrestrial and aquatic species and natural communities while achieving water supply and water quality goals for the Delta." *Id*. at ES iv; *see also id*. at 2 (same).

In summary, the Draft Biological Objectives and Flow Criteria include two species that are not "of concern," while it fails to include several species that clearly are of concern. This violates the Legislature's express mandate set forth in Water Code § 85084.5, and must be corrected in any subsequent draft or final document.

IV. Conclusion

The examples provided above do not constitute a comprehensive listing of the shortcomings of the Department's draft biological objectives and flow criteria. They do demonstrate the failure of the Department to exercise rigor in its review of existing data and analyses. As a result, the draft has many more shortcomings than those we have identified. For example, it does not reference or evaluate an analysis of Sacramento River winter run Chinook salmon by Wim Kimmerer and Randall Brown (2006) that led the authors to conclude that flow has no detectable effect on run size.[17] This finding is certainly relevant to the Department's work. For this reason, we urge the Department to conduct an honest appraisal of the literature relied upon (and omitted) during the preparation of the draft and reassess the data, analyses, and findings contained in that literature to assure that the final biological objectives and flow criteria are based upon a scientifically defensible analysis of the best scientific and commercial data available.

Sincerely,

William D. Phillimore
Board Member

Attachments (transmitted via email and U.S. Mail)

[17] Wim Kimmerer & Randall Brown, *Winter Chinook salmon in the Central Valley of California: Life history and management* (Aug. 2006) (attached to email transmitting this comment letter).