Coalition for a Sustainable Delta

VIA E-MAIL

September 21, 2011

Phil Isenberg, Chair
Delta Stewardship Council
980 Ninth Street, Suite 1500
Sacramento, CA 95814
DeltaPlanComment@deltacouncil.ca.gov

RE: Comments, 5th Draft Delta Plan

Dear Chairman Isenberg:

The Coalition for a Sustainable Delta (Coalition) respectfully submits the following comments on the fifth staff draft Delta Plan (Draft Plan). The Coalition consists of persons and entities that are engaged or interested in agricultural activities in the Central Valley, and its members depend on the Sacramento and San Joaquin river systems for substantial portions of their water supply. The Coalition is engaged in a wide array of activities to protect the Delta and its native species, and is committed to promoting strategies to ensure the sustainability of the Delta's ecosystems. The Coalition is very concerned that the Delta Stewardship Council (Council) has failed to give due consideration to public input to date and failed to incorporate the best available scientific information into the draft Delta Plan. Such shortcomings undermine the integrity of the entire planning process and, in our view, must be remedied.

The Coalition has submitted multiple comment letters to the Council and has yet to receive any response to those comments. We respectfully ask that Council staff explain how comments are distributed and considered by the Council.

While improvements have been made in the Draft Plan over prior versions, the Coalition remains concerned about a number of elements of the Draft Plan, and maybe even more so about what remains lacking in the Draft Plan. The Coalition applauds the Council for its decision to consider the Ag-Urban Alternate Plan (Alternate Plan) as part of the environmental review process for the Delta Plan and requests that the Council give serious consideration to the Alternate Plan and work with the Ag-Urban group to find the best options to meet the co-equal goals. While the Draft Plan remains very process-oriented, the Alternate Plan contains a number of actions, short- and long-term, to address the major issues in the Delta, including other stressors. In contrast, the Draft

Plan approach of additional regulatory burdens will only stymie economic growth and discourage local investment. What we need in the Delta Plan is action - not more process and regulation.

At the outset, we have a number of concerns about specific statements related to Delta exports contained within the Draft Plan that are factually inaccurate and/or inconsistent with the Council's role under the Delta Reform Act. First, the notion that current export contracts should not be the basis upon which reliability is measured is inconsistent with the Delta Plan's purpose and authority. The State Water Project and Central Valley Project water supply contracts represent no constraint on achieving the coequal goals and are irrelevant to the Council's duties. Second, the Draft Plan misconstrues the level of Delta exports; the Draft Plan states that the average project deliveries are "around 6 million acre-feet", then later indicates that project deliveries have ranged from 3 MAF to 6 MAF. In recent years (with the exception of our current very good water year) annual federal and state water project deliveries have been much less than 6 MAF, and without implementation of the BDCP, it is not expected, except in exceptional years such as the current one, that project deliveries will approach 6 MAF.

In addition, we have concerns about specific language in some of the policies and recommendations contained in the Draft Plan. First, it is unclear what is meant by "fully transparent" in G P1. Most projects that would be subject to this policy are already covered by the California Environmental Quality Act and/or National Environmental Policy Act. Is this policy intended to impose an additional requirement or simply restate the existing law on evaluation and disclosure of environmental impacts? And, if it is intended to impose additional requirements, why is such a policy necessary and what exactly will be required to comply? Second, WR R5 would require the evaluation and implementation of "all other feasible water supply alternatives" prior to the State Water Resources Control Board granting a new point of diversion, place of use or purpose of use in certain instances. This language is unduly vague. Furthermore such projects would be subject to CEQA and thus alternatives would be evaluated and disclosed thus this requirement would seem redundant.

Fundamentally, the Draft Plan continues to contain some critical flaws and omissions that will prevent it from accomplishing the co-equal goals mandated by the Delta Reform Act, which are discussed in detail below: 1) A flow-centric approach that does not address the other stressors in the system and instead focuses on further regulation of those entities that export water from the Delta, which will lead to a disincentive for effective local planning and investments and will stymie economic growth because of the uncertainty of water supplies; 2) Misinterpretation of the "reduced reliance" language in the Delta Reform Act; 3) A proposed finance plan that does is disconnected with the actual activities that will be undertaken, likely will further burden water users, particularly those that export water from the Delta, and does not adequately or

accurately quantify potential benefits associated with Delta Plan activities; 4) Failure to integrate efforts and authorities of other regulatory agencies involved in the Delta; 5) Failure to articulate a vision for the future Delta; and 6) Failure to adequately identify and utilize the best science.

Flow-Centric Approach

The Delta Plan continues to be very flow-centric with little attention given to other stressors on the ecosystem, including invasive species, water quality, development, and in-Delta diversions. The Delta Plan manifests this focus by placing great emphasis on the State Water Board's development of flow standards within a certain period of time and requiring that certain "covered actions" by exporters (and others) comply with specific requirements, while not requiring implementation of any concrete actions to address many of the other Delta stressors in the short- or medium-term. Beyond recommending certain dates for the State Water Resources Control Board and the Central Valley Regional Board to adopt specified water quality requirements (WQ R 6) and develop an improved monitoring program (WQ R 7) and recommending that the Delta Science Program conduct workshops on other stressors (ER R 7), the Delta Plan does not set forth any comprehensive strategy to address the other known stressors on the Delta ecosystem, including predation by non-native species (e.g., striped bass and black bass), in-Delta diversions (both unpermitted and unscreened), and runoff from urban and agricultural areas. And, while there is some discussion of Delta land use, the Draft Plan fails to articulate a vision for future development in the Delta to prevent further habitat loss. In contrast, the Alternate Plan contains a number of strategies, short- and long-term, to address the major issues in the Delta.

Reduced Reliance on the Delta/Water Supply Reliability Co-Equal Goal

The concept of "reduced reliance" on the Delta continues to be misconstrued in the Draft Plan. The Delta Reform Act provides as follows on this point (Cal. Water Code § 85021):

> "*The policy of the State of California is to reduce reliance on the Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency. Each region that depends on water from the Delta watershed shall improve its regional self-reliance for water through investment in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects, and improved regional coordination of local and regional water supply efforts*."

The Draft Plan's discussion of water demand espouses the view that future statewide water demands must be reduced from present levels. While fine as an aspirational goal, such an approach is inconsistent with the language of the statute quoted above, which

specifically provides that the State's policy is to reduce reliance on the Delta in meeting future water supply needs, not current needs. While improvements are continually being made in water use efficiency, many water users, including many farmers in the Central Valley, use water as efficiently as possible (frankly, because it is a very expensive input) and any reduction in water supply deliveries to these areas will result in reduced farming yields and reduced groundwater recharge, which in turn results in reduced economic productivity and job losses.

The Draft Plan makes repeated statements about allocating more water to the environment, which is fundamentally contrary to the "improve water supply reliability" co-equal goal set forth in the Delta Reform Act. The position of the Council seems to be that investment in local resources is the only method of "improving statewide water supply reliability" while also advocating for reduced exports from a present-day baseline. Water supply reliability to meet the standard set forth in section 85302(d) of the Delta Reform Act should not be defined as the exporters receiving less water than currently available to meet present demands because to do so will inevitably result in disinvestment in the Delta. The discussion of water supply reliability in the Delta Plan needs to be revised substantially to reflect an effort to increase the availability of supplies transferred through the Delta at times and in manners which are more environmentally benign (improved conveyance), which, in turn allows relatively less water to be diverted during dry periods. The Delta Plan should express the need to improve reliability and the long-term average amount of exports available from the Delta as compared to today's levels, while improving the Delta ecosystem.

Related to the water supply reliability co-equal goal, we remain concerned that the Draft Plan does not provide sufficient support for improved conveyance that is being considered as part of the BDCP. The legislation requires the Delta Plan to incorporate the BDCP if certain legal and statutory requirements are met; however, the Delta Plan should be clear in its commitment to improved conveyance as a critical part of the solution to an improved Delta through implementation of the co-equal goals mandated by the Legislature.

Financing Delta Plan Activities

The Draft Plan proposes a rather undefined finance plan that likely will further burden water users, particularly those that export water from the Delta, and does not adequately or accurately quantify potential benefits associated with the Delta Plan activities. All of the Delta's problems cannot and should not be solved by imposing additional regulation and costs on those that export from the Delta and then asking those same water users to finance the Council's activities. We do not believe the Council is the appropriate forum to develop fees to finance implementation of the Delta Plan, and feel strongly that there first must be a real plan with concrete actions before

there can be a serious discussion of financing and application of the beneficiary pays principle to funding Delta Plan implementation.

Failure to Integrate Other Efforts

There are numerous federal, state, and local agencies involved in the Delta with varying responsibilities and authorities. The Council should act as a coordinator and integrator of those activities and the Delta Plan should provide a strategy to do so. In order to do this effectively, the Council must first fully understand the roles these agencies play.

We previously recommended that the Council undertake an enforcement audit to better understand the roles of the various agencies involved the Delta. Enforcement of existing laws is the logical starting point for any action under the Delta Plan and the various roles and authorities are not fully understood. In order to guide action under the Delta Plan, the Council should conduct an audit of: (1) existing enforcement obligations of state and federal agencies; (2) existing enforcement activities; and (3) enforcement resources, including an assessment of what resources are needed to fully meet obligations. Legal counsel should also prepare an analysis regarding the universe of available enforcement tools. Utilizing this information, the Council should prepare a plan, with deadlines to implement full enforcement of existing laws. The Council should also engage with federal partners to encourage enforcement by federal agencies. This activity will allow the Council to identify enforcement activities to be taken under the Delta Plan and to identify those issues for which there is no responsible enforcing agency.

The Council has the opportunity, and the responsibility under the Delta Reform Act, to bring together the various players in the Delta; this has been described by some as the responsibility to prod other agencies to act, which is an appropriate and important role for the Council to play. The Draft Plan should be revised to provide a framework for the Council to act as the coordinator and facilitator of the efforts of various agencies and other entities and should provide for incorporation of the enforcement audit described above.

Failure to Set Forth Plan for Future Delta

In order to have a chance at meeting the co-equal goals mandated by the Delta Reform Act, the Delta Plan must articulate a clear vision for what the Delta should look like in the future; this likely involves limitations on resource use within the Delta, including agriculture and additional development, in order to allow for long-term sustainability of the region. More specifically, the land use planning component of the Delta Plan should provide a realistic vision for what the Delta will physically look like in the future at designated intervals (for example, 10, 25, 50 and 100 years), taking into account sea level rise as a result of climate change, likely development, and restoration/preservation

activities, and, the Plan should contain enforceable land use planning mechanisms to ensure that additional development does not occur in sensitive areas within the Delta, including those areas that are significantly flood-prone or that provide important habitat for native species, and that certain important areas are restored to provide habitat for native species.

Currently, the Draft Plan lacks a clear vision for the future Delta; in fact, there are no maps setting forth an understandable roadmap for the Delta throughout the course of Plan implementation. In multiple reports on California water issues, the PPIC has set forth its vision for a future Delta. Public Policy Institute of California, *Comparing Future for the Sacramento-San Joaquin Delta* (2008); Public Policy Institute of California, *Managing California's Water: From Conflict to Reconciliation* (2011). The PPIC map depicts in some detail the specific areas within the Delta that should be targeted for habitat protection and restoration, continued agricultural use, development, and levee restoration. *See* p. 70 of 2008 report and p. 220 of 2011 report. While PPIC's recommendations might not necessarily be the approach adopted and implemented by the Council to comply with the co-equal goals mandated by the Legislature, its comprehensive work should be used as an appropriate starting point to develop a clearly articulated vision for the future Delta. Without such a vision for the future Delta, it is difficult to see how the Council can adopt and implement a Delta Plan that meets the co-equal goals and other requirements of the Delta Reform Act.

Additionally, ER Policy 2 requires that all habitat restoration actions be consistent with certain elevation maps provided in the Department of Fish and Game *Conservation Strategy for the Sacramento-San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions* (2011). We caution the Council regarding use of this Plan beyond designation of certain desired habitat projects because it contains some significant problems, which are detailed in Attachment A to this letter.

Use of Science

We have submitted a number of comment letters over the last year dealing with the use of science in the Delta Plan. These comments appear to have been ignored. They are attached again for your reference as Attachment B, and we ask that they be considered prior to finalization of the Science and Adaptive Management chapter of the Delta Plan.

There remains in the Draft Plan a critical, and potentially fatal, gap in the application of science and adaptive management to the policy decisions that will inform development and implementation of the Delta Plan. In our comment letters dated April 4 and June 24, we went into some detail regarding the appropriate definition and utilization of best available science and adaptive management in conservation planning and made a number of recommendations for the Delta Plan. We will not repeat these comments here, but instead request that the Council and staff consider these comments in revising

the chapter on science and adaptive management and incorporating those concepts into other sections of the Plan, in order to develop and implement a real science-based set of solutions to the resource and ecosystem management challenges in the Delta.

The Coalition appreciates the opportunity to comment on the Draft Plan and would be happy to discuss these comments in greater detail at your convenience.

Sincerely,

William D. Phillimore
Board Member

Attachments (2)

ATTACHMENT A

Chad Dibble
Department of Fish and Game
830 S Street
Sacramento, CA 95811
cdibble@dfg.ca.gov

September 6, 2011

Dear Mr. Dibble:

The Coalition for a Sustainable Delta (Coalition) is writing in response to the Department of Fish and Game's (DFG) request for comments on the draft *Ecosystem Restoration Program Conservation Strategy for Restoration of the Sacramento-San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions* (Conservation Strategy). The Coalition is a California nonprofit corporation comprised of agricultural, municipal, and industrial water users, as wells as individuals in the San Joaquin Valley. The Coalition and its members depend on water from the Sacramento-San Joaquin Delta for their continued livelihood. Individual Coalition members frequently use the Delta for environmental, aesthetic and recreational purposes; thus, the economic and non-economic interests of the Coalition and its members are dependent on a healthy and sustainable Delta ecosystem. The Coalition urges you to consider these comments before issuing a final Conservation Strategy.

I. Introduction

DFG explains at the outset of the draft Conservation Strategy that it is intended to serve three purposes: (1) identify biologically promising ecosystem restoration opportunities in the Delta and Sacramento Valley and San Joaquin Valley regions, (2) provide rationale for restoration actions in each region, and (3) provide a conceptual framework and process that "will guide the refinement, evaluation, prioritization, implementation, monitoring, and review of the CALFED Ecosystem Restoration Program (ERP) actions." (Conservation Strategy, p. 1.) In order to realize these purposes, DFG must conduct a comprehensive review and critical assessment of the relevant data, analyses, and findings on the factors affecting Delta ecosystems and their native species and incorporate those data, analyses, and findings into the Conservation Strategy. Unfortunately, DFG has failed to do so. As currently drafted, the Conservation Strategy does not include certain readily available relevant data, analyses, and findings and misinterprets other relevant data, analyses, and findings. For this reason it cannot serve as a meaningful framework for future ERP actions.

A key shortcoming of the Conservation Strategy is its failure to consider all the relevant and available data and pertinent studies regarding factors affecting the Delta's ecological communities and at-risk species. For example, the Conservation Strategy does not consider the National Research Council's Report, *A Scientific Assessment of Alternatives for Reducing Water Management Effects on Threatened and Endangered Fishes in California's Bay Delta* (NRC Report), which addresses the biological opinions issued by the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) regarding the operation of the

State Water Project (SWP) and Central Valley Project (CVP). A second key shortcoming stems from DFG's failure to critically assess standing data, analyses, and findings, which can lead to misinterpretation of such scientific information, and compromise the scientific integrity of the Conservation Strategy. For example, in the discussion regarding the putative relationship between the location of X2 in the estuary and the size and trajectory of the population(s) of delta smelt, the Conservation Strategy cites to Feyrer et al. (2007), but does not discuss the shortcomings of this analysis including those described in the above-mentioned NRC Report. Moreover, the Conservation Strategy does not provide a comprehensive analysis of the factors that are affecting the Delta ecosystem and native species. One glaring omission is any discussion of predation and its effect on native species.

This comment letter examines three essential and representative areas in which the Conservation Strategy has not presented a complete analysis and/or excluded key information: (1) the use of X2 as a management metric and surrogate for the habitats of delta smelt and other native species in the Delta, (2) the effect of water diversions on delta smelt and salmonids, and (3) the effect of predation on native species. Due to time and resource constraints, this letter does not represent a comprehensive evaluation of all of the shortcomings of the current draft Conservation Strategy. Rather, it focuses on several key issues that must be addressed if the Conservation Strategy is to succeed in meeting its objectives.

II. The Conservation Strategy Wrongly Concludes that X2 is an Appropriate Metric for Habitat

The Conservation Strategy's discussion of at-risk fishes and the low-salinity zone in the estuary opens with the statement that "[p]elagic habitat quality in the estuary can be characterized by changes in X2. The abundance of numerous species increases in years of high outflow, when X2 is pushed seaward." (Conservation Strategy, p. 18.) The Conservation Strategy briefly summaries six studies that consider the location of X2 in the estuary and fish responses, and concludes that the data and findings "continue to support the conclusion that X2 location (i.e., outflow) is an important metric for the habitat (i.e., for recruitment success) of *several* native estuarine species." (Conservation Strategy, p. 20.) This is unequivocally incorrect. Notably absent from the discussion of X2 are several recent studies that disavow the use of the location of X2 as a responsive metric or valid surrogate for habitat for delta smelt and that show no deterministic relationship between X2 and the abundance of delta smelt.

Furthermore, DFG has misinterpreted the analyses and findings included in available studies. By doing so, it is repeating an error made by the State Board in its Final Report on the Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem. The authors of that report posit that an increase in outflow indexed by the location of X2 benefits longfin smelt and other species. But as Kimmerer et al. (2009) acknowledge "the mechanism chiefly responsible for the X2 relationship for longfin smelt remains unknown." In other words, the mechanism that is driving the correlation seen in the data is not understood. It is possible that longfin smelt abundance is related to floodplain productivity availability rather than outflow, but outflow is masking this relationship. Further critical review of the existing data and analyses is required before making management decisions in the form of the Conservation Strategy.

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A. X2 is Not Habitat a Suitable Habitat Indicator for Delta Smelt

While the Conservation Strategy concludes that X2 is an important metric for the habitat of "several" native species, in truth, only one study, Kimmerer (2009), found the position of X2 in the estuary to determine fish abundance, and that finding applies to just two of eight fish species associated with the low-salinity zone in the Delta during the spring and summer. For delta smelt, X2 is not a valid indicator that can be used to assess the status of delta smelt habitat or predict the direction or magnitude of population size changes. In order for X2 to be a valid surrogate measure for delta smelt habitat, the location of X2 in the Delta must closely match the distribution of delta smelt and the resources upon which the species depends for its survival, but this match is poor. Large portions of the lens of X2 in the Delta are unoccupied by delta smelt much of the time, presumably for reasons related to delta smelt behavior, but also because the X2 salinity condition overlays areas that are otherwise not suitable for delta smelt due to other environmental factors, such as insufficient food, an excess of predators, and suboptimal turbidity conditions. More importantly, delta smelt are frequently found well beyond the boundaries of X2 in the Delta, in areas with salinity conditions both greater and lesser than X2. Delta smelt have been recorded from freshwater areas to estuary areas with salinities of 16 ppt and more. They do not ascend particularly far up the tributaries that feed the estuary, and they rarely occur in the adjacent bay. There is no evidence to indicate that delta smelt are limited by the availability of habitat, and DFG's trawl surveys together with other available data indicate that the majority of delta smelt reside in areas of low salinity and freshwater relatively far from the location of X2 in the estuary.

Furthermore, habitat is the geographic area that supports the physical (abiotic) and biological (biotic) resources upon which a species depends for its survival and recovery. The habitat of a species includes not just the geographic areas it occupies, but also all the natural resources it uses, and the conditional state of those resources. For delta smelt, habitat quality depends on numerous factors, such as the variability in availability of food, shelter from predators, substrates for spawning, and a large number of physical variables including salinity, turbidity, and temperature. The use of X2 as a metric to represent the distribution and quality of delta smelt habitat serves to exclude numerous resources necessary for delta smelt survival; it is not valid and will misdirect conservation efforts that target the fish and other desirable co-occurring species.

B. Feyrer (2007) Contains Numerous Flaws

As support for its conclusion regarding use of the location of X2 as a proxy of habitat of numerous, distinct pelagic species, one of the studies that DFG relies on in the Conservation Strategy is Feyrer et al. (2007). However, the Conservation Strategy does not present an accurate and comprehensive discussion of the study and does not include the other studies that Feyrer and his colleagues have conducted that address the relationship between the location of X2 and delta smelt distribution and abundance. Feyrer et al. (2007) asserted that a relationship between "fall stock abundance" of delta smelt and "water quality" exists and contributes to the decline in the species, and as such can be used to predict delta smelt abundance.

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Feyrer et al. (2007) presented a weak correlation between the presence and absence of smelt at select fall mid-water trawl (FMWT) sampling stations and the levels of three environmental variables—specific conductance (salinity), secchi depth (turbidity), and temperature—which were termed environmental quality, or EQ, variables. Feyrer et al. (2007) found that these variables together explain roughly 26% of the variation in delta smelt presence/absence data. Feyrer et al. (2008) vastly expanded this analysis. First, it used EQ to *define* smelt abiotic habitat, despite the fact that Feyrer et al. (2007) showed that EQ only weakly predicted smelt presence/absence. Then it used habitat modeling based on probabilities of presence/absence to generate "a measure of surface area (ha) of suitable habitat" for delta smelt. Finally, it used X2 to predict the exact extent of "suitable abiotic habitat" down to the hectare.

The second and most important step in the analysis in Feyrer et al. (2008) of the effect of X2 on smelt habitat was defining a total "area of suitable abiotic habitat." This area was defined using a subset of core sampling sites of the FMWT, thereby ignoring large areas of delta smelt habitat that are known to be occupied. Feyrer et al. (2008) also excluded a full third of the core sample sites of the FMWT because they were on the periphery of the sampling grid. Excluding these sample sites was a serious omission because those very locations are necessary to test whether the EQ factors are important determinants of delta smelt presence or absence, and hence whether they can be considered indicators of its habitat. Excluding these sampling sites likely illegitimately amplified the statistical correlation that the authors claim exists between the EQ factors and delta smelt presence/absence.

Finally, the fact that the analysis excluded large areas of known smelt habitat had another important consequence: it meant that the estimations of a decline of available habitat were arbitrary, misleading, and undoubtedly incorrect. For example, Feyrer et al. (2011) developed a "habitat index" based on the amount of "suitable abiotic habitat" available for the smelt. Feyrer et al. (2011) claimed that the modeling showed that over the course of the FMWT monitoring history "the habitat index has declined by 78%." However, as discussed above, the habitat index was based on an arbitrarily small segment of the actual available smelt habitat.

The analyses in each step of the process used in Feyrer et al. (2007), Feyrer et al. (2008), and Feyrer et al. (2011) contained substantial uncertainty, and yet those studies simply assume that the results derived of each modeling exercise can be rolled into the next, as if there were no attending uncertainties in the results of each. These assumptions violate basic tenets of statistics, which require the rigorous examination of all possible sources of error in the analysis. The NRC criticized this process stating "the examination of uncertainty in the derivation of the details of this action lacks rigor. . . . The relationships are correlative with substantial variance being left unexplained at each step." (NRC Report, p. 54.) The NRC Report concluded that there is a weak statistical relationship between the location of X2 and the size of delta smelt populations, and while "the position of X2 is correlated with the distribution of salinity and turbidity regimes the relationship of that distribution and smelt abundance indices is unclear." (NRC Report, p. 5.)

Moreover, Feyrer's investigation is limited to the effects of the location of X2 in the estuary on just one life stage, instead of throughout the complete life cycle of the fish (as would occur with a life-cycle model), and therefore Feyrer's assertion that X2 is a valid surrogate for delta smelt habitat cannot reliably reflect the overall population-level effects of variation in the location of X2 in the fall on the fish. Proper analysis of the effect of an environmental variable

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on a species should include an analysis of its effects on the species' population dynamics. If an environmental variable has a causal relationship with the survival of a species, then the effect of that variable should be measurable in an analysis of one or more of the species' vital rates. It appears that DFG accepted Feyrer et al. (2007) as the final word on the relationship without critically assessing that study and failed to consider subsequent criticism of the study as well as subsequent studies. The assertion in the Conservation Strategy that X2 is an essential determinant of the ecological suitability of the estuary for delta smelt and other desirable species is inconsistent with the best available scientific information.

C. Quantitative Life Cycle Models Demonstrate No Statistically Significant Relationship between the Location of X2 in the Fall and Delta Smelt Abundance

When considering the effect of the location of X2 on delta smelt population dynamics, it is not sufficient to simply consider where the smelt are located; one must also consider whether the location of X2 actually affects the abundance of smelt. A life cycle model is the best available method for determining the effect of an environmental variable on the population dynamics of a species because it allows scientists to determine to what degree changes in the level or condition of an environmental factor correlate with changes in the population growth rate, thereby allowing identification of the degree to which individual factors drive changes in the population. A life cycle model also captures the full effect of the factors throughout the full life cycle of the species. Therefore, using a life cycle model allows one to understand the effect of the location of X2 on the population of delta smelt from one generation to the next and considers the survival and reproduction of a species over time.

The value of using life cycle modeling has been recognized both by a federal court and by the NRC. In its decision in the litigation challenging the biological opinion for the delta smelt, the federal district court found that it was "undisputed that application of a quantitative life-cycle model is the preferred scientific methodology" for determining the effects of a stressor on the population of a species like the delta smelt, and that "life-cycle modeling is standard practice in the field of fisheries biology." (*Delta Smelt Consol. Cases v. Salazar,* 760 F. Supp. 2d 855, 885 (E.D. Cal. 2010).) In addition, the NRC recognized the importance of a life cycle model and recommended that "the development of such models be given a high priority within the agencies" because life-cycle models are uniquely capable of assessing "population level responses" in fish species such as the delta smelt: "Nonlinear and compensatory relationships between different life-history stages are common in many fish species. Moreover many life-history traits exhibit significant patterns of autocorrelation, such that changes in one life-history trait induce or cause related changes in others. These patterns can most effectively be understood through integrated analyses conducted in a modeling framework that represents the complete life-cycle." (NRC Report, p. 32.) The Conservation Strategy does not discuss three life-cycle models that have all concluded that there is no statistically significant relationship between the location of X2 in the fall and delta smelt abundance: Maunder and Deriso (2011), MacNally et al. (2010), and Thomson et al. (2010).

Maunder and Deriso (2011) is a state-space multistage life-cycle model that analyzes delta smelt populations at every life stage using data from multiple seasonal surveys of delta smelt abundance. It is capable of utilizing an array of surveys, allowing for closely tailored

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testing of candidate environmental factors that may affect the survival and performance of each life stage. This model was structured so that it could test explicit hypotheses concerning the effects of individual environmental factors to determine if they were important in accounting for changes in the population growth rate. Maunder and Deriso (2011) demonstrated that the most critical factors impacting the delta smelt population dynamics are food availability, predator abundance, temperature, and density dependence. Maunder and Deriso (2011) concluded that the average location of X2 in the fall did not predict subsequent delta smelt abundance. MacNally et al. (2010) used a different statistical technique called multivariate autoregressive modeling to determine the effects of 54 different environmental covariates on delta smelt, and similar to Maunder and Deriso (2011), found that the average location of X2 in the fall was not an important cause of delta smelt population declines. Thomson et al. (2010) used Bayesian change point analysis to determine the effect of a number of covariates on delta smelt abundance. Thomson et al. (2010) concluded that while X2 and other abiotic variables explained some variation in the abundance of Delta fishes over the time species, no individual environmental covariates could explain the post-2000 changes in abundance for delta smelt, longfin smelt, striped bass, and threadfin shad. Each of these now-published life cycle models used different combinations of fish population index data, different environmental covariates and different modeling approaches, and all three came to the conclusion that, in contrast to the assertion in the Conservation Strategy, the location of X2 in the estuary in the fall does not have a statistically significant effect on delta smelt abundance.

III. The Conservation Strategy Fails to Consider Relevant Data Regarding the Effect of CVP and SWP Exports on Native Species

The ERP Plan's vision for water diversions is to reduce the adverse effects of water diversions, including entrainment, by in part, reducing the volume of water exported. (Conservation Strategy, p. 45.) The Conservation Strategy identifies the largest water diversions in the Delta as the CVP and SWP and that "[w]hile it remains very difficult to quantify the relative contribution of export operations on fish declines (Kimmerer and Nobriga 2008), there is a growing body of evidence that indicates water exports are having a significant contribution through a combination of entrainment as well habitat effects (USFWS 2008, NMFS 2009a)." (Conservation Strategy, p. 46.) Export operations, "may result in net reverse flows in Old and Middle Rivers." (Conservation Strategy, p. 46.) "Changes in hydrodynamics, notably reverse flows, have direct effects on fish . . . increasing their risk of entrainment." (Conservation Strategy, p. 46.) The Conservation Strategy then cites several studies that have purportedly concluded that the CVP and SWP contribute to fish declines for both delta smelt and salmonids.

With regard to delta smelt, the Conservation Strategy states that "[n]et reverse flow in Old and Middle rivers in winter months, a function of San Joaquin River flow into the Delta as well as SWP/CVP pumping rates and tides, is strongly correlated with entrainment of adult delta smelt." (Conservation Strategy, p. 47.) Furthermore, it asserts that analyses for delta smelt show that "pre-spawning adults, as well as larvae and early juveniles, may suffer substantial losses" and "delta smelt losses can be as high as 40 percent of the population throughout winter and spring. (Kimmerer 2008)" (Conservation Strategy, p. 47.) The Conservation Strategy relies heavily upon Kimmerer (2008), but fails to discuss the shortcomings of that study, which are documented in a response article, Miller (2011). Miller (2011) found that lower estimates are actually justified and that eight of the ten assumptions underlying the high estimates in

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Kimmerer (2008) resulted in upward bias. Using alternative assumptions, the highest annual estimates of adult proportional entrainment would have been no more than 13%, possibly even in the range of just 5% to 10%. The life cycle model used by Maunder and Deriso, discussed above, likewise indicated that entrainment is not an important factor in the survival of the species from one generation to the next. DFG failed to even cite – much less critically assess – these published analyses.

The Conservation Strategy also cites to the use of particle tracking model studies that have been used to demonstrate that reverse flows also result in high levels of delta smelt larval entrainment. A particle tracking model typically assumes that delta smelt are represented by neutrally buoyant planktonic particles. However, numerous scientists have acknowledged that the use of particle tracking model results to represent the movement of fish, including delta smelt, is countered by substantial evidence. (Anderson et al. 2010, Kimmerer and Nobriga 2008, Culberson et al. 2004, Bennett, Kimmerer, and Burau 2002, Kimmerer, Burau, and Bennett 2002.) Studies have acknowledged that the use of particle tracking models for late larval stage delta smelt is not appropriate "since delta smelt appear able to maintain their position in the estuary, generally in brackish water, beginning at the late larval stage." (Kimmerer and Nobriga 2008.) Even while the assumption that delta smelt movement patterns are represented by neutrally buoyant planktonic particles may be appropriate for the earliest stages of planktonic delta smelt larvae, it is recognized as not being representative of the movement and behavior of late larvae, juvenile, and adult lifestages. (Anderson et al. 2010.) As larvae grow and develop fins, swimming ability, and air bladders, they are able to maintain their position within favorable habitats rather than being randomly transported with water currents. (Culberson et al. 2004). Without such a mechanism to maintain their position within the estuary, delta smelt would be transported downstream into water with levels of salinity that are lethal for the species. This misrepresentation of delta smelt ecology in the Conservation Strategy has substantial implications to water resource planning in the Delta.

With regard to salmonids, the Conservation Strategy discusses the use of export to inflow, or E/I ratio and the Kimmerer and Nobriga (2008) study that "evaluated E/I ratio as a predictor of entrainment probability for neutrally buoyant particles to represent larval fish using a two-dimensional model and associated particle tracking model developed by DWR." (Conservation Strategy, p. 48.) The Conservation Strategy recognized that "[t]he E/I ratio was found to be useful as a predictor of entrainment probability for organisms with limited mobility, although the model may be less applicable to more competent swimmers such as salmon smolts." (Conservation Strategy, p. 48.) Particle tracking models typically compile results over 30 to 90 days, which is inappropriate for juvenile salmonids because migrating juvenile salmon do not stay in one place long enough to be subjected to such gradual effects. Particle tracking models use a long period for integrating the fate of particles, which greatly exaggerates the perception of export impacts on juvenile salmonids. Juvenile steelhead are substantially larger than juvenile Chinook salmon on average when they begin their migration to the Pacific Ocean, but both species are effective swimmers at that stage in their life history.

The Conservation Strategy cites to the two biological opinions issued by FWS and NMFS to support the statement that "there is a growing body of evidence that indicates water exports are having a significant contribution [on fish declines] through a combination of entrainment as well as habitat effects." However, the Conservation Strategy omits the significant problems with

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the analyses in the biological opinions. First, the delta smelt biological opinion does not normalize salvage data, and the federal court found this failure was a failure to use the best available science: "FWS nowhere explains its decision in the BiOp to use gross salvage numbers . . . and does not explain why it selectively used normalized salvage data in some parts of the BiOp but not in others . . . . This was arbitrary, capricious, and represents a failure to utilize the best available science in light of universal recognition that salvage data must be normalized." (*Delta Smelt Consol. Cases*, 760 F. Supp. 2d at 890.) Second, the court also concluded that it was improper for FWS to compare data output from two different models to show the effect of the exports on delta smelt: "In light of the known and material resulting disparity, FWS's decision to use a Calsim II to Dayflow comparison to quantitatively justify its jeopardy and adverse modification conclusions, without attempting to calibrate the two models or otherwise address the bias created, was arbitrary and capricious and ignored the best available science showing that a bias was present." (*Delta Smelt Consol. Cases*, 760 F. Supp. 2d at 907.) The federal court issued a final judgment after it determined that the FWS biological opinion and reasonable and prudent alternative are unlawful. Remarkably, DFG did not even acknowledge the fact that the biological opinion upon which it relies to draw certain conclusions has been set aside as unlawful by a federal court. Nor did DFG address the substantive deficiencies in the biological opinion, which were identified by the court and its court-appointed scientific experts.

DFG also failed to acknowledge or discuss the litigation regarding the NMFS biological opinion. While a decision regarding cross motions for summary judgment is pending in the matter, the federal court did issue a preliminary injunction granting relief from certain elements of the biological opinion and reasonable and prudent alternative to plaintiffs. The court issued extensive findings of fact and conclusions of law that were the basis for the injunction. Among other things, the court concluded that: "Federal Defendants have acted arbitrarily and capriciously in formulating RPA Actions to protect threatened species under the ESA that lack factual and scientific justification, while effectively ignoring the irreparable harm those RPA Actions have inflicted on humans and the human environment," and "Injunctive relief is . . . warranted . . . because, although the general premises underlying Actions IV.2.1 and IV.2.3 [of the reasonable and prudent alternative] find marginal support in the record, the precise flow prescriptions imposed on coordinated project operations . . . are not supported by the best available science and are not explained as the law requires." (*Consol. Salmonid Cases*, 713 F. Supp. 2d 1116, 1171 (E.D. Cal. 2010).) DFG erred by failing to address the substantive issues raised by the court in the Conservation Strategy.

IV. The Conservation Strategy Does Not Include Any Discussion Regarding the Effects of Predation on Native Species in the Delta

Multiple studies have demonstrated that predation is a significant factor that substantially affects the distribution and abundance of native species in the Delta. NMFS has identified predation as a critical stressor on salmonid populations that utilize the Delta. Predation is not considered a principal driver of delta smelt population decline, yet it is a factor known to be suppressing the population and potentially impeding recovery. (IEP 2008.) Recent research suggests that Mississippi silverside predation on larval delta smelt in the estuary could also constitute a significant impact on the species. (IEP 2010.) Despite this data, the Conservation Strategy does not include any discussion regarding the well-know effects of predation on native species in the Delta.

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Predators of native species remain abundant in the Delta, with populations of certain predators tracking upward. The population of striped bass aged 3+ remains above 500,000 individuals (IEP 2010) and the population of striped bass ages 0 to 3 is in the millions. The largemouth bass population has increased dramatically in the Delta since the 1980s, with the catch more than quadrupling in most Delta regions. (Brown and Michniuk 2007.) The Mississippi silversides' abundance has recently increased to its highest level in the Delta ever. (IEP 2010.)

Striped bass predation in tributaries to the Delta appears to be the largest single cause of mortality of juvenile salmon migrating through the Delta. Studies have shown mortality of juvenile Chinook salmon and steelhead in the Sacramento River upstream of the Delta to be approximately 90% in recent years. (MacFarlane et al. 2008, NMFS 2009.) Acoustic tagging studies on the Delta portion of the San Joaquin River have found similarly high rates of predation mortality on Chinook salmon. (Holbrook, Perry, and Adams 2009.) Hanson (2009) analyzed available diet composition data and estimated that striped bass annually consume 21% of juvenile winter-run Chinook salmon production, 42% of juvenile spring-run Chinook salmon production, 7-15% of juvenile Central Valley steelhead production, and 13% of delta smelt production. Consistent with Lindley and Mohr (2003) and NMFS (2009), Hanson (2009) concluded that mortality resulting from striped bass predation is increasing the probability of salmonid extinction and also reducing the probability of species recovery.

NMFS has also identified the significant effect that predation has on salmonids and the action that is necessary to restore the ecosystem. The NMFS (2009) draft Recovery Plan for Central Valley salmon and steelhead concludes that: (1) predation on winter-run Chinook salmon is a "major stressor" with very high importance, (2) restoring the ecosystem for anadromous salmonids will require, among other actions, "significantly reducing the nonnative predatory fishes that inhabit the lower river reaches and Delta," and (3) reducing abundance of striped bass and other non-native predators must be achieved to "prevent extinction or to prevent the species from declining irreversibly." (NMFS 2009, pp. 42, 48, 90, 15, 183, 190.) Nobriga and Feyrer (2007) concluded that "striped bass likely remains the most significant predator of Chinook salmon (Lindley and Mohr 2003) and threatened delta smelt (Stevens 1966), due to its ubiquitous distribution in the estuary and its tendency to aggregate around water diversion structures where these fishes are frequently entrained (Brown et al. 1996)." The failure to consider data, analyses, and findings regarding predation, which is one of a small number of factors that causes direct mortality of species, renders the draft Conservation Strategy unreliable as a resource management tool.

V. Conclusion

The Coalition urges DFG to revise the Draft Conservation Strategy to use the data, analyses, and findings discussed above so that any actions based on the Conservation Strategy will be fully informed. Herein, we have provided just three examples that are representative of a pervasive shortcoming of the Conservation Strategy, namely, the agency's failure to include certain readily available relevant data, analyses, and findings and misinterprets other relevant data, analyses, and findings. DFG must address this issue in order to maintain credibility among stakeholders and to devise a plan that could provide desperately needed benefits for the Delta ecosystems and their native species.

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Thank you for considering the Coalition's comments.

Sincerely,

William D. Phillimore
Board Member

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ATTACHMENT B

Coalition for a Sustainable Delta

June 24, 2011

VIA E-MAIL

Phil Isenberg
Chair, Delta Stewardship Council
650 Capitol Mall
Sacramento, CA 95814
deltaplancomment@deltacouncil.ca.gov

Re: Comments on Chapter 2 of the Fourth Staff Draft Delta Plan

Dear Chairman Isenberg,

The Coalition for a Sustainable Delta (Coalition) respectfully submits the following comments on the fourth staff draft Delta Plan. The Coalition consists of persons and entities that are engaged or interested in agricultural activities in the Central Valley, and its members depend on the Sacramento and San Joaquin river systems for substantial portions of their water supply. The Coalition is engaged in a wide array of activities to protect the Delta and its native species, and is committed to promoting strategies to ensure the sustainability of the Delta's ecosystems. The Coalition is very concerned that the Delta Stewardship Council (Council) has failed to give due consideration to public input to date and to incorporate the best available scientific information into the draft Delta Plan. Such shortcomings undermine the integrity of the entire planning process and, in our view, must be remedied.

In light of the breadth of the draft Delta Plan and the narrow window to provide comments for consideration by the Council, we will limit our comments to Chapter 2. We have in the past submitted extensive comments on the draft Delta Plan including an April 4, 2011 letter that focused primarily on Chapter 2. The Council has a legal obligation to base the Delta Plan on the best available scientific information. Water Code §§ 85200(a), 85300(a). Chapter 2 simply does not incorporate the best available scientific information despite the fact that it is intended to address science and adaptive management.

In the April 4 letter, we described our discomfort with the facile description of both the science required to support rigorous and appropriately directed restoration efforts in the Delta as well as the structure of the adaptive management framework and approaches necessary to inform and implement those efforts in the draft Delta Plan. Had your CalFed predecessor not failed in delivering reliable science to planning and management in the estuary, as evidenced by the welter of desired fishes declining dramatically during the past decade, the mere recapitulation of fundamental principles of and elements for generating reliable scientific information and using it in adaptive programs to guide accountable management might be acceptable. But, the concepts and language in Chapter 2 of the current draft Delta Plan are a mirror image of content in enabling guidance documents for CalFed more than a decade ago, such as the Strategic Plan

Core Team's Strategic Plan for the Ecosystem Restoration Program (Sept. 30, 1998). In straightforward terms, the Council is now crafting a Delta Plan – because science, described in the same platitudes, and adaptive management, illustrated with the same framework flow charts – failed to deliver via CalFed for the Delta's at-risk species, its stakeholders, and the state's citizens. Chapter 2, in recycling superficial descriptions of science and adaptive management in landscape-level natural resource planning, raises serious questions regarding the commitment of the Council to do better than its predecessor.

We believe that Chapter 2 must be much more explicit in describing how Delta planning and management will benefit from "best science," by not just listing the guidelines governing "the production and use of scientific information" (Chapter 2, page 33), but by addressing how scientific information can be better used to guide land acquisition, restoration efforts, and resources management, given the unique opportunities afforded to and constraints faced by conservation planners and resource managers in the Delta. Among other reasons, science has failed to contribute to the survival and recovery of the delta smelt and salmonids in the Delta, because the U.S. Fish and Wildlife Service and National Marine Fisheries Service, respectively, have failed to follow the directive from Congress and their own guidelines to "use the best available scientific and commercial data" or include structured effects analyses in their agency determinations, and have not ascribed to the tenets of good science and its application as presented in Chapter 2. How exactly can the Council expect to bring the benefits of rigorous science and responsive adaptive management to the restoration of the Delta, when the federal wildlife agencies eschew essentially all elements and features of the "comprehensive science plan" that are presented in Chapter 2? Such agency conduct has led stakeholders to seek neutral assessment of agency science from experts who are neither controlled nor funded by the Interagency Ecological Program (IEP) member agencies (e.g., via the federal courts aided by court-appointed experts and the National Research Council), rather than rely on the Council's Independent Science Board, where it rightfully should reside.

Chapter 2 does little to suggest that the Council recognizes that the IEP does not produce scientifically reliable information, collected and analyzed using best available tools and methods, and has not contributed to delivering the research findings and monitoring results that are necessary for a successful restoration program. And, Chapter 2 makes clear that the Council does not appreciate the need for a firewall to be established between the regulatory agencies that now control the resource management agenda in the Delta and those carrying out the scientific studies that should be informing that agenda and evaluating the efficacy of measures intended to protect species and their habitats. This conclusion is especially frustrating, because, as we suggested in previous comments, the Council is potentially well positioned to manage the boundary between regulatory authority and independent and neutral science, and, in so doing, de-politicize biology and hydrology in service to achieving a healthy and sustainable Delta ecosystem.

Surprisingly, in this fourth staff draft Delta Plan, the Council consistently fails to cite or incorporate the best available scientific information. Most notably, the Council fails to cite – or even acknowledge the existence of – two National Research Council Committee reports directly relevant to the Council's work (NRC 2010, 2011). One of those reports emphasizes the critical

role of effects analyses in management of at-risk species and cites to a number of sources on the subject that are also conspicuously absent from the draft Delta Plan (NRC 2011 citing EPA 2003, Murphy and Weiland 2011, and NRC 2009). The other describes the critical role of life cycle models stating that "development of such models be given a high priority within the agencies" (NRC 2010, p. 33). Important, contemporary scientific information regarding life cycle modeling of delta smelt and salmonids goes unmentioned in the draft Delta Plan (Maunder and Deriso, in press, Miller et al., under review, Cavallo 2011, Hilborn 2010, Deriso 2010). In addition, the draft Delta Plan eschews most of the standing literature regarding best available science (e.g., Joly et al. 2010, Bisbal 2002, Smallwood et al. 1999, Caroll et al. 1996). It also does not reflect consideration of recommendations by prominent expert review panels other than the NRC that have opined on important aspects of resource management in the estuary (e.g., Gross et al. 2010, Cummins et al. 2008). Many of the foregoing references were cited and discussed by the Coalition in past letters to the Council, which makes their absence all the more curious. It is unclear whether Council staff are poorly informed or purposely selective in their use of available scientific information. In either case, the resulting draft Delta Plan has plain shortcomings.

In light of the foregoing, we urge the Council to overhaul Chapter 2 but only after a careful review of the written comments of all stakeholders and completion of a comprehensive literature survey. We have included a list of references as Exhibit 1 to this letter to aid in completion of the literature survey. Further, there is a substantial body of available knowledge the Council can and should draw upon in formulating the Delta Plan, including a robust, heretofore untapped literature regarding science and adaptive management. We would be pleased to discuss this input with the Council and/or staff at your convenience.

Sincerely,

William D. Phillimore
Board Member

enclosure

Exhibit 1 – List of References

Bisbal, G.A. 2002. The best available science for the management of anadromous salmonids in the Columbia River Basin. Can. J. Fish. Aquat. Sci. 59:1952-1959.

Carroll, R, C Augspurger, A. Dobson, J. Franklin, G. Orians, W. Reid, R. Tracy, D. Wilcove, and J. Wilson. 1996. Strengthening the use of science in achieving the goals of the Endangered Species Act: an assessment by the Ecological Society of America. Ecological Applications 6:1-11.

Cavallo, B. 2011. Declaration of Bradley Cavallo in Support of Plaintiffs' Motion for Preliminary Junction, in *Consolidated Salmon Cases*, E.D. Cal. Case No. 09-1053 (Doc. No. 552).

Cummins, K., C. Furey, A. Giorgi, S. Lindley, J. Nestler, and J. Shurts. 2008. Listen to the river: an independent review of the CVPIA fisheries program.

Deriso, R. 2010. Declaration of Dr. Richard B. Deriso, in *The Delta Smelt Cases*, E.D. Cal. Case No. 09-407 (Doc. No. 401).

Environmental Protection Agency. 2003. Framework for cumulative risk assessment.

Gross, E.S., G.F. Lee, C.A. Simenstad, M. Stacey, and J.G. Williams 2010. Panel review of the CA Department of Fish and Game's quantifiable biological objectives and flow criteria for aquatic and terrestrial species of concern dependent on the Delta.

Hilborn, R. 2010. Declaration of Dr. Roy Hilborn in Support of Plaintiffs' Motion for Summary Judgment, in *Consolidated Salmon Cases*, E.D. Cal. Case No. 09-1053 (Doc. No. 443).

Joly, J.L., J. Reynolds and M. Robards. 2010. Recognizing when the "best available data" isn't. Stanford Environmental Law Journal 29:247.

Maunder, M.N. and R.B. Deriso. In press. A state-space multi-stage lifecycle model to evaluate population impacts in the presence of density dependence: illustrated with application to delta smelt. Can. J. Fish. Aquat. Sci.

Miller WJ, Manly BFJ, Murphy DD, Fullerton D, and Ramey RR. In review. An investigation of factors affecting the decline of delta smelt (*Hypomesus transpacificus*) in the Sacramento-San Joaquin Estuary.

Murphy, D.D. and P.S. Weiland. 2011. The route to best science in implementation of the Endangered Species Act's consultation requirement: the benefit of structured effects analysis. Environmental Management. 47:161-172.

National Research Council. 2011. A review of the use of science and adaptive management in California's draft Bay Delta Conservation Plan. National Academies Press. Washington, D.C.

National Research Council. 2010. A scientific assessment of alternatives for reducing water management effects on threatened and endangered fishes in California's Bay Delta. National Academies Press. Washington, D.C.

National Research Council. 2009. Science and decisions. National Academies Press. Washington, D.C.

Smallwood, K.S., J. Beyea, M.L. Morrison. 1999. Using best scientific data for endangered species conservation. Environmental Management 24:421-435.

Coalition for a Sustainable Delta

April 4, 2011

Phil Isenberg
Chair, Delta Stewardship Council
650 Capitol Mall
Sacramento, CA 95814
deltaplancomment@deltacouncil.ca.gov

Re: Science and adaptive management in the draft Delta Plan

Dear Chairman Isenberg,

The Coalition for a Sustainable Delta ("Coalition") respectfully submits the following comments regarding the science and adaptive management components of the draft Delta Plan, including Chapter 2, to the Delta Stewardship Council ("Council"). The Coalition consists of persons and entities that are engaged or interested in agricultural activities in the Central Valley, and its members depend on the Sacramento and San Joaquin river systems for substantial portions of their water supply. The Coalition is engaged in a wide array of activities to protect the Delta and its native species, and is committed to promoting strategies to ensure the sustainability of the Delta's ecosystems.

The Coalition is heartened to see a commitment by the Council to the use of good science and implementation of adaptive management in efforts to restore the Sacramento-San Joaquin Delta. But, the descriptions of those two programmatic elements in Chapter 2 of the Council's draft Delta Plan leave many questions unanswered about how that commitment to a new approach to Delta restoration will be realized. The Council undoubtedly is mindful that its CALFED predecessor made many formal and some less formal promises to use reliable scientific knowledge as a guide to its policy and management actions, using many of the same words used in the current draft Chapter 2– and CALFED fairly can be described as having failed to a significant extent in that endeavor. While CALFED scrupulously avoided declaring its commitment to adaptive management – its constituent resource agencies were unwilling to commit to the shared responsibilities and realigned prerogatives required of an adaptive management program – the interagency effort flew the flag of sound science for a decade without realizing the benefits that such an allegiance should have delivered. Instead, promises of science-driven management, rather than management-driven science (the latter being preferable to the former in our view),

have manifested as agency determinations, regulatory findings, and management actions, which have had anything but valid grounding in good science.

As a federal court has recently found in its summary judgment decision in the *Consolidated Delta Smelt Cases*, 717 F. Supp. 2d 1021 (E.D. Cal., 2010), which challenged the adequacy of the biological opinion for delta smelt issued by the U.S. Fish and Wildlife Service (FWS), the best available science was not used in the development of water supply management prescriptions for the federal and state water projects. And, preliminary injunction rulings on salmonids (and other species) by the National Marine Fisheries Service (NMFS) made by the same federal judge indicate that similar conclusions may soon be forthcoming for management measures developed to protect other fishes in the Delta. It is in the application of technical information and available knowledge through the regulatory authority of the federal wildlife agencies that "best available science" should be guiding resource management and conservation of the Delta. The court says that it is not. Not clear from Chapter 2 is how a commitment to using best scientific information by the Delta Stewardship Council might compel the federal regulatory agencies to follow in suit.

There are far too many recent examples of the failure of the regulatory agencies to use best science in water supply management decisions. Invalid or unreliable findings from poorly designed studies too frequently seem to define the approaches to hydrological management that target at-risk species and other ecological values in the Delta. The FWS, for example, is fully committed to using X2 as the indicator of habitat for delta smelt, despite ample documentation that the species survives in a broad array of salinity conditions in the estuary and actually spawns in freshwater. While it is clear that the low-salinity zone does not define the distribution of delta smelt or habitat for the species, and the species now nearly exclusively persists in the northern portions of the estuary, FWS insists on manipulating export flows from the south Delta as a dominant conservation strategy. And, as the most reliable available science would predict, the delta smelt continues its precipitous decline, with FWS devoting inadequate attention to the actual environmental stressors that impact the species. And, NMFS, in support of its conservation strategy for fishes in the Delta, has produced water export management guidance using data from hatchery-generated fall and late fall run Chinook salmon as a surrogate for wild Chinook salmon in different runs, for steelhead, and even for green sturgeon – all without any attempt at validation, and counter to two decades of warnings against using such information in published papers the conservation biology literature. (D.D. Murphy, P.S. Weiland, and K.M. Cummins, *Surrogate species in conservation planning: a cautionary tale from the California Bay-Delta*. Attached, in review in Conservation Biology.) This conservation strategy is inconsistent with use of the best available scientific information.

Likewise, the California Department of Fish and Game (DFG) devised a set of flow recommendations for the Delta pursuant to its statutory mandate that is unsupported

by the best available scientific information. Many salient shortcomings in those recommendations were identified by an independent review panel, which assessed the DFG *Quantifiable Biological Objectives and Flow Criteria for Aquatic and Terrestrial Species of Concern Dependent on the Delta*. Among other things, the panel identified "the use (or lack of use) of citations in the Draft" as a critical shortcoming of the agency document. The panel opined "the best available science would have involved a different set of analyses and approaches than was taken in the Draft." DFG misrepresents available science in its flow recommendations, for example, contending "[t]he NAS (2010) review panel concluded that the fall X2 criteria is conceptually sound, but expressed concern about the uncertainty associated with its potential benefits." In fact the National Research Council (NRC) Committee on Sustainable Water and Environmental Management in the California Bay-Delta (in its *A Scientific Assessment of Alternatives for Reducing Water Management Effects on Threatened and Endangered Fishes in California's Bay* Delta) described the relationship between delta smelt populations and the position of X2 as "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."

The NRC Committee recommended the use of adaptive management, further study, and a review to determine "whether the action should be continued, modified, or terminated." Instead of conducting its own analysis in accordance with the NRC Committee's recommendation, DFG simply adopted the flow criteria relating to fall X2 set forth by FWS. Thus, DFG has incorporated the same faulty analysis of fall X2 flow criteria for the protection of delta smelt criticized by the NRC Committee and invalidated in federal court. Incorrect interpretation of standing scientific information and conclusions drawn from that information led the independent review panel to level a series of as yet unaddressed criticisms against DFG, including the criticisms that "[c]ritical assumptions and areas of major uncertainty are not described," that "[t]he Draft frequently relies on some sources to the exclusion of scientifically superior sources," and that "[t]he Draft does not acknowledge the uncertainty associated with most of the modeling work referred to in the Draft." Unfortunately, these criticisms apply with equal force to the State Water Resources Control Board flow criteria, which DFG relied upon heavily in devising its own flow criteria. These examples illustrate several of the many portholes through which best scientific information should be – but is not – passing into the process of informing essential regulatory findings and management actions in the Delta. Chapter 2 would benefit from a description of how the Council might compel the many federal and state agencies in the Delta to identify and use best scientific information in meeting their obligations and carrying out their roles in the Delta.

The Council undoubtedly recognizes how far directed research and monitoring in the Delta must evolve to meet the minimum standards necessary to provide the reliable

information required of an interagency adaptive management program. With that in mind, to suggest that the CALFED model, or its constituent programmatic elements, might provide a ready template from which an adaptive management scheme for the Delta might be built is unrealistic. The research and monitoring agenda that is necessary to support restoration of the Delta will have to be built from scratch. Chapter 2 of the draft Delta Plan describes characteristics of the Council's research agenda, which emphasizes such elements as investing in "young scientists and researchers," at the same time welcoming and supporting "alternative ways of learning about the system." Those concerned about the fate of the estuary and the species it supports would prefer to see an unequivocal commitment by the Council to a research agenda that focuses attention on resolving the critical uncertainties that bedevil the ecosystem's managers, regulators, and planners who are challenged right now to sustain native species, to restore the ecological communities of the Delta, and at the same time to allocate water for multiple other beneficial uses. While CALFED generated an active program supporting "young" post-doctoral scientists, it could not quite get around to a programmatic emphasis on answering the most vexing questions regarding the state of the natural resources and threats to those resources in the Delta. And now, a decade and hundreds of millions of dollars in research funding later, the Council faces its stewardship duties without anything approaching a clear understanding of the relationships between the Delta's species and ecological communities, and the factors that stress and compromise them. The Council should distance itself from the failed science approach of the past, and make the unequivocal statement that it supports the prioritization of research that will provide immediate and explicit guidance to resource managers and those making agency determinations related to water allocation, regulation of contaminants, restoration of habitat for imperiled species, and other immediate ecosystem management challenges.

Under the header "science to understand change," Chapter 2 fairly acknowledges that an "ongoing investment in research is essential for understanding how the system changes over time." In this context, we urge the Council to recognize that well-designed and effectively implemented monitoring is arguably the most important and essential fundamental form of research in support of ecosystem management in the Delta. In the aquatic ecosystems of the Delta and in reference to the declining fishes in the system, it is the limited data from monitoring that constitutes virtually all of the available information from which inferences can be drawn on the health of the Delta's ecological communities, the status of at-risk, native species, and the causes of ecosystem decline (and not from controlled and replicated field experiments, of which precious few have been carried out in the Delta and similarly few have been proposed and funded). In that light, activating the short-list of directives to guide that research on pages 9 and 10 will do little to produce the changes from the science status quo that are necessary for a really effective Delta research agenda. The six research principles presented – research needs to be relevant, objective, inclusive, etc. – are a laudable starting point, but, frankly they ask scientists and those in the

agencies to behave as we all already expect them to, as they produce reliable and value-neutral technical products and guidance that should contribute to effective management decisions and actions. It is rather disappointing that those six elements have to be reiterated to Delta managers and technical staff, but they do – and, those elements alone are not nearly sufficient. The Council needs to dig deeper into research and monitoring and their application in order to develop and implement a real science-based set of solutions to the resource and ecosystem management challenges in the Delta.

Data collection and interpretation, as research and as monitoring, is not exclusively in the purview of expert scientists in the Delta. It is mostly being designed and carried out by personnel, many of whom likely lack training in the essential protocols of data collection and research design and implementation. Furthermore, there is evidence that in some cases technical competence is wanting. For example, the delta smelt biological opinion does not reflect an understanding of the fundamental concept of habitat. With the assistance of the Independent Science Board, the Council's needs to elevate, issue by issue, the contribution of science to policy and management; steering those who will implement the Delta Plan to the best available scientific information and tools for the task. Peer review has its value in planning for the Delta, but it cannot remedy defects in analyses or syntheses, such as refusal to consider spatially explicit data or employ life-cycle models and population viability analysis. (D.D. Murphy and P.S. Weiland*, The Route to Best Science in Implementation of the Endangered Species Act's Consultation Mandate: The Benefits of Structured Effects Analysis* Environmental Management 47: 161-172, attached.) Without adequate expertise and resources, the regulatory agencies operating in the Delta cannot find and use good science on their own, irrespective of the quality of independent scientific review that occurs.

The use of science – that is, available, reliable technical guidance from research and monitoring – to inform management and regulatory determinations in the Delta has been desultory. Chapter 2 points out that "[a]daptive management is not currently being used to its fullest extent in the Delta." We believe that adaptive management has not been implemented in any context in the Delta, and the most fundamental element of adaptive management – a reliable monitoring program targeting listed and other desired fishes, other important ecological attributes of the Delta ecosystem, and the stressors that contribute to the ongoing declines in the conditions of both – has remained as an unresolved point of discussion to this day. The delta smelt survey and sampling scheme, for example, is lacking in rigor, design, and integration to such an extent that a simple, functional map of the geographic and temporal distribution of delta smelt remains unavailable fully 18 years after the species was federally listed. Data on the status and demographic trends of that flagship species in the Delta drawn from five different monitoring programs shows clearly that none of those sampling schema are designed in spatial and temporal context to characterize adequately the distribution, size, and population trajectory of delta smelt in the estuary, much less

get to the essential environmental causes of the species' imperilment. The Council will find that standing data sets from monitoring efforts in the Delta are derived from schema lacking the sampling design that is necessary to answer any of the essential management-related questions facing Delta planners. The Council must, in our view, oversee the establishment of rigorous and accountable monitoring schemes that target key physical and biotic resources in the Delta.

Although Delta restoration efforts can point to a number of interagency efforts – the Interagency Ecological Program (IEP) is perhaps the most visible – the Council presumably is aware that the most formative agency determinations and actions in the Delta have not been inter-institutional or collaborative. The Council can invoke good science as its operating principle and adaptive management as it organizing principle, but absent adaptive management, best science is reduced to a philosophical homily when the regulatory agencies that operate in the Delta do not commit similarly. The Council may emphasize a "plan-implement-decide" cycle in support of a Delta management, but the wildlife and other regulatory agencies must make that same commitment. Chapter 2 needs not just to describe the often-invoked attributes and values of adaptive management, but to tell the public how the Council will lead others to accept adaptive management as the organizing principle for Delta restoration and management.

The spare text of Chapter 2 fails to demonstrate that the Council fully appreciates the programmatic support elements that are necessary to realize adaptive management and other agency-generated and institution products that can be described as having been informed by best available science. The Council enjoys the guidance afforded by its Independent Science Board. The other putative "science" body is the IEP, a consortium of federal and state agency technical staff, which gathers data on the Delta environment, produces summary reports, and a newsletter that reports on ongoing studies and recent findings from agency data collection efforts. The IEP's conduct is not always consistent with generally accepted scientific practices – its data collection efforts are seldom carried out using rigorous experimental frameworks and its reports are neither in the format of scientific presentations nor subjected to independent scientific review. Accordingly, Delta planners cannot consistently rely on IEP products as the best available scientific information. The Delta restoration effort is then not especially well served by science at the delivery and application levels at which management decisions are made and implementation actions are carried out.

The Delta restoration effort that extends before the current Council will require a substantially more evolved, integrated, and synthesized science program than is alluded to in Chapter 2 of the draft Delta Plan. The necessary technical support for that effort must extend beyond the Council's ISB and the agencies' biologists and hydrologists. Toward the goal of effective policy and management that is well-informed by science and an implementation program that meets the definition of

adaptive management, we urge the Council to recognize that all affected parties in the Delta should have an opportunity to contribute. From the aforementioned biological opinions and the ongoing BDCP, to composition the Council's ISB and identification of the tasks in front of it, Delta stakeholders and their views have been effectively marginalized. The wildlife agencies, in particular, have an established relationship with stakeholder interests and their technical experts that has been aggressively adversarial. Continuation of that dysfunctional dynamic virtually assures that the ultimate resolution of the most pressing environmental challenges in the Delta will continue to be determined in the courts.

The Coalition encourages the Council to reach beyond a platitudinous listing of the steps necessary for a passive form adaptive management for the Delta. The Council needs to explain to the public, how it could be that the approaches to adaptive management in the CALFED Bay-Delta Program planning document published in 2000, which is cited in Chapter 2, can be just as relevant and potentially productive eleven years later -- yet it was not implemented. Why should concerned Californians have reason to believe that adaptive management can be implemented in this coming decade, given the failure of government to do so in the past? How will the Council induce the necessary changes from Delta-business-as- usual-management to realize the adaptive management directive?

As we offer these comments to the Council, we acknowledge the critique of the science and adaptive management portion of the draft Delta Plan by the ISB. We note that we agree with virtually all of the points raised by the ISB, and observe that the concerns we articulate above differ from and can be added to those conveyed by the Council's scientific advisors. We believe that neither the ISB's comments nor our own comments fully address the complete set of challenges posed by the Council's commitment to using the best available scientific information to support its many important efforts. We think that the Council could benefit from a more thorough accounting of how exactly science, and science through adaptive management, can and should be used to meet the emerging vision for a healthy and sustainable Delta that can provide the many ecosystem services that all Californians expect.

Coalition for a Sustainable Delta

By: William D. Phillimore

Coalition for a Sustainable Delta

January 7, 2011

VIA E-MAIL AND U.S. MAIL

Cliff Dahm, Lead Scientist
Delta Science Program
Delta Stewardship Council
980 Ninth Street, Suite 1500
Sacramento, CA 95814

Re: Independent Science Board Delta Stressors Workshop

Dear Dr. Dahm,

Recently, we received electronic notice of the workshop being convened on January 12 and 13, 2011, of the Delta Stewardship Council's Independent Science Board (ISB) "to evaluate multiple stressors to the California Delta." We respectfully request that you share this letter, which we submit with the hope that it may assist the ISB in fulfilling its mission, with the board's members prior to the workshop. The assignment to the ISB to "focus on identifying alternative classifications of stressors and ways of evaluating their relative importance, especially considering interactions of multiple stressors" is at the same time worthwhile and fraught with the potential to repeat failed past efforts to bring science to bear in informing environmental policy and management in the Delta. In our view, the task should be configured into a more basic endeavor in order to provide exactly the information that is needed to lead the state and federal agencies responsible for conservation in the Delta to an effective, efficient, and accountable species recovery and ecosystem restoration agenda.

The ISB can play an essential – previously unfulfilled – role in bringing reliable information and guidance to the Delta planning process, and informing a societal understanding of environmental stressors in two ways. First, it can do so by using its summed professional judgment to identify and assess available information on environmental stressors, including, but not limited to, information on the direct and indirect effects of those stressors on species of concern, their habitats, and ecological communities. Identifying the "best science" from among the available information on environmental stressors – as is required by the Sacramento-San Joaquin Delta Reform Act of 2009 – has not yet been attempted for species of concern in the estuary or for the habitats that support them. Second, the ISB can contribute to the Delta restoration effort by providing guidance to the Delta Stewardship Council and the other relevant state (and federal) regulatory agencies, by showing them how to "use" the best available science on the effects of stressors on the Delta's species and ecosystems in their deliberations and decisions. The ISB can set forth a structured process to take reliable scientific data, analyses, and related findings, and, employ it to analyze the effects of alternative management regimes on species of concern and their habitats.

Identifying the Best Available Science

The requirement to bring to bear the best available science in resource decision-making begins with the process of gathering scientific information. This initial step must be followed by a process of vetting that information; that is, critically assessing the quality and pertinence of available data, analyses, and results from research and monitoring. Combined, these two steps are absolute prerequisites for meaningful subsequent analyses to guide decision-making. The recently released *Interagency Environmental Program 2010 Pelagic Organism Decline Workplan and Synthesis of Results* goes a long way toward accomplishing the initial step with respect to a number of pelagic species by gathering the best available science on those species and the broader Delta ecosystem. It offers a useful compendium of published information and agency reports, and includes much of the available pertinent data, analyses, and syntheses that have been drawn from studies in the estuary. But, as it stands, the report is an unreliable source of information to complete the analyses necessary to guide agency decision-making, as it doesn't differentiate between results from data derived from rigorous studies that employ an experimental framework and the most robust analytical tools, and results derived from other, lesser approaches. And, the report promulgates and espouses agency findings that a Federal District Court aided by two respected science experts have found to be not valid. While some contributors and consumers of past reports from the same series would argue that the report is not intended to be a resource for the specific purpose of representing the best available science, its ambiguous intent and presentation has it cited in journals and agency reports and resource management decisions as if an authoritative scientific source, which it is not.

Accordingly, the ISB can and should pick up where the *Workplan and Synthesis of Results* left off by providing an expert assessment of the state of knowledge of the environmental stressors that act to compromise desired conditions in the Delta. That task could not be more timely. To date, the most recent draft of the Bay Delta Conservation Plan (BDCP), for example, offers no data-based synthesis of the roles of individual or multiple stressors acting on listed and other at-risk, native species and their habitats in the Delta, hence is yet unable to assess objectively either the effects of proposed water conveyance actions or proposed management, restoration, or acquisition schemes. The BDCP is not lacking for a stressors classification; instead, its consultant authors need an expert assessment of the identities, roles, and cumulative effects of environmental stressors that are acting individually and in concert to compromise the Delta's ecosystems and species of concern.

Using the Best Available Science

The process of informing agency determinations with the best available science, and then providing guidance to management programs that are intended to recover at-risk species and their habitats, has several discrete steps that require contributions from distinct participants. This process is described in some detail in the attached paper from the journal *Environmental Management.* Two separate steps in the process require the active involvement of scientists; the first is described above. It is the requirement that any and all available technical information that is pertinent to and may be useful in shaping and directing the conservation response to species and ecosystems at risk – including identifying management or restoration actions, determining

their timing and the locations of the actions, engaging the right tools to facilitate the actions, and subsequently assessing the effectiveness and efficacy of the actions – be vetted and considered. That process step requires direct contributions from scientists. It is fully within the capacity of the ISB, or additional experts that the ISB might choose to assist it, to perform that essential task in support of delta stewardship.

The need for scientific expertise and the role of the ISB in Delta restoration, however, does not end with identification of that information that can defensibly be used to support policy decisions and management action. Scientists need to engage in the next step in the process of bringing science to decision-making; that is, the actual use of the "best available science" in what the federal wildlife agencies refer to as "effects analysis," and the Environmental Protection Agency and others refer to as "risk assessment." In resource management decision-making, federal and state agencies have too often neglected to carry out this essential and required step of engaging the best available science in their determinations and regulatory actions. This is certainly the case in the Delta. In our view, it is undeniable that the failure to both identify and use the best available science led a Federal District Court to state that "sloppy science" made the U.S. Fish and Wildlife Service's determinations in its recent biological opinion on delta smelt "arbitrary, capricious, and unlawful." Likewise, it led a National Research Council committee to indicate that it "does not understand" the basis for the link between Delta salinity conditions and delta smelt population trends, which are asserted by the Fish and Wildlife Service to be the essential determinant of the fish's current imperiled status.

As described in the National Research Council's volume *Science and Decisions* (2009) and in the attached article, risk assessment/effects analysis is a structured process that uses best available science to inform selection among resource management decisions or strategies. Effects analysis assesses the benefits and costs – both ecological and economic – that attend different planning outcomes. For imperiled species, effects analysis employs well-established approaches using population viability analysis tools, informed by the best available data on targeted species and the environmental factors that put them at risk. It is a task that needs the expertise of scientists to succeed. Effects analysis was a required element in the biological opinions, but was not carried out appropriately. Further, effects analysis is still missing in the drafts of the BDCP document circulated to date. Without this essential decision support step, transparently and fully carried forth, policy decisions and the actions that follow are arbitrary and not defensible. It is not clear how the recovery of species and the restoration ecosystems in the Delta can advance without the direct engagement of the ISB members or other scientists in this essential activity.

Concluding Thoughts

The general opinion of the ISB on environmental stressors and classifications of them presumably will be accorded high standing by the Delta Stewardship Council and others active in the effort to halt and reverse the decline of numerous at-risk, native species in the Delta as well as their respective habitats, but it will do nothing to address historic shortcoming in the application of the best available science in resource management decision-making stemming from the failure to properly identify and use the best available science. Therefore, we urge the

ISB to use its position and expertise to discriminate formally from among available information, that constitutes the "best" science – in regards to species-environmental stressor relationships, and in other diverse attributes of the complex Delta ecosystems. And, the ISB should assist the Delta Stewardship Council and other state and federal regulatory agencies in applying those data, analyses, syntheses, system models and other "scientific" information and tools that are reliable in the requisite analysis of the probable effects of the diverse future Delta action scenarios that are available for consideration. We are concerned that engagement of the ISB in tasks peripheral to direct support of agency and inter-agency efforts to restore a desired Delta ecosystem – anything less than formal integration of the ISB, and its best judgments regarding best science and the role of best science in assessing the effects of future actions the Delta environment, into the structure of decision-making for the Delta – will simply be a continuation of the opportunities lost over the past decade.

Thank you for considering the Coalition's comments.

Sincerely,

William D. Phillimore
Board Member

cc: Joe Grindstaff (via e-mail)

encl.