Coalition for a Sustainable Delta

March 16, 2017

VIA E-MAIL

Jeanine Townsend, Clerk of the Board
State Water Resources Control Board
1001 "I" Street, 24th Floor
Sacramento, California 95814
commentletters@waterboards.ca.gov

Re: Comment Letter – 2016 Bay Delta Plan Amendment & SED

Dear Ms. Townsend,

The Coalition for a Sustainable Delta ("Coalition") is a California nonprofit corporation comprised of agricultural, municipal, and industrial water users, as well as individuals in the San Joaquin Valley. The Coalition and its members depend on water from the Sacramento-San Joaquin Delta ("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 appreciates the opportunity to review and comment on the 2016 draft revised Substitute Environmental Document ("SED") that supports potential changes to the Water Quality Control Plan for the Bay-Delta. The Coalition recognizes that the State Water Resources Control Board ("State Board") has made significant changes to the SED, as compared to the draft previously issued in 2012, and appreciates the State Board's efforts to address concerns raised by stakeholders and the public. However, the Coalition is concerned that the State Board has not adequately weighed the adverse impacts of the proposed flow objectives, including potentially significant economic harm, against the perceived benefits to the species. Furthermore, the SED's conclusions regarding unimpaired flows—namely that unimpaired flows will provide environmental benefits and improve salmonid viability—are not supported by the scientific literature. Without these analyses and support, the SED is inadequate.

In addition, the Coalition is concerned that the State Board's analysis fails to take into account the best available science, both with respect to Central Valley steelhead and Chinook salmon. The State Board relies principally on purported benefits to these two species to justify the proposed flow objectives, but the scientific evidence supporting such benefits is lacking, in large part because benefits to steelhead are assumed and benefits to Chinook salmon are primarily

based on gray literature that is misinterpreted by State Board staff and that yields highly uncertain results.

The Coalition encourages the State Board to consider these concerns, which are discussed in further detail below, before it moves forward in finalizing the SED.

I. The SED lacks a meaningful cost-benefit analysis.

The Coalition acknowledges that the SED contains various economic analyses addressing the direct and regional economic impacts associated with the proposed flow alternatives. *See, e.g.,* SED Chapter 20, *Economic Analyses*; SED Appendix G, *Agricultural Economic Effects of Lower San Joaquin River Flow Alternatives: Methodology and Modeling Results*. While useful, these analyses stop short of accomplishing what is necessary to support the State Board's proposed flow objectives. Specifically, the analyses assess the potential economic effects of the proposed alternatives based on how the use of certain resources may change. *See, e.g.,* SED at 20-3. But the SED does not weigh the adverse economic impacts of the flow objectives against the perceived benefit to the species. That is, while certain costs and beneficial effects are identified, there is no comprehensive comparison of these impacts, whereby the costs are balanced against the perceived benefits. As a result, the net impacts associated with the proposed flow objectives are currently unknown, and therefore not addressed. The Coalition requests that the SED be revised to include a meaningful cost-benefit analysis, whereby the adverse impacts of the flow objectives are weighed against the perceived benefit to the species.

II. The SED's conclusions regarding unimpaired flows are unsupported.

The SED states that the proposed flow objectives are intended to provide flows that "more closely mimic the natural hydrographic conditions (including frequency, timing, magnitude, and duration of natural flows)" in the Lower San Joaquin River and three eastside tributaries. SED at ES-9. The proposed flow objectives are based on the premise that unimpaired flows will provide environmental benefits and increase salmonid viability. *E.g.,* SED Appendix 3, 3-29, 3-41. The scientific literature, however, does not support this conclusion. Rather, the results of several studies are mixed, particularly in highly altered systems such as the Delta. *E.g.,* Poff et al. (1997); Hart and Finelli (1999); Bunn and Arthington (2002); Poff and Zimmerman (2010). In fact, the literature indicates that targeted unimpaired flows may be a useful management tool, but only when attempting to attain a particular ecological benefit. *Id.* Here, however, the SED does not explain how the specific flow regime being proposed (as opposed to flows in general) will provide fishery benefits through restored flow functions. Without an analysis that shows expected improvements in specific ecological functions, the SED lacks the information to support its conclusion that the proposed flow objectives are necessary to benefit salmonids.

Likewise, the SED cites Brandes and McLain (2001), among others, to assert that the "primary limiting factor for tributary abundances are reduced spring flow, and that salmonid populations on the tributaries are highly correlated with tributary, Vernalis, and Delta flows." SED at 3-29.

In Brandes and McLain (2001), however, the authors offer no support for that assertion. In fact, no evidence of such a relationship exists, and no ecological mechanism has been identified that explains how managed river flows could influence juvenile salmonid survival during passage through the Delta.

In sum, the SED assumes, without support, that natural flow regimes are best and that water project operations that alter natural flow conditions should be minimized to the extent possible. That paradigmatic assertion is not justified and the analyses supporting it are flawed, and certainly cannot be applied in a severely altered and conflicted management environment such as the Delta. Providing a reliable water supply, while also protecting, restoring, and enhancing the Delta ecosystem, requires an approach that can account for the conditionally unique and nuanced circumstances that attend a complex and highly disturbed system. Because the proposed flow objectives singularly focus on unimpaired flows, the approach leaves no room for a necessarily customized management response to the highly constrained hydrodynamics of the contemporary San Joaquin River and south Delta.

III. The best available science does not support the SED's conclusion that conditions that benefit fall-run Chinook salmon also benefit steelhead.

In several instances, the SED concludes that certain flow objectives intended to benefit salmon will equally benefit steelhead. For example, the SED states: "Central Valley steelhead co-occurs with fall-run Chinook salmon in the [San Joaquin River] basin and both species have somewhat similar environmental needs for river flows, cool water, and migratory corridors. As a result, conditions that favor fall-run Chinook salmon ***are assumed to provide benefits to co-occurring steelhead populations***, and other native fishes." SED Appendix C at 3-13 (emphasis added). The best available science does not support this assumption—namely, that steelhead respond to flows in the same manner as salmon. Indeed, there is significant scientific support for the proposition that hatchery fall-run Chinook salmon is an improper surrogate species or proxy for wild Central Valley steelhead.

A. The SED fails to take into account relevant scientific information.

As an initial matter, it appears that the SED does not take into account all readily available, relevant, and high quality scientific information relating to the use of surrogates. Specifically, the SED ignores the numerous publications discussing how and when the use of surrogates is appropriate, including the publications set forth in the attached Exhibit A. The Coalition requests that these publications be taken into account, to ensure that the analyses in the SED reflect the best available science.

B. Any use of surrogates must be rigorously analyzed.

The use of surrogate (or substitute) species in conservation planning has been debated vigorously by scientists. *E.g.,* Landres (1992); Andelman & Fagan (2000); Wenger (2008). 25 years ago, Peter Landres concluded that the use of surrogates is "financially not practical,

conceptually inappropriate, and empirically unsupported potentially leading to inaccurate long-term management and assessment decisions." Landres (1992). Tim Caro (who is among the foremost experts on the use of surrogate species) and his colleagues have drawn the following conclusion: "the assumptions required to use substitute species in conservation biology are too onerous when applied to trying to predict population responses to anthropogenic disturbance. Where at all possible, we advocate making every possible effort to examine the target species directly before resorting to substitute species." Caro et al. (2005). In other words, use of surrogate species should be a tool of last resort.

In general, when the response of one species to an environmental disturbance is being used to predict the response of another species to a similar disturbance, it is critical that a rigorous analysis be used to select an appropriate surrogate. Murphy et al. (2011); Landres et al. (1988). One approach to such an analysis involves the following: (1) establish the relationship between levels of environmental disturbance and demographic vital rates for the surrogate species; (2) identify the key traits that affect demographic viability in both the surrogate and target species with regard to the environmental disturbance; and (3) establish the relationship between the key trait and the disturbance threshold. Caro et al. (2005). Put simply, stating that "both species have somewhat similar environmental needs for river flows, cool water, and migratory corridors" is insufficient to support the use of salmon as surrogates for steelhead for purposes of conservation planning for the latter species. *E.g.,* Summary Report, Peer Review of Technical Guidance on Selecting Species for Landscape Scale Conservation, U.S. Fish and Wildlife Service, June 20, 2014, available at https://www.fws.gov/science/pdf/Final-Summary-Report-Complete-Technical-Guidance-on-Selecting-Species-for-Landscape-Scale-Conservation.pdf (explaining that, in the context of landscape scale conservation, environmental documents must progress "beyond generalities" to provide detailed support for the use of surrogates in making management decisions). Without a rigorous analysis showing that steelhead respond ecologically and behaviorally to unimpaired flows in the same manner as fall-run Chinook salmon, the SED's assumption is improper.

Furthermore, the SED appears to rely solely on the National Marine Fisheries Service's 2009 salmonid biological opinion ("NMFS BiOp") to assert that fall-run Chinook salmon is an appropriate surrogate for steelhead. SED Appendix C at 3-13. This reliance is misplaced. The NFMS BiOp does not provide evidence that steelhead and salmon behave similarly in certain conditions. Rather, the NMFS BiOp makes the same flawed assumption as the SED. BiOp App. at 5 at 12; *see also* BiOp at 62. As important, the SED fails to reference articles and peer review reports that contradict the assumption made in the NMFS BiOp. Murphy et al. (2011); Hankin et al. (2010). Hankin and his colleagues note that "[l]ife history differences between Chinook salmon and steelhead are striking," and go on to state that the performance (i.e., survival) of juvenile Chinook salmon does not provide a reliable basis for inference concerning performance of steelhead. Without a robust analysis of whether steelhead respond to environmental disturbances in the same manner as salmon in the San Joaquin River and south Delta, assuming that they do so is improper, especially given that available data and analyses support the contrary conclusion.

In sum, NMFS has failed to undertake a rigorous analysis, or any analysis whatsoever, to ensure that steelhead respond similarly to fall-run Chinook in similar conditions. Indeed, as described below, there is evidence suggesting that salmon is not a valid surrogate for steelhead due to differences in life history, size, and overall strength. Accordingly, the Coalition requests that the SED be revised to provide supporting information for its assumption that the use of fall-run Chinook as a surrogate for steelhead is appropriate, including specific evidence regarding behavior, movement, size, feeding habits, predation data, and other life history characteristics, particularly as those characteristics relate to unimpaired flows.

C. The SED fails to consider data from the six-year acoustic tag experiment.

The NMFS BiOp's reasonable and prudent alternative (action IV.2.2) requires a six-year acoustic tag experiment that is intended to assess the behavior and movement of outmigrating steelhead and salmon. Specifically, the study was intended to evaluate the survival of emigrating smolts from tributaries into the mainstem of the San Joaquin River, from the mainstem San Joaquin River downstream into the Delta, and from the Delta to Chipps Island. Despite difficulties implementing the study in certain years, the study was conducted from 2011 through 2016. As we understand it, at least two years of data (2011 and 2012) are currently available, while the additional data are being analyzed. Accordingly, the Coalition requests that, at a minimum, the available data be included and assessed as part of the SED.

D. The conclusions in the Collaborative Adaptive Management Team's Salmon Scoping Team Gap Analysis Report are contrary to the SED's assumptions.

The Collaborative Adaptive Management Team's ("CAMT") Salmon Scoping Team ("SST") recently finalized its report entitled: "Effects of Water Project Operations on Juvenile Salmonid Migration and Survival in the South Delta" ("SST Report"). The report is comprised of two volumes, with the first describing findings and recommendations, and the second describing the SST's response to eight management questions posed by CAMT.

The SST Report presents the results of a collaborative scientific assessment of (1) juvenile salmonid migration behavior primarily based on tracking acoustically tagged juvenile Chinook salmon and steelhead released into the lower San Joaquin River, and (2) the survival of juvenile Chinook salmon and steelhead as they migrate downstream through the lower San Joaquin River and central and south regions of the Delta. Information on salmonid migration was primarily derived from acoustic tag studies conducted in 2011 and 2012 (as part of the six-year acoustic study described above). Among other things, the report describes the following:

- Smaller fish (e.g., fall-run Chinook) respond to conditions differently and usually experience lower survival than larger fish (steelhead). *See, e.g.,* SST Report at 3-35, 3-86, 3-87. Larger fish have higher survival in the Delta. *Id.*

- Survival data preliminarily suggests that steelhead have a higher survival rate in the Delta than fall-run Chinook. For example, based on data from 2011 and 2012, the SST

concluded that survival of acoustic-tagged juvenile steelhead migrating from the San Joaquin River (0.32 to 0.54) has been greater than that of fall-run Chinook salmon from the same years (0.02 to 0.03). SST Report, Appendix E, Section E.2.1, Table E.2-3; *see also id.,* Appendix E, Section E.2.1, Table E.2-2.

- The use of surrogates should be accompanied by a description of the evidence that supports their use (citing Murphy and Weiland (2014)). SST Report at 3-73, 3-74.

- The biological differences between species, including habitat preferences, ability to avoid prey, size, strength, etc. likely impact through-Delta survival. *See generally,* SST Report at 3-77.

The Coalition therefore requests that the SED be revised to take into account the conclusions and analyses set forth in the recently issued SST Report. As a participant in the Collaborative Science and Adaptive Management Program and CAMT, the State Board has access to the SST Report.

IV. Benefits to fall-run Chinook salmon from the proposed flow objectives are uncertain.

A. The SED relies on unpublished data and comment letters.

Appendix C to the SED sets forth the scientific basis for the State Board's proposed flow and salinity objectives. *See* SED, Appendix C, *Technical Report on the Scientific Basis for Alternative San Joaquin River Flow and Southern Delta Salinity Objectives*. The analysis in Appendix C, however, is largely based on unpublished data, draft papers, and comment letters that are neither peer-reviewed nor published. For example, Appendix C relies on, among others:

- Mesick, C.F. 2001b. **Unpublished**. Factors that Potentially Limit the Populations of Fall-Run Chinook Salmon in the San Joaquin River Tributaries;

- San Joaquin River Technical Committee (SJRTC). 2008. **Draft** Summary Report of the Vernalis Adaptive Management Plan (VAMP) for 2000-2008. Prepared for the Advisory Panel Review Conducted by the Delta Science Program;

- Mesick, C.F., J.S. McLain, D. Marston, and T. Heyne. 2007. Limiting Factor Analyses & Recommended Studies for Fall-Run Chinook Salmon and Rainbow Trout in the Tuolumne River California Department of Fish and Game. Prepared for the U. S. Fish and Wildlife Service. **Draft Report;**

- Mesick, C.F. and D. Marston. 2007. **Provisional Draft:** Relationships Between Fall-Run Chinook Salmon Recruitment to the Major San Joaquin River Tributaries and Stream Flow, Delta Exports, the Head of the Old River Barrier, and Tributary Restoration Projects from the Early 1980s to 2003;

- California Department of Fish and Game (DFG). 2005a. California Department of Fish and Game Supplemental **Comments and Recommendations** on the Vernalis Flow and Salmon Doubling Objectives in the 1995 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin River Delta Estuary; and

- California Department of Water Resources (DWR). 2007b. **Comments** on SWRCB Southern Delta Salinity Standards Modeling Requests (Tara Smith, Parviz Nader-Tehrani, Erik Reyes, Mark Holderman) May 2007.

SED Appendix C (emphasis added). The analyses in the SED, including the discussions relating to the anticipated benefits to fall-run Chinook, do not take into account the uncertainty associated with, among others, the above-referenced sources. Thus, the Coalition requests that, at a minimum, the analysis in Appendix C be revised to take into account the fact that these sources are not peer-reviewed and not published, in order to ensure that the SED appropriately addresses the uncertainty surrounding the conclusions derived therefrom.

B. The SED's alternatives analysis in inadequate.

The Lower San Joaquin River Alternatives include the following: Alternative 1 (no action alternative); Alternative 2 (range of unimpaired flows between 20 and 30 percent, with 20 percent as the starting point, from February-June); Alternative 3 (range of unimpaired flows between 30 and 50 percent, with 40 percent as the starting point, from February-June); and Alternative 4 (range of unimpaired flows between 50 and 60 percent, with 50 percent as the starting point, from February-June). These alternatives are inadequate because the only variation between the alternatives relates to the percentage of unimpaired flows. The State Board can meaningfully consider other aspects of flow, including pulse flows. Indeed, the SED admits that pulse flows are an important factor for juvenile salmonid migration. SED Appendix C, 3-29. The State Board can also establish flow objectives for different time periods, rather than the full February through June period for each alternative. Yet no alternative includes such options. The Coalition therefore requests that the alternatives be expanded to include variables other than just changes in percentages of unimpaired flows.

V. Conclusion.

In sum, the Coalition urges the State Board to address the foregoing items prior to issuance of the final SED. We would be happy to discuss these issues further at your convenience.

Sincerely,

William D. Phillimore
Board Member

Exhibit A

Relevant Publications

Andelman, S.J., Fagan, W.F. 2000. Umbrellas and flagships: Efficient conservation surrogates or expensive mistakes? *PNAS* 97:5954-5959

Banks, J.R., Ackleh, A.S., Stark, J. 2010. The Use of surrogate species in risk assessment: Using life history data to safeguard against false negatives. *Society for Risk Analysis* 30:175-182

California Department of Fish and Wildlife. January 2002. Escapement and Life History Patterns of Adult Steelhead in freshwater Creek California, 2000-2001 Annual Report

California Department of Fish and Wildlife. September 2008. Escapement and Spawning Distribution of Adult Salmonids in freshwater Creek, 2007-08

California Department of Fish and Wildlife. September 2008. Results of Juvenile Salmonid Downstream Migrant Trapping conducted on Freshwater Creek, 2007

Carignan, V., Villard, M. 2002. Selecting Indicator Species to Monitor Ecological Integrity: A Review. *Environmental Monitoring and Assessment* 78:45-61

Caro, T., Eadie, J., & Sih, A. 2005. Use of substitute species in conservation Biology. *Conservation Biology* 19:1821-1826

Favreau, J.M., Drew, C.A., Hess, G.R., Rubino, M.J., Koch, F.H., Eschelbach, K.A. 2006. Recommendations for assessing the effectiveness of surrogate species approaches. *Biodiversity and Conservation* 15:3949-3969

Hankin, D., Dauble, D., Pizzimenti, J.J., Smith, P. 2010. The Vernalis adaptive management program (VAMP): report of the 2010 review panel

Hitt, N.P., Frissell, C.A. 2004. A case study of surrogate species in aquatic conservation planning. *Aquatic Conservation: Marine and Freshwater Ecosystems* 14:625-633

Kostow, K.E. 2004. Differences in juvenile phenotypes and survival between hatchery stocks and a natural population provide evidence for modified selection due to captive breeding. *Canadian Journal of Fisheries and Aquatic Sciences* 61:577-589

Landres, P.B. 1992. Ecological Indicators: Panacea or Liability? Chap. 74 in *Ecological Indicators*, Vol. 2. London: Elsevier Applied Science

Landres, P.B., Verner, J., Thomas, J.W. 1988. Ecological Uses of Vertebrate Indicator Species: A Critique. *Conservation Biology* 2:316-328

McEwan, D., Jackson T.A. 1996. Steelhead restoration and management plan for California. California Department of Fish and Game, Inland Fisheries Division, Sacramento, California 234 pp.

Murphy, D.D., Weiland, P.S. 2014. The use of surrogates in implementation of the federal Endangered Species Act—proposed fixes to a proposed rule. *Journal of Environmental Studies and Sciences* 4:156-162

Murphy, D.D., Weiland, P.S., Cummins, K.W. 2011. A critical assessment of the use of surrogate species in conservation planning in the Sacramento-San Joaquin Delta. *Conservation Biology* 5:873-878

Roper, B, and Scarnecchia, DL. 1996. A comparison of trap efficiencies for wild and hatchery age-0 Chinook salmon. *North American Journal of Fisheries Management* 16:214-217

Wenger, S.J. 2008. Use of surrogates to predict the stressor response of imperiled species. *Conservation Biology* 22:1564-1571