

San Luis & Delta-Mendota Water Authority



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December 16, 2016

VIA E-MAIL

State Water Resources Control Board
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CommentLetters@WaterBoards.Ca.Gov

Re: Comment Letter – Bay-Delta Phase II Working Draft Science Report

Members of the Board:

The San Luis & Delta-Mendota Water Authority (“Water Authority”), is very concerned about the Working Draft Scientific Basis Report for the Phase II Potential Amendments to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (“Draft Report”).¹

The Draft Report does not reflect the open, transparent, and collaborative process initiated by the State Water Resources Control Board (“State Water Board”) in 2012. At that time, the State Water Board conducted a series of workshops on scientific issues of importance to the Bay-Delta Plan. The Notice for the Workshops explained:

The purpose of the workshops is to receive information and conduct discussions regarding the scientific and technical basis for considering potential changes to the 2006 Water Quality Control Plan for the San Francisco/Sacramento-San Joaquin Delta Estuary.

¹ The Water Authority’s concerns are amplified by the State Water Board’s unwillingness to afford interested parties sufficient time to review the Draft Report. Providing such a short time for review and comment on a foundational document such as the Draft Report deprives the State Water Board of the benefit of further analysis and input from the scientific community. Indeed, the Delta Independent Science Board (“ISB”) has indicated that it will provide only a “programmatic and not detailed” review of the Draft Report and will not “scrutinize the literature and detailed findings of this report for ambiguity, conflicting scientific findings, missing scientific evidence, edits, and interpretations of scientific results.” Additional time could have allowed the type of detailed review necessary to effectively evaluate, and contribute to, the Draft Report. Moving forward, the State Water Board should seek to utilize all available resources in developing the scientific basis for potential amendments, to ensure a robust, genuine scientifically-driven, process.

State Water Resources Control Board
Attn: Jeanine Townsend
December 16, 2016
Page 2

The State Water Board requested and received a report on the workshops, which addressed key points, including areas of agreement and disagreement, sources of disagreement and degree of certainty. The Draft Report departs from the collaboration and transparency of that process. Although there are some exceptions, generally, the information presented in the Draft Report reflects a singular perspective that largely ignores the significant information provided during the 2012 workshops and important areas/sources of agreement, disagreement, and uncertainty.

The Draft Report also does not reflect the full breath of scientific information needed for the State Water Board to appropriately exercise its water quality control planning authority. The most egregious deficiency is with the discussion of the “Percent of Unimpaired Flow” approach for establishing flows. The Draft Report, as explained by State Water Board staff at the December technical workshop, is intended to support the use of a “Percent of Unimpaired Flow” to define a quantity of water, the specific uses for which would be determined at some later point in time. The Draft Report, however, does not adequately present information on the potential uses for the water (the water quality constituents or characteristics that the flow is intended address), the strengths and weaknesses of the proposed approach in the highly altered Bay-Delta, or the alternative scientific approaches to establishing environmental flows or achieving the desired objectives.

We have long supported the need to update the Bay-Delta Plan, which presents an important opportunity to establish a comprehensive approach that improves water quality for all beneficial uses. The update process reflects a generational opportunity to establish an effective approach to protecting the beneficial uses of the Bay-Delta and therefore, the focus should be on thoroughly developing the new approach, rather than on a rush to get something done. The Water Authority respectfully requests that the State Water Board revise the Draft Report to address the concerns the Water Authority and many others, including independent scientists, have raised. The process to revise the Draft Report should be open, transparent and foster collaboration and consensus.

I. There Are Outstanding Questions Raised By Independent Scientists And Interested Parties That Should Be Addressed Through An Open, Transparent, And Collaborative Process

The update process for the Bay-Delta Plan started many years ago, and throughout that process, independent scientists and interested parties have provided comments, questions, and scientific information that remain outstanding or unaddressed. Most recently, albeit in a draft comment letter, the ISB presented fundamental questions with the Draft Report. The ISB:

- Questions why the Draft Report only considers an unimpaired flow approach to environmental flows.
- Questions the level of detail supporting the “cold water habitat” recommendation.

- Questions the “lack of quantitative treatment of any effects from non-flow stressors.”
- Questions the “limited description of possible methods for reducing effects of non-flow stressors.”
- Questions the lack of “substantive discussion on the use of adaptive management in the context of these new regulations and address how it will be implemented and how it might be used to address cause and effect.”

Delta Independent Science Board, Draft Review of SWRCB’s “Working Draft Scientific Basis Report for New and Revised Flow Requirements on the Sacramento River and Tributaries, Eastside Tributaries to the Delta, Delta Outflow, and Interior Delta Operations”, December 5, 2016 (“ISB 2016 Draft Comments”).² These questions, as well as others raised by previous independent science reviews and interested parties, remain largely unaddressed in the Bay-Delta Plan update process. To advance and inform the update process and address the outstanding issues, the State Water Board should ensure there is an open, transparent, and collaborative process that allows for input and engagement by the scientific community and stakeholders.

There are two immediate examples the State Water Board can follow to accomplish that objective. The first example is the process the State Water Board followed as it considered updates to the southern Delta salinity objectives. In 2009, the State Water Board staff conducted a series of workshops at which interested parties along with those responsible for preparing a technical document (Study Report entitled Crop Salt Tolerance in the Southern Sacramento-San Joaquin River Delta) met. The meetings were structured to allow those most knowledgeable to work towards consensus, and where consensus was not reached, a common understanding of the differences and examination of the uncertainties associated with the science was pursued.³ The second example is the series of workshops the State Water Board conducted in 2012 as part of this Phase II to the Bay-Delta Plan update. An important component of those workshops was the “discussions regarding the scientific and technical basis”, and the product called for by the State Water Board, which was capturing “key points, including areas of agreement and disagreement, sources of disagreement and degree of certainty.” See Notice for Public Workshops and Request for Information.⁴ A process and work product similar to those from the examples could be used by the State Water Board to greatly enhance the Draft Report.

² Available at <http://deltacouncil.ca.gov/docs/delta-isb-isb-meeting/draft-review-swrbc-scientific-basis-report-12-5-16>.

³ See Notice of Public Staff Workshops, available at www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/docs/notice_cropsalttolerance.pdf.

⁴ Available at www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/pubnot_phs2wrkshps.pdf.

II. The Draft Report Does Not Provide The State Water Board With The Information Required To Update The Water Quality Control Plan

The Draft Report reflects an early, but extremely important, step in the Phase II update process. The Draft Report is supposed to provide the scientific foundation and information to support the State Water Board's development of water quality objectives that, in the State Water Board's judgment, will ensure the reasonable protection of beneficial uses. (See Health and Safety Code § 57004; see *also* Draft Report at 1-1.) Therefore, it is critical that the Draft Report presents a complete objective, scientific analysis of the water quality needs of beneficial uses.

In its current state, the Draft Report conflates science with policy and regulatory choices, and as a result, does not well-serve its function as a scientific basis report. The Draft Report recommends a percent of unimpaired flow as a regulatory approach but does not provide a thorough discussion of the "empirical data or other scientific findings, conclusions, or assumptions" that provide the scientific basis for the recommended unimpaired flow approach. (Health and Safety Code § 57004.) Nor does the Draft Report examine or disclose the complexity and uncertainty of the underlying ecosystem functions within the highly altered Bay-Delta or meaningful comparison of the efficacy of alternative management solutions. The Draft Report should be revised to provide a more robust and transparent examination of the limits of scientific understanding regarding the Bay-Delta ecosystem and the habitat needs of its fish and wildlife, and provide a clear distinction between what constitutes empirical scientific conclusions and findings versus subjective policy choices and recommendations.

A. The Draft Report Does Not Present Or Evaluate The Various Scientifically-Sound Methodologies For Estimating Flow Needs That Are Alternatives To An Unimpaired Flow Approach

The Draft Report does not evaluate, or even present, the several available scientifically-sound approaches to estimating flow needs, approaches which may serve as alternatives or complements to the proposed unimpaired flow approach. The Draft Report endorses an unimpaired flow approach without providing the State Water Board with relevant information regarding the alternative approaches that could be utilized, and without discussion of the relative merits of the various approaches to estimating flow needs. The Draft Report needs to be revised to provide a robust analysis of a reasonable range of approaches to flow management.

Such an analysis appears to be commonly performed. Although the Water Authority does not take a position on their merits, the following reports provides some examples of where such analysis appears to have been undertaken.

- Linnansaari, T., Monk, W.A., Baird, D.J. and Curry, R.A. 2013. Review of approaches and methods to assess Environmental Flows across Canada and internationally. DFO Can. Sci. Advis. Sec. Res. Doc. 2012/039. viii + 74 p; see also Adams, J.B., 2014. A review of methods and frameworks used to determine

the environmental water requirements of estuaries. *Hydrological Sciences Journal*, 59 (3–4), 451–465.

- Davies Peter M., Naiman Robert J., Warfe Danielle M., Pettit Neil E., Arthington Angela H., Bunn Stuart E. 2013. Flow–ecology relationships: closing the loop on effective environmental flows. *Marine and Freshwater Research* 65, 133-141.
- Sarah M. Yarnell, Geoffrey E. Petts, John C. Schmidt, Alison A. Whipple, Erin E. Beller, Clifford N. Dahm, Peter Goodwin, and Joshua H. Viers. October 01, 2015. Functional Flows in Modified Riverscapes: Hydrographs, Habitats and Opportunities. *BioScience*.
- Marsili-Libelli, S., Giusti, E., & Nocita, A. 2013. A new instream flow assessment method based on fuzzy habitat suitability and large scale river modelling. *Environmental modelling & software*, 41, 27-38.

The Lower Yuba River Accord provides another example of an alternative methodology that might be considered. To develop the flow schedules that form the foundation for the Accord, scientists examined stressors and limiting factors for key life stages of anadromous fish based on the existing hydrological and biological conditions in the lower Yuba River.⁵ The Technical Team of the Yuba Accord relied on available information such as the stressor matrix results (and the species and life stage rankings, life stage periodicities, and geographical considerations developed for the stressor matrix), flow-habitat relationships (i.e., weighted usable area for Chinook salmon and steelhead spawning), and an understanding of the lower Yuba River flow-water temperature relationship to build the flow schedule. The development of the flow schedule for the Yuba River Accord was an iterative process that examined both “optimal” flows and “survival” flows and that considered the trade-offs inherent in flow management. The flow schedule built upon the initial flow schedule developed from the following steps:

- Identifying basic hydrologic conditions, physical parameters and operations objectives that influence flow;
- Development of an “optimal” flow schedule for years with virtually unlimited water availability;

⁵ See Draft EIR/EIS for Proposed Lower Yuba River Accord, Appendix C: Background Regarding the Development of the Proposed Yuba Accord Fisheries Agreement. June 2007. at http://www.yubaaccordrmt.com/Yuba%20Accord%20Documents/Yuba%20Accord%20Final%20EIR_EIS/Appendix%20C-Background%20Regarding%20Development%20of%20the%20Agreements.pdf; see also HDR Inc. 2007. Final Environmental Impact Report/Environmental Impact Statement for the Proposed Lower Yuba River Accord. Sacramento, CA. Accessed 6-Dec-16 at www.hdrprojects.com/engineering/ProposedLowerYubaRiverAccord/; Wells BK, Field JC, Thayer JA, Grimes CB and others (2008) Untangling the relationships among climate, prey and top predators in an ocean ecosystem. *Mar Ecol Prog Ser* 364:15-29.

- Development of a “survival” flow schedule for years with extremely low water availability; and
- Development of additional flows schedules between the high and low range, corresponding to varying the water availabilities between the very wet years and the extremely dry years.

The Yuba River Accord approach also relied on consensus building and ranking and weighting various stressors relative to one another, rather than seeking for complete scientific certainty or stakeholder agreement. Recognizing the year-to-year variations in lower Yuba water availability, the Technical Team developed 6 different flow schedules to accommodate different levels of water availability. The flow schedules were developed to maximize fisheries benefits during wetter years, and to maintain fisheries benefits to the extent possible for drier years. This process thus considered a hierarchy of stressors and variations in water needs and water availability throughout a single-year and during various water year types.

To enhance the information available to the State Water Board, the Draft Report should be revised to provide a review and assessment of the various methodologies available for evaluating ecological flow requirements, including the pros and cons of each, to provide the necessary scientific information for developing potential water quality objectives.

B. The Draft Report Does Not Provide A Thorough Scientific Evaluation Of Utilizing An Unimpaired Flow Approach

The Draft Report does not provide a scientifically-based evaluation of the unimpaired flow approach. The Draft Report only briefly acknowledges that unimpaired flow is not the same as “natural flow” and then proceeds to assert that unimpaired flow provides a more natural flow pattern. For example, the Draft Report states: “While unimpaired flows are not natural flows, they can be used to provide for more natural functional flows, especially when implemented in an adaptive management framework.” (Draft Report, at 1-9.) This description of unimpaired flow fails to examine the function of flow in relation to the physical and temporal aspects of habitat needs, or in the context of a highly altered ecosystem, and instead promotes flows in the abstract. The Draft Report does not realistically examine how much suitable floodplain habitat might be achieved at particular flow levels under current conditions, or examine what is the needed duration of particular flow levels to support floodplain habitat. Likewise, the Draft Report does not examine how the hydrodynamics of an altered ecosystem may affect the functionality of particular flow levels. Rather, the report seems to suggest that simply changing the volume and velocity of flow will result in some form of benefit.

It is critical that the Draft Report provide a scientific evaluation of the potential utility and ecosystem function of increased flows in a highly-altered ecosystem such as the Bay-Delta. For example, the ICF International summary report from the 2012 workshops recognized that there is broad consensus that “present day flow patterns are quite different from natural patterns” and that “natural patterns” cannot be restored under current conditions due to the “pervasive

modifications to the structure and function of the hydrologic system . . .”⁶ The Draft Report does not provide a scientific evaluation of what functions the percent of unimpaired flow can provide under current conditions. Nor does the Draft Report try to reconcile the concepts of mimicking more “natural” historical flows and the concept of using a simple percent of unimpaired flow in the face of climate change and an altered hydrograph. The Independent Science Board’s recent draft comments emphasize the importance of discussing climate change, and state: “[h]ydrologic conditions in the Delta, particularly unimpaired flow and stream temperatures, are expected to see climate change effects. This merits an expanded discussion in the SWRCB report.” (ISB 2016 Draft Comments, at 7.) The Draft Report needs to evaluate flow in the context of an altered ecosystem, and acknowledge the various other stressors in the Bay-Delta ecosystem, so that the State Water Board can understand the role of flow in the context of the existing ecosystem.⁷

In addition, the Draft Report should discuss and more closely examine the references it cites in support of an unimpaired flow approach. For example, the Draft Report states: “regulatory programs in Texas, Florida, Australia and South Africa have developed flow prescriptions based on unimpaired hydrographic conditions in order to enhance or protect aquatic ecosystems (Arthington, et al. 1992; Arthington, et al. 2004; NRDC 2005; Florida Administrative Code 2010) . . .” (Draft Report, at 5-3.) The referenced citations for this statement do not appear to directly support the assertion being made. The referenced paper by Arthington, et al. (1992) includes a detailed review of the multiple features that should be included in the development of a holistic approach to establish flow requirements for a river. However, the citation listed is for a research paper, not a regulatory document, and there is no mention in the paper that the guidance contained within the paper (which is of value) had made it into any adopted regulatory program, no less one that controls an estuary (as opposed to a river or an estuary like the Bay-Delta).

It is difficult to evaluate the Draft Report’s reference to “Florida Administrative Code 2010” (Draft Report, at 5-3), as there is no listing in the Reports Literature Cited section that corresponds with the referenced document. However, the enabling legislation for Florida’s Minimum Flows and Levels (“MFL”) program (Florida Statute 373.0421) states:

“When establishing minimum flows and minimum water levels pursuant to § 373.042, the department or governing board shall consider changes and structural alterations to watersheds, surface waters, and aquifers and the effects such changes or alterations have had, and the constraints such changes or alterations have

⁶ ICF International. 2013. Comprehensive (Phase 2) Review and Update to the Bay-Delta Plan. Final Bay-Delta Plan Workshops Summary Report, at 5. Final. June. (ICF 00427.11.) Sacramento, CA. Prepared for State Water Resources Control Board, Sacramento, CA. Available at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/docs/bdwrkshprpt070813.pdf.

⁷ See Hanak, et al. 2013. Stress Relief: Prescriptions for a Healthier Delta Ecosystem. San Francisco: Public Policy Institute of California.

placed, on the hydrology of an affected watershed, surface water, or aquifer, provided that nothing in this paragraph shall allow significant harm as provided by § 373.042(1) caused by withdrawals.”

In other words, the development of MFL guidance in the State of Florida “shall” consider changes in the watershed.

The Draft Report appears to suggest that regulatory guidance in the State of Florida is based mostly (or solely) on the establishment of inflow criteria that are derived from a percentage of unimpaired flows. That appears to be an oversimplification of Florida’s regulatory guidance, as can be illustrated via a review of the MFL guidance for the lower Peace River (SWFWMD 2010).⁸ The Peace River is the major source of freshwater inflow into Charlotte Harbor, the second largest estuary (after Tampa Bay) in the State of Florida. The MFL for the lower Peace was developed to provide regulatory guidance consistent with the intent that “...the minimum flow for a given watercourse shall be the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area.” A series of mechanistic and empirical models were developed and linked to determine the amount of withdrawals that, if exceeded, would constitute “significant harm.” Rather than use a single “percentage of historical flows” the MFL guidance for the lower Peace River varies as a function of time of the year and flow. The MFL for the lower Peace River, which is an example of regulatory guidance adopted by the State of Florida, is more complex than a single percentage reduction in flow. Thus, adopted regulatory guidance used by the State of Florida to protect estuaries is more complicated than the approach suggested in the Draft Report.

C. The Draft Report Does Not Adequately Or Accurately Reflect The Current State Of The Science On Critical Recommendations Related To Central Valley Project And State Water Project Operations Within The Delta

In what appears to be a relatively simplistic approach, the Draft Report recommends requirements based on criteria found in biological opinions, that were developed almost a decade ago under a different regulatory process as part of “project” specific regulation of the Central Valley Project (“CVP”) and State Water Project (“SWP”). (See Draft Report, at 5-38 – 5-44.) The Draft Report contains recommendations regarding the Delta Cross Channel (“DCC”) operations, flow in Old and Middle Rivers (“OMR”), and pumping at the South Delta facilities of the CVP and SWP, terms taken from prior biological opinions regarding coordinated CVP and SWP operations. In fact, the Draft Report makes it clear that its recommendations regarding “interior Delta flows” are all focused on “CVP and SWP diversion activities.” (Draft Report, at 5-38.) In importing project-specific requirements from old biological opinions, the Draft Report fails to consider the current science in the context of this quasi-legislative process that requires consideration of (a) past, present, and probable future beneficial uses of water and (b)

⁸ Southwest Florida Water Management District (SWFWMD). 2010. Proposed Minimum Flows and Levels for the Lower Peace River and Shell Creek – Final Report and Appendix 1. Southwest Florida Water Management District. Brooksville, FL. 590 pp.

environmental characteristics of the hydrographic unit, and (3) conditions that could reasonably be achieved through the coordinated control of all factors in the area. Water Code, § 13241. In doing so, the Draft Report also fails to consider important scientific information developed since the “project” specific regulation was imposed on the CVP and SWP through consultations under the federal Endangered Species Act (“ESA”).

The Draft Report recommends changed export limits and modifications to the ratio of San Joaquin River flow to export rate, based on its evaluation of relationship between San Joaquin River flow, operations of the CVP and SWP pumping facilities, and San Joaquin River Chinook salmon survival. (Draft Report, at 5-41 -5-43.) Specifically, the Draft Report recommends “additional restrictions during the February through June time period . . . within the range of 1:1 to 4:1 San Joaquin River flows to exports (consistent with the NMFS BO) with minimal exports as low as 800 cfs.” (Draft Report, at 5-42.) Those recommendations, however, do not reflect adequate consideration of the best available science and improperly rely on the 2009 National Marine Fisheries Service Biological Opinion issued for continued operations of the CVP and SWP (“NMFS BiOp”). The best science available today does not support a conclusion that changes in operations of the CVP and SWP pumping facilities to limit exports would improve salmonid survival. As reflected in by the Collaborative Adaptive Management Team (“CAMT”) and in its Draft Salmon Scoping Team Synthesis Analysis (“Draft Salmon Synthesis Report”), there exists a high degree of uncertainty regarding the relationships between CVP and SWP operations and through-Delta salmonid survival. The current science therefore does not support the Draft Report’s underlying presumption that an increase in river flows relative to exports is predicted to result in increased abundance or survival of a targeted fish species.

In addition, the Draft Report appears to rely almost exclusively on the 2008 FWS BiOp and the 2009 NMFS BiOp as support for its recommendation to impose requirements for net OMR reverse flows. (Draft Report, at 5-40.) The Draft Report recommends imposing OMR reverse flow limitations that are “similar” to those found in the biological opinions. (Draft Report, at 5-40.) The Draft Report does not recognize that existing limits on CVP and SWP operations related to flow in Old and Middle River focused on regulation of “take”, as that term is defined under the ESA. And, there is scant evidence to support hypothesized indirect effects from net OMR reverse flows. The Draft Report does not provide citations to support its summary of the increased risk of entrainment found at pages 5-40 – 5-41, nor does the Draft Report adequately explain the scientific basis for its recommended OMR reverse flow requirements of -1,250 cfs to -5,000 cfs. (Draft Report, at 5-41.) The Draft Report refers to salvage rates as “lower” and “higher” rates but the Draft Report does not examine the biological significance of any particular salvage rate.

The Draft Report also recommends DCC gate closure requirements for the additional month of October, based largely on the NMFS BiOp’s requirement regarding DCC gate closure for the interval of October 1 through November 30. (Draft Report, at 5-39.) However, the Draft Report does not review or evaluate the scientific basis for the NMFS BiOp’s DCC gate closure requirements. The Draft Report does not provide an analysis or estimate of the expected benefit of the additional DCC gate closure requirements. Nor does the Draft Report provide

sufficient detail regarding the recommendation that “[a]daptive management provisions are also proposed for DCC gate closure requirements to consider diurnal operations and other real time measures to improve the efficiency and effectiveness of DCC gate closures.” (Draft Report, at 5-39.)

D. Additional, Important Information Needed To Update The Water Quality Control Plan Is Missing From The Draft Report

1. The Draft Report Does Not Scientifically Evaluate Flow In The Context Of A Complex Highly Altered Ecosystem With Multiple Stressors

The Draft Report does not provide the Water Board with the necessary information to develop effective water quality regulation. The Draft Report presents a “flows first” approach, the foundation for which is the presumption that more flow will provide the protection of fish and wildlife beneficial uses. This approach does not follow a scientific process that examines the relationship between water quality constituents, flow, ecological functions, and habitat conditions. Instead, the analysis presented in the Draft Report relies on statistical correlations to argue that increased flows in a highly altered system somehow provide the same biological function and value it might have provided in an unaltered system and therefore would be beneficial to native species. For example, the Draft Report states: “While natural conditions have not existed in the Bay-Delta watershed for more than a hundred years, many of the native fish and wildlife species maintained healthy populations until the past several decades when water development intensified.” (Draft Report, at 1-3.) This statement implies a causal relationship between water development, which has been rather stable for decades, and fish decline, when in fact, only a correlation exists. Since the first imposition of flow objective, numerous independent scientists have warned against overreliance on correlation and have instead recommended focusing on the biological mechanisms and physical functions to ensure more meaningful outcomes. There is a whole suite of factors affecting fish populations, many of which intensified even more so in the past several decades, that the Draft Report does not adequately consider. These types of statements are ubiquitous throughout the Draft Report and do not provide a scientifically objective or accurate presentation of the factors affecting the fish and wildlife beneficial uses of the Bay-Delta. This reliance on correlative relationships follows the existing failed approach and presents the continued risk of objectives that are based upon an incorrect assessment of which factors are central to causation and could result in more unnecessary environmental and economic harm without generating commensurate benefits. The approach has been questioned by scientists for some time.⁹ Thus, a more detailed and robust analysis of underlying ecological factors, functions, and mechanisms is necessary to inform the Water Board’s development and selection of reasonable water quality objectives and a program of implementation.

⁹ See, e.g., Kimmerer, W.J. Physical, Biological, and Management Responses to Variable Freshwater Flow into the San Francisco Estuary. *Estuaries* Vol. 25, No. 6B, p. 1275–1290 (December 2002); Delta Independent Science Board. *Flows and Fishes in the Sacramento-San Joaquin Delta: Research Needs in Support of Adaptive Management* (August 2015).

The Draft Report makes several leaps in its analysis and sets up a regulatory approach that presumes flows are controlling the abundance of fish species in the Delta and its tributaries. For example, the Draft Report states: “For estuarine-dependent species, the statistically significant declines in population size of Sacramento splittail and longfin and Delta smelt have continued since implementation of D-1641. The statistically significant declines suggest that D-1641 is not sufficiently protective for these species and additional actions are required to recover the species.” (Draft Report, at 1-13.) This statement presumes that declines in fish populations are due to D-1641’s flow-related requirements not providing adequate protection, and in turn, presumes that increasing flows will cause the recovery of fish populations. Such presumptions are not scientifically defensible and set up a false paradigm that assumes the following: (1) if flows are increased and fish abundance increases, the increase in abundance was caused by the increased flows; (2) in contrast, if flows are increased and fish abundance remains the same or declines, then flows were simply not increased enough. This simplistic and false paradigm risks further re-allocating significant quantities of water to which they have been reallocated without any assurance of a benefit to instream beneficial uses.

The Draft Report contains very little information regarding the expected benefits of particular flow levels, and the statistical and scientific uncertainties with the flow-abundance relationships that it presents. For example, on page 5-26 the Draft Report states that the “flow frequency distributions suggest that population abundance of native species will increase with increasing percent of unimpaired flow because net Delta outflow also increases.” However, the Draft Report then states that “No attempt was made to quantify the statistical uncertainty in these values.” (Draft Report, at 5-26.) Without additional analyses regarding the expected benefits of specific flow levels, and the uncertainties associated with the expected benefits, the State Water Board cannot evaluate the trade-offs of a particular flow level. It is difficult to understand how the State Water Board can make an informed decision regarding what actions will provide for the reasonable protection of beneficial uses, based on a balancing of all beneficial uses, if the State Water Board does not have information regarding the uncertainties in the flow-abundance relationships and expected fish benefits presented in the Draft Report.

The Draft Report also provides only a cursory analysis of non-flow stressors and does not attempt to evaluate the relative importance of the various ecosystem stressors on fish survival and abundance or even how those stressors may interact with flows. As the ISB’s draft comments on the Draft Report state, the Draft Report “suffers from a lack of quantitative treatment of any effects from non-flow stressors” and has “little description of possible methods for reducing effects of non-flow stressors.” (ISB 2016 Draft Comments, at 5-6.) It is beyond dispute that the State Water Board lacks the authority to address many of the factors stressing the beneficial uses of water within the Bay-Delta. That, however, does not mean the State Water Board can truncate analysis of “other stressors”, as the Draft Report does. Understanding the impact of the biological, chemical and physical changes that have occurred within the Bay-Delta, at the level possible given the state of the science, is critical to satisfying the mandates of science and law.

The law requires the State Water Board to develop the Bay-Delta Plan to “attain the highest water quality which is reasonable, considering all demands being made and to be made

State Water Resources Control Board
Attn: Jeanine Townsend
December 16, 2016
Page 12

on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible.” (Water Code § 13000.) To do that, the State Water Board must consider, among other factors: “...conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area.” (Water Code § 13241.) Science compels nothing different. A couple of examples to demonstrate that point. William J. Kimmerrer wrote:

The high cost of the water to move the salt field raises the question: Can these actions be made more effective with the same quantity of water, or equally effective with less water? The answer to these questions depends on the mechanisms of response and the biology of the species being managed, which determine the location, timing, and duration of the flow effect.

Kimmerrer, W.J., Physical, Biological, and Management Responses to Variable Freshwater Flow into the San Francisco Estuary, *Estuaries*, Vol. 25, No. 6B, p. 1275–1290 (December 2002). U.S. E.P.A. explained:

The WQCP should contain standards that, to the greatest extent possible, address conditions or parameters that directly affect beneficial uses and are measureable in the field. For example, salinity or temperature may directly affect the aquatic resource and are readily measurable. In some cases, a regulatory parameter such as the Net Delta Outflow Index (NDOI) may serve as a surrogate for more detailed analytical tools, but the linkage to measurable field parameters that relate to the protected beneficial use should be explicit and scientifically sound.

U.S. E.P.A., Scoping comments for the review of the 2006 Water Quality Control Plan, April 25, 2012. The Independent Science Board counseled:

Flows and other drivers on fishes need to be examined for their direct and indirect effects on essential fish production processes and vital rates (i.e., growth rates, reproduction success, mortality rates, and migrations/transport). Increased focus on measurable rate processes (e.g., individual fish growth rates) can complement annual population levels that integrate all factors affecting fishes. The overarching questions include: What are the essential requirements of a desirable fish species for individual and population growth and sustainability and how do flows change those requirements?

Delta Independent Science Board, *Flows and Fishes in the Sacramento-San Joaquin Delta*, August 2015.

In sum, the Draft Report does not evaluate the relationships between flow, ecosystem stressors and fish abundance, nor does the Draft Report disclose the possibility that non-flow measures may be a dominant factor in the ability to increase fish abundance. The limited analysis and disclosure regarding the various factors that may be controlling fish distribution,

survival and abundance leads to a skewed presentation of the factors affecting fish and wildlife beneficial uses of water, and an overreliance on flow. Equally important, without a balanced, ecosystem evaluation of the needs of fish, the Draft Report does not provide the State Water Board with the breadth of scientific information and available options it needs to determine what actions will result in the reasonable protection of beneficial uses.

2. The Draft Report Is Missing Detail And Scientific Information Regarding Several Important Components Of The Draft Report's Recommendations

In its current form, the Draft Report is not ready for peer review pursuant to Health and Safety Code section 57004 because the Draft Report is missing important information regarding the scientific basis for the recommended changes to the Bay-Delta Plan. Section 57004 requires the State Water Board to submit the scientific portions of the proposed water quality control plan amendments, along with a statement of the scientific findings, conclusions, and assumptions on which the scientific portions of the proposed amendments are based and the supporting scientific data, studies, and other appropriate materials, to the external scientific peer review entity for its evaluation prior to adopting the amendments. (Health and Safety Code § 57004.) However, for several components of the recommended changes to the Bay-Delta Plan, the Draft Report does not provide sufficient scientific information to allow for the peer review evaluation required by section 57004.

As an example, the Draft Report indicates that summer Delta outflow requirements may be considered by the State Water . The Draft Report states: "Based on additional scientific information, the State Water Board will consider a summer Delta outflow requirement for increased Delta outflow to benefit Delta smelt. The anticipated range for such a requirement would be from 7,100 to 11,400 cfs during July and August. Summer outflows may also be part of an adaptive management program." (Draft Report, at 5-30.) The Draft Report does not identify or discuss any science underlying the potential summer Delta outflow requirement. Any potential summer Delta outflow requirement should be subject to peer-review and the basis for such a requirement needs to be described in the Draft Report. Particularly in areas of emerging science and greater uncertainty, such as potential summer Delta outflow requirements which are both emerging and uncertain, it is critical that the State Water Board proceed in a cautious manner that allows the science to develop before significant quantities of additional water are re-allocated away from human needs.

In addition, the Draft Report does not examine the relationship between the Draft Report's recommendations for increased inflows and outflows, with the need for cold water management. Instead, the Draft Report defers the issue by recommending a narrative cold habitat requirement. (See Draft Report, at 1-14.) The Draft Report does not provide the State Water Board with sufficient information regarding the possible trade-offs between increased inflow/outflow requirements and cold water pool management. Nor does the Draft Report present an evaluation of the potential relative benefits to fish of the recommended inflow/outflow requirements versus allowing additional storage of water for cold water pool management. This

is the type of information the State Water Board needs to determine what actions will lead to the reasonable protection of beneficial uses.

The Draft Report also defers key components of the scientific development of water quality objectives. For example, the Draft Report states that “[b]iological goals are proposed to inform whether and how adaptive management is conducted.” (Draft Report, at 5-11.) However, the Draft Report then states that the “parameters for use of unimpaired flows, adaptive management, and biological goals will be provided in the proposed Phase II water quality objectives and program of implementation language included with the final Report.” (Draft Report, at 5-11.) While the Water Authority recognizes that the Draft Report is an early draft, the biological goals are necessary to adequately inform the development of the recommendations for water quality objectives, thus cannot be deferred. In addition, the biological goals would benefit from being included in the required peer review process and the required peer review process will benefit from knowing the biological goals that the water quality objectives are presumably meant to achieve.

Likewise, the proposed use of adaptive management should be developed and described prior to peer-review, as this is a key component of the Draft Report’s recommendations. The Delta Independent Science Board previously commented that a “science-based adaptive management program is essential” and emphasized that information such as what will be monitored and what performance measures will be used as the basis for the adaptive management program are critical to determining whether the program is “science-based.”¹⁰ More recently, the ISB released draft comments on the Draft Report that state: “We recommend adding a substantive discussion on the use of adaptive management in the context of these new regulations and address how it will be implemented and how it might be used to address cause and effect. This section could also identify expected outcomes, alternatives and the most prominent gaps in the scientific basis and understanding developed in the report.” (ISB 2016 Draft Comments, at 7.) The Draft Report cannot effectively function as the scientific basis for a program of implementation that involves adaptive management without providing the necessary details regarding the proposed adaptive management program.

III. Consensus Among Those In The Scientific Community Supports The State Water Board’s Use Of A New Approach That Considers First the Mechanisms Impairing Beneficial Uses, With Flow Used, As Reasonable, To Improve The Mechanisms/Functions

The State Water Board has the opportunity and obligation to examine and evaluate the existing requirements and regulatory approach of the Bay-Delta Plan and to consider alternatives for the future. Most would agree that the existing regulatory approach to protecting the beneficial uses of the Delta is not working, and that a new approach must be developed. Most would also agree that native species dependent upon the Delta have experienced significant decline over the last several decades. However, there are divergent views regarding

¹⁰ See ISB letter available at www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/docs/item8_att2_delta_isb_response.pdf.

what approach will best ensure reasonable and effective water quality regulation for the protection of all beneficial uses.

A functional ecosystem approach that examines the water quality constituents and characteristics that support beneficial uses is needed. A comprehensive approach that identifies, for example, the habitat and life-cycle needs of fish species in the context of existing physical conditions and the water quality needs for fish species, is best designed to provide effective water quality regulation. This requires an examination of the existing environmental characteristics of the Bay-Delta and its tributaries, as well as the identification of water quality characteristics that can be achieved through the coordinated control of factors affecting water quality.

This complex analysis must be advanced with acknowledgement and consideration of the complexity and uncertainties inherent in the Bay-Delta ecosystem. The bounds of scientific understanding need to be disclosed and distinction between science versus policy and regulation needs to be recognized so that policy decisions are not being cloaked as scientifically-compelled. To advance the scientific understanding of the Bay-Delta ecosystem and its native fish populations and develop effective regulation, the State Water Board should apply a structured decision-making process that: (1) develops conceptual models that link fish and essential environmental attributes to ecological processes and potential management actions; (2) collects relevant data and other information pertaining to physical and biotic components of the Bay-Delta ecosystem and fish life stages; (3) identifies an inclusive set of candidate management actions and formulates management hypotheses that can be tested using those data and observations; (4) constructs numerical (mathematical) models for purposes of testing the management hypotheses and identifying management-action scenarios that are likely to be effective from among candidate action scenarios; and (5) carries out risk analysis that allows selection of an effective, efficient, and accountable management actions from among the best candidate actions by considering potential effects on beneficial uses of water.

Also, inherent in the exercise of balancing the water needs of all beneficial uses must be a consideration of the trade-offs and a cost-benefit analysis of potential water quality management actions. Currently, the Draft Report advocates for a significant re-allocation of water away from human needs, to provide more instream water in the hope of protecting fish and wildlife beneficial uses. The Draft Report recommends a relatively gross approach to the protection of fish and wildlife that relies on the presumption that more instream water will necessarily increase the survival and abundance of fish and wildlife. This type of approach fails to recognize the significant risk that more water will not improve, and may be adverse to, the protection of fish and wildlife beneficial uses because other habitat components continue to limit survival and abundance. Nor does the Draft Report capture the risks associated with taking water away from existing beneficial uses that will certainly be impaired and re-allocating that water despite significant uncertainty regarding whether and how much that reallocation will actually benefit fish and wildlife if other stressors are not addressed as well. In other words, the uncertainties underlying the habitat needs of fish and wildlife warrant a more cautious and tailored approach to developing new water quality objectives for the protection of fish and

wildlife, where management actions are more carefully designed in light of the limits of scientific understanding and are targeted to addressing those conditions where there is more certainty regarding the ability to improve habitat conditions.

IV. The Law Is Consistent With The Scientific Consensus On The Use Of A Mechanistic/Functional Approach To Protecting Beneficial Uses

The law is consistent with the scientific consensus calling for the use of a mechanistic/functional approach to water quality protection. The four categories of flow requirements examined in the Draft Report are not appropriate parameters for water quality objectives.

Flow is not a proper parameter for a water quality objective because it is actually a water *quantity* parameter. By definition, flow is the rate at which a specified amount of water travels, hence the oft-used term of “cubic feet per second” when discussing flow. “Water quality objectives” are defined in the Porter-Cologne Act as the “limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area.” (Water Code, § 13050, subd. (h).) Temperature, pH, dissolved solids, pathogens, dissolved oxygen, and chemical constituents such as pesticides are all examples of “water quality constituents or characteristics.” Flow, by contrast is the physical movement of water in a watercourse. While flow may affect water quality, flow is not a water quality constituent or characteristic of the water. Flow is therefore outside the scope of a water quality objective as defined in Water Code section 13050, subd. (h). The State Water Board’s current task is to consider potential amendments to water quality objectives. Questions of flow may be properly addressed as part of implementation, in a quasi-judicial water rights proceeding.¹¹

In sum, while the relationship between flows and beneficial uses can be utilized to identify and develop “limits or levels of water quality constituents or characteristics” that can serve as water quality objectives, flow by itself is not an appropriate parameter for water quality objectives. Flow is appropriately addressed through an exercise of the State Water Board’s water right authority.

CONCLUSION

The Water Authority appreciates the opportunity to comment on the Draft Report and looks forward to providing additional comments and information as the Bay-Delta Plan update process continues. The Water Authority is striving to contribute to the common goal of developing effective, efficient, and reasonable water quality objectives that appropriately balance the numerous beneficial uses of the Bay-Delta and its tributaries. The Water Authority recognizes that the State Water Board is working diligently to respond to declines in the Bay-

¹¹ For a complete argument on this issue, see prior comments of the Water Authority, available at http://www.waterboards.ca.gov/waterrights/water_issues/programs/hearings/baydelta_pdsed/docs/comments032913/daniel_nelson.pdf.

State Water Resources Control Board
Attn: Jeanine Townsend
December 16, 2016
Page 17

Delta fish populations and that the State Water Board is seeking to utilize its water quality authorities to help protect Bay-Delta fish and wildlife beneficial uses.

The Water Authority cannot overstate the importance of this stage in the process. Independent reviews, as well as interested parties, have expressed concern with the Draft Report. The current regulatory approach is failing native fish and wildlife. At the same time, people in urban and agricultural communities are facing chronic, adverse impacts to the reliability and/or quantity of water supplies. This quasi-legislative process presents an opportunity for an open, transparent process that furthers collaboration and hopefully leads to a better result for California. The State Water Board, to take advantage of that opportunity, should revise its process and allow the expertise of independent and interested experts to assist its staff in preparing a scientific report that reflects the state of science where there is consensus, the level of uncertainty in those areas, and areas of disagreement.

Thank you,



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