June 3, 2005

Arthur G. Baggett, Jr., Chair
State Water Resources Control Board
P. O. Box 100
Sacramento, CA 95812-0100

RE: BAY-DELTA PLAN PERIODIC REVIEW

Dear Mr. Baggett,

This letter is submitted as supplemental and response comments of the Bay Institute regarding Topics 2 (Delta Cross Channel gates closure); 3 (Salmon protection); 5 (Delta outflow); 6 (Export limits); 7 (River flows: Sacramento River at Rio Vista); 8 (River flows: San Joaquin River at Airport Bridge, February 1 – April 14 and May 16 – June 30); and 11 (Program of implementation) for the State Water Resources Control Board's (SWRCB) public workshops to consider potential amendments or revisions of the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan). Our proposed changes to the Bay-Delta Plan are also summarized below and included in a track-changes version as Attachment A.

Workshop Topic 2: Delta Cross Channel gates closure

a. Response to comments by other parties: Information presented by the Department of Interior (DOI-EXH-20) and National Marine Fisheries Service (NMFS; NOAA-EXH-01 and NOAA-EXH-13) indicates that yearling winter- and spring-run Chinook salmon are present in the Delta beginning in September or October (e.g., see DOI-EXH-20, slide 22), more than a month prior to the beginning of the fall – winter period when the current Bay-Delta Plan objective for Delta Cross Channel (DCC) gate closures goes into effect. These two Chinook salmon runs, both listed under the federal Endangered Species Act (ESA), have made the least progress towards the Central Valley Project Improvement Act (CVPIA) and SWRCB "doubling" goal (see DOI-EXH-22, BAY-EXH-01, and Workshop Topic 3 below) and clearly require additional protection. NMFS

expressed concern that early migrants (e.g., fish present in the Delta in the fall months) "could be diverted from the Sacramento River at higher rates … if the gates are open". Two years of intensive research conducted at the DCC support this concern: large proportions of juvenile salmon released into the Sacramento River upstream of the DCC are entrained into the central Delta when the DCC gates are open (DOI-EXH-08). Results of multiple studies and statistical analyses clearly indicate that survival of juvenile salmon entrained into the interior Delta via the open DCC is reduced (USFWS; DOI-EXH-20). For this reason, NMFS recommended that the SWRCB help develop enhanced protection measures for salmonids that migrate past the DCC between October 1 and January 31.

In our earlier comments on this topic (BAY-EXH-01), we recommended increasing the allowable number of days of DCC closures during the November 1 – January 31 period by 15 days, to a total maximum of 60 days. Based on the information submitted by NMFS and USFWS, we are modifying our original recommendation – that is, to increase the total number of days of allowable closures for fish protection to 60 days in the November through January period – to extend the period during which the DCC gates may be closed for fish protection to include October (thus maintaining the 50% maximum closure duration for the period contained within the present Bay-Delta Plan). Extending the period and increasing the number of allowable days of DCC gates closure will allow state and federal fishery agencies greater flexibility to more effectively use real-time monitoring and decision tree-based management of this facility, and minimize the tendency to delay needed closures of the DCC gates early in the salmon migration season in order to conserve their ability to protect other fish later in the season.

In their supplemental comments (SWC-EXH-04), the State Water Contractors (SWC) criticized TBI for suggesting that exports could be reduced to address water quality impacts in the Delta when the DCC gates are closed, arguing that we ignored the need for "reasonableness and balancing to avoid impacting the reasonable needs of water users throughout the State." SWC not only ignores the obvious fact that the SWRCB has placed a number of constraints on export pumping in order to ensure that various beneficial uses are being adequately protected, but overlooks the particular fact that deteriorating water quality in the Delta during the late fall and early winter period is not a function of DCC gate closure alone, but is usually associated with the concurrence of low Delta inflows, high export pumping rates, and gate closures. Therefore it is both appropriate and reasonable for the SWRCB to consider revising both the export

criteria and Delta inflow objectives in the Bay-Delta Plan in order to better address water quality concerns raised concerning DCC gates closure.

b. Recommended language regarding the Delta Cross Channel gates closure objective:

i. The first of the three time periods identified for Delta Cross Channel gates closure in Table 3 of the Bay-Delta Plan should be changed to read "Oct – Jan". The first sentence of Footnote 26 to Table 3 should be revised to read: "For the October – January period, close Delta Cross Channel gates for up to a total of 60 days, as needed for the protection of fish. Days when the gates are closed for flood control or export water quality purposes shall not be counted against the 60 day maximum."

ii. The following sentence should be added to Footnote 26 to Table 3: "When the gates are closed for fish protection, the operations group will reduce exports or increase inflows as needed to prevent adverse water quality impacts."

Workshop Topic 3: Salmon protection

a. Response to comments by other parties: In their supplemental comments (SWC-EXH-04), the SWC suggest that, while they do not contest the validity of the salmon doubling objective, serious questions remain regarding the role of the Delta in salmon protection, how the doubling goal should be measured, and whether steelhead should be included in the objective. On the contrary, however, the SWRCB received more than sufficient information at the workshops and in supplemental materials to resolve these questions.

Role of the Delta in Meeting the Doubling Objective
Four runs of Chinook salmon (as well as steelhead trout) reproduce in more than two dozen rivers and streams in the Sacramento-San Joaquin watershed – and all of them must migrate through the Delta at least twice to complete their lifecycle. Contrary to the SWC assertion that the Delta is "just a migration corridor", it is the migration corridor and rearing habitat common to all anadromous salmonids in the watershed of the Delta. Therefore, providing improved in-Delta conditions that increase survival of the fish as they transit and rear in the estuary is a key component of any plan to achieve the objective (as well as that of the Central Valley Project Improvement Act) of doubling salmon populations. It is highly unlikely that any implementation strategy that improves conditions in one part

of the watershed but fails to address serious problems in other parts will succeed over the long term in achieving and maintaining the doubling objective.

Juvenile salmonids of different runs enter and transit the Delta from different directions (e.g., via the Sacramento River, eastside tributaries, or the San Joaquin River) and at different times (e.g., fall, winter, or spring). Accordingly, the effectiveness of specific protection actions differs among these runs. For example, Sacramento basin salmonids are most vulnerable to entrainment into the interior Delta, where their survival is reduced compared to that of fish that remain in the mainstem river (DOI-EXH-08). Under some conditions (e.g., high export rates) survival of the young fish that remain in the river is double that of fish entrained into the interior Delta. Therefore, periodic closures of the DCC gates, timed to coincide with presence of migrating fish in the lower Sacramento River, Delta, and Chipps Island, represent an important protection action that provides known benefits to all four runs of Chinook salmon as well as Sacramento basin steelhead populations. In another example, both the survival of juvenile migrants and subsequent adult escapement (the most commonly used estimate of population size) of San Joaquin basin fall-run Chinook salmon is strongly related to San Joaquin River flows (at Vernalis) during the spring period when the juveniles migrate downstream to the ocean (NOAA-EXH-17, DFG-EXH-08, DFG-EXH-09, BAY-EXH-08, BAY-EXH-09). As a result, objectives for minimum flows in the lower San Joaquin River that correspond to the population levels needed to meet the doubling objective represent an important in-Delta protection action for this run.[1]

Converting the Narrative Objective to Numeric Objectives

The SWC are incorrect in their contention that no party participating in the workshops suggested converting the narrative salmon protection objective into one or more numeric objectives (SWC-EXH-04). Together with DOI (USFWS; DOI-EXH-22), the Bay Institute (TBI; BAY-EXH-01) suggested the SWRCB could easily adopt the quantitative doubling goals established by the USFWS Anadromous Fish Restoration Program (AFRP; DOI-EXH-16) for each Chinook salmon run and for each salmon-producing stream, as a complement to the overall narrative objective. Together with NMFS, we also suggested that progress

[1] In addition to providing suitable habitat conditions in the lower San Joaquin River for juvenile salmon (as well as resident estuarine species), minimum Vernalis flow objectives have the added benefit of driving the complementary "other measures in the watershed", in the form of improved tributary flows, recognized by the SWRCB to be necessary to achieve the doubling goal.

towards the objective be measured using some or all of the four "viable salmonid population" criteria developed by NMFS to assess the status and trends of Chinook salmon and (where possible) steelhead populations (BAY-EXH-01, NOAA-EXH-12, NOAA-EXH-13, NOAA-EXH-14). The SWC also argue that establishing quantitative doubling goals for each run and for each stream was not an appropriate approach for the SWRCB to take as part of this review of the Bay-Delta Plan and instead suggested that a single basin-wide population objective would be sufficient. Such an approach, by ignoring the ecological and genetic diversity of the salmonids that rely on the watershed, the different threats to their survival within the Delta, and the glaring differences in current population status among the runs (including ESA listings for two of the four Chinook salmon runs and Central Valley steelhead), is biologically meaningless and inconsistent with all ongoing species protection and fisheries management efforts within the watershed (e.g., ongoing AFRP activities, NMFS use of "viable salmonid population" criteria).

In addition to recommending adoption of quantitative population objectives, TBI and NMFS (NOAA-EXH-14) have recommended that specific numeric objectives for instream flow, water temperature, and Delta exports be established by the SWRCB and CVRWQCB for the purpose of achieving the doubling goal. Our proposed modifications to some of the Bay-Delta Plan's numeric objectives would fulfill this need in part. However, as we and others emphasized in our workshop presentations and written comments, and as the SWRCB has recognized in the current narrative objective, the in-Delta protections contained within the Bay-Delta Plan need to be augmented by additional measures in the upper watershed, including flow, temperature and water diversion criteria within the SWRCB's authority.

Doubling Objectives for Steelhead

State and federal fish management agencies and TBI recommended that the Bay-Delta Plan's salmon protection objective be amended to include Central Valley steelhead, whose populations continue to decline or, at best, are stable at critically low levels (DFG-EXH-02, NOAA -EXH-13, NOAA-EXH-14, BAY-EXH-01). The SWC have noted that few data are available on the current adult population size of the species. Absent the rich data available for Chinook salmon, establishing a quantitative adult population size or natural production objective, as we and other parties have suggested for Chinook salmon, is more challenging. Currently, steelhead adults and juveniles are monitored in some Central Valley streams and in the Delta. In order to establish quantitative population size and/or natural production objectives, we suggest that the SWRCB consult with

state and federal fishery agencies to identify what monitoring programs and evaluation approaches are needed to adequately assess the population status and trends of the species, and incorporate those findings into the Bay-Delta Plan's salmon protection objective. As reported by NMFS (NOAA-EXH-13, NOAA-EXH-17), although steelhead exhibit more complex life history strategies, their habitat and environmental requirements overlap with and are very similar to those of Chinook salmon. Therefore, numeric objectives for flow, water temperature, and exports established for Delta and upstream habitats for Chinook salmon, particularly those for spring-run Chinook salmon, may be sufficiently protective for steelhead as well.

b. Recommended language regarding the salmon protection objective:

i. The name of the salmon protection objective in Table 3 of the Bay-Delta Plan should be revised to read: "Salmon and Steelhead Protection". The text of the objective in Table 3 should be revised to read: "Water quality conditions in the Delta shall be maintained, along with water quality conditions and other measures in the watershed, sufficient to achieve a doubling of natural production of each run of Chinook salmon and steelhead on each salmonid-producing upstream tributary from the average production of 1967 – 1991, consistent with the provisions of state and federal law."

ii. A new footnote should be added at the end of this sentence in Table 3. This new footnote should consist of a table of doubling objectives for each salmonid run in each salmonid-producing stream based on the targets in the AFRP.

Workshop Topic 5: Delta outflow

a. Response to comments by other parties: The Delta's estuarine ecosystem is characterized by large between- and within-year variations in freshwater flows (inflow and outflow), driven by inter-annual and seasonal variations in precipitation and snowmelt. Life histories of the fish and invertebrate species native to the estuary are tied to these predictable variations in flow, which drive physical aspects of the estuary such as the influx of sediment and nutrients; trigger migration and movement within the estuary, spawning, and phyto- and zooplankton blooms that provide food for larval and juvenile forms; and provide large areas of low-salinity habitat where numerous estuarine and marine species

rear (Jassby et al, 2003; Kimmerer, 2002a, b, 2004). The greatest effect of water management operations has been to reduce the amounts and variability in flows to the estuary during the ecologically sensitive spring period,[2] factors that are known to correlate with population abundance and/or survival of numerous Delta fish and invertebrates species. The current Delta outflow objective is based on a reasonable, science-based approach to regulating minimum outflows in a manner that reflects and partially mimics the seasonal and inter-annual variations in springtime flows of the natural estuarine system, and serves in average to dry hydrologic conditions to provide a minimum level of protection to help prevent chronic depressed population levels and concomitant high risk of extinction. (It should be noted that no single component of the Bay-Delta Plan – even one as scientifically significant and critically important as the Delta outflow objective – can be expected in and of itself to ensure full protection of the fish and wildlife and estuarine habitat beneficial uses of the estuary).

Scientific Basis of the Delta Outflow Objective Remains Strong
Contrary to the contention of the SWC (SCW-EXH-06, slide 13), the observed relationships between the survival and/or abundance of numerous fish and invertebrate species with springtime X2 location have not weakened, despite massive changes in the upper estuary's food web (EPA-EXH-02, EPA-EXH-03). This error, as well as the SWC's failure to consider the significant relationship between juvenile delta smelt populations (as measured by the California Department of Fish and Game [CDFG] summer townet survey) and springtime X2 (published in Kimmerer, [2002a], and reported to the SWRCB in DOI-EXH-23), is likely the result of their reliance on out-of-date literature and non-peer-reviewed analyses, rather than the recently published reviews of the Delta estuarine dynamics and X2 relationships by Kimmerer (2002a, b, 2004).

The SWC also suggest that, because the specific multi-month period for which an average X2 location was calculated (e.g., February – May v March – June), and the specific population abundance and/or survival indices with which they correlated, differ among X2-related species, therefore the use of the February - June period to implement the objective is too coarse. The SWC's assertion is not justified for several reasons. First, the comment is simply not valid. For a number of the X2-related species, significant correlations exist between several multi-month periods and their abundance, suggesting that springtime flows from the Delta are a strong driver for the population dynamics of these estuarine species.

[2] The springtime period used in the Delta outflow objective, February-June, was identified on the basis of both hydrology and biology.

For example, longfin smelt abundance is significantly correlated with average X2 for January – June, March – May, and April – June (note that not all combinations of months were tested, but those listed here bracket the February-June period used in the Delta Outflow objective). In another example, Bay shrimp abundance is significantly correlated with January – April, March – May, and February - May. Second, the SWC apparently do not understand the purpose of the Delta outflow objective, which was specifically designed to provide broad ecosystem protection for the dynamic estuarine habitat, not simply to protect a few or specific individual fish species. Delta outflow affects multiple aspects of the estuarine ecosystem, including the location and quantity of different physical habitat types (e.g., "low-salinity" habitat known to be important to many Delta species), sediment and nutrient transport and dispersal, water quality (including effects of contaminants), larval transport and dispersal, and environmental conditions that trigger and cue migration and spawning (EPA-EXH-03; Kimmerer, 2002b, 2004). All of these ecological features, acting singly and in combination, likely contribute to the statistically significant fish – X2 relationships. The aquatic species for which these correlations have been established serve as a set of surrogates for the broader array of organisms and communities that are affected by Delta outflow. Any variation that may exist in the specific timing of the documented fish – X2 relationships is a clear indication of the complexity of the estuarine ecosystem and the multiple mechanisms that have been shown or are hypothesized to drive the X2 relationships.

Based on these misunderstandings of the Delta outflow objective, the SWC assert that, given the five-month period over which the objective is implemented, modifying or "flexing" the objective such that the average X2 shifts a short distance upstream of its presently required position would have negligible effects. However, their own documents (SWC-EXH-06) do not bear this conclusion out, citing a >2% population decrease for longfin smelt for a year in which springtime X2 was hypothetically shifted just 0.05 km upstream.[3] This is by no means a trivial impact, and a particularly troubling one given the recent decline in pelagic fish species populations in the Delta. Larger-scale upstream movements of X2, as a result of the cumulative effects of the proposed

[3] The source of the data used by the SWC for their analyses of the effects of changes in average X2 position on longfin smelt abundance is not specified (SWC-EXH-06, slide 27), but neither the data nor the results appear to agree with those used by Kimmerer (2002a) and provided to C. Swanson by the author. For example, according to Kimmerer's data and using the January-June period for averaging X2 cited in SWC-EXH-07, an average springtime X2 location of 64.4 corresponds to a longfin smelt abundance index of 4066, not 2281.

relaxations, increased export pumping, and/or increased upstream diversions, could be catastrophic. For instance, using the X2 - population abundance relationship published by Kimmerer (2002a), it can be estimated that an upstream movement of 1 km (e.g., from 65 to 66 km), would result in a 12% population decrease for longfin smelt, dramatically increasing the risk of extinction for this species that is already at a critically low population level. For this species, as well as for all others for which an X2 – abundance relationship has been observed, any modification or relaxation of the present Delta outflow objective that results in even a modest upstream shift in springtime X2 will result in a predictable and potentially significant population decline.

"Flexing" the Delta Outflow Objective is Not Warranted
A number of parties, including DOI (DOI-EXH-23, DOI-EXH-24), DWR (DWR-EXH-15), and the SWC (SWC-EXH-07), have suggested that compliance with the Delta outflow objective periodically requires abrupt releases of large amounts of water from upstream reservoirs that have caused adverse impacts on upstream in-river habitat (e.g., large flow fluctuations killed eggs and juveniles of Chinook salmon and steelhead, and/or reduce availability of cold water for temperature control releases later in the year). This contention is based on events that occurred during February 2003 and April 2004. These parties recommend that under these types of conditions they be allowed to "flex", or relax, the Delta outflow objective in order to avoid the adverse upstream impacts that were observed in these two years. At the same time, TBI, the Sacramento Water Forum, and other parties presented evidence that operational decisions by the U.S. Bureau of Reclamation (USBR) and Department of Water Resources (DWR) were responsible for creating the perceived conflict between meeting the Delta outflow objective and avoiding adverse impacts to American River fishes, and that using alternative operational protocols could have prevented the problem from occurring. We also raised concerns that the flexibility requested by the parties was not only unnecessary, but also dangerously open-ended.

In January 2005, following extensive analyses and discussions at the request of the CALFED Operations Group, the CALFED Operations and Fisheries Forum provided the Ops Group with a draft "Port Chicago Compliance Decision Tree" (attached as Appendix B).[4] In contrast to the vague and open-ended

[4] The CALFED Operations and Fisheries Forum (OFF) is an inter-agency and stakeholder group periodically convened to review fishery protection and water management operations and to make recommendations to the CALFED Operations Groups regarding these issues. The CALFED Operations Group was established by the Framework Agreement.

recommendations for flexibility made at the workshops, the draft decision tree identifies specific triggers and sideboards for operational and fishery management actions, with priority given to actions that would avoid or minimize the need to "flex" the Delta outflow objective. The straw proposal limits releases from Nimbus Dam to 4000 cfs (rather than the typical maximum of 8000 cfs) consistent with Sacramento Water Forum recommendations (WF-EXH-01). It proposes that (a) operational decisions regarding compliance with the Delta outflow objective be made earlier each month to avoid last minute decisions which limit flexibility and increase the chance of an upstream impact; (b) alternative operations of other upstream reservoirs and/or Delta export pumps be employed more often to avoid the need for higher American River releases; and (c) if alternative operations were not possible, and if American River releases needed to be limited by the proposed 4,000 cfs cap in order to avoid fishery impacts, the water project agencies be allowed to meet the Port Chicago X2 with a 3-day average Delta outflow of 25,000 cfs instead of the presently required 29,200 cfs, in effect limiting the modification to meet the 4,000 cfs cap. The straw proposal would then require that additional days of 25,000 cfs flow be met to ensure the same total volume of Delta outflow, in order to ensure the overall level of Delta fisheries protection was not reduced (although the greater abundance associated with downstream movement of X2 is not likely to be fully mitigated by a longer duration of X2 at an upstream location). This draft decision tree was never finalized by the OFF.

Following the SWRCB Delta outflow workshops, the water project and fishery management agencies, along with a number of water user and environmental stakeholder representatives, organized a computer-model "gaming" exercise to quantitatively test alternative water management operations during the February 2003 and April 2004 periods. The approach agreed upon by the group was to modify reservoir releases (compared to actual historical operations) to avoid the large releases and flow fluctuations identified by the fishery agencies as harmful to anadromous fishes present in upstream river habitat at the time (e.g., American River flows>4000 cfs) and to determine how those modified operations affected compliance with the Delta outflow objective, total Delta outflow, and average February-June X2. The gaming exercise results show that the large reservoir releases made on the American River were unnecessary in each of the two years and that the Delta outflow objective (i.e., Port Chicago flows of 29,200 cfs for the specified numbers of days) would have been fully met using alternative operational scenarios, even had Nimbus Dam releases been capped at

the 4000 cfs level desired by the fishery agencies. (See Attachment C, an email memorandum prepared by David Fullerton, Metropolitan Water District, summarizing the gaming exercises). The results of these preliminary gaming exercises clearly demonstrate that there is no need to allow flexibility in complying with the Delta outflow objective, and that the existing process for securing a Temporary Urgency Change is sufficient to deal with outlier events. For all the reasons stated above, TBI opposes changing the Delta outflow objective to incorporate this flexibility. The work done by the OFF in preparing the draft decision tree also underscores the fact that a highly detailed operating plan, or decision tree, with clearly understood constraints, and explicitly designed to avoid or minimize the need for flexibility, can and must be developed as the basis for future SWRCB approval of any TUC requests to "flex" as a result of outlier events that may cause unavoidable, unacceptable upstream impacts.

Use of the Port Chicago EC Trigger Reduces Protection Afforded by the Delta Outflow Objective

In our earlier comments on the Delta outflow objectives (BAY-EXH-04 and BAY-EXH-05), we recommended that the SWRCB eliminate the requirement that Port Chicago 14-day average EC be less than or equal to 2.64 mmhos/cm in order to trigger the requirement for Port Chicago flows for February and March. This recommendation was based on our analyses of Water Year 2002, a year in which the Port Chicago Island EC trigger eliminated the requirements for the high Port Chicago flows (29,200 cfs) despite upstream hydrologic conditions (i.e., the previous month's 8 River Index) that specified those flows for a total of 44 days in four of the five springtime months: in 2002 the Port Chicago EC trigger requirement effectively "flatlined" Delta outflows at the intermediate Chipps Island flow level (11,400cfs). The resultant reduced Delta outflow shifted <u>average</u> February – June X2 nearly 2 km upstream of the location predicted on the basis of upstream hydrologic conditions, and provided ecologically "poor" estuarine conditions (based on X2-abundance relationships for multiple fish and invertebrate species for X2>73 km, see BAY-EXH-05, slide 12). The upstream shift in X2 during the first two months of the spring period was even more severe: in February, the failure to trigger the Port Chicago objective caused X2 to shift 5.1 km upstream, from an estimated monthly average of 67.2 km to the actual monthly average of 72.3 km, and in March, X2 shifted 3.9 km, from an estimated 67.7 km to the actual X2 location of 71.6 (see BAY-EXH-04, Table 2). Within-year variation in Delta outflow, an important component of springtime flow conditions and an explicit design feature of the Delta Outflow objective, was reduced by half. It is worth noting that the population abundances measured

later in the year for of a number of key estuarine species, including delta smelt, were markedly lower (see BAY-EXH-09, slide 18). Using data and analyses from Kimmerer (2002a), the 1.7 km upstream shift in average February - June 2002 X2 corresponds to a predicted 20% decrease in longfin smelt population abundance, a 10% decline in Bay shrimp populations, and 8% declines for Pacific herring and starry flounder.

Several parties criticized our comments regarding the EC trigger at the workshops, asserting that we had confused "normal" variation in the location of X2 with the X2 – abundance relationships based on average X2 location throughout the February – June period. These comments are quite simply wrong. As our previous submissions and the preceding paragraph make clear, the impacts of using the current EC trigger result in significant changes in average X2 location over several long term timeframes, including monthy, multiple-month periods, and the entire February – June period.

b. Recommended language regarding the Delta outflow objective:

i. Footnote [d] of Table A (a continuation of Footnote 14 to Table 3) should be revised to read: "This standard applies in the April through June period only when the average EC at Port Chicago during the fourteen days immediately prior to the first day of the month is less than or equal to 2.64 mmhos/cm."
ii. Table A should also be adjusted so that the number of days when maximum daily average electrical conductivity of 2.64 mmhos/cm must be maintained at the specified location equals the number of days that X2 would have occurred at these locations assuming an average 1956 – 1968 Level of Development.

Workshop Topic 6: Export limits

a. Response to comments by other parties: In their comments on this topic, San Luis Delta Mendota Water Authority (SLDMWA; SLDM-EXH-05) suggest that the current export limit objective be effectively eliminated, recommending that "variations to the maximum exports rates be authorized and … considered whenever … maximum exports", as defined by the current objective, control Delta water management operations. This surprising recommendation is based

on the contention that SLDMWA's own (non-peer-reviewed and unpublished) analyses were unable to detect statistically significant incremental negative impacts of this type of action on two individual fish species (Chinook salmon and delta smelt). SLDMWA argues that a new standard should be applied to proposals to "flex" (or waive) current water quality objectives, specifically, calculating "percent change in population of affected life stage" (PCPALF) that would result from the action, and proposes that the waivers be granted automatically unless substantial negative impacts are disclosed by an exhaustive evaluative process to be conducted by the CALFED Operations Group and the SWRCB. SLDMWA's recommendation appears to be based not only by over-reliance on a speculative tool but on a misunderstanding of both the purpose of the export limits objective and its current implementation, which already allows for periodic flexing of the export/inflow ratio (E/I ratio) at the discretion of fishery and water project agencies.

Like the Delta outflow and Sacramento and San Joaquin river flow objectives, the export limit objective is intended to broadly protect estuarine habitat by seasonally limiting the physical and biological impacts of exports in relation to Delta inflows (and/or San Joaquin River flows at certain times of the year) (e.g., see DFG-EXH-05, page 4). The objective was not developed on the basis of the effects of export rates on individual species (although such effects have been clearly demonstrated, see DOI-EXH-20, slides 16-17; Bay-EXH-07A, slide 10) but rather to regulate the effects of exports on estuarine habitat, in-Delta hydrodynamics, and residence times, transport, dispersal, movement and direct entrainment of nutrients, plankton, eggs, larvae, and fishes at the Delta pumps.

Like all of the Bay-Delta Plan objectives, the inflow-related export limits represent a minimal level of protection for fish and wildlife beneficial uses in the estuary. However, for this objective, the SWRCB already allows substantial flexibility. At present, with the concurrence of the fish management agencies, the E/I ratio can be flexed to allow higher export rates for the purpose of acquiring water for environmental purposes (e.g., the Environmental Water Account). It is also worth noting that, after several years in which the E/I ratio has been flexed during the spring to acquire EWA water, CDFG is now expressing concern that this action may have adverse effects on juvenile delta smelt (DFG-EXH-04, page 1-2).

While we are sympathetic to the approach suggested by SLDMWA for assessing the effects of various fish protection or water management actions (e.g., closure

of the DCC gates, flexing the E/I ratio) in terms of population-level change in abundance, the PCPALF model is simplistic and simply inadequate for this purpose. In addition, the data presently available to us, while suitable for evaluating effects of variables such as export rates over wide ranges of tested levels (e.g., 3000 cfs v 12,000 cfs), lack the resolution and precision needed to develop quantitative models that can meaningfully calculate the incremental effects of small, short duration changes in a factor such as the E/I ratio, particularly for long-lived species such as Chinook salmon.

Most of the other analyses presented by SLDMWA (SLDM-EXH-05, SLDM-EXH-06) are also deeply flawed and uninformative for either evaluating the efficacy of the current objective or for supporting the revisions proposed by the party. For example, SLDM-EXH-06 (slides 5-10) relates the abundance of juvenile delta smelt in the southern Delta measured from survey results with salvage of delta smelt at the pumps and concludes that, because abundance of the fish is relatively lower during the period when delta smelt salvage is high, most of the fish have left the area and are no longer vulnerable to the pumps. This analysis fails to consider that delta smelt smaller than 20 mm in length, the size of the fish during the March - April period, are regularly taken at the pumps in large numbers but are <u>not</u> counted as salvage. It is more likely that the decline in abundance of delta smelt in the southern delta reported by the survey results reflects uncounted loss of these small fish at the pumps (a conclusion supported by numerous particle tracking modeling studies conducted by state and federal agencies).

b. <u>Recommended language regarding the export limit objective</u>:

i. The time periods and values for the maximum 3-day running average export limits in Table 3 of the Bay-Delta Plan should be revised to read:

"March 15 – 31	200% Vernalis flow [22]
April 1 – 14	100% Vernalis flow [22]
April 15 – May 15 [21]	[22]
May 16 – 31	100% Vernalis flow [22]
June 1 – 15	200% Vernalis flow" [22]

ii. Revise the first sentence of Footnote 22 to Table 3 to read: "Maximum export rate from April 15 to May 15 is 1,500 cfs, 2,250 cfs, or 3,000 cfs, as determined by the San Joaquin River Technical and Management Committees and presented to the executive director of the SWRCB. If the executive director does not object to the export limits within 10

days, the export limits will go into effect." Revise the second and third sentences to read: "The March 15 – June 15 export restrictions do not supercede the export restriction of 35% of Delta inflow. The more restrictive of these two objectives applies from March 15 to June 15."

Workshop Topic 7: Rio Vista flows

At the workshops, several parties requested that the Bay-Delta Plan's objective for Sacramento River flows at Rio Vista be modified to allow for flexible implementation. None of these parties presented any evidence of any problems associated with compliance with the Rio Vista flow objective or made any suggestions regarding criteria for and use of flexible implementation. The benefits for fish and wildlife beneficial uses of the Rio Vista flow objective in providing attraction and transport flows and suitable habitat for various life stages of aquatic organisms, including delta smelt and Chinook salmon, were not disputed by any party. The minimal level of protection afforded by this objective is particularly important given that there are no flow objectives for the San Joaquin River in place during the September – December period (except for October). Flexing the Rio Vista flow objective, especially when exports are near, at or exceed (as a result of flexing) the E/I ratio during this period, could result in significant adverse impacts to fish and habitat conditions in the Delta. For these reasons, the Bay-Delta Plan's current objective for Sacramento River flow at Rio Vista should not be modified.

Workshop Topic 8: San Joaquin River flows at Airport Bridge, February – April 14 and May 16 – June 30

a. Response to comments by other parties: In their comments on this issue (SJRG-EXH-19), the San Joaquin River Group asserts that the current objectives should be eliminated because they are not based on "sound science". In fact, the extensive record shows that these objectives were developed as a compromise between the science-based, water year type-dependent flow recommendations developed by the AFRP (DOI-EXH-16) for the protection of juvenile San Joaquin basin Chinook salmon and steelhead, the science-based, water year type-dependent flow requirements contained in the 1995 Biological Opinion for protection of delta smelt and its critical habitat (USFWS, 1995), scientific and management considerations regarding the relative contributions of the two river

basins to total Delta inflow, and the need for adequate San Joaquin River flows to help improve and maintain overall water quality conditions (such as dissolved oxygen) in the San Joaquin River at Stockton. The objectives represent a reasonable attempt to balance the scientific information available at the time with the needs of multiple beneficial uses of water in this portion of the watershed.

Putting aside for a moment the issue of the scientific underpinnings of the current objective, in their comments the SJRG present little relevant information or analyses of the responses of juvenile Chinook salmon, steelhead, delta smelt or estuarine habitat conditions to those objectives or recent San Joaquin River flows. The lack of current data on San Joaquin basin Chinook salmon populations, which are known to be strongly responsive to flows during the juvenile outmigration period, is particularly puzzling. Instead the SJRG's comments rely on limited, minimally informative studies of smolt travel times (an unlikely driver for improved smolt survival), and incomplete results from the Vernalis Adaptive Management Plan studies (which do not occur during the period for which this objective applies). No useful analyses of the effects of Vernalis flows on estuarine habitat conditions are presented. Finally, the SJRG recommend an alternative set of Vernalis flow objectives that itself has no basis in science, fails to consider any aspect of the fish and wildlife beneficial uses that are the explicit purpose of the objective, and that is in fact derived from modeling conducted using CALSIM II, a water management and delivery optimization tool that incorporates no information or mechanisms for evaluating or predicting biological and habitat responses to flow.

In contrast to the comments provided by the SJRG, a number of workshop participants presented up-to-date information on the status of San Joaquin basin salmonids, delta smelt, and estuarine habitat conditions, and quantitatively related these data to Vernalis flows (DFG-EXH-08, DFG-EXH-09, NOAA-EXH-17, BAY-EXH-08, and BAY-EXH-09). All of these materials and analyses indicate that the current flow objectives do not provide adequate fish and estuarine habitat protection. In particular, the current Vernalis flow objectives are insufficient to support the doubling of San Joaquin basin Chinook salmon populations. On the basis of these analyses, NMFS, CDFG and TBI all concluded that the SWRCB should consider revising the present Vernalis flow objective to require higher flows during the February-April 14 and May 16 – June 30 periods.

b. Recommended language regarding the San Joaquin River flow objective: The specific flow rates and time periods for the San Joaquin River at Airport Way

Bridge, Vernalis, during the February – April 14 and May 16 – June periods should be revised to read:

"W, AN	Feb	3,240
BN,D	Feb	2,280
C	Feb	1,500
W,AN	Mar	5,000
BN	Mar	3.240
D	Mar	2,280
C	Mar	1,500
W	April 1 – 14	7,000
AN,BN,D	April 1 – 14	5,000
C	April 1 – 14	2,000
W	May 16 – 31	7,000
AN,BN	May 16 – 31	5,000
D	May 16 – 31	3,240
C	May 16 – 31	2,000
W,AN	June	5,000
BN	June	3,240
D	June	2,280
C	June	1,500"

Workshop Topic 11: Program of implementation

Chapter IV of the Bay-Delta Plan should be extensively revised to address implementation of any changes to the Plan objectives as well as reflect changes in management of Bay-Delta resources since 1995. The SWRCB should particularly note the recent decline in pelagic fish populations in the Delta, which appears to be the result of the cumulative impacts on the Delta food web from increased export pumping, toxics loading, and invasive species introductions. This decline underscores the need for the SWRCB to adopt more stringent flow and diversion requirements to protect estuarine habitat and fish and wildlife, and to work with other agencies to further reduce toxics loading and address invasive species impacts. In this regard, it should also be noted that implementing the CALFED Record of Decision's (ROD) targets for increasing Delta export pumping (primarily by implementing the South Delta Improvement Project) and increasing average south of Delta deliveries will exacerbate these current conditions and cause further adverse impacts to both pelagic resident species and anadromous migrants.

Section A. Implementation measures within SWRCB authority over water diversion and use: The SWRCB should initiate a new proceeding to amend water rights, and consider using its Clean Water Act Section 401 certification authority to ensure compliance with TBI's proposed changes to the objectives for DCC gates closure, salmon protection, Delta outflow, export limits, and San Joaquin River flows at Vernalis. (Because implementation of the narrative salmon objective is likely to also include flow, temperature and water diversion measures to be taken by water rights holders in upstream tributaries, the SWRCB may choose to convene separate proceedings to address implementation of this specific objective, although separate proceedings may not be strictly necessary). In addition, under its water rights permitting authority and public trust authority the SWRCB should specifically revisit the permit conditions for Red Bluff Diversion Dam, to determine what changes to this facility's operations are necessary to avoid its current large-scale effects on salmon migration, and for the Delta pumping plants of the Central Valley Project (CVP) and State Water Project (SWP), to determine the appropriate timeline and criteria for upgrading the efficacy of the fish protective facilities at the two plants.

Section B. Implementation measures requiring SWRCB water quality and water rights authority and multi-agency cooperation:

Narrative objective for salmon protection: Many of the implementation measures necessary to achieve this objective (e.g., flow, temperature and water diversion) fall completely within the SWRCB's authority over water diversion and use. However, this objective should also be addressed in Section B to the extent that implementing other measures (i.e., physical habitat restoration, pollutant control) relies on cooperation with other agencies (including the CVRWQCB). In any case, the Bay-Delta Plan should be updated to reflect the status of current implementation efforts to double anadromous fish populations. While numerous projects to improve physical habitat and remove barriers to fish passage in tributary areas have been initiated or completed, efforts to improve flow conditions have been largely unsuccessful. The Central Valley Project Improvement Act of 1992 dedicated 800,000 acre-feet of project yield to fish, wildlife and habitat restoration, including the priority goal of anadromous fish doubling [under Section 3406(b)(2)], and provided for supplemental water acquisitions to help meet these purposes [under Section 3406(b)(3)]. The amount of (b)(2) water allocated by the Department of the Interior (DOI) for these purposes has been far less than that assumed by the CALFED ROD to be part of the regulatory baseline (ROD, p. 56), and is inconsistent with the hierarchy of purposes established by the Act and affirmed by the U.S. Ninth Circuit Court of Appeals in its June 2003 and January 2004 rulings. For instance, in WY 2003 only 26% of (b)(2) water was used for fish restoration purposes, whereas 51% was used to meet the CVP's existing permit obligations in the Delta, and 23% for additional Delta export reductions (TBI, 2004). In addition, (b)(3) water has not been used to improve flow conditions as identified by the CVPIA Anadromous Fish Restoration Program. Instead, funds for the (b)(3) program have been used mostly to acquire south of Delta wildlife refuge water supplies or subsidize DOI's purchase of San Joaquin River flows pursuant to the San Joaquin River Agreement, which was not intended to double anadromous fish populations but was solely designed to assist DOI in meeting its water right permit obligations for complying with the San Joaquin River flow objective at Vernalis. Furthermore, not one drop has yet been acquired toward meeting the CALFED ROD commitment to purchase up to 100,000 acre-feet per year to improve salmon spawning and juvenile survival in upstream tributaries (ROD, p. 36), and the source and amount of future funding for this and other elements of the CALFED Ecosystem Restoration Program are highly uncertain. Finally, the USFWS, NMFS, and CDFG, in assessing progress toward achieving milestones under the CALFED ROD and the Conservation Agreement Regarding the Multi-species Conservation Strategy, found that insufficient progress had been made

toward addressing inadequate flows for salmonids on San Joaquin River and eastside Delta tributaries, securing supplemental Delta outflow pulse flows, and improving fish passage and screening diversions in the Delta, Suisun Marsh and the Sacramento River basin (USFWS et al., 2004).

Out of valley disposal of salts: The 1995 Plan states that "it will be necessary for the in-basin management of salts to be supplemented by the disposal of salts outside of the San Joaquin valley" and that "the USBR should re-evaluate alternatives for completing a drain to discharge salts from agricultural drainage outside of the San Joaquin Valley and pursue appropriate permits" (p. 33). However, the recently released San Luis Drainage Feature Re-evaluation Draft EIS prepared by USBR includes viable alternatives which solely rely on in-valley treatment and source control and which are clearly the most environmentally protective and economically cost-effective approaches to managing salts in the San Joaquin Valley. For more information on long-term in-valley salt management options, see TBI et al., 2003.

Section C. Recommendations to improve habitat conditions:

While progress has been made on a number of actions specified in the 1995 Plan's Program of Implementation, several, including those that directly relate to the SWRCB's authority over water diversion and use, have not been adequately implemented, are behind schedule, and/or are being effectively reversed by changes in water management operations.

Reduce losses of all life stages of fishes at unscreened water diversions: While performance criteria for fish screens affecting different species and in different habitats (e.g., Chinook salmon v delta smelt) have been developed, and a number of the larger diversions were screened during the past decade, thousands of diversions in the watershed and Delta remain unscreened and unmonitored. Evaluations to test whether diversions have an unreasonable effect on fishes and to estimate the overall population level impacts of entrainment losses locally and throughout the system have not been conducted and, lacking these data, further screening activities have apparently been delayed or abandoned.

Reduce entrainment by, and improve fish survival at, the SWP and CVP export facilities: Fish protection facilities at the CVP and SWP pumping plants are known to be inadequate and deteriorating. In fact, the CVP fish protective facility can no longer be operated to meet its original design criteria, much less fish screen criteria now known to be necessary to protect delicate Delta species like delta smelt. However, plans to replace and/or renovate the facilities have been indefinitely delayed. An alternative strategy to reduce entrainment losses at these facilities, the Environmental Water Account (EWA), has been implemented for the past five years but it has been consistently under-funded and inadequately sized, and future funding for its continuation is not secure. The SWRCB should reject any proposals to increase pumping above currently allowed levels until the fish protective facilities have been upgraded to, at a minimum, comply with currently required performance criteria.

Evaluate the effectiveness of barriers as a means of improving fish survival in the Delta: Understanding of the effects of DCC gate operations (and to a lesser extent, the Head of Old River Barrier and Suisun Marsh salinity control gate) on movements and survival of anadromous fishes migrating through the Delta has improved substantially. The SWRCB should incorporate findings of these various studies into their consideration of the current water quality objectives for operations of these barriers, as we have suggested in our proposed revisions to the DCC gates closure objective.

Reduce impacts of introduced species on native species in the estuary: The negative impacts of introduced plant and animals species on the Delta appear to have increased during the past ten years. The SWRCB should require that state and federal fish management and water project agencies renew and increase their efforts to (a) identify environmental and biological factors that favor non-natives species in the estuary; (b) develop plans to reduce new introductions and reverse the spread of non-native species within the estuary; and (c) identify and implement actions that will reduce populations and /or negative impacts of non-natives species on Delta habitats and species.

Minimize losses of salmon and steelhead due to flow fluctuations: Upstream water management operations continue to have adverse impacts on anadromous fishes in most rivers throughout the watershed. Poorly planned water management operations in 2003 and 2004 that harmed fish in the American River are only the most recent example (see BAY-EXH-04, BAY-EXH-05, and our comments on "flexing" the Delta outflow objective above).

Implement temperature control measures to reduce adverse impacts on salmon and steelhead: After expending tens of millions of dollars on a temperature control device at Shasta Reservoir and implementing operational measures to provide cool water temperatures for endangered winter-run Chinook salmon, actions that are credited with contributing to improved survival and increased populations, the USBR has proposed to reduce these protections in their future operations (DOI-EXH-10). Planned future operations for river releases and carryover storage management are predicted to exceed tolerable temperatures (as well as current SWRCB water quality objectives for the upper Sacramento River) much more frequently than in the past, an action that NMFS reports will adversely affect all anadromous fishes that use this habitat during the affected times. The SWRCB should closely review state and federal plans for future upstream water management activities and, using its authority, enforce existing and/or establish new water quality objectives to protect anadromous fishes in these upstream habitats.

Thank you for considering these supplemental and response comments regarding periodic review of the Bay-Delta Plan. Please contact us if you have any questions regarding these comments.

Sincerely,

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Enc: Attachment A (Track-changes version of Bay-Delta Plan objectives)
Attachment B (Draft OFF Port Chicago Decision Tree)
Attachment C (Gaming Results Memo, David Fullerton, MWD)

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