

1 JON D. RUBIN, State Bar No. 196944
2 KRONICK, MOSKOVITZ, TIEDEMANN & GIRARD
3 A Professional Corporation
4 400 Capitol Mall, 27th Floor
5 Sacramento, CA 95814-4416
6 Telephone: (916) 321-4500
7 Facsimile: (916) 321-4555

8 Attorneys for San Luis & Delta-Mendota Water
9 Authority

10
11 BEFORE THE
12 STATE WATER RESOURCES CONTROL BOARD
13

14
15 PERIODIC REVIEW OF THE 1995 WATER
16 QUALITY CONTROL PLAN FOR THE
17 SAN FRANCISCO BAY/ SACRAMENTO-
18 SAN JOAQUIN DELTA ESTUARY

19 Memorandum Supplementing Information And
20 Providing Additional Comments On The Delta
21 Cross Channel Gates Operations and Salmon
22 Protection Objective

23 Pursuant to the Revised Notice Public Workshop, issued by the State Water Resources
24 Control Board (Water Board) on September 17, 2004 (Revised Notice), the San Luis & Delta-
25 Mendota Water Authority (Authority) submit this memorandum. It is intended to summarize and
26 supplement the information presented by the Authority to the Water Board at the workshop
27 regarding review of the 1995 Water Quality Control Plan (1995 WQCP) for the San Francisco
28 Bay/Sacramento-San Joaquin Delta Estuary and provide final comments on (1) the Delta Cross
Channel Gates Closure Objective, and (2) the Salmon Protection Objective. The Revised Notice
presented the issues as follows:

Delta Cross Channel Gate Closure

Is new information available regarding the effects of operation of the Delta Cross
Channel gates?

Should the [Water Board] amend the Delta Cross Channel Gates Closure Objective
in the Water Quality Objectives for Fish and Wildlife Beneficial Uses (Table 3 of
the 1995 Plan)?

1 How should the objective be modified and what are the scientific and legal
2 arguments in support of and against such modifications?

3 **Salmon Protection Objective**

4 Should the Water Board amend the narrative Salmon Protection Objective in the
5 Water Quality Objectives for Fish and Wildlife Beneficial Uses (Table 3 of the
6 1995 Plan)?

7 How should the value or description be modified and what are the scientific and
8 legal arguments in support of and against such modifications?

9 Revised Notice, at p. 3. This memorandum supports the following two responses to those
10 questions:

11 First, there is new information available regarding the effects of operation of the Delta
12 Cross Channel gates. That information indicates that closing the Delta Cross Channel,
13 particularly if the inquiry focuses on closure for an additional 15 day during the November 1
14 through January 31 period, has small, uncertain effects on smolt survival and salmon populations.
15 The information also indicated that the closures could cause, under certain conditions,
16 unquestioned, serious, adverse impacts to water quality and/or water supply. That information
17 thus supports a finding by the Water Board that the Delta Cross Channel gates should not be
18 closed for an additional 15 day during the November 1 through January 31 period, if the closure
19 would create adverse water quality or water supply impacts; but that, otherwise, closure of the
20 Delta Cross Channel gates could occur when necessary to prevent flooding in the Mokelumne
21 River or when believed the closure could benefit outmigrating populations of salmon.

22 Second, information that is now available supports a finding by the Water Board that no
23 change in the Salmon Protection Objective (Water Quality Objectives for Fish and Wildlife
24 Beneficial Uses, Table 3 of the 1995 Plan) be made, as the existing Objective has facilitated and
25 will continue to facilitate the recovery of salmon. However, if the Water Board seeks to amend
26 the Salmon Protection Objective, the amendment should be limited to one that recognizes the fact
27 that achievement of the objective is dependent on actions outside of the Delta and that actions in
28 the Delta appear not to be as important.

///

The memorandum is organized as follows:

1			
2	I.	Summary Of Information Presented By The Authority.....	4
3	A.	Delta Cross Channel Gates Closure Objective.....	4
4	1.	Operation And Maintenance Of The Delta Cross Channel Gates.....	4
5	2.	Risk To Water Quality And Water Supply From Changes In Operations..	5
6	3.	Prior Studies On Changed Operations Or Structure.....	6
7	a.	Operated Based On Tidal Fluctuations.....	6
8	b.	Fish Barrier For The Cross Channel.....	7
9	B.	Salmon Protection Objective.....	7
10	II	Supplemental Information And Additional Comments Of The Authority.....	9
11	A.	Delta Cross Channel Gates Closure Objective.....	9
12	1.	Issue Before The Water Board.....	9
13	2.	Science Does Not Support A Finding That Increased Days Of Closure Would Increase Smolt Survival.....	10
14	3.	A Factor In Any Decision To Change The Delta Cross Channel Gate Objective Should Be The Effect Of The Change On Population Levels..	12
15	a.	Background.....	12
16	b.	The General Method Of Estimating Population Level Effects.....	12
17	4.	Science, Albeit Uncertain At This Time, Suggests That Increased Days Of Closure Would Not Increase Salmon Population.....	14
18	5.	Even If Science Supported A Need For Additional Closures, Above That Which Has Occurred Historically, Those Days Are Available Under the Existing Objective.....	16
19	6.	Even If Science Did Support Increasing Days Of Closure, The Gates Could Be Closed Under Authority Accorded By The Central Valley Project Improvement Act And/Or The CALFED Program.....	17
20	7.	Before The Water Board Were To Amend The Delta Cross Channel Objective, It Must Consider The Potential Benefits And Harms That Could Be Caused To All Beneficial Uses Of The Water Involved.....	18
21	8.	The Authority Is Concerned With The Capability Of The Delta Cross Channel Gates To Operate Remotely Or More Frequently Consider.....	19
22	a.	Public Safety Concerns.....	19
23	b.	Structural Integrity Concerns.....	19
24	B.	Salmon Protection Objective.....	20
25	III.	Conclusion.....	21
26			
27			
28			

1 **I. Summary Of Information Presented By The Authority**

2 A. Delta Cross Channel Gates Closure Objective

3 1. **Operation And Maintenance Of The Delta Cross Channel Gates**

4 At the workshop, Frances Mizuno, the Authority's Assistant Executive Director, provided
5 a description of the physical construct and operational limitations of the Delta Cross Channel
6 gates. Ms. Mizuno explained that the Authority is responsible for the operation and maintenance
7 of the Delta Cross Channel facility, pursuant to a service contract with the United States Bureau
8 of Reclamation (Reclamation). As currently configured, the Delta Cross Channel facility is
9 comprised of two gates, each measuring 60 feet wide by 30 feet tall, each weighing approximately
10 100 tons, and each requiring manual operation from a control panel located on the structure.

11 Currently, when operation of the gates is required, Reclamation's Central Valley
12 Operations Office notifies the Authority by electronic mail or telephone of the date and time the
13 gates need to be operated. Typically, one-day advance notice is provided, unless an emergency
14 requires immediate operation. Upon notification of a need for gate operation, because the Delta
15 Cross Channel gates are located in a navigable body of water, the Authority staff and the Central
16 Valley Operations Office immediately provide local organizations (i.e. marinas, water districts
17 and law enforcement agencies) with notice of and schedule for the operation. The operator is
18 dispatched from the Tracy Field Office approximately 1.5 hours prior to the gate operation. That
19 provides the operator, who is located in Tracy, California, sufficient travel time to the Delta Cross
20 Channel, located along the Sacramento River near the City of Walnut Grove, California.

21 Upon arrival, the operator initiates the Delta Cross Channel gates operation procedures by
22 sounding the horn for 30 seconds to warn nearby boaters and fisherman of the intent to operate the
23 gates. During a mandatory 20 minute waiting period after the sounding of the horn, the operator
24 reads and records the upstream (West) and downstream (East) water level readings on the staff
25 gages and changes the upstream and downstream gate position warning signs to indicate the gate
26 final position (i.e., GATE CLOSED or GATE OPENED). Each of these operations is performed
27 by direct visual inspection and manual manipulation. If the gates are being closed, the operator
28 manually releases the gate safety hook from each gate. After the 20-minute waiting period, the

1 operator initiates the gate operation by manually pushing a control button in the control panel
2 located on top of the concrete deck. Due to the massive size and weight of the gates, the gate
3 hoist mechanism takes 27 minutes to raise or lower. If the gates are being raised, the operator
4 must lift the gates and ensure through manual manipulation that the gates rest on a set of safety
5 hooks. When the gates reach their final position, the operator reads and records the upstream and
6 downstream staff gage readings. After a 30-minute period of flow equalization, the operator
7 again reads and records the upstream and downstream staff gage readings. After completion of
8 the above procedures, the operator contacts the Authority's Watermaster to provide the recorded
9 staff gage readings and report that the gate operation is complete. The operator provides one
10 additional visual observation of the area to assure the gates are secure and to ensure there are no
11 stranded boaters before the operator can obtain approval from the Watermaster to return to the
12 Tracy Office. A typical operation at the gates will take approximately 5 hours, including travel
13 time (1-1/2 to 2 hours at the Delta Cross Channel gates, 3 to 3-1/2 hours for travel to and from the
14 Delta Cross Channel gates.).

15 **2. Risk To Water Quality And Water Supply From Changes In** 16 **Operations**

17 In addition to the operational issues the Water Board should consider before seeking to
18 amend the Delta Cross Channel Closure Objective, the Authority wanted the Water Board to have
19 information on the potential adverse effects of Delta Cross Channel gates closures on water
20 quality and water supply. The Authority, through its joint presentation with the State Water
21 Contractors, provided that information by way of example. SLDM-EXH-01. Using data from
22 1999, information was present to the Water Board that shows the effects of a gates closure in
23 November-December 1999. SLDM-EXH-01, slides 1, 2. As a result of the closure, water quality
24 in the Delta fell to levels seen during extreme drought. SLDM-EXH-01, slide 4. The poor water
25 quality forced exports to be reduced, resulting in reductions to water supply of almost 300,000
26 acre-feet. SLDM-EXH-01, slide 3. If those effects were not sufficiently demonstrative of the
27 possible impacts of a gates closure, the results of the gates being re-open should be. Once the
28 Delta Cross Channel gates were re-opened, exports were able to increase and water quality

1 improved, despite Delta outflow decreasing from the level that existed when the Delta Cross
2 Channel gates were closed. SLDM-EXH-01, slides 2, 3. *See also*, CCWD-EXH-02, slide 7.¹

3 **3. Prior Studies On Changed Operations Or Structure**

4 To respond to the Water Board's questions, the Authority also provided the Water Board
5 with information on prior studies conducted on the operation of the Delta Cross Channel gates.
6 The Authority is aware of two types of studies: one based on tidal fluctuations, and one based on
7 acoustic barriers.

8 a. Operated Based On Tidal Fluctuations

9 Limited information has been prepared from the studies of the effect of operations of the
10 Delta Cross Channel gates based on tidal fluctuations. The studies, nevertheless, were conducted
11 from September 28 through November 8 of 2000, August 10 through October 27 of 2001, and
12 June 3 through June 14 of 2002. During those times, the Delta Cross Channel gates were
13 operated based on tidal fluctuations, and in a manner that allowed the gates to be operated at
14 various parts of the tidal cycle. Central Valley Operations Office provided the gate operation
15 schedule. Authority personnel operated the gates during daylight hours Monday through Friday
16 and hired a local resident to operate the gates during the nighttime hours Monday through Friday
17 and on all occurrences on the weekends. The same operating procedures as mentioned above
18 were followed during this experimental period. There were substantial prior notifications in the
19 local newspapers and to the local marinas of the requirement for the increased operation of the
20 gates. Again, the Authority is not aware of any formal analysis of the data that resulted from
21 those experiments.

22 ///

23 _____
24 ¹ Contra Costa Water District proposes that the Delta Cross Channel Closure Objective be revised
25 to include additional closures, in part, when "Sacramento River flows are in excess of 20,000
26 cfs." The Authority objects to that part of the proposal because it does not reflect the existing
27 operating procedure. Currently, Reclamation uses a 25,000 cfs Sacramento River flow "soft"
28 target to guide when closures are required for flood protection purposes. For example, if the
Sacramento River is projected to reach approximately 25,000 cfs and remain at or above this
value for some extended period of time, then Reclamation has order the gates closed.
Accordingly, the Authority requests that if the Water Board decides to amend the Objective, the
change should maintain Reclamation's existing discretion. The Authority takes no position at this
time on the other elements of the proposal advanced by Contra Costa Water District.

b. Fish Barrier For The Cross Channel

1
2 The Authority also cooperated with the Department of Water Resources on an
3 experimental Acoustic Fish Barrier Project at Georgiana Slough. This experiment was to test the
4 efficacy of using an acoustic barrier at the head of Georgiana Slough (on the Sacramento River,
5 near Walnut Grove, to guide migrating smolts away from entrance to the Slough in lieu of a
6 physical barrier. Unfortunately, the experiment was discontinued due to lack of financing and
7 concerns for out-migrating fish before adequate data could be developed to determine the level of
8 its effectiveness. Attached hereto as Exhibit A is a copy of a report entitled "Georgiana Slough
9 Acoustic Barrier Applied Research Project: Results of 1994 Phase II Field Tests," prepared by the
10 Authority and Charles H. Hanson for the Department of Water Resources and United States
11 Bureau of Reclamation, dated May 1996.

12 B. Salmon Protection Objective

13 As described in the September 30, 2004 Water Board staff report entitled "Periodic
14 Review Of The 1995 Water Quality Control Plan For The San Francisco Bay/Sacramento San
15 Joaquin Delta Estuary," adopted by Resolution 2004-0062, the Water Board staff requested the
16 stakeholders provide: (1) information that the Water Board could use to determine whether Delta
17 conditions are a limiting factor in meeting the objective; and (2) an update on the studies and
18 restoration projects presented at the 2001 [Water Board] salmon-doubling workshop. The
19 Authority, again through its joint presentation with the State Water Contractors, sought to provide
20 responses to the request by the Water Board staff and the questions presented by the Water Board.

21 Initially and in response to the request for information on whether Delta conditions are a
22 limiting factor in meeting the objective, the Authority and the State Water Contractors invited Dr.
23 Wim Kimmerer to present study results on population trends and the influence of restoration
24 actions on winter-run Chinook salmon. Dr. Kimmerer presented that information, which
25 identified the factors important to winter run salmon. WK-EXH-01. To develop that
26 information, Dr. Kimmerer first estimated the average cohort replacement rate for the multi-
27 decade period of decline and the more recent period of increase in spawners. The cohort
28

1 replacement rate is the ratio of the number of spawning salmon in any given year to the number of
2 their parents. In other words, the "cohort" is the generation of salmon spawned in a particular
3 year, and the "cohort replacement rate" is the ratio of the number of spawners in the next
4 generation to the number of spawners in the original, "parent" cohort. If the cohort replacement
5 rate is greater than 1.0, the population is increasing.

6 Dr. Kimmerer then searched for factors whose long-term change was statistically related
7 to the long-term changes in the winter run salmon cohort replacement rate. The preliminary
8 results of that study lead to a conclusion that ocean harvest and temperature have the strongest
9 effect, hatcheries have a weak effect, and that other environmental variables, including exports
10 from the Delta, have no effect on Winter-run Chinook salmon. See WK-EXH-01. The Authority
11 believes that, at least preliminarily, Dr. Kimmerer's conclusions result in a response to the Water
12 Board that Delta conditions do not present a limiting factor in meeting the Salmon Protection
13 Objective.

14 The Authority also provided information to the Water Board on the numerous actions
15 being undertaken pursuant to the CALFED Program and/or the Central Valley Project
16 Improvement Act,² including: (1) passage barrier removal/fish ladders; (2) positive barrier fish
17 screens; (3) habitat enhancement (spawning gravel, riparian vegetation, instream cover, instream
18 flows, water temperature, sediment loading, watershed management); (4) modifications to
19 hatchery operations; (5) harvest regulations/enforcement; (6) scientific investigations. The
20 following documents provide a discussion and/or examples of the type of actions being
21 undertaken in California for the benefit of fish, wildlife and habitat:

- 22 ● The draft report on the Central Valley Project Improvement Act entitled
23 "10-Years of Progress Report", attached hereto as Exhibit B; and
- 24 ● The CALFED program annual report for 2003, dated March 12, 2004,
25 attached hereto as Exhibit C; and
- 26 ● Ecosystem Restoration Multi-Year Program Plan, attached hereto as
27 Exhibit D.

27 ² The CALFED Record of Decision can be found at: <http://calwater.ca.gov/Archives/General>
28 [Archive/RecordOfDecision2000.shtml](http://www.usbr.gov/mp/cvpia/index.html), and the CVPIA Record of Decision can be found at:
<http://www.usbr.gov/mp/cvpia/index.html>.

1 Those documents demonstrate that there are extensive, existing programs furthering the
2 restoration of salmon, and achievement of the Salmon Protection Objective.

3 **II. Supplemental Information And Additional Comments Of The Authority**

4 The Authority provides the following additional information to supplement the
5 information the Authority presented and respond to information offered by other stakeholders at
6 the workshop.

7 A. Delta Cross Channel Gates Closure Objective

8 1. **Issue Before The Water Board**

9 The issue before the Water Board may have been clouded by the presentation by other
10 stakeholders. No one doubts that the existing objective for the Delta Cross Channel gates requires
11 the following:

12 (1) The gates to be closed for a total of up to 45 days from November 1
13 through January 31, for fisheries protection and as requested by the USFWS,
NOAA Fisheries, and DFG.

14 (2) The gates to be closed from February 1 through May 20.

15 (3) The gates to be closed for a total of 14 days from May 21 through June 15,
16 for fisheries protection and as requested by the USFWS, NOAA Fisheries, and
17 DFG.

18 *See* 1995 WQCP at 19. Neither the Water Board staff nor a party to this workshop has requested
19 that the Water Board reconsider the manner in which the objective applies from February 1
20 through May 20 or May 21 through June 15. Instead, the only element of the objective that was
21 asked to be reconsidered was the requirement that the gates be closed for a total of up to 45 days
22 from November 1 through January 31. That request came from the Bay Institute. *See* BAY-
23 EXH-01.

24 Specifically, the Bay Institute requested reconsideration and amendment that would allow
25 the Delta Cross Channel gates to be closed for up to 15 additional days. BAY-EXH-01 at p. 2.
26 The request was based upon the Bay Institute's belief that the additional days would "improve
27 survival of winter-run Chinook salmon and other juvenile fish in the Delta [and] allow for more
28 complete protection throughout December and January, when risks to juveniles are likely to be

1 higher." BAY-EXH-01 at p.2. The Bay Institute attempted to support that request by suggesting
2 that the survival for juvenile salmon that move into the Central Delta through the Delta Cross
3 Channel is reduced, particularly when exports from the Tracy and Banks pumping plants are high.
4 BAY-EXH-02, slides 11, 12. The suggestion advanced was supported, at least in part, by a
5 presentation made earlier on that same day by Pat Brandes. DOI-EXH-20.

6 Thus, the issue before the Water Board is whether (1) the salmon would benefit if the
7 Delta Cross Channel Closure Objective were amended to allow, during the November 1 through
8 January 31 period, for up to 60 additional days of closure, as opposed to the existing objective,
9 which allows for 45 days of closure; and (2) whether the benefit should be realized when balanced
10 against the effect on other beneficial uses.

11 **2. Science Does Not Support A Finding That Increased Days Of Closure**
12 **Would Increase Smolt Survival**

13 The Authority does not believe the science supports a finding by the Water Board that the
14 availability of up to 15 more days of closure during the November 1 through January 31 period
15 would provide significant, if any, benefits to salmon. Pat Brandes of the United States Fish &
16 Wildlife Service developed the science advanced by the Bay Institute to support its request.
17 Brandes analyzed data collected from experiments performed in recent years and during the
18 December through January period. Those experiments consisted of the release and recapture of
19 coded wire tagged smolts with the Delta Cross Channel open and closed. Her presentation to the
20 Water Board shows that there was a statistically significant difference in survival of smolts
21 released above and below the Delta Cross Channel because the upstream smolts had farther to
22 travel. See DOI-EXH-20.

23 However, Brandes did not present at the workshop an analysis she previously performed,
24 which considered the effect of closing the Cross Channel gates on smolt survival through the
25 Delta. A copy of a presentation that contains that analysis is attached hereto as Exhibit E. Dr.
26 Bryan Manly, whose Curriculum Vitae is attached as Exhibit F, reviewed that analysis and found
27 that Brandes' data shows that closing the Delta Cross channel gates has no statistically significant
28 effect on outmigrating smolt survival. The results of Dr. Manly's review of the work performed

1 by Brandes are attached hereto as Exhibit G.

2 Indeed, Ken B. Newman, independently, and Newman with John Rice have done much
3 work on factors affecting smolt survival through the Delta. The work is reflected in two papers,
4 (1) Modelling paired release-recovery data in the presence of survival and capture heterogeneity
5 with application to marked juvenile salmon, by Ken B. Newman, and (2) Modeling the Survival
6 of Chinook Salmon Smolts Outmigrating Through the Lower Sacramento River System, by Ken
7 B. Newman and John Rice. Those two papers are attached hereto as Exhibits H and I,
8 respectively.

9 Through their studies, Newman and Newman and Rice have analyzed results from a large
10 number of coded wire tagged release-recapture experiments and ocean recovery data for fall run
11 smolts. Fall run are smaller than other races of salmon outmigrating through the Delta and
12 should, therefore, be more subject to the effects of Cross Channel gate position and other factors
13 than would the larger, stronger-swimming, other races. If the work by Newman and Newman and
14 Rice indicated insignificant or small effects of Cross Channel gate closures, this would confirm
15 the results from Brandes' experiments with larger smolts. Preliminary review of the papers by
16 Newman and Newman and Rice, Exhibits H and I, show that closing the Delta Cross Channel
17 gates has at most a small and uncertain effect on survival of outmigrating fall run smolts.

18 Based on the analyses discussed above, it appears clear that those who have long held the
19 idea that closing the Delta Cross Channel gates are important to smolt survival could not have
20 drawn that idea from the recent data developed by Brandes, Newman, or Newman and Rice. It
21 must have been based on older, past experiments in which smolts were released in the interior
22 Delta and in the main stem of the Sacramento River. In those experiments, however, smolts
23 released in the main stem had higher survivals than those released in the interior Delta. Such
24 results might be assumed to support the idea that closing the gates was important to smolt
25 survival, but this is not necessarily the case.

26 For one thing, some of the smolts migrating downstream past Sacramento reach Chipps
27 Island via Sutter and Steamboat Sloughs, thereby bypassing the Delta Cross Channel. Also, as
28 shown by John Burau in his presentation to the Water Board, when the Delta Cross Channel gates

1 are closed, more water (and, presumably, more outmigrating smolts) enter Georgiana Slough, thus
2 partially offsetting the effect of Cross Channel gate closures. *See* DOI-EXH-08. Finally, it is
3 possible that smolts released in the interior Delta have poorer survival to Chipps Island than those
4 released in the main stem because those released in the interior Delta take longer to reach Chipps
5 Island. If that were true, they would arrive at Chipps Island as larger fish, whose survival to the
6 ocean might be greater than that of the small smolts that took less time to reach Chipps Island. In
7 any regard, any or all of those factors could cause the survival comparisons between smolts
8 released in the interior Delta and those released in the main stem to be misleading. It may be true
9 that smolts released in the main stem survive to Chipps Island better than those released in the
10 interior Delta. However, when this difference in survival is applied to the entire population
11 passing through the Delta and when the higher flows into Georgiana Slough and survival to the
12 ocean are considered, closing the gates may not matter much.

13 **3. A Factor In Any Decision To Change The Delta Cross Channel Gate**
14 **Objective Should Be The Effect Of The Change On Population Levels**

15 a. Background

16 Notwithstanding the information presented at the workshop and in this memorandum, the
17 Authority recognizes that the Delta Cross Channel gates may have some small, uncertain,
18 beneficial effects. That effect, the Authority believes, should be measured by its impact on
19 population levels. Indeed, for that reason, the Authority appreciates the repeated request from the
20 Water Board for estimates of the population level effects of actions such as closing the Cross
21 Channel gates and for comparisons among actions taken to increase fish populations (i.e., benefits
22 of closing the Delta Cross Channel gates compared with other actions directed at salmon). The
23 Authority now seeks to respond to those requests.

24 b. The General Method Of Estimating Population Level Effects

25 After years of data collection and analyses, most if not all environmental requirements are
26 supported by some sort of statistical evaluation. As a result, evaluations are either available or
27 may be performed that correlate the desired environmental effects (e.g., increasing smolt survival
28 through the Delta) to a given action (e.g., closing the Delta Cross Channel gates); correlations that

1 should be used to evaluate the efficacy of each action undertaken. Furthermore, those evaluations
2 can be used to estimate population level effects of the action and to estimate the change in the
3 desired effect for any given action.

4 For example, how much does the population of smolts reaching Chipps Island change if
5 the Delta Cross Channel gates are closed? In algebraic terms, the answer to that question amounts
6 to taking the partial first derivative of the correlation equation relating the desired effect to the
7 action. In non-algebraic terms, the answer to that question amounts to estimating the effect with
8 and without the action and comparing the difference.

9 As an additional example, assume there is a statistically significant relationship between
10 smolt survival and export rate. Using the correlation equation, it is possible to estimate the
11 survival for any export curtailment using the following formula:

$$F = (N*S2 - N*S1)/N*S1$$

13 F = Fractional Change in the population surviving to Chipps Island

14 N = Number of smolts

15 E1 = Initial export rate

16 E2 = Rate after the curtailment

S1 = Survival of smolts through the Delta for export rate E1

S2 = Survival of smolts through the Delta for export rate E2.

17 In other words, if N smolts enter the Delta, then N*S1 of them will survive with exports at E1,
18 and N*S2 of them will survive with exports at E2. The fractional change in the population
19 surviving to Chipps Island will be the difference in the population divided by the original
20 population. Note that when the formula is applied, the number of smolts (N) cancels out, leaving
21 the fractional change in population as (S2-S1)/S1. Thus, it is not necessary to know the
22 population size to estimate the fractional change in population.

23 In this later example, the estimate of the fractional change in population would be applied
24 to smolts surviving to Chipps Island. In general terms, the example estimates the fractional
25 change in population of the affected life stage (smolts), but with all else being equal for later life
26 stages, it could also estimate the fractional change in population of adults. So long as one can
27 assume (or have no good reason not to assume) that the number of adult salmon is proportional to
28

1 the number of smolts surviving to Chipps Island, then the fractional population change in smolts
2 at Chipps Island is an estimate of the fractional change in adult population associated with the
3 export curtailment.

4 Dr. Kimmerer recognizes the fractional change in population of the affected life stage is
5 the currency by which actions can be compared, provided that populations of successive life
6 stages are proportional to each other. WK-EXH-01. For scarce species, generally the ones of
7 interest, proportionality among life stages is usually a good assumption. Indeed, as discussed in
8 more detail above, Dr. Kimmerer presented such comparisons to the Water Board, concluding that
9 the actions that made a difference in the winter run decline and subsequent partial recovery were
10 upstream and ocean actions, not actions in the Delta (i.e., Delta Cross Channel gate closures or
11 export curtailments). See WK-EXH-01.

12 The Authority believes that estimates of population level effects can also be used to
13 develop a benefit/cost ratio for any given action. In fact, such analyses are starting to be
14 performed. Through their joint presentation, the Authority and the State Water Contractors
15 introduced a model developed by the California Urban Water Agencies and State Water
16 Contractors, in cooperation with state and federal resource agencies, which is intended to do just
17 that. See SLDM - EXH - 01, slides 11, 12.³ The model, however, cannot at this time provide
18 results that estimate the incremental effect of increasing the number of available days during
19 which the Delta Cross Channel gates could be closed.

20 **4. Science, Albeit Uncertain At This Time, Suggests That Increased Days**
21 **Of Closure Would Not Increase Salmon Populations**

22 The science shows that there would at best be small, uncertain effects of having up to 15
23 additional day of Delta Cross Channel Gate closures during the November 1 through January 31

24 ³ It should be noted that such an elaborate model, while desirable, is not necessary if it is possible
25 to estimate the fractional population changes for the affected life stages and the costs of the action
26 producing those changes.

27 Further, that model incorporates study results of Ken B. Newman, which reinforces Kimmerer's
28 conclusions (discussed above), namely, that Delta factors, including closing of the Delta Cross
Channel gates, have little effect on winter run salmon abundance, especially when compared to
the importance of upstream and ocean factors.

1 period. As described above, if statistical relationships are available relating smolt survival
2 through the Delta to Delta Cross Channel gate closure, estimates of the population level effect of
3 such closures can be made. The fractional change in smolt population surviving to Chipps Island
4 is simply the difference in survival with the gates open and closed divided by the survival with the
5 gates open. All else being equal, this fractional change in population of smolts can be assumed to
6 apply to subsequent adults as well.

7 This is not to say that unpredictable factors, such as ocean food supply, might not play an
8 important or dominant role in determining subsequent adult population. It is to say that whatever
9 the food supply, as a first approximation, it can be assumed that the resulting population will be,
10 fractionally, as much higher or lower as the fractional population change in smolts surviving to
11 Chipps Island. That is, if one can increase smolt population at Chipps Island by 20 percent, then
12 it is not unreasonable to assume that the population of subsequent adult salmon would be 20
13 percent higher than it otherwise would have been without the increase in smolt population.

14 In the case of the Delta Cross Channel, good relationships are not available. Brandes' data
15 show no statistically significant relationships for late fall salmon as surrogates for winter run.
16 Analyses by Newman and Newman and Rice indicate that closing the Delta Cross Channel gates
17 has small and uncertain effects on fall run smolt survival. Therefore, it is not possible to estimate
18 with confidence the population level effects, if any, of closing the Delta Cross Channel,
19 particularly if focused on the effects of up to an additional 15 days.

20 Nevertheless, several statements can be made that lead to a conclusion that increased the
21 days of closure would not increase salmon populations. First, one can conclude that whatever the
22 effects are, they apply only to that fraction of outmigrating smolts that pass the Delta Cross
23 Channel when the Delta Cross Channel gates are closed. It is accepted that results from coded
24 wire tagged release experiments apply to 100 percent of the released fish. So, if those results
25 show small, questionable effects, it is reasonable to assume that in actual practice, the effects to
26 the entire outmigrating population are even less because, typically, the gates are only be closed
27 when a fraction of the population is passing the Delta Cross Channel.

28 Further, the population level effects of increasing the number of days the Delta Cross

1 Channel gates may be closed by up to 15 days is likely even smaller. One can conclude this
2 because data indicate that smolts tend to enter the Delta very roughly in a bell-shaped distribution.
3 That is, first there are a few smolts entering the Delta, then larger numbers, then, fewer numbers
4 again, eventually tailing off to zero. The existing objective allows the Delta Cross Channel gates
5 to be closed up to 45 days during smolt migration. This allows for the Delta Cross Channel gates
6 to be closed, presumably at the time when most of the fish are migrating past the Cross Channel.
7 Therefore, additional closures would typically be made when a small fraction of the population is
8 migrating past the Delta Cross Channel gates. Accordingly, the effects of such additional
9 authority for closures would have a small incremental effect.

10 **5. Even If Science Supported A Need For Additional Closures, Above**
11 **That Which Has Occurred Historically, Those Days Are Available**
12 **Under the Existing Objective**

13 Even if science provided strong support for increasing the number of days of closure, there
14 is no demonstrated need that those additional days demand an amendment to the existing
15 objective. Since the CVP and SWP began operating to meet the objectives set forth in the 1995
16 WQCP, the gates have never been closed during the November-January period for 45 or more
17 days to benefit fish and wildlife. The following table provides the data on Delta Cross Channel
18 gate closures from 1996 through 2003.⁴

18 ///

19 ///

20 ///

21 ///

22 ///

23 ///

24 ///

25 ///

26 ///

27 ⁴ The data presented in the following table can be found on the World Wide Web at
28 www.usbr.gov/mp/cvo/ under the heading "Cross Channel Gate Operations Historical Log."

DELTA CROSS CHANNEL OPERATION			
DURING NOV - JAN PERIOD			
YEAR	DAYS CLOSED FOR FISH	DAYS CLOSED FOR HIGH FLOWS	TOTAL DAYS CLOSED
1996	20	56	76
1997	43	25	68
1998	0	92	92
1999	34	0	34 ⁵
2000	26	0	26
2001	26	41	67
2002	8	48	56 ⁶
2003	22	40	62
Average	22.4	37.8	60.1

6. Even If Science Did Support Increasing Days Of Closure, The Gates Could Be Closed Under Authority Accorded By The Central Valley Project Improvement Act And/Or The CALFED Program

Even if there were no change in the Delta Cross Channel Closure Objective, authority exists under state and federal law to close the Delta Cross Channel gates for more than 45 days during the November 1 through January 31, if needed to benefit fish and wildlife. The Central Valley Project Improvement Act provides authority to take actions that benefit fish, wildlife and habitat restoration. In particular, section 3406 provides the Secretary of the Interior the ability to close the Delta Cross Channel gates, in excess of that authorized under the existing objective and at a water supply cost, provided that as a result of the closure no more than 800,000 acre-feet of Central Valley Project water is dedicated and managed for authorized purposes. Pub. Law No. 102-575, 106 Stat. 4600, 4715-16.

Similarly, the Delta Cross Channel gates could be closed as part of the CALFED program, specifically, the Environmental Water Account program. The Environmental Water Account program provides water for the protection and recovery of fish through existing regulatory actions. Because the Environmental Water Account must operate with no uncompensated water cost to water users, if an action is taken that adversely effects a use of water, the Environmental Water Account must purchase water and compensate the affected water users. Thus, with the

⁵ Water quality concerns limited number of days of closure.

⁶ One gate broken, in the down position for 23 days (Oct-Nov).

1 Environmental Water Account in place, the Delta Cross Channel gates could be closed, again for
2 a period beyond that authorized under the existing objective, with any adverse impact to Delta
3 exports being mitigated with water acquired under the Environmental Water Account program.

4 *See* CALFED Programmatic Record of Decision at 54.⁷

5 **7. Before The Water Board Were To Amend The Delta Cross Channel**
6 **Closure Objective, It Must Consider The Potential Benefits And**
7 **Harms That Could Be Caused To All Beneficial Uses Of The Water**
8 **Involved**

9 Before the Water Board was to amend the Delta Cross Channel Closure Objective, it must
10 consider the potential benefits and harms caused to all beneficial uses of the water involved due to
11 the change. This need to balance between competing demands for water quality was recognized
12 in the 1995 WQCP, when the Water Board wrote:

13 Consistent with the intent of the State Legislature, as expressed in the Porter-
14 Cologne Water Quality Control Act of 1969, as amended (Porter-Cologne Act)
15 (Wat. Code §13000 et seq.), these objectives and recommendations are intended to
16 attain the goal of the highest water quality which is reasonable, considering all
17 demands being made and to be made on those waters and the total values involved,
18 beneficial and detrimental, economic and social, tangible and intangible.

19 1995 WQCP at 3-4. *See also* Water Code § 13241.

20 The amendment proposed by the Bay Institute, it asserts, would benefit fish, wildlife and
21 habitat restoration. The information provided to the Water Board by the Authority and others
22 suggests that such benefit would be small, approaching insignificant, and uncertain. *See*
23 discussion above. That limited and undefined benefit must be weighed against the possible
24 adverse effects on other beneficial uses currently protected under the 1995 WQCP.

25 Again, as described above, in more detail as part of the Authority's joint presentation,
26 SLDM-EXH-01, and by Contra Costa Water District, *see* CCWD-EXH-01; CCWD-EXH-02,
27 closures of the Delta Cross Channel gates can cause significant, adverse impacts to water quality
28 and water supplies. Indeed, information before the Water Board shows by example that as a
result of a closure of the Delta Cross Channel gates, water quality in the Delta could degrade to

⁷ *See* <http://calwater.ca.gov/Programs/EnvironmentalWaterAccount/EnvironmentalWaterAccountRecordofDecision.shtml>.

1 levels seen during extreme drought and water supplies could be sharply reduced.

2 For these reasons, to seek the highest, reasonable level of water quality, while balancing
3 between the needs of competing demands for water and the beneficial, detrimental, economic,
4 social, tangible, and intangible values involved, the Authority recommends that if the Water
5 Board accommodates the Bay Institutes request, and authorizes additional days of closure during
6 the November 1 through January 31 period, it does so with a condition that the additional days of
7 closure can occur only if there would be no adverse impacts to water quality or water supplies.

8 **8. The Authority Is Concerned With The Capability Of The Delta Cross**
9 **Channel Gates To Operate Remotely or More Frequently**

10 The suggestions raised by some of the presentations to the Water Board that could lead to
11 the Delta Cross Channel gates being operated remotely and/or more frequently, *see, e.g.*, DOI-
12 EXH-08, raise concerns for the Authority. The Authority has identified the following,
13 preliminary concerns with that possibility.⁸

14 a. Public Safety Concerns

15 **Fencing:** The Delta Cross Channel is not currently fenced to prevent public access to the
16 structure. Fencing improvements would be required to restrict access to the structure to reduce
17 the possibility of injury when the gates started moving automatically.

18 **Boater Warning System:** An adequate audible/visual warning system would be required
19 to appropriately warn nearby boaters of the gate movement. The system would need to allow
20 delay in gate operation if boaters are seen trying to reach the gates before they close.

21 b. Structural Integrity Concerns

22 **Fail/Safe Operation System:** The automation equipment must be vandal proof. This
23 structure is located near and very visible from State Highway 160 and currently is vandalized on a
24 regular basis. Failure of certain components during the operation of the gates could result in
25 failure within the gates hoisting equipment and possibly cause structural damage.

26 **Gate Locking Mechanism:** A fail/safe system must be incorporated in the automation

27 ⁸ Attached hereto at Exhibit J is a section of the Designers' Operating Criteria for the Delta
28 Mendota Canal. It reflects the limited operations originally contemplated for the Delta Cross
Channel gates.

1 equipment to release and/or install the gate safety hook/locks. The current locking system is
2 performed manually, and those locks provide a physical means to hold the gates in the open
3 position if the mechanical equipment fails.

4 **Structural Improvements/Additional Maintenance:** The Authority is not aware of any
5 current analysis as to the cost associated with the remote operation of the gates. However, a very
6 rough estimate would be in the range of \$500,000 to \$1,000,000. In addition to the cost to
7 remotely operate the gates, one would anticipate an increased average annual operation and
8 maintenance cost of \$160,000, due to additional equipment to maintain and added wear and tear
9 of the gates (includes replacement of both gates within the next 15 to 20 years, as compared to
10 currently projected service of 30 additional years). Further, as with any large equipment, the more
11 frequent operations of the system, the higher the chance of failure. A major failure of these gates
12 where the gates are either stuck open or closed may have significant water quality and/or water
13 supply impacts in the central Delta and south Delta.

14 B. Salmon Protection Objective

15 During the workshop, stakeholder presented the Water Board with information on how the
16 Salmon Protection Objective could be changed. In particular, the Bay Institute requested
17 "quantitative salmon doubling objectives for each Chinook salmon run, each basin (e.g.,
18 Sacramento and San Joaquin), and each salmon-producing stream," BAY-EXH-01, page 1, and
19 NOAA Fisheries discussed the application of a "Viable Salmonid Population" concept. NOAA-
20 EXH-13. At this time, the Authority takes no position on the substantive merits of either
21 approach to the Salmon Protection Objective. Instead, the Authority reiterates its belief, based on
22 those factors discussed above, that Delta conditions do not present a limiting factor in meeting the
23 Salmon Protection Objective. The Authority also questions the appropriateness of the Water
24 Board consideration of such ideas in this workshop.

25 The Water Board's staff, in the September 30, 2004 report entitled Periodic Review Of
26 The 1995 Water Quality Control Plan For The San Francisco Bay/Sacramento San Joaquin Delta
27 Estuary, adopted by the Water Board in Resolution 2004-0062, wrote:

1 A review of the objective should ascertain whether progress is being made toward
2 the current objective, or if the current objective needs modification. To that end,
3 the SWRCB should request an update on the studies and restoration projects that
4 were presented at the 2001 SWRCB salmon-doubling workshop. The SWRCB
5 also should request information that it can use to determine whether Delta
6 conditions are a limiting factor in meeting the objective. It is staff's opinion that
7 the periodic review workshops should focus on habitat conditions and restoration
8 efforts within the Delta itself, and not expand the focus of the Plan to Delta
9 tributaries.

10 Staff Report at page 40 (emphasis added). That concern, however, would be realized if the Bay
11 Institute's recommendation or a "Viable Salmonid Population" concept were accepted by the
12 Water Board. On its face, the recommendation of the Bay Institute would force the Water Board
13 to focus on areas outside of the Delta. A "Viable Salmonid Population" concept would do the
14 same. Such a concept according to NOAA Fisheries, involves a risk-matrix to quantify risks in
15 terms of spatial structure, abundance, production rate, and genetic diversity, each of which
16 involve considerations outside of the Delta. *See* NOAA-EXH-13, slides 3-7.

17 In sum, the science does not show a need to amend, in the 1995 WQCP, the Salmon
18 Protection Objective, as Delta conditions do not appear to present a limiting factor. *See* WK-
19 EXH-01; SLDM-EXH-01. However, if the Water Board is inclined to amend the Salmon
20 Protection Objective, the Authority asks that the Water Board limit the change to a more explicit
21 recognition that actions outside of the Delta affect the ability to achieve a goal of doubling natural
22 production of chinook salmon.

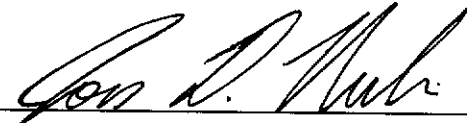
23 **III. Conclusion**

24 For the reasons stated above, the Authority believes that no change in either the Delta
25 Cross Channel Closure Objective or Salmon Protection Objective should be made. If, however,
26 the Water Board is inclined to change the Delta Cross Channel Closure Objective to include
27 authority for additional days of closure, that authority should be limited to those times when the
28 additional days of closure will not adversely impact water quality or supplies. In addition, if the
Water Board seeks to amend the Salmon Protection Objective, the Authority requests that the
change be limited to a recognition that actions outside of the Delta impact the ability to achieve

1 the Salmon Protection Objective.

2
3 Dated: December 16, 2004

4 KRONICK, MOSKOVITZ, TIEDEMANN & GIRARD
5 A Professional Corporation

6 By 
7 Jon D. Rubin
8 Attorneys for San Luis & Delta-Mendota Water Authority

9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
784414.1