

**STATE WATER RESOURCES CONTROL BOARD**

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AUGUST 18 1994

To Whom It May Concern:

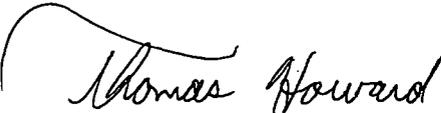
**ALTERNATIVE STANDARDS FOR THE BAY-DELTA ESTUARY**

The enclosed memorandum has been sent to the Department of Water Resources to request its assistance in estimating the water supply impacts of alternative standards for the Bay-Delta Estuary. The memorandum is being distributed for informational purposes.

The alternatives identified in the memorandum are preliminary and may change as the process proceeds. The subject of alternative standards for the Bay-Delta Estuary will be discussed at a workshop scheduled for September 1-2, 1994. Workshop notices were mailed under separate cover.

If you have any questions, please contact me at (916) 657-1873.

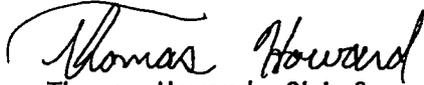
Sincerely,

  
Thomas Howard, Chief  
Bay-Delta Unit

## Memorandum

To : George Barnes, Chief  
Modeling Support Branch  
Department of Water Resources  
1416 Ninth Street  
Sacramento, CA 95814

Date: AUGUST 18 1994



Thomas Howard, Chief  
Bay-Delta Unit

From : STATE WATER RESOURCES CONTROL BOARD  
901 P Street Sacramento, CA 95814  
Mail Code G-8

Subject: REQUEST FOR DWRSIM OPERATION STUDIES

The purpose of this memorandum is to request the Department of Water Resources' (DWR) assistance in estimating the water supply impacts of alternative standards for the Bay-Delta Estuary.

The State Water Resources Control Board (SWRCB) is undertaking a triennial review of its 1991 Water Quality Control Plan for the Bay-Delta Estuary, and the SWRCB intends to evaluate a range of alternative standards. Initially, we would like to evaluate the alternatives listed below, which are based on input by various parties. After the water supply and fishery impacts of these alternatives have been evaluated, additional studies may be required. Also, the SWRCB is holding a workshop on September 1, 1994 to solicit comments on alternative standards, and additional alternatives may be developed through that process.

Please be advised that the standards the SWRCB is considering may not be formulated precisely as characterized below.

### Alternative 1

This alternative should include:

1. The water quality standards in the 1991 Water Quality Control Plan for Salinity (1991 Bay-Delta Plan);
2. The flow and export standards for the protection of fish and wildlife in D-1485;
3. The X2 isohaline standard contained in study 2' (1968 level of development with Roe Island triggered), as described in the June 10, 1994 letter from Bruce Herbold to George Barnes.
4. The salmon smolt survival standard as described in the August 17, 1994 letter from Susan Hatfield to George Barnes.

## Alternative 2

This alternative should include:

1. The standards for the protection of agricultural and municipal uses in the 1991 Bay-Delta Plan;
2. The standards for the protection of Suisun Marsh contained in the water right permits of the DWR and the USBR;
3. Flows on the San Joaquin River at Vernalis for four weeks from April 17 through May 14 of 8,000, 7,000, 6,000, 5,000, and 4,000 cfs in wet, above normal, below normal, dry and critical years, respectively;
4. Maximum exports of 1,500 cfs for four weeks from April 17 through May 14;
5. Total exports for the rest of April through June not above 4,000 cfs in critical years, 5,000 cfs in dry years, and 6,000 cfs in below normal, above normal and wet years;
6. Total exports less than 9,200 cfs in July;
7. Fixed export constraints in April through July are eliminated when the Delta Outflow Index exceeds 50,000 cfs;
8. Close the Delta Cross Channel gates from November 1 through June 30;
9. Delta Outflow Indices as follows:

Year Type	Delta Outflow Index	
	12,000 cfs	7,000 cfs
Wet	2/1-6/30	---
Above Normal	2/1-6/30	---
Below Normal	3/15-6/15	3/1-3/14 and 6/16-6/30
Dry	4/1-6/10	3/1-3/31 and 6/11-6/30
Critical	4/15-5/15	3/15-4/14 and 5/16-6/15

10. Maximum CVP and SWP exports less than 30 percent of Delta inflow from February 1 through June 30 and 60 percent of Delta inflow from July 1 through January 30;
11. Flow on the San Joaquin River of 2,000 cfs from October 18 through October 31.

Alternative 3

This alternative is the same as Alternative 2 with one exception. The Delta outflow standard in Alternative 2 (# 9) should be replaced with the X2 isohaline standard recommended by the California Urban Water Agencies in the August 10, 1994 letter from Lyle Hoag to Harry Seraydarian.

Alternative 4

This alternative should include:

1. The standards for the protection of agricultural and municipal uses in the 1991 Bay-Delta Plan;
2. The standards for the protection of Suisun Marsh contained in the water right permits of the DWR and the USBR;
- ✓3. Close the Delta Cross Channel gates from February 1 through June 30;
- ✓4. Flow on the Sacramento River at Rio Vista of 4,000 cfs from April 1 through June 30;
5. Minimum daily flow on the Sacramento River at Freeport of 13,000 cfs from April 15 through May 31;
6. QWEST of zero cfs from February 1 through March 30;
7. QWEST of at least 1,000 cfs from April 1 through June 30 in all year types and from April 15 to May 31 QWEST of 1,500, 2,000, 2,500, 3,000 cfs in dry, below normal, above normal and wet years, respectively;
8. Flows on the San Joaquin River at Vernalis and maximum exports from April 15 through May 15 as follows:

<u>Year Type</u>	<u>Export Limit (cfs)</u>	<u>Flow (cfs)</u>
Wet	6,000	10,000
Above Normal	5,000	8,000
Below Normal	4,000	6,000
Dry	3,000	4,000
Critical	2,000	2,000

9. Mean Daily Delta Outflow Indices below which exports in excess of 1,500 cfs and diversions to storage would be prohibited:

Month	Delta Outflow Index (cfs)			
	Wet	Above Normal	Below Normal	Dry
February	50,000	50,000	22,200	19,200
March	45,000	50,000	15,400	15,000
April	18,000	13,600	9,500	9,500

May	24,400	15,000	9,500	9,500
June	17,500	12,000	8,600	7,900
July	12,500	9,900	8,300	7,600
October	14,200	--	--	--
November	16,300	12,900	9,500	--
December	28,000	27,000	26,000	20,000

10. Delta Outflow Indices of 8,700, 7,800, 7,000, 6,200, 5,600, and 5,000 cfs in February, March, April, May, June and July of critical years;

11. Average Delta Outflow Indices (cfs) as follows:

<u>Year Type</u>	<u>Aug</u>	<u>Sept</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
Wet	5,800	7,300	7,300	7,300	7,300
Above Normal	5,600	4,200	4,500	4,500	5,400
Below Normal	5,300	4,200	4,500	4,500	4,900
Dry	5,000	4,000	4,500	4,500	4,700
Critical	3,300	3,000	3,600	3,600	4,700

12. Average monthly exports (cfs) less than:

<u>Year Type</u>	<u>Apr-Jul</u>	<u>Aug-Mar</u>
Wet	6,400	7,900
Above Normal	5,400	7,100
Below Normal	4,400	6,500
Dry	3,400	6,000
Critical	1,600	5,000

(For standards # 9, 11, and 12, October through December should be classified based on the previous year's hydrologic index. Two of the standards in this alternative are expressed as daily standards (# 5 and 9). DWRSIM cannot directly model daily standards because it operates on a monthly time step. Please develop assumptions to model these daily standards and discuss these assumptions with me prior to beginning the study.)

#### Alternative 5

This alternative should include:

1. The standards for the protection of agricultural and municipal uses in the 1991 Bay-Delta Plan;
2. The standards for the protection of Suisun Marsh contained in the water right permits of the DWR and the USBR.
3. Delta Outflow Index from February 1 through June 30 of 12,000 cfs in wet, above normal, and below normal years and 7,000 cfs in dry and critical years;

4. Delta Outflow Index of 25,000 cfs for seven days in April, May, and June in wet and above normal years;
5. Delta Outflow Index of 25,000 cfs for seven days in May in below normal years;
6. Delta Outflow Index of 12,000 cfs for seven days in April, May, and June of dry or critical years unless the previous water year was dry or critically dry in which case only the May flow is required;
7. Total CVP and SWP exports during the flows described in # 4, 5, and 6 above of 3,000 cfs;
8. Flows on the Sacramento River at Freeport from September 1 through October 14 of 12,000 cfs in wet, above normal and below normal years and 8,000 cfs in dry and critical years;
9. Flows on the Sacramento River at Rio Vista from March 15 through June 15 of 7,000 cfs in wet, above normal and below normal years and 5,000 cfs in dry and critical years;
10. Flows on the San Joaquin River at Vernalis as follows:

Year Type	Dates	Flow (cfs)
Wet, above normal, and below normal	3/1-3/31	1,000
	4/1-5/15	6,000
	5/16-6/15	1,000
	9/1-10/31	2,000
Dry and critical	3/1-3/31	1,000
	4/1-5/15	3,000
	5/16-6/15	1,000
	9/1-10/31	1,000

11. CVP and SWP exports limited to 35 percent of Delta inflow from March 1 through June 30, 55 percent from July 1 through September 30, and 65 percent from October 1 through February 28;
12. Close the Delta Cross Channel gates from February 1 through May 20.

#### Alternative 6

This alternative eliminates all existing standards and includes the following new standards:

1. Delta Outflow Indices (cfs) as follows:

Month	Wet	AN	BN	Dry	Critical
October	4,500	4,500	4,500	3,500	3,500
November	4,500	4,500	4,500	3,500	3,500
December	4,500	4,500	4,500	3,500	3,500
January	4,500	4,500	4,500	3,500	3,500
February	12,000	12,000	12,000	12,000	12,000
March	12,000	12,000	12,000	12,000	12,000
April	12,000	12,000	12,000	12,000	12,000
May	12,000	12,000	12,000	12,000	12,000
June	12,000	12,000	12,000	12,000	12,000
July	7,000	7,000	4,500	3,500	3,500
August	7,000	7,000	4,500	3,500	3,500
Sept	3,500	3,500	3,500	3,500	3,500

2. QWEST greater than zero cfs from February 1 through July 31, with the exception of the month of June where QWEST is greater than 4,000 cfs, and QWEST greater than -2,000 cfs from August 1 through January 31;
3. Flow on the San Joaquin River at Vernalis of 5,000 cfs from April 20 through May 10;
4. Exports limited to 2,000 cfs from April 20 through May 10;
5. Flow on the San Joaquin River at Vernalis of 2,000 cfs from October 18 through October 31;
6. Flow on the Sacramento River at Freeport of 13,000 cfs from April 15 to May 15;
7. Release 14,000 cfs from Keswick from May 1 through May 7;
8. Close the Delta Cross Channel gates from February 1 to June 30;

Assumptions

The assumptions listed below should be incorporated into the operation studies. Please consult with me if there are additional, significant assumptions that need to be made to complete the requested studies.

1. The variable export demand option should be used. Under this option CVP and SWP demands south of the Delta are adjusted to account for hydrologic conditions in Central and Southern California.
2. The sharing formula between the CVP and SWP in the Coordinated Operation Agreement should be used except when QWEST restrictions are controlling. Export pumping rate reductions necessary to meet the QWEST standard should be shared on an equal percentage basis from a base of 6,680 cfs for the SWP and 4,600 cfs for the CVP, except when the reductions occur at the same time that fixed export limits apply in which case the export reductions are shared equally.
3. The studies should be done from two different base cases. The first base case is D-1485, and all of the alternatives should be evaluated relative to this base case. The second base case is existing conditions, which consists of D-1485, the winter-run Chinook salmon biological opinion and the Delta smelt biological opinion, including take limits. Only alternative 1 should be evaluated relative to this second base case at this time. Eventually, DWR will be asked to evaluate all of the final alternatives relative to this second base case, but this request will be deferred until the final alternatives for consideration are selected.

The issue of take limits is complicated and not amenable to modeling; however, in DWR's written comments to the SWRCB at its May 1994 Bay-Delta workshop, DWR stated that assumptions for take limits based on operational experience during the past two years can be incorporated into the studies.

4. The water necessary to meet the pulse flow requirements on the San Joaquin River should be released from New Melones. If there is insufficient water to meet all of the requirements from this reservoir, the additional water should be provided from the San Joaquin River upstream of the confluence with the Stanislaus River. The quantity of additional water required should be identified.
5. The D-1485 base case should be modeled using D-1485 year types. The isohaline standard in Alternative 1 should be modeled using the method described in the June 10, 1994 letter from Bruce Herbold to George Barnes. The isohaline standard in Alternative 3 should be modeled in consultation with representatives from the California Urban Water Agencies. The San Joaquin River flow requirements should be modeled using the 60-20-20 San Joaquin Valley water year hydrologic classification system. All other standards should be modeled using the 40-30-30 Sacramento Valley water year hydrologic classification system.

Thank you for your consideration of this request. Please contact me at (916) 657-1873 if you have any questions.

**STATE WATER RESOURCES CONTROL BOARD**

PAUL R. BONDERSON BUILDING  
901 P STREET  
P.O. BOX 100  
SACRAMENTO, CA 95812-0100



Sept 21 9AM 901 P '94  
SEPTEMBER 09 1994

To Whom It May Concern:

**ADDITIONAL ALTERNATIVE STANDARDS FOR THE BAY-DELTA ESTUARY**

The enclosed memorandum has been sent to the Department of Water Resources (DWR) to request its assistance in estimating the water supply impacts of alternative standards for the Bay-Delta Estuary. The memorandum is being distributed for informational purposes.

Like the alternatives transmitted to the DWR in the August 18, 1994 memorandum, the two additional alternatives identified in the enclosed memorandum are preliminary and may change as the process proceeds. The subject of alternative standards for the Bay-Delta Estuary will be discussed at a staff workshop scheduled for September 21, 1994. Workshop notices were mailed under separate cover.

If you have any questions, please contact me at (916) 657-1873.

Sincerely,

Handwritten signature of Gail Linck in cursive script.

for Thomas Howard, Chief  
Bay-Delta Unit

Enclosure

**M e m o r a n d u m**

To : George Barnes, Chief  
Modeling Support Branch  
Department of Water Resources  
1416 Ninth Street  
Sacramento, CA 95814

Date: **SEPTEMBER 09 1994**

*Gail Linck*  
for Thomas Howard, Chief  
Bay-Delta Unit  
From : **STATE WATER RESOURCES CONTROL BOARD**  
901 P Street Sacramento, CA 95814  
Mail Code G-8

Subject: **REQUEST FOR DWRSIM OPERATION STUDIES**

The purpose of this memorandum is to request the Department of Water Resources' (DWR) assistance in estimating the water supply impacts of alternative standards for the Bay-Delta Estuary.

On August 18, 1994, I requested the DWR to evaluate the water supply impacts of six alternative sets of standards. The following two alternatives are modifications of Alternatives 3 and 5 in that request. In order to avoid confusion with the six alternatives already requested, the alternatives listed below are numbered 7 and 8.

Please be advised that the standards the SWRCB is considering may not be formulated precisely as characterized below.

Alternative 7

This alternative should include:

1. The standards for the protection of agricultural and municipal uses in the 1991 Bay-Delta Plan;
2. The standards for the protection of Suisun Marsh contained in the water right permits of the DWR and the USBR;
3. Flows on the San Joaquin River at Vernalis for four weeks from April 17 through May 14 of 7,000, 6,000, 5,000, 4,000, and 3,000 cfs in wet, above normal, below normal, dry and critical years, respectively;
4. Maximum exports of 2,000 cfs for four weeks from April 17 through May 14, unless the flow at Vernalis exceeds 8,000 cfs in which case maximum exports can be increased by the amount of flow in excess of 8,000 cfs;
5. The X2 isohaline standard recommended by the California Urban Water Agencies in the August 25, 1994 report titled "Recommendations to the State Water Resources Control Board for a Coordinated Estuarine Protection Program for the San Francisco Bay- Sacramento and San Joaquin River Delta Estuary";

8. CVP and SWP exports limited to 35 percent of Delta inflow from March 1 through June 30, 55 percent from July 1 through September 30, and 65 percent from October 1 through February 28;
9. QWEST greater than -1,000 cfs from February 15 through May 31;
10. Delta Cross Channel gates closed from January 1 through May 20.

Assumptions

Please use the same assumptions requested in our August 18, 1994 letter.

Thank you for your consideration of this request. Please contact me at (916) 657-1873 if you have any questions.

# Memorandum

To : George Barnes, Chief  
Modeling Support Branch  
Department of Water Resources  
1416 Ninth Street  
Sacramento, CA 95814

Date: NOVEMBER 4 1994

ORIGINAL SIGNED BY:

From : Thomas Howard, Chief  
Bay-Delta Program  
Division of Water Rights  
STATE WATER RESOURCES CONTROL BOARD  
901 P Street Sacramento, CA 95814  
Mail Code G-8

Subject: DWRSIM Studies

On November 3, 1994 a meeting was held to discuss Bay-Delta standards. Participants in the meeting included representatives from the agriculture/CUWA group, environmental interests, Club FED, and State Water Resources Control Board staff. The participants agreed to request the Department of Water Resources (DWR) to undertake the seven DWRSIM operation studies listed below.

All of the studies start with the most recent agriculture/CUWA proposal for Bay-Delta standards, designated Alternative K by DWR.

### Alternative K-1

Change the Ag/CUWA X2 and outflow standards in the February through June period to the USEPA's X2 standards in the February through June period.

### Alternative K-2

Add 31 days of the X2 isohaline (with three ways to comply) at the confluence in March, and in February lower the Chipps Island trigger to 800 TAF from 1.5 MAF.

### Alternative K-3

Replace the Ag/CUWA maximum export limits from April 15 through May 15 with a maximum limit of 1,500 cfs.

### Alternative K-4

Start with Alternative K-3 and raise the required flows of 2,000-5,000 cfs (depending on year type) on the San Joaquin River at Vernalis from April 15 through May 15 to 4,000-10,000 cfs, as described by USEPA in its August 17, 1994 letter from Susan Hatfield to George Barnes.

Alternative K-5

Remove the Ag/CUWA Delta Cross Channel gate closure requirement in January. Add a requirement to close the gates for 45 days between November 1 and January 31. (This requirement should be modeled as it was for the National Marine Fisheries Service.) Add a QWEST standard of -2,000 cfs From November 1 through January 31.

Alternative K-6

Add a QWEST requirement of zero cfs in February through April.

Alternative K-7

Starting with Alternative K-6, add a QWEST requirement of +2,000 cfs for six weeks between February 1 and April 30. (This requirement should be modeled as it was for the National Marine Fisheries Service.)

Thank you for your consideration of this request. Please try to complete these studies by November 14. A meeting has been scheduled for the morning of November 15 to discuss the results.

If you have any questions, call me at (916) 657-1873.

cc: (via fax)  
Harry Seraydarian  
Jim Lecky  
Kay Goude  
Greg Gartrel  
Dave Schuster  
Dan Steiner  
Chuck Hansen  
Dan Nelson  
Lester Snow  
Dave Fullerton  
Gary Bobker  
John Krautkramer  
Gerald Johns  
Walt Pettit

THOWARD:knox:11/4/94:final:a:studies.th

# Memorandum

To : George Barnes, Chief  
Modeling Support Branch  
Department of Water Resources

Date: NOVEMBER 8 1994

## ORIGINAL SIGNED BY:

Thomas Howard, Chief  
Bay-Delta Unit  
Division of Water

From : STATE WATER RESOURCES CONTROL BOARD  
901 P Street Sacramento, CA 95814  
Mail Code G-8

Subject: DWRSIM Studies

The purpose of this memorandum is to request the Department of Water Resources' (DWR) assistance in estimating the water supply impacts of a set of standards for the Bay-Delta Estuary.

As you know, State Water Resources Control Board (SWRCB) staff is meeting with the stakeholders to review alternative proposals for Bay-Delta standards. By memorandum dated November 4, 1994, I transmitted to you the stakeholder's request for seven DWRSIM studies. The study described below is being requested by SWRCB staff, not the stakeholders.

The study starts with the most recent agriculture/CUWA proposal for Bay-Delta standards, designated Alternative K by DWR. The study is labeled Alternative 10 because SWRCB staff has requested nine previous studies during this review of Bay-Delta standards.

### Alternative 10

1. Require 31 days of the X2 isohaline (with three ways to comply) at the confluence in March, and in February lower the Chipps Island trigger to 800 TAF from 1.5 MAF.
2. Reduce the maximum export limits from April 15 through May 15 to 1,500 cfs.
3. Raise the required flows on the San Joaquin River at Vernalis from April 15 through May 15 to 4,000-10,000 cfs, as described by USEPA in its August 17, 1994 letter from Susan Hatfield to George Barnes.
4. Remove the Delta Cross Channel gate closure requirement in January. Add a requirement to close the gates for 45 days between November 1 and January 31. (This requirement should be modeled as it was for the National Marine Fisheries Service.)

5. Add a requirement that QWEST must be greater than -2,000 cfs in January and greater than zero cfs from February through April.

Thank you for your consideration of this request. My previous request for seven studies on behalf of the stakeholders should receive priority over this request; however, completion of this request prior to the next stakeholder's meeting on November 15 would be helpful.

If you have any questions, call me at 657-1873.

THOWARD:knox:11/8/94:final:a:study2.mem