

Amendment of the Bay-Delta Water Quality Control Plan's Compliance and Baseline Monitoring Program

Presented to the State Water Resources Control Board
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The Department of Water Resources (DWR) and the Bureau of Reclamation (Reclamation) propose for the State Water Resources Control Board's (SWRCB) consideration amendments to the Water Quality Compliance and Baseline Monitoring Program (Program) which is described in Table 4 and Figure 2 of the 1995 Bay-Delta Plan (Plan). The proposed amendments are based on an in-depth, scientific and technical review of the Program by the Interagency Ecological Program (IEP). The proposed amendments would address:

- Baseline monitoring at 17 stations:
 - "Compliance Station" D29,
 - "Compliance and Baseline Stations" C9, C10, D10, D12, D24, S42, and
 - "Baseline Stations" C3, D6, D7, D9, D11, D19, D28A, D41A, P8, NZ080)
- Compliance monitoring at 2 stations:
 - "Compliance Station" D9 and D22
- Sampling intervals for discrete baseline monitoring

The Porter Cologne Water Quality Control Act provides the SWRCB authority to identify monitoring needed to determine compliance with water quality objectives and to obtain information to support recommendations for changes in the Water Quality Control Plan (Water Code Section 13242). DWR and Reclamation request that SWRCB amend the Plan pursuant to this authority.

Water Quality Compliance and Baseline Monitoring Program

The Program described in Table 4 and Figure 2 of the 1995 Bay-Delta Plan calls for the collection of data to:

- (1) Provide baseline information and determine compliance with the water quality objectives in this plan;
- (2) Evaluate the response of the aquatic habitat and organisms to the objectives; and
- (3) Increase understanding of the large-scale characteristics and functions of the Estuary ecosystem to better predict system-wide responses to management options. (1995 Bay-Delta Plan, Page 41)

DWR and Reclamation implement the Plan's monitoring Program in accordance with the requirements of SWRCB's Decision 1641 (D-1641) to:

- Ensure compliance with water quality objectives in the 1995 Bay-Delta Water Quality Control Plan;
- Identify meaningful changes in any significant water quality parameters potentially related to operation of the State Water Project (SWP) or the Central Valley Project (CVP); and
- Reveal trends in ecological changes potentially related to SWP/CVP operations.

The Program consists of 42 monitoring stations in the upper San Francisco Bay-Delta estuary, extending from the Sacramento River at Hood to the San Joaquin River at Vernalis and west into San Pablo Bay (Figure 1). Of these, twenty stations are operated as "Compliance Monitoring Stations", to ensure compliance with the water quality objectives. Fifteen stations are "Baseline Monitoring Stations", operated to identify changes in the estuary. The remaining seven are "Compliance and Baseline Monitoring Stations", which include a mixture of compliance and baseline monitoring elements.

Monitoring at a station may include six types of monitoring elements:

- Continuous Recorder Monitoring - provides continuous EC and temperature monitoring for compliance monitoring purposes,
- Multiparameter Monitoring - provides continuous monitoring of multiple parameters for compliance and baseline monitoring purposes,
- Physical/Chemical Monitoring - provides discrete baseline monitoring of physical and chemical parameters,
- Phytoplankton Monitoring - provides discrete baseline phytoplankton monitoring
- Zooplankton Monitoring - provides discrete baseline zooplankton monitoring
- Benthos Monitoring - provides discrete baseline benthos monitoring

DWR and Reclamation make the monitoring data available through the California Data Exchange Center (CDEC) [<http://cdec.water.ca.gov/>] and the Bay Delta and Tributaries Project (BDAT) [<http://bdat.ca.gov>].

In addition to providing data to help determine SWP and CVP compliance with its water quality objectives and assess project effects on the estuary, the monitoring data are used by DWR, Reclamation and others to:

- Assess and evaluate ecological changes in the estuary that might not be related to SWP and CVP operations, including detection of invasive and nuisance species
- Assess and evaluate ecosystem restoration projects
- Develop and calibrate hydrodynamic and water quality models for the estuary

DWR and Reclamation, with assistance from the U.S. Geological Survey (USGS) and Department of Fish and Game (DFG), conduct monitoring at 22 of the Baseline and Compliance Monitoring Program's 42 monitoring stations through the Environmental Monitoring Program (EMP). The 22 EMP stations include one "Compliance Monitoring Station," 14 "Baseline Monitoring Stations," and 7 "Compliance and Baseline Monitoring Stations." While the EMP conducts part of the compliance monitoring, it conducts almost all of the baseline monitoring. DWR and Reclamation coordinate their EMP activities with the estuary monitoring and studies of other State and federal agencies through the Interagency Ecological Program.

Review of the Water Quality Monitoring Program

DWR's and Reclamation's proposed amendments to the Plan are based on recommendations from an in-depth review of the EMP conducted from 2001-2002. The review was conducted in accordance with Condition 11.e of D-1641 and IEP guidelines. A complete report of the Program review is available at <http://www.iep.water.ca.gov/emp/>.

The purpose of the EMP review was to "recommend a balanced, scientifically sound, implementable environmental monitoring program design to fulfill water right permit conditions and address the needs of current and potential users identified during this review." Review recommendations were guided by the need to maintain D-1641 compliance, a relatively level budget, and long-term data continuity.

The technical review was conducted by:

- EMP Review Core Team: IEP staff from DWR, CALFED, Reclamation, and USGS
- Subject Area Teams of local agency & university experts: Staff from DWR, USBR, DFG, USGS, San Francisco Estuary Institute, University of California at Davis and San Francisco State University
- IEP Science Advisory Group of independent scientists: Stephen Monismith (Stanford University), Si Simensted (University of Washington), Jim Cloern (USGS), Ed Houde (University of Maryland), Terry Short (USGS), Jon Sharp (University of Delaware) and Alan Jassby (UC Davis)
- Participants in three public meetings: All participants listed above plus representatives of the CALFED Drinking Water Program, CALFED Ecosystem Restoration Program, Sacramento River Watershed Program, National Heritage Institute, Central Valley Regional Water Quality Control Board, U.S. Environmental Protection Agency and several environmental consulting firms

The review produced recommendations to improve the EMP, including several that would provide a refined scientific basis for EMP monitoring. Some of these recommendations have been implemented immediately (e.g. improved sample

analysis, data analysis and storage, reporting of data and information). Other recommendations affecting the specific timing, location and elements of the monitoring identified in D-1641 have been presented for SWRCB approval.

DWR and Reclamation requested several amendments to the monitoring Program in a March 25, 2003 letter to the SWRCB's Executive Director. These changes consisted of:

- Adding, reestablishing, or consolidating several monitoring stations and elements, and
- Adjusting the discrete sampling interval

In a response letter dated August 11, 2003, the SWRCB Executive Director:

- Approved the changes to baseline monitoring at Baseline Stations,
- Approved the adjustments to the discrete sampling interval, and
- Issued new D-1641 Table 5 and Figure 4 to reflect the approved changes.

However, the Executive Director did not approve the proposed changes at the compliance stations and compliance and baseline stations. Instead, DWR and Reclamation were directed to propose the requested changes during the SWRCB's review of the 1995 Bay-Delta Plan and then seek these changes to D-1641 in a subsequent water rights proceeding.

After meeting with SWRCB staff, DWR and Reclamation sent a follow-up letter dated February 5, 2004, to the SWRCB clarifying that requested changes to compliance stations and compliance and baseline stations would affect only baseline monitoring at these stations. All aspects of the compliance monitoring activities at these stations would remain unchanged. This letter also contained a newly modified proposed Table 5 for D-1641. On April 7, 2004, the SWRCB staff noted that it would include the requested changes to compliance stations and compliance and baseline stations during the periodic review of the 1995 Plan. Therefore, DWR and Reclamation submit the following proposed amendments to support specific changes to the plan.

Proposed Amendments to the 1995 Bay-Delta Plan's Monitoring Plan

DWR and USBR propose amendments to Table 4 and Figure 2 of the 1995 Bay-Delta Water Quality Control Plan to:

- Improve the scientific basis for the program and the usefulness of the resulting data by
 - Enhancing comprehensive monitoring at important ambient and flux stations (Figure 2 of this document)
 - Enhancing continuous monitoring
 - Increasing shallow water monitoring
 - Reducing spring-neap tidal biases

- Improving QA/QC
- Improve monitoring efficiency by consolidating neighboring stations
- Improve safety

The amendments would:

- 1) Add, reestablish, or move baseline monitoring elements at
 - a. One "Compliance Monitoring Station" (Station D29)
 - b. Seven "Compliance and Baseline Monitoring Stations" (Stations C9, C10, D10, D12, D22, D24, & S42)
 - c. Six "Baseline Monitoring Stations" (Stations C9, C10, D10, D12, D22, D24, & S42)
- 2) Remove one "Baseline Station" (Station NZ080)
- 3) Modify station numbers and descriptions for 4 "Baseline Monitoring Stations" (Stations C3, D6, D28A, P8)
- 4) Modify sampling interval description in footnotes to Table 5 of the 1995 Plan
- 5) Modify Table 4 layout in the 1995 Plan to include geographic coordinates and rearrange table columns
- 6) Update Figure 2 in the 1995 Plan

The specific proposed amendments to monitoring at Compliance Stations and Compliance and Baseline Stations are described in Table 1 of this document. The amendments would result in the following:

- All ongoing compliance monitoring activities at the 8 Compliance and Compliance and Baseline Stations would remain unchanged
- 13 monitoring elements would remain unchanged
- 9 historically monitored elements would be reestablished. This includes more clearly reflecting in Table 4 in the 1995 Plan the ongoing compliance monitoring (electrical conductivity and chloride) that occurs at C9 and D22
- 5 baseline monitoring elements would be added
- 2 baseline monitoring elements would be moved from an unsafe bridge site to a nearby location

Tables 2 and 3 of this document identify the proposed amendments to the monitoring at specified Baseline Stations. These amendments would have the following results:

- 17 monitoring elements would remain unchanged
- 4 monitoring elements would remain operationally unchanged but would be identified with new station numbers
- 8 historically monitored elements would be reestablished
- 8 historically monitored elements would be removed
- 8 baseline monitoring elements would be added
- 2 baseline monitoring elements would be moved to consolidate two neighboring stations (Hood & Greens Landing) for greater sampling

efficiency. Comparisons of monitoring data from these two stations show no differences (Figure 3 of this document).

Another proposed amendment would modify the sampling interval for discrete sampling that is described in the footnotes to Table 4 of the 1995 Plan. The amendment would change "monthly" to "on a near-monthly basis that alternates between spring and neap tides." The purpose of this modification is to avoid a spring-neap tide sampling bias.

Amendment of the layout of Table 4 in the 1995 Plan would be needed to reflect proposed changes. DWR and Reclamation also propose the addition of geographic coordinates for each station and the rearrangement of table columns to group the continuous monitoring and discrete monitoring activities. Tables 1-3 of this document show the new layout and information that would be included in the revision of the Plan's Table 4. DWR and Reclamation will provide a revised copy of the full Table 4 to the SWRCB within 30 days after this workshop.

The amendment of Figure 2 of the Plan would reflect the previously proposed changes to the monitoring plan. Figure 4 of this document shows the proposed revision of the Plan's Figure 2.

Conclusion

In conclusion, DWR and Reclamation request that the SWRCB amend the Compliance and Baseline Monitoring Plan of the 1995 Plan to define a more scientifically sound and safer program. The changes are designed to enable improved surveillance of water right permit conditions and to better address the needs of current and potential users of the resulting data. After approval of the amendments by the SWRCB, DWR and Reclamation would petition the SWRCB pursuant to Water Code Section 1701 to make changes to D-1641 Table 5 consistent with the revised Table 4 of the Plan. These changes would be necessary for the reasons discussed above and DWR and Reclamation would provide the necessary information in support of a petition to modify Table 5. Based on the information provided during the Workshop, DWR and Reclamation believe that the proposed changes to the EMP will not cause injury to any legal users of water because the changes do not modify monitoring used to determine compliance with water quality requirements.

Thank you for consideration of the proposed amendments. Reclamation and DWR staff are available to discuss our proposal further with the SWRCB and its staff. For more information please contact Anke Mueller-Solger, DWR, at amueller@water.ca.gov or Erwin Van Nieuwenhuise, Reclamation at evannieuwenhyise@mp.usbr.gov.

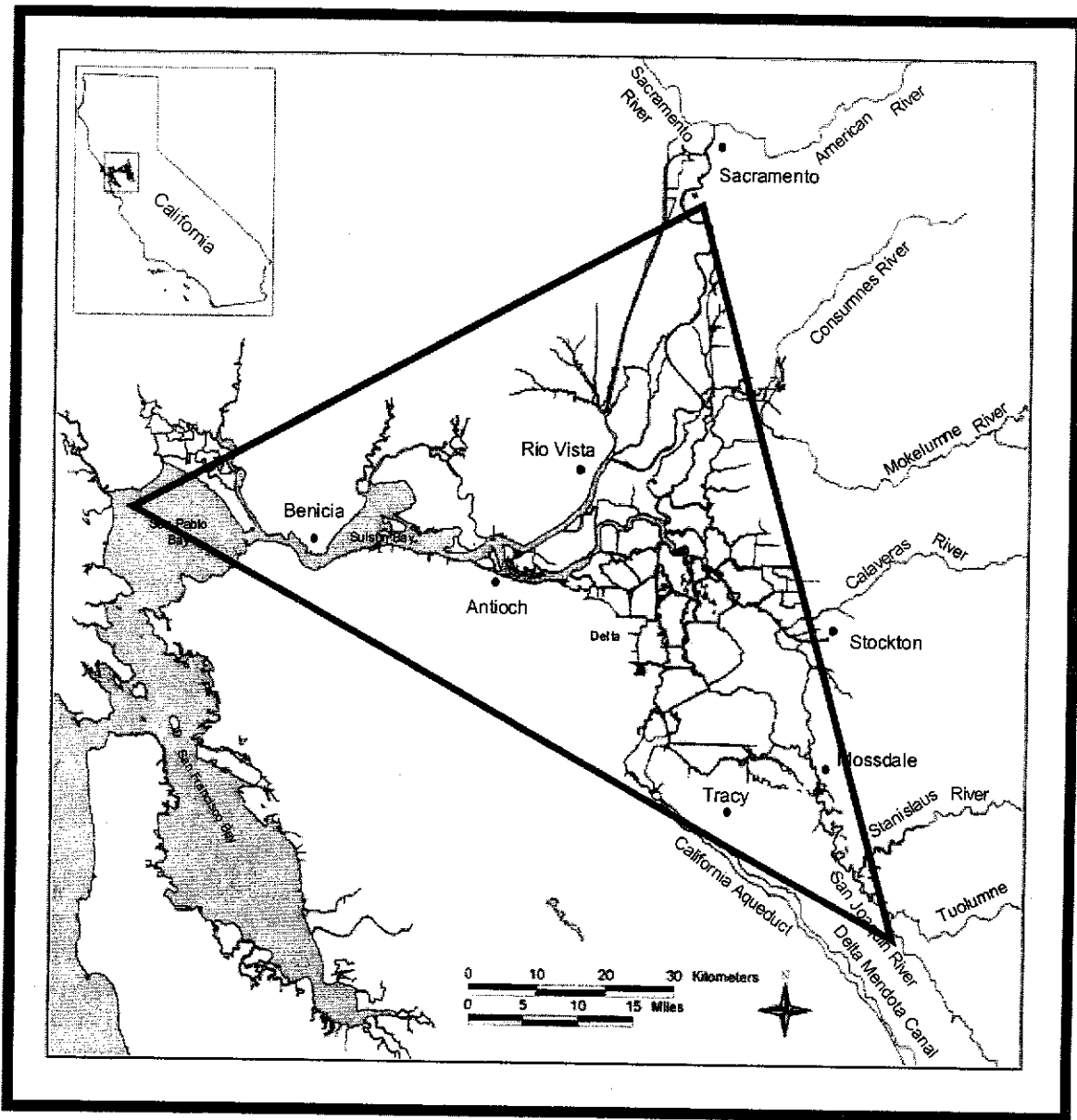


Figure 1: Boundary of Water Quality Compliance and Baseline Monitoring Program

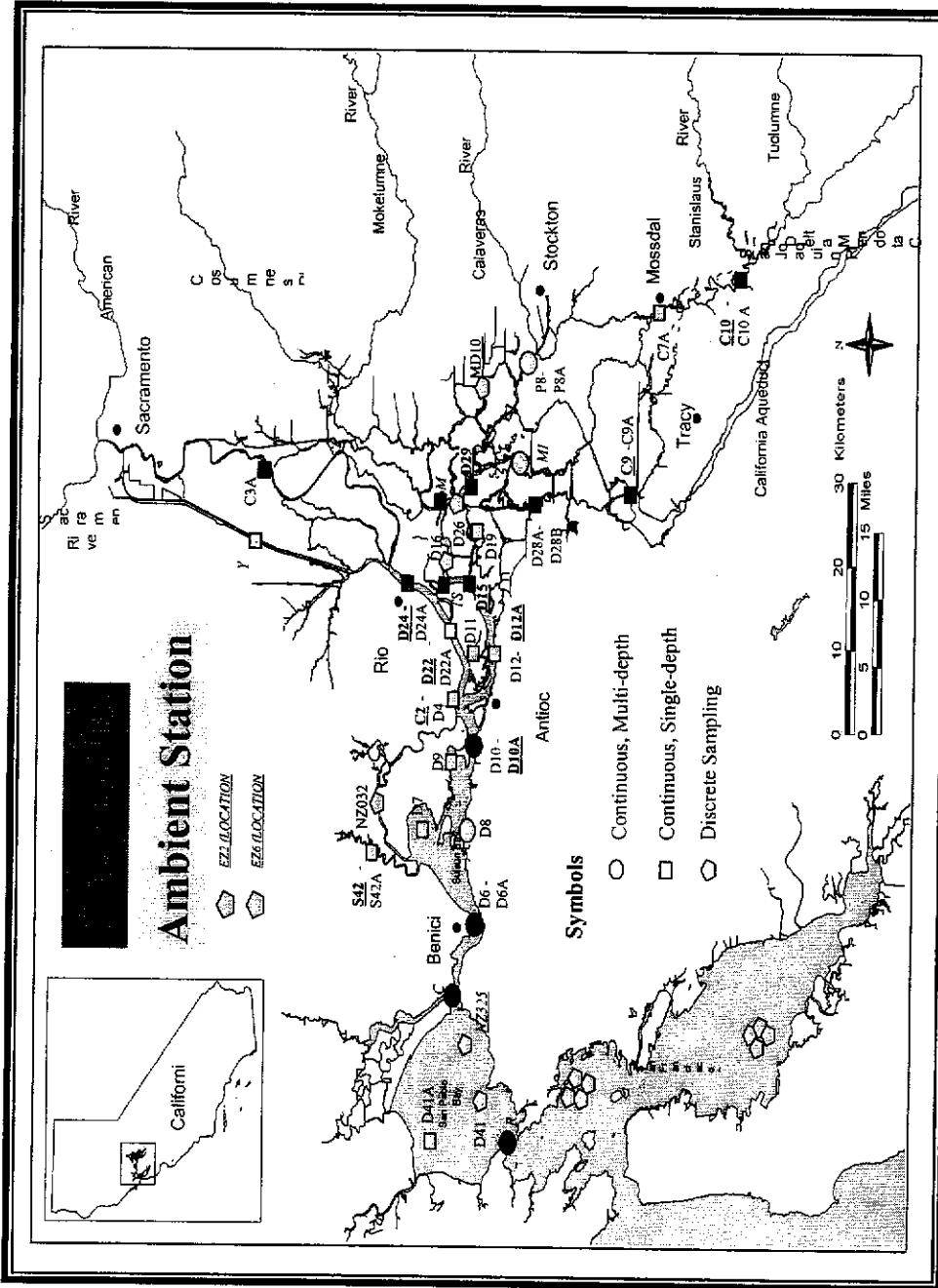
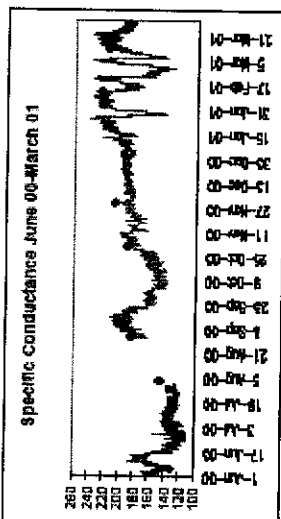
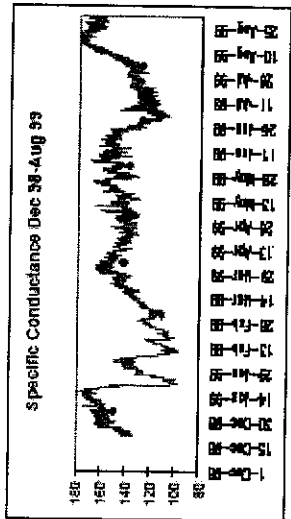
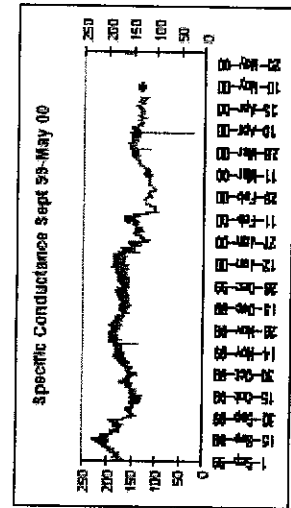


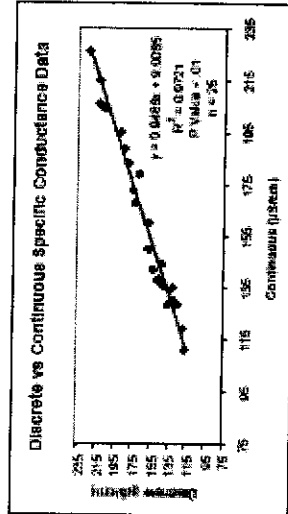
Figure 2: Conceptual Design of Water Quality Compliance and Baseline Monitoring Program

Specific Conductance ($\mu\text{S}/\text{cm}$) for Discrete Station C3 and Continuous Monitoring Station 7D
December 1998 – March 2001



— Continuous

◆ Discrete



Absolute Difference Discrete - Continuous	
Mean	-0.6
Standard Deviation	5.5
Minimum	-10
Maximum	11

Residuals	
Standard Deviation	5.4
Minimum	-9
Maximum	11.6

Figure 3: Comparison of Hood and Greens Landing Monitoring Stations

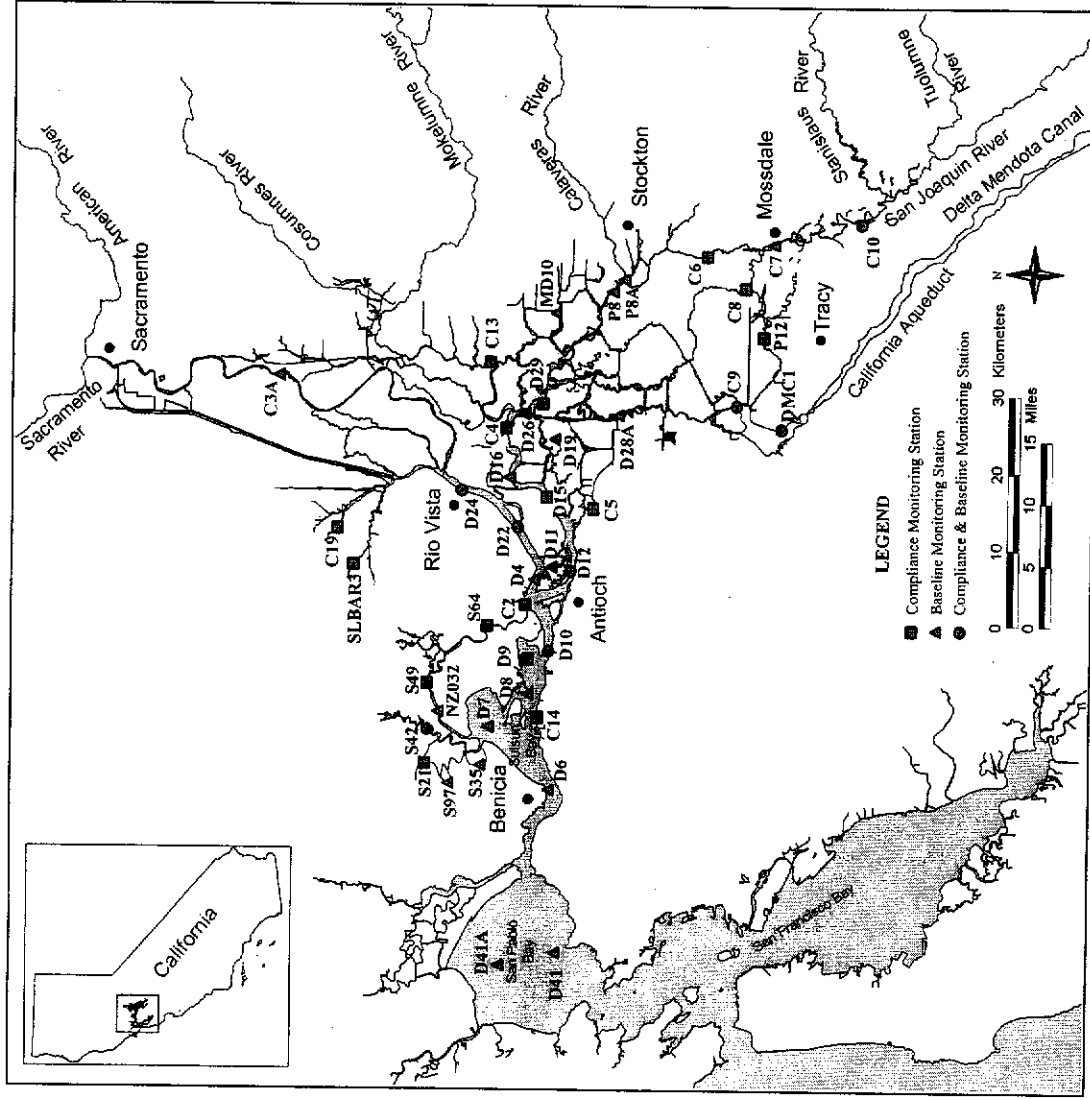


Figure 4: Proposed Revision of Figure 2 of the 1995 Bay-Delta Water Quality Control Plan

Table 1: Changes at "Compliance" and "Compliance & Baseline" Monitoring Stations

Station Number	Station Type	Station Description	Lat	Long	Cont. Recorder	Cont. Multiparameter	Discrete Physical/Chemical	Discrete Phytoplankton	Discrete Zooplankton	Discrete Benthos	Water Quality Objectives in 1995 B-D	Rationale for
C	•	West Canal @ Mouth of CC Forebay Intake	37.83075 37.82818	-121.55703 -121.55275		Reinstate (Ongoing)	Reinstate	No change	Reinstate	No change	CI* (Table 1), EC (Table 2)	Water Quality Objective: Flux station (exports); Continuous data QA/QC
CI	•	San Joaquin River near Vernalis	37.67575 37.67934	-121.265 -121.26472	No change	Add	Move from Move to	Move from Move to	Add		CI* (Table 1), EC (Table 2), Flow (Table 3)	Flux station (imports); Southern "rim"; High productivity; Long & highly utilized data set; Improved safety at new location
DI	•	Sacramento River @ Chipps Island	38.04288 38.04631	-121.92011 -121.91829		No change	Reinstate				EC (Table 3, Footnote 14)	Continuous data QA/QC
DI	•	San Joaquin River @ Antioch Ship Channel	38.03177 38.02162	-121.80273 -121.80638		No change	Reinstate				CI* (Table 1)	Continuous data QA/QC
D2	•	Sacramento River @ Emmailon	38.08466 38.08453	-121.73912 -121.73914	Reinstate (Ongoing)							Water Quality Objective (no operational change)
D2	•	Sacramento River below Rio Vista Bridge	38.15891 38.1555	-121.68721 -121.68113		No change	Reinstate				Flow (Table 3)	Continuous data QA/QC
D2	▲	San Joaquin River @ Prisoners Point	38.05793 38.05793	-121.55736 -121.55736	No change		Add	Add	Add		EC (Table 3)	Important mid-Delta flux station, northern endpoint for Stockton Ship Channel D.O. monitoring.
S4	•	Suisun Slough 300' south of Volanti Slough	38.18053 38.18027	-122.04696 -122.04779	No change		Reinstate	Reinstate			EC (Table 3)	Ecologically important tidal marsh habitat station with long-term monitoring history.

Compliance monitoring station
 Baseline monitoring station
 Compliance and baseline monitoring station
 monitoring station

Table 2: Changes at "Baseline" Monitoring Stations

Station Number	Station Type	Station Description	Lat	Long	Cont. Recorder	Cont. Multiparameter	Discrete Physical/Chemical	Discrete Phytoplankton	Discrete Benthos	Water Quality Objectives in 1995 B-D	Rationale for Change and Implementation	Approved by SWRCB Exec.
C3A	▲	Sacramento River @ Hood	38.36772	-121.52051		No op. change, but new station number	Moved from C3 (C3 has been discontinued)	C3 Moved from C3 (C3 has been discontinued)		None	Continuous & discrete monitoring station consolidation at continuous station location to improve monitoring efficiency & QA/QC - implementation complete; Reinstated zooplankton monitoring at ecologically important northern rim flux station (imports) - implementation in progress	Ye
D7	▲	Grizzly Bay @ Dolphin nr. Suisun Sl.	38.11708	-122.03972	Add		No change	No change	No change	None	Ambient stations representing shallow water habitat in ecologically and operationally important locations along the estuarine transition zone. New continuous monitoring to better understand tidal constituent dynamics - implementation in progress	Ye
D9	▲	Honker Bay near Wheeler Point	38.07245	-121.93923	Add		Reinstate	Reinstate		None		Ye
D11	▲	Sherman Lk. near Antioch	38.04228	-121.79951	Add		Reinstate	Add		None		Ye
D19	▲	Frank's Tract near Russo's Landing	38.04376	-121.61477	Add		Reinstate	Reinstate		None		Ye
D41A	▲	San Pablo Bay near Mouth of Petaluma River	38.08472	-122.39067			Add	Add	No change	None	Ecologically important ambient station representing shoal habitat with fluctuating salinity levels. Long-term benthos station. - implementation complete	Ye
NZ080	▲	San Joaquin River, 549 meters upstream of light 26							Remove	None	Station discontinued since 1996, not mandated in D-1641	No

Compliance monitoring station
 Baseline monitoring station
 Compliance and baseline monitoring station

Table 3: Modified Station numbers and descriptions at "Baseline" Monitoring Stations

Statio Numb	Statio Typ	Statio Descripti	La	Lon	Cont Record	Cont Multipar mete	Discret Physical Chemic	Discr Phyt plankt	Discr. plankt	Discret Benth	Water Objectives 1995 B-D	Rationale for
C	▲	Sacramento River @ Green's Landin	38.3677	-			Moved from C3 (C3 has been discontinued)	Moved from C3 (C3 has been discontinued)			Non	Station consolidation at C3.4 reviewed & approved by the SWRCB Exec. Director in 2003.
C3		Sacramento River @	38.3677	-		No op. change, but new station numbe	Move	Moved	Reinstat			No operational change at continuous multiparameter station. New station number and description to indicate that the (shore-based) continuous monitoring is taking place in a different location than the (channel) discrete monitoring activities. These changes were approved by the SWRCB Exec. Director in 2003.
D	▲	Suisun Bay @ Bull's Head Pt. near	38.0442	-			No	No	No	No	Non	
D6		Suisun Bay @ Martine	38.0276	-		No op. change, but new station numbe						
D28	▲	Old River near Rancho Del	37.9703	-			No	No	No	No	Non	
D28		Old River @ Bacon	37.969	-		No op. change, but new station numbe						
P	▲	San Joaquin River @ Buckley	37.9781	-			No	No	No	No	Non	
P8		San Joaquin River @ Rough and Ready Islan	37.9627	-		No op. change, but new station numbe						

■ station ▲ station ● station
 Compliance monitoring station Baseline monitoring station Compliance and baseline monitoring station