INTEGRATED REPORT – 2008 LIST OF IMPAIRED WATERS AND SURFACE WATER QUALITY ASSESSMENT [303(d)/305(b)]

Comments of the

SAN JOAQUIN RIVER GROUP AUTHORITY

South San Joaquin Irrigation District	Modesto Irrigation District
Oakdale Irrigation District	Turlock Irrigation District
Merced Irrigation District	City and County of San Francisco
Friant Water Users Authority and its member agencies:	
Lower Tule River Irrigation District	Shafter-Wasco Irrigation District
Arvin-Edison Water Storage District	Southern San Joaquin Municipal Utility District
Orange Cove Irrigation District	Stone Corral Irrigation District
Pixley Irrigation District	Ivanhoe Irrigation District
Chowchilla Water District	Teapot Dome Water District
Porterville Irrigation District	Kern-Tulare Water District
Delano-Earlimart Irrigation District	Terra Bella Irrigation District
Rag Gulch Water District	Lindmore Irrigation District
Exeter Irrigation District	Tulare Irrigation District
Saucelito Irrigation District	Lindsay-Strathmore Irrigation District
Fresno Irrigation District	Madera Irrigation District
San Joaquin River Exchange Contractors Water Authority and its members:	
Central California Irrigation District	Firebaugh Canal Water District
San Luis Canal Company	Columbia Canal Company

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I. INTRODUCTION.

The Lower San Joaquin River ("LSJR"), from Mendota Pool to Airport Way Bridge, near Vernalis ("Vernalis"), is currently listed as a water quality limited segment, pursuant to §1313(d) of the Federal Water Pollution Control Act (§303(d) of the "Clean Water Act") (33 U.S.C. §1251 et seq.)) for salinity, measured as Electrical Conductivity ("EC"), and boron and must be de-listed. In general, four lines of evidence require de-listing.

1. There are no Water Quality Objectives ("WQOs") for EC on the LSJR. A water quality limited segment is a water body where WQOs are not attained. Existing WQOs are therefore conditions precedent to classification as a water quality limited segment, but since the LSJR has no WQOs for EC, it cannot be listed as a water quality limited segment.
2. The only WQO for EC on the LSJR is at Vernalis, where the EC WQO has been met, without fail, since 1995, when the implementation of new management practices and regulatory schemes radically altered Basin conditions. Although exceedances occurred from 1987 to 1994, the rate of compliance far outstrips the threshold for de-listing established by the Water Quality Control Policy for Developing California's §303(d) List of Water Quality Limited Segments.
3. CALSIM II, the most advanced modeling available, conclusively demonstrates that the Vernalis EC Objective can be met at all times and under all conditions. Arguments that the model is insufficiently accurate and that exceedances "may" occur in the future have already been made, adjudicated, and dismissed in both the Third District Court of Appeals in the State Water Resource Control Board

Cases and in the US Ninth Circuit Court of Appeal in Central Delta Water Agency v. United States Bureau of Reclamation.

4. Agriculture is the beneficial use most sensitive to EC, but there is no evidence of any agricultural beneficial use impacts as a result of excessive LSJR EC. The only evidence is to the contrary, that LSJR EC is adequate to support agricultural beneficial uses.

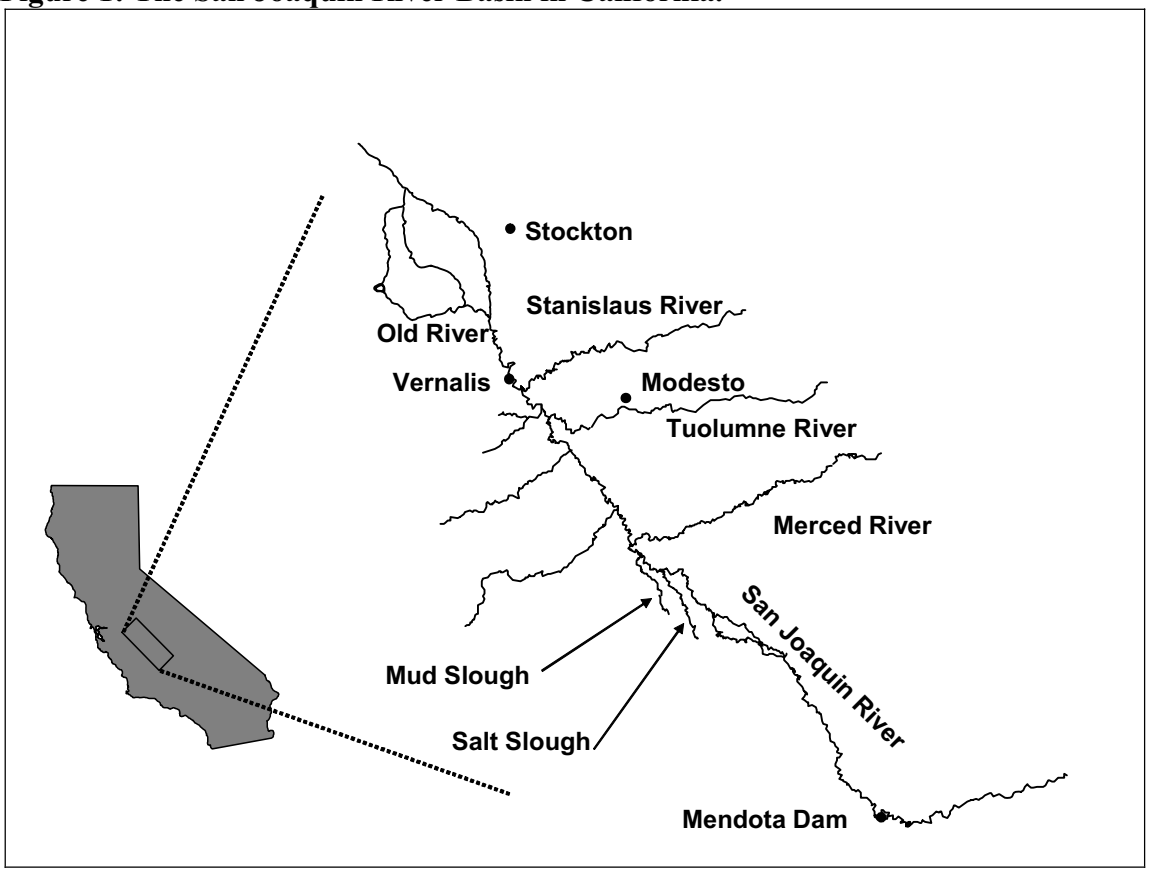
II. PROJECT SETTING.

A. Watershed Setting

1. Geography.

The LSJR watershed is defined as the area draining to the San Joaquin River downstream of the Mendota Dam and upstream of Vernalis and includes the counties of San Joaquin, Stanislaus, Merced, Madera, and Fresno. (Central Valley Regional Water Quality Control Board, Water Quality Control Plan for the Sacramento River and San Joaquin River Basins ("Basin Plan"), Fourth Edition (September 10, 2004), p[I-2.00] (available at http://www.waterboards.ca.gov/centralvalley/available_documents/basin_plans/SacSJR.pdf, accessed January 5, 2007).; *See* Figure 1, below.)

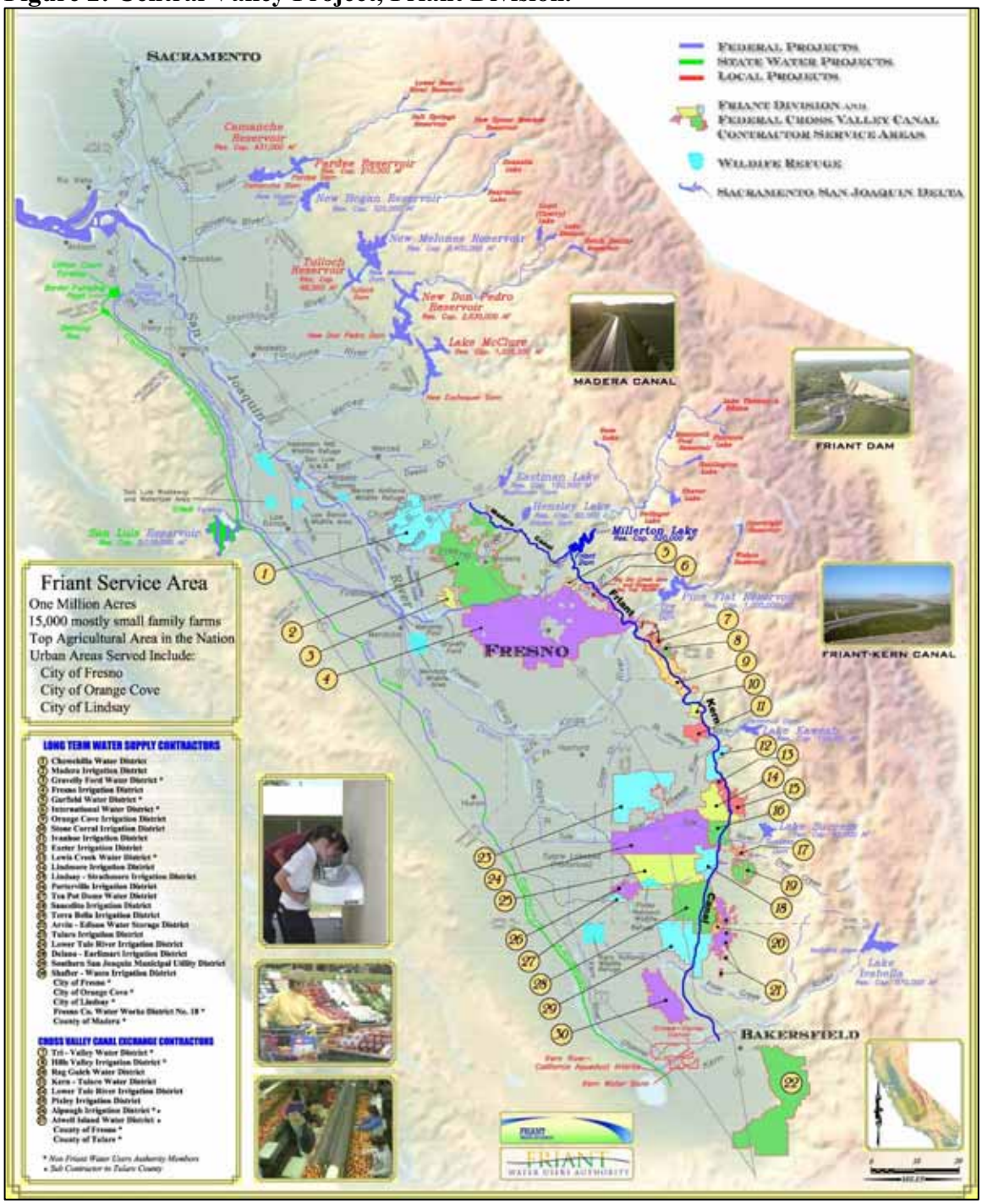
Figure 1: The San Joaquin River Basin in California.



For basin planning purposes, the LSJR watershed excludes areas upstream of dams on the major Eastside reservoirs: New Don Pedro, New Melones, Lake McClure, and similar Eastside reservoirs in the LSJR system (including all land within Tuolumne and Mariposa Counties). (Central Valley Regional Water Quality Control Board, Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Salt and Boron Discharges into the San Joaquin River (SJR Salt & Boron TMDL) Final Staff Report, p5 (September 10, 2004) (available at http://www.waterboards.ca.gov/centralvalley/programs/tmdl/vernalis-salt-boron/StaffRptDec04.pdf, accessed January 5, 2007).) As defined, the LSJR watershed drains approximately 2.9 million acres, of which approximately 1.4 million acres are devoted to agriculture. (Id.)

In addition to substantial diversions of water from the Merced, Tuolumne and Stanislaus rivers tributary to the San Joaquin River, a substantial portion of the natural flow from the Upper SJR and its headwaters is diverted at Friant Dam, approximately 63 miles upstream of Mendota Pool, south via the Friant-Kern Canal to the Tulare Lake Basin and north via the Madera Canal to Madera County at Millerton Lake. (SJR Salt & Boron TMDL Appendix 1: Technical Report, p31 (available at http://www.waterboards.ca.gov/centralvalley/programs/tmdl/vernalis-salt-boron/appendix1.pdf, accessed January 5, 2007).) As was true prior to the construction of Friant Dam, except during periods of wet weather flow and major snow melt, the SJR is frequently dry between Gravelly Ford and the Mendota Pool. (Id., p13.) Water is imported to the basin from the southern Delta via the Delta-Mendota Canal ("DMC") to replace the flows that are diverted by Friant Dam. (Id.) DMC water is delivered to about 36 agricultural, municipal, and wetland water users in the LSJR Basin. (Id. at p31.)

Figure 2: Central Valley Project, Friant Division.[1]



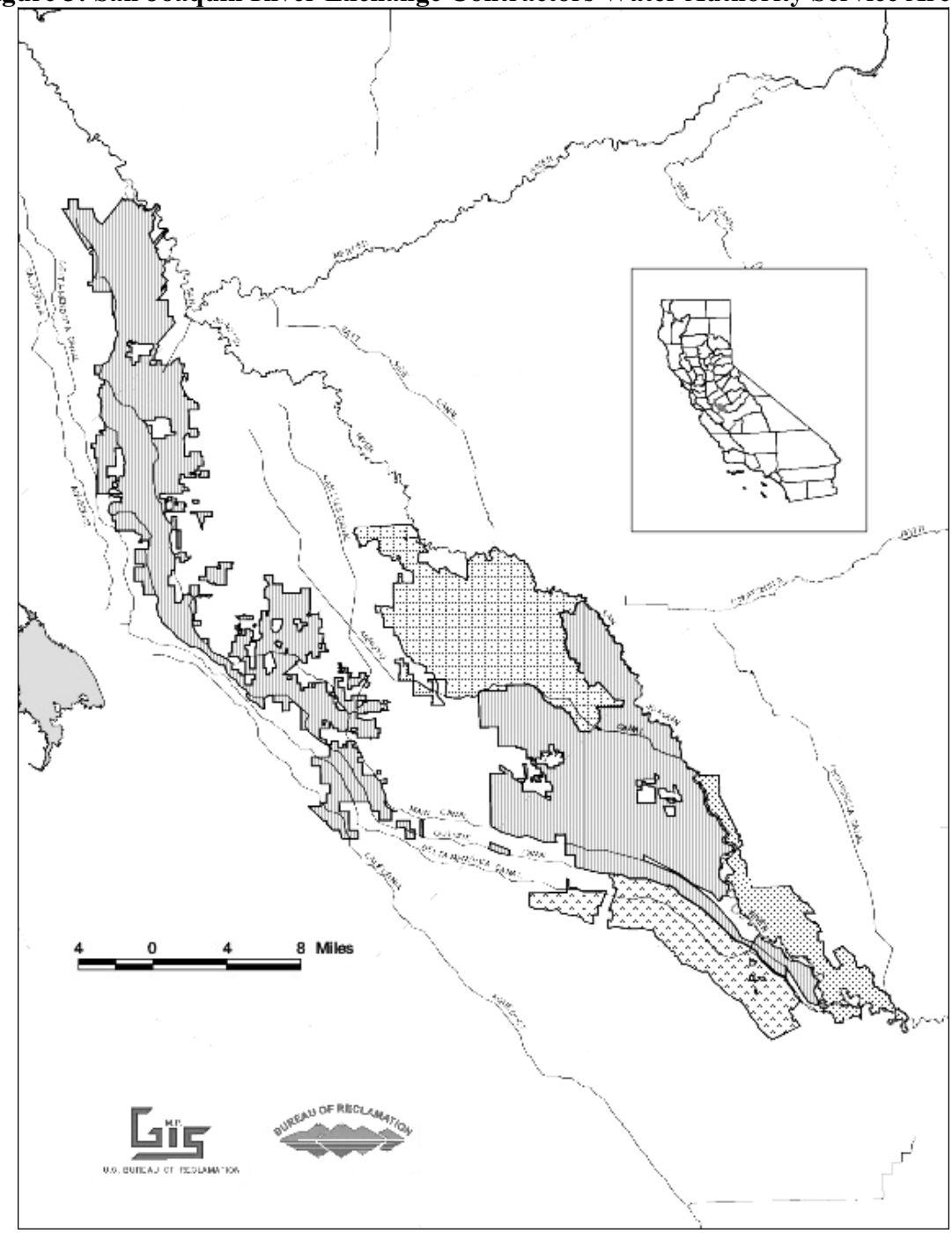
In anticipation of the construction of the Friant Division of the CVP, the USBR entered into an Exchange Contract with LSJR irrigators. (*See* Figure 3, below.) Under the

[1] Friant Water Users Authority, "CVP – Friant Division Map" (available at http://www.fwua.org/SJR%20River%20System-v3.pdf, accessed June 22, 2006.)

Exchange Contract, LSJR irrigators with water rights senior to those of the CVP are supplied with water from the Delta in exchange an agreement not to exercise their rights to San Joaquin River water previously diverted by them from the River to irrigate their farms.[2] (Id.) That water is now diverted via the Madera and Friant-Kern Canals to irrigate about a million acres of some of the most productive farmland in the United States. (Id.)

[2] The Exchange Contractors, who comprise the "San Joaquin River Exchange Contractors Water Authority", consists of the Columbia Canal Company, the Central California Irrigation District, the San Luis Canal Company, and the Firebaugh Canal Water District.

Figure 3: San Joaquin River Exchange Contractors Water Authority Service Area.[3]



[3] USBR and San Joaquin River Exchange Contractors Water Authority, Water Transfer Program for the San Joaquin River Exchange Contractors Water Authority 2005-2014 Final EIS/EIR (December 2004), Figure 2-2 (available at http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=1222, accessed June 22, 2006).

The DMC is the primary facility used to implement the Exchange Contract by replacing and supplementing the natural river flows now diverted at Friant Dam. The DMC was completed in 1951 and conveys water from the Tracy Pumping Plant in the South Delta to the Mendota Pool. (Id.) The DMC supplies a volume of water to the Exchange Contractors that is roughly equal to the average volume of water that was previously diverted by the Exchange Contractors directly from the SJR prior to the construction of Friant Dam. (Id.) The DMC exchange water provides a far more reliable supply, seasonally and annually, than existed before the construction of Friant Dam, but it also provides a much greater salt load than was previously provided by the SJR since Delta water contains more salt than the SJR water. (Id.) In addition to providing water to the Exchange Contractors, the DMC also provides water to other agricultural, municipal, and wetland water users. (Id.)

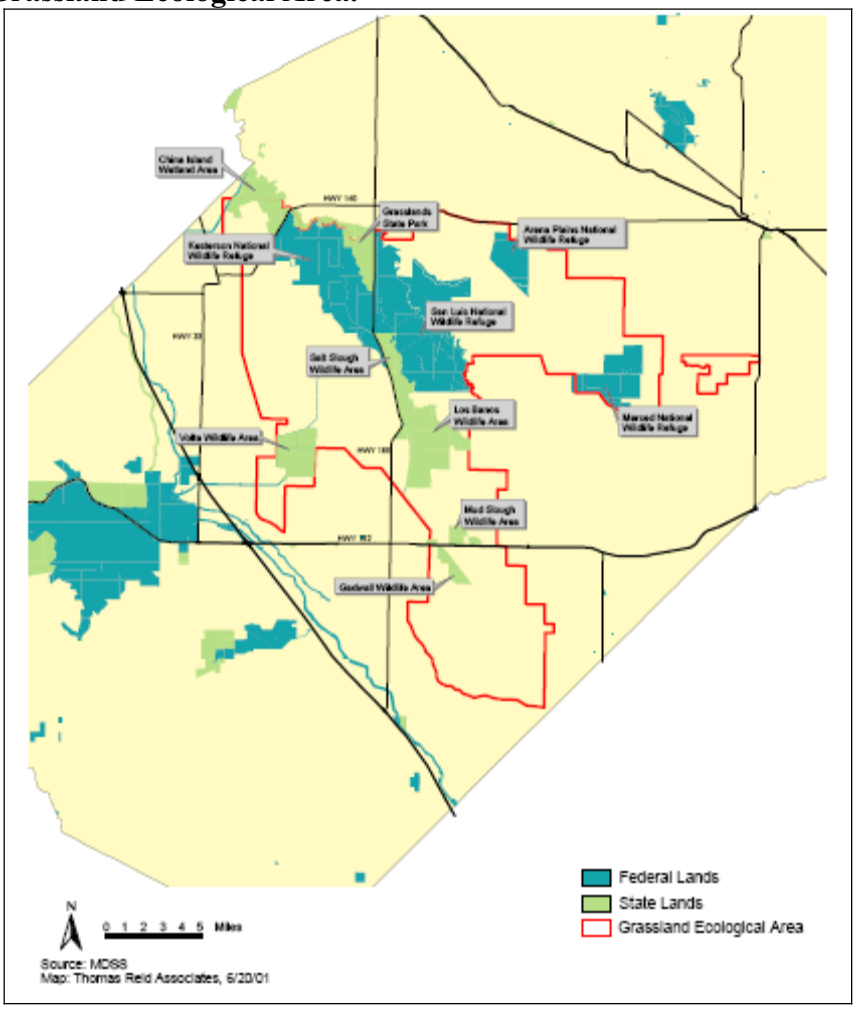
Water discharged from Mendota Pool supplies canals irrigating farmland on the west side of the LSJR Basin. (Id., p14.) Water is also directly released to the LSJR from Mendota Pool. This water is diverted by various agricultural users from Mendota Pool to Sack Dam. (Id.) Most or all of the remaining flow in the river is diverted at Sack Dam. (Id.) Other than flood-flow periods, the reach between Sack Dam and Bear Creek flows intermittently and is composed of groundwater accretions and agricultural return flows. (Id.) Downstream of Bear Creek, the SJR once again becomes a permanent stream that flows all year.[4] (Id.) The remainder of the SJR downstream of the Merced River is influenced by natural flow from the main east side tributaries and numerous diversions

[4] Although Bear Creek contributes flow to the LSJR, its flow originates from irrigation return flows and flow entering Bear Creek from the East Side Bypass. (James, Edward W., Westcott, Dennis W., Gonzalez, Jeanne L., Water Diversion and Discharge Points Along the San Joaquin River: Mendota Pool to Vernalis, Central Valley Regional Water Quality Control Board, p20 (April 1989).)

and discharges. (James, Edward W., Westcott, Dennis W., Gonzalez, Jeanne L., Water Diversion and Discharge Points Along the San Joaquin River: Mendota Pool to Vernalis, Regional Board, p11 (April 1989).)

The LSJR Basin includes the Grassland Ecological Area ("GEA"), which comprises approximately 130,000 acres of wetlands and wildlife refuges above the Merced River. (SJR Salt & Boron TMDL: Appendix 1, p42; *See also* Figure 4, below.) The only refuge between the Merced River and Vernalis is the San Joaquin River National Wildlife Refuge, which is part of the place of use described by the RJ Gallo statement of diversion (S014002). All other refuges and wetlands, such as Kesterson National Wildlife Refuge, Volta Wildlife Management Area, Merced National Wildlife Refuge, the San Luis National Wildlife Refuge, and numerous private duck clubs, such as the Newman Gun Club and Lone Tree Gun Club, are above the Merced River. (*See* Appendix B, p29 Figure 1.)

Figure 4: Grassland Ecological Area.[5]



The GEA is the largest contiguous wetland complex remaining in California and is comprised of a combination of federal, state and privately owned land. (SJR Salt & Boron TMDL: Appendix 1, p42.) These wetlands are managed by the US Fish & Wildlife Service, the Department of Fish & Game, privately owned duck clubs, gun clubs, and water districts. (Id.) The Regional Board anticipates that wetland acreage will increase as more land is incorporated under state and federal refuge status. (Id.) These wetlands are mostly on the west side of the San Joaquin River and primarily managed as seasonal

[5] Grassland Water District, *Land Use and Economics Study, Merced County California* (July 2001) Appendix 1 Figure 2 (available at http://www.traenviro.com/cgwd/pdfs/geastudy.pdf, accessed June 22, 2006).

freshwater ponds or as permanent marshes, which provide habitat for an abundance of migratory birds. (Id.)

Most of the supply water used to support the wetlands comes from the Delta via the DMC. (Id.) Peak water demand for the wetlands is between mid September and early November, when the wetlands are flooded. (Id.) Water demands for the wetlands are lowest from mid-January through April when seasonal wetlands are drained to encourage germination of grasses that are an important food source for waterfowl. (Id.) During the summer months, wetland acreage is managed as irrigated pasture, and seasonal and semi-permanent wetlands. (Id.)

2. Water Quality Monitoring in the San Joaquin River Basin – the Surface Water Ambient Monitoring Program.

The Surface Water Ambient Monitoring Program ("SWAMP") is a comprehensive program designed to provide an overall picture of water quality throughout the State. (SWAMP, Executive Officer's Report, p1 (January 2005), available at http://www.waterboards.ca.gov/centralvalley/programs/swamp-prog-rpt.pdf, accessed January 5, 2007).) SWAMP monitoring in the SJR Basin began in 1985. (Id. at 2.) Parameters were selected to measure the most limiting beneficial use impacts: salt, bacteria, and total organic carbon for drinking water; trace elements, toxicity, and bioassessments for aquatic life; salt, boron, and minerals for irrigation water supply; bacteria for recreation; and selenium for waterfowl. (Id.) Permanent monitoring stations exist along the main stem of the SJR at Sack Dam, Lander Avenue (Highway 165), Fremont Ford (Highway 140), Hills Ferry, Crows Landing, Patterson, Maze Blvd (Highway 132), and Airport Way near Vernalis. (*See* Table 1 and Table 2.)

Table 1: SWAMP stations on the main stem of the San Joaquin River.

Site	ID	Date From	Latitude	Longitude	County	USGS Quad
Sack Dam	MAD 007	10/26/2000	N 36° 59' 01.2"	W 120° 30' 01.0"	Madera	
Lander Ave.	MER 522	10/6/1995	N 37° 17' 43"	W 120° 51' 01"	Merced	Stevenson
Fremont Ford	MER 538	10/6/1995	N 37° 18' 34"	W 120° 55' 45"	Merced	Gustine
Hills Ferry	STC 512	10/6/1995	N 37° 20' 33"	W 120° 58' 38"	Stanislaus	Gustine
Crows Landing	STC 504	10/6/1995	N 37° 25' 55"	W 121° 00' 42"	Stanislaus	Crows Landing
Patterson	STC 507	10/6/1995	N 37° 29' 52"	W 121° 04' 54"	Stanislaus	Crows Landing
Maze Blvd.	STC 510	10/6/1995	N 37° 38' 31"	W 121° 13' 40"	Stanislaus	Ripon
Airport Way	SJC 501	10/6/1995	N 37° 40' 32"	W 121° 15' 51"	San Joaquin	Vernalis

Table 2: Water sources for SWAMP stations on the San Joaquin River.

Site	Water Source
Sack Dam	Mendota Pool, the primary source of water, is supplied with Delta water pumped via the DMC. During the wet season or periods of planned releases, high quality SJR water from Friant Dam also flows to Mendota Pool.
Lander Ave.	Surface water in the San Joaquin River. In low flow periods, a significant portion of the river flow consists of surface runoff from irrigated areas. Water quality at this site is expected to show natural background levels or good quality surface runoff from irrigated agriculture. No tile drainage water enters the river upstream of this site. This site is often used as the reference site for LSJR water quality prior to significant inflows of subsurface tile drainage entering the SJR.
Fremont Ford	This site represents the SJR downstream of the confluence with Salt Slough. Water quality at this site is usually elevated with respect to salinity.
Hills Ferry	Flows at this site, located approximately 30 yards upstream of the Merced River confluence, are composed of subsurface agricultural drainage, wetland drainage, and some surface runoff from the Grassland Area, as well as wet season inflows from Merced River flood channels. Water at this site will likely be elevated with respect to salt, selenium, and boron.
Crows Landing	Water quality at this site will be better than that at upstream stations, because the Merced River and Orestimba Creek drain to the SJR upstream. This station represents the SJR, as influenced by Grassland Area discharges and dilution by Merced River flow.
Patterson	The water source at this site is similar to that at Crows Landing Bridge, with the additional influence of agricultural discharges to the SJR and significant groundwater accretions.
Maze Blvd.	Water quality and water quantity at this site is poor and lower, respectively, than that found immediately downstream at Vernalis. This station is immediately upstream of the inflow of the Stanislaus River and downstream of the inflow of the Tuolumne River.
Airport Way	Water at this site is natural surface flow in the SJR, with inflow from all three major east side tributaries. Water quality at this site is good and shows typical surface flow quality. This site is just downstream of the inflow from the Stanislaus River. Quality is likely to be the best of any of the river sites.

Figure 5: SWAMP stations in the San Joaquin River Basin.

Figure 6: Gustine quadrangle, with Hills Ferry and Fremont Ford SWAMP stations and major inflows.

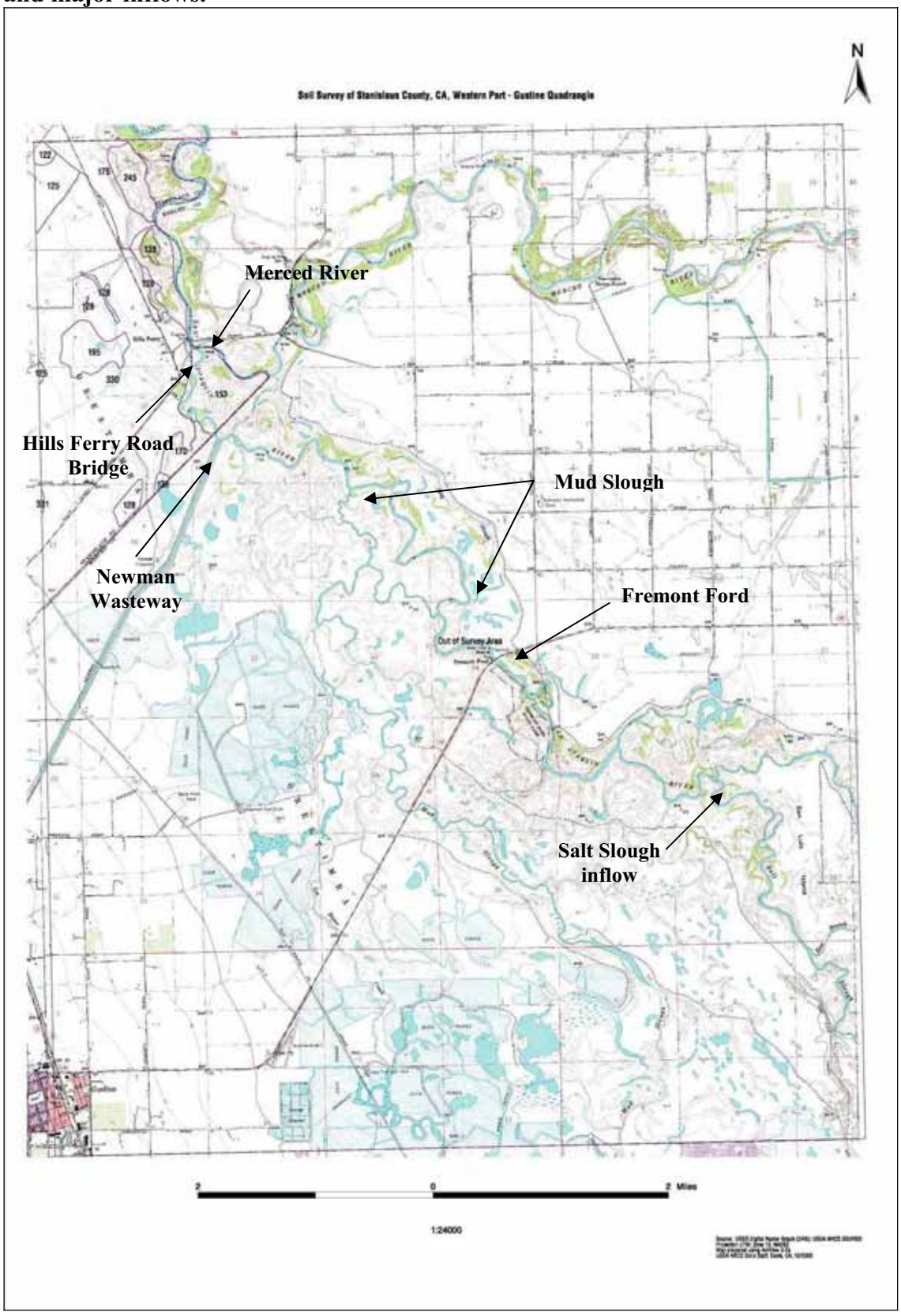


Figure 7: Crows Landing quadrangle, with Crows Landing and Patterson SWAMP stations.

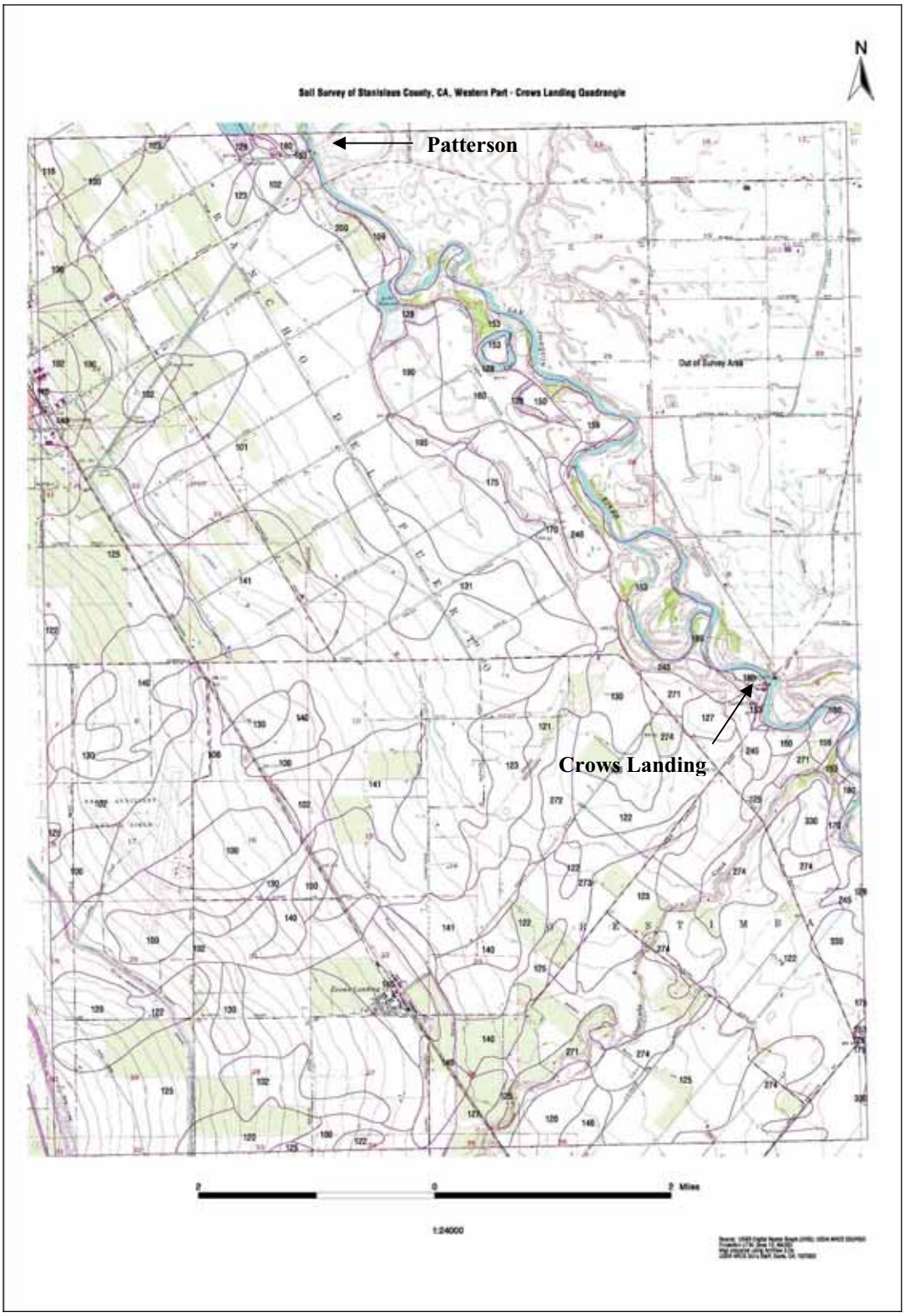


Figure 8: Ripon quadrangle, with Maze SWAMP station.

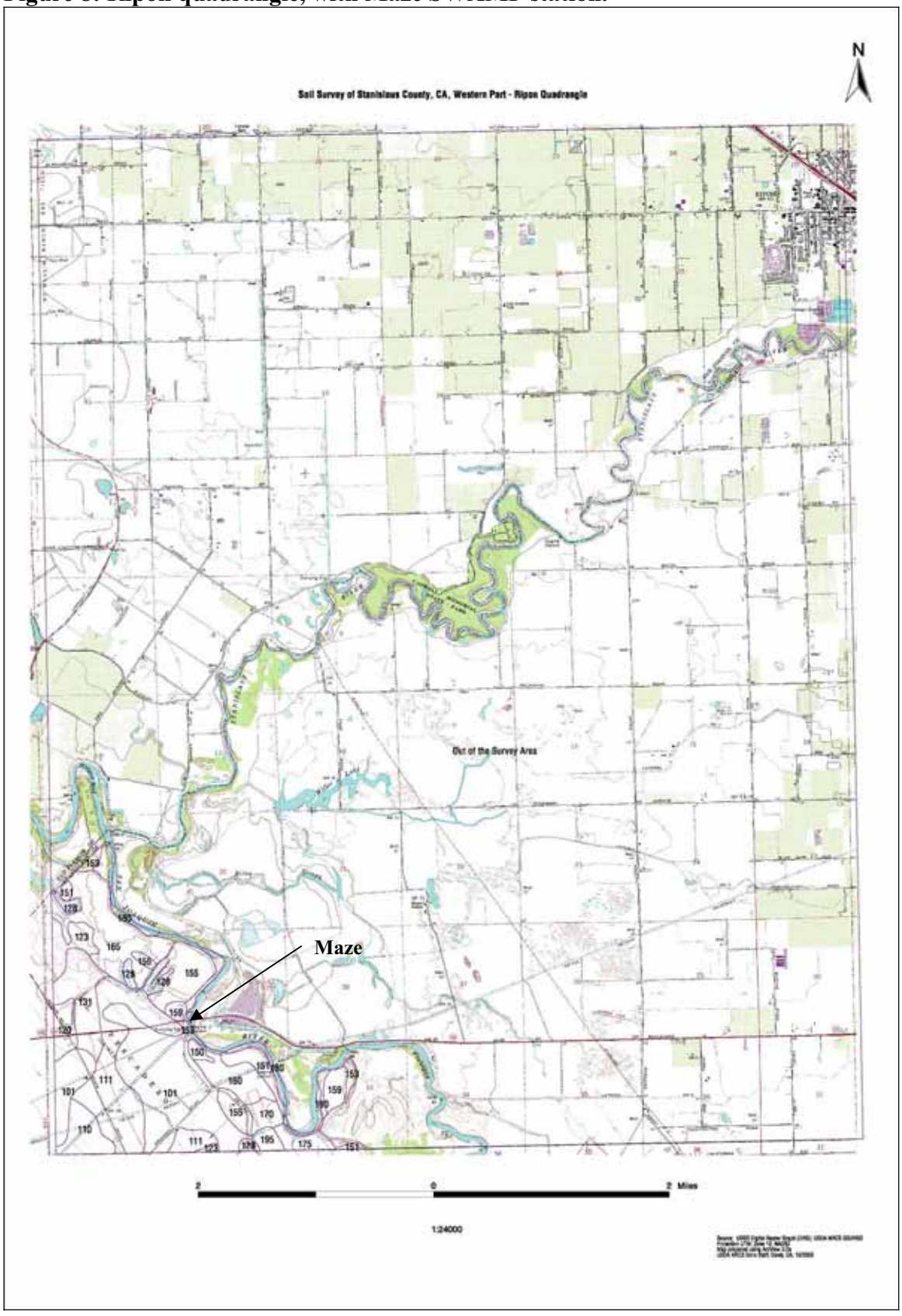
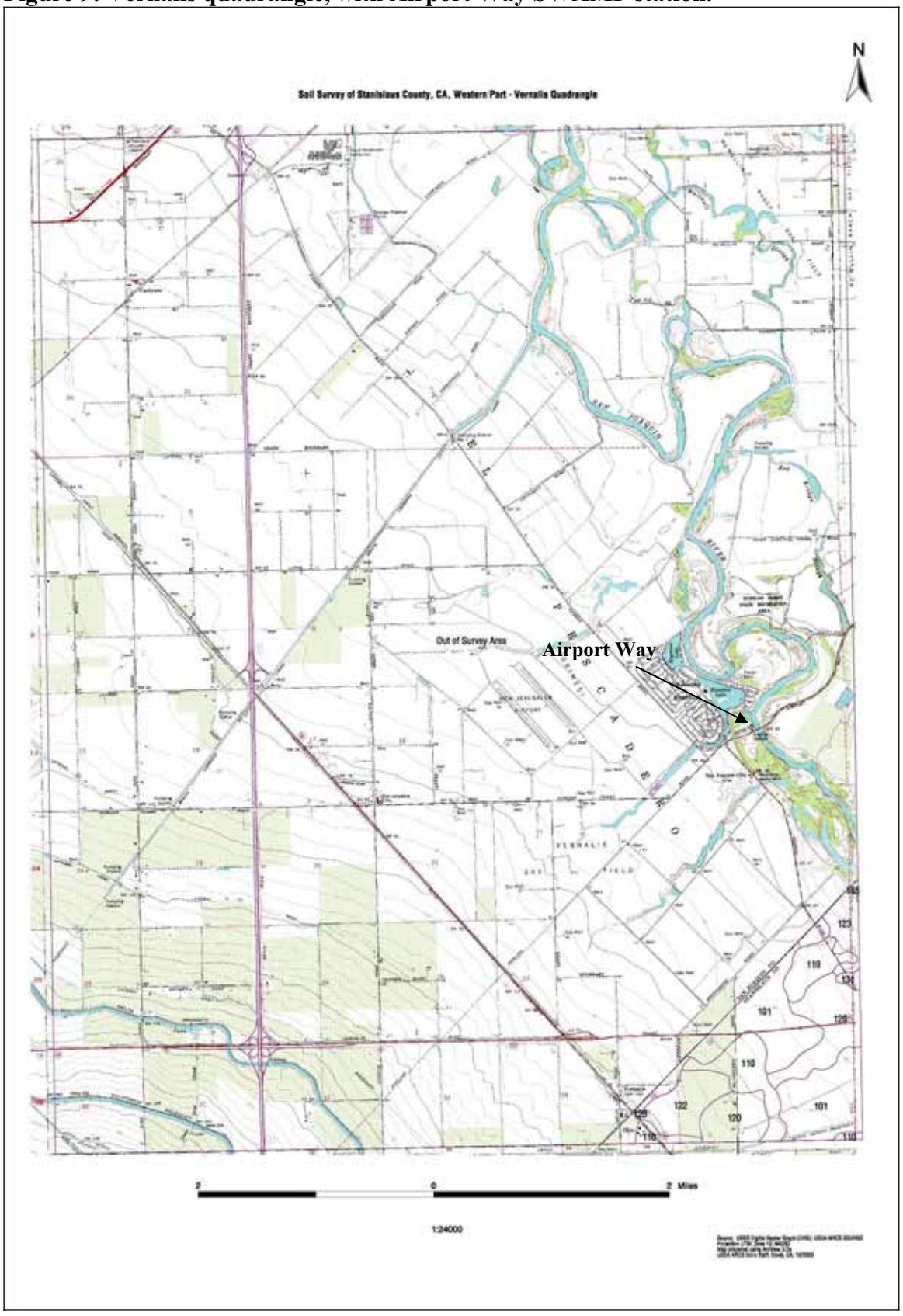


Figure 9: Vernalis quadrangle, with Airport Way SWAMP station.



3. Water Quality in the Lower San Joaquin River.

The majority of water quality problems in the LSJR are caused by high loading of salt, selenium, and boron in subsurface drainage and naturally displaced groundwater along with irrigation surface water runoff discharged to the river. (Department of Water Resources, *State Water Project Sanitary Update 2001* ("SWP Sanitary Update 2001"), p[4-78].)

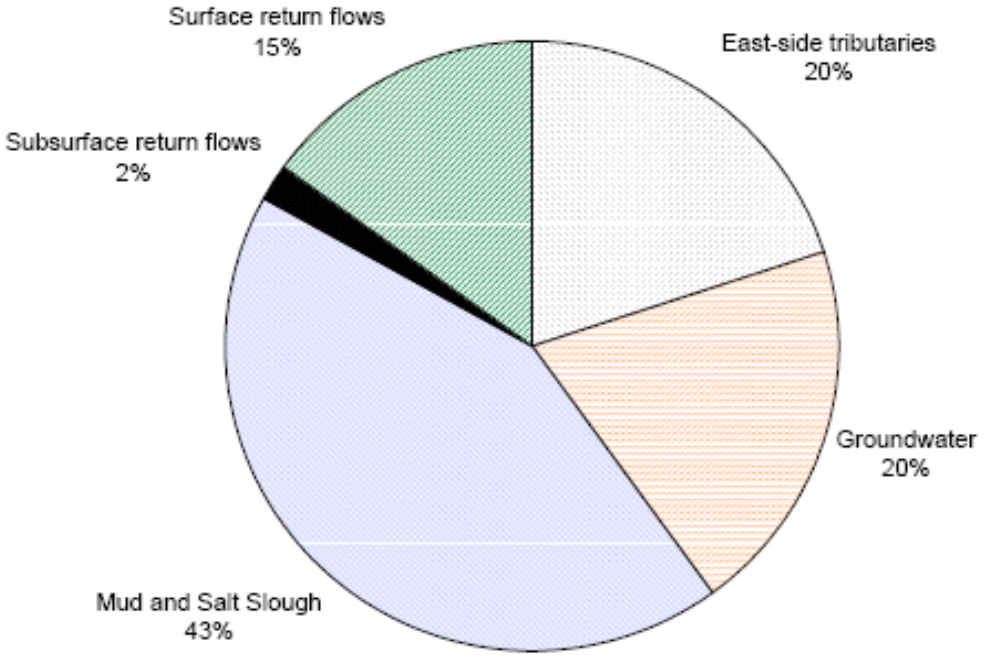
From 1977 to 1997, mean annual salt loading at Vernalis was approximately 1.1 million tons. (SJR Salt & Boron TMDL Appendix 1, p26.) In that period, annual salt loading ranged from a low of 442,000 tons in 1977 (the driest year of record) to a maximum of 2.7 million tons in 1983 (the wettest year of record). (Id.)

Salt contributions from SJR drainage mainly result from re-circulated seawater in DMC delivered irrigation surface water and subsurface drainage. (SWP Sanitary Update 2001, p[4-78].) The source water for irrigation on the west side of the LSJR Basin is pumped Delta water imported by the DMC that contains seawater and agricultural runoff from the Delta and Sacramento River, as well as re-circulated SJR water. (Id.) This, coupled with the shallow water table and naturally occurring minerals found in the soils, has led to higher concentrations of selenium, boron, and salts entering the SJR. (Id.)

From 1977 to 1997, the DMC accounted for approximately 47 percent of the LSJR's total salt load, as measured at Vernalis. (SJR Salt & Boron TMDL Final Staff Report, p31.) However, since the DMC water users are geographically spread out over the LSJR Basin, imported DMC salt discharges to the LSJR indirectly and thereby acts as a non-point source. (Id.) The largest direct loading comes from Mud and Salt Sloughs, which, although they account for less than 10 percent of the mean annual SJR flow,

together account for over 40 percent of the salt load. (Id. at [13-9]; *See also* Figure 10, below.)

Figure 10: **Mean Annual Loading of TDS to San Joaquin River from Water Year 1985 to 1995.**[6]

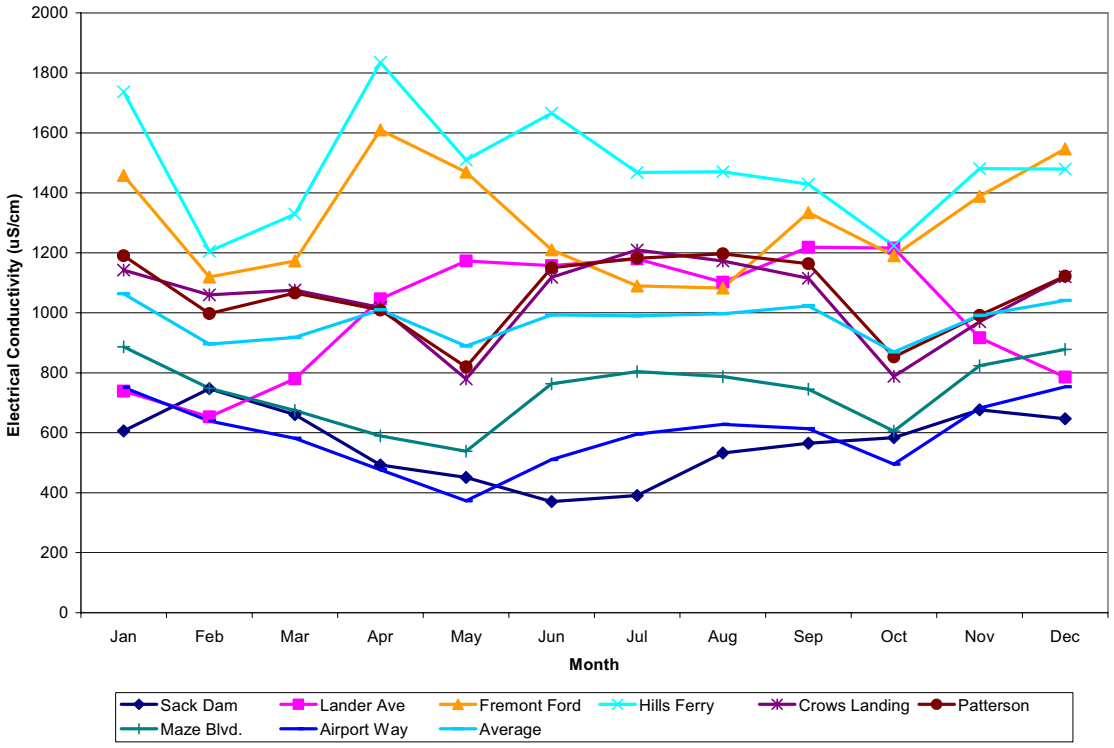


[6] See SWP Sanitary Update 2001, p[4-157] Figure [4-58].

Table 3. Average monthly electrical conductivity on the Lower San Joaquin River upstream of Airport Way near Vernalis (uS/cm) from 1995 to 2005[7]

Month	Sack Dam	Lander Ave	Fremont Ford	Hills Ferry	Crows Landing	Patterson	Maze Blvd.	Airport Way	LSJR Average	Above Hills Ferry	Below Hills Ferry
Jan	606	738	1458	1737	1143	1190	887	751	1064	1135	993
Feb	747	653	1119	1205	1059	997	749	639	896	931	861
Mar	661	780	1173	1329	1076	1066	675	582	918	986	850
Apr	493	1047	1610	1835	1018	1009	590	477	1010	1246	773
May	451	1173	1470	1510	779	820	538	374	889	1151	628
Jun	370	1157	1210	1666	1119	1150	763	511	993	1101	886
Jul	391	1180	1090	1468	1210	1182	804	596	990	1032	948
Aug	532	1102	1083	1470	1173	1197	787	628	997	1047	946
Sep	565	1219	1334	1429	1116	1164	745	613	1023	1137	909
Oct	584	1216	1190	1223	788	853	605	495	869	1053	685
Nov	676	917	1389	1481	970	991	823	682	991	1116	867
Dec	647	786	1546	1480	1120	1122	878	754	1041	1115	968
Average	560	997	1306	1486	1047	1062	737	592	973	1087	859
Irrigation	447	1132	1293	1590	1060	1072	697	517	976	1115	836
Non-Irrigation	641	901	1316	1412	1039	1055	766	645	972	1067	876

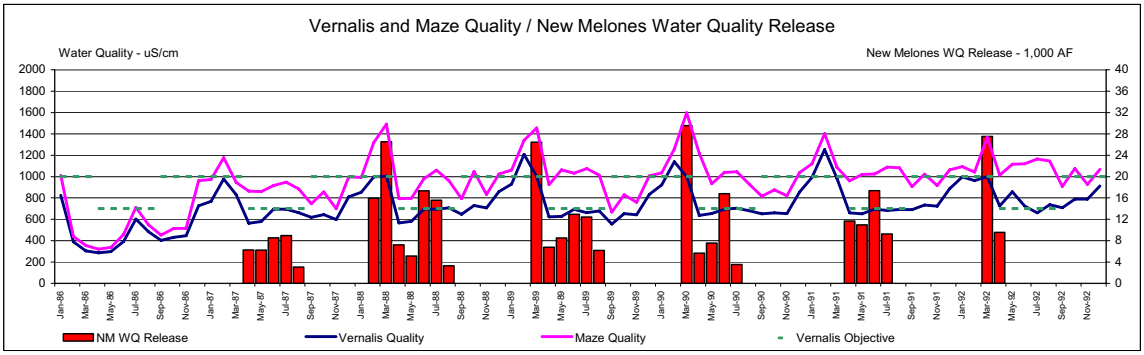
Figure 11: Monthly average electrical conductivity in the Lower San Joaquin River.



[7] See Appendix B Table 1; data available at http://www.waterboards.ca.gov/centralvalley/programs/agunit/swamp/sjr_swamp.html, accessed June 9, 2006.

Simulations of EC at Vernalis with the latest version of CALSIM II, the planning model for the State Water Project and CVP, show that, with current operations and strict compliance with the Interim Plan of Operations ("IPO"), the operations plan the USBR uses for New Melones, some of the highest EC's recorded at Vernalis would have occurred in the months between mid-January and April when the refuges release their water. (*See* Figure 12, below.)

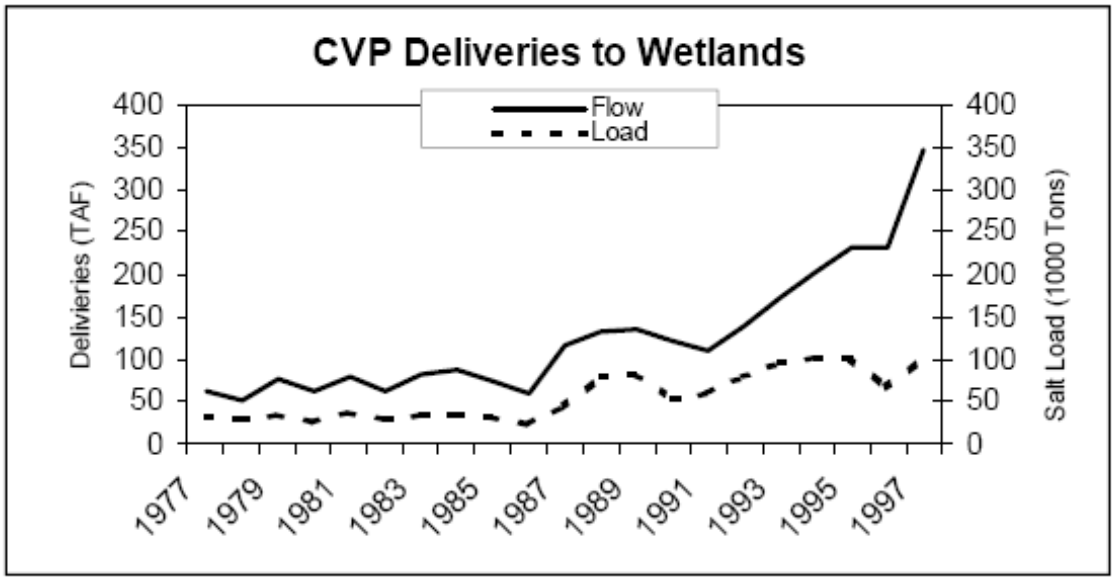
Figure 12: CALSIM II simulation of San Joaquin River Electrical Conductivity at Vernalis.[8]



Since the Central Valley Project Improvement Act ("CVPIA") was implemented, DMC deliveries to wetlands, and thereby salt contributions, have increased. (SJR Salt & Boron TMDL Appendix 1, p43.) Although the GEA diverts very little water from the LSJR, it discharges significant amounts of salt. Between 1977 and 1997, an average of 269 thousand acre-feet ("TAF"), with a mean concentration of 0.5 dS/m, a total of 56,000 tons of salt, was delivered to the GEA each year via the DMC. (Id.) Since then, water deliveries, and thereby salt deliveries, have increased. (Id.)

[8] See Periodic Review of the 1995 Bay-Delta Plan, SJRG-EXH-13, p20.

Figure 13: Central Valley Project deliveries to wetlands from 1977 to 1997.[9]

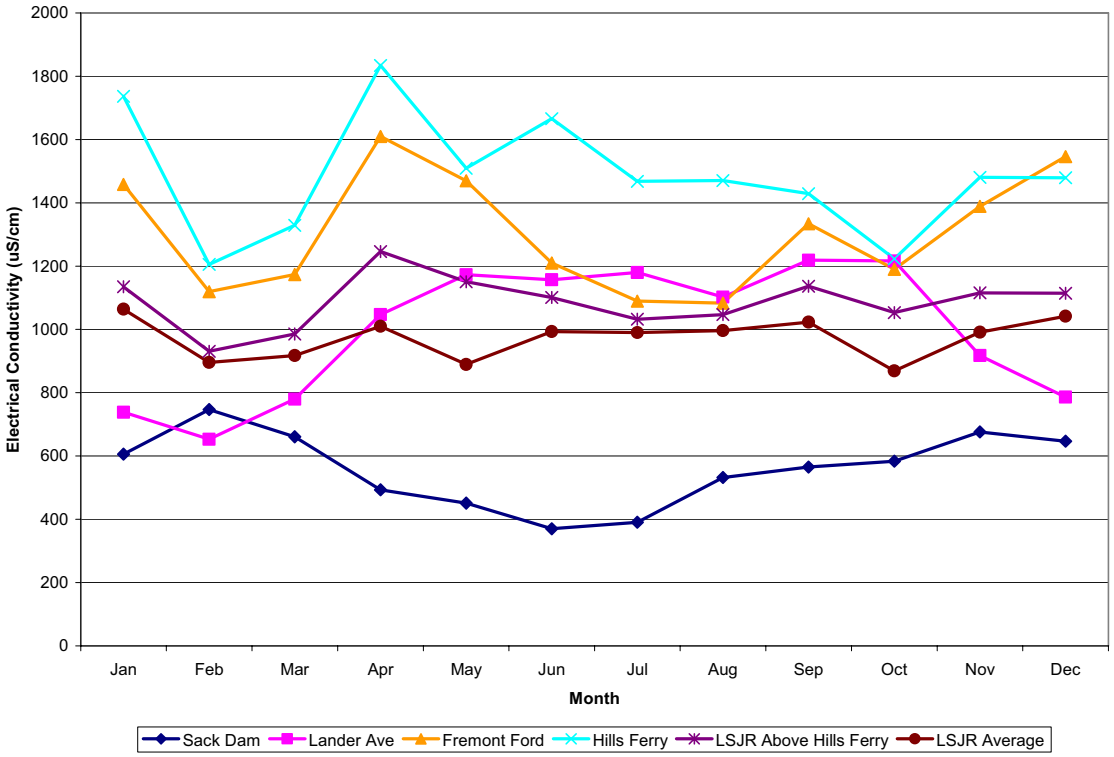


Limited data are available on wetland discharges, but the mean net discharge, based on deliveries, has been estimated at 193 TAF per year, with a mean EC of 0.6 dS/m, for a total of 101,000 tons of salt, approximately five percent of the mean annual discharge at Vernalis and nine percent of the LSJR's total salt load. (Id.)

Since the wetlands are drained between mid-January and April, all of the salt imported to the GEA from the DMC is discharged into the LSJR in this short period. The EC's simulated by CALSIM II are consistent with SWAMP data, which has, on average, sampled the highest EC's in the LSJR in January and April at Fremont Ford and Hills Ferry, where water quality is most strongly influenced by wetlands discharges. (*See* Table 2, above, and Figure 14, below.)

[9] See SJR Salt & Boron TMDL, Appendix 1, p43 Figure 3-5.

Figure 14: Monthly average electrical conductivity on the Lower San Joaquin River above Hills Ferry.



The discharge of salts from the GEA, upstream of the Merced River, significantly impacts EC downstream in the LSJR and in the Delta. To date, there has been little or no monitoring or collection of data regarding wetland discharges.

B. REGULATORY SETTING.

The State Board's statutory mandate as the state water pollution control agency derives from the Porter Cologne Water Quality Control Act ("Porter Cologne") (Water Code §13000 et seq.), which delegates to the State Board any powers delegated to the state by, and for all purposes stated in, the Federal Water Pollution Control Act ("Clean Water Act") (33 U.S.C. §1251 et seq.). In implementing the Clean Water Act, Porter Cologne requires each regional water quality control board to formulate and adopt water

quality control plans[10], also known as "basin plans", for each area in its region. (Water Code §13240.) A water quality control plan contains beneficial uses for the waters in the region, water quality objectives for such waters, and a program of implementation necessary to attain such water quality objectives. (Water Code §13050(j).) WQOs are the limits of water quality constituents or characteristics established to reasonably protect the beneficial uses of a water body or prevent nuisance.[11] (Water Code §13050(h).)

The basin planning process must be conducted in compliance with applicable requirements of Porter-Cologne and the CWA. (Government Code §11353(b)(7).) WQOs are contained in regional water quality control plans ("basin plans"). (Water Code §13241.) Regional boards cannot adopt basin plans without first holding a public hearing and giving notice by publication. (Water Code §13244.) No water quality control plan or any revision thereof, including any addition or alteration of WQOs, becomes effective until approved by the State Board. (Water Code §13245.) All such revisions must be subsequently approved by the Office of Administrative Law ("OAL"). (Government Code §11353(b)(5).) The OAL must reject all basin plans and basin plan amendments that fail to comply with the public participation requirements of the CWA. (Government Code §11353(b)(4).)

Currently, the Basin Plan lacks WQOs for EC in the LSJR. (Regional Board, Basin Plan, Table [II-1].) The nearest and most applicable EC objective is the Vernalis EC Objective for Agricultural Beneficial Uses downstream at Airport Way Bridge, Vernalis ("Vernalis EC Objective"), but the Vernalis EC Objective is a WQO for the

[10] "Water quality control plans" are referred to in the Clean Water Act as "water quality management plans." (40 CFR §130.2.)
[11] The term "water quality objective" as used in Porter Cologne is equivalent to the term "water quality standard" in the Clean Water Act. (Water Code §13050(h); 40 CFR 130.3; State Water Resource Control Board Cases (2004) 136 Cal.App.4th 674, 697 fn11.)

Southern Delta, not for the LSJR Basin. (State Board Resolution 95-24, *Revised Draft 2006 Water Quality Control Plan for the San Francisco Bar/Sacramento-San Joaquin Delta Estuary*[12] ("Bay-Delta Plan"), p 13, Table 2 (available at http://www.waterrights.ca.gov/baydelta/docs/rev2006wqcp.pdf, accessed January 5, 2007); *See also* State Board, 1978 Water Quality Control Plan for the Sacramento-San Joaquin Delta and Suisun March ("1978 Delta Plan") (August 1978), adopted pursuant Resolution No. 78-43, Table B-1 Sheet 5 of 6.) The Vernalis EC Objective was adopted in the 1995 Bay-Delta Plan and subsequently implemented in State Board Water Rights Decision 1641. (State Board Revised Decision 1641, *In re: Implementation of Water Quality Objectives for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary; A Petition to Change Points of Diversion of the Central Valley Project and the State Water Project in the Southern Delta; and A Petition to Change Places of Use and Purposes of Use of the Central Valley Project* (December 29, 1999, revised in accordance with Order WR 2000-02, March 15, 2000) 1999 WL 1678482 ("D-1641"), p182 (available at http://www.waterrights.ca.gov/Decisions/D1641rev.pdf, accessed January 5, 2007.) The Vernalis EC Objective is measured at Airport Way Bridge, near Vernalis, in San Joaquin County, and requires a 30-day running average EC of 700 microsiemens per centimeter ("uS/cm") from April 1 through August 31 ("South Delta Irrigation Season EC Objective") and 1000 uS/cm at all other times ("South Delta Non-Irrigation Season EC Objective").[13] (See Table 4, below.) In addition, the Regional Board has adopted boron water quality objectives for the LSJR, but these objectives were never approved by the

[12] At the time these comments were submitted, the 2006 Bay-Delta Plan was still awaiting approval by the OAL and US EPA. As a result, there was no "final" version. Consequently, the "Revised Draft", the version adopted by the State Board and whose approval is expected, is cited herein.

[13] EC is also often measured and reported as deciSiemens per meter ("dS/m"). For purposes of conversion, 1 dS/m = 1000 uS/cm.

United States Environmental Protection Agency ("USEPA"). Agriculture is the most sensitive beneficial use with regard to salinity. (State Board Water Quality Order No. 85-1, *Technical Report: Regulation of Agricultural Drainage to the San Joaquin River*, p[VIII-14] ("WQO 85-1 Technical Report").) Therefore, an EC objective protective of agriculture will also protect all other beneficial uses.

Table 4: Water Quality Objective for the Southern Delta for Electrical Conductivity and boron.[14]

SALINITY Reach	Irrigation Season (April 1 – August 31)	Non-Irrigation Season (September 1 – March 31)
Vernalis only	700 uS/cm (30-day running average)	1000 uS/cm (30-day running average)
BORON Reach	Irrigation Season (March 15 – September 15)	Non-Irrigation Season (September 16 – March 14)
Merced River to Vernalis	2.0 mg/L (maximum) 0.8 mg/L (monthly mean)	2.6 mg/L (maximum) 1.0 mg/L (monthly mean)[15]

As an objective based on a running average, "Determination of compliance… begins on the last day of the averaging period. If the objective is not met on the last day of the averaging period, all days in the averaging period are considered out of compliance." (2006 Revised Draft Bay-Delta Plan, p13 fn2.) Footnote 2 is a critical component in the United States Bureau of Reclamation's ("USBR") method of operating New Melones. If not for footnote 2, New Melones would have to start releasing more water in March in order to comply with the Vernalis EC Objective on April 1.

Per the first sentence of footnote 2, compliance is based on the 30th day of a 30-day averaging period. Since the Vernalis EC Objective has two seasonal objectives, the 30-day running average does not run continuously throughout the year. Instead, a new 30-day averaging period starts every April 1 and every September 1. Consequently, in

[14] See Basin Plan, Table [III-5]; Revised Draft 2006 Bay-Delta Plan, p13 Table 2
[15] In Critical years, the required monthly mean Non-Irrigation Season Merced River-Vernalis Boron Objective is 1.3 mg/L.

April and September, when the seasonal objectives change, compliance is not determined until April 30th and September 30th and no compliance is assessed on the first 29 days of April and September. If, based on the 30-day running average and the effect of the second sentence of footnote 2, the 30th day is out of compliance, the entire 30-day period is out of compliance. As a result, if April 30th or September 30th is out of compliance, then all of April or all of September are out of compliance. The seasonal objectives led to such a degree of confusion that the method of determining compliance was clarified in the 2006 Bay-Delta Plan, which inserted, after the first sentence, "The averaging period commences with the first day of the time period for the applicable objective." (2006 Bay-Delta Plan, p12 Table 2 fn2.) Since the first day of the time period for the April through August objective is April 1, the first day of the averaging period is April 1.

After the State Board adopted the 1995 Bay-Delta Plan, it directed the Regional Board to establish EC objectives for the LSJR upstream of Vernalis. (1995 Bay-Delta Plan, p29-30; D-1641, p85.) The State Board again directed the Regional Board to develop EC objective for the LSJR upstream of Vernalis. (Revised Draft 2006 Bay-Delta Plan, p30.) Thus far, no such objectives have been adopted.

1. Water Code §12230.

According to Water Code §12230, "Legislative Findings and Declarations" for the SJR:

> "The Legislature hereby finds and declares that a serious problem of water quality exists in the San Joaquin River between the junction of the San Joaquin River and the Merced River and the junction of the San Joaquin River with Middle River; that by virtue of the nature and causes of the problem and its effect upon water supplies in the Sacramento-San Joaquin Delta, it is a matter of statewide interest and is the responsibility of the State to determine an equitable and feasible solution to this problem."

Water Code §12230, adopted in 1961 only says the SJR has "a serious water quality" problem the State should solve. It addresses water quality problems generally, but does not specifically refer to salt. Furthermore, it cannot supersede Clean Water Act §303(d) requirements or EPA regulations.

2. State Water Resources Control Board Water Quality Order 85-1.

WQO 85-1 was adopted in 1985 in response to a complaint that wastewater discharged from Kesterson Reservoir that caused, or threatened to cause, pollution and nuisance, especially due to high selenium concentrations in the discharged water. (State Board WQO 85-1, p3-6.) The discharged wastewater was particularly high in selenium, mercury, and nickel. (Id., p32.) In response, the State Board ordered the Regional Board to develop a monitoring program and collect data adequately characterizing the quantity, quality, and destination of agricultural drainage flows across the boundaries of irrigation districts and other appropriate entities. (Id., p64.) Additionally, the State Board formed a technical committee to draft a report to serve as a basis for "appropriate" basin plan amendments and a program the Regional Board would undertake to regulate agriculture drainage into the SJR Basin. (Id., p64-65.)

WQO 85-1 directed the Regional Board to develop appropriate basin plan amendments and impose drainage controls for the control of agriculture drainage generally, but not salt and boron in particular. (Id.) Selenium was the only pollutant the State Board specifically instructed the Regional Board to control. (Id., p64.)

3. Regulation of Agricultural Drainage to the San Joaquin River: Final Report, Prepared Pursuant to Water Quality Order 85-1.

Pursuant to WQO 85-1, a technical committee prepared a report in 1987 on Delta water quality and recommendations for the control of agricultural discharges, which was subsequently adopted pursuant to State Board Resolution 87-78. Increasing salinity caused by subsurface agriculture drainage had long been a major concern in the LSJR Basin. (WQO 85-1 Technical Report, p[IV-3].) Furthermore, the 1975 Basin Plan discussed water quality concerns caused by EC and classified the LSJR from Lander Avenue to below Vernalis a "water quality limited segment" due to excessive salinity. (Id., p[III-15] Therefore, the Technical Committee included salt among the "constituents of concern" in the LSJR Basin. (Id., p[V-3])

In developing water quality objectives, the Technical Committee requested the State Board Division of Water Quality to prepare water quality criteria which would prevent excessive selenium bioaccumulation and protect beneficial uses from direct toxicity caused by selenium and other constituents. (WQO 85-1 Technical Report, p[IV-4].)

At that time, the salinity objective for the South Delta was 500 mg/L TDS, regardless of changes caused by hydrologic conditions experienced during different water year types. (WQO 85-1, Attachment 10.) The 500 mg/L TDS standard was, however, not based on the needs of agriculture, but on the needs of the USBR's Tracy Pumping Plant:

> "The agricultural standards in the Basin 5B Plan reflect criteria that have not changed for over 13 years and are based essentially on the water quality needs of the Bureau's Tracy Pumping Plant in the southern Delta."

(D-1485, p11.)

The focus in developing WQOs was to provide a level of protection that would have existed under pre-project conditions (pre-1944), but with present depletions unrelated to project operations:

> "The trial objectives for agriculture and municipal and industrial uses (consumptive uses) reflected the level of protection which would have been available under pre-project conditions (1922-1944). However, as many parties pointed out, water quality standards based on pre-project conditions would require the SNP and CVP to offset increased upstream depletions, unrelated to project operations, which have occurred since 1944 to the extent such upstream depletions infringe upon Delta riparian rights. The trial Standards thus would require the projects to provide water quality levels significantly better than conditions which would prevail in the absence of the projects. Consequently, the staff trial objectives for consumptive uses have been replaced by conceptual alternatives to reflect without project conditions at 1980 level of depletions."

(1978 Delta Plan, p[V-3].) The subsequently adopted Water Right Decision 1485 ("D-1485") acknowledged the 1978 Delta Plan's policy of developing WQOs based on pre-project conditions:

> "The underlying principle of these standards is that water quality in the Delta should be at least as good as those levels which would have been available had the state and federal projects not been constructed, as limited by the constitutional mandate of reasonable use. The standards include adjustments in the levels of protection to reflect changes in hydrologic conditions experienced under different water year types."

(State Board, Water Right Decision 1485 (August 1978), p10 (available at http://www.waterrights.ca.gov/hearings/decisions/WRD1485.PDF, accessed January 26, 2007).)

In proceeding to develop WQOs for agricultural beneficial uses, the Technical Committee, noting that, "[f]or agricultural beneficial uses the existing criteria still appear to be appropriate," adopted recommendations previously developed by the University of

California Consultants in 1974 for boron, molybdenum, selenium, and salinity. (WQO 85-1, Attachment 10, p[IV-4].)

The Technical Committee first observed that a criterion of 700 uS/cm would fully protect all crops in the LSJR Basin and in the South Delta:

> "An EC of 0.7 mmhos/cm permits production of all crops on all soils with adequate drainage in the San Joaquin River Basin and downstream in the southern Delta. Salinity levels above this require special cropping or water management techniques. Above an EC of 3.0 mmhos/cm (about 2,000 mg/l TDS) water quality is generally too poor to support agriculture."

(WQO 85-1 Technical Report, p[IV-9].) The Technical Committee's general guidelines are summarized in Table 5, below.

Table 5: Salinity and water quality criteria and irrigation and stockwatering supply needs recommended in State Board Order No. 85-1 Technical Report[16]

NEEDS	**EC** (dS/m)	**TDS**
Water which permits full production of all crops on all soils with adequate drainage in the San Joaquin River Basin and Southern Delta	0.7	415-430
Water which can have detrimental effects on crops	0.8-3.0	470-2,000
Water that may have severe effects on crops	>3.0	>2,000
Excellent for stockwatering	1.5	950
Very satisfactory for stockwatering	1.5-5.0	950-3,200

The Technical Committee also studied the soils and cropping patterns in other areas of the LSJR Basin and made more specific recommendations for such areas. For the segment from Lander Avenue on the LSJR down to Hills Ferry Road Bridge, just above the Merced River, the technical committee recommended an EC objective of 3.0 dS/m:

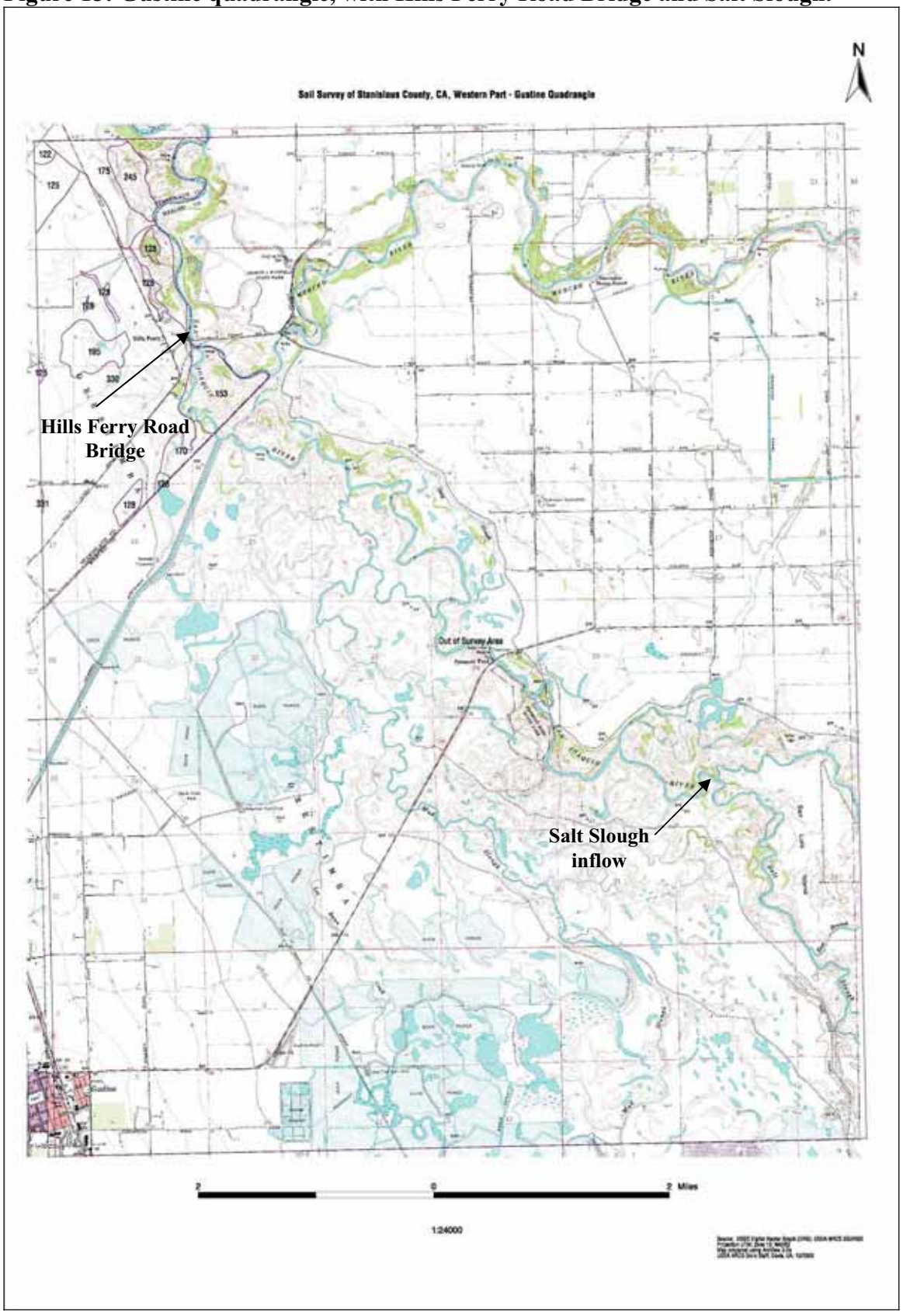
> "In Salt Slough and areas of the San Joaquin River downstream to Hills Ferry there are only a few agricultural diversions. These diversions are for the irrigation of pasture which is very salt tolerant. Historical maximum salinity concentrations in Salt Slough are typically as high as or higher than 3.0 mmhos/cm EC . An objective of 3.0 mmhos/cm EC supports the existing uses in Salt Slough

[16] WQO 85-1 Technical Report, p[IV-31] Table IV-3.

> and areas downstream to Hills Ferry consistent with the historic water quality and present agricultural practices. Therefore, an objective of 3.0 mmhos/cm EC is recommended as the water quality objective for this limited area."

(WQO 85-1 Technical Report, p[VIII-16]; See Figure 15, below.)

Figure 15: Gustine quadrangle, with Hills Ferry Road Bridge and Salt Slough.



For the segment below Hills Ferry, the Technical Committee recommended an objective of 1.0 dS/m:

> "The Regional Board staff has evaluated the soil types and crops that are grown using diversions from the San Joaquin River in the areas immediately downstream of Hills Ferry. They have determined that a water quality objective of 1.0 mmhos/cm EC (about 620 mg/l TDS) would provide reasonable protection to these crops on the soils in this area."

(WQO 85-1 Technical Report, p[VIII-15]; See Figure 15, above.)

4. 1991 Water Quality Control Plan for Salinity.

The Bay-Delta Plan for Salinity for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary ("1991 Salinity Plan"), adopted in May of 1991 pursuant to State Board Resolution No. 91-34, adopted, and subsequently implemented, today's Southern Delta WQO for Agricultural Beneficial Uses. (State Board Resolution 91-34, *1991 Bay-Delta Plan for Salinity for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* (May 1991), p[5-9].) The State Board based its analysis on the University of California's "Guidelines for Interpretation of Water Quality for Agriculture" and the 1978 Delta Plan. (Id. at [5-12].) The Southern Delta WQO for Agricultural Beneficial Uses were developed using beans and alfalfa, the two most salt-sensitive crops grown in the southern Delta at the time, as representative salt-sensitive crops for establishing WQOs, because meeting objectives for beans and alfalfa would protect less salt-sensitive crops. (Id. at [5-9].)

The implementation plan for the 1991 Bay-Delta WQCP consisted of two stages. Interim Stage 1 established a WQO for agricultural beneficial uses for the southern Delta ("Southern Delta WQO for Agricultural Beneficial Uses") of 500 milligrams per liter

("mg/l") of total dissolved solids ("TDS") all year, with the compliance location at Airport Way Bridge, near the town of Vernalis ("Vernalis"). (Id.) Interim Stage 2, to be implemented no later than 1994, established a Southern Delta WQO for Agricultural Beneficial Uses at Vernalis of ("Vernalis EC Objective") of a maximum 30-day running average mean daily Electrical Conductivity ("EC"), a measure of salinity, of 0.7 decisiemens per meter ("dS/m") from April 1 through August 31, the irrigation season, and September 1 through March 31, the non-irrigation season. (Id.) No EC objectives for the LSJR upstream of Vernalis were adopted and no adjustments were made to reflect changes in hydrologic conditions experienced under different water year types.

The planned water rights proceeding never occurred, but Water Rights Order 95-06 subsequently modified the terms and conditions of the USBR's water right permits to require compliance with the Vernalis EC Objective as specified in the Basin Plan, which had, in turn, been adopted from the 1991 Salinity Plan). (State Board, Water Rights Order No. 95-06, *Order Regarding Petition for Changes in Water Rights that Authorize Place Diversion and Use of Waters Affecting the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* (June 8, 1995) ("WRO 95-06"), p52 (available at http://www.waterrights.ca.gov/hearings/WaterRightOrders/WRO95-06.pdf, accessed February 16, 2007).; *See also* Basin Plan, p[III-6.01].) Water Rights Order 98-09 subsequently extended WRO 95-06, which was only an interim order and scheduled to expire at the end of 1998, until the end of 1999. (State Board, Water Rights Order No. 98-09, *Order Extending the Effective Term of SWRCB Order WR 95-6 Regarding Diversion of Waters From the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* (December 3, 1998), ("WRO 98-09"), p2 (available at

http://www.waterrights.ca.gov/hearings/WaterRightOrders/WRO98-09.pdf, accessed February 16, 2007).)

The 1991 Salinity Plan also requested that the Regional Board develop an "initial salt-load reduction program," whose goal would be "to reduce the annual salt-loads discharged to the SJR by at least 10 percent and to adjust the timing of salt discharges from low flow to high flow periods." (1991 Salinity Plan, p[1-16].) In the subsequent water rights proceeding, the State Board planned for the Regional Board to discuss implementation methods, such as "drainage operation plans and best management practices." (Id.)

The Regional Board responded by "requiring drainage operation plans from the areas on the westside of the SJR with the worst drainage problems. The drainage operation plans focus[ed] on water conservation to reduce salt and trace metal loading to the river." (WRO 95-06, p42.)

5. The 1995 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary and Water Right Decision 1641.

a. The 1995 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary.

In the 1995 Bay-Delta Plan, the State Board revisited the Vernalis EC Objective and made minor modifications. (State Board Resolution No. 95-24, *1995 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* ("1995 Bay-Delta Plan"), p1 (available at http://www.waterrights.ca.gov/baydelta/1995Bay-Delta PlanB.pdf, accessed January 5, 2007.)) The flow objectives established were expected to strongly contribute to meeting the Vernalis EC Objective. (Id., p29.) The Program of Implementation would also allocate responsibility for implementing the

supply-related objectives of the 1995 Bay-Delta Plan, including those for Delta outflow, river flows, export limits, Delta Cross Channel Gates, and the Vernalis EC Objective, in a subsequent water right proceeding, which would establishing terms and conditions in appropriate water right permits. (Id., p27.)

The State Board also recommended that the Regional Board "should" continue the salt load reduction program it initiated in response to the 1991 Bay-Delta Plan. (1995 Bay-Delta Plan, p29.)

b. Water Rights Decision 1641.

On December 29, 1999, the State Board adopted D-1641, the water rights portion of the 1995 Bay-Bay-Delta Plan's Program of Implementation, and therein assigned responsibility among water right holders for meeting the flow-dependent water quality objectives set forth in the 1995 Bay-Delta Plan. (D-1641, p6.) D-1641 specifically addressed the issue of the USBR's responsibility for meeting the Vernalis EC Objective and the Vernalis fishery flow requirements. As for the Vernalis EC Objective, the State Board observed that:

> In D-1422, notwithstanding that the [Bureau] estimated that no more than 70 taf would be needed for salinity control at Vernalis, the State Board required the [Bureau] to meet the Vernalis objective, without setting a limit of 70 taf.

(D-1641, p79.)

D-1641 therein reaffirmed the applicability of the Vernalis EC Objective, as well as the dissolved oxygen objective on the Stanislaus River, to the USBR's operation of the New Melones Project, through amendments to the USBR's water right permits for the project. (D-1641, p160.) In so doing, the State Board specifically stated that the "Licensee/Permittee shall, at all times, meet the Vernalis water quality objectives for

agricultural beneficial uses at Vernalis." (D-1641, p161.) Absent compliance with the Vernalis EC Objective "no diversion [was] authorized for consumptive uses." (D-1641, p162.)

D-1641 offered the USBR flexibility as to how to achieve compliance with its water quality and fishery requirements. In footnote 87, the State Board provided that the water quality and fishery flow conditions "do not mandate that the Permittee use water under these permits to meet these conditions if it uses other sources of water or other means to meet these conditions." (D-1641, p160 n87.) Thus, D-1641 allows the USBR to meet the Vernalis EC Objective requirements of its permits through means other than New Melones Dam releases, where feasible alternatives are available to the USBR. However, the State Board was unaware of any feasible alternatives to releases from New Melones that were available to the United States during the 1993-2004 time period that would have satisfied these requirements. (State Water Resource Control Board Cases ("SWRCB Cases") (2006) 136 Cal.App.4th 674, 764.)

D-1641 made the USBR solely responsible for maintaining the Vernalis EC Objective and prohibited any diversion into New Melones for consumptive use unless the Vernalis EC Objective and Stanislaus River Dissolved Oxygen Objective are met. (D-1641, p159-161.) The USBR was further required to develop a program it would use to consistently meet the foregoing objectives. (D-1641, p163.) The USBR was required to use modeling to evaluate the effectiveness of the program in meetings the Vernalis EC Objectives. (Id.) If no program was developed, the USBR was required to report all other actions it had taken in attempting to meet the objectives, included drainage and management alternatives. (Id.) The Executive Director would evaluate the report and

determine whether further action should be taken by the SWRCB to ensure that the objectives are met. (Id.)

The USBR is subject to enforcement action by the State Board should it fail to comply with its obligations.[17] (Id.) If the DWR and USBR violate, or threaten to violate, the terms and conditions of their permits, the State Board may order them to cease and desist from their violations. (Water Code §1831.) Then, if the DWR and USBR fail to comply with an order to cease and desist from violating their permit terms and conditions, they may be liable for up to $1,000 per day that the violation occurs. (Water Code §1845(b)(1).) The State Board may also seek civil liability or request further action by the Attorney General, who "shall" petition for prohibitory of mandatory injunctive relief, which may include temporary restraining orders, preliminary injunctions, or permanent injunctions. (Water Code §1845.) Having allocated responsibility through D-1641, the State Board now has a powerful enforcement tool at its disposal to help ensure water quality objectives are achieved and beneficial uses protected.

D-1641 further recommended that the Regional Board adopt a basin plan amendment to regulate the timing of agriculture drainage discharges into the LSJR, but only after the adoption of EC objective upstream from Vernalis. (D-1641, p8.) However, while EPA regulations implementing §303(d) of the CWA require development and implementation of TMDLs for all water bodies, TMDLs are only permitted for unlisted

[17] Exceedances occurred from 1987 to 1994, but no enforcement actions were undertaken, due to an understanding of the inability to meet the Vernalis EC Objective as a result of the unprecedented drought. Regardless, the State Board has long been aware of enforcement as an implementation method, noting in the 1978 Delta Plan that "all of the water right permits for the San Joaquin River Basin upstream of the Delta include a paramount provision that appropriations under [CVP and SWP permits] are subject to prior vested rights." (1978 Delta Plan, pV-13].)

water bodies after they have been developed for all listed water bodies. (40 CFR §130.7(e).)

The salt-load reduction program described was not necessarily a TMDL, but the development and implementation of EC objectives, with a TMDL being one of several possible methods of implementation. (D-1641, p85; see also the Reporter's Transcript for D-1641, p4847 (October 15, 1998); see also Central Valley Regional Water Quality Control Board, Agricultural Drainage and Planning Unit, *Work Plan San Joaquin River Basin Plan Amendment Addressing Salt and Boron* (June 1997), p5.) Coping with resource issues and staffing priorities and the need for clearer "buy-in" for the necessary upstream work, the Regional Board, in violation of the State Board's mandate in D-1641, proceeded directly with the development of the SJR Salt & Boron TMDL. (Tr. Les Grober, State Board Meeting (November 16, 2005), p58.) As the Regional Board explained in its responses to comments on the SJR Salt & Boron TMDL:

> Establishment of new water quality objectives was excluded from the initial phase of the TMDL by design so that significant improvements in water quality could be achieved without further delay… Staff believes phasing is appropriate because establishment of water quality objectives for the upper reaches of the LSJR will be extremely difficult; this difficulty would likely result in delayed adoption of this TMDL. Such a delay may be unacceptable to downstream and environmental interests and the U.S. EPA. Establishment of water quality objectives for the upper reaches of the LSJR will be extremely difficult because of issues related to use attainability as defined in the Clean Water Act. In particular, hydromodifications that contribute to extremely low and no flow conditions make attainability of objectives established to protect beneficial uses potentially difficult or impossible. In the interim, the initial phase of this TMDL would provide the framework for how new water quality objectives would be implemented. The TMDL represents an important first step toward improving salinity conditions in the LSJR. To help alleviate concerns regarding the timeliness of developing the upstream water quality objectives, staff will include a time schedule for

> adoption of the upstream water quality objectives into the proposed basin plan amendment.

(Regional Board, S*JR Salt & Boron TMDL Response To Written Public Comments On The November 2003 Public Review Draft Staff Report For The Control Of Salt And Boron Discharges Into The Lower San Joaquin River* (July 2004) ("SJR Salt & Boron TMDL Response to Comments July 2004"), p46 (available at http://www.waterboards.ca.gov/centralvalley/programs/tmdl/vernalis-salt-boron/responsetocoms.pdf, accessed January 19, 2007).)

6. Litigation Outcomes of 2006.

2006 saw the resolution of significant litigation actions that whose outcomes settled long-running disputes and answered many legal questions regarding the Delta and LSJR salinity. Two actions, the State Water Resource Control Board Cases ("SWRCB Cases") ((2006) 136 Cal.App.4th 674) in the California Third District Court of Appeal ("3rd DCA") and Central Delta Water Agency v. United States Bureau of Reclamation ("CDWA v. USBR") ((2006) 452 F.3d 1021) in the US Ninth Circuit Court of Appeal ("9th Circuit"), were specifically directed towards D-1641 or elements of its implementation. Meanwhile, the parties in Natural Resources Defense Council et al. v. Rodgers ("NRDC v. Rodgers") (Civ. No. S-88-1658 LKK/GGH (E.D. Cal.)) agreed to a settlement that may significantly affect hydrologic conditions and water quality in the LSJR.

a. State Water Resource Control Board Cases.

The SWRCB Cases involved challenges to various aspects of D-1641, among them a challenge by the "Central Delta parties", consisting of the Central Delta Water Agency, RC Farms, Inc., Reclamation District No. 2072, Reclamation District No. 2039,

Zuckerman-Mandeville, Inc., and the South Delta Water Agency, to the implementation of the Southern Delta Salinity Objectives. (SWRCB Cases, *supra* 136 Cal.App.4th at 734.) Specifically, the Central Delta parties argued that the State Board had failed to fully implement the 1995 Bay-Delta Plan by not implementing a plan to achieve the Vernalis EC Objective and other Southern Delta EC Objectives, because "[a]lthough the Board assigned the responsibility for meeting the salinity standards to the Bureau and [the Department], the evidence as well as the statements of the Board clearly show that the Bureau ... [did] not plan to implement any actions which will improve its ability to meet the salinity standards." (Id.)

In an opinion drafted by Judge Ronald Robie, the 3rd DCA held that the State Board was not required to tell the USBR exactly how it was required to meet the Vernalis and other Southern Delta EC Objectives, but, rather, it was sufficient that D-1641 directed the USBR and DWR to meet the objectives. (Id.) If such a showing had been made, the D-1641's allocation of responsibility would have been "illusory" and the State Board would have failed to implement the 1995 Bay-Delta Plan. (Id.)

The Central Delta parties further alleged that the State Board, in approving the long-term change petitions for the San Joaquin River Agreement, had further failed to implement the Vernalis and other Southern Delta EC Objectives in the 1995 Bay-Delta Plan, because the shift in stream flows from late spring and summer to April through May would degrade water quality, specifically salinity. (Id. at 737.) The Central Delta parties' arguments regarding water quality impacts were, however, "beside the point", as the USBR had been ordered, by the State Board, to meet the Vernalis EC Objective irrespective of changes made to its licenses. (Id. at 743.) Further, as D-1641 required the

USBR to meet the Vernalis EC Objective through whatever means necessary, it must be presumed that the USBR will comply with the legal obligation places upon it by the State Board and that the State Board would enforce that obligation. (Id.) The Central Delta parties had not shown that the USBR could not meet the Vernalis EC Objective and, consequently, had nothing other than "fear" that the USBR would not do so, and fear alone was insufficient. (Id. at 744.)

b. Central Delta Water Agency v. United States Bureau of Reclamation.

Shortly after the 3rd DCA issued their decision in the SWRCB Cases, the 9th Circuit issued its decision in CDWA v. USBR, wherein Central Delta Water Agency, South Delta Water Agency, Alexander Hildebrand, and RC Farms, Inc. ("Delta parties") claimed that the USBR was violating the Central Valley Improvement Act ("CVPIA") (CVPIA, Publ. Law No. 102-575 §3406(b) 106 Stat 4600, 4604 (October 30, 1992)), by operating the CVP in a manner that would at some point in the future violate the Vernalis EC Objective. (CDWA v USBR, *supra* 452 F.3d at 1023.)

However, the CVPIA required the USBR to operate the CVP to comply with all obligations under both State and Federal law, including decisions made by the State Board, namely, the Vernalis EC Objective. (Id. at 1024.)

To comply with its flow-related obligations, including its obligation to meet the Vernalis EC Objective, the USBR, using the now-outdated STANMOD model, developed theIPO in 1997. (Id.; *Long Term Central Valley Project Operations Criteria and Plan Biological Assessment* ("CVP-OCAP-BA") (June 30, 2004), p[2-49] (available at http://www.usbr.gov/mp/cvo/ocap/OCAP_BA_6_30_04.pdf, accessed January 5, 2007).) The IPO defines categories of water supply and, based on storage and projected

inflow, allocates annual water releases for CVP contracts and in-stream fishery enhancement, water quality, and Vernalis flow requirements required in D-1641. (Id.) The IPO supports meeting the Vernalis flows from the Stanislaus required in D-1641 when water conditions are determined to be in a "high" or "medium-high" IPO designation with up to 75 TAF of water. (Id., p[2-50]; see Table 6 and Table 7, below.) If the Vernalis EC Objectives cannot be met using the IPO, then additional water is used to achieve compliance. (Id.)

Table 6. Inflow characteristics for the New Melones Interim Plan of Operations.[18]

Annual Water Supply Category	March-September Forecasted Inflow Plus End of February Storage (TAF)
Low	0-1,400
Medium-Low	1,400-2,000
Medium	2,000-2,500
Medium-High	2,500-3,000
High	3,000-6,000

Table 7. New Melones Interim Plan of Operations flow objectives (TAF).

Storage Plus Inflow		Fishery		Vernalis EC Objectives		Bay-Delta		CVP Contractors	
From	To	From	To	From	To	From	To	From	To
1,400	2,000	98	125	70	80	0	0	0	0
2,000	2,500	125	345	80	175	0	0	0	59
2,500	3,000	345	467	175	250	75	75	90	90
3,000	6,000	467	467	250	250	75	75	90	90

Although the USBR was legally required to meet the Vernalis EC Objective, STANMOD nevertheless predicted that operating New Melones pursuant to the IPO would result in exceedances in approximately 10% of months. (CDWA v USBR, *supra* 452 F.3d at 1025.) The IPO, unlike the CVPIA and the USBR's permit terms and conditions, is not a legal obligation, but merely an operating procedure. The USBR had discretion in choosing how to meet the Vernalis EC Objective, but not to exceed it. (Id.)

[18] Long Term Central Valley Project Operations Criteria and Plan Biological Assessment ("CVP-OCAP-BA") (June 30, 2004), p[2-49].)

The USBR had consistently met the Vernalis EC Objective, without fail, since 1994, even though the IPO's modeling predicted that exceedances would occur 10% of the time. (Id.) In water years 2002, 2003, and 2004, the USBR deviated from the IPO to provide additional releases for Vernalis EC Objective and Vernalis flow standards. (CVP-OCAP-BA, p[2-50].)

STANMOD however, was nevertheless a model, and, like all models, based on hypothetical conditions. (Id. at 1026.) Actual hydrologic conditions however, would undoubtedly and frequently change while the USBR operated the CVP. (Id.) Additionally, the exceedance rate assumed the USBR would strictly adhere to the IPO, but it was undisputed that the USBR had, in the past, deviated from the IPO in order to meet the Vernalis EC Objective and nothing indicated the USBR would not deviate from the IPO again to comply with its obligations in the future. (Id.)

The USBR is required by the CVPIA, Reclamation Act of 1902, and its permit terms and conditions to meet the Vernalis EC Objective. (Id. at 1025.) Absent proof that the USBR could not comply with its obligations, there was no "reasonable scientific certainty," let alone any issue of material fact, that the Vernalis EC Objective would not be met. (Id. at 1027.) Claims that exceedances "may" occur based on future hypothetical conditions, such as another six-year drought, were insufficient. (Id. at 1026.)

The State Board has adopted a position consistent with the holdings in both CDWA v. USBR and the SWRCB Cases that the USBR is obligated to meet all requirements of applicable California law relating to the control, appropriation, use, and distribution of water, is obligated to meet such requirements as a matter of **first priority** before delivering water to any other party, and thereby lacks the discretion to violate the

Vernalis EC Objective.[19] (Br. of Amicus Curiae State Water Resources Control Board at 33 (Stockton East Water District v. United States, Case No. 04-541L (October 10, 2006) (United States Court of Federal Claims).)

c. Natural Resources Defense Council v. Rodgers.

In 1988, the Natural Resources Defense Council ("NRDC"), Sierra Club, and other environmental groups challenged the long-term contract renewal of the CVP's Friant Division and alleged that, since the late 1940s, the USBR had failed to release sufficient water from Friant Dam to keep the SJR historic fisheries in good condition. (NRDC v Rodgers (2004) 333 F.Supp.2d 906, 914.) In September 2006, the parties reached a settlement to restore and maintain populations of fish, particularly populations of Spring-run Chinook salmon, in "good condition" in the mainstem of the SJR down to the confluence with the Merced River. (NRDC v Rodgers, Stipulation of Settlement, CIV NO. S-88-1658 - LKK/GGH (September 13, 2006) ("Friant Settlement"), p4 (available at http://www.fwua.org/settlement/supplemental/docs/settlementdocsnexhibits.pdf, accessed January 17, 2007).)

Implementing the Friant Settlement will require improvements in channel capacity, flood protection, fish passage, and fish screening, flow releases from Friant Dam, and reintroduction of Spring-run Chinook salmon in the upper SJR. (Id. at 5.) Restoration flows will begin with experimental flows in 2009 with full flows to be implemented by 2014. (Friant Settlement, §13(j).) Friant releases would range from 230 cfs in July and August in Critical years to as much as 4,000 cfs in the spring pulse flow

[19] The position is also consistent with WRO 98-09, wherein the SDWA presented evidence that, under the IPO exceedances could occur in 40 percent of the years. (WRO 98-06, p12.) The State Board disagreed however, because the USBR could find water from other sources, such as willing sellers, to comply with the Vernalis EC Objective. (Id.) If the Vernalis EC Objective were not met, then the USBR could have been subject to enforcement action. (Id.)

period in Wet years. (Friant Settlement, Exhibit F p1-2.) Depending on year type, Friant releases may, at times, accounting for gains from riparian releases and accretions from Mud and Salt Slough and seepage losses, be as high as 4,055 cfs at the confluence of the Merced River. (Id.) At other times however, "flushing flows" as high as 8,000 cfs may be released for several hours for the purposes of flushing spawning gravel. (Friant Settlement, Exhibit B p2.) Total annual releases could exceed 670,000 acre-feet. (Id.) The USBR will be required to initially purchase 40,000 acre-feet, although the total amount could be as high as 60,000. (Friant Settlement, p12.)

Legislation to implement and fund the Friant Settlement, the San Joaquin River Restoration Act, has already been introduced in Congress. (HR 24, 110th Congress (January 4, 2007); S 27, 110th Congress (January 4, 2007).) The State of California has signed a Memorandum of Understanding ("MOU") agreeing, through the Department of Fish and Game, Department of Water Resources, and California Environmental Protection Agency, to assist the Settling Parties in implementing the Friant Settlement, consistent with their authorities, resources, and regional resources strategies, and to work together and collaborate with the Settling Parties in planning, designing, funding, and implementing appropriate aspects of the Friant Settlement. (Memorandum of Understanding by and Among the Department of the Interior et al. Regarding Implementation of the Settlement in Natural Resources Defense Council et al. v. Kirk Rodgers et al., p2 (available at http://www.fwua.org/settlement/jsmi2/docs/statemou.pdf, accessed January 18, 2007).) The MOU is contingent upon Congressional funding and other funding, but the USBR is already utilizing limited appropriations and the State has committed $10 million of Proposition 13 funds to implementation. Additionally,

Proposition 84, passed in November 2006, specifically provides for $100 million to implement the SJR Restoration in accordance with the Friant Settlement.

Although the purpose of the Restoration Flows is to restore the fishery, the restoration of natural flow above the confluence with the Merced River and the resulting increase in assimilative capacity may improve water quality, including salinity. The Friant Settlement did not consider impacts below the confluence with the Merced River, but the additional assimilative capacity could improve water quality, including EC, at Vernalis.[20]

7. Programs Implemented to Control Saline Discharges.

a. Basin Plan Amendment for the Control of Salt and Boron Discharges into the Lower San Joaquin River.

In November 2005, the State Board adopted a Basin Plan amendment establishing a TMDL regulating the loading of salt and boron in the LSJR for the purposes of attaining the Vernalis EC Objective ("SJR Salt & Boron TMDL"). (State Board Resolution No. 2005-0087, available at http://www.waterboards.ca.gov/resdec/resltn/2005/rs2005-0087.pdf, accessed January 5, 2007).) The purpose of the SJR Salt & Boron TMDL is to achieve the Vernalis EC Objective by requiring dischargers of salts to cease discharging, particularly if the discharge exceeds 0.315 dS/m, and requiring that dischargers operate under waivers of waste discharge requirements. (SJR Salt & Boron TMDL Final Staff Report, p1

[20] New Melones still has many obligations on the Stanislaus River, most significantly the Dissolved Oxygen Objective at Ripon, which in the summer months requires about the same amount of flow as maintaining the Vernalis EC Objective. State Water Resources Control Board, Periodic Review of the 1995 Bay-Delta Water Quality Control Plan, *Presentation of Daniel B. Steiner*, SJRG-EXH-07, p21 (March 14, 2005) (available at http://www.waterrights.ca.gov/baydelta/docs/exhibits/SJRG-EXH-07.pdf, accessed February 15, 2007) Consequently, relaxing the degree to which flow and water quality at Vernalis depend on releases from New Melones may not necessarily reduce supply demands upon New Melones.

(available at http://www.waterboards.ca.gov/centralvalley/programs/tmdl/vernalis-salt-boron/StaffRptDec04.pdf, accessed January 5, 2007.)

The SJR Salt & Boron TMDL was adopted and implemented as the first phase of a multi-phased approach. (SJR Salt & Boron TMDL Final Staff Report, p31.) In the second phase, the Regional Board would develop EC objectives for the LSJR upstream of Vernalis, load allocations, and a modified implementation framework. (Id.) A groundwater control program would also be developed in a subsequent phase. (Id.) When the SJR Salt & Boron TMDL was adopted, the Regional Board planned to consider the second phase of the TMDL by June 2006 and the groundwater control program by 2020.[21] (Id.)

b. Irrigated Lands Conditional Waiver.

The Regional Board implemented its Conditional Waiver Program for Irrigated Lands in 2004 to reduce or eliminate discharges of pollutants to surface water bodies from Central Valley agricultural return flows and storm water runoff that currently contribute salt and other pollution to tributaries to the Southern Delta. (2006 Bay-Delta Plan Appendix I, p66 (available at http://www.waterrights.ca.gov/baydelta/docs/rev2006wqcp_app1.pdf, accessed January 5, 2007).) The program was readopted in 2006, pursuant to Regional Board Resolution Nos. R5-2006-0053 and R5-2006-0054.

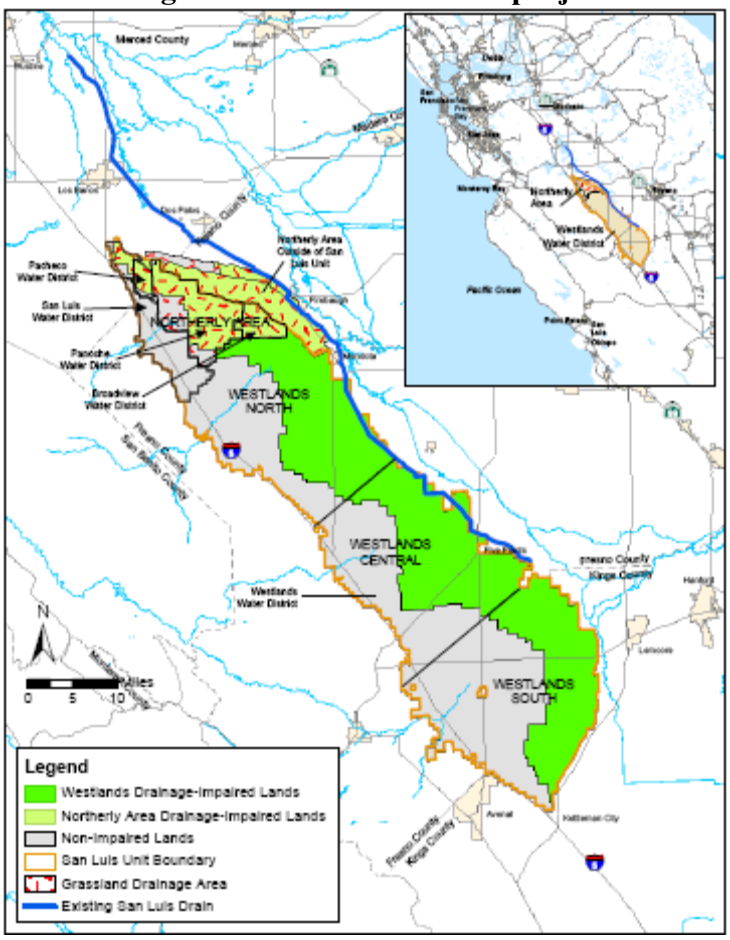
c. San Luis Drainage Feature Reevaluation.

Due to the effects of the CVP, the USBR has developed the San Luis Drainage Feature Re-evaluation, which, if implemented, will provide agricultural drainage service

[21] At the time this memorandum was submitted, no draft Basin Plan amendment for EC WQOs upstream of Vernalis had been released for public review and comment.

for the San Luis Unit of the CVP. (USBR, *San Luis Drainage Feature Re-evaluation Final Environmental Impact Statement* (Volume 1: Main Text, May 2006), p[ES-1] (available at http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=2226, accessed January 5, 2007).) The project is required by order of the Ninth US Circuit Court of Appeal in Firebaugh Canal Co. v. United States (203 F.3d 568, 578.), pursuant to Pub.L. No. 86-488, 74 Stat. 156 (1960) (the "San Luis Act"). The purpose of the project is to provide long-term salt and water balance to ensure sustainable agriculture in the San Luis Unit and in the LSJR Basin. (Id. at ES-1.) The total cost of the In-Valley/Drainage-Impaired Area Land Retirement Alternative, the USBR's recommended alternative, is estimated at $857.5 million. (Id. at ES-16 Table ES-5.)

Figure 16: San Luis Drainage Feature Re-evaluation project area.[22]



The In-Valley/Drainage-Impaired Area Land Retirement Alternative consists of three elements: (1) on-farm drain water reduction measures, (2) the use of new federal facilities, and (3) land retirement. (Id. at ES-10.) Drain water reduction would involve drain water recycling, irrigation system improvements, shallow groundwater management, and seepage reduction, as well as installation of subsurface pipe drains on drainage-impaired lands and on lands in the Northerly area where pipe drains would be cost-effective. (Id.) New federal facilities would include a closed collection system that would collect and convey drain water from on-farm subsurface pipe drains to one of four

[22] USBR, *San Luis Drainage Re-evaluation Final Environmental Impact Statement* (Volume 1: Main Text, May 2006), p[F_ES_2] (available at http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=2226, accessed July 5, 2006).)

reverse osmosis facilities, in addition to 16 drain water reuse facilities, where drain water would be used to irrigate salt-tolerant crops, and a DMC Drain that would convey high-selenium groundwater from the Firebaugh sumps to the Northerly Reuse Area for reuse, treatment, and disposal. (Id.) Finally, land retirement would retire 308,000 acres, including all of the drainage-impaired lands in the Westlands Water District (approximately 298,000 acres) and 10,000 acres in Broadview WD. (Id. at ES-15.)

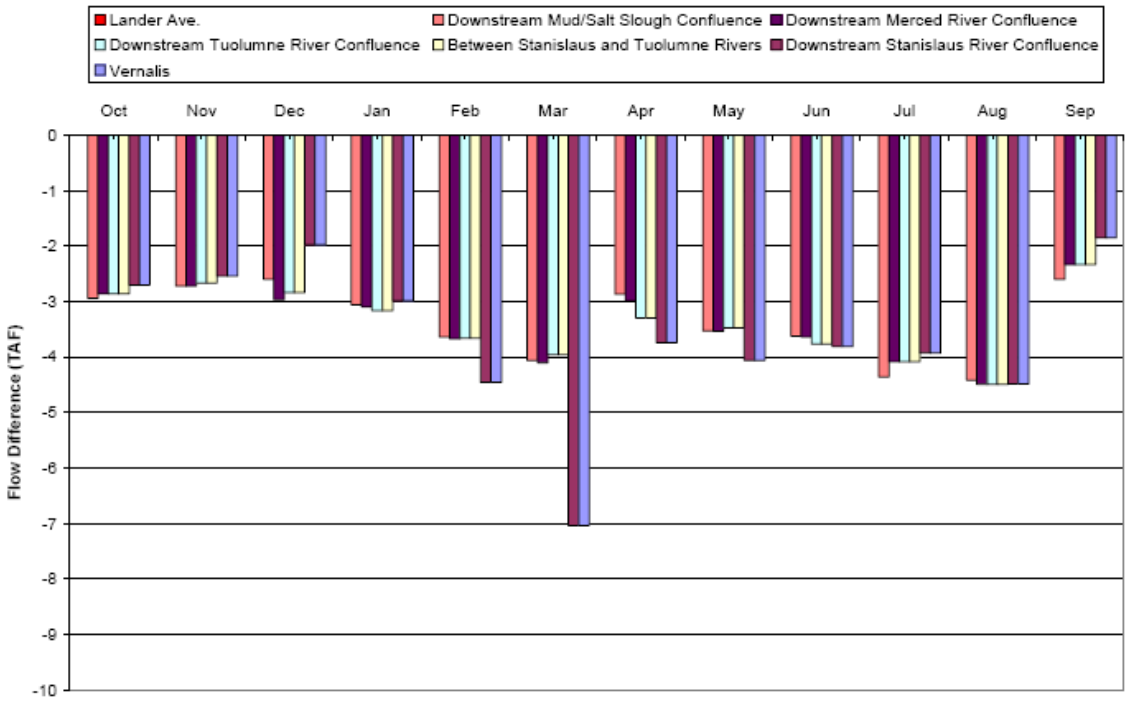
Land remaining in production in the Northerly drainage-impaired area would be eligible for drainage service, which would involve the collection, treatment, and disposal of drain water collected from drained lands with Firebaugh Sumps in DMC Drain and regional reuse facilities. Reused drain water would be conveyed to four areas for reverse-osmosis treatment to be blended with CVP water for irrigation. One reverse-osmosis plant would be located in the Northerly Area, one in the Westlands North Area, one in the Westlands Central Area, and one in the Westlands South Area. (Id. at F_ES_2.) The reverse-osmosis plants would be located near each of the four evapotranspiration basins. Each reverse-osmosis plant would consist of a single-stage, single-pass array with pretreatment sufficient for 50% recovery. (Id. at ES-11.) The In-Valley/Drainage-Impaired Area Land Retirement Alternative includes a selenium bio-treatment facility. (Id.)

The In-Valley/Drainage-Impaired Area Land Retirement Alternative would improve LSJR water quality by redirecting drain water that is currently discharged to the LSJR via Mud Slough to the In-Valley/Drainage-Impaired Area Land Retirement Alternative facilities. (Id. at Section 5-141.) The improved water quality would diminish

the burden of New Melones for dilution flows to meet the Vernalis EC Objective. (Id.) Decreased inflows from Mud Slough would however, also reduce flows in the LSJR. (Id.)

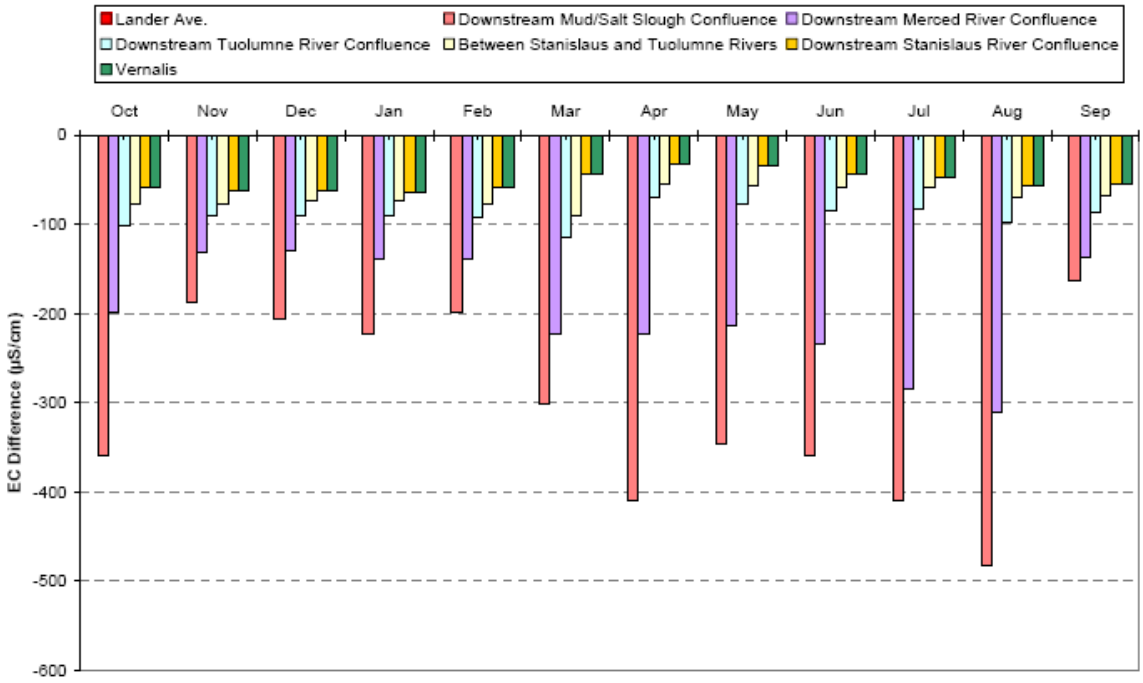
The In-Valley/Drainage-Impaired Area Land Retirement Alternative would reduce flows downstream of the Stanislaus River by about 43,000 AFA and 41,000 AFA upstream. (Id. at Appendix D, p[D-14]; See Figure 17 and Figure 22, below.) Monthly average EC downstream of Mud and Salt Slough would decrease by about 0.305 dS/m. (Id.; See Figure 18, below.) Monthly average EC at Vernalis would decrease by about 0.05 dS/m. (Id.)

Figure 17: Average LSJR flow change under the In-Valley/Drainage-Impaired Area Land Retirement Alternative.[23]



[23] USBR, *San Luis Drainage Re-evaluation Final Environmental Impact Statement* (May 2006), Appendix D p[D-14 Figure D2-1] (available at http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=2234, accessed January 5, 2007).)

Figure 18: Average LSJR change in electrical conductivity under the In-Valley/Drainage-Impaired Area Land Retirement Alternative.[24]



d. Grassland Bypass Project.

The Grassland Bypass Project, which began operating in 1996, manages discharges of agricultural drainage water from 97,000 acres in the Grassland Watershed at rates of up to 150 cfs, by transporting subsurface agriculture drainage, tailwater and storm water runoff via the Grassland Bypass Channel and a portion of the San Luis Drain and discharging it to Mud Slough. (2006 Bay-Delta Plan, p30; See also Regional Board, Waste Discharge Requirements No. 5-01-234 for the San Luis and Delta Mendota Water Authority and US Dept of the Interior USBR Grassland Bypass Project (Phase II) (September 21, 2001) (available at http://www.swrcb.ca.gov/rwqcb5/adopted_orders/Fresno/5-01-234.pdf, accessed January 18, 2007).)

[24] USBR, *San Luis Drainage Re-evaluation, Final Environmental Impact Statement* (May 2006) Appendix D p[D-15 Figure D2-2] (available at http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=2234, accessed July 5, 2006).)

Although the primary purpose of the project is to control selenium discharges to wildlife refuges and wetlands in the San Joaquin Valley, it has also reduced salt loading by 39 percent, from 187,000 tons to 113,600 tons, through sump management, recycled surface and subsurface drainage water programs, on-farm drain water and tail water management, and various source control and other measures. (2006 Bay-Delta Plan, p30.) Boron load has been reduced by 39%. (USBR, *Grassland Bypass Project Annual Report 2003*[25] ("GBP Annual Report 2003") (2003), p19 (available at http://www.sfei.org/grassland/reports/gbppdfs/AnnualReports/GBPAnnualReport2003.pdf, accessed January 23, 2007).) The Grassland Bypass Project has substantially reduced the dilution flows necessary to maintain the Vernalis EC Objective. (Id. at 77.) Compared to pre-project conditions, reduced salt loads from the Grassland Drainage Area require 68,830 fewer acre-feet of dilution flows from New Melones to meet the Vernalis EC Objective.[26] (Id.) In 2003, 271,000 fewer acre-feet would have been required. (Id.)

[25] Monthly reports are available at http://www.sfei.org/grassland/reports/gbppdfs.htm.

[26] The analysis solely considered flows necessary to dilute the discharge from the Grassland Drainage Area in isolation of other areas. Even in the absence of upstream loading, demands on New Melones change little, because the Vernalis EC Objective and the Stanislaus River Dissolved Oxygen Objective in the summer require approximately the same level of releases from New Melones. (State Board, Periodic Review of the 1995 Bay-Delta Water Quality Control Plan, *Presentation of Daniel B. Steiner*, SJRG-EXH-13, p7 (March 14, 2005) (available at http://www.waterrights.ca.gov/baydelta/docs/exhibits/SJRG-EXH-07.pdf, accessed February 15, 2007).)

Table 8. Annual volume discharge from the Grassland Drainage Area and Mud/Salt Sloughs.[27]

Water Year	GBP Operating	Discharge from GDA (AF)	Discharge from Mud & Salt Sloughs (AF)	GDA discharge as percent of discharge from the Sloughs
1986		67,010	284,320	24%
1987		74,900	233,840	32%
1988		65,330	230,450	28%
1989		54,190	211,390	26%
1990		41,660	194,660	21%
1991		29,290	102,160	29%
1992		24,530	85,430	29%
1993		41,200	167,960	25%
1994		38,670	183,550	21%
1995		57,570	263,770	22%
1996		52,980	267,950	20%
1997	GBP	37,550	287,010	13%
1998	GBP	45,940	378,680	12%
1999	GBP	32,320	253,130	13%
2000	GBP	31,270	235,510	13%
2001	GBP	28,230	226,760	12%
2002	GBP	28,390	180,150	16%
2003	GBP	27,090	215,500	13%

Table 9. Annual loads of salt discharged from the Grassland Drainage Area and Mud/Salt Slough.[28]

Water Year	GBP Operating	Discharge from GDA (tons)	Discharge from Mud & Salt Sloughs (tons)	GDA discharge as percent of discharge from the Sloughs
1986		214,250	494,540	43%
1987		241,530	438,900	55%
1988		236,300	455,960	52%
1989		202,420	389,330	52%
1990		171,270	380,560	45%
1991		129,900	221,540	59%
1992		110,330	197,350	56%
1993		183,020	336,520	54%
1994		171,500	379,410	45%
1995		237,530	499,340	48%
1996		197,530	477,730	41%
1997	GBP	167,740	446,690	38%
1998	GBP	205,100	627,690	33%
1999	GBP	149,130	401,620	37%
2000	GBP	134,990	372,450	36%
2001	GBP	120,010	383,160	31%
2002	GBP	116,180	327,340	35%
2003	GBP	118,170	372,990	32%

[27] GBP Annual Report 2003, p80 Table 2a.
[28] GBP Annual Report 2003, p81 Table 3a.

Table 10. Comparison of WY2002 salt loads to previous years.[29]

Discharge from Grassland Drainage Area (Tons)			WY 2003 difference	Discharge from Mud & Salt Sloughs (tons)	WY 2003 difference
Average, all years	1986 - 2003	172,610	-32%	400,170	-7%
Prior years average	1986 - 2002	175,810	-33%	401,770	-7%
Before GBP average	1986 - 1996	190,510	-38%	388,290	-4%
GBP average	1997 - 2003	144,470	-18%	418,850	-11%
Below Normal Water Years		177,210	-33%	379,710	-2%
Above Normal Water Years		185,070	-36%	442,050	-16%

In water quality studies, the Regional Board has noted the significant impact of the Grassland Bypass Project on LSJR hydrology, which has improved overall water quality in the LSJR, irrespective or year type:

> The opening of the Grassland Bypass impacted the hydrology of the lower San Joaquin River beginning in Water Year 1997. The immediate impact of the bypass was to divert subsurface agricultural drainage from Salt Slough into Mud Slough (north) thereby removing the subsurface drainage from the San Joaquin River at Fremont Ford. That impact is clear given the lower concentrations of all constituents at the Fremont Ford site during post-Project water years as compared to pre-Project water years, whether wet or critical. For example, mean selenium concentrations at Fremont Ford were 0.6 ug/L for Water Year 1999 and 0.7 ug/L for Water Year 2000, as opposed 11.6 ug/L for pre-project years. Boron and salt followed similar trends.

(Crader P.G, Eppinger J.L., Chilcott, J.E. *2002, Water Quality in the Lower San Joaquin River: October 1998 - September 2000 (Water Years 1999 & 2000),* Regional Water Quality Control Board, Central Valley Region. Sacramento, CA (April 2002), p22 (available at http://www.waterboards.ca.gov/centralvalley/available_documents/agunit/bypass/SJR9900.pdf, accessed February 2, 2007).).

[29] GBP Annual Report 2003, p81 Table 3b. Below Normal Water Years with 50 percent or less CVP deliveries were WY 1990 - 1994, and 2001. Above Normal Water Years with more than 50 percent CVP deliveries were WY 1986 - 1989, 1995 - 2000, 2002, and 2003.

The Grassland Bypass Project is regulated by the Regional Board pursuant to a Revised Monitoring and Reporting Program and Waste Discharge Requirements, both subject to enforcement by the Regional Board. (Regional Board, *Revised Monitoring and Reporting Program No. 5-01-234 for the San Luis and Delta Mendota Water Authority and US Dept of the Interior USBR Grassland Bypass Project* (Phase II) (May 10, 2005) (available at http://www.swrcb.ca.gov/rwqcb5/adopted_orders/Fresno/5-01-234-mrp-rev2.pdf, accessed January 18, 2007); Regional Board, *Waste Discharge Requirements No. 5-01-234 for the San Luis and Delta Mendota Water Authority and US Dept of the Interior USBR Grassland Bypass Project (Phase II)* (September 21, 2001) (available at http://www.swrcb.ca.gov/rwqcb5/adopted_orders/Fresno/5-01-234.pdf, accessed January 18, 2007).) Pursuant to the Regional Board's monitoring program, saline discharges from the GEA are monitored daily at Crows Landing. (Id.)

e. West Side Regional Drainage Plan.

The West Side Regional Drainage Plan evolved from the Grassland Bypass Project as a long-term solution to eliminate discharges to the San Joaquin River of agriculture return flows containing high amounts of selenium, salt and other constituents. (Revised Draft 2006 Bay-Delta Plan, p31.) The plan reduces drainage volume through improved source controls and improved water use efficiency, re-circulating tailwater on primary irrigation lands, collecting and reusing tile drainage, installing and pumping groundwater wells to reduce infiltration into groundwater, and treating and disposing of remaining drain water through reverse osmosis, evaporation, and disposal or reuse of salts. (Id.) When fully implemented, the plan will assist in maintaining EC at Vernalis

and reduce the frequency of exceedances at Brandt Bridge. (Id.) Full implementation is anticipated by 2010.

8. 2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary.

On December 13, 2006, the State Board adopted the 2006 Bay-Delta Plan. (State Board Resolution No. 2006-0098, *Adoption of the Amended Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* (December 2006) (available at http://www.waterrights.ca.gov/baydelta/2006res_adopt.pdf, accessed January 5, 2007.) There were no substantive amendments to any WQOs. (Id., p2.)

Pursuant to the 2006 Bay-Delta Plan, the State Board held workshops in January 2007 to review the salinity requirements of the beneficial uses of water in the Southern Delta, the causes of salt loading in the Southern Delta, practices that could reduce salt loading from Delta sources, flow and salt load reduction measures to implement salinity objectives, and timelines for implementation. (Revised Draft 2006 Bay-Delta Plan, p6.) The workshop notice issued however, focused solely upon the EC objectives at the three interior South Delta stations – Brandt Bridge, Old River near Middle River, and Old River at Tracy Road Bridge. (State Board, *Notice of Public Workshop: Southern Delta Salinity* (October 13, 2006) (available at http://www.waterrights.ca.gov/baydelta/docs/southerndeltasalinity/noticeof_publicworkshop.pdf, accessed January 5, 2007).)

The 2006 Bay-Delta Plan also noted that:

> There is a need for an updated independent scientific investigation of irrigation salinity needs in the southern Delta (similar to the investigation on which the current objectives are based). The scientific investigation should address whether the agricultural beneficial uses in the southern Delta would be reasonably

> protected at different salinity levels, whether management practices are available that would allow for protection of the beneficial uses at a higher salinity level in the channels of the southern Delta, and whether such management practices are technically and financially feasible. The investigation could address the feasibility of providing an alternative method of delivering fresh water to agricultural water users in the southern Delta. The scientific investigation must be specific to the southern Delta.

(Revised Draft 2006 Bay-Delta Plan, p33.)

The State Board recommended studies and actions by other agencies, but left itself open to amend the program of implementation, take action in a water right proceeding or proceedings to change the water right responsibilities of the DWR, USBR, and other water right holders to implement the objectives contained therein, or take other actions as necessary. (Revised Draft 2006 Bay-Delta Plan, p22.)

III. THE LOWER SAN JOAQUIN RIVER MUST BE DE-LISTED.

A. The Clean Water Act Prohibits Listing

1. No Applicable Water Quality Objectives Have Been Established for the Lower San Joaquin River.

The authority for the Regional Board to regulate water quality derives from the Porter-Cologne Act, which in turn delegates powers to State Board and regional water quality control boards for the purposes of implementing the Clean Water Act. Therefore, the basin planning process, including the development of water quality objectives and TMDLs, must comply with Porter-Cologne and the CWA.

WQOs[30] are "the limits or levels of water quality constituents or characteristics" established to reasonably protect beneficial uses or prevent nuisance within a specific

[30] The term "water quality objective" as used in Porter-Cologne is equivalent to the term "water quality standard" in the Clean Water Act. (Water Code §13050(h); 40 CFR 130.3; State Water Resource Control Board Cases (2004) 136 Cal.App.4th 674, 697 fn11.)

area. (Water Code §13050(h).) The CWA provides the statutory basis for defining water quality limited segments and, by its explicit language, makes WQOs an integral element and prerequisite for listing a water body:

> Each State shall identify those waters within its boundaries for which the effluent limitations required by section 1311(b)(1)(A) and section 1311(b)(1)(B) of this title are not stringent enough to implement any **water quality standard** applicable to such waters.

(33 USCA 1313(d)(1)(A) (emphasis added); See also San Francisco Baykeeper v. Whitman (2002) 297 F.3d 877, 885.) Federal regulations, consistent with the CWA, make WQOs an integral element of the definition of "water quality limited segment":

> "Any segment where it is known that water quality does not meet **applicable water quality standards**, and/or is not expected to meet **applicable water quality standards**…"

(40 CFR §130.2 (emphasis added).)

It therefore follows, based on the federal statutory and regulatory definition of "water quality limited segment," adopted and implemented through the Water Quality Control Policy for Developing California's §303(d) List of Water Quality Limited Segments ("Listing Policy"), that a water body cannot be classified as a "water quality limited segment" unless applicable WQOs for the pollutant are first established. (State Board Resolution No. 2004-0063, *Water Quality Control Policy for Developing California's §303(d) List of Water Quality Limited Segments* (September 30, 2004), p1 (available at http://www.waterboards.ca.gov/tmdl/docs/ffed_303d_listingpolicy093004.pdf, accessed January 5, 2007); 23 Cal. Code Regs. §2917.)

No WQOs for EC have been established for the LSJR upstream of Vernalis. (State Board, *Revision of the Clean Water Act §303(d) List of Water Quality Limited Segments:*

Responses to Comments (Vol. 4, September 2006) ("2006 §303(d) List Responses to Comments"), p180 (available at http://www.waterboards.ca.gov/tmdl/docs/303dlists2006/v4sr_all.pdf, accessed January 5, 2007).) Until such WQOs are properly established and sufficient exceedances demonstrated, the LSJR, by definition, cannot be classified as a water quality limited segment and must be de-listed.

2. The Vernalis EC Objective Does Not Apply to the Lower San Joaquin River.

Currently, the only EC objective on the LSJR is the Southern Delta Water Quality Objective for Agricultural Beneficial Uses compliance location at Airport Way Bridge, near Vernalis ("Vernalis EC Objective"). (1995 Bay-Delta Plan, p17 Table 2.) The Vernalis EC Objective requires a maximum 30-day running average mean daily EC of 0.7 deciSiemens/meter ("dS/m") from April 1 through August 31 and 1.0 dS/m from September 1 through March 31. (Id.) It was adopted from the earlier 1991 Salinity Plan for the purpose of protecting South Delta agricultural beneficial uses.[31] (State Board Resolution No. 95-24, p1.) It was neither developed nor adopted to protect the LSJR upstream of Vernalis.

[31] The Vernalis EC Objective in the 1991 Bay-Delta Plan was, in turn, adopted from the terms and conditions established in Water Rights Decision 1422. (1991 Bay-Delta Plan, p[5-10].) D-1422 required "releases of conserved water from New Melones Reservoir for water quality control purposes… to maintain a mean monthly total dissolved solids concentration in the San Joaquin River at Vernalis of 500 parts per million." (State Board Water Rights Decision 1422, *New Melones Project Water Rights Decision* (April 4, 1973), p31 (available at http://www.waterrights.ca.gov/hearings/decisions/WRD1422.PDF, accessed January 5, 2007.) "Interim Stage 2" of the 1991 Bay-Delta Plan revised the Vernalis EC Objective from 500 ppm total dissolved solids to the current irrigation and non-irrigation season objectives of 0.7 and 1.0 dS/m, respectively. This objective was re-adopted in the 1995 Bay-Delta Plan and then again in the 2006 Bay-Delta Plan.

3. The Vernalis EC Objective Cannot Apply to the LSJR.

The Regional Board is still in the early stages of developing WQOs for EC for the LSJR upstream of Vernalis. No draft public review staff report has been issued and no Basin Plan amendment adopting such objectives has been approved by the State Board or adopted by the OAL. By applying the Vernalis EC Objective upstream, the State Board and Regional Board would circumvent the public participation process mandated by Porter-Cologne and the CWA and effectively impose new WQOs on the LSJR without amending the Basin Plan. The proper procedure dictated by the CWA and Water Code is to develop WQOs and incorporate them into the Basin Plan via a basin plan amendment. Only after developing WQOs can a water body classified as a "water quality limited segment" and, based on the frequency and severity of water quality exceedances of WQOs, allocated a priority for a TMDL.

The continuing scientific validity of the Vernalis EC Objective itself has also become questionable, so much so that the 2006 Bay-Delta Plan calls for an updated independent scientific investigation of the irrigation salinity needs of the South Delta, similar to the investigation on which the current objective is based. (2006 Bay-Delta Plan, p30 (available at http://www.waterrights.ca.gov/baydelta/docs/rev2006wqcp.pdf, accessed January 5, 2007).)

The only investigation of irrigation salinity needs upstream was in the WQO 85-1 Technical Report. (SJR Salt & Boron TMDL Appendix 1, p[1-21].) In developing WQO's for agricultural beneficial uses, the Technical Committee adopted recommendations previously developed by the University of California Consultants in 1974. (WQO 85-1 Technical Report, p[IV-4].) The Technical Committee, based on the

crop and soil types grown upstream, recommended different WQOs, recommending an objective of 3.0 dS/m from Lander Avenue to Hills Ferry and an objective of 1.0 dS/m for the segment between Hills Ferry and Vernalis. (WQO 85-1 Technical Report, p[VIII-15] and [VIII-16].) Based on the WQO 85-1 Technical Report, applying the Vernalis EC Objective upstream therefore would lack any scientific basis, but even if applying the Vernalis EC Objective upstream were scientifically valid, the 2006 Bay-Delta Plan acknowledges that any such scientific basis could now be outdated. (Revised Draft 2006 Bay-Delta Plan, p33.) While blind application of the Vernalis EC Objective upstream might be easy, it would also be improper.

B. The Listing Policy Requires De-Listing.

The Water Quality Control Policy for Developing California's Clean Water Act §303(d) List ("Listing Policy") establishes the methodology for developing the §303(d) List for California. (State Water Resources Control Board, *Water Quality Control Policy (Policy) for Developing California's Clean Water Act Section 303(d) List* (September 30, 2004), 22 CCR §2917, p1 (available at http://www.waterboards.ca.gov/tmdl/docs/ffed_303d_listingpolicy093004.pdf, accessed January 5, 2007).)

1. The Current Listing is Based on a "Faulty Analysis", as Regulatory and Hydrologic Conditions Have Changed Since the LSJR Was Listed in 1996.

The Listing Policy requires that data used to list a water body-pollutant combination temporally represent the water body. (Listing Policy, §6.1.5.3.) If the data set originally used to list the water body does not represent current conditions in the water body, it no longer temporally represents the water body. The data set and resulting

analysis would fall short of the data quality assurance and quality control guidelines contained in §6 of the Listing Policy and now result in a "faulty analysis." Under §4 of the Listing Policy, if a water body was listed due to a "faulty analysis" shall be de-listed. Since the language used is mandatory, the State Board has no discretion to keep such a water body on the §303(d) List.

a. No Data, Facts, or Other Evidence Were Considered in Listing the LSJR in 1996.

The administrative record for the 1996 §303(d) List had no evidence and no data regarding the listing for salinity.[32] The record is silent, but for a single statement contained in a memorandum from Ms. Betty Yee of the Regional Board Planning Unit to Ms. Nancy Richard of the Regional Board Division of Water Quality. (*See* CVRWQCB 1996 §303(d) List Administrative Record, p39.) The "newly revised §303(d) List", which included salt and boron as pollutants impairing the SJR, was attached. (Id.) According to the memorandum:

> Salt has been added to the LSJR and the Delta, and boron has been added to the LSJR. These pollutants are well documented to be impairing the respective water bodies and should have been included on the earlier list. The water body data used for making these changes as well as that used for making the list is on file at our office.

(Id.) Despite Ms. Yee's references to "well documented" impairment and the documents "on file" at the Regional Board office, the record has no references and no citations to anything. (Id.) There are no supporting documents and there is no data or evidence. (Id.) Even under the deferential "arbitrary and capricious" standard, an agency must adequately consider all relevant factors and demonstrate a rational connection

[32] In 1998, all §303(d) listings for salinity were changed to listings for EC. (Regional Board, 1998 Clean Water Act §303(d) Administrative Record, p37, 237, 251.)

between those factors and the choice made. (Kucharczyk v. Regents of the University of California (1996) 946 F.Supp. 1419, 1438.) Based on the administrative record from 1996, no factors, relevant or otherwise, were considered, precluding any consideration or anything. The listing was therefore "arbitrary and capricious."

b. LSJR Basin Conditions Have Substantially Changed Since 1996.

The Regional Board has wide discretion in establishing the scale of spatial and temporal data and information that are to be reviewed. (Listing Policy, p22.) However, "If the implementation of a management practice(s) has resulted in a change in the water body segment, only recently collected data [since the implementation of the management measure(s)] should be considered." (Listing Policy, p23.) As the Regional Board has acknowledged, historical flow and water quality data is not indicative of future trends due to substantial operations and regulatory changes in the LSJR Basin.

> Though extensive historical flow data is available for the LSJR, use of the historical flow data is inherently flawed because numerous structural and operational changes have affected LSJR hydrology over time, therefore past hydrologic conditions are not necessarily a good indicator of future conditions.

(SJR Salt & Boron Basin Plan TMDL, *Final Staff Report of the Regional Water Quality Control Board, Central Valley Region, Appendix 5: Technical Evaluation of Alternatives* (September 10, 2004) ("Salt & Boron TMDL Appendix 5"), p[A5-3] (available at http://www.waterboards.ca.gov/centralvalley/programs/tmdl/vernalis-salt-boron/appendix5.pdf, accessed January 5, 2007); see Appendix A: Vernalis Flow and Water Quality Data.)

After the LSJR was listed for EC, many new regulatory schemes and management programs were implemented, some specifically intended to solve, or at least diminish, the

EC problem, and others with incidental, although significant, effects in reducing saline discharges. Based on an analysis of covariance (ANCOVA), if the Basin Index were the same from 1986 through 2004, the years before 1996 (1986-1995), the mean number of exceedances would have been about 87 per year. (*See* Appendix D: Statistical Analysis of Compliance with the Southern Delta Water Quality Objectives for Agricultural Beneficial Uses at Vernalis.) From 1996 through 2004 however, the mean annual number of exceedances only would have been about 5 per year.[33] (Id.) Irrespective of whether the period since 1995 has been relatively wet, Basin conditions since then have changed considerably.

The most significant change was the adoption of D-1641 in 2000, which held the USBR responsible for the salt problem in the Delta and LSJR and prohibited any diversion for consumptive use unless the Vernalis EC Objective and San Joaquin River Dissolved Oxygen Objective were both met. (D-1641, p162.) The USBR is legally required to meet the Vernalis EC Objective as a matter of first priority. Unless the State Board's implementation of the Vernalis EC Objective was "illusory" and therefore a violation of its statutory obligation to fully implement the 1995 Bay-Delta Plan, the State Board will enforce the USBR's legal obligation to meet the Vernalis EC Objective. (SWRCB Cases, *supra* 136 Cal.App.4th at 734.) Additionally, there has never been any proof that the USBR cannot meet EC at Vernalis, only charges that the USBR "may not" meet EC at Vernalis. (CDWA v USBR, *supra* 452 F.3d at 1026-1027.) Absent proof that

[33] The 95% confidence interval for the adjusted means is 29.88 to 133.36 (95% confident that the mean number of exceedances would be 29.88 to 133.36 greater for unregulated years than for regulated years). (*See* Appendix D: Statistical Analysis of Compliance with the Southern Delta Water Quality Objectives for Agricultural Beneficial Uses at Vernalis.) The width of the confidence interval is due to the small sample size and wide variability among the number of observed exceedances. (Id.) Nevertheless, even with a small sample and wide variability, there is a very strong difference between the period up to and after 1996. (Id.)

the USBR cannot meet EC at Vernalis, there is no "reasonable scientific certainty" or any issue of material fact that exceedances of the Vernalis EC Objective will occur. (Id.)

Other programs have been implemented to reduce saline discharges into the LSJR, most significantly the Grassland Bypass Project, which has been operating since 1996. (Both programs are described, in detail, in Paragraph II.B.7.d, p54, and II.B.7.e, p58, above.) The Regional Board also adopted and implemented the Irrigated Lands Conditional Waiver, implemented in 2001, which regulates saline discharges contained in agriculture runoff. (See Paragraph II.B.7.b, p49, above.)

Despite the propagation of new management programs and regulatory schemes, the propriety of the LSJR's §303(d) listing for EC and boron was never reexamined with data or in light of the new management programs.

c. In 1998, the LSJR was Scheduled for a TMDL Without Evidence.

Two changes occurred to the §303(d) listing for salt and boron in 1998. First, the pollutant designation for "Salinity" was changed to electrical conductivity, reflecting change from the Vernalis WQO of 500 TDS to the current Vernalis EC Objective. Then, the LSJR was scheduled for a TMDL for the control of discharges of salt and boron. (State Board Resolution No. 98-055 Attachment 1, *Approval of the 1998 California §303(d) List and Total Maximum Daily Load Priority Schedule and Authorizing the Executive Director to Transmit the List to the US Environmental Protection Agency* (May 27, 1998), p86 (available at http://www.waterboards.ca.gov/resdec/resltn/1998/rs98-055att1_all.pdf, accessed January 18, 2007).) According to responses to public comments on the draft §303(d) List for the Central Valley region for 1998:

> The priority for developing an EC TMDL for the [SJR] has been elevated to high because of its significance to water quality impacts, staff and Board commitment to comply with the Bay/Delta Water Quality Control Plan, and increased stakeholder interest in salinity control on the River due to the serious water quality impacts experienced during the last drought.

(CVRWQCB 1998 Clean Water Act §303(d) Administrative Record, p236.)

Irrespective of the Regional Board's response to public comment, the record lacks any public comment indicating "increased stakeholder interest." Neither is there any data or discussion documenting "the serious water quality impacts experienced during the last drought" or documentation thereof. Regardless of whether WQOs were exceeded in the '87-'92 drought, no data or reference to such data is in the record. (CVRWQCB 1998 §303(d) List Administrative Record, p1263-1267.)

Even the factors described in the response to comments, the 1987 through 1992 drought and the adoption of the 1995 Bay-Delta Plan, existed when the LSJR was listed for salinity in 1996. If the factors were unchanged, then nothing supported changing the priority, much less continued listing.

d. Evaluation of Lower San Joaquin River §303(d) Listing for Electrical Conductivity and Boron in 2002.

The §303(d) List was next revised in 2003 when the SWRCB adopted the 2002 §303(d) List pursuant to Resolution 2003-0009. There have been no other revisions since then, and the 2002 §303(d) List has provided the basis for the draft §303(d) for 2006. (State Board Resolution No. 2003-0009, *Approval of 2002 Federal Clean Water Act §303(d) List* (February 4, 2003) (available at http://www.waterboards.ca.gov/resdec/resltn/2003/rs2003-0009.pdf, accessed January 18, 2007).)

The most significant change that occurred in the 2002 listing cycle divided the formerly 130-mile stretch from Mendota Pool to Vernalis into four segments. (Id.) The first was a 67-mile segment from Mendota Pool to Bear Creek, the second was a 14-mile segment from Bear Creek to Mud Slough, the third was a 3-mile segment from Mud Slough to the Merced River, and the fourth was a 43-mile segment from the Merced River to the South Delta boundary at Vernalis. (Id.) No explanation was given for this change. The majority of §303(d) documents for the 2002 listing cycle list the water quality limited segment as the 130-miles from Mendota Pool to Vernalis. Even the Salt & Boron TMDL described the water quality limited segment as 130 miles from Mendota Pool to Vernalis. (SJR Salt & Boron TMDL, p1.)

The other change to the LSJR listing was rescheduling the TMDL end date from December 1999 to 2002. (Regional Board, *Final Staff Report on Recommended Changes to California's Clean Water Act §303(d) List* (December 14, 2001) ("CVRQCB §303(d) Recommendations for 2002"), p11.) No other changes were made. (Id.)

Analysis of water body-pollutant combinations for which no recommendations for any changes were made were included by implication in the list of references for "Documents and References Reviewed that Did Not Provide Information to Support Changes to the 303(d) List" (Id., p41.) The list of such references includes two sources directly relevant to LSJR salinity, *Water Quality of the Lower San Joaquin Rivers: Lander Avenue to Vernalis October 1995 - September 1997 (Water Years 1996-1997)* ("Water Quality in the LSJR 1996-1997"), drafted by Chilcott and Grober in December, 1998, and *Water Quality of the Lower San Joaquin Rivers: Lander Avenue to Vernalis October 1997 - September 1998 (Water Year 1998)* ("Water Quality in the LSJR 1998"),

drafted by Chilcott, Grober, and Eppinger in May of 2000 (available at http://www.swrcb.ca.gov/rwqcb5/available_documents/water_studies/SJR.PDF, accessed February 5, 2007).)

The reports cover Water Years 1996 through 1998, a period following the implementation of the Grassland Bypass Project, and compare the data to data collected from May 1985, a period preceding implementation of the Grassland Bypass Project, through September 1998, two years after implementation of the Grassland Bypass Project. The reports extensively document flow, rainfall, EC, and loading of salt, selenium, and boron, but EC WQOs for the LSJR were still not adopted. Whether the upstream ECs observed would have adversely affected agricultural beneficial uses and the extent of such effects, if any, cannot be determined. As for the Vernalis EC Objectives, no exceedances occurred in the years observed.

The reports also evaluated the impacts of the Grassland Bypass Project, and although project had only been operating two years, the 1998 report noted that:

> "concentrations of all constituents measured during wet WY98, were lower than concentrations measured during previous wet water years. The reduction in constituent concentrations can be attributed to two major factors: continued high rainfall and high dilution flows between January and June 1998; and impacts from the Grassland Bypass Project."

(Water Quality in the LSJR 1998, p22.)

Irrespective of the data gathered and reported upon, neither of the cited reports or any other documents relied upon discussed or considered the impacts of IPO, which had only recently been implemented in 1997, and D-1641, which was not adopted, as revised, until 2000, after the most recent Regional Board analysis of LSJR loading, *Water Quality in the LSJR 1997-1998*. Furthermore, since the reports only analyzed loading up to 1998,

the continuing trend in discharge reduction from the Grassland Bypass was neither analyzed nor considered. (SJR Salt & Boron TMDL Response to Comments July 2004, p116.) As a result, the impacts of regulatory changes such as D-1641 and management practices such as the Grassland Bypass Project and IPO were never considered.

e. Basin Plan Amendment for the Control of Salt and Boron Discharges into the Lower San Joaquin River.

Based on the §303(d) listing of the LSJR for EC and boron, the SJR Salt & Boron TMDL was adopted for the purposes of achieving the Vernalis EC Objective. (SJR Salt & Boron TMDL, p1.) In the public process leading up to the adoption of the SJR Salt & Boron TMDL, issues were raised regarding the adequacy of the LSJR's listing for EC and boron. The listing however, was not reconsidered, because SJR Salt & Boron TMDL was conducted as a separate process.[34] (Tr. Mr. Michael Levy, State Board Meeting (November 16, 2005), p45.) Questions regarding the adequacy of the §303(d) listings for EC and boron were, instead, left to the process revising the §303(d) List. (Id.)

Even if the State Board and Regional Board had considered whether the LSJR were properly listed when adopting the SJR Salt & Boron TMDL, the Problem Statement, which established the project baseline, only described exceedances of the Vernalis EC Objective from 1986 through 1998. (SJR Salt & Boron TMDL Final Staff Report, p4.) The project baseline provided no further analysis than the Regional Board's report for the 2002 §303(d) Listing Cycle. (Regional Board §303(d) Recommendations for 2002, p41.) The most recent report on saline discharges to the LSJR that was cited in the staff reports and technical reports, *Water Quality of the Lower San Joaquin Rivers:*

[34] As then-Chief Counsel Levy commented at the meeting, comments regarding the adequacy of the listing were best directed toward the 2006 revision of the §303(d) List, a separate process, yet forthcoming, process. (Id.)

Lander Avenue to Vernalis October 1997 - September 1998 (Water Year 1998), only addressed data up to September 1998. A subsequent report, *Water Quality in the Lower San Joaquin River: October 1998 - September 2000* (Crader, et al.), was not cited.

In developing the SJR Salt & Boron TMDL, the Regional Board acknowledged that, due to changes in facilities, regulations, and operations, historical data did not represent current conditions. (SJR Salt & Boron Basin Plan TMDL, Final Staff Report, Appendix 5: Technical Evaluation of Alternatives (September 10, 2004), p[A5-3].) Much of the historical data, particularly from before 1995, preceded the IPO. The analysis also failed to account for the effects of the Grassland Bypass Project. (USBR Comments on 2006 §303(d) List, p3 (available at http://www.waterboards.ca.gov/tmdl/docs/303dlists2006/comments_vol4/056kirkrodgers011706.pdf, accessed January 5, 2007.) Since historical data poorly represented current and future conditions, modeling was required in order to compare various project alternatives to one another and to No Project conditions, which represented current conditions. (SJR Salt & Boron TMDL Appendix 5, p[A5-1].) Under No Project conditions, the Regional Board modeling predicted that exceedances would occur in approximately 13% of months. (*See* Appendix C: Grober, L. *Report on San Joaquin River Salinity* (2006), Attachment 1 p19; SJR Salt & Boron TMDL Appendix 5, p[A5-21]; See Table 11, below.) Consequently, the "no project" conditions described by the Regional Board were therefore too low to list the LSJR for EC and boron.

Table 11. Number and Rate of Exceedances Predicted by Regional Board TMDL.[35]

Year Type	Years	Irrigation Season			Non-Irrigation Season		
		Months	Exceedance Rate (%)	Exceedances	Months	Exceedance Rate (%)	Exceedances
CD	17	85	40	34	119	34	40
D	15	75	18	14	105	14	15
BN	17	85	13	11	119	15	18
AN	21	105	9	9	147	7	10
W	34	170	2	3	238	1	2
Total	104	520	14	71	728	12	86

Total Months: 1,248 **Total Exceedances:** 157 **Exceedance Rate (%):** 13

f. Evaluation of Lower San Joaquin River §303(d) Listing for Electrical Conductivity and Boron in 2006.

For the 2006 §303(d) listing cycle, the SJRGA submitted extensive comments documenting changes in management practices, regulations, and operations in the LSJR Basin, especially those resulting from D-1641, since the 1996 listing. Subsequent comments submitted by the SJRGA explained the impacts of the SWRCB Cases and CDWA v USBR. (SJRGA Comment Letter – 2006 Federal CWA §303(d) List (October 18, 2006), p16 (available at http://www.waterboards.ca.gov/tmdl/docs/303dlists2006/comments/kenneth_petruzzelli.pdf, accessed January 19, 2007).) In the interest of adopting the 2006 §303(d) List without further delay however, such changes were not evaluated and instead left for the next listing cycle. (State Board, *Staff Report Supporting the Approved 2006 §303(d) List of Water Quality Limited Segments Volume IV: Responses to Comments* (November 2006), p186 (available at

[35] The Regional Board did not provide overall rates and numbers of exceedances in either its SJR Salt & Boron TMDL or its 2006 §303(d) List submission. Numbers and rates of exceedances were calculated based on the number of year types in the period from 1901 through 2004 cited in the Regional Board 2006 §303(d) List comments. (Grober Memorandum Attachment 1, p19.) Exceedance rates were based on "No Project" conditions modeled for the SJR Salt & Boron TMDL. (SJR Salt & Boron TMDL Appendix 5, p[A5-21].) The numbers of months were based on five months each year in an irrigation season (April through August) and seven months for the non-irrigation season. Numbers were rounded to whole numbers.

http://www.waterboards.ca.gov/tmdl/docs/303dlists2006/final/staffreport/v4sr_final.pdf, accessed January 5, 2007).)

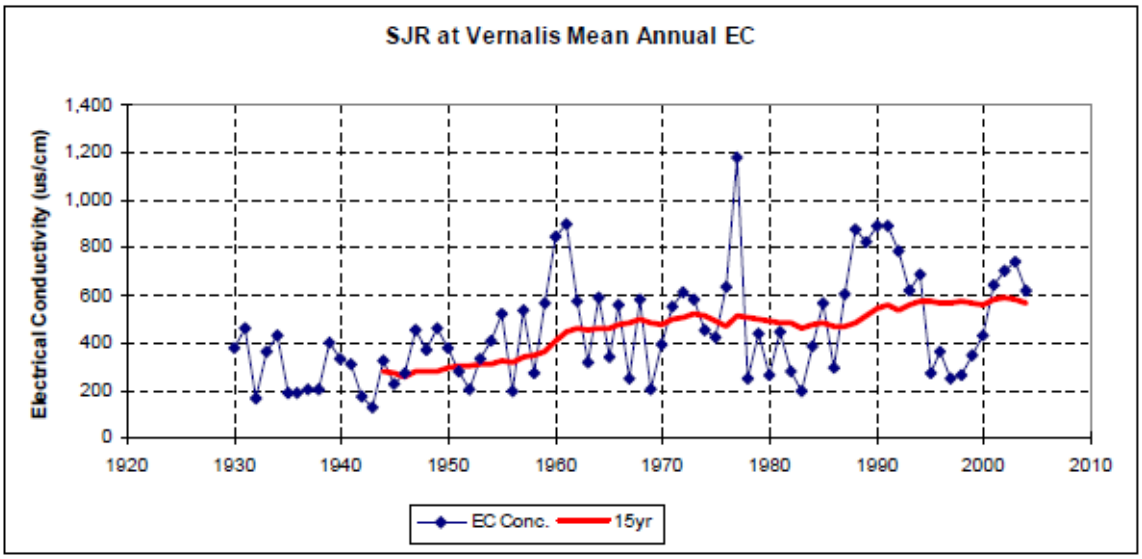
Other data considered was submitted by Mr. Les Grober, then of the Regional Board Staff, at the request of State Board Staff. (*See* Appendix C: Grober, L. *Report on San Joaquin River Salinity* (2006) ("Grober Memorandum").) The memorandum relied on three documents. The first, "Attachment 1," was a draft TMDL report developed for the SJR EC and Boron Upstream of Stanislaus Confluence TMDL that had not been adopted by the Regional Board, let alone released for public review. The second, "Attachment 2," was an excerpt from the SJR Salt & Boron TMDL. The third, "Attachment 3," a water quality data spreadsheet, was Appendix A, to Attachment 1. The Grober Memorandum relied on four lines of evidence, all of which flawed, inaccurate, irrelevant, and unrepresentative of current conditions.

The first line of evidence was an increase in mean annual EC levels in the SJR at Vernalis over a 75-year period. (*See* Appendix C: Grober, L. *Report on San Joaquin River Salinity* (2006), p1; *See also* Figure 19, below.) The Grober memorandum did not, however, discuss how the trend had changed with respect to changes in facilities and regulations. (Id.) Although the trend in mean annual EC increases, it later levels out. D-1422, which first required the USBR to meet the Vernalis EC Objective, was not adopted until 1973. Even then, achievement of the salinity objective at Vernalis could not be ensured until New Melones Reservoir became operational.[36] (1978 Delta Plan, p[VI-23].) Later, in 1996, the Grassland Bypass Project began managing upstream salt discharges, then, in 1997, the USBR implemented the IPO at New Melones. Finally, the State Board

[36] Construction of New Melones Dam started in 1966 and was completed in 1979. Initial filling occurred in 1983.

adopted the D-1641 in 1999. Such factors are ignored entirely by only observing the general trend.

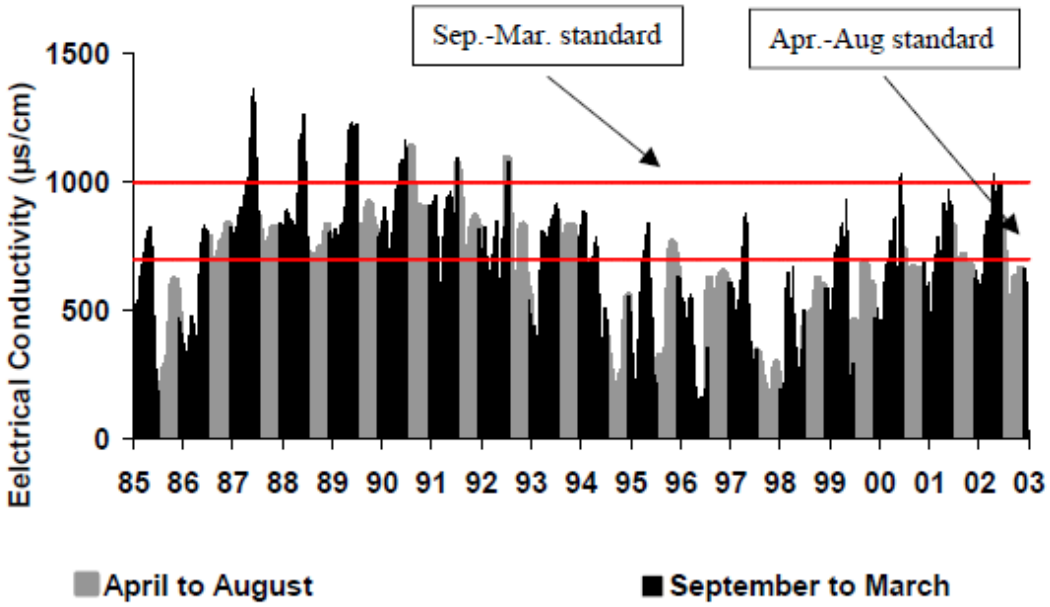
Figure 19. Mean annual EC in the LSJR at Vernalis, 1930-2004. [37]



A cursory review of absolute EC also ignores whether EC at Vernalis met applicable WQOs. The Grober Memorandum used a 15-year running average EC, to depict LSJR EC at Vernalis relative to the Vernalis EC WQO. (*See* Appendix C: Grober, L. *Report on San Joaquin River Salinity* (2006); *See also* Figure 20, below.) As depicted in Figure 20, compliance with the Vernalis EC Objective clearly improves after 1994. (Id.)

[37] Grober Memorandum Attachment 1, p17 Figure 5.

Figure 20. Electrical Conductivity for the LSJR at Vernalis, 1985-2003.[38]



A 15-year running average will also depict ECs that are greater than the Vernalis EC Objective, but not exceedances. Merely calculating a running average ignores the method of calculating running averages described in footnote 2 to Table 2 of the 1995 and 2006 Bay-Delta Plans, which dictate that compliance is not assessed until the thirtieth day a WQO based on a running average is in operation.(*See* discussion of calculating 30-day running averages, p26.) The 15-year running average depicted in Figure 20 does not

The second line of evidence, exceedances of the Vernalis EC Objective from 1985 through 1998, completely ignores the period since 1998. (*See* Appendix C: Grober, L. *Report on San Joaquin River Salinity* (2006), p2; SJR Salt & Boron TMDL Final Staff Report, p4.) State Board Staff described the sample period as one representative of the "critical timing a pollutant is expected to impact [a] water body." (State Board, *Staff Report Supporting the Approved 2006 §303(d) List of Water Quality Limited Segments*

[38] Grober Memorandum Attachment 1, p18 Figure 6. *See* also SJR Salt & Boron TMDL Appendix 1: Technical Report, p[1-16] Figure 1-3.

Volume IV: Responses to Comments (November 2006), p187.) The 1985 through 1998 period is not however, limited to drought years. If it had, then the sample period would have been from 1987 through 1992 (six consecutive Critical years), or perhaps through 1994 (an Above Normal year and another, seventh, Critical year).

The document relied upon for the second line of evidence was Attachment 2, an excerpt from the Appendix 1 to the SJR Salt & Boron TMDL, which in turn only analyzed EC data through 1998. (*See* Appendix C: Grober, L. *Report on San Joaquin River Salinity* (2006).) Limiting the sample to 1998 excluded the effects of the many management, regulatory, and operational changes initiated since 1996, such as the Grassland Bypass Project, the IPO, and the water rights portion of the 1995 Bay-Delta Plan, D-1641. As a result, the second line of evidence did not consider all "readily available data," as required by both the Listing Policy and Federal regulations and failed to consider current conditions. (Listing Policy, p1; 40 CFR §130.7(b)(5).

The third line of evidence, use of New Melones supply to provide dilution flow, because the "CALSIM II model review found that the model consistently underestimates salinity." (CALSIM II Peer Review, p9.) The Peer Review nevertheless concluded that the representation of SJR mainstem EC was a "substantial advance over the older 'Kratzer equation' representation" and "[u]nder most circumstances… will be more accurate." (Id.) Any such "overestimate" has since been addressed by the CALSIM II development team and, where it existed at all, was found to be insignificant. (USBR and DWR, *CALSIM-II San Joaquin River Peer Review Response In Reply to the Peer Review of the CALSIM-II San Joaquin River Model January 2006* (January 31, 2007), Appendix B and C (available at http://www.usbr.gov/mp/calsim/calsim_rpt.pdf, accessed January

31, 2007).)) In any event, the third line of evidence relies solely on the "potential" that an exceedance "may" occur in the future, and lacks any evidence or analysis demonstrating that an exceedance "will" occur in the future. An identical argument, with the same facts and less advanced modeling, was made before the Ninth Circuit and summarily dismissed as lacking any "reasonable scientific certainty." (CDWA v. USBR, *supra* 452 F.3d at 1027.)

Finally, the fourth line of evidence, LSJR EC upstream of Vernalis, is not relevant to compliance with WQOs, because there are no upstream WQOs for EC. (*See* Appendix C: Grober, L. *Report on San Joaquin River Salinity* (2006), p2.) Furthermore, as there has never been a site-specific determination of the irrigation salinity needs of the LSJR upstream of Vernalis, the data does not indicate whether beneficial uses are protected. Even if there were, use of any threshold number, absent a WQO contained in a basin plan, approved by the State Board and USEPA and enacted into regulation by the OAL, would constitute an "underground regulation" and provide an improper and illegal basis for regulatory determinations or actions.

The four lines of evidence used in the Grober Memorandum were all either incomplete or inaccurate. Others have since become outdated or were addressed by in court decisions.

2. Water Quality Compliance Requires De-Listing.

a. The Vernalis EC Objective, as Established in the 2006 Bay-Delta Plan, Has Been Met, Without Fail, for Over Twelve Years.

Under the §4.2 of the Listing Policy, a water body must be de-listed if numeric WQOs for pollutants are not exceeded. (Listing Policy, p12.) If, based on the binomial

distribution, the number of measured exceedances supports rejection of the null hypothesis as presented in Table 4.2 of the Listing Policy, the water body must be de-listed. **There has never been an exceedance or violation of an EC WQO for the LSJR, because no EC WQOs for the LSJR exist.**

Due to the lack of EC WQOs for the LSJR, the Vernalis EC Objective has operated as the de facto indicator of LSJR EC, even though releases from New Melones by the USBR have historically been the method used to maintain the Vernalis EC Objective. Since New Melones is located on the Stanislaus River, the downstream end of the LSJR, and such releases do not affect EC upstream, EC at Vernalis is a poor indicator of EC upstream. Nevertheless, Vernalis remains the only EC WQO on the LSJR.

Due to the array of management programs adopted and implemented since 1995, earlier data poorly represents current basin conditions, and, as a result, assessments of LSJR conditions should use data collected since then. Since 1995, there have been no exceedances of the Vernalis EC Objective.[39] (See Table 12, below.) Twelve years, including three leap years, constitutes 4,383 days. Since the Vernalis EC Objective is based on a 30-day running average, each day constitutes one sample.[40] (2006 Revised Draft Bay-Delta Plan, p13 Table 2.) Under §4.2 of the Listing Policy, de-listing is required.

[39] Under conditions existing up to 1995, 87 exceedances per year would have occurred, but under conditions existing since, only 5 exceedances per year would have occurred. (See Appendix D: Statistical Analysis of Compliance with the Southern Delta Water Quality Objectives for Agricultural Beneficial Uses at Vernalis.)

[40] Of the exceedances occurring from 1986 through 2006, 691 (64%) occurred in the irrigation season and 389 (36%) occurred in the non-irrigation season. (Id.)

b. Sufficient Compliance With the Vernalis EC Objective has Occurred, Since 1986, to Require De-Listing.

De-listing is required, even if a broader sample, the period from 1986 to the end of 2006, is assessed. From 1986 to 2006 there were a total of 7,670 days and 1,080 exceedances.[41] (*See* Table 12, below.)

Table 12. Exceedances of the Vernalis EC Objective, 1986-2006. [42]

CY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Year Type
1986														W
1987						27	31	31					89	C
1988					8	30	31	31					100	C
1989	13	28	22	30	24	22	31	31					201	C
1990	25	28	18	30	31	30	31	31					224	C
1991	7	28	31	30	20	27	31	31					205	C
1992			12	30	1	24	31	31					129	C
1993			17				21	9					47	W
1994						23	31	31					85	C
1995														W
1996														W
1997														W
1998														W
1999														AN
2000														AN
2001														D
2002														D
2003														BN
2004														D
2005														W
2006														W
Total	45	84	100	120	84	23	238	226	0	0	0	0	1,080	

Table 13. SJR Basin Index Definitions

Index = (0.6 * X) + (0.2 * Y) + (0.2 * Z)
Where: X is Current Year's April - July San Joaquin Valley Unimpaired Runoff
Y is Current Year's October - March San Joaquin Valley Unimpaired Runoff
Z is Previous Year's Index Capped at 4,500,000 acre-feet

Year Classifications	Index
Wet (W)	3,800,000 af
Above Normal (AN)	3,100,000 af
Below Normal (BN)	2,500,000 af
Dry (D)	2,100,000 af
Critical (C)	< 2,100,000 af

Using the binomial equation of §4.2 of the Listing Policy, are 1,080 exceedances in a sample size of 7,670 are sufficiently few to require de-listing. (Id.; *See also*

[41] 365 x 21 years + 5 leap years = 7,670 days.
[42] In later phases of the 2008 §303(d) List revision process, the SJRGA will submit updated EC data for Vernalis. SJR Basin Index. See Appendix A: Vernalis Flow and Water Quality Data. Currently, the USBR anticipates sufficient supply in New Melones for compliance with the Vernalis EC Objective through 2007, a which point there will be 8,035 samples and the exceedance rate, assuming the USBR's planning is correct and no exceedances occur, will be 13.4%.

Appendix D: Statistical Analysis of Compliance with the Southern Delta Water Quality Objectives for Agricultural Beneficial Uses at Vernalis.) Although many exceedances, 95% of those occurring in the period, occurred from 1992 to 1992, no exceedances occurred after 1995. (Id.) Consequently, the overall exceedance rate for the period was only 14%. (Id.) Even if the sample limited to April through August, the irrigation season, when there were 3,213 days, 691 exceedances, and an exceedance rate of 21.5%, application of the binomial equation of §4.2 nevertheless requires de-listing.[43] (Id.; *See also* Appendix D: Statistical Analysis of Compliance with the Southern Delta Water Quality Objectives for Agricultural Beneficial Uses at Vernalis.)

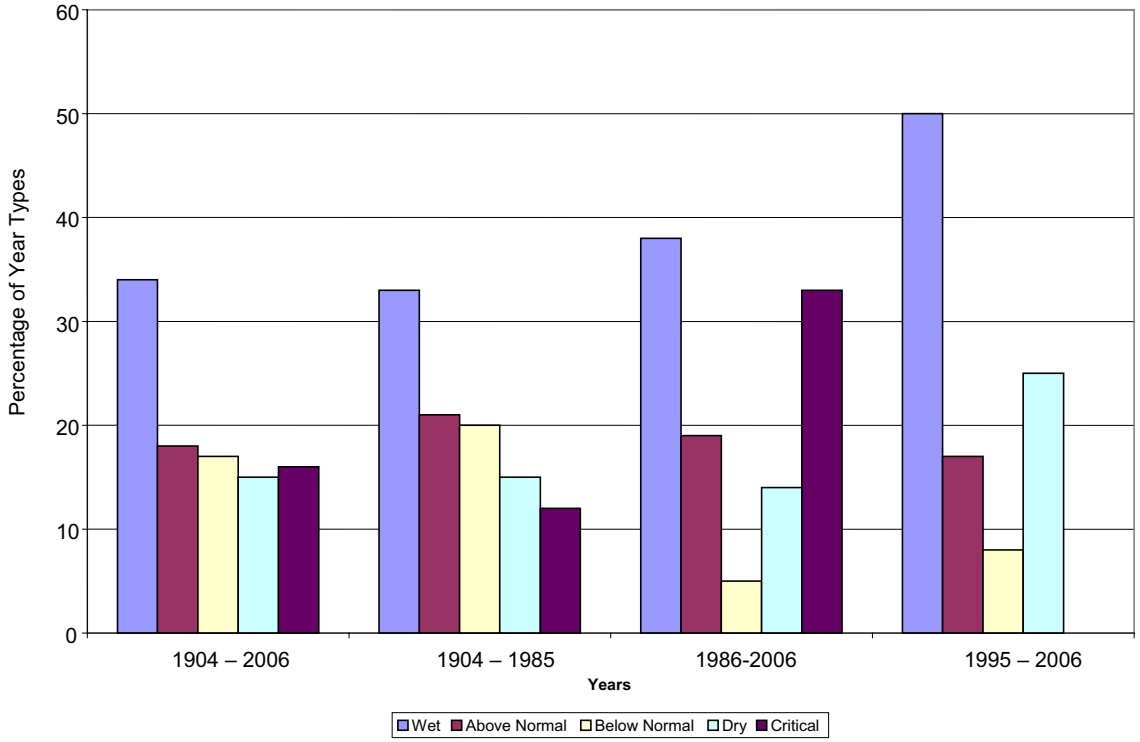
A high rate of compliance was achieved from 1986 through 2006, even though the period was drier than the period or record, with a higher proportion of Critical years and lower proportion of Dry years, and included the worst drought on record. (See Table 14, below.)

Table 14. SJR Basin Index Year Types, 1904-2006 and 1986-2006.[44]

	1904 – 2006		1904 – 1985		1986-2006		1995-2006	
Year Type	**Years**	**%**	**Years**	**%**	**Years**	**%**	**Years**	**%**
Wet	35	34	27	33	8	38	6	50
Above Normal	19	18	17	21	2	19	2	17
Below Normal	17	17	16	20	1	5	1	8
Dry	15	15	12	15	3	14	3	25
Critical	17	16	10	12	7	33	0	0
Total Years	103		82		21		12	

[43] For the non-irrigation season, January through March and September through December, there were 4,457 days and 229 exceedances for an exceedance rate of 5.1%. For a sample limited to the non-irrigation season, applying the binomial equation of §4.2 of the Listing Policy, de-listing is required.
[44] See Appendix A: Vernalis Flow and Water Quality Data.

Figure 21. Relative proportions of year types, 1904-2006.[45]



All of the exceedances since 1986 occurred in the period from 1987 through 1994, which consisted of six consecutive Critical years, a Wet year, and then another Critical year. (*See* Appendix A: Vernalis Flow and Water Quality Data.) Never, in the entire hydrologic record, have so many Critical years occurred consecutively. (Id.) In planning for the Revised Plan of Operations, the successor to the IPO, it has been estimated that such a drought only occurs every 250 to 450 years. (Brekke, Levi, *Drought Reoccurrence Analysis for the Stanislaus River* (January 11, 2006), p7 (available at http://www.usbr.gov/mp/ccao/nmrpo/news_info/3-23-06_mtg/dft_drought_recurrence_analysis.pdf, accessed January 8, 2007).) The only period that comes close, 1929 through 1931, consisted of 3 consecutive Critical years.. (Id.) Even in a twenty-one year period that includes the longest, most severe drought on

[45] See Appendix A: Vernalis Flow and Water Quality Data.

record in California, compliance with the Vernalis EC Objective has nevertheless been sufficient to require de-listing, pursuant to §4.2 of the Listing Policy.[46]

c. The Vernalis EC Objective Will Be Met in the Future.

Due to both the disproportionate number and concentration of Critical years in the period from 1986 through 2006, a higher exceedance rate than would occur under the full spectrum of basin conditions might be expected. Conditions have markedly changed however, since the hydrologic record began. The Regional Board provided examples in the SJR Salt & Boron TMDL, noting that:

> The New Exchequer Dam on the Merced River was completed in 1969, Don Pedro Dam on the Tuolumne River was completed in 1971, and New Melones Dam on the Stanislaus River was completed in 1979. These dams significantly altered the annual and seasonal flow patterns of the LSJR. More recently, major operational changes caused by the Central Valley Project Improvement Act (CVPIA) and the Vernalis Adaptive Management Program (VAMP) have also changed LSJR hydrology.

(SJR Salt & Boron TMDL Appendix 5, p[A5-3].)

To operate New Melones in compliance with its obligations, including the obligation to meet the Vernalis EC Objective, the USBR developed the IPO, but due to changes such as those noted by the Regional Board in the SJR Salt & Boron TMDL, historical data poorly represented current and future conditions, necessitating modeling in order to simulate compliance with regulatory requirements under various operational scenarios. (SJR Salt & Boron TMDL Appendix 5, p[A5-1].) Since then, the USBR and

[46] Even assuming sufficient exceedances of the Vernalis EC Objective have occurred or will occur in the future to require listing the LSJR for EC and boron, then, because the Vernalis EC Objective applies to the Southern Delta, the properly listed water body would be the Delta Waterways. (Revised Draft 2006 Bay-Delta Plan, p12 Table 2.) The Delta Waterways are already listed for EC and scheduled for a TMDL in 2019. (State Board Resolution No. 2006-0079, *2006 Clean Water Act §303(d) List of Water Quality Limited Segments* (October 25, 2006), p148 (available at http://www.waterboards.ca.gov/tmdl/docs/303dlists2006/final/state_final303dlist.pdf, accessed January 24, 2007).)

DWR have adopted the new, state-of-the-art CALSIM II model as their official planning model. (CALFED Science Program, *Review Panel Report: San Joaquin River Valley CALSIM II Model Review* ("CALSIM II Peer Review") (January 12, 2006), p4 (available at http://science.calwater.ca.gov/pdf/calsim/calsim_II_final_report_011206.pdf, accessed January 5, 2007).) Modeling by CALSIM II clearly demonstrates that, even if the USBR strictly operates pursuant to the IPO and only uses New Melones releases to maintain the Vernalis EC Objective, exceedances would occur in less than 2% of months. (See Table 15, below.)

Table 15: Exceedances of the Vernalis EC Objective simulated by CALSIM II-Revised with Current LSJR hydrology.[47]

Average Monthly Water Quality at Vernalis - Simulated (uS/cm)

WY	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1935	C	C	C	C	1080	C	C	C	C	C	C	C
1961	C	C	C	C	1058	C	C	C	C	C	717	C
1977	C	C	C	C	C	C	C	C	C	C	710	C
1988	C	C	C	C	C	C	C	C	C	C	708	C
1989	C	C	C	C	1207	C	C	C	C	C	C	C
1990	C	C	C	C	1139	C	C	C	C	C	C	C
1991	C	C	C	C	1253	C	C	C	C	C	C	C
1992	C	C	C	C	C	C	749	1011	723	C	737	C
1994	C	C	C	C	C	C	C	C	735	718	725	C

Notes: "C" means water quality was within compliance for month. Exceedence during April or May is during non-pulse flow period.

Water Quality Objective - uS/cm

Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1000	1000	1000	1000	1000	1000	700	700	700	700	700	1000

Estimated Additional New Melones Release Needed to Provided Water Quality Compliance - 1,000 acre-feet

WY	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1935					10							
1961					7						2	
1977											1	
1988											1	
1989					20							
1990					15							
1991					22							
1992							6	21	1		3	
1994									4	1	2	

End of Month New Melones Storage - 1,000 acre-feet

WY	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1935	584	580	583	616	640	690	820	1012	1127	1074	1001	958
1961	1201	1216	1231	1239	1243	1224	1186	1132	1079	1023	966	934
1977	1448	1444	1436	1428	1400	1339	1273	1209	1181	1124	1069	1047
1988	1443	1424	1410	1414	1404	1361	1298	1222	1182	1145	1109	1081
1989	1045	1029	1022	1020	1029	1079	1047	1002	984	932	882	886
1990	906	908	923	936	952	920	856	786	733	676	633	609
1991	598	580	589	587	584	626	594	558	521	461	404	385
1992	382	371	386	400	450	467	441	361	308	252	194	166
1994	716	738	772	802	825	775	723	675	619	552	490	455

From 1921 through 1994, the period modeled by CALSIM II in Table 15, above, 15 exceedances would have occurred if New Melones were strictly managed by the IPO and only New Melones releases were used to maintain the Vernalis EC objective. (Id.) Five of the fifteen exceedances predicted by CALSIM II would have occurred in the relatively wet month of February, when the refuges discharge much of their water and the Vernalis EC Objective is only 1.0 dS/m, as opposed to 0.7 dS/m, and would have accounted for a third of all exceedances of the Vernalis EC Objective. (Id.) Furthermore, the February exceedances would have required an average of 14.8 TAF for compliance

[47] See State Board Periodic Review of the 1995 Bay-Delta Plan, SJRG-EXH-13, *CALSIM II – San Joaquin River Basin Refinements and Results*, p21, available at http://www.waterrights.ca.gov/baydelta/docs/exhibits/SJRG-EXH-13.ppt, accessed June 8, 2006.) Exceedances are shaded pink. For purposes of conversion, 1000 uS/cm = 1 dS/m.

with the Vernalis EC Objective, whereas the exceedances from April through August would have required, on average, 4.2 TAF. (Id.)

If the focus is solely on Critical years, a total of 16 Critical years are modeled in Table 15, above. As there were 180 months within the 16 Critical years and 14 months with exceedances, the rate of exceedances would have been about 9%. Even focusing solely on Critical years, sufficient compliance would have occurred to require de-listing pursuant to §4.2 of the Listing Policy. Only one exceedance in the simulated period, which occurred in February 1935, an Above Normal year, would have occurred in a year that was not a Critical year. (Id.)

Most importantly however, whenever CALSIM II predicts an exceedance, New Melones has more than enough storage available to maintain the Vernalis EC Objective at all times and under all conditions. (*See* Table 15, above.) The simulated exceedances assume the USBR will rigidly adhere to the IPO, but, since the USBR is legally required to maintain the Vernalis EC Objective, it must deviate from the IPO if and when necessary to maintain the Vernalis EC Objective. (CDWA v USBR, *supra* 452 F.3d at 1027.) It has done so in the past and there has never been evidence that it will not do so in the future. (Id.)

The CALSIM II Peer Review concluded that CALSIM II is a significant advance over earlier models and, although some uncertainties remained in the new representation

and "imperfections" exist, none are "fatal" to the model. [48] (CALSIM II Peer Review, p8.) Regardless, none have recommended a superior model for simulating EC at Vernalis.

Concerns that exceedances historically occurred in Critical years and will therefore reoccur in future Critical years fail to address the likelihood and magnitude of such exceedances, and, in so doing, fail to provide any evidence that exceedances "will" occur. (*See* Appendix C: Grober, L. *Report on San Joaquin River Salinity* (2006).) Such concerns also ignore the affects of changes in management practices, such as the Grassland Bypass Project, which, since 1996, has significantly reduced salt loading into the LSJR, and the IPO, which the USBR has used to operate New Melones in compliance with its obligations. (*See* discussion of the Grassland Bypass Project, page 54, above, and of the IPO, page 43, above.) Most important, concerns that exceedances are "likely" in the future ignore the impact of regulatory changes such as D-1641, which prohibited any diversion by New Melones for consumptive use unless the Vernalis EC Objective and the Stanislaus River Dissolved Oxygen Objective are met and required the USBR to maintain the Vernalis EC Objective by any means necessary. (D-1641, p162.) The USBR is not precluded by either the CVPIA or its permits, from purchasing non-CVP water, using water from CVP units other than New Melones, or undertaking whatever other action it deems necessary or most effective in maintaining the Vernalis EC Objective. (Central Valley Water Agency v. United States Bureau of Reclamation (2004) 327 F.Supp.1180, 1205, affirmed, sub nom. CDWA v USBR, *supra* 452 F.3d at 1021.) The altered management practices and regulatory structure were expected to reduce, if not altogether

[48]Uncertainties and "imperfections" contained in CALSIM II are discussed in the CALSIM II Peer Review Response In Reply to the Peer Review of the CALSIM-II San Joaquin River Model January 2006. (USBR and DWR, *CALSIM-II San Joaquin River Peer Review Response In Reply to the Peer Review of the CALSIM-II San Joaquin River Model January 2006* (January 31, 2007), Appendix B and C (available at http://www.usbr.gov/mp/calsim/calsim_rpt.pdf, accessed January 31, 2007).)

eliminate, the likelihood of exceedances. CALSIM II, the best model available for simulating compliance with the Vernalis EC Objective, shows that the likelihood of an exceedance under current conditions is zero.

The State Board has acknowledged that the USBR, pursuant to its permits terms and conditions, is legally required to maintain the Vernalis EC Objective. (Stockton East Water District v. United States, Case No. 04-541L (October 10, 2006) (United States Court of Federal Claims).) No other party was included in the State Board's order that the USBR maintain the Vernalis EC Objective "at all times." (D-1641, p162.) The burden falls solely upon the USBR and, as a result, only the USBR is accountable should an exceedance occur. (Id.) However, the State Board must follow through with its obligation to fully implement the Bay-Delta Plan by strictly enforcing the USBR's obligation to maintain the Vernalis EC Objective "at all times." (SWRCB Cases, *supra* 136 Cal.App.4th at 734.)

In any event, such arguments have already been dismissed by the 3rd DCA in the SWRCB Cases and by the 9th Circuit in CDWA v USBR. The USBR is legally required to maintain EC at Vernalis, has stated it can maintain EC at Vernalis, and has demonstrated it can. (CDWA v USBR, *supra* 452 F.3d at 1026.) It chooses to use CALSIM II at its own risk. (SWRCB Cases, *supra* 136 Cal.App.4th at 744.) The only "evidence" to the contrary is a hypothetical situation in which New Melones expends its supply in a prolonged drought. (CDWA v USBR, *supra* 452 F.3d at 1026; *See also* Appendix C: Grober, L. *Report on San Joaquin River Salinity* (2006) and Tr. Bd. Member Gary Wolff, State Board Meeting (October 25, 2006), p63.) As the 9th Circuit concluded, there is no "reasonable scientific certainty" or issue of material fact that an

exceedance of the Vernalis EC Objective will occur, let alone at a rate sufficient to result in a water quality limited segment, as defined by §3.2 of the Listing Policy. (CDWA v USBR, *supra* 452 F.3d at 1026.)

3. Trends in Water Quality Require De-Listing.

The Listing Policy requires de-listing if trends in declining water quality, as described in steps 1 through 4 of §3.10 of the Listing Policy, are unsubstantiated, **or** if impacts are no longer observed. (Listing Policy, §4 and §4.10 (emphasis added).) As the Listing Policy uses the disjunctive, rather than the conjunctive, a water body must be de-listed if either criterion is not observed.[49] (Listing Policy, §4.10.)

a. Trends in Declining Water Quality are Unsubstantiated.

In the existing conditions description for the SJR Salt & Boron TMDL, and again in support of continued listing in 2006, Regional Board Staff cited a steady increase in mean annual EC at Vernalis since the 1930's. (SJR Salt & Boron TMDL Appendix 1, p[1-14]; *See also* Appendix C: Grober, L. *Report on San Joaquin River Salinity* (2006) Attachment 1, p17.) Trends going back to the 1930's however, are not trends resulting from current conditions.

Regional Board Staff have acknowledged that historical conditions are neither representative of current conditions nor indicative of future conditions. (SJR Salt & Boron TMDL Appendix 5, p[A5-3].) Since the 1930's, new facilities were constructed and became operational and water quality and flow objectives were adopted and implemented. Today, the LSJR, especially downstream of the Stanislaus River, has become a highly managed water body. In there interest of conserving supply, New

[49] By comparison, Listing Policy §3.10 uses the conjunctive, rather than the disjunctive, and therefore requires substantiated trends in declining water quality **and** proof of beneficial use impacts.

Melones releases what is necessary to meet its obligations, pursuant to the terms and conditions imposed upon it by D-1641, and no more.

Regional Board data showing that 15-year moving average EC has leveled out since about 1990 confirms the managed nature of the LSJR at Vernalis.[50] (*See* Appendix C: Grober, L. *Report on San Joaquin River Salinity* (2006), Attachment 1 p17 Figure 5.) Since 1995, there have been no exceedances of the Vernalis EC Objective, but because the USBR operates New Melones to comply with the Vernalis EC Objective, pursuant to D-1641, it may, at times, come close to, but not exceed the objective. (*See* Appendix A: Vernalis Flow and Water Quality Data; *See also* CVP-OCAP-BA, p[2-49].)

While a listing pursuant to §3.10 of the Listing Policy does not require WQO exceedances, it does require an assessment of whether the declining trend is expected to result in failure to attain WQOs in the next two years. (Listing Policy, §3.10.) As noted, there are no EC WQOs for the LSJR and there has been no determination of the site-specific irrigation salinity requirements necessary to support agricultural beneficial uses in the LSJR, short of the WQO 85-1 Technical Report. The WQO 85-1 Technical Report was, however, based on 30 year-old science that, as the State Board concluded in the 2006 Bay-Delta Plan, must be updated. (Revised Draft 2006 Bay-Delta Plan, p33.)

As for the Vernalis EC Objective, there have been no exceedances in twelve years and, while there may be concerns that an exceedance "may" occur "if" there were a prolonged drought, such as that which occurred from 1987 through 1992, there is no

[50] The Draft 2006 WQCP discusses several projects that "may assist in meeting the [Vernalis EC Objective] by reducing drainage to the [SJR]; improving circulation in the southern Delta; and supplementing flows through recirculation." (Draft 2006 WQCP, p28.) "If successful, these projects and the actions they contain could make additional regulatory measures by the [SWRCB] and [CVRWQCB] unnecessary." (Id.) Such projects include the Grassland Bypass Project, the West Side Regional Drainage Plan, the San Luis Unit Feature Reevaluation Project, the CVPIA Land Retirement Program, the South Delta Improvements Program, and Delta-Mendota Canal Recirculation. (Id. at 28-29.)

evidence that an exceedance "will" occur any time in the foreseeable future, let alone in the next two years. (Tr. Bd. Member Gary Wolff, State Board Meeting (October 25, 2006), p63.) Such concerns were addressed and summarily dismissed by the 9th Circuit as lacking any "reasonable scientific certainty" and failing to even constitute issues of "material fact." (CDWA, *supra* F.3d at 1026.) Unless and until an actual exceedance occurs or there is proof that the USBR cannot maintain the Vernalis EC Objective, it must be presumed that the Vernalis EC Objective will be met at all times and under all conditions. (Id.)

b. Any Parameter Used to Determine Whether there is a Declining Trend in EC for the LSJR Constitutes an Invalid "Underground Regulation."

In the existing conditions description for the SJR Salt & Boron TMDL, and again in support of continued listing in 2006, Regional Board Staff cited a steady increase in the 15-year moving average salt discharge at Vernalis. (SJR Salt & Boron TMDL Appendix 1, p[1-14].) The applicable WQO, however, the Vernalis EC Objective, is not salt load, but EC. (Revised Draft 2006 Bay-Delta Plan, p13 Table 2.)

A rule intended to apply generally, rather than in a specific case, to implement, interpret, or make specific the law administered by the agency, but not adopted in substantial compliance with the Administrative Procedures Act ("APA") (Government Code §11340 et seq.) constitutes an "underground regulation" and is invalid. (Excelsior College v. California Bd. of Registered Nursing (2006) 136 Cal.App.4th 1218, 1239.) Government Code §11353 exempts the State Board from many of the requirements of the APA, but establishes many specific requirements that apply specifically to the State Board and regional water quality control boards, including the requirement that the basin

planning process be conducted in compliance with applicable requirements of Porter-Cologne and the Clean Water Act. (Government Code §11353(b)(7).)

In implementing Porter-Cologne and the Clean Water Act, each regional board must develop, for each area in its region, a basin plan setting forth the beneficial uses for the waters in the region and the WQOs necessary to attain such beneficial uses. (Water Code §13240; Water Code §13050(j).) Before adopting a basin plan or any amendment however, a regional board must hold a noticed public hearing, with the proposed basin plan amendment circulated prior for public review. (Water Code §13244.) In addition, all basin plans adopted by the regional boards, and all amendments thereto, must be subsequently approved by State Board. (Water Code §13245.) Finally, all basin plans and amendments and revisions thereto must be approved by the OAL, wherein they are enacted into regulation. (Government Code §11353(b)(5).) Since WQOs must be adopted in compliance with applicable requirements of Porter-Cologne and the Clean Water Act, any rule, determination, or standard with the effect of a WQO that has not been adopted in substantial compliance with Government Code §11353, Porter Cologne, and the Clean Water Act, constitutes an "underground regulation" and is therefore invalid.

Using load or any parameter other than the Vernalis EC Objective to gauge whether agricultural beneficial uses are attained constitutes a change in the WQO established by the Basin Plan and therefore constitutes an underground regulation. Loads adopted pursuant to TMDLs may provide a valid basis for listing, because such loads are

interpretations of existing, applicable WQOs.[51] (State Board, Resolution 2005-0050 (June 2005), *Process for Addressing Impaired Waters in California,* 23 CCR §2917, p[1-3] (available at http://www.waterboards.ca.gov/tmdl/docs/iw_guidance.pdf, accessed January 12, 2007).) However, the 15-year moving average trend in salt loading, as described in the Grober Memorandum, is not described in the context of the Vernalis EC Objective, but in isolation. Furthermore, compliance with the Vernalis EC Objective is the expected long-term trend for the next two years and for the foreseeable future and there is no evidence to the contrary, only "fear" that compliance "may" not occur "if" certain hypothetical events also occur. As the courts have already concluded however, "fear" and fantasy are insufficient. (SWRCB Cases, *supra* 136 Cal.App.4th at 744.) Unless and until an exceedance occurs or there is evidence an exceedance "will" occur, it must be presumed that, in the long-term, the Vernalis EC Objective will be met and agricultural beneficial uses will be protected. (CDWA v USBR, *supra* 452 F.3d at 1026.)

c. There is no Evidence that Agricultural Beneficial Uses Have Been Adversely Affected By Salinity in the LSJR.

A water body-pollutant combination must be de-listed if the trends in assessing water quality are either no longer observed or unsubstantiated. (Listing Policy, p13.) If no evidence exists demonstrating the existence of such tends, then they are neither observed nor substantiated. Proof of the existence of beneficial use impacts is therefore required to support a listing, but not required for a de-listing.

[51] Grober Memorandum also relied on monthly average flow-weighted EC. (Grober Memorandum, Attachment 3, p2.) The Vernalis EC Objective however, is not a flow-weighted monthly average, but a 30-day running average of mean daily EC that is not flow-weighted. (Revised Draft 2006 Bay-Delta Plan, p13 Table 2.) Weighting flow changed the criteria and thereby changes the applicable WQO. Salinity data contained in Attachment 3 of Grober Memorandum therefore does not and cannot indicate whether compliance with the Vernalis EC Objective has occurred.

There has never been any evidence of impacts to agricultural beneficial uses as a result of salinity in the LSJR. No data was used to list the LSJR for EC in 1996 and no evidence of agricultural beneficial use impacts was provided in the 2006 §303(d) listing process. (Grober Memorandum; State Board, *Staff Report Supporting the Recommended Revisions to the Clean Water Act §303(d) List* (Volume IV: Responses to Comments, November 2006), p188 (available at http://www.waterboards.ca.gov/tmdl/docs/303dlists2006/final/staffreport/v4sr_final.pdf, accessed January 5, 2007).) Finally, the SJR Salt & Boron TMDL premised the existence of agricultural beneficial use impacts in the LSJR Basin on exceedances of the Vernalis EC Objective, but provided no quantitative data documenting actual crop damage. (SJR Salt & Boron TMDL Final Staff Report, p4.) To date, none has been provided.[52]

d. Current EC Levels are Adequate for Agricultural Beneficial Uses.

Under §4.10 of the Listing Policy, a water body must be de-listed if impacts to beneficial uses are not observed, based on the occurrence of adverse biological responses, degradation of biological communities, or toxicity. A de-listing pursuant to §4.10 of the Listing Policy does not require evidence disproving adverse beneficial use impacts, only a showing that that there is no evidence of adverse beneficial use impacts.[53]

[52] As for the Southern Delta, the US District Court for the Eastern District of California concluded that plaintiffs, consisting of CDWA, SDWA, Alex Hildebrand, and RC Farms, provided "no tangible evidence or expert opinion" that they had been injured, were being injured, or would be injured by an actual or imminent future violation of the Vernalis EC Objective. (Central Valley Water Agency v. United States Bureau of Reclamation (2004) 327 F.Supp.1180, 1210, affirmed, sub nom. CDWA v USBR, *supra* 452 F.3d at 1021.) Numerous witnesses for the Plaintiffs were deposed, but none could provide any specific, tangible proof that the USBR had failed since 1995 to meet the Vernalis EC Objective or that they suffered injury to their land (e.g., salt build up in soil). (Id.)

[53] A listing pursuant to §3.10, by comparison, requires evidence of adverse beneficial use impacts.

i. The Majority of Land Irrigated With Water From the Lower San Joaquin River is Contained in the West Stanislaus Irrigation District, Patterson Irrigation District, and El Solyo Water District.

The SWP, CVP, and tributary diversions from the Merced, Tuolumne, and Stanislaus Rivers have significantly altered the hydrology, agricultural operations, and water rights in the LSJR Basin. With the exception of the Lone Tree Mutual Water Company, which diverts water for irrigation pursuant to Statement No. 10411, all appropriative and riparian rights upstream of the Merced River were either purchased by the federal government through eminent domain or part of the SJR Exchange Contract.

The Regional Board report "Water Diversion and Discharge Points Along the San Joaquin River: Mendota Pool to Vernalis" ("Water Diversion and Discharge Points Along the SJR"), surveyed 150 miles of the SJR from Mendota Pool to Mossdale Bridge. (James, Edward W., Westcott, Dennis W., Gonzalez, Jeanne L., *Water Diversion and Discharge Points Along the San Joaquin River: Mendota Pool to Vernalis*, CRWQCB-CVR, p11 (April 1989).)[54]

The segment from Hills Ferry Road Bridge, which included inflows from the Merced, Tuolumne, and Stanislaus River, to Airport Way Bridge near Vernalis, had 46 points of diversion irrigating approximately 59,850 acres.[55] (Water Diversion and Discharge Points Along the SJR, p12 Table 2.) Irrigated acreage could not be determined for lands above river mile 129.5 however, because the diversions were not potentially affected by discharges of subsurface drain water or were multiple-use diversions, which made estimating the irrigated acreage impossible. (Id.)

[54] A subsequent survey was commenced in 2002, but never completed.
[55] The segment from Mud Slough down to Hills Ferry Road Bridge was designated "Segment 12." (*Water Diversion and Discharge Points Along the SJR*, p24.) The segment from Maze Road Bridge to Airport Way Bridge near Vernalis was designated "Segment 17." (Id., p32.)

The diversions and irrigated lands surveyed in *Water Diversion and Discharge Points Along the SJR* were matched with currently held statements of diversion and licenses to appropriate water. If a diversion lacked a corresponding statement or license, it was listed as a "riparian" diversion, although no title searches or thorough examination of assessor parcel maps were made.[56] Based on water rights and *Water Diversion and Discharge Points Along the SJR*, approximately **56,649** acres of the LSJR Basin have a right to use water from the LSJR. (*See* Table 16, below.) This acreage does not include lands irrigated by the San Joaquin River Exchange Contractors Water Authority[57] or where the acreage was either not disclosed, such as in a statement of diversion or where *Water Diversion and Discharge Points Along the SJR* could not determine the irrigated acreage. Overlapping places of use were only counted once. Since the LSJR Basin encompasses approximately **2.9 million acres**, less than 2% of this land area is actually irrigated with water from the LSJR. Of the **1.4 million acres** devoted to agriculture, approximately **4%** of such lands are irrigated with water from the LSJR.

[56] Legally, riparian land must be (1) in the same watershed as the watercourse, (2) contiguous to the watercourse, and (3) the smallest parcel in the chain of title retaining a riparian water right. (Pleasant Valley Canal Co. v. Borror (1998) 61 Cal.App.4th 742, 774-775; Rancho Santa Margarita v. Vail (1938) 11 Cal.2d 501, 528-529.)

[57] The San Luis Canal Company, for example, has a right to divert approximately 324 TAF, pursuant to Statement 1074, but due to the Exchange Contract, obtains water from the Delta Mendota Canal.

Table 16: Lower San Joaquin River Water Use and Diversion.[58]

Diverter	Acres	AFA	Flow (cfs)	Term Start	Term End	Permits	Statements
Arnold Souza & Sons	350	1,644	3	1-Mar	1-Nov		S005469
Azavedo, Joe T.	Inactive	Inactive	Inactive	1-Jan	1-Nov	A015175	
Azavedo, Joe T.	Inactive	Inactive	Inactive	1-Apr	1-Oct		S005279
Bogetti Farms	1100	NA	NA	NA	NA	Riparian	Riparian
Cabral Farms	159	NA	NA	NA	NA	Riparian	Riparian
Cerutti Bros	Inactive	Inactive	Inactive	1-Jan	31-Dec	A006393	
Coddington, Philip and James (Elewett Mutual Water Co/Blewett RD/RD2101)	2,359	15,870	35	1-Mar	15-Oct	A001195	
Columbia Canal Co.	16,500	Exchange Contractor with right to 126,403 AFA.	210	1-Feb	1-Dec		S001073
Stanislaus County (Peterson)	3	11	0	15-Apr	15-Oct	A016669	
Deniz Dairy	460	NA	NA			Riparian	Riparian
El Solyo WD	3,781	22,893	47	1-Mar	1-Nov	A001476	
Enciso	90	NA	NA	NA	NA	Riparian	Riparian
Eskue	7	NA	NA	NA	NA	Riparian	Riparian
Gallo, RJ	70	4,335	9	9-Mar	9-Nov		S014002
Gillmeister, Bouzenerais	165	9,668	18	1-Feb	1-Nov		S007681
Hailwood Ranch	520	1,807	2.5	1-Jan	31-Dec	Riparian	Riparian
Harry H Baker Trust	40	375	1	1-Mar	1-Nov	A016662	
Herger, Berta	84	364	1	1-Apr	1-Oct	A013553	
Herger, Berta	734	1,494	4	1-Apr	1-Oct	A004507	
Houk, Dean	117	536	1.47	1-Apr	1-Oct	Riparian	Riparian
Island Dairy	275	5,465	15	1-Apr	1-Oct	Riparian	Riparian
Lone Tree Mutual Water Co	Not indicated	12,000	40	1-Jan	1-Dec		S010411
Manuli, Mario (Novenafarm Proprietary Limited)	145	2,408	4	1-Feb	1-Dec	A013555	
Mendonca, Francisco	250	11,662	47	1-May	1-Sep		S007393
Menefee River Ranch Co	1,651	4,470	16	1-Jan	31-Oct	A026875	
Patterson ID	13,555	54,945	150	1-Mar	1-Sep		S009320
RD 2099	364	NA	NA	NA	NA	Riparian	Riparian
San Joaquin City	220	NA	NA	NA	NA		
San Luis Canal Co	Exchange Contractor	324,324 AF, but exchanges about 600 TAF.	0	1-Feb	1-Nov		S001074
Sanny	95	NA	NA	NA	NA	Riparian	Riparian
Serpa, Allen	450	NA	NA	NA	NA	Riparian	Riparian
Silviera, Alfred	Part of Victoria Dairy	190	0	1-Feb	1-Nov	A006467	
Twin Oaks Irrigation Company/Buehner/RD 1602	6,380	10,542	22	15-Feb	15-Oct	A004237	
Verhaegen River Well	80	NA	Well	NA	NA	Riparian	Riparian
Victoria Dairy	320	NA	NA	NA	NA	Riparian	Riparian
West Stanislaus ID	21,666	189,456	262	1-Jan	31-Dec	A001987	
TOTAL	55,669	351,223	681				

[58] "NA" indicates the information was not provided by the survey in *Diversion and Discharge Points Along the SJR*.

The three major diverters of LSJR water are the Patterson Irrigation District ("PID"), which irrigates approximately 13,555 acres, the West Stanislaus Irrigation District ("WSID"), which irrigates approximately 21,666 acres, and the El Solyo Water District ("ESWD"), which irrigates approximately 3,781 acres. (*See* Table 16, above, and Figure 22, Figure 23, and Figure 24.) Together, these lands account for approximately 39,000 acres, or over two-thirds of the land irrigated with water from the LSJR.

Figure 22: Ripon quadrangle with El Solyo Water District diversion.

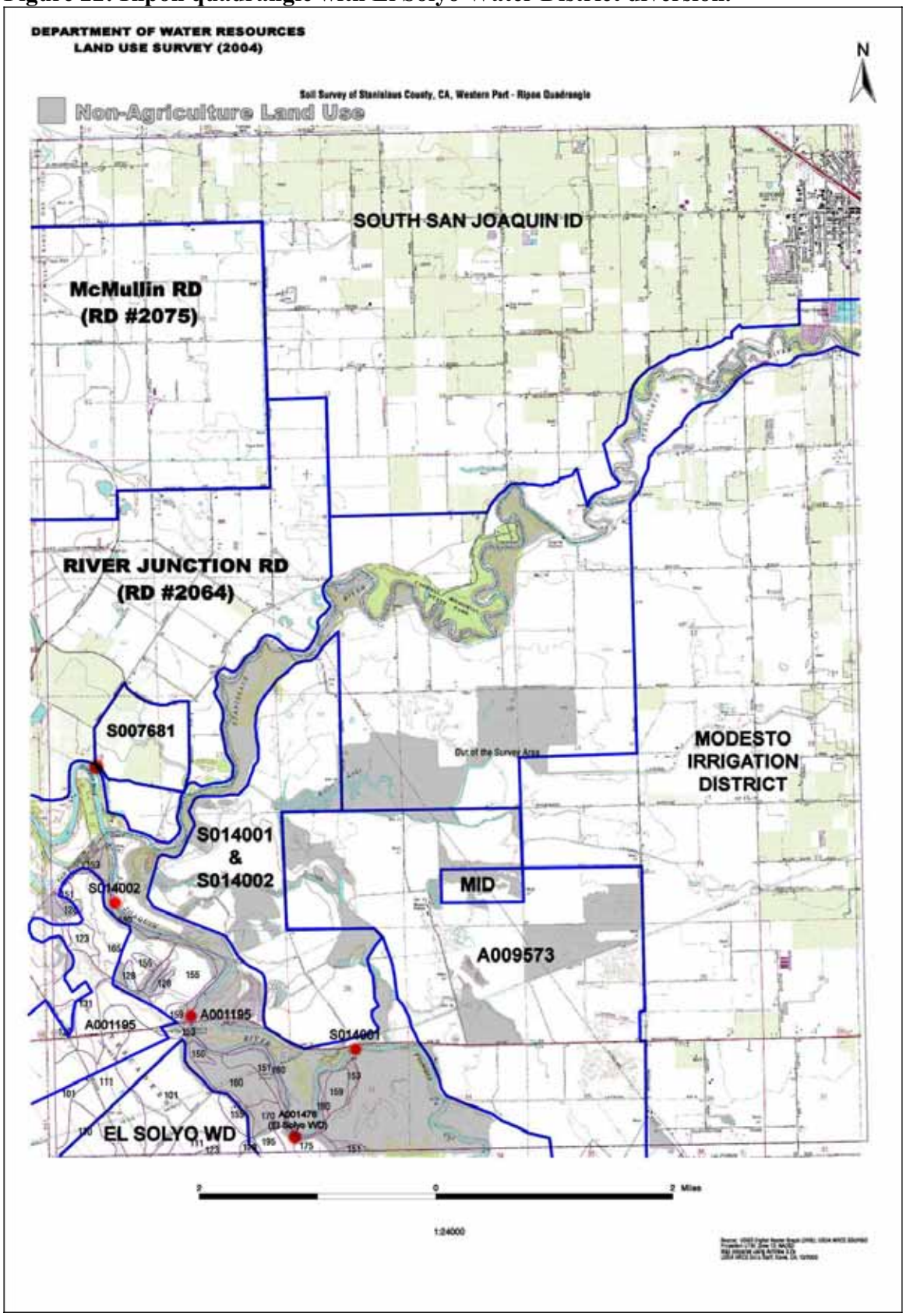


Figure 23: Westley quadrangle with West Stanislaus Irrigation District diversion.

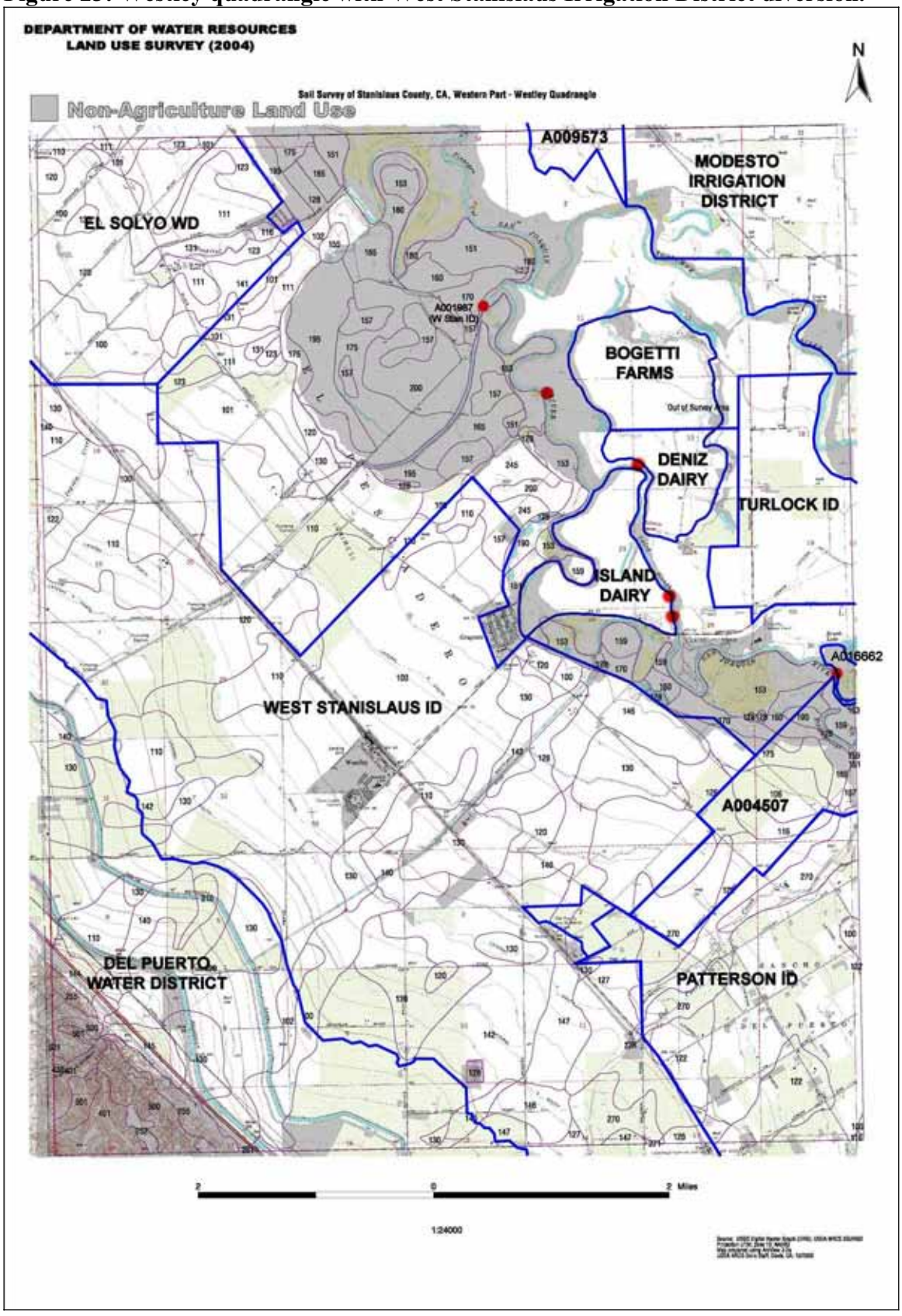
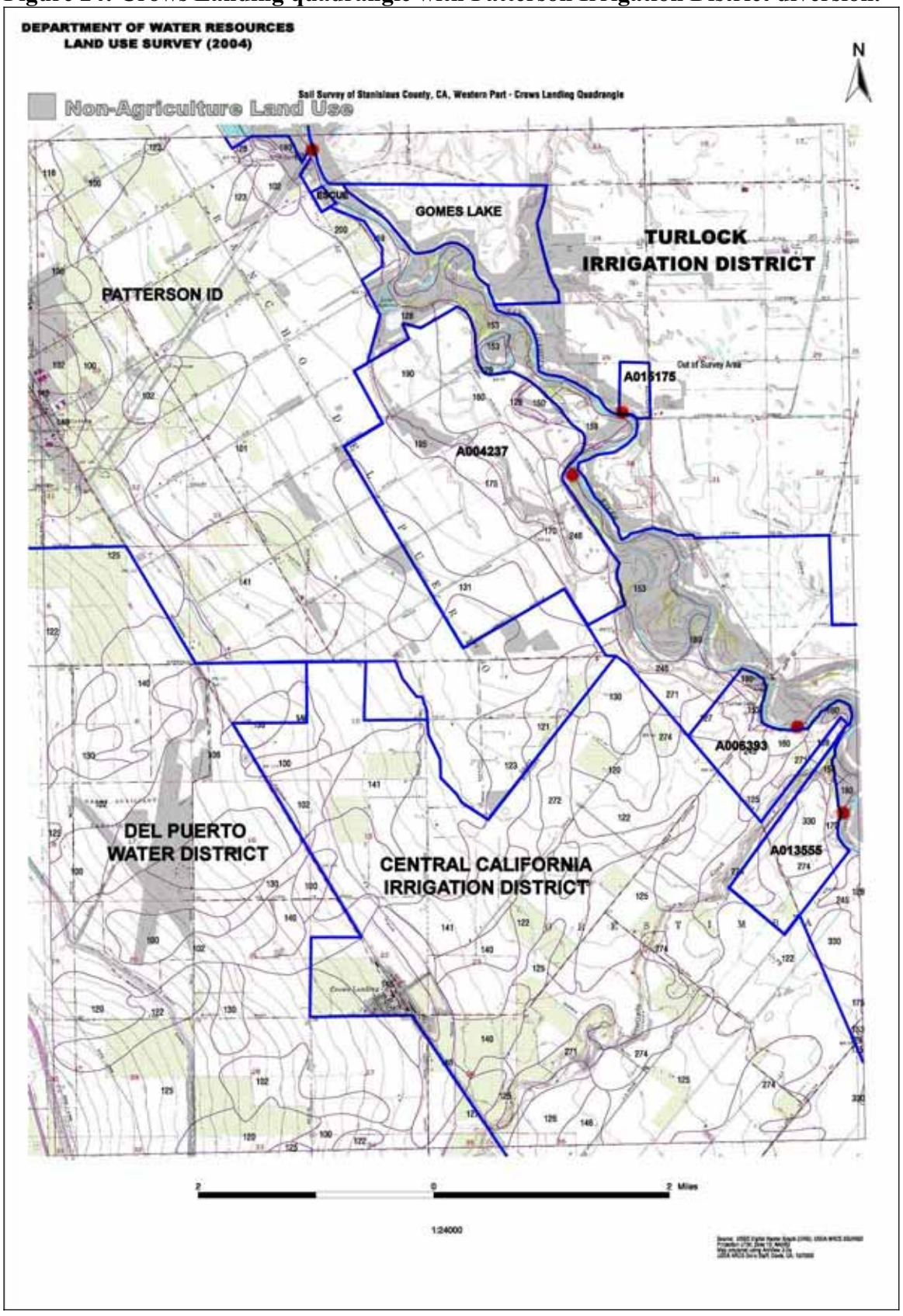


Figure 24: Crows Landing quadrangle with Patterson Irrigation District diversion.



ii. The Majority of Water From the Lower San Joaquin River is Used By the West Stanislaus Irrigation District, Patterson Irrigation District, and El Solyo Water District.

A review of water rights licenses and the riparian diversions surveyed in *Water Diversion and Discharge Points Along the SJR* shows that the total maximum diversion of SJR water is 681 cfs, assuming all parties divert at their maximum capacity throughout their annual terms.[59] If the annual terms of use are considered, the total water right in the LSJR Basin is 351,223 acre-feet annually ("AFA"). Together, the three major diverters, PID, WSID, and ESWD, have rights to divert 267,167 AFA and therefore hold over three-quarters of the water rights in the LSJR.[60]

Diverters normally do not divert at their maximum water right continuously. Water use reports provided by PID and WSID and license reports filed by ESWD and the Twin Oaks Irrigation Company (A004237), who were the only diverters to report their diversion volume, show this is not necessarily true.[61] The diversions of WSID, PID, ESWD, and Twin Oaks Irrigation Company increase significantly as the irrigation season begins in April, peak starting in May, diminish in August, and then fall substantially by October. (*See* Figure 25, below.)

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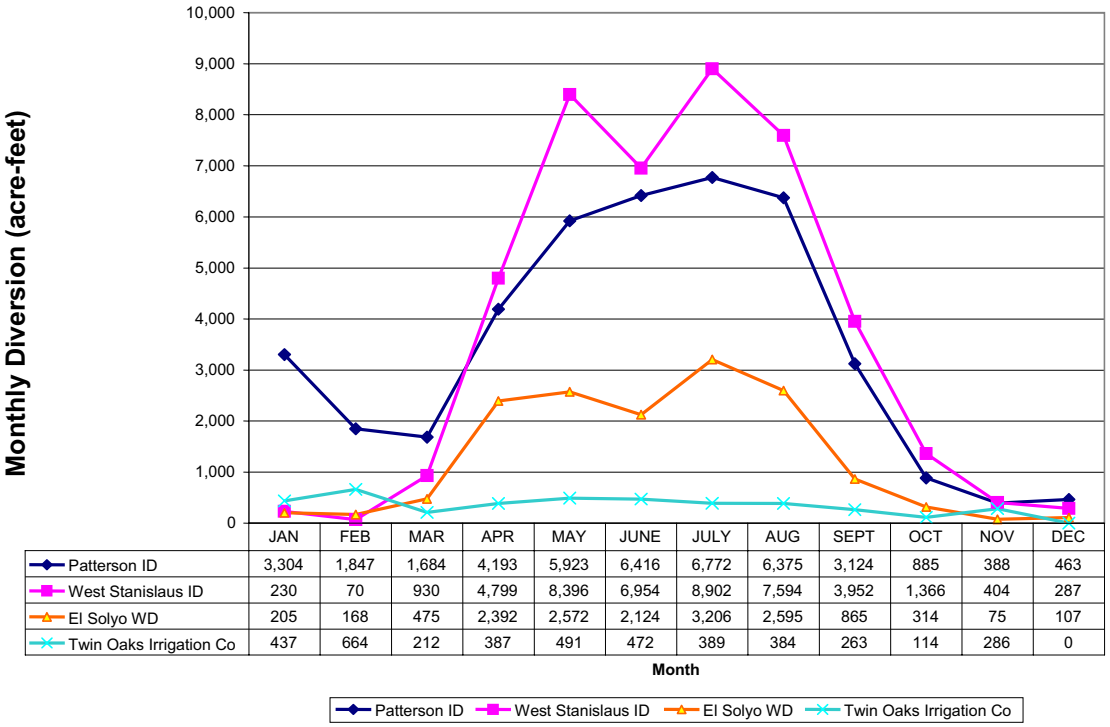
[59] Diversions listed as "riparian" in "Water Diversion and Discharge Points Along the SJR" that did not have annual terms were listed as diverting year-round. Further, this estimate only includes flow and annual acre-foot use that were surveyed in that report.

[60] WSID and PID also have contracts with the USBR with provisions to replace some of the water that could no longer be pumped from the LSJR. (Quinn, Nigel and Tulloch, Alice, *San Joaquin River Diversion Data Assimilation* (CALFED Project No. ERP-01-N61-02), p23 (September 15, 2002) (available at http://www.sjrtmdl.org/technical/2001_studies/reports/final/quinntulloch_final.htm, accessed February 2, 2007).) The WSID has a contract for 50 TAF (USBR Contract No. 14-06-200-1072-LTR1), although the Central Valley Improvement Act ("CVPIA") has limited actual delivery to as little as 12.5 TAF. (Id.) PID has a contract (USBR Contract No. 14-06-200-3598A-LTR1) for 6,000 AF of replacement water.

[61] All other licensees simply "checked the boxes" and reported only having used water in that particular month, but not how much. Some licensees checked boxes for all months of the year, even if their water right did not allow year-round diversion.

Figure 25: Monthly San Joaquin River Diversions by West Stanislaus ID, Patterson ID, and El Solyo WD.



	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Patterson ID	3,304	1,847	1,684	4,193	5,923	6,416	6,772	6,375	3,124	885	388	463
West Stanislaus ID	230	70	930	4,799	8,396	6,954	8,902	7,594	3,952	1,366	404	287
El Solyo WD	205	168	475	2,392	2,572	2,124	3,206	2,595	865	314	75	107
Twin Oaks Irrigation Co	437	664	212	387	491	472	389	384	263	114	286	0

Annually, PID, WSID, ESWD, and the Twin Oaks Irrigation Company divert substantially less than their full water rights. (*See* Table 17, below.)

Table 17: Proportions of water rights used by major LSJR diverters.

Diverter	Water Right	Total Diverted	% Diverted
Patterson ID	55,000	34,254	62
West Stanislaus ID	189,000	43,884	23
El Solyo WD	22,900	14,200	62
Twin Oaks Irrigation Co.	10,500	3,627	35
Total	277,400	95,965	35

The combined water right use "deficit" of PID, WSID, ESWD, and the Twin Oaks Irrigation Company is approximately 182,600 AF, which is more than half the maximum annual water right for the entire LSJR Basin. Since many diverters hold water rights extending beyond the irrigation season, the pattern of use exhibited by PID, WSID, ESWD, and the Twin Oaks Irrigation Company indicate that the actual amount of water

diverted is far less than even half of the maximum water rights held by all LSJR riparian diverters and appropriators.

iii. The Salinity of the Lower San Joaquin River is Adequate to Support Cultivation of Salt-Sensitive Crops.

The lands identified by place of use maps filed with water right permits and in *Water Diversion and Discharge Points Along the SJR* were subsequently matched with land use classifications in land use surveys conducted by the Department of Water Resources.[62] Crop reports filed with the USBR for 2004 were used for areas served by WSID and PID.[63]

Together, the licenses, place of use maps, *Water Diversion and Discharge Points Along the SJR*, and land use surveys accounted for almost all of the land area.[64] The land use surveys identified agricultural land uses, such as crop types, and non-agricultural land uses, such as urban classifications, native grasses, and duck marshes.

The crop acreages were broken down into segments of the SJR based on the locations of the eastside tributaries. (*See* Table 18, below.) The first segment extended from the Merced River to the Tuolumne, the second from the Tuolumne to the Stanislaus, and the third from the Stanislaus to Vernalis. Combined, there are 46,094 acres of crops irrigated with water from the San Joaquin River, which constitutes approximately 1.6% of the LSJR Basin or 3.2% of the area of the basin devoted to agriculture. The land area actually irrigated is less than the land area indicated by water right permits, because not

[62] The most recent survey available was used for each area. These surveys were for the counties of San Joaquin in 1996, Stanislaus in 2004, and Merced in 2002.
[63] These crop reports were more accurate than the land use surveys, because areas identified in the land use surveys as "miscellaneous" crop types were more specifically identified in the crop reports.
[64] Only the San Joaquin County land use survey identified areas irrigated with surface water and areas irrigated with groundwater. Consequently, areas irrigated with groundwater could not be excluded.

all of the land areas within the places of use have agricultural land use designations. For example, a large portion of the place of use under RJ Gallo's statement (S014002) is now part of the SJR National Wildlife Refuge.[65] The largest land area irrigated with water from the LSJR is the segment between the Merced and Tuolumne Rivers (36,989 acres) and accounts for approximately 80% of the land irrigated with water from the LSJR.

[65] After severe flooding in 1997, the United States Fish & Wildlife Service purchased a conservation easement on most of the Faith Ranch, which was then owned by Robert Gallo. (United States Fish & Wildlife Service, *San Joaquin River National Wildlife Refuge Draft Comprehensive Conservation Plan and Environmental Assessment* (June 22, 2006), p9 (available at http://www.fws.gov/pacific/planning/main/docs/CA/sanjoaquin/San%20Joaquin%20River%20NWR%20Draft%20CCP-EA.pdf, accessed July 6, 2006).)

Table 18: San Joaquin River irrigated crops – Merced River to Vernalis.

Type	Stanislaus-Vernalis	Tuolumne-Stanislaus	Merced-Tuolumne	Total	%	EC Threshold (dS/m)
Alfalfa/Alfalfa Mix		2,975	4,814	7,789	16.90	1.3
Almonds		281	4,337	4,618	10.02	1.0
Apples			191	191	0.41	1.0
Apricots		7	3,090	3,097	6.72	1.1
Beans (dry)		343	6,100	6,443	13.98	0.7
Beans (green)			774	774	1.68	0.7
Being prepared		83		83	0.18	
Broccoli			882	882	1.91	1.9
Cabbage			63	63	0.14	1.2
Cauliflower			190	190	0.41	1.9
Cherries			307	307	0.67	
Clover			2,343	2,343	5.08	1.5
Corn (field & sweet)	68	1,109	3,641	4,818	10.45	1.1
Dairies		15	64	79	0.17	
Farmsteads		90	2	92	0.20	
Flowers	32		16	48	0.10	
Lettuce			169	169	0.37	0.9
Melons		125	315	440	0.95	
Deciduous (Misc.)		5	9	14	0.03	
Field (Misc.)		197	172	369	0.80	
Grain (Misc.)		427	55	482	1.05	
Grasses (Misc.)			118	118	0.26	
Truck (Misc.)	24		617	641	1.39	
Pasture (Mixed)		2,359	937	3,296	7.15	
Not cropped			717	717	1.56	
Oats			496	496	1.08	
Peaches & nectarines			84	84	0.18	1.1
Peas			30	30	0.07	
Safflower			58	58	0.13	
Spinach			737	737	1.60	1.3
Sudan			46	46	0.10	
Table grapes			413	413	0.90	1.0
Tomatoes		592	8,101	8,693	18.86	1.7
Turf farms			176	176	0.38	
Unknown Pasture			570	570	1.24	
Walnuts		373	2,098	2,471	5.36	
Total	124	8,981	36,989	46,094	100	

The three most prevalent crops grown are tomatoes (8,693 acres, or 18.86%), almost all of which were grown in the WSID (about 6,000 acres), followed by alfalfa (7,789 acres, or 16.9%), and beans (6,443 acres, or 13.98%). In the segment between the Merced and Tuolumne River, tomatoes (8,101 acres) remain the most prevalent crop, but

beans, the most salt-sensitive crops grown in the LSJR Basin, are the second most prevalent crop (6,100 acres) ahead of alfalfa (4,814 acres).

Water quality in this segment is sampled at the Crows Landing and Patterson SWAMP sites. (*See* Table 1, above.) Water quality at Crows Landing is greatly influenced by dilution flows from the Merced River, whereas Patterson is also influenced by significant agricultural discharges and groundwater accretions. (*See* Table 2, above.) Nevertheless, compiled SWAMP data shows that EC at Patterson is, on average, similar to EC at Crows Landing, especially from June through September. (*See* Figure 26 and Figure 27.) Surprisingly, EC at Crows Landing and Patterson is, on average, slightly better than EC at Lander Avenue, the site used to gauge "background" water quality for the LSJR prior to significant inflows of subsurface tile drainage entering the SJR, despite the influence of agriculture return flows and upstream water quality at Hills Ferry. (Id.)

Figure 26: Average electrical conductivity moving downstream on the San Joaquin River.

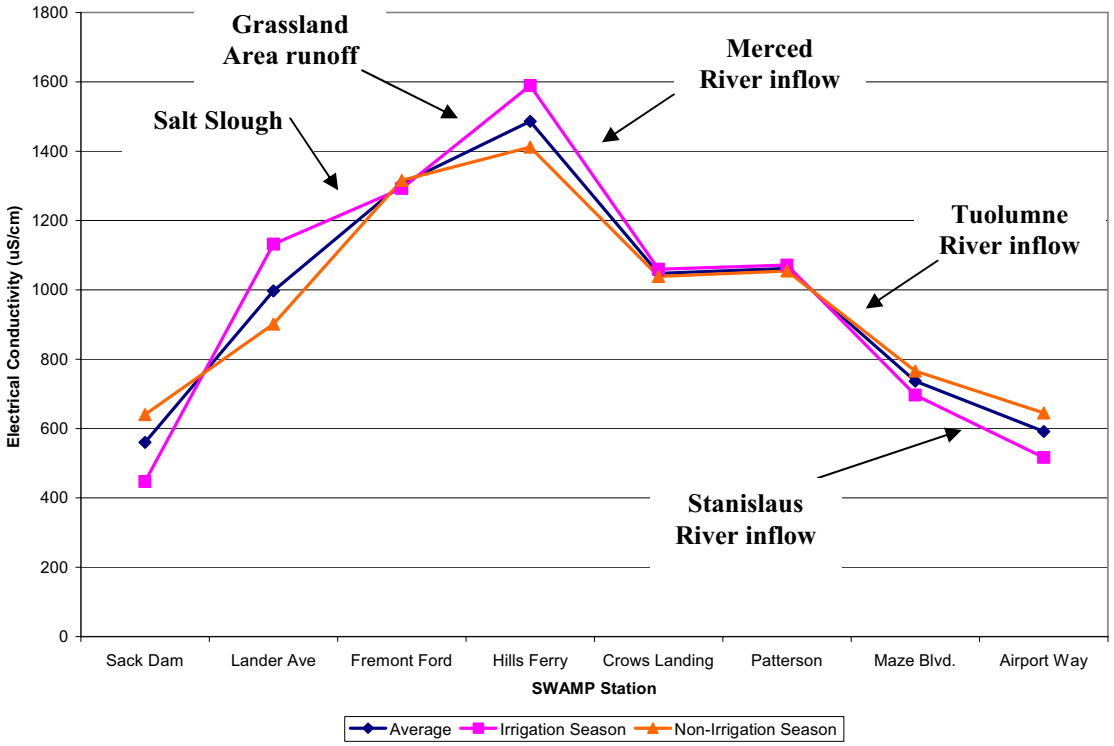
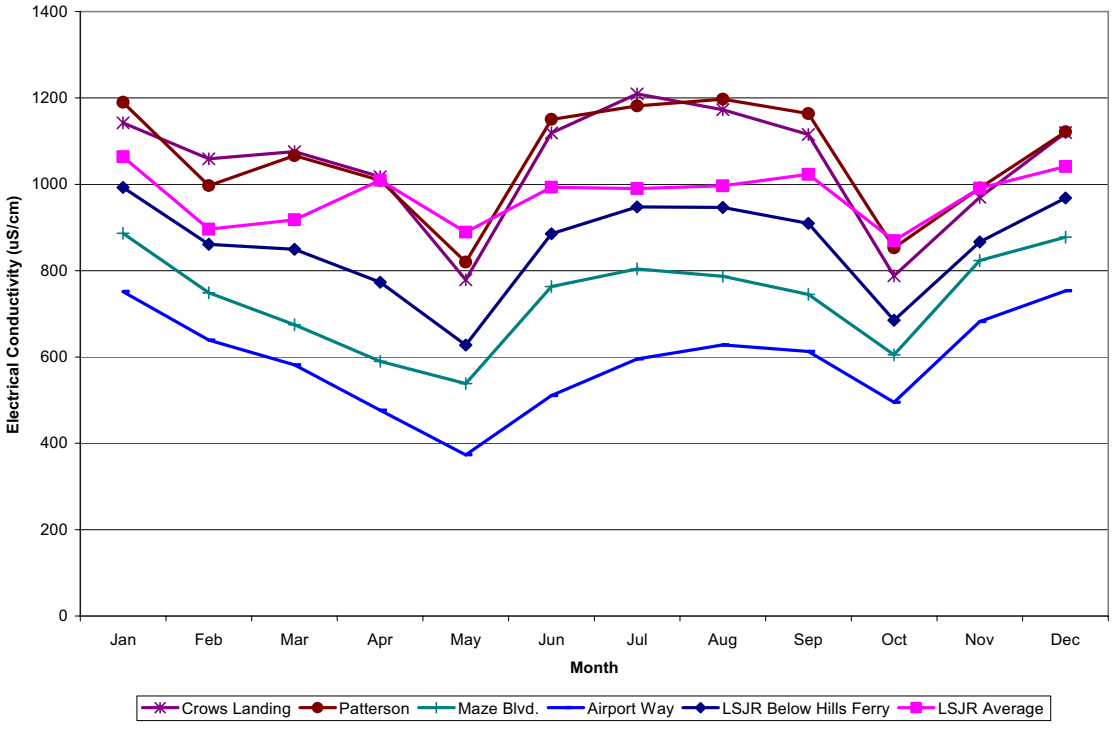


Figure 27: Average monthly electrical conductivity sampled at SWAMP stations below Hills Ferry.



During the irrigation season, the average EC at Crows Landing is 1.06 dS/m, while the average EC at Patterson is 1.07 dS/m. (*See* Table 3, above, and Figure 27, above.) The EC thresholds for tomatoes, beans, and alfalfa, the three most prevalent crops grown between the Merced and Tuolumne River are, respectively, 1.7 dS/m, 1.3 dS/m, and 0.7 dS/m. (Ayers, R.S. and Westcot, D.W., Water Quality For Agriculture, United Nations FAO Irrigation and Drainage Paper 29 Rev. 1, §2.4.3 Table 4 (1994).) The monthly average EC at Crows Landing and Patterson never exceeded 1.7 dS/m, the EC threshold for tomatoes. (*See* Table 19, below.) However, monthly average EC's at both sites regularly exceed both the South Delta EC Objective of 0.7 dS/m and the 1.0 dS/m EC objective recommended by the WQO 85-1 Technical Report. At Crows Landing, the monthly average EC in the irrigation season exceeds 0.7 dS/m, the EC threshold for beans, 40% of the time, while at Patterson the monthly average EC in the irrigation season exceeds 0.7 dS/m 41% of the time. Even 1.0 dS/m, the EC objective recommended by the WQO 85-1 Technical Report, is exceeded at both Crows Landing and Patterson 32% of the time. (Id.) Finally, the monthly average EC at Crows Landing and Patterson exceeded 1.3 dS/m, the EC threshold for alfalfa, 18% and 17% of the time, respectively.

Table 19: Exceedance rates for the San Joaquin River below Hills Ferry from April 1 through August 31, based on monthly average EC.

EC (dS/m)	Crows Landing	Patterson	Maze Blvd.	Airport Way	SJR Average	Average Below Hills Ferry
0.7	40	41	28	8	29	29
0.8	38	39	22	0	27	25
0.9	33	36	11	0	24	20
0.10	32	32	6	0	22	18
0.11	26	27	0	0	19	13
0.12	25	24	0	0	18	12
0.13	18	17	0	0	15	9
0.14	6	5	0	0	11	3
0.15	1	2	0	0	9	1
0.16	0	1	0	0	7	0
0.17	0	0	0	0	6	0

If EC were a limiting factor, one would not expect to observe high acreages of salt-sensitive crops. Nonetheless, alfalfa and beans, both salt-sensitive crops, are two of the three most prevalent crops grown with water from the LSJR. Even more remarkable, is that almost all of the beans grown with water from the LSJR are grown in the WSID, even though it diverts at River Mile 84, just upstream of the Tuolumne River, where the highest EC's below Hills Ferry would be expected to occur.[66] (*Water Diversion and Discharge Points Along the SJR*, p31.)

If LSJR EC limited agricultural beneficial uses, then cultivation of salt-sensitive crops such as beans and alfalfa should be low, yet beans and alfalfa are two of the three most prevalent crops grown with LSJR water. Therefore, the EC of the LSJR must not limit or otherwise impair agricultural beneficial uses in the LSJR.

[66] WSID, whose diversion is located at River Mile 84, immediately upstream from the Tuolumne River, reported growing approximately 6,000 acres of beans in 2004.

iv. The Major Agricultural Users of Water From the Lower San Joaquin River Have Adequate Water Quality to Grow Salt-Sensitive Crops.

PID, WSID, and ESWD irrigate more crops with LSJR water than any other diverter in the LSJR Basin. They also grow many acres of salt-sensitive crops. WSID, in particular, reported growing approximately 6,000 acres of beans in 2004.

WSID, PID, and ESWD have taken the position that the current EC of the LSJR is adequate for their agricultural operations and does not affect the choices of crops they choose to cultivate.[67] (Appendix B: Lower San Joaquin River Basin Geography, Geology, Hydrology, and Irrigation and Water District Policies, p62.) Furthermore, bean farmers in the PID have reported that they have successfully cultivated beans for many years and that the EC of the water they use to irrigate does not affect or otherwise influence the decisions they make regarding which crops to grow. (Id.) These farms have "generally" been in the range of 2,000 to 3,000 lbs. (1.0 to 1.5 tons) for large lima beans and 2,400 to 3,600 lbs. (1.2 to 1.8 tons) for baby lima beans. (Id.)

Stanislaus County, from 1970 to 2004, averaged yields of 2,413 lbs./acre for large lima beans and 2,588 lbs./acre for baby lima beans. (*See* Appendix B: Lower San Joaquin River Basin Geography, Geology, Hydrology, and Irrigation and Water District Policies, p26.) The yields obtained by PID farmers are similar to, if not better, than those reported by Stanislaus County farmers overall. Furthermore, since the maximum yields reported by the Stanislaus County Agricultural Commission from 1970 to 2004 were 3,012 lbs/acre for large lima beans and 3,335 lbs/acre for baby lima beans, the yields obtained

[67] PID has believes that the published EC thresholds previously adopted have little real-world applicability or supporting data and willingly point to their higher than expected crop yields as proof. (Id.)

by the PID's bean farmers are also similar to, if not better than, those reported for the county.[68]

Compared to the western part of Stanislaus County, even the lowest yield "generally" obtained by PID bean farmers significantly exceeded the average yield on prime farmland for lima beans (0.8 tons).[69] (*See* Appendix B, p21-23.) The average of the yields reported by PID farmers also exceeded the highest yields observed in the soil survey, based on high water table and hydrologic group, of 1.1 tons/acre. (*See* Appendix B, p22-23.) Finally, some of PID's bean farmers even exceeded the highest lima bean yields observed, regardless of soil type, in all of western Stanislaus County. EC at Patterson is not only sufficiently low to prevent deterring PID bean farmers from growing beans, but good enough for PID's bean farmers to obtain yields far in excess of those expected on any soil type in western Stanislaus County. Current conditions have therefore been adequate to support development of one of the nation's leading agricultural economies.

e. There is No Evidence of Agricultural Beneficial Use Impacts Due to Exceedances of the Vernalis EC Objective.

The Vernalis EC Objective applies to Southern Delta agricultural beneficial uses, rather than LSJR agricultural beneficial uses, there is nevertheless no quantitative evidence of agricultural beneficial uses impacts in the Southern Delta due to exceedances of the Vernalis EC Objective.

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[68] Yields in the PID also exceeded the averages for California statewide, which from 1995 to 2004 averaged 1,988 lbs/acre for large limas and 2,256 lbs/acre for baby limas. (California Department of Food & Agriculture, *California Agricultural Resource Directory 2005*, p42-43 (available at http://www.cdfa.ca.gov/card/pdfs/3cdfafieldflora.pdf, accessed July 6, 2006); See also Appendix B, p64-70.) Furthermore, since Lima Bean yields for San Joaquin County, another region where agriculture is significant, averaged 2,402 lbs/acre from 1970 to 2004, the yields obtained by the PID farmers were also better than those obtained in San Joaquin County. (See Appendix B, p64-70.)

[69] The yields of lima beans observed in the soil survey are the average of yields for both large and small lima beans.

IV. CONCLUSION.

The LSJR must be de-listed for EC and boron under both the Clean Water Act and the Listing Policy. The listing violates the Clean Water Act by classifying a water body as a water quality limited segment, even though applicable WQOs are non-existent. The closest WQO for EC, the Vernalis EC Objective, has been met, without fail for twelve years. Even over the last 21 years, a period that includes the longest drought on record in California, sufficient compliance with the Vernalis EC Objective occurred to require de-listing. Finally, there is not, and never has been, any evidence of agricultural beneficial use impacts due to elevated EC and boron. For all of the foregoing reasons, the LSJR must be de-listed for EC and boron.

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