San Joaquin River Basin Plan Amendment Addressing Salinity and Boron

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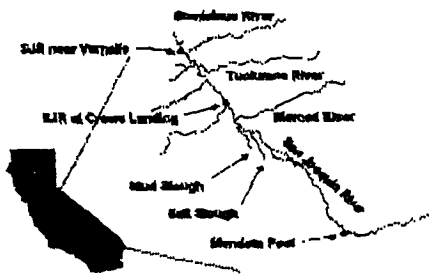
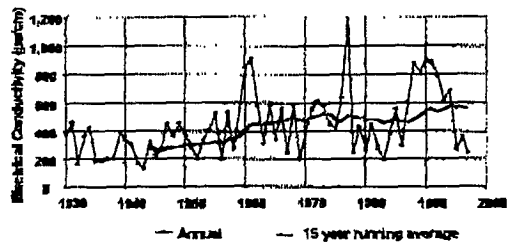
Why a Basin Plan Amendment for Salt and Boron in the San Joaquin River?

- Salt and boron concentrations are affecting beneficial uses
  - lower San Joaquin River
  - southern Delta
- Existing water quality objectives are being exceeded
- Directed by the SWRCB in 1995 to develop a salinity control program

Lower San Joaquin River Basin



SJR near Vernalis Mean Annual Electrical Conductivity



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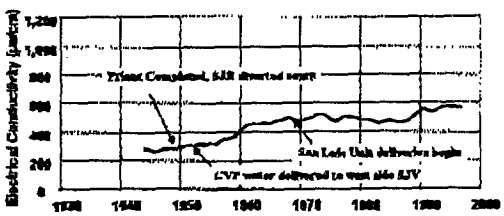


Current Water Quality Objectives

SWRCB EC Objectives at Vernalis

April through August	700 µs/cm
September through March	1,000 µs/cm

CRWQCB Boron Objectives:

Location / Season	Monthly Mean (mg/L)
Sack Dam to Merced River 3/15 to 9/15	2.0 (5.8 maximum)
Merced River to Vernalis 3/15 to 9/15	0.8 (2.0 maximum)
Merced River to Vernalis 9/16 to 3/14	1.0 (2.6 maximum)
Critical year relaxation	1.3

Current Water Quality Objectives

SWRCB EC Objectives at Vernalis

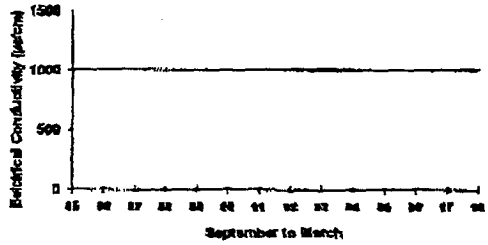
April through August	700 µs/cm
September through March	1,000 µs/cm

CRWQCB Selenium Objectives:

Location	4-day avg (µg/L)
SJR, Mouth Merced River to Vernalis	5 (12 maximum)
Mud Slough & SJR Sack Dam to Merced	5 (20 maximum)
Salt Slough and wetland channels	2 (monthly mean)

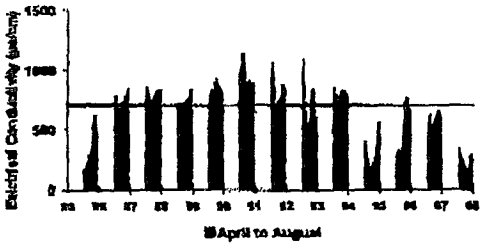
San Joaquin River near Vernalis

30 Day Running Average Electrical Conductivity



San Joaquin River near Vernalis

30 Day Running Average Electrical Conductivity

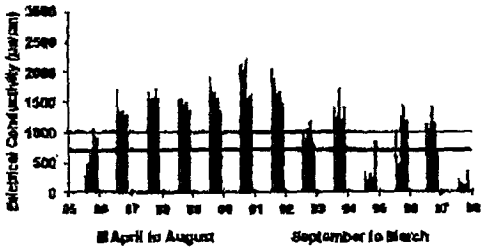


San Joaquin River near Vernalis

30 Day Running Average Electrical Conductivity

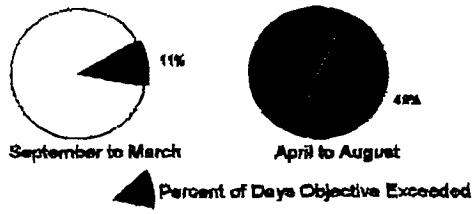
San Joaquin River at Crows Landing

Monthly Average Electrical Conductivity



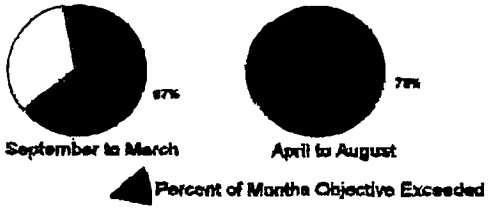
San Joaquin River near Vernalis

Percent of days that 30-day running average electrical conductivity objective has been exceeded from water year 1986 through 1998

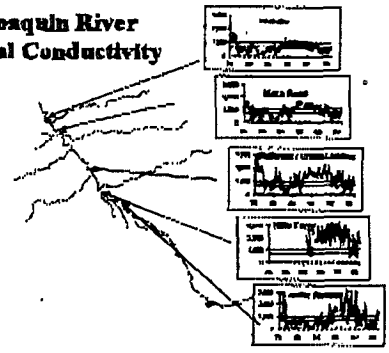


San Joaquin River at Crows Landing

Percent of months that mean monthly electrical conductivity at Crows Landing exceeded Vernalis objectives from water year 1986 through 1998

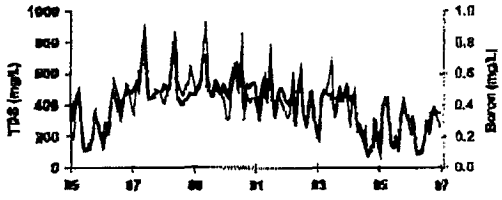


San Joaquin River Electrical Conductivity

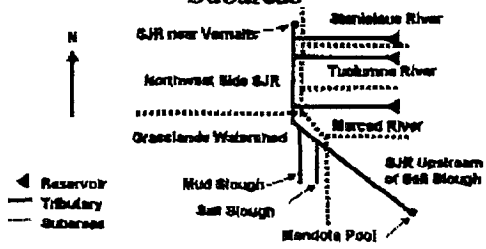


San Joaquin River near Vernalis

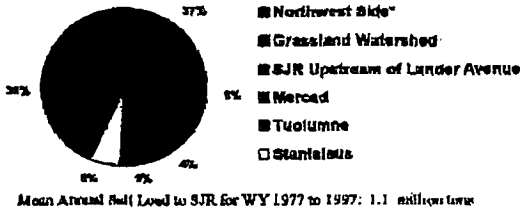
TDS and Boron Concentrations



Lower San Joaquin River Basin Subareas



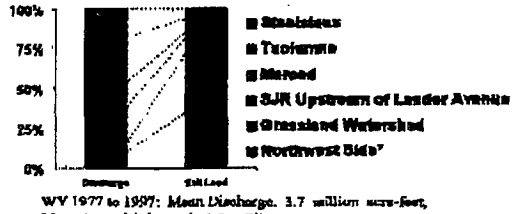
Sources of Salt (Geographic)



Mean Annual Salt Load to SJR for WY 1977 to 1997: 1.1 million tons

*Northwest Side estimated by difference: Vernalis minus sum of other sources

Geographic Sources of Discharge and Salt



WY 1977 to 1997: Mean Discharge: 3.7 million acre-feet,
Mean Annual Salt Load: 1.1 million tons

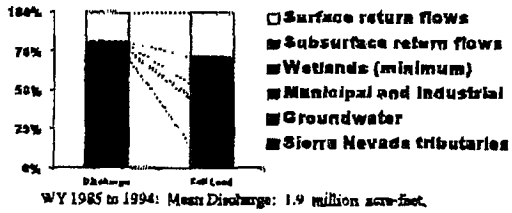
Basis: Historical and SJRIO* model data and spreadsheet analyses

*SJRIO: San Joaquin River Input Output Model

Sources of Salt (by type)

Mean Annual Loading of TDS to SJR for WY 1985 to 1994: 1 million tons
Basis: Historical and SJRIO* model data and spreadsheet analyses

Type Sources of Discharge and Salt



WY 1985 to 1994: Mean Discharge: 1.9 million acre-feet,
Mean Annual Loading of TDS: 1 million tons
Basis: Historical and SJRIO* model data and spreadsheet analyses

Components of a Basin Plan Amendment

- Beneficial Use Listing
- Establish Water Quality Objectives
- Develop Implementation Plan

Salinity Water Quality Criteria

Range of numbers being considered:

Objective (µs/cm)	Source & Beneficial Use
700 to 1,000	1995 SWRCB Irrigated agriculture
900 (recommended) 1,600 (upper limit)	California secondary MCL for drinking water
5,400	SWRCB Technical Committee for Aquatic Life (maximum)

Boron Water Quality Criteria

Range of numbers being considered:

Objective (mg/L)	Source & Beneficial Use
1.0	California State Action Level to protect drinking water
0.6	USEPA (SNARL, IRIS)
0.7 to 2.0	Irrigated Ag (SWRCB Technical Committee, 1987)

Implementation Tools

- Wide range of actions possible:
  - Voluntary actions
  - Regulatory-based encouragement
    - watershed approach
    - real time management

  Waste Discharge Requirements

  Prohibition of Discharge