
Suisun Marsh Monitoring Program Channel Water Salinity Report

Reporting Period: November 2008

Questions regarding this report should be directed to:

Jim Sung

California Department of Water Resources
Division of Environmental Services
901 P Street
Sacramento, CA 95814

Telephone: (916) 651--0182
sung@water.ca.gov

TABLE OF CONTENT

1. SUISUN MARSH MONITORING STATIONS AND REPORTING REQUIREMENT1

2. MONITORING RESULTS.....2

 2.1 CHANNEL WATER SALINITY COMPLIANCE2

 2.2 DELTA OUTFLOW2

 2.3 RAINFALL3

 2.4 SUISUN MARSH SALINITY CONTROL GATE (SMSCG) OPERATIONS3

3. DISCUSSION.....3

 3.1 FACTORS AFFECTING CHANNEL WATER SALINITY IN THE SUISUN MARSH3

 3.2 OBSERVATIONS AND TRENDS.....4

 3.2.1 *Conditions during the Reporting Period*.....4

 3.2.2 *Comparison of Reporting Period Conditions with Previous Years*.....4

4. List of Figures

- Figure 1: Suisun Marsh Progressive Mean High Tide Specific Conductance for compliance stations
- Figure 2: Suisun Marsh Progressive Mean High Tide Specific Conductance for monitoring stations
- Figure 3: Daily Net Delta Outflow Index and Precipitation
- Figure 4: 10-yr Comparison of Monthly Values of Monthly Mean Specific Conductance at High Tide for compliance and monitoring stations
- Figure 5: Map of compliance and monitoring stations, and control facilities in Suisun Marsh

1. SUISUN MARSH MONITORING STATIONS AND REPORTING REQUIREMENT

As per SWRCB Water Rights Decision 1641, dated December 29, 1999, and previous SWRCB decisions, the California Department of Water Resources (DWR) is required to provide monthly channel water salinity compliance reports for the Suisun Marsh to the SWRCB. Conditions of channel water salinity in the Suisun Marsh are determined by monitoring specific electrical conductivity, which is referred as "specific conductance" (SC). The locations of all listed stations are shown in Figure 5.

The monthly reports are submitted for October through May each year in accordance with SWRCB requirements. The reports are required to include salinity data from the stations listed below to ensure salinity standards are met to protect habitat for waterfowl in managed wetlands:

Station Identification	Station Name	General Location	Classification
C-2*	Collinsville	Western Delta	Compliance Station
S-64	National Steel	Eastern Suisun Marsh	Compliance Station
S-49	Beldon's Landing	North-Central Suisun Marsh	Compliance Station
S-42	Volanti	North-Western Suisun Marsh	Compliance Station
S-21	Sunrise	North-Western Suisun Marsh	Compliance Station

Data from the stations listed below are included in the monthly reports to provide information on salinity conditions in the western Suisun Marsh.

Station Identification	Station Name	General Location	Classification
S-97	Ibis	Western Suisun Marsh	Monitoring Station
S-35	Morrow Island	South-Western Suisun Marsh	Monitoring Station

Information on Delta outflow, area rainfall, and operation of the Suisun Marsh Salinity Control Gates are also included in the monthly reports to provide information on conditions that may affect channel water salinity in the Marsh.

* Throughout the report, the representative data from nearby USBR station is used in lieu of data from station C-2.

2. Monitoring Results

2.1 Channel Water Salinity Compliance

During the month of November, 2008, **deficiency standard apply as define in D1641 and RSMPA, thus salinity conditions at only two compliance stations (i.e. S21 and S42)** are in compliance with channel water salinity standards of SWRCB (Table 1). Compliance with standards for the month of October was determined for each compliance station by comparing the progressive daily mean of high-tide SC with respective standards. The standard for compliance stations S-21 and S-42 are 16.5 mS/cm during November 2008. Table 1 lists monthly mean high-tide SC at these compliance stations. The progressive daily mean (PDM) is the monthly average of both daily high-tide SC values. The mathematical equation is shown below.

$$\text{PDM} = \frac{\sum \text{daily average of high tide SC}}{\# \text{ days of the month}}$$

2.2 Delta Outflow

Outflow for November 2008 started off above 6,000 cfs and peaked to a monthly high of about 17,000 cfs on the first week of November due to runoffs from precipitation events that occurred at the end of October and early November. Thereafter, outflow dropped quickly and remained between 3,000 cfs and 5,000 cfs for most of November until the last week of November where it increased above 4,000 cfs and ended the month slightly above 6,000 cfs as shown in Figure 3. The monthly Delta outflow is represented by the mean Net Delta Outflow Index (NDOI). The NDOI is the estimated daily average of Delta outflow. Mean NDOI for November 2008 is listed below:

Month	Mean NDOI (cubic feet per second)
November	6,105

2.3 Rainfall

Most of the November 2008 rainfall events occurred in the first week. The largest daily total for the month was 1.59 inches and occurred on the 2nd of November. The monthly total is shown below:

Month	Total Rainfall (inches)
November	2.67

2.4 Suisun Marsh Salinity Control Gate (SMSCG) Operations

Operations and flashboard/boat lock installations at the SMSCG during November 2008 is summarized below.

Date	Gate status	Flashboards status	Boat Lock status
November 1 – 23	3 Open	In	Open
November 24 – 30	3 – Tidally operate	In	Open

The gates were suspended for most of November and did not resumed operation until November 24, where salinity levels were of concern and DWR re-operated the gates. On November 27, gate # 1 failed to work but gate operation continued with the two remaining gates.

3. Discussion

3.1 Factors Affecting Channel Water Salinity in the Suisun Marsh

Factors that affect channel water salinity levels in the Suisun Marsh include:

- delta outflow;
- tidal exchange;
- rainfall and local creek inflow;
- managed wetland operations; and,
- operations of the SMSCG and flashboard configurations.

3.2 Observations and Trends

3.2.1 Conditions during the Reporting Period

During November 2008 PDM salinity levels at Collinsville(C-2), National Steel(S-64), Beldons (S-49), and Volanti(S-42) ranged between 8.0 mS/cm and 18.5 mS/cm as shown in Figure 1. Salinity levels started off above 10 mS/cm at the beginning of the month at all stations but soon decreased as a result of precipitation in the first days of November, except for S-64 where salinity pattern was the opposite in early November. Thereafter, salinity pattern stabilized at all stations and remained that way through the end of the month. Gate operation was resumed in late November to control salinity at S42 specifically but due to uncontrollable gate failure, salinity at S42 exceeded by 0.1 mS/cm.

3.2.2 Comparison of Reporting Period Conditions with Previous Years

Monthly mean high-tide SC at the compliance and monitoring stations for November 2008 were compared with means for those months during the previous nine years (Figure 4).

Mean salinity pattern of all compliance and monitoring stations resembles that of 2003 but at a higher level, except for C-2. Compared to previous nine years, November 2008 salinity levels overall were ranked first in high Specific Conductance. Unlike past years, the higher salinity for November 2008 is probably a result of delay gate operations in support of fish passage and allowing more salinity intrusion but salinity standards will not be compromised in the overall operational decisions.

Table 1**Monthly Mean High Tide Specific Conductance at Suisun Marsh
Water Quality Compliance Stations****November 2008**

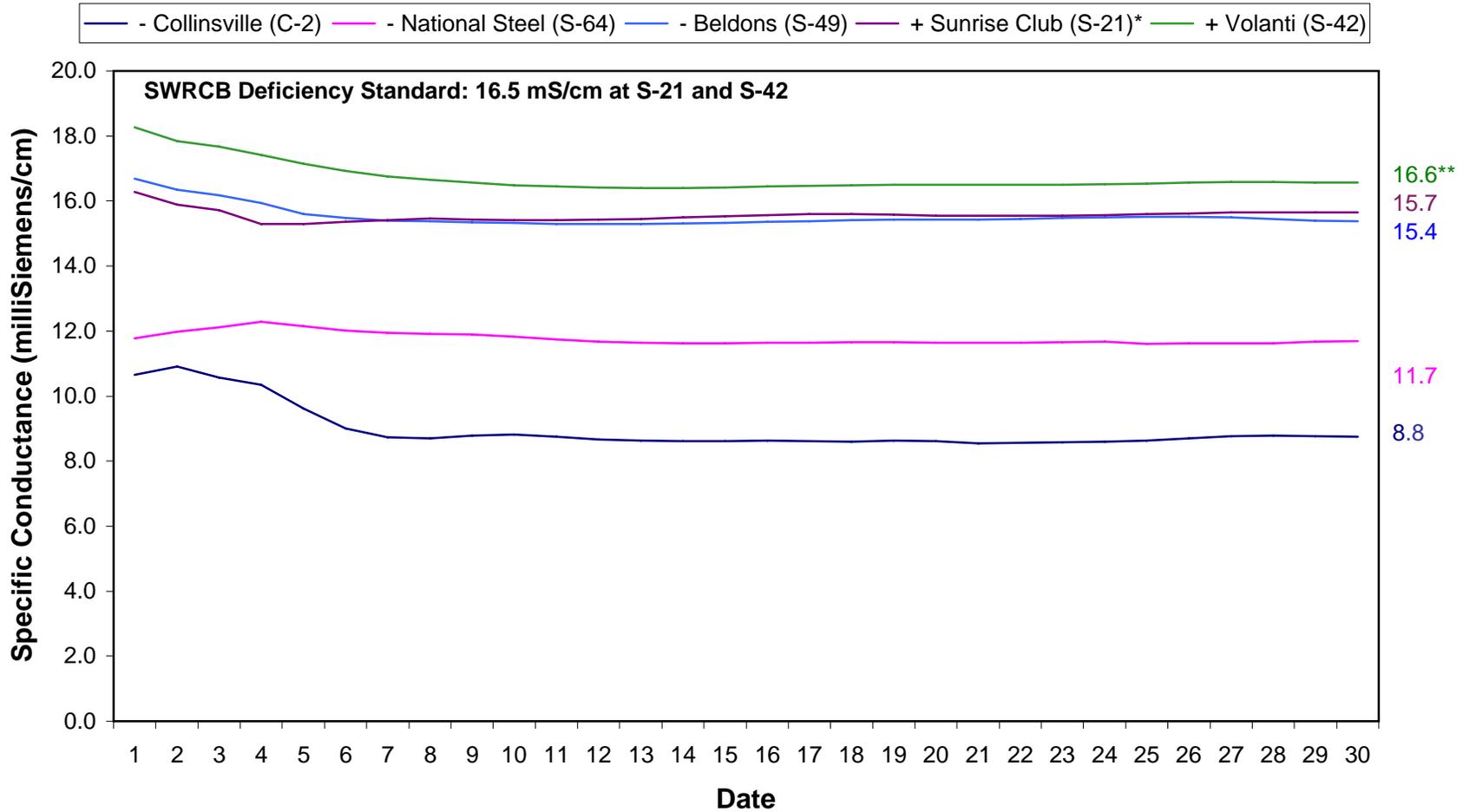
Station	Specific Conductance (mS/cm)*	Deficiency Standard	Deficiency Standard meet?
C-2**	8.8	n/a	n/a
S-64	11.7	n/a	n/a
S-49	15.4	n/a	n/a
S-42***	16.6	16.5	No
S-21***	15.7	16.5	Yes

*milliSiemens per centimeter

**The representative data from nearby USBR station is used in lieu of data from station C-2.

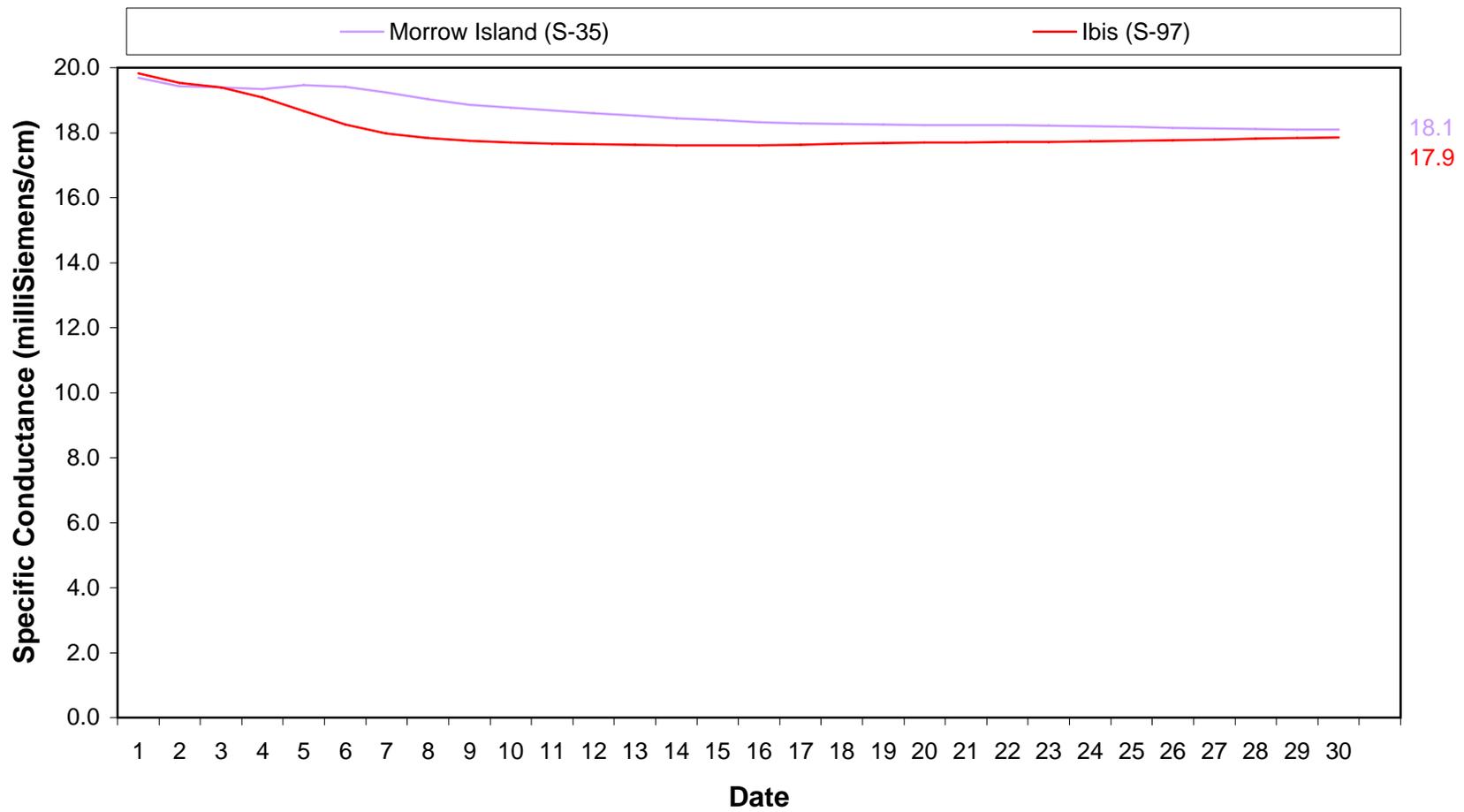
***As define in D1641 and RSMMPA, monthly standard only apply to compliance stations, S-42 and S-21 during deficiency year.

Figure 1 - Suisun Marsh Progressive Mean High-Tide Specific Conductance for November 2008

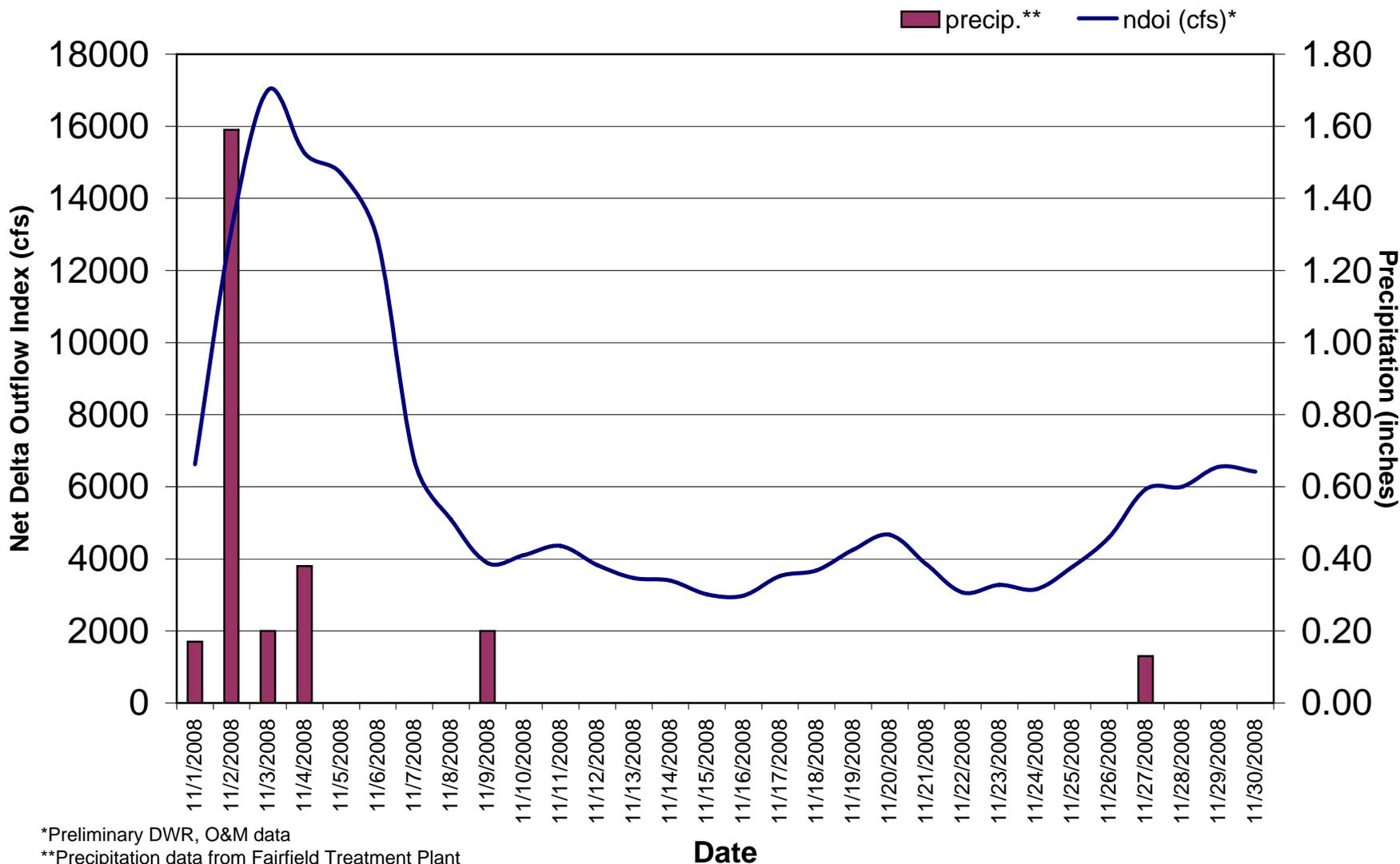


**S42 exceeded monthly standard by 0.1

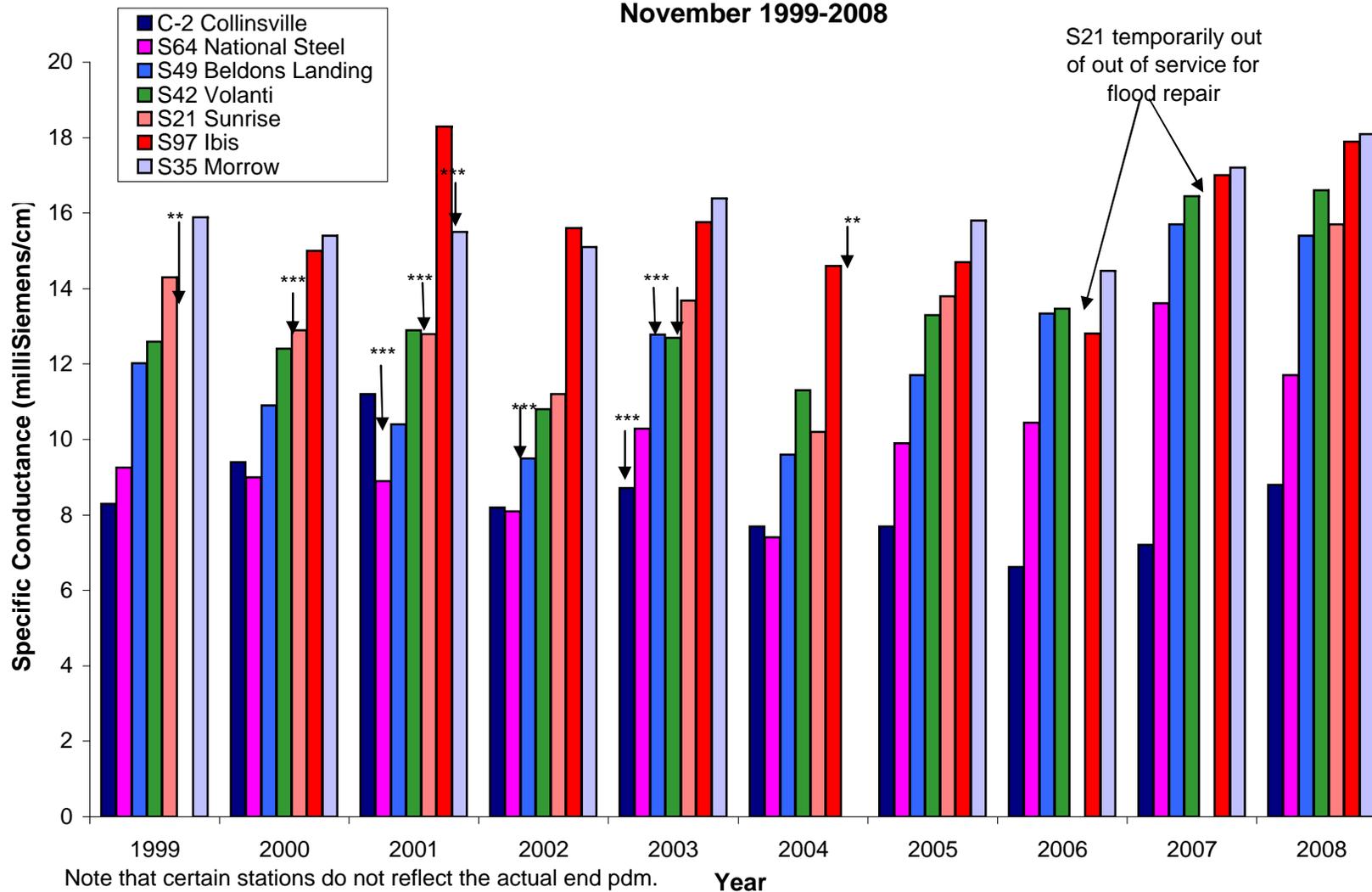
Figure 2. Suisun Marsh Progressive Mean High-Tide Specific Conductance at Monitoring Stations S35 and S97 November 2008



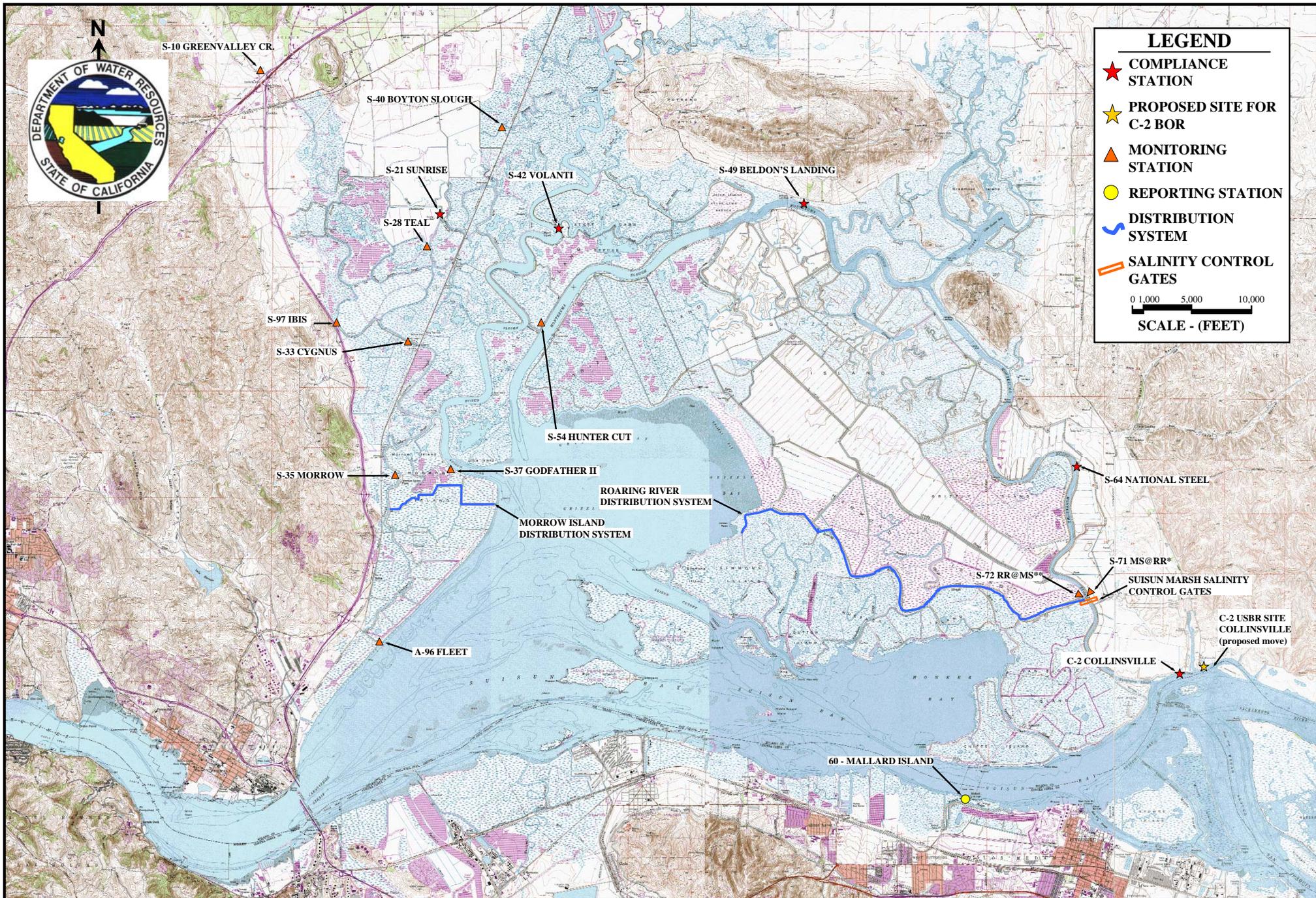
**Figure 3. Daily Net Delta Outflow Index and Precipitation
November 2008**



**Figure 4. Monthly Mean Specific Conductance at High Tide:
Comparison of Monthly Values for Selected Stations
November 1999-2008**



S21 temporarily out of out of service for flood repair



LEGEND

- ★ COMPLIANCE STATION
- ★ PROPOSED SITE FOR C-2 BOR
- ▲ MONITORING STATION
- REPORTING STATION
- DISTRIBUTION SYSTEM
- ▭ SALINITY CONTROL GATES

0 1,000 5,000 10,000
SCALE - (FEET)

SUISUN MARSH PROGRAM WATER QUALITY MONITORING AND CONTROL FACILITIES