
Suisun Marsh Monitoring Program Channel Water Salinity Report

Reporting Period: November 2009

Questions regarding this report should be directed to:

Bill Burkhard

California Department of Water Resources
Division of Environmental Services
3500 Industrial Blvd
West Sacramento, CA 95691

Telephone: (916) 376--9761
burkhard@water.ca.gov

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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, 2009, **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 2009. 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 2009 ranged between 3,800 cfs and 5,000 cfs until mid-month, when there was a precipitation event that was enough to increase outflow to peak about 8,000 cfs. Thereafter, outflow dropped sharply down to about 4,000 cfs and remained in the range it started at the early half of the month. 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 2009 is listed below:

Month	Mean NDOI (cubic feet per second)
November	4,757

2.3 Rainfall

There were only four rainfall events in November and all were below 0.5 inches. Most of the rainfall events occurred in the second half of the month. The largest daily total for the month was 0.44 inches and occurred on the 21st of November. Overall, the month was dry. The monthly total is below:

Month	Total Rainfall (inches)
November	0.69

2.4 Suisun Marsh Salinity Control Gate (SMSCG) Operations

Operations and flashboard/boat lock installations at the SMSCG during November 2009 is summarized below.

Date	Gate status	Flashboards status	Boat Lock status
November 1 – 24	3 Open	In	Open
November 25 – 30	3 – Tidally operate	In	Open

The gates were suspended for most of November and did not resumed operation until November 25, where salinity levels were of concern, not from a regulatory but contractual perspective. As such, DWR operated the gates for a brief period to control the monthly salinity standard.

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 2009 PDM salinity levels at Collinsville(C-2), National Steel(S-64), Beldons (S-49), and Volanti(S-42) ranged between 6.0 mS/cm and 16.0 mS/cm as shown in Figure 1. Salinity levels were stable at both compliance sites S21 and S42, and among all other marsh stations too. Salinity were not of a concern with respect to D-1641 monthly deficiency standard, however, with respect to the Drought Response Fund (DRF) condition, DWR may possibly trigger a month, thus gate operation was conducted on November 25 to meet the DRF standard. Both D-1641 and DRF monthly standards were met.

3.2.2 Comparison of Reporting Period Conditions with Previous Years

Monthly mean high-tide SC at the compliance and monitoring stations for November 2009 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 2008 but at a bit lower level at most stations, except for S49. S49 salinity level for 2009 was higher than previous year level because the month was drier or had less precipitation activity than prior year. Compared to previous nine years, November 2009 salinity levels overall were ranked third in high Specific Conductance. Unlike past years, the higher salinity for November 2009 is probably a result of extremely low precipitation totals and delay gate operations in support of fish passage and allowing more salinity intrusion. But salinity standard was not compromised in the overall operational decisions.

Table 1**Monthly Mean High Tide Specific Conductance at Suisun Marsh
Water Quality Compliance Stations****November 2009**

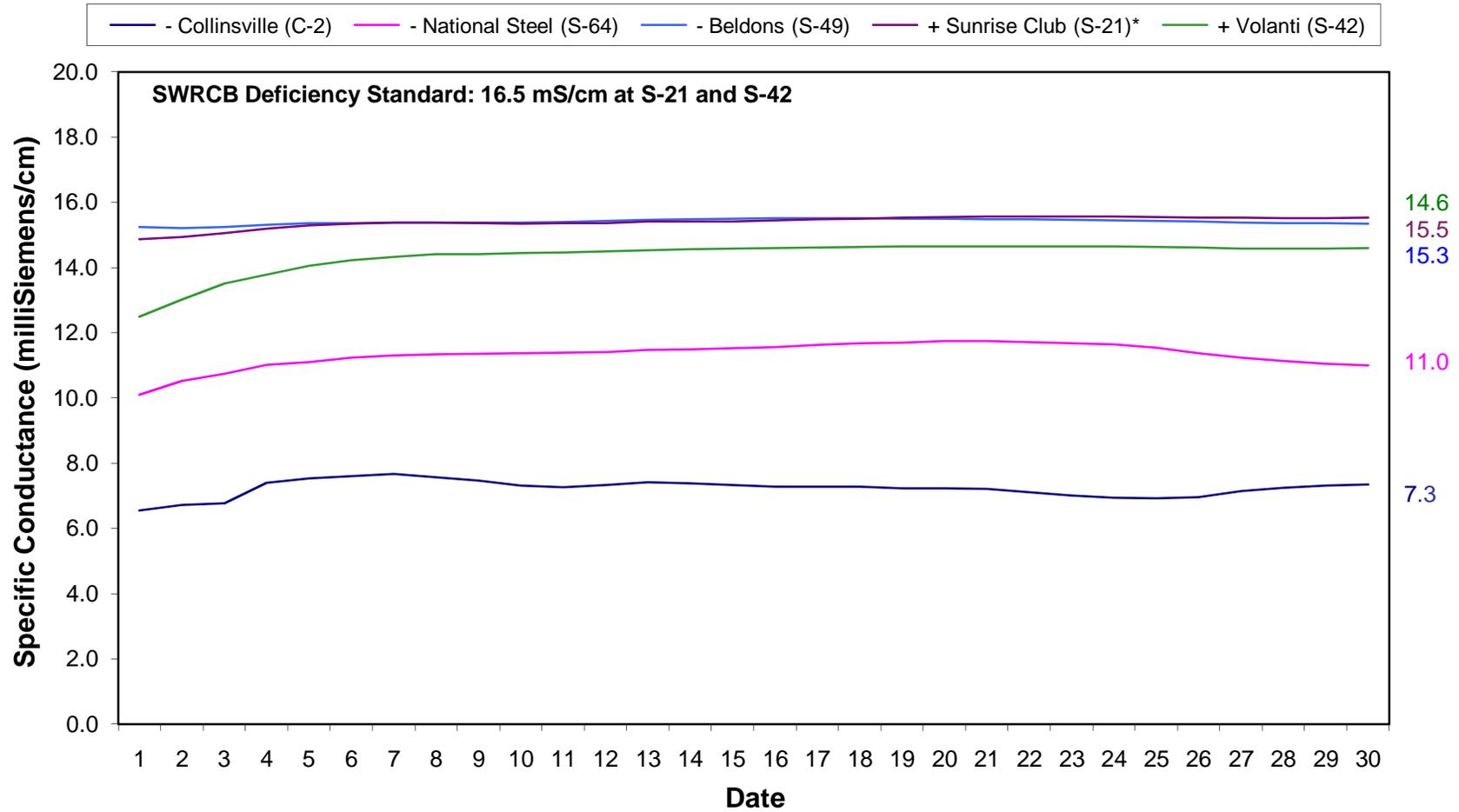
Station	Specific Conductance (mS/cm)*	Deficiency Standard	Deficiency Standard meet?
C-2**	7.3	n/a	n/a
S-64	11.0	n/a	n/a
S-49	15.3	n/a	n/a
S-42***	14.6	16.5	Yes
S-21***	15.5	16.5	Yes

*milliSiemens per centimeter

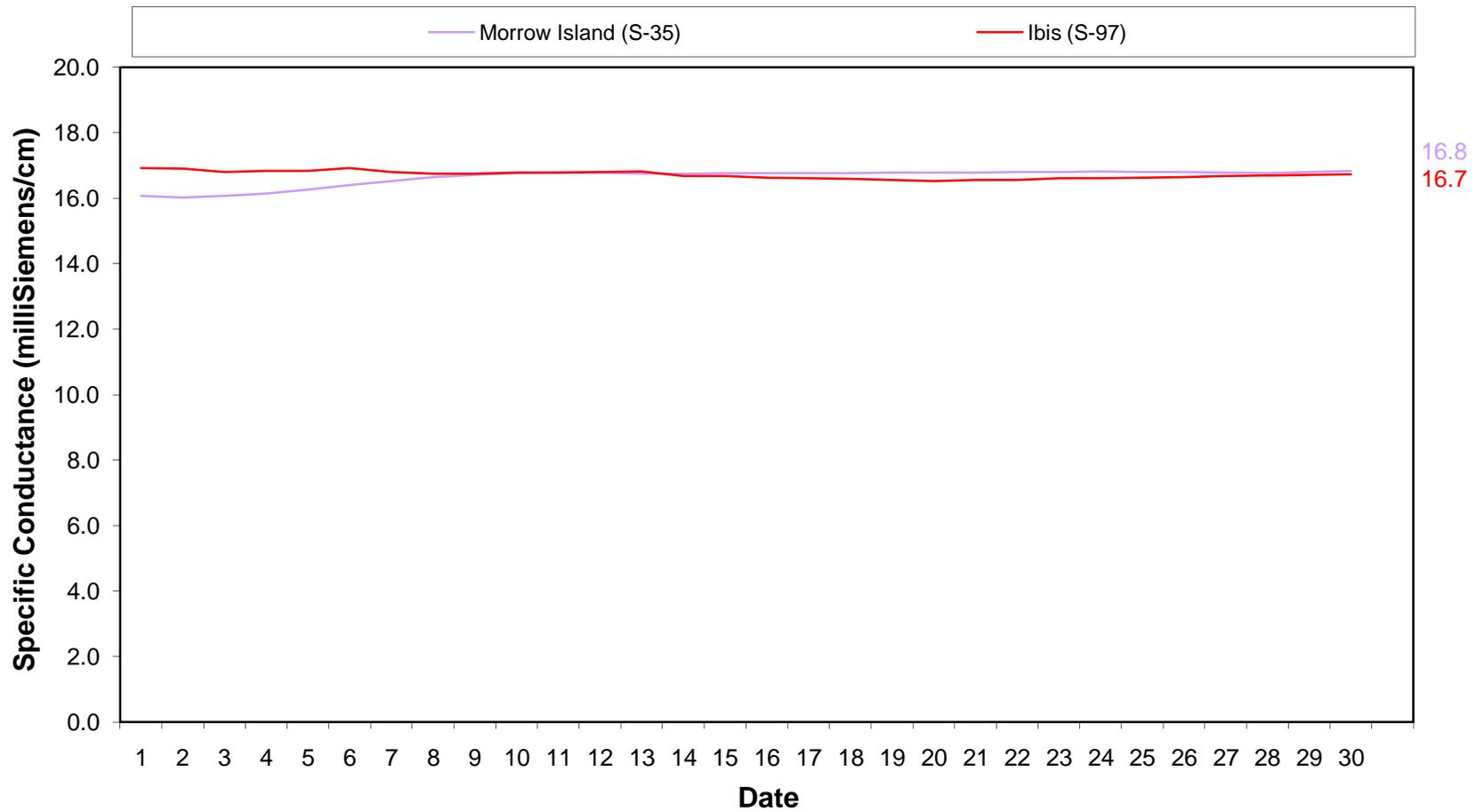
**The representative data from nearby USBR station is used in lieu of data from station C-2.

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

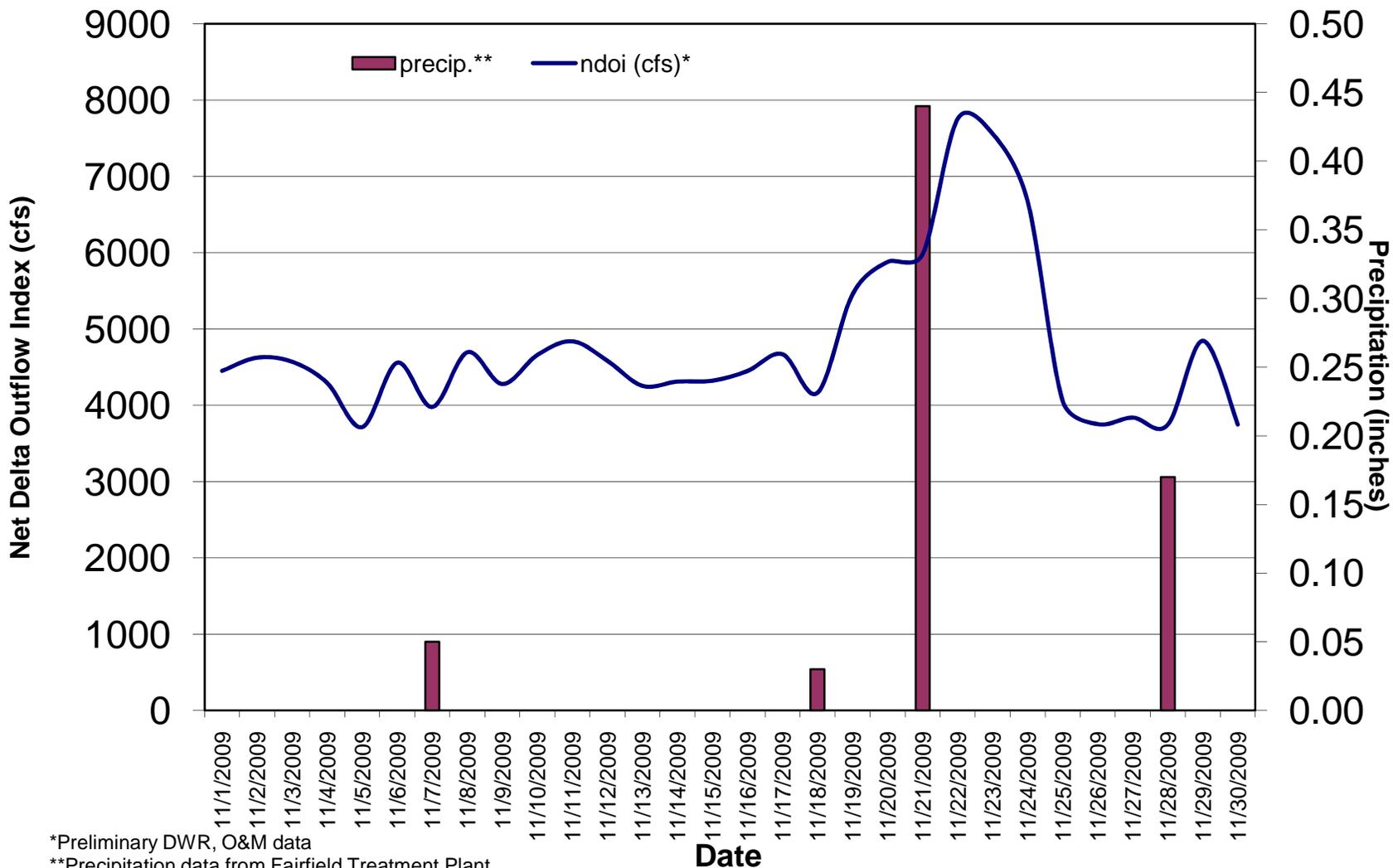
Figure 1 - Suisun Marsh Progressive Mean High-Tide Specific Conductance for November 2009



**Figure 2. Suisun Marsh Progressive Mean High-Tide Specific Conductance
at Monitoring Stations S35 and S97
November 2009**

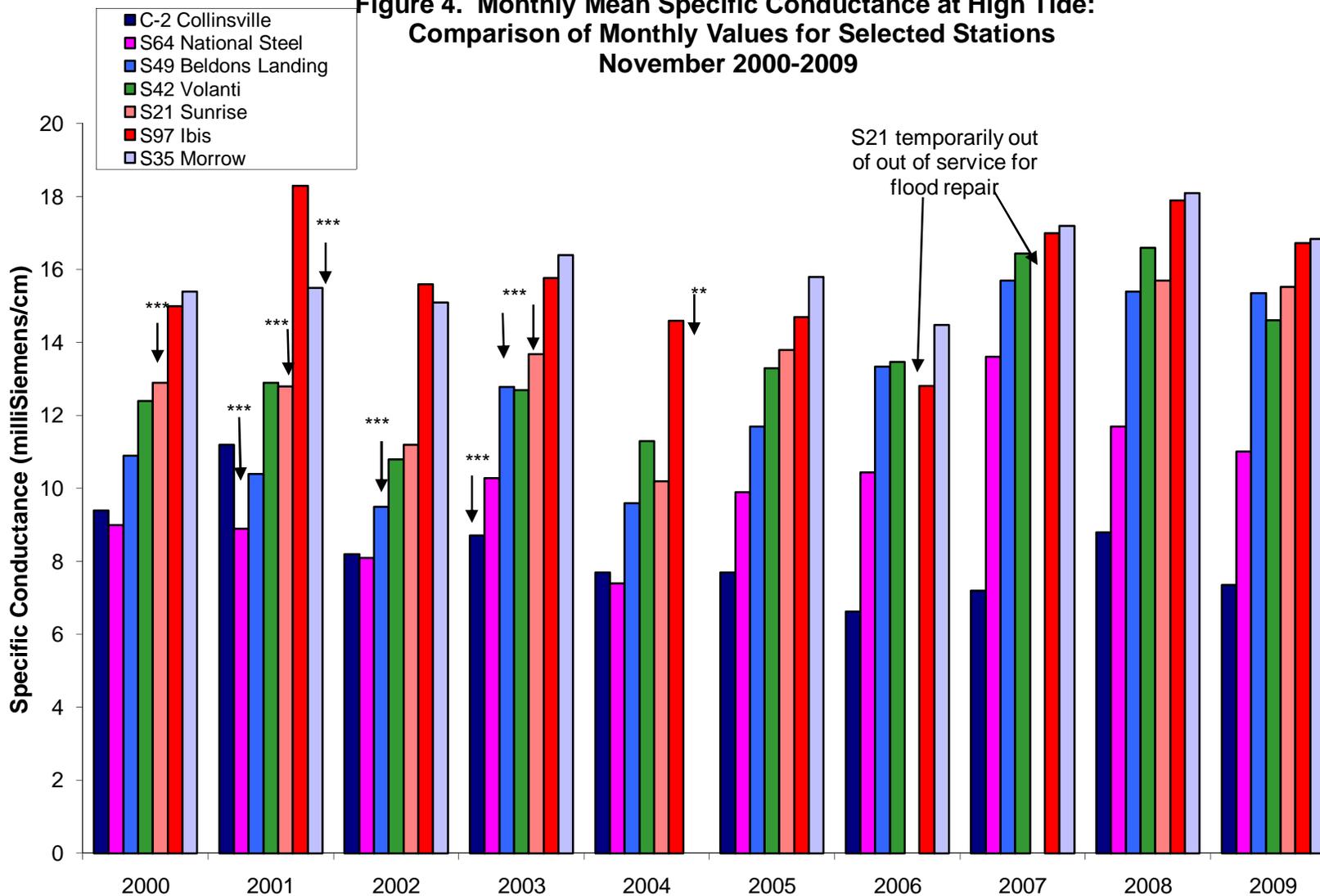


**Figure 3. Daily Net Delta Outflow Index and Precipitation
November 2009**



*Preliminary DWR, O&M data
 **Precipitation data from Fairfield Treatment Plant

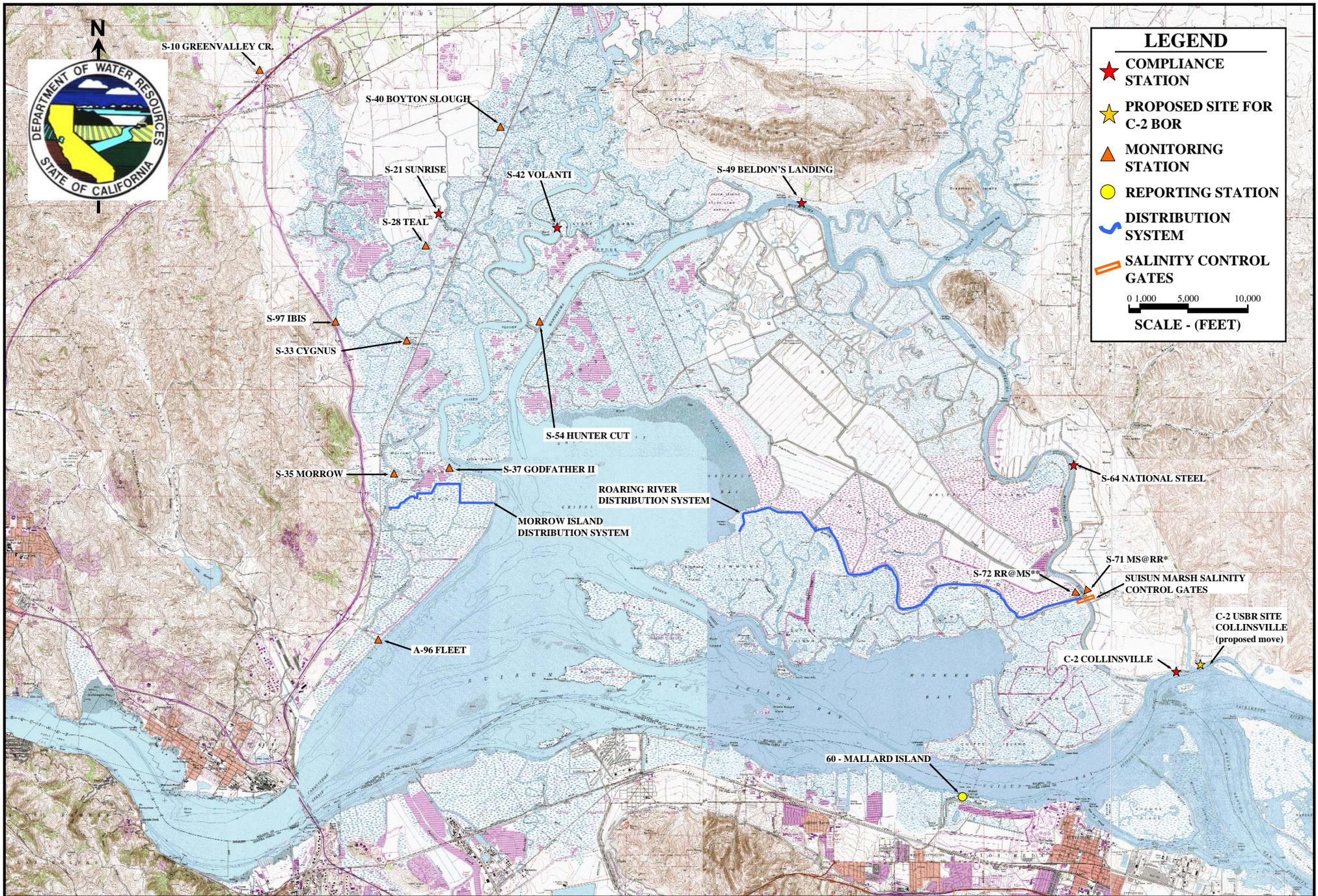
**Figure 4. Monthly Mean Specific Conductance at High Tide:
Comparison of Monthly Values for Selected Stations
November 2000-2009**



Note that certain stations do not reflect the actual end pdm.

** Data was not obtained due to powder problems at the station.

*** Some data not obtained due to equipment malfunction.



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