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# **Suisun Marsh Monitoring Program Channel Water Salinity Report**

Reporting Period: April 2012

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Questions regarding this report should be directed to:

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**TABLE OF CONTENT**

**1. SUISUN MARSH MONITORING STATIONS AND REPORTING REQUIREMENT .....2**

**2. MONITORING RESULTS.....3**

    2.1 CHANNEL WATER SALINITY COMPLIANCE .....3

    2.2 DELTA OUTFLOW.....3

    2.3 PRECIPITATION.....3

    2.4 SUISUN MARSH SALINITY CONTROL GATES (SMSCG) OPERATIONS .....4

**3. DISCUSSION.....4**

    3.1 FACTORS AFFECTING CHANNEL WATER SALINITY IN THE SUISUN MARSH .....4

    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*.....5

**4. LIST OF FIGURES**

    Figure 1: Suisun Marsh Progressive Daily Mean High Tide Specific Conductance for Compliance Stations

    Figure 2: Suisun Marsh Progressive Daily Mean High Tide Specific Conductance for Monitoring Stations

    Figure 3: Daily Net Delta Outflow Index and Precipitation

    Figure 4: Monthly Mean Specific Conductance at High Tide - Comparison of Monthly Values for Selected Stations

    Figure 5: Suisun Marsh Stations

## 1. SUISUN MARSH MONITORING STATIONS AND REPORTING REQUIREMENT

As per the State Water Resources Control Board (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:

<b>COMPLIANCE STATIONS:</b>		
Station Identification	Station Name	General Location
C-2*	Collinsville	Western Delta
S-64	National Steel	Eastern Suisun Marsh
S-49	Beldon's Landing	North-Central Suisun Marsh
S-42	Volanti	North-Western Suisun Marsh
S-21	Sunrise	North-Western Suisun Marsh

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

<b>MONITORING STATIONS:</b>		
Station Identification	Station Name	General Location
S-97	Ibis	Western Suisun Marsh
S-35	Morrow Island	South-Western Suisun Marsh

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

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.

## 2. MONITORING RESULTS

### 2.1 Channel Water Salinity Compliance

During the month of April, salinity conditions at all five compliance stations were in compliance with channel water salinity standards (Table 1). Compliance with standards for the month was determined for each compliance station by comparing the progressive daily mean (PDM) of high tide SC with respective standards. The standard for compliance stations C-2, S-64, S-49, S-21, and S-42 was 11.0 mS/cm for April 2012. The progressive daily mean is the monthly average of both daily high tide SC values. The mathematical equation is shown below:

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

### 2.2 Delta Outflow

Outflow for April 2012 ranged between 17,500 cfs and 44,800 cfs (Figure 3). For the month, outflow began at 40,000 cfs decreasing to 17,500 cfs before responding to a precipitation event on April 10<sup>th</sup>. Outflow increased to a high of 44,800 cfs on April 16<sup>th</sup> and decreased to 20,000 cfs on April 21<sup>st</sup>. An increase in Sacramento River flow and a decrease in State pumping lead to an increase in Delta outflow. The month ended with outflow at 34,000 cfs. 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 April 2012 is listed below:

Month	Mean NDOI (cubic feet per second)
April	28,400

### 2.3 Precipitation

There was one precipitation event in April for a total of 2.31 inches. The event started on April 10<sup>th</sup> and ended on April 15<sup>th</sup>. A high of 1.01 inches was recorded on April 13<sup>th</sup>. This data was recorded at the Fairfield Water Treatment Plant. The monthly total precipitation is below:

Month	Total Precipitation (inches)
April	2.31

## 2.4 Suisun Marsh Salinity Control Gates Operations

Operations and flashboard/boat lock installations at the Suisun Marsh Salinity Control Gates (SMSCG) during April 2012 are summarized below:

Date	Gate Status	Flashboards Status	Boat Lock Status
April 1-30	3 Open	In	Partially Closed

Given a wet March, outflow coming into April was at a high level. With a significant precipitation event in the middle of the month, it was determined that operation of the SMSCG was not necessary. A conference call was held on April 24<sup>th</sup> to discuss the removal of the SMSCG flashboards in early May. Boat lock gates are partially closed due to ongoing investigation on safety concerns expressed by Delta Field Division staff. NOAA was briefed about the safety concern and will schedule a field visit to assess options with DWR to balance fish needs and safety needs.

## 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 April 2012, PDM salinity levels at Collinsville (C-2), National Steel (S-64), Beldon's Landing (S-49), Sunrise Club (S-21) and Volanti (S-42) ranged between 0.23 mS/cm and 2.6 mS/cm as shown in Figure 1. For the month of April, salinity levels gradually decreased at Beldon's Landing and Volanti while staying fairly stable at Collinsville and National Steel. Communication was lost at Sunrise Club on April 4<sup>th</sup> due to silting in of the stilling well. The

existing equipment was replaced by a pressure transducer which eliminates the need for a stilling well. Data capture was reestablished on April 17<sup>th</sup>.

Salinity levels at monitoring stations Morrow Island (S-35) and Ibis (S-97) are shown in Figure 2. Ibis began the month at 2.2 mS/cm and ended the month at a slightly higher value of 3.3 mS/cm. Data for Morrow Island was not recorded between April 4<sup>th</sup> and April 22<sup>nd</sup> due to a power outage at the station.

### 3.2.2 Comparison of Reporting Period Conditions with Previous Years

Monthly mean high tide SC at the compliance and monitoring stations for April 2012 were compared with means for those months during the previous nine years (Figure 4).

April's mean salinity pattern for all compliance and monitoring stations ranked fourth in salinity levels for the past 10 years. The pattern followed that of 2005 but at a slightly higher salinity level. As expected, the salinity levels gradually increased from east to west with the exception of S-42 and S-21. The lower salinity levels at these two stations may be due to local inflows.

**Table 1: Monthly Mean High Tide Specific Conductance at Suisun Marsh Water Quality Compliance Stations April 2012**

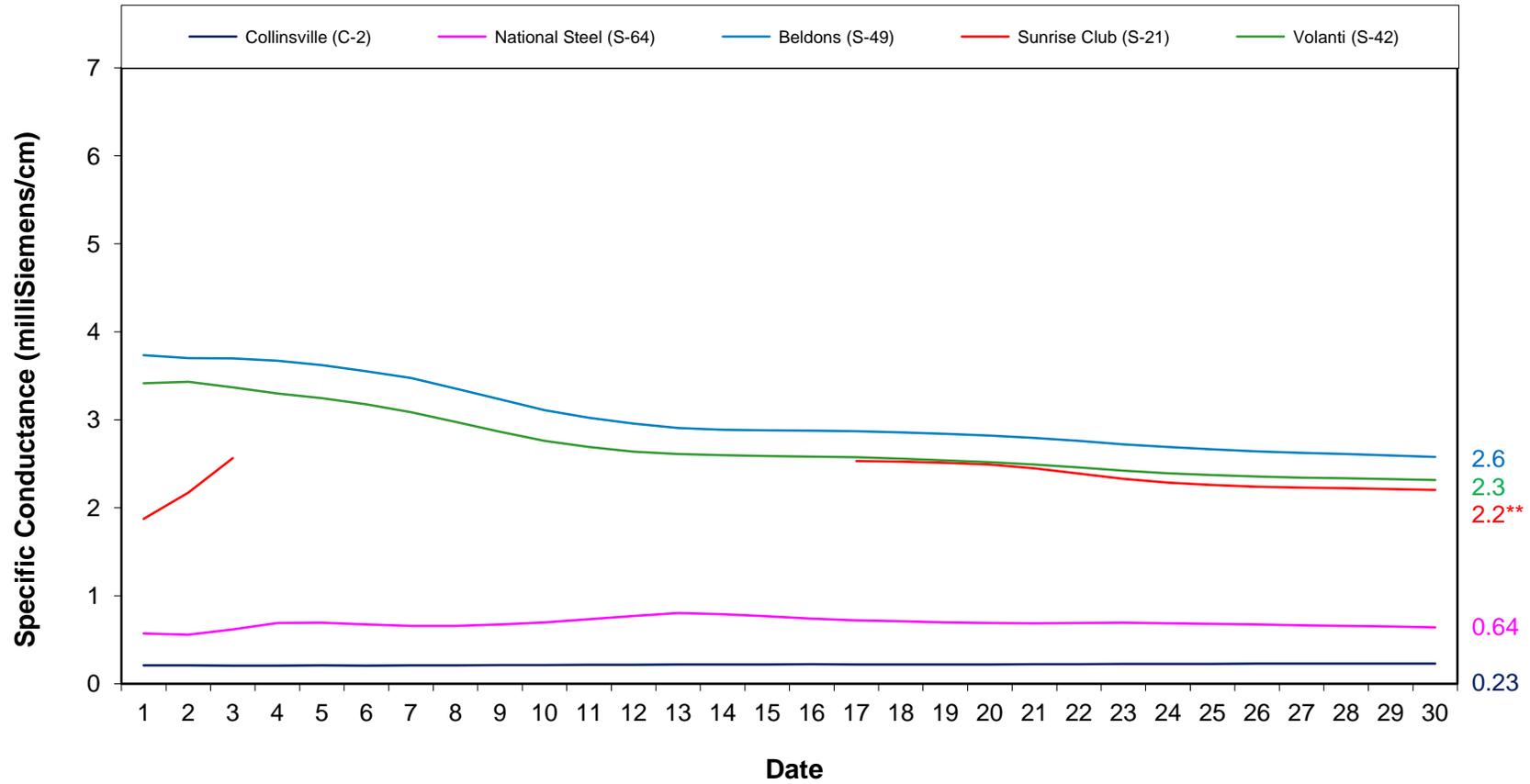
Station Identification	Specific Conductance (mS/cm)*	Normal Standard	Normal Standard Met?
C-2**	0.23	11.0	Yes
S-64	0.64	11.0	Yes
S-49	2.6	11.0	Yes
S-42	2.3	11.0	Yes
S-21	2.2	11.0	Yes

\*milliSiemens per centimeter

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

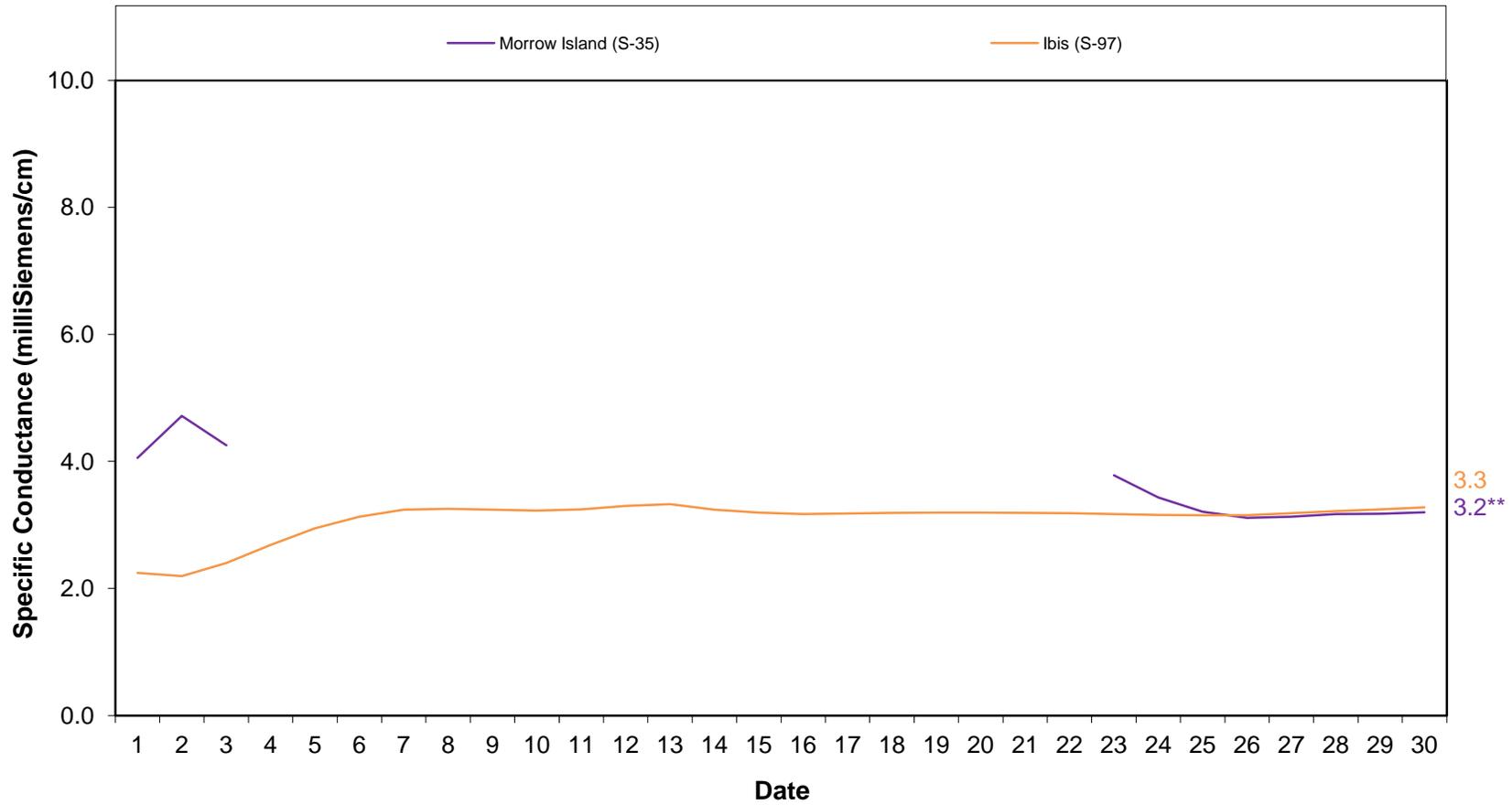
**Figure 1: Suisun Marsh Progressive Daily Mean High Tide Specific Conductance  
for Compliance Stations  
April 2012**

Standard = 11.0 mS/cm



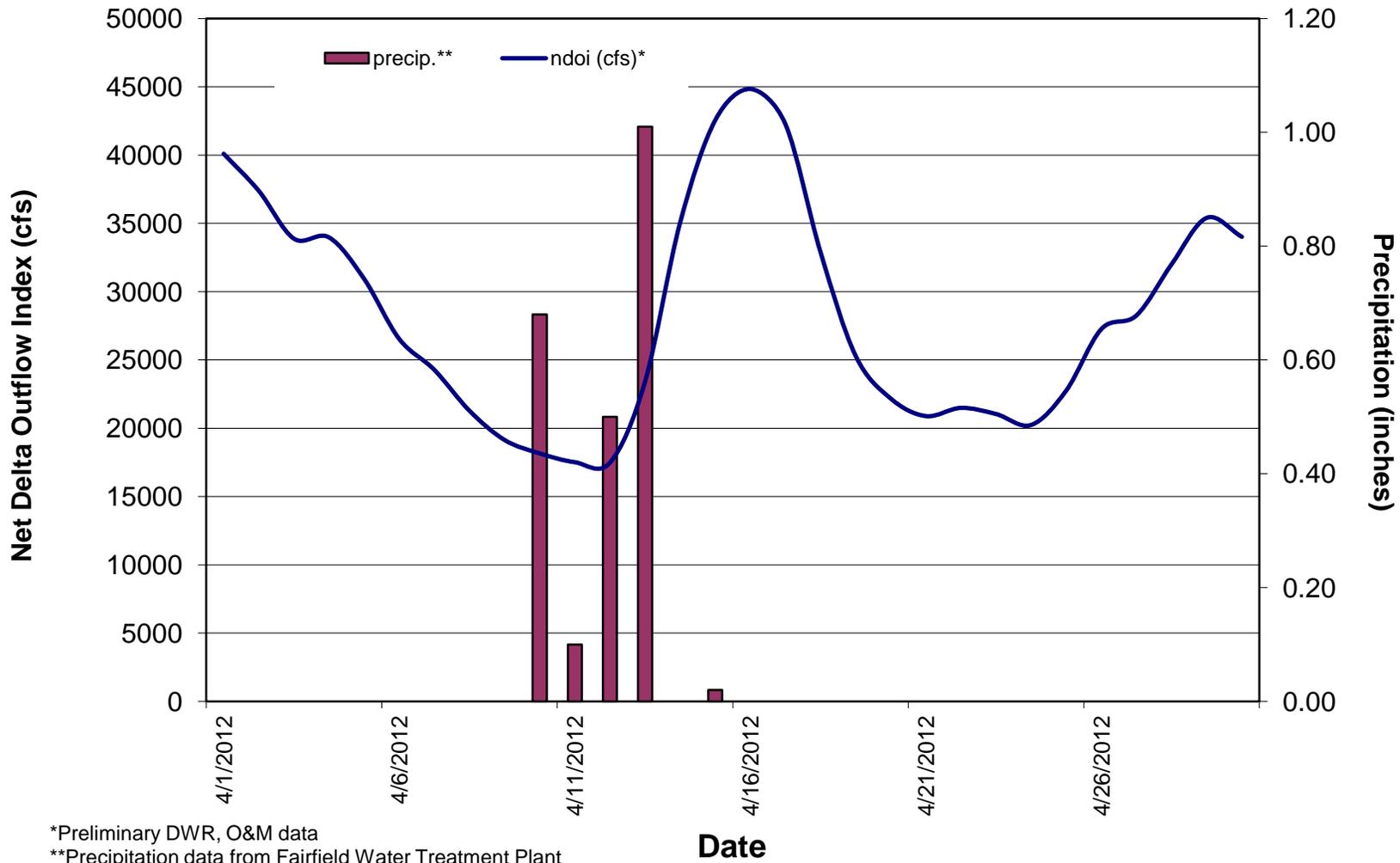
\*\* Communication lost due to silting in of stilling well. Pressure transducer replaced shaft encoder eliminating need for stilling well.

**Figure 2: Suisun Marsh Progressive Daily Mean High Tide Specific Conductance for Monitoring Stations April 2012**

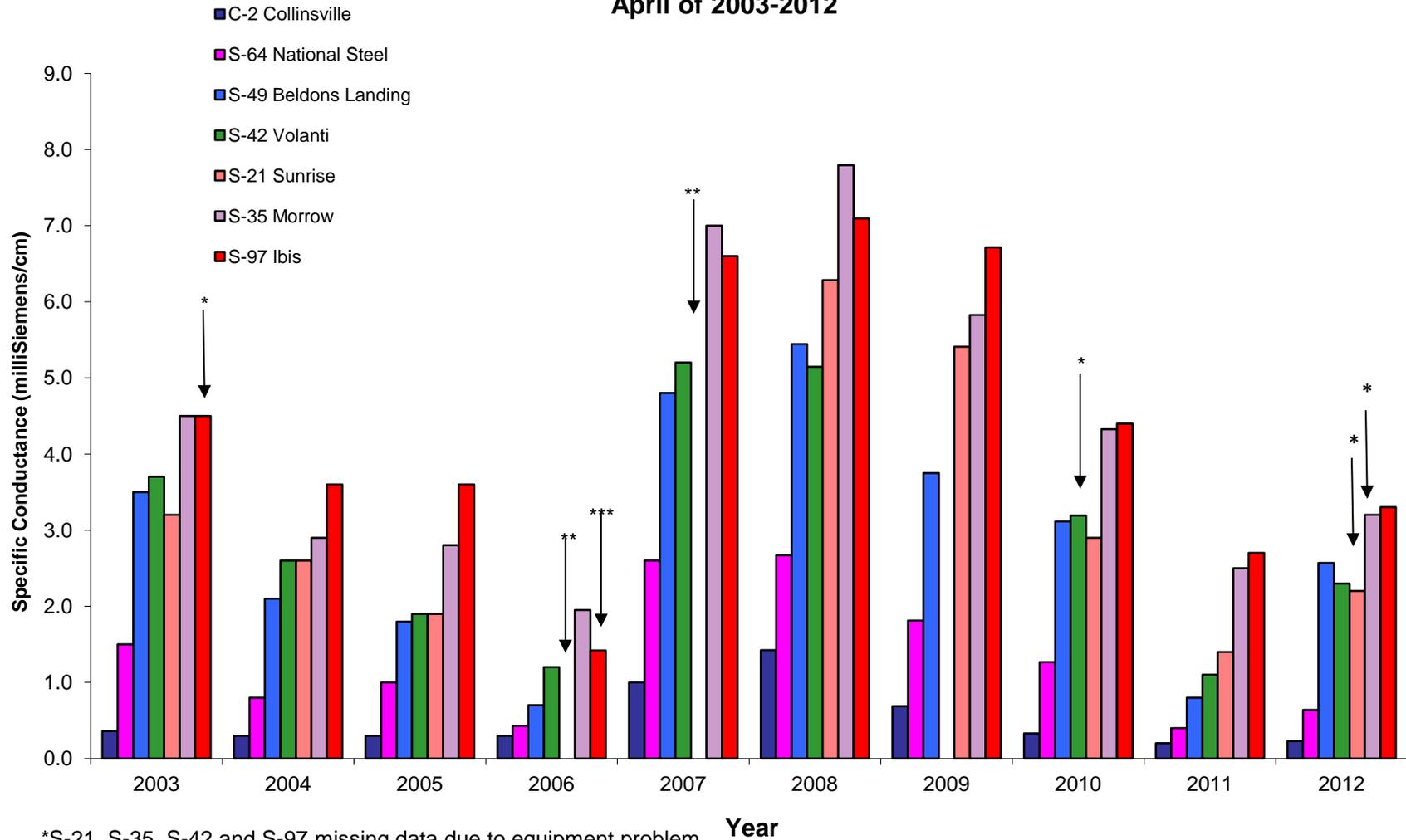


\*\* Power outage between 4/4 and 4/22.

**Figure 3: Daily Net Delta Outflow Index and Precipitation  
April 2012**



**Figure 4: Monthly Mean Specific Conductance at High Tide -  
- Comparison of Monthly Values for Selected Stations  
April of 2003-2012**



\*S-21, S-35, S-42 and S-97 missing data due to equipment problem.  
 \*\*S-21 data not available due to flooded roads.  
 \*\*\*S-97 data not representative of end of month value due to missing data within the month.

**Figure 5: Suisun Marsh Stations**

- ★ Compliance
- ▲ Monitoring
- ◆ Blacklock
- Initial Facilities

