
Suisun Marsh Monitoring Program Channel Water Salinity Report

Reporting Period: April 2014

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1. SUISUN MARSH MONITORING STATIONS AND REPORTING REQUIREMENT

As per the State Water Resources Control Board (SWRCB) Water Rights Decision 1641 (D-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:

COMPLIANCE STATIONS:		
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:

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

* 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

2014 is forecasted as a Critical Water Year Type based on the California Cooperative Snow Surveys Forecast of May 1, 2014. April 2014 was the fourth month in the deficiency period that started January 2014. A deficiency period is defined by D-1641 Table 3 footnote 6. 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 April was 11.0 mS/cm for stations Collinsville (C-2), National Steel (S-64), Beldon's Landing (S-49), and the deficiency standard was 14.0 mS/cm for stations Sunrise Club (S-21) and Volanti (S-42). 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 2014 ranged between 3,700 cfs and 21,500 cfs (Figure 3). For the month, outflow began at 13,400 cfs and peaked at 21,500 cfs on April 3rd. Outflow then decreased and stayed around 6,000 cfs before responding to a precipitation event on April 25th. Outflow increased to 8,500 cfs and ended the month at 8,400 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 2014 is listed below:

Month	Mean NDOI (cubic feet per second)
April	8,200

2.3 Precipitation

There were three precipitation events in April 2014. The first event began in March on March 31st and ended on April 1st producing 1.50 inches of precipitation. The second was on April 4th and amounted to 0.45 inch. The third event began on April 25th and ended on April 27th and totaled 1.09 inches of precipitation. April's historical average precipitation in Fairfield is 1.39 inches. The monthly total precipitation recorded at the Fairfield Water Treatment Plant is below:

Month	Total Precipitation (inches)
April	2.39

2.4 Suisun Marsh Salinity Control Gates Operations

Operations and flashboard/boat lock installations at the Suisun Marsh Salinity Control Gates (SMSCG) during April 2014 are summarized below:

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

Due to salinity concerns, the gates were operated for the whole month of April.

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

For April 2014, PDM salinity levels at compliance stations C-2, S-64, S-49, S-21 and S-42 are shown in Figure 1. Salinity levels for April started in the range of 2.89 mS/cm to 4.79 mS/cm and ended the month in the range of 3.46 mS/cm to 4.56 mS/cm. Salinity values decreased

during the first week of the month then gradually increased and leveled off at the end of the month. Equipment failure at S-21 resulted in missing data between April 22nd to April 28th.

Salinity levels at monitoring stations S-35 and S-97 are shown in Figure 2. Salinity for S-35 began the month of April at 8.41 mS/cm and increased slightly during the first week of the month. Salinity then decreased slightly before gradually increasing and ending the month at 8.84 mS/cm. Due to a sensor malfunction at S-97, salinity values are missing for the first 3 days of the month. Salinity was 7.41 mS/cm on April 4th and decreased in response to the precipitation event at the beginning of April. Salinity then gradually increased to end the month at 8.09 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 April 2014 were compared with means for those months during the previous nine years (Figure 4).

April 2014 mean salinity pattern for all compliance and monitoring stations ranked 2nd highest in salinity levels for the past 10 years. The year 2013 ranked higher in salinity and was a dry water year type. As expected, the salinity levels gradually increased from east to west with monitoring stations S-35 and S-97 having significantly higher salinity values. These two stations are the furthest from the SMSCG and therefore may not benefit from SMSCG operations.

**Table 1: Monthly Mean High Tide Specific Conductance at Suisun Marsh
Water Quality Compliance Stations
April 2014**

Station Identification	Specific Conductance (mS/cm)*	Normal Standard	Normal Standard Met?	Deficiency Standard	Deficiency Standard Met?
C-2**	3.46	11.0	Yes	N/A	N/A
S-64	3.70	11.0	Yes	N/A	N/A
S-49	3.80	11.0	Yes	N/A	N/A
S-42	4.35	N/A	N/A	14.0	Yes
S-21	4.56	N/A	N/A	14.0	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 2014

Standard = 11.0 mS/cm
 Deficiency Standard = 14.0 mS/cm (S-21 & S-42)

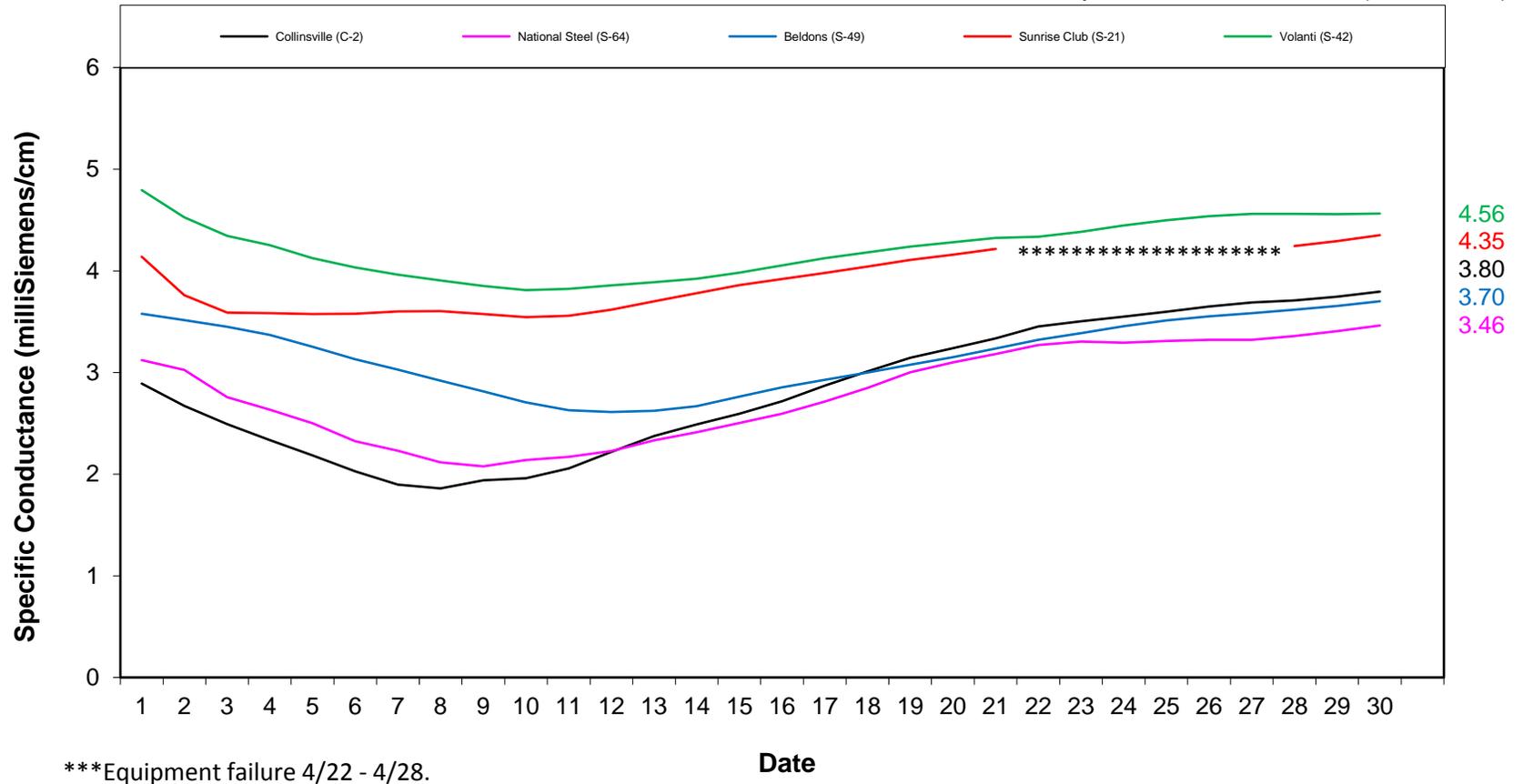
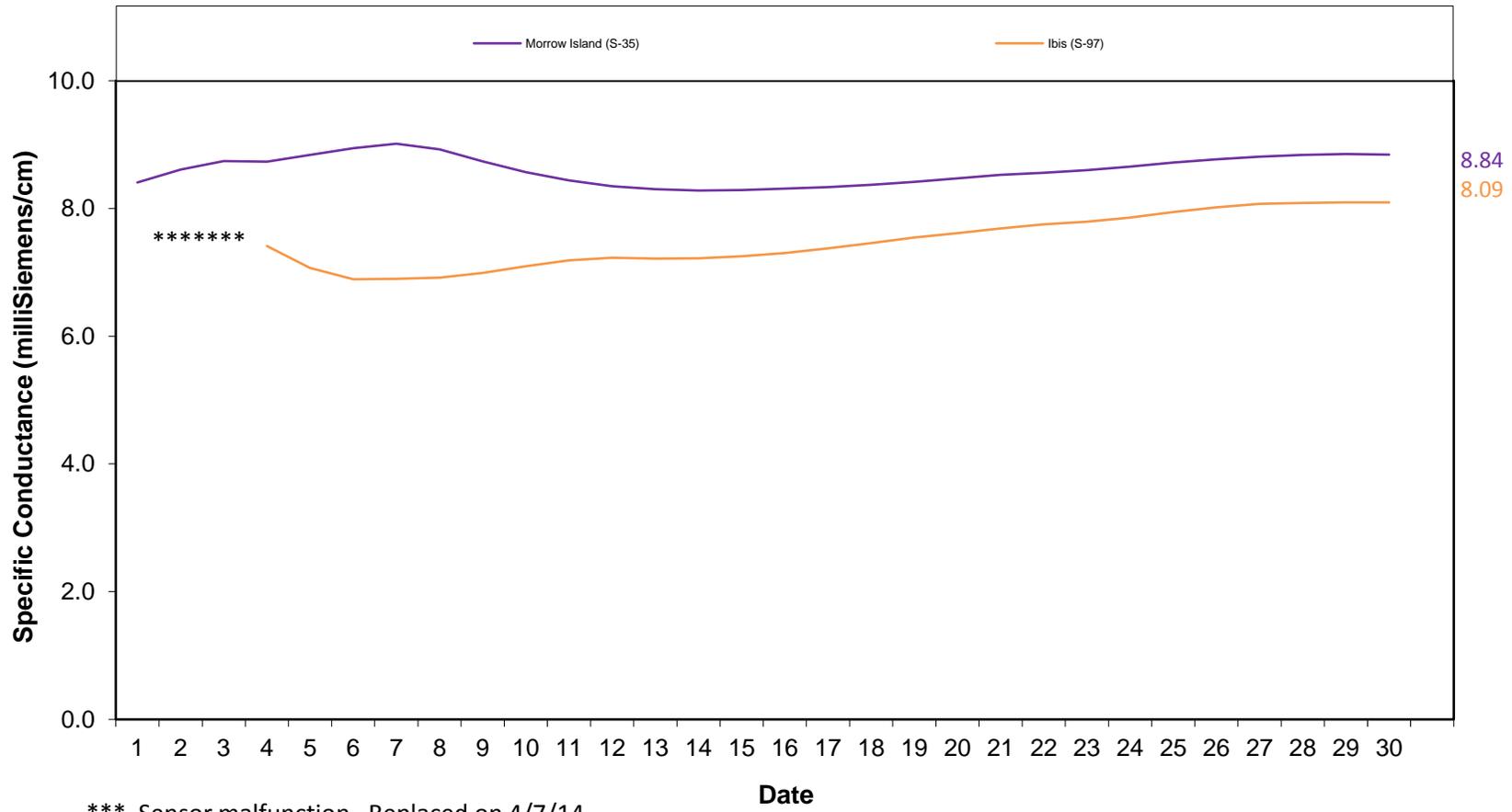


Figure 2: Suisun Marsh Progressive Daily Mean High Tide Specific Conductance for Monitoring Stations April 2014

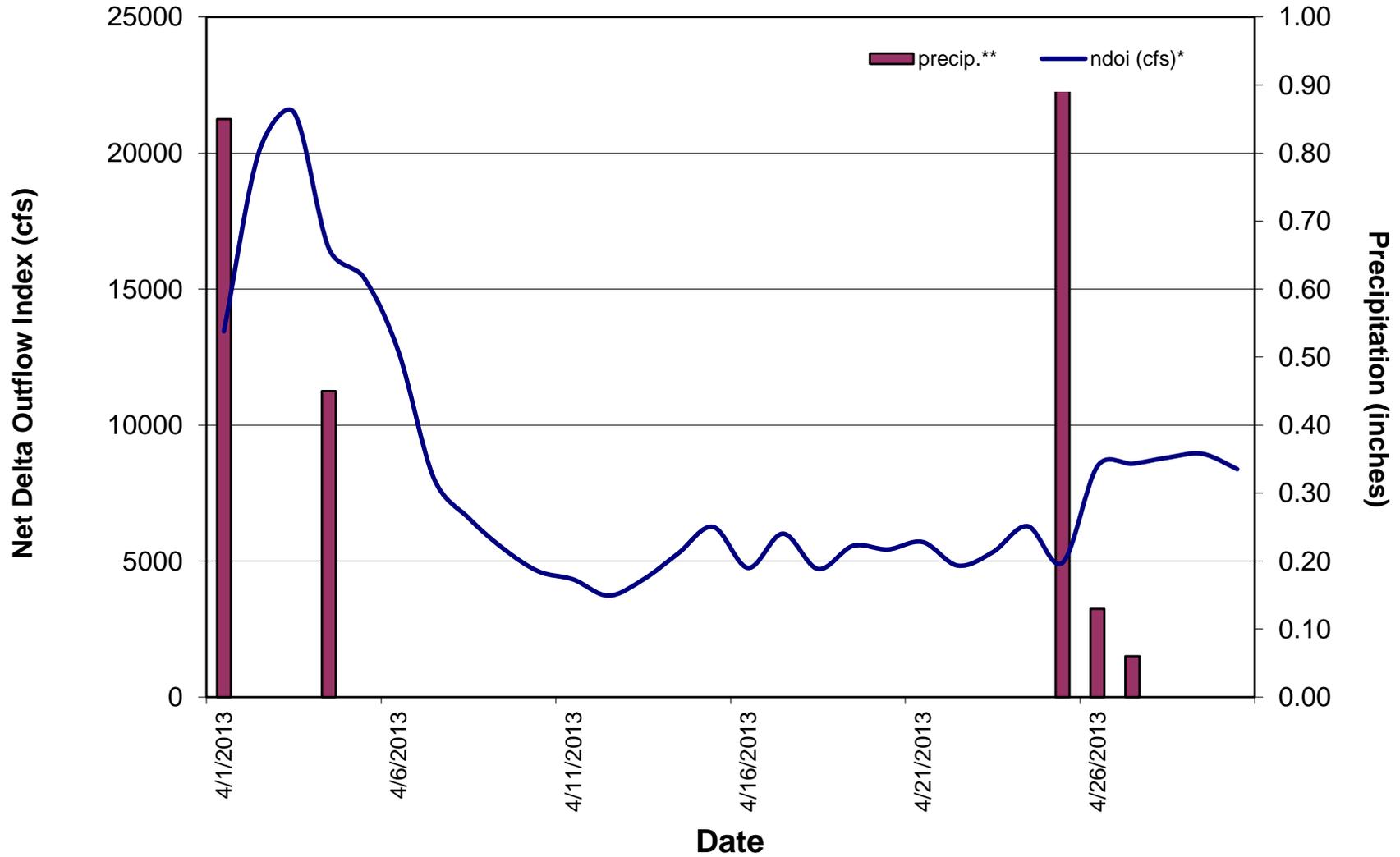


*** Sensor malfunction. Replaced on 4/7/14.

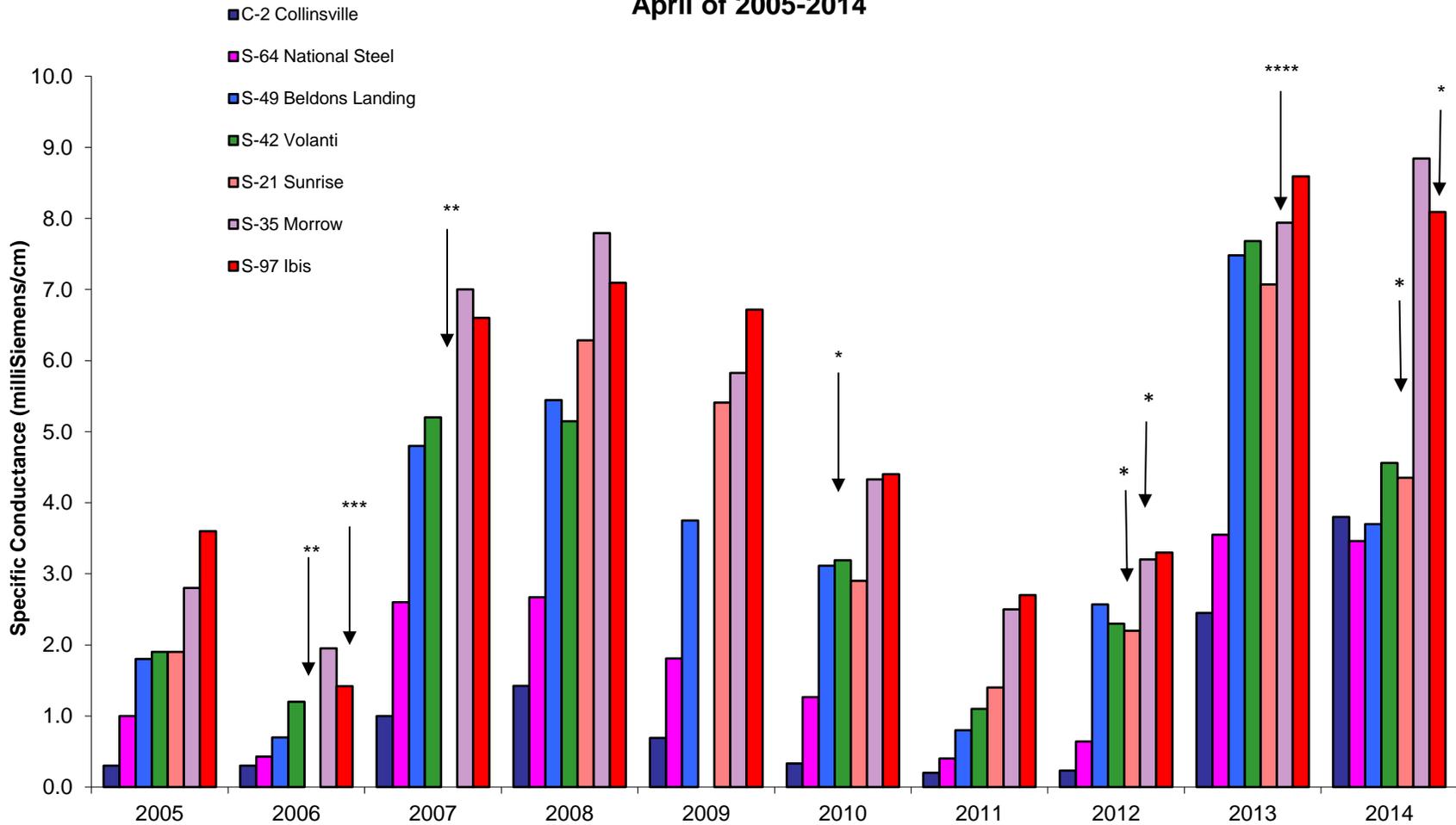
**Figure 3: Daily Net Delta Outflow Index and Precipitation
April 2014**

*Preliminary DWR, O&M data

** Missing data on 4/17. Replaced with data from Stockton Fire Station #4.



**Figure 4: Monthly Mean Specific Conductance at High Tide -
- Comparison of Monthly Values for Selected Stations
April of 2005-2014**



* S-21, S-35, S-42 and S-97 missing data due to equipment problem. **Year**
 ** 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.
 **** S-35 data from 4/27-4/30 failed QA/QC.

Figure 5: Suisun Marsh Stations

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

