
Suisun Marsh Monitoring Program Channel Water Salinity Report

Reporting Period: March 2016

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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 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

March 2016 was the 27th 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 March, 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 March was 8.0 mS/cm for stations Collinsville (C-2), National Steel (S-64), Beldon Landing (S-49), and the deficiency standard was 15.6 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 March 2016 ranged between 8,400 cfs and 145,200 cfs. For the month, outflow began at 10,100 cfs and increased to 66,400 cfs on March 10th in response to an early March storm. Outflow then increased again to a high of 145,200 cfs on March 16th in response to a second storm event. Outflow then decreased and ended the month at 40,000 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 March 2016 is listed below:

Month	Mean NDOI (cubic feet per second)
March	61,100

2.3 Precipitation

There were two significant precipitation events in March. The first event occurred between March 4-7 where 3.30 inches of precipitation fell. The second event occurred

between March 10-14 where 3.39 inches of precipitation fell. A third smaller event took place between March 20-22 where 0.23 inch of precipitation fell. March's historical average precipitation in Fairfield is 3.09 inches. The monthly total precipitation recorded at the Fairfield Water Treatment Plant is below:

Month	Total Precipitation (inches)
March	6.92

2.4 Suisun Marsh Salinity Control Gates Operations

Operations and flashboard/boat lock installations at the Suisun Marsh Salinity Control Gates (SMSCG) during March 2016 are summarized below:

Date	Gate Status	Flashboards Status	Boat Lock Status
March 1-31	3 Open	In	Partially Closed

Given low salinity levels at the compliance stations, the gates continued to be in the open position.

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 March 2016, PDM salinity levels at the five compliance stations are shown in Figure 1. Salinity levels for March started in the range of 0.25 mS/cm to 6.41 mS/cm and ended the month in the range of 0.53 mS/cm to 3.89 mS/cm. For stations S-21, salinity levels gradually decreased during March. For stations, C-2, S-42, S-49, and S-64, salinity increased to a high on March 7th then gradually decreased for the remainder of the month.

PDM salinity levels at monitoring stations S-35 and S-97 are shown in Figure 2. Salinity at S-35 began the month at 10.32 mS/cm and decreased during the month to end at 5.44 mS/cm. At station S-97, salinity started the month at 9.52 mS/cm and decreased to end the month at 4.57 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 March 2016 were compared with means for those months during the previous nine years (Figure 4).

The average salinity for March 2016 at all compliance and monitoring stations ranked the fifth highest in salinity levels for the past 10 years. The highest salinity was in 2013 which was a dry water year followed by 2015 which was a critical water year. 2014 which was a critical water year placed third highest and 2012 which was a below normal water year placed fourth.

**Table 1: Monthly Mean High Tide Specific Conductance at Suisun Marsh
Water Quality Compliance Stations
March 2016**

Station Identification	Specific Conductance (mS/cm)*	Normal Standard	Normal Standard Met?	Deficiency Standard	Deficiency Standard Met?
C-2**	0.53	8.0	Yes	N/A	N/A
S-64	1.42	8.0	Yes	N/A	N/A
S-49	3.30	8.0	Yes	N/A	N/A
S-42	3.32	N/A	N/A	15.6	Yes
S-21	3.89	N/A	N/A	15.6	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
March 2016**

C-2, S-64, S-49 Standard = 8.0 mS/cm
S-21, S-42 Deficiency Standard = 15.6 mS/cm

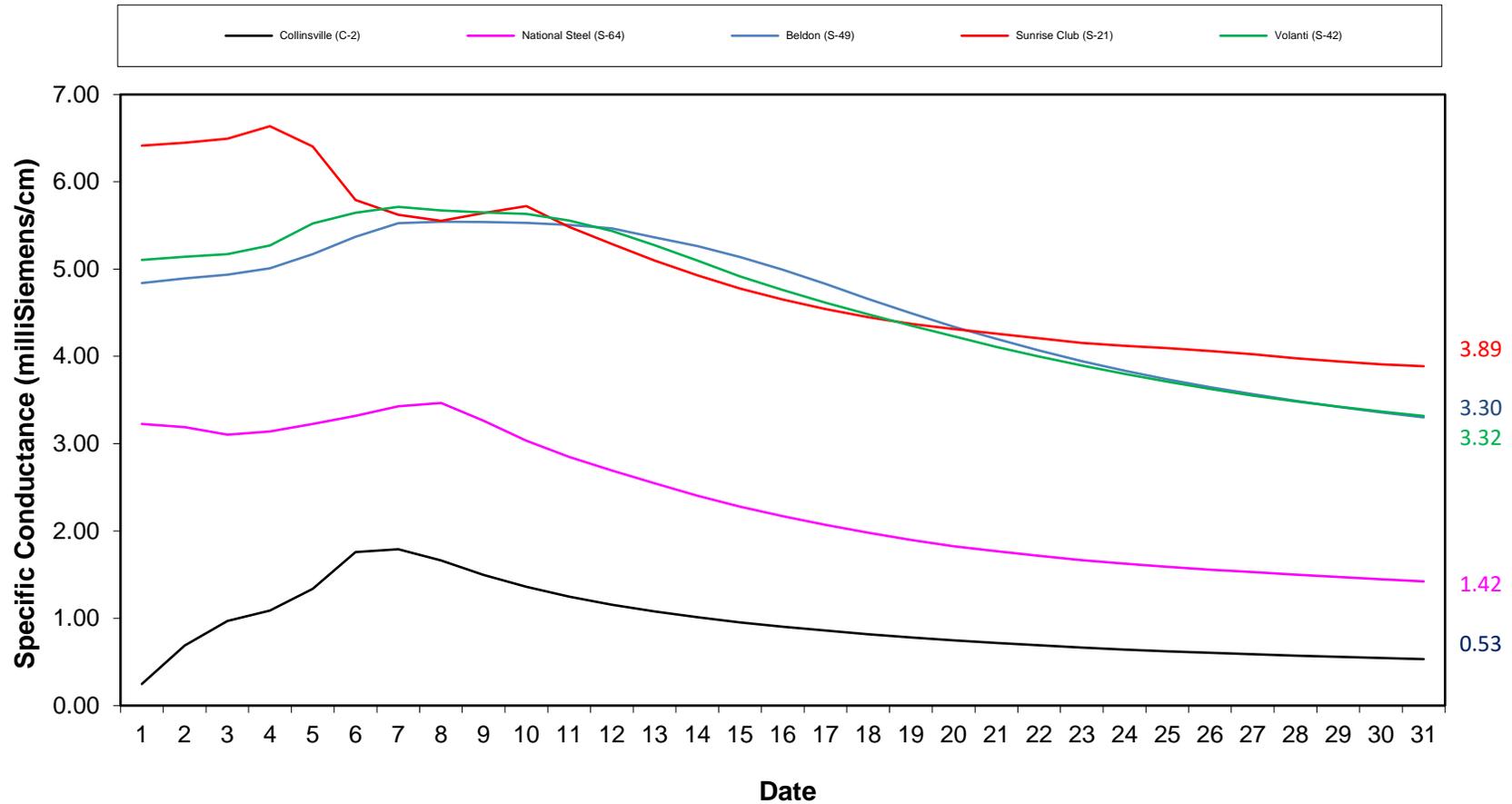
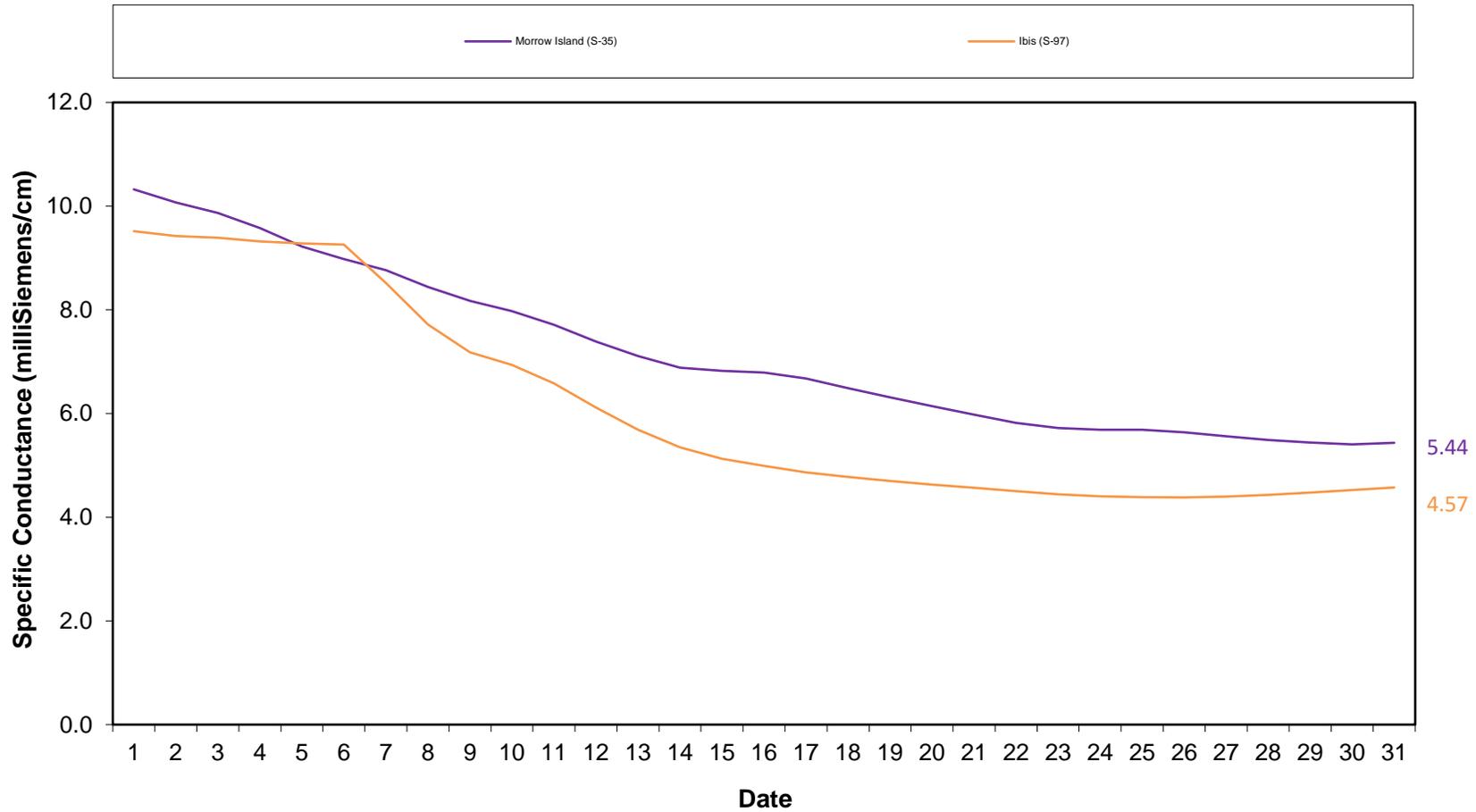


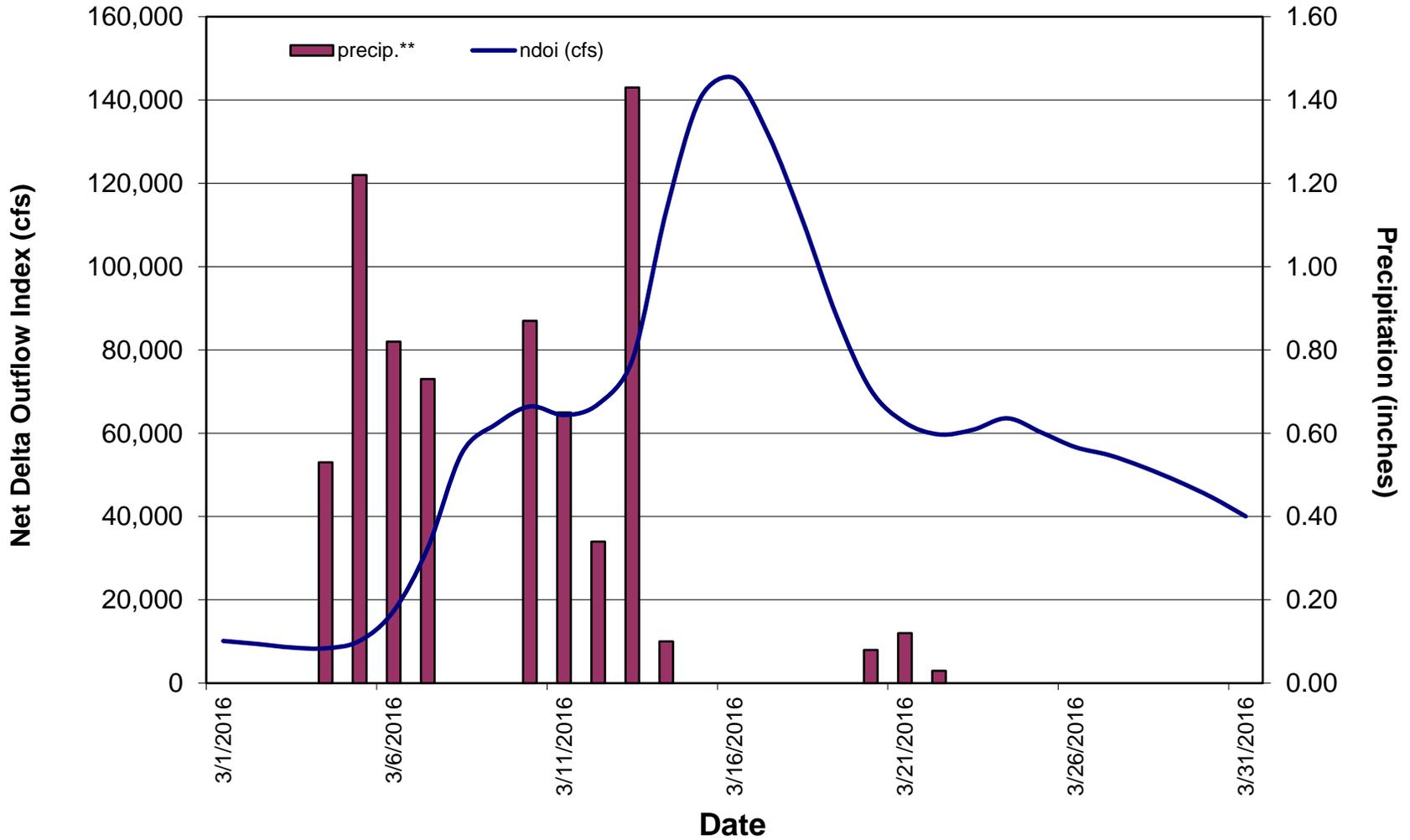
Figure 2: Suisun Marsh Progressive Daily Mean High Tide Specific Conductance for Monitoring Stations March 2016



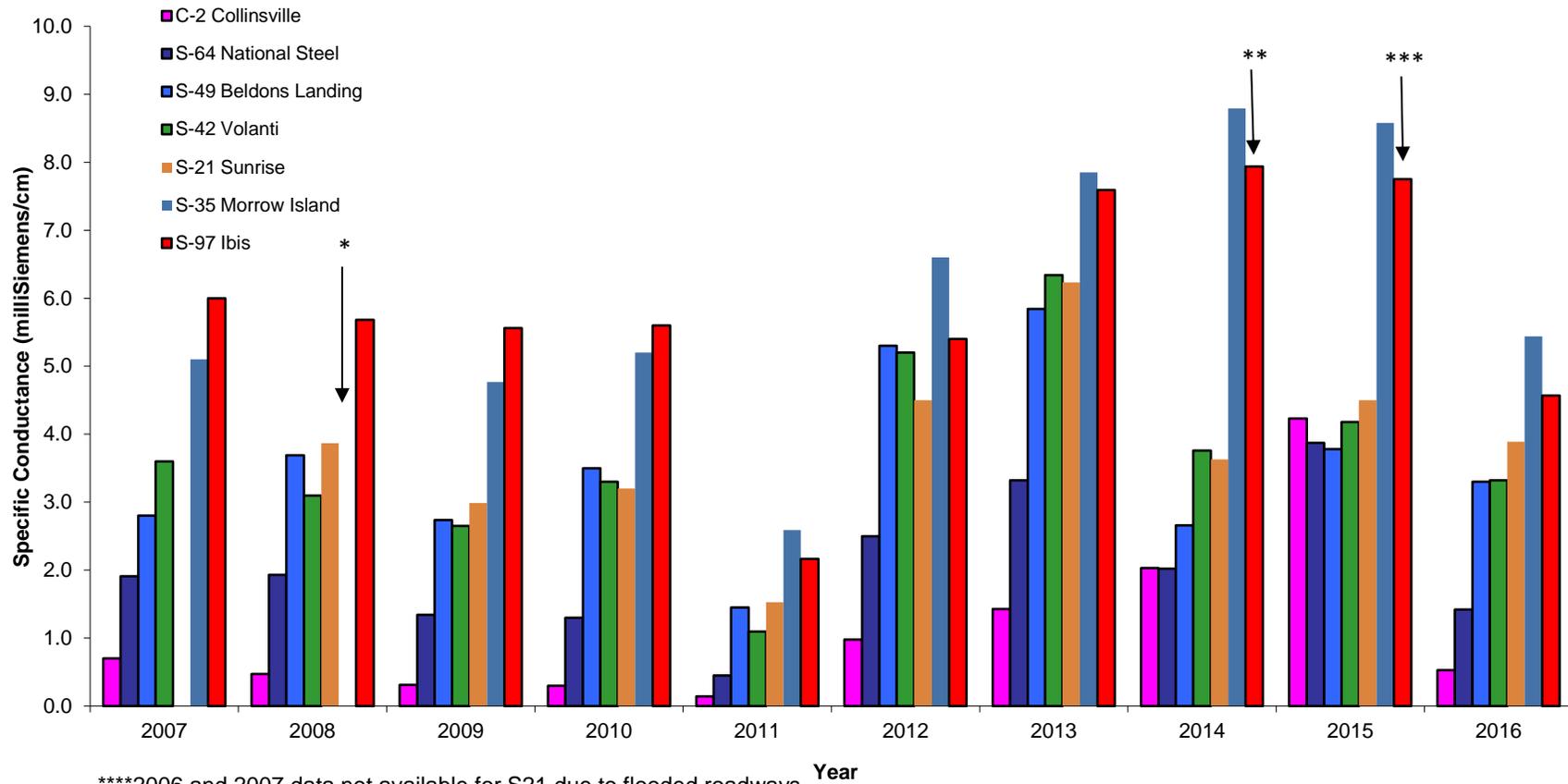
**Figure 3: Daily Net Delta Outflow Index and Precipitation
March 2016**

*Preliminary DWR, O&M data

**Precipitation data from the Fairfield Water Treatment Plant



**Figure 4. Monthly Mean Specific Conductance at High Tide:
Comparison of Monthly Values for Selected Stations
March of 2007-2016******



****2006 and 2007 data not available for S21 due to flooded roadways.
 *Data not available for S35 due to equipment upgrade.
 ** Sensor malfunction 3/29/14-3/31/14.
 *** Bad stage data 3/19/15-3/31/15.

Figure 5: Suisun Marsh Stations

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

