Suisun Marsh Monitoring Program
Channel Water Salinity Report

Reporting Period: May 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

May 2016 was the 29th 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 May, 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 May was 11.0 mS/cm for stations Collinsville (C-2), National Steel (S-64), Beldon Landing (S-49), and the deficiency standard was 12.5 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 May 2016 ranged between 7,900 cfs and 15,500 cfs. For the month, outflow began at 10,500 cfs and decreased to a low of 7,900 cfs on May 4th. Outflow then increased to a high of 15,500 cfs on May 11th. Outflow then decreased to 10,700 cfs on May 16th before gradually increasing again to 15,000 cfs on May 26th. Outflow ended the month at 9,200 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 May 2016 is listed below:

Month	Mean NDOI (cubic feet per second)
May	11,600

2.3 Precipitation

There was one significant precipitation event in May. Between May 5-8, 0.35 inch of precipitation fell. May's historical average precipitation in Fairfield is 0.55 inch. The monthly total precipitation recorded at the Fairfield Water Treatment Plant is below:

Month	Total Precipitation (inches)
May	0.35

2.4 Suisun Marsh Salinity Control Gates Operations

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

Date	Gate Status	Flashboards Status	Boat Lock Status
May 1-23	3 Open	In	Partially Closed
May 24-31	3 Open	Out	Closed

The flashboards were removed on May 24th.

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 May 2016, PDM salinity levels at the five compliance stations are shown in Figure 1. Salinity levels for May started in the range of 0.31 mS/cm to 4.17 mS/cm and ended the month in the range of 1.14 mS/cm to 6.73 mS/cm. Salinity levels at all stations gradually increased during 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 5.64 mS/cm and decreased to 5.29 mS/cm on May 4th before gradually increasing to 7.28 mS/cm. At station S-97, salinity started the month at 7.72 mS/cm and decreased to 7.00 mS/cm on May 4th. Salinity then gradually increased to end the month at 8.84 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 May 2016 were compared with means for those months during the previous nine years (Figure 4).

The average salinity for May 2016 at all compliance and monitoring stations ranked the fifth highest in salinity levels for the past 10 years. The highest salinity was in 2015 which was a critical water year followed by 2014 and 2008 which were both critical water years. 2013 was the next highest and it was a dry water year.

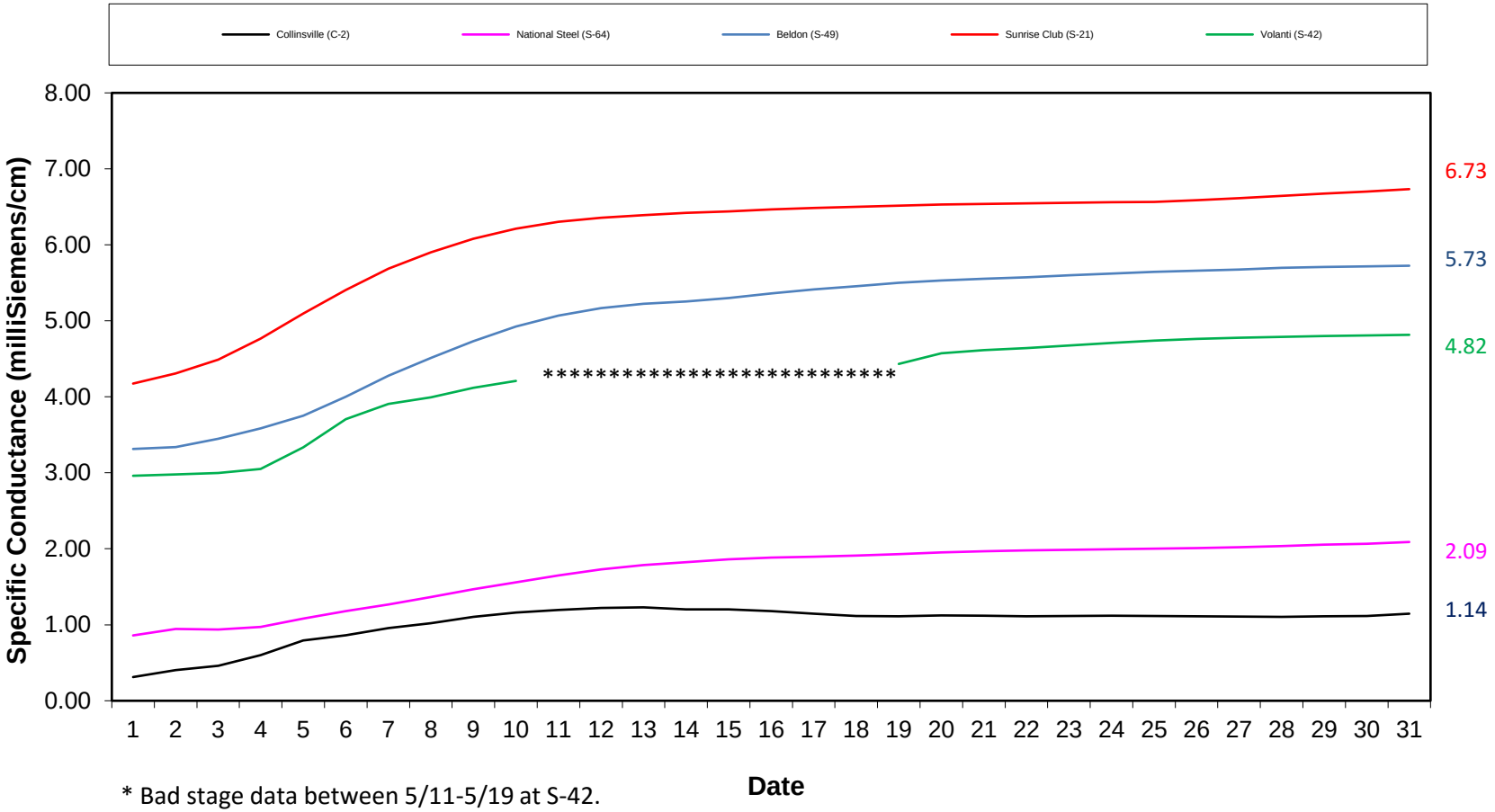
Table 1: Monthly Mean High Tide Specific Conductance at Suisun Marsh Water Quality Compliance Stations May 2016

Station Identification	Specific Conductance (mS/cm)*	Normal Standard	Normal Standard Met?	Deficiency Standard	Deficiency Standard Met?
C-2**	1.14	11.0	Yes	N/A	N/A
S-64	2.09	11.0	Yes	N/A	N/A
S-49	5.73	11.0	Yes	N/A	N/A
S-42	4.82	N/A	N/A	12.5	Yes
S-21	6.73	N/A	N/A	12.5	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
May 2016

C-2, S-64, S-49 Standard = 11.0 mS/cm
S-21, S-42 Deficiency Standard = 12.5 mS/cm



* Bad stage data between 5/11-5/19 at S-42.

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

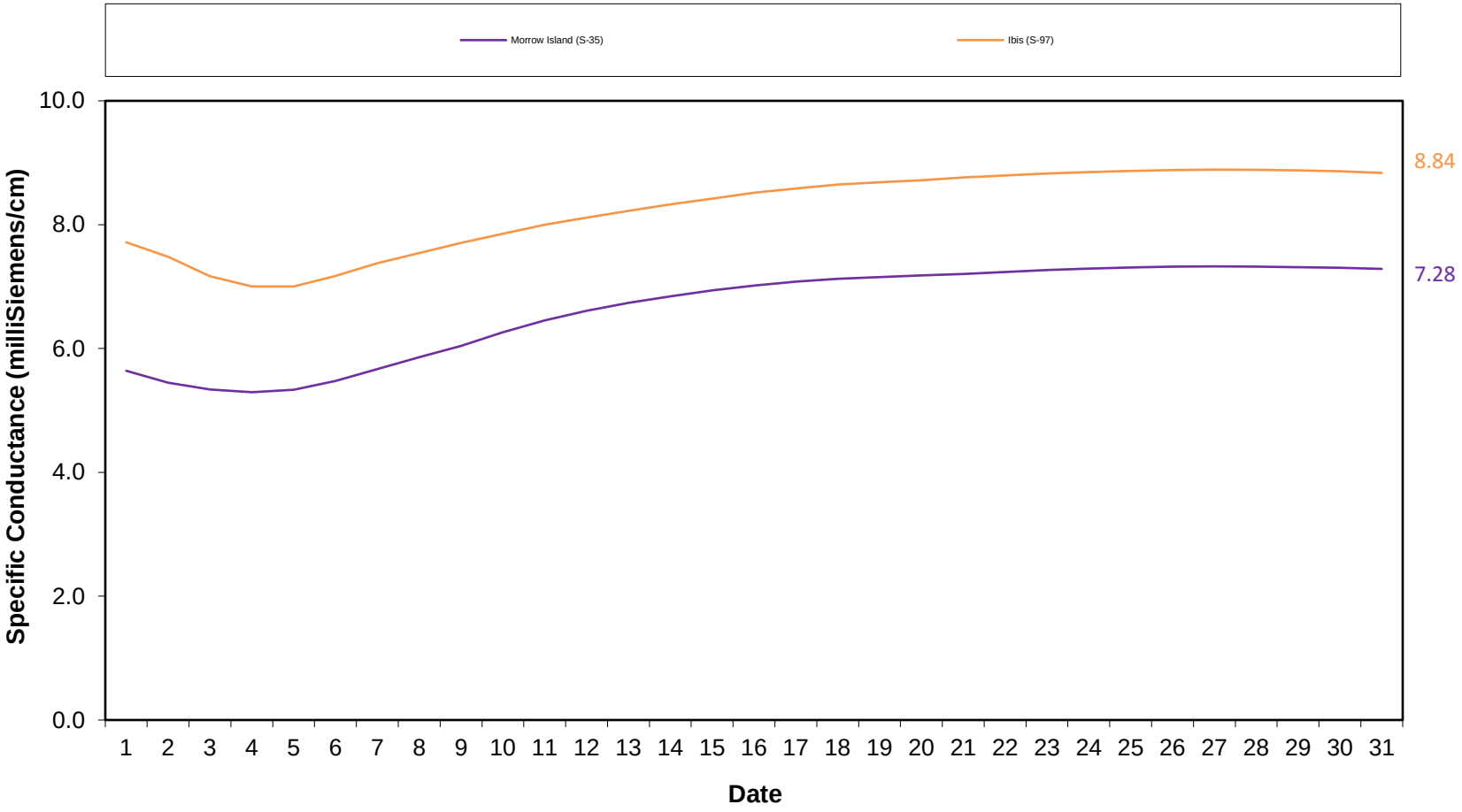


Figure 3: Daily Net Delta Outflow Index and Precipitation
May 2016

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

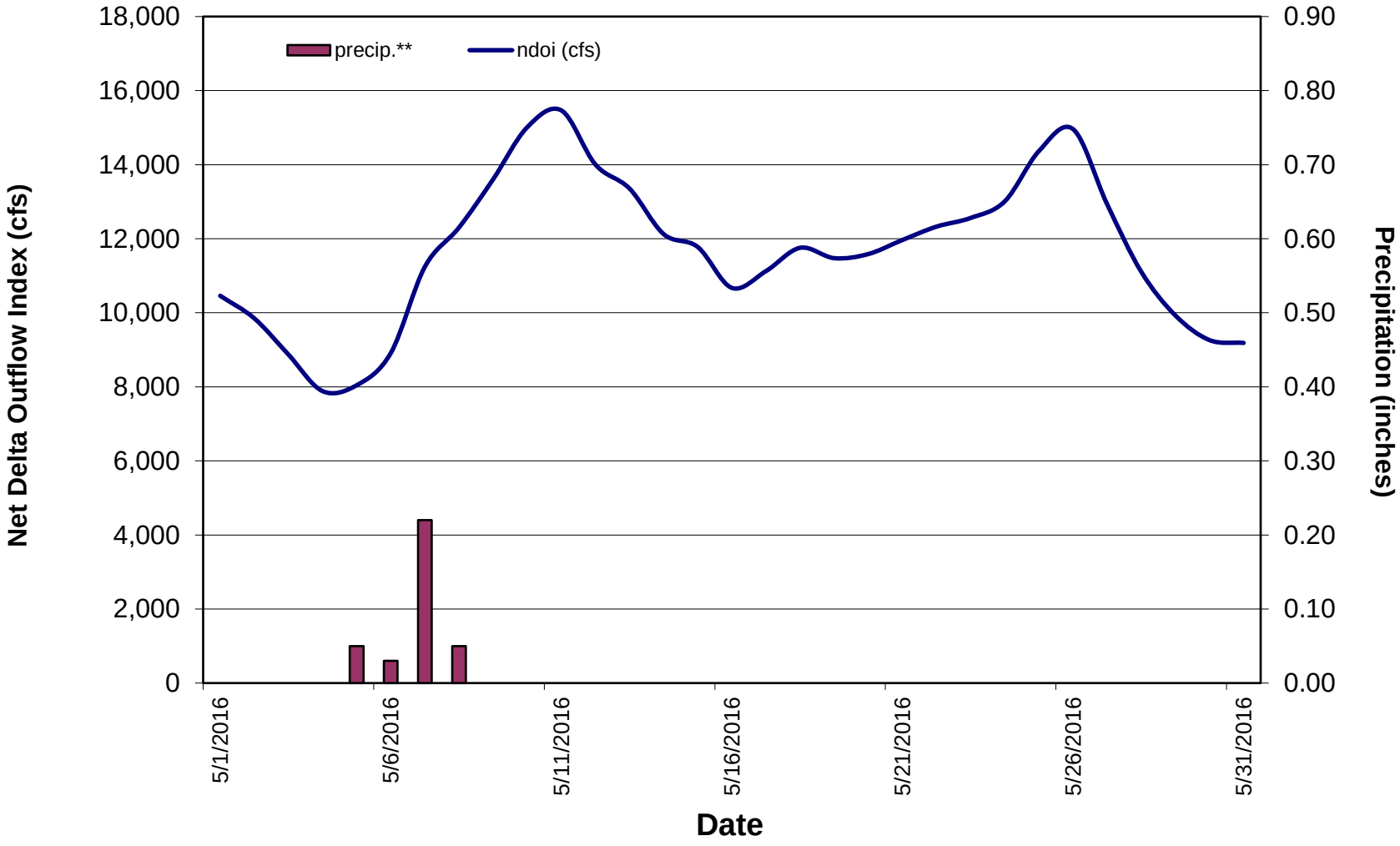
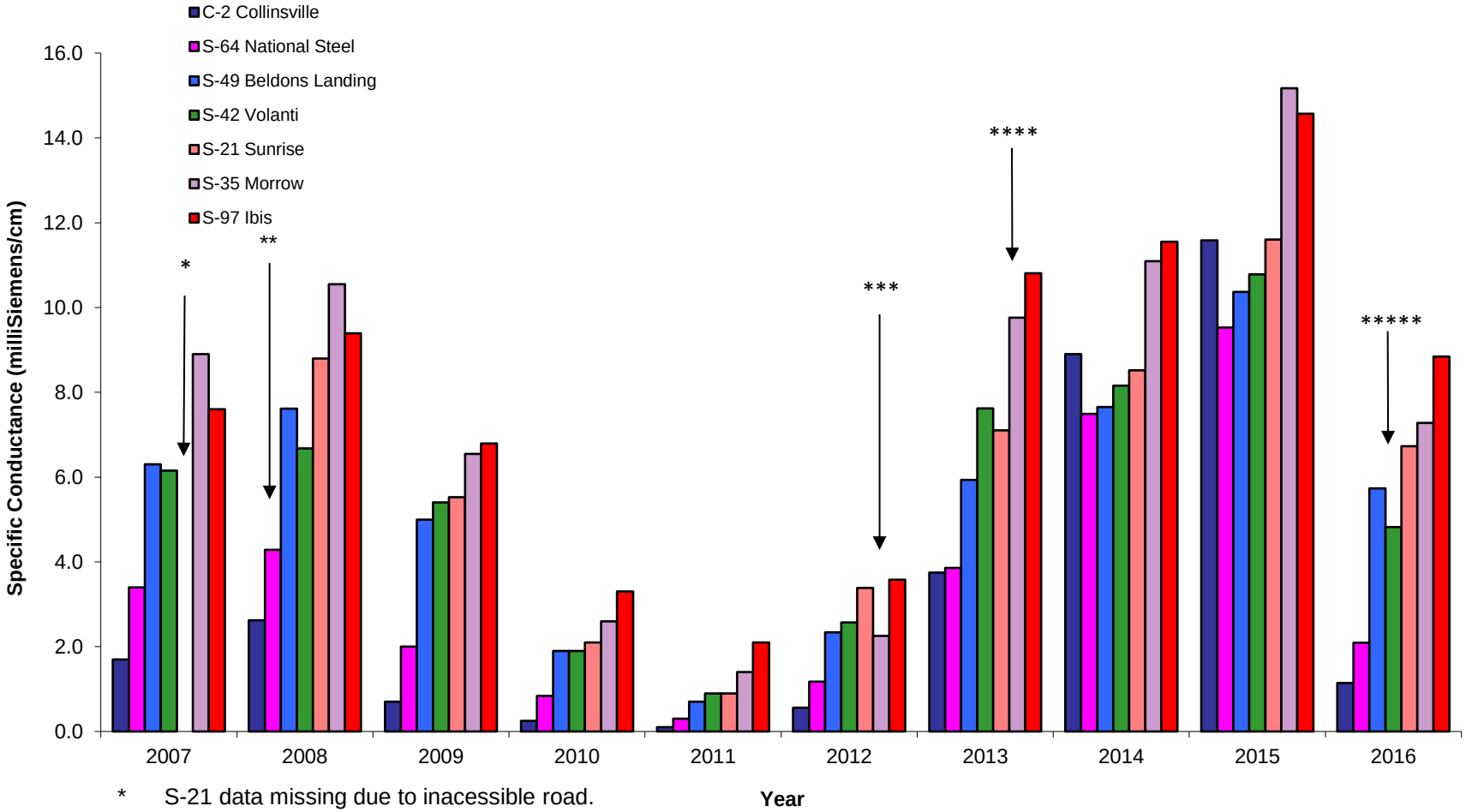


Figure 4. Monthly Mean Specific Conductance at High Tide: Comparison of Monthly Values for Selected Stations May of 2007-2016



* S-21 data missing due to inacessible road.
** S-64 PDM based on last good entry (6/20/08).
*** S-35 PDM based on last good entry (6/14/12).
**** S-35 data for 5/1-5/16 failed QA/QC.
*****S-42 data for 5/11-5/19 failed QA/QC.

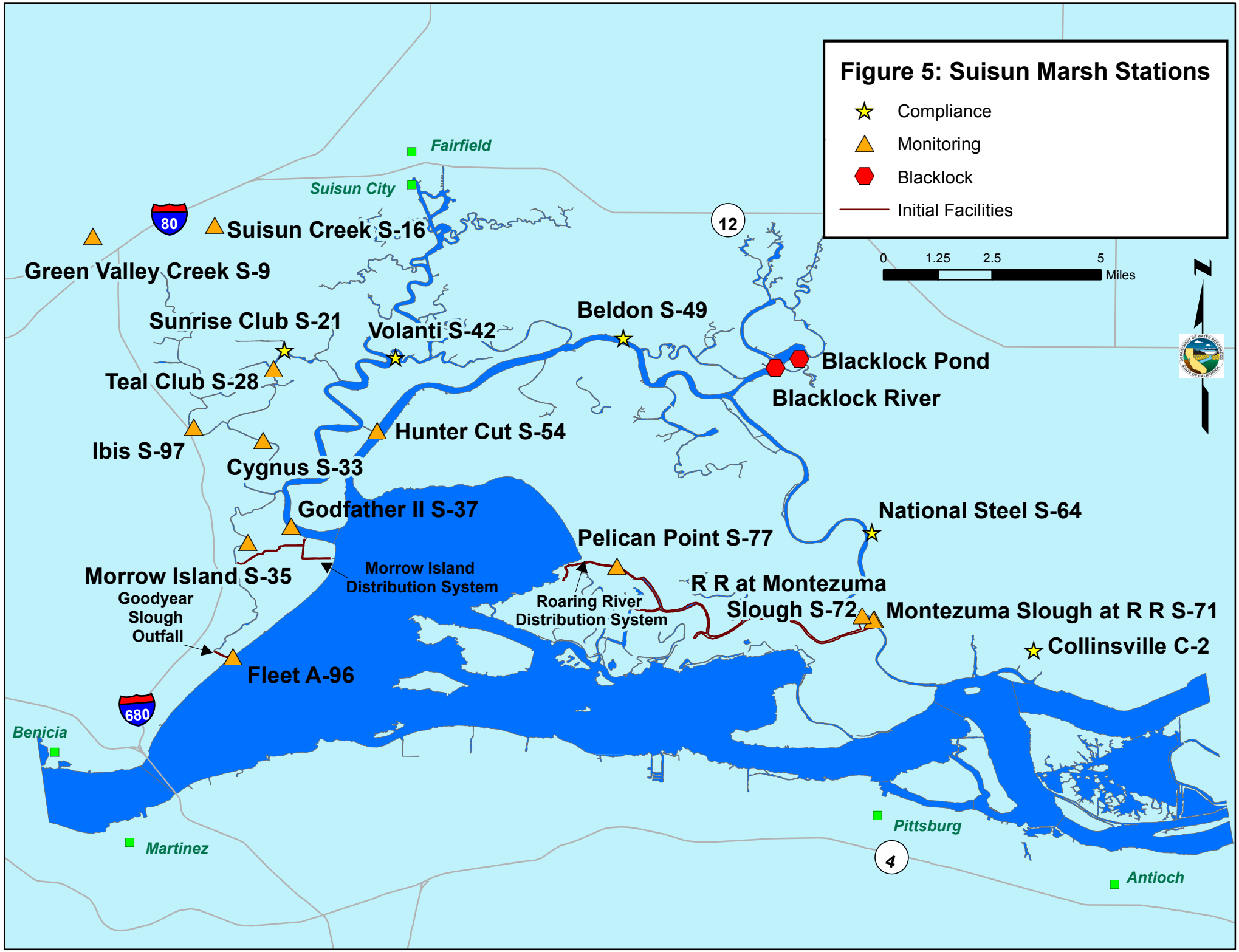


Figure 5: Suisun Marsh Stations
Compliance
Monitoring
Blacklock
Initial Facilities
0
1.25
2.5
5
Miles
N
Fairfield
Suisun City
80
12
Suisun Creek S-16
Green Valley Creek S-9
Sunrise Club S-21
Volanti S-42
Beldon S-49
Blacklock Pond
Blacklock River
Teal Club S-28
Hunter Cut S-54
Ibis S-97
Cygnus S-33
Godfather II S-37
National Steel S-64
Pelican Point S-77
Morrow Island S-35
Morrow Island Distribution System
Roaring River Distribution System
R R at Montezuma Slough S-72
Montezuma Slough at R R S-71
Collinsville C-2
Goodyear Slough Outfall
Fleet A-96
680
Benicia
Pittsburg
Martinez
4
Antioch