
Suisun Marsh Monitoring Program Channel Water Salinity Report

Reporting Period: February – May 2000

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➤ **SUISUN MARSH MONITORING STATIONS AND REPORTING
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RESULTS

Channel Water Salinity Compliance

Salinity standards were met at all compliance stations during the reporting period (Table 1). Compliance with State Water Resources Control Board (SWRCB) channel water salinity standards was determined for each compliance station at the end of each month by comparing the monthly mean specific conductance (SC) at high tide with the station's standard.

The progressive monthly mean SC for each station is used to track salinity conditions during each month (Figures 1-4). The progressive mean is calculated for each compliance station by averaging mean SC at high tide for a given day and all previous days that month. New progressive mean calculations begin at the start of each month.

Delta Outflow

High Delta outflow occurred during February and lasted until about mid-March due to large amounts of rainfall. Outflow declined rapidly after mid-March (Figure 5). The monthly mean Net Delta Outflow Index (NDOI) during the reporting period is listed below:

Month	Mean NDOI (cubic feet per second)
February	97,823
March	103,906
April	28,554
May	23,449

In comparison, the NDOI for January 2000 is 19,933 cfs. The NDOI is the estimated average daily rate of outflow from the Delta.

Rainfall

Total monthly rainfall at the Waterman Gauging Station in Fairfield during the reporting period is listed below:

Month	Total Rainfall (inches)
February	11.25
March	2.87
April	1.29
May	0.98

In comparison, rainfall for January 2000 was measured at 5.98 inches at the Waterman gauge.

Suisun Marsh Salinity Control Gate (SMSCG) Operations

Operations and flash board installations at the SMSCG during the reporting period are summarized below.

Date	Flash Board Installation	Gate Status
January 17 – February 29	Modified	Operating
March 1-March 27	Modified	Open
March 28 – May 30	None	Open

DISCUSSION

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,
- operation of the SMSCG and flashboard configurations.

Evaporation may also affect salinity levels in some areas of the Marsh, especially during summer months.

State Water Resources Control Board Order WR 98-6, issued September 25, 1998, authorizes DWR to experimentally test the effects of "modified" flashboards at the SMSCG on salmon behavior. The modifications include gaps between adjacent flashboards. The modified flashboards tend to allow channel water salinity levels in the Marsh to rise somewhat higher than when the original flashboards are used. Experimentation with the modified flashboards began in October 1998 and may continue periodically through May 2001.

Observations and Trends

Conditions during the Reporting Period

Channel water salinity levels in the Marsh were mostly a function of Delta outflow and SMSCG operation during the reporting period. Gate operation and rapid increases in Delta outflow during February kept high-tide salinity levels low at all compliance stations throughout the reporting period (Figures 1 – 4). Small increases in salinity levels occurred during April at S-64, S-49, S-21 and S-42 following reductions in Delta outflow.

Daily mean high tide salinity levels at S-35 and S-97 were highly variable but generally declined during the reporting period (Figures 6 – 9). High-tide salinities at Mallard Island reflect freshwater conditions in the lower Sacramento River resulting from high Delta outflow during February and March (Figures 6 – 7). Pulses of higher salinity water occurred at Mallard Island in early April following a substantial reduction in Delta outflow in late March (Figure 8). Lower salinity conditions then followed at Mallard Island after small increases in Delta outflow on about April 10, 2000. Salinity levels at Mallard Island increased somewhat during the latter part of May.

Comparison of Reporting Period Conditions with Previous Years

Monthly mean high-tide SC at the compliance stations and at monitoring stations S-35 and S-97 for February, March, April and May 2000 were compared with means for those months over the previous nine years (Figures 10 – 13). Means for February and March are relatively similar to those measured since 1995 for each compliance station. Means for February and March are somewhat higher overall at S-35 and S-97 than those measured since 1995. Means in April at all listed stations were somewhat higher than compared to those for 1998 and 1999. Means in May were similar to those in 1998 and 1999.

SUISUN MARSH MONITORING STATIONS AND REPORTING REQUIREMENT

The California Department of Water Resources (DWR) is required to provide monthly channel water salinity compliance reports for the Suisun Marsh to the SWRCB. This requirement is based on SWRCB Water Rights Decision 1641, dated December 29, 1999, and on previous SWRCB decisions. Channel water salinity conditions in the Suisun Marsh are determined by monitoring specific electrical conductivity. Specific Electrical Conductivity is referred to in the reports as specific conductance.

Monthly compliance reports are required to include salinity data from stations listed below:

Station Identification	Station Name	General Location	Status
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
60	Mallard Island	South of the Eastern portion of the Suisun marsh	Reporting Station for conditions in the vicinity of Chipps and Van Sickle Islands

Data from the stations listed below are included in the monthly reports to provide information on salinity conditions in the western Suisun Marsh, even though there is no reporting requirement for these data. The locations of all listed stations are shown in Figure 14.

Station Identification	Station Name	General Location	Status
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 is included in the monthly reports to provide information on conditions that may affect channel water salinity conditions in the Marsh.

Table 1
Comparison of Monthly Mean High Tide Specific
Conductance at Suisun Marsh Compliance Stations
to State Water Resources Control Board Standards

February 2000

Station Name	Station ID	Specific Conductance (mS/cm)*	Standard (mS/cm)*
Collinsville	C-2	0.2	8.0
National Steel	S-64	0.2	8.0
Beldons Landing	S-49	0.9	8.0
Volanti	S-42	1.9	8.0
Sunrise Club	S-21	not available**	8.0

March 2000

Station Name	Station ID	Specific Conductance (mS/cm)*	Standard (mS/cm)*
Collinsville	C-2	0.2	8.0
National Steel	S-64	0.5	8.0
Beldons Landing	S-49	0.9	8.0
Volanti	S-42	1.3	8.0
Sunrise Club	S-21	1.2	8.0

April 2000

Station Name	Station ID	Specific Conductance (mS/cm)*	Standard (mS/cm)*
Collinsville	C-2	0.2	11.0
National Steel	S-64	1.6	11.0
Beldons Landing	S-49	2.3	11.0
Volanti	S-42	2.6	11.0
Sunrise Club	S-21	2.6	11.0

May 2000

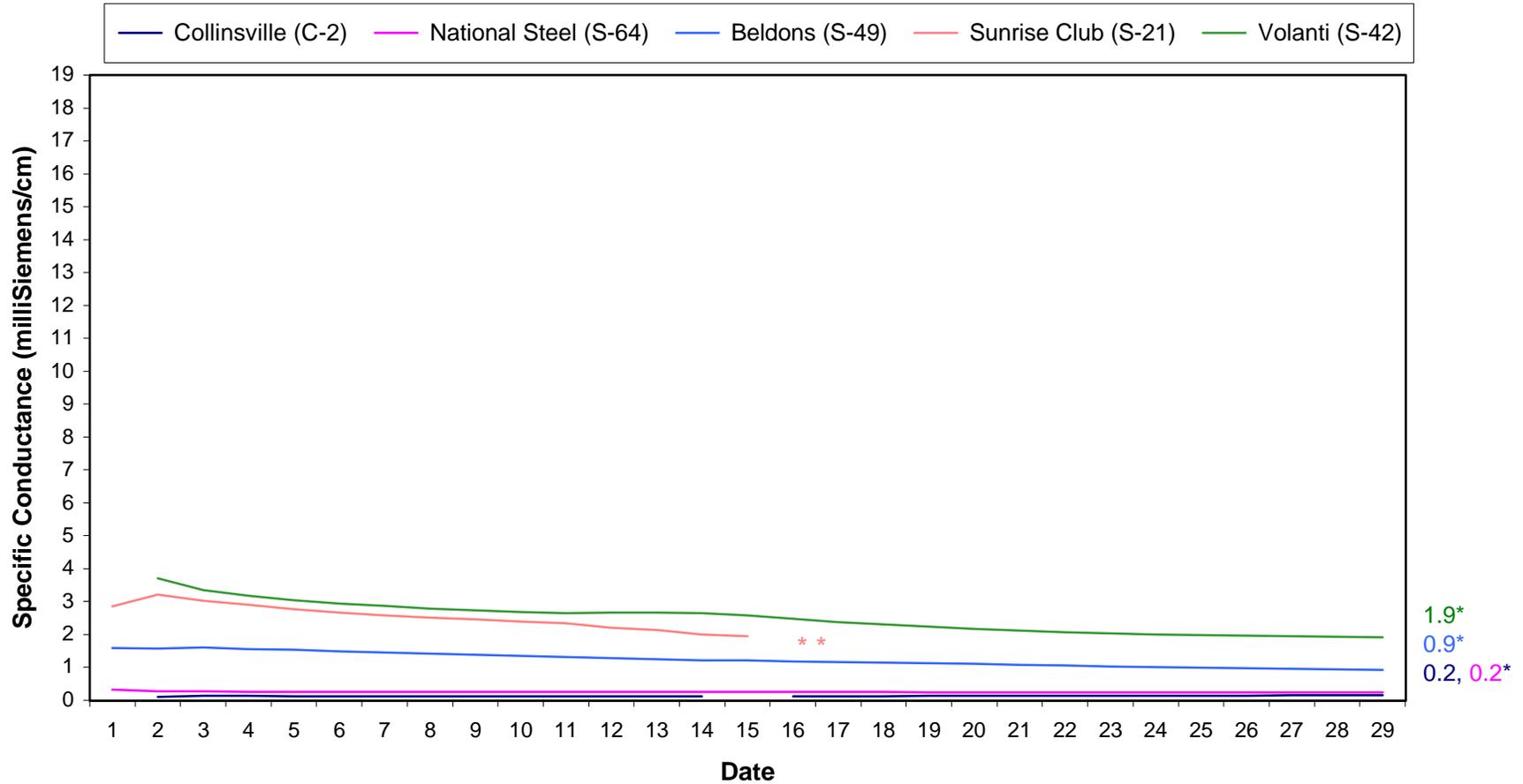
Station Name	Station ID	Specific Conductance (mS/cm)*	Standard (mS/cm)*
Collinsville	C-2	0.2	11.0
National Steel	S-64	0.8	11.0
Beldons Landing	S-49	1.8	11.0
Volanti	S-42	1.8	11.0
Sunrise Club	S-21	1.6	11.0

* = milliSiemens per centimeter.

** = because of equipment malfunction due to flooding.

**Figure 1. Suisun Marsh Calendar Month Progressive Mean
of the Specific Conductance at High Tide
February 2000**

Standard = 8.0 mS/cm

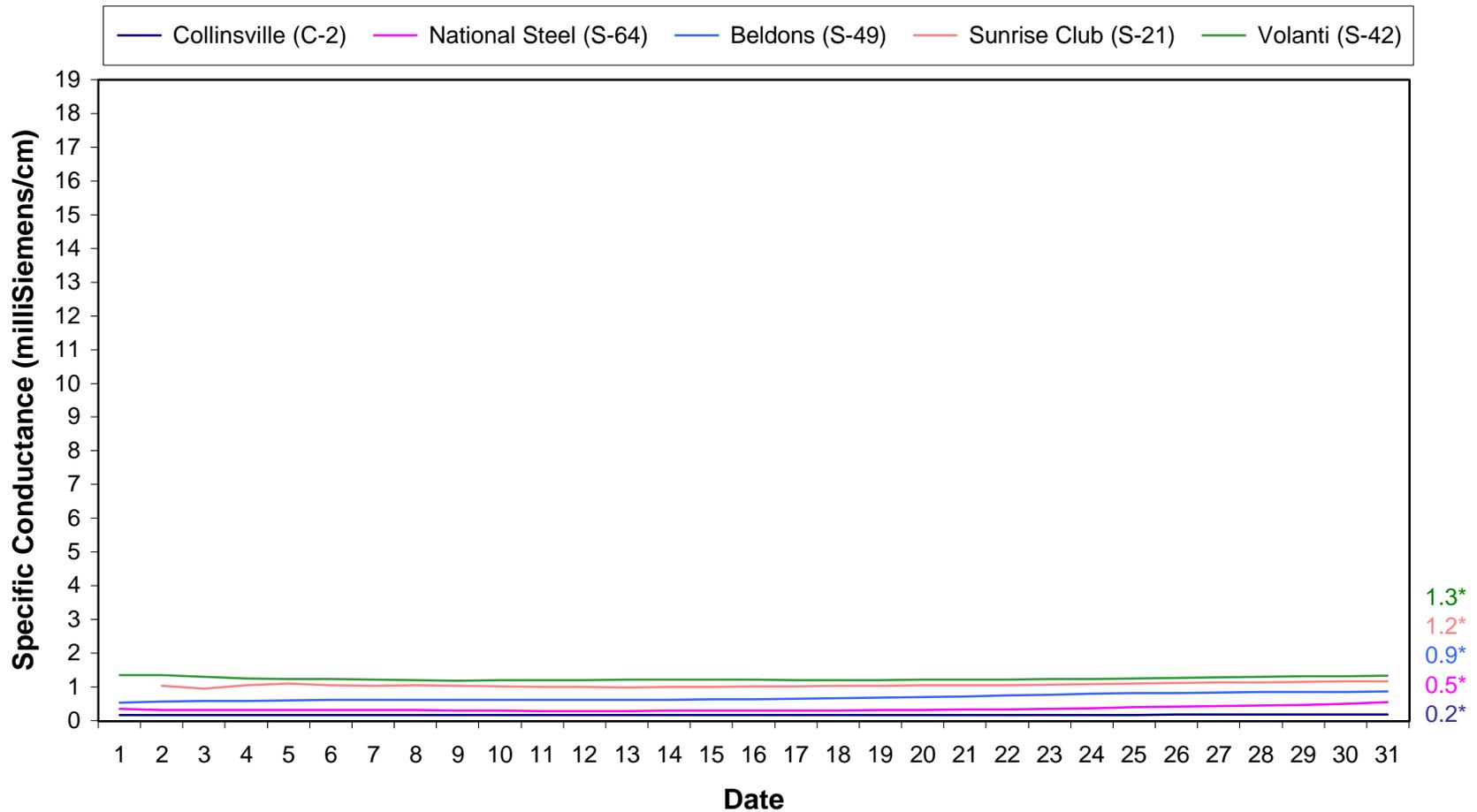


* = monthly mean specific electrical conductance at high tide in milliSiemens/cm.

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**Figure 2. Suisun Marsh Calendar Month Progressive Mean
of the Specific Conductance at High Tide
March 2000**

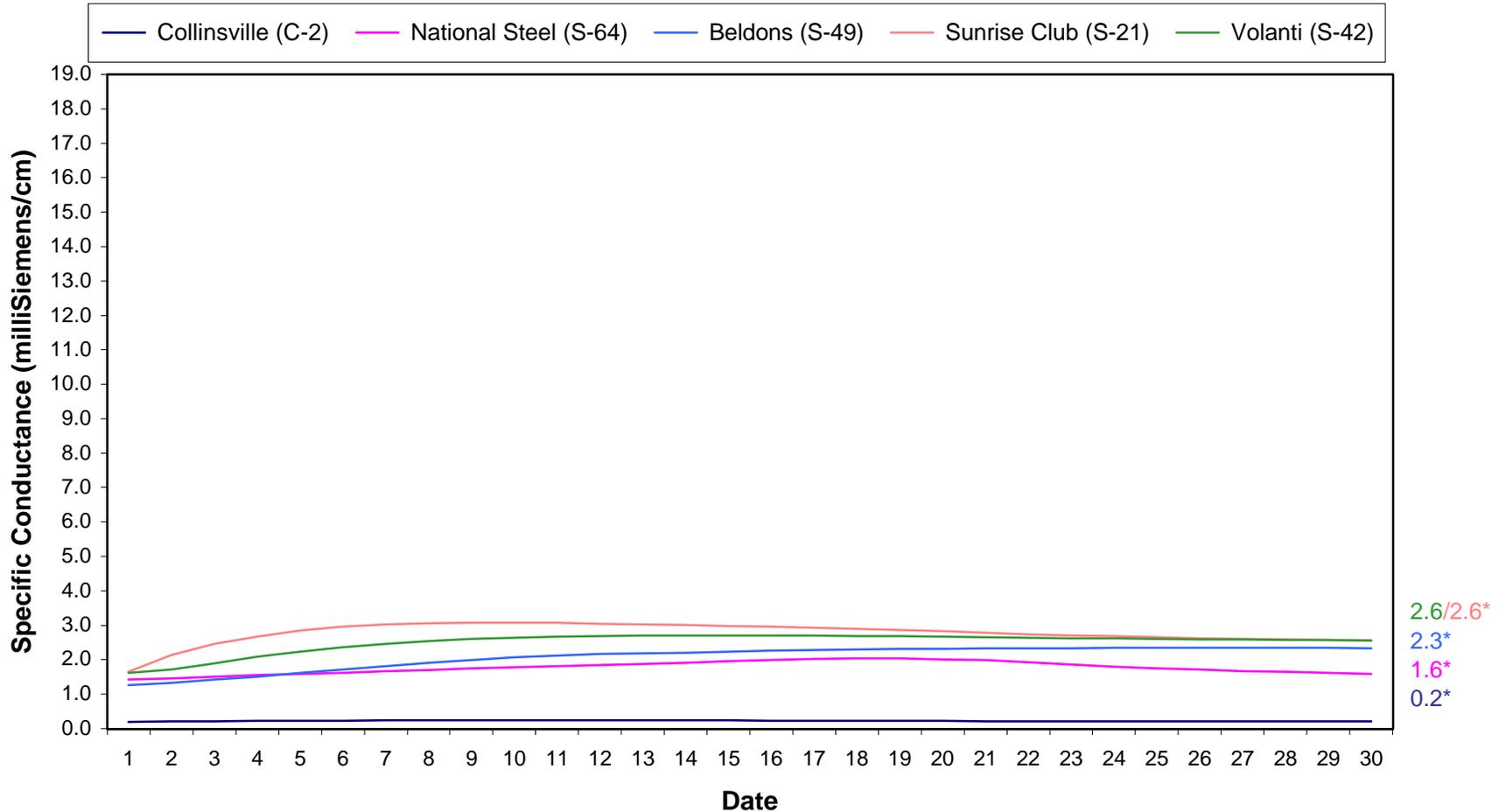
Standard = 8 mS/cm



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**Figure 3. Suisun Marsh Calendar Month Progressive Mean
of the Specific Conductance at High Tide
April 2000**

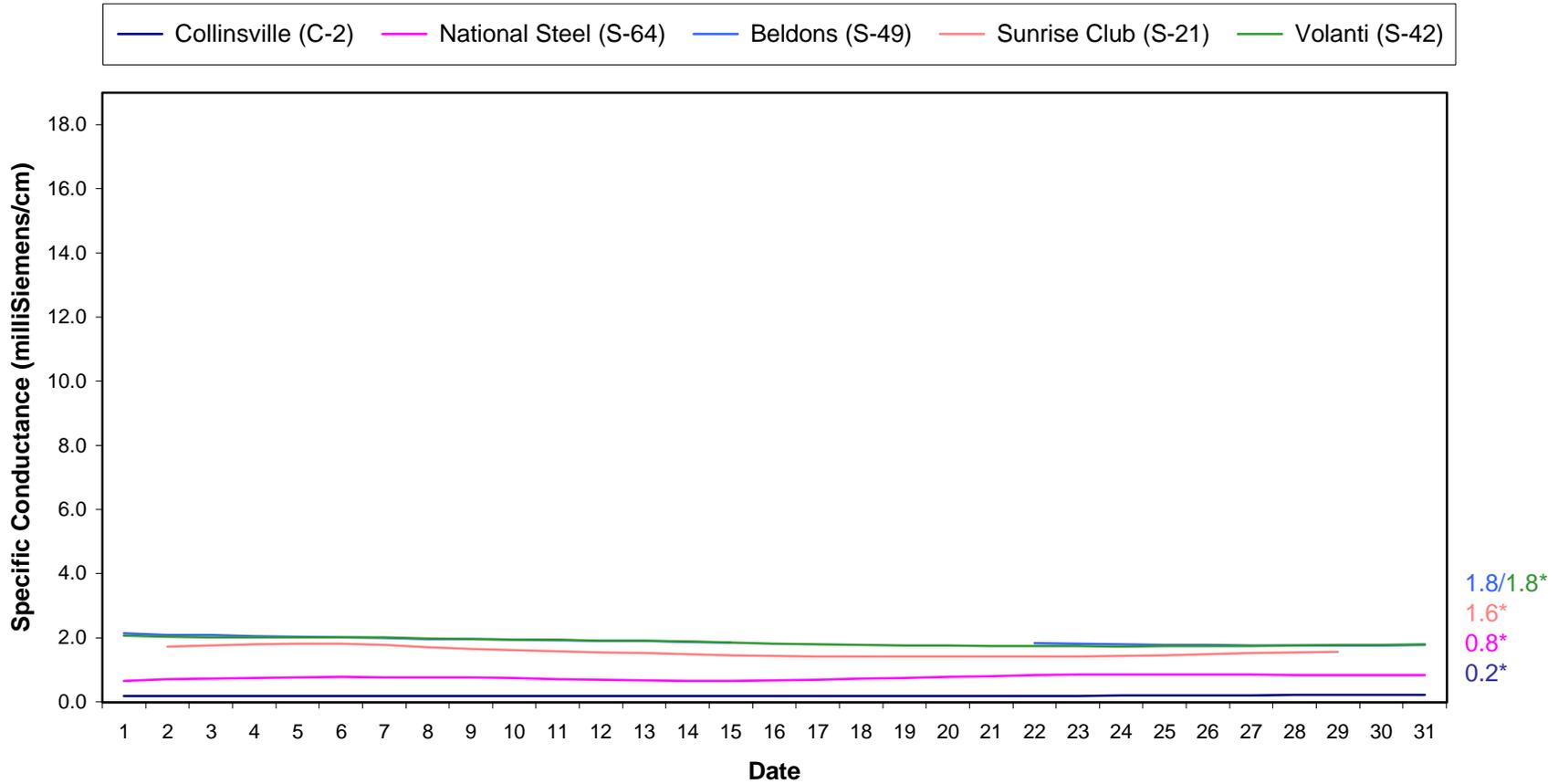
Standard = 11.0 mS/cm



* monthly mean specific electrical conductance at high tide in milliSiemens/cm.

**Figure 4. Suisun Marsh Calendar Month Progressive Mean
of the Specific Conductance at High Tide
May 2000**

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* monthly mean specific electrical conductance at high tide in milliSiemens.

**Figure 5. Net Delta Outflow Index
January through May 2000**

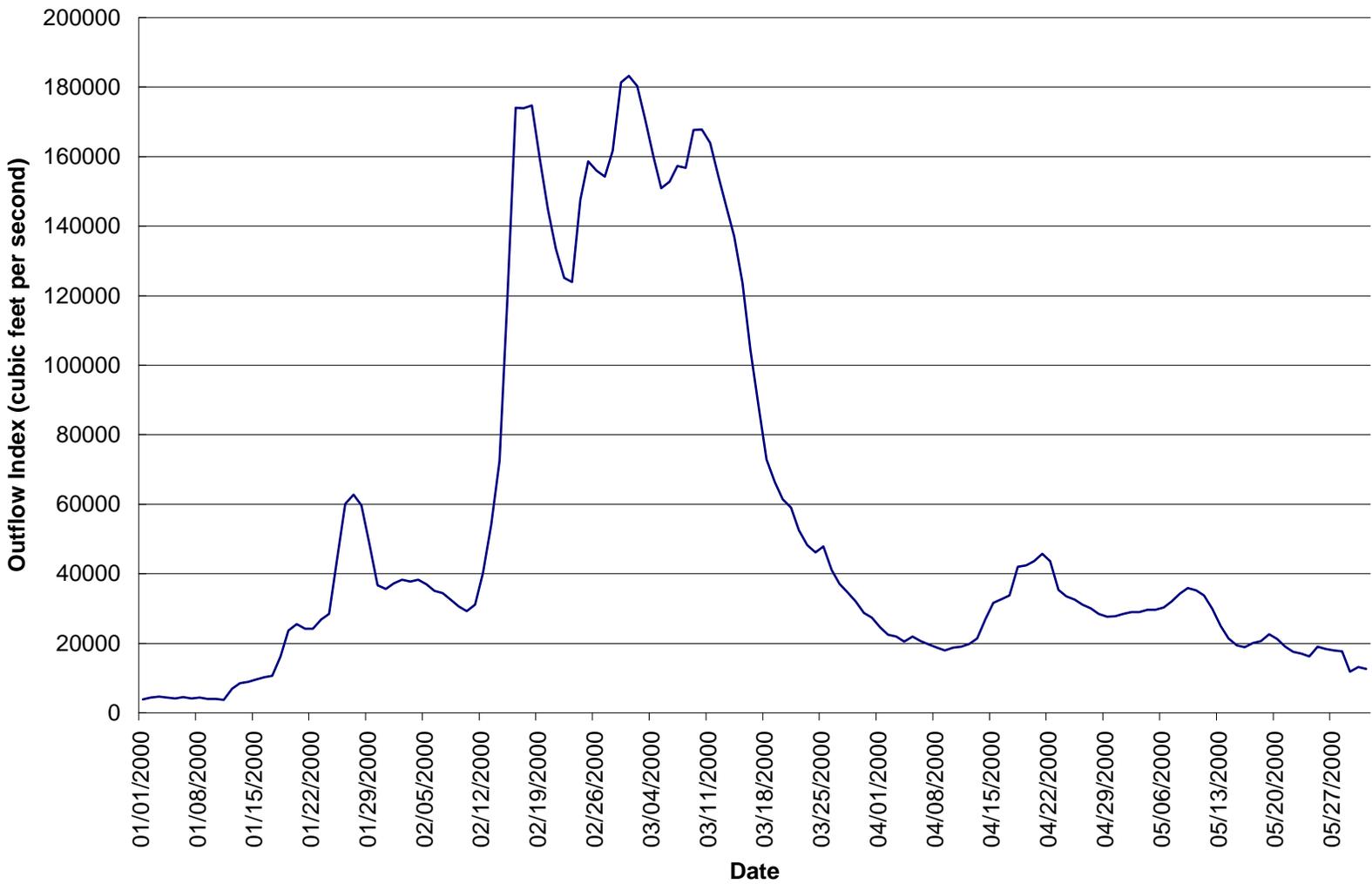
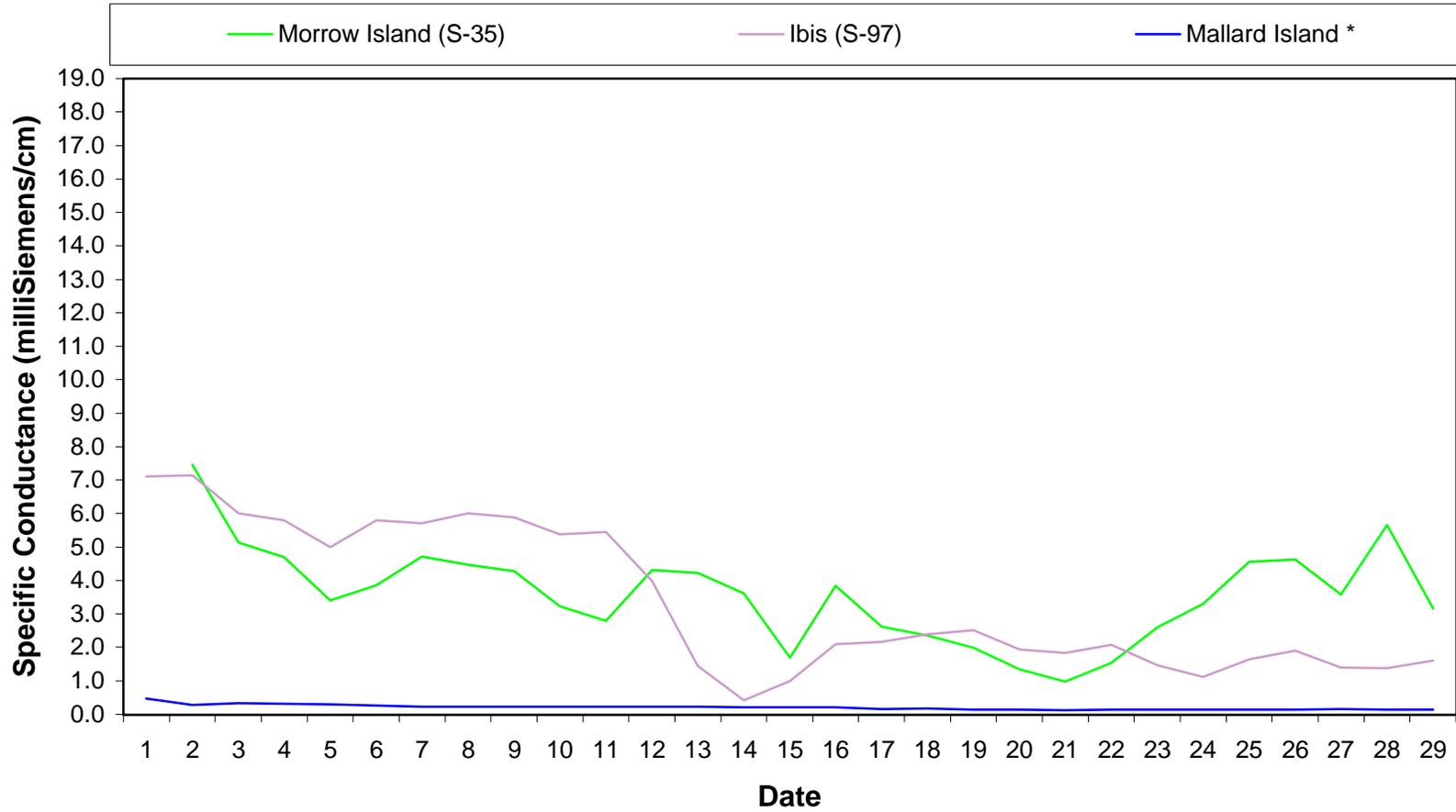
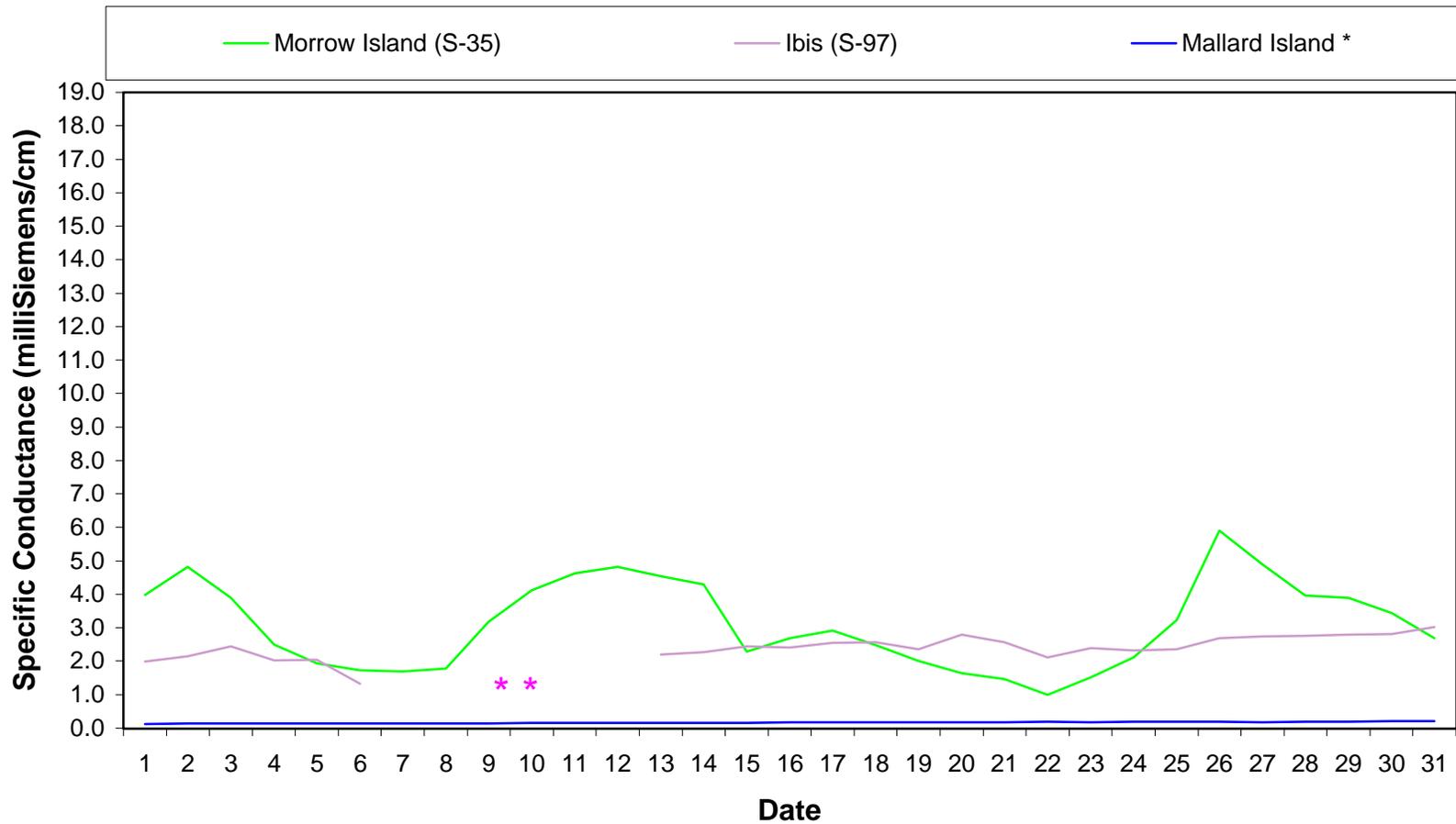


Figure 6. Suisun Marsh Mean Daily High Tide Specific Conductance at Monitoring Stations S-35, S-97 and Mallard Island February 2000



* = Mallard Island station data used to represent conditions at Chipps and VanSickle Islands.

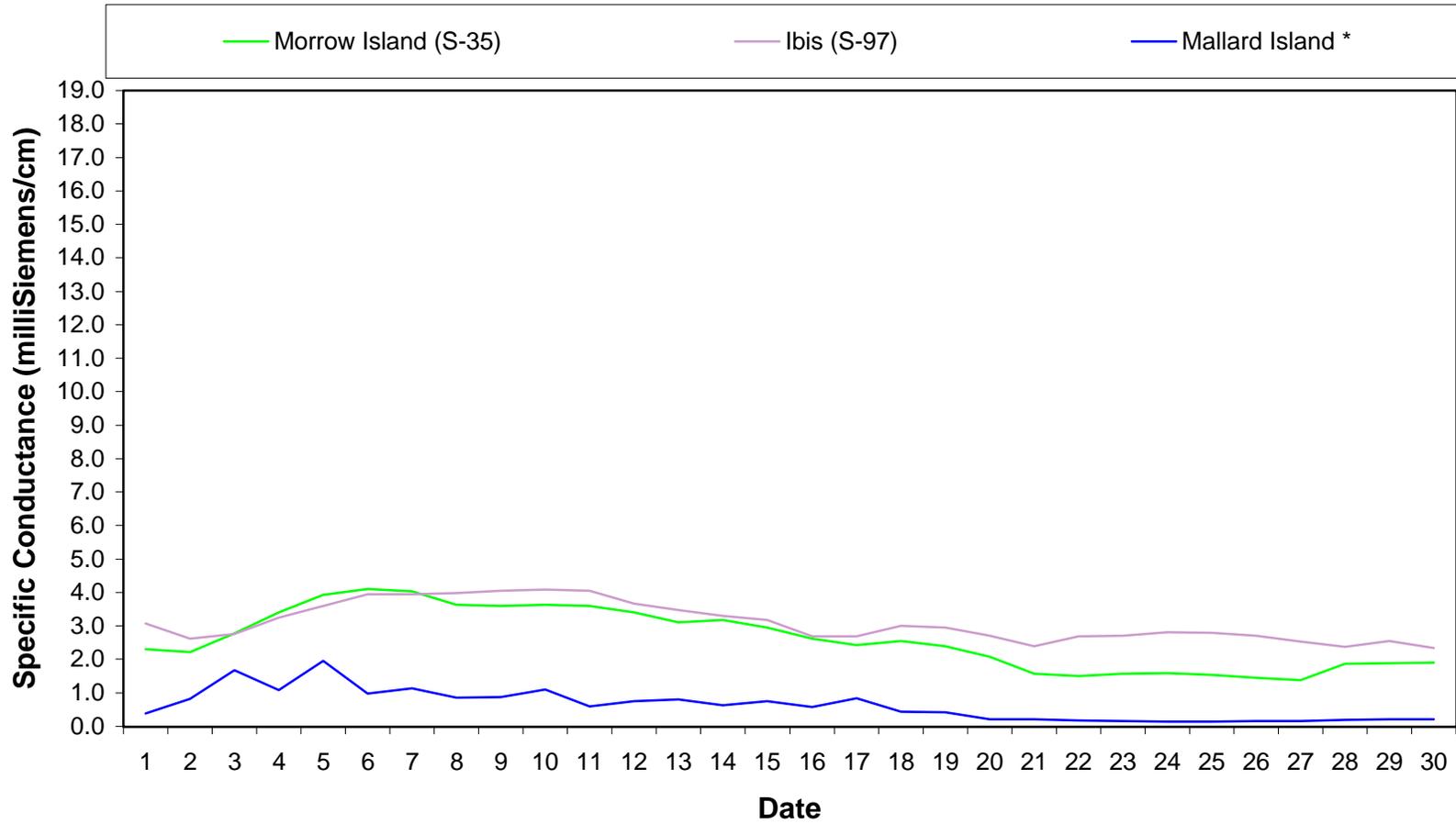
Figure 7. Suisun Marsh Daily Mean High Tide Specific Conductance at Monitoring Stations S-35, S-97 and Chipps & Van Sickle Islands March 2000



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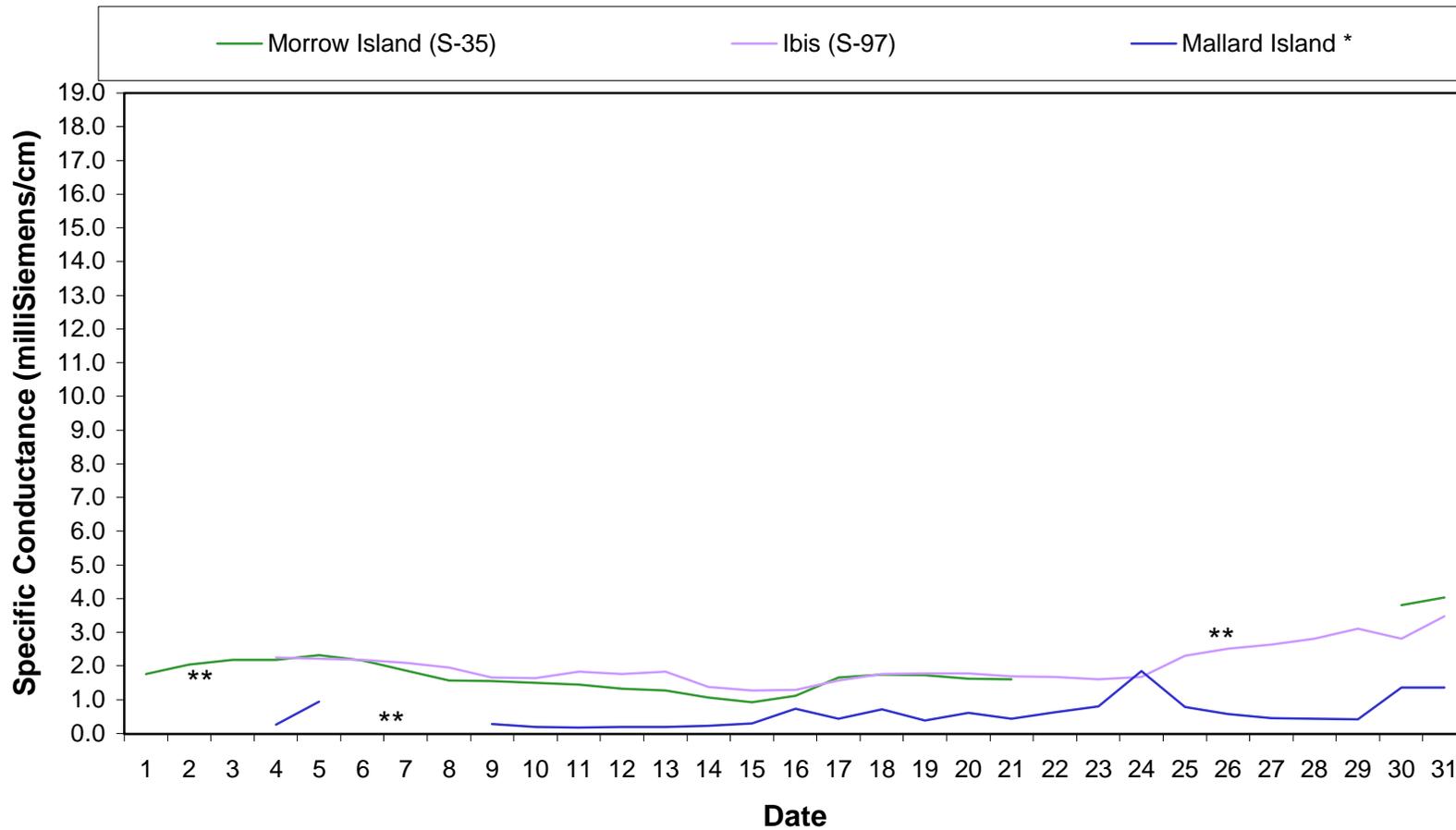
** = data not available.

Figure 8. Suisun Marsh Daily Mean High Tide Specific Conductance at Monitoring Stations S-35, S-97 and Mallard Island April 2000



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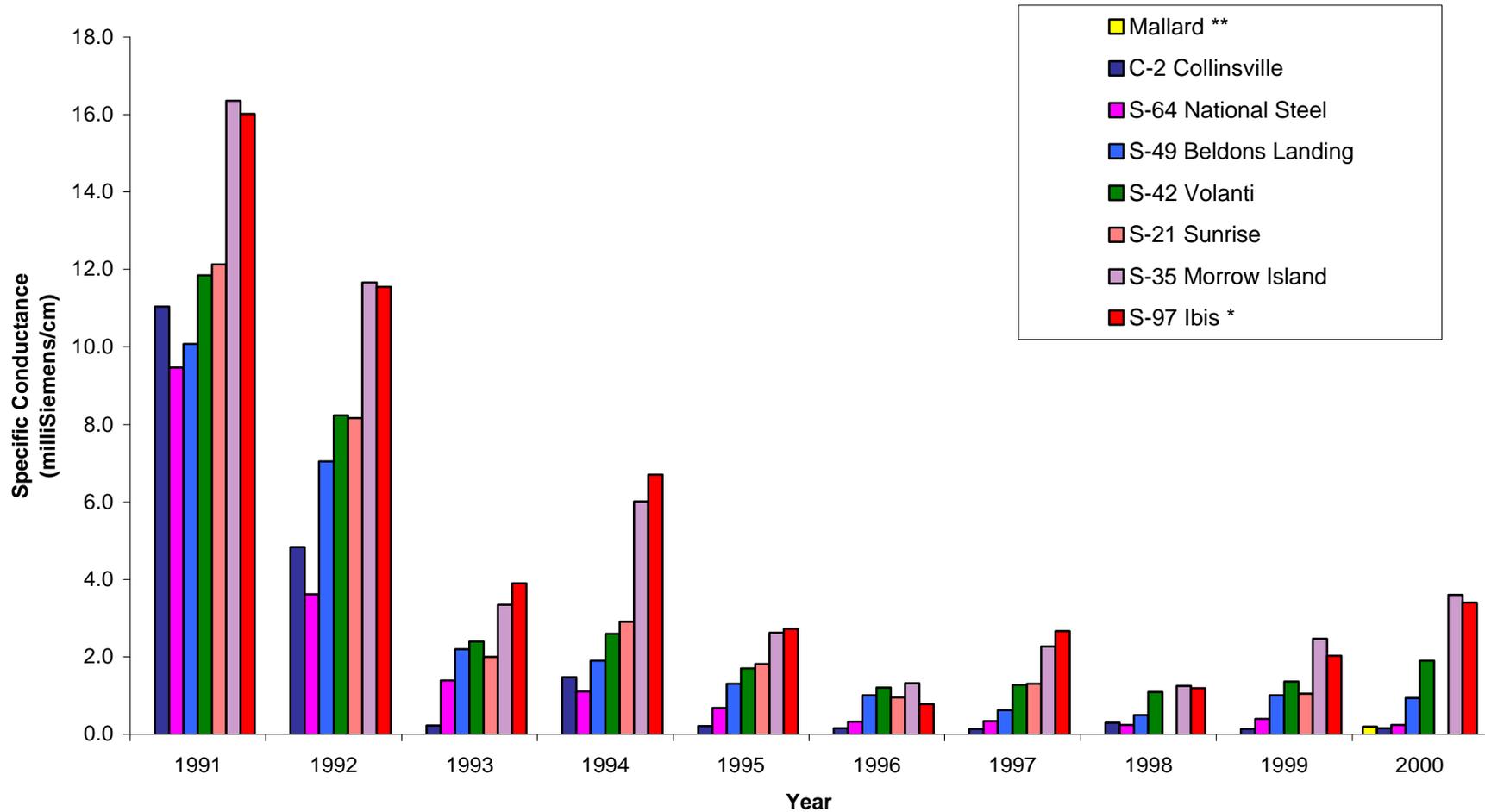
**Figure 9. Suisun Marsh Daily Mean High Tide Specific Conductance
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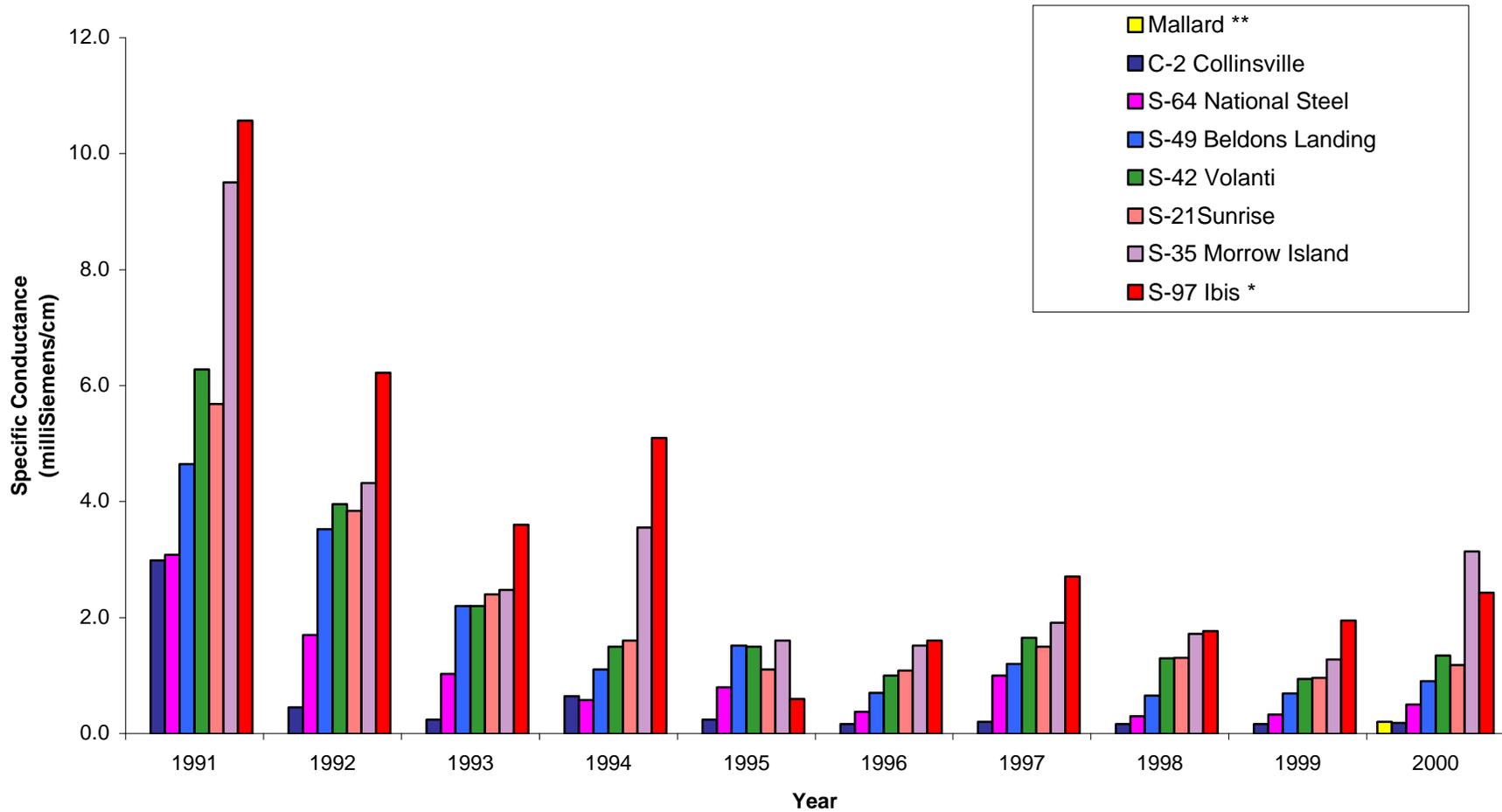
**Figure 10. Monthly Mean Values of Specific Conductance
at High Tide for Selected Suisun Marsh Compliance and Monitoring Stations
during February of 1991-2000**



* = Stage data from S-33 has been used to determine the time of high tide salinity at S-97 since mid October 1999 .

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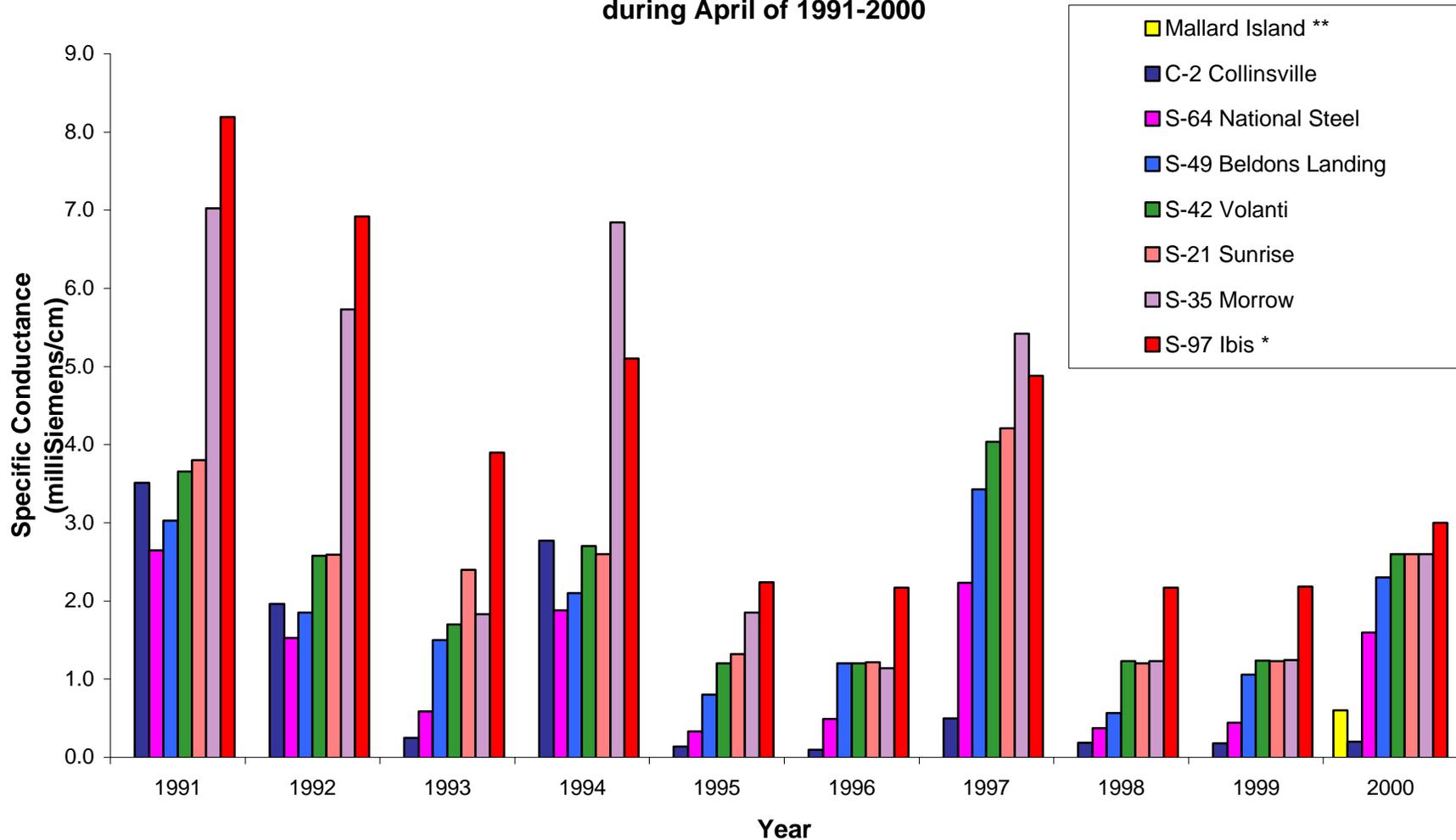
Figure 11. Monthly Mean Values of Specific Conductance at High Tide for Selected Suisun Marsh Compliance and Monitoring Stations during March of 1991-2000



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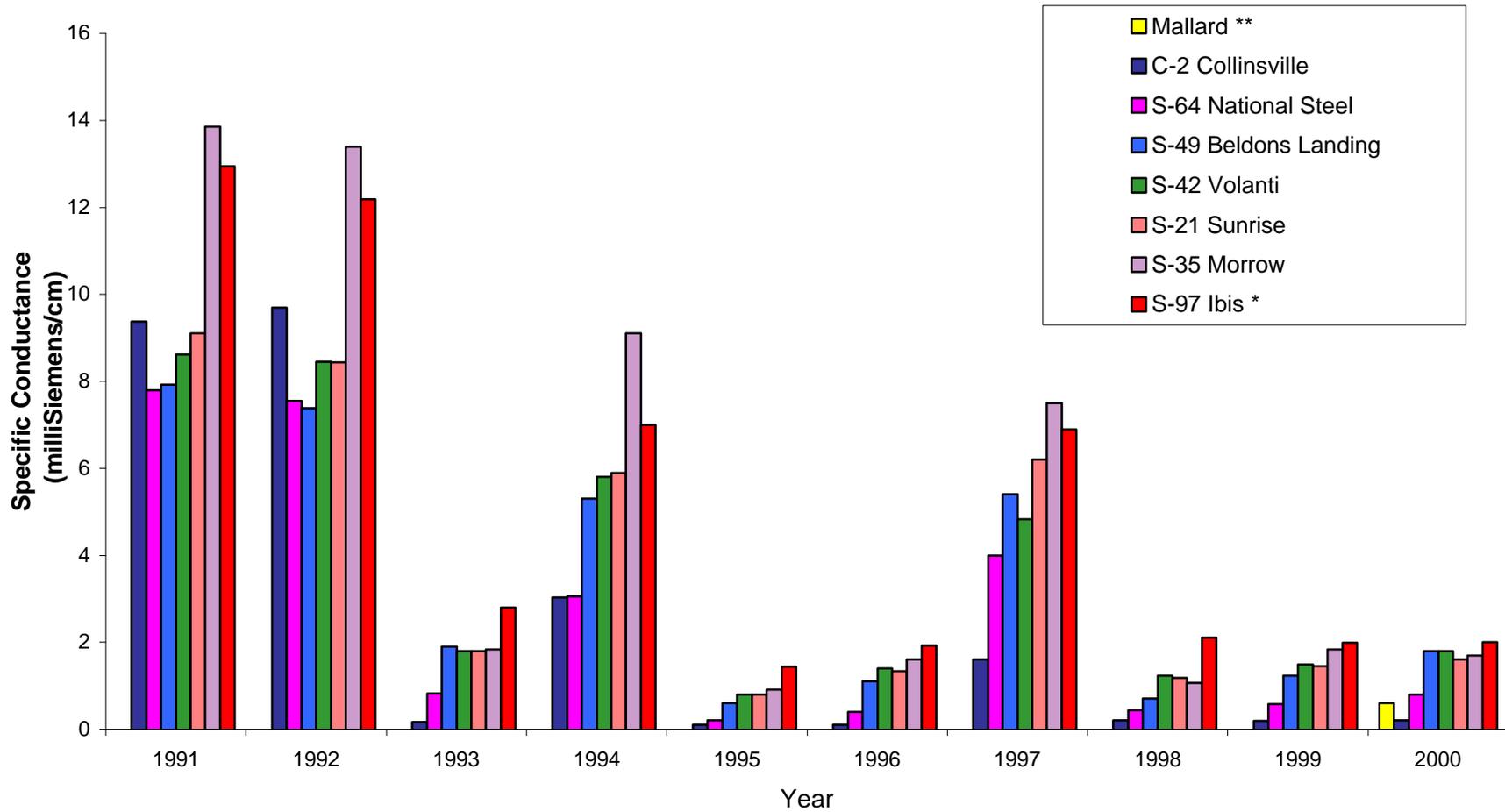
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Figure 14. Suisun Marsh compliance and other monitoring stations. Compliance station names are indicated in green lettering.

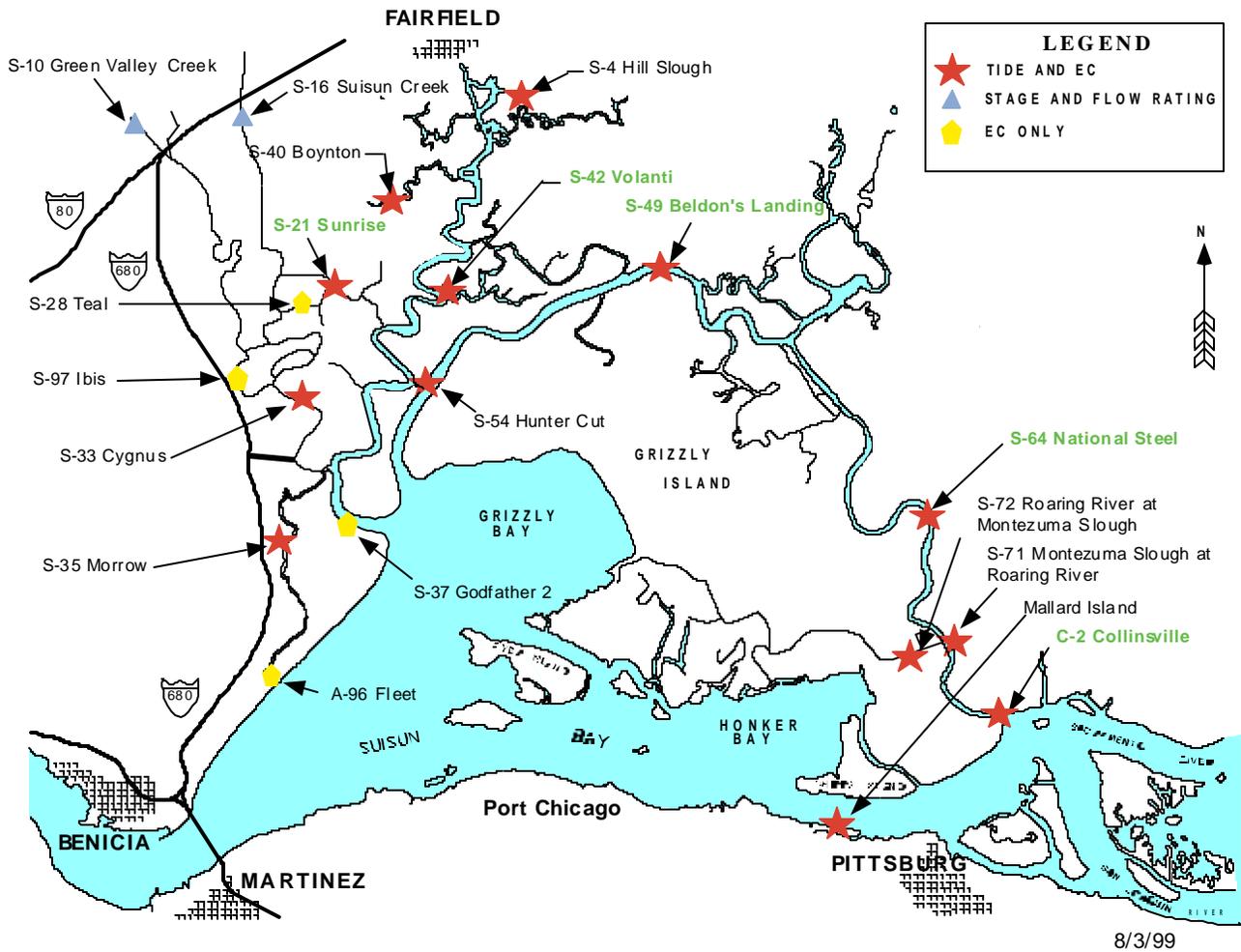


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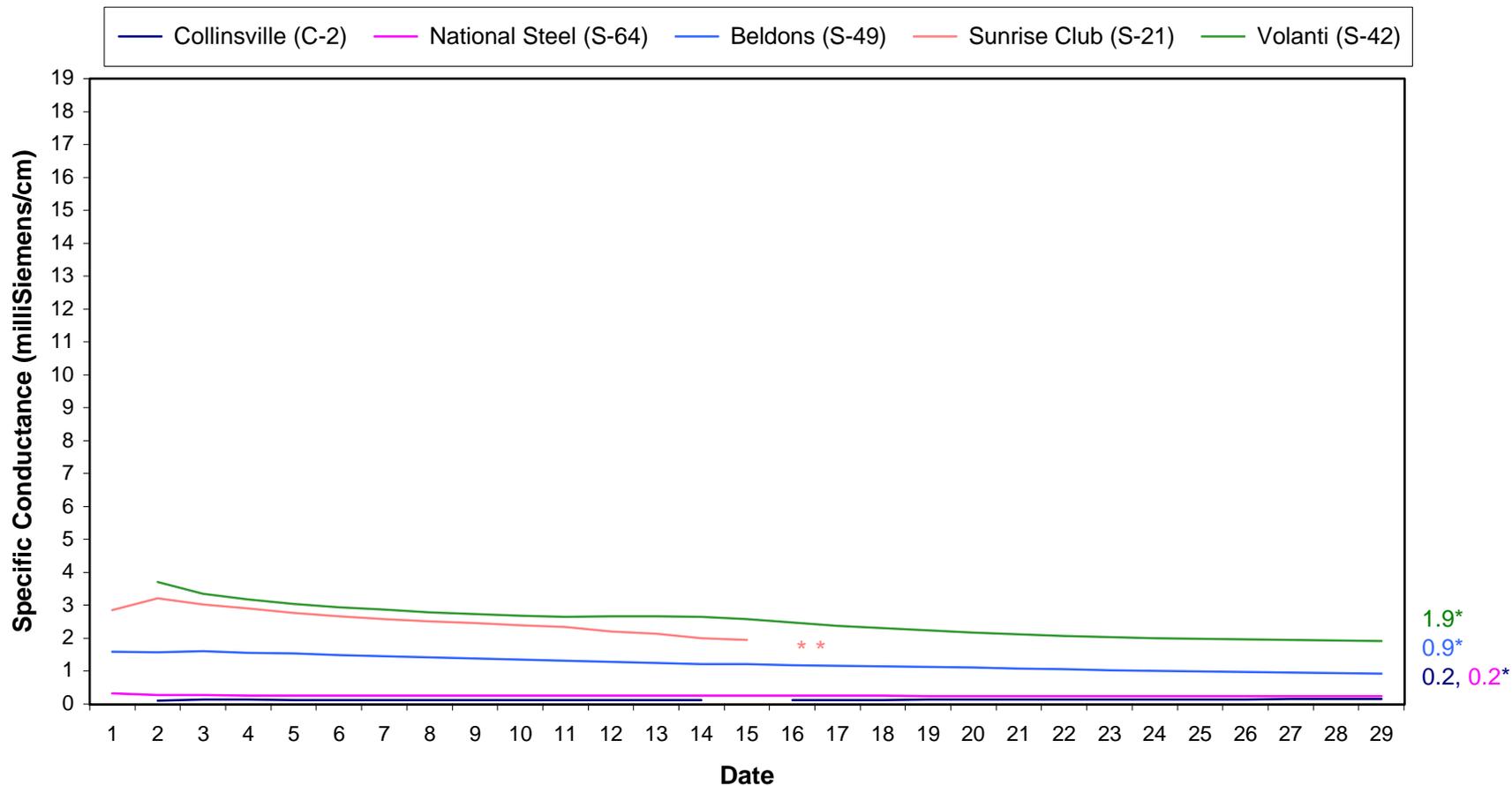
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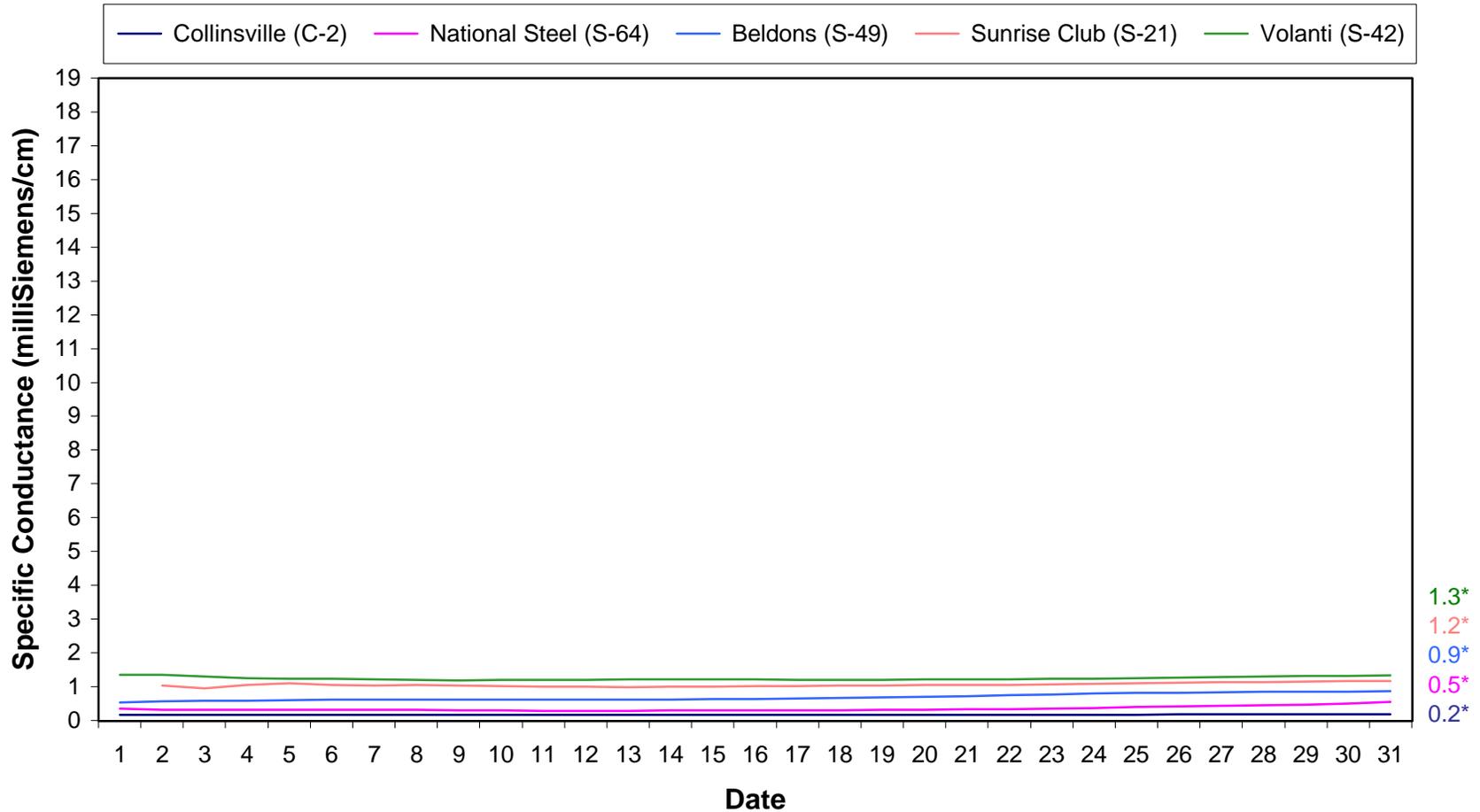


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**Figure 2. Suisun Marsh Calendar Month Progressive Mean
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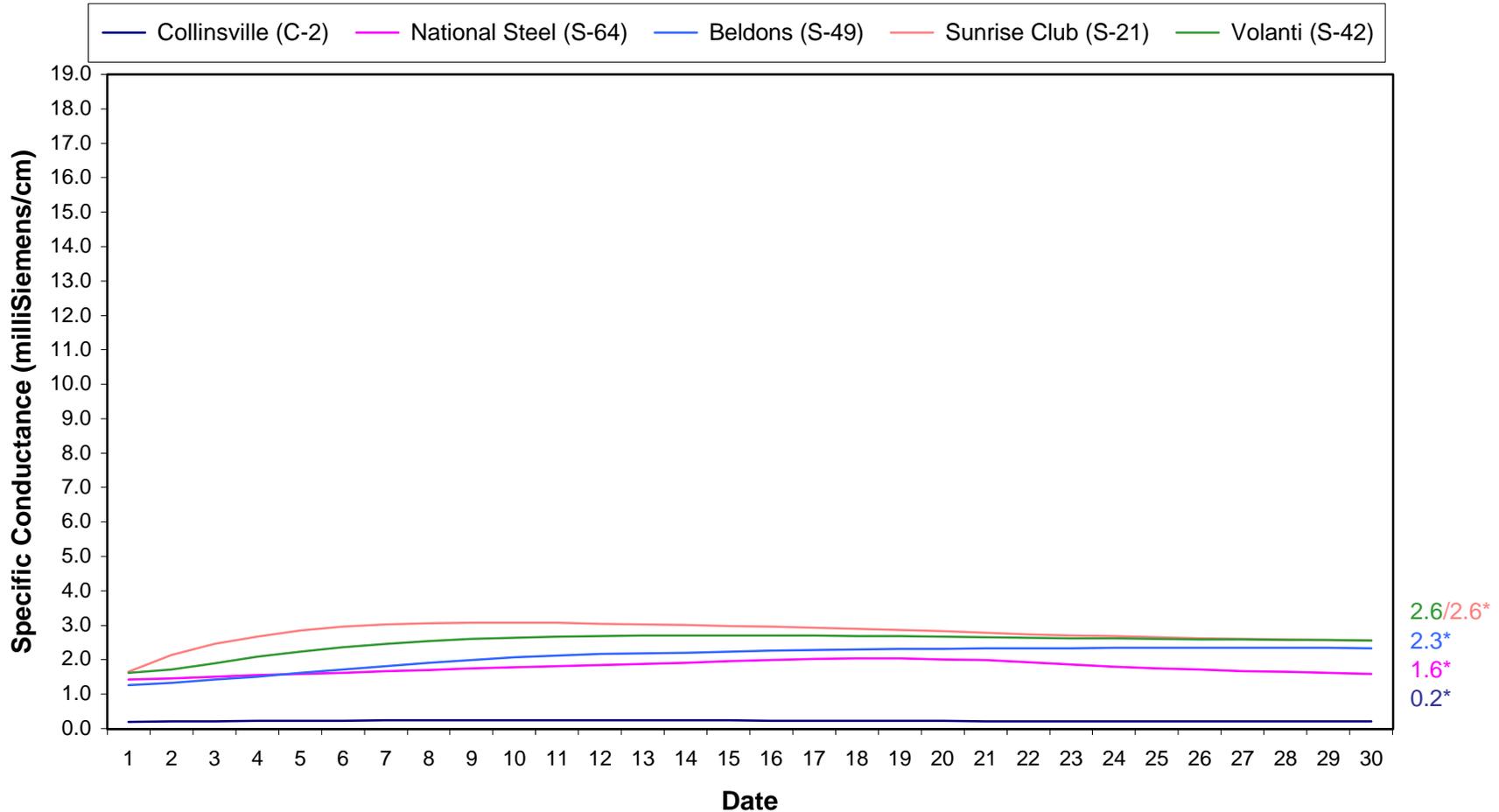
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**Figure 3. Suisun Marsh Calendar Month Progressive Mean
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April 2000**

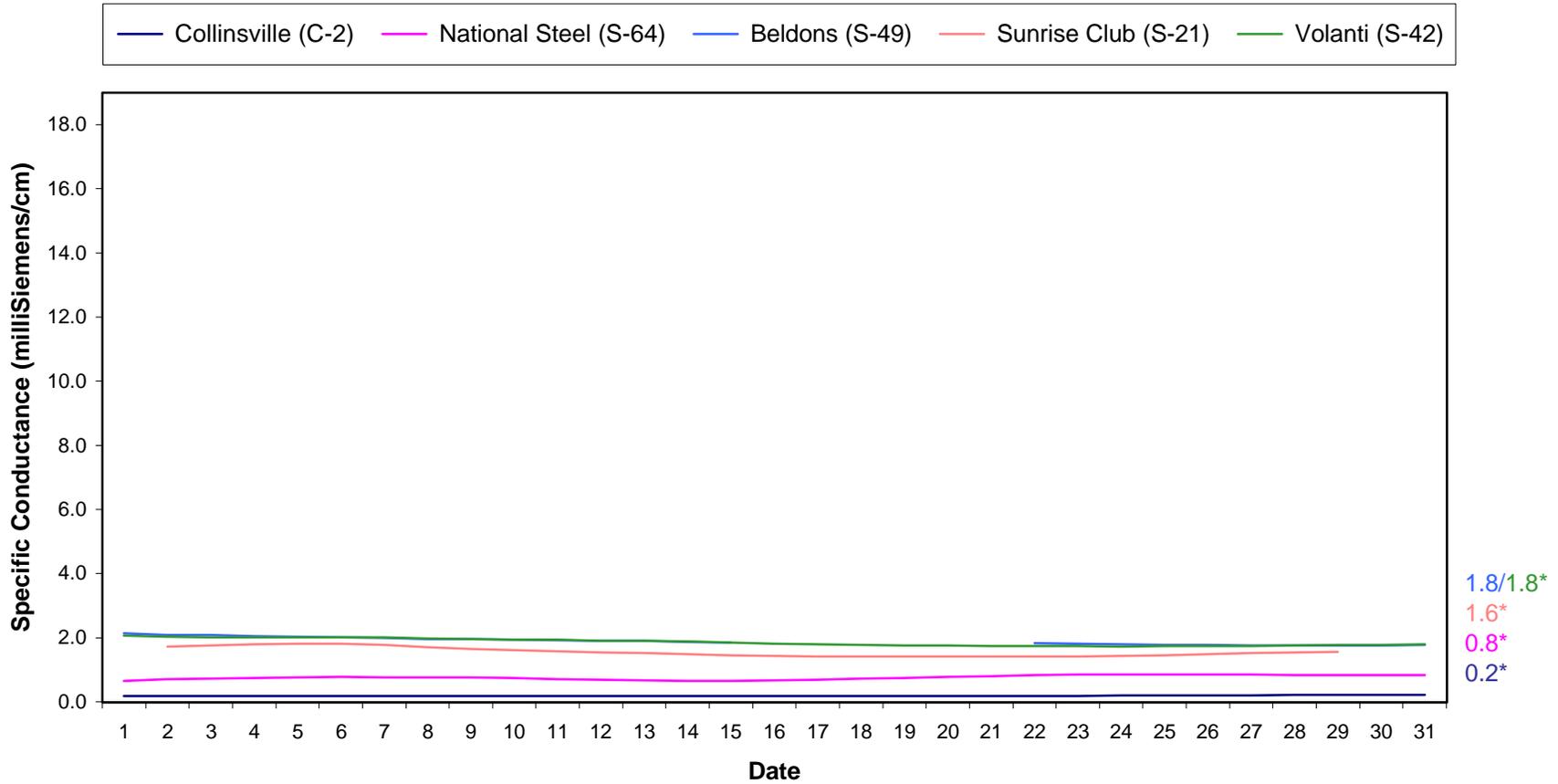
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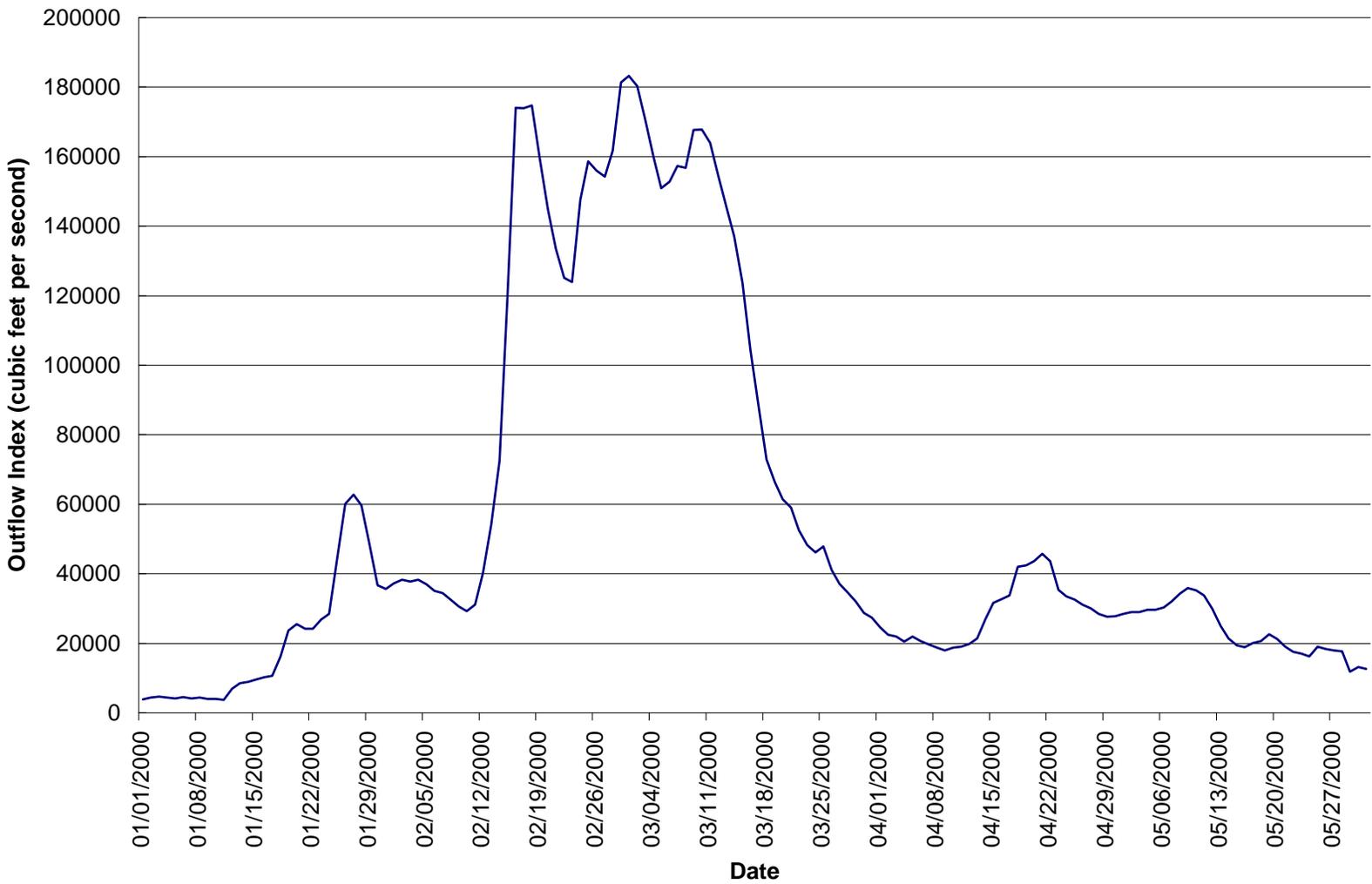
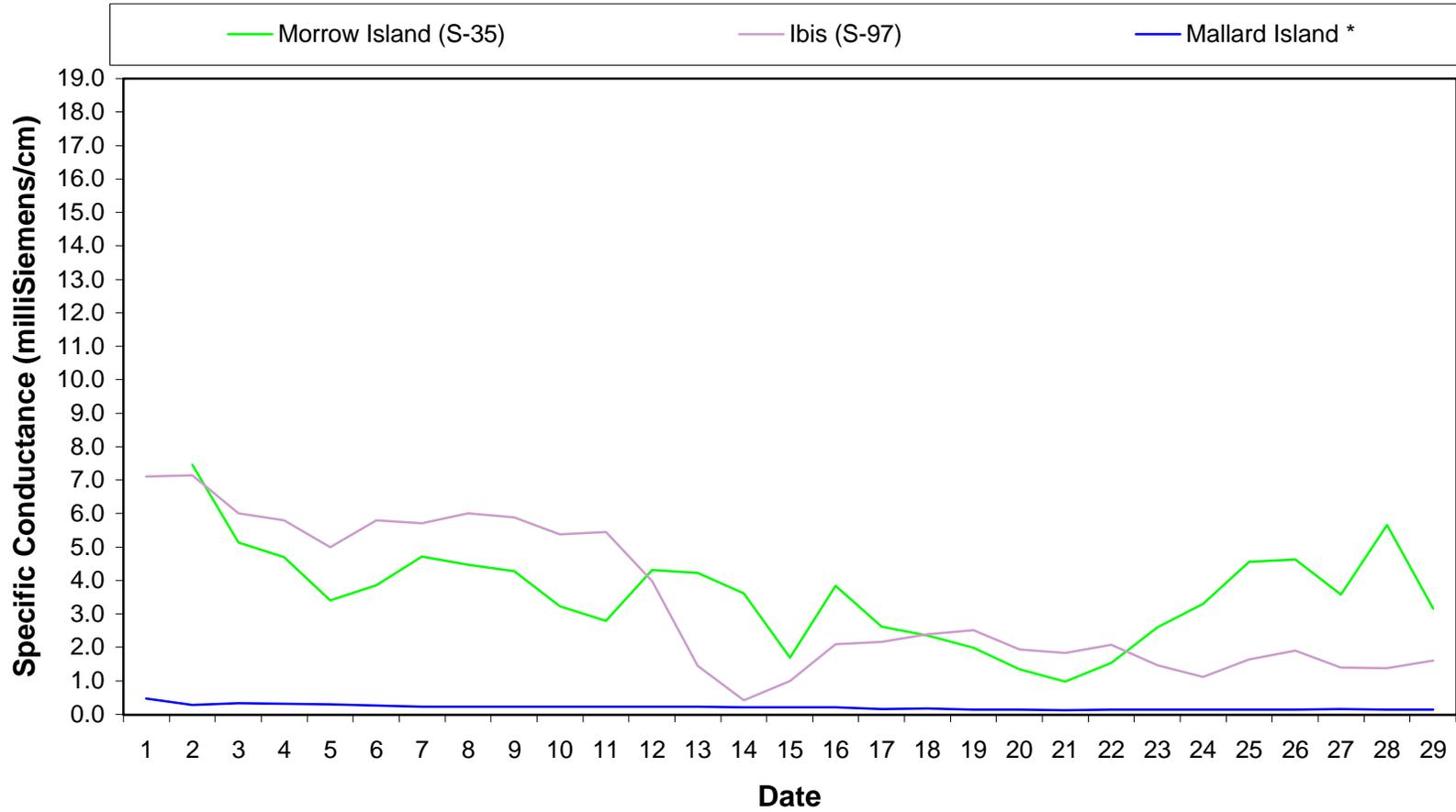
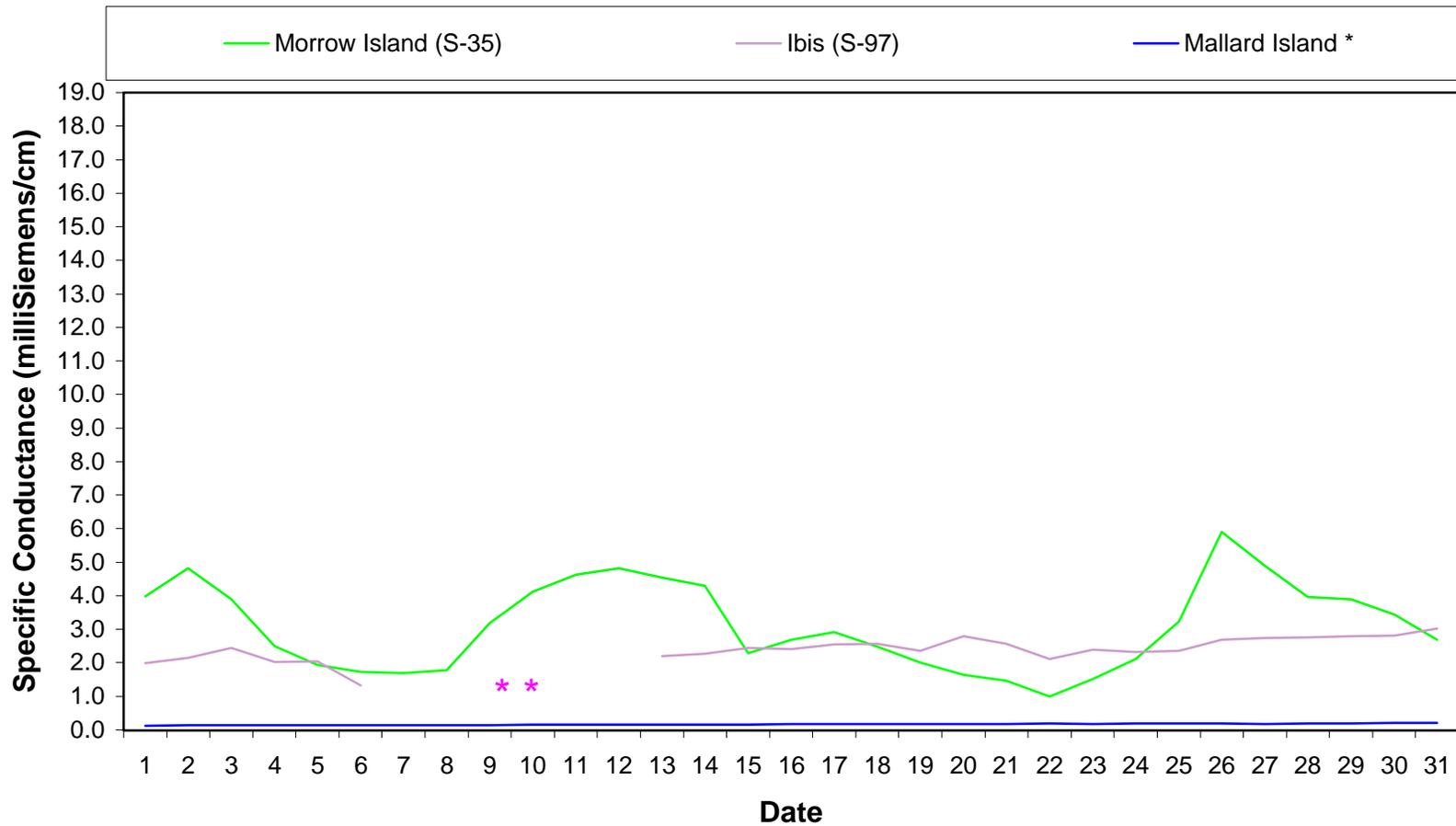


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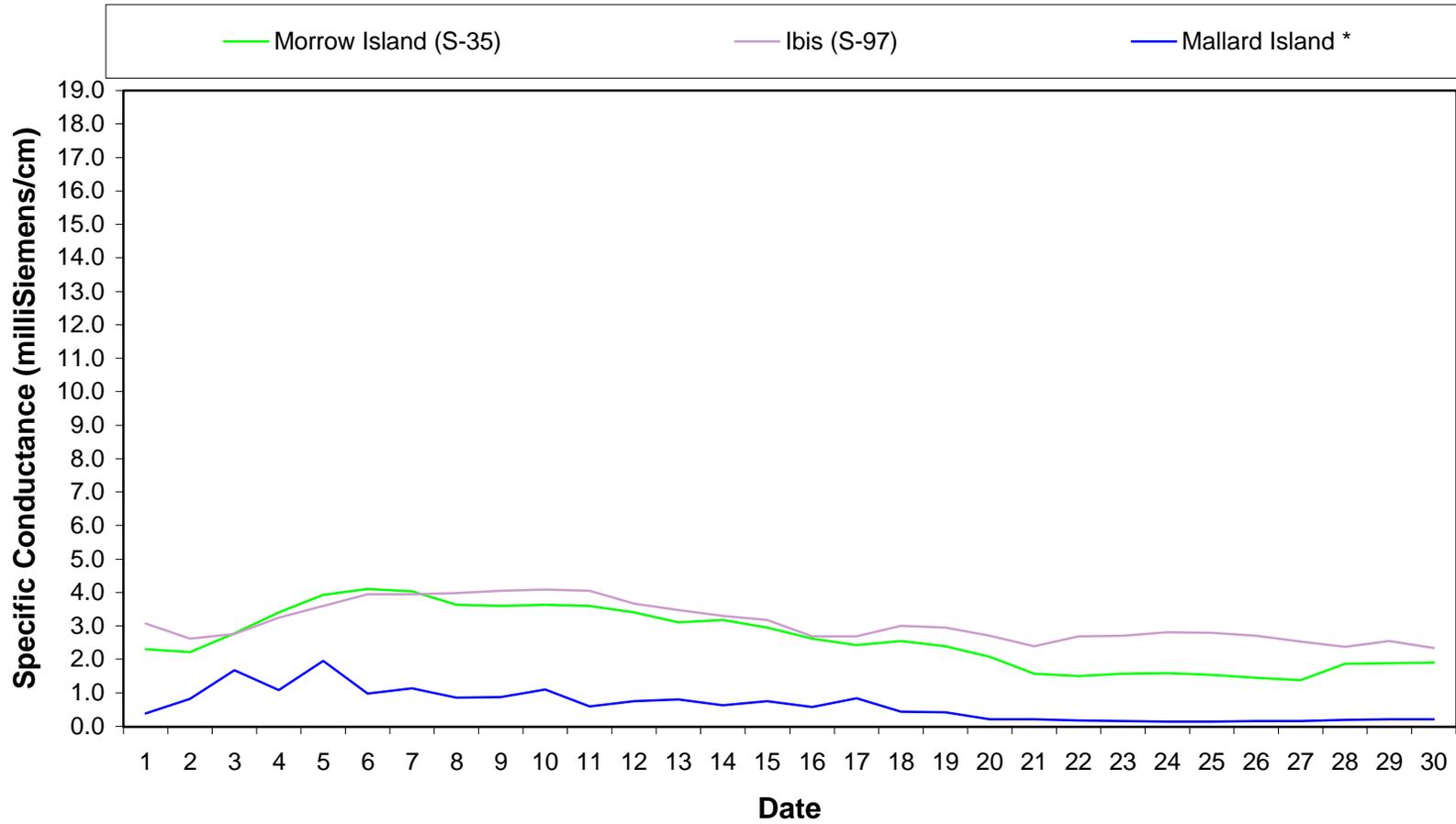
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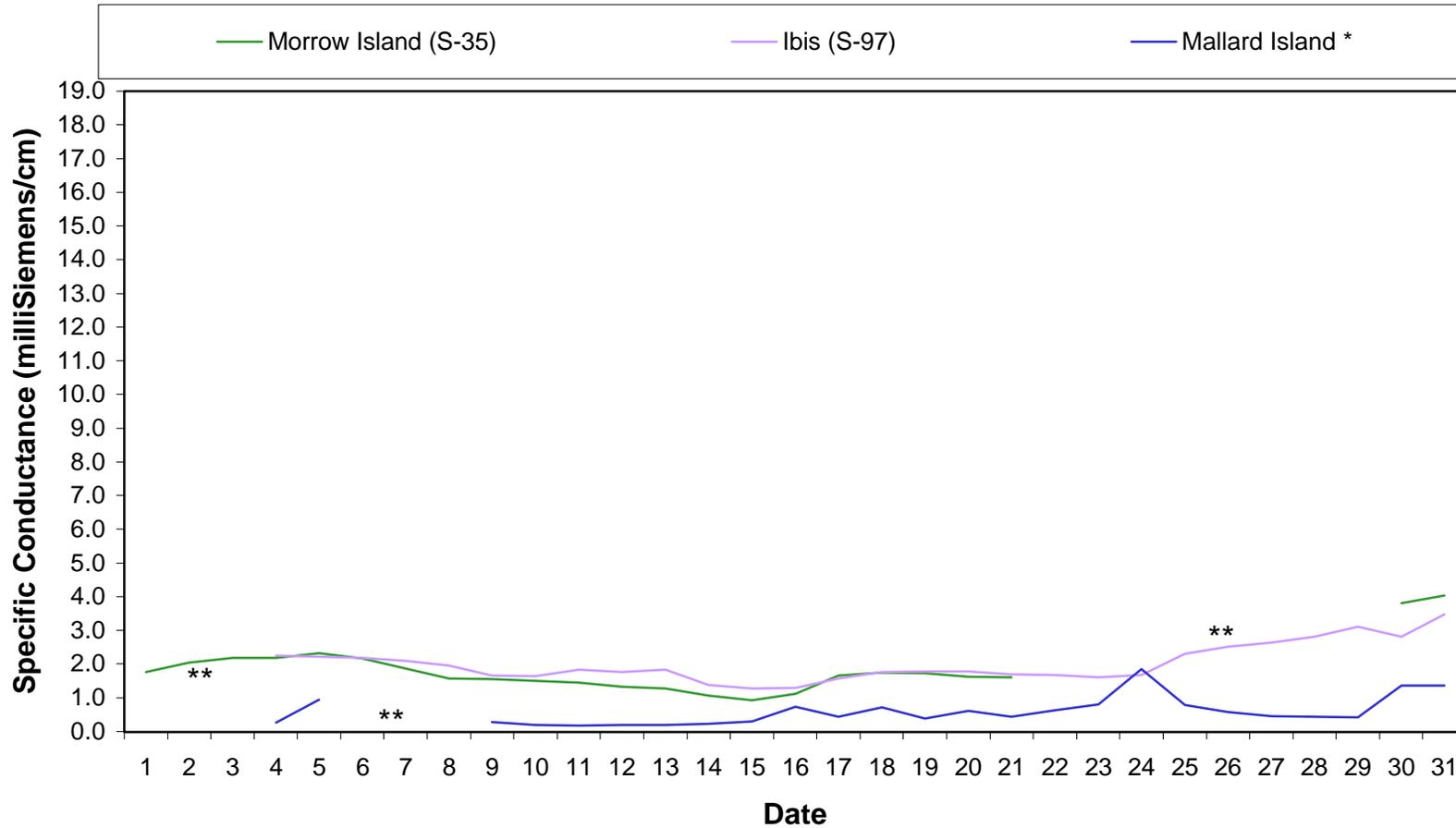
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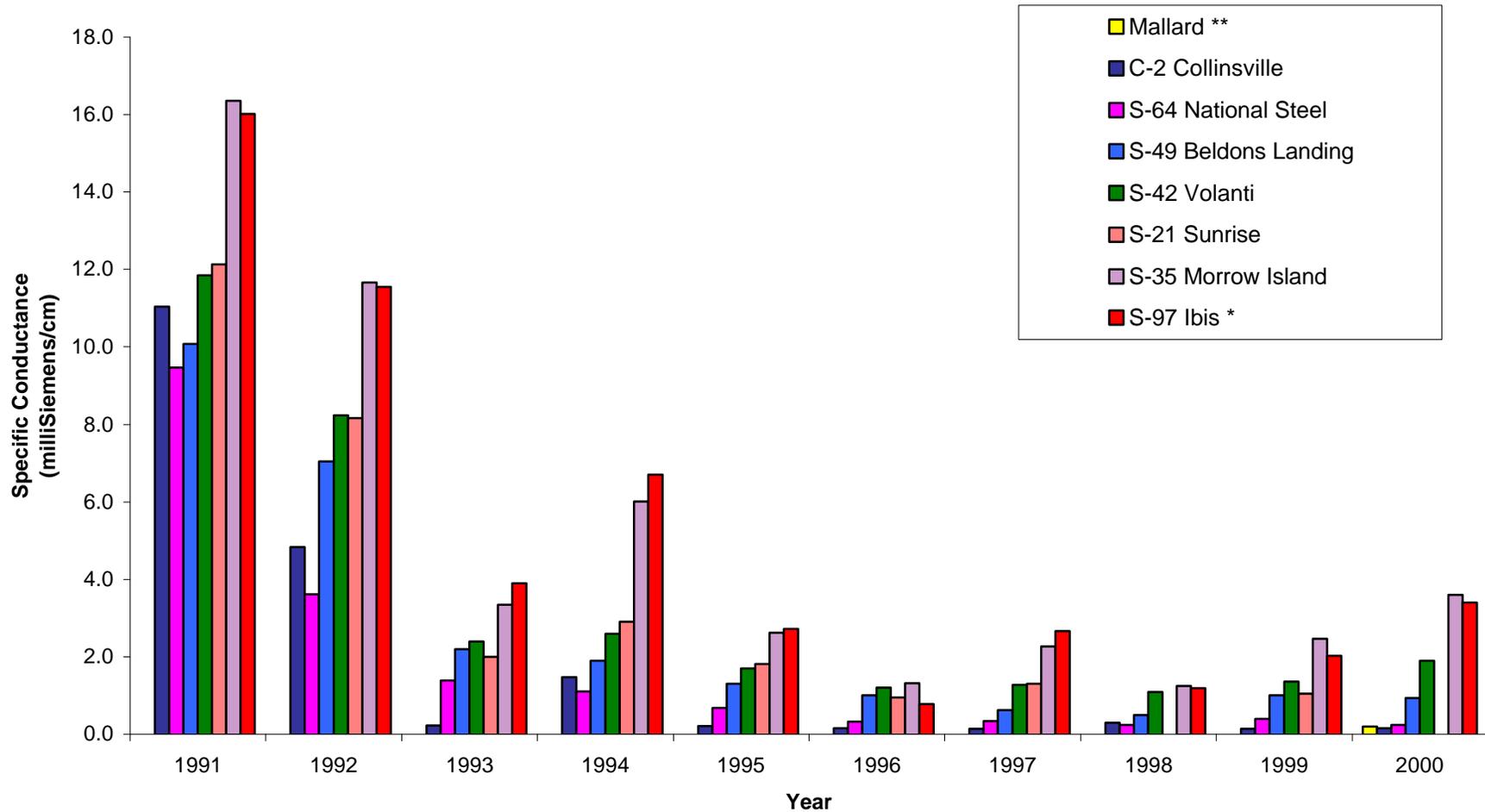
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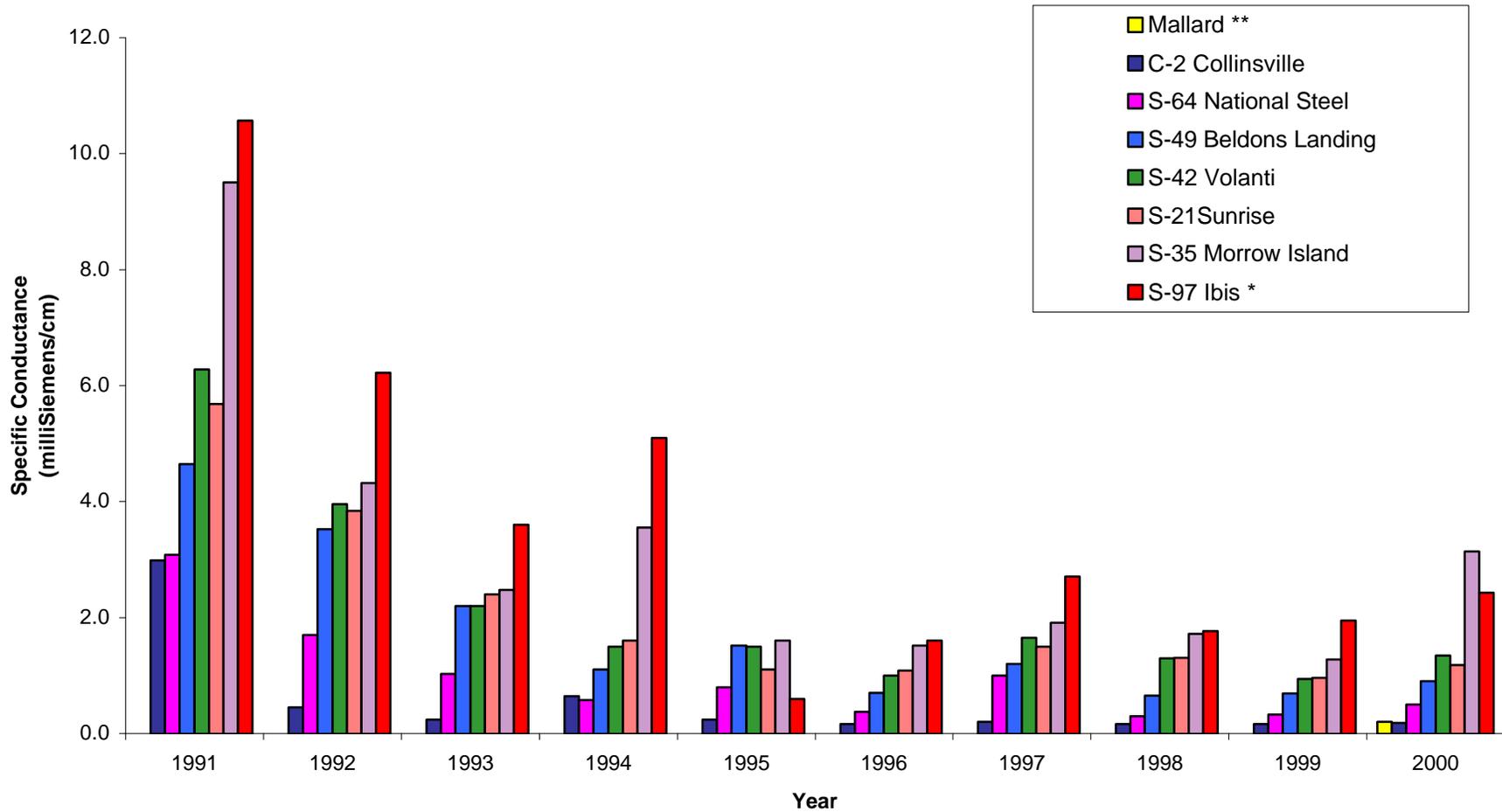
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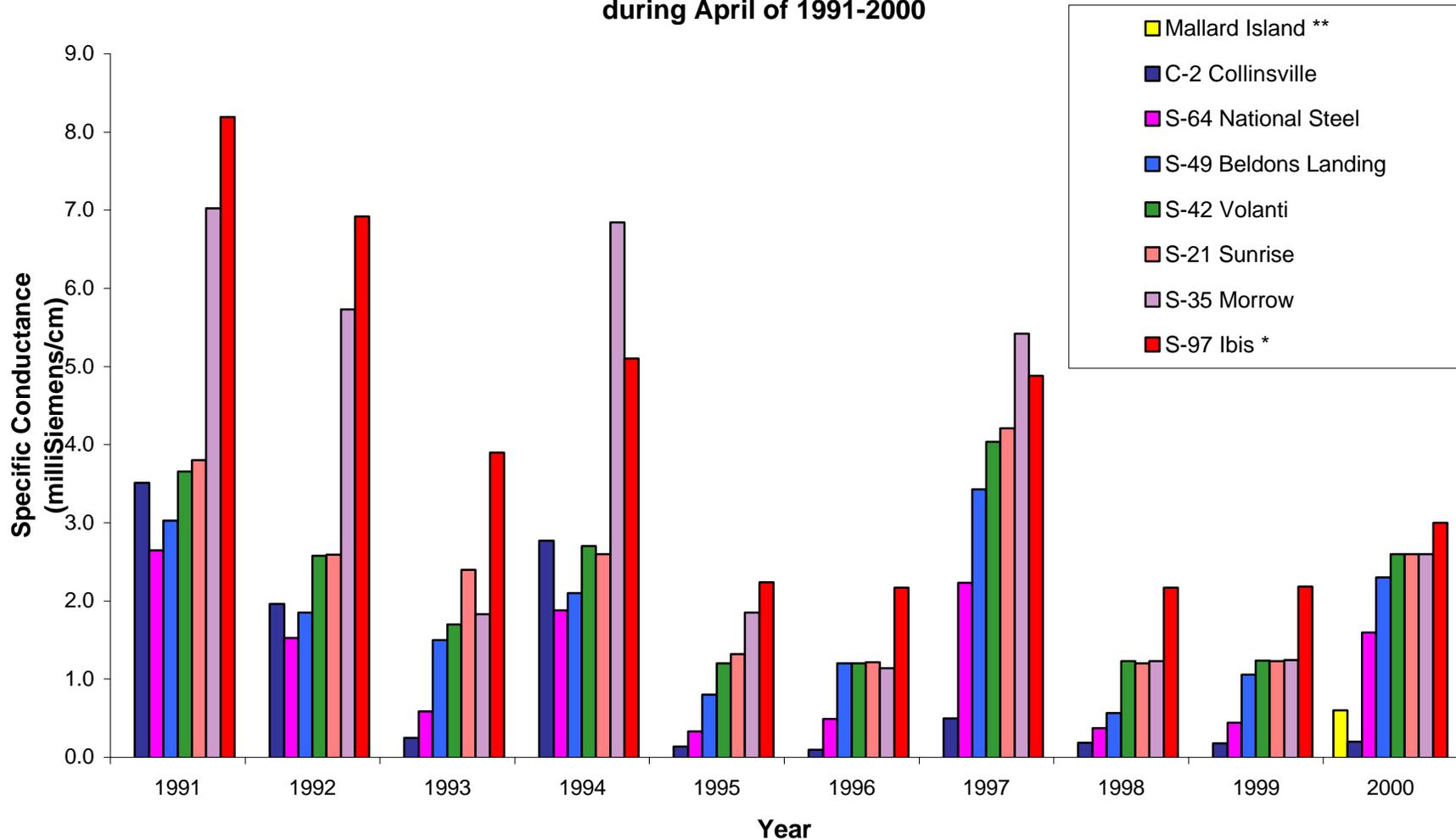
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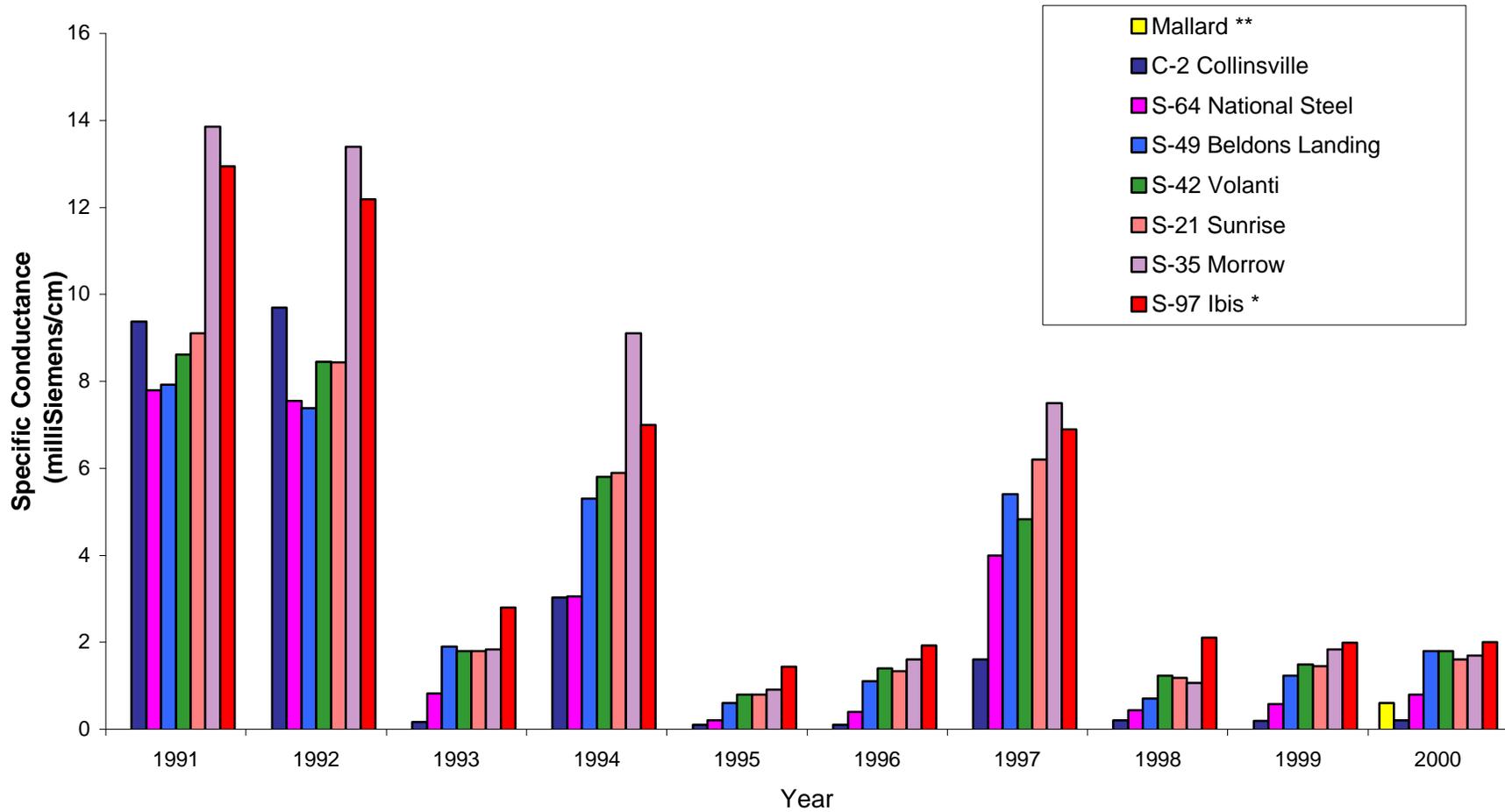
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