

Particulate Organic Carbon Scarcity Exacerbates Vulnerability of the Sacramento-San Joaquin Delta Ecosystem Electronic Supplemental Material

Madison A. Mathers*, Brian A. Bergamaschi , Peter J. Hernes

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*Corresponding author: Madison Mathers (madisonmathers@gmail.com)

Department of Land, Air, and Water Resources, University of California, Davis, Davis, CA,
United States

California Water Science Center, U.S. Geological Survey, Sacramento, CA, United States

Corresponding author: Madison Mathers (madisonmathers@gmail.com)

Online Resource 1. Station names and locations with latitudes and longitudes for Delta sampling sites (Table S1), weekly average discharge data from Dayflow used in the Delta POC mass balance equations (Table S2), p-values of pairwise comparisons between sampling months for TSS, POC, and C:N atomic ratios (Table S3), monthly discharge rates and sampling weeks for the Sacramento and San Joaquin Rivers during sampling periods (Fig. S1), and the relationship between TSS and POC in the Delta across May, July, and October for the years 2021 and 2022 (Fig. S2).

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Table S1 Complete list of station names and locations with latitudes and longitudes for Delta sampling sites.

Station abbreviation	Station name	NWIS latitude	NWIS longitude
CCH41	CACHE SLOUGH AB RYER ISLAND FERRY NR RIO VISTA CA	38.19395556	-121.6580028
CFL	SUISUN BAY A VAN SICKLE ISLAND NR PITTSBURG CA	38.04953056	-121.88755
TOL	SACRAMENTO R BL TOLAND LANDING NR RIO VISTA CA	38.077806	-121.767278
GRZ	GRIZZLY BAY A SUISUN SLOUGH NR AVON CA	38.10853056	-122.0559806
JPT	SAN JOAQUIN R A JERSEY POINT CA	38.0521424	-121.6888428
LIB	CACHE SLOUGH A S LIBERTY ISLAND NR RIO VISTA CA	38.2430111	-121.684286
SS	LIBERTY ISLAND A UPPER STAIR STEP NR FIVE POINTS C	38.33616667	-121.672925
SSB	SHAG SLOUGH A LIBERTY ISLAND NR COURTLAND CA	38.30791944	-121.6928306
FPT	SACRAMENTO R A FREEPORT CA	38.45601954	-121.5013437
GAM	GEORGIANA SLOUGH A TYLER ISLAND RD NR ISLETON CA	38.13028056	-121.5797
HOOD	SACRAMENTO R A HOOD CA	38.3679666	-121.5213432
WGA	SACRAMENTO R AB DELTA CROSS CHANNEL CA	38.25769218	-121.5182865
LPS	LITTLE POTATO SLOUGH A TERMINOUS CA	38.09638889	-121.496111
SMS	S MOKELUMNE R A SYCAMORE SLOUGH NR TERMINOUS CA	38.1419611	-121.5036889
NFM	N MOKELUMNE NR WALNUT GROVE CA	38.2233333	-121.5072222
NMR	N MOKELUMNE R A TYLER ISLAND RD NR ISELTON CA	38.14366944	-121.5595389
MRB	MIDDLE R A BORDEN HWY NR TRACY CA	37.89159208	-121.4899492
MRH	MIDDLE R NR HOLT CA	38.00305556	-121.5108333
ORF	OLD R A FRANKS TRACT NR BETHEL ISLAND CA	38.05	-121.58
ORI	OLD R A INDIAN SLOUGH CA	37.914369	-121.5655064
SYC	SYCAMORE SLOUGH NR TERMINOUS CA	38.142	-121.47
MDM	MIDDLE R AT MIDDLE RIVER CA	37.942702	-121.534117
14MILE	FOURTEENMILE SLOUGH NR TERMINOUS CA	38.04221944	-121.405
PPT	SAN JOAQUIN R A PRISONERS PT NR TERMINOUS CA	38.05944444	-121.5572222
SJRBC	SAN JOAQUIN R A BUCKLEY COVE NR STOCKTON CA	37.97527778	-121.3769444
SJRST	SAN JOAQUIN R NR STOCKTON CA	37.94686848	-121.3402249
SJW	SAN JOAQUIN R A TINSLEY ISLAND NR TERMINOUS CA	38.03908889	-121.4927778
TRN	TURNER CUT NR HOLT CA	37.9925	-121.4538889

Table S2 Weekly average discharge data (m³/s) from California Department of Water Resources Dayflow for each sampling period used in the Delta POC mass balance equations.

Sampling period	SAC	YOLO	CSMR	MOKE	MISC	SJR	EAST	CCC	SWP	CVP	WEST	RIO
May 2021 5/11-5/14/2021	208.624	1.628	2.393	4.474	5.479	29.173	41.520	5.423	8.212	22.788	25.811	128.877
July 2021 7/26-7/29/2021	218.111	1.281	0.007	0.871	5.614	36.316	42.808	4.056	9.713	23.595	51.296	60.110
October 2021 10/4-10/7/2021	202.536	1.189	0.198	10.152	0.623	9.571	20.544	2.846	11.107	48.705	-1.819	111.944
May 2022 5/16-5/19/2022	222.429	2.315	7.306	4.545	4.446	16.976	33.272	4.863	16.841	25.804	15.957	132.006
July 2022 7/18-7/21/2022	339.094	1.876	0.949	0.885	7.228	6.371	15.440	3.094	16.849	76.498	14.619	131.971
October 2022 10/17-10/20/2022	189.086	0.835	0.722	0.000	1.869	25.655	28.253	3.271	13.925	25.853	16.749	111.313

Table S3 P-values of pairwise comparisons between sampling months for TSS, POC, and POC:N atomic ratios.

TSS					
	May 2021	July 2021	October 2021	May 2022	July 2022
July 2021	0.86	-	-	-	-
October 2021	p < 0.01	0.71	-	-	-
May 2022	1	1	0.77	-	-
July 2022	p < 0.01	0.69	1	0.61	-
October 2022	p < 0.01	p < 0.01	0.09	0	0.1
POC					
	May 2021	July 2021	October 2021	May 2022	July 2022
July 2021	1	-	-	-	-
October 2021	p < 0.01	0.05	-	-	-
May 2022	1	1	p < 0.01	-	-
July 2022	0.33	1	0.1	1	-
October 2022	p < 0.05	0.49	1	p < 0.05	1
POC:PN					
	May 2021	July 2021	October 2021	May 2022	July 2022
July 2021	p < 0.05	-	-	-	-
October 2021	0.78	0.41	-	-	-
May 2022	1	p < 0.01	1	-	-
July 2022	1	p < 0.01	0.76	1	-
October 2022	1	p < 0.01	1.00	1	1

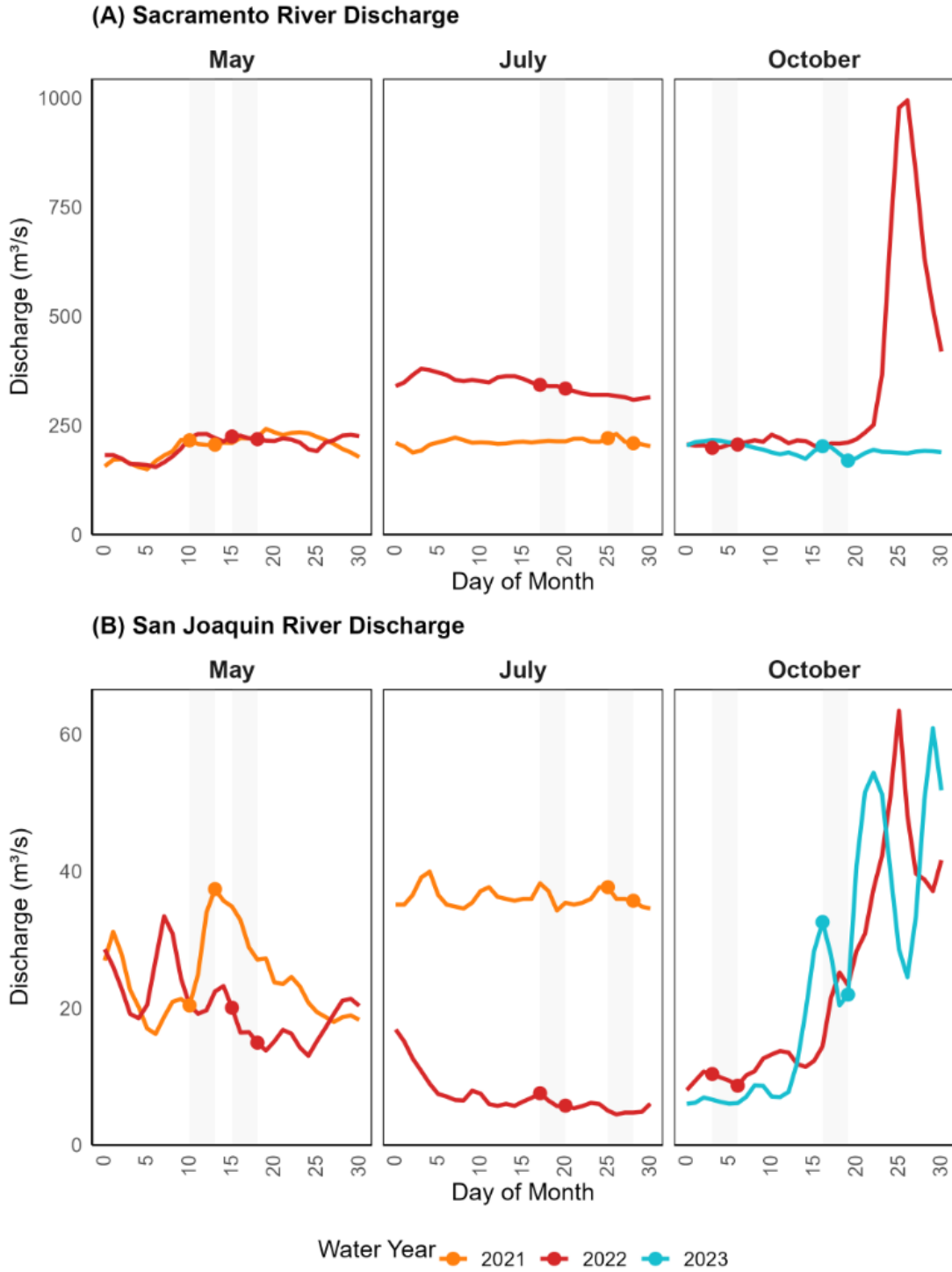


Fig S1 Dayflow discharge rates in cubic meters per second (m^3/s) for the Sacramento River (A) and the San Joaquin River (B). The gray shaded regions indicate sampling weeks. Points represent the start and end dates of each sampling week, while lines represent daily discharge trends. Dayflow data for the Sacramento River (A) was sourced from the USGS gage station 11447650, while data for the San Joaquin River (B) corresponds to USGS gage station 11303500.

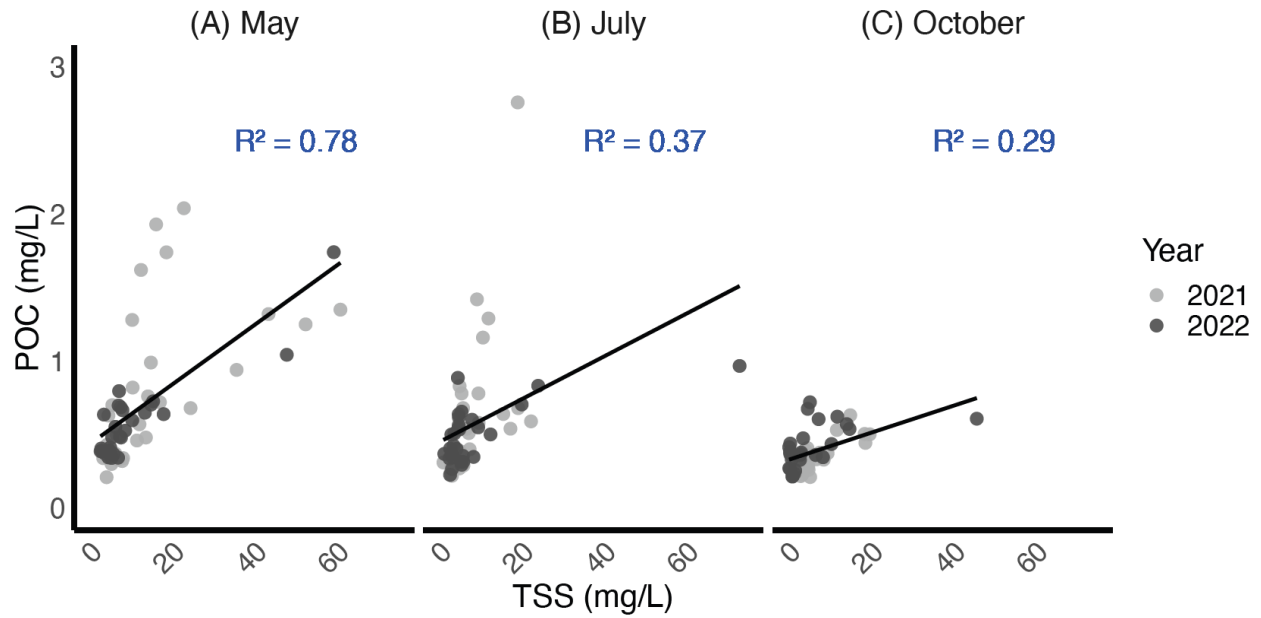


Fig. S2 Relationship between Total Suspended Sediment (TSS) and Particulate Organic Carbon (POC) in the Delta for (A) May, (B) July, and (C) October during the years 2021 and 2022. The light grey points represent data from 2021, while the dark grey points represent data from 2022. The linear regression lines for each month are shown, with the coefficient of determination (R^2) values indicated in blue for each month: May ($R^2 = 0.78$), July ($R^2 = 0.37$), and October ($R^2 = 0.29$). Note the TSS maximum of 266 mg/L and the POC maximum 5.09 mg/L was omitted from this plot.