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Supplement of

Spatial and temporal trends in summertime climate and water quality indicators in the coastal embayments of Buzzards Bay, Massachusetts

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Supplement

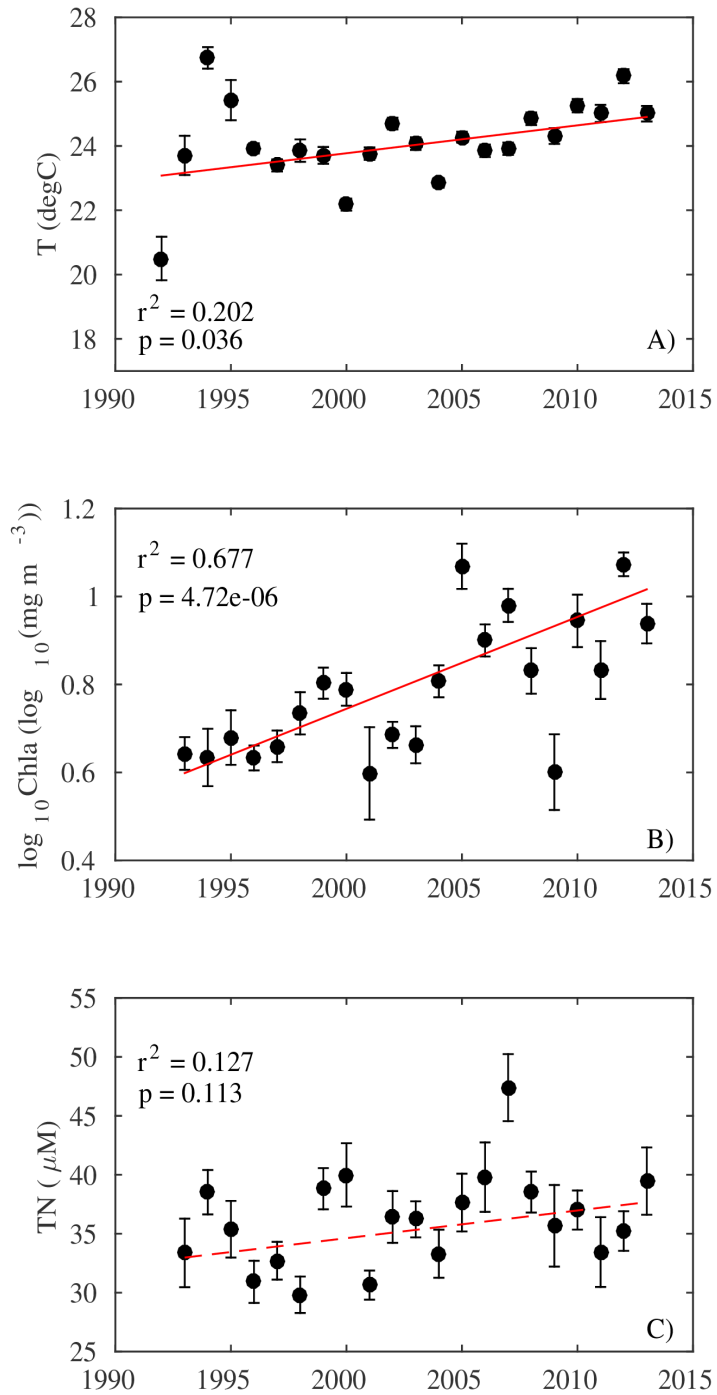


Fig. S1. July/August averages of (A) temperature (T), (B) total nitrogen (TN), and (C) chlorophyll (Chla) from Sippican Harbor (#9). Lines are long term trends fitted using linear regression, solid lines indicate statistical significant at the $\alpha = 0.05$ level. Error bars are standard error.

An example of the T, TN, and Chl_a time series from one embayment (Sippican Harbor, #11) is given in Fig. S1. In this example, each point reflects the average of 7 stations, with ~40 measurements per year. While there is considerable interannual variability, linear regressions reveal a positive slope over time in all three parameters, though a statistically significant increasing trend is only observed for T and Chl. As seen in Figure 3, the pattern exhibited in Sippican Harbor of statistically significant increasing trends in T and Chl was common around Buzzards Bay.

Table S1. Mean, standard deviation (SD), and total number of samples (n) of physical parameters across embayments.

Embayment Name	#	T			Salt			DO			DOsat		
		degC	SD	n	ppt	SD	n	mg/L	SD	n	% sat	SD	n
Westport River	1	22.6	2.4	3088	27.0	7.8	3130	6.1	1.3	2287	0.82	0.18	2268
Slocums River	2	22.9	2.4	1344	25.3	8.8	1351	5.9	1.1	905	0.81	0.13	736
Apponagansett Bay	3	23.1	2.2	1629	28.7	6.9	1700	5.8	1.1	864	0.81	0.15	859
Clarks Cove	4	23.4	1.7	431	31.0	1.5	440	5.8	1.3	142	0.82	0.18	140
New Bedford Harbor	5	23.2	1.9	1324	27.6	8.2	1346	5.9	1.5	652	0.81	0.21	647
Nasketucket Bay	6	23.1	2.0	777	27.9	6.4	827	5.3	1.5	518	0.73	0.22	516
Mattapoisett Harbor	7	23.1	2.0	1660	29.1	3.9	1933	5.5	1.3	1007	0.76	0.18	1006
Aucoot Cove	8	23.2	1.8	903	30.5	2.0	916	5.2	1.7	438	0.73	0.23	438
Sippican Harbor	9	24.2	2.0	1197	30.0	2.7	1230	5.3	1.1	713	0.75	0.15	707
Wareham River	10	24.1	1.8	3161	22.8	6.7	3434	5.8	1.0	1503	0.79	0.13	1501
Onset Bay	11	21.3	2.1	1746	30.0	1.9	1940	7.2	1.1	1144	0.96	0.14	1135
Buttermilk Bay	12	22.1	2.3	946	28.8	1.8	989	6.3	0.9	313	0.86	0.12	313
Eel Pond/Phinneys Harbor	13	22.9	2.0	820	29.1	2.6	923	6.3	1.2	440	0.86	0.16	438
Red Brook Harbor/Pocasset River	14	24.0	2.0	2007	29.6	2.0	2373	5.8	1.0	1193	0.82	0.14	1187
Megansett Harbor	15	23.4	1.8	2138	29.0	2.4	2146	6.2	0.9	1520	0.86	0.13	1514
West Falmouth Harbor	16	22.5	1.9	1006	28.0	3.8	1685	6.1	1.1	968	0.83	0.15	959
Quissett Harbor	17	22.5	1.6	706	31.0	1.5	706	6.5	1.0	561	0.89	0.14	560

Table S2. Mean, standard deviation (SD), and total number of samples (n) of inorganic nutrient parameters across embayments.

Embayment Name	#	NO ₃ + NO ₂			NH ₄			PO ₄		
		uM	SD	n	uM	SD	n	uM	SD	n
Westport River	1	3.4	9.0	1041	3.2	4.1	1042	1.1	0.8	1043
Slocums River	2	4.8	10.0	409	2.3	2.7	409	1.1	0.6	409
Apponagansett Bay	3	7.2	20.0	499	2.2	2.8	499	1.8	0.8	499
Clarks Cove	4	0.4	0.5	250	1.0	1.1	250	1.9	1.3	250
New Bedford Harbor	5	7.4	14.6	356	3.7	4.2	359	2.1	1.0	357
Nasketucket Bay	6	2.4	5.9	319	1.7	1.8	319	0.9	0.4	321
Mattapoissett Harbor	7	1.2	2.5	665	1.2	1.4	665	0.8	0.4	665
Aucoot Cove	8	0.6	1.2	394	1.3	1.3	394	1.0	0.5	394
Sippican Harbor	9	0.4	0.7	572	1.1	1.3	573	1.0	1.1	573
Wareham River	10	0.5	0.6	1197	1.8	2.4	1197	1.0	0.4	1197
Onset Bay	11	0.3	0.4	551	1.1	1.0	550	0.5	0.2	550
Buttermilk Bay	12	0.6	1.4	460	1.3	1.5	462	0.6	0.4	461
Eel Pond/Phinneys Harbor	13	0.7	1.4	430	1.1	1.2	433	0.6	0.4	433
Red Brook Harbor/Pocasset River	14	0.5	0.9	696	1.2	1.5	689	0.7	0.6	688
Megansett Harbor	15	0.6	1.0	547	0.9	0.8	548	0.5	0.5	548
West Falmouth Harbor	16	2.1	5.5	1610	1.6	1.9	1610	0.6	0.5	1616
Quissett Harbor	17	0.5	0.6	166	1.5	1.5	166	0.7	0.2	166

Table S2. Mean, standard deviation (SD), and total number of samples (n) of organic nutrient parameters across embayments.

Embayment Name	#	PON			POC			DON			*ChlA		
		uM	SD	n	uM	SD	n	uM	SD	n	mg m3	SD	n
Westport River	1	10.9	8.1	1033	77.1	57.6	1032	38.8	24.4	1037	4.1	2.3	1019
Slocums River	2	17.5	11.9	398	134.5	98.5	397	28.1	15.0	409	6.5	2.6	407
Apponagansett Bay	3	14.5	16.0	484	110.0	141.1	484	21.5	10.4	497	6.2	2.2	536
Clarks Cove	4	8.8	9.5	242	67.1	72.5	242	23.1	14.9	248	3.8	2.0	289
New Bedford Harbor	5	16.5	14.8	347	118.7	101.2	347	27.9	17.4	355	8.3	2.5	298
Nasketucket Bay	6	12.1	11.1	307	97.1	121.2	307	25.8	14.3	318	5.2	1.8	251
Mattapoisett Harbor	7	10.4	8.0	645	79.0	64.9	645	19.9	10.6	664	4.2	2.0	783
Aucoot Cove	8	8.3	5.1	386	64.5	44.1	387	18.6	8.3	394	3.3	1.9	552
Sippican Harbor	9	12.3	6.2	561	95.4	54.2	561	22.3	9.1	571	6.1	2.0	568
Wareham River	10	14.3	8.8	1167	112.1	98.3	1167	23.0	13.7	1192	7.5	2.1	1612
Onset Bay	11	7.9	5.2	541	55.4	30.1	542	17.8	7.2	549	4.1	1.6	547
Buttermilk Bay	12	11.2	8.5	454	75.3	48.3	454	19.0	7.9	459	5.2	1.9	456
Eel Pond/Phinneys Harbor	13	8.9	3.4	422	64.1	27.7	422	18.8	8.4	429	4.6	2.0	423
Red Brook Harbor/Pocasset River	14	10.2	5.8	687	78.0	50.9	686	22.0	11.3	688	4.8	2.1	691
Megansett Harbor	15	9.7	7.9	533	69.1	52.0	533	19.1	10.7	546	4.5	2.0	545
West Falmouth Harbor	16	10.9	7.2	1590	60.0	29.6	654	22.4	12.5	1603	3.2	2.1	616
Quissett Harbor	17	5.6	2.5	163	43.2	19.5	163	16.0	5.0	164	2.3	1.8	165

*indicates geometric mean and standard deviation

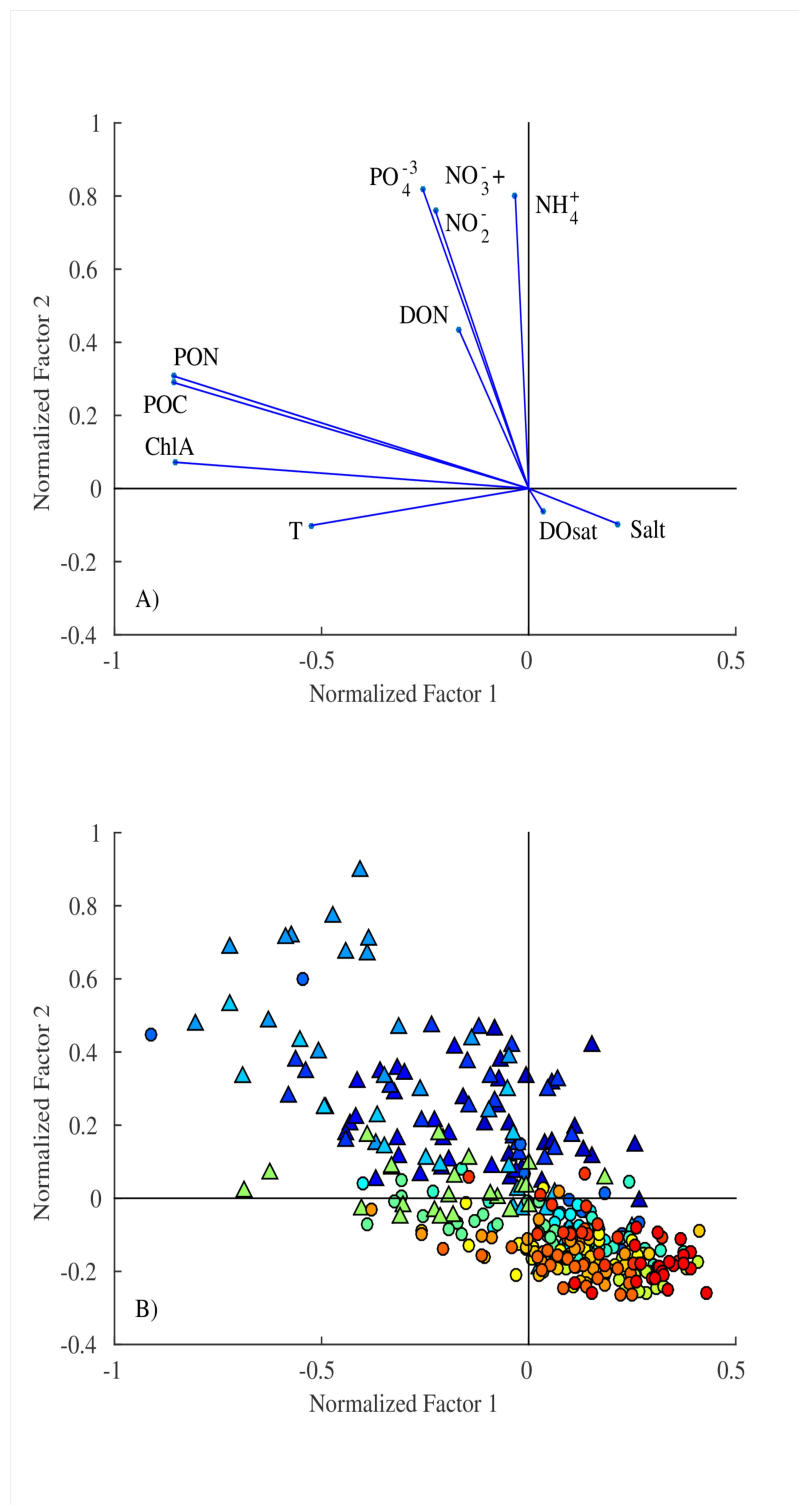


Fig. S2 Factor loadings (top panel) and factor scores (bottom panel) showing factor scores for each year, from each embayment. Colors correspond to embayments in Figure 1. Triangles are embayments designated 'river-fed', and circles are embayments designated 'groundwater-fed'.