Table S1. Mean SSI by Basin and Bonferroni Corrected Wilcoxon Ranked Sum Test Results. **Bold** values indicate p < 0.05 for basin-to-basin comparisons.

	Mean (sd)	JON	RKB	RAN	TWN	WHP	MAD	CAL	CRN	EAG	DUC	BLK	MAN	BAR
Mean (sd)	-	51.7 (9.1)	38.1 (9)	39.3 (9)	37.9 (16.1)	44.8 (13.6)	41.6 (11.3)	43.2 (10.9)	40.1 (9.3)	46.2 (12.1)	54.0 (10)	44.3 (10)	44.3 (13.3)	58.9 (17.8)
JON	51.7 (9.1)	-	**0.001**	**0.007**	**0.035**	1.000	0.183	0.764	**0.006**	1.000	1.000	1.000	1.000	1.000
RKB	38.1 (9)	-	-	1.000	1.000	1.000	1.000	1.000	1.000	0.417	1.000	**0.000**	1.000	**0.000**
RAN	39.3 (9)	-	-	-	1.000	1.000	1.000	1.000	1.000	1.000	1.000	**0.002**	1.000	**0.003**
TWN	37.9 (16.1)	-	-	-	-	1.000	1.000	1.000	1.000	1.000	1.000	**0.007**	1.000	**0.003**
WHP	44.8 (13.6)	-	-	-	-	-	1.000	1.000	1.000	1.000	1.000	0.668	1.000	**0.016**
MAD	41.6 (11.3)	-	-	-	-	-	-	1.000	1.000	1.000	1.000	**0.025**	1.000	**0.016**
CAL	43.2 (10.9)	-	-	-	-	-	-	-	1.000	1.000	1.000	0.127	1.000	0.108
CRN	40.1 (9.3)	-	-	-	-	-	-	-	-	1.000	1.000	**0.001**	1.000	**0.001**
EAG	46.2 (12.1)	-	-	-	-	-	-	-	-	-	1.000	0.852	1.000	0.411
DUC	54.0 (10)	-	-	-	-	-	-	-	-	-	-	0.499	1.000	0.476
BLK	44.3 (10)	-	-	-	-	-	-	-	-	-	-	-	0.286	1.000
MAN	44.3 (13.3)	-	-	-	-	-	-	-	-	-	-	-	-	0.328
BAR	58.9 (17.8)	-	-	-	-	-	-	-	-	-	-	-	-	-

Table S2. AIC selection table of null model and GAMs receiving a weight of at least 0.01 for SSI as a function of potential predictors with the inclusion of basin identity. The top model from the previous GAM is also included. + indicates inclusion in model.

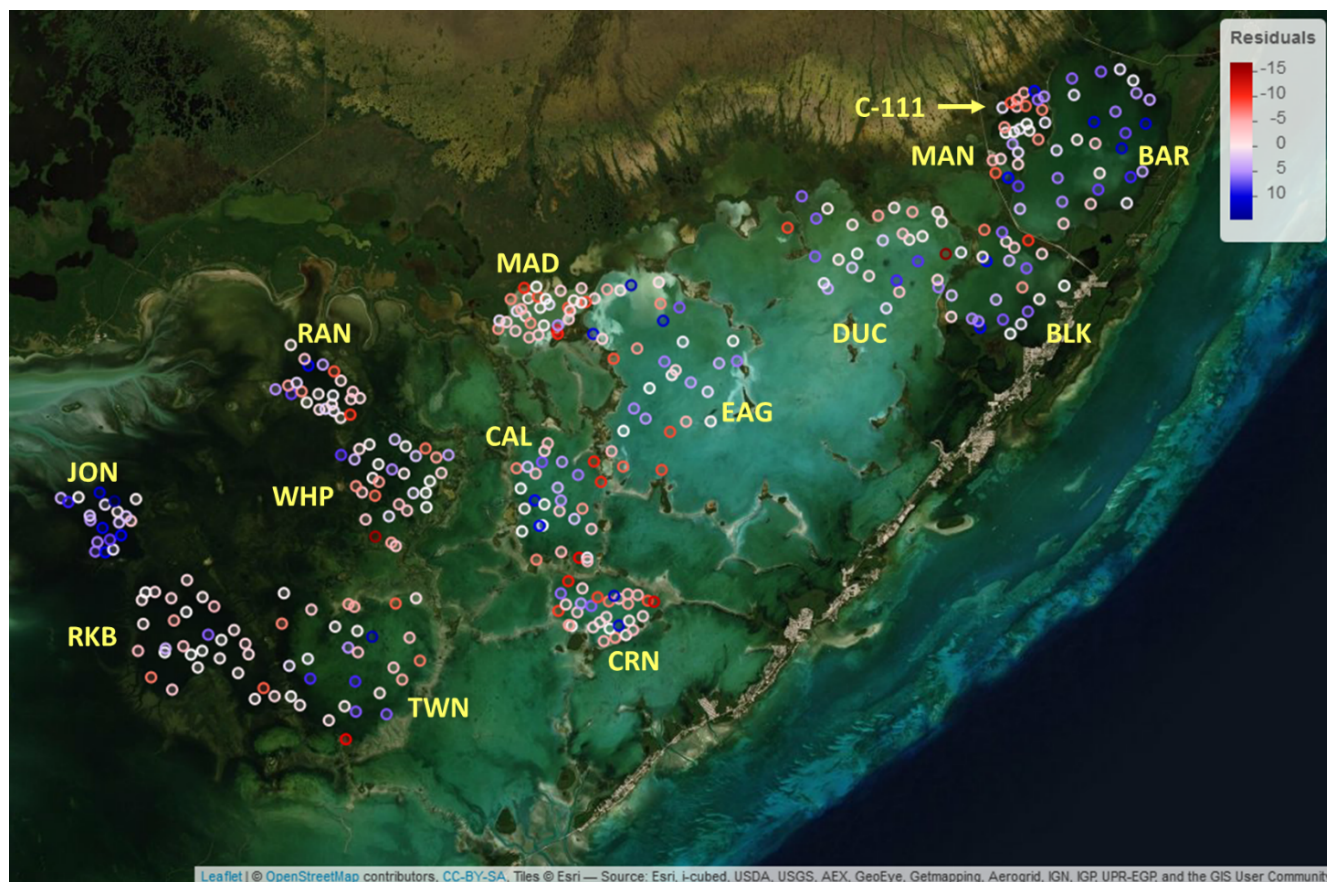| Variables Included							Model Scores				
Basin ID	*Tt* Cover	*Hw* Cover	Sediment Depth	S-W Diversity	TMA Cover	Salinity	D.F.	LogLik	AICc	Δ AIC	Weight
+		+	+				23	-1311.59	2674.239	0.00	0.35
+	+	+	+				25	-1310.18	2674.688	0.45	0.28
+		+	+	+			24	-1311.68	2676.415	2.18	0.12
+	+	+	+		+		26	-1310.14	2676.876	2.64	0.09
+	+	+	+	+			26	-1310.27	2676.967	2.73	0.09
+	+	+	+	+	+	+	30	-1305.56	2679.028	4.79	0.03
+	+	+	+	+	+	+	30	-1305.56	2679.028	4.79	0.03
+	+	+	+	+	+		26	-1310.25	2679.09	4.85	0.03
	+	+	+				14	-1338.71	2707.321	33.08	0.00
+							13	-1355.59	2740.435	66.20	0.00
							2	-1393.71	2791.458	117.22	0.00

Figure S1. Map of Residuals of generalized additive model of *T. testudinum* leaf δ^{34}S as a function of total sulfur (% Dwt.).
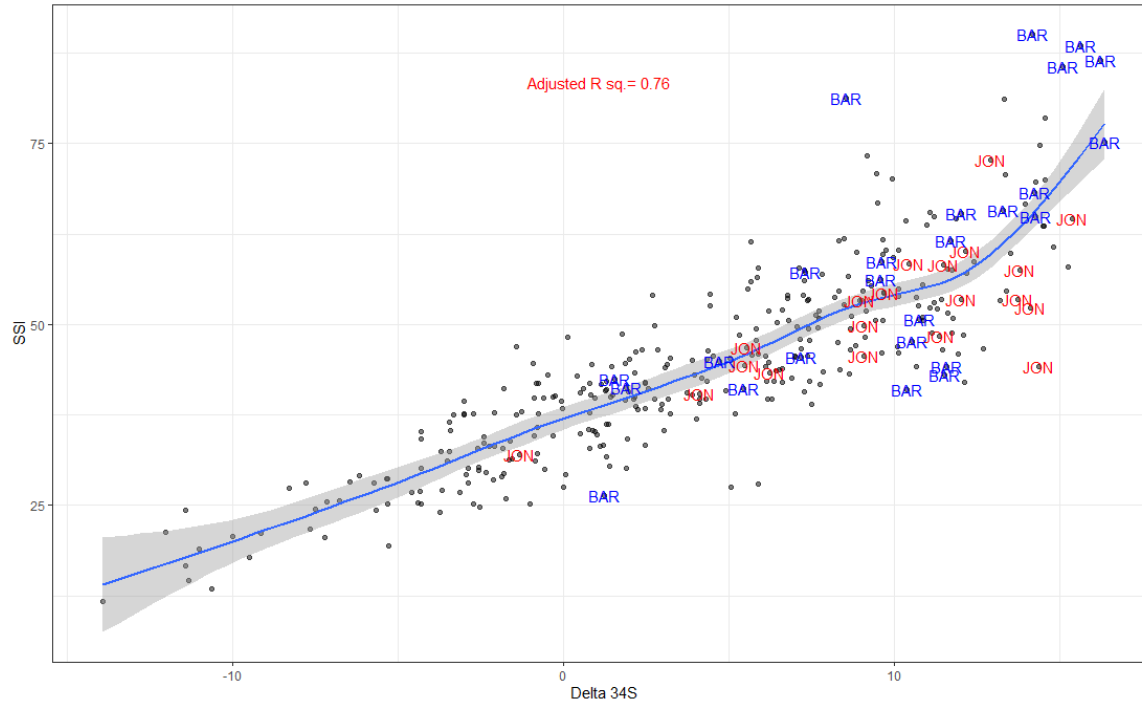
Figure S2. Scatter plot and generalized additive model of the sediment stress indicator (SSI) as a function of leaf δ^{34}S with points from Johnson Key Basin (JON) and Barnes Sound (BAR) labelled.
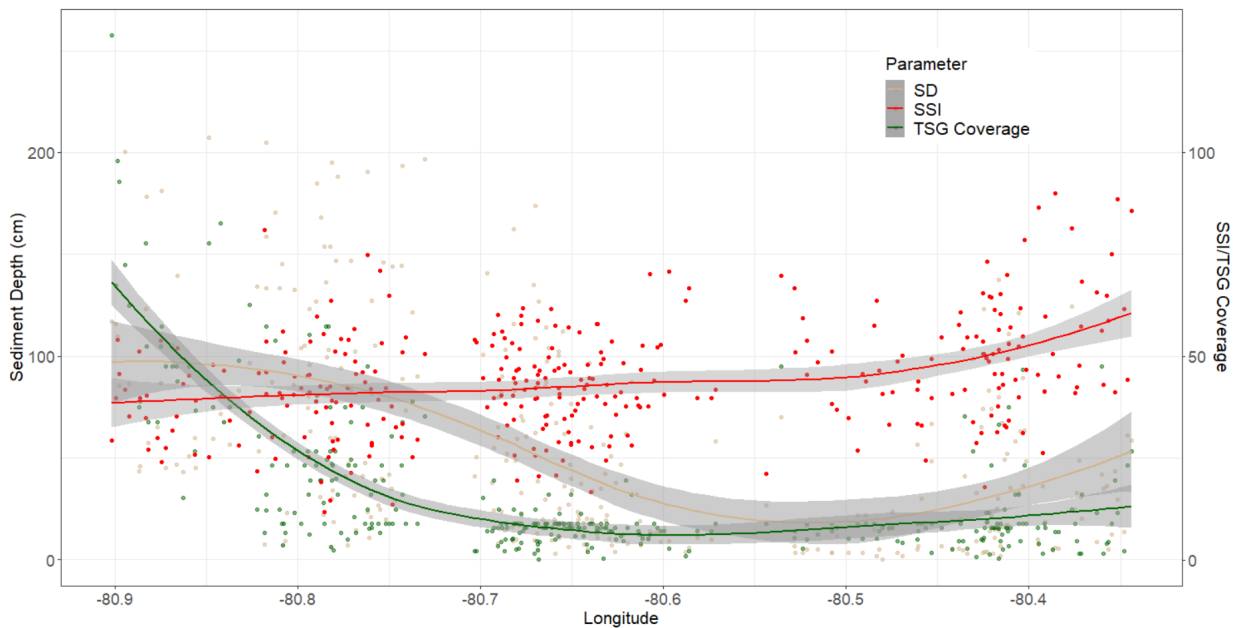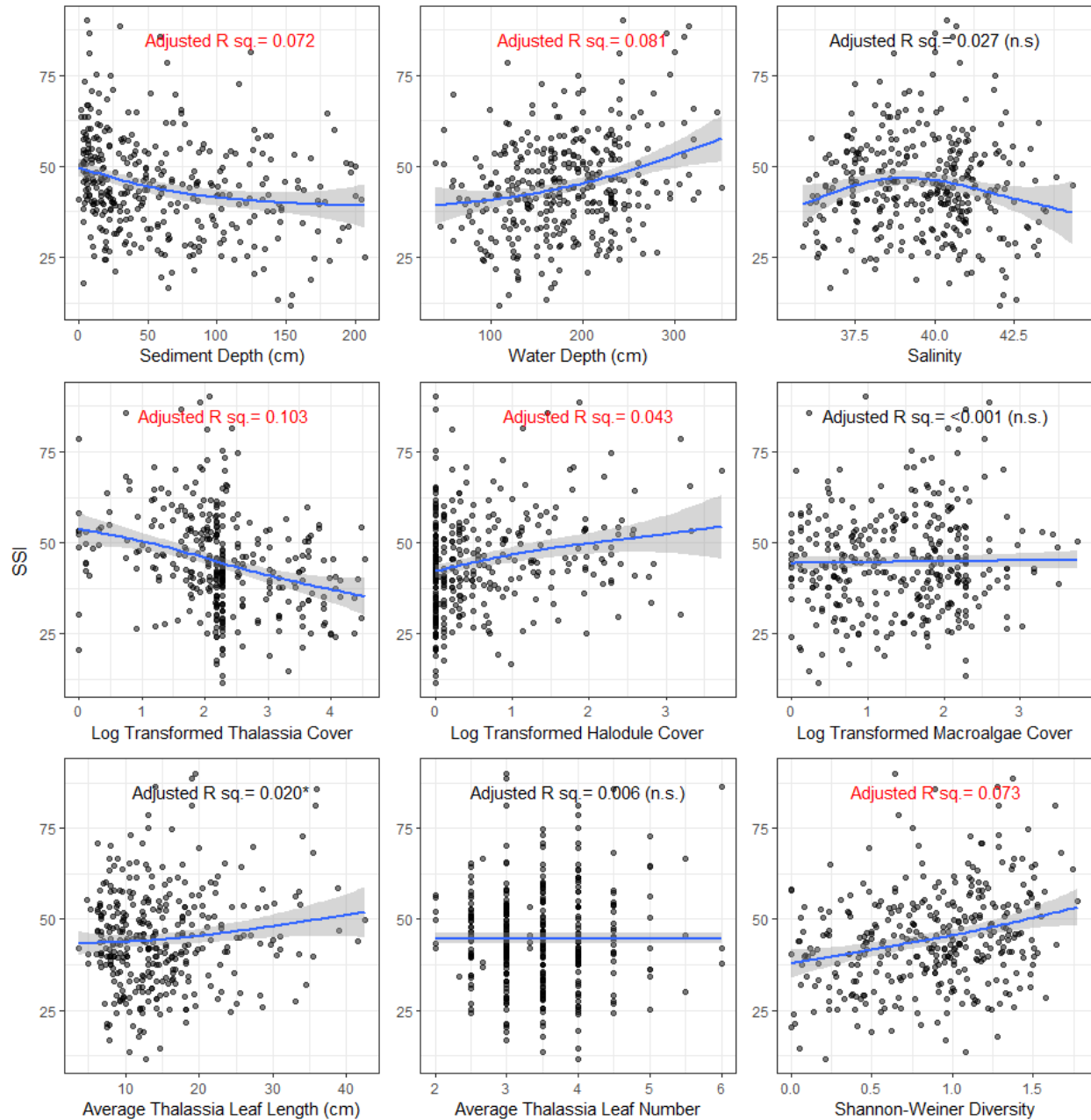

Figure S3. Generalized additive models of sediment depth, seagrass cover, and the sediment stress indicator (SSI) along a longitudinal gradient, excluding sites from the western-most basin, Johnson Key Basin (JON).

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Figure S4. Scatter plots and generalized additive models of the sediment stress indicator (SSI) as a function of sediment depth, water depth, salinity, *T. testudinum* cover, *H. wrightii* cover, total macroalgae cover, average *T. testudinum* leaf length, average number of leaves per *T. testudinum* shoot, and Shannon-Weiner diversity. Adjusted R^2 values are shown and models significant at the $p < 0.0001$ level are in red, * indicates $p < 0.05$.
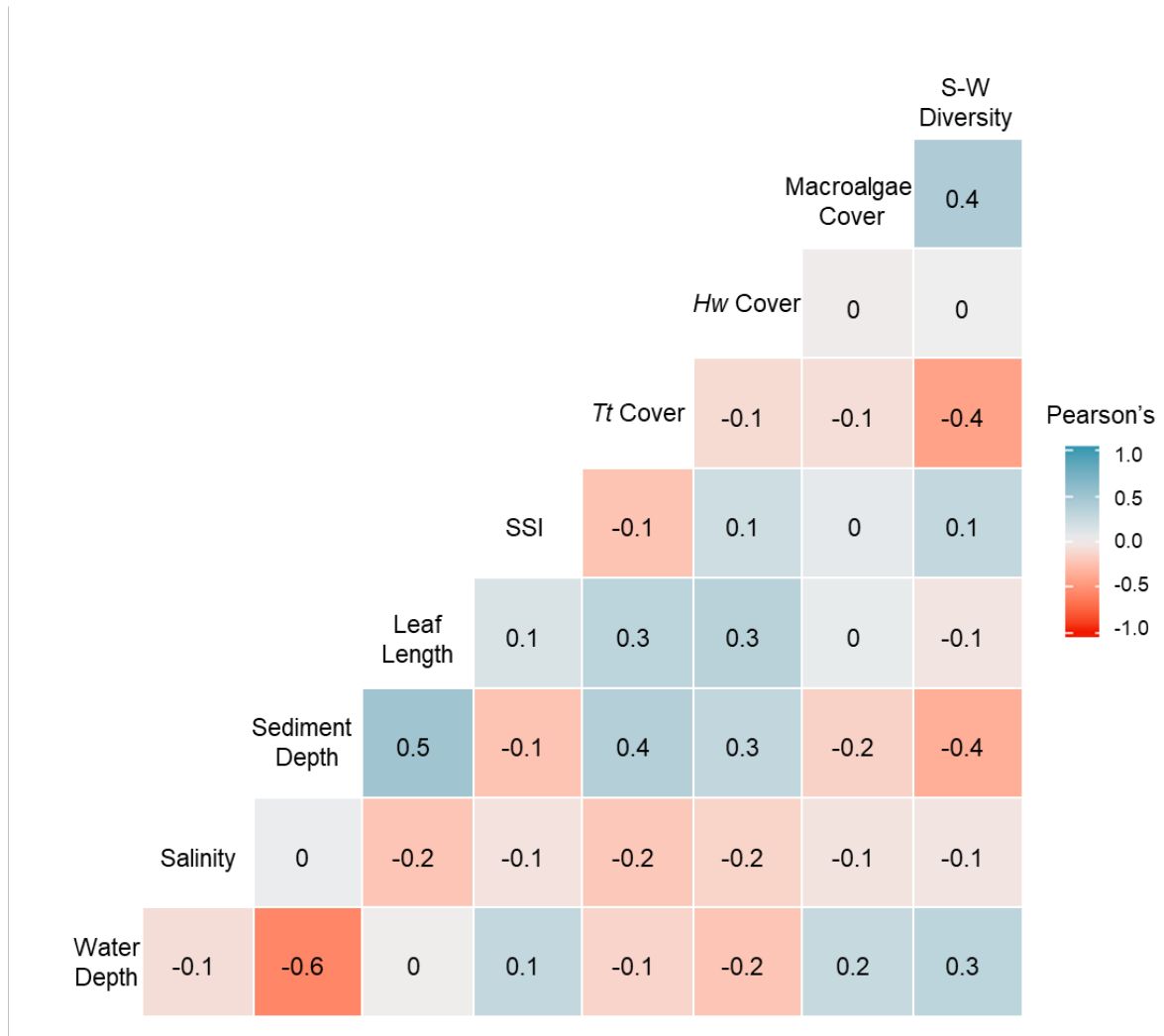
Figure S5. Linear correlation matrix of Pearson's R values among the sediment stress indicator (SSI) and other FHAP variables. Abundant, but weak collinearity is evident, with the exception of water depth and sediment depth. All data are untransformed. The non-continuous leaf number variable has been excluded.
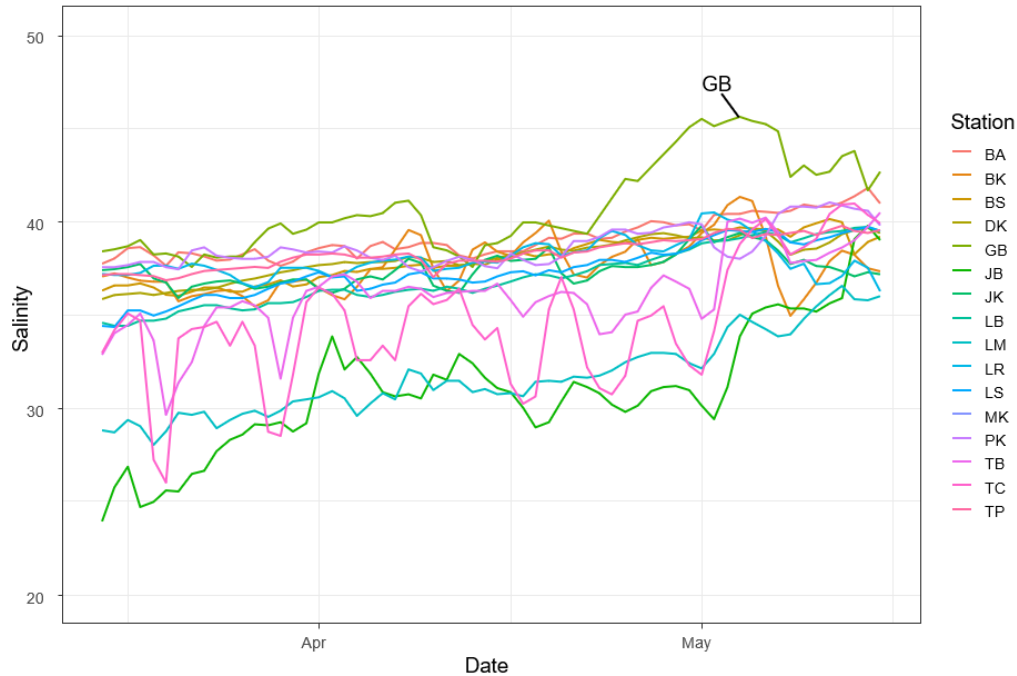
Figure S6. Daily mean salinity of Florida Bay NDBC stations from two months prior to 2019 FHAP to the last day of sample collection. The station with the highest salinity value, Garfield Bight (GB), is labeled.
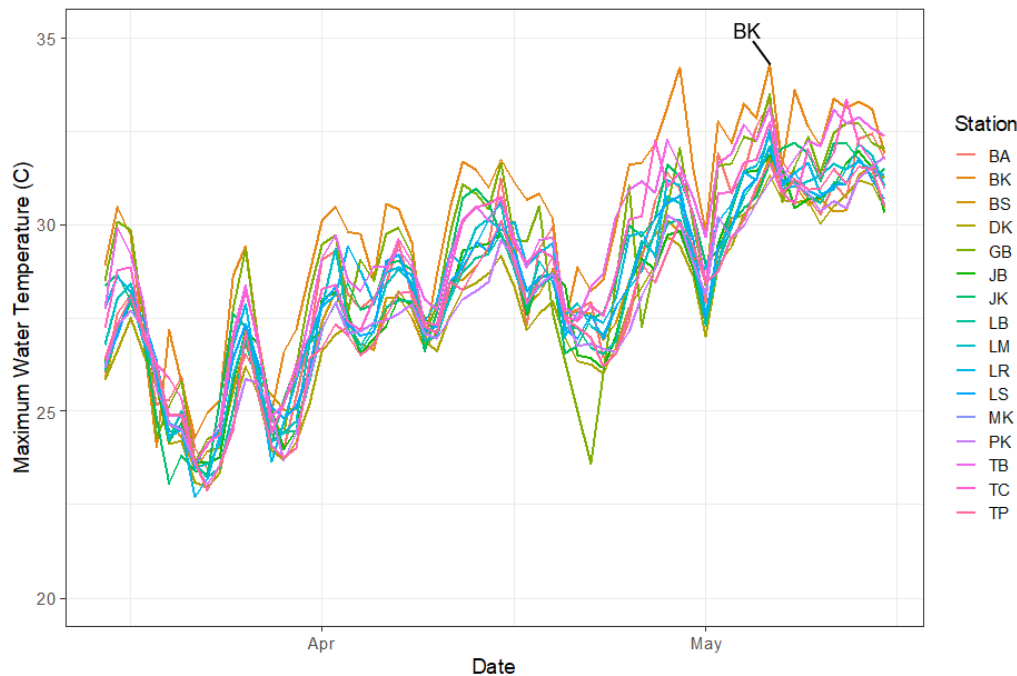

Figure S7. Daily maximum water temperature of Florida Bay NDBC stations from two months prior to 2019 FHAP through the last day of sample collection. The station with the highest temperature value, Buoy Key (BK), is labelled.