

Supplementary Material for “Comprehensive Analysis of Biomass, Nutrient, and Heavy Metal Contributions of Pelagic *Sargassum* Species (Phaeophyceae) Inundations in South Florida”

Supplemental Tables

Table S1. Summary of collections and analyses of sargasso conducted at Dania Beach, Crandon Park, and Bill Baggs during the survey period (2018 to 2022).

Site	Year	Month	Analysis
Dania Beach	2018	September	Biomass
		October	Biomass, Inorganic mass
		January	Biomass, Inorganic mass
		February	Biomass, Nutrient, Inorganic mass
	2019	March	Biomass
		April	Biomass, Nutrient, Inorganic mass
		July	Biomass, Nutrient
		July	Biomass, Nutrient, Inorganic mass, Heavy metals
	2020	May	Nutrient, Inorganic mass, Heavy metals
		June	Inorganic mass, Heavy metals
	2021	July	Biomass, Nutrient, Inorganic mass, Heavy metals, Arsenic
		May	Biomass, Inorganic mass
	2022	June	Biomass, Inorganic mass
		July	Biomass, Inorganic mass
Crandon Park	2019	August	Nutrient
	2021	May	Biomass (not reported), Nutrient, Inorganic mass, Heavy metals, Arsenic
		January	Biomass (no sargassum to collect)
		February	Biomass (no sargassum to collect)
		March	Biomass (no sargassum to collect)
		April	Biomass (no sargassum to collect)
		May	Biomass, Inorganic mass
	2022	June	Biomass, Inorganic mass
		July	Biomass, Inorganic mass
		August	Biomass, Inorganic mass
		September	Biomass (no sargassum to collect)
		October	Biomass (no sargassum to collect)
		November	Biomass (no sargassum to collect)
		December	Biomass (no sargassum to collect)
		September	Nutrient, Inorganic mass
Bill Baggs	2018	December	Nutrient
		March	Nutrient
	2019	August	Nutrient, Inorganic mass
		June	Nutrient, Inorganic mass, Heavy metals, Arsenic

Table S2. Results of parametric and non-parametric analyses on biomass of sargasso at Dania Beach and Crandon Park.

	Test	P-value
Biomass at Dania Beach <i>post hoc results</i>	Kruskal-Wallis	0.01682 Jul22 > Sep18 = Oct18 = Jan19 = Feb19 = Apr19 = Jul19 = Jul20 = Jul21 = May22 = Jun 22 > Mar19
Biomass in 2019 at Dania Beach <i>post hoc results</i>	Kruskal-Wallis	0.046 Jan19 > (Feb19= Apr19= Jul19) > Mar19
Biomass in July 2019 to 2022 at Dania Beach	Kruskal-Wallis	0.2678
Biomass at Crandon Park	Kruskal-Wallis	0.0976
Biomass in July 2022 at Crandon Park <i>versus Dania Beach</i>	Mann-Whitney	0.4857

Significant differences are indicated in bold. Post hoc results were determined by a Dunn test ($\alpha = 0.05$).

Table S3: Results of parametric and non-parametric analyses on nutrient content of sargasso in South Florida.

	Variable	Test	P-value
Morphotype nutrient content grouped across all three sites	Carbon	Kruskal-Wallis	0.1106
	Nitrogen	One-way ANOVA	$F = 2.864, P = 0.0621$
	Phosphorus	One-way ANOVA	$F = 1.724, P = 0.184$
	Carbon:Phosphorus	One-way ANOVA	$F = 2.342, P = 0.102$
	Carbon:Nitrogen	One-way ANOVA	$F = 2.797, P = 0.0661$
	Nitrogen: Phosphorus <i>post hoc results</i>	One-way ANOVA	$F = 4.377, P = 0.0152$ <i>S. fluitans III > S. natans VIII, S. natans I= (S. fluitans III, S. natans VIII)</i>
Annual nutrient content from 2018 to 2021 grouped across all three sites	Carbon <i>significant post hoc differences only</i>	Kruskal-Wallis	2.586×10^{-10} 2018 < 2020, 2019 < (2020, 2021)
	Nitrogen <i>post hoc results</i>	Kruskal-Wallis	5.599×10^{-7} 2019 < (2018 = 2021) > 2020
	Phosphorus <i>significant post hoc differences only</i>	Kruskal-Wallis	1.194×10^{-6} 2019 > (2018, 2021)
	Carbon:Phosphorus <i>significant post hoc differences only</i>	Kruskal-Wallis	6.378×10^{-6} 2019 > (2018, 2021)
	Carbon:Nitrogen <i>post hoc results</i>	Kruskal-Wallis	5.118×10^{-6} 2020 > 2018, 2019, 2021
	Nitrogen: Phosphorus <i>significant post hoc differences only</i>	Kruskal-Wallis	1.129×10^{-5} 2019 > (2020, 2021)
Nutrient content from 2019 to 2021 at	Carbon <i>post hoc results</i>	Kruskal-Wallis	2.360×10^{-6} 2019 < (2020 = 2021)
	Nitrogen <i>post hoc results</i>	Kruskal-Wallis	2.122×10^{-5} 2019 > 2020 < 2021

Dania Beach only	Phosphorus	Kruskal-Wallis	3.261×10^{-7}
	<i>post hoc results</i>		2019 < 2020 = 2021
	Carbon:Phosphorus	Kruskal-Wallis	2.525×10^{-6}
	<i>post hoc results</i>		(2019 = 2020) > 2021
	Carbon:Nitrogen	Kruskal-Wallis	8.114×10^{-6}
	<i>post hoc results</i>		(2019 = 2021) < 2020
	Nitrogen: Phosphorus	Kruskal-Wallis	3.942×10^{-7}
	<i>post hoc results</i>		2019 > (2020 = 2021)
Nutrient content in 2019 at all three sites	Carbon	Kruskal-Wallis	0.1917
	Nitrogen	Kruskal-Wallis	0.06903
	Phosphorus	Kruskal-Wallis	0.01086
			(Bill Baggs < Crandon Park) = Dania Beach
	Carbon:Phosphorus	Kruskal-Wallis	0.01882
			(Bill Baggs < Crandon Park) = Dania Beach
	Carbon:Nitrogen	Kruskal-Wallis	0.06811
	Nitrogen: Phosphorus	Kruskal-Wallis	0.001366
	<i>post hoc results</i>		(Bill Baggs = Dania Beach) < Crandon Park
Nutrient content in 2021 at all three sites	Carbon	Kruskal-Wallis	0.520
	Nitrogen	Kruskal-Wallis	0.07694
	Phosphorus	Kruskal-Wallis	0.1226
	Carbon:Phosphorus	Kruskal-Wallis	0.1108
	Carbon:Nitrogen	Kruskal-Wallis	0.1036
	Nitrogen: Phosphorus	Kruskal-Wallis	0.3816

Significant differences are indicated in bold. Post hoc results for one-way ANOVA were determined by a Tukey (HSD) test ($\alpha = 0.05$) and results for Kruskal-Wallis were determined using a Dunn test ($\alpha = 0.05$).

Table S4: Percent carbon, nitrogen, phosphorus, and nutrient ratios (mean \pm standard error) for dry weight values of sargasso in South Florida.

Morphotype	Carbon	Nitrogen	Phosphorus	C:N	C:P	N:P
<i>S. fluitans III</i>	35.95 \pm 0.4	0.93 \pm 0.03	0.03 \pm 0.003	47.93 \pm 1.8	3477.13 \pm 185	71.51 \pm 2.9
<i>S. natans I</i>	36.12 \pm 0.6	1.04 \pm 0.04	0.05 \pm 0.005	44.00 \pm 1.9	2973.72 \pm 204	64.33 \pm 3.1
<i>S. natans VIII</i>	37.65 \pm 0.4	0.86 \pm 0.03	0.04 \pm 0.003	51.91 \pm 2	2870.66 \pm 213	54.92 \pm 3.5
	36.27 \pm 0.34	0.97 \pm 0.02	0.04 \pm 0.002	46.83 \pm 1.19	3173.69 \pm 124	66.03 \pm 2.0

Table S5. Results of parametric and non-parametric analyses on elemental concentrations of sargasso at all three sites. Dashes indicate more than two elemental concentrations were not present.

		Test	P-value
Dania Beach <i>versus</i>	Ag	One-way ANOVA	-
	As	One-way ANOVA	$F = 13.16, P = 0.00226$

Crandon Park concentrations in May 2021	<i>post hoc results</i>		Dania Beach > Crandon Park
	Ba	One-way ANOVA	$F = 1.329, P = 0.266$
	Be	One-way ANOVA	-
	Cd	One-way ANOVA	$F = 11.42, P = 0.00382$
			Dania Beach < Crandon Park
	Co	One-way ANOVA	$F = 0.827, P = 0.377$
	Cr	One-way ANOVA	$F = 5.151, P = 0.0374$
	<i>post hoc results</i>		Dania Beach > Crandon Park
	Cu	One-way ANOVA	$F = 1.359, P = 0.261$
	Hg	One-way ANOVA	-
	Mn	One-way ANOVA	$F = 0.836, P = 0.374$
	Mo	One-way ANOVA	$F = 20.92, P = 0.000312$
	<i>post hoc results</i>		Dania Beach < Crandon Park
	Ni	One-way ANOVA	$F = 0.441, P = 0.516$
	Pb	One-way ANOVA	$F = 1.139, P = 0.302$
	Se	One-way ANOVA	$F = 0.076, P = 0.787$
	V	One-way ANOVA	$F = 0.19, P = 0.669$
	Zn	One-way ANOVA	$F = 2.971, P = 0.104$
Dania Beach versus Bill Baggs concentrations in June 2021	Ag	One-way ANOVA	-
	As	One-way ANOVA	$F = 0.008, P = 0.932$
	Ba	Kruskal-Wallis	0.01235
			Dania Beach < Bill Baggs
	Be	One-way ANOVA	$F = 0.1, P = 0.76$
	Cd	One-way ANOVA	$F = 12.26, P = 0.00322$
			Dania Beach < Bill Baggs
	Co	One-way ANOVA	$F = 0.272, P = 0.61$
	Cr	One-way ANOVA	$F = 0.233, P = 0.636$
	Cu	One-way ANOVA	$F = 9.644, P = 0.00724$
			Dania Beach < Bill Baggs
	Hg	One-way ANOVA	-
	Mn	One-way ANOVA	$F = 2.89, P = 0.11$
	Mo	One-way ANOVA	$F = 2.208, P = 0.158$
	Ni	One-way ANOVA	$F = 5.249, P = 0.0368$
	<i>post hoc results</i>		Dania Beach > Bill Baggs
	Pb	One-way ANOVA	$F = 0.023, P = 0.881$
	Se	One-way ANOVA	$F = 13.43, P = 0.0023$
			Dania Beach < Bill Baggs
	V	Kruskal-Wallis	0.001496
	<i>post hoc results</i>		Dania Beach < Bill Baggs
	Zn	One-way ANOVA	$F = 5.774, P = 0.0297$
Sampling times at Dania Beach from 2020 to 2021(July 2020, May 2021, June 2021, June 2021)	<i>post hoc results</i>		Dania < Bill Baggs
	Ag	One-way ANOVA	-
	As	One-way ANOVA	$F = 5.114, P = 0.00409$
	<i>significant post hoc differences only</i>		July 2020 > June 2021
	Ba	Kruskal-Wallis	8.297×10^{-5}
	<i>significant post hoc differences only</i>		July 2020 < May 2021, July 2021
			July 2021 > July 2020
			May 2021 > July 2020, June 2021, July 2021

Dania Beach concentrations in July 2020 versus July 2021	2021, and July 2021)			June 2021 < May 2021 0.2276
	Be	Kruskal-Wallis		
	Cd	One-way ANOVA	$F = 4.661, P = 0.00659$	July 2021 > June 2021, July 2020
	<i>significant post hoc differences only</i>			
	Co	One-way ANOVA	$F = 4.294, P = 0.00977$	July 2020 < June 2021, July 2021
	<i>significant post hoc differences only</i>			
	Cr	One-way ANOVA	$F = 10.26, P = 3.23 \times 10^{-5}$	May 2021 > July 2020, June 2021, July 2021
	<i>post hoc results</i>			
	Cu	One-way ANOVA	$F = 0.595, P = 0.622$	
	Hg	One-way ANOVA	$F = 2.471, P = 0.0876$	
	Mn	One-way ANOVA	$F = 2.023, P = 0.125$	
	Mo	One-way ANOVA	$F = 3.293, P = 0.0294$	July 2021 > May 2021
	<i>significant post hoc differences only</i>			
	Ni	One-way ANOVA	$F = 1.216, P = 0.315$	
	Pb	One-way ANOVA	$F = 0.169, P = 0.916$	
	Se	One-way ANOVA	$F = 3.093, P = 0.0368$	May 2021 > June 2021
	<i>significant post hoc differences only</i>			
	V	One-way ANOVA	$F = 1.699, P = 0.182$	
	Zn	One-way ANOVA	$F = 4.857, P = 0.00536$	July 2020 > July 2021, May 2021
	<i>significant post hoc differences only</i>			
	Ag	One-way ANOVA	-	
	As	One-way ANOVA	$F = 17.38, P = 0.000238$	July 2020 > July 2021
	<i>post hoc results</i>			
	Ba	One-way ANOVA	$F = 20.22, P = 0.000118$	July 2020 < July 2021
	<i>post hoc results</i>			
	Be	One-way ANOVA	$F = 2.783, P = 0.115$	
	Cd	Kruskal-Wallis	0.009051	July 2021 > July 2020
	<i>post hoc results</i>			
	Co	One-way ANOVA	$F = 10.68, P = 0.00295$	July 2020 < July 2021
	<i>post hoc results</i>			
	Cr	One-way ANOVA	$F = 1.869, P = 0.183$	
	Cu	One-way ANOVA	$F = 0.501, P = 0.485$	
	Hg	One-way ANOVA	$F = 2.172, P = 0.164$	
	Mn	One-way ANOVA	$F = 0.977, P = 0.332$	
	Mo	One-way ANOVA	$F = 0.782, P = 0.384$	
	Ni	One-way ANOVA	$F = 0.034, P = 0.855$	
	Pb	One-way ANOVA	$F = 0.31, P = 0.582$	
	Se	One-way ANOVA	$F = 0.96, P = 0.336$	
	V	One-way ANOVA	$F = 3.508, P = 0.0723$	
	Zn	One-way ANOVA	$F = 8.097, P = 0.00836$	July 2020 < July 2021
	<i>post hoc results</i>			
Dania Beach sampling times in 2021 “peak-season” (May, June, July)	Ag	One-way ANOVA	-	
	As	One-way ANOVA	$F = 2.753, P = 0.0784$	
	Ba	Kruskal-Wallis	0.004341	June 2021 > May 2021
	<i>significant post hoc differences only</i>			
	Be	One-way ANOVA	$F = 0.053, P = 0.949$	
	Cd	One-way ANOVA	$F = 3.083, P = 0.0592$	
	Co	One-way ANOVA	$F = 0.462, P = 0.634$	

Cr	One-way ANOVA	$F = 10.36, P = 0.00322$
<i>post hoc results</i>		May 2021 > June 2021, July 2021
Cu	One-way ANOVA	$F = 6.742, P = 0.00351$
<i>post hoc results</i>		May 2021 > June 2021, July 2021
Hg	One-way ANOVA	All samples have 0 concentration
Mn	One-way ANOVA	$F = 1.935, P = 0.161$
Mo	Kruskal-Wallis	0.005473
<i>significant post hoc differences only</i>		May 2021 < July 2021
Ni	One-way ANOVA	$F = 1.501, P = 0.238$
Pb	One-way ANOVA	$F = 0.153, P = 0.859$
Se	One-way ANOVA	$F = 4.29, P = 0.0221$
<i>significant post hoc differences only</i>		May 2021 > June 2021
V	One-way ANOVA	$F = 0.951, P = 0.397$
Zn	One-way ANOVA	$F = 7.88, P = 0.00159$
<i>post hoc results</i>		July 2021 > June 2021, May 2021

Significant differences are indicated in bold. Post hoc results for one-way ANOVA were determined by a Tukey (HSD) test ($\alpha = 0.05$) and results for Kruskal-Wallis were determined using a Dunn test ($\alpha = 0.05$).

Table S6. Element concentrations (mean \pm SD) of sargasso in South Florida reported in mg kg⁻¹ dw from this study are indicated in blue rows. Element concentrations (mean \pm SD or range) of sargasso from previous studies reported in mg kg⁻¹ dw or ug g⁻¹ dw conducted in other countries are indicated in yellow rows. Maximum levels permitted by different countries in agricultural soils reported in ppm or mg kg⁻¹ dw are indicated in green rows.

Region	Morphotype	Ag	As	Ba	Be	Cd	Co	Cr	Cu	Hg	Mn	Mo	Ni	Pb	Se	V	Zn
Florida*	<i>S. fluitans</i> III	-	53.90 \pm 22.66	20.11 \pm 6.08	< LOD	0.43 \pm 0.11	0.60 \pm 0.08	0.40 \pm 0.24	2.58 \pm 0.56	< LOD	16.36 \pm 4.83	0.14 \pm 0.05	2.17 \pm 0.57	0.19 \pm 0.06	0.74 \pm 0.20	2.54 \pm 3.20	8.56 \pm 1.91
	<i>S. natans</i> I	0.25 \pm 0.31	39.86 \pm 16.25	22.75 \pm 6.68	< LOD	0.50 \pm 0.13	0.66 \pm 0.12	0.50 \pm 0.37	2.51 \pm 0.79	0.03 \pm 0.05	33.28 \pm 11.46	0.19 \pm 0.05	2.65 \pm 0.48	0.26 \pm 0.1	0.83 \pm 0.22	2.47 \pm 2.81	8.83 \pm 2.62
	<i>S. natans</i> VIII	0.05 \pm 0.05	52.38 \pm 19.33	19.04 \pm 6.31	< LOD	0.34 \pm 0.11	0.41 \pm 0.10	0.47 \pm 0.58	2.60 \pm 2.71	0.01 \pm 0.01	17.16 \pm 7.27	0.12 \pm 0.03	2.23 \pm 1.17	0.24 \pm 0.21	0.55 \pm 0.14	1.33 \pm 0.96	8.75 \pm 2.75
	Pelagic Sargassum	0.11 \pm 0.18	52.74 \pm 20.58	20.57 \pm 6.46	< LOD	0.44 \pm 0.13	0.56 \pm 0.15	0.43 \pm 0.41	2.54 \pm 1.63	0.01 \pm 0.03	22.06 \pm 11.36	0.15 \pm 0.05	2.40 \pm 0.81	0.22 \pm 0.14	0.70 \pm 0.22	2.05 \pm 2.53	8.73 \pm 2.41
Tropical Atlantic ¹	<i>S. fluitans</i> III		81 \pm 59			0.65 \pm 0.59	0.39 \pm 0.30	1.9 \pm 1.3	1.93 \pm 0.48		22 \pm 35		2.8 \pm 0.7	0.52 \pm 0.59		8.6 \pm 9.2	6.4 \pm 4.3
	<i>S. natans</i> I		72 \pm 25			0.80 \pm 0.64	0.42 \pm 0.27	0.9 \pm 0.6	1.68 \pm 0.47		28 \pm 28		3.3 \pm 1.0	0.45 \pm 0.53		7.3 \pm 8.4	5.3 \pm 3.1
	<i>S. natans</i> VIII		96 \pm 33			0.58 \pm 0.44	0.27 \pm 0.30	2.1 \pm 4.7	1.12 \pm 0.24		21 \pm 30		2.8 \pm 0.7	0.25 \pm 0.26		3.7 \pm 2.8	5.3 \pm 4.1
Tropical Atlantic ²	Pelagic <i>Sargassum</i>		87.92 \pm 13.87			0.70 \pm 0.09		4.16 \pm 1.11	1.53 \pm 0.49		19.42 \pm 5.69		3.07 \pm 0.26			1.33 \pm 0.08	6.68 \pm 0.83
Tropical Atlantic ²	Pelagic <i>Sargassum</i>		85.43 \pm 10.43			0.86 \pm 0.05		0.52 \pm 0.16	1.67 \pm 0.13		19.89 \pm 7.15		3.30 \pm 0.67			8.17 \pm 0.69	8.17 \pm 1.36
Tropical Atlantic ²	Pelagic <i>Sargassum</i>		95.93 \pm 13.17			1.01 \pm 0.11		0.735 \pm 0.37	<LOD		23.71 \pm 7.21		3.93 \pm 0.58			1.43 \pm 0.03	8.30 \pm 1.33
Tropical Atlantic ²	Pelagic <i>Sargassum</i>		88.60 \pm 8.78			1.05 \pm 0.81		0.72 \pm 0.12	2.15 \pm 0.81		22.82 \pm 6.48		3.95 \pm 0.25			2.24 \pm 0.64	5.30 \pm 1.30
Tropical Atlantic ²	Pelagic <i>Sargassum</i>		99.53 \pm 9.06			1.04 \pm 0.01		2.30 \pm 0.82	3.51 \pm 0.80		24.76 \pm 13.17		5.08 \pm 1.28			1.90 \pm 0.96	6.07 \pm 0.91
Tropical Atlantic ²	Pelagic <i>Sargassum</i>		88.23 \pm 8.78			82.88 \pm 120.15		4.66 \pm 1.60	3.87 \pm 0.69		24.27 \pm 8.29		5.86 \pm 2.25			1.38 \pm 0.26	7.11 \pm 0.86
Tropical Atlantic ²	Pelagic <i>Sargassum</i>		103.44 \pm 9.53			0.48 \pm 0.024		2.39 \pm 1.01	4.24 \pm 0.33		22.44 \pm 9.62		4.16 \pm 0.001			2.42 \pm 1.28	4.65 \pm 0.39
Tropical Atlantic ³	Pelagic <i>Sargassum</i>		225 \pm 1.1			0.24 \pm 0.005	1.49 \pm 0.12		3.31 \pm 0.1	0.03 \pm 0.001	23.0 \pm 0.23		9.32 \pm 0.20			31.9 \pm 1.99	13.2 \pm 0.20
Tropical Atlantic ³	Pelagic <i>Sargassum</i>		130 \pm 1.7			0.79 \pm 0.03	0.85 \pm 0.08		3.01 \pm 0.17	-	16.2 \pm 0.05		3.54 \pm 0.14			2.31 \pm 0.06	13.2 \pm 0.26
Tropical Atlantic ³	Pelagic <i>Sargassum</i>		146 \pm 4.9			0.64 \pm 0.02	0.67 \pm 0.05		2.96 \pm 0.01	0.02 \pm 0.001	31.1 \pm 0.84		5.43 \pm 0.11			12.4 \pm 1.54	17.3 \pm 0.38

Tropical Atlantic ³	Pelagic <i>Sargassum</i>		144 ± 4.5			0.555 ± 0.04	0.45 ± 0.07		3.21 ± 0.08	0.019	26.28 ± 0.56		4.81 ± 0.21			13.1 ± 5.52	3.72 ± 0.31
Tropical Atlantic ³	Pelagic <i>Sargassum</i>		134 ± 1.5			0.83 ± 0.01	0.54 ± 0.01		4.55 ± 0.12	0.018 ± 0.001	18.2 ± 0.84		3.71 ± 0.09			6.09 ± 0.19	4.28 ± 0.3
Tropical Atlantic ³	Pelagic <i>Sargassum</i>		124 ± 2.3			0.54 ± 0.01	0.86 ± 0.03		5.31 ± 0.61	2.01	48.2±0.67		7.19 ±0.23			1.72 ±0.08	24.6 ± 2.01
Tropical Atlantic ³	Pelagic <i>Sargassum</i>		116 ± 4.0			0.77 ± 0.01	0.44 ± 0.02		4.27 ± 0.17	0.015 ± 0.001	28.0±0.70		13.82 ±0.56			1.94±0.19	5.06 ± 0.36
Mexico ⁴	<i>S. fluitans</i> III		77.80 ± 5.1 2			0.54 ± 0.07	2.85 ± 0.22						4.57 ± 0.63				4.99 ± 0.62
Mexico ⁴	<i>S. natans</i> I		58.93 ± 3.4 9			0.58 ± 0.07	2.34 ± 0.19						6.15 ± 0.52				4.76 ± 0.57
Mexico ⁴	<i>S. natans</i> VIII		87.41 ± 5.6 4			0.77 ± 0.08	1.55 ± 0.15						4.19 ± 0.72				5.99 ± 1.28
Mexico ⁵	Pelagic <i>Sargassum</i>		65.70 ± 31.97			0.60 ± 0.69			0.63 ± 1.34						<0.20		3.65 ± 1.53
Mexico ⁵	Pelagic <i>Sargassum</i>		40.50 ± 6.97			1.27 ± 0.36			<0.20						<0.20		3.96 ± 2.16
Mexico ⁵	Pelagic <i>Sargassum</i>		43.20 ± 15.61			0.80 ± 0.53			0.32 ± 0.55						<0.20		5.82 ± 3.03
Mexico ⁵	Pelagic <i>Sargassum</i>		41.10 ± 10.87			1.36 ± 0.67			0.60 ± 0.84						<0.20		3.64 ± 1.04
Mexico ⁵	Pelagic <i>Sargassum</i>		29.00 ± 6.24			1.20 ± 0.35			0.90 ± 0.95						0.22 ± 0.48		7.20 ± 2.66
Mexico ⁵	Pelagic <i>Sargassum</i>		64.90 ± 5.29			0.32 ± 0.32			1.09 ± 1.61						0.29 ± 0.33		5.03 ± 1.53
Mexico ⁶	Pelagic <i>Sargassum</i>		24-172	<36		< 2	< 11	< 8	<6-540		40-139	< 1-7	< 10	< 2-3		< 3-13	< 5-17
Mexico ⁷	Pelagic <i>Sargassum</i>		55.91 ± 4.53	22.56 ± 2.24		0.40 ± 0.086	0.54 ± 0.02	0.69 ± 0.35	2.38 ± 0.16		11.03 ± 0.84		4.59 ± 0.84	0.50 ± 0.50		1.42 ± 0.18	4.84 ± 2.05
Mexico ⁷	Pelagic <i>Sargassum</i>		53.89 ± 1.30	19.63 ± 0.06		0.77 ± 0.20	0.70 ± 0.02	0.73 ± 0.15	2.25 ± 0.15		13.60 ± 0.30		4.72 ± 0.15	3.12 ± 1.76		5.38 ± 1.03	11.49 ± 2.39
Jamaica ⁸	<i>S. fluitans</i> III		58.32 ± 2.2 9	23.21 ± 0.4 2		0.57 ± 0.02	0.89 ± 0.06	9.18 ± 0.37	4.47 ± 0.20		22.92 ± 0.6 6		3.52 ± 0.08	1.11 ± 0.47		4.21 ± 0.43	7.2 ± 1.20
Jamaica ⁸	<i>S. natans</i> I		64.91 ± 0.61	22.17 ± 0.6 7		0.77 ± 0.43	0.91 ± 0.07	3.18 ± 0.99	4.29 ± 0.16		39.62 ± 0.3 6		4.21 ± 0.16	2.47 ± 1.79		2.37 ± 0.06	14.71 ± 1.9 8

Jamaica ⁸	<i>S. natans</i> VIII		60.30 ± 0.3 4	19.21 ± 0.6 5		0.40 ± 0.02	0.47 ± 0.03	1.50 ± 0.54	2.78 ± 0.14		13.03 ± 0.4 8		3.87 ± 0.10	0.33 ± 0.13		2.28 ± 0.18	6.35 ± 0.62
Jamaica ⁷	Pelagic <i>Sargassum</i>		86.84 ± 5.11	15.17 ± 1.77		0.39 ± 0.02	0.46 ± 0.07	1.47 ± 0.93	2.11 ± 0.11		22.30 ± 0.72		3.75 ± 0.34	0.85 ± 0.05		1.57 ± 0.20	3.87 ± 1.52
Turks and Caicos ⁹	<i>S. fluitans</i> III		26.25			0.12		0.43	2.91	0.01	<3			0.37			35.64
Turks and Caicos ⁹	<i>S. natans</i> I		29.76			0.12		ND	2.71	0.01	<3			0.28			30.88
Turks and Caicos ⁹	<i>S. natans</i> VIII		20.94			0.09		0.36	1.25	ND	<3			0.48			26.49
Turks and Caicos ¹⁰	Pelagic <i>Sargassum</i>		25.65			0.11		0.40	2.29	0.01	< 3			0.38			31.00
Turks and Caicos ¹¹	<i>S. fluitans</i> III		59.22 – 217.82			<LOD – 0.23		0.004–5.15						<LOD – 0.996			
Turks and Caicos ¹¹	<i>S. natans</i> I		123.81 – 198.36			<LOD – 0.392		<LOD – 0.399						<LOD – 0.499			
Turks and Caicos ¹¹	<i>S. natans</i> VIII		82.44 – 197.95			<LOD – 0.22		0.004–2.82						<LOD – 0.66			
Turks and Caicos ⁷	Pelagic <i>Sargassum</i>		123.69			0.13		<0.3	2.51		30.15			0.26			5.81
Ghana ¹²	Pelagic <i>Sargassum</i>		13-54			78-119			24-36					105-335			16-100
Dominican Republic ¹³	Pelagic <i>Sargassum</i>		14-42	7-17		0.1-3	0.4-1				16-32	0.6-3	10-33	1-2		1-3	13-21
Dominican Republic ¹⁴	Pelagic <i>Sargassum</i>		67.75 ± 1.5 4			<0.001	0.47 ± 0.01	0.5 ± 0.01	2.632 ± 0.03				0.201 ± 0.01	<0.01			11.46 ± 0.1 9
Dominican Republic ¹⁴	Pelagic <i>Sargassum</i>		35.19 ± 0.2 4			<0.001	0.54 ± 0.01	0.54 ± 0.01	2.302 ± 0.03				<0.001	0.35 ± 0.01			9.32 ± 0.11
Dominican Republic ¹⁴	Pelagic <i>Sargassum</i>		71.89 ± 1.3 6			<0.001	0.36 ± 0.01	0.15 ± 0.01	1.85 ± 0.01				<0.001	<0.01			3.83 ± 0.01
Dominican Republic ¹⁴	Pelagic <i>Sargassum</i>		73.99 ± 0.9 6			0.11 ± 0.01	0.31 ± 0.01	0.91 ± 0.03	2.364 ± 0.01				1.526 ± 0.14	0.74 ± 0.01			9.84 ± 0.07
Dominican Republic ¹⁴	Pelagic <i>Sargassum</i>		80.52 ± 1.1 3			<0.001	0.67 ± 0.02	0.98 ± 0.07	3.021 ± 0.02				0.506 ± 0.01	1.34 ± 0.08			10.84 ± 0.1 0
Dominican Republic ¹⁴	Pelagic <i>Sargassum</i>		88.49 ± 0.9 3			0.16 ± 0.01	0.06 ± 0.01	0.83 ± 0.03	1.609 ± 0.01				0.937 ± 0.04	0.8 ± 0.05			7.6 ± 0.10

Dominican Republic ¹⁴	Pelagic <i>Sargassum</i>		101.89 ± 1.57			<0.001	0.53 ± 0.01	0.41 ± 0.05	1.374 ± 0.02				<0.001	3.41 ± 0.10			8.96 ± 0.02
Dominican Republic ¹⁴	Pelagic <i>Sargassum</i>		95.38 ± 0.94			0.4 ± 0.01	0.23 ± 0.01	1.62 ± 0.02	2.642 ± 0.02				1.403 ± 0.08	1.19 ± 0.03			4.86 ± 0.04
Dominican Republic ⁷	Pelagic <i>Sargassum</i>		21.42 ± 0.93	26.93 ± 0.82		0.35 ± 0.01	0.47 ± 0.02	1.99 ± 0.36	3.53 ± 0.02		14.49 ± 0.17		4.40 ± 0.62	0.45 ± 0.19		2.18 ± 0.09	13.73 ± 2.99
Nigeria ¹⁵	Pelagic <i>Sargassum</i>																0.5
Austria			50 ¹⁶			5 ¹⁶		100 ¹⁷	100 ¹⁸			10 ¹⁶		100 ¹⁷			
Britain			20 ¹⁶			1 ¹⁶		50 ¹⁷	100					100 ¹⁷			
Canada			25 ¹⁶			8 ¹⁶		75 ¹⁷	100 ¹⁷			2 ¹⁶		200 ¹⁷			
Germany									140 ¹⁷					300 ¹⁷			
EU			40 ¹⁶			1 ¹⁶		200 ¹⁷	200 ¹⁷					1000 ¹⁷			
Japan			15 ¹⁶						125 ¹⁷					400 ¹⁷			
Mexico			22 ¹⁸			37 ¹⁸		280 ¹⁸						400 ¹⁸			
Poland			30 ¹⁶			3 ¹⁶		100 ¹⁷	100 ¹⁷			10 ¹⁶		100 ¹⁷			

* This study

¹ Gobert et al. 2022

² Cipolloni et al. 2022

³ Dassié et al. 2021

⁴ Ortega-Flores et al. 2022

⁵ Vásquez-Delfín et al. 2021

⁶ Rodríguez-Martínez et al. 2020

⁷ Tonon et al. 2022

⁸ Davis et al. 2021

⁹ Milledge et al. 2020

¹⁰ Milledge et al. 2010

¹¹ Nielsen et al. 2021

¹² Addico and deGraft-Johnson 2016

¹³ Fernández et al. 2017

¹⁴ Liranzo-Gómez et al. 2023

¹⁵ Oyesiku and Egunyomi 2014

¹⁶ Galán and Romero 2008

¹⁷ Belmonte et al. 2010

¹⁸ NOM-147-SEMARNAT-SSA 11-2004

Supplemental Figures

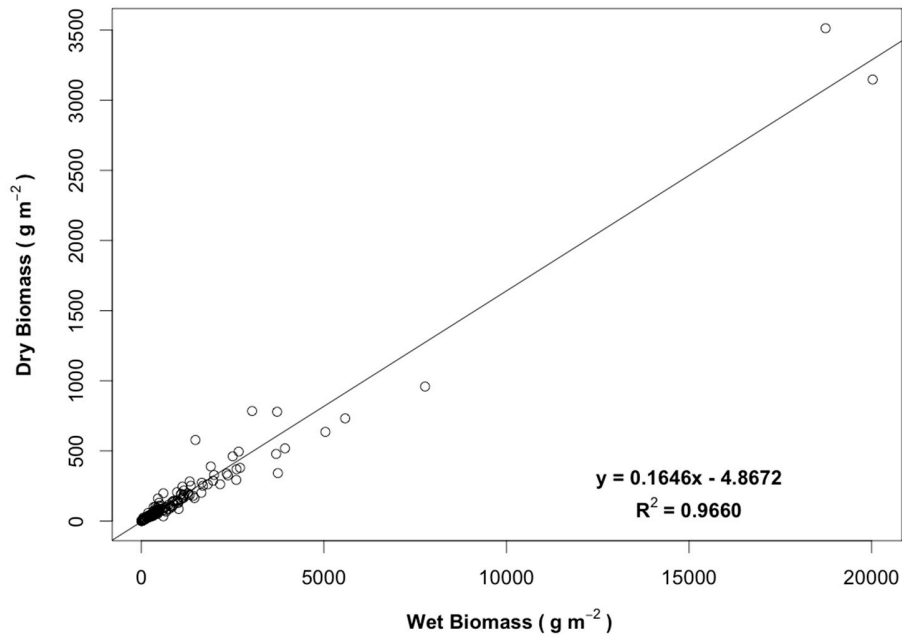


Figure S1. Relationship between wet weight and dry weight measurements taken for sargasso at both Dania Beach and Crandon Park for all sampling time

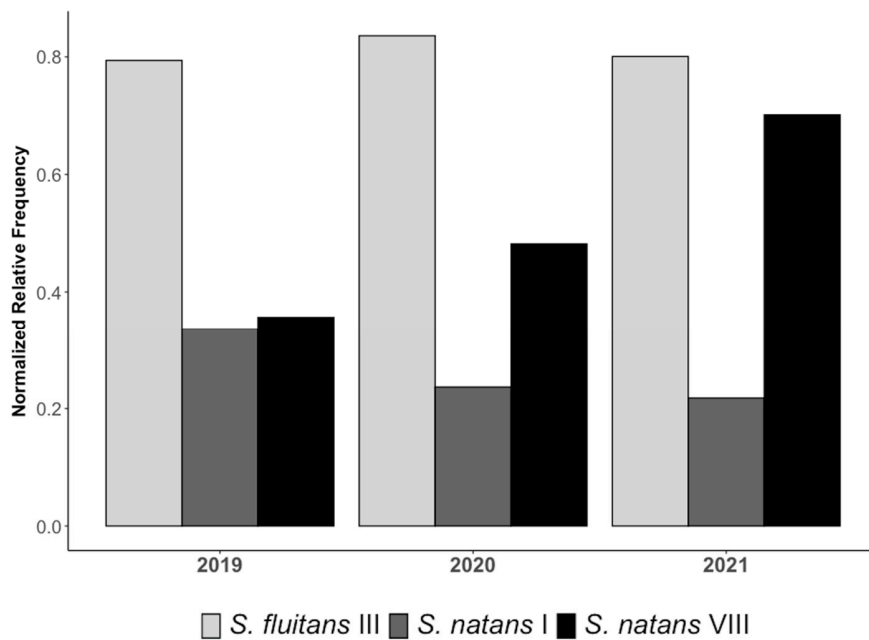


Figure S2: Interannual relative frequency of sargasso morphotypes collected from citizen science data at Dania Beach from 2019 to 2021

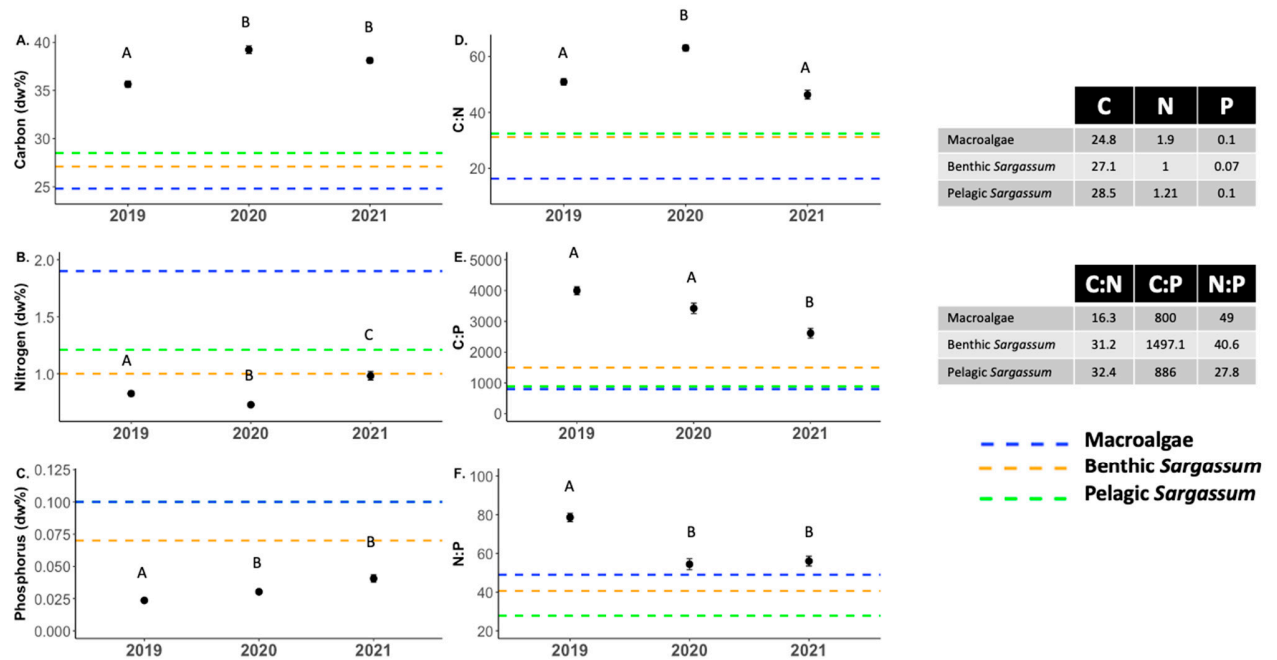


Figure S3: (A–C) Annual average carbon, nitrogen, and phosphorus tissue contents of sargasso and (D–F) annual average carbon, nitrogen, and phosphorus molar ratios of sargasso collected at Dania Beach from 2019 to 2021. The blue dashed line represents the average nutrient content values for macroalgae reported by Duarte in 1992 [43]. The orange dotted line represents the average nutrient content value for benthic *Sargassum* obtained by averaging published values of nutrient content for *Sargassum* spp. [44–46]. The green dashed line represents the average nutrient content value for sargasso reported by Lapointe et al. in 2021 [21]. The green dashed line in panel (C) is overlapping with the value reported in the blue dashed line for macroalgae. Different letters indicate post hoc analyses (Dunn test) when nutrient content differed across years.

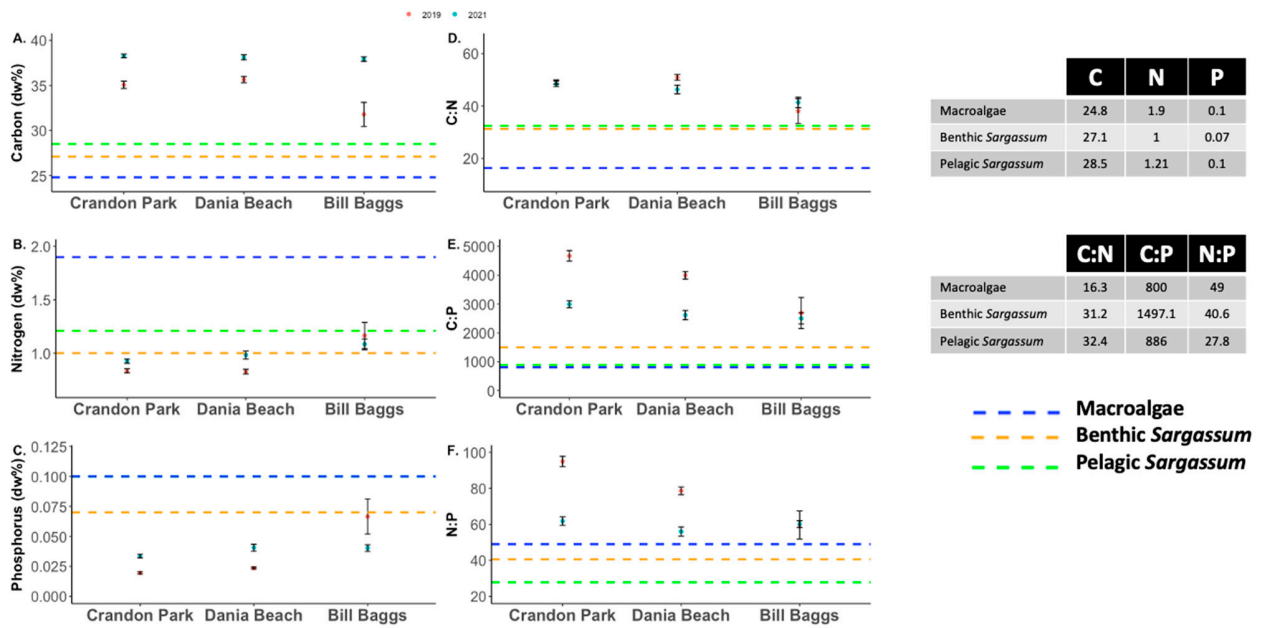


Figure S4: (A–C) Annual average carbon, nitrogen, and phosphorus tissue contents of sargasso and (D–F) annual average carbon, nitrogen, and phosphorus molar ratios of sargasso collected at all three sites in 2019 and 2021. The blue dashed line represents the average nutrient content value for macroalgae reported by Duarte in 1992 [43]. The orange dotted line represents the average nutrient content value for benthic *Sargassum* obtained by averaging published values of nutrient content for *Sargassum* spp. [44–46]. The green dashed line represents the average nutrient content values for sargasso reported by Lapointe et al. in 2021 [21]. The green dashed line in panel (C) is overlapping with the value reported in the blue dashed line for macroalgae. Different letters indicate post hoc analyses (Dunn test) when nutrient content differed across sites and years.

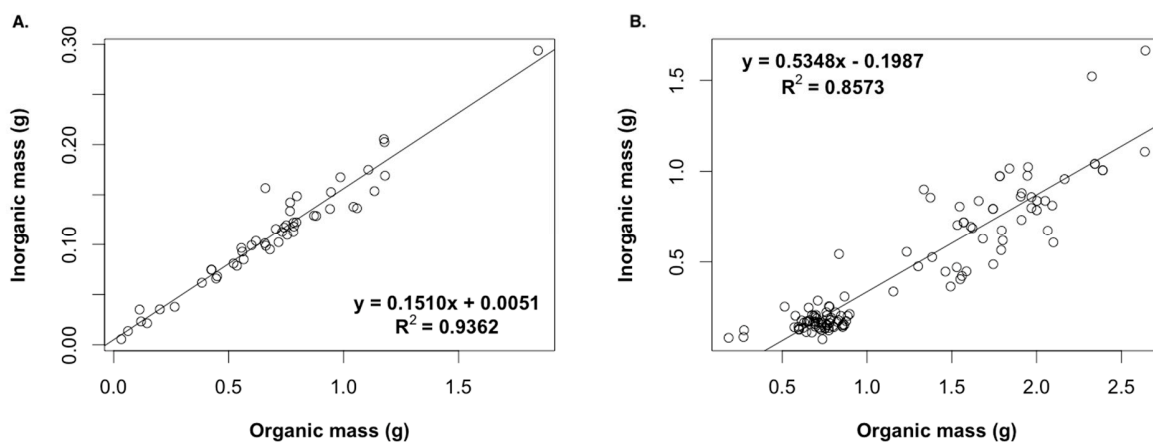


Figure S5: Relationship between organic and inorganic mass of sargasso in (A) cleaned and (B) uncleaned specimens of sargasso.