

Table S1. Summary of 2 way ANOVA results for *Z. marina* metrics. Main effects were temperature (Temp; warm and cold), water residence time (RT; slow, medium, fast), and the interaction term Temp x RT for each dependent variable. Df = degrees of freedom, MS = mean square. **Bold** font for p-values < 0.05. ^a Above + below-ground tissues

Tissue	Dependent	Source	df	MS	F-ratio	p
Total	Biomass ^a (gdw)	Temp	1	280.0	52.93	<0.0001
		RT	2	8.1	1.53	0.2551
		T x RT	2	10.6	2.00	0.1774
		Error	12	5.2		
		Total	17			
Leaf	Terminal shoot weight (gdw shoot ⁻¹)	Temp	1	0.005	2.57	0.134
		RT	2	0.004	1.92	0.187
		T x RT	2	0.014	6.58	0.011
		Error	12	0.002		
		Total	17			
	Lateral shoot weight (gdw shoot ⁻¹)	Temp	1	0.002	7.79	0.016
		RT	2	0.0003	1.01	0.393
		T x RT	2	0.0003	1.14	0.352
		Error	12	0.0003		
		Total	17			
	Total density (shoots tank ⁻¹)	Temp	1	440.0	39.60	0.0003
		RT	2	0.055	0.005	0.995
		T x RT	2	2.05	0.185	0.833
		Error	12	11.11		
		Total	17			
	Lateral density (shoot tank ⁻¹)	Temp	1	288	39.57	0.0004
		RT	2	0.888	0.122	0.886
		T x RT	2	2	0.274	0.764
		Error	12	7.277		
		Total	17			
Dead shoots (shoots tank ⁻¹)	Temp	1	12.5	11.25	0.005	
	RT	2	0.388	0.35	0.711	
	T x RT	2	1.166	1.05	0.379	
	Error	12	1.111			
	Total	17				
Tot. sugars (mg gdw ⁻¹)	Temp	1	16389	66.6	<0.0001	
	RT	2	58.6	0.23	0.788	
	T x RT	2	28.8	0.12	0.889	
	Error	48	245.8			

	Total	53			
Sucrose (mg gdw ⁻¹)	Temp	1	693	20.8	<0.0001
	RT	2	60.8	1.8	0.171
	T x RT	2	61.5	1.8	0.168
	Error	48	33.2		
	Total	53			
Glucose (mg gdw ⁻¹)	Temp	1	1310	53.4	<0.0001
	RT	2	15.1	0.618	0.542
	T x RT	2	5.4	0.221	0.802
	Error	48	24.5		
	Total	53			
Fructose (mg gdw ⁻¹)	Temp	1	4289	79.1	<0.0001
	RT	2	30.4	0.562	0.573
	T x RT	2	53.0	0.979	0.382
	Error	48	54.1		
	Total	53			
Elongation (cm shoot ⁻¹ d ⁻¹)	Temp	1	166.6	22.15	0.0001
	RT	2	3.8	0.50	0.602
	T x RT	2	12.9	1.71	0.186
	Error	81	7.5		
	Total	86			
Growth (mg dw shoot ⁻¹ d ⁻¹)	Temp	1	236.5	10.40	0.001
	RT	2	18.11	0.796	0.454
	T x RT	2	13.56	0.596	0.553
	Error	81	22.74		
	Total	86			
Areal weight (mg dw cm ⁻²)	Temp	1	3.00	5.22	0.024
	RT	2	0.422	0.73	0.483
	T x RT	2	1.14	1.98	0.144
	Error	81	0.57		
	Total	86			
δ ¹³ C (‰)	Temp	1	37.82	49.27	<0.0001
	RT	2	13.86	18.07	<0.0001
	T x RT	2	0.58	0.75	0.472
	Error	79	0.76		
	Total	84			
%C (%)	Temp	1	54.42	50.74	<0.0001
	RT	2	4.65	4.34	0.016

		T x RT	2	1.25	1.17	0.314
		Error	79	1.07		
		Total	84			
	$\delta^{15}\text{N}$ (‰)	Temp	1	17.86	2.91	0.091
		RT	2	26.38	4.30	0.016
		T x RT	2	15.86	2.58	0.081
		Error	79	6.12		
		Total	84			
	%N (%)	Temp	1	0.699	6.52	0.012
		RT	2	0.099	0.93	0.397
		T x RT	2	0.094	0.88	0.417
		Error	79	0.107		
		Total	84			
	C:N	Temp	1	57.34	19.14	<0.0001
		RT	2	4.84	1.61	0.204
		T x RT	2	1.54	0.515	0.599
		Error	79	2.99		
		Total	84			
Rhizome	Tot. sugar (mg gdw ⁻¹)	Temp	1	7215	9.10	0.004
		RT	2	131.7	0.16	0.847
		T x RT	2	1129	1.42	0.250
		Error	48	792		
		Total	53			
	Sucrose (mg gdw ⁻¹)	Temp	1	49668	86.8	<0.0001
		RT	2	721	1.2	0.292
		T x RT	2	1361	2.4	0.103
		Error	48	571		
		Total	53			
	Glucose (mg gdw ⁻¹)	Temp	1	3005	49.7	<0.0001
		RT	2	21.6	0.36	0.700
		T x RT	2	15.6	0.25	0.772
		Error	48	60.3		
		Total	53			
	Fructose (mg gdw ⁻¹)	Temp	1	6905	81.3	<0.0001
		RT	2	152.7	1.8	0.176
		T x RT	2	41.3	0.5	0.617
		Error	48	84.8		
		Total	53			

Table S2. Summary of ANOVA results for green macroalgae (GMA) and surface microalgal (SMA) metrics. Main effects were temperature (Temp; warm and cold), water residence time (RT; slow, medium, fast), and the interaction term Temp x RT for each dependent variable. Df = degrees of freedom, MS = mean square. **Bold** font used to denote P value < 0.05.

Plant	Depend	Source	Df	MS	F-ratio	P value
GMA	Biomass (gdw)	Temp	1	23.75	5.21	0.041
		RT	2	21.26	4.66	0.031
		T x RT	2	3.40	0.74	0.494
		Error	12	4.55		
		Total	17			
	Growth (mg dw d ⁻¹)	Temp	1	0.049	5.23	0.041
		RT	2	0.040	4.23	0.040
		T x RT	2	0.005	0.54	0.592
		Error	12	0.009		
		Total	17			
	$\delta^{13}\text{C}$ (‰)	Temp	1	8.36	6.8	0.022
		RT	2	21.5	17.5	0.0002
		T x RT	2	8.0	6.5	0.011
		Error	12	1.2		
		Total	17			
$\delta^{15}\text{N}$ (‰)	Temp	1	118.0	30.3	0.0001	
	RT	2	5.5	1.4	0.279	
	T x RT	2	6.8	1.7	0.214	
	Error	12	3.8			
	Total	17				
SMA	SMA (mg Chl <i>a</i> tank ⁻¹)	Temp	1	6802	31.6	<0.0001
		RT	2	974	4.5	0.034
		T x RT	2	168	0.78	0.477
		Error	12	214		
		Total	17			

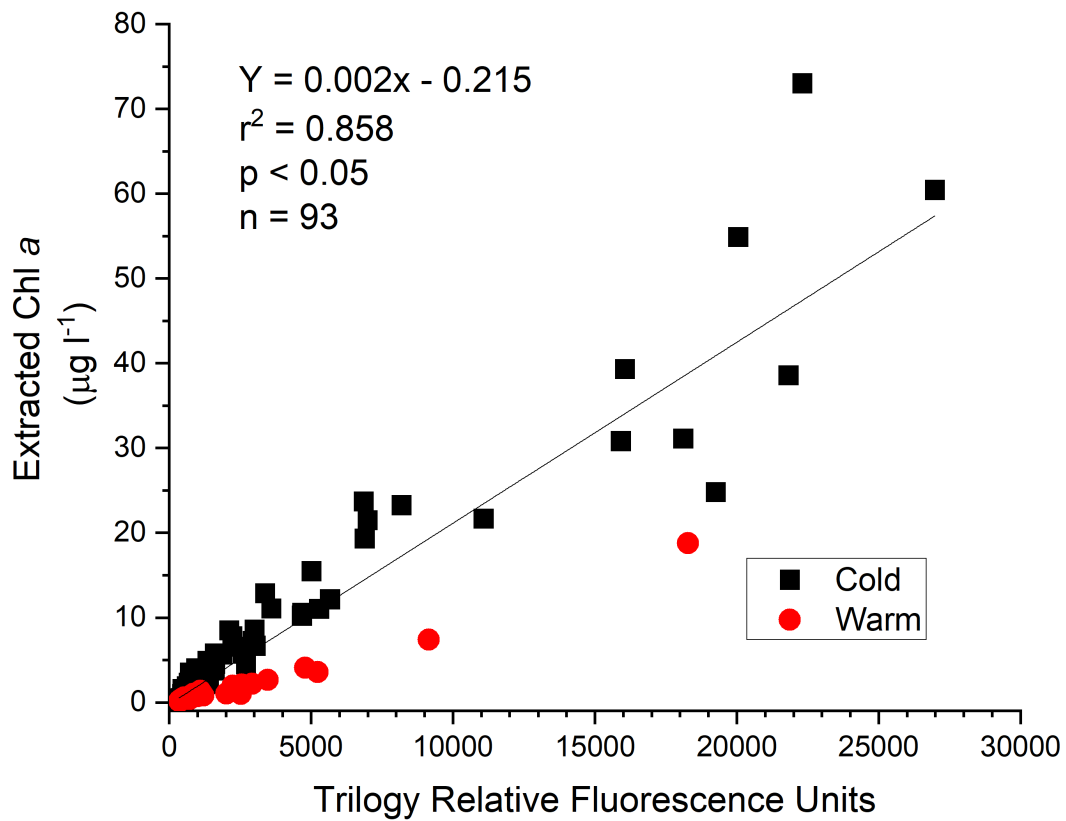


Figure S1. Relationship between Relative Fluorescence Units (RFU) and extracted Chl *a* concentration from the same sample during the warm and cold mesocosm experiments. Combined data were used to convert measured RFU into estimated Chl *a* concentrations.

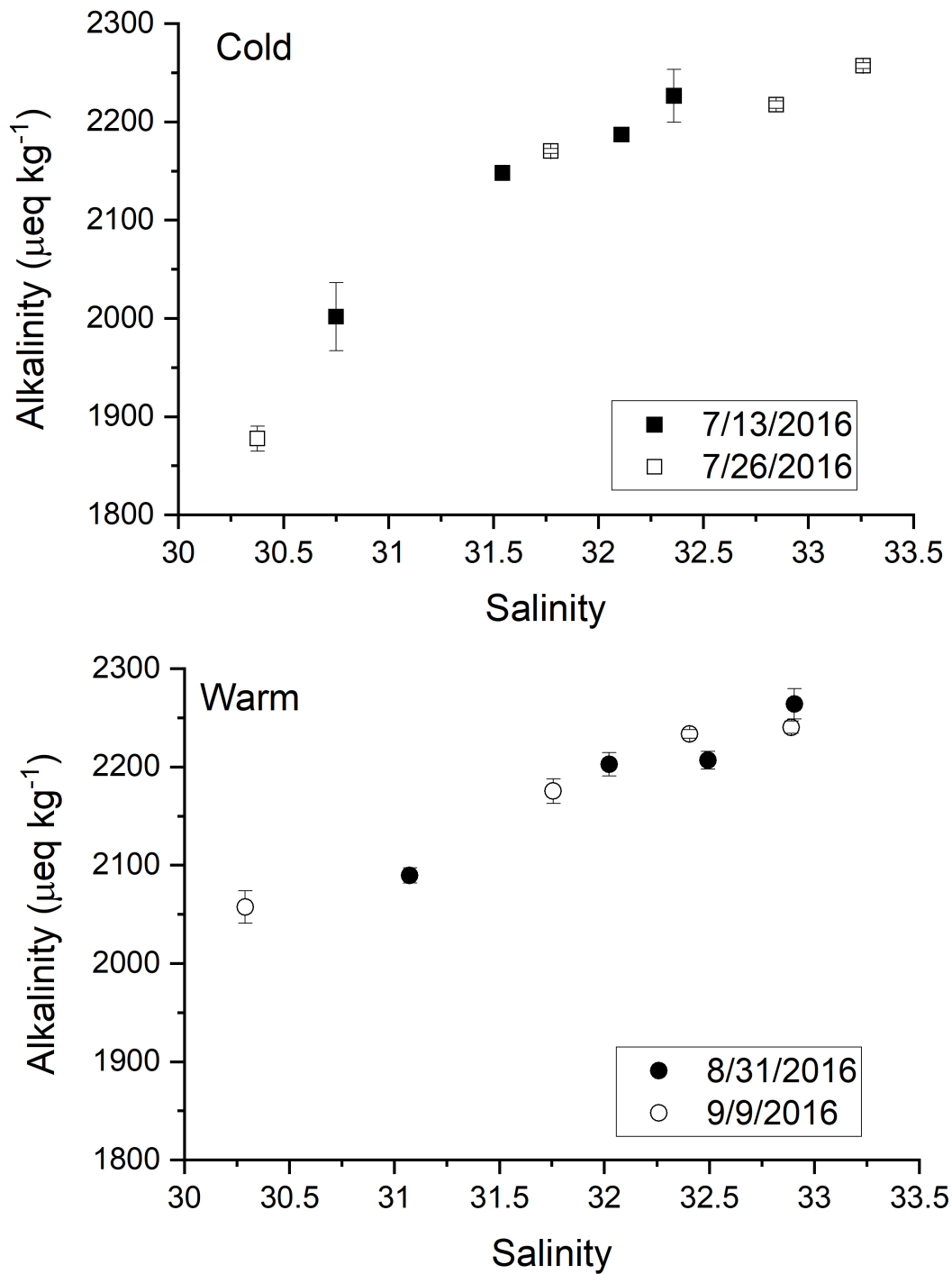


Figure S2. Plot of alkalinity ($\mu\text{eq kg}^{-1}$) versus salinity for the 10 d residence time treatments during the warm and cold experiments. Lowered salinity was an artifact of daily addition of 4 liter nutrient solution aliquots in Milli-Q water.