Table S1. Summary statistics from a field survey conducted in *Zostera marina* beds in July 2014 in Shinnecock Bay, NY to evaluate natural *Dyspanopeus sayi*, *Mytilus edulis* and *Z. marina* shoot densities. Three different *Z. marina* beds were evaluated. At each eelgrass bed, three 1 m^2 quadrats were suction sampled and *D. sayi* individuals greater than 10 mm in carapace width (CW) were measured and sexed. Adjacent to the 1 m^2 quadrates, six 0.625 m^2 quadrats measuring *Z. marina* shoot were taken. Additionally, mussels were excavated from the quadrat and counted. Shell heights (SH) were measured for mussels greater than 40 mm SH. Of the remaining mussels less than 40 mm SH, 30 mussels were randomly selected to obtain an SH range.

Metric	Mean	SD	Range	Sample size
Mud crab density (per m^2)	21	9		9
Mussel <40 mm density (per m^2)	3365	2684		12
Mussel >40 mm density (per m^2)	133	264		12
Mussel size (<40 mm)	6.5	3.1	3–39	12
Mussel size (>40 mm)	47	4.2		12
Shoot density (per m^2)	447	223	192–1024	12
Aboveground dried biomass (g per m^2)	58.7	44.7		12
Belowground dried biomass (g per m^2)	231.0	133.1		12

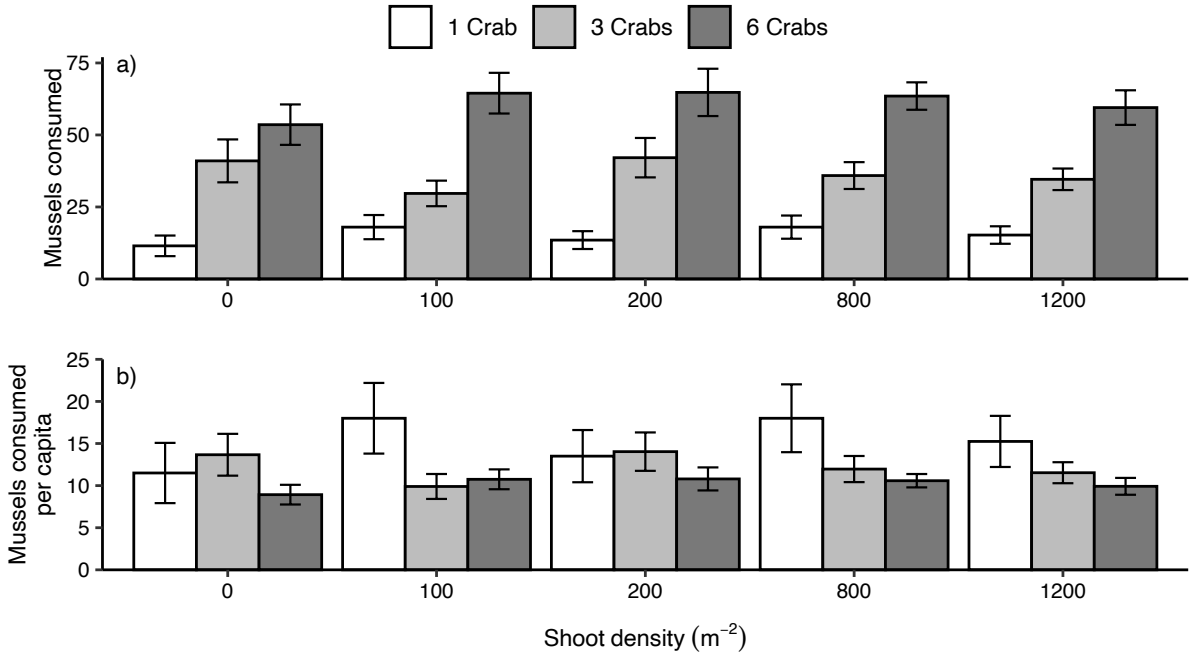

Figure S1. Mean total (a) and per capita (b) number of mussels consumed by *Dyspanopeus sayi* across increasing mimicked *Zostera marina* shoot density treatments when predator density increased from one to three to six. The error bars are ± 1 SE.

Table S2. Type II Wald chi-square test results for the linear mixed model on the effect of crab and shoot density on total number of mussels consumed.

Response variable:	Total mussel consumption		
Parameter	df	X^2	p
Crab density	2	450.34	<0.001
Shoot density	4	3.36	0.50
Crab density: shoot density	8	15.85	0.045

Table S3. Post-hoc pairwise comparisons of total mussel consumption using the Tukey method among the three crab densities at each shoot density treatment.

Contrast	df	*t*	p
0 m^{-2} Shoot density			
1 Crab: 3 crabs	114	–6.29	<0.001
1 Crab: 6 crabs	114	–8.38	<0.001
3 Crabs: 6 crabs	114	–2.50	0.036
100 m^{-2} Shoot density			
1 Crab: 3 crabs	114	–2.56	0.030
1 Crab: 6 crabs	114	–9.67	<0.001
3 Crabs: 6 crabs	114	–7.27	<0.001
200 m^{-2} Shoot density			
1 Crab: 3 crabs	114	–6.10	<0.001
1 Crab: 6 crabs	114	–10.9	<0.001
3 Crabs: 6 crabs	114	–4.69	<0.001
800 m^{-2} Shoot density			
1 Crab: 3 crabs	114	–3.92	<0.001
1 Crab: 6 crabs	114	–9.97	<0.001
3 Crabs: 6 crabs	114	–6.05	<0.001
1200 m^{-2} Shoot density			
1 Crab: 3 crabs	114	–3.83	<0.001
1 Crab: 6 crabs	114	–8.29	<0.001
3 Crabs: 6 crabs	114	–4.91	<0.001

Table S4. Type II Wald chi-square test results for the linear mixed model on the effect of crab and shoot density on per capita mussel consumption.

Response Variable:		Mussels consumption per capita	
Parameter	df	X^2	p
Crab density	2	5.75	0.056
Shoot density	4	1.51	0.820
Crab density: shoot density	8	8.97	0.340

Table S5. Post-hoc pairwise comparisons of mussel consumption per capita using the Tukey method among the crab densities.

Contrast	df	*t*	p
1 crab: 3 crabs	114	1.11	0.510
1 crab: 6 crabs	114	2.41	0.046
3 crabs: 6 crabs	114	1.35	0.370

Table S6. Number of replicates that either had more than 2 legs missing or at least one damaged crab claw. A crab claw was considered damaged if it was cracked or part of the claw was missing. Since no single-crab treatments had a damaged claw or missed more than 2 legs, these differences were assumed to be due to antagonistic interactions and not damage from consuming mussels.

Treatment	Number of replicates		
	Crab missing >2 legs	Crab with damaged claw	Total
1 crab	0	0	49
3 crabs	1	4	48
6 crabs	0	7	43

Table S7. Type II Wald chi-square test results for the linear mixed model comparing the effect of shoot density on the observed versus estimated (i.e. null model) proportion of mussels consumed by six crabs.

Response variable:	Proportion of mussels consumed		
Parameter	df	X^2	p
Null vs observed	1	3.07	0.080
Shoot density	4	4.70	0.320
Null vs observed: shoot density	4	9.07	0.059

Table S8. Post-hoc pairwise comparisons between null and observed proportion of mussels consumed using the Tukey method at each shoot density treatment.

Null: Observed	df	*t*	p
0 m^{-2}	71	1.15	0.250
100 m^{-2}	71	–3.02	0.004
200 m^{-2}	71	–0.32	0.750
800 m^{-2}	71	–1.21	0.230
1200 m^{-2}	71	–0.40	0.690