

**Figure S1.** Generalized Estimating Equation model predictions for site-by-site means for total egg cluster abundance as well as predictions for a continuous variable representing position along the shoreline from the lower bay to upper bay. Estimates control for variation due to year, sampling interval, sand depth and management (reference vs restoration).

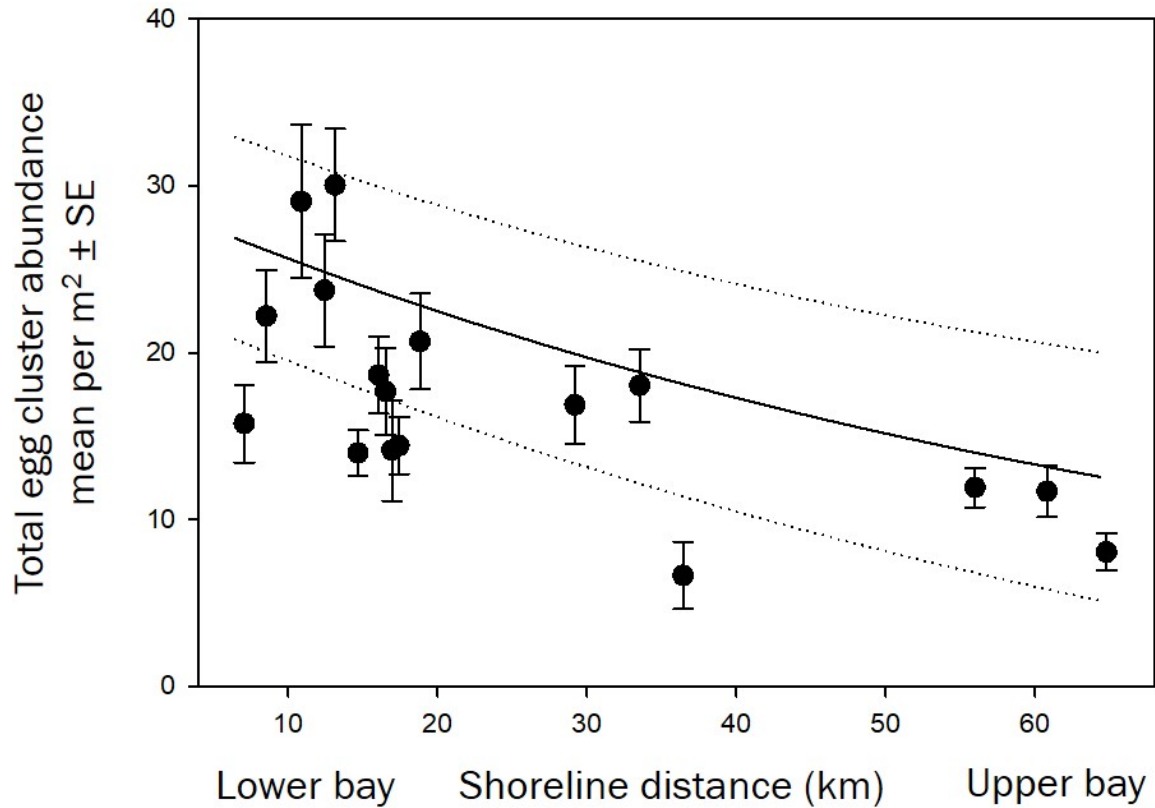


Table S1. Parameter estimates for the Generalized Estimating Equation for the effect of site, year, sampling interval, sand depth and restoration sand grain size on egg cluster abundance at the egg-stage. For the categorical year, sampling week and grain size variables, statistical comparisons for each level of the variable are made against the categories with blank rows.

Parameter	$\beta$	SE	Lower CI	Upper CI	Chi-Square	df	Sig.
Intercept	-2.11	0.39	-2.88	-1.35	29.21	1	< 0.0001
2014	-0.28	0.11	-0.50	-0.07	6.74	1	0.009
2015	0.58	0.07	0.44	0.72	66.25	1	< 0.0001
2016							
Sampling week 1	1.53	0.15	1.24	1.82	106.99	1	< 0.0001
Sampling week 2	1.64	0.13	1.39	1.90	158.93	1	< 0.0001
Sampling week 3	2.03	0.15	1.74	2.32	185.88	1	< 0.0001
Sampling week 4	2.37	0.14	2.10	2.64	292.34	1	< 0.0001
Sampling week 5	2.23	0.14	1.95	2.52	243.81	1	< 0.0001
Sampling week 6	1.83	0.15	1.55	2.12	157.09	1	< 0.0001
Sampling week 7	1.40	0.14	1.12	1.68	97.90	1	< 0.0001
Sampling week 8	0.81	0.14	0.53	1.09	32.05	1	< 0.0001
Sampling week 9							
Natural reference	0.12	0.17	-0.22	0.46	0.47	1	0.49
Coarse	0.58	0.16	0.27	0.89	13.71	1	< 0.0001
Fine							
Sand depth	0.07	0.01	0.06	0.08	93.01	1	< 0.0001
Baycove	0.18	0.11	-0.04	0.40	2.57	1.00	0.11
Cooks	-0.27	0.27	-0.80	0.26	0.99	1.00	0.32
Cape Shore Lab	0.32	0.14	0.03	0.60	4.79	1.00	0.03
Dyers Cove	-0.42	0.18	-0.76	-0.08	5.74	1.00	0.02
East Point	-0.71	0.29	-1.28	-0.14	5.95	1.00	0.02
Fortescue	-0.17	0.15	-0.46	0.12	1.29	1.00	0.26
Gandys	-0.62	0.14	-0.90	-0.35	19.78	1.00	< 0.0001
Green Creek	0.72	0.18	0.37	1.07	15.98	1.00	< 0.0001
Higs	0.66	0.12	0.42	0.89	30.09	1.00	< 0.0001
Kimbles	-0.06	0.18	-0.41	0.30	0.10	1.00	0.76
Moores	0.21	0.18	-0.14	0.57	1.37	1.00	0.24
N. Reeds	0.34	0.15	0.05	0.63	5.36	1.00	0.02
Pierces Point	-0.10	0.17	-0.43	0.24	0.33	1.00	0.57
S. Reeds	-0.20	0.16	-0.52	0.12	1.52	1.00	0.22
Sunray	0.34	0.10	0.14	0.54	11.34	1.00	< 0.0001
Thompsons	0.26	0.14	-0.02	0.53	3.40	1.00	0.07
Villas							

Table S2. Parameter estimates for the Generalized Estimating Equation for the effect of site, year, sampling interval, sand depth and restoration sand grain size on developed-stage egg cluster abundance. For the categorical year, sampling week and grain size variables, statistical comparisons for each level of the variable are made against the categories with blank rows.

Parameter	$\beta$	SE	Lower CI	Upper CI	Chi-Square	df	Sig.
Intercept	-1.08	0.58	-2.21	0.06	3.48	1	0.062
2014	0.65	0.17	0.30	0.99	13.65	1	< 0.0001
2015	0.69	0.10	0.49	0.90	43.96	1	< 0.0001
2016							
Sampling week 4	-1.90	0.19	-2.28	-1.53	99.68	1	< 0.0001
Sampling week 5	-1.14	0.15	-1.43	-0.84	56.68	1	< 0.0001
Sampling week 6	-0.62	0.15	-0.92	-0.32	16.59	1	< 0.0001
Sampling week 7	0.34	0.12	0.11	0.57	8.55	1	< 0.0001
Sampling week 8	0.25	0.13	0.00	0.51	3.97	1	0.046
Sampling week 9							
Natural reference	0.79	0.31	0.19	1.39	6.57	1	0.010
Coarse	0.83	0.33	0.19	1.47	6.38	1	0.012
Fine							
Sand depth	0.07	0.01	0.04	0.09	31.71	1	< 0.0001
Baycove	0.09	0.19	-0.29	0.46	0.20	1.00	0.66
Cooks	0.42	0.33	-0.22	1.06	1.64	1.00	0.20
Cape Shore Lab	0.09	0.18	-0.26	0.44	0.28	1.00	0.60
Dyers Cove	0.22	0.33	-0.43	0.86	0.43	1.00	0.51
East Point	-1.69	0.44	-2.55	-0.83	14.91	1.00	< 0.0001
Fortescue	-0.50	0.27	-1.02	0.03	3.42	1.00	0.07
Gandys	-0.42	0.32	-1.03	0.20	1.73	1.00	0.19
Green Creek	0.15	0.26	-0.35	0.66	0.35	1.00	0.55
Highs	0.26	0.15	-0.04	0.55	2.79	1.00	0.10
Kimbles	0.84	0.35	0.15	1.54	5.68	1.00	0.02
Moores	-0.29	0.33	-0.94	0.35	0.79	1.00	0.37
N. Reeds	-0.41	0.23	-0.86	0.04	3.25	1.00	0.07
Pierces Point	-0.03	0.21	-0.45	0.39	0.02	1.00	0.89
S. Reeds	0.26	0.28	-0.30	0.81	0.82	1.00	0.36
Sunray	0.06	0.18	-0.30	0.42	0.11	1.00	0.74
Thompsons	-0.15	0.28	-0.70	0.41	0.27	1.00	0.60
Villas							

Table S3. Parameter estimates for the Generalized Estimating Equation for the effect of site, year, sampling interval, sand depth and restoration sand grain size on total egg cluster abundance (egg and developed stages). For the categorical year, sampling week and grain size variables, statistical comparisons for each level of the variable are made against the categories with blank rows

Parameter	$\beta$	SE	Lower CI	Upper CI	Chi-Square	df	Sig.
Intercept	-0.65	0.35	-1.33	0.03	3.48	1	0.06
2014	-0.16	0.10	-0.36	0.04	2.51	1	0.113
2015	0.48	0.07	0.34	0.61	46.76	1	< 0.0001
2016							
Sampling week 1	-0.12	0.10	-0.32	0.08	1.31	1	0.25
Sampling week 2	0.01	0.10	-0.19	0.20	0.01	1	0.93
Sampling week 3	0.38	0.10	0.18	0.58	13.66	1	< 0.0001
Sampling week 4	0.79	0.09	0.60	0.97	69.44	1	< 0.0001
Sampling week 5	0.79	0.09	0.61	0.98	70.67	1	< 0.0001
Sampling week 6	0.62	0.11	0.41	0.83	33.93	1	< 0.0001
Sampling week 7	0.67	0.09	0.48	0.85	49.83	1	< 0.0001
Sampling week 8	0.39	0.10	0.19	0.58	14.37	1	< 0.0001
Sampling week 9							
Natural reference	0.23	0.20	-0.15	0.62	1.41	1	0.24
Coarse	0.62	0.19	0.24	0.99	10.08	1	< 0.0001
Fine							
Sand depth	0.072	0.01	0.06	0.09	128.05	1	< 0.0001
Baycove	0.17	0.13	-0.09	0.43	1.60	1.00	0.21
Cooks	-0.11	0.27	-0.63	0.42	0.16	1.00	0.69
Cape Shore Lab	0.41	0.15	0.11	0.71	7.37	1.00	0.007
Dyers Cove	-0.30	0.19	-0.67	0.08	2.45	1.00	0.12
East Point	-0.86	0.31	-1.47	-0.26	7.77	1.00	0.01
Fortescue	-0.28	0.17	-0.62	0.06	2.63	1.00	0.11
Gandys	-0.67	0.14	-0.95	-0.40	22.65	1.00	< 0.0001
Green Creek	0.61	0.17	0.28	0.95	12.99	1.00	< 0.0001
Highs	0.65	0.11	0.42	0.87	31.85	1.00	< 0.0001
Kimbles	0.12	0.22	-0.32	0.55	0.28	1.00	0.60
Moores	0.07	0.21	-0.34	0.48	0.11	1.00	0.74
N. Reeds	0.27	0.15	-0.02	0.57	3.30	1.00	0.069
Pierces Point	-0.12	0.18	-0.46	0.23	0.46	1.00	0.50
S. Reeds	-0.09	0.19	-0.46	0.28	0.22	1.00	0.64
Sunray	0.34	0.13	0.09	0.59	7.28	1.00	0.007
Thompsons	0.14	0.16	-0.17	0.44	0.76	1.00	0.39
Villas							

Table S4. Parameter estimates for the Generalized Estimating Equation for the effect of year, sampling interval, sand depth and restoration sand grain size on dead egg cluster abundance that succumbed to dessication or anoxia. For the categorical year, sampling week and grain size variables, statistical comparisons for each level of the variable are made against the categories with blank rows

Parameter	$\beta$	SE	Lower CI	Upper CI	Chi-Square	df	Sig.
Intercept	0.39	0.61	-0.81	1.58	0.40	1	0.53
2015	0.03	0.21	-0.38	0.44	0.02	1	0.89
2016							
sampling week 6	-1.79	0.34	-2.46	-1.12	27.72	1	<0.0001
sampling week 7	-0.98	0.21	-1.38	-0.57	22.29	1	<0.0001
sampling week 8	0.06	0.17	-0.26	0.39	0.14	1	0.71
sampling week 9							
Sand depth	0.01	0.01	-0.01	0.04	0.99	1	0.32
Natural reference	0.14	0.36	-0.57	0.86	0.16	1	0.69
Coarse	0.51	0.37	-0.21	1.23	1.94	1	0.16
Fine							

Table S5. Parameter estimates for the top ranked Generalized Estimating Equation model for the effect of sampling interval, sand depth and percent coarse sand fraction on egg cluster abundance across all sampled beaches in 2016. For the categorical sampling week variable, statistical comparisons for each level of the variable are made against sampling week 9.

Parameter	$\beta$	SE	Lower CI	Upper CI	Chi-Square	df	Sig.
Intercept	-1.35	0.45	-2.23	-0.47	9.00	1.00	< 0.001
sampling week 1	-0.08	0.15	-0.38	0.22	0.26	1.00	0.61
sampling week 2	-0.17	0.15	-0.46	0.11	1.40	1.00	0.24
sampling week 3	0.53	0.14	0.27	0.80	15.42	1.00	< 0.001
sampling week 4	0.90	0.14	0.63	1.20	43.42	1.00	< 0.001
sampling week 5	1.00	0.14	0.74	1.30	50.14	1.00	< 0.001
sampling week 6	0.76	0.13	0.50	1.00	33.50	1.00	< 0.001
sampling week 7	1.00	0.13	0.76	1.30	61.21	1.00	< 0.001
sampling week 8	0.76	0.13	0.50	1.00	33.90	1.00	< 0.001
sampling week 9							
sand depth	0.08	0.01	0.06	0.09	59.17	1.00	< 0.001
% coarse fraction	0.02	0.00	0.01	0.02	14.95	1.00	< 0.001

Table S6. Parameter estimates for the Generalized Estimating Equation for the effect of site, year, sampling interval, sand depth and restoration sand grain size shallow egg abundance in the top 5cm of sand. For the categorical year, sampling week and grain size variables, statistical comparisons for each level of the variable are made against the categories with blank rows.

Parameter	$\beta$	SE	Lower CI	Upper CI	Chi-Square	df	Sig.
Intercept	4.09	0.69	2.73	5.44	35.13	1	< 0.0001
2015	0.46	0.12	0.23	0.69	15.96	1	< 0.0001
2016							
Sampling week 1	-1.28	0.20	-1.67	-0.89	42.08	1	< 0.0001
Sampling week 2	-0.98	0.14	-1.26	-0.70	46.98	1	< 0.0001
Sampling week 3	0.12	0.17	-0.20	0.44	0.53	1	0.47
Sampling week 4	0.45	0.14	0.19	0.72	11.16	1	0.001
Sampling week 5							
Natural reference	1.42	0.34	0.76	2.07	17.70	1	< 0.0001
Coarse	1.64	0.28	1.09	2.18	34.49	1	< 0.0001
Fine							
Sand depth	0.04	0.01	0.02	0.06	12.59	1	< 0.0001
Baycove	1.04	0.28	0.49	1.59	13.84	1.00	< 0.0001
Cooks	1.51	0.46	0.60	2.41	10.68	1.00	0.001
Cape Shore Lab	1.72	0.26	1.22	2.23	44.33	1.00	< 0.0001
Dyers Cove	0.01	0.28	-0.53	0.54	0.00	1.00	0.99
East Point	1.11	0.61	-0.09	2.30	3.31	1.00	0.07
Fortescue	1.43	0.25	0.94	1.92	32.76	1.00	< 0.0001
Gandys	0.97	0.25	0.48	1.46	15.01	1.00	< 0.0001
Green Creek	2.38	0.37	1.66	3.10	41.49	1.00	< 0.0001
Highs	2.61	0.20	2.22	2.99	176.98	1.00	< 0.0001
Kimbles	2.26	0.42	1.44	3.08	29.30	1.00	< 0.0001
Moores	1.60	0.31	1.00	2.20	27.19	1.00	< 0.0001
N. Reeds	3.37	0.50	2.39	4.36	44.86	1.00	< 0.0001
Pierces Point	1.59	0.26	1.08	2.10	37.54	1.00	< 0.0001
S. Reeds	2.59	0.36	1.88	3.29	51.48	1.00	< 0.0001
Sunray	1.26	0.29	0.69	1.83	18.69	1.00	< 0.0001
Thompsons	1.42	0.22	0.98	1.86	39.65	1.00	< 0.0001
Villas							