

Figure S1: Map of the coastal estuary Ninigret Pond, RI showing the location of the 4 sampling sites. All molecular samples were collected within 50 m of each other within coordinates of 41.357°N, 71.653°W.

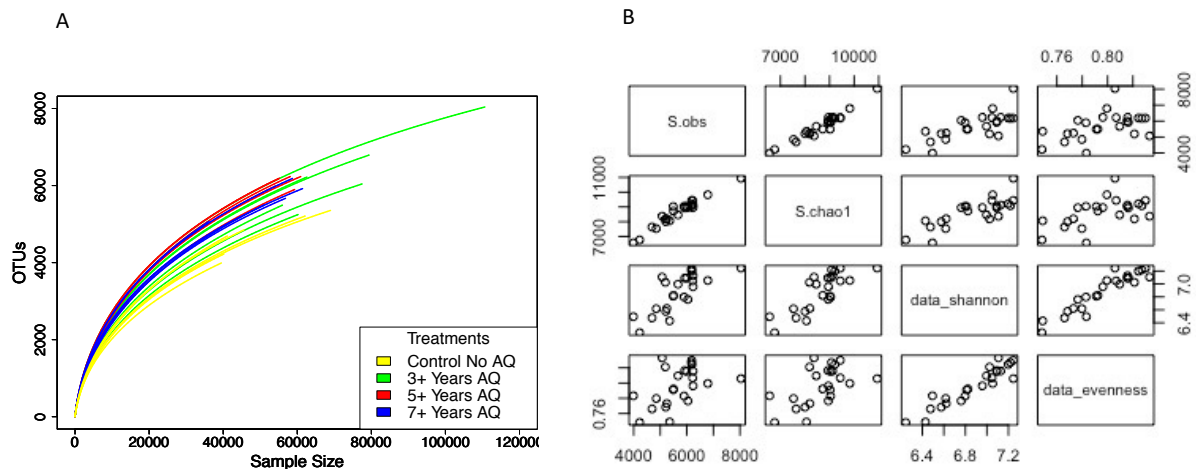


Figure S2: (A) Rarefaction curves from 24 samples using OTU classification at 97% similarity. Control, 3, 5, and 7 years of oyster farming sites are represented by yellow, green, red, and blue points respectively. (B) Diversity indices across all 4 samples. Data is average \pm SD, $n = 6$.

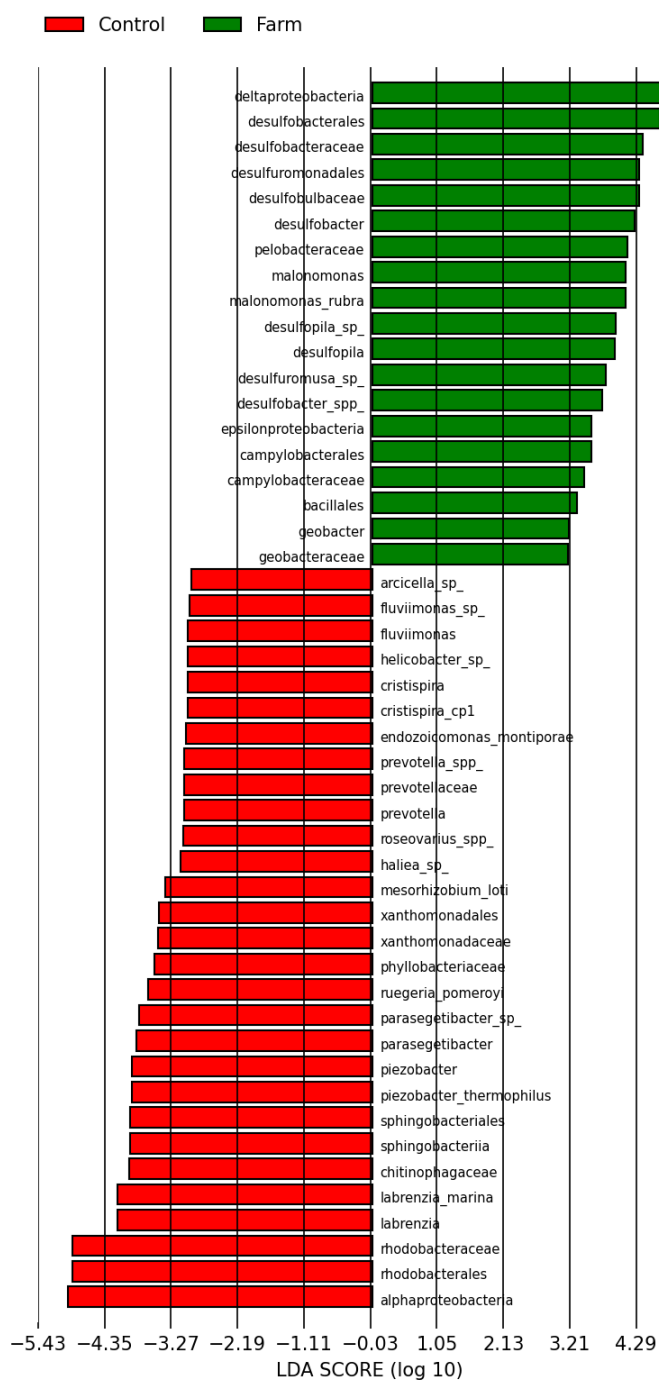


Figure S3: Log₁₀ LDA Scores of taxonomic biomarkers in control (red) and 7-year (green) farm sites as predicted by Linear [discriminant analysis](#) (LDA) effect size (LEfSe) analyses.

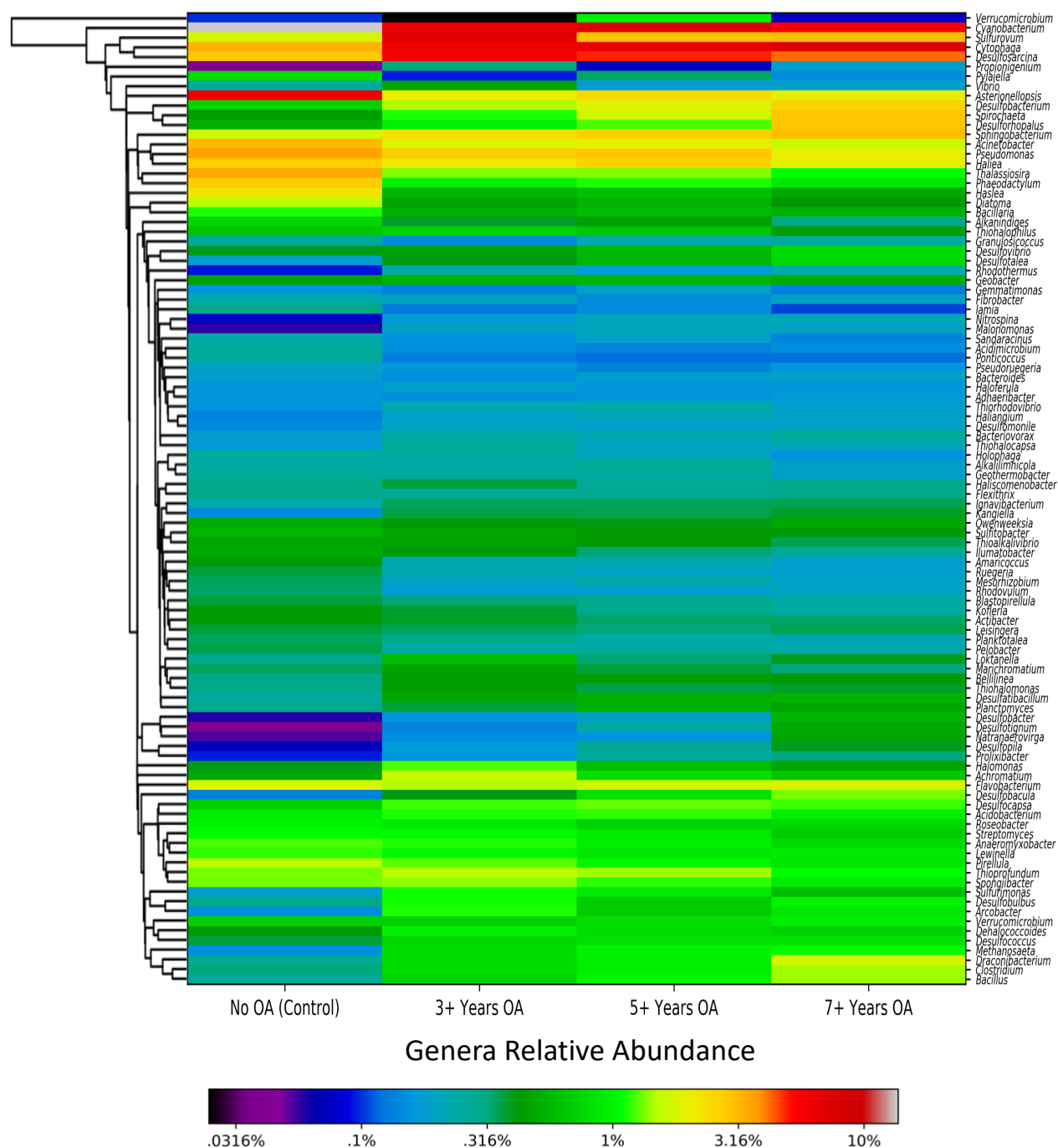


Figure S4: Heat map of top 100 most abundant genera shared between all 4 sampling sites. Heat map was constructed using *Python* with gene dendrogram assigned by neighbor joining method using *hclust* in *R*. Each bar is the average of the relative abundances of the individual genus across all 6 replicates within that sampling site.

Table S1: Concentrations of individual elements in mg kg⁻¹ across all 4 sampling sites. Data is average±SD, n= 6.

	Metal Concentrations (mg/kg)			
	Control (0 years)	OA 1 (3 years)	OA 2 (5 years)	OA 3 (7 years)
Sodium (Na)	2754.59 ± 469.13	2593.22 ± 734.14	2678.81 ± 582.05	3051.39 ± 960.92
Magnesium (Mg)	890.81 ± 75.63	699.31 ± 142.77	821.64 ± 107.10	772.34 ± 179.62
Aluminum (Al)	1192.35 ± 87.07	873.45 ± 173.79	1052.07 ± 117.28	939.99 ± 112.36
Potassium (K)	586.74 ± 49.52	438.67 ± 90.27	538.70 ± 58.95	459.31 ± 87.60
Calcium (Ca)	536.67 ± 89.48	1404.57 ± 518.27	1074.70 ± 653.45	1025.12 ± 818.22
Phosphorus (P)	167.98 ± 32.51	121.77 ± 24.24	148.07 ± 10.74	149.18 ± 27.81
Sulphur (S)	660.26 ± 70.50	528.74 ± 134.41	614.50 ± 110.69	681.09 ± 147.96
Chromium (Cr)	1.89 ± 0.19	1.30 ± 0.22	1.64 ± 0.16	1.44 ± 0.19
Manganese (Mn)	27.71 ± 2.15	18.83 ± 2.98	24.81 ± 2.82	23.01 ± 2.07
Iron (Fe)	2173.31 ± 137.59	1564.83 ± 271.10	1920.93 ± 175.69	1737.11 ± 259.50
Cobalt (Co)	0.67 ± 0.03	0.46 ± 0.08	0.58 ± 0.058	0.48 ± 0.06
Nickel (Ni)	1.54 ± 0.14	1.08 ± 0.20	1.40 ± 0.19	1.12 ± 0.16
Copper (Cu)	1.63 ± 0.21	1.69 ± 0.46	1.54 ± 0.17	1.69 ± 0.38
Zinc (Zn)	9.94 ± 1.09	8.59 ± 1.49	8.66 ± 0.70	7.46 ± 1.36
Arsenic (As)	1.08 ± 0.06	0.88 ± 0.19	1.19 ± 0.45	0.87 ± 0.16
Selenium (Se)	0.05 ± 0.01	0.04 ± 0.01	0.05 ± 0.01	0.05 ± 0.02
Molybdenum (Mo)	0.40 ± 0.08	0.38 ± 0.15	0.40 ± 0.14	0.51 ± 0.076
Cadmium (Cd)	0.05 ± 0.01	0.04 ± 0.01	0.05 ± 0.00	0.044 ± 0.01
Barium (Ba)	6.51 ± 0.82	4.70 ± 1.07	5.68 ± 0.69	4.42 ± 0.70
Lead (Pb)	2.61 ± 0.24	1.69 ± 0.36	2.36 ± 0.21	2.09 ± 0.48

Table S2: Detrended Correspondence analysis and PCA analyses with *envfit* function on bacterial OTUs and sediment elemental concentrations.

Detrended correspondence analysis with 26 segments.					
Rescaling of axes with 4 iterations.					
Total inertia (scaled Chi-square): 0.8337					
		DCA1	DCA2	DCA3	DCA4
Eigenvalues		0.08314	0.04285	0.03408	0.02806
Additive Eigenvalues	0.08314	0.04281	0.03406	0.02799	
Decorana values	0.08378	0.0421	0.03281	0.02952	
Axis lengths		1.14156	0.87701	0.99252	0.98369
The 1st axis length is <3.5, linear or PCA can be done (Lepš & Šmilauer 2003)					

ENFIT results:

*****VECTORS**

Elements	PC1	PC2	r2	Pr(>r)
Na	0.61741	-0.78664	0.0259	0.773
Mg	-0.70118	-0.71298	0.1538	0.173
Al	-0.82696	-0.56226	0.3826	0.009 **
K	-0.84644	-0.53249	0.2894	0.031 *
Ca	0.94259	0.33395	0.1628	0.149
P	-0.46594	-0.88482	0.2245	0.067 *
S	0.1085	-0.9941	0.095	0.347
Cr	-0.67235	-0.74024	0.5204	0.001 ***
Mn	-0.70068	-0.71348	0.3863	0.005 **
Fe	-0.76549	-0.64344	0.3792	0.004 **
Co	-0.84742	-0.53092	0.4909	0.002 **
Ni	-0.725	-0.68875	0.4134	0.003 **
Cu	0.51566	-0.85679	0.0135	0.881
Zn	-0.87564	-0.48296	0.3279	0.024 *
As	-0.24232	-0.9702	0.0392	0.635
Se	-0.06555	-0.99785	0.1225	0.25
Mo	0.69074	-0.7231	0.209	0.091 *
Cd	-0.68368	-0.72978	0.1373	0.205
Ba	-0.94497	-0.32714	0.4188	0.003 **
Pb	-0.65236	-0.75791	0.2386	0.066

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Permutation: free

Number of permutations: 999