Text S1. Species Grouping

Fish and crab species were identified to their lowest taxonomic groupings and by vertical distribution (pelagic, demersal, or benthic) (Table 2). We removed species that had fewer than three observations and other non-focal species, including dogfish, jellyfish, harbor seals, diving ducks, as well as unknown fish that were not flatfish. To increase sample size, we grouped some species into broader taxonomic groups including flatfish (starry flounder, *Platichthys stellatus*, speckled sanddab, *Citharichthys stigmaeus*, and unknown flatfish), crabs (Dungeness, *Metacarcinus magister,* and graceful, *M. gracilis*), surfperch (shiner, *Cymatogaster aggregate,* and striped, *Embiotoca lateralis*), sculpin (Pacific staghorn*, Leptocottus armatus* and unknown sculpin), forage fish (Pacific sand lance, *Ammodytes hexapterus* and unknown forage fish), and greenling (white spotted, *Hexagrammos stelleri*, and kelp, *H. decagrammus*). Groups of species (primarily surfperch and forage fish) that were categorized as "schooling", defined as travelling in a specific direction in a group of greater than three individuals, were also removed for a separate analysis due to difficulty in interpreting their affiliation with the habitat.

Text S2. Analysis of Within Habitat variation

We conducted a separate study to determine how well our observations represented species' presence within a given habitat footprint (e.g., clam habitat within a given site). We placed three cameras roughly equidistant from each other spread across each habitat type (clam, flipbags, on-bottom, eelgrass, sediment) at one farm in each of the three regions (North Sound, South Sound, Hood Canal) in June of 2019. We did not sample the on-bottom habitat type in South Sound. Recording and video analysis protocols matched those described above. Analysis was conducted at a functional group level (pelagic, demersal, benthic), instead of species, to augment sample sizes. The functional group counts from each set of three cameras were analyzed using the Fisher's Exact Test of independence, testing the null hypothesis that there was no difference in observations between cameras (within a given habitat/site).

Variation between cameras was observed in five out of thirteen region/habitat combinations, including clam and sediment habitats in two of the three regions, and flipbags in one region ($p < 0.05$). In Hood Canal, variation in functional group abundances between cameras was observed in the clam and sediment habitats ($p < 0.05$) but not in the eelgrass, flipbag and oyster on-bottom habitats ($p > 0.05$). In North Sound, we observed variation between cameras within sediment habitat ($p < 0.05$) but not the other four habitats ($p > 0.05$). South Sound variation occurred between cameras in the flipbag and clam habitats ($p < 0.05$), but not sediment, eelgrass, or oyster on-bottom ($p > 0.05$). No difference was found in functional group observations between cameras in the other habitats/regions.

Table S1. Results of SIMPER analyses for North Sound and Hood Canal. Aquaculture presence/absence was not found to be statistically significant in South Sound (PERMANOVA, $p > 0.05$)

Region	Functional Groups	% Contribution	% Cumulative
North Sound	Surf perch	0.226	0.226
	Stickleback	0.207	0.433
	Sculpin	0.167	0.600
	UnID.crab	0.139	0.739
Hood Canal	UnID.crab	0.300	0.300
	Surf perch	0.207	0.508
	Flatfish	0.166	0.674
	Sculpin	0.135	0.809

Table S2. Shannon-Wiener Index and species richness (mean ± standard error, minimum, and maximum values) by region (North Sound, South Sound, Hood Canal) and habitat type (clam, oyster flipbag, oyster on-bottom, eelgrass, and sediment).

		Shannon-Wiener Index		Species Richness		Shannon-Wiener Index (excl. perch)	
		mean ± SE	range	mean ± SE	range	mean ± SE	range
North Sound	Clam	1 ± 0.22	0.6 - 1.6	4 ± 0.9	2 - 6	0.7 ± 0.3	0 - 1.4
North Sound	Eelgrass	0.7 ± 0.13	0.3 - 1.4	3 ± 0.4	2 - 5	0.4 ± 0.2	0 - 1.2
North Sound	Flipbag	0.9 ± 0.12	0.4 - 1.4	4 ± 0.5	3 - 6	0.8 ± 0.2	0.1 - 1.4
North Sound	Oyster on-bottom	1.2 ± 0.11	1 - 1.4	5 ± 0.5	4 - 6	0.9 ± 0.2	0.6 - 1.4
North Sound	Sediment	0.5 ± 0.25	0 - 1	2 ± 0.5	1 - 3	0.3 ± 0.2	0 - 0.7
South Sound	Clam	0.4 ± 0.11	0.1 - 0.6	3 ± 0.5	2 - 4	0.4 ± 0.2	0 - 0.9
South Sound	Flipbag	0.5 ± 0.17	0 - 0.9	3 ± 0.5	2 - 5	0.4 ± 0.2	0 - 1.1
South Sound	Oyster on-bottom	0.7 ± 0.24	0.2 - 1.4	3 ± 0.7	2 - 5	0.4 ± 0.3	0 - 1.3
South Sound	Sediment	0.8 ± 0.08	0.6 - 1.2	3 ± 0.7	2 - 7	0.5 ± 0.2	0 - 1.6
Hood Canal	Clam	1 ± 0.23	0.2 - 1.5	4 ± 0.4	3 - 5	0.8 ± 0.2	0.2 - 1.3
Hood Canal	Eelgrass	0.6 ± 0.19	0 - 1.2	3 ± 0.6	1 - 4	0.6 ± 0.2	0 - 1
Hood Canal	Flipbag	1 ± 0.19	0.8 - 1.2	5 ± 0.5	4 - 5	1 ± 0.1	0.8 - 1.1
Hood Canal	Oyster on-bottom	0.9 ± 0.31	0.6 - 1.2	5 ± 0	5 - 5	0.6 ± 0.3	0.4 - 0.9
Hood Canal	Sediment	1.2 ± 0.16	1.1 - 1.4	4 ± 0	4 - 4	0.9 ± 0.2	0.7 - 1.1

Table S3. Results from general linear mixed models of species diversity (Shannon-Wiener Index) and species richness. The model fixed effects include Region (North Sound, South Sound, Hood canal) and Aquaculture (present, absent). All models had Site as a random effect to account for lack of independence. The best fit model was selected based on AICc (denoted by asterisk).

		Degrees of Freedom	AICc	ΔAICc	Degrees of Freedom	AICc	ΔAICc
Metric	Models	Including Perch			Excluding Perch		
Diversity	Region+Habitat	9	91.3217	10.2	9	108.4992	10.7
	Region+Aquaculture	6	81.6603	0.5*	6	97.7837	0*
	Region:Aquaculture	8	81.1623	0*	8	100.2111	2.4
	Intercept only	2	93.5760	12.4	2	101.2059	3.4
Richness	Region+Habitat	9	225.4660	8.3	9	224.4319	9.2
	Region+Aquaculture	6	221.2000	4.0	6	219.9595	4.7
	Region:Aquaculture	8	217.1981	0*	8	215.2519	0*
	Intercept only	2	247.3319	30.1	2	241.7085	26.5

Table S4. Results from species-specific and functional group-specific generalized linear mixed models of abundance for surf perch, flatfish, sculpin, crabs, unidentified crabs. Model fixed effects include region, aquaculture (present, absent) and habitat (clam, flipbags, on-bottom, eelgrass, sediment). All models had site and/or year as a random effects to account for lack of independence. Best fit model was selected based on AICc (denoted by asterisk).

Model	Surf Perch		Sculpin		Crab		UnID Crab		Flatfish (Hood Canal)		Flatfish (North Sound)	
Fixed effects	df	AICc	df	AICc	df	AICc	df	AICc	df	AICc	df	AICc
Region+Habitat	17	567.478	9	282.765	17	262.793	10	189.532*	6	117.635*	6	67.602
Region+Aquaculture	14	567.479	6	277.005	14	260.058*	7	192.977	3	161.748	3	59.76*
Region:Habitat	16	569.347	16	278.146	16	271.473	17	197.788	NA	NA	NA	NA
Region:Aquaculture	16	570.826	8	271.341*	16	260.860	9	197.073	NA	NA	NA	NA
null	2	594.743	2	278.491	2	267.596	3	253.064	1	176.387	1	72.919
Random effects	site		year		site		site, year		site		site	

Table S5. Results from functional group-specific generalized linear mixed models of abundance for benthic, demersal, and pelagic functional groups. Model fixed effects include region, aquaculture (present, absent) and habitat (clam, flipbags, on-bottom, eelgrass, sediment). All models had site and/or year as a random effects to account for lack of independence. Best fit model was selected based on AICc (denoted by asterisk).

Model	Benthic		Pelagic		Demersal	
Fixed effects	df	AICc	df	AICc	df	AICc
Region+Habitat	10	348.671	10	559.6*	10	375.295*
Region+Aquaculture	7	352.083	7	563.939	7	382.204
Region:Habitat	16	508.430	17	569.953	17	374.945*
Region:Aquaculture	9	333.565*	9	563.219	NA	NA
null	3	367.574	3	570.438	3	382.808
Random effects	site, year		site, year		site, year	

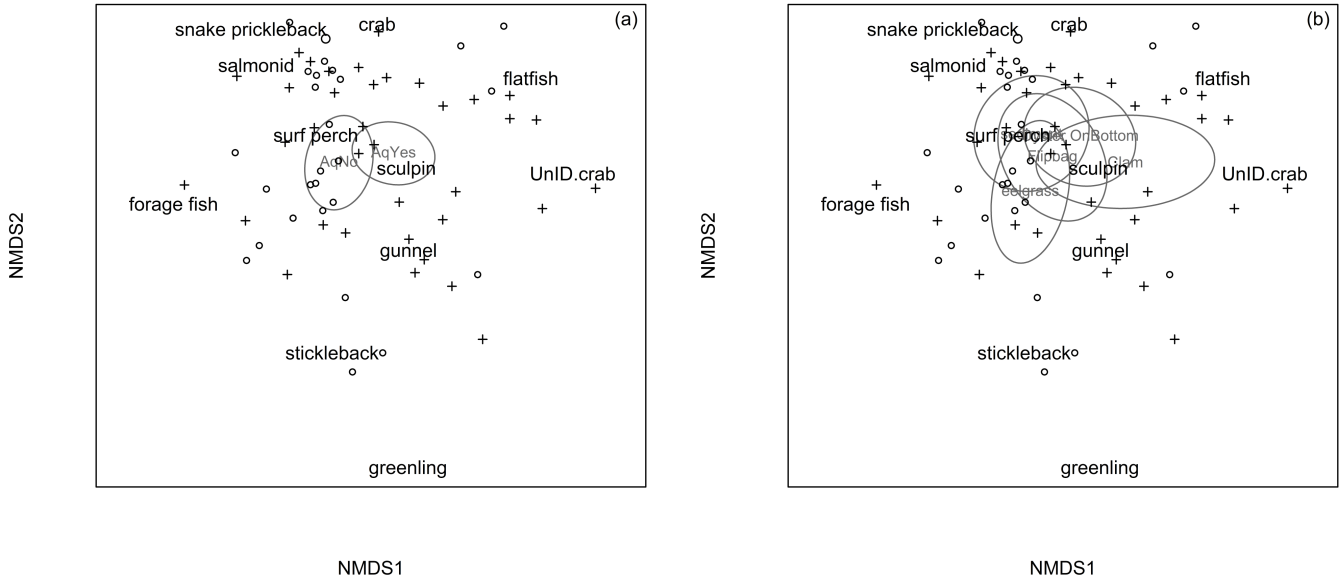

Fig. S1. NMDS results for comparisons that subsequent PERMANOVA tests proved to not vary significantly ($p > 0.05$) in species composition relative to (a) aquaculture presence and (b) type of habitat, when all regions are combined. Sample sites are signified by circles (non-aquaculture) and crosses (aquaculture). The 95% confidence ellipses indicate the uncertainty around the estimate of the centroid, given the data.