Supplementary Information

Supplementary Text 1 - Sequencing metrics and controls

The universal and elasmobranch Illumina sequencing runs produced 9,276,041 and 14,801,645 raw paired end reads respectively that could be assigned to a sample index. The run using universal primers produced an average of 132,031.3 ± 60,736.9 (s.d.) raw reads per non-control sample with 125,825.2 ± 57,427.0 (s.d.) reads remaining after low quality and chimeric reads were excluded. The run using elasmobranch primers produced an average of 212,978.1 ± 1,063,729.3 (s.d.) raw reads per non-control sample with 190,523.5 ± 933,726.9 (s.d.) reads remaining after low quality and chimeric reads were excluded, the high variance in raw read output was due to three samples receiving a larger than expected proportion of reads (7,675,465; 1,377,703; 895,459) due to a pooling error. Excluding these samples from the above calculations resulted in 53,120.2 ± 20,338.5 (s.d.) raw and 48,446.9 ± 18,638.9 (s.d.) filtered reads per sample. In total 23,111 reads were found in the negative control samples across both runs with 15 and 42 ASVs in the universal and elasmobranch datasets respectively. The majority (81.8%) of these reads were from 12 ASVs assigned to homo sapiens, and 348 reads were from 12 ASVs assigned to fish species. After cleaning and filtering 485 and 563 ASVs were retained for the universal and elasmobranch datasets respectively. The merging of these datasets and removal of human, domestic and all other ASVs not assigned to fish (teleost and elasmobranch) species resulted in a dataset of a total of 551 ASVs, which was then used for all subsequent analyses. Taxonomic assignment indicated all ASVs were from elasmobranch or teleost fish, with 66 ASVs assigned to species, 216 to Genus, 167 to Family and 99 above Family.

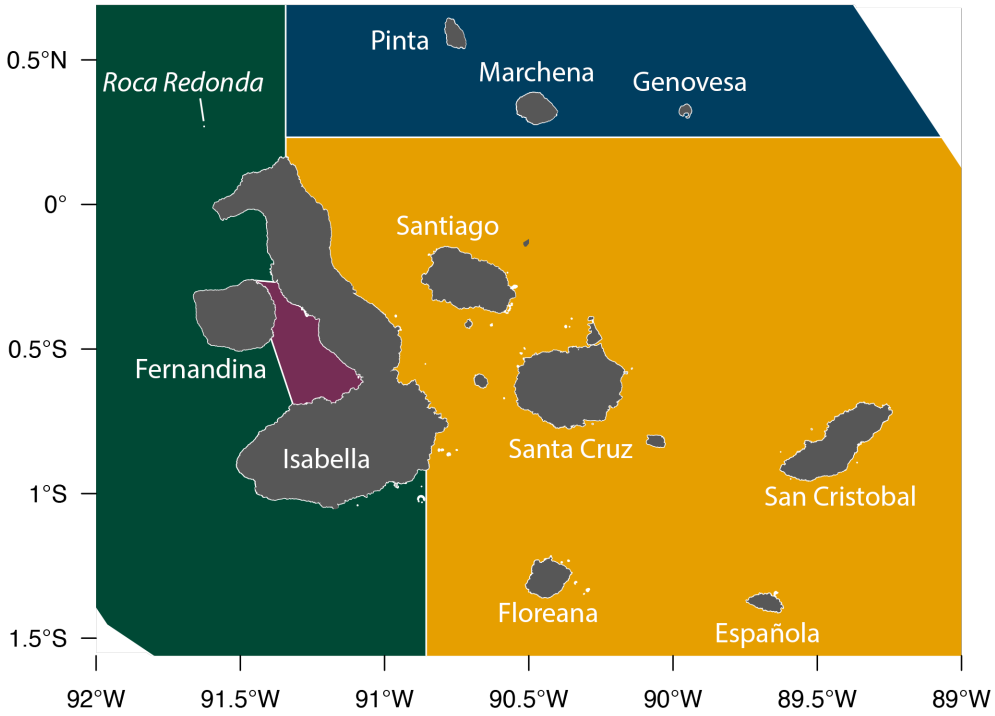

Fig. S1. Labeled map of the Galápagos islands. Bioregions are shown by the color with the western bioregion in green, the Elizabeth bioregion in purple, the Northern bioregion in blue and and Central South-eastern bioregion in orange.

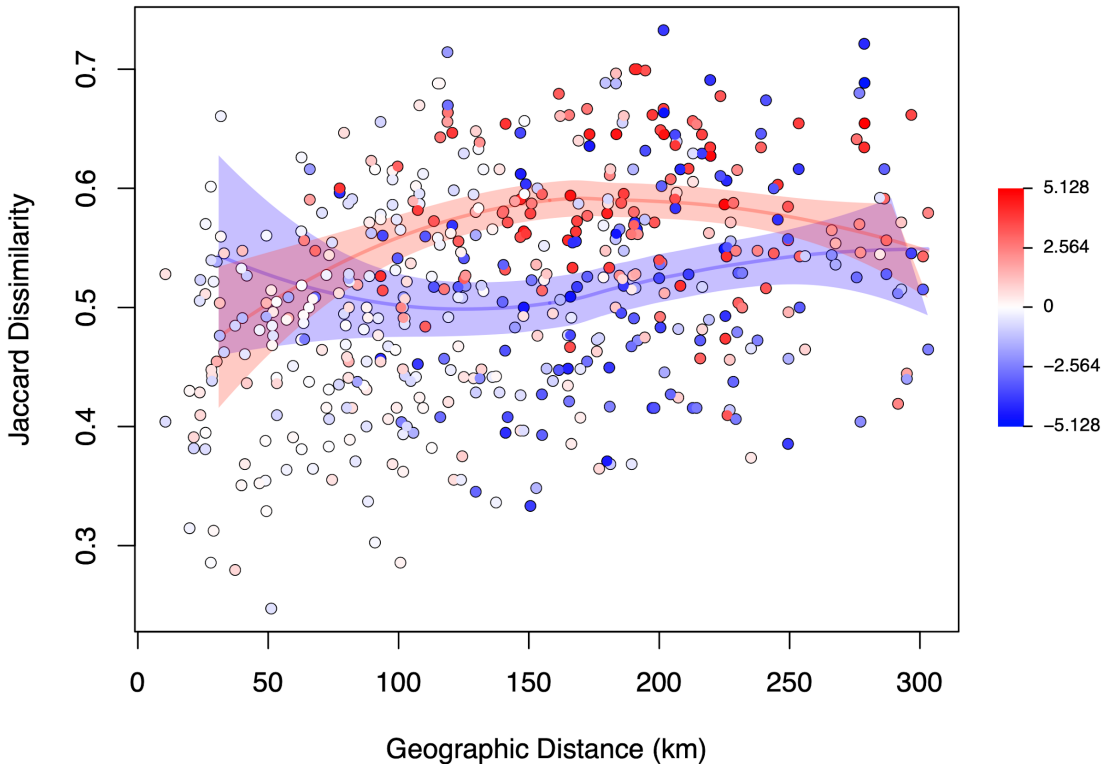

Fig. S2. Modified asymmetric Jaccard dissimilarity for each pair of sites, displayed against geographic distance measured in km. Each point is colored according to the temperature difference between pairs of sites; point color indicates temperature difference with scale shown on the left, measured in °C. Loess smoothed fit lines for data below the 20th percentile and above the 80th percentile of oceanographic resistance are shown as red and blue lines respectively, with shading indicating the 95% confidence interval of the fit.

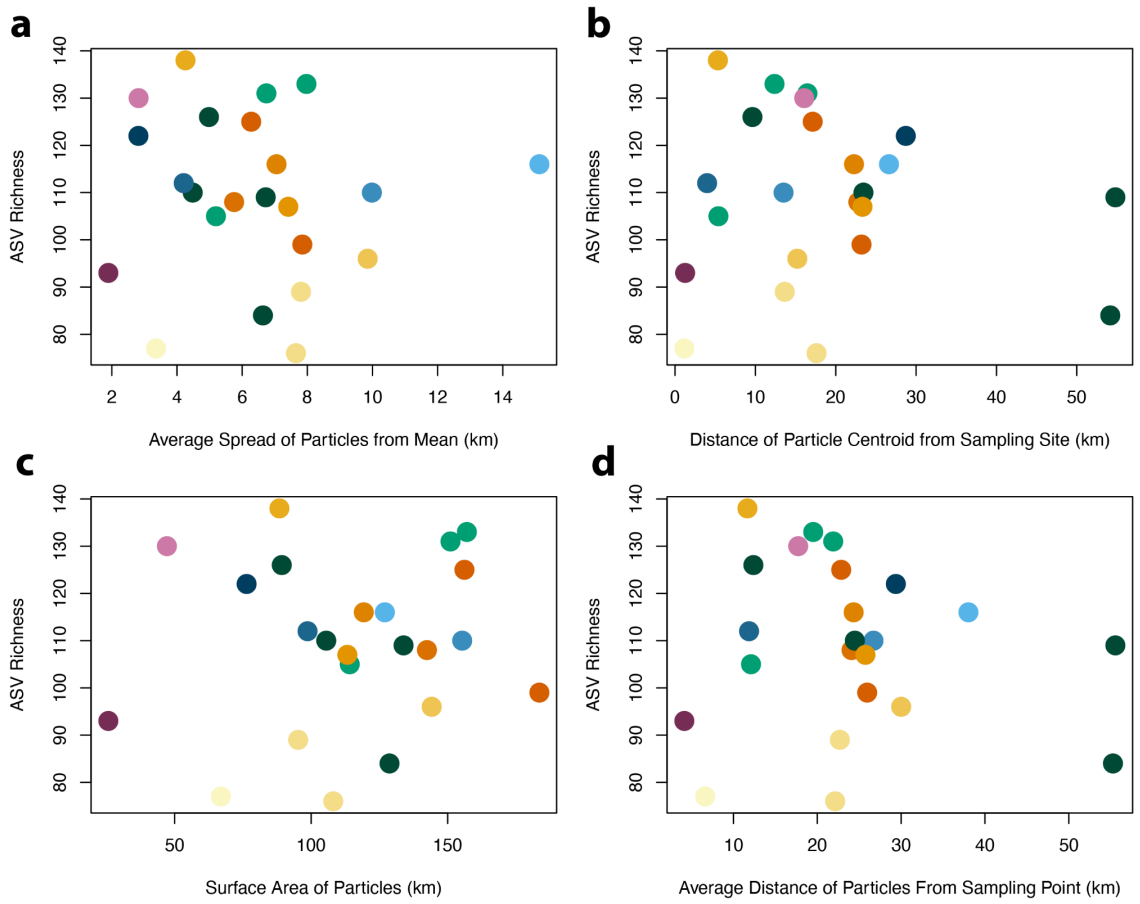

Fig. S3. Measures of particle spread from the collection site 72 hours before eDNA sampling compared to ASV richness at each site. Colors from points indicate sites matching those in Fig. 1 from the main manuscript with green points from the western bioregion, blue from the northern bioregion, purple from the elizabeth bioregion and orange/yellow from the central south-eastern bioregion. a) The direct line distance between the average latitude and longitude of the points from the release point b) the mean distance of the particles from the mean latitude and longitude of the points, c) the surface area occupied by grid squares with greater than 0.01% of released particles d) the average of the individual particle direct line distances from the release point.

Table S1. Outputs from beta diversity statistical models testing for significant within group dispersion (PERMDISP procedure) and between group differences (PERMANOVA) for bioregion differences from eDNA metabarcoding data. The compared bioregions are shown in the leftmost column with the outputs from the PERMDISP procedure in subsequent columns and the results from the PERMANOVA procedure in the last six columns. Significant results (α = 0.05) are shown in bold.

	Beta Dispersion (PERMDISP)				PERMANOVA					
	diff	lwr	upr	P value	SumofSqs	MeanSquares	F.model	R2	P value	Adjusted P
Elizabeth-CSouthEastern	-0.1393	-0.2407	-0.0379	**0.0053**	0.4538791	0.4539	2.2871	0.1861	0.0134	**0.0201**
Northern-CSouthEastern	-0.0448	-0.1222	0.0327	0.3888	0.3228144	0.3228	1.6053	0.1180	0.0009	**0.0027**
Western-CSouthEastern	0.0126	-0.0520	0.0771	0.9461	0.5146647	0.5147	2.4282	0.1393	0.0003	**0.0018**
Northern-Elizabeth	0.0945	-0.0189	0.2079	0.1232	0.4814028	0.4814	2.5428	0.3886	0.0667	0.0800
Western-Elizabeth	0.1518	0.0469	0.2568	**0.0034**	0.2823101	0.2823	1.2972	0.1563	0.1093	0.1093
Western-Northern	0.0573	-0.0247	0.1394	0.2358	0.5056828	0.5057	2.3314	0.2057	0.0027	**0.0054**

Table S2. Sampling site metadata detailing nearest island, co-ordinates, bioregion, sampling date (DD/MM/YYYY), and sampling depth in feet for the shallow and deep samples.

SiteID	Location	Island	latitude	longitude	Bioregion	SamplingDate	DeepSample DepthFeet	ShallowSample DepthFeet
BAR	Barahona Beach	Isabela	-1.038750	-91.156367	Western	30/09/2018	12	6
CDOU	Cabo Douglas	Fernandina	-0.302817	-91.651733	Western	03/10/2018	12	3
CHAM	Cabo Hammond	Fernandina	-0.469583	-91.611183	Western	02/10/2018	18	3
CMAR	Cabo Marshall	Isabela	-0.001333	-91.223850	CSouthEastern	05/10/2018	17.8	3
CORA	Salvaje de Corazón	Genovesa	0.311317	-89.975150	Northern	08/10/2018	18	3
CUEV	Las Cuevas	Floreana	-1.253350	-90.374100	CSouthEastern	12/10/2018	28	3
DAPH	Daphne Mayor	Seymour	-0.425800	-90.372117	CSouthEastern	10/10/2018	32	3
EGAS	Cerca a Puerto Egas	Santiago	-0.259600	-90.868783	CSouthEastern	09/10/2018	71	3
ELI	Marielas-Bahia Elizabeth	Isabela	-0.595050	-91.085900	Elizabeth	01/10/2018	16	3
GARD	Bahía Gardner	Española	-1.365467	-89.639317	CSouthEastern	13/10/2018	19	3
PCAL	Punta Calle	Marchena	0.286433	-90.501817	Northern	07/10/2018	21	3
PESP	Punta Espinosa	Fernandina	-0.272283	-91.435383	Western	03/10/2018	28	3
PIN	Cabo Ibbetson	Pinta	0.603883	-90.789833	Northern	06/10/2018	25	3
PLAZ	Islas Plaza	Santa Cruz	-0.567567	-90.173617	CSouthEastern	11/10/2018	18	3
PMAN	Punta Mangle	Fernandina	-0.458567	-91.390833	Elizabeth	02/10/2018	11.4	3
PMOR	Punta Moreno	Isabela	-0.722300	-91.345067	Western	01/10/2018	22	3
PROJ	Playa Roja	Rábida	-0.408950	-90.715533	CSouthEastern	09/10/2018	61	3
PVIC	Punta Vicente Roca	Isabela	-0.045367	-91.543017	Western	04/10/2018	23	3
RED	Roca Redonda	Isabela	0.270600	-91.626483	Northern	04/10/2018	26.8	3
SOMB	Sombrero Chino	Santiago	-0.350817	-90.568500	CSouthEastern	10/10/2018	25	3

STAFE	Bahía Santa fe	Santa Fe	-0.799483	-90.047450	CSouthEastern	11/10/2018	20	3
SUAR	Punta Suárez	Española	-1.350567	-89.710433	CSouthEastern	13/10/2018	36	3
TOR	Isla Tortuga	Isabela	-1.011717	-90.876700	Western	30/09/2018	100	6