

The following supplement accompanies the article

Effective population size of the critically endangered east Australian grey nurse shark *Carcharias taurus*

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Table S1. Details of the grey nurse shark samples (length, life stage, sex, location and date collected) and which analyses they were used in. A tick (✓) represents that a sample was used in the analysis, while a cross (✗) shows that a sample was not. ID numbers with asterisks (*) denotes samples that did not have geographic location data available. Missing data is represented by dashes (-).

Sample details						Analyses				
ID	Length (m)	Life stage	Sex	Location	Date collected	Preliminary, Sibship (Colony), BottleSim (n = 63)	Pairwise FST & Pairwise Relatedness (n = 55)	Mantel test/Spatial autocorrelation (n = 58)	Sex-biased Dispersal (males = 32, females = 20)	Nb & Ne (n = 57)
1	2.53	Adult	Male	Flat Rock, QLD	25-07-02	✓	✓	✓	✓	✓
2	2.56	Adult	Male	Flat Rock, QLD	23-07-02	✓	✓	✓	✓	✓
3	2.49	Adult	Male	Flat Rock, QLD	23-07-02	✓	✓	✓	✓	✓
4	2.53	Adult	Male	Flat Rock, QLD	23-07-02	✓	✓	✓	✓	✓
5	2.61	Adult	Male	Flat Rock, QLD	23-07-02	✓	✓	✓	✓	✓
6	-	Adult	Male	Flat rock, QLD	05-06-02	✓	✓	✓	✓	✓
7	2.47	Adult	Female	Flat Rock, QLD	26-03-02	✓	✓	✓	✓	✓
8	2.56	Adult	Male	Flat Rock, QLD	08-10-01	✓	✓	✓	✓	✓
9	-	Adult	Male	Flat Rock, QLD	10-03-01	✓	✓	✓	✓	✓
10	-	Adult	Male	Flat Rock, QLD	20-08-99	✓	✓	✓	✓	✓
11	-	Adult	Male	Flat Rock, QLD	20-08-99	✓	✓	✓	✓	✓
12	-	Adult	Male	Flat Rock, QLD	20-08-99	✓	✓	✓	✓	✓
13	-	Adult	Female	Flat Rock, QLD	-	✓	✓	✓	✓	✓

Sample details						Analyses				
ID	Length (m)	Life stage	Sex	Location	Date collected	Preliminary, Sibship (Colony), BottleSim (n = 63)	Pairwise FST & Pairwise Relatedness (n = 55)	Mantel test/Spatial autocorrelation (n = 58)	Sex-biased Dispersal (males = 32, females = 20)	Nb & Ne (n = 57)
14	2.56	Adult	Female	South Solitary Island, NSW	22-09-06	✓	✓	✓	✓	✓
15	2.3	Adult	Male	South Solitary Island, NSW	09-08-02	✓	✓	✓	✓	✓
16	2.4	Adult	Male	South Solitary Island, NSW	09-08-02	✓	✓	✓	✓	✓
17	2.44	Adult	Male	South Solitary Island, NSW	09-08-02	✓	✓	✓	✓	✓
18	2.3	Adult	Male	South Solitary Island, NSW	08-08-02	✓	✓	✓	✓	✓
19	2.56	Adult	Female	South Solitary Island, NSW	08-08-02	✓	✓	✓	✓	✓
20	2.4	Adult	Male	Fish Rock, NSW	22-05-07	✓	✓	✓	✓	✓
21	2.4	Adult	Female	Fish Rock, NSW	22-05-07	✓	✓	✓	✓	✓
22	2.1	Adult	Female	Fish Rock, NSW	22-05-07	✓	✓	✓	✓	✓
23	2.2	Adult	Male	Fish Rock, NSW	22-05-07	✓	✓	✓	✓	✓
24	2.45	Adult	Male	Fish Rock, NSW	22-05-07	✓	✓	✓	✓	✓
25	2.15	Adult	Male	Fish Rock, NSW	01-12-06	✓	✓	✓	✓	✓
26	1.8	Adult	Male	Fish Rock, NSW	01-12-06	✓	✓	✓	✓	✓
27	2.38	Adult	Female	Fish Rock, NSW	01-12-06	✓	✓	✓	✓	✓
28	2-2.50	Adult	Female	Fish Rock, NSW	01-12-06	✓	✓	✓	✓	✓
29	2.25	Adult	Male	Fish Rock, NSW	29-04-05	✓	✓	✓	✓	✓
30	2.26	Adult	Male	Fish Rock, NSW	11-11-03	✓	✓	✓	✓	✓
31	2.4	Adult	Female	Fish Rock, NSW	11-11-03	✓	✓	✓	✓	✓
32	2.4	Adult	Male	Fish Rock, NSW	23-10-03	✓	✓	✓	✓	✓
33	2.13	Adult	Female	Fish Rock, NSW	25-09-02	✓	✓	✓	✓	✓
34	1.96	Adult	Female	Fish Rock, NSW	24-09-02	✓	✓	✓	✓	✓
35	2.45	Adult	Male	Fish Rock, NSW	25-07-02	✓	✓	✓	✓	✓
36	2.41	Adult	Male	Fish Rock, NSW	26-06-02	✓	✓	✓	✓	✓
37	2.44	Adult	Male	Fish Rock, NSW	26-06-02	✓	✓	✓	✓	✓
38	2.38	Adult	Male	Fish Rock, NSW	26-06-02	✓	✓	✓	✓	✓
39	2.37	Adult	Male	Fish Rock, NSW	26-06-02	✓	✓	✓	✓	✓

Sample details						Analyses				
ID	Length (m)	Life stage	Sex	Location	Date collected	Preliminary, Sibship (Colony), BottleSim (n = 63)	Pairwise FST & Pairwise Relatedness (n = 55)	Mantel test/Spatial autocorrelation (n = 58)	Sex-biased Dispersal (males = 32, females = 20)	Nb & Ne (n = 57)
40	2.15	Adult	Male	Fish Rock, NSW	25-06-02	✓	✓	✓	✓	✓
41	2.17	Adult	Male	Fish Rock, NSW	25-06-02	✓	✓	✓	✓	✓
42	1.53	Juvenile	Male	Forster, NSW	05-12-06	✓	✓	✓	✗	✗
43	1.745	Juvenile	Female	Forster, NSW	26-06-06	✓	✓	✓	✗	✗
44	2.49	Adult	Male	Forster, NSW	12-05-06	✓	✓	✓	✓	✓
45	1.97	Adult	Female	Forster, NSW	09-06-04	✓	✓	✓	✓	✓
46	1.93	Adult	Female	Forster, NSW	19-01-02	✓	✓	✓	✓	✓
47	1	Juvenile	Male	Little Broughton Island, NSW	19-03-02	✓	✗	✓	✗	✗
48	-	Adult	Female	Sydney, NSW	19-12-07	✓	✓	✓	✓	✓
49	2.79	Adult	Female	Sydney, NSW	18-12-07	✓	✓	✓	✓	✓
50	2.51	Adult	Male	Sydney, NSW	08-12-05	✓	✓	✓	✓	✓
51	2.65	Adult	Female	Sydney, NSW	13-09-04	✓	✓	✓	✓	✓
52	2.88	Adult	Female	Sydney, NSW	13-09-04	✓	✓	✓	✓	✓
53	1.5	Juvenile	Female	Sydney, NSW	05-12-03	✓	✓	✓	✗	✗
54	2.002	Adult	Female	Sydney, NSW	18-03-03	✓	✓	✓	✓	✓
55	1.66	Juvenile	Female	Sydney, NSW	12-12-02	✓	✓	✓	✗	✗
56	2.51	Adult	Female	Sydney, NSW	13-09-02	✓	✓	✓	✓	✓
57	1.53	Juvenile	Female	Tollgate Is, NSW	16-05-02	✓	✗	✓	✗	✗
58	2.72	Adult	Female	Wallagoot Lake, NSW	20-06-02	✓	✗	✓	✓	✓
59*	-	Adult	Male	NSW	-	✓	✗	✗	✗	✓
60*	-	Adult	-	NSW	-	✓	✗	✗	✗	✓
61*	-	Adult	-	NSW	-	✓	✗	✗	✗	✓
62*	-	Adult	-	NSW	-	✓	✗	✗	✗	✓
63*	-	Adult	-	NSW	-	✓	✗	✗	✗	✓

Table S2. Allelic differentiation, represented by pairwise F_{ST} , between grey nurse shark (*Carcharias taurus*) sampling locations at Flat Rock (n = 13), South Solitary Island (n = 6), Fish Rock (n = 22), Forster (n = 5), and Sydney (n = 9) with the 19 loci deviating from Hardy-Weinberg Equilibrium removed from the dataset.

	Flat Rock	Sth Sol Is	Fish Rock	Forster
Sth Sol Is	0.0027	0		
Fish Rock	-0.0023	-0.0002	0	
Forster	-0.0069	0.0065	-0.0024	0
Sydney	-0.0012	-0.0028	-0.0006	-0.0045

Table S3. Effective number of breeders (N_b) estimate for 57 adult grey nurse sharks from eastern Australia, with inbreeding accounted for and 95% lower and upper confidence intervals (LCI and UCI).

Method	N_b	LCI	UCI
$N_{b(sib)}$ random mating	399	261	791
$N_{b(sib)}$ non-random mating	366	243	674

Table S4. $N_{b(LD)}$ estimates and 95% lower and upper confidence intervals (LCI and UCI) of random subsets of our SNP dataset, calculated in NeEstimator2.1.

Number of SNPs	$N_{b(LD)}$ Estimate	LCI	UCI
250	273.8	207	397.9
500	283.9	243.3	339.6
750	300.3	268.7	339.9
1000	317.7	290.1	350.8
1500	309.4	292	328.9
2000	334.8	319.2	352.0

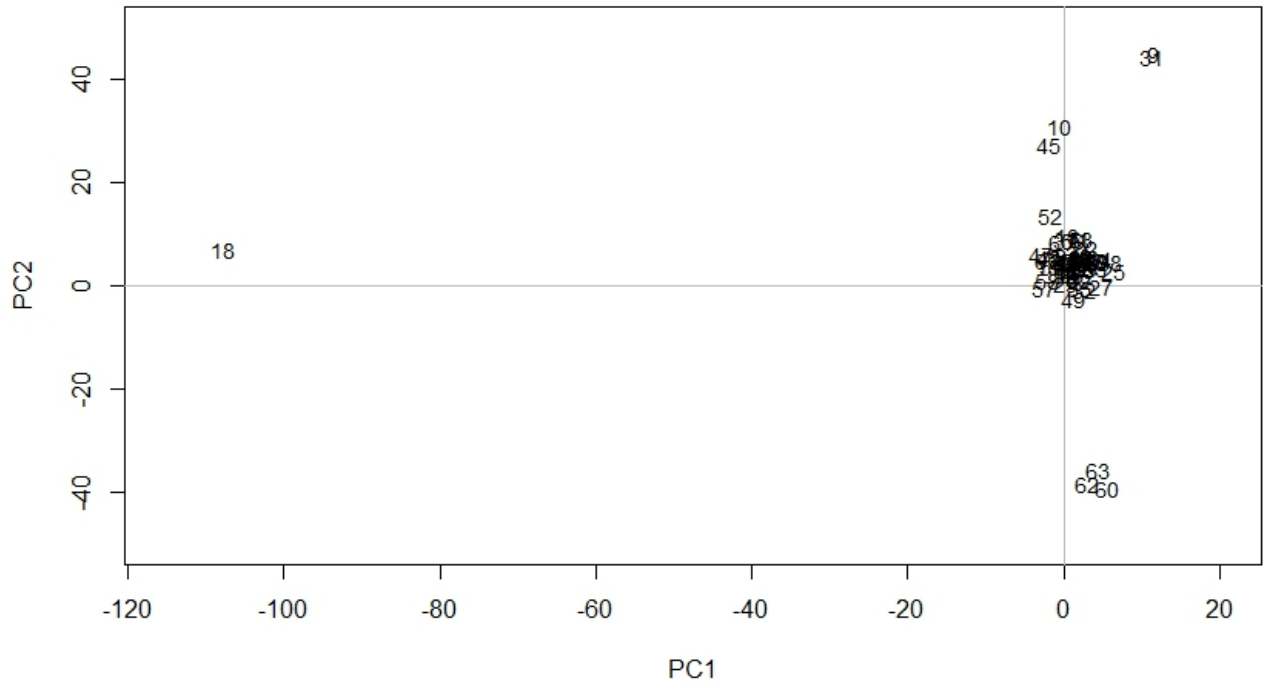


Fig. S1. Principal Component Analysis of 63 east Australian grey nurse sharks (*Carcharias taurus*) that explains 3.21% of variation in genetic distance of all individuals. Each number that is plotted represents the ID number of the individual grey nurse shark sampled.

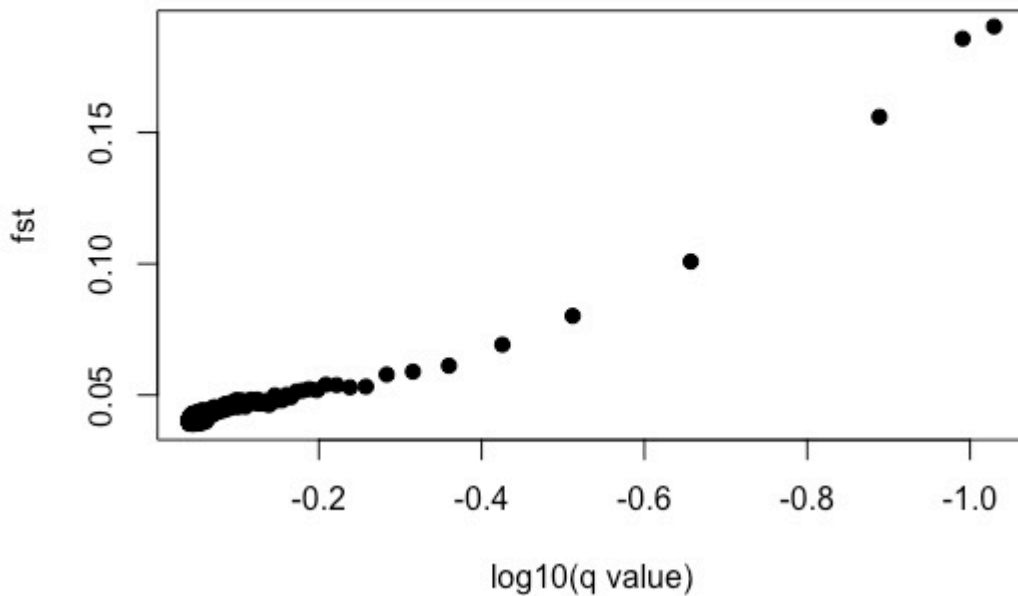
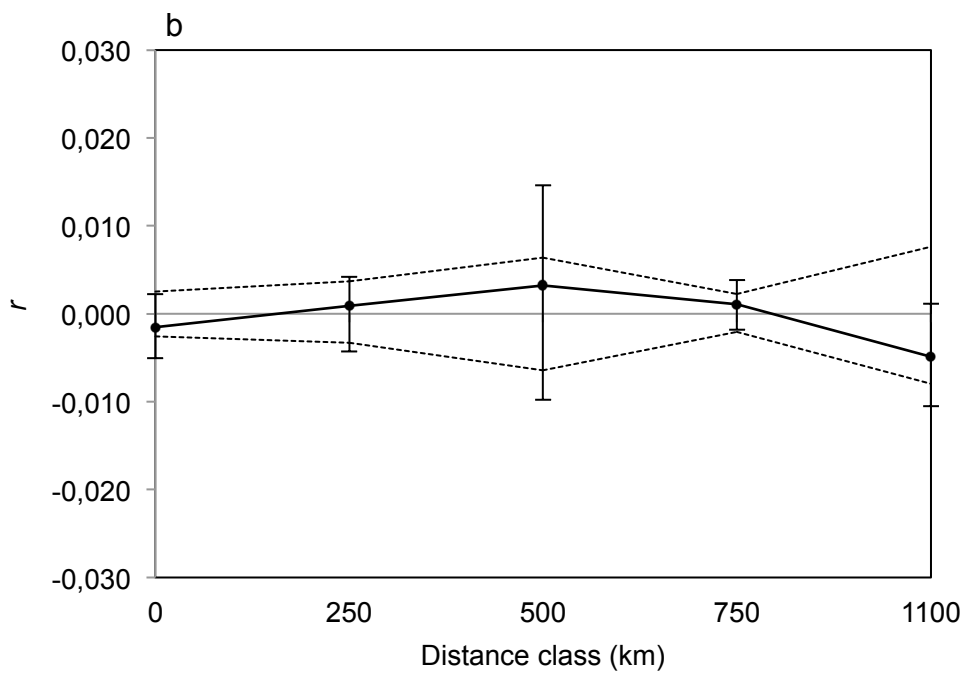
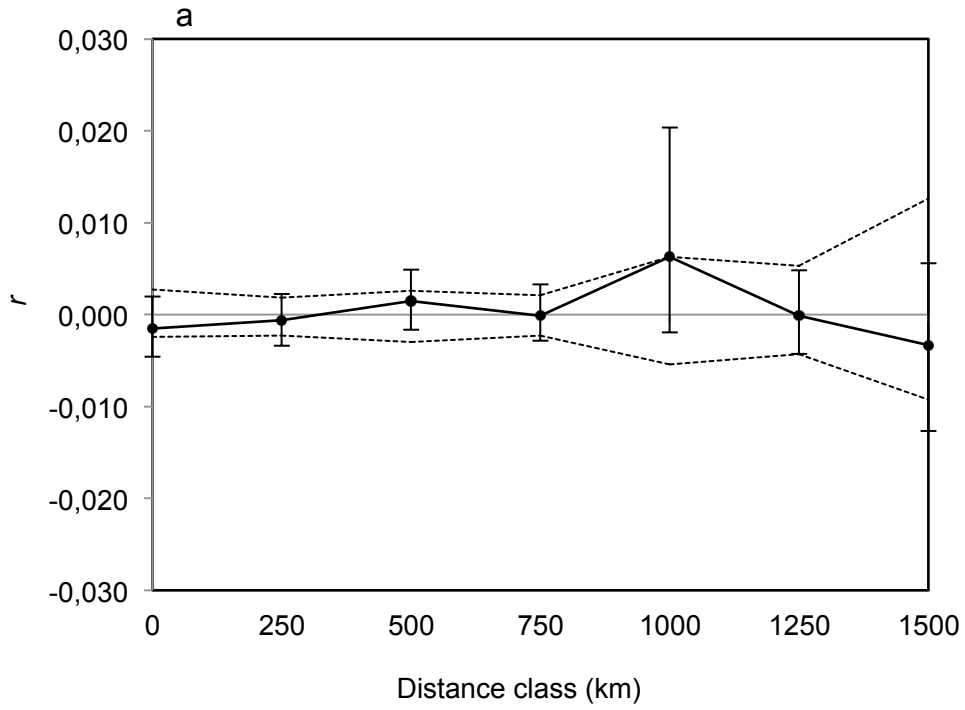


Fig. S2. F_{ST} outlier test results of BayeScan on sampling locations showing no loci detected as putatively under directional selection.



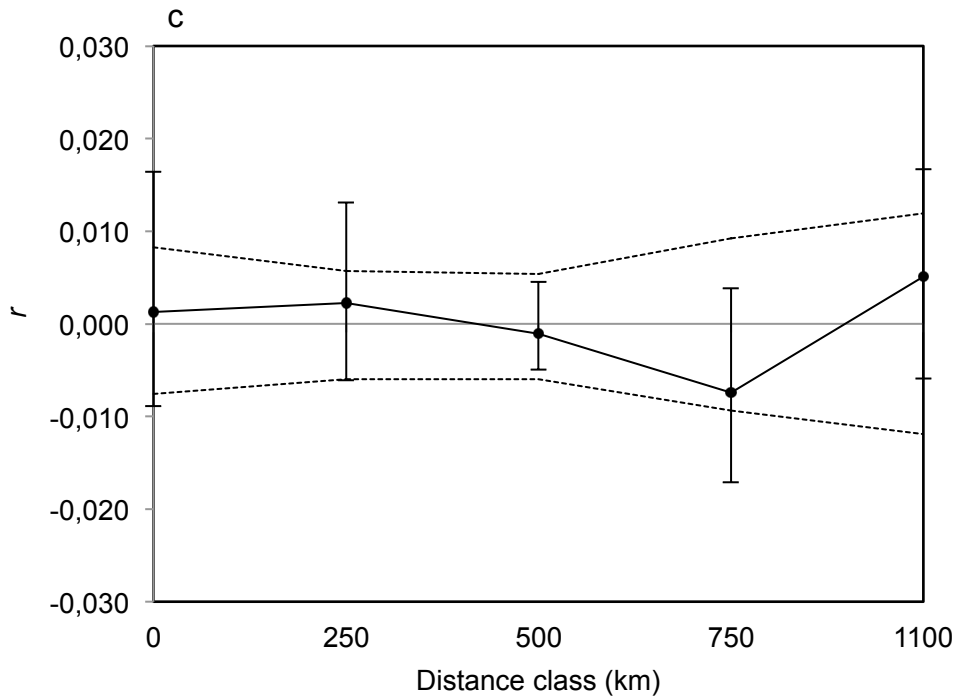


Fig. S3. Correlograms showing spatial autocorrelation (r) estimates for east Australian grey nurse sharks (*Carcharias taurus*) with distance class sizes of 0 km (within the same location) up to 1500 km (most distant location), including (a) all individuals with geographic location data available ($n = 58$); (b) males only, excluding juveniles ($n = 32$); (c) females only, excluding juveniles ($n = 20$). Error bars show the 95% confidence intervals estimated from 1000 bootstrap resampling. The dotted lines represent the upper and lower 95% confidence intervals from the null mode of no spatial structure, determined by 999 permutations.

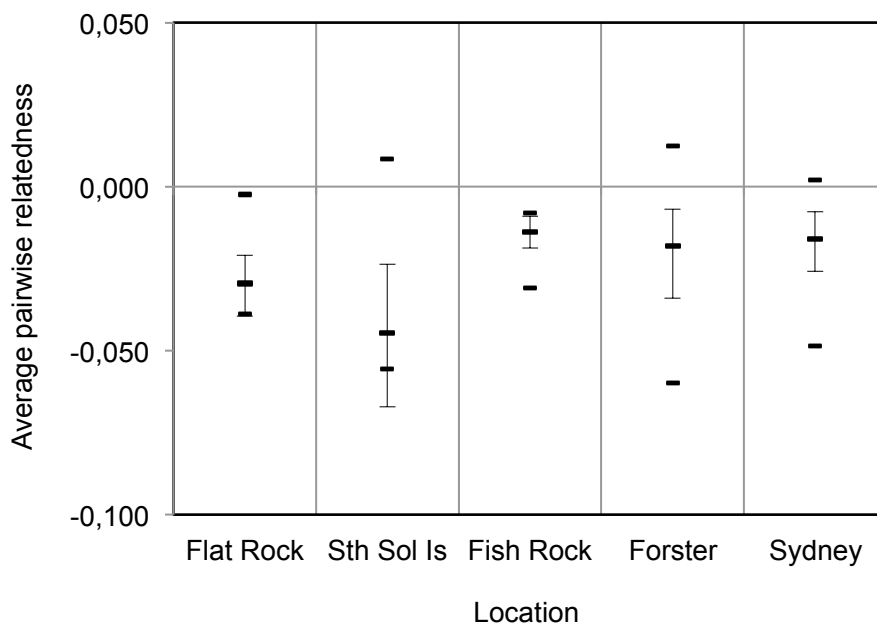


Fig. S4. Average pairwise relatedness per sampling location ≥ 5 grey nurse sharks (*Carcharias taurus*) from east Australia. The upper and lower error bars represent the 95% confidence interval around the average relatedness, as determined by 1000 bootstraps. The upper and lower horizontal markers represent the 95% confidence interval of no difference in relatedness among the locations, as determined by 1000 permutations.