

Table S1: Shark species of French Polynesia (Clua et al. 2021, Siu et al., 2017), their IUCN protection status and their primary habitats as determined by habitat description Ebert et al. (2021), and being consistent with the definition of reef sharks as found in defined by Chapman et al. (2022). (LC= Least concern, NT= Near Threatened, VU= Vulnerable, EN= Endangered, CR= Critically Endangered, DD= Data Deficient).

Family	Scientific name	Common name	Primary habitat	IUCN status
Alopiidae	<i>Alopias pelagicus</i>	Pelagic thresher	Pelagic	EN
Alopiidae	<i>Alopias vulpinus</i>	Thresher	Pelagic	VU
Carcharhinidae	<i>Carcharhinus albimarginatus</i>	Silvertip shark	Reef	VU
Carcharhinidae	<i>Carcharhinus amblyrhynchos</i>	Grey reef shark	Reef	EN
Carcharhinidae	<i>Carcharhinus falciformis</i>	Silky shark	Pelagic	VU
Carcharhinidae	<i>Carcharhinus galapagensis</i>	Galapagos shark	Reef	LC
Carcharhinidae	<i>Carcharhinus leucas</i>	Bull shark	Transient	VU
Carcharhinidae	<i>Carcharhinus limbatus</i>	Common blacktip shark	Transient	VU
Carcharhinidae	<i>Carcharhinus longimanus</i>	Oceanic whitetip	Pelagic	CR
Carcharhinidae	<i>Carcharhinus melanopterus</i>	Blacktip reef shark	Reef	VU
Carcharhinidae	<i>Galeocerdo cuvier</i>	Tiger shark	Transient	NT
Carcharhinidae	<i>Negaprion acutidens</i>	Sicklefin lemon shark	Reef	EN
Carcharhinidae	<i>Prionace glauca</i>	Blue shark	Pelagic	NT
Carcharhinidae	<i>Triaenodon obesus</i>	Whitetip reef shark	Reef	VU
Dalatiidae	<i>Euprotomicrus bispinatus</i>	Pygmy shark	Deep sea	LC
Dalatiidae	<i>Isistius brasiliensis</i>	Cookie cutter shark	Deep sea	LC
Echinorhinidae	<i>Echinorhinus cookei</i>	Prickly shark	Deep sea	DD
Etmopteridae	<i>Etmopterus lucifer</i>	Blackbelly lanternshark	Deep sea	LC
Ginglymostomatidae	<i>Nebrius ferrugineus</i>	Tawny nurse shark	Reef	VU
Hexanchidae	<i>Hexanchus nakamurai</i>	Bigeyed sixgill shark	Deep sea	NT
Lamnidae	<i>Isurus oxyrinchus</i>	Shortfin mako	Pelagic	EN
Pseudocarchariidae	<i>Pseudocarcharias kamoharai</i>	Crocodile shark	Pelagic	LC
Rhincodontidae	<i>Rhincodon typus</i>	Whale shark	Pelagic	EN
Scyliorhinidae	<i>Pseudotriakis microdon</i>	False catshark	Deep sea	LC
Somniosidae	<i>Centroscymnus owstonii</i>	Roughskin dogfish	Deep sea	NT
Sphyrnidae	<i>Sphyrna lewini</i>	Scalloped hammerhead	Pelagic	CR
Sphyrnidae	<i>Sphyrna mokarran</i>	Great hammerhead	Transient	CR
Squalidae	<i>Centrophorus atromarginatus</i>	Dwarf gulper shark	Deep sea	CR
Squalidae	<i>Centrophorus moluccensis</i>	Smallfin gulper shark	Deep sea	VU
Squalidae	<i>Centrophorus tessellatus</i>	Mosaic gulper shark	Deep sea	EN
Squalidae	<i>Squalus megalops</i>	Shortnose spurdog	Deep sea	LC
Squalidae	<i>Squalus melanurus</i>	Blacktailed spurdog	Deep sea	DD
Squalidae	<i>Squalus mitsukurii</i>	Shortspine spurdog	Deep sea	EN

Table S2: Sample sizes for sampled reefs, the sites and island groups where they are found, the type of island geomorphology of the site, and human population size (*Census Report 2017*, ISPF).

Reef	Site	Island group	Island geomorphology	Number of sets	Human population
Amanu 1	Amanu	East Tuamotu	Open atoll	57	174
Amanu 2	Amanu	East Tuamotu	Open atoll	60	174
Apataki1	Apataki	West Tuamotu	Open atoll	70	442
Apataki2	Apataki	West Tuamotu	Open atoll	64	442
Mangareva 1	Mangareva	East Tuamotu	Near atoll	53	1384
Mangareva 2	Mangareva	East Tuamotu	Near atoll	55	1384
Marutea 1	Marutea	East Tuamotu	Closed atoll	55	104
Maupiti1	Maupiti	Leeward Society	Near atoll	52	1295
Maupiti2	Maupiti	Leeward Society	Near atoll	61	1295
Moorea1	Moorea	Windward Society	High barrier	66	18071
Moorea2	Moorea	Windward Society	High barrier	54	18071
Moorea3	Moorea	Windward Society	High barrier	63	18071
Nuka Hiva 1	Nuka Hiva	Marquesas	High rocky	54	3120
Nuka Hiva 2	Nuka Hiva	Marquesas	High rocky	52	3120
Raiatea1	Raiatea	Leeward Society	High barrier	65	12249
Raiatea2	Raiatea	Leeward Society	High barrier	59	12249
Rangiroa1	Rangiroa	West Tuamotu	Open atoll	62	2709
Rangiroa2	Rangiroa	West Tuamotu	Open atoll	57	2709
Rurutu 1	Rurutu	Austral Islands	High fringing	42	2574
Rurutu 2	Rurutu	Austral Islands	High fringing	61	2574
Tahiti1	Tahiti	Windward Society	High barrier	58	189277
Tahiti2	Tahiti	Windward Society	High barrier	59	189277
Tahiti3	Tahiti	Windward Society	High barrier	55	189277
Takapoto1	Takapoto	West Tuamotu	Closed atoll	58	501
Takapoto2	Takapoto	West Tuamotu	Closed atoll	64	501
Takaroa 1	Takaroa	West Tuamotu	Open atoll	48	674
Takaroa 2	Takaroa	West Tuamotu	Open atoll	60	674
Tetiaroa1	Tetiaroa	Windward Society	Closed atoll	60	240
Tetiaroa2	Tetiaroa	Windward Society	Closed atoll	55	240
Tikehau 1	Tikehau	West Tuamotu	Open atoll	61	560
Tikehau 2	Tikehau	West Tuamotu	Open atoll	61	560
Tubuai1	Tubuai	Austral Islands	High barrier	49	2217
Tubuai2	Tubuai	Austral Islands	High barrier	55	2217
Uapou 1	Uapou	Marquesas	High rocky	55	2213
Uapou 2	Uapou	Marquesas	High rocky	55	2213

Table S3: Boosted Regression Tree parameters and mean model results for initial models results. CV= Cross Validated. Percent variation explained = 1- (residual deviance/total deviance).

Model response variable	Tree complexity	Learning rate	Bag fraction	% Variation explained	Correlation	CV % variation explained	CV correlation
Total shark MaxN	2	0.017	0.685	53.38	0.728	48.22	0.677
Reef mean shark MaxN	2	0.009	0.750	80.48	0.909	65.73	0.796
Blacktip reef shark MaxN	2	0.019	0.655	44.43	0.629	38.72	0.563
Grey reef shark MaxN	2	0.023	0.560	58.60	0.726	54.15	0.675
Whitetip reef shark MaxN	1	0.033	0.525	19.69	0.413	16.18	0.366

Table S4: Mean relative influence of all model factors for initial model runs.

	Total shark MaxN	Reef mean shark MaxN	Blacktip reef shark MaxN	Grey reef shark MaxN	Whitetip reef shark MaxN
Island geomorphology	49.08	62.22	31.08	7.56	26.64
Island group	11.44	18.96	18.04	47.89	4.70
Sea surface temperature	7.62	8.05	9.84	7.32	7.79
Net primary productivity	11.08	5.20	7.47	4.25	5.32
Random	7.52	2.37	11.16	5.84	7.95
Gravity	4.07	1.24	8.66	10.07	11.01
Lagoon size	1.36	0.94	3.10	11.10	32.94
Season	0.09	1.22	0.13	0.28	0.02
Time without bait	2.18	NA	2.97	1.93	2.54
Bait type	3.45	NA	3.78	1.64	NA
Depth	1.60	NA	2.53	2.13	1.03
Visibility	0.51	NA	1.25	0.01	0.06

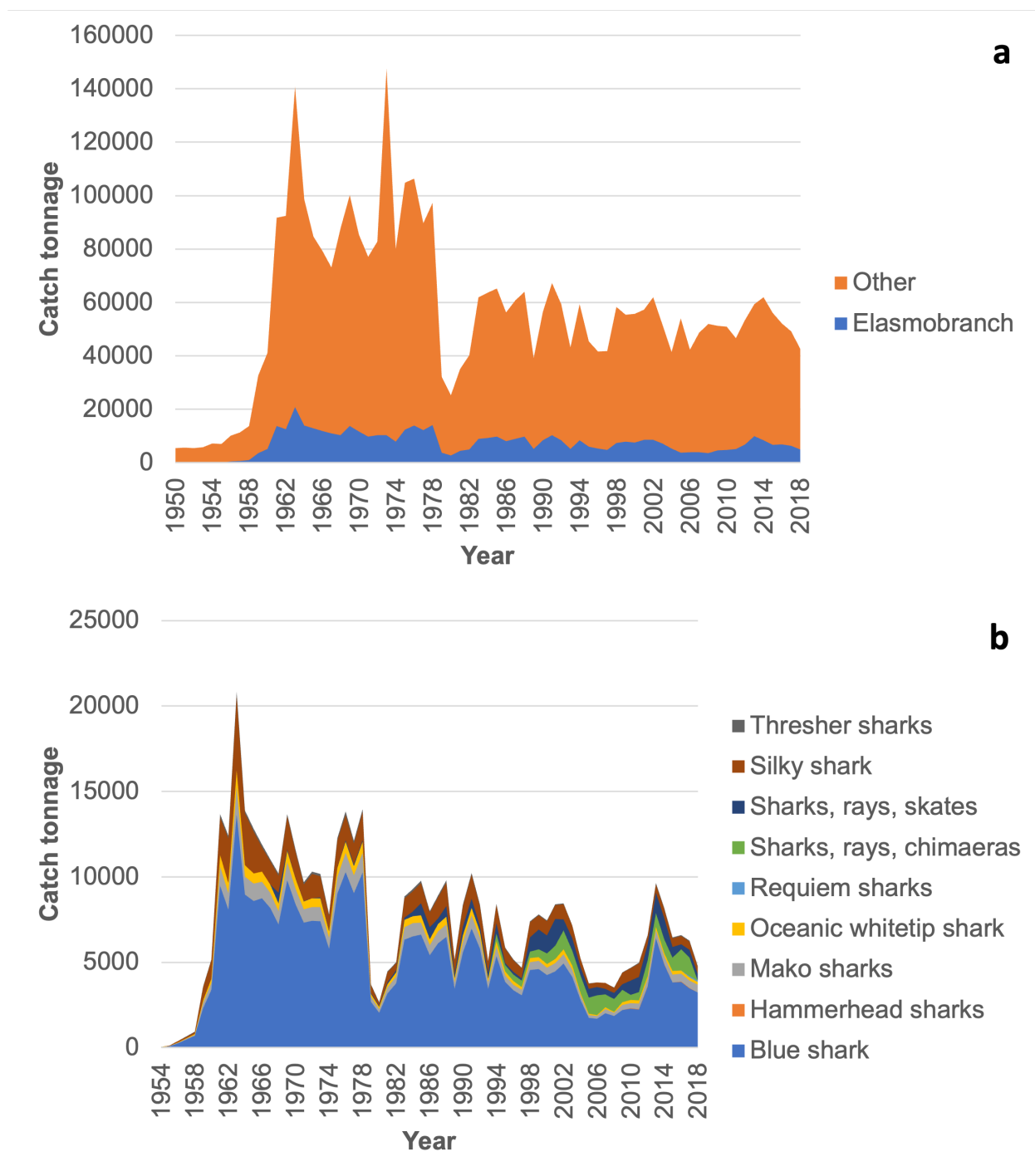


Figure S1: Reconstructed catch data, in tons from French Polynesia (Bale et al., 2009; Pauly et al., 2020; R. White et al., 2020). (a) Total catch of elasmobranchs and other catches, (b) Taxa-specific elasmobranch catches.

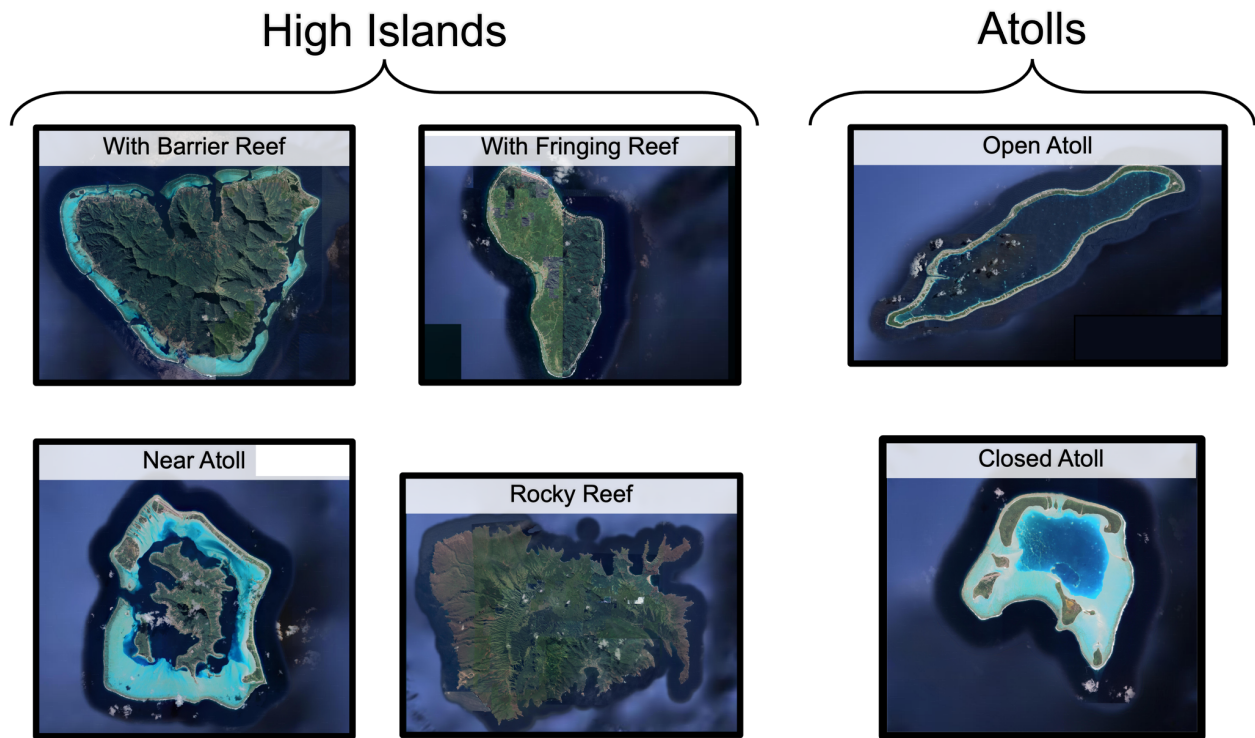


Figure S2: Figure showing examples of each island geomorphology type.



Figure S3: Illustration of BRUV deployment. Art credit: Erin Z. Anderson

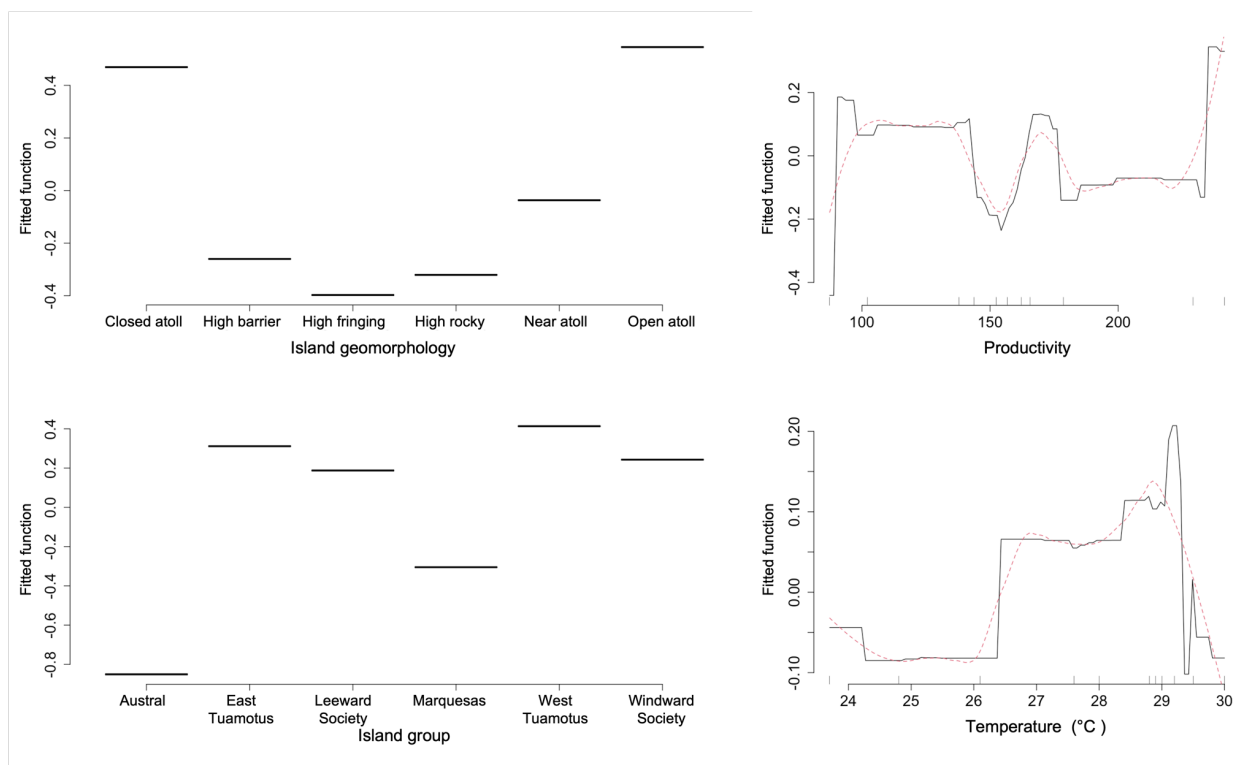


Figure S4: Partial dependency plots generated by single run of final boosted regression tree model, showing the relationship between final model predictor variables and total shark MaxN.

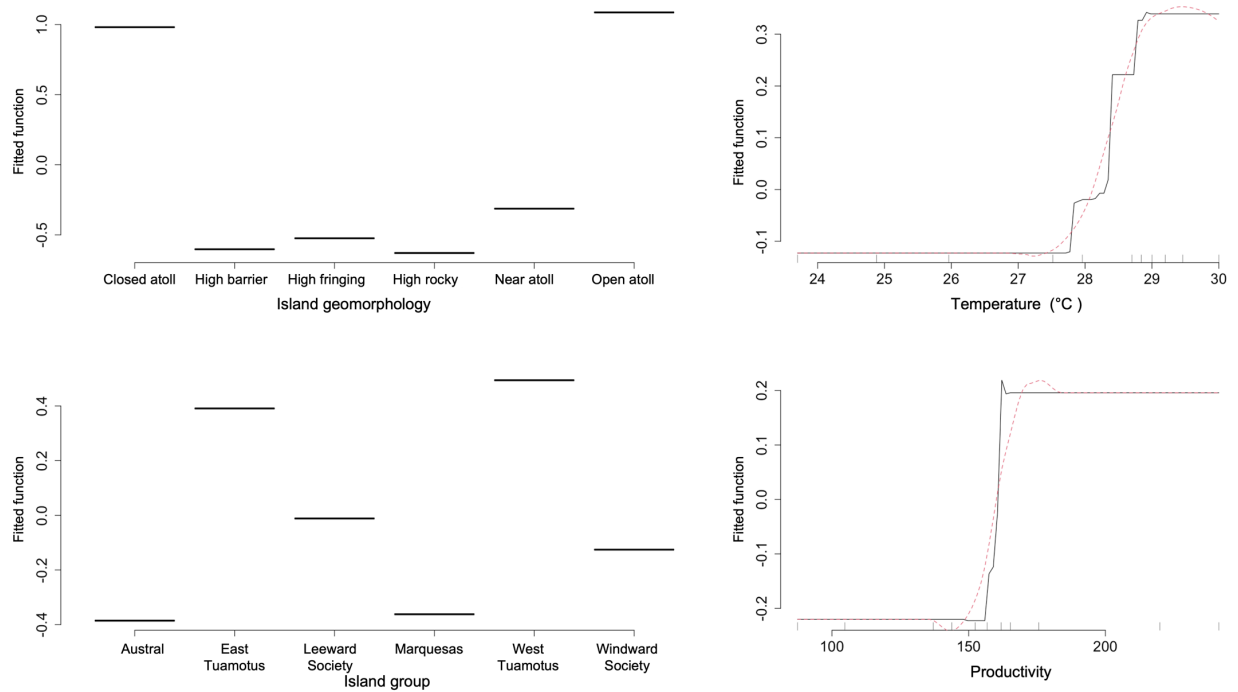


Figure S5: Partial dependency plots generated by single run of final boosted regression tree model, showing the relationship between final model predictor variables and reef mean MaxN of all sharks.

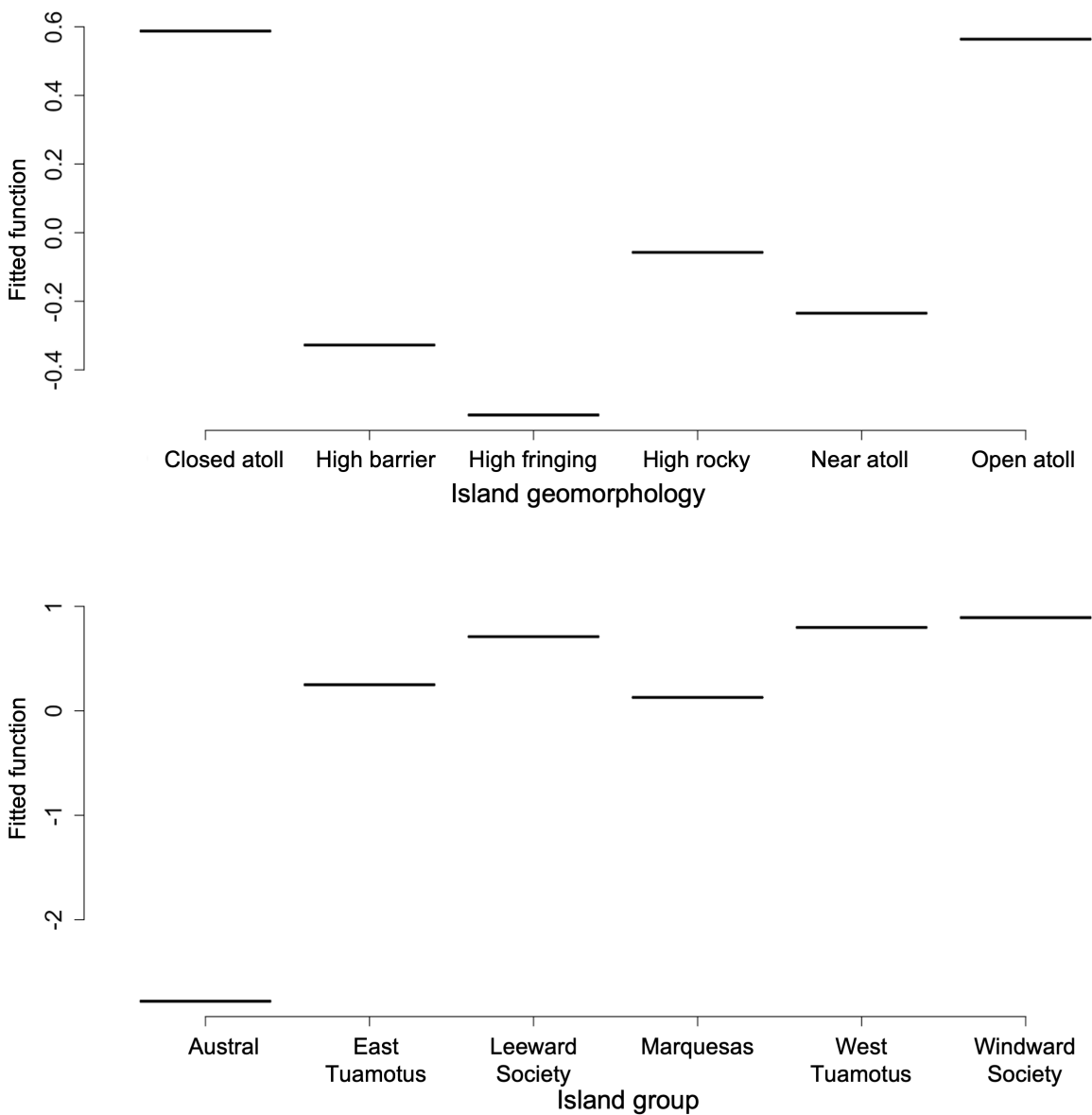


Figure S6: Partial dependency plots generated by single run of final boosted regression tree model, showing the relationship between final model predictor variables and blacktip reef shark MaxN.

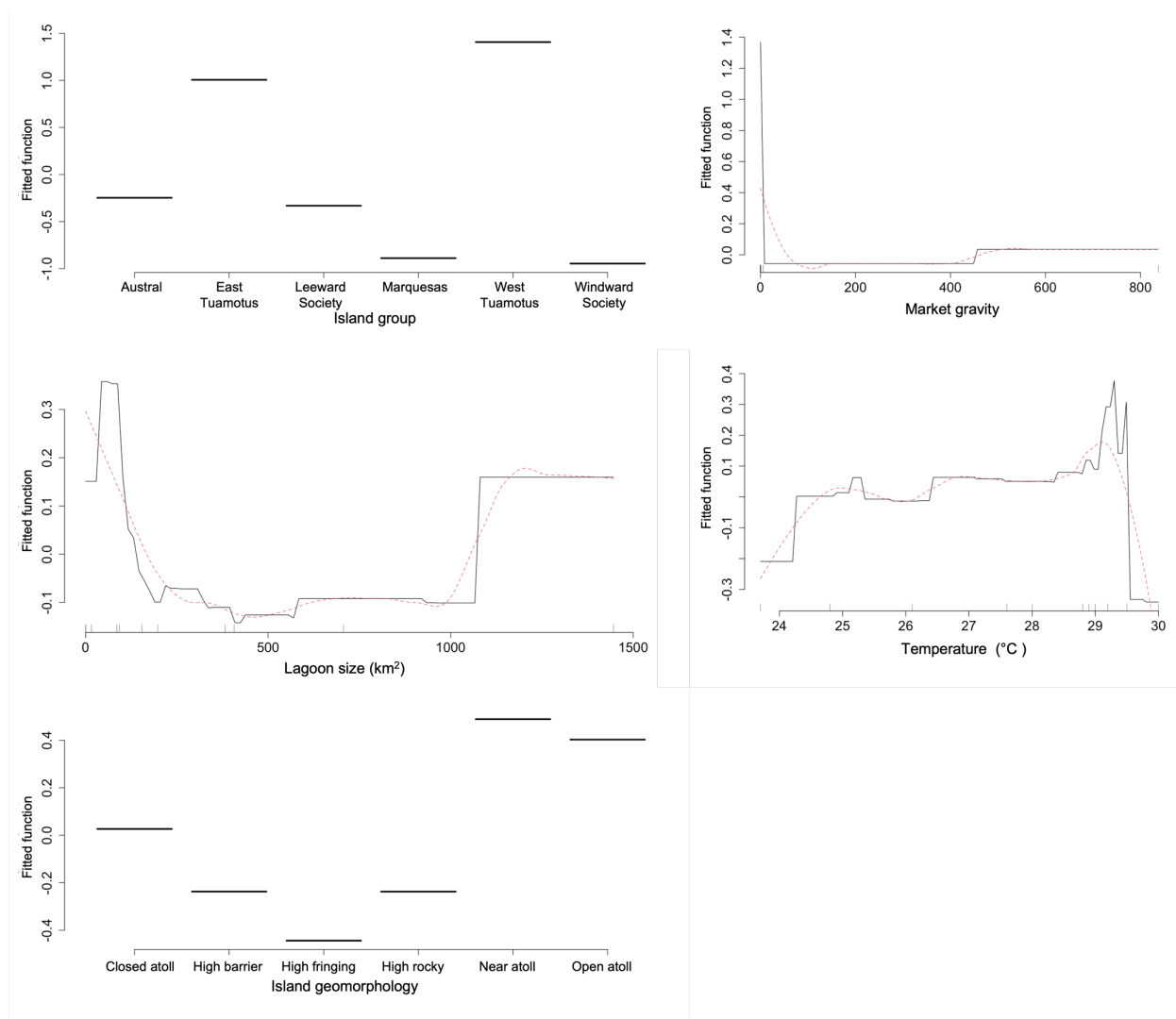


Figure S7: Partial dependency plots generated by single run of final boosted regression tree model, showing the relationship between final model predictor variables and grey reef shark MaxN.

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