

APPENDIX 1

Average live coral cover (LCC) and Reef Functional Index (RFI) values. Percent changes for each period are also included.

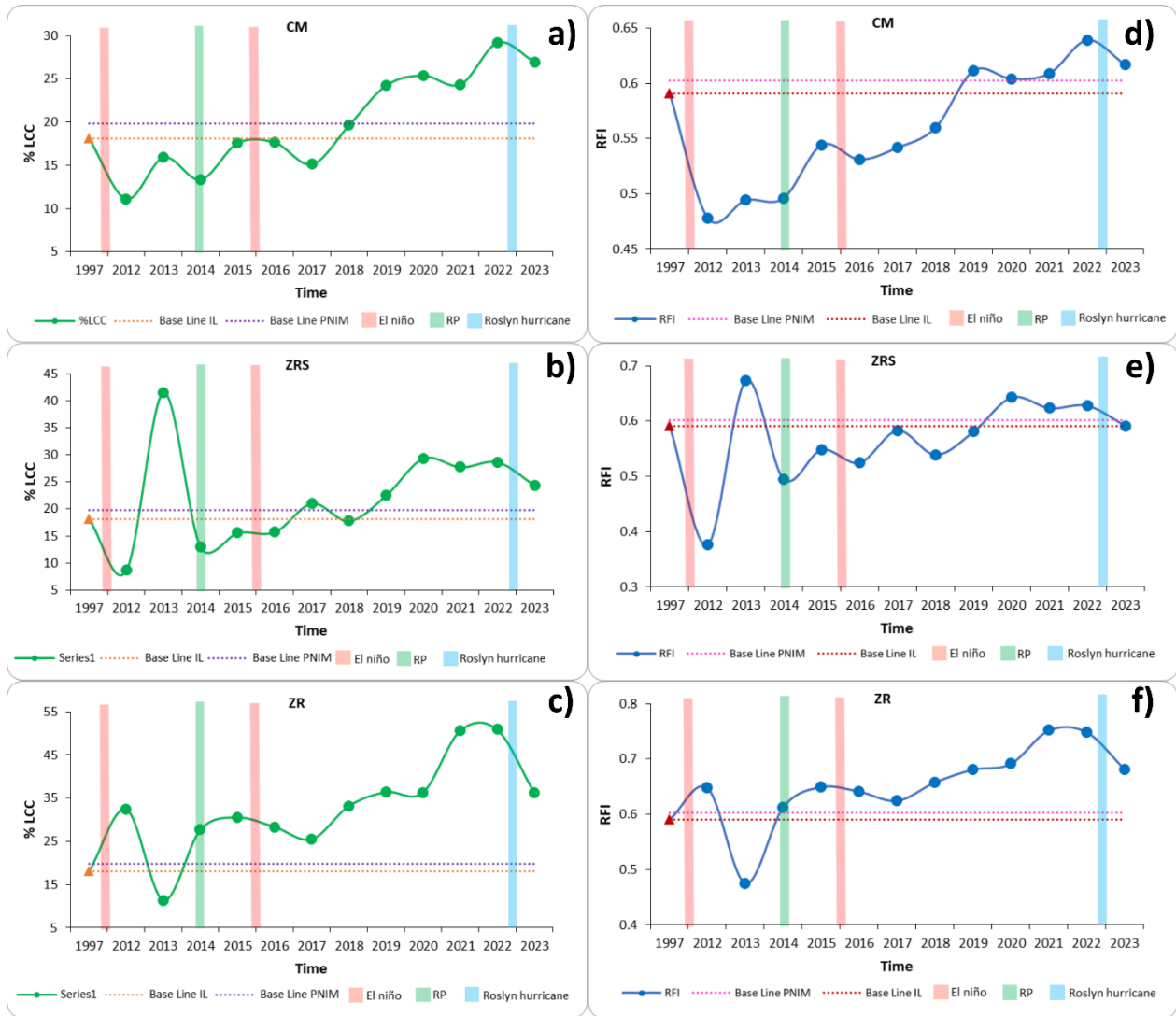
Year	PNIM	IL	IR	CM	ZRS	ZR	TA	PP	PA
2012	RFI: 0.419 ± 0.193 LCC: 12.928 ± 12.450	RFI: 0.501 ± 0.171 LCC: 17.400 ± 14.569	RFI: 0.338 ± 0.183 LCC: 8.456 ± 8.279	RFI: 0.478 ± 0.093 Δ% (1997* - 2012) = -19.05 % LCC: 11.133 ± 7.025 Δ% (1997* - 2012) = 38.49 %	RFI: 0.376 ± 0.193 Δ% (1997* - 2012) = -36.40 % LCC: 8.667 ± 8.308 Δ% (1997* - 2012) = -52.12 %	RFI: 0.648 ± 0.095 Δ% (1997* - 2012) = 9.64% LCC: 32.400 ± 14.100 Δ% (1997* - 2012) = 79.00 %	RFI: 0.309 ± 0.203 Δ% (1997* - 2012) = -49.66 % LCC: 7.000 ± 7.389 Δ% (1997* - 2012) = -67.59 %	RFI: 0.408 ± 0.129 Δ% (1997* - 2012) = -33.60 % LCC: 10.367 ± 8.367 Δ% (1997* - 2012) = -52.01 %	RFI: 0.298 ± 0.224 Δ% (1997* - 2012) = -51-45 % LCC: 8.000 ± 10.385 Δ% (1997* - 2012) = -62-96 %
2013	RFI: 0.454 ± 0.193 LCC: 16.289 ± 15.523	RFI: 0.548 ± 0.161 LCC: 22.956 ± 17.920	RFI: 0.360 ± 0.180 LCC: 9.622 ± 9.097	RFI: 0.494 ± 0.181 LCC: 15.933 ± 10.405	RFI: 0.673 ± 0.133 LCC: 41.567 ± 17.805	RFI: 0.475 ± 0.100 LCC: 11.367 ± 6.015	RFI: 0.347 ± 0.164 LCC: 7.467 ± 7.536	RFI: 0.390 ± 0.193 LCC: 11.800 ± 10.484	RFI: 0.342 ± 0.219 LCC: 9.600 ± 10.545
2014	RFI: 0.439 ± 0.166 LCC: 12.572 ± 11.505	RFI: 0.535 ± 0.130 LCC: 18.000 ± 13.294	RFI: 0.344 ± 0.143 LCC: 7.144 ± 5.860	RFI: 0.496 ± 0.134 Δ% (2012 - 2014) = 3.73 % LCC: 13.367 ± 9.492 Δ% (2012 - 2014) = 20.06 %	RFI: 0.495 ± 0.131 Δ% (2012 - 2014) = 31.70 % LCC: 12.933 ± 7.627 Δ% (2012 - 2014) = 49.23 %	RFI: 0.613 ± 0.113 Δ% (2012 - 2014) = -5.32 % LCC: 27.700 ± 17.140 Δ% (2012 - 2014) = -14.51 %	RFI: 0.338 ± 0.140 Δ% (2012 - 2014) = 9.48 % LCC: 6.200 ± 4.938 Δ% (2012 - 2014) = -11.42 %	RFI: 0.369 ± 0.148 Δ% (2012 - 2014) = -9.46 % LCC: 8.400 ± 5.566 Δ% (2012 - 2014) = -18.97 %	RFI: 0.323 ± 0.172 Δ% (2012 - 2014) = 8.51 % LCC: 6.833 ± 7.849 Δ% (2012 - 2014) = -14.58 %
2015	RFI: 0.467 ± 0.175 LCC: 14.097 ± 12.672	RFI: 0.581 ± 0.101 LCC: 21.261 ± 13.844	RFI: 0.354 ± 0.161 LCC: 6.933 ± 5.568	RFI: 0.544 ± 0.117 LCC: 17.600 ± 13.585	RFI: 0.548 ± 0.058 LCC: 15.667 ± 5.006	RFI: 0.650 ± 0.099 LCC: 30.517 ± 17.269	RFI: 0.310 ± 0.177 LCC: 5.567 ± 3.980	RFI: 0.403 ± 0.166 LCC: 10.000 ± 6.999	RFI: 0.347 ± 0.161 LCC: 5.233 ± 5.097
2016	RFI: 0.453 ± 0.185 LCC: 13.339 ± 12.159	RFI: 0.566 ± 0.129 LCC: 20.578 ± 12.172	RFI: 0.340 ± 0.164 LCC: 6.100 ± 6.768	RFI: 0.531 ± 0.154 LCC: 17.633 ± 14.175	RFI: 0.525 ± 0.136 LCC: 15.767 ± 9.384	RFI: 0.641 ± 0.070 LCC: 28.333 ± 10.707	RFI: 0.308 ± 0.077 LCC: 2.833 ± 2.098	RFI: 0.422 ± 0.141 LCC: 10.267 ± 9.342	RFI: 0.291 ± 0.237 LCC: 5.200 ± 5.707
2017	RFI: 0.482 ± 0.149 LCC: 13.672 ± 10.589	RFI: 0.583 ± 0.092 LCC: 20.567 ± 9.901	RFI: 0.381 ± 0.124 LCC: 6.778 ± 5.691	RFI: 0.542 ± 0.081 LCC: 15.133 ± 7.991	RFI: 0.583 ± 0.121 LCC: 21.067 ± 9.939	RFI: 0.625 ± 0.063 LCC: 25.500 ± 10.623	RFI: 0.337 ± 0.133 LCC: 4.900 ± 2.613	RFI: 0.466 ± 0.073 LCC: 10.867 ± 5.620	RFI: 0.340 ± 0.132 LCC: 4.567 ± 6.598
2018	RFI: 0.489 ± 0.169 LCC: 16.217 ± 13.872	RFI: 0.586 ± 0.126 LCC: 23.544 ± 14.755	RFI: 0.392 ± 0.152 LCC: 8.889 ± 8.115	RFI: 0.560 ± 0.122 LCC: 19.667 ± 14.957	RFI: 0.539 ± 0.149 LCC: 17.800 ± 9.105	RFI: 0.658 ± 0.090 LCC: 33.167 ± 16.721	RFI: 0.321 ± 0.137 LCC: 4.867 ± 2.772	RFI: 0.479 ± 0.102 LCC: 13.367 ± 8.754	RFI: 0.374 ± 0.189 LCC: 8.433 ± 10.031
2019	RFI: 0.524 ± 0.162 LCC: 19.339 ± 13.724	RFI: 0.625 ± 0.101 LCC: 27.756 ± 12.458	RFI: 0.423 ± 0.151 LCC: 10.922 ± 9.118	RFI: 0.612 ± 0.077 LCC: 24.267 ± 10.568	RFI: 0.581 ± 0.136 LCC: 22.567 ± 12.479	RFI: 0.681 ± 0.068 LCC: 36.433 ± 11.523	RFI: 0.355 ± 0.149 LCC: 4.867 ± 2.772	RFI: 0.524 ± 0.064 LCC: 16.467 ± 7.837	RFI: 0.391 ± 0.182 LCC: 9.200 ± 12.332

2020	RFI: 0.544 ± 0.152 LCC: 20.872 ± 15.001	RFI: 0.646 ± 0.094 LCC: 30.367 ± 12.758	RFI: 0.442 ± 0.128 LCC: 11.378 ± 10.497	RFI: 0.604 ± 0.124 LCC: 25.400 ± 17.249	RFI: 0.643 ± 0.097 LCC: 29.400 ± 12.050	RFI: 0.692 ± 0.038 LCC: 36.300 ± 7.137	RFI: 0.362 ± 0.091 LCC: 5.367 ± 3.237	RFI: 0.526 ± 0.061 LCC: 16.567 ± 7.521	RFI: 0.439 ± 0.169 LCC: 12.200 ± 15.457
2021	RFI: 0.549 ± 0.187 LCC: 23.661 ± 17.786	RFI: 0.662 ± 0.112 LCC: 34.244 ± 16.642	RFI: 0.436 ± 0.181 LCC: 13.078 ± 11.761	RFI: 0.609 ± 0.097 LCC: 24.367 ± 13.370	RFI: 0.624 ± 0.130 LCC: 27.767 ± 13.776	RFI: 0.752 ± 0.045 LCC: 50.600 ± 9.589	RFI: 0.293 ± 0.184 LCC: 5.733 ± 6.203	RFI: 0.557 ± 0.044 LCC: 19.533 ± 5.877	RFI: 0.459 ± 0.185 LCC: 13.967 ± 17.047
2022	RFI: 0.569 ± 0.170 LCC: 25.267 ± 17.891	RFI: 0.672 ± 0.106 LCC: 36.267 ± 16.544	RFI: 0.465 ± 0.161 LCC: 14.267 ± 11.403	RFI: 0.639 ± 0.098 LCC: 29.200 ± 16.170	RFI: 0.628 ± 0.127 LCC: 28.700 ± 13.447	RFI: 0.749 ± 0.052 LCC: 50.900 ± 10.679	RFI: 0.347 ± 0.179 LCC: 7.533 ± 7.058	RFI: 0.557 ± 0.061 LCC: 20.200 ± 7.259	RFI: 0.492 ± 0.161 LCC: 15.067 ± 15.845
2023	RFI: 0.538 ± 0.154 LCC: 20.689 ± 14.244	RFI: 0.630 ± 0.116 LCC: 29.200 ± 13.730	RFI: 0.447 ± 0.133 LCC: 12.178 ± 8.748	RFI: 0.617 ± 0.118 Δ% (2014 - 2023) = 24.33 % Δ% (1997* - 2023) = 4.41 % LCC: 26.933 ± 15.664 Δ% (2014 - 2023) = 101.50 % Δ% (1997* - 2023) = 48.80 %	RFI: 0.591 ± 0.153 Δ% (2014 - 2023) = 19.54 % Δ% (1997* - 2023) = 0.12 % LCC: 24.367 ± 13.198 Δ% (2014 - 2023) = 88.40 % Δ% (1997* - 2023) = 34.62 %	RFI: 0.682 ± 0.065 Δ% (2014 - 2023) = 11.17 % Δ% (1997* - 2023) = 15.40 % LCC: 36.300 ± 11.899 Δ% (2014 - 2023) = 31.05 % Δ% (1997* - 2023) = 100.55 %	RFI: 0.354 ± 0.117 Δ% (2014 - 2023) = 4.62 % Δ% (1997* - 2023) = -42.34 % LCC: 7.200 ± 4.332 Δ% (2014 - 2023) = 16.13 % Δ% (1997* - 2023) = -66.67 %	RFI: 0.521 ± 0.041 Δ% (2014 - 2023) = 41.21 % Δ% (1997* - 2023) = -15.11 % LCC: 16.067 ± 4.672 Δ% (2014 - 2023) = 91.27 % Δ% (1997* - 2023) = -25.62 %	RFI: 0.465 ± 0.169 Δ% (2014 - 2023) = 43.78 % Δ% (1997* - 2023) = -24.26 % LCC: 13.267 ± 13.262 Δ% (2014 - 2023) = 94.15 % Δ% (1997* - 2023) = -38.58 %

Δ% = Percentage of change. * The baseline data used to calculate the rate of change correspond to the island to which each site belongs. PNIM = Parque Nacional Islas Marietas, IL = Isla Larga, IR = Isla Redonda, ZR = Zona de Restauración, ZRS = Zona de Restauración Sur, CM = Cueva del Muerto, PP = Plataforma Pavonas, TA = Túnel Amarradero, PA = Playa del Amor

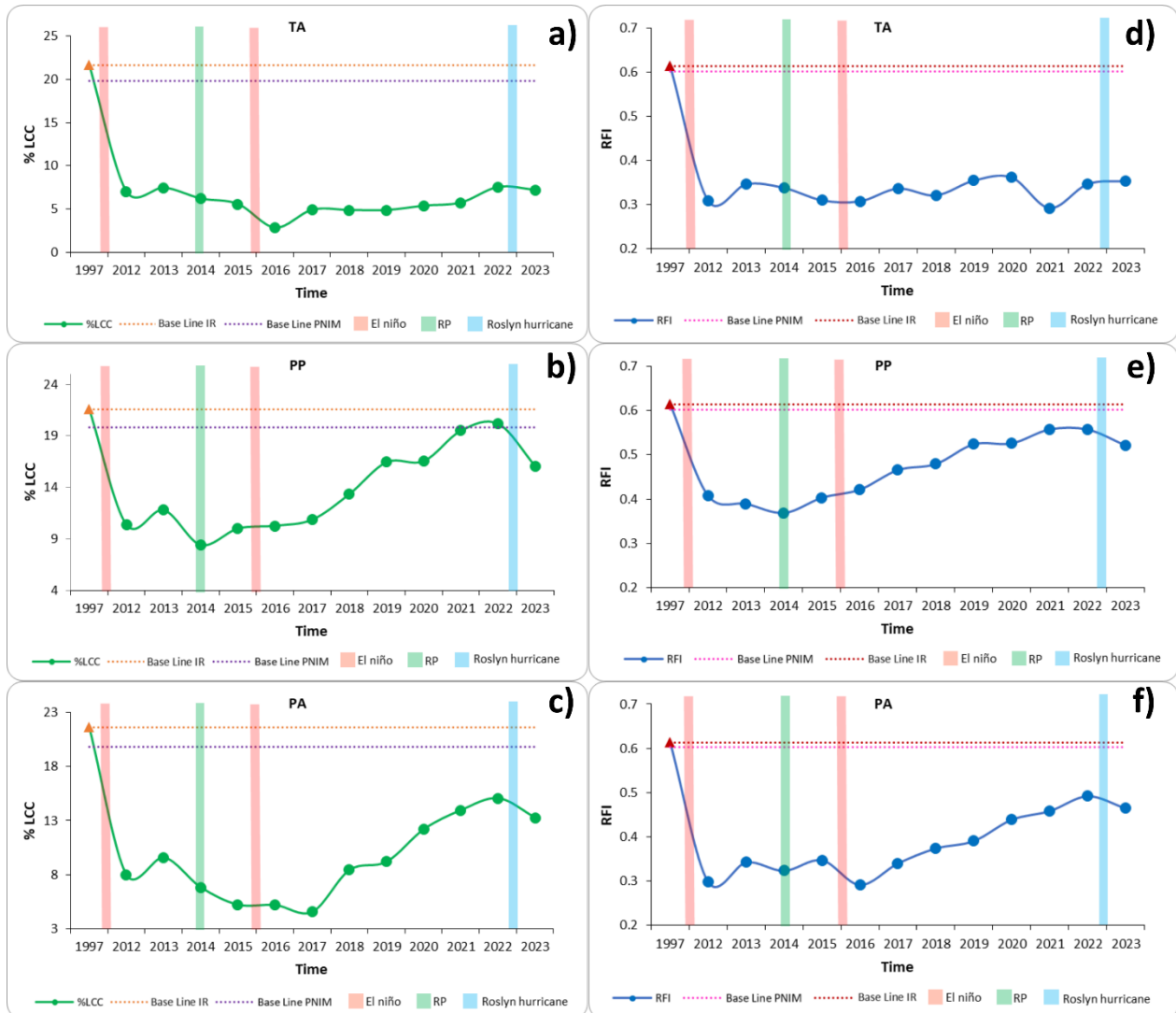
APPENDIX 2

Historical trends in live coral cover (LCC; a, b, c) and reef functional index (RFI; d, e, f) across different sites of Isla Larga. RP = beginning of the restoration program; CM = Cueva del Muerto; ZRS = Zona de Restauración Sur; ZR = Zona de Restauración.



APPENDIX 3

Historical trends in live coral cover (LCC; a, b, c) and reef functional index (RFI; d, e, f) across different sites of Isla Redonda. RP = beginning of the restoration program; TA = Túnel Amarradero; PP = Plataforma Pavonas; PA = Playa del Amor.



APPENDIX 4

Global LCC model

Term	Estimate	Std.Error	z	p
Intercept	-1.56300	0.05087	-30.728	<2e-16
Year_c	0.06120	0.01359	4.505	6.65e-06

APPENDIX 5

Type III Wald Chi-Square Tests for the Global LCC Model

Effect	Chisq	Df	Pr(>Chisq)
(Intercept)	944.182	1	< 2.2 × 10 ⁻¹⁶
Year_c	20.291	1	6.651 × 10 ⁻⁶

APPENDIX 6

LCC model – Island fixed

Term	Estimate	Std.Error	z	p
Intercept	-1.13273	0.05283	-21.441	<2e-16
Year_c	0.08377	0.01520	5.512	3.54e-08
Island: Redonda	-1.02865	0.08509	-12.089	<2e-16
Year_c × Redonda	-0.03361	0.02457	-1.368	0.171

APPENDIX 7

Type III Wald Chi-Square Tests for the LCC Model – Island fixed

Effect	Chisq	Df	Pr(>Chisq)
(Intercept)	459.708	1	< 2.2e-16
Year_c	30.384	1	3.543e-08
Island	146.136	1	< 2.2e-16
Year-C:Island	1.872	1	0.1712

APPENDIX 8

LCC model – Site fixed

Term	Estimate	Std.Error	z	p
Intercept	-1.422387	0.088805	-16.017	<2e-16
Year_c	0.091191	0.025590	3.564	0.000366
Site: Plataforma Pavonas	-0.364149	0.130415	-2.792	0.005235
Site: Playa del Amor	-0.965863	0.144905	-6.666	2.64e-11
Site: Túnel Amarradero	-1.070445	0.145228	-7.371	1.70e-13

Site: Zona de Restauración	0.706999	0.117054	6.040	1.54e-09
Site: ZR Sur	0.094442	0.123661	0.764	0.445035
Year_c × Pavonas	-0.006485	0.037843	-0.171	0.863930
Year_c × Playa del Amor	-0.025706	0.042892	-0.599	0.548960
Year_c × Túnel Amarradero	-0.079924	0.042347	-1.887	0.059115
Year_c × ZR	0.012533	0.034140	0.367	0.713541
Year_c × ZR Sur	-0.028750	0.035909	-0.801	0.423331

APPENDIX 9

Type III Wald Chi-Square Tests for the LCC Model – Site fixed

Effect	Chisq	Df	Pr(>Chisq)
(Intercept)	256.544	1	< 2.2e-16
Year_c	12.699	1	0.0003659
Site	243.820	5	< 2.2e-16
Year-C:Site	6.013	5	0.3049593

APPENDIX 10

LCC model – by site

Term	Estimate	Std.Error	z	p
Cueva del Muerto				
Intercept	-1.40683	0.09571	-14.699	<2e-16
Year_c	0.08968	0.02669	3.361	0.000778
Plataforma Pavonas				
Intercept	-1.87772	0.08198	-22.905	< 2e-16
Year_c	0.09149	0.02303	3.972	7.13e-05
Playa del Amor				
Intercept	-2.26895	0.14395	-15.762	<2e-16
Year_c	0.05875	0.03661	1.605	0.109
Tunel Amarradero				
Intercept	-2.73015	0.10042	-27.187	<2e-16
Year_c	0.01377	0.02821	0.488	0.625
Zona de Restauración				
Intercept	-0.71531	0.07748	-9.233	<2e-16
Year_c	0.10371	0.02269	4.571	4.84e-06
Zona de Restauración sur				
Intercept	-1.27474	0.10444	-12.205	<2e-16
Year_c	0.05917	0.02906	2.036	0.0417

APPENDIX 11

Global RFI model

Term	Estimate	Std. Error	z	p
(Intercept)	0.2319	0.0708	3.273	0.0010
Year_c	0.0579	0.0206	2.809	0.0050
Site: Plataforma Pavonas	-0.374 5	0.1001	-3.74 0	<.001
Site: Playa del Amor	-0.827 9	0.1023	-8.09 7	<.001
Site: Túnel Amarradero	-0.949 7	0.1025	-9.26 3	<.001
Site: Zona de Restauración	0.3789	0.1019	3.720	<.001
Site: Zona de Restauración Sur	0.0186	0.1002	0.186	0.853
Year_c × Plataforma Pavonas	0.0147	0.0292	0.503	0.615
Year_c × Playa del Amor	0.0363	0.0300	1.210	0.226
Year_c × Túnel Amarradero	-0.044 9	0.0297	-1.51 2	0.131
Year_c × Zona de Restauración	0.0008	0.0296	0.027	0.979
Year_c × Zona de Restauración Sur	-0.008 0	0.0291	-0.27 5	0.783

APPENDIX 12

Type III Wald Chi-Square Tests for the Global RFI Model

Effect	Chisq	Df	Pr(>Chisq)
(Intercept)	10.7151	1	0.001052
Year_c	7.8897	1	0.004972
Site	251.3712	5	<2.2e-16
Year_c:Site	7.8320	5	0.165741

APPENDIX 13

RFI model – Island fixed

Term	Estimate	Std.Error	z	p
Intercept	0.359732	0.044323	8.116	4.81e-16
Year_c	0.54826	0.012890	4.253	2.11e-05
Island: Redonda	-0.838969	0.063189	-13.277	< 2e-16
Year_c × Redonda	0.003679	0.018337	0.201	0.841

APPENDIX 14

Type III Wald Chi-Square Tests for the RFI Model – Island fixed

Effect	Chisq	Df	Pr(>Chisq)
(Intercept)	65.8717	1	4.813e-16
Year_c	18.0899	1	2.107e-05
Island	176.2847	1	< 2.2e-16
Year-C:Island	0.0402	1	0.841

APPENDIX 15

RFI model – by site

Term	Estimate	Std.Error	z	p
Cueva del Muerto				
Intercept	0.23944	0.05666	4.226	2.38e-05
Year_c	0.05982	0.01650	3.626	0.000287
Plataforma Pavonas				
Intercept	-0.14685	0.05811	-2.527	0.0115
Year_c	0.07475	0.01702	4.393	1.12e-05
Playa del Amor				
Intercept	-0.54046	0.10143	-5.329	9.9e-08
Year_c	0.08455	0.02965	2.851	0.00436
Tunel Amarradero				
Intercept	-0.70720	0.08011	-8.828	<2e-16
Year_c	0.01279	0.02290	0.558	0.577
Zona de Restauración				
Intercept	0.64440	0.04762	13.531	<2e-16
Year_c	0.06230	0.01384	4.502	6.72e-06
Zona de Restauración Sur				
Intercept	0.25014	0.07144	3.501	0.000463
Year_c	0.04983	0.02077	2.399	0.016428