The following supplement accompanies the article

Variation in breeding success and survival of little penguins *Eudyptula minor* in response to environmental variation

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Table S1. Number of nests monitored and little penguin fledglings and adults captured, marked (if not already) and released each breeding season at Oamaru

Breeding season	Nests monitored	Fledglings released	Adults released
1993	87	67	61
1994	156	87	86
1995	156	121	122
1996	163	158	167
1997	163	181	201
1998	185	144	224
1999	189	78	227
2000	192	162	228
2001	189	140	222
2002	203	176	194
2003	186	248	211
2004	210	137	236
2005	210	294	257
2006	232	281	269
2007	232	221	309
2008	243	197	314
2009	249	324	324
2010	249		324
2011	249		330

Table S2. Monthly and annual wave statistics for 3-hourly significant wave height (m) data near Oamaru, 1994–2011. n = number of records, P99 = 99th percentile, 2.32 m = overall 99th percentile value, Max = maximum recorded for the period

	Mean	SE	n	P99	Count of records >2.32 m	Max
May	1.13	0.01	4464	2.52	89	3.49
Jun	1.20	0.01	4320	2.41	72	3.28
Jul	1.20	0.01	4464	2.79	139	3.68
Aug	1.23	0.01	4464	2.57	93	3.78
Sep	1.03	0.01	4320	2.26	36	3.13
Oct	0.97	0.01	4464	2.03	15	3.04
Nov	0.98	0.01	4320	2.04	8	2.52
Dec	0.91	0.01	4464	1.96	4	2.45
Jan	0.93	0.01	4464	2.18	21	2.70
Feb	0.97	0.01	4072	2.03	17	2.94
Mar	0.99	0.01	4464	2.03	16	3.12
Apr	1.05	0.01	4320	2.20	26	2.68
1994	1.06	0.01	2920	2.29	28	3.25
1995	1.05	0.01	2928	2.21	16	3.05
1996	1.04	0.01	2920	2.17	19	2.59
1997	0.98	0.01	2920	2.20	22	2.67
1998	1.00	0.01	2920	1.92	1	2.40
1999	1.02	0.01	2928	2.53	68	3.12
2000	0.97	0.01	2920	2.33	34	3.28
2001	1.05	0.01	2920	2.58	57	3.30
2002	1.06	0.01	2920	2.20	17	2.98
2003	1.04	0.01	2928	2.11	7	2.94
2004	1.08	0.01	2920	2.27	22	2.60
2005	1.00	0.01	2920	2.05	9	2.77
2006	1.04	0.01	2920	2.16	15	2.52
2007	1.04	0.01	2928	2.43	42	3.68
2008	1.12	0.01	2920	2.53	57	3.30
2009	1.15	0.01	2920	2.34	31	2.79
2010	1.11	0.01	2920	2.56	39	3.49
2011	1.06	0.01	2928	2.71	52	3.78

Table S3. Models in the set examining variation in 4-monthly survival rate ϕ of breeding little penguins at Oamaru, 1994–2011, in relation to storms

Model	Variable	AICc	ΔAICc	w_i	k	Deviance	R^2_DEV
1	ϕ (*t*) *p* (*t*)	7932.15	0	1.00	106	3202.50	
2	ϕ (storm scenario + Y) *p* (*t*)	8051.40	119.25	0.00	73	3388.85	0.80
3	ϕ (S + Y) *p* (*t*)	8071.95	139.79	0.00	75	3405.34	0.78
4	ϕ (storm scenario) *p* (*t*)	8079.72	147.56	0.00	55	3453.59	0.73
5	ϕ (storm scenario + S) *p* (*t*)	8084.70	152.55	0.00	58	3452.51	0.73
6	ϕ (Y) *p* (*t*)	8085.89	153.74	0.00	72	3425.36	0.76
7	ϕ (P99) *p* (*t*)	8091.34	159.18	0.00	55	3465.21	0.72
8	ϕ (P99 + S) *p* (*t*)	8096.02	163.87	0.00	58	3463.83	0.72
9	ϕ (S + Y) *p* (S + Y)	8105.77	173.62	0.00	44	3501.85	0.68
10	ϕ (Y) *p* (S + Y)	8120.01	187.85	0.00	41	3522.13	0.66
11	ϕ (*t*) *p* (S)	8124.82	192.67	0.00	57	3494.65	0.63
12	ϕ (S) *p* (*t*)	8150.07	217.92	0.00	57	3519.91	0.68
13	ϕ (.) *p* (*t*)	8166.05	233.90	0.00	54	3541.95	0.66
14	ϕ (S) *p* (S + Y)	8180.50	248.35	0.00	26	3612.81	0.61
15	ϕ (.) *p* (S + Y)	8197.53	265.38	0.00	23	3635.87	0.56
16	ϕ (*t*) *p* (S + Y)	8227.76	295.61	0.00	75	3561.15	0.53
17	ϕ (S + Y) *p* (S)	8286.86	354.71	0.00	26	3719.17	0.44
18	ϕ (Y) *p* (S)	8304.15	372.00	0.00	23	3742.49	0.42
19	ϕ (S) *p* (S)	8356.85	424.69	0.00	8	3825.27	0.33
20	ϕ (.) *p* (S)	8374.00	441.84	0.00	4	3850.43	0.30
21	ϕ (S + Y) *p* (Y)	8390.05	457.90	0.00	41	3792.17	0.36
22	ϕ (Y) *p* (Y)	8402.84	470.69	0.00	38	3811.01	0.34
23	ϕ (*t*) *p* (.)	8409.43	477.28	0.00	54	3785.32	0.37
24	ϕ (*t*) *p* (Y)	8440.13	507.97	0.00	72	3779.60	0.38
25	ϕ (S) *p* (Y)	8465.99	533.84	0.00	23	3904.33	0.24
26	ϕ (.) *p* (Y)	8481.90	549.74	0.00	20	3926.26	0.22
27	ϕ (S + Y) *p* (.)	8562.17	630.02	0.00	24	3998.50	0.14
28	ϕ (Y) *p* (.)	8574.50	642.34	0.00	20	4018.86	0.12
29	ϕ (S) *p* (.)	8630.25	698.10	0.00	4	4106.69	0.02
30	ϕ (.) *p* (.)	8648.97	716.81	0.00	2	4129.40	

AICc: Akaike's information criterion, the selection criterion corrected for small sample size; ΔAICc: value of the difference between each model and the best model; w_i: Akaike weights; k: number of parameters; P99: number of consecutive 3-hourly records above the 99th percentile significant wave height value; storm scenario: covariate representing years grouped by the persistence of extreme significant wave heights, ≥20 consecutive records above the P99 or <20 consecutive records; Y: annual variation; S: seasonal/four-monthly; (.): constant; *p*: recapture; R^2_DEV: proportion of model deviance accounted for by each covariate