APPENDIX (ONLINE ONLY)

Appendix 1 – Details of survival analysis

Because our technique captures both breeding and non-breeding individuals, some individuals are never seen again after marking (Jones *et al.* 2002, Jones *et al.* 2007). These transient "prospectors" that we marked on the plot but had no fidelity to it result in a lower estimate of survival on the first occasion after marking (Pradel *et al.* 1997, Prévot-Julliard *et al.* 1998, Bertram *et al.* 2000, Jones *et al.* 2007). To account for this permanent emigration, we included a transient term that modelled survival estimates for the period following capture independently of estimates in subsequent years. This results in the first estimate of survival being the product of both survival and permanent emigration from the study plot (Pradel *et al.* 1997). Marked individuals' breeding status each year was not known. We defined a global model that included a transient term and both survival and resighting probabilities varying with time.

We tested the goodness-of-fit of the global model to the data using 100 parametric bootstraps (Jones *et al.* 2002, Jones *et al.* 2007). From these bootstraps, we obtained the mean model deviance and mean overdispersion, or extra-binomial variation. This variation arises when assumptions of the model are not met, such as variation in the recapture rates of individuals (Burnham & Anderson 2002). The observed deviance and $\hat{c}$ (which measures extra-binomial variation) were divided by the mean values from the bootstraps and the higher of the two results was taken as an estimate of overall overdispersion, $\hat{c}$. We restricted our candidate models to the global model, plus a series of reduced parameter models. We did not construct every reduced parameter model, many of which would have poor fit, but rather we used the approach of Lebreton et al. (1992) by first modelling recapture rates to determine the best structure for recapture rates and then modelling survival rates.

Table A1. Comparison of capture-mark-recapture/resight models from program MARK for Crested Auklets at Sirius Point, Kiska Island, Alaska from 2001-2009, where ϕ is survival, p is the encounter probability and t is time. The term "Year1" estimates survival separately for the year immediately following marking. p(grouped) groups years with similar resight probability to reduce model parameterization (see Table 2). All models were adjusted for $\hat{c}$ = 1.146.

Model	$QAIC_c$	$\Delta QAIC_c$	Akaike Weight	Model Likelihood	No. Parameters	Deviance
A $\{\phi_{(Year1+t)}\ p_{(grouped)}\}$	340.595	0.00	0.965	1.000	9	51.132
B $\{\phi_{(Year1+t)}\ p_{(t)}\}$	347.261	6.67	0.034	0.036	13	49.137
C $\{\phi_{(.)}\ p_{(t)}\}$	360.592	20.00	< 0.001	< 0.001	10	68.987
D $\{\phi_{(t)}\ p_{(t)}\}$	360.770	20.17	< 0.001	< 0.001	17	53.734
E $\{\phi_{(t)}\ p_{(.)}\}$	382.016	41.42	< 0.001	< 0.001	10	90.411
F $\{\phi_{(.)}\ p_{(.)}\}$	384.689	44.09	< 0.001	< 0.001	2	109.814

Table A2. The number of Crested Auklets marked and resighted during our study at Kiska Island, 2001-2010. Resighted birds do not include those marked in the same year. There was reduced resighting effort in 2005, and therefore a lower probability of detection (Table 2).

Year	Newly banded adults	Total birds resighted
2001	23	-
2002	1	17
2003	6	18
2004	0	20
2005	0	9
2006	0	18
2007	23	13
2008	41	28
2009	26	54
2010	7	60
Total	**127**	**237**

Table A3. A summary of Crested Auklet adults and eggs found depredated by rats or in rat caches at Sirius Point. There was one brief visit in 1996 and visits encompassing the entire breeding season in 2001-2010. Dead adults that had been cached or partially eaten by rats were assumed to be the result of direct predation rather than scavenging (see text).

Date	Details	Source
23 August 1996	1 egg in rat cache	(Williams 1996)
23 August 1996	4 adults found separately	(Williams 1996)
04 June 2002	4 eggs in a rat cache	(Major & Jones 2002)
17 July 2002	1 broken egg with bite marks	(Major & Jones 2002)
01 August 2003	1 depredated adult	(Major & Jones 2003)
08 June 2004	1 depredated egg in productivity crevice	(Jones *et al.* 2004a)
26 June 2004	1 depredated egg	(Jones *et al.* 2004a)
16 June 2006	4 eggs in a rat cache	(Eggleston & Jones 2006)
29 May 2007	1 egg in rat cache	(Bond & Jones 2007)
15 July 2008	1 depredated egg	(Bond & Jones 2008)
19 July 2008	1 depredated egg	(Bond & Jones 2008)
31 May 2009	1 depredated egg	(Bond & Jones 2009)
06 June 2009	1 depredated egg	(Bond & Jones 2009)
11 June 2009	2 eggs in rat cache	(Bond & Jones 2009)
06 July 2009	2 depredated eggs	(Bond & Jones 2009)
13 July 2009	1 depredated egg	(Bond & Jones 2009)

29 July 2009	1 depredated adult	(Bond & Jones 2009)
02 June 2010	1 depredated egg, 3 eggs in rat cache	(Bond *et al.* 2010)
07 June 2010	3 depredated eggs	(Bond *et al.* 2010)
11 June 2010	3 depredated eggs	(Bond *et al.* 2010)
13 June 2010	1 depredated egg	(Bond *et al.* 2010)