The following supplement accompanies the article

Net loss of endangered humpback dolphins: integrating residency, site fidelity and bycatch in shark nets

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Table S1. Summary of annual survey effort and success rate for humpback dolphins at Richards Bay, South Africa. SD: standard deviation

Period	Start	# Survey-days	Mean (±SD) survey duration (hrs)	# Follow-days	Mean (±SD) follow duration (hrs)	# Groups seen	Mean (±SD) group size	Cataloguing rate (photos/hrs)
Year 1	Apr-98	82	4.08±1.78	59	1.52±1.23	80	7.58±5.29	0.52
Year 2	Apr-99	67	3.70±1.93	43	1.60±1.50	59	7.57±5.30	0.69
Year 3	Apr-00	64	3.47±1.67	46	1.21±1.25	69	5.91±3.87	0.64
Year 4	Apr-01	83	2.53±1.24	39	0.64±0.62	57	3.79±2.62	0.42
Year 5	Apr-02	21	2.37±1.26	10	1.10±0.85	13	6.54±4.70	0.96
Year 6	Apr-03	44	2.57±1.08	34	0.82±0.76	47	5.49±3.48	1.00
Year 7	Apr-04	34	2.51±1.43	22	0.81±0.75	33	5.24±3.75	1.19
Year 8	Apr-05	22	3.07±1.34	19	1.12±0.84	26	7.38±5.47	1.58
Total		417	1328.17	272	447.75	384	6.21±4.57	0.71

Table S2. Candidate exponential decay models of lagged identification rates (LIR) for resident, intermediate and transient humpback dolphins at Richards Bay, 1998-2006. Best fitted models (bold) displayed the lowest Akaike Information Criterion (AIC), since overdispersion was not an issue. ΔAIC indicates the relative support among models. Identification rates of individuals (*R*), given as a function of time lag (*d*), was related to the following parameters: population size (*N*), mean residence time in the study area (*a*), mean time out of the study area (*b*), emigration rate (λ) and mortality rate (δ); other parameters (a_1,a_2, a_3) can be reparameterized as: population size (1/a_1); the proportion of the population in the study area at any time ($a_2/(a_2 + a_3)$); and immigration rate (μ), where $a_2 = \lambda/(N$ x $(\lambda + \mu)$ and $a_3 = \lambda/(N$ x $(\lambda + \mu)$; see Whitehead (2001).

LIR models	Biological interpretation	Residents		Intermediates		Transients	
		AIC	ΔAIC	AIC	ΔAIC	AIC	ΔAIC
$R(d) = a_1$	Closed	43362	126.1	23351	58.5	7879	94.8
$R(d) = {}^{1}/_{N}$	Closed	43362	126.1	23351	58.5	7879	94.8
$R(d) = N^{-1} \times e^{-\lambda \times d}$	Emigration/ mortality	43238	2.5	**23293**	**0**	7816	31.7
$R(d) = N^{-1} \times e^{-d/a}$	Emigration/ mortality	43238	2.5	**23293**	**0**	7816	31.7
$R(d) = a_2 + a_3 \times e^{(-\lambda \times d)}$	Emigration + reimmigration	**43236**	**0**	23353	60.5	7880	96.4
$R(d) = \frac{N^{-1} \times \left((b^{-1}) + (a^{-1}) \times e^{(-(b^{-1} + a^{-1}) \times d)}\right)}{(b^{-1} + a^{-1})}$	Emigration + reimmigration	**43236**	**0**	**23294**	**1.2**	**7784**	**0**
$R(d) = b \times e^{(-N \times d)} + \delta \times e^{(-a \times d)}$	Emigration + reimmigration + mortality	43241	5.5	23296	3.4	7820	35.7
$R(d) = \frac{\left(e^{-\left(\delta \times d/N\right)}\right) \times \left((b^{-1}) + (a^{-1}) \times e^{(-(b^{-1} + a^{-1}) \times d)}\right)}{(b^{-1} + a^{-1})}$	Emigration + reimmigration + mortality	43241	5.5	23297	4	**7785**	**1.5**

Table S3. Humpback dolphin bycatch recorded in Richards Bay shark nets from April 1998 to March 2006, including the number of bycaught humpback dolphins photographed, how many of them had distinctive dorsal fins and whether they were identified or not during the study. Dependent juveniles are a special case involving individuals that were recognised but had not been included in the catalogue because they were dependent juveniles during at least part of the study. In parentheses are the number of males:females.

Period	Recorded by KZNSB	# photographed	# with distinctive fins	Identified in catalogue	Not identified in catalogue	Identified but dependent juveniles
Year 1	7 (6:1)	5 (4:1)	2 (2:0)	1 (1:0)	1 (1:0)	0
Year 2	5 (4:1)	5 (4:1)	4 (4:0)	3 (3:0)	1 (1:0)	0
Year 3[a]	0	0				
Year 4[a]	2[b] (1:0)	2[b] (1:0)	2[b] (1:0)	2[b] (1:0)	0	0
Year 5	8 (6:2)	8 (6:2)	4 (3:1)	3 (2:1)	1 (1:0)	0
Year 6	2 (1:1)	2 (1:1)	2 (1:1)	0	0	2 (1:1)
Year 7	8 (5:3)	1 (1:0)	1 (1:0)	0	0	1 (1:0)
Year 8	3 (2:1)	0				
Mean	5.5	3.5	2.6	1.4	0.6	0.6
SD	2.4	2.8	1.2	1.4	0.5	0.8
Overall	(2.8:1)	(3.2:1)	(6.0:1)	(7:1)	-	(2:1)

[a] Omitted from the means and standard deviations (SD) due to an underreporting issue

[b] The sex of one dolphin was unknown.

Table S4. Best Linear Discriminant Analysis (LDA) models for expressing the differences in residency patterns among humpback dolphins, where *Res:* Residence categories (Resident, Intermediate, Transient) defined by hierarchical clustering analysis and SIMPROF (see Fig. 3, main text); M_m: mean annual number of months with sightings; P_m: proportion of months with sightings; P_y: proportion of years with sightings. Models were selected by leave-one-out cross validation, in which "forward" means including variables not in the model; "backward" means excluding variables already in the model; and "none" represented a predefined model with the residence variables used to build the hierarchical clustering (Fig. 3). The criterion to define the best model was accuracy, given by the proportion of correct assignment of non-bycaught individuals ("classification correctness rate") to the residency categories defined previously in the hierarchical clustering (Fig. 3).

Selection procedure	LDA Model selected	Classification correctness rate of non-bycaught individuals relative to cluster analysis	Classification agreement rate of bycaught individuals with cluster snapshots
Forward	$Res \sim M_m$	98%	89%
Backward	$Res \sim M_m + P_m + P_y$	100%	89%
None	$Res \sim M_m + P_y$	100%	78%

The models were used to classify the bycaught individuals and their agreement with the snapshot clustering approach was evaluated. Since all three models had very high correctness rate and agreement rate, for consistency with the hierarchical clustering (Fig. 3) we chose the model $Res \sim M_m + P_y$ to classify the bycaught individuals into residency classes.

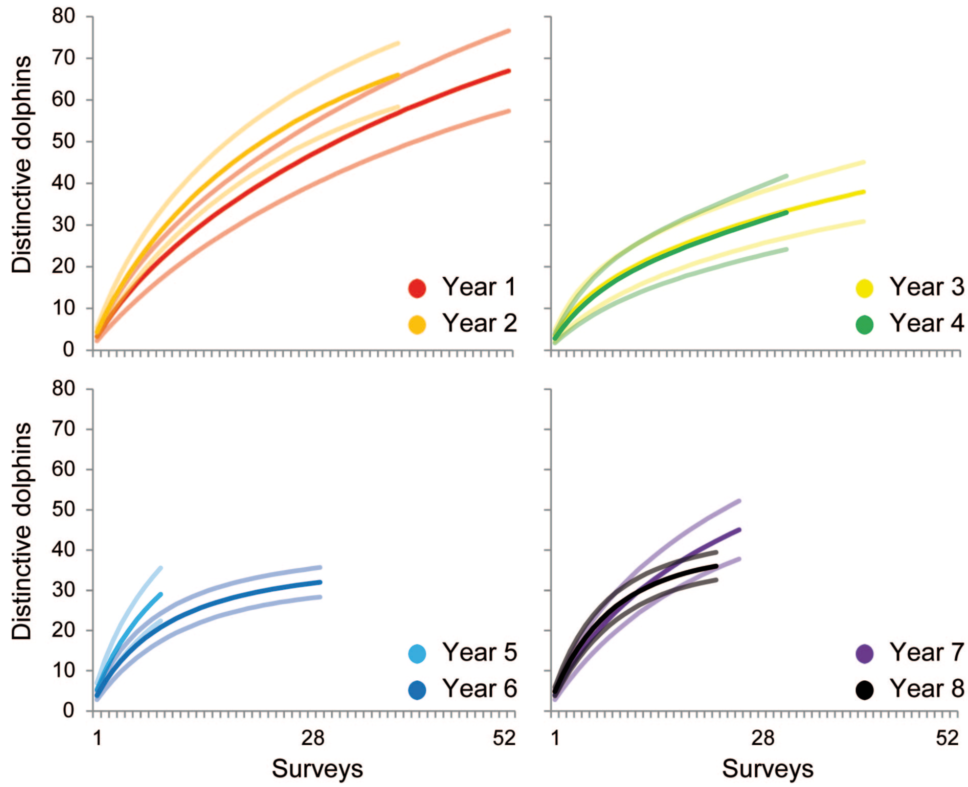

Figure S1. Annual discovery curves (darker lines) with 95% confidence intervals (lighter lines around discovery curves) of distinctive humpback dolphins catalogued at Richards Bay from April 1998 to March 2006.

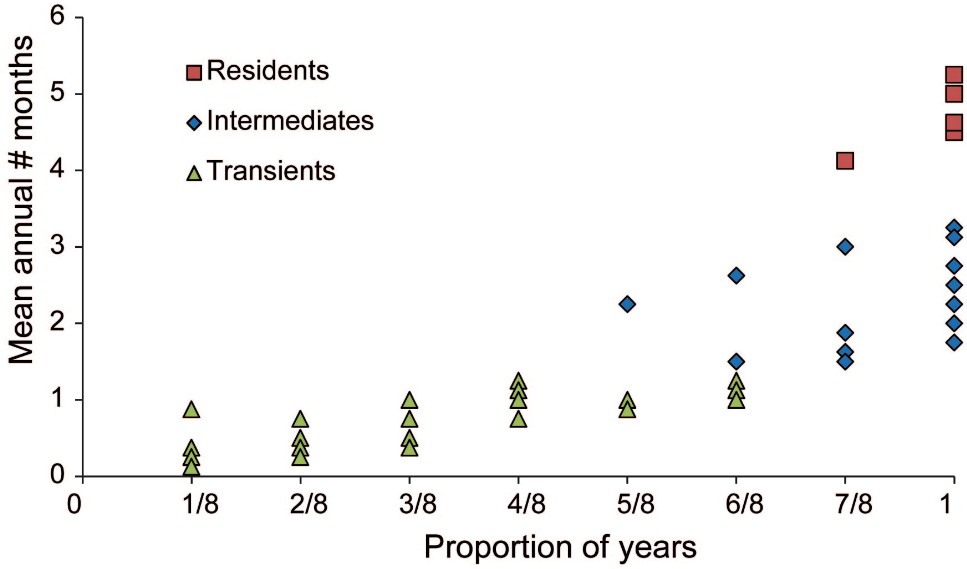

Figure S2: Sighting rates (mean annual number of months and proportion of years with sightings) of humpback dolphins (excluding bycatch) from April 1998-March 2006. Residency classifications were determined using hierarchical clustering.

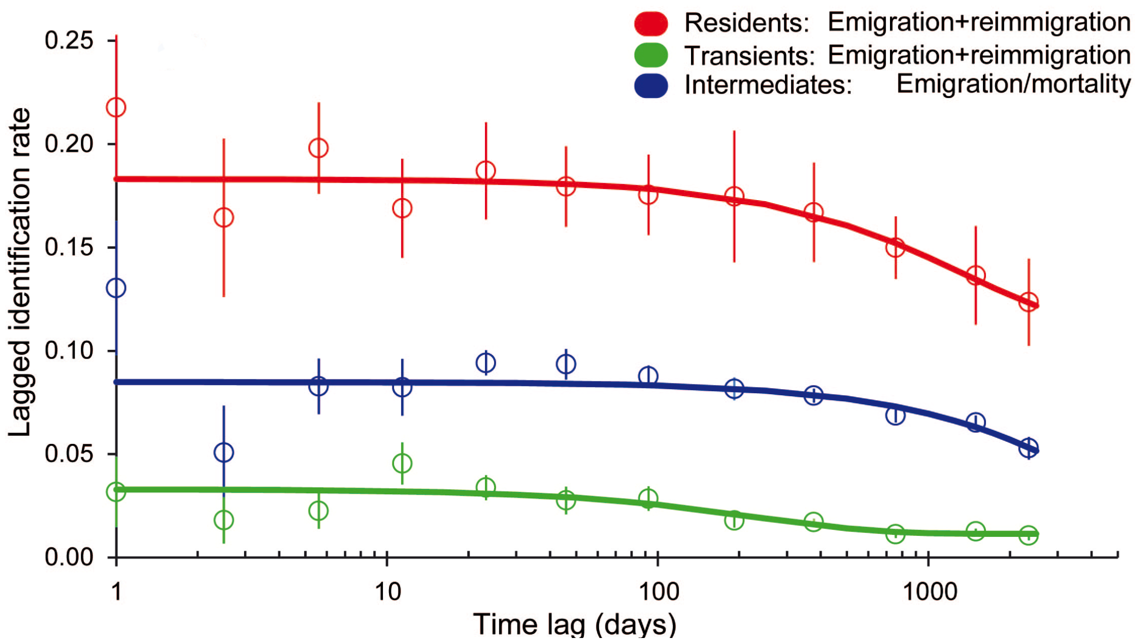

Figure S3. Lagged identification rates (LIR) for each residency category of humpback dolphins at Richards Bay and the best fit models (see Table S2). Open circles represent observed LIR; solid lines represent fit model; whiskers represent bootstrap-estimated standard errors. Resident, Intermediate and Transient dolphins had different resighting probabilities, reinforcing the distinctive intrapopulation variation in the residence patterns and use of the area. The probability of resighting Residents was relatively high, and declined after long time periods mainly due to movements outside of the study area: emigration followed by reimmigration (Table S2). The resighting probability of Intermediates was lower than the Residents, and the decline was marked by individuals leaving the population through permanent emigration or death (Table S2). Finally, the Transient dolphins had the lowest, but more stable, probabilities. LIR declined in shorter periods, but less substantially, as a combination of emigration and reimmigration, perhaps with marked mortality rates (Table S2).