

POP 2007-01 Demographic parameters and at-sea distribution of New Zealand sea lions breeding on the Auckland Islands

NZ sea lion research trip, Auckland Islands, December 4th 2009 to February 20th 2010

Progress Report

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This progress report outlines key findings from the 2009/10 New Zealand sea lion research field trip to the Auckland Islands. The field trip covered the period from December 4th 2009 when the first team arrived on Enderby Island through to the departure of the second team from the Island on February 20th 2010, and continues annual surveys of the Auckland Island breeding sites of the New Zealand sea lions (*Phocarctos hookeri*). Full findings will be reported at a later date.

Objectives

The objectives¹ of the project were:

1. To collect field data that will allow quantification and estimation of:
 - pup production,
 - survival of previously marked New Zealand sea lions,
 - reproduction by known-age female New Zealand sea lions;
2. To maintain and update the New Zealand sea lion database;
4. To make available field data for relevant modelling work; and
5. To characterise at-sea distribution of poorly known age and sex classes of New Zealand sea lions.

Logistics

The scientific trip was split into two parts to allow changes in personnel: December 4th - January 14th, and January 10th - February 20th. The first science team comprised of three people: Nathan McNally (DOC, Otago), Elaine Leung (University of Otago) and Baukje Lenting (Massey University). Eric Mellina from the Ministry of Fisheries joined the first team on the 21st December. The second team comprised of six people: Louise Chilvers (DOC, MCT), Nathan McNally, Kate McInnes (DOC, National Office), Elaine Leung, Grant Oaks (DOC contractor) and Myles Riki (DOC, West Coast Tai Poutini). Transport during the season was aboard the Evohe under charter to DOC R&D. All personnel were accommodated in the two huts at Sandy Bay and the Apple Hut at Dundas Island.

¹ For further details see the Conservation Services Annual Plan 2007/08 available at:
<http://www.doc.govt.nz/publications/conservation/marine-and-coastal/marine-conservation-services/csp-plans/archive/2007-2008/approved-csp-annual-plan-2007-08/>

Pup production estimate

Estimates of pup production were calculated for the four breeding sites in the Auckland Islands between 10 Jan and 21 Jan 2010 (Tables 1 and 2). Mark-recapture methods were used to estimate pup production at Sandy Bay, Enderby and Dundas Island, while Figure of Eight Island and South East Point areas were estimated using direct counts. The total pup production estimate was 1814 ± 39 (Fig. 1).

On the 16th of January, the mark-recapture estimate at Sandy Bay was 364 ± 4 . There were 21 dead pups from the area at the 16th January giving a total pup production for Sandy Bay for the 2009/2010 season of 385 ± 4 . The mark-recapture estimate at Dundas Island was completed on 21st January 2010 with an estimation of 1218 live pups ± 35 . 151 dead pups were counted on the island on the same day giving a total pup production for Dundas Island of 1369 ± 35 . Direct counts from Figure of Eight Island on the 10th Jan yielded a count of 48 pups + 7 dead giving a total of 55. The direct count at South East Point on 15th January yielded 1 live pup + 4 dead giving a total of 5 pups.

The estimate of pup production from the Auckland Islands was 21% higher than that seen in 2008/09, however still 17% lower than 2007/08 (Figure 1). The 2009/10 sea lion pup production estimate is lower than any other count for the last 10 years (except the 2008/09 season). Pup mortality during the first 4 weeks of the 2009/10 season from all studied locations was 10% (Table 2). Pup mortality at Sandy Bay was 5% at 16th January and was 15% by 18th Feb 2008.

Figure 1. Annual pup production for the Auckland Islands 1998/99 to 2009/10.

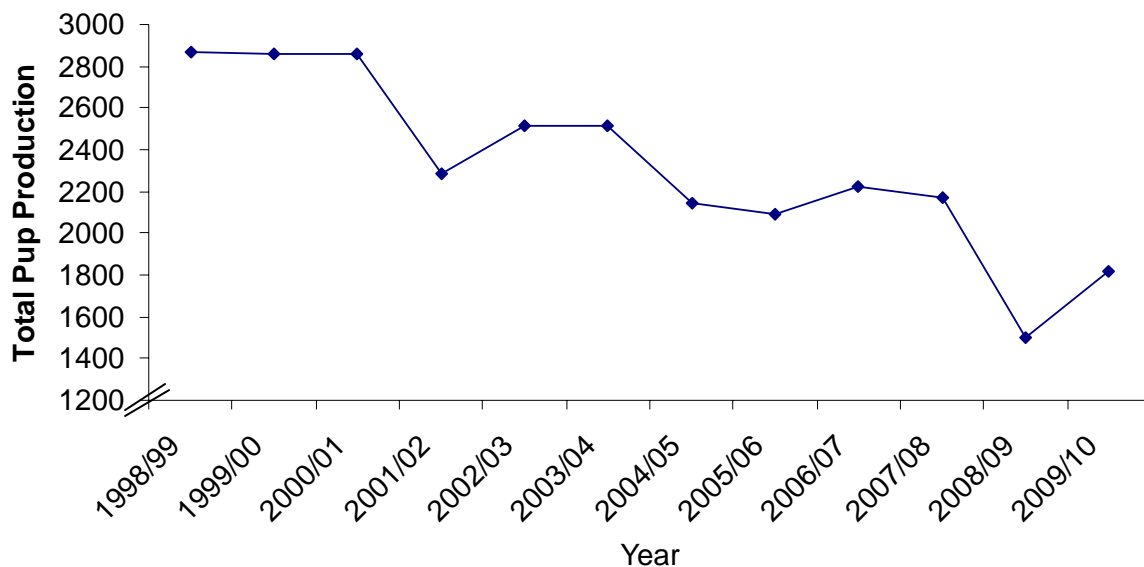


Table 1: Pup production estimates for Auckland Islands

Season	Sandy Bay			Dundas Island			Figure of Eight Island			South East Point		
	total	alive	dead	total	Alive	Dead	Total	alive	dead	total	alive	Dead
97/98	477	468	9	2373	1748	625	120	97	23	51	37	14
98/99	513	473	40	2186	1957	229	109	100	9	59	42	17
99/00	506	482	24	2163	2039	124	137	131	6	50	37	13
00/01	562	527	35	2148	1802	346	94	92	2	55	47	8
01/02	403	320	83	1756	1395	361	96	90	6	27	21	6
02/03	489	408	80	1891	1555	336	95	89	5	43	26	17
03/04	507	473	34	1869	1749	120	87	86	1	52	39	13
04/05	441	411	30	1587	1513	74	83	79	4	37	31	6
05/06	422	383	39	1581	1349	232	62	55	7	24	20	4
06/07	437	414	23	1693	1587	106	70	67	3	24	19	5
07/08	448	425	23	1635	1512	123	74	72	2	18	13	5
08/09	301	289	12	1132	1065	67	54	48	6	14	8	6
09/10	385	364	21	1369	1218	151	55	48	7	5	1	4

Table 2: Total pup production from the Auckland Islands (NB. These estimates do not include an estimate of pup production from Campbell Island).

Season	Annual pup production			% Annual change in no. pups born	% Mortality at mark recapture estimate date		% Mortality at end of season (SB only)
	Total	Alive	Dead		Total	SB only	
97/98	3021	2350	671	1.5%	22.2%	2%	42%
98/99	2867	2572	295	-5.1%	10.3%	8%	9%
99/00	2856	2689	167	-0.4%	5.8%	5%	11%
00/01	2859	2468	391	0.1%	13.7%	6%	10%
01/02	2282	1826	456	-20.2%	20.0%	21%	33%
02/03	2518	2078	438	10.3%	17.4%	16%	21%
03/04	2515	2347	168	-0.001%	6.7%	8%	15%
04/05	2148	2034	114	- 14.6%	5.3%	7%	12%
05/06	2089	1807	282	- 2.8%	13.5%	9%	16%
06/07	2224	2087	137	6.4%	6.2%	5.3%	16%
07/08	2175	2022	153	-2%	7%	5.1%	14%
08/09	1501	1410	91	- 31%	6%	4%	12%
09/10	1814	1631	183	+21%	10%	5%	15%

Pup tagging

Pups have been tagged to provide a pool of known age individuals for the estimation of parameters such as survival, recruitment and reproductive rate as part of the long-term study. Tags applied were 'coffin' shaped Dalton 'Jumbo' tags with a letter and three-digit number combination. All pups were tagged in both flippers. All live pups at both Sandy Bay (364 by the 17th January) and South East Point (1 on 15th January), and 400 pups at Dundas Island (100 males and 300 females, by the 23rd January) were tagged with blue Dalton tags. 24 pups were tagged on Figure of Eight Island with orange coffin shaped Dalton 'Jumbo' tags.

Resighting of previously marked individuals

Daily counts of all animals and resights of tags and brands on NZ sea lions were undertaken on Enderby Island to understand the composition of animals at this breeding site and to enable the calculation of survivability, recruitment and fecundity of animals. Daily checks were undertaken at Sandy Bay with approximately 8000 resights made on 1430 animals previously tagged or branded (including 427 individuals identified from a chip).

Female mark-recapture

A mark-recapture was conducted to estimate the number of females using Sandy Bay this season as recommended by Darryl McKenzie². On the 28th December, 63 females in the harem were dyed with dark brown human hair dye leaving a line across the females back at hip level to mark animals. On the 30th December 2009, 1st January 2010 and 3rd January 2010 three people counted the marked and total number of females on the beach for a mark-recapture estimate to be established.

Satellite tagging

Nine juvenile sea lions (4 male and 5 female) between the age of 1 and 5 years were captured at Sandy Bay, Enderby Island. Tags were deployed for at least 8 days and for one animal the tag is still on and transmitting as at 26 March 2010.

Date	Tag	Satellite tag id	Sex	Age	Weight	Length	Girth	Days
15/01/2010	7458	98814	F	3	73.0	153	98	17
15/01/2010	7199	76963	F	3	78.5	154	107	17
24/01/2010	7584	76965	F	3	68.0	152	100	8
28/01/2010	7260	76964	M	3	89.0	157	111	12
28/01/2010	5752	J19057	M	5	150.0	209	125	62
30/01/2010	H227	76967	F	1	50.5	131	83	11
30/01/2010	8179	49094	M	2	77.5	156	91	Still on
3/02/2010	untagged	89571	M	1	66.0	138	99	8
4/02/2010	E107	89573	F	1	61.5	133	90	8

² See draft report Mackenzie 2009 Estimation of demographic parameters for New Zealand sea lions breeding on the Auckland Islands: 1997/98-2008/09, available to download from <http://www.doc.govt.nz/mcs>

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