

**Australian Centre for Applied Marine Mammal Science**  
**Final Report**  
(subclause 9 and Schedule Item 5 of the Funding Agreement)

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**Season 2007/08**

- **Title** - 0708/8 Australian fur seal pup production and population trends
- **Chief Investigator** - Roger Kirkwood
- **Organisation** - Phillip Island Nature Parks

**Activity Period** - Dec 2007 to Dec 2008

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**1. Activity Summary**

A clear summary of approximately 500 words outlining the work undertaken and any significant findings (for publication on the Department's web site)

We estimated the number of live Australian fur seal pups at all breeding sites following the pupping season of November-December 2007 to be  $21,882 \pm 187$  (mean  $\pm$  se). This total represents a 2.0% annual rate of increase since the 2002 estimate of 19,820 pups. Previously, pup production between 1986 and 2002 had increased at 5.1% per year, so we recorded a continued increase but at a reduced rate.

Pups were recorded at 17 locations; 10 previously known colony sites, 3 newly recognised colonies and 7 haul-out sites where pups are occasionally born. Two colonies adjacent to the Victorian coast account for 51% of total pup production; Seal Rocks (5,660 pups, 25.9%) and Lady Julia Percy Island (5,574 pups, 25.5%). A further three colonies, two Victorian and one in Tasmanian Bass Strait, produced a further 37% of pup production; Kanowna Island (2,913, 13.3%), The Skerries (2,705, 12.4%) and Judgment Rocks (2,387, 10.9%). The remaining pup production (12%) was mainly at other Tasmanian Bass Strait islands. The three newly recognised colonies were; Wright Rocks (130 pups) and Double Island (51 pups) in Tasmanian Bass Strait, and North Casuarina Island (28 pups), near Kangaroo Island, South Australia.

With >50% of pup production at just two colonies, the Australian fur seal remains vulnerable. However, after confinement to 9 colony sites for over 100 years (prior to 2002), there are now 13 established colonies of Australian fur seals, suggesting the species' vulnerability is reducing.

Between 1986 and 2002, the species' distribution concentrated more toward the

northern extent of its range, with pups born at Victorian colonies constituted 61% and 79%, respectively, of the total, and has remained with this pattern, with 78% of pups at Victorian colonies in 2007. The establishment of a colony at North Casuarina Island, South Australia, represents a substantial change to the breeding range of the species, the first movement away from Bass Strait.

## 2. The Outcomes/Objectives

The degree to which the Activity has achieved the objectives		
List of objectives:		
Stated objective	Planned time-frame	Status
1. Co-ordinate equipment and logistics	July - Dec 2007	Completed on time
2. Visit all sites, collect data on live pups	Dec 2007 - Feb 2008	Completed on time
3. Collect data derive colony estimates of live pup numbers	Dec 2007 - Feb 2008	Completed on time
4. Estimate total live pups	Feb - June 2008	Completed on time
5. Estimate populations	Feb - June 2008	Completed on time
6. Assess trends	Feb - June 2008	Completed on time
7. Prepare report on status	July 2008	Completed on time
8. Submit report to government departments	July - Dec 2008	In progress for submissions in Dec 2008 and early 2009
9. Prepare manuscript	July - Dec 2008	In progress for submission in early 2009

## 3. Appropriateness

The appropriateness of the approaches used in the development and implementation of the Activity
<p>The research provides a thorough estimate of live pups present during colony visits following the 2007 pupping season, against which past and future estimates may be compared. The techniques are standardised, documented and represent an appropriate method for monitoring pup production for Australian fur seals. However, the technique has several short-comings.</p> <ol style="list-style-type: none"> <li>1) Pup production at colonies changes between years which not be detected through 5-yearly monitoring. The main reason for using 5-yearly monitoring is that monitoring is highly invasive, especially with thousands of pups being handled for capture-mark-recaptures, and should therefore not be an annual procedure at all colonies. There are also financial and logistical constraints on conducting annual production estimates at all sites.</li> <li>2) The technique provides an indication, not an accurate estimate, of population size. There are two main sources for error in the indication. Most importantly, factors</li> </ol>

for multiplying pup production to get population size provide a broad range. A range of 3.5 to 4.5 was proposed for most populations of polygynous pinnipeds (Harwood and Prime 1978). Using known maximum ages (from Warneke and Shaughnessy 1985) and theoretical models of survival based on other otariids, Goldsworthy et al. (2003) derived the multiplier 3.95 for Australian fur seals. Recent assessments of pupping rates for Australian fur seals, however, recorded a low rate (53%) and which suggests a higher multiplier may be more appropriate for this species (J. Gibbons, in prep.).

A second source for error is that pup mortality prior to visits to colonies varies broadly between years, locations and breeding areas, and cannot be accurately accounted for. In the absence of an alternative, a figure of 15% can be applied, which represents the average mortality in the first 6 weeks based on tagging data at Seal Rocks during the 1970s and 1980s (Warneke 1975).

#### **4. Effectiveness**

**The degree to which the Activity has effectively met its stated objectives**

This project will achieve all its objectives within the predicted budget.

1. Effective collaborations were planned and carried out between government departments in Victoria and Tasmania.
2. All breeding colonies were visited and live pups present were estimated across the breeding range of Australian fur seals.
3. As many haul-out sites as could be expected were visited, including all sites in Victorian waters and many rarely visited sites in Tasmanian waters.
4. The project came in under budget, surplus ACAMMS funding was returned.
5. The study provides a current description of the status of Australian fur seals that is freely available to government departments.

SEAL CENSUS 2007/08 - STAFFING, VICTORIA

<b>Volunteers</b>	<b>site</b>	<b>days</b>
1 Kerry Seaton	SR	5
2 Tony Mitchell	SR	3
3 Peter Menkhorst	SR	3
4 Lucy Clausen	SR	3
5 Derek Hibbert	SR	2
6 Sue Robinson	SR	2
7 Tamara van Polanen Petel	SR	2
8 Peter Dann	SR	2
9 Kath Handasyde	LJP	8
10 Mat Wills	LJP	8
11 Noel Heafield	LJP	8
12 Debbie Dyson	LJP	8
13 Kieran Halloran	LJP	8
14 Bruce Deagle	LJP	8
15 Paige Everson	LJP	8
16 Paul Smith	LJP	4
17 Darrel Jewel	LJP	4
18 Julia Back	LJP	4
19 Richard Hill	LJP	4
20 Bruce Deagle	TS	6
21 Lucy Clausen	TS	4
22 Leona Waldegrave Knight	TS	4
23 Dave Donnelly	TS	4
24 Adrian Howard	TS	4
25 Jemma Daniels	TS	4
26 Andrew Hoskins	K	4
27 Julia Back	K	4
28 Kailash	K	4
29 Keysha	K	4
30 Art	K	4
31 Beth	K	4
32 Richard Hill	CB	3
33 Gary Pearson	CB	3
34 Kath Handasyde	MH	2
35 Tim Godfrey	MR	1
<b>total</b>	<b>153</b>	

<b>Contractors (ACAMMS funded)</b>	<b>site</b>	<b>days</b>
Tony Mitchell	LJP	8
John Gibbens	LJP	8
Andrew Hoskins	LJP	4
Tony Mitchell	TS	6
Andrew Hoskins	TS	4
Tony Mitchell	Rag	2
<b>total</b>	<b>32</b>	

<b>Melb. Zoo (vet - contract)</b>		
Michael Lynch	SR	2
Paul Ramos	SR	2
Michael Lynch	LJP	8
Kate Bodely	LJP	4
Paul Ramos	TS	4
Paul Ramos	K	4
<b>total</b>	<b>24</b>	

<b>Media - Talk to the animals</b>		
Camera	SR	2
Sound	SR	2
Presenter	SR	2
<b>total</b>	<b>6</b>	

<b>PINP</b>	<b>site</b>	<b>days</b>
Roger Kirkwood	SR	6
Richard Dakin	SR	1
Jarvis Weston	SR	1
Stu Murphy	SR	1
Tanya Murray	SR	1
Beau Fanhle	SR	1
Terry Robinson	SR	1
Roger Kirkwood	LJP	8
Roger Kirkwood	TS	6
Julie McInnes	Rag	2
<b>total</b>	<b>28</b>	

<b>Deakin</b>		
John Arnould	LJP	4
John Arnould	TS	4
John Arnould	KI	4
<b>total</b>	<b>12</b>	

<b>Parks Vic</b>		
Phil Reichelt	TS	4
Mike Irvine	TS	4
<b>total</b>	<b>8</b>	

CONTRIBUTIONS TO SEAL CENSUS - VEHICLE USAGE

<b>Use of vehicles</b>	<b>km</b>	<b>/km</b>	<b>Amount</b>
PINP (SR)	200	0.63	126.00
Deakin (KI)	800	0.63	504.00
DSE,PV,vol (SR)	1200	0.63	756.00
DSE,PV,vol (Kan)	800	0.63	504.00
DSE,PV,vol (Rag)	800	0.63	504.00
DSE,PV,vol (CB)	400	0.63	252.00
DSE,PV,vol (MR)	400	0.63	252.00