

# Update to the Robben Island moult count series for 2011

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## Introduction

The 2010/2011 penguin moult season conventionally runs from 1 July 2010 to 30 June 2011. During this period, counts of moulting birds were made on 20 occasions (Table 1). These counts have now been converted to aggregates for the year using the technique of fitting the sum of two Gaussian curves and calculating the area under the function (Robinson and Butterworth 2010).

## Results

The aggregates obtained for the 2010/2011 season are 3000 adults and 1199 juveniles (Table 2). CVs were also calculated as before, with the adjustment for over-dispersion. The fits to the counts are plotted in Figure 1 (adults) and Figure 2 (juveniles). The full time series are plotted in Figure 3.

## Discussion

The fit to the adult counts is excellent. As is often the case, the fit to the juvenile counts is somewhat more messy, but satisfactory.

It is unfortunate that no counts were made during September and October 2010. Counts during this period may have provided a more precise estimate of juvenile moulters.

The average number of days between counts during the peak of the moult season (November to February) is 17, while the average number of days between counts from March to June is 12. It is preferable to have more frequent counts during the peak season rather than during the autumn and winter months when one expects few moulting birds.

The number of adult moulters is lowest for Robben Island since recording began in 1988. This is consistent with the low nest count for 2011. The proportion of juveniles in the count is high, as it was in the previous two seasons (Figure 4). Possible explanations are that either juveniles from other colonies are moulting at Robben Island, or perhaps that Robben Island adults are moulting elsewhere.

## Acknowledgements

Thanks go to Newi Makhado, Rob Crawford and his team for collecting and collating the count data.

## Reference

Robinson W and Butterworth DS. 2010. A proposed new method for obtaining penguin moult count estimates. Document MCM/2010/SWG-PEL/Island Closure Task Team/05.

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## Tables

Table 1: Counts of African penguins at Robben Island in the feather-shedding phase of moult during the 2010/2011 moult season.

Date	Adults	Juveniles
02/07/2010	1	0
06/07/2010	4	0
27/07/2010	1	5
05/08/2010	6	10
01/11/2010	190	113
17/11/2010	370	127
09/12/2010	496	117
27/12/2010	347	47
14/01/2011	203	8
26/01/2011	148	28
11/02/2011	80	35
08/03/2011	58	64
15/03/2011	17	24
24/03/2011	15	26
11/04/2011	16	15
21/04/2011	18	12
12/05/2011	1	5
19/05/2011	3	3
07/06/2011	1	2
15/06/2011	2	0

Table 2: Updated time series of annual numbers of moulting penguins at Robben Island.

Year	n	Adults		Juveniles		Juvenile proportion
		M	CV (%)	M	CV (%)	
1988/1989	18	3466	7.9	800	10.7	0.188
1989/1990	25	3397	7.4	851	10.7	0.200
1990/1991	24	4724	6.1	915	10.1	0.162
1991/1992	26	4939	6.0	1603	7.5	0.245
1992/1993	26	6544	5.3	1631	7.6	0.199
1993/1994	24	7915	4.8	1574	7.6	0.166
1994/1995	25	7932	4.8	1368	8.3	0.147
1995/1996	25	6674	5.4	1406	8.3	0.174
1996/1997	23	7300	8.0	2292	9.5	0.239
1997/1998	25	8556	4.4	2381	6.0	0.218
1998/1999	20	9125	4.3	2738	5.9	0.231
1999/2000	21	11694	4.0	2811	5.8	0.194
2000/2001	15	12883	3.8	2417	8.5	0.158
2001/2002	9	12361	8.6	2712	8.5	0.180
2002/2003	16	14521	3.9	3430	6.4	0.191
2003/2004	14	16975	3.6	3326	5.8	0.164
2004/2005	15	12442	4.0	2508	5.5	0.168
2005/2006	20	7660	4.9	2614	6.0	0.254
2006/2007	17	6453	6.0	1889	8.9	0.226
2007/2008	19	5157	6.4	1393	10.7	0.213
2008/2009	26	3745	7.2	1799	7.2	0.325
2009/2010	26	4209	19.1	1730	8.1	0.291
2010/2011	20	3000	9.9	1199	13.9	0.286

**Figures**

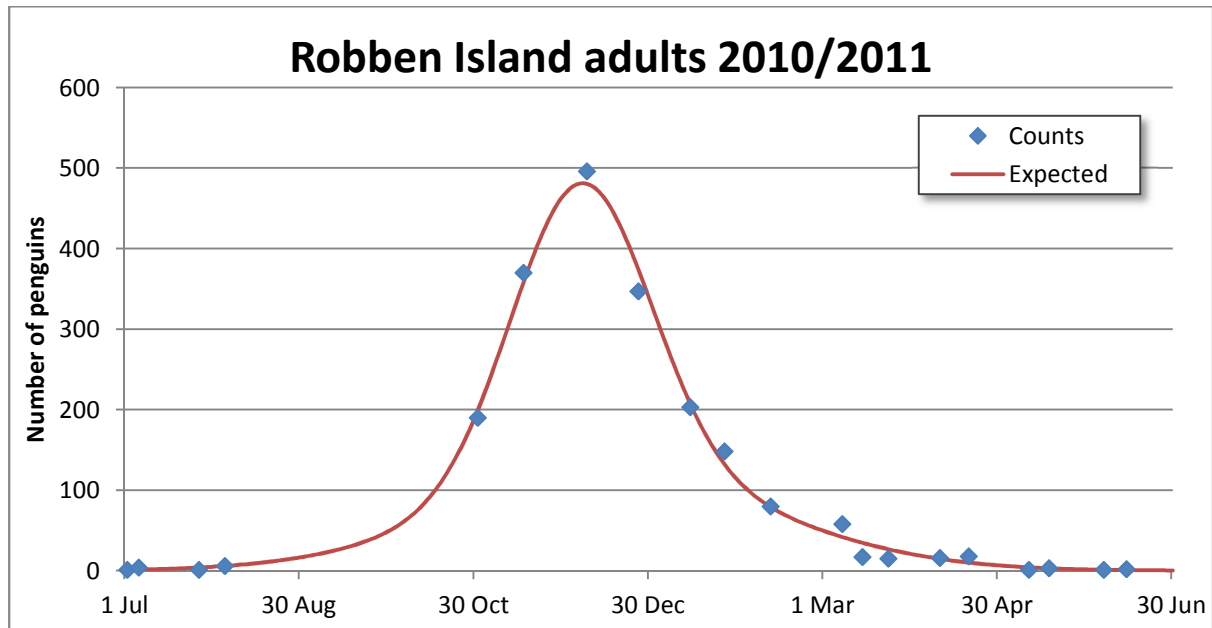


Figure 1: Expected numbers of adult penguins moulting at Robben Island during the 2010/2011 season fitted to the counts made.

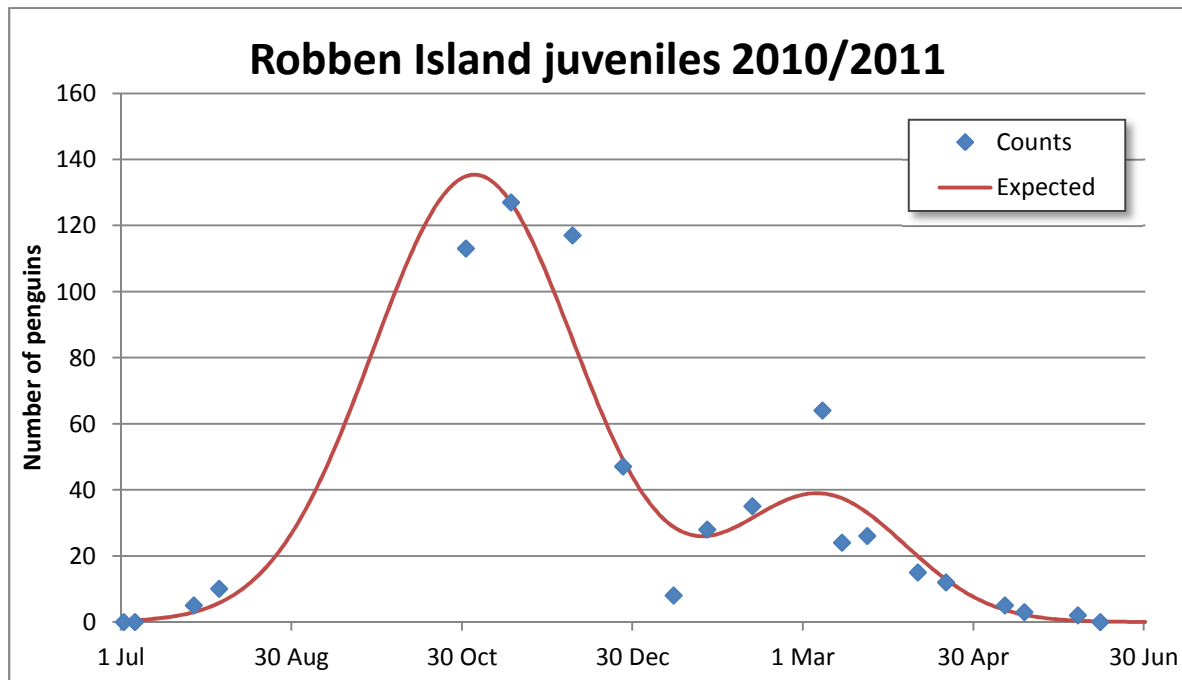


Figure 2: Expected numbers of juvenile penguins moulting at Robben Island during the 2010/2011 season fitted to the counts made.

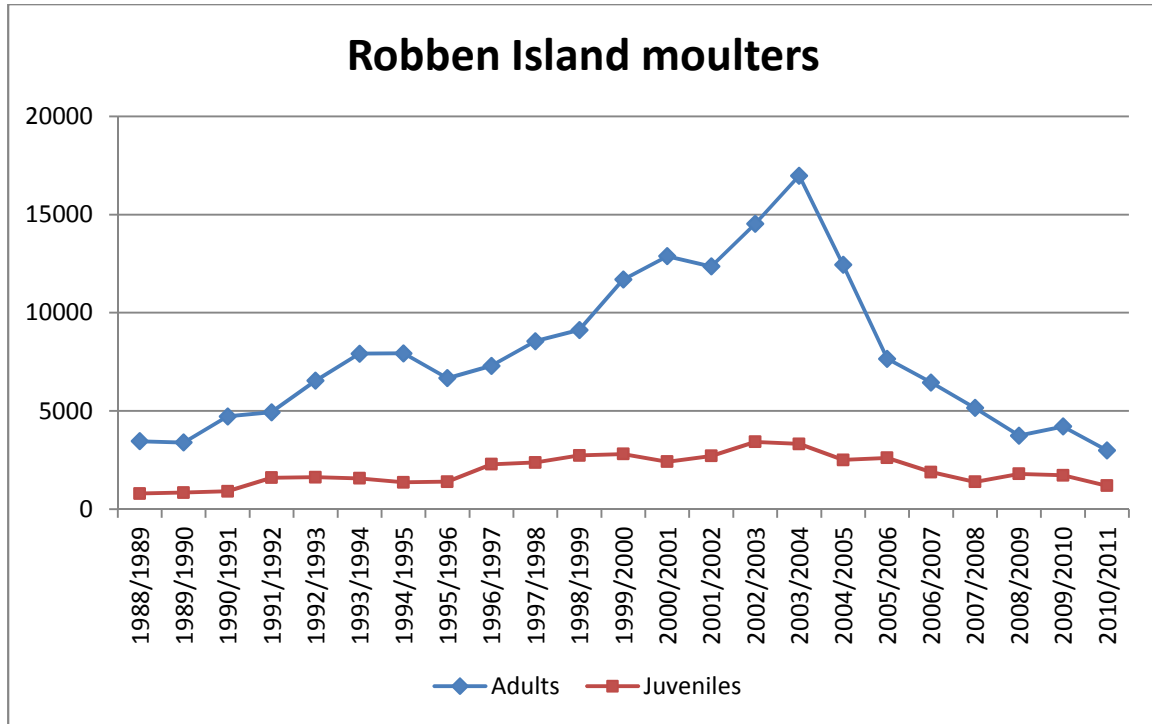


Figure 3: Time series of the numbers of adult and juvenile penguins moulting at Robben Island.

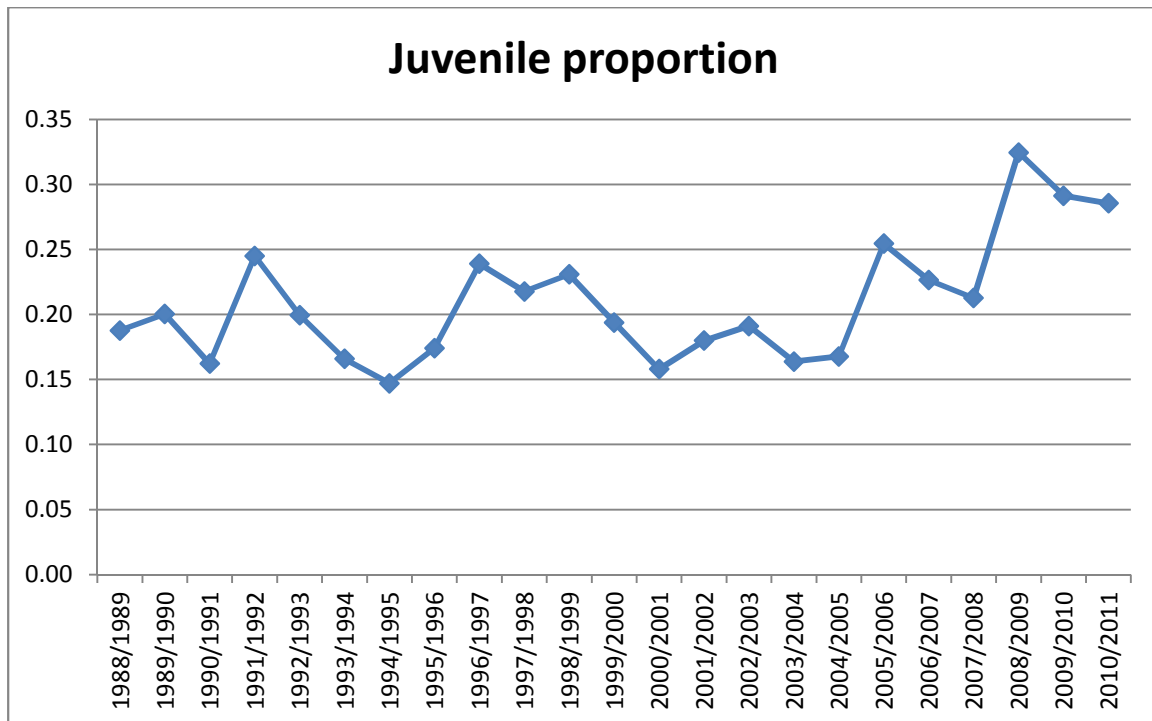


Figure 4: Time series of the proportions of the annual total number of moulting penguins which are juvenile.