



## **South African Penguins**

### **2012 FIELD REPORT**

#### **Background Information**

Lead PI: Peter Barham

Report completed by: Peter Barham, Richard Sherley and Sue Kuyper

Period Covered by this report: 2012

Date report completed: 2012-11-09 10:08:14



30 July 2013

**Professor Peter Barham**

H H Wills Physics Laboratory

Tyndall Avenue

Bristol, BS8 1TL

T +44 (0) 117 928 8711

F +44 (0) 117 925 5624

[peter.barham@bristol.ac.uk](mailto:peter.barham@bristol.ac.uk)

We had seven teams and 22 volunteers in the 2012 Earthwatch "South African Penguin" project on Robben Island. So, thank you Janet, Kyoko, Suzette, Elizabeth, Susan, Sharon, Peter, Pricilla, Roberta, Robert, Kathryn, Brian, Mary, Douglas, Frank, Satomi, Arisa, Tammy, Haleigh, Patricia, Avra, and Nancy; both for the help you have provided the project and for being such fun to be with. We hope you enjoyed your brief stay with us as much as we enjoyed meeting you and that you learnt a little (or a lot?) about the feisty African Penguin.

Together, we monitored 203 breeding attempts from 193 penguin nests in all. We recorded around 180 penguin chicks fledge at these nests; a total of 0.89 chicks per breeding attempt. We are very grateful to those of you who spent long and patient hours trying to find penguins wearing flipper bands and even more time trying to read the bands with telescopes. This year we recorded 216 retraps corresponding to 104 individual penguins. This data is of the utmost importance as it lets us make good estimates of the annual survival rates of the African penguin.

The good news is that the proportion of chicks fledged per breeding attempt this year was significantly more than in 2011 which in turn was more than in 2010 – something we hope will continue into the future. We measured the heads and weights of 406 chicks to determine how well they were growing. This year the chicks were, on average, much better fed and in better condition than chicks in 2011. Teams 6 and 4 in August and June saw the best fed chicks - while Team 1 in March found the chicks in the poorest condition. Thanks to all who got bitten, scratched, pounded by flippers or covered in guano

in the process of catching chicks to measure, as well as when checking nests and banding birds!

Many of you also helped catch oiled or injured birds that were sent to SANCCOB from Robben Island this year along with 5 chicks we found that were seriously underweight. Most of them have now been treated and returned to their rightful environment. So more thanks to you all for helping in this way to protect the penguins of Robben Island. All the nest monitoring, retraps, moult counts, nest counts (area U), wader counts, game counts and BIRP forms that you worked so hard to complete all contribute to ongoing data that will help with conservation and management decisions on Robben Island, as well as population studies of the African Penguin and several other species in the Western Cape. The data has also been submitted to the Department of the Environment (Oceans and Coasts) to assist in the decision-making process when the fisheries closure around Dassen Island comes up for review.

Furthermore all the data gathered by all the Earthwatch teams over the past 12 years has made a really important contribution to getting an official Biodiversity Management Plan for African penguins underway – the BMP was formally gazetted by the South African Authorities and hopefully with its full implementation we will see a reversal in the decline of the penguins. Some teams braved “rough sea crossings” on the ferry, unexpected water and electricity failures due to weather, days when rain stopped play, penguin diet sampling and team 7 spent a lot of time and effort rescuing penguins oiled after the Seli II leaked oil again.

These experiences are part of what make this project unique, but we hope it is more the delights of the close encounters with wildlife, South African wine, braais, prison tours, Robben's sunsets, shooting stars, the unique mix of wildlife and birds on the Island and the knowledge that you made a difference that you will never forget.

On behalf of Sue, Mario, Les, Rob, Rich, and Kate and all the other project staff who shared time with you on Robben or help make this project what it is, thank you again. May we take this opportunity to wish you happy holidays and every success for the future. If you are off on an Earthwatch project in the New Year, we hope you enjoy it.



Peter Barham

## **SECTION ONE: Scientific research achievements**

### **Top highlight from the past season**

Although not really a highlight of the project, team 7 in September was involved in helping to rescue around 200 penguins after oil leaked from the 'Seli I' which ran aground opposite SANCCOB three years ago. Astonishingly team 7 in 2011 also had to collect oiled penguins (although many fewer) when the same vessel broke up and released what we were then told was all the remaining oil. We hope that this time the wreck is completely free of oil. For most volunteers helping us measure the growth and condition of chicks was the main highlight. More importantly, the data we have gathered is proving to be very useful - early analysis suggests there are close correlations with the condition of the chicks and the availability of prey.

### **Reporting against research objectives**

1. To compare breeding success of penguins using different types of nest site; to compare breeding success of different groups of penguins (e.g. those that were oiled in the Treasure oil spill, hand reared orphaned chicks and birds that have never been handled); where possible, to provide nest boxes to replace lost habitat

The regular nest monitoring has provided us with a very useful data set of the contents of about 193 nests throughout the whole breeding season. The detailed analysis of this data set together with data from previous years is ongoing (it will be published in a series of papers in the coming year or two). The regular nest monitoring has provided us with a very useful data set of the contents of around 2649 breeding attempts over 12 breeding seasons. We have developed an improved (modified Mayfield) method to analyse this data (and that from all the previous seasons) so that we can make reliable comparisons between breeding success for different groups of birds, or nest sites, etc. This re-analysis confirms the poorer breeding record of birds that were oiled in the Treasure spill in 2000 and also shows that there are clear differences between natural and man made nest sites. Breeding success is significantly better for birds nesting inside disused buildings and in the nest boxes and artificial burrows we have placed for their use. We still need to gather further data to tell whether one type of artificial nest is better than another - this is something we will continue to address in the coming season. We have applied for funding from several other agencies

to enable us to provide up to 100 additional nest boxes in the coming seasons – we intend to ask Earthwatch volunteers to help set these out and of course to monitor their usage.

**2.** To continue to record sightings of previously banded penguins to establish the success of rehabilitation projects and provide other demographic data such as annual survival rates and age at breeding

This year volunteers read 216 bands which corresponded to 104 different birds 29 had been oiled in the Treasure spill, 1 was a hand reared orphaned chick from the Treasure spill, and 3 were birds that had been translocated to Port Elizabeth during the Treasure spill. We are using this data to help estimate the annual survival rates of the penguins. Although we have seen a drop in the proportion of birds oiled in the Treasure spill amongst these retraps in the past few years (60% in 2006, 53% in 2007 and 2008, compared to 49% in 2009,; 50% in 2010; 43% in 2011 and 28% in 2012) with the traditional analysis tools (MARK), the survival rates of rehabilitated birds (such as those oiled in the Treasure spill) are found to be similar to those of birds that have never been handled. However, we are, in collaboration with Res Altwegg at SANBI, modelling the annual survival rates using more advanced Bayesian statistical methods to provide better estimates (in particular estimates with smaller error ranges) of survival rates. The early results show an alarming and continuing decline in annual survival rates for adult penguins and do indicate that there may be small but significant differences between survival of birds that have and have not been oiled and rehabilitated, As well as reading bands each team carried out two counts of all the moulting penguins around the coast of the island. This is a part of a larger project at all the breeding colonies; by making such regular counts at all the breeding locations we are able to get an independent measure of the total population.

**3.** To determine movements of juvenile and immature birds

At present there is a virtual moratorium on banding of penguins (although the use of rubber bands will we hope soon recommence) so that it is difficult to use retrap data to determine movements of juvenile penguins. Instead we have started a project to fit juvenile penguins with transmitters so that we can follow their movements as they leave the natal colony, or are released after being hand reared. Although this is not a direct part of the Earthwatch project, volunteers have been involved in the work. The hand reared chicks that have been released with transmitters this year were all ones that had been sent to SANCCOB after being found to be underweight on Robben Island by Earthwatch teams. It is remarkable

that most of the released chicks headed north towards Namibia – their progress can be followed on the penguin watch web site (<http://penguins.adu.org.za/>) .

#### 4. To measure the overall body condition of chicks throughout the breeding season

Two data sets were obtained, one from a group of chicks that were monitored at two week intervals as they grew (we monitored a total of 80 'growth' chicks) and a second data set of where we randomly selected up to 50 chicks each week and measured their condition – we avoided picking the same chicks twice by using different areas of the colony in each week. (we measured a total of 326 'condition' chicks). We found that the condition of chicks varied during the year and we will later be able to compare the condition measurements with surveys of fish abundance in the area once those data become available to us. Overall this year we found that the growth rates of chicks were similar to those in 2008 (a generally good year) and better than those in 2009 and 2011.

#### 5. To provide general assistance with a range of projects on the island including:

- Assisting with the development of an automatic penguin recognition and identification system on Robben Island
- Monitoring the numbers and breeding success of other bird species on Robben Island
- Monitoring the population of other animals on the Island (including Rabbits, Springbok, etc.)

Volunteers provided a wealth of assistance with other projects. They took around 200 photographs of penguin chests which will be imported into our ever growing database of penguin spot patterns and eventually used to monitor the movements of these birds on Robben Island. We carried out 4 counts of wading birds around the island and 5 complete list of bird species seen each week a team was on the island – these feed directly into several atlas projects run at the ADU and provide valuable data on the movements of birds around Southern Africa. Each team helped by counting rabbits – although this is often seen as tedious it is essential if we are to ensure the rabbit population remains under control and does not explode again as it did to great detriment of the environment a few years ago. We also counted the other mammals on the island at least once during each team – this data is very useful for the conservation management on the island as it provides a consistent baseline data set to help estimate the actual populations of Steenbok, Springbok and fallow deer.

## **SECTION TWO: Impacts**

### **Partnerships**

Robben Island Museum (RIM); Oceans and Coasts (formerly Marine and Coastal Management), Department Environmental Affairs and Tourism (O&C); the Animal Demography Unit, University of Cape Town (ADU) and The University of Bristol, UK (UoB) all provide staff, equipment and logistical support for the project.

Bristol Zoological Gardens (BZG) assisted with the testing of the rubber flipper bands and made those used this year.

The Southern African Foundation for the Conservation of Coastal Birds (SANCCOB) rehabilitates oiled, weak, injured and orphaned seabirds sent by the Earthwatch teams from Robben Island.

SAFRING at the ADU, maintains the central database of recaptured birds.

### **Contributions to conventions, agendas, policies, management plans**

- **National or regional**

In 2012 (20th August) the South African government gazetted (published officially for public comment) the Biodiversity Management Plan (BMP) for the African penguin. This means that the BMP is now open for public comment before it is finally implemented. All the Earthwatch PIs made significant contributions to the BMP and the project provided the bulk of the data relating to the penguins on Robben Island. The BMP is of the greatest importance as it will enshrine in law the conservation actions required to ensure the long term survival of the African penguins. Earthwatch PIs have contributed to the South African red data book on birds, a BirdLife South Africa initiative.

- **Local**

Earthwatch PIs have attended the meetings contributed to and commented on the Robben Island Museum Integrated management plan

### **Developing Environmental Leaders**

1 Phd student, 2 MSc Students and 2 Honours students from the department of Zoology have been involved in various aspects of the project and have benefitted from input from all the team leaders and PISs into their own development. The penguin watch website ([penguins.adu.org.za](http://penguins.adu.org.za)) continues to develop and provide educational materials. PIs have

presented a number of public and schools lectures on the research in the UK, France and South Africa.

## **Actions or activities that enhance natural and/or social capital**

### **Conservation of Taxa**

*Spheniscus demersus* - African penguin; listed by IUCN as endangered. Our work provides a long term dataset of breeding success and survival at one of the remaining major colonies. The data are used to inform conservation decisions and to support conservation efforts. While the Earthwatch project is not carrying out any direct conservation work it contributes significantly to a range of conservation work. Specific projects include the major fisheries closure experiment referred to above, the collection of oiled and injured birds which are sent for rehabilitation at SANCCOB and participation in a chick bolstering project led by Bristol Zoo Gardens.

*Phalacrocorax neglectus* - Bank cormorant, listed by IUCN as Endangered. Robben Island now hosts one of the main breeding groups of Bank cormorants. Research into the stability of the population both by measuring breeding success and the movements of birds between colonies contributes to the planning of the conservation management of this species.

### **Conservation of Habitats**

Data from the project over the past 12 years shows that artificial nest boxes and burrows are both preferred by penguins and that birds using them tend to have better breeding success. We are in the process of obtaining funding to increase the number of such artificial nest sites on the Island and carrying out further research to advise and inform workers at other colonies on best practice.

### **Ecosystem Services**

The data gathered by the project has been fed into a PhD project Evaluating and communicating the efficacy of an Ecosystems approach to Fisheries management in the SA sardine fishery. The project worked closely with the chief directorate fisheries research at DAFF on the small pelagic scientific working groups island closure feasibility study.

## Dissemination of research results

### Scientific peer-reviewed publications

Sherley R.B., Underhill L.G., Barham B.J., Barham P.J., Coetzee J.C., Crawford R.J.M., Dyer B.M., Leshoro T.M. and Upfold L. (In press). Roles for local and regional prey availability in influencing breeding performance of African penguins *Spheniscus demersus*. *Marine Ecology Progress Series*. DOI:10.3354/meps10070.

Sherley R.B., Barham B.J., Barham P.J., Leshoro T.M. and Underhill L.G. (2012). Artificial nests enhance the breeding productivity of African Penguins (*Spheniscus demersus*) on Robben Island, South Africa. *Emu*. **112**: 97–106.

Sherley R.B., Ludynia K., Underhill L.G., Jones R. and Kemper J. (2012). Storms and heat limit the nest success of Bank Cormorants: implications of future climate change for a surface-nesting seabird in Southern Africa. *Journal of Ornithology*. **153**: 441–455.

### Grey literature and other dissemination

Non peer-reviewed or popular press publications: Sherley R.B. and Robinson K.J. (2012). First observation: Pied Avocet at Robben Island. *Ornithological Observations*. **3**: 100–101. Sherley R.B. 2012. Catching up with the secret lives of African Penguins. *Environment* **10**: 64–66.

Conference and workshop presentations: Sherley R.B., Ludynia K., Underhill L.G., Jones R. and Kemper J. Don't bank on a sea view: could climate variability be limiting the breeding success of an endemic cormorant in southern Africa? *International Statistical Ecology Conference 2012*, Krokkleiva, Norway, 3–6 July 2012. Oral Presentation.

Sherley R.B. and Hampton S. Ma-Re Basics Workshop Report: How can management policy balance the competing objectives of conservation, tourism and fisheries by considering both negative impacts and new opportunities? *Annual Ma-Re Forum*, University of Cape Town, Cape Town, 14 March 2012. Oral Presentation.

Scientific communication and outreach activities: Television Interview on 50/50 (South African Broadcasting Corporation) about dispersal of fledgling African penguins. Aired on SABC2, December 2011. Available at:

<[https://www.youtube.com/watch?v=j4K9zUgOSFo&feature=player\\_embedded#!](https://www.youtube.com/watch?v=j4K9zUgOSFo&feature=player_embedded#!)>

Radio Live interview with Tim Neary about dispersal of fledgling African penguins. Sunday Early, 24 June 2012, Talk Radio (national), South Africa. Available at:

<<http://www.uct.ac.za/downloads/email/TalkRadioFMstudyofPenguins24June.mp3>>

## **SECTION THREE: Anything else**

### **Is there anything else you would like to tell us?**

We would like to emphasise the importance of the long term data set that we continue to gather and which would not exist were it not for the continued support of Earthwatch.. The information we have gathered over the past 12 years provides a unique and valuable dataset which we continually refer back to and use when looking at trends across the region.

### **Acknowledgements**

We should thank all our collaborators for their ongoing support (especially Robben Island Museum who continue to provide logistical support without which the project could not operate). We also thank all the team leaders and field assistants who have helped run the teams this year.