Conservation of the African Penguin (*Spheniscus demersus*) South Africa

ANNUAL REPORT
(01.04.01 – 31.03.02)

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Contents:

Darwin Initiative for the Survival of Species

Annual Report

1. Darwin Project Information

Project Title:	Conservation of the African Penguin (*Spheniscus demersus*)
Country:	South Africa
Contractor:	Earthwatch Institute
Project Reference No:	162/10/005
Grant Value:	£152,945
Start/Finishing dates:	April 2001 – March 2004
Reporting Period:	01.04.2001 – 31.03.2002

2. Project Background

The project represents collaboration between Earthwatch Institute, University of Cape Town and University of Bristol to enhance the knowledge base of the African Penguin, in order to aid its conservation, and develop new technology for penguin monitoring with potentially global implications.

The African Penguin *Spheniscus demersus* is classified as 'Vulnerable' and is now decreasing at a rate of 2% per year, and decreased by 90% in the 20th century. At present, the main factors influencing the adverse conservation status of the species are: competition with industrial fisheries for food (purse-seine nets extract large quantities of sardine and anchovy), oil spills, and displacement from breeding sites by burgeoning Cape Fur seal populations. Acute oiling events such as the *Treasure* spill of June 2000 made international headlines.

The project will collect baseline data to inform and establish a monitoring programme which can be continued beyond the life of the Darwin Grant. In order to monitor the effects of oil pollution, a resighting programme, of birds banded following the *Treasure* oil spill in June 2000, will be established. The project will field test a new plastic flipper band which, if successful, could be used for penguin studies worldwide, and will also develop materials which will assist local authorities exploit the penguin colonies for tourism.

3. Project Objectives (Logical Framework attached as Appendix 1)

Purpose:

To enhance the knowledge base of the African Penguin, in order to aid its conservation, and develop new technology for penguin monitoring with potentially global implications.

Objectives:

- The project will undertake penguin counts at offshore islands of the Western Cape in order to show trends from the earliest available count data. This will allow a long-term monitoring programme to be set up, based mainly on Robben island, which will ultimately be self-sustaining.
- The project will monitor the progress of penguins oiled by the sinking of the *Treasure* in June 2000 and establish a resighting programme of birds banded during the clean-up operation.
- The project will field test a new plastic flipper band which has the potential to replace the current bands used worldwide, which are thought may affect penguin survival rates.
- The project will develop tourism materials to assist the exploitation of the penguin colonies as tourist attractions.

The objectives have not been modified over the last year.

4. Progress

Brief history of the project – The Avian Demography Unit (ADU) of the University of Cape Town is the South African partner organisation in this project. As such, the ADU, through its Director, Professor Les Underhill, achieved the majority of outputs identified for the first year. Earthwatch Institute's responsibilities included submitting one national press release, visiting the project in November 2001, submitting a first half yearly report in October 2001 and preparing this annual report for DEFRA.

Summary of progress against baseline timetable - Activities detailed in the agreed timetable have been successfully completed. These are:

- April 2001 – Penguin counts at offshore islands of the Western Cape were completed in May 2001.

- April 2001 - Monitoring of banded penguins started as an ongoing activity until March 2004, with the intention of continuing beyond the life of the Darwin Project.

- June 2001 – One national press release and one national and two local radio interviews in South Africa.

- July 2001 – Report on Penguin counts at offshore islands of Western Cape (report entitled 'Results of the 2001 census of African penguins *Spheniscus demersus*: first measures of the impact of the *Treasure* oil spill on the breeding population'.)

- Oct 2001 – UK press release planned for June but delayed until October (entitled ' Triumph in adversity: Earthwatch announces unexpected results of African Penguin Census).

- November 2001 – Resighting report produced entitled 'Treasure Monitoring Project: Results from First Year of Monitoring: August 2000 to July 2001'.

- March 2002 – Leaflets on penguins for tourists explaining threats to penguins and need for conservation produced. This was planned for November but delayed until March due to a penguin leaflet having been released in late 2001 by the South African Foundation for the Conservation of Coastal Birds (SANCCOB). The delay was necessary to review the leaflet's content and message so as to avoid duplication.

- By March 2002 – work experience for South African postgraduate students. An additional student was included making a total of 3 students as against the original 2 planned at the start of the project.

- By March 2002 – five papers submitted to peer reviewed journals, detailed in Section 7, Table 2 of this report. This is two more than planned at the start of the project. As well as a paper on the impact of the *Treasure* spill on penguins, there are papers on shorebirds on the islands inhabited by penguin colonies. Penguins are therefore not being studied in isolation, but are seen as a component of the wider biodiversity on key islands off the Western Cape.

- By March 2002 - conferences attended:
  - March 2001- Les Underhill - 15th Conference of the European Bird Census Council
  - May 2001 - Les Underhill presented a paper on the Treasure oil spill and the lessons learnt from the event, including the new flipper bands, to the Royal Society of South Africa.
  - November 2001 - Peter Barham and Les Underhill - Earthwatch Institute Annual Conference "Celebrating the role of partnerships in research, conservation and education", in Boston, USA
  - November 2001 – Les Underhill presented a paper on the statistical analysis of the results of flipper banding to the annual conference of the South African Statistical Association, in Goudini Spa, Western Cape.

Numerous other presentations on Avian Demography Unit (University of Cape Town) penguin work were made by members of the team of researchers at a variety of meetings, including bird clubs and service organisations.

Account of projects research, training and technical work

2001 Penguin Census. This was conducted in the year immediately following the *Treasure* Spill. These census are conducted annually at as many breeding colonies as it is feasible to visit, and takes place in April when nest counts are generally at a maximum. The field work consists of dividing a colony into manageable units, and counting the number of active penguin nests within each unit.

Predictions were that the *Treasure* spill would have a negative influence on the 2001 census due to the death of about 2000 penguins during the spill, massive disturbance to colonies during the rescue operation and disruption to pair bonds, so that many pairs would be breeding together for the first time in 2001, a condition known to reduce breeding success. Against this background, results were surprising, showing that 2001 had been a good breeding year for African penguins, with an overall increase in the number of breeding pairs of 20%. The increase in the number of penguins breeding in 2001 can be attributed to two key factors:

- an abundance of food for penguins (preferred prey are sardines and anchovies)
- a strong recruitment of first-time breeders to the breeding populations (penguins recruit to the breeding population at 3-4 years of age and the past 3-4 years have been markedly better food years than earlier years)

Therefore, the anticipated adverse impact of the *Treasure* oil spill has fortuitously been offset by favourable feeding conditions, which appear to be the result of two factors:

- careful management of the sardine resource over the past two decades with the intent to rebuild it
- favourable environmental conditions in recent years have resulted in good year-classes of anchovy.

Work experience – The project is not providing training but is providing work experience to masters and doctoral students at the University of Cape Town through their participation in the monitoring projects. Beyond the work experience, the data collected is vital to their research. The following students received work experience.

> Ms Kathleen M Calf. PhD student. 2/3rds time - post as Penguin Database Manager (May 2001 to March 2002)
>
> Ms Janine le Roux. MSc student. 1/3rd time - post working on Penguin Database (July 2001 to March 2002)
>
> Ms Jenny Griffen. MSc student working on penguins, with 1/3rd time post funded by Darwin Initiative helping to sponsor her studies (April 2001 to Mach 2002).

Resighting work – Resightings of flipper-banded penguins made since the *Treasure* oil spill are being entered into a Penguin Database. Each flipper band has a unique number, which can be read from a distance of over 50m with a telescope. When each banded penguin is resighted, its activity (breeding, moulting or 'loafing in colony') is noted and entered into the database.

This new database will hold all primary ringing data for African penguins back to the commencement of penguin banding in 1972. The development of the Database will enable important analyses to be performed, such as looking for evidence of changes in penguin survival rates through time and comparison of survival rates between colonies. Ms Kathleen Calf was employed as Penguin Database manager on a two-thirds time basis from 1st May 2001. The report "*Treasure* Penguin Monitoring Project- Results from the First year of Monitoring: August 2000-July 2001" details all those who contributed to gathering resighting data. These include six teams of Earthwatch volunteers who made approximately 2000 resightings per team (spending 2 weeks per team) on Robben Island from February to July 2001.

Moult counts – Penguins come ashore to moult, replacing old feathers with new. The process takes approximately 2 weeks, during which most birds stand on the shoreline and do not go to sea. Moult studies were undertaken by a Masters student (Mathew Hemming), whose supervisors included Professor Les Underhill (ADU). Results showed that penguins that had been oiled came ashore to moult 2 weeks earlier than average. This displacement is consistent with birds oiled following the *Apollo Sea* oil spill in 1994.

Immune system tests – Mathew Hemming conducted an experiment to test the difference between the immune systems of penguins oiled in the Treasure spill and normal penguins. Results of the experiment showed that there was no difference between the responses of penguins that had and had not been oiled. This indicates that oiling has no long-term effects on the immune system of the African penguin, and is a good result from the conservation perspective.

New penguin bands
Penguin studies have traditionally relied on steel flipper bands fixed around the top of the flipper. However, evidence is pointing to risks associated with these bands, notably hydrodynamic drag which can lead to an increase in energy use while swimming. Observations of Adelie Penguins on the Antarctic Peninsula indicate that banded birds have a significantly reduced breeding success. They arrive at the breeding site later than non-banded birds, their weight on arrival is lower than non-banded birds, and they are more likely to abandon eggs and chicks than non-banded birds.

Field studies (conducted by ADU, Dr Peter Barham, Earthwatch volunteers and other researchers) are proving that the new plastic flipper bands are a success and that a change to the new bands is needed. Some minor modifications will be tested in 2002 before entering into a mass production phase. The most important decision was that bands should be made in two sizes, and therefore there is a need to develop criteria for deciding which size band to fit onto a particular penguin. The most important forum at which the results will be presented will be to the Fifth International Penguin Conference, to be held in Argentina in 2003. These meetings are held three times a year and are attended by most penguin researchers.

Significant difficulties – None

Changes to project design – No

Timetable for next reporting period -the next report required by DEFRA is a half yearly report to cover the period 01.04.2002 to 30.09.2002 and will report on the following outputs:

- March -April 2002 – Penguin counts at offshore islands of Western Cape
- March – July 2002- Intensive monitoring of banded penguins with modifications to bands if necessary
- June 2002 – one national press release, one national radio interview, two local radio interviews in South Africa
- July 2002 - Report written on penguin counts
- July 2002 – Conservation poster on penguins produced.

5. Partnerships

Earthwatch Institute (Europe) collaborates with the Avian Demography Unit (ADU) of the University of Cape Town. This relationship has worked very well, strengthened by

Earthwatch's African Programme Manager visiting the ADU last November. A follow up visit is planned for May 2002. The other UK partner collaborating closely with Earthwatch and ADU is the University of Bristol, in the form of Dr Peter Barham who is designing, testing and eventually manufacturing a new generation of plastic flipper bands. Several final year Physics undergraduates have undertake projects in the Physics Department at the University of Bristol to establish the materials and design criteria for an ideal band.

With only one species of African Penguin, there are no similar projects in the host country. The ADU works in close partnership with all other institutions involved with penguin research: Marine and Coastal Management (central government), Western Cape Nature Conservation Board (provincial government), Southern African Foundation for the Conservation of Coastal Birds (NGO), Ministry of Fisheries and Marine Resources (Namibian government). The ADU takes the lead on matters relating to flipper banding because it administers SAFRING (South African Bird Ringing Unit). However, penguin researchers worldwide are awaiting the results with a great deal of interest. In particular, Dr John Croxall, of the British Antarctic Survey, is taking a keen interest in the project. Dr Peter Barham (University of Bristol), developer of the new bands, has been asked by ADU's Australian counterparts to produce a band for their Little Penguin. Dr Barham measured the sizes of Little Penguin flippers while he was attending the Earthwatch PI Conference in Boston, USA, last November. He did this at the New England Aquarium, which has a penguin display that focuses on African and Little Penguins.

6. Impact and Sustainability

Public interest and concern at the plight of the African penguin is high due to the devastating oil spills that occurred in the last few years.

The work has been promoted so far by:

- one national press release and one national and two local radio interviews in South Africa.
- UK press release entitled 'Triumph in adversity: Earthwatch announces unexpected results of African Penguin Census.
- conservation leaflet produced by ADU for tourists explaining threats to penguins and need for conservation produced. Leaflets will be given to tourists visiting Robben Island and its penguin colony. 15,000 leaflets will be inserted into the two top environmental magazines in South Africa: Africa – Geographic and Africa – Birds and Birding.

The project received a setback in that the local news media published an ill-informed and grossly exaggerated report on the impact of stainless steel flipper bands on penguins. The message was that the 18 000 penguins which had been cleaned by members of the Cape Town public after the oil spill a year previously were now suffering as a result of the flipper bands put on the birds by scientists. (The twin realities are that scientists know that most of these birds are still alive and are breeding because of the flipper bands, and that stainless steel flipper bands work satisfactorily on African Penguins [and the three similar South American species], but not on most of the southern penguin species.) Although this project relates to new bands to address the issues, the likelihood of the media getting the wrong end of the stick was considered too great a risk to proceed with extensive media coverage. The risk was that the media would turn public opinion against scientists, and therefore all forms of penguin

marking. It was therefore decided to maintain a low profile. This was hugely disappointing, but will revisit the issue in 2002/03.

Components of the project are planned to continue beyond the life of the project, and new funding will be sought.

7. Outputs, Outcomes and Dissemination

Table 1. Project Outputs (According to Standard Output Measures)

Code No.	Quantity	Description
15A	1	one national press release
19A	1	one UK press release entitled ' Triumph in adversity: Earthwatch announces unexpected results of Penguin Census
19A	1	one national radio interview in South Africa
19C	1	local radio interviews in Western Cape
10	1	20,000 copies of penguin conservation leaflet
12A	1	Database on penguin resighting enhanced
4C/D	1	more than 12 weeks work experience for 3 South Africa postgraduate students
8	1	one week spent by Earthwatch African Programme Manager on project work in SA
11B	1	5 papers submitted to peer-reviewed journals
14B	1	3 conferences attended per year

Differences in actual outputs against agreed outputs:

- Earthwatch African Programme Manager spent one week in South Africa as opposed to 5 weeks in the agreed outputs. It was not necessary for a visit of 5 weeks duration.
- An extra 5,000 copies of the penguin conservation leaflet are being produced (20,000 as opposed to 15,000)
- An extra postgraduate student is receiving work experience (now 3 as opposed to the original 2)
- 5 papers as opposed to 3 have been submitted to peer-reviewed journals

Table 2: Publications

Type	Detail	Publishers	Available from	Cost £
Journal	Results of the 2001 Census of African Penguins *Spheniscus demersus* in South Africa: First Measures of the Impact of the Treasure Oil Spill on the Breeding Population. Wolfaardt A.C., Underhill, L.G., Crawford, R.J., Klages,N.T.	Submitted to Transactions of the Royal Society of South Africa		
Journal	Shorebirds of Robben Island, Western Cape, South Africa. Underhill, L.G., Whittington, P.A. & Calf, K.M.	Submitted to Wader Study Group Bulletin		
	Waders (Charadrii) and other Waterbirds at Dyer Island, Western Cape, South Africa. Venter,A.D et al.	"	"	
	A handicapped Ruddy Turnstone *Arenaria interpres* loses mass and delays primary moult. Underhill, L.G.	"	"	
Journal	Flesh-Footed Shearwater *Puffinus carneipes* and White-Faced Storm Petrel *Pelagodroma marina* at Dyer Island, South Africa. Underhill, L.G. et al.	Submitted to Atlantic Seabirds		

8. Project Expenditure

Table 3: Project expenditure during the reporting period

Item	Budget	Expenditure
Salaries		
UK staff		
Director of Programmes		
African Programme Manager		
Accounts Officer		
SA Staff		
Project co-ordinator		
ADU Director		
IT Manager		
Ringing Co-ordinator		
Data processing		
Field Assistants		
Rent, rates heating, lighting etc		
Office administration costs		
Capital items/equipment		
Other		
Total		

Expenditure is £500 less than the budget. This sum, taken from the travel and subsistence budget line, has been carried forward to the second financial year and will be claimed for in the first quarter. This has been agreed by DEFRA.

9. Monitoring, Evaluation and Lessons

Measurable indicators and means of verification against outputs (see Logical framework, Appendix 1) have been met for this first year of the project, demonstrating that the project purpose is being met.

In the first year after the Treasure oil spill, ADU was unable to give sufficient attention to data capture and the maintenance of the database of flipper band resightings. The Darwin project has enabled ADU to address this problem. ADU will therefore increase its capacity to do resightings, in the knowledge that it can handle the increased volumes of information that results.

10. Authors

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29th April 2002

Annex 1 - Logical framework.

Project summary	Measurable indicators	Means of verification	Important assumptions
Goal To assist countries rich in biodiversity but poor in resources with the conservation of biological diversity and implementation of the Biodiversity Convention			
Purpose The project will enhance the knowledge base of the African Penguin and establish a monitoring programme, in order to aid its conservation, and will develop new technology for penguin monitoring with potential global implications, as well as materials to help exploit the tourism potential of the bird.	Reports published from the field work and data available on African penguin numbers and trends. Success of new flipper bands.	Project reports. Project reports.	Political situation does not change unfavourably. Colonies under study are extant for duration of study. Political will exists to implement conservation recommendations.
Outputs Information from counts used to show trends from earliest available count data. Resighting programme in place. Results of resighting work analysed. Results of flipper band field tests analysed. Ecotourism materials produced and used.	Information from counts processed. Database is fully updated. Report written on resightings. Report written on flipper band testing. Ecotourism materials in place.	Reports from penguin counts. Project reports. Project reports. Project reports. Ecotourism materials available. Project reports.	Further catastrophic events (oil spills, fire) do not hamper field work. Earthwatch volunteers able to work in South Africa. Penguins remain attractive to tourists.
Activities Penguin counts undertaken at offshore islands of the Western Cape. Resighting work of *Treasure* (oiled) penguins. New flipper bands field tested. Ecotourism materials developed.	Results from counts available for processing. Results from resighting work available for databasing and analysing. Results from field tests available. Draft materials developed and approved by ADU.	Project reports. Project reports. Project reports. Ecotourism materials available. Project reports.	Earthwatch volunteers able to work in South Africa. Further catastrophic events do not hamper field work.