
Editorial

It is with pride and a sense of achievement that we feature an article to mark 10 years of bird monitoring in the ADU. The projects that have reached or surpassed this milestone are CWAC, CAR, NERCS and BIRP. They have achieved this despite severe financial strictures. The reason they have succeeded is largely thanks to you, the project participants. You have loyally supported these projects with your time, energy and enthusiasm, not to mention petrol and wear-and-tear on your vehicles! We can see that you share with us the firm belief that we can only plan the conservation of South Africa's birds if we understand what is happening to their populations. We sincerely thank you for your support.

The article on bird monitoring also appears on the ADU website, as do all back issues of BN. If you have access to the internet, please visit the ADU site from time to time. There is a lot of news and information there that does not appear elsewhere, and the site is updated regularly. The address is www.aviandemographyunit.org

A number of articles in this issue demonstrate once again the intense interest that we as birders have in waterbirds. I am therefore very pleased to publish Dirk van Driel's report on the bird kill at Melkbos Pan. This follows up an earlier report by Margaret Maciver [BN 12(1) 2003] and provides additional insights into two potential causes of mass mortality in waterbirds. The ongoing expansion of built-up areas in our cities places local wetlands under increasing threat of pollution. This is likely to lead to many bird kills in future. We desperately need to understand the exact mechanisms of these kills so that appropriate management actions can be taken. It is therefore very heartening to see an official of the City of Cape Town taking this relatively small incident seriously and making a serious attempt to arrive at a

scientific explanation. It is also encouraging to note the willingness of a government official to collaborate with the birding community to collect data and implement actions. I hope that BN will have many opportunities to publish articles from officials in local government in future.

BN also continues to publish important new distribution records and we hope that BN will become first in line for ornithologists wanting to publish this type of information. However, potential contributors of this type of information should please bear in mind that only relatively important new information will be published and it is preferable that new information not be based on single records only. Vincent Ward's article about Wedge-tailed Shearwaters is a good example of an article that pulls together a number of records and identifies a pattern in them.

As always, many thanks to all contributors for fascinating material! My job as Editor of BN is indeed a pleasure.

It is our intention to get this issue out before Christmas, so I trust that I can wish you a blessed festive season and a New Year full of interesting birds!

James Harrison



A special word of thanks to Felicia Stoch



Felicia Stoch came to work at the ADU in 1993. Her first task was to design, typeset and see to the publication of the *Atlas of southern African birds* (1997), a mammoth task by anyone's standards. Once this was completed there was no stopping her: she prepared a stream of other publications, both in-house for the ADU and for many other organisations. All her work bears testimony to meticulous care, attention to detail and tremendous dedication. Once this had a rather unexpected result: one Monday it was discovered that the files server for the whole science faculty had crashed because of the volume of files of the *Atlas* which Felicia had backed up over the weekend!

Felicia was a generous and supportive colleague. One could always count on her to get to the bottom of a problem or question, whether it was a computer matter or fine point of English grammar, just as one could always rely on a heartfelt "Mazel tov!" when one shared some good news with her.

By the end of 2003 Felicia was experiencing an accumulation of serious health problems. She bravely continued to work from home for a period but eventually has had to give up work altogether.

All of us at the ADU would like to thank Felicia for her many years of work and companionship here.

John Cooper relates: "Back in early 2001, I was appointed to organize an inter-governmental meeting to conduct the final negotiations for the Agreement on the Conservation of Albatrosses and Petrels. Funds were tight, so I 'borrowed' the ADU's support staff to act as the Secretariat.

"All the ADU staff were a great help, but Felicia stands out as she took on single-handedly the task of ensuring that all the meeting's papers were carefully filed electronically with proper back-ups as they emerged in numerous drafts from the translators in three different languages. Indeed, Felicia was usually the last to leave the meeting premises, often very late at night.

"Opportunities of properly thanking the 'back-room workers' at such meetings are not always available, and their efforts are quickly forgotten after the event. Thus it is a great pleasure to thank Felicia for her work for the Agreement, on behalf of all the albatrosses of the world!"

Erratum: *Bird Numbers* 13(1)

Page 12, right hand column, third paragraph:

"... will continue the ringing effort initiated by Marine and Coastal Management in 2000. There are already three cohorts of pelicans born on Dassen Island wearing colour-rings, a total of 358 birds."

Should be: "... a total of 306 birds."

Donations

The Avian Demography Unit struggles to keep on the financial straight and narrow. If your birding has been enriched by participation in the projects of the ADU, please consider making a donation. Apart from accommodation and computing facilities provided by the University of Cape Town, all expenses, including salaries, need to be covered by sponsorships, donations and contracts. Donation cheques should be made payable to the University of Cape Town (not the ADU), and posted to the ADU, University of Cape Town, Rondebosch 7701. The University issues a tax certificate in terms of Section 18A of the Tax Act; donations are deductible.

Generous donations were received from the following organizations and individuals: A.M. Archer; B.K. Balchin; A.D. Bezuidenhout, S.J. Bousfield; A.L. Chesters; J.E. Clements; J. Heywood; S. Fisk; Lakes Bird Club; G. Patten and B.V. Ralphs.

We appreciate your support for the work of the Avian Demography Unit.

The ADU does not have any formal membership. Anyone wanting to participate in an ADU project is welcome to do so and will receive *Bird Numbers* free of charge.

Although it is not required, we would like to encourage you to join BirdLife South Africa if you are not already a member. BirdLife South Africa is an important sponsor of the ADU and a collaborative partner in its work. (The address is: PO Box 515, Randburg 2125; e-mail: info@birdlife.org.za.)

Subscriptions for 2004 are due

Anyone who is not an active participant in ADU projects, but would like to continue to receive *Bird Numbers*, should send **R40** per annum to cover printing and postage. Please make out your cheque/postal order to **UCT** (not ADU) and post it to us: **Avian Demography Unit, University of Cape Town, Rondebosch 7701. Thank you!**

Getting involved

If you would like to get involved in any of the ADU's projects, either write to **Projects, Avian Demography Unit, University of Cape Town, Rondebosch 7701**, or send an e-mail to adu@adu.uct.ac.za. Tell us which of the projects interests you, and we will get back to you with the relevant information. The ADU projects are: Birds in Reserves (BIRP); Coordinated Waterbird Counts (CWAC); Coordinated Avifaunal Roadcounts (CAR); the Nest Record Card Scheme (NERCS) and bird ringing (SAFRING).

Please visit www.aviandemographyunit.org for an overview of the projects and other ADU activities.

ADU celebrates 10+ years of bird monitoring

J.A. Harrison, D.M. Harebottle, M. Wheeler & D. Young

Avian Demography Unit, University of Cape Town, Rondebosch 7701

When the bird atlas project (SABAP) was near completion, the ADU was determined that birders' enthusiasm for collecting data, so brilliantly demonstrated during SABAP, should continue to be harnessed in the cause of science and conservation. To that end, four bird monitoring projects were launched, namely CWAC (Coordinated Waterbird Counts), CAR (Coordinated Avifaunal Roadcounts), BIRP (Birds in Reserves Project) and NERCS (Nest Record Card Scheme). These projects have now all reached or surpassed the 10-year mark. This they have achieved despite a chronic shortage of funds and understaffing.

The ADU is proud of the achievements of these projects and we highlight some of these in the paragraphs below. We are tremendously grateful to the many hundreds of volunteers who have contributed data to CWAC, CAR, BIRP and NERCS, and we invite all birders to assist us in taking these projects forward to their 20th anniversary. *Let your birding skills continue to make contributions to bird conservation!*

CWAC (Coordinated Waterbird Counts)

CWAC started in January 1992. Its aims are to monitor populations of waterbirds at wetlands throughout South Africa and to identify and document threats facing wetlands and waterbird populations. Forty-eight sites were first covered in 1992 and currently 486 wetlands are registered with the project, of which 338 are counted regularly, including all viable Ramsar sites. More than 2500 people have participated in CWAC over the past 10+ years and currently about 870 people count waterbirds each summer and winter.

A report on the results of the first six years of CWAC was published in 1999: *Coordinated Waterbird Counts, 1992–1997: Total CWAC Report*. It highlighted the importance of particular sites for waterbirds in South Africa, but also emphasized the enormous value that volunteers add to bird conservation on a national scale. Now into its 13th year, CWAC has the longest-running time series of wetland bird data in South Africa – an achievement that would not have been possible without the ongoing support and commitment of volunteer CWACers.

Although coverage is quite substantial, there are still potential growth areas, and together with a planned second CWAC report, we hope to maintain, but also improve, current levels of participation and further increase the value of CWAC as a monitoring tool for waterbird conservation in South Africa.

CAR (Coordinated Avifaunal Roadcounts)

CAR was initiated in July 1993 to monitor trends in two threatened species, namely the Blue Crane and Denham's Bustard. The project soon gained momentum and CAR participants now monitor the populations of over 20 species of large terrestrial birds in agricultural lands, as well as their use of habitats. Fourteen of these are Red Data species.

Currently, about 340 fixed CAR routes in seven provinces are covered by about 780 enthusiastic observers. That is about 19 000 km of road, equivalent to the distance between Cape Town and London! About half of the observers are farmers, many are bird club members, and others are nature conservationists, school learners and other interested members of the public.

CAR observers have covered about 244 400 km of road in the past 11 years! The information gathered provides an early warning of changes in populations and assists in making scientific recommendations on land management practices, as well as supplying information for specialist studies. CAR recognizes that effective conservation has to involve the private landowner.

The results from the first eight years of data collection have been summarised in a report: *Big birds on farms: Mazda CAR Report 1993–2001*. The report provides landowners with advice on how to promote the conservation of these magnificent birds on their lands and is available from the ADU.

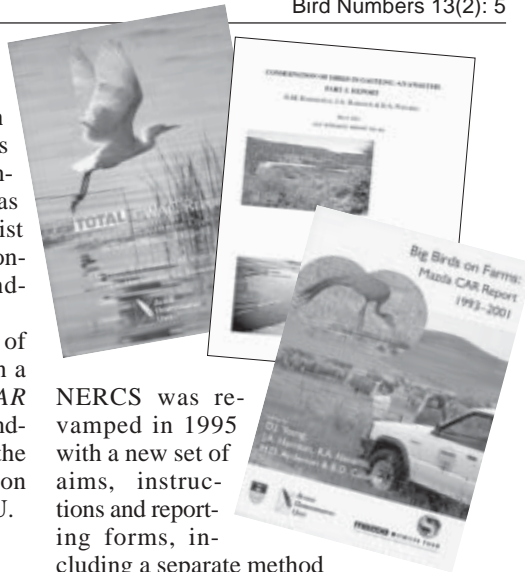
BIRP (Birds in Reserves Project)

BIRP was launched in 1992. Its aim is to document the occurrence of birds in protected areas throughout the country. This information is used to assess the conservation status of species. The method of collecting data for protected areas is very similar to that used by SABAP for grid cells. To date, 737 observers have accumulated in excess of 23 000 checklists for 857 protected areas. BIRP is approaching comprehensive coverage of protected areas in some provinces, but much remains to be done. Ongoing monitoring of species occurrence in protected areas will also help to show change over time – very relevant in a time of climate change.

BIRP has marked its 10th anniversary with a comprehensive assessment of the conservation of birds in the protected areas of Gauteng. Data collected by birders, and analyses thereof, are now available to conservation authorities in Gauteng to assist them in planning the conservation of birds in that province.

NERCS (Nest Record Card Scheme)

NERCS had its beginnings in the 1950s under the Southern African Ornithological Society. The nest record cards have long been housed in the bird ringing unit (SAFRING) which forms part of the ADU.



NERCS was revamped in 1995 with a new set of aims, instructions and reporting forms, including a separate method

for recording colonially nesting birds. Since that time, 2749 nest record cards for 274 species have been submitted by 128 observers. In addition, about 10 cards for heronries have been received.

We hope that the modest levels of participation in NERCS will gradually grow to a point where the annual breeding success of some common species can be measured. This will allow us to monitor productivity – one of the key indicators of population trends and environmental change.

The Future

The first priority for the ADU is to keep CWAC, CAR, BIRP and NERCS going. Every additional year of data enormously increases the value of the project databases.

But the ADU has also long been aware of the need for projects that monitor raptor populations and the sizes of important colonial roosts. The latter is presently being promoted as an extension of CWAC, and the former has been tested as a road-count project. We hope that sources of funds will be found to build these into fully fledged monitoring projects.

In collaboration with South Africa's birders, the ADU will continue to serve the cause of bird conservation!

A bird kill at Melkbos Pan

Dirk van Driel

Scientific Services, City of Cape Town

Members of the Tygerberg Bird Club, notably Margaret Maciver, recorded mortalities at Melkbos Pan, spanning a period of at least four weeks (Maciver 2003). Live affected birds were taken to SANCCOB for treatment where the veterinarian, Nola Parsons, diagnosed avian botulism. She admitted that she did not make provision for blue-green algae toxins in her diagnosis, which is understandable because differential diagnosis is extremely difficult.

A scum of cyanobacteria, also known as blue-green algae, 5–10 m wide, formed on the surface of the Pan, especially along the south-eastern shores, driven there by light north-westerly winds. The algae were identified and, upon testing in the laboratories of Scientific Services of the City of Cape Town, it was duly established that these scums contained toxins lethal to bird life.

Cyanobacterial blooms occur as a result of the presence of nutrients in the water column. Environmentalists and the birding community alike suggested that the golf estate is responsible for the eutrophication of the Pan and the subsequent toxic algal bloom resulting in the bird kill. However, as the neurological symptoms of algal toxicosis and avian botulism are similar, no firm diagnosis has been made to date. It is uncertain if the deaths were the result of algal toxins, botulism, or both.

This document describes the research that led to this conclusion. Some of the analytical results are recorded and recommendations are made to prevent another bird kill.

Melkbos Pan

Melkbos Pan is situated on Cape Town City Council property along the R27 trunk road at Melkbosstrand on the west coast to the north of Cape Town. It is a body of water of c.1 ha, artificially created by quarrying. At its deep-

est point it is c.1 m deep, but for the most part the depth does not exceed 0.5 m. Following quarrying, the area was landscaped into a gently sloping wetland.

Initially the Pan was ephemeral, drying up completely in summer and filling up only during the rainy winter months. Presently the Pan is a perennial water body. Large quantities of sediment washed into the Pan during winter rains, probably as a result of soil disturbance during construction (Justine Ewart-Smith pers. comm.). At that time, no *Typha* reeds were present on the Pan. At present the southern shore is colonized by *Typha* reeds, which will probably expand significantly in the foreseeable future.

The Pan is surrounded by the original renosterveld vegetation, some of which appears quite pristine, although invasion by alien acacias is evident. A stand of alien acacias is present on the eastern shore, most of

Table 1. Number of birds that died at Melkbos Pan from 20 May to 28 June 2002. Data collected by M. Maciver.

Hartlaub's Gull	10
Blackwinged Stilt	9
Blacksmith Plover	3
Threebanded Plover	8
Yellow billed Duck	7
Cape Teal	5
Redbilled Teal	3
Cape Shoveller	6
Dabchick	1
Moorhen	1
Redknobbed Coot	5
Sacred Ibis	7
Glossy Ibis	1
Painted Snipe	2
Unidentified birds	68
Total	136

which are dead as a result of inundation.

The Atlantic Beach Golf Estate to the south of the Pan irrigates its greens with c.1.5 million litres/day of treated sewage effluent from the Melkbosstrand Wastewater Treatment Works during the dry summer months. The greens are fertilized. It is unknown how much fertilizer is applied. The estate covers an area of 174 ha, 73 of which are golf course.

During rain events, storm water flows strongly through the culverts under the road separating the golf estate from the Pan. From this it seems obvious that most of the water in the Pan is runoff from the golf estate. During periods between rainfall events, little or no flow is observed. Storm water from surrounding roads and the rest of the catchment adds to inflow.

Extent of bird kill

The total number of dead birds does not include martins and wagtails. During the course of the bird kill, some smaller bird carcasses were also buried, but could not be identified. A number of birds comprising a mixture of various ducks, cormorants and

plovers died in the middle of the Pan and on the islands, and could not be identified. On 11 July 2002, Maciver reported more deaths, but no details were provided.

On 27 June, Maciver visited Potsdam Wastewater Treatment Works. She noted two bird carcasses in a dried-up sludge pond. Upon discussing the matter with Dave Sindle, the manager of the works, she was informed about previous bird kills and the occurrence of sick birds at the works. As far as can be established, <10 birds were noted.

To put these statistics into perspective, the number of birds on the Pan was recorded. Three separate counts by Maciver between April and August 2002 produced 157, 158 and 59 non-passerine birds, respectively. It appears that a substantial number of birds died in relation to the amount of available habitat and numbers of birds present. However, the numbers are insignificant when compared to the thousands and even millions of bird deaths recorded from North America during outbreaks of botulism (Eklund & Dowell 1987). Verdoorn (2003) estimated some 5000 dead birds of 35 species on a pan on a farm near Koster, North West province,

Table 2. Water quality attributes of Melkbos Pan. Data supplied by the Hydrobiology Section, Scientific Services, City of Cape Town. Dates are from 2002.

Constituents	Concentrations					
	3 June	10 June	18 June	24 June	8 July	22 July
Temperature (°C)	14.1	12.8	16.6	16.9	15.2	12.9
Dissolved oxygen (mg/l)	14.50	10.65	7.64	9.90	15.8	8.46
pH	8.86	8.02	8.49	8.68	8.7	8.1
Conductivity (mS/m)	520	382	482	462	453	447
Total suspended solids (mg/l)	108	672	408	678	380	200
Total oxidizable nitrogen (mg/l N)	5.988	17.06	5.007	13.76	7.50	6.773
Soluble ammonia (mg/l N)	2.725	2.400	0.664	1.474	0.03	0.525
Soluble nitrite + nitrate (mg/l N)	0.087	1.093	0.217	2.349	0.08	0.023
Total phosphorus (mg/l P)	1.178	12.91	6.866	15.82	4.39	5.816
Soluble reactive phosphorus (mg/l P)	0.430	0.300	0.299	0.333	0.220	0.495

Table 3. Algal cells recorded per ml of water in a sample from Melkbos Pan collected on 3 June 2002. Data supplied by the Hydrobiology Section, Scientific Services, City of Cape Town.

<i>Anabaena</i> sp.	32 274
<i>Microcystis</i> sp.	235 309
<i>Chlamydomonas</i> sp.	587
<i>Cryptomonas</i> sp.	782
<i>Monoraphidium</i> sp.	391
<i>Scenedesmus</i> sp.	196
Centric diatoms	391
Pennate diatoms	196

South Africa. The Melkbos Pan bird kill event was significant only at a local scale.

The most significant and alarming item on the list is the pair of Painted Snipe, a Near-threatened species (Barnes 2000).

Water quality at Melkbos Pan

Grab samples were taken from the surface water in Melkbos Pan, along those shores where scum had accumulated. The dissolved oxygen, temperature and conductivity were measured at the Pan using YSI hand-held instruments. The rest of the analyses were conducted at the Scientific Services laboratory in Athlone (Table 2).

The total nitrogen levels (including ammonia, nitrate and nitrite) in the Pan were relatively high throughout the period of investigation. Phosphorous levels (including the soluble, reactive part of the phosphorous) were also high. This indicated that nutrients had accumulated in the pond over time.

Ammonia levels were also high. Ammonia is associated with the release of raw sewage into water bodies, which is apparently not the case at Melkbos Pan. High ammonia levels may have been the result of algal death and decay.

Blue-green algae are particularly prolific in waters where the total nitrogen concentration is at least 30 times greater than the total phosphorous concentration. This was not the case in Melkbos Pan, since the phosphorous concentration was sometimes as high or even

Table 4. Intracellular toxins measured in water samples taken at Melkbos Pan. Data provided by the Hydrobiology Section, Scientific Services, City of Cape Town.

	Micro-cystin $\mu\text{g/g}$ dry weight
3 June 2002	6.88
10 June 2002	12.4
18 June 2002	49.01
24 June 2002	11.61
22 July 2002	13.7
25 April 2003	1175.7
29 April 2004	13.73

higher than the nitrogen concentration. If this ratio were to change because of a higher nitrogen input, an even more serious algal bloom could be expected.

In addition, the algal bloom was curbed by relatively low water temperature. Blue-green algae are most prolific at 22°C or higher.

The water of Melkbos Pan was generally clear and transparent, ensuring penetration of sunlight and hence adequate sunlight for algal photosynthesis. Being a shallow body of water subject to strong winds, mixing of the water was apparent, ensuring a high oxygen concentration, which is apparently also a growth requirement of planktonic algae.

Algal toxicity at Melkbos Pan

Water samples taken from Melkbos Pan were taken to the laboratory in Athlone for the identification and enumeration of algal cells (Table 3).

Water samples were analysed for algal toxins using a high-performance liquid chromatograph (Table 4).

Of the algae detected, only the blue-green algae *Anabaena* and *Microcystis* are capable of producing toxins. In addition, Bill Harding, in his report to Atlantic Beach Golf Estate, mentioned the presence of *Oscillatoria*, a benthic species also capable of producing toxins.

The concentration of *Microcystis* was

high. Only the sample collected on 3 June was enumerated. The concentration of cells in the remaining samples was too high to achieve any level of accuracy with the available equipment. In this laboratory, routine toxin analysis for potable water for human consumption commences at a concentration of 2000 cells of blue-green algae per ml of water, and for recreational use at 20 000. (At Voëlvelei Dam a count of 245 000 has been recorded and in Die Oog, a storm water collection pond where bird kills are reported from time to time, a count of approximately 2.3 million has been recorded.)

No correlation exists between the algal cell count and the toxin concentration (our own findings as well as reports in literature). Large numbers of cells may be present without a trace of toxin. The reasons for the onset of toxin production is largely unknown to science.

A microcystin toxin concentration of 30 µg/g dry weight of freeze-dried algal cells, is lethal to mammals. No experimental work has been done specifically on locally occurring bird species, but it can reasonably be assumed that such toxicity levels are deadly to these birds as well. Moreover, bird deaths occurred over an extended period, and not only when the measured toxin concentration peaked on 18 July, exceeding 30 µg/g dry weight. This indicates that, if deaths were the result of algal toxicosis and not botulism, a lower concentration of algal toxins is lethal to birds. This requires confirmation.

Significantly, no bird deaths were recorded during late summer of the following year, 2003. During this time, the intracellular toxin concentration was extremely high (Table 4) and exceeded the theoretical lethal concentration of 30 µg/g dry weight almost 40 times. Could this serve as proof that the deaths were indeed the result of botulism rather than algal toxicity? In addition, no deaths were reported during the summer of 2004, even though toxicity was found in the algal scum, albeit at low concentrations.

Once algal cells die and degenerate, they release their cell contents into the surrounding water. Toxins were detected intracellularly only, and not in the water column. Therefore, to be affected, the birds would have had to ingest algal cells from areas where scum accumulated, rather than by drinking clear water from the Pan.

Avian botulism

Avian botulism is a frequent and cosmopolitan bacterial disease and the single greatest cause of mass deaths. Bacterial spores are always present in soils, especially in concentrations of decaying organic material. Decaying carcasses and maggots that have fed on carcasses are sources of active bacteria, and can cause sudden outbreaks.

The Cape Metropolitan Area frequently experiences outbreaks of avian botulism, especially during late summer. Waterbirds are mostly affected. It seems as if Sacred Ibis and Hartlaub's Gull are particularly susceptible, because these birds often feed at wastewater treatment works where they may ingest botulism toxins (cf. Williams & Parsons 2004). When defecating at roost sites on the water's edge, these birds spread the disease to other water birds, especially ducks and geese which feed in mud close to the water's edge, as well as on the banks. Once carcasses are present at the water's edge, a massive outbreak may follow, including birds other than waterfowl (see Table 1). This is the route botulism could have followed at Melkbos Pan, with affected birds arriving from nearby Melkbosstrand and Potsdam wastewater treatment works. This is probable but uncertain and the role of wastewater treatment works in outbreaks of botulism needs to be investigated.

Since the toxin produced by the botulism bacterium *Clostridium botulinum* results in limber-neck symptoms similar to those caused by algal toxins, it is difficult to distinguish between these phenomena. Birds with

the role of wastewater treatment works in outbreaks of botulism needs to be investigated

botulism lose the ability to fly because of partial paralysis, then have difficulty walking, typically propelling themselves with flapping motions of their wings. Forced breathing follows and death occurs from cardiac arrest.

Tertius Gous, veterinarian and professional animal pathologist, collected gut-content samples from affected Melkbos Pan birds and despatched them to the Veterinary Research Institute at Onderstepoort, Pretoria, for specific mouse tests.

For the mouse-test, blood is collected from a sick or freshly dead bird and the serum fraction is then inoculated into two groups

of laboratory mice, one of which is given specific antitoxin. The mice with the antitoxin will survive and the ones without will die if botulism toxin is present in the serum. The same applies to the gut contents, a fraction of which is used for mouse tests. These tests were negative, that is, the presence of botulism toxin could not be confirmed.

Microcystin produced by *Microcystis* (see Tables 3 and 4) is a hepatotoxin and causes lesions on the livers of affected birds. Gous, in his investigation, could not detect any *post mortem* liver lesions.

However, anatoxin produced by the *Anabaena* alga (present in Melkbos Pan, Table 3) is a neurotoxin and is responsible for typical limber-neck and associated symptoms. The Scientific Services Department is not equipped to detect anatoxin, and although other South African institutions have the required analytical instruments, they are currently not set up and running. It may not be cost effective to keep these instruments operational for small numbers of samples.

Scientists and veterinarians are reluctant to attribute the bird kill to algal toxicosis, and rule out botulism, on account of the limited number of mouse tests, especially as mouse tests may render false results. Moreover, although cyanobacterial neurotoxicosis among wildlife in South Africa has been indicated in the past, it has not been confirmed,

while botulism is common. The situation at Melkbos Pan is complex and may involve both conditions. Some bird species may have succumbed to botulism, others to algal toxins, or possibly even both.

Chemical analysis and pathological investigation are expensive and there is no budget for unforeseen events at Melkbos Pan. To resolve the algal toxin/botulism issue in future outbreaks, a special budget is required.

Some bird species may have succumbed to botulism, others to algal toxins, or possibly even both.

Recommendations

As the cause of the bird kill could be either botulism or cyanobacteria or both, the appropriate ap-

proach to prevent further outbreaks should address both causes simultaneously.

I recommended the use of copper sulphate to control blue-green algae in the Pan. Should deaths abruptly end following the addition of an algaecide, this would be strong evidence that a particular bird kill was the result of cyanobacterial toxins. This recommendation was met by strong support, as well as equally strong opposition. The reason for the opposition stems from the lack of proof of cyanobacterial involvement, perceived unknown fate of the copper in the Pan and the fear of accumulation of copper in the Pan following repeated treatments.

The use and effects of copper sulphate in pest control has been thoroughly documented in the formal scientific and commercial press. This substance is commonly used in the control of bilharzia-carrying freshwater snails. A solution of elemental copper is also sold in grocery stores for the control of algae in domestic swimming pools. Copper is registered with Agricultural Technical Services of the Department of Agriculture as a legitimate chemical control agent for a number of recognized pests.

The vision that may spring to mind is of a massive dose administered by a fire engine, resulting in the accumulation of copper in the Pan's sediments. This view is not realistic, as responsible chemical control is conducted

with care and finesse. The use of back-pack type agricultural spraying equipment is envisaged, using waders to enter shallow water, only in an area where algal scum has accumulated, and not covering the entire area. Care should be taken that the concentration of copper does not exceed 5 mg/l of water in the Pan and this could be tested and verified by the Scientific Services laboratory. This concentration is adequate for the elimination of algae, but not enough to result in traceable residues in the bottom sediments, even following repetitive use and despite the pan being a closed system without a water outlet.

The copper in the water would probably be less harmful to aquatic life in general than the oil slick that is regularly noticed on the water surface at the road culvert.

Copper sulphate is not expensive at R832.20 for 50 kg. This amount would be adequate for a number of treatments.

A massive dose of salt was used to successfully control a toxic algal bloom at Wildevölvlei in the south Peninsula, using a helicopter, under the auspices of Bill Harding (Barnes et al. 1998). This is a coastal wetland subject to the periodic influx of seawater, which is not the case at Melkbos Pan. Hence the use of salt at the Pan is not recommended, for it would probably result in brackish conditions in an otherwise freshwater environment.

Chemical control, in this instance, does not serve as a long-term solution to the problem, which should rather be achieved by implementation of catchment-management principles. Officials from Blaauwberg Administration, together with Atlantic Beach Golf Estate personnel, should endeavour to reduce the nutrient load of storm water runoff entering the Pan.

Email allows regular contact between Scientific Services Department and the organized birding community. This constitutes an early warning system. Should botulism be reported to any of the bird clubs or to relevant council officials, appropriate action

could be instituted.

To prevent the spread of botulism, sick birds must be taken to SANCCOB for treatment. If SANCCOB is not in a position to render assistance, they should be able to refer sick birds to other veterinarians.

Carcasses must be burnt or deeply buried and not be allowed to decompose on site. This should be done on an organized metro-wide scale, by officials at wastewater treatment works and waste disposal sites. The public and bird clubs could assist in the removal of sick and dead birds throughout the Cape Metropolitan Area.

Carcasses must be burnt or deeply buried and not be allowed to decompose on site.

It is advisable to chase away birds from the site of an outbreak. Gas cannons are a means of achieving this.

For the control of outbreaks over the long and medium term, it is imperative that a record of incidents is compiled, such as the one Maciver has started. The Scientific Services Department will officially apply for funding to add a botulism record module to an existing computerised bird recording software package. Some historical records are available from SANCCOB and the State Veterinarian at Stellenbosch.

Acknowledgements

The Scientific Services Department and, for that matter, the entire birding community, are indebted to Margaret Maciver for her efforts at Melkbos Pan. These include conducting bird counts and burying dead birds.

Robert Siebritz and Candice Haskins of the Scientific Services Department are thanked for taking water samples at Melkbos Pan and their interest. Likewise, Michelle Lamprecht is thanked for the cyanobacteria counts and toxin analysis, as well as Ayanda Sineli and her team for the chemical analysis of water samples. Tertius Gous is thanked for his diagnostic expertise, Bill Harding for assisting with the identification of algae, and SANCCOB for their efforts to rehabilitate sick birds.

The author is grateful to members of the

Tygerberg Bird Club, particularly to Mariana Delpont, for their dedicated interest and for correcting the manuscript.

Barnes E., Davies B. & Harrison J.A. 1998. Ecological problems at Wildevoëlvele, Kommetjie. *Bird Numbers* 7(2): 12–14.

Barnes K.N. 2000. The Eskom Red Data Book of birds of South Africa, Lesotho and Swaziland. BirdLife South Africa, Johannesburg.

Eklund M.W. & Dowell V.R. (eds.) 1987. Avian

Botulism: an international perspective. Charles C. Thomas, Springfield, IL.

Maciver M. 2003. Golf greens and blue-green algae: bird deaths at Melkbos Pan. *Bird Numbers* 12(1): 15–16.

Verdoorn G. 2003. Mother Nature strikes a hard blow with botulism. *Agri S.A.* June/July 2003: 40.

Williams A.J. & Parsons N. 2004. Cholera catastrophes: are Kelp Gulls culprits? *Bird Numbers* 13(1): 8–10.

Acute death of some not-so-cute coot

A.J. Williams

*Western Cape Nature Conservation Board & ADU, UCT, Rondebosch 7701;
tony@adu.uct.ac.za*

Birds die by the millions every year, but mortality is generally “chronic”, spaced out in time and place, so that it goes unnoticed or at least unreported. Occasionally, there is “acute” mortality when a number of birds die together and this is reported as an unusual event. The recent avian cholera outbreaks near Cape Town are an example (Williams & Ward 2003). Here I report on the acute mortality of some Redknobbed Coots at the Bot River estuary, Western Cape Province.

The lower Bot River exists in two modes: less frequently as a functioning estuary, and most often as a shallow lake or lagoon, cut off from the sea by a sand barrier. Floods down the river cause natural breaching of the sand barrier and temporary formation of estuarine conditions. Once flood-waters subside, on-shore winds, coupled with long-shore drift, restore the sand barrier. This blocks the estuary off from the sea and leads to lake formation upstream. Fine sediments accumulate within the Bot River Lagoon, and these sediments are colonized by submerged aquatic plants (*Ruppia*, *Pomatogeton*, etc.). These plants, in turn and over time, attract thousands of coots to the lagoon (Heyl & Currie 1985; Harebottle & Delpont 2000).

In August 2003, the dune barrier was artificially breached. This led to massive outflows of water from the lagoon into the sea during the following low tides. Some of the coot that had been foraging near the mouth got caught in the out-rushing water. They were funneled through the gap in the sand barrier and swept out into the sea and breakers beyond. Subsequently, some 30 coot were found washed up dead on the strandline.

At first, it seems surprising that a waterbird like a coot should drown. They are used to small waves on wetlands during windy periods and are capable of taking-off from water. What then went wrong?

Well yes, coot are waterbirds, but they are substantially geared to relatively calm waters where the submerged plants upon which they feed can grow, and the plants themselves serve to calm surface waters. Further, to enable them to swim through water-weeds without getting tangled, coots have feet that are not fully webbed like those of most waterbirds. Instead, they have lobes on the sides of their toes. When the foot is brought forward, the lobes flatten back to create least resistance to both water and plants. When the foot is pushed backwards, the lobes spread out

and create greater push against the water. Lacking a webbed foot makes it more difficult for coot to take off from water. That, plus their low centre of gravity, is the reason why, instead of leaping off the water like a fully web-footed duck, they have to run some way across water before they have enough momentum and lift to take off.

A lobed foot serves coots well in calm waters but, as the Bot River situation showed, is not adequate in rough seas. Apparently, once caught in the outrushing water, the coots could not get airborne. This was probably through a combination of the stress of being in rushing water, the speed at which they were carried along, and because there was insufficient level water to allow their normal mode of take-off. Once out among the breakers, they again could not take off, for similar reasons. As a consequence, they were washed inshore and dumped by wave after wave until, exhausted, they drowned and washed up on the beach.

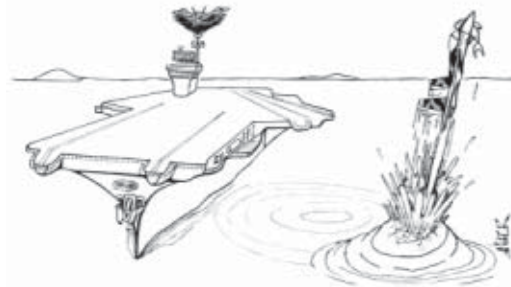
Although some web-footed waterfowl (e.g., scoters, steamer ducks, eiders) freely

use the sea, at least in other parts of the world, they all generally keep well out of the breaker zone. This is in contrast to seabirds like gulls and cormorants which are prepared to land between breakers and then take off or dive to avoid breaking waves. Cormorants have an enlarged webbed (totipalmate) foot that gives them extra surface take-off and underwater swimming power. Most gulls are lighter than waterfowl, sit higher in the water which helps lift-off, and have a wing shape that is presumably better suited for rapid take-off.

Harebottle D.M. & Delpont M. 2000. Waterbird responses to management decisions at Botrivierlei, Western Cape Province. *Bird Numbers* 9(2): 39–44.

Heyl C.W. & Currie M.H. 1985. Variations in the use of the Bot River estuary by water-birds. *Transactions of the Royal Society of South Africa* 45: 397–417.

Williams A.J. & Ward V.L. 2002. Catastrophic choleras: coverage, causes, context, conservation and concern. *Bird Numbers* 11 (2): 2–6.



'Aircraft carrier birds'

Kelp Gulls as predators of large African Penguin chicks: observations at Possession Island, Namibia

Linda Malan, Francois Malan & ¹A.J. Williams

Western Cape Nature Conservation Board & ADU, UCT, Rondebosch 7701;
¹tony@adu.uct.ac.za

Large *Larus* gulls are well known predators of the eggs and chicks of other seabirds (Burger & Gochfeld 1994). The South African Kelp Gull *L. (dominicanus) vetula* is generally acknowledged to be a predator of the eggs and chicks of local seabirds (e.g. Cooper 1974; Crawford et al. 1982). However, little information has been published on their predatory capacity and capabilities (e.g. Williams 1990). Here we document observations on the predation of large African Penguin *Spheniscus demersus* chicks at Possession Island, Namibia, in the 1991–92 austral summer breeding season.

On two occasions we had evidence of Kelp Gulls being able to carry penguin chicks which weighed 1.1 kg. This is heavier than the maximum recorded weight, 1.047 kg, of any southern African Kelp Gull and 200 g heavier than the mean weight of 924 g for this gull species (Maclean 1985). On the first occasion, a marked chick which weighed 1.125 kg was found three hours later, 130 m from the colony, with marks that indicated that the gull had dragged the chick at least the last 30 m.

On the second occasion, a Kelp Gull was seen to seize a marked penguin chick whose weight the previous day had been 1.1 kg. The gull hovered over the chick and seized the chick by its head. Then, flying low at up to 3 m off the ground, the gull carried the chick a short distance before dropping it. It did this

twice until the chick was 50 m clear of the penguin colony. The gull was chased off. The chick was still alive and, seemingly, little damaged. It was returned to its nest site but was found dead the next day.

The Kelp Gull population at Possession Island increases from some 700 birds during the austral winter to some 1700 during the breeding season. Peak predation by gulls on other seabirds at the island occurs in February when newly fledged gulls join adults and are quite brazen. Many healthy, attended penguin chicks are lost in this season.

Burger J. & Gochfeld M. 1994. Predation and effects of humans on island-nesting seabirds. *Birdlife Conservation Series* 1: 39–67.

Cooper J. 1974. The predators of the Jackass Penguin *Spheniscus demersus*. *Bulletin of the British Ornithologists' Club* 94: 21–24.

Crawford R.J.M., Cooper J. & Shelton P.A. 1982. Distribution, Population size, breeding and conservation of the Kelp Gull in southern Africa. *Ostrich* 53: 164–177.

Williams A.J. 1990. Kelp Gull feeding capacity. *Lanioturdus* 25: 57–58.



"It should be a fantastic parrot. It cost an arm and a leg."

Seabirds are not tasty to all Cape Fur Seals

Silvia Mecenero

ADU, UCT, Rondebosch 7001

Cape Fur Seals *Arctocephalus pusillus pusillus* have been observed to prey on seabirds on various occasions and at varying intensities around South African and Namibian islands. The seabirds that mainly fall prey to these seals are the African Penguin *Spheniscus demersus*, Cape Gannet *Morus capensis*, Cape Cormorant *Phalacrocorax capensis*, Crowned Cormorant *P. coronatus* and Bank Cormorant *P. neglectus* (Cooper 1974; Shaughnessy 1978; Rebelo 1984; Marks et al. 1997; Navarro 2000; Crawford et al. 2001; Ward & Williams 2004; David et al. in press; Du Toit et al. submitted). Three of these species are listed as Vulnerable (Barnes 2000). Therefore, considering that the total seal population exceeds one million, featuring on the seals' menu could have serious implications for a seabird's conservation status.

In Namibia, important seabird colonies are within foraging distance of four large seal breeding colonies (Van Reenen, Atlas and Wolf bays, and Cape Cross). Together these colonies comprise more than half a million seals, roughly two thirds of the Namibian population. Analysis of nearly a thousand seal scats (faeces), collected at these colonies over one year, yielded only two scats, collected at Cape Cross, with seabird remains in them (<0.1%). The remains (feathers) were identified as belonging to an African Penguin and a juvenile of one of the cormorant species (either Cape or Bank Cormorant). Adult female seals are found at the colonies nearly year-round, alternating regular foraging trips at sea with shore visits to their pups, therefore the majority of the scats collected were probably deposited by them. The results indicate that adult females have little or no taste for seabirds.

Adult males are found in large numbers only during the breeding season at three of

the colonies, and they mainly fast at this time. However, at Cape Cross, large numbers of males can be found at most times of the year, because this colony serves as both a breeding and a resting site. It is therefore quite possible that the couple of scats that were seabird positive at Cape Cross were deposited by male seals. Other studies have indicated that seabird predation is concentrated around seabird colonies, and is perpetrated by only a handful of individual male seals, mostly sub-adults or adults, that have specialized in this predatory technique (e.g., Navarro 2000; Du Toit et al. submitted). To reduce the incidence of seabird predation, it seems that the only effective measure is to cull the 'outlaws', and not to reduce the entire seal population.

Acknowledgements

Logistical support was provided by the Namibian Ministry of Fisheries and Marine Resources, and the project was supported by a National Research Foundation bursary. Dr G. Avery of Iziko Museums (Cape Town) assisted in identifying the feathers.

Barnes K.N. 2000. Eskom Red Data Book of the birds of South Africa, Lesotho and Swaziland. BirdLife South Africa, Johannesburg.

Cooper J. 1974. The predators of the jackass penguin *Spheniscus demersus*. Bulletin of the British Ornithology Club 94: 21–24.

Crawford R.J.M., David J.H.M., Shannon L.J., Kemper J., Klages N.T.W., Roux J-P., Underhill L.G., Ward V.L., Williams A.J. & Wolfaardt A.C. 2001. African penguins as predators and prey – coping (or not) with change. South African Journal of Marine Science. 23: 435–447.

David J.H.M., Cury P., Crawford R.J.M., Randall R.M., Underhill L.G. & Meyer M.A. in press. Assessing conservation priorities in the Benguela ecosystem, South Africa: analyzing

- predation by seals on threatened seabirds. Biological Conservation.
- Du Toit M., Bartlett P.A., Bester M.N. & Roux J.-P. submitted.** Seal-seabird predation at Ichaboe Island, Namibia: prey selection by individual seals. *South African Journal of Wildlife Research*.
- Marks M.A., Brooke R.K. & Gildenhuis A.M. 1997.** Cape fur seal *Arctocephalus pusillus* predation on Cape cormorants *Phalacrocorax capensis* and other birds at Dyer Island, South Africa. *Marine Ornithology*. 25: 9–12.
- Navarro R.A. 2000.** Cape fur seal predation on Gannet fledglings. *Bird Numbers* 9: 15–16.
- Rebello A.G. 1984.** Cape fur seal *Arctocephalus pusillus* kills Jackass Penguin *Spheniscus demersus* on land. *Cormorant* 12: 111.
- Shaughnessy P.D. 1978.** Cape fur seals preying on seabirds. *Cormorant* 5: 31.
- Ward V.L. & Williams A.J. 2004.** Coastal killers: causes of seabird mortality. *Bird Numbers* 13: 14–17.

Do Turnstones prey on seabird eggs in southern Africa?

A.J. Williams

*Western Cape Nature Conservation Board & ADU, UCT, Rondebosch 7701;
tony@adu.uct.ac.za*

Ruddy Turnstones *Arenaria interpres* are common migratory visitors to southern African shores where some nonbreeding individuals remain throughout the year. Elsewhere they are well established as predators of tern and gull eggs. The Turnstones walk near the tern or gull colony and, if they see an exposed egg, run in, tap a hole in it, and quickly suck up the contents.

Turnstones have been recorded preying on eggs of ground-breeding Sooty Terns *Sterna fuscata* and Greybacked Terns *S. lunata* in Hawaii (Crossin & Huber 1970), Common Terns *S. hirundo* and Royal Terns *S. maxima* in North America (Loftin & Sutton 1979; Morris & Wiggins 1986), Common Gulls *Larus canus* and Common Terns in Europe (Brearey & Hilden 1985), and of Slenderbilled Gulls *Larus genei* in north-western Africa (Von Westernhagen 1968). Based on the species whose eggs have been predated elsewhere, Turnstones would, in southern Africa, be capable of preying upon the eggs of Damara Terns *Sterna balae-narum*, Roseate Terns *S. dougallii*, Swift Terns *S. bergi* and, potentially, Caspian Terns *S. caspia*, and on the eggs of Hartlaub's Gulls *Larus hartlaubi*, Greyheaded Gulls *L. cirrocephalus* and, potentially, Kelp

Gulls *L. (dominicanus) vetula*. There is no indication that Turnstones would prey on guarded eggs of penguins, gannets or cormorants, although this cannot be precluded.

Despite the numbers of Turnstones that occur in southern Africa, predation of tern and gull eggs has not been reported. Is this because nobody has looked for it or because it doesn't happen?

Opportunities to witness Turnstone predation on tern or gull eggs is certainly limited in southern Africa. The majority of terns and gulls breed on island nature reserves to which access is substantially restricted. The lucky few who have access to the islands are generally focused on the colonies of larger seabirds. They generally avoid, or spend minimal time near, the tern and gull colonies because these birds are readily disturbed, giving Kelp Gulls a chance to prey on their eggs or chicks. It is thus possible that predation of eggs by Turnstones could be occurring without being seen and reported.

There may be factors that reduce the likelihood of Turnstones preying upon eggs in southern Africa. One factor may be the richness of the inter-tidal areas at the islands where terns and gulls breed. The rocky shores of southern African islands probably

provide richer invertebrate food resources for Turnstones than the sandy shores where most Turnstone predation of eggs has been reported. Additionally, guano from other seabirds at the islands should provide richer invertebrate feeding opportunities than at localities elsewhere (Bosman & Hockey 1986). Rich and easily available invertebrate food may keep Turnstones along the shore and less likely to visit tern or gull colonies in southern Africa.

However, Turnstones are established generalist and opportunist foragers, therefore predation of eggs is likely to occur in southern Africa and has just not been reported so far. I forecast that the most likely time for Turnstone predation on eggs in southern Africa is in February to March. This is when Turnstones need to put on fat prior to their return migration to far-northern breeding areas. It is also the height of the dry season in western parts of southern Africa (where most regional seabirds breed) and eggs may provide a useful source of water. February and March coincide with the initial breeding period of Hartlaub's Gulls and Swift Terns. Further, observations in North America indicate that eggs laid early in the breeding season are particularly vulnerable to Turnstone predation (Morris & Wiggins 1986).

Only persistent watching, ideally from a

hide, is likely to reveal whether Turnstones prey upon the eggs of southern African seabirds. This is a potential project for students visiting Robben Island where there is often a large breeding colony of Swift Terns and Hartlaub's Gulls. It could usefully be part of a broader project to document causes of brood failure in these species.

Bosman A.L. & Hockey P.A.R. 1986. Seabird guano as a determinant of rocky intertidal community structure. *Marine Ecology – Progress Series* 32: 247–257.

Brearey D. & Hilden O. 1985. Nesting and egg predation by turnstones *Arenaria interpres* in larid colonies. *Ornis Scandinavica* 16: 283–292.

Crossin R.S. & Huber L.N. 1970. Sooty Tern egg predation by Ruddy Turnstones. *Condor* 72: 372–373.

Morris R.D. & Wiggins D.A. 1986. Ruddy Turnstones, Great Horned Owls and egg loss from Common Tern clutches. *Wilson Bulletin* 98: 101–109.

Loftin R.W. & Sutton S. 1979. Ruddy Turnstones destroy Royal Tern colony. *Wilson Bulletin* 92: 133–135.

Parkes K.C., Poole A. & Lapham H. 1971. The Ruddy Turnstone as an egg predator. *Wilson Bulletin* 83: 306–308.

Von Westernhagen W. 1968. Limicolen – Vorkommen an der westafrikanischen Kuste auf der Banc d'Arguin (Mauretaniien). *Journal für Ornithologie* 109: 185–205.



"Can you do anything to stop him chasing ambulances?"

The lower Berg River wetlands as a roost site for coastal birds

Keith Harrison

1 Hofmeyer Street, Vredenburg 7380

This article is in response to an article in BN about the importance of counting birds at roosts (Harebottle & Wheeler 2004).

Due to an exceptionally early start to the Summer 2004 Coordinated Waterbird Count on the Berg River, the counters on Section 2 (Cerebos Pans to the Berg River mouth) found birds in numbers not normally recorded, for example, 937 Common Terns *Sterna hirundo* and 740 Cape Cormorants *Phalacrocorax capensis*.

The conclusion was that these, especially the terns, may be using the area as a night roost. On previous counts, skeins of Cape Cormorants were seen flying down-stream before counting was scheduled to start. The Winter 2004 count was a late start and the counters on Section 1 (bridge to mouth) found, at midday, 11 000 Cape Cormorants roosting on the piers and the beach between. While carrying out regular winter counts of the terns, it was observed that the islands and roadways amongst the salt pans were filled with Cape Cormorants after sundown, with additional birds carrying on further up-stream.

Table 1. Numbers of Cape Cormorants counted on 20 August 2004 at the river entrance of Port Owen.

Time	Cape Cormorants
17:00–17:15	1 500
17:15–17:30	2 300
17:30–17:45	2 400
17:45–18:00	3 500
18:00–18:15	4 900
18:15–18:30	7 400
18:30–18:45	2 600
Total	24 600

On the evening of 20 August 2004, my wife and I parked at the river entrance of Port Owen and, over a two-hour period, counted the skeins of Cape Cormorants as they flew past (Table 1). In addition, 100 White-breasted Cormorants *Phalacrocorax lucidus* were also counted.

The combined population of Cape Cormorants of South Africa and Namibia was estimated to be 216 000 birds (Wetlands International 2002). This count represents 11.2% of that total population. The average South African population estimated for the period 1994/95 to 1999/2000, was 81 000 birds (Marine and Coastal Management). This count represents 30.4% of that total.

The flight path was interesting. Birds could be seen flying along the coastline and turning sharply between the piers, following the course of the river, but at high tide, when the marsh was flooded, they changed course and flew directly over the flooded area. The White-breasted Cormorants did not follow the river but cut the bend by flying over the marsh, enabling the two species to be counted separately.

The mass of roosting birds on the islands and road ways did not consist solely of Cape and White-breasted cormorants; there were also Great (Eastern) White Pelicans, herons and egrets, Darters, Hartlaub's and Kelp gulls, Swift, Common and Sandwich terns, indicating that the wetlands of the lower Berg River are important both as a feeding area during the day, and as a safe sanctuary for many more birds at night, at least during the winter.

Harebottle D.M & Wheeler M. 2004. Roost counts – adding value to CWAC and wetlands. Bird Numbers 13(1): 46–48.

Lesser Flamingo breeding attempt at Kamfers Dam, Kimberley

Mark D. Anderson

*Dept of Tourism, Environment & Conservation, P. Bag X5018, Kimberley 8300
manderson@grand.ncape.gov.za*

The Lesser Flamingo *Phoeniconaias minor* has a fairly widespread distribution in southern Africa (Williams & Velásquez 1997). The population has been estimated at 40 000 (Simmons 1997), 55 000 (Cooper & Hockey 1981) and 60 000 birds (Del Hoyo et al. 1992; Williams & Velásquez 1997). It has been suggested that the southern African population has decreased since the early 1980s by about 15 000 birds or 27% (Simmons 1996, 1997).

In southern Africa, Lesser Flamingos breed at Sua Pan in Botswana (Hancock 1990; McCullough & Irvine 2004) and Etosha Pan in Namibia (Berry 1972; Simmons 1996, 1997). At least 12 breeding attempts at sites in South Africa have been unsuccessful (e.g., Uys & Macleod 1967; Brooke 1984) and it is unlikely that South Africa has suitable wetlands for mass breeding (Simmons 1996, 1997; Anderson 2000a).

Large numbers of Lesser Flamingos fre-

quent Kamfers Dam (2824DB), a perennial wetland located just north of Kimberley, South Africa. Since 1991, bi-annual surveys of the dam's flamingos and other waterbirds have been undertaken (Anderson 2000a) while latterly (since November 1995), monthly surveys of the flamingos have been undertaken (Anderson unpubl. data). Kamfers Dam supports large numbers of Lesser Flamingos, with 19 566 individuals counted in October 1998 (Anderson 2000a), 57% of the southern African population (Simmons 1996). More recently (June 2003), c.36 000 Lesser Flamingos were counted, c.95% of the southern African population (Anderson unpubl. data; Fig. 1).

On 24 January 2004 c.14 500 Lesser Flamingos and c.530 Greater Flamingos were present at Kamfers Dam. It was also noted that c.2000–2500 nests were present at the southeastern corner of the Dam (Fig. 2). Two newly constructed nests contained added

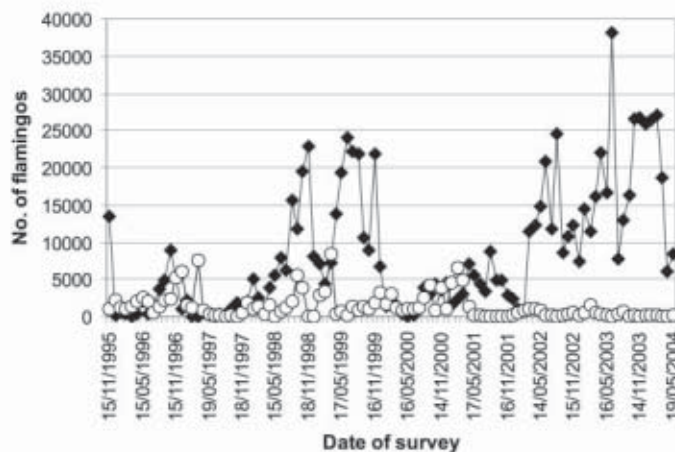


Figure 1. The number of Lesser Flamingos (diamonds) and Greater Flamingos (circles) counted at Kamfers Dam between November 1995 and May 2004.



Figure 2. Large numbers of nests were present at Kamfers Dam during the water-bird survey conducted on 24 January 2004.



Figure 3. Two of the nests contained eggs, presumed to belong to Lesser Flamingos.

eggs (Fig. 3). The eggs were collected, measured (50.6×81.8 mm; 54.1×88.6 mm) and deposited in the egg collection of the McGregor Museum, Kimberley. Their dimensions suggest that they belong to Lesser Flamingos.

Lesser Flamingos have previously constructed nests at Kamfers Dam, at the southeastern and the northwestern corners of the dam. On 24 January 2004, it was noted that the nests in the northwestern corner of the dam (which previously numbered several hundred) had all but disintegrated. In the southeastern corner, both weathered and newly constructed nests were present. Despite nest-building, only on one previous occasion had egg-laying taken place. On 31 March 1994, six addled eggs were collected (Anderson 1994a), with their measurements indicating that they belonged to Greater Flamingos (87.4 ± 6.0 , 54.7 ± 1.5 mm). In contrast to the Lesser Flamingo, the Greater Flamingo breeds more regularly at sites other than Sua and Etosha pans in southern Africa (e.g., Boshoff 1979; Daneel & Robertson 1982; Anderson 2000a).

It is not clear why Lesser and Greater Flamingos do not complete their breeding attempts at Kamfers Dam. Disturbance by dogs and humans, as well as an often rapidly receding water level, may be responsible (Anderson 2000a). In order to solve these two problems and perhaps promote breeding of flamingos, Anderson (1996) proposed that

a flamingo breeding island should be constructed. Recent concern has also been expressed about Kamfers Dam's deteriorating water quality and its possible effect on flamingos (Van Niekerk 2000; T. Szep in litt.). Independent studies by Prof. Val Beasley (Department of Veterinary Biosciences, University of Illinois) and co-workers, and T. Szep (College of Nyiregyhaza, Hungary), M.D. Anderson and S.E. Piper (School of Botany & Zoology, University of Natal) will commence in the near future to study the health of Kamfers Dam's flamingo population and water quality effects on these birds.

Elsewhere in southern Africa, flamingos are threatened by a variety of factors, including soda ash and salt mining, disturbance by low-flying aircraft, collisions with fences and utility lines, fluctuating water levels, pollution of wetlands, and human interference (Hall 1983; Brooke 1984; Aves 1992; Simmons 1996, 1997; Williams & Velásquez 1997). As a result, both the Lesser and Greater Flamingo are listed as Near-threatened (Anderson 2000bc). The Lesser Flamingo is also listed as globally Near-threatened (Collar et al. 1994).

Kamfers Dam is an important site for flamingos (Anderson 2000a) and other waterbirds (e.g., Anderson 1994b). As such it is recognized as a Natural Heritage Site (Anderson & Koen 1994; Abrahams & Anderson 2001a) and an Important Bird Area (Barnes & Anderson 1998), but a submission for recognition of the wetland as a Ramsar

site was not successful (Abrahams & Anderson 2001a, J.H. Koen in litt.). Kamfers Dam and its flamingos are a dominant feature of Kimberley's landscape. The magnificent spectacle of thousands of pink and white birds, against a backdrop of an urban skyline, is used in many tourism marketing documents. Kamfers Dam is therefore important for ecotourism (Abrahams & Anderson 2001b; Abrahams & Anderson 2002; Biggs et al. 2003a,b; Anderson & Biggs 2004), especially in view of the recently completed Kimberley bird guide project (Biggs et al. 2003a,b; Anderson & Biggs 2004). The conservation of the dam's flamingos is therefore important, not only for the tourism and economic benefits to the city, but also in terms of conserving the southern African population of, in particular, the Lesser Flamingo. Successful breeding by both Lesser and Greater Flamingos at Kamfers Dam would improve the value of Kamfers Dam, both for tourism and conservation.

- Abrahams A. & Anderson M. 2001a.** Messages from the mud! Kamfers Dam, waterbirds and Ramsar status. *African Wildlife* 55(5): 20–21.
- Abrahams A. & Anderson M. 2001b.** Kamfers Dam is Kimberley's wetland gem. *Diamond Fields Advertiser* 15 June 2001: 22–23.
- Abrahams A. & Anderson M. 2002.** Kamfers Dam: wetland gem of the Diamond City. Department of Agriculture, Land Reform, Environment & Conservation pamphlet.
- Anderson M.D. 1994a.** Greater Flamingo breeding attempt at Kamfers Dam, Kimberley. *Mirafr* 11(3): 45–46.
- Anderson M.D. 1994b.** Large raft of Blacknecked Grebes at Kamfers Dam, Kimberley. *Mirafr* 11(1): 6.
- Anderson M.D. 1996.** A breeding island for flamingos at Kamfers Dam, Kimberley. Unpubl. report. Northern Cape Nature Conservation Service, Kimberley. 3 pp.
- Anderson M.D. 2000a.** The status of flamingos in the Northern Cape Province, South Africa. *Ostrich* 71: 431–434.
- Anderson M.D. 2000b.** Lesser Flamingo *Phoeniconaias minor*. In: Barnes K.N. (ed.). The Eskom Red Data Book of Birds of South Africa, Lesotho & Swaziland. p. 138. BirdLife South Africa, Johannesburg.
- Anderson M.D. 2000c.** Greater Flamingo *Phoenicopterus ruber*. In: Barnes K.N. (ed.). The Eskom Red Data Book of Birds of South Africa, Lesotho & Swaziland. p. 138. BirdLife South Africa, Johannesburg.
- Anderson M. & Biggs D. 2004.** Birds, Kimberley's other gems. Guided bird-watching around Kimberley. BirdLife SA and Northern Cape Department of Agriculture, Land Reform, Environment & Conservation.
- Anderson M.D. & Koen J.H. 1994.** Kamfers Dam: a jewel in an arid land. *Birding in S.A.* 46(2): 49–53.
- Aves J. 1992.** Flamingos in a changing world. *Marunga* 10: 19–21.
- Barnes K.N. & Anderson M.D. 1998.** Important Bird Areas of the Northern Cape. In: Barnes K.N. (ed.). The Important Bird Areas of southern Africa. Pp 103–122. BirdLife South Africa, Johannesburg.
- Berry H.H. 1972.** Flamingo breeding on the Etosha Pan, South West Africa, during 1971. *Madoqua Series* 1(5): 5–31.
- Biggs D, Anderson M. & Evans S. 2003a.** BirdLife South Africa developments in the Northern Cape. *Africa Birds & Birding* 9(1): 74–75.
- Biggs D, Anderson M. & Evans S. 2003b.** The development of local birding and eco-guides in the Kimberley area of the Northern Cape. *Indaba Inyoni* 6(3): 26.
- Boshoff A.F. 1979.** A breeding records for the Greater Flamingo in the Cape Province. *Ostrich* 50: 124.
- Brooke R.K. 1984.** South African Red Data Book – Birds. *South African Progress Report* 97: 1–213.
- Collar N.J., Crosby M.J. & Stattersfield A.J. 1994.** Birds to watch 2. The world list of threatened birds. BirdLife International, Cambridge.
- Cooper J. & Hockey P.A.R. 1981.** The atlas and site register of South African coastal birds. Unpublished report, University of Cape Town.
- Daneel A.B.C. & Robertson H.G. 1982.** Two previously undocumented breeding records of the Greater Flamingo in the Orange Free State. *Ostrich* 53: 51–52.
- Del Hoyo J., Elliot A. & Sargatal J. (eds) 1992.** Handbook of the birds of the world. Vol. 1. Lynx Edicions, Barcelona.
- Hall D.G. 1983.** Birds of Matabaffin, eastern Transvaal. *Southern Birds* 10.
- Hancock P. 1990.** The flamingos of Sowa. *Bushcall* 1: 16–21.
- McCulloch G. & Irvine K. 2004.** Breeding of

- Greater and Lesser Flamingos at Sua Pan, Botswana, 1998–2001. *Ostrich* 75: 4 (in press).
- Parker I.C.S. 1975.** A census of Ostriches (*Struthio camelus*) in the vicinity of Makgadikgadi Pans of Botswana. Nairobi, Wildlife Services Ltd. 66 pp.
- Simmons R.E. 1996.** Population declines, viable breeding areas, and management options for flamingos in southern Africa. *Conservation Biology* 10(2): 504–514.
- Simmons, R.E. 1997.** Southern Africa's Lesser Flamingos – a summary. Proc. of East African Flamingo Workshop. IUCN, Nairobi. (Ed: G. Howard).
- Uys C.J. & Macleod J.G.R. 1967.** The birds of the De Hoop vlei region, Bredasdorp, and the effect of the 1957 inundation over a 10-year period (1957–1966) on the distribution of species, bird numbers and breeding. *Ostrich* 38: 233–254.
- Van Niekerk H. 2000.** A brief investigation into the water quality of Kamfers Dam. Unpubl. report. Institute for Water Quality Studies, Department of Water Affairs & Forestry, Pretoria.
- Williams A.J. & Velásquez C. 1997.** Lesser Flamingo *Phoenicopterus ruber*. In: Harrison J.A., Allan D.G., Underhill L.G., Herremans M., Tree A.J., Parker V. & Brown C.J. (eds), The atlas of southern African birds. Vol. 1: Non-passerines. pp. 114–115. BirdLife South Africa, Johannesburg.

Forget the stork – delivery by duck

A.J. Williams

Western Cape Nature Conservation Board & ADU, UCT, Rondebosch 7701;
 tony@adu.uct.ac.za

European tradition has White Storks delivering human babies. This obviously isn't true (or maybe the decline in stork numbers is due to over-work!). On the other hand ducks, and some other waterbirds, may well be responsible for "delivering babies", but in this case, baby wetland plants and small animals.

Recent studies in Europe and North America have shown that waterbirds do not convert everything they eat and that viable seeds and invertebrate eggs may pass through their digestive systems to be excreted in their faeces. One result is that seeds or eggs may be transported from the wetland where a bird fed to other wetlands some distance away.

To date, the plants whose seeds may be viable after duck delivery are from widespread wetland plant genera: *Potamogeton* pond weed, *Carex* sedges, *Scirpus* rushes, *Sparganium* bur-reeds, *Salix* willows, *Polygonum* (= *Persicaria*) knotweed, *Ranunculus* wetland buttercups, and *Ruppia* (Mueller & Van der Valk 2002; Figuerola et al. 2003).

Transport of invertebrate eggs by waterbirds seems less common, but it has been

shown that eggs of *Cladocera* water fleas and of Corixidae water boatmen, as well as statoblasts of freshwater bryozoans, can all be viably transported by waterfowl (Figuerola et al. 2003).

Not all waterfowl act as delivery agents to the same extent. Most effective are the omnivorous or herbivorous dabbling waterfowl, e.g. Mallard, Pintail, Shoveller, Teal, and Coot. These species ingest vegetation, or filter ooze, which contains seeds or eggs. The particular species so far studied in the northern hemisphere do not occur naturally in southern Africa but there are related local species occupying equivalent ecological niches. These are, respectively, the Yellow-billed Duck, Cape Shoveller, Red-billed Teal and Cape Teal and Red-knobbed Coot. Ducks that feed on invertebrates, e.g., Goldeneye, and Wood Duck, consume far less plant material and the seeds and eggs that may be held on or within it.

Seeds and eggs are more likely to remain viable after bird consumption if they are excreted within twelve hours of being eaten,

but some, in progressively smaller numbers, may be retained and remain viable for up to a day or more. The period that seeds and eggs are held within the bird probably relates to frequency of feeding. A bird eating often will pass excreta frequently, whereas a bird travelling, especially on migration, may go for some time without feeding and so excrete at less frequent intervals. Comparative studies of fruit-eating bats and birds indicate that, whilst bats freely excrete when in flight this, fortunately for us diurnal humans, is less common in birds. Probably after a long flight, excretion occurs again only once a bird has started to eat at its new destination.

It follows that most bird-transported seeds and eggs will be deposited close to where the bird ingested them either in the same wetland or in another wetland within a short flight distance. However, when seeds or eggs are consumed shortly before a longer, e.g. migratory flight, they may be transported considerable distances. Since the viability of ingested seeds and eggs decreases with increasing time inside the bird, it follows that most transport of viable material will be within the first six hours after ingestion. As ducks can maintain flight speeds of 60 km/h, this indicates dispersal of up to 360 km. Radio-tracked ducks in Europe are known to travel up to 1240 km within 24 hours, indicating a maximum range for dispersal of viable seed and eggs.

The average number of viable eggs or seeds transported by an individual duck at any one time is small, i.e., five. This may seem unimportant as a means of dispersal. However, a single duck has been estimated to transport between 5000 and 10 000 seeds within a three-month period (Mueller & Van der Valk 2002). Multiply this by the number of ducks within a region or flyway and the potential for the establishment of viable seed at distant wetlands becomes significant.

When seeds or eggs are transported to other wetlands where the same species already occur, duck delivery may not be ecologically significant, though it may be

genetically so. Duck delivery becomes ecologically important when the birds transfer eggs and seeds to wetlands where these plant or animal species do not already occur. On the local scale, this may be between existing pools and newly-created, post-flood pools within the same or adjacent riverine systems. On a wider scale, this may help diversify newly restored wetlands, as in the prairie pothole area of North America. In a southern African context, "duck delivery" could lead to establishment of wetland species at newly created farm dams, or at vleis after irregular flooding.

In a Western Cape province context, the distance between regional wetlands is mostly within the 60 km range in which there is a higher probability of viable seeds or eggs being deposited. In a wider context, several local waterbird species migrate regularly to other regions. These include the vegetarian/omnivorous Redknobbed Coot and the South African Shelduck, both of which could be "deliverers", and the Southern Pochard which, being invertivorous, is less likely to "deliver". Elsewhere in southern Africa, the Pygmy Goose and the whistling ducks, omnivores which are nomadic between seasons or years according to which systems are in flood, are likely candidates for propagule dispersal.

The field is open for a southern African student to work on this scientifically "hot" issue in terms of purely southern African species. If, in the future, you see somebody going around wetlands and carefully scooping up and bagging waterbird poop, it may not be a heat-struck loony but a researcher investigating waterfowl delivery!

Figuerola J., Green A.J. & Santamaria L. 2003.

Passive internal transport of aquatic organisms by waterfowl in Donana, south-west Spain. *Global Ecology & Biogeography* 12: 427–436.

Mueller M.H. & Van der Valk A.G. 2002. The potential role of ducks in wetland seed dispersal. *Wetlands* 22: 170–178.

Racing Pumpkin, a homing African Penguin

Jessica Kemper

African Penguin Conservation Project, c/o Ministry of Fisheries and Marine Resources, PO Box 394, Lüderitz, Namibia

Pumpkin is a huge adult African Penguin *Spheniscus demersus* from Halifax Island off the Namibian coast. I found him on 6 May 2004, in an empty nest bowl in the main breeding colony, sporting large patches of oil on his chest, belly and flippers. I caught him, took him back to Lüderitz on my paddle-ski, and washed him. Since washing penguins strips the feathers of their natural waterproofing, they need to be held in captivity until they are waterproof again. Here they bathe regularly, which encourages them to preen. Although Pumpkin never learned to free-feed and did not particularly enjoy being handled, he settled down very quickly in the rehabilitation pen, together with 16 other rehabs. Seven weeks later he was ready for release.

Normally we try and release rehab birds at the island where they were found. We have never released a penguin from the mainland, in case the bird doesn't get the plot and gets munched by jackals or hyenas instead of heading for the nearest island. Since I was

pretty sure that Pumpkin is a resident on Halifax and since there was no boat to take him back to his island, I embarked on a little experiment. In addition to his flipper-band, Pumpkin received a spot of pink dye (Porcimarck) on his chest.

On Friday 25 June 2004, Kathie Peard, Joan James (both from the Ministry of Fisheries and Marine Resources) and I drove to Guano Bay, which is situated directly opposite Halifax Island. Unfortunately it was very foggy, and the island was hardly visible from the bay. I then paddled across to the island. At 11:15, Kathie and Joan released Pumpkin, making sure he did not reappear on the beach somewhere, while I patrolled the landing beaches on Halifax Island for any signs of him. While waiting (and freezing to death in the fog), I did my routine bi-monthly penguin counts, returning to the beaches every now and again to scan for pink penguins. Alas, no sign of Pumpkin.

Eventually I turned my attention to the main breeding colony, ready to count all ac-



Pumpkin (with the flipper band) settled in back home.

tive nests, when through the fog I saw a pink spot! It was 12:40, and Pumpkin was back in his nest, greeting his partner who was covered in guano and had clearly been holding the fort. Not five minutes later the two were mating, and it was then that I realized that Pumpkin, despite weighing a hefty four kg, is female! For another hour I watched the two walking around each other and shaking their heads in typical penguin courtship fashion. Pumpkin's partner then enthusiastically started to get the nest ready by collecting large amounts of nesting material, mostly by stealing seaweed from the nest next door.

I am aware that penguins have a brilliant GPS in their heads. This was demonstrated during the *Treasure* oil spill near Cape Town in 2000 when about 20 000 non-oiled penguins from Dassen and Robben islands were evacuated and relocated to Cape Recife near Port Elizabeth, about 800 km away. They were released there in the hope that the oil around the islands could be cleaned up before the first penguins returned. The gamble paid off, but it was a close call. It took the fastest penguins only eleven days to swim

back to their islands! (See ADU website for details.)

Nevertheless, Pumpkin still bowled me over completely. An hour and a half after being released from an unfamiliar place in thick fog, after seven weeks in captivity, Pumpkin had found her nest and her partner and was preparing to breed. I guess penguins will never cease to amaze me.



Postscript: When I visited this island again on 21 September Pumpkin had become the proud mom of a substantial chick!

Observations at a breeding colony of Red-billed Quelea in the Klaserie Private Nature Reserve

Zephné Bernitz & Herman Bernitz

PO Box 1276, Middelburg, Mpumalanga 1050; bernitz@iafrica.com

On a recent family holiday to the Klaserie Private Nature Reserve in mid-April 2004, huge numbers of Red-billed Quelea *Quelea quelea* were conspicuous all over the veld. During the course of a game-viewing drive, we became aware of a clamorous cheeping and swizzling which marked the site of a quelea breeding colony. In 25 years of visiting the area as committed birders, this was the first time that the spectacle described below had been experienced.

At 70 000 ha, the Klaserie Private Nature Reserve (KPNR) is the largest privately

owned nature reserve in SA (Bornman 1995), and is home to the Big Five. It lies in the eastern Lowveld where it shares a common (unfenced) border with the Kruger National Park, and is limited by the Olifants River to the north, the Timbavati Game Reserve to the south and Hoedspruit Airforce Base to the west. Only the western boundary is fenced, as this forms the western-most limit of the large conservation area encompassing the Kruger Park and adjacent private nature reserves.

The KPNR straddles the junction of two

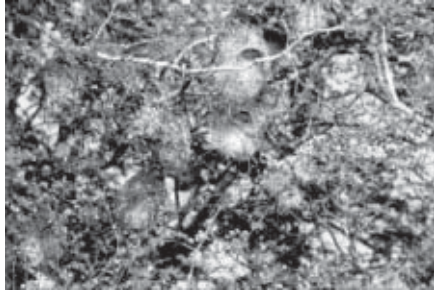


Figure 1. *Quelea* nests in *A. nigrescens* trees.



Figure 2. Five day old Red-billed *Quelea* chick in the hand.

vegetation zones, namely arid woodland and Mopane woodland as described in the bird atlas (Harrison et al. 1997) and in Van Wyk (1972). The authors' property, Dundee Farm, which is a small part of the KPNR, consists mainly of arid woodland where the following species dominate: Red Bushwillow *Combretum apiculatum*, Knobthorn *Acacia nigrescens*, Marula *Sclerocarya birrea*, Russet Bushwillow *Terminalia prunoides*, Silver Terminalia *Terminalia sericea*, Appelblaar *Philonoptera violaceae*, Weeping Wattle *Peltophorum africana*, Flaky-bark Thorn *Acacia exuvialis*, False Marula *Lannea schweinfurhtii*, Candelabra Tree *Cassia abbreviata*, Jackalberry *Diopspyros mespiliformes* and Tree Fuchsia *Schotia brachy-petala* along the Klaserie River which bisects the farm, and Tree Wisteria *Bolusanthus speciosus* along drainage lines. Mopane *Colophospermum mopane* occurs at low densities as shrubs in the area, but seven km to the northeast are solid stands of Mopane. The midstratum consists chiefly of several raisin bushes *Grewia* spp., Sickle Bush *Dichrostachys cinerea*, gwarries *Euclea* spp. and Poison Grubwood *Commiphora africana*.

The grasses are sweetveld (Van Oudts-hoorn 1992): Buffalo Grass *Panicum maximum*, Natal Redtop *Melinis repens*, *Eragrostis curvula* and Love Grass *E. superba*, finger grasses *Digitaria* spp. and Herringbone Grass *Pogonarthria squarrosa*, with steekgras/bristle grasses *Aristida* spp. in overgrazed areas. Above average rainfall had fallen late in the season and the veld was in

excellent condition with good grass cover. Rainfall for the area averages 500 mm per year. The Klaserie River was flowing strongly after a dry period of about four months, during which it consisted only of pools.

Dundee Farm is undulating and lies at an altitude of c.300 m. The area is scattered with rocky outcrops of quartz in which mica commonly occurs. The town of Mica lies to the northwest. Our property has only one artificial waterhole, a cattle trough mounted below ground level in front of the homestead, the trough being an artefact of the previous generation of Bernitzes who wished to view game from the stoop. The Klaserie River bisects the property and renders the eastern portion inaccessible when the river is at high levels, as was the case at the time of the visit.

The breeding colony of queleas covered an area of at least 1 km by 0.5 km, and probably extended further east onto the adjacent farm, but that area is not accessible by road and was therefore not surveyed. The coordinates of the ringing site were 2407S 3108E. Nests were almost entirely in Knobthorn *Acacia nigrescens* trees, especially in the smaller trees up to 3 m tall, with a few *Terminalia prunoides* also utilized. Every single Knobthorn was utilized, and a count yielded 84–130 nests per tree. Not all nests were active, and especially on the periphery of the colony, many trees contained incomplete nests consisting of only an opening ring.

Table 1. Age and sex of Red-billed Queleas caught.

Breeding males	Breeding females	Immatures
113	153	167

Most nestlings that could be seen peeping or hanging from the nests were at the same stage of development, with primaries all in Moulting Stage 2. This represents an age of five days which is the ideal age for ringing (C. Elliott pers. comm.).

No nestlings were ringed, however, as the abundance of adults made extracting nestlings from nests in thorny trees unnecessary. Also, mortality of first year birds is known to be high (Fry 1980), so the investment of ringing adult birds made more sense. The area below the trees was liberally scattered with empty egg shells (very pale blue, 19 × 13 mm) and the odd addled egg. The whole area was pervaded by a pungent odour not unlike that of Bird Island, Lambert's Bay, which could be ascribed to the accumulation of faeces all over the foliage of the trees and the underlying grasses. The nutrient value of the droppings to the vegetation must be substantial.

It was conspicuous that not a single dead nestling was found below the nests, despite considerable searching. This probably indicates high levels of predation by small carnivores and scavengers. Only one raptor was consistently present in the area, a Wahlberg's Eagle *Aquila wahlbergi* (cf. Biggs 2001). The breeding colony was within 500 m of a known Wahlberg's Eagle nest site, but this late in the season there was no evidence of breeding, with only the single bird seen.

The nest of the Red-billed Quelea is oval in shape, approximately 110 × 90 mm, with a large opening that is partially covered by a "porch". The nests are woven from grass and are unlined.

The huge concentration of nests in the breeding colony meant that there was a con-

Table 2. Distribution of facial mask colours of the Red-billed Quelea breeding males caught.

Black/red	Black/yellow	Cream/red	Cream/yellow
61	41	6	5

tinuous flow of parent birds to and from the area. Three mist nets between trees caught birds consistently throughout the day at a fixed rate, c. eight birds per clearance from net one (12 m), three birds per clearance at net two (9 m) and two birds per clearance at net three (12 m). Time of day did not influence the catch rate. A total of 433 birds were caught in three sessions. See Table 1 for the spread of age and sex.

Any bird with a horn-coloured bill (or partly so) was considered to be immature. It was noted that each and every individual with a yellow/pale yellow bill had a well-developed brood patch. See Table 2 for the ratio of facial mask colours in the breeding males.

Not a single bird was found in moult. Only one bird was retrapped immediately after release when it flew directly back into the mistnet, and only one non-target species, a Laughing Dove *Streptopelia senegalensis*, was caught. The only reason that more birds were not ringed was because of exhaustion of our ring supplies – who could have anticipated such a phenomenon?!

This was truly a remarkable highlight of a fantastic holiday.

Postscript

On a subsequent visit to the site of the breeding colony, 11 weeks later on 29 June, all that remained were signs of disintegrating nests in the trees (mainly only opening rings), a mass of collapsed nest material below the trees and some eggshells. This represents the perfect calcium-enriched mulch.

Subsequently we came across two other spent quelea colonies within the KPNR, one smaller than ours, and another much bigger.

The three colonies were roughly in the position of the corners of an equilateral triangle, with sides of about seven km.

Red-billed Queleas caught by mistnet in the riverbed, on the second visit, confirmed the presence of a complete post-juvenile moult as described by Jones et al. (2001).

Biggs D. 2001. Observations of eagle congregations at a Redbilled Quelea colony in the Kruger National Park. *Bird Numbers* 10(1): 25–28.

Bornman H. 1995. Klaserie Private Nature Reserve. K.P.N.R., Hoedspruit.

Harrison J.A., Allan D.A., Underhill L.G., Herremans M., Tree A.J., Parker V. &

Brown C.J. (eds) 1997. The atlas of southern African birds. Vol. 1. BirdLife South Africa, Johannesburg.

Van Wyk P. 1979. Trees of the Kruger National Park. Vol. 1. Purnell, Cape Town.

Van Oudtshoorn F. 1992. Guide to grasses of South Africa. Briza, Arcadia.

Fry C. H. 1980. Survival and longevity among tropical land birds. Proceedings of the IV Pan-African Ornithological Congress. pp. 454–458.

Jones P.J., Elliott C.C.H. & Cheke R.A. 2001. Methods for ageing juvenile Red-billed Queleas *Quelea quelea*, and their potential for the detection of juvenile dispersal patterns. *Ostrich* 72(3&4): 43–48.

Sixty-five years of Blacksmith Plovers in the Western Cape

L.G. Underhill

ADU, UCT, Rondebosch 7701

On 26 September 1939, a klinking call alerted Professor Gerry Broekhuysen to the presence of a single Blacksmith Plover at Zeekoevlei, near the club house of the yacht club. Thus 26 September 2004 is the 65th anniversary of the first sighting of the Blacksmith Plover in the Western Cape.

Gerry Broekhuysen's bird had disappeared by the following day. This was one of the first records of this species anywhere south of the Orange River. In a large collection of bird data for the Western Cape, compiled between 1982 and 1986, the Blacksmith Plover was the eighth most frequently encountered bird species. Its metallic "klink klink klink" is one of the characteristic bird calls of open places in the Western Cape. So, it is hard to believe that this species was encountered in this area for the first time in 1939.

It was next seen seven years later, in October 1946, in Milnerton, and in the following year the first nest was found, at Eerstevier on the Cape Flats, on 29 August 1947. Gerry Broekhuysen and Jack MacLeod, who reported this first nest, commented: "As the

species has now been found breeding it is very likely that it will stay and that its numbers for the neighbourhood of Cape Town will gradually increase. It will be interesting to follow the future behaviour of this species." Their prediction of a gradual increase was certainly correct, but it is unlikely that they could have envisaged that, within 40 years, it would increase to become the eighth most frequently encountered species in the region!

About 10 years after the first breeding record, Professor K.R.L. Hall undertook a review of the records of Blacksmith Plover in the region. All the early records were from vleis. He estimated that the maximum number in 1958 in the greater Cape Town area was 150 birds. At this time, regular counts of waterbirds were being made at most of the vleis in the region, and he was confident that "no large flock is likely to have been overlooked in 1958, the bird being so conspicuous both in plumage and call-notes."

Hall has a graph showing the number of nests recorded in the vicinity of Cape Town each year. Until 1954, no more than three

nests were found in a year. In both 1955 and 1956, five nests were found. In 1957 the count was eight, with a sharp increase to 21 recorded nests in 1958. Hall argued that the increase cannot be argued away as simply a consequence of better observers, but was a genuine increase. For example, the number of nests at the Athlone Sewage Works, a site that had been carefully watched, doubled in 1958 from the total for the previous three years. So it seems that 1958 was an important year in the evolution of the population in the Western Cape.

From 1958 onwards, the rapid range expansion and remarkable increase in abundance of the Blacksmith Plover in the Western Cape are incredibly poorly documented. We have no insight into how the Blacksmith Plover went from 150 birds in 1958 to being present on 69% of the 9300 birdlists submitted for the bird atlas project of the Cape Bird Club in the mid-1980s. The nest record cards, the bird ringing files, and other databases curated at the Avian Demography Unit will be the best starting point for doing this detective work. At some point in this period, the Blacksmith Plover discovered it was not limited to damp habitats such as the vleis to which it was initially confined in the Western Cape. It moved into relatively dry habi-

tats such as sports fields, golf courses and pastures, which were traditionally owned by Crowned Plovers. It is quite likely that Crowned Plovers are being quietly (or not so quietly!) ousted from these places by Blacksmith Plovers.

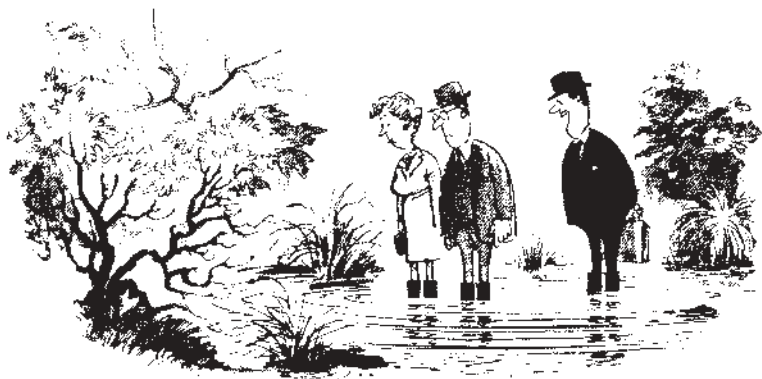
The 65th anniversary of the arrival of the Blacksmith Plover to the Cape Peninsula provides a reminder that bird distributions are not static, but are on the move. There is a continuous need to monitor bird populations, and to monitor as many species as possible, because the nature and direction of changes are unpredictable, as are the interactions between species.

Broekhuysen G.J. 1942. Two rare plovers recorded from the neighbourhood of Cape Town. *Ostrich* 13: 44–47.

Broekhuysen G.J. & MacLeod J.G.R. 1948. Breeding record of the Blacksmith Plover *Hoplopterus armatus* for the neighbourhood of Cape Town. *Ostrich* 19: 237–239.

Hall K.R.L. 1959. A study of the Blacksmith Plover *Hoplopterus armatus* in the Cape Town area: I. Distribution and breeding data. *Ostrich* 30: 117–126.

Hockey P.A.R., Underhill L.G., Netherway M. & Ryan P.G. 1989. Atlas of birds of the southwestern Cape. Cape Bird Club, Cape Town.



“If you can get building permission it will be worth a fortune.”

First record of Tree Pipit in western South Africa

Claire Spottiswoode¹ & Frank R. Lambert²

¹Dept of Zoology, University of Cambridge, Downing Street, Cambridge, CB2 3EJ, U.K.; ²c/o 64 Eldred Avenue, Brighton BN1 5GE, U.K.

The Tree Pipit *Anthus trivialis* is a Palearctic-breeding migrant to the Afrotropics. In southern Africa, it is a sparse summer visitor, most regularly to the highlands and plateau of Zimbabwe, but also scarcely to Botswana and Limpopo province, South Africa. In these regions it favours broadleaved woodland, forest edge, plantations and particularly hillsides (Irwin 1981; Clancey 1997). In South Africa, it has never been recorded west of about 27°E, or south of 25°S (Clancey 1997).

On 25 November 2002, FRL noticed two unusual pipits on Dronfield Farm (28°38'S 24°50'E, c.1200 m a.s.l.), 10 km north of Kimberley, Northern Cape Province. The habitat here is primarily open Umbrella Thorn *Acacia tortilis* and Camelthorn *A. erioloba* savannah, punctuated by dolerite hills. The pipits were perched within *A. tortilis* thicket growing on a disused dam wall constructed from rocks. They were foraging close to each other on the rocks below the trees, and occasionally perched quietly in the tree canopy. They gave several soft "dzeep" calls, but responded to playback of neither Tree nor Striped Pipit *Anthus lineiventris* songs. CS collected one of the birds, a female, and the specimen was deposited at the McGregor Museum, Kimberley (accession number MMK/B/2581).

Examination of the specimen confirmed the birds' identity. The face was buff with a paler supercilium and a diffuse, black malar stripe. The throat was buff and the underparts from breast to vent were white, with heavy

black streaking on the breast and narrow black streaking on the flanks. The mantle and upperparts were olive-brown with conspicuously darker brown streaks, and the rump was diffusely streaked. The tail was olive-brown except for white outer tail feathers. The legs and base of bill were pale pink. Measurements were: wing 82 mm, tail 57 mm, tarsus 22.4 mm, and mass 21.0 g. These are all within the ranges reported for females by Keith et al. (1992). Digital photographs are available from CS on request.

November is the main southward passage period of Tree Pipits in southcentral Africa (Keith et al. 1992), so vagrants at this time would not be unexpected. The presence of two birds together, as well as their 'dzeep' calls and behaviour of foraging on the ground and perching on low branches, is typical of Tree Pipits on their non-breeding grounds (Keith et al. 1992).

We thank the late Richard Liversidge for coming to Dronfield to examine the birds, and Angus Anthony and Mark Anderson for permission to work on Dronfield and collect the specimen.

Clancey P.A. 1997. Tree Pipit *Anthus trivialis*. In: Harrison J.A., Allan D.G., Underhill L.G., Herremans M., Tree A.J., Parker V., Brown C.J. (eds). The atlas of southern African birds. Vol 2: Passerines. BirdLife South Africa, Johannesburg.

Irwin M.P.S. 1981. The birds of Zimbabwe. Quest Publishing, Salisbury.

Keith S., Urban E.K. & Fry C.H. 1992. The birds of Africa: Vol IV. Academic Press, London.

New records and seasonality of Wedge-tailed Shearwaters off the southern African coast

Vincent L. Ward

Western Cape Nature Conservation Board & ADU, UCT, Rondebosch 7701

Wedge-tailed Shearwaters *Puffinus pacificus* breed on islands in the tropical Indo-Pacific region and disperse widely during the non-breeding and post-fledging periods (Marchant & Higgins 1990). At island groups in the southwestern Indian Ocean, breeding has been recorded on islets off Madagascar (October–March), and in the Mascarenes (September–March), Cargados Carajos Shoals (December–January), Amirante, Chagos and at the Seychelles (August–February). The regional breeding season is therefore from

August to March, with peak activity in December and January (Newton 1958; Appert 1965; Temple 1976; Diamond 1987; Skerret et al. 2001).

This species is considered a rare vagrant off the southern Mozambique and South African coasts (Sinclair 1978; Batchelor 1980; Clancey 1996; Ryan 1997). This note reports on two new records and discusses the seasonality of occurrence of Wedge-tailed Shearwaters in southern African waters.

Table 1. Wedge-tailed Shearwater *Puffinus pacificus* records from southern Africa.

Date	Locality	Comments & source
Breeding season		
14/08/1975	Umhlanga Rocks (29°35'S 31°05'E)	One bird. Sinclair (1978)
24/08/1979*	Port Alfred (33°29'S 26°56'E)	Two birds. Anon (1979)
28/08/1979*	Port Alfred (33°29'S 26°56'E)	One bird. Anon (1979)
22/09/1974	Mozambique Channel (26°18'S, 34°06'E)	Eight birds. Sinclair (1978)
18/09/1979	Bird Island, Algoa Bay (33°50'S 26°18'E)	Photographed and measured. Batchelor (1980)
6/12/1979	Bird Island, Algoa Bay (33°50'S 26°18'E)	Flying 100 m east of the island. Batchelor (1980)
11/12/1996	Bird Island, Algoa Bay (33°50'S 26°18'E)	Flying 150 m north of the island. This paper
30/12/1993	Riet River/Black Rock (33°33'S 27°02'E)	Beached bird. Specimen in East London Museum. Macleod (1994)
20/01/1980	Bird Island, Algoa Bay (33°50'S 26°18'E)	Flew over gannet colony. Batchelor (1980)
Post breeding period		
21/05/1996	Agulhas Bank (37°00'S 25°46'E)	First record of pale morph in southern Africa. Hockey et al. (1998)
May 2000	Plettenberg Bay (34°03'S 23°23'E)	Beached individual; sent to SANCCOB. This paper
9/07/1978*	Port Alfred (33°29'S 26°56'E)	Two birds. Boddam-Whetham (1978)
29/07/1978*	Port Alfred (33°29'S 26°56'E)	One bird. Boddam-Whetham (1978)

* Records are considered equivocal

New records

A single dark morph was sighted flying approximately 100 m north of Bird Island, Algoa Bay, on 11 December 1996. The sighting occurred while tropical cyclone Daniella was present in the Mozambique Channel.

A stranded dark morph was collected along the coast near Plettenberg Bay and admitted to SANCCOB (Southern African Foundation for the Conservation of Coastal Birds) rehabilitation centre in Cape Town on 14 May 2000. The bird was later euthanased and the specimen was subsequently lost.

Seasonality

There are 13 published sightings of Wedgetailed Shearwaters in southern African waters from both the breeding season and post-breeding period (Table 1). The four records published by Boddam-Whetham (1978) and Anon (1979) are not accompanied by any supportive descriptions and are therefore considered equivocal.

Records in the breeding season are possibly attributable to tropical weather systems that force some individuals outside of their usual range. The southwestern Indian Ocean is dominated by two meteorological phenomena during the austral summer: strong easterly winds, south of 15°S, and periodic tropical disturbances ranging from atmospheric pressure depressions to cyclones (Parker & Jury 1999). The 1993 and 1996 sightings were associated with tropical disturbances in the Mozambique Channel: TC 9311 and Cyclone Daniella, respectively. Strong tropical weather systems were present in the oceanic region east and south of Madagascar before, and concurrent with, the 1975 and 1979/1980 sightings (data from Mauritius and South African weather services).

The post-breeding season records are presumably examples of birds dispersing south of their regular range and into southern African waters.

Acknowledgments

Thanks to Tony Williams, Les Underhill, Marianne de Villiers and Peter Ryan for comments on earlier drafts.

- Anon. 1979.** More observations by Ronnie Samuels on seabirds. *Dias Diary* 76: 6–8.
- Appert O. 1965.** Decouverte de la nidification de *Puffinus pacificus* (Gmelin) pres de la cote de Madagascar. *L'Oiseau* 35: 135–139.
- Batchelor A.L. 1980.** Records of the Wedgetailed Shearwater *Puffinus pacificus* in southern African waters. *Cormorant* 8: 11–14.
- Boddam-Whetham D. 1978.** Oceanic birds. *Dias Diary* 62: 8–10.
- Clancey P.A. 1996.** The birds of southern Mozambique. African Bird Book Publishing, Durban.
- Diamond A.W. 1987.** Studies of Mascarene island birds. Cambridge University Press, Cambridge.
- Hockey P.A.R. & the rarities committee. 1998.** Eleventh report of the Birdlife South Africa Rarities Committee. *Africa – Birds and Birding* 3: 66–69.
- Marchant S. & Higgins P.J. 1990.** Handbook of Australian, New Zealand and Antarctic birds. Vol. 1. Part A: Ratites to petrels. Oxford University Press, Melbourne.
- Macleod S. 1994.** Recent reports. *Bee-eater* 45: 31.
- Newton R. 1958.** Ornithological notes on Mauritius and the Cargados Carajos Archipelago. *Proceedings of the Society of Arts and Sciences of Mauritius*. 2: 39–71.
- Parker B.A. & Jury M.R. 1999.** Synoptic environment of composite tropical cyclones in the south-west Indian Ocean. *South African Journal of Marine Science* 21: 99–115.
- Ryan P.G. 1997.** Wedgetailed Shearwater *Puffinus pacificus*. In Harrison J.A., Allan D.A., Underhill L.G., Herremans M., Tree A.J., Parker V. & Brown C.J. (eds). *The atlas of southern African birds*. Vol. 1: Non-passerines. BirdLife South Africa, Johannesburg.
- Sinclair J.C. 1978.** Sight records of the Wedgetailed Shearwater off southern Africa. *Ostrich* 49: 46.
- Skerret A., Bullock I. & Disley T. 2001.** *Birds of the Seychelles*. London: Christopher Helm.
- Temple S.A. 1976.** Observations of seabirds and shorebirds on Mauritius. *Ostrich* 47: 117–125.

Helping conserve albatrosses and petrels at sea: towards the creation of a marine protected area around South Africa's sub-antarctic Prince Edward Islands

J. Cooper¹, T. Akkers², R.J.M. Crawford² & D.C. Nel³

¹ADU, UCT, Rondebosch 7701; jcooper@adu.uct.ac.za

²Marine & Coastal Management, Dept of Environmental Affairs & Tourism,
P. Bag X2, Roggebaai 8012

³Marine Programme, WWF South Africa, P. Bag X2, Die Boord 7613

Introduction

South Africa's sub-Antarctic Prince Edward Islands in the southern Indian Ocean are its only overseas possession. The islands (Marion and Prince Edward) have been managed as a Special Nature Reserve since 3 November 1995 in terms of Section 18 of South Africa's Environment Conservation Act (Act No. 73 of 1989). The boundaries of the reserve were then set at low-water mark.

Currently, no conservation legislation has been extended to either the territorial waters (out to 12 nautical miles) or to the 200-nautical mile Exclusive Economic Zone (EEZ) surrounding the islands. However, no fishing activities are allowed within eight nautical miles of the island in order to reduce the incidental mortality of procellariiform seabirds by longline fishing. Additionally, fishing activities by South African vessels in waters surrounding the islands in the main abide with the various regulations and guidelines adopted by CCAMLR.

The National Environmental Management Protected Areas Act (Act No. 57 of 2003; NEMPA) allows for the continued proclamation of Special Nature Reserves, and as well as applying to territorial waters "also applies to the exclusive economic zone and continental shelf of the Republic" as defined in the Maritime Zones Act (Act No. 15 of 1994). A Marine Protected Area (MPA) as defined by the Marine Living Resources Act (Act No. 18 of 1998) may be included in a Special Nature Reserve, which must then be "managed and regulated as part

of the special nature reserve", as set out in the National Environmental Management Protected Areas Amendment Bill (B2 of 2004). NEMPA applies to the Prince Edward Islands, which are specifically named in the Act. Marine Protected Areas as defined in terms of the Marine Living Resources Act may be created for several purposes, including protection of flora and fauna and to facilitate fishery management. However, in terms of NEMPA, fishing is not an activity that would be allowed within a Special Nature Reserve.

A management plan for the islands was adopted in 1996 which allowed for the establishment of the Prince Edward Islands Management Committee (PEIMC), which advises the South African National Antarctic Programme (SANAP) of the Department of Environmental Affairs and Tourism (DEAT) on environmental matters. At its 14th Meeting, in August 2002, the PEIMC considered a verbal proposal for an expansion of the Special Nature Reserve to include territorial waters, and requested that a short document be prepared for further discussion at its next meeting. A written document was produced for the 15th meeting of the PEIMC, held in January 2003, when the committee endorsed the proposal and requested that the matter be discussed within governmental structures to ascertain a way forward.

On 28 July 2004 the Minister of Environmental Affairs and Tourism, Mr Marthinus van Schalkwyk, announced at a function to receive a WWF "Gift to the Earth" Award on behalf of the South African Government the

“firm intention to proclaim a major new MPA in the waters around the Prince Edward and Marion Islands which will effectively become one of the largest marine protected areas in the world”. He further noted that the first step in this process was likely to be the extension of the no-fishing zone around the island from eight to 12 nautical miles. His statement makes it clear that these intentions are to help combat Illegal, Unreported and Unregulated (IUU) fishing in the Southern Ocean, noting that new environmental patrol vessels and international co-operation with Australia and France through bilateral negotiations would strengthen South Africa’s ability to police its sub-Antarctic waters.

It is proposed that the territorial waters surrounding the Prince Edward Islands should be included as a Marine Protected Area within an expanded Special Nature Reserve, thus affording them the maximum level of environmental protection under South African legislation. However, to allow for the continuation of regulated fishing, a Marine Protected Area within the EEZ will need to fall outside this Special Nature Reserve. It would be zoned to allow for regulated activities in defined areas, whereas other zones would be fully protected as no-fishing areas.

Advantages of marine protected areas around the Prince Edward islands

An “inshore” Marine Protected Area within territorial waters

Currently the Special Nature Reserve is made up of two islands, 19 km apart. Expansion of the reserve’s boundary to 12 nautical miles will greatly increase the area of South Africa’s only Special Nature Reserve and will create a single geographical entity, offering full legal protection to the shallow waters (<300 m) linking the two islands.

Fishing has never been allowed between the two islands, although passage for South African-flagged vessels is allowed. Further, longline fishing has not been permitted within eight nautical miles of the islands

since 1 December 2001 (not within five nautical miles since 1997). An expansion of this no-fishing zone to all of the territorial waters around the island will offer further protection to the affected bird species (five species of albatrosses, and four large petrels of the genera *Macronectes* and *Procellaria*), nearly all of which are considered globally threatened by the World Conservation Union, and all of which are listed in Annex 1 of the Agreement on the Conservation of Albatrosses and Petrels (ACAP). However, the South African legally-fishing vessels are to be commended for their efforts in minimizing the incidental mortality of birds in recent years.

Enhanced legal protection will be extended to those inshore-foraging bird species, including the Imperial Cormorant *Phalacrocorax [atriceps] melanogenis*, Antarctic *Sterna vittata* and Kerguelen *S. virgata* Terns and Gentoo *Pygoscelis papua* and Eastern Rockhopper *Eudyptes chrysocome filholi* Penguins whose numbers are decreasing at the islands, and of which several species are listed as globally threatened by the World Conservation Union. These decreases are thought due to environmental changes affecting food availability.

An expanded Special Nature Reserve will greatly increase the number of legally protected species within its boundaries, including a large suite of benthic marine species that have been studied to varying degrees. Several of these species represent important prey for birds and seals breeding on the islands.

An expanded Special Nature Reserve with a large marine component will enhance the value of the island group as a Wetland of International Importance in terms of the Ramsar Convention. A proposal to nominate the Prince Edward Islands as Ramsar site has been endorsed by the PEIMC and is currently under review by DEAT.

An expanded Special Nature Reserve will strengthen South Africa’s World Heritage Site draft nomination text for the Prince Edward Islands, which includes territorial waters. This will match other World Heritage

island sites in the Southern Ocean, which all include territorial waters.

Congruity will be reached with a number of other island nature reserves in the Southern Ocean which extend to 12 nautical miles from shore. These include Gough and Inaccessible (UK), Heard and McDonald and Macquarie (Australia) and the Auckland Islands (New Zealand).

Lastly, the soon-to-be expanded capability of South Africa to protect its marine waters with the provision of new environmental patrol vessels with powers of seizure and arrest will allow for the more effective protection and management of the territorial waters around the Prince Edward Islands, making the declaration of an expanded Special Nature Reserve a more practical option.

An "offshore" Marine Protected Area within the Exclusive Economic Zone

A Marine Protected Area proclaimed within the EEZ of the Prince Edward Islands will hugely expand the area of sea surrounding the islands that is legally protected. It will represent South Africa's largest, and one of the world's largest, MPAs.

Control of both legal and IUU longline fishing will be enhanced, by way of regular patrols and by the adoption of regulations and imposition of penalties for infringements.

Legal protection at sea will be extended to a larger suite of foraging seals and seabirds breeding at the Prince Edward Islands, including the more offshore foraging Macaroni Penguin *E. chrysolophus*, the mollymawk albatrosses of the genus *Thalassarche* and the White-chinned Petrel *Procellaria aequinoctialis*, all globally threatened species.

Legal protection will be extended to benthic and pelagic marine species of deep (>4500-m) waters and on at least three sea mounts which rise to within 200 m of the surface, many species of which are very little known and some of which may be of poten-

tial commercial importance. It is most likely that many species are yet to be discovered as occurring within the EEZ, given the paucity of biological studies in the region that have been undertaken to date.

A South African Marine Protected Area within its sub-Antarctic EEZ will match and complement the two Marine Parks (equivalent to MPAs) recently declared by Australia in the EEZs of its sub-Antarctic islands.

A biodiversity spatial assessment and conservation strategy

Before an informed decision can be taken on how best Marine Protected Areas should be proclaimed around the Prince Edward Islands, a comprehensive review of the biotic and abiotic environment needs to be conducted. This biodiversity spatial assessment would include, *inter alia*, descriptions of physical and chemical oceanographic conditions, lists of biota known to occur within both territorial and EEZ waters, where possible descriptions of pelagic and benthic ecosystems, and a description and history of the legal and illegal fisheries for Patagonian Toothfish *Dissostichus eleginoides*.

In consultation with the various stakeholders, the Department of Environmental Affairs and Tourism will develop conservation strategies for both territorial and EEZ waters. It is considered that a conservation strategy for the proposed territorial waters' MPA should form part of a planned revision of the Islands' management plan on behalf of the PEIMC.

Furthermore, it is the intention of DEAT to conduct biodiversity surveys of the EEZ during 2006 and 2007. South Africa welcomes expressions of interest for international collaboration on these research cruises. They will also contribute to various Southern Ocean and Antarctic research initiatives forming part of the International Polar Year of 2007/08.

To the end of the world and back: Fifth International Penguin Conference, Ushuaia, Argentina

Jenny Griffin

ADU, UCT, Rondebosch 7701

On 12 September 2004, an unusual biological migration was observed, a phenomenon that only occurs once every four years. This was the fifth migration of such magnitude ever witnessed, as penguin biologists from many different countries from all the continents of the world migrated to Ushuaia, Argentina, and congregated for the Fifth International Penguin Conference.

Surrounded by snow-capped mountains, Ushuaia (see map) is situated on the island of Tierra del Fuego, at the southern tip of Argentina. It is located in a sheltered bay on the Beagle Channel and is the port of departure for passenger liners cruising to Antarctica. As the southern-most city in the world, it is also fondly referred to by locals, and marketed to wealthy cruise liner tourists, as the 'town at the end of the world'.

This migration to the end of the world included a party of ten South African scientists, conservationists and students, including representatives from the Avian Demography Unit, University of Port Elizabeth, Marine and Coastal Management, CapeNature, Rob-

ben Island Museum, SANCCOB, and Bird-Life SA.

The conference included oral sessions on feeding ecology, behaviour, breeding ecology, population dynamics and genetics, physiology, captivity and health, flipper banding, human disturbance, oil pollution, conservation – including presentations on large scale and international initiatives – as well as a sociable poster session where advice and ideas were shared and discussed.

The presentations were varied and interesting, with lots of positive stories. However, the negative effects of global warming on breeding penguins were clearly apparent in many talks and posters. These included issues of decreased productivity (and thus decreased food availability to sustain adult fitness and provision chicks); increased heat stress due to higher temperatures causing nest failure by abandonment; physical barriers formed by ice shelves that have broken away cutting off breeding areas from foraging areas; and adult mortality due to the physical impact of drifting ice crashing into breeding areas and crushing incubating penguins.

The flipper banding issue was still as contentious as ever, but the general consensus was that alternatives should be investigated that would alleviate or at least minimize the detrimental effects of banding. It was suggested that flipper banding should only be conducted for purposeful studies and not for 'ring and fling' mark-recapture studies, and where large cohort-type marking was necessary (e.g., fledglings marked in a season or rehabilitated birds following an oil spill) then perhaps colour marking (e.g., foot web-tags, tattooing, dye marking) could be used. Peter Barham of the University of Bristol, and an associate of the ADU, who has developed a new plastic flipper band currently being



tested on African Penguins on Robben Island, gave an interesting and thought-provoking presentation on using individual chest markings of certain species of penguins for identification, with the aid of digital photography and computer technology. Although this would not be suitable for all penguin species and for all research applications, with some refinement this work could have great potential at weighbridges and points of mass entry and exit at a colony.

The urgency of the situation for penguins and the need to take advantage of the presence of so many penguin biologists in one place, led to a two-day workshop following the conference to prioritise threats for each species, and to suggest future research and conservation priorities for all penguin species. The aim of this collaborative workshop, hosted by British Antarctic Survey, the University of Washington, Conservation International, Birdlife International, Conservation Breeding Specialist Group of IUCN/SSC, and sponsored by Sea World and the New England Aquarium, was to (a) review the 2004 Red List fact sheets for penguins; (b) review and update the 1998 Conservation

Assessment and Management Plan document for all penguin species; and (c) chart a future path for penguin conservation initiatives. From the feedback, it was evident that the top conservation issue for all species was threats to food availability by over-fishing and climate change. Thus, the top conservation priority involves fisheries management as well as the introduction of marine protected areas in penguin foraging areas.

Although the only penguin sightings were the backs of two miserable Gentoo Penguins huddled in a blizzard, and the rear end of one Magellanic Penguin as it dived underwater to escape the excited horde of curious biologists eager to get a glimpse of their first South American *Spheniscus* penguin, all in all it was a productive meeting, in a truly magical setting.

And now I can honestly declare that penguin biologists will indeed go to the end of the world and back for the sake of their beloved penguins!

Acknowledgements

Earthwatch and the Darwin Initiative supported my attendance of the conference.

Forktailed Drongo gleaning on Eland

Craig Symes & Greg Davies

School of Botany and Zoology, University of Natal, P/Bag X01, Scottsville 3209; ctsymes@lycos.co.uk

Roche & Kilpin (2003) reported a new record of gleaning by the Yellowspotted Nicator *Nicator gularis*. In addition, they reviewed other cases of gleaning by birds on large mammals, in particular those not reported to regularly do so.

On 8 August 2003, while conducting fieldwork in the Giants Castle Nature Reserve, KwaZulu-Natal, we observed a herd of six Eland *Taurotragus oryx* feeding in grassland on the edge of a *Leucosidea sericea* thicket. At 11:25, a single Forktailed Drongo

Dicrurus adsimilis was observed hawking over and behind the slow-moving herd. On one occasion, the drongo landed on an Eland's tail and appeared to glean and feed. The eland appeared to attempt to wag its tail but the drongo remained attached. Unfortunately, the Eland herd moved off and we were unable to observe for a longer period.

Roche C. & Kilpin A. 2003. New record of gleaning by the Yellowspotted Nicator. *Bird Numbers* 12(1): 18–19.

Breeding data on the Water Thicknee in the Mpenjati Nature Reserve

Richard Dobson

CBISA Museum, Ramsgate 4285, KwaZulu-Natal

Breeding data for the Water Thicknee *Burhinus vermiculatus* currently consists of descriptions of the nest, nesting site, clutch size, and data on the eggs, with some data on the incubation period, but no information on fledging. On the KwaZulu-Natal south coast, this species breeds from August to February.

To gather accurate data on incubation and fledging, observations were made over three breeding seasons from August 2001 to April 2004, in the Mpenjati Nature Reserve (30°56'S, 30°18'E; 66 ha). The reserve is controlled by the Kwa-Zulu Nature Conser-

vation Service and is situated 20 km south of Margate. It is a small coastal reserve, with the main feature being the Impenjati River estuary. It is one of the very few remaining undeveloped estuaries on the KwaZulu-Natal south coast.

The reserve includes grassland, forest, wetland, dune and estuarine habitats. Grassland and forest are dominant. The forest is divided into coastal and dune forest. The coastal grasslands are intersected by numerous wetlands. Management actions include the control of alien invasive vegetation and two-yearly burning of the grasslands. Bird-life in the reserve is abundant, with over 250 species recorded. The Water Thicknee population at Mpenjati is healthy, with up to 34 birds counted in a single night.

At this site, Water Thicknees bred more than once in a season; several pairs successfully raised two clutches. All the nests were located by observing adult behavior, and were found during nest preparation and egg-laying phases. The locations of all nests were recorded using a GPS, and marked with small coloured pegs which were placed 1 m from the nest. The presence of the pegs had no effect on nesting activity and were easily accepted.

Incubation commenced within a day of laying of the last egg. The fledging period was taken from the day of hatching to the first flight. All nests were monitored until hatching occurred. As soon as each chick hatched, the adults flew off with the eggshells. As the chicks are precocial, they leave the nest as soon as they are able after hatching, normally within 24 hours. The young chicks are mobile, but they are not capable of catching and handling prey. The parents feed them up to about a week before fledging. The chicks evade predators by hiding and crouch-

Table 1. Fledging data for the Water Thicknee at Mpenjati Nature Reserve over three breeding seasons: August 2001 to April 2004.

Nest no.	Hatch date	Fledging date	Days to fledging
01/2001	27/01/01	29/03/01	62
02/2001	06/02/01	07/04/01	60
01/2002	30/01/02	30/03/02	60
02/2002	01/02/02	02/04/02	61
03/2002	08/02/02	08/04/02	60
04/2002	16/02/02	17/04/02	61
05/2002	03/11/02	02/01/03	61
06/2002	11/11/02	11/01/03	62
07/2002	18/11/02	19/01/03	63
01/2003	28/08/03	27/10/03	61
02/2003	07/09/03	07/11/03	62
03/2003	19/09/03	17/11/03	60
04/2003	27/10/03	25/12/03	60
05/2003	05/11/03	04/01/04	61
06/2003	26/11/03	27/01/04	63
07/2003	12/12/03	10/02/04	61
08/2003	09/01/04	09/03/04	61
09/2003	27/01/04	27/03/04	60
10/2003	04/02/04	03/04/04	61
Mean			61.1

ing motionless in grass or undergrowth on the edge of thickets or coastal forest, depending wholly on camouflage.

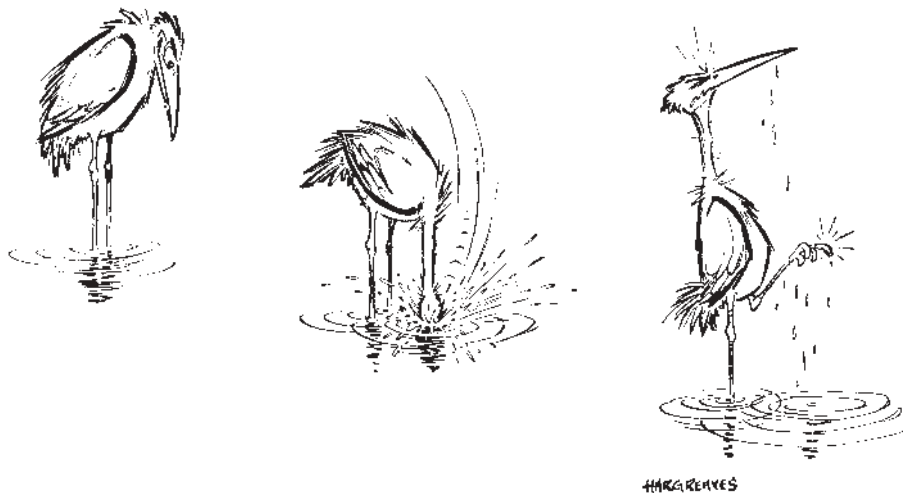
During the three breeding seasons, 27 nests were located and observed. Of these, 19 were successful breeding attempts. The others were failures due to nests destroyed by humans and eggs eaten by Water Monitors *Varanus niloticus*. In one instance, a nest was flooded by a rise in water level in the estuary. (The estuary filled with rainwater from inland and did not breach.)

All nests were small, shallow depressions in the ground, measuring 135–155 mm in diameter, and 15–20 mm in depth. The rims of the nests were lined with small pebbles and bits of plant matter. The nests were constructed by both adults. During incubation, it was noted that, when one of the adults approached the nest, it would stand motionless for a long period after its mate had got off the nest. It would occasionally preen itself and bob its head several times. On its final approach, it squatted down momentarily in

the incubating posture about one metre from the nest, bend down as if examining the eggs, and then proceed to incubate at the nest.

On hot days, incubating birds were observed sitting on the nest with beak open and wings slightly spread. The mate was more often than not observed standing in the shade some distance from the nest. It was interesting to note that both adults incubated the eggs during daylight hours; however the female always sat on the nest from last light until first light.

At Mpenjati, this species had a high breeding success rate. When a breeding attempt failed early in the season, the adults soon set about constructing another nest, normally in the vicinity of the first. The observed fledging period was 61.1 days (range = 60–63; n = 19 broods; Table 1). After fledging, the young birds normally congregated upstream in a group, well out of the way of the breeding adults, if there was a second breeding attempt.



Publications by members of the ADU July–December 2004

Chapter in book

Williams A.J. 2004. Report from the *Treasure* workshop. In: Proceedings of the penguin workshop following the sinking of the *Treasure* in June 2000. Kuyper S. & Williams A.J. (eds). Avian Demography Unit, University of Cape Town. pp. 43–54.

Research papers

Summers R.W., Underhill L.G., Nicoll M., Strann K.-B. & Nilsen S.O. 2004. Timing and duration of moult in three populations of Purple Sandpipers *Calidris maritima* with different moult/migration patterns. *Ibis* 146: 394–403.

Williams A.J., Ward V.L. & Underhill L.G. 2004. Waders respond quickly and positively to the banning of off-road vehicles from beaches in South Africa. *Wader Study Bulletin* 104: 79–81.

Conference presentations, posters and abstracts

● **Second European Conference on Behavioural Biology (ECBB). 28–31 August 2004, Groningen, the Netherlands.**

Calf K.M., Underhill L.G. & Visser G.H. 2004. Does parental behaviour and timing of breeding season impact on chick growth and energetics? [poster].

Calf K.M., de Leeuw J., Schekkerman H., Tulp I., Underhill L.G. & Visser G.H. 2004. From hatching to fledging – an energetic perspective of Little Stint *Calidris minuta* chicks on the Taimyr Peninsula, Siberia. [poster].

Mullers R.H.E., Navarro R.A., Underhill L.G. & Visser G.H. How important is the timing of breeding in Cape Gannets? [presentation].

● **Third International Albatross and Petrel Conference. 23–27 August 2004, Montevideo, Uruguay.**
Olmos A. & Stagi A. (comp.). Abstracts.

Cooper J. & Rivera K.S. FAO IPOA-Seabirds: progress to date and a comparative analysis of existing plans. p. 75. [presentation].

De Bruyn P.J.N. & Cooper J. Between a rock and a hard place: nest-site protection and breeding success of the Northern Giant Petrel. p. 21. [poster].

De Villiers M.S., Cooper J. & Ryan P.G. Variability of behavioural responses by Wandering Albatrosses (*Diomedea exulans*) to human disturbance. p. 21. [poster].

● **Fifth International Penguin Conference. 6–10 September 2004, Ushuaia, Argentina.**

Barham P.J., Barham B.J., Underhill L.G., Crawford R.J.M., Leshoro T.M., Oschadleus H.D., Wolfaardt A.C. & Williams A.J. Impact of the *Treasure* oil spill on survival and breeding of African Penguins on Robben Island. [presentation].

Barham P.J., Crawford R.J.M. & Underhill L.G. Energy costs of steel flipper bands caused by feather wear. [poster].

Barham P.J., Crawford R.J.M., Underhill L.G., Leshoro T.M., Meyer M.A., Wolfaardt A.C., Oschadleus H.D. & Williams A.J. Resighting rates of African Penguins relocated or oiled following the *Treasure* oil spill in 2000. [poster].

Barham P.J., Underhill L.G., Crawford R.J.M., Leshoro T.M. & Bolton D. Differences in breeding success of African Penguins depending on types of flipper bands used. [presentation].

De Villiers M.S. & Giese M. Heart rate responses of incubating African Penguins to pedestrian approaches. Abstracts. p. 21.

Giese M. & De Villiers M.S. To flee or not to flee: African Penguins and people. Abstracts p. 57.

Griffin J. & Underhill L.G. Variability in nest temperature between different nest types and its implication on desertion for the African penguin (*Spheniscus demersus*).

Kemper J., Roux J.-P., Bartlett P.A., Chesselet Y.J. & Jones R. Population size, recent trends and conservation status of the African Penguin (*Spheniscus demersus*) in Namibia. [poster].

- Kemper J., Roux J.-P. & Underhill L.G. 2004.** Breeding in bins: do artificial burrows improve breeding success of African Penguins (*Spheniscus demersus*) on Halifax Island, Namibia? [presentation].
- Whittington P.A.** Is hand raising orphaned African Penguin chicks worth the effort? An assessment from the *Apollo Sea* oil spill. [presentation].
- Wolfaardt A.C., Nel D., Underhill L.G., Williams A.J.** Breeding productivity and annual cycle of rehabilitated African Penguins following oiling. [poster].
- **Seventh Herpetological Association of Africa Symposium. 6–9 October 2004, Bayworld, Port Elizabeth.**
- Harrison J.A., Alexander G.J., Baard E.H.W., Bates M., Branch W.R., Cunningham M., Erasmus B., Foden W., Friedmann Y. & A. Turner.** A proposed conservation assessment and atlas for the reptiles of South Africa, Lesotho and Swaziland.
- **Eighth International Seabird Group Conference. North Atlantic Seabird Populations. 2–4 April 2004, University of Aberdeen, UK.**
- Mullers R.H.E., Navarro R.A., Underhill L.G. & Visser G.H.** How important is the timing of breeding in Cape Gannets? [poster].
- **16th International Congress of Arachnology. 2004. Ghent, Belgium.**
- Mukherjee A., Navarro R., Underhill L.G. & Lubin Y.** First record of spider diversity and abundance: Robben Island, South Africa.
- **25th Anniversary of the Bonn Convention Workshop. Successes to date and ways forward. Migratory Species: linking Ecosystems and Disciplines. June 2004, Berlin, Germany.**
- Cooper J.** Conserving migratory marine birds with the Bonn Convention and its daughter agreements. [presentation]
- **27th Antarctic Treaty Consultative Meeting. May–June 2004, Cape Town.**
- Cooper J. & De Villiers M.[S.]** Environmental management issues at South Africa's bases in the Southern Ocean. [poster].
- **2004 Fynbos Forum. 10–13 August 2004, Langebaan.**
- Williams A.J.** Feathered fynbos fauna foiled by fragmentation, felines, fire & formality: Will specialist shrubland birds survive in the Blouberg Conservation Area? [poster].
- Williams A.J.** Hidden menaces: impacts of roads and traffic on wildlife. [poster].
- Williams A.J., Harebottle D. & Wheeler M.** How significant are waterbird populations of Cape metropol wetlands? [poster].
- Williams A.J. & Parsons N.** Outbreaks of avian cholera: are Kelp Gulls culprits? [poster].
- **Transdisciplinary symposium on recent mass die-offs of Lesser Flamingos (*Phoeniconaias minor*) in eastern and southern Africa. 24–26 September 2004, Department of Veterinary Biosciences, College of Veterinary Medicine, University of Illinois, Urbana-Champaign, Illinois.**
- Anderson M.D. & Harebottle D.M.** Distribution, population status, breeding, movements and conservation of Greater and Lesser Flamingos in South Africa.
- **Waterbirds around the World Conference. 3–8 April 2004, Edinburgh, Scotland.**
- Cooper J.** Potential impacts of marine fisheries on migratory waterbirds of the Afrotropical Region. [presentation].

ADU publications

- Cooper J. 2004.** Albatross research and conservation at South Africa's subantarctic Prince Edward Islands. Bird Numbers 13(1): 4–7.
- Du Toit M., Boere G.C., Cooper J., De Villiers M.S., Kemper J., Lenten B., Petersen S.L., Simmons R.E., Underhill L.G., Whittington P.A. & Byers O.P. 2003.** Conservation Assessment and Management Plan for southern African coastal seabirds. Avian Demography Unit & Apple Valley, Cape Town & Conservation Breeding Specialist Group.
- Harebottle D.M., Harrison J.A. & Navarro R.A. 2004.** Conservation of birds in Gauteng. Parts 1 & 2. ADU Research Report 60a & 60b. Avian Demography Unit, Cape Town.
- Harrison J.A. 2004.** Development of Arabella Golf Estate, Phase 2: Second assessment of impacts on vertebrate fauna. ADU Research Report 61. Avian Demography Unit, Cape Town.

- Harrison J.A. 2004.** Development of Arabella Golf Estate, Phase 2: A survey of the amphibians in two seasonal ponds. ADU Research Report 62. Avian Demography Unit, Cape Town.
- Harrison J.A. & Young D.J. 2004.** CAR Information Sheet No. 1: How to count. ADU, Cape Town.
- Harrison J.A. & Young D.J. 2004.** CAR Information Sheet No. 4: Filling in the roadcount form. ADU, Cape Town.
- Harrison J.A. & Young D.J. 2004.** CAR Inligtingsblad No. 4: Hoe om die padtellingsvorm in te vul. ADU, Cape Town.
- Harrison J.A., Maciver M. & Freeman B. 2004.** Bird monitoring on Intaka Island during 2003/04, and an overview of seven years of bird monitoring. ADU Research Report 63. Avian Demography Unit, Cape Town.
- Parsons N.J. & Underhill L.G. 2004.** The importance of the Koeberg Nuclear Power Station for coastal birds: conservation implications and recommendations. ADU Research Report 64. Avian Demography Unit, Cape Town.
- Pepper J. & Lotz C. 2004.** Introducing the Cape Eagle Owl Project. Bird Numbers 13(1): 45.
- Wheeler M.J. & Harebottle D.M. 2004.** Coordinated Waterbird Counts (CWAC) Newsletter 24, June 2004.
- Wheeler M.J. 2004.** The Nest Record Card Scheme (NERCS). Bird Numbers 13(1): 42–43.
- Young D.J. 2004.** CAR Newsletter 16, June 2004. ADU, Cape Town.

Works of a popular nature

- Anon. [=Cooper, J.] 2004.** The ADU migrates to Scotland. Africa – Birds & Birding 9(4): 76.
- Cooper J. 2004.** Save that Wanderer! Quest Science for South Africa 1(1): 28–30.
- Griffin J. 2004.** 10 years – anniversary of the Apollo Sea oil spill. Sancor Newsletter 177, July 2004.
- Harebottle D. 2004.** Waterbird monitoring at Edith Stephens Wetland Park (ESWP). PSP News, Third Term. Newsletter of the Primary Science Programme. pp. 1–2.
- Harebottle D. 2004.** The Black-winged Stilts are breeding at ESWP. PSP News, Fourth Term. Newsletter of the Primary Science Programme. p. 2.
- Harebottle D. 2004.** Five years of bird ringing at Zandvlei Nature Reserve. Zandvlei Trust Newsletter No. 3: 7–8.
- Harebottle D. & Williams T. 2004.** How important are sportsfields for birds in Cape Town? Kite: 2–3.
- Harebottle D. & Williams T. 2004.** Sportsfields – how important are they for birds? Promerops 259: 12–13.
- Oschadleus D. 2004.** SAFRING News. Red-backed Shrike. Africa – Birds & Birding 9(4): 16.
- Oschadleus D. 2004.** SAFRING News. Icterine Warbler. Africa – Birds & Birding 9(5): 14.
- Pepper J. & Lotz C. 2004.** Cape Eagle Owl Project – public involvement needed. Promerops 259: 13.
- Ward V.L. & Williams A.J. 2004.** Coastal killers: causes of seabird mortality. Bird Numbers 13(1): 14–17.
- Williams A.J. 2004.** Is that a Kelp, Cape or Khoisan Gull? Bird Numbers 13(1): 21–23.
- Williams A.J. & Parsons N. 2004.** Cholera catastrophes: are Kelp Gulls culprits? Bird Numbers 13(1): 8–10.
- Young D.J. 2004.** Coordinated Avifaunal Roadcounts (CAR) Project tracks the changes. KZN Birds 9: 15–16.
- Young D.J. 2004.** Big birds on farms – CAR project tracks the changes. Northern Natal Farmer Oct: 8.

*“You never did like
my set of flying
ducks, did you?”*



Chirps from the past

This poem by Peter Steyn was originally published in 1973 under the pseudonym Petrunio in *The Honeyguide* (No. 73) in what was then the magazine of the Rhodesian Ornithological Society. Carl J. Vernon (last verse) was, and is, one of the finest field ornithologists in Africa. The common and scientific names in the poem are those that were current at the time and are listed in sequence:

rufilata: Tinkling Cisticola
ayresii: Ayres' Cisticola
lais: Wailing Cisticola
brunnescens: Pale-crowned Cisticola
tinniensi: Levaillant's Cisticola
natalensis: Croaking Cisticola
chiniana: Rattling Cisticola
erythrope: Red-faced Cisticola



Cisticoline blues (with apologies to the experts)

It requires only moderate skill
 The Rhodesian Field Card to fill;
 But when I get to CISTICOLA
 My pen remains poised perpendicular.

What issues from that thorny scrub?
 (Ah! there lies the rub)
 Perhaps it is the muted cantata
 Of skulking *rufilata*?

With snapping wings up on high
 Flits diminutive *ayresii*;
 But a view we're not allowed
 As it flies above a cloud.

Lord knows I must be barmy
 As I puff up Chimanimani;
 Here's a grassy montane place,
 Then that must be *Cisticola lais*.

Only an ass egregious
 Searches woodland brachystegious

For pale-crowned *brunnescens*
 Or frantic *tinniensi*.

In marshy ground seek Levaillant's
 Where above its nest it shrieks defiance:
 There too your binocs you may hoist
 To spy *natalensis*, croaky-voiced.

In that acacia what is rattling
 Like an antiquated Gatling?
 I would gladly strangle with a liana
 Yon tedious, raucous, *chiniana*.

Behold a wee exquisite nest
 'Twixt leaves and cobwebs neatly pressed;
 There it is, out it pops,
 That red-faced craftsman *erythrope*.

My view of that bird was hazy;
 Could it be the one that's Lazy?
 Oh for the skill of a Vernon C.J.
 To aid me on my cisticoline way!



Birds in Culture: the Sacred Ibis



Figure of a Sacred Ibis 332–30 B.C. Egyptian. Bronze and wood covered with linen and gesso, 34 × 13 × 43 cm. Metropolitan Museum of Art, New York.

The ibis was probably the first bird in the world ever to be protected. In ancient Egypt the offense of killing an ibis was punishable by death. The bird was sacred because it was believed that Thoth, the god of wisdom and learning, and scribe to Osiris, god of the dead and of the underworld, was incarnated as an ibis. (Thoth also had an incarnation as a baboon.) Thoth's name, written in hieroglyphics, is a picture of the ibis. It was believed that every individual sacred animal possessed a fragment of the sacred spirit of the god. One would gain favour with the god when one arranged for an animal to be embalmed.

Mummified remains of ibises have been found in many royal Egyptian tombs next to the gold, jewels and other treasures and a most remarkable discovery was made at the underground galleries beneath the temples at Saqqara. Dating back to the sixth century B.C., these catacombs were found to contain the mummified remains of between 1.5 and 4 million Sacred Ibises, about 800 000 falcons and about 400 baboons, individually

packed and stacked in elongated pottery jars, and wooden boxes in the case of the baboons. It seems that the priests raised the Sacred Ibises at a near-by lake, killed and embalmed them and sold the mummies to the believers visiting the temples. Evidently the understanding of the prohibition on killing ibises was somewhat elastic!

The Ibis was probably not indigenous to Egypt. It is likely that the first birds were captured on the shores of the Red Sea and brought to Egypt. At the time of the Roman conquest of Egypt, returning Romans introduced the Sacred Ibis into Italy. No Sacred Ibises have been recorded in Egypt since 1850 and the only remaining population north of the Sahara is in southern Iraq where it was fairly common in the 1970s.

Attenborough D. 1987. *The first Eden.* William Collins, London

Del Hoyo J., Elliott A. & Sargatal J. 1992. *Handbook of the birds of the world.* Vol. 1. Lynx Edicions, Barcelona.

Oster M. (ed.). 1978. *The illustrated bird.* Dolphin Books, New York.