

## The role of amateurs in the growth of bat conservation and research in South Africa

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Received 17 March 1998; accepted after revision 8 July 1998

During the 1980s and 1990s, Britain experienced an unprecedented increase in scientific and public interest in bat conservation, culminating in 90 'bat groups' by 1992. In South Africa, bats are poorly protected or unprotected, and most of the country's 54 species are poorly known. With the formation of bat interest groups in KwaZulu-Natal and Gauteng in 1994 and 1995, the British 'bat group' conservation model was applied in a South African context. The primary aim of South African bat groups has been to promote bats, bat research and bat conservation through public participation and education, and the training of amateur 'bat workers' by scientists. I evaluate the success of this approach, based on activities of the Durban Bat Interest Group (DBIG) over four years (1994–1997 inclusive), and on estimates of media impact available for 1994–1996 inclusive. The number of public activities increased by between 14% and 44% per year. Some 12 million South Africans have been exposed to a positive message about bats. A database containing 316 bat roost visit records from 239 individual bat roosts (mostly in buildings) has been compiled. Two species of bats were recorded for the first time in South Africa. Conservation efforts have focussed on a roof-dwelling species restricted to the Durban area, the large-eared free-tailed bat (*Otomops martiensseni*); this species and one other, the short-eared trident bat, *Clootis percivali*, have recently been protected in terms of provincial legislation.

**Keywords:** Chiroptera, bats, conservation, amateurs, roost database, public awareness

Just under 1000 species of bats (Order Chiroptera) make up almost one quarter of all mammal species. Recent research has underlined the important ecological and economic role played by bats. For example, at least 300 plants are known to be dependent on fruit bats for their pollination or seed dispersal services, providing more than 450 economically important products valued at hundreds of millions of US\$ annually (Tuttle 1988; Fujita 1991). It has been estimated that seeds dropped by bats account for up to 95% of forest regrowth on cleared lands in the tropics (Tuttle 1988). Insectivorous bats are vital predators of night-flying insects; a single American mouse-eared bat can catch up to 600 mosquitoes in one hour (Tuttle 1988).

In response to growing evidence for declines in bat numbers worldwide, there has been a recent increase in scientific and public interest in bat conservation (Mitchell-Jones, Hutson & Racey 1993; Tudge 1994). Nowhere has this been as dramatic as in Britain, where the Wildlife and Countryside Act of 1981/2 (which made it illegal to kill or harm bats) stimulated the formation of numerous amateur bat groups to assist with enforcing the Act. From some 23 amateur bat groups in 1984, 90 groups with 2000 members were known in 1992 (Mitchell-Jones *et al.* 1993). The Nature Conservancy Council (now known as English Nature) issued 350 licences to bat workers in 1992, compared to just a few in 1982. During the same period, the number of public enquiries about bats increased to about 3500 per year notified to the Nature Conservancy Council. About 80% of public enquiries were followed up by personal visits by a nature conservation official or an amateur bat worker, providing a valuable source of biological information. From 400 known roosts in 1972, 14 000 building roosts and 1000 underground hibernation roosts were known in 1992.

South Africa has a rich bat fauna comprising some 54 species, with greatest species diversity concentrated in the sa-

vanna regions of north-eastern South Africa (Gelderblom, Bronner, Lombard & Taylor 1995; Rowe-Rowe & Taylor 1996; Kearney & Taylor 1997). Bats are poorly known and poorly protected in this country. Microchiroptera are listed as 'protected wild animals' under Schedule 2 of Cape Provincial Ordinance No.19 of 1974. In 1996, two species of bats were listed as 'endangered mammals' in KwaZulu-Natal (Schedule 6 of Natal Provincial Ordinance No. 15 of 1974). However, elsewhere in South Africa bats are not formally protected. Twenty seven species of bats are listed in the South African Red Data Book on terrestrial mammals under the Indeterminate category (Smithers 1986).

In 1994 and 1995, bat interest groups were formed in KwaZulu-Natal and Gauteng, with the aim of promoting bats, bat conservation and bat research through active public participation and education and the training of amateur bat workers. This article reviews statistics from the Durban Bat Interest Group (DBIG) over four years (1994–1997 inclusive), as well as estimates of media impact obtained for 1994–1996 inclusive, to evaluate the potential of the 'bat group' model to stimulate bat conservation and research in South Africa and southern Africa as a whole. Three areas are covered: (1) public awareness; (2) local knowledge base; and (3) conservation action. In order to demonstrate the research benefits of an amateur-based approach, new data on the distribution and biology of selected species are presented.

### Impact on public awareness of bats

Public impact is difficult to measure. Indicators such as membership of DBIG, and the number of public enquiries, slide-show presentations to schools and other groups, exhibitions at expositions, and media reports (e.g. newspaper and magazine articles and television and radio programmes) give some indication of relative trends over time (Table 1). Membership of

**Table 1** Statistics for the Durban Bat Interest Group between 1994 and 1997

	1994	1995	1996	1997
No. of members	67	122	75	109
Total no. of public contacts <sup>1</sup>	157	249	309	269
Slide presentations (schools mostly)	8	35	27	22
Roost visits <sup>2</sup>	69	62	54	91
Miscellaneous enquiries & activities <sup>3</sup>	32	55	100	125
Exhibitions	3	3	7	3
Injured bats received (& released)	–	16 (4)	30 (9)	62 (16)
Media articles / broadcasts <sup>4</sup>	7	17	7	2
Income through fundraising	R1987	R4156	R3226	R4518

1. This category includes all of the below categories, as well as club functions, queries relating to 'problem bats', and other miscellaneous activities not reported here.
2. This category includes invited visits by bat workers to residential properties, as well as club outings to cave roosts, and ad hoc investigations of reported bat sites.
3. This category includes general public enquiries about bats as well as enquiries relating to injured bats, and involvement in public exhibitions.
4. This category includes newspaper reports, magazine articles, radio broadcasts and television documentaries.

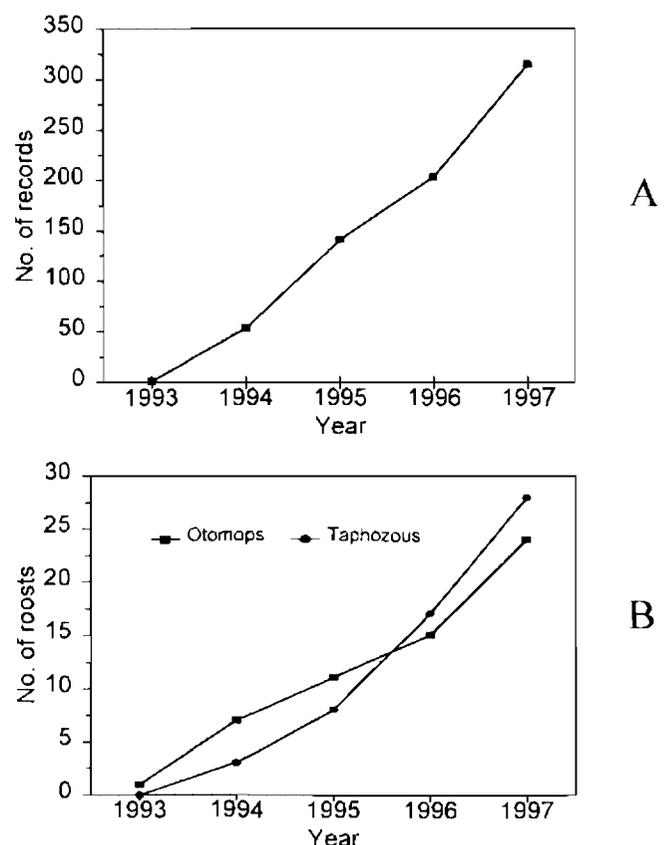
DBIG has fluctuated between 67 and 122 (Table 1). The total number of public 'contacts' rose from 157 in 1994 to 269 in 1997 (Table 1). This was due mostly to the large increase in the number of general public enquiries (Table 1). Because of time commitments on DBIG members and a general shortage of trained bat workers, the number of roost visits declined between 1995 and 1996, but rose sharply in 1997 due to the appointment of an active roost visit coordinator (Table 1). Slide-show presentations involve a presentation of commercially available photographic slides and a tape commentary on 'Bats: myth and reality' produced by Bat Conservation International, and, in some cases, presentation of either live captive bats or slides of South African bats.

In an attempt to quantify the impact of media coverage related to DBIG more accurately, various sources were searched to obtain estimates for media impact for the years 1994 to 1996 inclusive (Table 2). These figures were obtained from Brewer's Almanac (for print media), and from telephonic enquiries to radio and television stations, the South African Broadcasting Corporation (Research Division), and the Wildlife and Environment Society of southern Africa (see Table 2). Between 1994 and 1996, some twelve million people were exposed to a positive message on bats through the activities of DBIG (Table 2).

### Local knowledge base

As a consequence of visits by bat workers and club field outings to both residential and 'cave' bat roosts (usually abandoned mine adits or dam tunnels), the number of registered roosts has increased steadily between 1994 and 1996 (Figure 1). A specimen of the bat roost database form used is given in the Appendix. Roost visits always involved at least one scientist or bat worker. Bat workers, of which there are currently 20, complete a whole-day training course at the Durban Natural Science Museum, and three supervised roost visits before

qualifying as bat workers. The training course involves lectures on the biology and handling of bats, and an identification workshop using museum specimens, and is based on a



**Figure 1** Graphs showing increase with time in the total number of bat roost visit records registered by DBIG (A), and in the number of distinct roosts of two particular species (B), *Otomops martiensseni* (squares) and *Taphozous mauritanus* (circles)

50-page *South African bat workers' manual*, authored by P.J. Taylor and E.J. Richardson (available to interested persons from PJT).

Just over 300 bat roost visit records are contained in DBIG's bat roost database. A single record relates to a particular visit and a particular species; thus several records may apply to a single roost if more than one species is involved, or the roost is visited repeatedly. These records cover 239 unique bat roosts.

Figure 1 charts the increase in the number of documented roosts of two particular species, *Otomops martiensseni* (the large-eared free-tailed bat) and *Taphozous mauritanus* (the

Mauritian tomb bat). In addition to the roosts indicated in Figure 1, numerous roosts of both species (five of *T. mauritanus* and 12 of *O. martiensseni*) were obtained during a rabies scare in Durban during 1980/1 (C. Sapsford, unpublished data). Prior to 1980, very few records of either species were available from the Durban Metropolitan Region. *Otomops martiensseni* was known from 26 museum specimens from four broad localities: Durban, Mt Edgecombe, Westville and Warner Beach (Richardson & Taylor 1995). *Taphozous mauritanus* was known from two museum specimens from two localities: Durban and Durban North. These new data are particularly valuable in the case of *O. martiensseni*, since this represents the entire South African range of this species, which is now listed as endangered in KwaZulu-Natal (Taylor 1997). The distributions of both species in the Durban Metropolitan Region are given in Figures 2 and 3.

Apart from information contained in the bat roost database, bat workers have initiated projects monitoring roosts of individual species such as *Epomophorus wahlbergi* (Wahlberg's fruit bat), *Nycteris thebaica* (the Egyptian slit-faced bat), and *T. mauritanus*. Examples of new data gathered on the latter species are shown in Figure 4. Close monitoring of individual *T. mauritanus* roosts by an amateur bat worker, Fiona Mackenzie, has revealed that groups comprise between one and five individuals, usually a female and her young, never male-female pairs as suggested from the casual observation

**Table 2** Estimates of public impact of DBIG activities and media coverage: 1994–1996

Category	Number	Average viewership, listenership, readership, or attendance	Total viewership, listenership, readership, or attendance
Television <sup>1</sup>	1	1,243,320	1,243,320
Radio <sup>2</sup>	4	579,833	3,479,000
Newspaper <sup>3</sup>	14	546,875	6,868,000
Magazine <sup>4</sup>	4	193,500	774,000
Slide-shows	70	30	2100
Exhibitions <sup>5</sup>	13	13,740	123,668
TOTAL	106	–	12,490,088

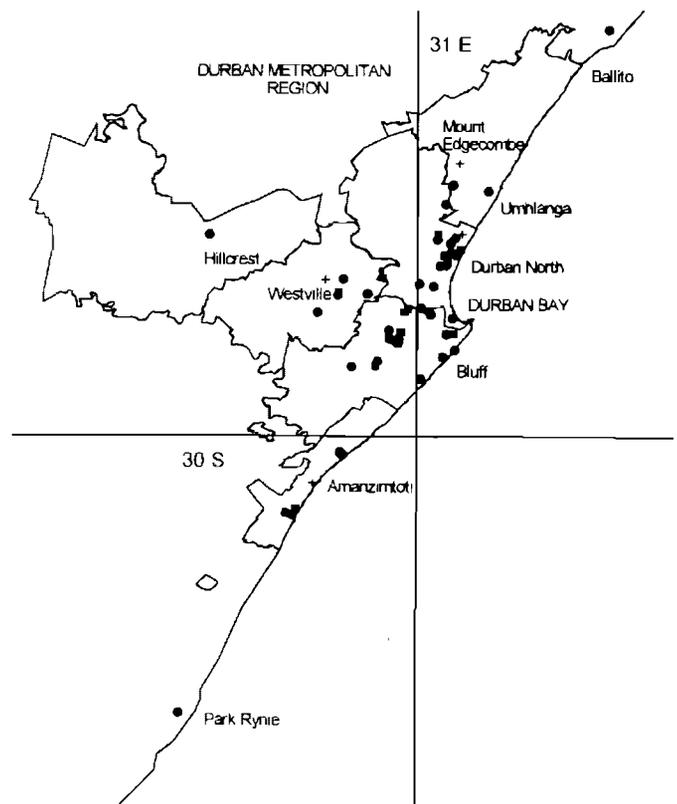
1 Statistics refer to a single documentary screened on the SABC 50/50 programme on 4th September 1994, and were obtained from Broadcasting Research Department, South African Broadcasting Corporation (SABC).

2 Listenership figures were obtained (from the Marketing Manager, SABC) for two programmes (SAfm 'Lifestyles': 200,000 listeners, and SABC 'Talking of Nature': 150,000 listeners), as well as for two short interviews which were screened as inserts on several stations including East Coast Radio (60,000), Radio Lotus (125,000), SAfm (92,000), Radio Zulu (2,852,000), and Highway Radio (not available). Listenership for the above stations were obtained directly from East Coast Radio and from Radio Active Durban for an average mid-afternoon slot in June 1997 (for East Coast Radio, dates of screening were not available)

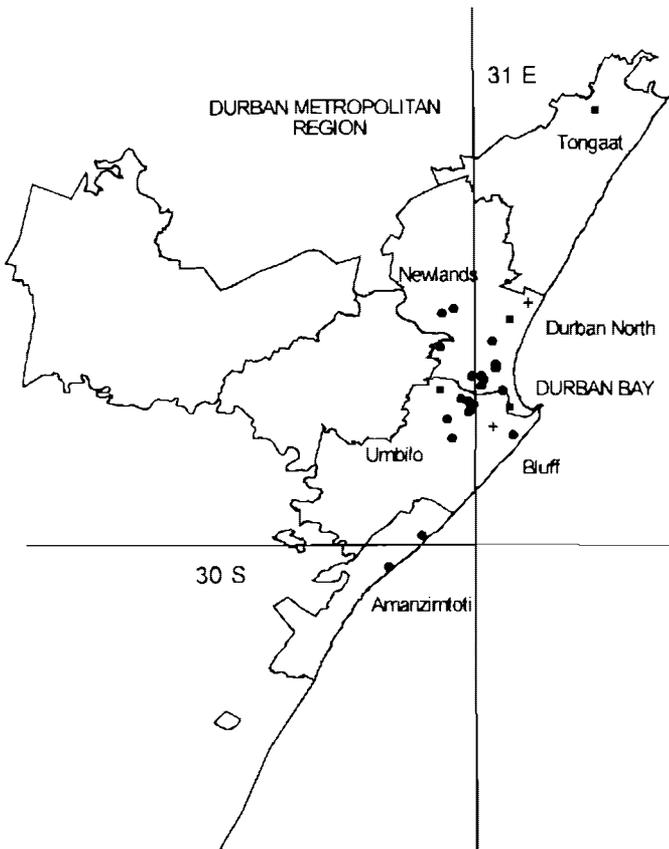
3. Newspapers which featured articles on bats on or from DBIG (with readership or circulation figures in parentheses) were: *The Mercury* (329,000), *Natal Witness* (196,000), *Saturday Paper* (273,000), *Suburban Echo* (20,000 – circulation, not readership), *Stanger Weekly* (30,000), *Sunday Times* (2,548,000), *Sunday Tribune* (523,000), and *Daily News* (456,000). Figures obtained from Brewer's Almanac. In cases where only circulation figures were available, as noted above, these were conservatively taken as 'readership', which is usually some three to five times higher.

4. Magazines which featured articles on bats on or from DBIG (with readership or circulation figures in parentheses) were: *Cosmopolitan* (447,000), *Country Life* (45,000 – circulation, not readership), *Farmer's Weekly* (139,000), and *Personality* (143,000). Figures obtained from Brewer's Almanac. In cases where only circulation figures were available, as noted above, these were conservatively taken as 'readership', which is usually some three to five times higher.

5 Figures apply for three exhibitions at the 'Wildlife Expo', for which information was supplied by the Wildlife and Environmental Society of southern Africa (total attendance = 114,126), as well as six 'open days' held during school holidays at the Durban Natural Science Museum (total attendance = 9542). Further exhibitions, for which no figures were available, included three environmental expositions organised by the Keep Durban Beautiful Association, and an exhibition organised by the Ster Kinekor Group to coincide with the public release of the film, *Jumani*.



**Figure 2** Distribution of *Otomops martiensseni* in Durban area (boundaries of Durban Metropolitan Region substructures shown). Squares represent records collected during a rabies scare in 1980/1. Circles represent records collected since 1993 by the Durban Bat Interest Group. Crosses represent localities known prior to 1980



**Figure 3** Distribution of *Taphozous mauritianus* in Durban area (boundaries of Durban Metropolitan Region substructures shown). Symbols as for Figure 2

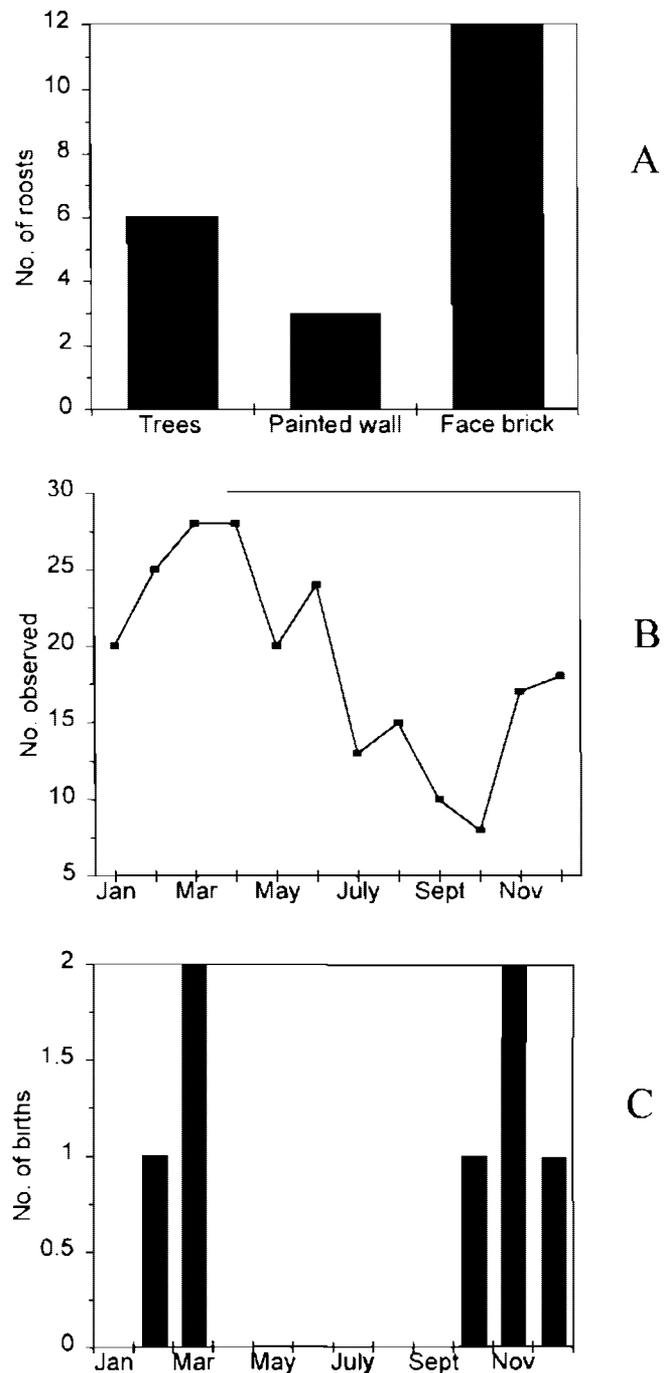
of pairs of roosting individuals (Skinner & Smithers 1990). Sexing of individuals without capturing them was possible due to the presence of a conspicuous gland in males located under the neck, which was visible with binoculars at a distance of up to several metres.

*Taphozous mauritianus* prefers roosting on face-brick walls of houses, under the protection of eaves (Figure 4A). A seasonal fluctuation in numbers observed at seven roosts (Figure 4B), with steady decline during late winter and early spring, suggests a localised migration pattern, possibly associated with torpor. The reproductive biology of this species in southern Africa is very poorly known, with a single previous report of a pregnant female in October and a juvenile in February, suggesting a breeding season in early summer (Skinner & Smithers 1990). Based on observations of seven births in the Durban Metropolitan Region, births occur in summer, with possibly two peaks (Figure 4C). An individual female was observed to give birth twice in the same season.

The involvement of the wider public has also led to an increased reporting rate for bats. One benefit of the higher reporting rate has been the discovery of new country and provincial species records. Largely due to public involvement and intensified collecting efforts by the Durban Natural Science Museum since 1994, two species new to South Africa were collected, *Eptesicus rendalli* (Rendall's serotine bat), and *Scotoecus albobfuscus* (Thomas' house bat), while signifi-

cant range extensions were recorded for *Laephotis cf. wintoni* (De Winton's long-eared bat) and *Pipistrellus anchietai* (Anchieta's pipistrelle) (Kearney & Taylor 1997).

A further consequence of the higher public reporting rate for bats has been the development of a rehabilitation programme to care for injured, sick and young bats, under the supervision of Kate Richardson, Associate Researcher, Durban Natural Science Museum. Several bat workers have been issued with KwaZulu-Natal Nature Conservation Service (KZN-NCS) permits and permitted to assist with the care of live bats. Two births of yellow house bats have so far been recorded in



**Figure 4** New data for *Taphozous mauritianus* in the Durban Metropolitan Region: (A) roost characteristics for 21 roosts; (B) total number of individuals observed throughout the year at seven roosts; and (C) seasonality of births

captivity, and post-natal growth and development has been documented (Richardson & Van Zyl, unpublished data). Table 1 indicates an increase in the number of live bats received per year from the public between 1995 and 1997 (from 16 to 62), of which 25–30% were released successfully.

### Conservation action

*Otomops martiensseni* (the large-eared free-tailed bat) has been the focus of conservation efforts by DBIG, and has been the 'flagship species' in raising public and government awareness about conservation of bats as a whole. This species is found in South Africa only in the roofs of houses in the greater Durban area (Figure 2), where it is susceptible to fumigation against wood borer (Bostrychidae, Cerambycidae, Anobiidae). Roost visits by bat workers have revealed 12 extant roosts and a further ten which represent colonies now extinct, or grounded individuals.

Application from DBIG and the KZN-NCS resulted in provincial legislation to protect this species in October 1996, as an 'endangered mammal' (Schedule 6 of Provincial Conservation Ordinance No. 15 of 1974). Through press releases and individual letters, pest control companies and the public in the Durban area have been advised to notify DBIG or the KZN-NCS on discovering bats prior to fumigation or roof construction work. In two cases recently, this has led to the discovery of new *O. martiensseni* roosts. In one of these cases it was necessary to remove the colony prior to fumigation and return the animals after fumigation; in the second case, advice was given prior to roof construction work, and the colony was unaffected.

Application also was made for provincial government protection of a second species, *Clootis percivali* (the short-eared trident bat), after a colony of this species was discovered roosting in inspection tunnels in the Jozini Dam wall, and this species has also been listed as endangered in KwaZulu-Natal. This colony of *C. percivali*, the second known colony in South Africa, was under possible threat of exclusion by Department of Water Affairs and Forestry officials, due to plans to eradicate the bats for 'hygiene' reasons, but its future has now been guaranteed by this Department.

### Pitfalls and problems

Bats have long suffered from negative public perceptions. Myths of bats being disease-ridden and evil, becoming entangled in human hair, biting and penetrating human skin, and chewing human ears while the victim sleeps are still prevalent in many cultures in South Africa. In spite of publicity surrounding the proclamation of *O. martiensseni* as an endangered mammal in October 1996, a resident of the Bluff, Durban, bludgeoned to death a colony of this species in April 1997 out of an irrational fear of the bats. Effective local and national conservation awareness programmes are required to reach a wider sector of the population.

The Durban Bat Interest Group is supported financially by the Durban Natural Science Museum to a limited extent. Income generally from fund-raising and membership is relatively low (Table 1) and insufficient to drive a nationally effective conservation awareness and research programme. There is an urgent need to establish institutional structures and financial backing, possibly involving formal nature con-

servation authorities in South Africa and/or overseas agencies such as the UCN Chiroptera Specialist Group, Bat Conservation International and the Bat Conservation Trust.

### The way ahead?

This article indicates the potential for the 'bat group' model to benefit bat conservation and research in South Africa, albeit on a much smaller scale than in Britain. In the absence of substantial funding, an interim strategy may be to establish a greater number of informal bat groups which can draw from expertise and resources of the larger existing bat interest groups in Durban and Pretoria. Given the lower proportion of environmentally educated citizens compared to first-world countries like Britain, and current economic and political concerns in this country which make conservation a low priority to many, this may prove difficult in the near future, but should nevertheless be encouraged. With appropriate supervision, school groups and university students can be encouraged to start bat interest groups.

A recent development has been the formation of an informal bat working group under the auspices of the Zoological Society of Southern Africa. This group covers southern Africa and currently lists some 22 interested scientists, conservators, speleologists, and students. The group promotes scientific collaboration on bats via an annual workshop and an occasional newsletter, and focuses on major projects such as a national bat roost database, an echolocation sound library, and a southern African bat atlas.

### Acknowledgements

The members of the Durban Bat Interest Group are thanked for their enthusiastic support, particularly the present and past committee: Paul Anderson, Teresa Kearney, Fiona Mackenzie, Kim Mari, Kate Richardson, Ernest Seemark, George and Joyce Skinner, Peter and Sylvia Watson and Tammie Van Zyl. The group would not have continued without the support of the Director of the Durban Natural Science Museum, Dr Q.B. Hendey, and the Chairman of the Friends of the Durban Natural Science Museum, Mr David Bennett. Fiona Mackenzie and Kate Richardson are gratefully acknowledged for contributing preliminary data on the tomb bat. Kim Mari kindly obtained the circulation and readership figures for various local publications which have featured articles from or on DBIG. Ongoing research on bats is partly funded by a grant from the Foundation for Research Development to Peter Taylor, as was Peter Taylor's attendance at the Zoological Society of Southern Africa's 1997 Annual Symposium. The two anonymous reviewers are thanked for their valuable and constructive comments.

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**Appendix**



**Bat Roost Visit Report Form**

Please circle choices and give further details if appropriate.

**Name of roost owner:** \_\_\_\_\_

**Contact person (if different to roost owner):** \_\_\_\_\_

**Address:** \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

For caves, mines etc give locality. If necessary, draw on separate sheet.

**Phone number(s):** \_\_\_\_\_

**Grid reference:** \_\_\_\_\_

**Roost type:** House/Church/Institution/Farm buildings/Ruin/Mine/Cave/Tree/Other(specify)

**Age:** \_\_\_\_\_

**Walls:** Brick/Stone/Wood/Wattle & daub/Other

Solid/cavity wall

**Roof:** Tile/Slate/Shingle/Thatch/Corrugated iron/Asbestos/Other(specify)

**Lining:** Plastic/Aluminium/Tar paper/Other

**Insulation:** Fibreglass/Vermiculite/Paper pulp/Other

**Bat access point(s):** Gable apex/Under eaves/Between tiles/Other(specify)

**Height above ground:** \_\_\_\_\_

**Facing direction (aspect):** \_\_\_\_\_

**Bat roosting site(s):** Under eaves/Between insulation and tiles/Gable apex/On rafters/Other(specify)

**Number of bats found:** \_\_\_\_\_

Count or estimate?

**Species:** \_\_\_\_\_

**How identified:** \_\_\_\_\_

**By whom:** \_\_\_\_\_

**Droppings:** \_\_\_\_\_

Indicate quantity, depth, and area

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**History of colony:** Seasonal/All-year

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**Description of problem:** None/Droppings/Intolerance/Fear/Smell/Noise/Bats in living area/Other(specify)

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**Is there any threat to roost?:** Exclusion/Timber treatment/Building work/Destruction/Other(specify)

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**Attitude of owners:**

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**Recommendations for action by B.I.G.:**

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**Sketch:**

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**Other visits:**(dates and counts)

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**Roost visited by:**

**Date:**

**Time:**

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