AFROTHERIAN CONSERVATION

Newsletter of the IUCN/SSC Afrotheria Specialist Group

IUCN AFROTHERIA SPECIALIST GROUP

Species Survival Commission

Number 10 | Edited by PJ Stephenson | September 2014

Afrotherian Conservation is published annually by the IUCN Species Survival Commission Afrotheria Specialist Group to promote the exchange of news and information on the conservation of, and applied research into, golden moles, sengis, hyraxes, tenrecs and the aardvark.

Published by IUCN, Gland, Switzerland.

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ISSN: 1664-6754

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Message from the Chair

Galen Rathbun
Chair, IUCN/SSC Afrotheria Specialist Group

There has been a long time gap since our last newsletter was produced in October 2012. Of course this is partly due to our editor having a full time job that comes first, but it also is due to a lack of material being submitted by our members and readers. Unless we can get more participation in contributing to the newsletter, we may need to discontinue it. We would welcome suggestions on preventing this.

The last 18 months has seen a busy period. We reassembled the membership of our group for the current quadrennium, and in the process thanked a few members (Ron Barry, Jonathan Benstead, Ngoni Chiweshe, Ian Gordon, Daniel Rakotondravony, and Terry Robinson) for their past voluntary participation and expertise. We also welcomed several new members (Lientjie Cohen, Kathryn Everson, Amiyaal Ilany, Yvonne de Jong, Erustus Kanga, Lee Koren, Jonathan Kingdon, Samantha Mynhardt, Chanel Rampartab, Hanneline Smit-Robinson, and Bill Stanley). I encourage everyone to explore the interests and backgrounds of our new members on our web site: www.afrotheria.net. Lee Koren has also agreed to become Hyrax Section Co-ordinator, replacing Paulette Bloomer who continues to provide her expertise as a member.

In our last newsletter, we put out an appeal for a logo for the group and, with input from section co-ordinators, we selected a design by a new member Chanel Rampartab. We realize the effort may not completely please everyone, but I am sure all can appreciate the similarity between achieving unanimous agreement and herding cats. The new logo is on the banner of this issue of our newsletter and on our website.

Speaking of our website, it was over ten years old and suffering from outdated material and old technology, making it very difficult to maintain. Charles Fox, who does our web maintenance at a hugely discounted cost (many thanks Charles), has reworked the site, especially the design of the home page and conservation page (thanks to Rob Asher for his past efforts with the latter material, which is still the basis for the new conservation page). Because some of the hyrax material was dated, Lee Koren and her colleagues completely updated the hyrax material, and we have now linked our websites. A similar update is being discussed by Tom Lehmann and his colleagues for the aardvark link. The sengi web material is largely unchanged, with the exception of updating various pages to accommodate the description of a new species from Namibia (go to the current topics tab in the sengi section).

Although a lot of effort has focused on our group's education goals (logo, website, newsletter), it has not over-shadowed one of the other major functions that our specialist group performs: the periodic update of the IUCN Red List (www.iucnredlist.org). Our new Red List Co-ordinator, Andrew Taylor, and our five Section Co-ordinators, are busy assessing data and feedback from group members so that we can meet our 2014 deadline. As we continue this process, many thanks for all of your help in getting this huge project done on time, especially to Andrew for largely shouldering the task of keeping us within the guidelines and time frame.

Lastly, in case any of our readers think we are not making progress, check out this website: http://www.arkive.org/conservation-in-action/#julianas-golden-mole. Well done golden molers!

G.B. Rathbun
Cambria, California. August 2014.

INSIDE THIS ISSUE

Articles

Distribution of sengis in the Horn of Africa

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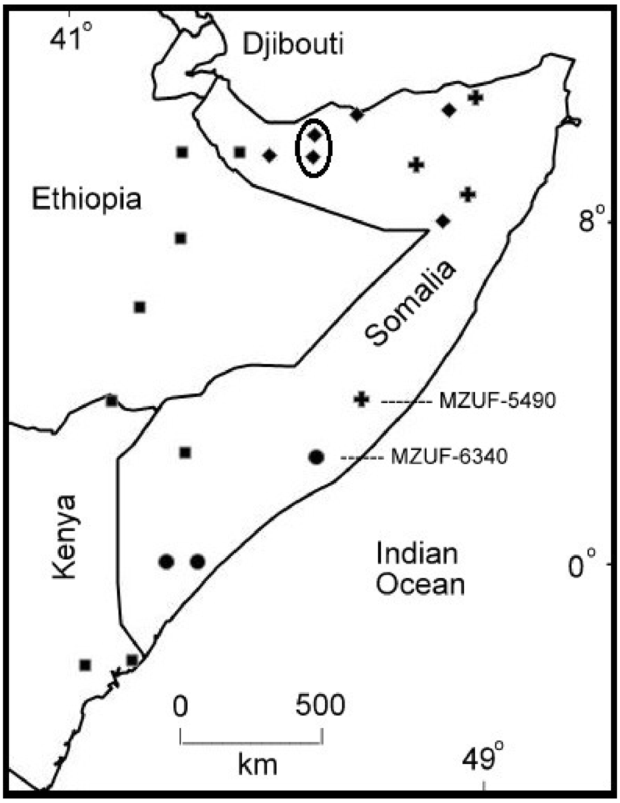
There are 19 recognized species of sengi or elephant-shrew (supercohort Afrotheria, order Macroscelidea), and all are endemic to Africa (Rathbun 2009, Dumbacher *et al.* 2014). The greatest diversity of species is found in southern and eastern Africa, where their distribution and ecology are reasonably well understood (Rathbun 2009, 2014). Among the least well-known species is the Somali sengi, *Elephantulus revoilii*, which is endemic to Somalia. For example, nearly the only information on this sengi is that gathered from 15 museum voucher specimens and presented in the near-definitive taxonomic revision of the order by Corbet and Hanks (1968).

While determining whether there are any sengis in Djibouti, north of Somalia, we (PA and GI) re-examined and re-assessed the identification (criteria from Corbet and Hanks 1968) of sengi specimens in the Zoological Museum of the University of Florence. Although we found no sengi specimens from Djibouti, we discovered three specimens and associated data (Table 1) that extend the distribution of *E. revoilii* in Somalia, mostly to the south by about 475 km (Figs. 1 and 2).

The Somali sengi is thought to be morphologically closely related to the rufous sengi, *Elephantulus rufescens*, (Corbet &Hanks 1968), which also occurs in the Horn of Africa. To better understand the spatial relationship of these two sengis, we mapped all the known locations for *E. revoilii* and all those of *E. rufescens* in Somalia and in adjacent areas of Kenya and Ethiopia (Fig. 1). We did not plot all the known locations of *E. rufescens* because this species is widely distributed, from central Tanzania west into eastern Uganda and the Sudans, and north to the Horn of Africa (Rathbun 2014).

Corbet and Hanks (1968) speculate that *E. revoilii* probably occurs over much of the arid stony habitats in the Horn of Africa, despite only being documented in the past from a small area in northern Somalia. The new data presented here expand the distribution, but still support the species' occurrence in stony arid habitats. Based on the general distribution of the two *Elephantulus* species, it is evident that the habitats that they occupy are different (Corbet & Hanks 1968), with *E. rufescens* being associated with sandy substrates that are often well-vegetated with bushes and low trees, compared to more stony or rocky substrates with sparse vegetation associated with *E. revoilii*. However, the two species may come in contact in some areas (Fig. 1), and these situations warrant closer attention by ecologists and molecular biologists, especially if these two species are determined to be syntopic, or even taxonomically synonymous based on their genetics.

Figure 1. Distribution of *Elephantulus revoilii* and *E. rufescens* in the Horn of Africa.
Locations for *E. revoilii* from Corbet and Hanks (1968) are indicated by a "diamond", and those from the Zoology Museum at the University of Florence by a "plus". Locations for *E. rufescens* from the University of Florence are indicated by a "solid circle" and selected locations from Rathbun (2014) by a "square". Locations from Corbet and Hanks (1968), and many from Rathbun (2014), are centroids of quarter degree squares, whereas locations from Florence are determined by the location of the nearest geographical feature, and often in consultation with the specimen collectors. The ellipse encompassing two locations (Corbet & Hanks 1968) indicate that both species occur at the two locations, suggesting gross sympatry in the area, although presumably they are allotopic. At the map scale, locations that are near each other, appear as one.



Although there has been speculation that *E. revoilii* and *E. rufescens* occur in Djibouti (Scaramella *et al.* 1974, Laurent & Laurent 2002), we are not aware of any voucher specimens or reliable sightings from there, despite some focused field work (Pearch *et al.* 2001). More recently, Nistri and Vanni (2014, personal communication) found no evidence of sengis in Djibouti during their expedition, and we (PA, unpublished data) similarly found none during a 2013 small mammal collecting trip to Djibouti. Although it is possible that sengis have escaped detection in Djibouti, this seems increasingly unlikely given that they are relatively easy to trap (Rathbun & Rathbun 2006), and they are not difficult to see by keen observers during the day, or at dawn and dusk (Rathbun 1979). We hope that this account will result in a greater effort to resolve this issue, especially given that *Elephantulus* in Djibouti would likely represent the furthest northern occurrence, south of the Sahara Desert (Rathbun 2014).

Figure 2. Comparison of dorsal (A) and lateral (B) views of *Elephantulus rufescens* (top; MZUF-6340; head and body length = 130 mm, tail length = 115 mm) and *E. revoilii* (bottom; MZUF-5490; head and body length = 130 mm, tail length = 143 mm) specimens from Somalia. Note proportionally longer tail and lighter pelage in *E. revoilii*.

Table 1. Data associated with Somali specimens of *Elephantulus revoilii* and *E. rufescens* from the Zoology Museum collection at the University of Florence. Catalogue numbers (MZUF-XXXX) are from the museum. Multiple collection dates in a row are in the same order as the multiple catalogue numbers in that row. If multiple specimens are catalogued from the same locality, they are grouped into the same row. Some locations on Figure 1 are not distinguished due to the precision of the map scale and their proximity to a neighboring location. Catalogue number MZUF-5490 represents a remarkable range extension of *E. revoilii.*

MZUF Catalogue Number	Species	Collection Locality	Collection Date	Latitude	Longitude
5490	*E. revoilii*	Bud Bud	16 Aug 1968	4.194	46.469
7852, 7853, 7854, 7855	*E. revoilii*	Migiurtinia (Galgalo)	10, 11, 12, 17 Oct 1973	10.984	49.062
3432, 3433	*E. revoilii*	Run (Garoe, Noghal plains)	7 Aug 1969	8.811	48.892
6279	*E. revoilii*	Run (Garoe, Noghal plains)	12 Aug 1969	8.811	48.892
6284, 6285	*E. revoilii*	Run (Garoe, Noghal plains)	13 Aug 1969	8.811	48.892
6289	*E. revoilii*	Run (Garoe, Noghal plains)	15 Aug 1969	8.811	48.892
6293, 6294	*E. revoilii*	Run (Garoe, Noghal plains)	16 Aug 1969	8.811	48.892
6306, 6310	*E. revoilii*	Run (Garoe, Noghal plains)	19, 20 Aug 1969	8.811	48.892
4200	*E. revoilii*	Somaliland (Ovole/Ovale?)	1896	9.460	47.705
2846, 2847, 2848	*E. rufescens*	Afmadu	8 Aug 1962	0.516	42.062
5811, 5812, 5813, 5814	*E. rufescens*	Afmadu	21 Aug 1970	0.495	42.085
2843, 2844	*E. rufescens*	Afmadu (ca. 14 km W)	7, 8 Aug 1962	0.513	41.946
2973	*E. rufescens*	Gelib (near the Giuba river)	13 Aug 1962	0.492	42.767
6343, 6344	*E. rufescens*	Giohar (6 km N)	28 Aug 1969	2.854	45.457
6340	*E. rufescens*	Giohar (ex Villabruzzi)	28 Aug 1969	2.756	45.478

Because so little is known about *E. revoilii*, it is difficult to determine its status for the Red List of Threatened Species (IUCN 2014). Indeed, in past and current assessments, this Somali endemic sengi is listed as Data Deficient. This difficulty is exacerbated by the lack of recent information. For example, all the sengi specimens at the Florence Museum (Table 1) were collected prior to 1974. Nevertheless, we hope that the new insights we have on its distribution will encourage biologists to gather additional information on this poorly understood sengi so that its status can be more accurately determined.

Acknowledgments

We thank Professor Alberto Maria Simonetta (Department of Biology, Florence University) and Dr Lorenzo Chelazzi (Institute of Ecosystem Study, CNR, Italy) for the information about their expeditions in Somalia and the ecological details on the localities where sengis were captured.

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The growth of Madagascar's protected areas system and its implications for tenrecs (Afrosoricida, Tenrecidae)

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Introduction

Evolution of Madagascar's protected area network

Madagascar's protected areas system has evolved considerably since the country gained its independence in 1960 with the creation of new institutions, a marked geographical expansion, and a diversification of governance categories tending strongly towards increased local community participation in management.

Madagascar's national parks system was one of the first to be established in 1927 and comprised strict nature reserves representing what we now classify as IUCN Category I sites. By the time of independence in 1960, Madagascar had a network comprising 36 protected areas covering 971,203 ha in three IUCN categories: I (strict nature reserve), II (national park) and IV (special reserve) (IUCN/UNEP/WWF 1987). Subsequently, Madagascar launched an ambitious multi-phase National Environmental Action Plan (NEAP) in 1991 and mandated protected areas management to a new institution, the National Association for the Management of Protected Areas, or ANGAP. By the time the first two NEAP phases had been completed in 2002, the network had increased to 47 protected areas which comprised 39 sites over an area of 1,819,133 ha. The three IUCN categories were retained but all new sites were Category II national parks, signalling a distinct shift in ANGAP's network vision (ANGAP 2001).

The third phase of the NEAP saw the renaming of ANGAP to Madagascar National Parks as well as major changes in protected area management strategies in Madagascar, not least of which was the country's commitment to triple the size of the network to 6 million hectares in five years. In addition, more IUCN management categories were now permitted; these were Category III (natural monument or feature), V (protected landscape/seascape) and VI (protected area with sustainable use of natural resources. Another major change was that protected area creation and management was open to any qualified body including government agencies other than Madagascar National Parks, environmental NGOs, and private entities such as mining companies that were obliged to create new reserves as part of their environmental obligations. The new policy sparked a major effort to design and establish an expanded network based on scientific planning using MARXAN and ZONATION (Kremen *et al.* 2008). These planning exercises aimed to increase the number of species under protection and to establish relatively large protected areas or corridors that would help to maintain ecological processes.

By 2010, when the new Madagascar Protected Areas System (SAPM, including both Madagascar National Parks sites and others) was formally established, the government recognized 148 existing or nascent protected areas covering 6,942,412 ha, though these figures are likely to be significant overestimates (Madagascar National Parks 2014). A significant number of the original proposals to create new protected areas were never realized, in large part because funding for conservation was greatly reduced following a four-year political crisis that began in 2009; there is no reliable estimate of the current number of protected areas although estimates are generally between 80 and 93 (e.g. WWF, in press). All new Madagascar National Parks sites continue to be in Category II while other new protected areas managed by other entities are predominantly in Categories V and VI, with smaller numbers in Category III. These NEAP Phase 3 changes were accompanied by a strong shift towards co-management of protected areas by local communities.

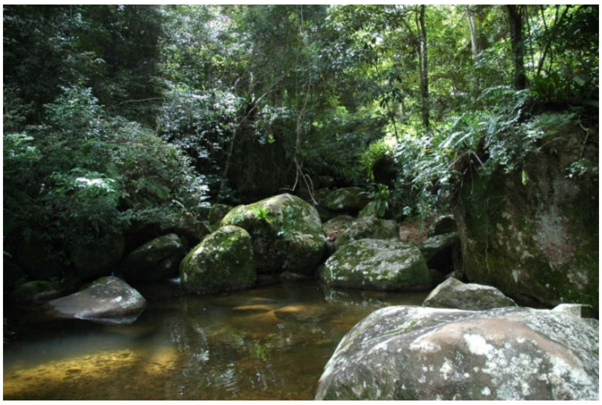

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Figure 1. Rocky streams in humid forests support the aquatic tenrec, *Limnogale mergulus*, a relatively little known species.

Tenrec diversity, distribution and conservation in Madagascar

The endemic tenrecs are descendants of one of the earliest known mammal groups found on the Madagascar, having rafted from Africa between 42 and 25 million years ago (Poux *et al.* 2005). It is one of four early radiations that dominate Madagascar's living non-volant terrestrial mammalian fauna. Three Malagasy tenrec subfamilies are recognized comprising 32 species in the Tenrecinae, Oryzorictinae and Geogalinae. Tenrecs occur throughout the island in all terrestrial habitats with a clear preference for intact or lightly disturbed forest (Goodman *et al.* 2013). Terrestrial tenrec diversity is highest in the eastern humid evergreen rainforests but a small number is confined to the western deciduous forests and arid south. The aquatic *Limnogale mergulus* is known from a small number of river sites in eastern Madagascar (Benstead & Olson 2003; Fig. 1).

The conservation status of 30 tenrec species has been evaluated within IUCN's Red List (IUCN 2013). One species is Data Deficient, 23 of Least Concern, 4 are Vulnerable and 2 are Endangered. The only species in this assessment that awaits evaluation is *Microgale grandidieri* known from several localities in the west and southwest (Olson *et al.* 2009) but this will be completed for the 2015 Red List update (PJ Stephenson, pers. comm.). An additional species, *M. prolixacaudata*, has recently been distinguished as a distinct clade within the *M. longicaudata* group (Soarimalala & Goodman 2011) and is included in the present article, especially as it is reported to be sympatric with *M. longicaudata.* (Olson *et al* 2004).

The role of protected areas in conserving tenrecs has not been assessed to date because distribution patterns were not consolidated into a readily accessible format until recently (Goodman & Raherilalao 2013).

In this paper we assess the presence of tenrecs in protected areas, whether any special measures have been taken other than maintaining healthy habitats and how different governance and category regimes may influence tenrec conservation success. We pay particular attention to species listed as Data Deficient, Vulnerable and Endangered.

Materials and methods

For the review of protected area coverage of tenrecs we have analysed the geographic coverage of officially listed protected areas within SAPM (Government of Madagascar 2010) but removing sites that we know have been abandoned since 2010. Goodman *et al.* (2013) provide information on species collection sites together with estimated tenrec distributions and habitat preferences using Maxent to calculate extent of occurrence.

We briefly examine how different protected area categories, governance regimes and on-site management regimes may influence tenrec conservation in practice and specifically look at the new Category V and, to a lesser extent, VI protected areas that allow for traditional natural resource uses that may include collection of larger tenrec species for food. We also provide anecdotal information provided by field researchers to examine whether some of the current IUCN assessments are still valid, especially for larger tenrec species that are widely hunted and for some of the smaller and apparently uncommon species.

Results

Habitat preferences

Tenrec habitat preferences have been summarized by Goodman *et al.* (2013) and in the IUCN Red List (IUCN 2013). All of the 23 shrew tenrecs in the genus *Microgale* (subfamily Oryzorctinae) are described as strictly confined to intact or lightly disturbed natural forest. Within the same subfamily, the aquatic tenrec, *Limnogale mergulus*, occurs mostly in rivers within natural forest but also uses degraded areas and non-native plantations. The two mole-like tenrecs in the genus *Oryzorictes* also prefer natural forests but can occur in marshes and other open areas. The only member of the Geogalinae, the large-eared tenrec, *Geogale aurita*, (see Stephenson 2002) is found in the arid south and strongly seasonal south-west and shows a marked preference for natural forest or thicket but can occur in degraded areas. In the subfamily Tenrecinae, the distribution and habitat preferences of the lesser hedgehog tenrec, *Echinops telfairi*, are similar to those of *G. aurita*. The remaining four members of the Tenrecinae – *Tenrec ecaudatus* (see Nicoll 2009), *Setifer setosus* and the two species of *Hemicentetes* (see Stephenson 2007) - occur in a wide range of natural and degraded habitats.

Tenrec representation in protected areas

Conserving the country's diverse natural habitats has been a focal objective of Madagascar's protected areas agencies, with by far the greatest effort allocated to forest and thicket formations. The original forest and thicket ecosystems have now been strongly fragmented and isolated, particularly the eastern humid lowland forests, the western deciduous formations and much of the central highlands. Conserving the most important remaining forests and thickets was thus a high priority within the emergent SAPM process. In addition, SAPM prioritization analyses targeted large, relatively intact habitat blocks where communities and species are likely to be more resilient to pressures and threats, whether natural or anthropogenic.

The most recent estimates of remaining natural forest and thicket ecosystems now occurring in protected areas is encouraging. For example, 32% of remaining natural forest (the humid forests in the eastern lowlands and eastern flanks of the central plateau) are within protected areas, comparable to levels encountered in forest and thicket ecosystems elsewhere in Madagascar (Madagascar National Parks 2014).

Currently, all forest-dependent tenrec species occur in at least one protected area. Two of the most range-restricted tenrec species recently had their habitat come under protection under the SAPM process: *Microgale jenkinsae* in the Mikea Forest (managed by Madagascar National Parks) and *M. jobihely* found in two new protected areas promoted by NGOs.

Before the creation of SAPM, targeting of rivers, lakes and marshes was rarely considered in national conservation planning (Benstead *et al.* 2003). At present, the wetlands focus is mainly oriented to conserving freshwater fish and threatened aquatic bird species so any benefits to tenrecs are incidental. Notwithstanding the absence of tenrecs in wetlands protected areas planning, there have been positive consequences, including the reported presence of *L. mergulus* at the new Nosy Volo reserve, which was established to conserve freshwater fish communities in the south-east (R. Lewis, pers. comm.) and the occurrence of the Endangered *M. jobihely* in a new wetlands/forest reserve (Goodman *et al.* 2006, Hoffmann 2008) created principally to conserve the only known population of the Madagascar pochard, *Aythya* *innotata* (Birdlife International 2014).

Two of Madagascar's five freshwater ecoregions are rated as globally important and two more are rated regionally important (Thieme *et al.* 2005), suggesting that more emphasis should be given to wetlands conservation in the future. However, conserving or restoring marshes continues to be a persistent challenge as they are frequently converted to rice paddy (Benstead *et al.* 2000). Similarly, conserving adequate stretches of rivers important for freshwater biodiversity may face inherent difficulties linked to their narrow and often rather long configuration as well as settlement and clearance for agriculture (R. Lewis, pers. comm.). It is difficult to predict future wetlands conservation efforts that may be favourable to tenrec species.

Around half of the parks and reserves within the new and expanded national protected areas system are currently under temporary protection, a step towards full legal protection in the near future. Assuming that some key new sites that are critical for conserving range-restricted tenrecs do indeed obtain full protection, all tenrec species will be represented in protected areas (Goodman *et al.* 2013).

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Figure 2. Continuous tracts of habitat spanning lowland evergreen forest to montane thicket - as found in Marojejy National Park - are important areas for tenrec conservation.

Protected area category, governance and on-site management

Occurrence in protected areas is not a certain guarantee that tenrec conservation will be effective. Madagascar National Parks has encouraged local participation to guide and support protected area management since its creation in 1991. Through the past decade, as SAPM developed the trend towards co-management with local communities (and other local entities such as regional tourism offices) has markedly increased. Madagascar National Parks is moving towards direct community participation in surveillance and monitoring, excepting Category I protected areas where only authorized government agencies and researchers are permitted access. It is also supporting the establishment of legally recognized community natural resource management zones beyond the park or special reserve. Patrolling and monitoring are, in part, an effort to reduce management costs but also provide recognition that local community knowledge is a valuable asset to management.

The same trend towards community involvement is evident in new protected areas being established by other entities such as NGOs. In these cases, Category V and VI sites typically have associated natural resource management areas but they may be established within or outside of the protected area, the former not being legally possible in Category I, II or IV sites managed by Madagascar National Parks. Promoters of these new protected areas typically provide technical support to local communities to manage the sites, building capacity for surveillance, monitoring and natural resource management. Many protected area promoters, including Madagascar National Parks, seek partnerships to improve local livelihoods and/or to develop new revenue generating activities. In some cases, the promoters seek to improve social services such as education and health for the communities (see Freudenberger 2010, Harris *et al.* 2012, Gardner *et al.* 2013, Mohan & Robson 2013).

The creation of community-based natural resource management adjacent to protected areas should increase the surface area of usable habitat for local tenrec species, especially as each resource site must have one or more core conservation areas. This will be of most benefit to the oryzorictine tenrec species that are forest dependent or regular users of marshes, especially if resource off take and other forms of disturbance are relatively light. There is no evidence that local people actively hunt these smaller species. However, the situation is likely to be different for the tenrecine tenrecs, notably *Tenrec ecaudatus*, *Setifer setosus* and *Echinops telfairi*, and to a lesser extent the smaller *Hemicentetes* species. These animals are widely hunted for food in their respective ranges at rates that are likely to be unsustainable, at least in some areas (Jenkins *et al.* 2011). Increasing poverty in rural communities may be causing greater dependency on wild species as a protein source. *Tenrec ecaudatus*, *S. setosus* and *E. telfairi* are also served in some urban restaurants. Field researchers familiar with tenrecs have anecdotal evidence that populations may have declined in recent years due to overly intense hunting (S.M Goodman and V. Soarimalala, pers. comm.). The local community managers are unlikely to halt or reduce their traditional hunting practices in resource management areas: in such cases there will be no added conservation value for the tenrecine species. The same scenario could occur in the stricter Category II and IV protected areas as Madagascar National Parks adopts its recent co-management policies to engage local communities in surveillance and monitoring. The individuals involved in these activities are trained and supervised by park staff. They also sign formal agreements with the park. At the moment it is not possible to predict the impacts on hunted tenrecs.

Category V and VI protected areas are less strict than those noted above, and many sites have an equal emphasis on conservation, natural resource use and livelihoods improvement (see Gardner *et al.* 2013). Governance structures and management regimes may also be rather informal. It is likely that hunting of tenrecs would be subjected to little or no control, except perhaps in well-recognized core conservation areas. Indeed, a total hunting ban is unlikely as the larger and widely sought *T. ecaudatus* is legally classed as a game animal (Rakotoarivelo *et al.* 2011).

It is our experience that natural resource use, especially in some new Category V protected areas, may be relatively high. It is possible that some forest and thicket habitats could be degraded beyond levels tolerable to tenrec species that are strict forest dependents. There is at present no information available to provide a clear answer but it would be prudent for the protected area's promoters to examine this issue.

Conservation status

The IUCN Red Listings for tenrecs are currently being reviewed by the IUCN/SSC Afrotheria Specialist Group. The existing assessments from 2008 include one Data Deficient species (*Oryzorictes tetradactylus,* Goodman *et al.* 2008), four Vulnerable species (*Limnogale mergulus,* Olson & Goodman 2008; *Microgale dryas,* Jenkins, & Andrianjakavelo 2008; *M. monticola,* Jenkins & Goodman 2008a; *M. nasoloi,* Jenkins & Goodman, 2008b) and two Endangered species (*M. Jenkinsae,* Goodman & Jenkins 2008; *M. jobihely,* Hoffmann, 2008). All other species that have been assessed are of Least Concern, and one recently described species (*M. grandidieri*) has not been assessed.

For Vulnerable or Endangered species we have noted that *L. mergulus* is reported in the new Nosy Volo Reserve in the east, and new parks and reserves are the only protected areas where *M. jenkinsae* and *M. jobihely* are reported. Since *M. jenkinsae* was described, the forest where it was discovered has been cleared. However, the locality was part of a large national park that may support populations. There is also potential habitat a few kilometers to the south.

Microgale grandidieri is recorded in Namoroka National Park and the new Menabe–Antimena Reserve north of Morondava, together with several points in between. It has also been collected near the Onilahy River in the south-west (Goodman *et al.* 2013). *Microgale prolixacaudata* is restricted to the northern humid forests and is known from Marojejy and Montagne d'Ambre National Parks, Anjanaharibe-Sud and Manongarivo Special Reserves managed by Madagascar National Parks, and a new reserve being developed by an NGO and its community partners. It is reported to be quite common in some localities (Goodman *et al.* 2013). Apart from protection afforded by parks and reserves, *M. prolixacaudata* occurs in one of the largest continuous blocks of forest in Madagascar.

The larger tenrec species, *T. ecaudatus*, *S. setosus* and *E. Telfairi,* are rarely identified as conservation targets in protected areas and, even if they are, there does not appear to be any conservation measures undertaken. The Red List (IUCN 2013) considers them as Least Concern as they are assumed to have stable populations, occur in numerous protected areas and hunting is only a local threat. Some anecdotal accounts (S.M Goodman and V. Soarimalala, pers. comm.) suggest that hunting pressure may be increasing at least in some areas. It may be prudent, therefore, to encourage protected area managers to take steps to ensure that hunted tenrec species maintain healthy populations that can be a sustainable resource for neighbouring communities.

Conclusions

The expansion of the protected areas system under the aegis of SAPM has been positive for Malagasy tenrecs, with all species occurring within parks or reserves. Indeed, even before the expansion most species were found in one or more parks or reserves.

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Figure 3. *Oryzorictes tetradactylus* is known from montane habitats such as those in Andringitra National Park.

The smaller shrew tenrecs and mole-like tenrecs are not directly threatened by human activities and there are no specific conservation measures needed for individual species. For most, or even all, of these tenrecs, maintaining sufficiently large and intact, or near-intact, forest and wetlands habitats should be sufficient for their protection. However, we suggest that protected area managers, where appropriate, consider actions to sustainably maintain the populations of the larger tenrecine species in areas where hunting pressure is high.

Acknowledgements

We thank Steven M. Goodman, Richard Lewis and Voahangy Soarimalala for thoughtful discussions on tenrec distribution and protected areas.

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The role of the Afrotheria Specialist Group in the IUCN Red List reassessment process

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The goal of the IUCN Red List of Threatened Species is: "*To provide information and analyses on the status, trends and threats to species in order to inform and catalyse action for biodiversity conservation"* (IUCN Red List Committee 2013). Its primary application, therefore, is to determine which species are at risk of extinction and to use this information to set priorities for conservation.

The Species Survival Commission published the first Red Data Book in 1963, which was an assessment of the conservation status of a few high profile threatened species based on the knowledge and experience of expert scientists (IUCN Red List Committee 2013). Early assessments did not follow a protocol, however, so were quite subjective. Over time, the Red List has evolved into a quantitative, data-driven process using more objective criteria, and has become the internationally accepted system for assessing species extinction risk (Rodrigues *et al.* 2006, Vié *et al.* 2009).

The Red List Categories and Criteria, which were adopted by the IUCN in 1994 (Mace *et al.* 2008), were first applied to all mammals in 1996 (Baillie & Groombridge 1996). The Categories and Criteria were refined in 2001 to create Version 3.1 (IUCN 2001), and have remained largely unchanged since then. These criteria assign each species to one of eight categories based on the likelihood of a species going extinct under the prevailing population characteristics and threats (see Mace *et al.* 2008 for references). In addition to greater objectivity of the criteria, consistency and transparency have been improved.

The Red List criteria may be applied to species, subspecies and subpopulations, as long as a species assessment is completed first (IUCN Standards and Petitions Subcommittee 2013). Assessments are normally only conducted on species that have been described formally in the peer-reviewed literature, but undescribed species may be assessed under exceptional circumstances, such as there is a clear conservation benefit (IUCN Standards and Petitions Subcommittee 2013). The criteria were initially only applied at the global level because national and regional assessments were generally based on country boundaries, which often do not relate to species viability (Mace *et al.* 2008), but national and regional guidelines have now been developed. Thanks to a two-way flow of information between national and global assessments, the two efforts exchange important insights into conservation efforts (IUCN Red List Committee 2013).

An important secondary use of the Red List has been the development of the Red List Index (RLI), which was designed to track trends over time in the threats to species, multi-species sets and families across different biogeographic realms (IUCN Red List Committee 2013). This Index, which is based on changes in the proportion of species in each threatened category over time, provides a global indicator of the changing state of biodiversity, and provides conservation efforts with knowledge on what and where the important conservation challenges are, and whether specific conservation actions are effective (Butchart *et al.* 2004).

One of the important roles of the IUCN/SSC Afrotheria Specialist Group is to update the Red List assessments, which includes keeping the foundational taxonomy current. Governments and international agencies are increasingly using the Red List to inform policy, while funding agencies, such as the Global Environment Facility (GEF), are using it to help decide where to direct their investments. The assessments generally are done once every five to ten years, but can be done at any time for newly described species or species for which the threatened status has changed. The most recent global assessment of the status of terrestrial and marine mammals, which included reassessments of the Afrotheria, was conducted in 2008 (Schipper *et al.* 2008), and the IUCN has set a goal to reassess all mammals by 2015. In line with this, the Afrotheria Specialist Group was requested to complete their reassessments in 2014, and we are close to fulfilling this target. The IUCN has made online training available at: http://www.iucnredlist.org/technical-documents/red-list-training/online-training.

Acknowledgements

Thanks to Mike Hoffmann and Galen Rathbun for commenting on the manuscript.

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A Personal Perspective

Highlights and disappointments during 40 years of research on otter-shrews

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My research career began in 1965 when I started a PhD on the ontogeny of shrews. I finished this morphological study in autumn 1970 and the publication, which had to be in German, was published two years later (Vogel 1972). It opened up the possibility for me to get a job as director of the Centre Suisse de Recherches Scientifiques in Côte d'Ivoire from 1970 to 1973.

In Côte d'Ivoire I studied the ecology of tropical shrews with investigations into energetics (Vogel 1976), as well as behaviour and systematics. When living in the African rainforest, I became fascinated by the enigmatic Nimba otter-shrew, *Micropotamogale lamottei,* that had been discovered by Maxime Lamotte in Guinea, close to the border of Côte d'Ivoire. Discussions with local Ivorian people showed that the otter-shrew was known and occasionally died in eel-bucks (fish traps set for eels).

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Figure 1. Adult male Nimba otter-shrew.

Incredibly, my first expedition in search of otter-shrews was successful: Sherman traps set along the edge of a forest river caught one animal which I kept in captivity for several weeks (Fig. 1). Frustration followed when I failed to close the cage properly and the otter-shrew escaped to the nearby lagoon. Later I trapped two more individuals and fishermen preserved drowned specimens for me in formalin bottles that I left in some villages. Over a period of five years I managed to collect 84 specimens (though many were badly decomposed). This study provided data on otter-shrew ecology, such as their ability to dive for up to 15 minutes (Vogel 1983).

One of the trapped animals was a female and she provided my next unexpected highlight: she gave birth 51 days after her capture. I have not yet found time to publish my data on the development of the single young (Fig. 2 and Fig. 3), but in 1976 I gave a presentation on the subject to a conference in Innsbruck. This explains why you can find data on the reproduction of the Nimba otter-shrew in the field guide of Haltenorth and Diller (1977). When the female eventually died we were able to prepare its karyotype post-mortem (Vogel *et al.* 1977).

I was happy when Robert Asher asked to use my *Micropotamogale* material for his thesis on the morphology of the Insectivora (Asher 2000) and the material formed the basis for many publications (e.g. Asher 1999, Asher 2001, Asher *et al.* 2003, Asher 2005, Asher *et al.* 2005, Asher 2007).

In 1973 I became professor of zoology and ecology at the University of Lausanne in Switzerland. My research continued on the biology and systematics of shrews, but I kept my ties with West Africa until now (see e.g. Vogel 2013, Decher *et al.* 2013) and my PhD students returned there for studies in shrew systematics (Maddalena 1990) and energetics (Sparti 1990).

In 1995 we started a project to study otter-shrew ecology to improve conservation of the species. Sadly this turned out to be the greatest disappointment of my scientific career as my doctoral student was unable to keep any of the animals alive in captivity for more than a few days – so I stopped the project immediately. The student eventually did a PhD on plant histology.

I am interested in the evolution of the placenta in mammals (Vogel 2005). This interest was fed by my contacts with Anthony Carter and led to collaboration with other colleagues on the placenta and ovary of otter-shrews and other Afrotheria (Enders *et al.* 2005, Carter *et al.* 2006).

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Figure 2. Nimba otter-shrew, 1 day old.

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Figure 3. Nimba otter-shrew, 20 days old, eye-lids still closed.

In the nineties, I sent my former PhD student François Catzeflis some *Micropotamogale* tissues. In 2001 I was asked by the Journal of Molecular Phylogenetics and Evolution to referee a manuscript from Douady and co-authors on the monophyly of the Tenrecidae; I was shocked to find an analysis of my material in the paper as no-one had informed me. The source of the tissues and my comments were acknowledged in the final publication (Douady *et al.* 2002) but, to my disappointment, my objection to the use of the term Afrosoricida – proposing Tenrecoidea instead - was ignored.

But another highlight came around the same time. David Happold engaged me in 2000 to write the chapter on the Potamogalinae in the planned series Mammals of Africa which gave me the occasion to discuss with the late Professor Urs Rahm his captures and studies of *Micropotamogale ruwenzorii*. The presence of webbed feet suggests keeping this species in a separate genus (Vogel 2013); I am not aware of a single case of a small mammal's genus containing a mix of species with and without highly adapted feet for swimming.

I had hoped this collaboration on Mammals of Africa would give me the possibility to introduce finally the term Tenrecoidea (McDowell 1958) to replace the misnomer of Afrosoricida. But here too I lost the battle (Bronner & Jenkins 2005); Asher and Helgen (2010) eventually showed clearly that Tenrecoidea has priority over Afrosoricida.

Overall, though, the Mammals of Africa is a beautiful synthesis of our knowledge and I am thankful to David and Meredith Happold for the energy they put into this great work.

The conclusion of my retrospective is that, if our findings and interpretations are not accepted one day, they may sometimes be recognized later – so never give up! It is important to participate in science with enthusiasm and I am very happy to have been involved in the adventure of biological research for over 40 years.

Acknowledgements

I thank Robert R. Asher and PJ Stephenson for their comments on a first version of this paper.

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Afrotheria News

Grey-faced sengi research update

In *Afrotherian Conservation Number 7*, Rovero and Rathbun (2009) described the research that was on-going and planned on the grey-faced sengi, *Rhynchocyon udzungwensis,* following its description as a new species in 2008 (Rovero *et al.* 2008; Figure 1). Here I provide an update on the results obtained.

The research project had two components: a molecular analysis of the evolutionary history of *R. udzungwensis*, especially in relation to the geographically closest *R. cirnei*, and a refinement of the distribution of the species with an analysis of its habitat associations. Both investigations are now completed and results published.

The molecular study has been based on extensive sampling of both species that yielded tissue samples from 22 specimens of *R. udzungwensis* and 8 of *R. cirnei*. Three mitochondrial and 2 nuclear loci were used to construct species trees and to determine whether introgression was detectable either from ancient or ongoing hybridization. Species-tree results show that *R. udzungwensis* and *R. c. reichardi* are distinct lineages, however mtDNA shows evidence of introgression in some populations. Nuclear loci of each species were monophyletic, implying that introgression was exclusively historical (Lawson *et al.* 2013). The genetic distinctness of the two species is an important, first result, because it validates the description of *R. udzungwensis* that was based on its distinct pelage pattern and distribution (Rovero *et al.* 2008). Because Lawson *et al.* (in press) found evidence of introgression, they used distribution data and species distribution modeling analysis for present, glacial, and interglacial climate cycles to predict how shifting species distributions may have facilitated hybridization in some populations. Whilst the interpretation of such modeling is affected by the limited range of these species, the results provide clear support that the relationships within the genus *Rhynchocyon* may be confounded by porous species boundaries and introgression, even if species are not currently sympatric (Lawson *et al.* 2013). These results bear interesting implications to understand the overall phylogeny of the genus *Rhynchocyon*, which is yet to be adequately understood.

The ecological study has been based on a large sample of 183 camera traps deployed over 6 years with a cumulative effort of 4,600 camera trapping days. As mentioned in Rovero and Rathbun (2009), the study refined the sengi distribution at 390 km^2 in the two forests where it occurs (Mwanihana to the east and Ndundulu/Luhomero to the west, Figure 2), which represent an increase of 30%. Vegetation sampling at a sub-set of 38 camera stations set in both forests (and of which 33 were positive to sengi presence) allowed us to construct multiple regression models of the best predictors of sengis' relative abundance (number of photo captures per day). These potential predictors were the density and cover (basal area) of canopy trees, sub-canopy trees and forest floor stems, as well as the type of forest floor cover and the leaf litter depth. Results showed that the cover of sub-canopy trees (5-10 cm diameter at breast height) is a significant and positive predictor of sengis' relative abundance (Rovero *et al.* 2013). This indicates preference for area that are densely covered.

In addition, a second sub-set of 40 camera traps was used to estimate sengi occurrence across Mwanihana forest in relation to broader habitat features such as terrain slope, gross habitat type at the camera trap sites (lowland deciduous forest or montane evergreen forest) and distance from the camera trap sites to forest edge. Results indicate that sengi occurrence in terms of sites occupied on sites sampled peaks in evergreen montane forest and is also greater in gentle slopes (Rovero *et al.* 2013). Combined, the results from these two habitat association analysis indicate that grey-faced sengis are most abundant in moist montane forest with adequate cover of understory vegetation and deep leaf-litter forest floors in gentle slopes. Rovero *et al.* (2013) suggest that these combined features may provide optimal conditions for antipredation vigilance and for nest-building and/or foraging on invertebrates in the thicker leaf litter.

Overall, these new research efforts on the Udzungwa-endemic grey-faced sengi bear important conservation implications. *R. udzungwensis* is confirmed as a monophyletic taxon with unique evolutionary history, very restricted distribution and relatively narrow ecological niche requirements that are mainly in montane evergreen forest. Its IUCN red listing as Vulnerable (IUCN 2013) is supported by the ecological study, as the extended range is relatively small, and, most importantly, it represents an extension into lowland forest which is sub-optimal habitat for this sengi.

Figure 1. An interesting camera trap image of the grey-faced sengi, *Rhynchocyon udzungwensis*, with a white-chested alethe, *Alethe fuelleborni,* that seemingly follows the sengi. This may be evidence of commensalism by the two insectivorous animals, a behavior that has been reported for other *Rhynchocyon* species (Rathbun 1979, K. Nowak pers. comm.). Photo credits: TEAM network/F. Rovero, MUSE.

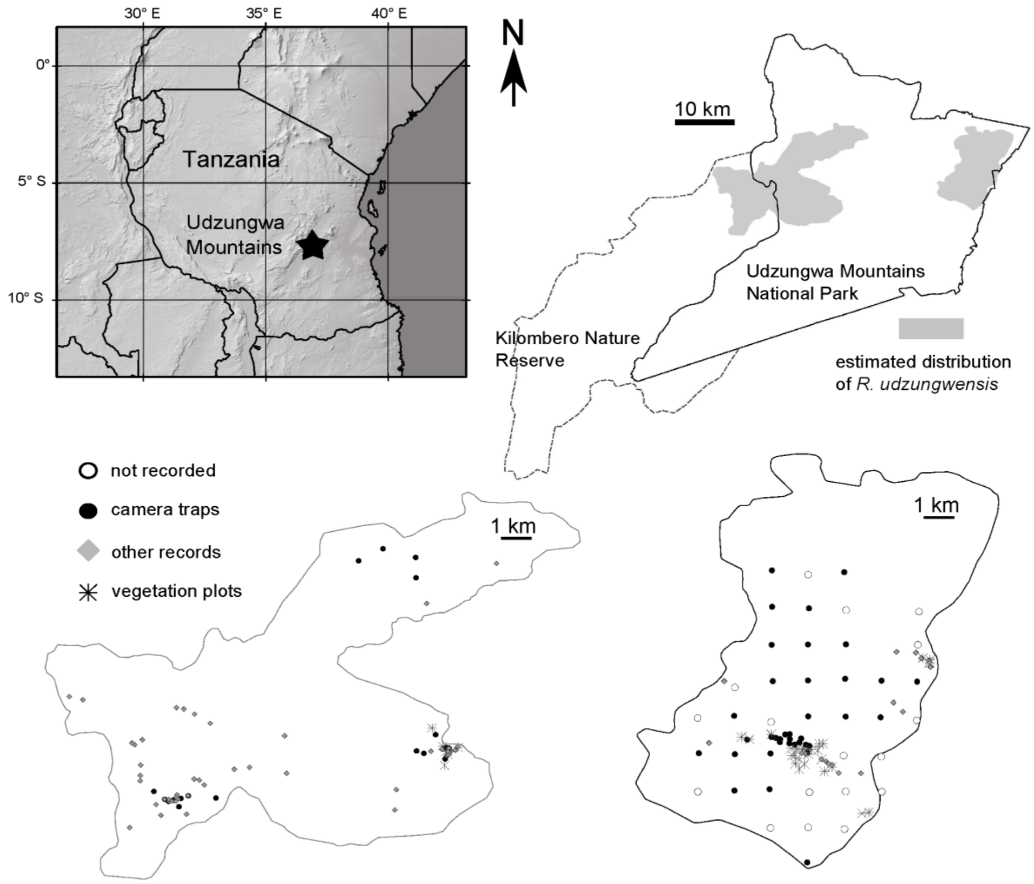

Figure 2. Top left inset shows the location of the Udzungwa Mountains in Tanzania. Top right: map of the estimated area of occurrence (gray shading) of the grey-faced sengi, *Rhynchocyon udzungwensis*, in northern Udzungwa Mountains, Tanzania, as derived from multiple survey methods. Bottom: enlargements of the 2 forest blocks where the species occurs and black dots show localizations. The western portion (left) of the distribution extends over the whole Ndundulu/Luhomero forest, while the eastern portion (right) extends over the mid-to-northern portion of Mwanihana forest. In this forest, the camera trap sites that failed to record the sengis within a regular grid of 40 camera trap sites are also shown. From Rovero *et al.* 2013.

The most important conservation recommendation remains to ensure that the full extent of forest where the species occurs continue to be protected by the Udzungwa Mountains National Park and the Kilombero Nature Reserve. In addition, monitoring the species' distribution and abundance over time will be importantl, and towards this end Italy's MUSE- Museo delle Scienze is implementing since 2009 the standardized monitoring of terrestrial vertebrates through camera trapping as part of the TEAM network (http://www.teamnetwork.org).

Lawson L.P., Vernesi C., Ricci S. & Rovero F. 2013. Evolutionary history of the grey-faced sengi, *Rhynchocyon udzungwensis*, from Tanzania: a molecular and species distribution modelling approach. *PLoS ONE,* 8(8):e72506, 10pp.

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Another new sengi species

The afrotheria continue to grow! A new species of sengi was recently described from Namibia (Dumbacher *et al.* 2014), the third brand new sengi species discovered in the wild in the last decade. *Macroscelides micus* is the smallest known member of the 19 sengis in the order Macroscelidea, weighing only 25-30 g. Although it occurs in a small geologically distinct area of north-western Namibia, it will be classified as Least Concern in the upcoming IUCN Red List update.

The discovery has also been reported in several web stories, such as:
http://www.latimes.com/science/sciencenow/la-sci-sn-elephant-shrew-mouse-sengi-africa-cute-20140627-story.html
and
http://www.sciencedaily.com/releases/2014/06/140626132216.htm

Also on sengis, a recent article on the BBC website focused on what was described as "the world's fastest small mammal", based on a recent paper by Lovegrove and Mowoe (2014). Check it out at: http://www.bbc.co.uk/nature/25729116

Dumbacher, J.P., Rathbun, G.B., Osborne, T.O., Griffin, M. & Eiseb, S.J. 2014. A new species of round-eared sengi (genus *Macroscelides*) from Namibia. *Journal of Mammalogy,* 95: 443-454.

Lovegrove, B.G. & Mowoe, M.O. 2014. The evolution of micro-cursoriality in mammals. *Journal of Experimental Zoology,* 217: 1316-1325.

Biodiversity & Protected Areas Task Force

Read the latest edition of the newsletter of the IUCN WCPA/SSC Joint Taskforce on Biodiversity & Protected Areas in the Union Portal:
https://portals.iucn.org/union/sites/union/files/doc/taskforce_newsletter_-_19july2014.pdf

The last months have been extremely busy, in particular with testing and refining the Key Biodiversity Area (KBA) criteria and thresholds.

Species 2013 - The SSC Annual Report

The SSC Annual Report details diversity of activities and achievements across the Species Survival Commission in 2013, and includes reports from the SSC Specialist Groups, Task Forces, Red List Authorities, the Sub-committees, the Steering Committee as well as the SSC Chair and the Director of the Global Species Programme.

Download the report at:
https://portals.iucn.org/library/sites/library/files/documents/IUCN-2014-014.pdf

The IUCN Red List explained in 4 minutes

In 2014 the number of species on The IUCN Red List rose to over 73,500. IUCN's aim is to include at least 160,000 species on The IUCN Red List by the year 2020. A short animated video has now been released to briefly explain what information is provided in The IUCN Red List, how this information can be used, and how The IUCN Red List is becoming an increasingly powerful 'Barometer of Life'. See the video on YouTube at:
https://www.youtube.com/watch?v=VukyqMajAOU&feature=youtu.be

Afrotheria display in Dresden

Thomas Brockmann, a volunteer at Dresden Zoo, recently requested the use of a tenrec photograph to help create an information panel. PJ Stephenson's image of Cowan's shrew tenrec (*Microgale cowani*) is now on display.

Thomas explained in an email: "The information panel is placed right next to our new enclosure for meerkats and rock dassies. It was my aim to show the average visitor the very interesting group of Afrotheria and their similarity to the others mammals evolved over million years."

Herr Brockmann's effort is clearly helping our specialist group with its goal of raising awareness of Afrotheria. Thanks to him for sharing the image of the panel.

Noticeboard

Seeking sengi records

The Sengi Section of the Afrotheria Specialist Group is seeking records of giant sengis (genus *Rhynchocyon*) from the Central African Republic or nearby countries in order to better understand the distribution of this large diurnal sengi in the region (www.sengis.org). I would appreciate hearing from you if you have information to share.

Galen Rathbun
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Hyrax vocalisations needed

The Hyrax Section of the Afrotheria Specialist Group is coordinating a hyrax vocalisation project with the objective of creating a hyrax phylogenetic tree using calls and a linguistic approach. This would be similar to a molecular tree using gene alignments or distances.

In order to create a thorough database, we need digital recordings of hyrax songs throughout Africa. If you have any digital hyrax recordings, or are in the field and able to record vocalisations, please consider collaborating with us.

In addition to good quality recordings of vocalisations, we would need at least the first three of the following data, and the remainder if possible:

1. Your name and contact information
2. Date and time of recording
3. Geographical location (description and GPS coordinates)
4. Species
5. Context (if hyrax were seen fleeing, fighting, mating, any behaviour at/before/after call)
6. Information on size, sex, etc. of caller
7. Picture
8. Habitat

If you, or someone you know, have or can obtain hyrax recording, please contact me.

Lee Koren, Ph.D.
Hyrax Coordinator, Afrotheria Specialist Group
Lee.Koren@biu.ac.il
Large files can be sent via WeTransfer (https://www.wetransfer.com)

12th African Small Mammal Symposium

The 12th African Small Mammal Symposium will be held from Sunday 12 April to Saturday 18 April 2015 in Mantasoa, Madagascar. Several members of the IUCN/SSC Afrotheria Specialist Group are on the organizing committee, namely Voahangy Soarimalala and Steve Goodman (co-chairs), Martin Nicoll, Paula Jenkins and PJ Stephenson.

This international symposium, organized by Association Vahatra and the Department of Animal Biology of The University of Antananarivo, will be an occasion for students, researchers, and experts on African and Malagasy small mammals to present their work and exchange ideas and experiences.

Further information is available from Steve Goodman (sgoodman@vahatra.mg) and Voahangy Soarimalala (vsoarimalala@vahatra.mg) or from the meeting website at: http://www.vahatra.mg/asms/asmseng.html.

Job Opportunity

Project Leader
Scimitar-horned Oryx Reintroduction Project
Republic of Chad

The Sahara Conservation Fund (SCF) is recruiting a dynamic, highly motivated and experienced Project Leader to oversee operations and manage the site, staff and infrastructure of a new, ground-breaking wildlife reintroduction project in the Republic of Chad, Central Africa.

Job duties will include significant organizational, logistical and social tasks and include responsibility for the building and maintenance of the reintroduction site, recruitment and supervision of local staff and contractors, contracting for the provision of food and water, transport and welfare of the antelopes to be reintroduced, and general management of the project's field-based operations, including facilitation of visits of international project technical and scientific staff. The Project Leader will also be responsible for building and maintaining excellent working relations with the project's government partners, the project's sponsors, the local Chadian administration, and the local communities.

For more information on this unique job opportunity, download the full terms of reference and information on how to apply at the following sites:
French:
http://www.saharaconservation.org/IMG/pdf/TDR_Coordonnateur_de_projet_Oryx_Final_French.pdf
English:
http://www.saharaconservation.org/IMG/pdf/TOR_Oryx_Project_Leader_Final_English.pdf

Funding opportunities

2014 Call for proposals for LIFE Action Grants (European Union)

The European Commission invites legal persons (entities) registered in the European Union (EU) to present proposals for the 2014 Call for proposals for LIFE Action Grants. The call covers proposals for both LIFE sub-programmes. For the sub-programme for Environment, this call will cover action grants "Traditional" projects, Preparatory projects, Integrated projects, Technical Assistance projects and Capacity Building projects. For the sub-programme for Climate Action, this call will cover action grants only for "Traditional" projects and Capacity Building projects (the other types will be covered from 2015 onwards). Details can be obtained at:. http://ec.europa.eu/environment/life/funding/life2014/index.htm

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Guidelines for Authors

Articles, species profiles, reviews, personal perspectives, news items and announcements for the noticeboard are invited on topics relevant to the newsletter's focus. Manuscripts should be sent to Dr. PJ Stephenson, Editor, *Afrotherian Conservation* (PJStephenson@wwfint.org). Articles should be under 3,000 words and follow the format of this edition. The Editor reserves the right to edit all contributions for style and content.

Subscription Information

Afrotherian Conservation is available on the IUCN/SSC Afrotheria Specialist Group website at: http://www.afrotheria.net/.

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