Convention on the Conservation of Migratory Species of Wild Animals (CMS)

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CMS/ScC12/Doc.12

DRAFT PROPOSALS FOR THE INCLUSION OF BAT SPECIES ON CMS APPENDICES

(Prepared by the Secretariat)

1. The eight draft listing proposals attached to this note were developed by Mr Tony Hutson, Co-chair of the IUCN Chiroptera Specialist Group on behalf of the CMS Secretariat in order to pre-identify species that, based on the scientific knowledge available, would appear to be eligible for listing on the CMS Appendices. They have been submitted to the Scientific Council for its consideration. Based on a positive evaluation from the Scientific Council, the Secretariat will address appropriate Parties and invite them to consider and subsequently submit the proposals to the Eighth Meeting of the Conference of the Parties.

2. The Council may wish to consider the listing proposals in conjunction with the updated study by Mr Hutson (ScC12/Doc.13). The Council may also wish to take into consideration the draft CMS Strategic Plan (2006-2011) (ScC12/Doc.4), and the Scientific Council draft Implementation Plan to the revised CMS Strategic Plan (ScC12/Doc.3) under agenda items 3.2 and 3.0, respectively.

DRAFT PROPOSAL FOR INCLUSION OF SPECIES ON THE APPENDICES OF THE CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS
(Updated February 2004)

A. PROPOSAL: Inclusion of the lesser long-nosed bat *Leptonycteris cuasoae* on Appendix I.

B. PROPONENT: Government of

C. SUPPORTING STATEMENT:

1. Taxon

1.1. Class	Mammalia
1.2. Order	Chiroptera
1.3. Family	Phyllostomidae
1.4. Genus/species/subspecies	*Leptonycteris curasoae* Miller 1900
1.5. Common name	English: Lesser long-nosed bat French: Glossophage de Curaçao Spanish: Murcielago-hocicudo de Curazoa

2. Biological data

2.1. Distribution

Distributed from southern states of USA (central Arizona and south-west New Mexico) to northern Central America (El Salvador) and in Colombia, Venezuela and the Netherlands Antilles (Koopman, 1993; Simmons, in press).

The northern populations have been regarded as separate species or subspecies (*L.c.sanborni*/*yerbabuenae*). Recent analysis suggests that the subspecies are separated at 6.1% mtDNA (= 0.5 mya) (Fleming, pers.comm.).

L. nivalis is the only other species in the genus.

2.2. Population

Forms large colonies, to 20,000, in caves and mines with major declines recorded in Netherlands Antilles, USA and Mexico.

Seasonal fluctuations in numbers in colonies makes population monitoring difficult.

For Guatemala, there were very few historic records (Arita & Humphrey, 1988) until a 2003 study of bats in dry valleys with columnar cacti and spiny vegetation (Lopez et al., 2004; S.G.Perez, pers.comm.). During 10 months (5 nights per month in each of three valleys), 76 (mostly males) were trapped, mainly from February to May, especially at the end of this period. From June to December one pregnant female was trapped at the end of August. Suggests major movement from/to dry valleys. Relationship of these bats with Mexico/US populations not known.

From the data collected in Venzuela, it seems that this species is at the southern limit of its distribution for reproduction mainly in caves located in the north-western zone of Venezuela. No population declines obvious in Venezuela (Angela Martino, pers. comm.).

2.3. Habitat

Nectarivore, foraging in arid scrub zones with agaves and columnar cacti.

Specialist feeder on nectar and pollen, plus some insects and soft fruit. roosting in caves, mines, etc. These bats have been regarded as keystone species in maintaining the pollination of the principal components of the arid zone flora, although Fleming (pers.comm.) suggests that it is not quite the 'keystone' species at was formerly thought to be. Regarded as the principal pollinator of the cacti that occur in the dry zones of Venezuela (A.Martino, pers.comm.).

Roosts in colonies in caves and mines

For a species account see Fleming & Valiente-Banuet (2002), Hutson *et al*. (2001).

2.4. Migration

Migrates between Mexico and USA (Fleming & Eby, 2003). There is evidence of long-range movements Venezuela, while it is assumed that the species is sedentary in the Netherlands Antilles.

Migrates from Mexico to maternity colonies in southern USA following flowering of arid-zone plants. Migrations cover distances of up to more than 1500 km. Nightly foraging range to 100km (commuting to 40km). Colonies in northern Mexico may reach 5000 in spring (March) or 75,000-100,000 in autumn (November), with females more or less absent from March to September (when they migrate further north to maternity colonies), but with an influx in July – August and a decrease in December (Ceballos *et al*., 1997). There may be two reproductive populations in Mexico, one with a spring birth period which migrates South, one with a winter birth period which migrates North. These two reproductive demes are not separable genetically. Fleming *et al*. (1993) found the species followed a predictable spatio-temporal corridor of CAM plants (plants using crassulacean acid metabolism, such as Cactaceae, Agave), although in southern Mexico they fed on more mixed sources (including other non-CAM, i.e. C3, plants) where the related *Glossophaga soricina* used C3 plants continually. Later Wilkinson & Fleming (1996) demonstrated two routes for separate populations (clades), one along the coast (with columnar cacti) and one along foothills of the Sierra Madre Occidental (with paniculate Agave). The inland bats move later than the coastal bats in line with flowering times. The authors noted with interest that such a long-range migrant should maintain separate clades. Rojas-Martinez *et al*. (1999) suggest that the species is resident below 21^{o}N.

In the north-west part of the range maternity colonies of 12-15,000 gather in Organ Pipe Cactus National Monument in mid-May and disappear by September. These may accumulate from a wide area (judging from the wide range in the progress of pregnancy on arrival, and DNA studies) (Ceballos *et al*., 1997). Ceballos *et al*. (1997) also discuss the appearance of large numbers of *Pteronotus davyi* in their study caves in October, plus this and *P. parnellii* in March to May and *Mormoops megalophylla* in April (all members of the family Mormoopidae).

Major passage of bats, including this species, have been observed in Rancho Grande region of Venezuela. Recent studies of DNA in Venezuela (where movements of up to 60 km are recorded) shows the likelihood of this being a long-range migrant here (more so than in the related *Glossophaga longirostris*) and this is supported by observations of its temporal absence from some areas and with large seasonal concentrations in certain caves (Newton *et al*. 2001; S.Walker, pers. comm.). Studies on this species for at least 10 years (Martino et al., 1997, 1998; Sosa & Soriano, 1993), have observed periods during which the number of individuals present in the arid zone of north-west Venezuela is very low or nil, reappearing later during the months of parturition and lactation. Coincidentally, in the arid zones of the Venezuelan Andes (at a distance of about 700km) they disappear in the reproductive period and reappear in the months when they are absent from the north-western zone. The same behaviour has been noticed by local people in the dry zones showing

periods in which these people see many bats concentrated in some sites. Through a project funded by the Fondo Nacional de Ciencia y Tecnologia (FONICIT) further studies using molecular techniques will be initiated related to the possible migrations that this species may undertake and with respect to other species associated with *L. curasoae* (mainly Mormoopidae).

Studies of movement in this species in Colombia have been made by Sanchez & Cadena (1999).

3. Threat data

3.1. Direct threats to the populations

Concentration in caves where subject to disturbance, blocking of entrances, direct killing (mainly in misplaced attempts at vampire bat control), recreational caving and tourism, mineral extraction. In the arid region of north-west Venezuela in recent years, there has been tourist development, which can result in disturbance to the colonies especially in their reproductive period. Due to the facility to move freely, it is possible that they could easily disappear, disrupting the dynamics of the semi-arid ecosystem in question. (?)

3.2. Habitat destruction

These bats have an extreme mutualism with key arid zone plants (such as Agave and certain cacti): the bats are the primary pollinators of the plants and the plants are the primary food source of the bats. The bats are threatened by loss of food sources, interruption of flowering of key food plants, and disruption of flowering corridors. Desert areas with low species diversity but high endemism are also threatened. Nectar specialists are considered especially at risk (Arita & Ortega, 1998).

3.3. Indirect threats

3.4. Threats connected especially with migrations

The reliance on a number of caves, migration along nectar corridors of critically important plants (including columnar cacti and paniculate agaves), and the importance in other threatened tropical dry forests, makes this an important species.

3.5. National and international utilization

4. Protection needs and status

The subject of the Program for the Conservation of Migratory Bats of Mexico and the United States (PCMM). Most of the species covered by this programme also occur in South America.

4.1. National protection status

Protected USA and Mexico, status elsewhere unknown. Mexico's Federal Law of Wildlife encompasses all caves and crevices *de facto* as protected areas. Bats may be protected in other range states by inclusion in general wildlife legislation, which is poorly enforced.

4.2. International protection status

IUCN status: Vulnerable.

4.3. Additional protection needs

There is good knowledge for this species at the northern end of its range, where it is a key species in the Program for the Conservation of Migratory Bats of Mexico and the United States (PCMM) (Walker, 1995; Withgott, 1999). In South American, there is increasing knowledge but still large knowledge gaps and hence major research requirements – studies of migration patterns of South American bat species is a recommendation in Hutson *et al.* (2001).

USA has recently adopted a migratory bird act and a similar act for bats would be appropriate.

While the migration in Mexico/USA is certainly transboundary, it is unclear as yet whether migration in northern South America includes transboundary movements.

There are efforts to increase co-operation between PCMM and PCMG (Program for the Conservation of Bats of Guatemala) to answer questions about migration and relationships between populations.

In Venezuela, one local NGO, INFALCOSTA, together with CIEZA (of the Universidad Nacional Experimental Francisco de Miranda) is trying to protect the caves which serve as a maternity refuge for this species in the Peninsula de Paraguana, reaching a partnership with the local communities. Also, the regional government is trying to introduce legislation that allows for the protection of the roost sites, which would make it much easier to obtain resources and local support for its protection, but problems to achieve this legislation are considerable. Further, resources are very limited to sustain this initiative. Although some contacts were made with Bat Conservation International, this has not yet achieved the more forceful campaign necessary for the protection and environmental education of the community and public in general that are involved with this species.

5. Range States1

Colombia, El Salvador, Guatemala, Honduras, Mexico, NETHERLANDS ANTILLES (Aruba, Curasoa, Bonnaire) (NETHERLANDS), USA, Venezuela (including Il de Margarita).

6. Comments from range states

7 Additional remarks

8. References

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DRAFT PROPOSAL FOR INCLUSION OF SPECIES ON THE APPENDICES OF THE CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS

(Updated February 2004)

A. PROPOSAL: Inclusion of the large flying fox *Pteropus vampyrus* on Appendix I.

B. PROPONENT: Government of

C. SUPPORTING STATEMENT:

1. Taxon

1.1. Class	Mammalia
1.2. Order	Chiroptera
1.3. Family	Pteropodidae
1.4. Genus/species/subspecies	*Pteropus vampyrus* (Linnaeus 1758)
1.5. Common name	English: large flying fox French: Grand renard volant Spanish:

2. Biological data

2.1. Distribution

Pteropus vampyrus one of the few widespread mainland *Pteropus* species, occurring from south Myanmar and the Andaman and Nicobar Islands (India) in the west, through Thailand, Cambodia to Vietnam (with a single record from northern Laos) and through Malaysia and Indonesia east to the Philippines, Borneo and Timor (Corbet & Hill 1992; Koopman, 1993; Simmons, in press). On many smaller islands, including recent colonisation of Krakatau group.

Further details of distribution can be found in Bates & Harrison (1997) for Indian subcontinent, Lekagul and McNeely (1977) for Thailand, Borissenko & Kruskop (2003) for Viet Nam, Francis et al. (1993) for Laos, Mohd-Azlan et al (2001) for Malaysia, Payne et al. (1985) for Borneo, Heidemann & Heaney (1989) for Philippines, Goodwin (1979) for Timor. A recent record for western India needs clarification.

About seven subspecies (mainly restricted to island groups) have been recognised, but the status of some subspecies needs reassessment. One subspecies, P.v.intermedius from Myanmar and adjacent Thailand is sometimes regarded as a separate species (Corbet & Hill, 1992). However, some authorities, including Corbet & Hill (1992), have even argued that *P.vampyrus* might be synonymised with *P. giganteus* from South Asia.

The genus *Pteropus* includes about 70 species, most species restricted to individual islands or island groups.

2.2. Population

Populations poorly known, but there are widespread reports of declines in colony sizes of up to 90% and there have been no recent sightings at 40% of 115 recorded colony sites in Peninsular Malaysia (Mohd-Azlan et al. 2001). Current colonies here generally number up to about 1500 in tall forest trees or mangrove areas. In Peninsular Malaysia declines have been particularly evident over the last 10–20 years (Mohd-Azlan et al. 2001) and are now considered much more severe than earlier suggested by Fujita & Tuttle (1991).

Elsewhere, colonies can be large, up to 15,000 recorded in Borneo and to 100,000 in former colonies recorded in the Philippines, but these colonies are often mixed with other species. Declines are also reported for Borneo and massive declines (up to 99%) since the 1920s in parts of the Philippines (see Mickleburgh et al. 1992).

2.3. Habitat

An account of the species can be found in Mickleburgh et al. (1992) and in Kunz & Jones (2000).

The Javan form of this species, locally known as 'Kalong', is regarded as the largest bat in the world with a wing span of up to 1.7 m.

The species roosts colonially in tall emergent forest trees or mangroves and often on off-shore islands. It feeds on a range of fruits and flowers, many of which are grown by man or have economic or social value to man (Fujita & Tuttle, 1991). The species is thus an important pollinator and seed disperser. Buds and leaves are also sometimes eaten. It occurs from sea level to at least 1300m, but is most frequent in lower (coastal) areas. It ranges up to 30 km during nightly foraging flights.

2.4. Migration

Migrations poorly known, but believed to migrate between Cambodia and Viet Nam (J. Walston, pers.comm.), Thailand and Malaysia, and Malaysia southwards across the Straits of Malacca (towards Singapore and Indonesia) (Mohd-Azlan et al. 2001) and between Sarawak (Malaysia) and adjacent Indonesia (M. Gumal, pers. comm.).

It has also been suggested that populations on the Andaman and Nicobar Islands (India) are seasonally migratory (Mason, 1908; Hill, 1967). Mason says the species is possibly a regular migrant to the Nicobar Islands during monsoons, arriving April and leaving in September; although he noted one record of them being seen in Car Nicobar in February/March of one year. It is believed to migrate between these islands and southern Myanmar (K. Swee, pers.comm.), but Mason's comments may also imply movement between the islands and adjacent parts of Indonesia (Sumatra).

Large colonies are recorded from inner Brunei Bay and these undoubtedly range into Sarawak and probably Sabah.

P. vampyrus was probably as early coloniser or visitor to Krakatau and it is believed that a higher proportion of the seeds that provided colonising trees and shrubs were brought by bats rather than by birds (L.Lumsden and R.Whittaker, pers. comm.).

Generally, very little is known about bat migration in the region. More intensive study of migration in *Pteropus* species has been carried out in Australia (Fleming & Eby, 2003)

3. Threat data

3.1. Direct threats to the populations

Hunting (for food, medicine or sport, and by orchard owners) is a widespread threat. Where licensed, hunting is often poorly controlled and monitored. Persecuted as a pest of fruit in some areas, although damage likely to be outweighed by benefits from pollination and seed dispersal.

Based on licences issued between 1990 and 1996 in peninsular Malaysia, over 56,000 individuals may have been harvested, but interviews with local villagers and hunters suggested that the total kill could have been much higher than was licensed and in addition and unknown quantity was (illegally) shot.

3.2. Habitat destruction
Habitat loss is particularly a threat in lowland forests and mangrove swamp areas principally used for roosting. Development, for various purposes, is a principal threat here (including rapid and increasing removal of mangrove).
In Brunei there are current threats to coastal forests used as foraging habitat, but also the hope that some mangrove roosts will be incorporated into a proposed Ramsar site (D.J.W. Lane, in litt.)

3.3. Indirect threats
More generally, agriculture, including widespread monoculture of crops unsuitable as food sources, such as oil palm, is also a threat.

3.4. Threats connected especially with migrations
Both aspects of habitat loss may also affect continuity of feeding habitat on migration routes.

3.5. National and international utilization
Significant use for food, but no current evidence of international trade.

4. Protection needs and status
4.1. National protection status
Until recently, fruit bats (Pteropodidae) were classed as 'Vermin' in India. Probably not protected in any other range state, although hunting is only allowed under licence in Malaysia.

4.2. International protection status
Included in Appendix II of CITES (although no recent international trade is recorded).

IUCN status: Least Concern (needs reassessment).

4.3. Additional protection needs
This is a species for which there is potential for involving the public in roost survey and monitoring, through contributing observations on the seasonal presence/absence, numbers and possibly food items used by the bats. This may encourage local communities to take an interest in and concern for their colonies as part of a general education and awareness programme.

At the other end of the scale, the species might be ideal for satellite/radio-tracking to clarify migration behaviour.

The conservation and monitoring of traditional roost sites is a priority. The maintenance of foraging habitat is of equal importance, although the species is well-adapted to feed on some cultivated plants.

There would appear to be interest and expertise in Malaysia (both in government and non-government organisations) to support, develop and implement an action plan for *Pteropus vampyrus*. The basis for an action plan is included in Mohd-Azlan et al. (2001). This includes control of hunting, increased co-operation between relevant government departments, biological studies (including demographic studies to determine sustainable hunting strategies), survey and roost monitoring, and educational activities. The Malaysian Nature Society has the capacity to be involved in awareness and education programmes and is currently developing a programme on bats for schools.

Interest from other countries is yet to be determined.

The question of transboundary movements of the large flying fox, *Pteropus vampyrus*, was mentioned several times at the 12th International Bat Research Conference in Kuala Lumpur, Malaysia, in August 2001. In both an opening address to the conference from the Department of Wildlife and National Parks, and in an account of conservation activity in Malaysia by the Malaysian Nature Society, the development of a CMS Agreement was proposed in view of the severely declining status of the species and its observed movements between Malaysia and Thailand and from Malaysia towards Singapore and Indonesia. The proposal for such an Agreement is also made in a recent review of the distribution, abundance and status of the species in Peninsular Malaysia published after the conference (Mohd-Azlan et al., 2001).

At present no other bat species has been identified as migratory in the region. Whether other species could be included in such an Agreement therefore needs to be further assessed.

An Agreement for *P. vampyrus* would have impact on the conservation of other larger fruit bats (including a number of threatened island species where they are sympatric with *P. vampyrus*), would have benefits for other fruit bats and probably for other bats and may influence the conservation of important forest and mangrove areas. While the species is protected and hunting regulations apply in Malaysia, there are clear needs for better enforcement and education; the conservation status and needs in other countries of the region are currently unknown.

5. Range States2

Brunei, Cambodia, INDIA (Andaman & Nicobar Islands only), Indonesia (east to Makassar Straits and Timor), Laos (one record only), Malaysia, Myanmar, PHILIPPINES, Singapore, Thailand, Viet Nam.

6. Comments from Range States

7 Additional remarks

8. References

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DRAFT PROPOSAL FOR INCLUSION OF SPECIES ON THE APPENDICES OF THE CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS
(Updated February 2004)

A. PROPOSAL: Inclusion of the greater long-nosed bat *Leptonycteris nivalis* on Appendix I.

B. PROPONENT: Government of

C. SUPPORTING STATEMENT:

1. Taxon

1.1. Class	Mammalia
1.2. Order	Chiroptera
1.3. Family	Phyllostomidae
1.4. Genus/species/subspecies	*Leptonycteris nivalis* (Saussure, 1860)
1.5. Common name	English: greater long-nosed bat French: Grand glossophage Spanish: Murcielago-hocicudo mayor

2. Biological data

2.1. Distribution

Occurs in USA (south-west Texas: Presidio and Brewster Counties), through Mexico to Guatemala (Koopman, 1993; Simmons, in press).

L. curasoae is the only other species in the genus.

2.2. Population

Populations very variable in USA (see under migration).

Major declines recorded in Mexico.

Status in Guatemala uncertain, two old records, one of which may be valid (Arita & Humphrey, 1988; McCarthy et al. 1993).

2.3. Habitat

Specialist feeder on nectar and pollen, plus some insects and soft fruit. Forages in arid areas of Mexico and mountainous pine-oak habitats in north (Texas). Occurs to 3500 m. Does not hibernate. Feeds extensively on cacti, more on other CAM plants in parts of range (Fleming et al., 1993; Moreno, 2000). Principal diet may be from five species of columnar cacti and two species of *Agave* (Fleming & Valiente-Banuet, 2002).

Colonial roosts in caves, mines and tunnels, sometimes rock crevices, buildings or trees. Colonies to 10,000 in underground habitats.

An account of the species can be found in Hensley & Wilkins, 1988.

2.4. Migration

Females migrate northwards to occupy northern parts of range from June to August, extent of migration varying from year to year (Texas populations vary between none and 14,000) probably depending on variation

in flowering succession in individual years (Schmidly, 1991; Fleming & Eby, 2003). Young are born in Mexico (April to June) and travel north with mothers. Most males remain in south of range. More southern populations thought to be non-migratory.
In Mexico/USA similar migrations are undertaken by the other species of *Leptonycteris* , *L. curasoae,* and the monotypic *Choeronycteris mexicana*, both similarly nectarivorous.

3. Threat data

3.1. Direct threats to the populations

Concentration in caves where subject to disturbance, blocking of entrances, direct killing (mainly in misplaced attempts at vampire bat control), recreational caving and tourism, mineral extraction. One key cave roost in Mexico was destroyed by a road development.

3.2. Habitat destruction

These bats have an extreme mutualism with key arid zone plants (such as agaves and certain cacti): the bats are the primary pollinators of the plants and the plants are the primary food source of the bats. The bats are threatened by loss of food sources, interruption of flowering of key food plants, and disruption of flowering corridors. Desert areas with low species diversity but high endemism are generally threatened. Nectar specialists are considered at particular risk (Arita & Ortega, 1998).

3.3. Indirect threats

3.4. Threats connected especially with migrations

3.5. National and international utilization

4. Protection needs and status

4.1. National protection status

Protected Mexico and United States of America. Guatemala (unknown). Texas roost site protected within National Park. Mexico's Federal Law of Wildlife encompasses all caves and crevices *de facto* as protected areas.

Key species in the Program for the Conservation of Migratory Bats of Mexico and the United States (PCMM) (Walker, 1995; Withgott, 1999).

4.2. International protection status

IUCN status: Endangered.

4.3. Additional protection needs

Studies of migration patterns of neotropical bat species is a recommendation in Hutson *et al.* (2001).

5. Range States

Guatemala, Mexico, USA.

6. Comments from Range States

7 Additional remarks

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DRAFT PROPOSAL FOR INCLUSION OF SPECIES ON THE APPENDICES OF THE CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS
(Updated February 2004)

A. PROPOSAL: Confirmation of the inclusion of the Brazilian free-tailed bat *Tadarida brasiliensis* on Appendix I.

B. PROPONENT: Government of

C. SUPPORTING STATEMENT:

1. Taxon

1.1. Class	Mammalia
1.2. Order	Chiroptera
1.3. Family	Molossidae
1.4. Genus/species/subspecies	*Tadarida brasiliensis* (Geoffroy, 1824)
1.5. Common name	English: Brazilian (or Mexican) free-tailed bat
	French: Tadaride du Brésil
	Spanish: Murcielago-cola suelta brasileno

2. Biological data

2.1. Distribution
Distributed from about 40°S in Chile and Argentina through Central America to the southern states of USA (to about 40°N) and on many Caribbean islands (Koopman, 1993; Williams. 1989; Simmons, in press). It is scarce or absent in much of Amazonia. Records from the Falkland Islands (52°S) are presumed to be of vagrants or through assisted passage (Hill, 1988; A.M.Hutson, pers.obs.).

Subspecies (Simmons, in press)

The genus has a world wide distribution with about eight species.

2.2. Population
Forms the largest aggregations of any terrestrial vertebrate (to 20 million, rising to close to 40 million with young). Some larger colonies were recorded formerly (Barbour & Davis, 1969; Cockrum, 1969). The largest colonies are in caves in the northern part of the range, but records to 12 million are also recorded in Argentina. Large colonies (up to one million) are also found under bridges, smaller colonies in buildings.

Population declines of over 90% (possibly over 99% in some areas) are recorded at some North American roost sites (Geluso et al. 1976, 1981; Mohr, 1972). Most of the USA population is now concentrated in about 12 sites.

Surprisingly scarcely recorded in Central America (McCarthy et al., 1993). Few historic records from Guatemala highlands (Jones, 1966; Hall, 1981). Recent bat detector work in Guatemala suggests the species might be more common than thought, especially in dry corridor of central Guatemala. Also two recent records from central mountain pine/cloud forest (S.G.Perez, pers.comm.). Other Central American records from Honduras, Costa Rica and Panama.

2.3. Habitat

Aerial hawking insectivorous species. Generally forages in open air over a wide range of habitats and may range to 60 km during nightly foraging flights.

Forms large colonies in caves and other structures, also smaller colonies in buildings.

For a species account see Williams (1989); see also Hutson *et al*. (2001).

2.4. Migration

Migratory at least in north and south of range. Migration mainly of females moving to higher latitudes to form nursery colonies. Not all populations of North America migrate and migration in central (tropical) parts of range not known.

Migrations of up to 1840 km are recorded south from natal sites in USA to Mexico (Glass, 1982; Williams, 1989; Fleming & Eby, 2003). Populations in central Mexico are very low from February to September, build up during October and decrease again by late January (Villa & Cockrum, 1962). Populations on the Pacific side of USA (Oregon, Nevada, south-western Utah, western Arizona and California) and those east of eastern Texas do not undertake long migrations, but may undertake local movements of up to 150 km (LaVal, 1973). The populations in between undertake longer migrations, some stopping in USA, but many moving into north and central Mexico and possibly further south. It is mainly females that migrate north in spring to summer maternity colony sites, although males are first to arrive at these roosts. While there was attempt to separate the migratory and non-migratory populations into separate subspecies, more recent DNA studies suggest that such separation is unjustified (e.g. McCracken *et al*, 1994; McCracken & Gassell, 1997). Russell & McCracken (2001) were, however, able to show differences between the populations of North and South America.

Stopping-off points are important on this migration. Davis et al. (1962) estimated that these bats might travel nearly 500 km per night, but Villa-R. & Cockrum (1962) suggested maximum documented daily travel at about 35 km, and data in Glass (1982) suggest up to 50 km/day (even though it is estimated that daily foraging flights from maternity colony sites may be up to 60 km). Cockrum (1969) suggest nearly 70 km between stopping-off points, which may only be used for a few days or even one day. From Oklahoma bats moved to the Mexican coast east to Sierra Madre Oriental and into the eastern half of the Mexican plateau (Glass, 1982). Migration is often in large flocks.

Nothing is recorded of migration at the southern end of the range, although there seems every reason to assume that similar migrations occur here and the potential has been discussed (e.g. Villa-R & Villa Cornejo, 1969). A newspaper report describes a colony of 12 million bats in Argentina that was believed to 'originate' from Brazil (Wullich, 1994).

Apart from one record of a mummified bat found on the Falkland Islands (Hill, 1988), there are three further records of live individuals found in the Falkland Islands group where there is no direct evidence for assisted passage (A. M. Hutson, pers.obs.). This location is c.1300 km from the nearest locality in Argentina and if these were natural occurrences, they would be an extreme example of 'overshooting' or of 'reverse migration', regularly reported in birds, but not so far for bats.

3. Threat data

3.1. Direct threats to the populations

Concentrations of huge populations from a very wide area into single sites, makes these populations very vulnerable. Ecological aspects associated with migration are also a threat (Arita & Ortega, 1995). At both ends of the migration route (and possibly at stop-over points in between), the major colonies rely on underground

habitats where they are subject to disturbance, blocking of entrances, direct killing, recreational caving and tourism, mineral extraction, guano extraction, changes to microclimate within cave.

Intentional exclusion from bridges has also been a threat in North America, but is being addressed by negotiated conservation policy.

Exclusion from buildings is only likely to be a serious threat to the populations on islands. However, *Tadarida brasiliensis* is the most common species in the cities of Uruguay. Here, they generally occupy buildings, abandoned or in use. Frequently their presence results in people calling in pest control companies, who usually completely exterminate the colony. There is no confirmation that numbers are decreasing, but no studies have been carried out and it is most likely that numbers are decreasing due to these control measures.

Association with rabies in Latin America and USA is also a threat.

3.2. Habitat destruction
Threats to cave roost are outlined above. The species is not very habitat specific for foraging, so threats to foraging habitat difficult to define and probably not a major influence. However, large-scale conversion to agriculture with associated use of pesticides has been identified as a major conservation concern.

3.3. Indirect threats
Pesticide use may be a threat in parts of the range.

3.4. Threats connected especially with migrations
Apart from the major colony roost sites at either end of migration routes, a range of stop-over points on migration are used. Such temporarily used sites may be difficult to identify and not receive the conservation effort that major nursery colony sites receive, but their loss could be critical to successful migration.

3.5. National and international utilization
Investigated for the potential of the attachment of an incendiary device to large numbers of individuals for military purposes (Couffer, 1992). Guano from large colonies was formerly marketed as fertilizer in USA and may still be in other parts of the species' range.

4. Protection needs and status
4.1. National protection status
Protected USA and Mexico, protected status elsewhere not established, though some range states have all-embracing legislation that nominally protects all wildlife. Mexico's Federal Law of Wildlife encompasses all caves and crevices *de facto* as protected areas.

4.2. International protection status
Bonn Convention: Appendix I (listed in 1985). The species was included in the original Appendix listing in 1985.

IUCN status: Near Threatened.

4.3. Additional protection needs
The species is a key species in the Program for the Conservation of Migratory Bats of Mexico and the United States (PCMM) (Walker, 1985). Elsewhere where it concentrates in large colonies in caves there is a need to identify, protect and monitor key roosts.

Studies of migration patterns of South American bat species is a recommendation in Hutson *et al.* (2001). Migration in this species is probably more marked in the southern cone than is recorded. *Tadarida brasiliensis* would provide a good flagship species for a Pan-American CMS-sponsored Agreement that incorporates the well-established PCMM of North America and Mexico and brings in newly established bat conservation programmes (Programa para la Conservacion de Murcielagos - PCMs) established in Costa Rica in 2001 and Guatemala in 2002 and in South America.

The USA has recently adopted a migratory bird act and a similar act for bats would be appropriate.

5. Range States3

Antigua and Barbuda, ARGENTINA, Bahamas, Belize, BOLIVIA, Brazil, CAYMAN ISLANDS (UK), CHILE, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, ECUADOR, El Salvador, GUADELOUPE (FRANCE), Guatemala, Haiti, Honduras, Jamaica, MARTINIQUE (FRANCE), Mexico, MONTSERRAT (UK), NETHERLANDS ANTILLES (NETHERLANDS), Nicaragua, PANAMA, PARAGUAY, PERU, Puerto Rico, St Kitts & Nevis, St Lucia, Trinidad and Tobago, TURKS & CAICOS ISLANDS (UK), United States of America, URUGUAY, Venezuela.

6. Comments from Range States

7 Additional remarks

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DRAFT PROPOSAL FOR INCLUSION OF SPECIES ON THE APPENDICES OF THE CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS

(Updated February 2004)

A. PROPOSAL: Inclusion of the straw-coloured fruit bat *Eidolon helvum* on Appendix II.

B. PROPONENT: Government of

C. SUPPORTING STATEMENT:

1. Taxon

1.1. Class	Mammalia
1.2. Order	Chiroptera
1.3. Family	Pteropodidae
1.4. Genus/species/subspecies	*Eidolon helvum* Kerr, 1792
1.5. Common name	English: straw-coloured fruit bat
	French: Roussette paillée africaine
	Spanish:

2. Biological data

2.1. Distribution

The subspecies *E. h. helvum* is widespread in Africa, including Gulf of Guinea islands and Zanzibar, Pemba and Mafia off Tanzania (Bergmans, 1990; Koopman, 1993; Simmons, in press). Resident in much of central Africa with long-range migrations south and north, as far south as South Africa (to 32°S) and north to northern Senegal across to the southern half of Sudan and Ethiopia. To 18°N in Niger. Distribution at northern and southern extremes of range patchy and erratic. Also sparse or absent in large areas of the Horn of Africa, central East Africa and elsewhere (Bergmans, 1990).

The species is also present in South-West Arabia as subspecies *E. h. sabaeum*.

The population on Madagascar is now generally regarded as a separate species, *E. dupreanum*, the only other species of the genus (Bergmans, 1990; Simmons, in press)

2.2. Population

Forms large colonies of 10s to 100s of thousands, occasional colonies estimated at about one million, with one in Zambia estimated at up to five million. Within the colonies they form tight clusters of up to 100 animals, although in particularly large colonies this clustering may not be so obvious.

The wide distribution and seasonal and erratic occurrence may mask a more complex distribution and smaller population than is apparent from distribution maps (particularly outside the rain forest areas of West and Central Africa) (Bergmans, 1990), and from records of colony size.

The colony in Kampala (in what was known as 'Bat Valley') was believed to number about one million in the early 1960s, but later estimated at 250,000 (Mutere 1967). Over the years, development in and around Kampala has broken up the colony into smaller groups and the numbers were believed to be declining. More recently they have been regarded as a nuisance (including by larger hotels), there have been control

programmes developed and removal of roost trees (*Eucalyptus*) and poisoning of the bats has been initiated. Population estimates in the 1990s and beginning of this Century were less than 50,000. The most recent counts (2002) gave populations estimates of c.70,000 (June) and about 20,000 (October) (R.Kityo, pers.comm.), which, relative to a conservative population estimate of c. 200,000 in the late 1960s, suggests a decline of between 65% and 90%.

A large colony in Lome, Togo, has similarly been regarded as a nuisance (W.Bergmans, pers. comm.). Other such declines have been recorded.

One of the largest bats of the region. An account of the species can be found in DeFrees & Wilson (1988), Mickleburgh et al. (1992) and Nowak (1994).

2.3. Habitat

Occupies wide range of forest, savannah and urban habitats at altitudes up to 2000m.

Feeds on fruit and flowers (Mickleburgh et al., 1992) and important for pollination and seed dispersal, although possibly not as important for pollination as smaller fruit bats (Happold, 1987). Also takes leaves and occasionally sap. Forms large, often noisy, colonies in trees, often in major cities (such as Accra, Freetown, Lagos, Douala, Kampala, Dar Es Salaam); sometimes roosts in rock crevices or the entrance zone of caves. Evening dispersal for foraging may take bats to 30 km from the roost.

2.4. Migration

Present all year in coastal areas of West African countries along the Gulf of Guinea and across to southern Kenya in the north and from northern Angola across to northern Mozambique in the south. Seasonally it extends north to southern Mauritania, across through southern Niger to most of Sudan and south through much of southern Africa.

Recorded at sea 250 km from nearest land (Rosevear, 1964).

Even in the core area seasonal use (or abandonment) of colony sites is noted in almost all major colonies; some major colonies such as in Kampala or those in Congo may only abandon the roost for as little as two months, others are only present for that length of time, such as the colony at Kasanka National Park, Zambia. Jones (1972) reported *Eidolon* as abundant in Rio Muni for only three months of the year.

An interesting feature of the migrations of this and certain other West African fruit bat species is that migration is not apparently always associated with lack of local food resources, i.e. towards improved food sources (Kingdon, 1974). Thomas (1983) showed that the bats migrate from the West African forest north into the savannah zone during the major wet season. Although fruit availability is much higher in the forest belt all year, the savannah offers a rich source of food in the wet season that it is advantageous for the bats to exploit. See also Fleming and Eby (2003).

Movements may be somewhat erratic depending on available food resources and ambient weather conditions. The northern and particularly the southern limits of migration may vary markedly from year to year.

Thomas (1983) estimated a colony in Abidjan (Cote d'Ivoire) at 300,000 to 500,000 in January/February, when the young were born. The main dispersal was in March, but colonies could be found in open savannah in February, where colonies of up to 100,000 could appear 'overnight'. There was little evidence of colonies in August to November when dispersal may be at its peak. Migration was estimated to take many bats more than 1000 km (and possibly to 1500 km). In Kampala the young are born in late February and early March, with the colony dispersed between June and August (Kingdon, 1974). A colony of up to five million accumulates in Kasanka National Park, Zambia, in November/December and that number of bats must be widely dispersed

during the rest of the year. There is some evidence of movement of these bats to Democratic Republic of the Congo and to Tanzania, but it is also likely that many move south. In the extremes of southern Africa it occurs sporadically and seasonally throughout the region with most records from the wetter eastern parts during the summer months (Skinner & Smithers, 1990; Taylor, 2000).

Colonies may show extreme roost-site fidelity, e.g. Kingdon (1974) notes that the Kampala roost was present before Europeans occupied the area and even recolonised introduced *Eucalyptus* trees after an absence following clearance of the original roost trees. *Eidolon* also probably shows great flexibility in finding temporary or new food sources; the range of the species was extended into a formerly unoccupied part of Sudan following establishment of suitable food plants at human settlements (Kock, 1969).

While some populations may follow a normal four-month foetal development, other populations may undergo delayed implantation (Kingdon, 1974); this may be related to the migratory patterns of the population. There is usually one young per year. In the Kampala colony mating is staggered from April to June, but implantation is mostly in October at the onset of the rains, and births are in February to March close to the onset of the other (major) rainy season (Mutere 1965a, 1965b, 1967; Kingdon, 1974). In the Kasanka colony, bats exhibited a great range of reproductive condition, from those in early pregnancy to those carrying new-born young (A.M.Hutson and P.A.Racey, pers.obs.); this might indicate a mixed origin for the colony, but other colonies may show extended parturition periods, such as that in Kampala, where births occur from early December to February (Kingdon, 1974). In Nigeria, mating occurred in June/July, gestation from October/November to births in March (Fayenuwo and Halstead, 1974; Happold, 1987), where implantation is timed with the beginning of the dry season and births with the onset of the wet season. Other variations in timing and the proportion of bats that migrate may relate to seasonal rainfall (Jones, 1972; Huggel-Wolf & Huggel-Wolf, 1965).

3. Threat data

3.1. Direct threats to the populations

While not in danger of extinction, the species is vulnerable, and perhaps misleadingly abundant, in large and temporary colonies. Frequently forms large colonies in towns and cities where unwelcome through fruit feeding, defoliation of roost trees, defecation on (commercial) buildings. Exploitation for meat (and medicinal use) may be a problem in some areas. However, in some areas, colonies may be protected by tradition (Funmilayo, 1979; Happold, 1987). Persecuted as a pest by fruit growers, but damage is likely to be far outweighed by benefits from pollination and seed dispersal; little evidence of damage to commercial fruit trees was found in Nigeria (Happold, 1987).

Electrocution on power lines is an obvious, and probably increasing, cause of death, but is unlikely to be a major threat to the population.

3.2. Habitat destruction

Encroachment on natural habitats through increased agriculture and developments, especially loss of tropical forest habitats.

3.3. Indirect threats

3.4. Threats connected especially with migrations

3.5. National and international utilization

Taken as food (including commercially) in towns and elsewhere – and occasionally for medicinal use (Funmilayo, 1976, 1978). As food it may be the source of fruit bat meat that appears in European food retailers.

4. Protection needs and status

4.1. National protection status
Probably not protected in any Range State legislation (unless included in very general wildlife protection).

4.2. International protection status
Not protected under any international measures.

IUCN status: Least Concern.

4.3. Additional protection needs
Conservation of key roosts, including those in towns. May require management of hunting and other persecution. Understanding of role in fruit damage in relation to benefits from pollination and seed dispersal. Urgent need for greater understanding of migratory patterns.

5. Range States4

Nominate subspecies recorded from Angola, BENIN, Bioko, Botswana, BURKINA FASO, Burundi, CAMEROON, Central African Republic, CHAD, CONGO, CÔTE D'IVOIRE, Equatorial Guinea, Ethiopia, Gabon, GAMBIA, GHANA, GUINEA, GUINEA-BISSAU, KENYA, Liberia, Malawi, MALI, Mozambique, Namibia, NIGER, NIGERIA, Rwanda, SAO TOME AND PRINCIPE, SENEGAL, Sierra Leone, SOMALIA(?), SOUTH AFRICA, Sudan, TANZANIA (including Mafia, Pemba, Zanzibar), TOGO, UGANDA, DEMOCRATIC REPUBLIC OF CONGO, Zambia, Zimbabwe.

E. h. sabaeum from North Yemen, SAUDI ARABIA, South Yemen.

6. Comments from Range States

7 Additional remarks

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DRAFT PROPOSAL FOR INCLUSION OF SPECIES ON THE APPENDICES OF THE CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS
(Updated February 2004)

A. PROPOSAL: Inclusion of the Mexican long-tongued bat *Choeronycteris mexicana* on Appendix II.

B. PROPONENT: Government of

C. SUPPORTING STATEMENT:

1. Taxon

1.1. Class	Mammalia
1.2. Order	Chiroptera
1.3. Family	Phyllostomidae
1.4. Genus/species/subspecies	*Choeronycteris mexicana* Tschadi 1844
1.5. Common name	English: Mexican long-tongued bat French: Choeronyctère mexicaine Spanish: Murcielago trompudo

2. Biological data

2.1. Distribution
Distributed from south-east Arizona (USA) and south-west New Mexico (USA), south to El Salvador and Honduras (Arroyo-Cabrales et al., 1987; Koopman, 1993; Simmons, in press). Also recorded from extreme south Texas (Hidalgo County) (Schmidly, 1991), and in California (Barbour & Davis, 1969). There is a single doubtful record from Venezuela (??source)

The genus includes only this species.

2.2. Population
Populations USA/Mexico?

Locally scarce (Arita & Santos del Prado, 1999).

Until recently the species was only known in Guatemala from a few historical records (Jones, 1966). Four records in 2003 (December, February, March, April) suggest that while the species is not common, it may not be as rare as formerly thought in the dry valley corridors of central Guatemala (S.G.Perez, pers.comm.).

2.3. Habitat
Roosts in caves and mines (occasionally buildings), in small insular mountain ranges in the north. Tend to roost spaced apart (not in dense clusters). Usually found close to the cave entrance and hence often use quite small caves. Generally in small of colonies of less than 25 individuals.

Feeds mainly on nectar and pollen, also fruit and probably some insects. Forages in arid thorn scrub to tropical deciduous forest and mixed oak-conifer forest. Primarily above 500 m (to 2400 m) and less common in the coastal lowlands of saguaro (*Carnegiea*), cardon (*Pachycereus*) and organ pipe (*Stenocereus*) cacti. Favoured food plants also include *Lemaireocereus*, *Ipomoea*, *Ceiba*, *Agave* and *Myrtillocactus*. (see Fleming & Valiente-Banuet, 2002 for further details).

In the arid lands of Mexico and southern USA, this bat and two species of *Leptonycteris* are believed to be the principal effective pollinators of columnar cacti and the agaves from which tequila is made.
An account of the species can be found in Arroyo-Cabrales et al. (1987).

2.4. Migration
Migrates north from Mexico during pregnancy to Arizona/New Mexico (USA) to give birth June/July (Wilson, 1979; Fleming & Eby, 2003). Some populations in New Mexico may be permanent summer residents (and some may overwinter). A major invasion occurred in September 1946 in California when individuals and small groups appeared in many scattered localities around San Diego (Barbour & Davis, 1969)

In Mexico/USA similar migrations are undertaken by two species of *Leptonycteris* - both similarly nectarivorous. While the migration in Mexico/USA is certainly transboundary, it is unclear as yet whether migration in the south of the range includes transboundary movements.

3. Threat data

3.1. Direct threats to the populations
Concentration in caves where subject to disturbance, blocking of entrances, direct killing (including in misplaced attempts at vampire bat control), recreational caving and tourism, mineral extraction.

3.2. Habitat destruction
Threats include deforestation (including of drier forests and other habitats). These bats have an extreme mutualism with key arid zone plants (such as Agave and certain cacti): the bats are the primary pollinators of the plants and the plants are the primary food source of the bats. The bats are threatened by loss of food sources and interruption of flowering of key food plants. Desert areas with low species diversity but high endemism are generally threatened. Specialist nectar feeders are generally considered as at high risk (Arita & Ortega, 1998).

Development for agriculture, oil extraction and mineral exploitation are other widespread threats.

These and other more local threats are discussed in Hutson *et al.* (2001).

3.3. Indirect threats
As a cave bat may be affected by misdirected attemptes at vampire bat control.

3.4. Threats connected especially with migrations
Disruption of flowering corridors used on migration.

3.5. National and international utilization
None known.

4. Protection needs and status

4.1. National protection status
Protected USA and Mexico, Mexico's Federal Law of Wildlife encompasses all caves and crevices *de facto* as protected areas. Protected status elsewhere unknown.

A key species of the Program for the Conservation of Migratory Bats of Mexico and the United States (PCMM) (Walker, 1995), which links with wider concerns for arid zone conservation and the role of bats in pollination (Withgott, 1999).

4.2. International protection status
IUCN status: Near Threatened.

4.3. Additional protection needs
There are large knowledge gaps and hence major research requirements – studies of migration patterns of Latin American bat species is a recommendation in Hutson *et al.* (2001). USA has recently adopted a migratory bird act and a similar act for bats would be appropriate. A bat conservation programme (Programa para la Conservacion de Murcielagos - PCM) recently established in Guatemala (in 2002) may be able to assist in transboundary studies of the species and some further information on distribution and diet is already being gathered (Perez, pers.comm.).

5. Range States
El Salvador, Guatemala, Honduras (?), Mexico, USA, Venezuela (?)

6. Comments from Range States

7 Additional remarks

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DRAFT PROPOSAL FOR INCLUSION OF SPECIES ON THE APPENDICES OF THE CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS

(Updated February 2004]

A. PROPOSAL: Inclusion of large-eared free-tailed bat (or giant mastiff bat) *Otomops martiensseni* on Appendix II.

B. PROPONENT: Government of

C. SUPPORTING STATEMENT:

1. Taxon

1.1. Class	Mammalia
1.2. Order	Chiroptera
1.3. Family	Molossidae
1.4. Genus/species/subspecies	Otomops martiensseni (Matschie, 1897)
1.5. Common name	English: large-eared free-tailed bat, giant mastiff bat French: Grand molosse à grandes oreilles Spanish:

2. Biological data

2.1. Distribution

Eastern Africa south to South Africa. Widely distributed in eastern Africa from Ethiopia to South Africa (Long, 1995), one record Yemen (Al-Jumaily, 1999), one from Ghana (Grubb et al., 1998) and recent records from Comoe National Park, Ivory Coast (J. Fahr, pers comm.). Widespread western Madagascar (Peterson et al., 1995).

The Madagascan population of *O. martiensseni* is regarded by some authorities as a separate species, *O. madagascariensis*, and it has been suggested that the southern African populations should be regarded as a separate species, *O. icarus*, or subspecies (Peterson et al., 1995). Koopman (1993) considered this all as a single species. The forthcoming Mammals of Africa (Happold et al., in prep.) treats *madagascariensis* as a separate species and Simmons (in press) has provisionally separated it as a separate species. However, Peterson et al. (1995) considered *madagascariensis* most closely related to southern African '*icarus*' and preliminary studies of DNA suggest that the populations of Africa are not separable (P. J. Taylor, pers.comm.). A final decision may depend on further DNA studies currently being carried out.

The genus includes five other species, all known from three or less localities and in other parts of the Old World tropics.

2.2. Population

Sparsely recorded and with few colony sites known. Generally colonial with larger colonies in underground sites. In South Africa (Durban area of KwaZulu-Natal) forms small colonies (to c.30 individuals) in houses (c.24 such colony sites known) (Richardson & Taylor, 1995; Taylor et al., 1999; Taylor, 2000; Fenton et al., 2002). A small colony of at least 10 individuals recorded from a tree hole in Tanzania (H.Baagoe. pers, comm.), and also recorded from a tree in Democratic Republic of the Congo by Verschuren (1957). In the case of the Tanzanian record, one or two of the bats were resting outside the tree hole.

Other records are from caves and lava tubes, where colonies may number several hundred; two lava tube localities (Mt Suswa in the Rift Valley and Ithundu in the Chyulu Hills, Kenya) recorded with more than 1000 (one with several thousand) (Mutere, 1973). These colonies must have been very large since Mutere (op.cit.) collected close to 5000 individuals in a 23 month period. In a description of the Mount Suswa caves, Glover et al. (1964) mentions large numbers of *Otomops* and *Miniopterus* sp. These major Kenya colony sites now with few or no bats. A recent survey found none in Suswa and only about 17 in Ithundu (B. Agwanda, pers.comm.), although this was not a complete survey of the cave systems. Hutson & Wilson (1992) noted groups of one, 42 and c.300 in lava tubes in Rwanda. Al-Jumaily (1999) found 1500 in one cave in Yemen, with the bats in several groups of about 200.

Most of the distribution records are based on isolated individuals found or trapped.

2.3. Habitat

Aerial insectivore, feeding mainly on moths plus a small measure of Orthoptera and Hemiptera (3% by volume) in a sample from Ethiopia (Rydell & Yalden, 1997). A sample from Rwanda (Hutson, pers. obs.) also comprised almost exclusively moths, plus the presence of grasshoppers (Acrididae) and beetles (Coleoptera) (S.Honey, pers. comm.).

This is a large bat species with the narrowest wings of any bat for fast direct flight in open areas. Forages over semi-arid areas to montane humid forest up to 2000 m (Kingdon, 1974). Probably a long-range forager over a wide diversity of habitats, and is likely to travel great distances even during nightly foraging. A number of recent records from Ivory Coast were from nets set in or above the forest canopy (J. Fahr, pers.comm.).

Generally roosting in caves, but in South Africa it is mostly recorded from houses and elsewhere has also been found roosting in trees. Individuals from colonies in South Africa frequently moved between two or three nearby roost sites (Fenton et al., 2002).

Accounts of the species can be found in Long (1995) and Hutson *et al*. (2001).

2.4. Migration

There is no direct evidence of migration in this species, but marked seasonal absence from some areas and from some major colony sites during the dry season has prompted the suggestion of migration (e.g. Mutere, 1973), and the species should certainly be capable of extended migration. The Kenyan sites studies by Mutere (op. cit.) are very close to the border with Tanzania.

Mutere (op.cit.) identified a single annual period of pregnancy and lactation as during the wet season of October to January with mother bats rearing a single young. In the smaller urban colonies of South Africa, there appeared to be a harem structure of a single adult male and a number of females (Fenton et al., 2002). In South Africa, the period of parturition was the same as that in Kenya (31^{o} of latitude further north) but no distinct seasonal absence has been recorded in South Africa.

3. Threat data

3.1. Direct threats to the populations

Threats poorly known, but major colonies in caves and lava tubes may have been lost through disturbance, including by guano digging and associated changes to microclimate. Other general conservation problems associated with caves may apply (other forms of disturbance, blocking of entrances, direct killing, recreational caving and tourism, mineral extraction).

It should be noted that in the course of 23 months of study on this species, Mutere (1973) collected almost 5000 individuals from his two study sites. The removal of this number of individuals and the disturbance through monthly sampling is likely to have had considerable effect on the colonies.

While no particular threats are known, the species is thinly distributed with few colony sites known. The only large colonies, in East Africa, have all but disappeared, possibly from disturbance (guano collecting and tourism). In South Africa the population appears to be stable, although intolerance of bats in roof spaces of private dwellings is a threat and remedial timber treatments using chemicals of wide toxicity is a potential threat.

It feeds (mainly on small to medium-sized moths) in open areas and often at high altitude. As a fast flying aerial insectivore capable of ranging widely and using a variety of habitats, it is likely that problems at roost sites are the main concern.

3.2. Habitat destruction
Ability for long-range foraging may mean that only gross landscape changes would affect foraging habitat and food availability.

3.3. Indirect threats

3.4. Threats connected especially with migrations
Seasonal movement involves relocation of populations to unknown sites.

3.5. National and international utilization
Guano exploitation for fertilizer in Kenya may have caused changes in microclimate within cave roost sites and decline or loss of bat populations.

4. Protection needs and status

4.1. National protection status
Listed for protection in KwaZulu-Natal, the area it is restricted to in South Africa, protected status elsewhere unknown. At least some colonies in Rwanda within national park boundaries. The site of the former large colony at Mt Suswa is believed to be protected (Hutson et al., 2001).

4.2. International protection status
Not listed in any international conservation statute or treaty.
IUCN status (2004): NT

4.3. Additional protection needs
Key roost sites need protection in some areas or control of activities therein. There should be a reassessment of all known roosts to ascertain numbers and status of colonies, so that key sites can be identified. The distinctive and audible echolocation calls (which may also have a social function) can be used to assess distribution and foraging needs in order to improve conservation status, although there is the possibility of confusion with one or two other molossid bat species in some parts of the range. The relative importance of caves and trees or other roost sites needs to be established. Further research will be needed to identify conservation requirements, including those related to any migrations.

5. Range States5

Angola, Central African Republic, DEMOCRATIC REPUBLIC OF CONGO, Djibouti, Ethiopia, GHANA, CÔTE D'VOIRE, KENYA, Madagascar, Malawi, Rwanda, SOUTH AFRICA, UNITED REPUBLIC OF TANZANIA, UGANDA, Yemen, Zambia, Zimbabwe.

6. Comments from Range States

7 Additional remarks

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DRAFT PROPOSAL FOR INCLUSION OF SPECIES ON THE APPENDICES OF THE CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS
(Updated February 2004)

A. PROPOSAL: Inclusion of the [[southern] African populations of] Schreiber's bent-winged bat *Miniopterus schreibersii* on Appendix II.

B. PROPONENT: Government of

C. SUPPORTING STATEMENT:

1. Taxon

1.1. Class	Mammalia
1.2. Order	Chiroptera
1.3. Family	Vespertilionidae
1.4. Genus/species/subspecies	*Miniopterus schreibersii* (Kuhl, 1817)
1.5. Common name	English: Natal clinging bat, Schreiber's bent-winged bat French: Minioptère de Schreibers Spanish: Murcielago troglodita

2. Biological data

2.1. Distribution
The most widely distributed bat species, occurring from southern Europe east to Japan, through the Old World tropics south to South Africa, Sri Lanka and through to southern Australia (Koopman, 1993, Simmons, in press). Distribution uneven (e.g in Afrotropical region only recorded across central, eastern and moister parts of southern Africa).

The extraordinarily wide range of this species has led to many attempts to separate it into a number of geographically separated species. None has been widely accepted so far. Recent attempts to identify DNA characteristics of the South African population offers another opportunity (Miller-Butterworth *et al*., 2002).

The genus includes about 14 species, some with restricted distribution. Five other species of the genus occur in Africa.

Further current work on the systematics of the species could affect the taxonomy of the African species and needs to be assessed.

2.2. Population
Cave bat forming colonies of up to 300,000. Colonies of up to 200,000 are recorded in South Africa (Taylor, 2000).

Although the species is widespread major population declines are recorded in Europe, Australia and South Africa (those places at higher latitudes where the species has been most studied).

2.3. Habitat
Insectivorous species. Roosting in caves. Caves used for maternity colonies, for hibernation at higher latitudes and as stop-off points during migration. At least in the more temperate regions, it needs a range of cave sites at

different times of its annual cycle. In Zimbabwe, also roosts in buildings and hollow trees (M.B.Fenton, pers.comm.).

In Africa the species appears to favour the cooler moister areas.

An account of the species can be found in Hutson et al. (2001).

2.4. Migration

Migrations to 1300 km (Australia), over 800 km (Europe), 250 km (South Africa) (Fleming & Eby, 2003). Movements to hibernation sites may be in almost any direction. Males often less migratory, but movements and summer behaviour poorly understood.

Van der Merwe (1975) examined migration in South Africa. He studied a number of sites with up to 4000 bats and found bats move from hibernation sites in the southern Transvaal highveld to maternity sites in northern Transvaal bushveld. Such movements recorded were up to 260 km (Taylor, 2000). Some animals remain in the highveld, moving less than 60 km to maternity roosts.

Working in Kenya at 704m (Kibwezi, Machakos Distr.), O'Shea &Vaughan (1980) found *M.natalensis* an annual resident but at very low density between May and October. *M.africanus* (n=2) was caught in February, M.*fraterculus* (n=8) between November and April, and only one *M.schreibersii* was trapped in (month unknown).

The species is also believed to be migratory in Swaziland (A.Monajdem, pers.comm.).

In Europe the maximum recorded movement is 833 km (Rodrigues, 2002) and in Australia it is 1300 km (Dwyer, 1969) and it is considered likely that similar range movements occur in Africa. In Australia, Dwyer (1966) identified sites for transient colonies (mostly of juveniles) that are reused each year and are otherwise empty of the species; and transient colonies have been identified as an important feature of migration of the species in Europe. It is also considered that although migration may occur in any direction, particular routes are followed by the bats, with stop-over sites used temporarily and that key maternity sites draw bats from a very wide area. While Dwyer (1966) originally suggested that winter dispersal was possibly not along set routes, he later (Dwyer, 1969) suggested that most movements were within specific (or related) drainage areas; the same is thought to be true in Europe.

3. Threat data

3.1. Direct threats to the populations

Although effects on foraging habitats are likely to be a serious problem for the species, most conservation concern has been expressed about problems of conservation of cave roosts, as a result of damage, disturbance, change of use, mineral exploitation, etc.

Reliant on caves where subject to disturbance, blocking of entrances, direct killing, recreational caving and tourism, mineral extraction, changes to microclimate within cave.

Particularly sensitive during maternity and hibernation periods, but conservation of other used sites, including caves used as migratory stop-off points, also important.

Recent major mortality in summer maternity colonies of western Europe from, as yet, unknown causes.

3.2. Habitat destruction
Foraging habitat threatened by intensive agriculture, development, forestry (including logging).

3.3. Indirect threats

3.4. Threats connected especially with migrations

3.5. National and international utilization

4. Protection needs and status

4.1. National protection status
Protected in most European and former Soviet Union Range States and Australia. Protected status elsewhere uncertain.

4.2. International protection status
In Europe included in CMS Appendix II and the Agreement on the Conservation of Bats in Europe, Annex II of EU Habitats and Species Directive, Bern Convention on the Conservation of European Wildlife and Natural Habitats (Appendix II). Some international collaborative programmes in Europe.

IUCN status: Near Threatened.

4.3. Additional protection needs

5. Range States6
Afghanistan, ALBANIA, Algeria, Angola, AUSTRALIA, Austria, Azerbaijan, Bosnia & Herzegovina, Botswana, BULGARIA, CAMEROON, Central African Republic, China, CROATIA, Ethiopia, FRANCE, GAMBIA (?), GERMANY, GHANA, GIBRALTAR (UK), GREECE, GUINEA, Hong Kong, HUNGARY, INDIA, Indonesia, Iran, Iraq, ISRAEL, ITALY, Japan, JORDAN, KENYA, Lebanon, MACEDONIA, Madagascar, Malawi, Malaysia, MALTA, MOROCCO, Mozambique, Myanmar, Namibia, Nepal, Papua New Guinea, PHILIPPINES, PORTUGAL, ROMANIA, Rwanda (?), SAUDI ARABIA, Sierra Leone, SLOVAKIA, SLOVENIA, Solomon Islands, SOMALIA (?), SOUTH AFRICA, SPAIN, SRI LANKA, Sudan, SWITZERLAND, SYRIA, Taiwan, TAJIKISTAN, REPUBLIC OF TANSANIA, Thailand, TUNISIA, Turkey, Turkmenistan, UGANDA, UKRAINE, UZBEKISTAN, Viet Nam, Yemen, Yugoslavia, DEMOCRATIC REPUBLIC OF CONGO, Zambia, Zimbabwe.

6. Comments from Range States

7 Additional remarks

8. References

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