REGIONAL RED LIST STATUS OF CARNIVORES IN THE ARABIAN PENINSULA

Compiled by David Mallon and Kevin Budd

ARABIAN PENINSULA

The IUCN Red List of Threatened Species™

SSC Species Survival Commission

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EPAA

The Environment and Protected Areas Authority of Sharjah is responsible for the management of the Protected Areas in the Emirate of Sharjah. The department manages 5 educational facilities: Arabia's Wildlife Centre, the Breeding Centre for Endangered Arabian Wildlife, the Natural History Museum, the Botanical Museum and the Children's Farm.

Identifying the need for cooperation with other Arab countries and addressing greater ecological issues facing the region, The Breeding Centre for Endangered Arabian Wildlife hosted the first regional conservation workshop in 2000. Since then the workshops have become an annual event with representatives from all over the Peninsula. They add their own expertise and discuss problems, concerns and if possible develop a conservation strategy.

The workshops have now gone to the next level in cooperation with the IUCN Red List office and starting to produce IUCN Red List regional assessment of chosen taxa.

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The IUCN Red List of Threatened Species™ - Regional Assessment

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Cover photo: Arabian leopard *Panthera pardus nimr, ex-situ* Breeding Centre for Endangered Arabian Wildlife, Sharjah, UAE. © Jane & Kevin Budd, EPAA.

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We are grateful to those individuals and organisations who provided photographs, see individual captions for details, especially David Stanton - for providing details of predators camera trapped during the Foundation for the Protection of the Arabian Leopard in Yemen (FPALY) project in Hawf, Yemen and for allowing us to reproduce some of them here.

While every effort has been made to trace the owners of copyright material, in a few cases this has proven impossible and we take this opportunity to offer our apologies to any copyright holders whose rights we may have unwittingly infringed.

A number of people contributed to editing and proof reading including Jane Budd, Cyrintha Barwise-Joubert and Paul Vercammen.

The Arabian carnivore assessment was entirely dependent on more than 30 mammal experts from many different countries in the Arabian Peninsula and elsewhere, who generously gave of their time and knowledge. Their enthusiasm and commitment to species conservation has enabled us to generate a comprehensive and detailed picture of mammalian status and trends in Arabia. A list of all participating scientists is included with each of the individual species assessments and we record our thanks to all of them and apologise to anyone whose name is inadvertently omitted or misspelled.

Executive Summary

A Regional Red List Workshop for the carnivores of the Arabian Peninsula took place 8-10 February 2011. The workshop was organised and funded by the Environment and Protected Areas Authority, Government of Sharjah and hosted by the Breeding Centre for Endangered Arabian Wildlife. More than 30 experts from within and outside the region participated. The workshop was facilitated by Caroline Pollock from the IUCN Red List Unit in Cambridge, UK.

Thirty species of terrestrial carnivores have been reported to occur within the Arabian region and 20 of these have been recorded within the Arabian Peninsula. The regional Red List status of 16 species was assessed in two working groups. Out of the 20 species, one was assessed as Regionally Extinct, one as Critically Endangered, two as Endangered, one Vulnerable, four Near Threatened, five Least Concern and two Data Deficient. The four remaining species were deemed Not Applicable for regional assessment, according to the IUCN guidelines.

Eight (50%) species are more threatened at a regional level than they are globally, the three largest species (wolf, leopard, cheetah) by 2-3 categories of threat. Populations of 12 species are considered to be declining, two are increasing and trends in two are unknown. The main threat to all carnivores is indiscriminate and sustained persecution through hunting, trapping and poisoning. Other threats include habitat destruction and degradation through overgrazing, expansion of roads and settlements and commercial and industrial development.

Several Protected Areas have been established, some of which cover a substantial area, and carnivores occur in many of these. However, very few have been designed in order to protect carnivores and protection within them may not be effective when high priority potential prey species are present.

A sustained public awareness campaign is needed across the region to highlight the ecological importance of carnivores and to counter the prevailing negative attitude towards them.

عقدت ورشة العمل الإقليمية للقائمة الحمراء للحيوانات آكلة اللحوم في شبه الجزيرة العربية في الفترة من 8 – 10 فبراير 2011. وقد تم تنظيم وتمويل الورشة من قبل هيئة البيئة والمحميات الطبيعية في الشارقة واستضافها مركز حماية وإكثار الحيوانات البرية العربية المهددة بالإنقراض. شارك في الورشة أكثر من 50 خبيرا من داخل وخارج المنطقة، وقد ساعد في تنظيم الورشة كارولين بولوك من الإتحاد الدولي لصون الطبيعة/القائمة الحمراء كامبريدج، المملكة المتحدة.

وقد تم الإعلان عن ثلاثين نوعاً من الحيوانات آكلة اللحوم البرية موجودة في المنطقة العربية، سجلت 20 منها في شبه الجزيرة العربية. وقد تم تقييم الوضع الإقليمي للقائمة الحمراء لعدد 16 نوعاً من خلال مجموعتي عمل، ومن الأنواع ال 20 تم تقييم واحد كنوع منقرض إقليمياً، نوع واحد مهدد بالانقراض بشدة، نوعان مهددان بالإنقراض، نوع واحد كنوع ضعيف، أربعة أنواع قريبة من التهديد بالانقراض، وخمسة أقل قلقاً، واثنين بياناتها ناقصة. واعتبرت الأنواع الأربعة الباقية لا ينطبق عليها التقييم الإقليمي وفقاً لمبادئ الإتحاد الدولي لصون الطبيعة IUCN.

ثمانية أنواع تشكل (50٪) هي أكثر عرضة للتهديد على المستوى الإقليمي مما هي عليه في العالم، الأنواع الثلاثة الأكبر (الذئب، النمر، الفهد) من الفئات2-3 من التهديد. ويعتبر 12 نوعا في تناقص، اثنين من الأنواع في ازدياد ونوعان غير معروفة. التهديد الرئيسي لجميع الحيوانات آكلة اللحوم هي العشوائية والاضطهاد المستمر من خلال الصيد، المحاصرة والتسميم. تهديدات أخرى تشمل تدمير المواطن والتدهور من خلال الإفراط في الرعي، والتوسع في المستوطنات والطرق والتنمية التجارية والصناعية.

وقد أنشأت العديد من المناطق المحمية، وبعضها تغطي مساحات كبيرة، وتوجد الحيوانات آكلة اللحوم في الكثير منها. ومع ذلك، فإن عدد قليل جداً منها تم تصميمه من أجل حماية الحيوانات آكلة اللحوم، والحماية بداخل هذه المحميات لا يكون فعالا عند وجود الأنواع المفترسة.

هناك حاجة لاستمرار حملة توعية عامة في جميع أنحاء المنطقة لتسليط الضوء على الأهمية البيئية للحيوانات آكلة اللحوم ومواجهة الموقف السلبي السائد تجاهها.

1. Background

1.1 Aim

The aim of the workshop was to assess the regional conservation status of terrestrial carnivores in the Arabian Peninsula. The information provided here will help to put national conservation priorities into a regional context, thus maximising the effectiveness of local and national conservation measures, and facilitating the development of integrated regional conservation strategies. This Red List publication summarizes results for terrestrial carnivores, and provides the first overview of the conservation status of these species to follow IUCN Regional Red Listing guidelines. It identifies species that are threatened with extinction at the regional level – in order that appropriate conservation action can be taken to improve their status.

1.2 The Arabian Peninsula

The Arabian Peninsula is conventionally defined as the countries of Saudi Arabia, Kuwait, Bahrain, Qatar, UAE, Yemen and Oman, plus Jordan except for its Mediterranean fringe (Figure 1). It thus excludes Iraq and Syria in the north of the Arabian region, Lebanon, Israel, Palestine and the West Bank, and the Sinai Peninsula. The total area covered exceeds 3 million km² (Table 1). All area definitions based on political or administrative grounds are to some extent arbitrary, and it is difficult to define the Arabian Peninsula biogeographically because the boundary in the north is not clear-cut, and habitats continue and intergrade with those farther north.

Figure 1. Carnivores in the Arabian Peninsula assessment region

Table 1. Countries of the Arabian Peninsula

Country	Area (km²)
Bahrain	690
Jordan	89,210
Kuwait	17,820
Oman	212,460
Qatar	11,437
Saudi Arabia	2,149,690
UAE	83,600
Yemen	527,970
Total	3,092,877

1.3 Carnivores in the Arabian Peninsula

Thirty species of terrestrial carnivores have been reported to occur in the Arabian Region (Gasperetti *et al.* 1985, Kock 1990, Harrison and Bates 1991, Nader and Al Safadi 1991) and are listed in Table 2. Twenty species have been recorded in the Arabian Peninsula as defined here. Two species, Egyptian Mongoose *Herpestes ichneumon* and Jungle Cat *Felis chaus* occur in Jordan, but outside the desert areas (Qumsiyeh *et al.* 1993, Abu Baker *et al.* 2003). Seven occur in the Mediterranean biome along the coast, the Tigris-Euphrates marshes, or the mountains of northern Iraq, which in biogeographical terms have more in common with Turkey and the Iranian region. One species, Small Indian Civet *Viverricula indica* has been recorded recently on the island of Socotra where it must have been introduced. (M. Al Jumaily pers. comm. 2011). Kock (1990) gave an account of a reported sighting of a tiger in northern Iraq in 1877.

1.3.1 Endemism

None of these species is endemic, but several subspecies have been described within the Arabian Peninsula and the wider Arabian region. Details are included in the individual species assessments. Most of these forms are based on variations in coat colour, external morphology or craniological measurements and their validity has not been confirmed through molecular genetic analysis. Furthermore, in many cases, the distribution limits of named subspecies are unclear and intergrades occur, or are suspected to occur.

Table 2. Carnivore species occurring in Arabia

Species reported in the Arabian Peninsula		
Canidae	*Canis aureus*	Golden Jackal, Common Jackal
	Canis lupus	Grey Wolf
	Vulpes vulpes	Red Fox
	Vulpes cana	Blanford's Fox
	Vulpes rueppellii	Rüppell's Fox
	Vulpes zerda	Fennec Fox
Mustelidae	*Vormela peregusna*	Marbled Polecat
	Meles meles	Eurasian Badger
	Mellivora capensis	Honey Badger, Ratel
Herpestidae	*Herpestes edwardsi*	Indian Grey Mongoose
	Ichneumia albicauda	White-tailed Mongoose
	Bdeogale crassicauda	Bushy-tailed Mongoose
Viverridae	*Genetta genetta*	Common Genet
Hyaenidae	*Hyaena hyaena*	Striped Hyena
Felidae	*Felis silvestris*	Wildcat
	Felis margarita	Sand Cat
	Caracal caracal	Caracal
	Panthera pardus	Common Leopard
	Panthera leo ?	Lion
	Acinonyx jubatus	Cheetah
Species occurring outside the Arabian Peninsula		
Ursidae	*Ursus arctos*	Brown Bear
Mustelidae	*Lutra lutra*	Eurasian Otter

	Lutra perspicillata	Smooth-clawed Otter
	Martes foina	Stone Marten
	Mustela nivalis	Weasel
Herpestidae	*Herpestes auropunctatus*	Small Indian Mongoose
	Herpestes ichneumon	Egyptian Mongoose
Viverridae	*Viverricula indica*	Small Indian Civet
Felidae	*Felis chaus*	Jungle Cat
	Lynx lynx	Eurasian Lynx
	Panthera tigris	Tiger

Where DNA-based analysis has been applied to isolated Arabian populations, it has in three cases revealed distinctive regional characteristics. Common Genet *Genetta genetta* specimens from the Arabian Peninsula display remarkable chromosomal differentiation and further research may demonstrate greater genetic distinctiveness (Oom *et al.* 2010). Recent research also indicates that White-tailed Mongoose *Ichneumon albicauda* colonized Arabia in a single event around 32,500 years ago and has remained isolated from other White-tailed Mongoose populations in Africa since then (Fernandes 2011). Preliminary results of ongoing genetic research on the Arabian Leopard *Panthera pardus nimr* clearly indicate that it is a very distinct, unique and ancient Leopard subspecies (C.A. Fernandes, pers. comm. 2011).

1.3.2 Information on Arabian carnivores

The standard works on the carnivores of Arabia are Harrison (1968, 1972), Gasperetti *et al.* (1985) and Harrison and Bates (1991). Several works summarise the status of carnivores at national level: Bahrain (Al-Khalili 1990); Jordan (Qumsiyeh *et al.* 1993); Oman (Grobler and Al Ojali, no date); Yemen (Al Jumaily 1998). Nader (1990) summarised the status of five large carnivores in for Saudi Arabia. Several publications provide regional context on the carnivores of the Arabian region, outside the Arabian Peninsula: Iraq (Hatt 1959); Lebanon and Syria (Kumerloeve 1975, Massetti 2009); Sinai (Osborn and Helmy 1980); Israel (Ferguson 1975). Scientific publications relating to individual species are referred to in the assessments. All authors have stated that carnivore populations were declining across the Arabian Peninsula (e.g. Gasperetti *et al.* 1985, Nader 1990, Harrison and Bates 1991, Qumsiyeh *et al.* 1993). Further information and status summaries have been compiled at regional workshops in Sharjah since 2000 (see 2.1). Several projects have been conducted at national level by government agencies, universities and others, but the results of these are not always widely available. The Saudi Wildlife Commission has recently put a series of reports on its website.

Nevertheless, quantified data and reliable estimates of population size are not generally available. There is no standard regional recording scheme nor a central database of georeferenced species localities across the Peninsula. Camera-trapping projects are starting to improve this situation, such as on Jebel Samhan and elsewhere in Oman, recent efforts in the mountains of western Saudi Arabia, and at sites in Yemen; e.g. confirming the presence of several species in Hawf Forest, eastern Yemen, between September 2010- and January 2011, some for the first time, including Arabian Leopard (D. Stanton, *in litt*. 6 February 2011).

Researchers have discovered that the Common Genet *Genetta genetta* found on the Arabian Peninsula has remarkable chromosomal differentiation when compared to other subspecies and may in fact be a unique species; making it endemic to the Arabian Peninsula. © Jane and Kevin Budd, EPAA. *Ex situ* Arabia's Wildlife Centre.

2. The Regional Red List Assessment

2.1 Previous assessments

Conservation Workshops for the Fauna of the Arabian Peninsula have taken place in Sharjah annually since February 2000, and have included status reviews of selected taxonomic groups. Carnivores have featured on several occasions: small carnivores in 2000; caracal in 2002; sand cat and wildcat in 2004; canids and Striped Hyaena in 2005 (CBSG 2000, 2001; EPAA 2002, 2003, 2004, 2005).

Arabian Leopard has been a priority from the beginning and was discussed at every workshop 2000-2007. A full status review was carried out in 2006 (published as Cat News Special Issue No. 1) and a conservation strategy for the Arabian leopard was discussed and developed in 2007 (EPAA/IUCN Cat Specialist Group 2011).

These workshops originally followed the CBSG CAMP format and a modified version thereafter. A taxon data sheet was compiled for each species. These included a regional red list assessment but this component was not carried out in a formal way. Arabian Leopard *Panthera pardus nimr* is the only regional taxon that has a formal IUCN Red Listing, carried out as part of the 2008 Global Mammal Assessment.

In order to increase the effectiveness of regional assessments, a Red List training workshop was held in Sharjah in January 2010 led by staff from the IUCN Red List Unit and a second training workshop took place in Amman, Jordan, in January 2011, convened by the IUCN Regional Office for West Asia.

2.2 The 2011 Assessment

A three-day regional Red Listing workshop was held on 8-10 February 2011 at the Breeding Centre for Endangered Arabian Wildlife in Sharjah, UAE, as part of the annual series of conservation workshops on the fauna of Arabia. The aim was to make a Red List (RL) assessment of the regional status of terrestrial carnivores in the Arabian Peninsula in accordance with the IUCN Categories and Criteria (IUCN 2001) and the Guidelines for Application of IUCN Red List Criteria at Regional Levels (IUCN 2003).

Figure 2. The Arabian Leopard *Panthera pardus nimr* is the region's most threatened carnivore, currently categorised as Critically Endangered (CR) and is the only regional taxon that has a formal IUCN Red Listing. © Jane and Kevin Budd, EPAA, *ex situ* BCEAW.

2.3 Assessment procedure

As a first step the list of terrestrial carnivores recorded in the Arabian Peninsula (Table 2) was reviewed using the Guidelines for Application of IUCN Red List Criteria at Regional Levels (IUCN 2003) (Figure 3). Four species were identified as Not Applicable for regional assessment because their occurrence in the Arabian Peninsula was marginal (Marbled Polecat *Vormela pergusna*, Eurasian Badger *Meles meles*) or unconfirmed (Lion *Panthera leo*, Bushy-tailed Mongoose *Bdeogale crassicauda*). Appendix 1 contains the rationales and further details of these.

The regional Red List status of the remaining 16 species was assessed in two working groups (one dealing with felids, and the other with canids, hyena and small carnivores), using the IUCN Red List Criteria (IUCN 2001), which are the world's most widely accepted system for measuring relative extinction risk. Assessments for each species were supplemented by the full range of supporting information required for entry onto the IUCN Species Information System (SIS): taxonomic notes, global and regional range, population information, habitat preferences, major threats, conservation measures (in place, and needed), species utilization, and key literature references.

Earlier taxon data sheets and workshop summaries provided baseline data. These were updated from recent published sources and with new information reported by workshop participants. Existing maps were reviewed and amended or redrawn as appropriate.

Information available on species' distributions and populations is generally very limited. There are no systematic long-term monitoring programmes in the region to generate accurate estimates of rates of population decline. Current maps are mainly based on guesses or extrapolations from a relatively small number of known sites. As a consequence, Red List assessments frequently relied on trends that were inferred, suspected or estimated (IUCN 2008).

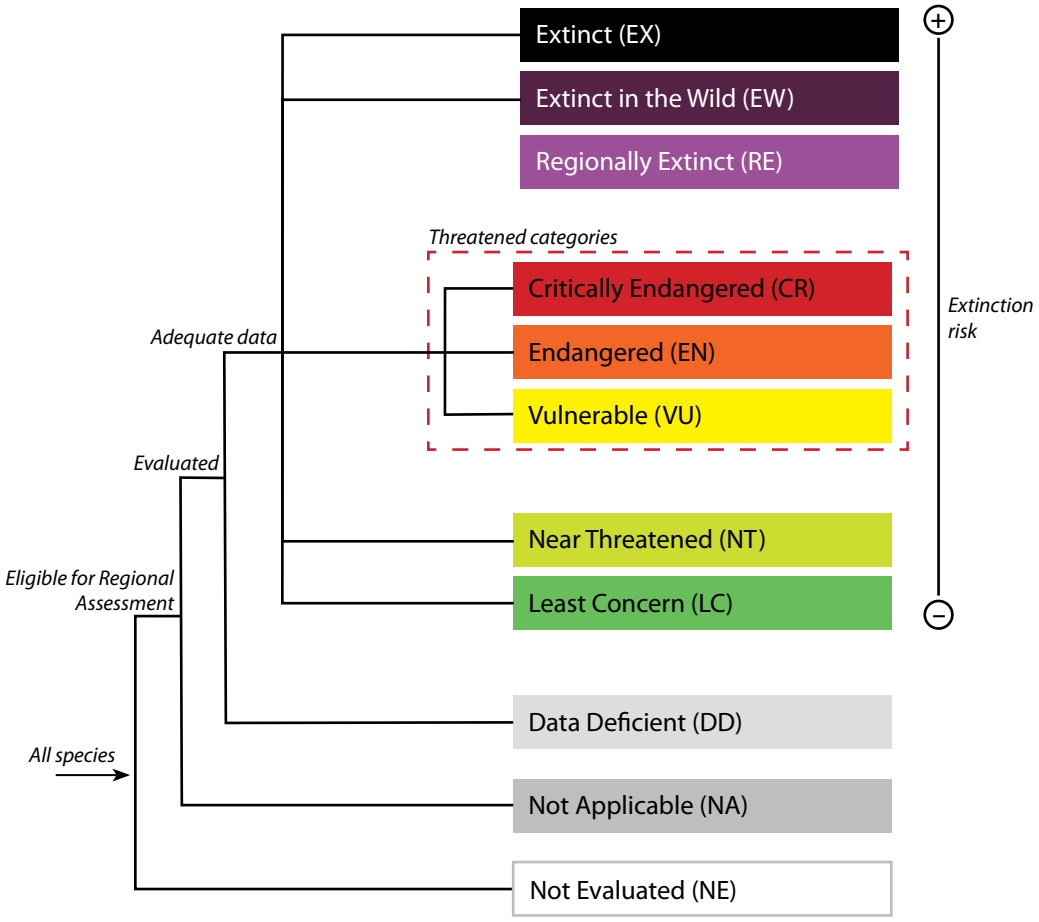

Figure 3. IUCN Red List Categories at the regional level (IUCN 2003)

3. Assessment Results

Of the 16 species assessed at the workshop four (25%) are threatened with extinction in the Arabian Peninsula, of these one is Critically Endangered, two are Endangered and one is Vulnerable. A further four (25%) were considered to be Near Threatened. Five (31%) are Least Concern, two (12%) are Data Deficient and one (Cheetah) is already Regionally Extinct (Figure 4). Table 3 summarises the regional Red List categories and compares them with the species' global status.

Half the species assessed are more threatened regionally than globally. The four largest carnivores have fared particularly badly, and are listed in a regional category of threat that is 2–3 categories higher than their global status. The populations of nine species are declining, and only two, Red Fox *Vulpes vulpes* and White-tailed Mongoose *Ichneumia albicauda*, are considered to be increasing.

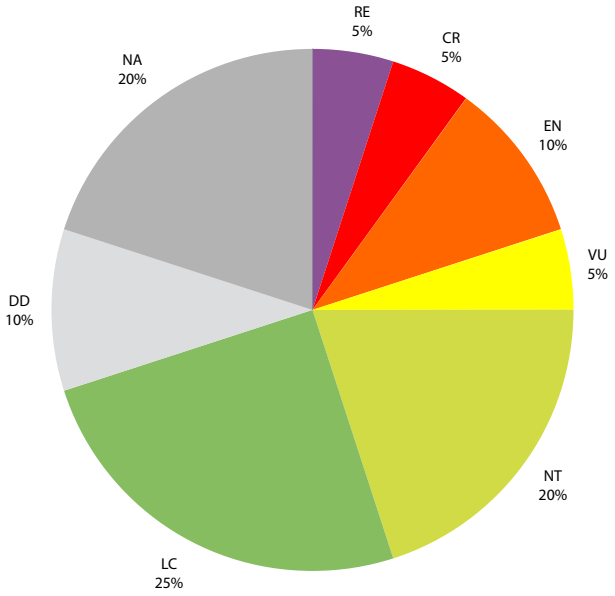

Figure 4. Red List status of carnivores in the Arabian Peninsula

Table 3. Regional and Global status of carnivores in the Arabian Peninsula

Species	Regional Status 2011	Global Status 2008	Population trend
Acinonyx jubatus	Regionally Extinct	Vulnerable	-
Panthera pardus	Critically Endangered	Near Threatened	Declining
Canis lupus	Endangered	Least Concern	Declining
Hyaena hyaena	Endangered	Near Threatened	Declining
Vulpes cana	Vulnerable	Least Concern	Declining
Canis aureus	Near Threatened	Least Concern	Declining
Mellivora capensis	Near Threatened	Least Concern	Declining
Felis silvestris	Near Threatened	Least Concern	Declining
Felis margarita	Near Threatened	Near Threatened	Declining
Vulpes vulpes	Least Concern	Least Concern	Increasing
Vulpes rueppellii	Least Concern	Least Concern	Declining
Ichneumia albicauda	Least Concern	Least Concern	Increasing
Genetta genettta	Least Concern	Least Concern	Unknown
Caracal caracal	Least Concern	Least Concern	Fluctuating?
Vulpes zerda	Data Deficient	Least Concern	Unknown
Herpestes edwardsi	Data Deficient	Least Concern	Unknown
Meles meles		Not Applicable	
Vormela peregusna		Not Applicable	
Bdeogale crassicauda		Not Applicable	
Panthera leo		Not Applicable	

There is real concern over the status of the Sand Cat *Felis margarita* in the Arabian Peninsula. Sand dune habitat continues to be lost and the population is likely to be declining, although more information is required to confirm the rate of decline across the region. © Jane and Kevin Budd, EPAA. *Ex situ* BCEAW.

4. Species Assessments

4.1 Felidae

4.1.1 Arabian Leopard *Panthera pardus nimr* (Hemprich & Ehrenberg, 1833)

Common Names

English: Arabian Leopard, Common Leopard
Arabic: *al nimr*, *Nimr al Arabi*

Taxonomic Notes

Panthera pardus nimr was tentatively affirmed as a distinct subspecies by genetic analysis from a single captive leopard from Israel of south Arabian origin (Uphyrkina *et al.* 2001, Spalton and Al Hikmani 2006). Preliminary results of ongoing genetic research indicate that it is a very distinct, unique and ancient Leopard subspecies (C.A. Fernandes, pers. comm. 2011). The geographic range is poorly understood but generally considered as limited to the Arabian Peninsula, including Egypt's Sinai Peninsula (Spalton and Al Hikmani 2006, Breitenmoser *et al.* 2006). The south Arabian individual appeared most closely related to African Leopard (*P. p. pardus*) (Uphyrkina *et al.* 2001). Preliminary genetic analysis found no evidence of geographic partitioning between Leopards from northern and southern Arabia (J. Williamson pers. comm. in Spalton and Al Hikmani 2006). DNA analysis of Arabian Leopard samples is continuing at the University of Lisbon.

Regional Assessment: Critically Endangered C2a(i)

Rationale: Listed as Critically Endangered, as the effective population size is clearly below 250 mature individuals, the population is declining, and distribution is severely fragmented, with no subpopulation larger than 50 mature individuals (Breitenmoser *et al.* 2006). This subspecies is endemic to the Arabian Peninsula, except for a very small number in Israel. Therefore there is no potential for rescue from outside of the region and no change is made to the preliminary assessment.

Date of Assessment: 8 February 2011

Assessors: Christine Breitenmoser, Urs Breitenmoser, Haitham Al-Aamri, Arnna Al-Abri, Masaa Al-Jumaily, Christiana Hebel, Aimee Cokayne, Raed Al Hassan, Abdullah Alshehmy, Ahmed Boug, Anas Z. Sambas, Moaz Sawaf, Mike Maunder, Pritpal Soorae, Gary Feulner, Jane Budd

Global Assessment (2008):
P. p. nimr – Critically Endangered C2a(i)
P. pardus – Near Threatened

Geographic Range

Endemic to the Arabian Peninsula except for a tiny population in Israel. Participants at the 2006 Conservation Workshop for the Fauna of Arabia estimated there were three separate subpopulations (Breitenmoser 2006, Spalton and Al Hikmani 2006).

Oman: The 4,500 km² Jabal Samhan Nature Reserve in Dhofar was established there in 1997 after camera trap records of Leopards were obtained. Camera trapping has also confirmed the presence of 9-11 Leopards in the mountains that run west of the reserve to the Yemen border (Spalton and Al Hikmani 2006).

Saudi Arabia: Potential range in the western Sarawat and Hijaz mountains range was estimated at 4,000-19,635 km², only about 10% of the Leopard's historic range in that country (Judas *et al.* 2006). However, although Al-Johany (2007) collected over 65 records from informants during 1998-2003, and Judas *et al.* (2006) also obtained a number of informant reports, subsequent camera trapping failed to confirm Leopard presence (Judas *et al.* 2006). Two Leopards were poisoned near An-Namas in the south-west in January 2007. Camera trapping at five sites in October 2010 failed to obtain any positive records of Leopards.

Yemen: The only site with confirmed records was Wada'a, 120 km north of the capital Sana'a (Al Jumaily *et al.* 2006). Since then, a scat recovered in 2009 in Hajja, western Yemen, was confirmed as that of a leopard by genetic analysis (C. Fernandes, pers. comm.). Two Leopards were camera trapped in Hawf, eastern Yemen, by the Foundation for the Protection of the Arabian Leopard in Yemen (FPALY)

Figure 5. Distribution map for Arabian Leopard *Panthera pardus nimr*

Figure 6. One of the camera trap photographs which confirmed that Arabian Leopards *Panthera pardus nimr* are still present in Hawf Protected Area, Yemen. © FPALY.

in January 2011, the first confirmed record for this area. Leopards potentially occur in four other mountainous areas of the country but their current presence is unconfirmed (Al Jumaily *et al*. 2006).

Leopards are probably extinct in Jordan (Qarqaz and Abu Baker 2006) and the United Arab Emirates (Edmonds *et al*. 2006a).

Countries

Jordan (RE), Oman, Saudi Arabia, UAE (RE), and Yemen.

Population

Fewer than 200 Leopards were estimated to remain on the Arabian Peninsula (Breitenmoser 2006, Spalton and Al Hikmani 2006). The largest confirmed subpopulation is in the Dhofar mountains of southern Oman. The 4,500 km² Jabal Samhan Nature Reserve was established there in 1997 after camera trap records of Leopards were obtained. Camera trapping has identified 17 individual adult leopards, including one cub in Jebel Samhan reserve and confirmed the presence of 9-11 leopards in the mountains to the west towards the Yemen border (Spalton and Al Hikmani 2006). In Saudi Arabia, the potential population size was estimated at 60-425 (Judas *et al*. 2006).

Population Trend

Decreasing.

Habitat and Ecology

The Arabian Leopard occurs mainly in the mountainous regions along the coast of the Arabian Peninsula. The prime habitat in Dhofar and eastern Yemen is woodlands, scrub and grasslands dominated by *Anogeissus dhofarica* and Acacia in the Dhofar mountains. The western highlands of Yemen rise steeply from the coast to peaks of over 3000 m. The wadis are partially wooded with trees and shrubs such as *Cordia abyssinica*, *Breonadia alicina* and *Ficus* species.

Threats

Causes of past population declines are:

1. Unrestricted killing of Leopards
2. Loss of prey base through hunting, habitat degradation and competition with livestock
3. Destruction or degradation of habitat as a consequence of woodland destruction and overgrazing
4. Lack of effective law enforcement after Leopard was granted legal protection

Current threats:

1. Insufficient or non-existent law enforcement
2. Hunting, killing and capturing of Leopards for pets
3. Habitat degradation and fragmentation as a consequence of unsustainable human exploitation (destruction of woodland, overgrazing, roads, mining)
4. Unsustainable hunting of Leopard prey
5. Genetic depletion

Trade and Use

Live animals have been caught for the private pet trade. Leopards are still occasionally reported for sale but many of these are known to originate in north-east and east Africa.

Conservation Action

Legally protected in all countries. Occurs in Jebel Samhan (Oman) and Hawf (Yemen) protected areas. A comprehensive status review was produced in 2006 as Cat News Special Issue No. 1. An Arabian Leopard conservation strategy was developed in 2007 and published by the IUCN/SSC Cat Specialist Group and the Environment and Protected Areas Authority (Breitenmoser *et al.* 2010). There are captive breeding programmes at the Breeding Centre for Endangered Arabian Wildlife, Al Ain Wildlife Park and Resort, Oman Mammal Breeding Centre, and the National Wildlife Research Centre in Taif. Animals of local origin are kept in Sana'a and Ta'izz Zoos and a very small number are also known to exist in private collections.

Oman: Fieldwork is continuing in Dhofar.
Saudi Arabia: Field survey and training in camera trapping was conducted by Rodney Jackson and Saudi Wildlife Commission staff in October 2010. Nine locations have had fixed camera traps and survey work is ongoing in this country with the aim of developing an action plan for this species. Reports are also being developed on the techniques used for this survey work. No field signs or photos were obtained at 5 locations sampled.
Yemen: The FPALY is collaborating with the Ministry of Environment and Water on field surveys, camera trapping, and programmes to raise awareness and other aspects of leopard conservation. A regular newsletter is produced in Arabic and English.

4.1.2 Cheetah *Acinonyx jubatus* (Schreber, 1776)

Common Names

English: Cheetah, Hunting Leopard (obsolete)
Arabic: *Fahad*, *fahd*

Taxonomic Notes

Arabian specimens were assigned to the Asian subspecies *A. j. venaticus* Griffith, 1821 (Harrison and Bates 1991). DNA analysis has recently confirmed that the animal shot in Dhofar in 1977 belonged to this subspecies (Charruau *et al.* 2011).

Geographic Range

Cheetahs are distributed in southern, eastern, north-eastern and parts of west and north Africa. The Asiatic Cheetah *A. j. venaticus* now survives only in Iran, where it is Critically Endangered.

In the Arabian Peninsula there is an old specimen from Zerqa Main in Jordan and records from Kuwait and Saudi Arabia up to the 1950s. Hatt (1959) reported that since 1950 four

Regional Assessment: Regionally Extinct

Rationale: The last confirmed records of wild Cheetahs within their natural range date back to the 1950s except for the specimen from Dhofar in 1977, which may not have been from a wild population. In the absence of reports of any kind, the Cheetah is regarded as Regionally Extinct in the Arabian Peninsula.

Date of Assessment: 8 February 2011

Assessors: Christine Breitenmoser, Urs Breitenmoser, Haitham Al-Aamri, Arnna Al-Abri, Masa'a Al-Jumaily, Christiana Hebel, Aimee Cokayne, Raed Al Hassan, Abdullah Alshehmy, Ahmed Boug, Anas Z. Sambas, Moaz Sawaf, Pritpal Soorae, Gary Feulner, Jane Budd

Global Assessment (2008):
Acinonyx jubatus - Vulnerable A2cd; C1
A. j. venaticus – Critically Endangered D

Cheetahs had been killed in northern Saudi Arabia, close to the point where it borders Iraq and Jordan. A Cheetah was seen in Wadi Mitan, southern Yemen, in 1963 and one was shot near Jibjat in southern Oman in 1977 (Harrison and Bates 1991); it is doubtful whether these records were of animals within the natural range, since all other records are from northern Arabia. There is some confusion between local names for Leopard and Cheetah which may have obscured some records; for example, Raswan (1935) reported his guide shooting 'a leopard and cubs' in northern Saudi Arabia, but the animals shown in the photo are clearly Cheetahs. It is regarded as Regionally Extinct in the Arabian Peninsula.

Countries

Jordan (RE), Kuwait (RE), Saudi Arabia (RE), Oman (RE), and Yemen (RE).

Habitat and Ecology

The Cheetah formerly occurred in open deserts, wadis, and mountain fringes.

Threats

Uncontrolled hunting of the Cheetah and its prey drove it to extinction in the Arabian Peninsula.

Trade and Use

Cheetahs from Africa are frequently imported into the region as pets. Many are illegally imported from north-east Africa as evidenced by confiscations by customs officers in Dubai.

Conservation Action

Several well-managed captive populations exist within the region, all consisting of African stock, of which a significant number are from north-east Africa.

4.1.3 Caracal *Caracal caracal* (Schreber, 1776)

Common Names

English: Caracal, Caracal Lynx, Red Lynx
Arabic: *Washeq*, *Anaq al ardh*, *Al Khanaq*, *Hirr Khuwainga*, *Tiffa*,
Mahri, Jibali: *Khanshant*

Taxonomic Notes

The Caracal has been classified variously with *Lynx* and *Felis* in the past, but molecular evidence supports a monophyletic genus. The Caracal is closely allied with the African Golden Cat *Caracal aurata* and Serval *Leptailurus serval* (Johnson *et al.* 2006. Eizirik *et al.* submitted).

Specimens from Arabia are assigned to *C. c. schmitzi* Matschie. 1912 which is smaller and paler than the nominate form which is not endemic to the region (Harrison and Bates 1991). The validity of the taxon has not been confirmed by DNA analysis.

Regional Assessment: Least Concern

Rationale: The species is widespread in the region and appears to be stable at present. A Preliminary Assessment of Least Concern is therefore appropriate, and there is no scope to make a regional adjustment to this category.

However, with a population size below 10,000 mature individuals and a decline reported in some range states, the species may be approaching the threshold of a 10% decline over three generations thus qualifying for Vulnerable status under criterion C1, so may already be close to Near Threatened.

Date of Assessment: 8 February 2011

Assessors: Christine Breitenmoser, Urs Breitenmoser, Haitham Al-Aamri, Amna Al-Abri, Masaa Al-Jumaily, Christiana Hebel, Aimee Cokayne, Raed Al Hassan, Abdullah Alshehry, Ahmed Boug, Anas Z. Sambas, Moaz Sawaf, Mike Maunder, Pritpal Soorae, Gary Feulner, Mariam Saeed Yamani, Jane Budd, Mohammed Shobrak

Global Assessment (2008): Least Concern

Geographic Range

Widely distributed in Africa and the Middle East, through Iran to north-west India and Central Asia.

The Caracal is widespread in the Arabian Peninsula, though most records are from the south-west, south and south-east (Harrison and Bates 1991). In Jordan it is known from a few places and is regarded as rare. In Yemen there are records from the south of the country (Al Jumaily 1998) and recent camera trap records from Mahra on the eastern border (D. Stanton, in litt.). In Oman it is found in Dhofar, Jiddat al Harasis, Hajar mountains and Musandam (Grobler and Al-Ojali , no date). Records in Saudi Arabia are concentrated in the mountains of the south-west and it is regarded as rare (Nader 1990). It is also known in Harrat al Harrah in the north (van Heezik and Seddon 1998). In the UAE it is recorded in wadis of the northern mountains but was considered rare by Gross (1987).

Figure 7. Distribution map for Caracal *Caracal caracal*

Countries

Jordan, Kuwait, Oman, Saudi Arabia, UAE, and Yemen.

Population

Rough estimates of population size based on likely distribution and home range size indicate it is likely to be less than 10,000 mature individuals. No national population estimates have been made. Over 100 camera trap photos of Caracal were taken September 2010-January 2011 in Hawf PA, Yemen (D. Stanton, in litt.).

Population Trend

In Saudi Arabia, this species is less visible than it has been in the past and is seen less often in road kills. Habitat fragmentation and loss of prey base are ongoing. However, it is not certain that the population is declining. In the United Arab Emirates the species is declining. In Yemen, the Caracal population is more likely to be stable than declining. In Oman, the population trend is unknown. There appear to be more accidents involving Caracal (road kills, hunting, etc.). Rainfall over the last couple of years has increased and this has kept the prey base stable. Overall, the regional population size is likely to fluctuate depending on the availability of prey. 1999-2004 was the driest five year record for some time and this likely resulted in a lower population size over this time.

Habitat and Ecology

The Caracal occurs from sea level to 3,000 m.a.s.l. It occurs in desert wadis, foothills, mountains and basalt fields. In Dhofar and eastern Yemen it is found in wooded mountains dominated by *Anogeissus dhofarica*. Generation length is likely to be around 6 years. Caracals in the region feed on birds, small mammals, gazelles, lizards and snakes (Harrison and Bates (1991). Van Heezik and Seddon (1998) tracked a radio-collared male caracal for 11 months in Harrat al Harrah Protected Area in northern Saudi Arabia; they found that scats contained mostly rodent bones, particularly Libyan Jird *Meriones libycus* but the Caracal was also seen feeding on Arabian Sand Gazelle *Gazella subgutterosa marica* and once on a Steppe Eagle *Aquila niplaensis*. The collared animal had a range size > 1100 km^2.

Threats

Caracals may prey on sheep and goats and are deliberately killed by shooting, trapping and poisoning. Habitat loss and fragmentation due to expanding road networks and settlements are also a serious threat. Gazelle populations have greatly declined across the Arabian Peninsula (Mallon and Kingswood, 2001), reducing the potential prey base, and during periods of drought the rodent prey base is likely to be reduced.

Trade and Use

In the United Arab Emirates, animals have been seen for sale in markets for the international pet trade but the source of these animals is not known. The impact of this trade on the wild population is not known.

Conservation Action

The species is listed on CITES Appendix I. It is included in the Oman National Red Data Book (CR C2a). The species is legally protected in all range countries, but better implementation of legislation is needed. The Caracal occurs in the following protected areas: Dana (Jordan); Arabian Oryx Sanctuary, Jebel Samhan (Oman); Harrat Al Harrah, Raydah, Shada (Saudi Arabia); Jebel Bura'a, Hawf, Otamah (Yemen).

There are captive breeding populations within the region at Al Ain Wildlife Park and Resort, the Breeding Centre for Endangered Arabian Wildlife (UAE), and Riyadh Zoo (Saudi Arabia).

Figure 8. Caracal *Caracal caracal, ex situ* BCEAW. © Jane and Kevin Budd, EPAA.

4.1.4 Sand Cat *Felis margarita* Loche, 1858

Common Names

English: Sand Cat
Arabic – *Qit al Riml*, *Al Tiffa*

Taxonomic Notes

Specimens from Arabia are assigned to *F. m. harrisoni* Hemmer, Grubb and Groves, 1976 (Harrison and Bates 1991). This is differentiated from the nominate form on craniological and dental characters (Harrison and Bates 1991). It has not been validated by genetic analysis and precise limits of the distribution of the two forms are unclear.

Regional Assessment: Near Threatened

Rationale: The global assessment for Sand Cat is Near Threatened. This is a precautionary assessment based on the possibility of declines approaching 30% over three generations caused by the various threats across its range (habitat loss in particular). There is real concern over the status of the Sand Cat in the Arabian Peninsula. Sand dune habitat continues to be lost and the population is likely to be declining, although more information is required to confirm the rate of decline across the region. There is therefore no reason to believe that the Sand Cat's status in the Arabian Peninsula is better than it is at the global level; in fact, it is likely to be more threatened in this region because of habitat loss and other threats. The Preliminary Assessment is Near Threatened. There is no possibility of significant immigration or a rescue effect, so a regional adjustment is not applied.

Further research on population size and trends may result in a future reassessment showing that the species is threatened.

Date of Assessment: 8 February 2011

Assessors: Christine Breitenmoser, Urs Breitenmoser, Haitham Al-Aamri, Amna Al-Abri, Masaa Al-Jumaily, Christiana Hebel, Aimee Cokayne, Raed Al Hassan, Abdullah Alshehry, Ahmed Boug, Anas Z. Sambas, Moaz Sawaf, Mike Maunder, Pritpal Soorae, Gary Feulner, Mariam Saeed Yamani, Jane Budd, Mohammed Shobrak

Global Assessment (2008): Near Threatened

Geographic Range

North Africa, Arabia, Central Asia, Iran and Pakistan.

There are records from scattered localities across the Arabian Peninsula, but its distribution and status are not known in detail.

Jordan: It is considered very rare. There are records from Wadi Rum in the south and a more recent one from the north-east, but extensive trapping failed to record the species in Wadi Arava (Bunaian *et al.* 1998).

Kuwait: No confirmed records.

Oman: Recorded from Mughshin, Arabian Oryx Sanctuary, As Saleel Nature Reserve, and Wahiba Sands.

Qatar: Two records are reported in Harrison and Bates (1991), including a specimen from near the Saudi border.

Saudi Arabia: Sand Cats have been recorded in three protected areas: Mahazat As Sayd, Saja/Um Ar- Rimth, and Uruq Bani Ma'arid. There are a few other records including one close to the border with Kuwait (Harrison and Bates 1991).

UAE: Rarely seen. The Sand Cat has mainly been recorded in Abu Dhabi Emirate at Dhafra and Umm Al Zumul in the south-east on the edge of the Rub Al Khali.

Yemen: No records in Yemen for more than 50 years, despite surveys for other species across the country. The only specimen was found near Beihan in south Yemen in 1952 (Al Jumaily 1998).

Countries

Jordan, Oman, Qatar, Saudi Arabia, UAE, and Yemen.

Population

Population size within the Arabian Peninsula region is impossible to estimate at present. This is a cryptic species that is rarely seen. Numbers are presumed to be low, based on the scarcity of records. The only available density estimates come from a telemetry study in southern Israel, where 11 cats were caught in a 375 km^2 study area (M. Abbadi, in Sliwa in press). In Saudi Arabia, a trapping programme in two protected areas with 495 trap nights resulted in 6 captures of Sand Cats and 148 of Rüppell's Fox *Vulpes rueppellii* (Strauss

Figure 9. Distribution map for Sand Cat *Felis margarita*

et al. 2007). In Oman, six Sand Cats were recorded during 2009, which is considered a relatively high number for this species in one year.

Population Trend

Considered to be declining, but at an unknown rate. The Sand Cat population is believed to be declining in Saudi Arabia based on trapping success, although this may be the result of prey-base fluctuations (Dr M. Shobrak, pers. comm. 8 February 2011).

Habitat and Ecology

The Sand Cat is the only felid found primarily in true desert. They are specialists of vegetated sandy desert, sand dunes and sand/gravel plains. They are nocturnal. Few details of their ecology and biology are known. A radio-tracking study is ongoing in Saudi Arabia (Strauss *et al*. 2007).

Threats

Habitat loss and degradation is likely to represent the major threat to the Sand Cat through overgrazing by camels and other livestock and expansion of roads and settlements. 'Dune bashing' further damages fragile sand dune habitat.

Figure 10. Sand cat *Felis margarita*, *ex situ* BCEAW. © Jane and Kevin Budd, EPAA.

Sand Cats are vulnerable to indiscriminate trapping and poisoning of predators. They are unlikely to be directly targeted although there have been occasional reports of animals shot in south-east Saudi Arabia (M. Strauss pers. comm.). Some reserves operate programmes to reduce fox numbers to protect Houbara Bustard *Chlamydotis macqeeni* so Sand Cats may be caught in traps set for this purpose. Four Sand Cats were trapped by fences 2004-2007 at Saja/Umm ar-Rimth PA in Saudi Arabia (Sher Shah and Cunningham 2008).

In view of the widely scattered known localities, fragmentation may also be a factor, but this requires further investigation.

Trade and Use

Sand Cats are sometimes caught for the international pet trade (M. Maunder pers. comm. 8 February 2011). This is an ongoing activity, but the scale is not known.

Conservation Action

Occurs in the following protected areas: Wadi Rum (Jordan); Arabian Oryx Sanctuary, As Saleel (Oman); Harrat al Harrah, Ibex Reserve, Mahazat as Sayd, Saja/Umm ar-Rimth, Uruq Bani Ma'arid (Saudi Arabia); Dubai Desert Conservation Reserve, Umm Al Zumul (UAE).

Included on CITES Appendix II. There are captive breeding populations within the region at Al Wabra (Qatar), Al Ain Wildlife Park and Resort, the Breeding Centre for Endangered Arabian Wildlife (UAE), and Riyadh Zoo (Saudi Arabia). Captive breeding populations in the USA are managed through a Species Survival Plan and in Europe through a European Endangered Species Programme, coordinated at Osnabrück Zoo, Germany.

There is an urgent need to develop reliable survey methods to estimate population sizes and trends for Sand Cats. In Saudi Arabia, studies are underway in the Mahazat Al-Sayed, Saja/Umm Ar-Rimth and Uruq Bani Ma'arid Protected Areas (Ahmed Boug pers. comm. 8 February 2011).

4.1.5 Wildcat *Felis silvestris* Schreber, 1777

Common Names

English: Wildcat, Gordon's Wildcat
Arabic: *Al qit*, *al herra*, *al barra*, *sunnooor* (Oman).

Taxonomic Notes

The taxonomy is confused, with several named forms recorded in the Arabian Peninsula, including *F. s. gordoni* in the southeast, *F. s. tristrami* elsewhere and *F. s. iraki* in Kuwait (Harrison and Bates (1991). None of these have been validated by genetic analysis and the boundaries between their ranges are unclear. The IUCN Red List assessment refers to *F. s. lybica* in the Arabian Peninsula (Driscoll and Nowell 2009).

Regional Assessment: Near Threatened

Rationale: There are no direct data available on population size of the Wildcat. However, hybridisation with domestic cats was identified as a serious threat to the species more than 10 years ago. Over the last 10-20 years, human settlements and road networks have expanded across the region extending the range of domestic cats. The practice of dumping stray domestic cats in remote areas also continues to be a problem.

For these reasons, it is likely that the Wildcat population has declined by at least 20-30% over the last 15-20 years (three generations), close to or possibly even reaching the threshold for Vulnerable under criterion A. This results in a Preliminary Assessment of Near Threatened. There is no significant rescue effect from outside the region, so no adjustment is made and this category is retained.

Research is urgently needed to determine the full extent of the hybridisation issue and the risk of disease transfer between domestic cats and Wildcats, as well as research into population size and developing a more refined range map.

The status should be reassessed as soon as more information is available and an uplisting to a threatened category may be appropriate.

Date of Assessment: 8 February 2011

Assessors: Christine Breitenmoser, Urs Breitenmoser, Haitham Al-Aounti, Arnna Al-Abri, Masaa Al-Jumaily, Christiana Hebel, Aimee Cokayne, Raed Al Hassan, Abdullah Alshehmy, Ahmed Boug, Anas Z. Sambas, Moaz Sawaf, Mike Maunder, Pritpal Soorae, Gary Feulner, Jane Budd

Global Assessment (2008): Least Concern

Geographic Range

Very widely distributed across most of Africa, Europe and western and central Asia.

Distribution is widespread and is presumed to cover all the Arabian Peninsula except for extensive areas of sand dunes such as Rub Al Khali. Obtaining accurate distribution records is complicated by the presence of hybrids with domestic cats.

Countries

Bahrain, Jordan, Kuwait Saudi Arabia, Oman, Qatar, UAE, and Yemen.

Population

There are no estimates of population size.

Figure 11. Distribution map for Wildcat *Felis silvestris*

Population Trend

Considered to have been declining for at least the last 10-15 years due to hybridization, disease, loss of habitat, persecution, and fragmentation.

Habitat and Ecology

Occurs in rocky areas, scrub deserts, dunes and plains from sea level to 2,300 m. There are no detailed studies of the Wildcat in Arabia except for a radio-tracking study of two animals in UAE (Phelan and Sliwa 2005, 2006). A female followed for 14 months occupied a home range size of 52.7 km² and used 42 den sites during that time, often using fox burrows (Phelan and Sliwa 2006). A Wildcat was found resting in the hollow of a Ghaf tree *Prosopis cinerea* (Tourenq and Coleman 2011). It is presumed to be a generalist feeder, preying on rodents, small birds, reptiles, eggs, etc. The stomach of one Wildcat examined on the Batinah coast, Oman, contained Coleoptera, Orthoptera, lizards, mammal fur, and a date stone, with the insect remains perhaps a response to the scarcity of rodents during a period of drought (Harrison and Bates 1991).

Threats

The major threat is hybridisation with feral and free-ranging domestic cats. These are now extremely widespread throughout the Arabian Peninsula even in remote desert areas. In places, stray cats are collected up and dumped in the desert, making the problem worse. Disease transfer from domestic cats is also a risk to Wildcats.

Direct persecution occurs, e.g. a dead Wildcat hanging in a tree (Harrison and Bates 1991), a burrow sealed and the Wildcat inside suffocated by smoke (Phelan and Sliwa 2005, 2006). Wildcats may not be specifically targeted but remain vulnerable to indirect persecution through trapping and poisoning .

Habitat loss and fragmentation are also a threat due to expansion of settlements and development of agriculture. The expanding road network increases the risk of road kills, though Wildcat road kills are rarely reported.

Trade and Use

Not recorded in trade.

Conservation Action

Wildcats are known in the following protected areas: Ajloun, Azraq, Dana, Mujib, Shaumari and Wadi Rum (Jordan); Ibex Reserve, Mahazat as-Sayd, Uruq Bani Ma'arid (Saudi Arabia); Arabian Oryx Sanctuary, Jebel Samhan (Oman); Dubai Desert Conservation Reserve, Jebel Hafit (UAE); and are presumed to occur widely in other PAs across the peninsula.

There are captive breeding populations within the region at the Breeding Centre for Endangered Arabian Wildlife (UAE), Oman Mammal Breeding Centre (Oman).

More taxonomic research is required to refine the knowledge of the subspecies ranges within the region. Compiling and extending the bank of existing photographic records of Wildcats in the region would help with this.

Basic life history and ecological research is needed (research on diet, specific habitat requirements, generation length, etc.) and surveys on range, population size and trends are required. Screening of domestic and feral cat populations for disease is recommended to determine the potential risk to the regional population.

4.2 Canids and Hyaena

4.2.1 Golden Jackal *Canis aureus* Linnaeus, 1758

Regional assessment: Near Threatened

Rationale: There is no information on population size or trend. The area of occupancy is small and is estimated to cover less than 2,000 km^2; suitable habitat is declining due to development, and the species occurs at <10 locations. The preliminary assessment was therefore Vulnerable under criteria B2a+b(iii). However, this species is widespread elsewhere in the Middle East and regular immigration from other populations, especially those in Iraq, is possible. The potential rescue effect therefore results in a downlisting by one category, to NT.

Date of Assessment: 8 February 2011

Assessors: Abdulaziz N. Alagaili, Abdulhadi Aloufi, Thabit Alshare, Khalid Juma Al Rasbi, Omer Ahmed Baeshen, Lisa Banfield, Salah Behbehani, Anniek Boshoven, Vladimir Korshunov, David Mallon, Osama B. Mohammed, Nazrul Islam Pathan, Moaz Sawaf, Mohammed Shobrak.

Global Assessment (2008): Least Concern

Common Names

English: Golden Jackal, Common Jackal
Arabic: *ibn awa*

Taxonomic Notes

Animals from Iraq have been assigned to *C. a. aureus* and those from Northern Arabia to *C. a. syriacus*, but the two forms are not clearly defined and show considerable intergradations (Harrison and Bates 1991).

Geographic Range

Distributed across north and northeast Africa, southwest Europe, the Middle East, and Central Asia to India and Thailand.

In the Arabian Peninsula it is restricted to a small part of eastern Saudi Arabia in the Hofuf area and around Al Asfah Lake. There were sightings in Qatar in the 1950s (Gillespie 2008) and in 2008 (Hellyer 2009). An anecdotal report of one animal caught near the Abu Dhabi-Saudi Arabia border (Gross 1987) is presumed to have been from a location west of the current border and there are no confirmed records from UAE (Hellyer 2009).

There is one record from Al Jouf in northern Saudi Arabia dating from the early 1980s that is thought to be of an animal that wandered from populations farther north.

Figure 12. Distribution map for Golden Jackal *Canis aureus*

Reports from Aden and Sheikh Othman in southern Yemen in 1895 cited in Harrison & Bates (1991) are unconfirmed and are likely to be erroneous or refer to released or imported animals. The species is not included in a recent list of the mammals of Yemen by Al Jumaily (1998).

In Jordan it is known from Azraq and Wadi Rum (Harrison & Bates 1991). Jackals are more widespread in northern Arabia and were described as abundant along rivers in Iraq and in the southern marshes (Harrison & Bates 1991), so the distribution may extend into northern Kuwait.

Countries
Saudi Arabia, Jordan, Kuwait?, and Qatar.

Population
There are no reliable estimates of population size.

Population Trend
Unknown.

Habitat and Ecology
Lake sides, reeds and agricultural areas.

Threats
Threats are unknown. A lack of suitable habitat is likely to limit range expansion.

Trade and Use
It is not known to occur in trade.

Conservation Action
No specific measures are taken. Jackals do not occur in any protected areas.

4.2.2 Grey Wolf *Canis lupus* Linnaeus, 1758

Common Names
English: Grey wolf
Arabic: *dheeb*; *serhan* (northern Saudi Arabia). Many other local names

Taxonomic notes
According to Harrison and Bates (1991) the subspecies *C. l. arabs* occurs in the Arabian Peninsula and *C. l. pallipes* in Iraq and northern Arabia, with specimens intermediate in size recorded in Kuwait. The possible separation of these two forms has not yet been supported by genetic evidence. *C. l. arabs* is smaller with a less luxuriant coat. A large Wolf with a thick coat typical of northern forms was shot recently in north-west Saudi Arabia (Figure 14).

Geographic Range
Globally widespread across the whole northern hemisphere.

In the Arabian Peninsula, distribution was formerly extensive, with confirmed records from all parts except the Rub al Khali and part of the northeast (Harrison & Bates 1991).

Regional Assessment: Endangered C1

Rationale: Numbers are estimated at <2500 mature individuals (see Population). A decline of 20% over two generations (calculated as 14 years) is considered plausible, based on the known disappearance from large parts of its range (e.g. UAE, northern Oman) and severe ongoing persecution, leading to a preliminary assessment of Endangered under criterion C1.

There are no natural barriers to prevent immigration from the north. However, the Grey Wolf is also regarded as highly threatened in Israel, Jordan and Syria (Sillero-Zubiri *et al.* 2004) so the level of immigration is unlikely to be significant and insufficient to provide a rescue effect. Therefore, no change is made to the preliminary assessment.

Date of Assessment: 8 February 2011

Assessors: Abdulaziz N. Alagaili, Abdulhadi Aloufi, Thabit Alshare, Khalid Juma Al Rasbi, Omer Ahmed Baeshen, Lisa Banfield, Salah Behbehani, Anniek Boshoven, Vladimir Korshunov, David Mallon, Osama B. Mohammed, Nazrul Islam Pathan, Moaz Sawaf, Mohammed Shobrak.

Global Assessment (2008): Least Concern

Figure 13. Distribution map for Grey Wolf *Canis lupus*

Jordan: Rare. Still occurs in the south including Wadi Rum, the north (Azraq) and centre (Dana).

Kuwait: No recent records.

Oman: Regarded as probably extinct from all areas north and west of Jebel Akhdar (Fisher 1999, Spalton 2002). Now reportedly disappeared from northern and most of central Oman and confined to Dhofar and possibly the Jiddat Al Harasis.

Saudi Arabia: Records are widespread except in Rub Al Khali (Gasperetti *et al*. 1985, Harrison and Bates 1991). Cunningham and Wronski (2010) reviewed unpublished reports at the Saudi Wildlife Commission (SWC; formerly National Commission for Wildlife Conservation and Development) and added a further 64 confirmed sightings and documented presence in 12 protected areas. Workshop reports included several from areas in the north-west: Al Qassim, Jebel Al Lawz, Bajdat, and fairly regular sightings in Tabuk; and from Hail and Mahat al Dahab. One Wolf was captured c.30 km north of Riyadh in 2009 (Cunningham and Wronski 2010).

UAE: One was captured in Dubai Emirate in 1978, one shot in 1984 in Al Ain and a few sightings and track reports were received up to 1987 (Gross 1987). There have been no confirmed records in the last 20 years (G. Feulner pers. comm.). It was regarded as Extinct in the Wild in UAE by Hornby (1996).

Yemen: There are confirmed records from several parts of southern Yemen but few from the north (Harrison & Bates 1991, Al Jumaily 1998), though there are anecdotal reports of their presence in the western mountains. Wolves are known to occur in similar mountain habitat in southwest Saudi Arabia so it is possible that they occur in N Yemen but their presence has not been documented. Workshop reports include one killed in Shabwa governorate in 2006. A camera trapping project in Hawf on the eastern border with Oman captured 100 photos of Wolves between September 2010 and January 2011 (D. Stanton pers. comm.).

Countries

Kuwait, Jordan, Oman, Saudi Arabia, UAE, and Yemen.

Population

The Wolf population in Saudi Arabia has been estimated at 600-700 Nader (1996), 500-600 (Mech and Boitani 2004) and <800 (CBSG 2000). Details of how these estimates were calculated are unclear, as is their accuracy. However, extrapolating them to the Arabian Peninsula as a whole, on the basis that Saudi Arabia occupies approximately 70% of the total area (see Table 1) would indicate a population of 715-1,150. Sinibaldi *et al*. (2000; cited in Cunningham and Wronski 2010) carried out a Wolf census of Saudi Arabia and suggested the population may be higher than the published estimates. However, even if these figures were doubled, they still fall well below the level of 2,500 mature individuals in the region.

Wolves are considered rare in most places, and live at low densities; e.g. only 17 sightings or tracks were recorded

Figure 14. A Grey Wolf *Canis lupus* shot in north-west Saudi Arabia. © Dr Abdulhadhi Aloufi.

in a seven year period, 1991-97 in the Arabian Oryx Sanctuary, Oman. However, in some mountainous areas of Saudi Arabia, local bedu regarded Wolves as numerous (Cunningham and Wronski 2010). Workshop reports indicated they were relatively common in the Al Qasim area and were sighted fairly regularly in Tabuk.

Population Trend

Declining everywhere in the region. In Oman, considered Endangered on the basis of small population size and a continuing decline.

Habitat and Ecology

Occurs in all habitats in the region except extensive areas of loose sand. Usually seen in ones and twos, occasionally in larger groups; an attack by five Wolves on livestock in NW Saudi Arabia was reported at the workshop.

Threats

Direct persecution– shooting, trapping, and poisoning - is the main threat. The use of 'hanging trees' to display the carcasses of Wolves and other predators is widespread especially in Saudi Arabia (e.g. Cunningham *et al.* 2009). Other threats include a reduced wild prey base (most gazelle species have sharply declined outside Protected Areas – see the country chapters in the IUCN Antelope Action Plan; Mallon and Kingswood 2001), habitat destruction and fragmentation and spread of urban areas. Hybridisation with domestic/feral dogs is known, with one recent case in Saudi Arabia confirmed by DNA analysis and reported at the workshop, but the extent of this factor is unknown. In Oman, there is no evidence of interbreeding and few bedu now keep traditional salukis (Spalton 2002).

Trade and Use

In parts of northern Saudi Arabia the gall bladder is used to treat cataracts.

Conservation Action

Legally protected except in Yemen, but law enforcement is weak or absent outside protected areas. Occurs in the following protected areas: Azraq, Dana, Wadi Rum (Jordan); Arabian Oryx Sanctuary, Jebel Samhan (Oman); Al Khunfah, Al Tubayq, Harrat al Harrah, Harrat 'Uwayrid, Ibex Reserve, Jabal Shada, Mahazat as Sayd, Majami al Hadb, Raydah, Saja/Umm al Rimth, Uruq Bani Ma'arid, Wadi Dhum (Saudi Arabia); Hawf (Yemen).

4.2.3 Blanford's Fox *Vulpes cana* Blanford, 1877

Common names

English: Blanford's Fox
Arabic: *tha'leb sakhari*, *thaleb jebali* (Oman)

Taxonomic notes

Animals in the Arabian Peninsula are provisionally assigned to *V. c. cana* (Harrison and Bates 1991).

Regional Assessment: Vulnerable C1

Rationale: While there is no robust population estimate, the limited distribution suggests that a population < 10,000 mature individuals is plausible. A decline of 10% over 10-12 years (generation length = 4 years) was considered conservative on the basis of continuing persecution and tourist development in the mountains. Hence a preliminary assessment of Vulnerable under Criterion C1. Arabian populations are isolated by the Syrian and Iraqi deserts, so immigration from Iran is very unlikely, and there is no rescue effect. Therefore, no change to the preliminary assessment is justified.

Date of Assessment: 8 February 2011

Assessors: Abdulaziz N. Alagaili, Abdulhadi Aloufi, Thabit Alshare, Khalid Juma Al Rasbi, Omer Ahmed Baeshen, Lisa Banfield, Salah Behbehani, Anniek Boshoven, Vladimir Korshunov, David Mallon, Osama B. Mohammed, Nazrul Islam Pathan, Moaz Sawaf, Mohammed Shobrak.

Global Assessment (2008): Least Concern

Geographic Range

Occurs in Pakistan, Turkmenistan, Iran and Arabia, including Sinai.

First recorded in the region in 1981 in Israel, and subsequently found in Jordan, Oman, Saudi Arabia and UAE. All records are from the mountainous periphery of the Arabian Peninsula, except one from the Ibex Reserve in central Saudi Arabia which lies 800 km inland.

Jordan: A trapping study in 2010 caught 10 individuals at five localities, Jebel Masouda, Petra, south of Mujib, Wadi Rum and Dana.

Oman: First recorded in 1985 when two were trapped on Jebel Samhan in Dhofar, and it has been camera trapped there regularly since then. It has been recorded on Jebel Qamar also in Dhofar. In 2002 it was trapped in Wadi Serin Tahr Reserve. It has also been found on Jebel Qahwan at the eastern end of the Hajar Mountains. Spalton (2002) considered it likely to occur more widely in Dhofar and throughout the Hajar mountains.

Saudi Arabia: There are two records from the southwestern mountains: one killed on the road on the Biljuraishi escarpment and one photographed in the same general area (Harrison & Bates 1991). Camera-trap photographs were obtained in Al Tubayq Reserve close to the Jordan border in 2001 and the Ibex Reserve in 2004 (Cunningham & Wronski 2009). The Ibex Reserve lies 800 km inland and represents a considerable range extension. The Tuwaiq escarpment could potentially act as a corridor between the western mountains and this area.

UAE: There are many records (camera traps, live traps) in

Figure 15. Distribution map for Blanford's Fox *Vulpes cana*

the northern mountains up to the Oman border on the Musandam Peninsula and also on Jebel Hafit where a skull was found in 2009.

Yemen: Al Safadi (1990) said it occurred in the north but listed no localities and there are no confirmed specimens. Al Jumaily (1998) did not include it on her list of Yemen mammals. However, the mountains of western Yemen are contiguous with those in Asir, SW Saudi Arabia, where Blanford's Fox has been recorded, so there is a good possibility that it also occurs in some parts of NW Yemen.

Countries
Jordan, Oman, Saudi Arabia, and UAE.

Population
No estimates of numbers are available. In Jebel Samhan Reserve, it was camera trapped nearly 150 times (Spalton 2002) whereas in the Ibex Reserve only one picture was obtained during five years of camera trapping (Cunningham & Wronski 2009). It is regarded as rare in Jordan but not rare in suitable habitat in Saudi Arabia and UAE.

Population Trend
It is generally considered to be declining (CBSG 2000, EPAA 2005).

Habitat and Ecology
It is a good climber and prefers rocky mountainous areas. In Jordan, all known localities are in rocky sandstone areas.

Rodent remains occurred in 33% of 85 scats in UAE, plus hare, goat hair, birds, reptiles (<6%) and invertebrates, plus the fruit of *Zizyphus spina-christii* and Wild Fig *Ficus salicifolia* (Stuart and Stuart 2003).

Threats
General persecution, indirect poisoning; habitat loss due to expanding human settlement and tourism development. Competitive exclusion by Red Foxes expanding with spread

Figure 16. Blanford's Fox *Vulpes cana*, *ex situ* at BCEAW. © Jane and Kevin Budd, EPAA.

of development has been suggested as a negative factor (EPAA 2005) but there is no firm evidence to support or contradict this view. Both Red Fox and Blanford's Fox have been camera trapped at the same localities in Fujairah and there are some dietary and habitat differences which may facilitate co-existence.

Trade and Use

It is not known in trade.

Conservation Action

Legally protected in Oman. Occurs in the following Protected Areas: Dana, Jebel Masouda, Wadi Rum (Jordan); Jebel Samhan, Wadi Sareen (Oman); Al Tubayq reserve, Ibex Reserve (Saudi Arabia), and Wadi Wurrayah (UAE).

4.2.4 Rüppell's Fox *Vulpes rueppellii* (Shinz, 1825)

Common names

English: Rüppell's Fox, Sand Fox

Arabic: *tha'leb al-ramli*, *thaleb sahrawi*

Taxonomic notes

Specimens from the Arabian Peninsula and northern Arabia are assigned to *V. r. sabaea*, which is much paler than the nominate subspecies, found in Egypt, though there is some intergradation in Sinai (Harrison and Bates 1991). The validity of these subspecies has not been confirmed by genetic analysis.

Regional Assessment: Least Concern

Rationale: Populations were considered to be declining sufficiently to warrant a Regional Red List category of endangered (EPAA 2005). However, a detailed discussion during the workshop concluded that this was a very widespread species, regarded as common in Saudi Arabia and Yemen. There is no evidence to show a significant decline and the estimated population size and range size are far in excess of the thresholds for threatened status. Criteria A, B and C are therefore inapplicable. The preliminary assessment was therefore Least Concern, which is the lowest category of threat and no regional adjustment is possible.

Date of Assessment: 8 February 2011

Assessors: Abdulaziz N. Alagaili, Abdulhadi Aloufi, Thabit Alshare, Khalid Juma Al Rasbi, Omer Ahmed Baeshen, Lisa Banfield, Salah Behbehani, Anniek Boshoven, Vladimir Korshunov, David Mallon, Osama B. Mohammed, Nazrul Islam Pathan, Moaz Sawaf, Mohammed Shobrak.

Global Assessment (2008): Least Concern

Geographic Range

North and northeast Africa, Arabia, and Iran to Pakistan (Larivière and Seddon 2001).

In the Arabian Peninsula, records are widely but thinly spread in suitable habitat. Oman: widespread but rare in lowland deserts; known from Arabian Oryx Sanctuary (186 sightings 1990-97), Wahiba Sands and edge of Rub Al Khali, N of Fasad; (Fisher 1999, Spalton 2002). Saudi Arabia: Recorded in Rub al Khali, and centre and north of the country. Recent records from Mahazat as Sayd, Harrat al Harrah, Al Khunfah, Uruq Bani Ma'arid reserves and at Thummamah. Assumed to be widespread in suitable habitat. UAE: Generally suggested that it occurs throughout, but only a few confirmed records: Al Dhafra (SW Abu Dhabi); Liwa (S Abu Dhabi), Al Maha and Jebel Ali (both Dubai), Rub Al Khali border area with Saudi Arabia (Gross 1987, Murdoch *et al.* 2007). Yemen: recorded in the south (Hadhramaut, Mahra, other localities) and north (Al Jouf).

Countries

Jordan, Oman, Saudi Arabia, UAE, and Yemen.

Population

Olferman and Hendrichs (2006) trapped 150 Rüppell's Foxes during 12 trapping sessions in their study area in Mahazat as Sayd Reserve, Saudi Arabia. The estimated density was 0.25-0.62/km^2, with corrected figures, for adults only, of 0.16-0.17/km^2. Extrapolating these figures to even 20% of the Arabian Peninsula (a very conservative estimate of the area of suitable habitat) would suggest a population size of 32,000-34,000 adults.

Population Trend

Populations were considered to be declining sufficiently to warrant a Regional Red List category of Endangered (EPAA

Figure 17. Distribution map for Rüppell's Fox *Vulpes rueppellii*

Figure 18. Rüppell's Fox *Vulpes rueppellii*, *ex situ* at BCEAW. © Jane and Kevin Budd, EPAA.

2005). However, a detailed discussion during this workshop concluded that this remained a very widespread species, regarded as common in Saudi Arabia and Yemen, but rare in Oman and UAE, and that there was no convincing evidence of a steep decline.

Habitat and Ecology

Arid steppe, sandy, stony and rocky deserts (Larivière and Seddon 2001). In Mahazat as Sayd, Rüppell's Foxes showed a clear preference for open stony habitats (gravel or basalt) with short grass or low shrubs (Olferman and Hendrichs 2006).

Crepuscular and nocturnal, spending the day underground; utilise breeding and resting dens either dug themselves or enlarged burrows of Spiny-tailed Lizards (*dhab*) *Uromastyx aegyptiacus* (Olferman and Hendrichs 2006). They are agile and climb trees, fences and rocks (Larivière and Seddon 2001).

Average home range size in Mahazat as Sayd was 16.3 km^2 (males 20.9 km^2, females 13.2 km^2) (Olferman and Hendrichs 2006) and 69.1 km^2 (males 89.4, females 53.8) in Oman (Lindsay and Macdonald 1986).

Small mammals and birds formed 85-90% of the diet in Mahazat based on analysis of almost 3000 scats (Olferman and Hendrichs 2006). In Oman, small mammals were the most frequent item in scats, lizards the next frequent, and insects and grass (in 1/3) (Lindsay and Macdonald 1986).

They are territorial and form monogamous pairs. They are seasonal breeders in central Saudi Arabia, mating mid-late November and giving birth in early to mid-June/July.

They overlap widely with Red Fox in many places but are able to penetrate into the interior of deserts (Wacher and Attum 2003). May be forced out of the richest sites by Red Fox but predominate in waterless areas (Larivière and Seddon 2001). Rüppell's Fox is adapted to arid areas that are marginal for Red Fox. There is no evidence of direct competition though Rüppell's are known to vacate areas when Red Foxes move in near to human habitation (Lindsay and Macdonald 1986).

Preyed on by Eagle Owls *Bubo bubo* and Steppe Eagle *Aquila nipalensis* (Olferman and Hendrichs 2006).

Threats

Persecution and poisoning, loss and fragmentation of desert habitat, grazing pressure, agricultural development, and off-road driving. In the Arabian Oryx Sanctuary, Oman, and parts of UAE at least, it has been displaced around settlements by the Red Fox. Three were found hanging from

a tree in an area used for dune-bashing, 50 km north of Riyadh (Cunningham 2009).

Trade and Use
Not known in trade.

Conservation Action
Protected by law in Oman and foxes are not actively hunted there (Spalton 2002). Otherwise it receives little protection outside protected areas. Occurs in the following protected areas: Mahazat as Sayd, Uruq Bani Ma'arid, Harrat Al Harrah (Saudi Arabia); Arabian Oryx Sanctuary (Oman); Arabian Oryx Reserve (UAE).

4.2.5 Red Fox *Vulpes vulpes* (Linnaeus, 1758)

Common names
English: Red Fox
Arabic: *tha'leb ahmar*, *hosseini*,

Taxonomic notes
Specimens from the Arabian Peninsula are referred to *V. v. arabica*, characterized by small size and pale colour (Harrison and Bates 1991) but the validity of this and other subspecies has not been confirmed by genetic analysis.

Regional Assessment: Least Concern

Rationale: This is a common and widespread species which may be increasing along with an expansion of settlements. It is not close to meeting threatened status under any of the Red List criteria.

Date of Assessment: 8 February 2011

Assessors: Abdulaziz N. Alagaili, Abdulhadi Aloufi, Thabit Alshare, Khalid Juma Al Rasbi, Omer Ahmed Baeshen, Lisa Banfield, Salah Behbehani, Anniek Boshoven, Vladimir Korshunov, David Mallon, Osama B. Mohammed, Nazrul Islam Pathan, Moaz Sawaf, Mohammed Shobrak.

Global Assessment (2008): Least Concern

Geographic Range
Most of Eurasia, North Africa, North America and widely distributed throughout the Arabian Peninsula.

Countries
Jordan, Kuwait, Oman, Qatar, Saudi Arabia, UAE, and Yemen.

Population
No estimate of population size is available. Numbers fluctuate apparently in connection with outbreaks of rabies and/or other diseases.

Figure 19. Distribution map for Red Fox *Vulpes vulpes*

Population Trend
Believed to be increasing in the Arabian Peninsula, aided in part by spread of human settlements.

Habitat and Ecology
Occupies a wide range of habitats, though not recorded from the interior of extensive dune areas such as Rub Al Khali. In rocky mountain areas it is probably less common than Blanford's Fox. Less well adapted than Rüppell's Fox to the most arid areas.

In one study in Saudi Arabia, Red Foxes were found to use food-rich sites associated with human activity. They were not territorial and up to four animals were regularly sighted together (Macdonald *et al.* 1999).

Trade and Use
Rarely occurs in trade.

Threats
Subject to persecution and poisoning by livestock herders. Rabies outbreaks killed a number of Red Foxes in the Arabian Oryx Sanctuary in 1990 and 1998 (Spalton 2002).

Conservation Action
Occurs in many protected areas.

4.2.6 Fennec Fox *Vulpes zerda* (Zimmermann, 1780)

Common Names
English: Fennec Fox
Arabic: *hosni fennec*

Taxonomic notes
Arabian specimens are provisionally assigned to *V. z. zerda* (Harrison and Bates (1991).

Regional Assessment: Data Deficient

Rationale: With only a single specimen dating from the 1930s and a few recent sight records, there is not enough data on which to base an accurate assessment, though it is likely that the distribution is limited and numbers relatively low. The preliminary assessment of DD is therefore appropriate and no regional adjustment is made.

Date of Assessment: 8 February 2011

Assessors: Abdulaziz N. Alagaili, Abdulhadi Aloufi, Thabit Alshare, Khalid Juma Al Rasbi, Omer Ahmed Baeshen, Lisa Banfield, Salah Behbehani, Anniek Boshoven, Vladimir Korshunov, David Mallon, Osama B. Mohammed, Nazrul Islam Pathan, Moaz Sawaf, Mohammed Shobrak.

Global Assessment (2008): Least Concern

Geographic Range
North Africa from Morocco to Egypt (including Sinai) and the extreme north of the Arabian Peninsula.

There is a specimen from Kuwait in the Natural History Museum in London and another specimen has been obtained from southern Iraq, a short distance to the north (Harrison and Bates 1991). An animal identified as this species caught near Jebel Hafit (UAE/Oman border) and taken to Al Ain Zoo (now Al Ain Wildlife Park and Resort) was later shown to be Rüppell's Fox (Gasperetti *et al.* 1985). It has been recorded in Sinai, east of the Suez Canal and in Israel (Harrison and Bates (1991).

Figure 20. Distribution map for Fennec Fox *Vulpes zerda*

Some new information was presented at the workshop: Salah Behbehani interviewed senior members of local communities in Kuwait about the occurrence of this species and was told the local name (*hosni fennec*) and that people used to catch them for the tails which were hung in their cars. There are no confirmed records since 1934. Dr Abdulhadhi Aloufi has photographed the species in Tabuk, NW Saudi Arabia and observed it there several times in 2010. It may have a wider distribution in the north of the Arabian Peninsula than previously thought.

Population
No information

Population Trend
No information

Habitat and Ecology
No information

Threats
No information

Conservation Actions
No information

4.2.7 Striped Hyaena *Hyaena hyaena* (Linnaeus, 1758)

Common Names
English: Striped Hyaena
Arabic: *dhaba*, *ja'air, 'arj* (Yemen)

Taxonomic notes
Animals from southern Arabia are assigned to *H. h. sultana* and those from the north to *H. h. syriaca*, but characteristics are not sharply defined and the two forms are thought to intergrade in northern Saudi Arabia (Harrison and Bates 1991).

Geographic Range
North and East Africa, Turkey to India and Central Asia. Formerly distributed widely in the Arabian Peninsula except for Rub Al Khali, with numerous records from the mountains of SW Saudi Arabia and W Yemen (Harrison & Bates 1991) but has declined sharply.

Jordan: Widespread in the eastern desert and rocky hills on the eastern side of the Jordan Valley and Wadi Araba (Qarqaz *et al.* 2004) but considered to have declined by at least 50% in the last 20 years (M. Al Qarqaz, K. Al Omari, pers. comm.).
Kuwait: No recent confirmed records. One specimen in 2008 may have been imported.
Oman: Formerly occurred throughout, but currently found mainly in Dhofar. It is now believed to be extinct north of Qureiyat; recorded in Arabian Oryx Sanctuary (1991-97), Wahiba Sands (1998) and camera trapped in Jebel Samhan

Regional Assessment: Endangered A2acd, A3cd, A4acd, C1

Rationale: Declining sharply due to direct persecution and habitat destruction (mining/quarrying for stone and tourism development). The decline is estimated to have reached or exceeded 50% over three generations (30-36 years) based on the extensive areas where it is no longer present (UAE, Kuwait, much of Oman) and the estimate of at least a 50% loss in Jordan over the last 20 years. Estimated population size is <2,500 mature individuals and a decline of more than 20% in two generations (20-24 years).

The Preliminary assessment was therefore Endangered A2acd, A3cd, A4acd, C1. Immigration from neighbouring populations is expected to be low so there is no significant rescue effect and severe, ongoing persecution in the Arabian Peninsula may even contribute to a sink effect. Therefore no change to the preliminary assessment is appropriate.

Date of Assessment: 8 February 2011

Assessors: Abdulaziz N. Alagaili, Abdulhadi Aloufi, Thabit Alshare, Khalid Juma Al Rasbi, Omer Ahmed Baeshen, Lisa Banfield, Salah Behbehani, Anniek Boshoven, Vladimir Korshunov, David Mallon, Osama B. Mohammed, Nazrul Islam Pathan, Moaz Sawaf, Mohammed Shobrak.

Global Assessment (2008): Least Concern

reserve (Spalton 2002). Two cubs were found in 2010 in the mountains near Ibri.

Saudi Arabia: Widespread especially in the western mountains. It has been recorded at several places in the mountains especially south of Taif and was photographed there during a camera-trapping project in 2010. In the northwest, it occurs in the Tabuk area, Jebel Al Lawz, Medina, Hesam (west of Tabuk), Jebel Madyen and Jebel Hijaz. It is also known from rocky areas near Riyadh.

UAE: No confirmed specimens; the latest record is a sighting from 1984 (Hornby 1996).

Yemen: Widespread records in the western mountains and in the south (Al Jumaily 1998). It appears to be common in Hawf Protected Area where over 300 photos were taken by camera traps during September 2010-January 2011 and was also camera trapped on Jebel Milhan in Hajja governorate (D. Stanton, pers. comm.).

Countries
Jordan, Kuwait, Oman, Saudi Arabia, UAE, and Yemen.

Population
Estimated to be <2,500 mature individuals. Striped Hyaenas were recorded more often than Grey Wolves in camera traps in Hawf, parts of Saudi Arabia and Jebel Samhan, but regarded as more common than the Wolf in Yemen and Jordan, but the opposite in NW Saudi Arabia.

Figure 21. Distribution map for Striped Hyaena *Hyaena hyaena*

Population Trend
Declining sharply in all areas.

Habitat and Ecology
Occurs in a wide range of habitats but apparently avoids extensive areas of loose sand. Needs rocky areas in which to site dens and that are not too far from water (Qarqaz *et al* 2004). May feed at garbage dumps. Mainly active at night.

Threats
Routinely killed by poisoning, shooting and trapping. Traditional stone traps in the Hajar Mountains are called *madhba* indicating that their primary purpose may have been to catch Hyaenas. In parts of the region, there is a folk belief that witches ride Hyaenas, increasing their unpopularity.

Other threats include loss and fragmentation of habitat due to quarrying for stone, tourist developments and expansion of settlements and roads.

Trade and Use
Striped Hyaenas may be killed for their meat, for medicinal purposes and organs as an aphrodisiac.

Conservation Action
Legally protected except in Yemen, but protection is not enforced outside protected areas. Occur in the following protected areas: Ajloun, Azraq, Dana, Mujib, Shaumari, Uweishat, Wadi Rum, (Jordan); Arabian Oryx Sanctuary, Jebel Samhan, Wadi Sareen (Oman); Al Khunfah, Harrat al Harrah, Al Tubayq, Raydah (Saudi Arabia); Hawf (Yemen).

There are captive breeding populations within the region at the Breeding Centre for Endangered Arabian Wildlife, and on Sir Bani Yas Island (UAE). Captive breeding populations in Europe are managed through a European Studbook, coordinated at Cerza Zoo, France.

4.3 Small Carnivores

4.3.1 Honey Badger *Mellivora capensis* Schreber, 1776

Common Names

English: Honey Badger, Ratel

Arabic: *Ghareer Al Asal*, *Akel Al Asal*, *Abu Riha*, *Dherban*, *Drombel* (local), *Dhrambun*

Mahri: *Kamour*

Taxonomic Notes

Specimens from southern Arabia are assigned to *M. c. pumilio* and those from northern Saudi Arabia, Kuwait and northern Arabia to *M. c. wilsoni*; there is probably an intermediate zone in central Saudi Arabia (Harrison and Bates 1991). These forms have been distinguished principally on coat colour and their validity has not yet been confirmed by genetic analysis.

Geographic Range

Widespread in sub-Saharan Africa, Middle East and India. In the Arabian Peninsula, records of Honey Badger are few but widespread across the region in Jordan, Saudi Arabia, Kuwait, Yemen, UAE and Oman. The species has been camera trapped during the Arabian Leopard survey in Dhofar and Saudi Arabia (NWRC).

Figure 22. Distribution map for Honey Badger *Mellivora capensis*

Regional Assessment: Near Threatened

Rationale: The range of this species (extent of occurrence and area of occupancy) is well outside the criterion B thresholds. There is no accurate estimate of population size. It is not very often recorded, and is known to exist at very low densities, but it is a widespread species. It is suspected that the population is declining due to persecution across its range. It is a long-lived species (generation length is around 12-13 years) and a decline of at least 10% over the last 38 years is considered plausible. Some considered the regional population may be only 5000 but the consensus at the workshop was that this was too low and that 10,000 was a more realistic figure.

With few direct data available at present, the most appropriate preliminary assessment is Near Threatened (close to meeting VU under criterion C1). There is a low possibility of a significant rescue effect from populations outside the region. Therefore the NT category is retained for the final regional assessment.

Date of Assessment: 9 February 2011

Assessors: Abdulaziz N. Alagaili, Abdulhadi Aloufi, Thabit Alshare, Masa'a Al Jumaily, Khalid Juma Al Rasbi, Omer Ahmed Baeshen, Lisa Banfield, Salah Behbehani, Anniek Boshoven, Ahmed Boug, Vladimir Korshunov, David Mallon, Osama B. Mohammed, Nazrul Islam Pathan, Caroline Pollock, Moaz Sawaf, Mohammed Shobrak

Global Assessment (2008): Least Concern

Jordan: Known from Azraq and other localities in the north.

Kuwait: In 2008, there are records of this species from west and northeast Kuwait.

Oman: Rare and confined to the mountains of Dhofar (Grobler and Al-Ojali no date) but has since been recorded from the north of the country.

Saudi Arabia: Widespread but rare though not recorded in the Rub Al Khali. Presence at individual localities appears to fluctuate.

UAE: There are no recent records.

Yemen: Known from Hadhramaut and other localities in southern Yemen and also recorded from the north (Al Jumaily 1998). Recorded in Wadi 'Ardan, Shabwa governorate in 2006. Camera trap records were obtained in Hawf Protected Area close to the border with Oman between September 2010 and January 2011 (D. Stanton pers comm.).

Countries

Kuwait, Jordan, Oman, Saudi Arabia, UAE, and Yemen.

Figure 23. Camera trap photograph of two Honey Badgers *Mellivora capensis* in Hawf Protected Area, Yemen. © FPALY

Population

Population size is unknown. This species has rarely been seen in Oman or Saudi Arabia. It is unclear how much the lack of records is due to its nocturnal habits or to its rarity. Generally it appears to live at low densities, e.g. only 2-3 pairs were estimated to occur in Mahazat as Sayd reserve (2244 km²). In Africa they are known to range over areas as much as 500 km² (Begg *et al.* 2005). In southern Oman 6-8 have been seen congregating at garbage dumps.

Population Trend

There is no evidence that the species is declining across its range. In Saudi Arabia the species is apparently stable in protected areas. Possibly declining outside protected areas, due to persecution.

Habitat and Ecology

The Honey Badger occurs in most habitats (wadis, mountains, sandy-gravel desert, plateaux) in the Arabian Peninsula except extensive sand dunes. It has been recorded at 2,000 m.a.s.l in Abha, southwestern Saudi Arabia.

In Mahazat as Sayd, Honey Badgers have been known to predate Houbara chicks in breeding enclosures and also predated Rüppell's Fox and Red Fox caught in live traps (Islam *et al.* 2011). Very little is known about this species' life history and behaviour in Arabia (densities, home range, etc.) and more research is essential to enable a more detailed reassessment.

In Africa Honey Badgers are known to be opportunistic, generalized carnivores, and feed on a range of prey items varying in size from small insect larvae to the young of ungulates. Although they are primarily hunters of their own food, they may steal food from other carnivores and will also scavenge from the kills of larger animals (Begg *et al.* in press). They have a life span of up to 25 years.

Threats

General persecution is a threat and it is seen occasionally on 'hanging trees'. It is deliberately killed by bee keepers because it destroys bee hives/nests.

Trade and Use

Honey Badgers are rarely seen in animal markets.

Conservation Action

It is known to occur in several protected areas: Azraq (Jordan); Kuwait NP (Kuwait); Arabian Oryx Sanctuary, Jebel Samhan (Oman); Mahazat as Sayd, Saja, Tabuk, Umm Ar Rimth (Saudi Arabia); Hawf (Yemen).

4.3.2 Indian Grey Mongoose *Herpestes edwardsi* Blanford, 1874

Common Names:

English: Indian Grey Mongoose
Arabic: *Al Nims, Al Ramadee al Hindi*

Taxonomic Notes

Arabian specimens are assigned to *H. e. ferrugineus*, distinguished by its longer winter coat and other external features including a strong tendency for reddish forms (Harrison and Bates 1991). The status of the subspecies has not yet been corroborated by genetic analysis.

Regional Assessment: Data Deficient

Rationale: This species is most likely to have been introduced or to have arrived as an accidental ship-borne immigrant. In either of these cases, the species would be Not Applicable for Regional Red List Assessment. However, since the possibility of natural colonization cannot be ruled out, it was assessed at the workshop. Given the lack of information on precise limits of its range, population and trend as well as ecology, its preliminary assessment was Data Deficient. There is no opportunity to uplist or downlist from a DD category, so this category is retained for the Regional Assessment.

Date of Assessment: 9 February 2011

Assessors: Abdulaziz N. Alagaili, Abdulhadi Aloufi, Thabit Alshare, Masa'a Al Jumaily, Khalid Juma Al Rasbi, Omer Ahmed Baeshen, Lisa Banfield, Salah Behbehani, Anniek Boshoven, Ahmed Boug, Vladimir Korshunov, David Mallon, Osama B. Mohammed, Nazrul Islam Pathan, Caroline Pollock, Moaz Sawaf, Mohammed Shobrak.

Global Assessment (2008): Least Concern

Geographic Range

The Indian Grey Mongoose is widely distributed in the Indo-Malayan region, extending westwards through Afghanistan and Iran to eastern Arabia.

Its distribution in the Arabian Peninsula is restricted to the Gulf coast of Kuwait, Saudi Arabia and Bahrain. There is one record from Oman, a specimen caught in Badia and brought to the Oman Mammal Breeding Centre in 1997. The Indian Grey Mongoose is thought not to have been present in the region 100 years ago (Harrison and Bates 1991, CBSG 2000) and it is likely that the species was introduced or was brought accidentally on ships crossing the Gulf some time during the last 40 years. Hatt reported that there were no specimens from Iraq. However, a natural spread of this species from Iran cannot be completely ruled out and a combination of both origins is possible.

Figure 24. Distribution map for Indian Grey Mongoose *Herpestes edwardsi*

Countries

Bahrain, Kuwait, Oman, and Saudi Arabia.

Population

This Mongoose is common in some places, e.g. in Bahrain. There are no estimates of population size or density.

Population Trend

Unknown.

Habitat and Ecology

Mainly occurs near the coast, but recorded up to 40 km away, around human habitation and in agricultural areas.

Threats

No threats are known.

Trade and Use

No trade in this species is known.

Conservation Action

No conservation measures are in place or recommended at present. No occurrence in protected areas has been reported.

4.3.3 White-tailed Mongoose *Ichneumia albicauda* (Cuvier, 1829)

Common Names

English: White-tailed Mongoose
Arabic: *Al-Nims*, *al-namas*, *soutar*
Jebali, Mahri: *Khantheer*

Taxonomic Notes

Arabian specimens are usually referred to *I. a. albicauda* (Harrison and Bates 1991). Recent genetic research indicates that this species colonized Arabia around 32,500 years ago and has remained isolated from other White-tailed Mongoose populations since then (Fernandes 2011).

Geographic Range

White-tailed Mongoose is widespread in sub-Saharan Africa. In Arabia it is distributed in southwestern Saudi Arabia and western Yemen (north to about 20°N), Dhofar (southern Oman) and the Hajar Mountains of Oman and UAE. It has also been recorded from Farasan Kabir Island in the Red Sea (Simmons 1995) where it is believed to have been introduced.

Regional Assessment: Least Concern

Rationale: The population size is unknown, but the species is thought to be expanding its range in the southwest of the region. No significant threats are known at present. The range size is well outside the criteria thresholds for Criterion B (extent of occurrence is greater than 20,000 km² and area of occupancy is greater than 2,000 km²). Therefore the preliminary assessment is Least Concern. LC is the lowest threat category and no "rescue" effects are possible from outside the region so this category is retained for the regional assessment.

Date of Assessment: 9 February 2011

Assessors: Abdulaziz N. Alagaili, Abdulhadi Aloufi, Thabit Alshare, Masa'a Al Jumaily, Khalid Juma Al Rasbi, Omer Ahmed Baeshen, Lisa Banfield, Salah Behbehani, Anniek Boshoven, Ahmed Boug, Vladimir Korshunov, David Mallon, Osama B. Mohammed, Nazrul Islam Pathan, Caroline Pollock, Moaz Sawaf, Mohammed Shobrak

Global Assessment (2008): Least Concern

In Saudi Arabia and Yemen, the White-tailed Mongoose appears to be extending its distribution down to the Tihama coastal plain and also eastwards; for example it is now reported more often in the Taif area. In UAE it is known in Wadi Shawka, Ras al Khaimah and in Musandam.

Countries

Oman, Saudi Arabia, UAE, and Yemen.

Figure 25. Distribution map for White-tailed Mongoose *Ichneumia albicauda.*

Population

The species is not uncommon in southwest Saudi Arabia but is less common in Oman. There is no estimate of population size, but records of this species have been increasing across a wider area of southwest Arabia in recent years and the population seems to be increasing across this part of the region.

Population Trend

Apparently increasing.

Habitat and Ecology

White-tailed Mongoose can be found in wooded wadis,

Figure 26. White-tailed Mongoose *Ichneumia albicauda,* ex situ at Arabia's Wildlife Centre. © Jane and Kevin Budd, EPAA

coastal plains, plantations, gardens and even urban areas. Details of the diet in Arabia are unknown. Recorded preying on the eggs of Kentish Plover *Charadrius alexandrinus* on the Farasan Islands.

Threats
There are no major threats known to the species. Some are trapped by farmers, but this is not thought to be a significant problem. Not persecuted on Farasan Islands as they kill snakes.

Trade and Use
In Saudi Arabia, live animals are regularly seen on sale at Al Khobar market, and occasionally at Taif market, as a curiosity.

Conservation Action
This species occurs in the following protected areas: Wadi Sareen, Jebel Samhan (Oman), Farasan Islands, Shada, Raydah (Saudi Arabia).

4.3.4 Common Genet *Genetta genetta* Thunberg, 1811

Common Names
English: Common Genet; Small-spotted Genet
Arabic: *Retam*; *Al Rabah*; *Al Sagheer*; *Zuraiqa*
Jebali: *Sheem*
Mahri: *Hameem*

Taxonomic Notes
Arabian specimens are usually assigned to subspecies *G. g. grantii* (Harrison and Bates 1991) and they display remarkable chromosomal differentiation (Oom *et al.* 2010). Further research may demonstrate wider genetic distinctiveness. There is a high degree of intra-specific variation in this species, which has resulted in many described subspecies; the validity of many of these is unknown, while others may represent distinct species (Gaubert *et al.* 2004, 2005).

Geographic Range
The Common Genet is widespread in Africa, and southwestern Europe (where it is believed introduced).

Distribution in Arabia is restricted to the mountains of southwestern Saudi Arabia and Yemen, north to about 20°N, and the mountains of Dhofar (Oman). The species may also occur in similar habitat across the border in Hawf Forest in the extreme east of Yemen. It is widespread in southern Asir, Saudi Arabia (Harrison and Bates 1991).

Countries
Oman, Saudi Arabia, Yemen

Population
There is no information available to be able to estimate population size or trends. The species is rarely recorded.

Regional Assessment: Least Concern

Rationale: There is no evidence to suggest a continuing decline. Clearly there are data gaps for the common genet, but there are no obvious threats to the species at present and the range size is well outside the thresholds for Criterion B (Extent of occurrence is greater than 20,000 km² and area of occupancy is greater than 2,000 km²). Therefore, the preliminary assessment is Least Concern, but it is also recommended that further research be carried out on this species. The Arabian population is isolated from African populations so there is no possibility of immigration or "rescue" effect, and LC is the lowest threat category, so this is retained for the regional assessment.

Date of Assessment: 9 February 2011

Assessors: Abdulaziz N. Alagaili, Abdulhadi Aloufi, Thabit Alshare, Masa'a Al Jumaily, Khalid Juma Al Rasbi, Omer Ahmed Baeshen, Lisa Banfield, Salah Behbehani, Anniek Boshoven, Ahmed Boug, Vladimir Korshunov, David Mallon, Osama B. Mohammed, Nazrul Islam Pathan, Caroline Pollock, Moaz Sawaf, Mohammed Shobrak.

Global Assessment (2008): Least Concern

Population Trend
Unknown

Habitat and Ecology
The species tends to be found in wooded wadis on both sides of the southwestern Arabian mountains. It occurs in

Figure 27. Distribution map for Common Genet *Genetta genetta*

wooded wadis and rocky areas, often near settlements and water. It has been recorded in low and high elevations (to at least 2,000 m).

There is no information on its diet in Arabia. Globally it feeds mainly on small mammals, but will also take birds, other small vertebrates, insects, and fruit (Delibes and Gaubert, in press).

Threats

There are no records of hunting or persecution of Common Genets in the region.

In recent years some increase in road kills has been noted in SW Saudi Arabia, as new roads are constructed in the mountains and existing tracks are hard-surfaced, increasing vehicle speeds.

Trade and Use

This is not a commonly traded species. However, live animals are sometimes seen on sale in markets in southern Saudi Arabia (e.g. Al Khobar) possibly for medicinal use. The scale and any effect of this trade on the regional population are not known.

Conservation Action

Common Genet occurs in the following protected areas: Raydah and Shada (Saudi Arabia).

There should be more focus on coordinating camera trap efforts throughout the range states to compile confirmed records for this species. This will help to confirm the full extent of this species' range within the region.

Further research on the life history and behaviour of the Common Genet is also required (e.g. to determine home range size, density, generation length, diet, habitat preferences, etc.). Local trade in parts of its range needs to be further investigated to determine the scale and effects of this on the regional population.

Figure 28. Common Genet *Genetta genetta, ex situ* at Arabia's Wildlife Centre. © Björn Jordan, EPAA

The Grey Wolf *Canis lupus* is Endangered (EN) and in decline. Previously widespread throughout the Arabian Peninsula it is now believed to be extinct in the wild in NE Oman and UAE. © Xavier Eichaker. *Ex situ* Breeding Centre for Endangered Arabian Wildlife (BCEAW).

5. Threats

The main threats to carnivores identified during the assessment process were persecution and loss or degradation of habitat. Other adverse factors included disease, reduction in prey base (for larger species), disturbance, and recreational activities. Hybridisation with domestic cats was viewed as a big threat to the Wildcat *Felis silvestris* and domestic dogs a potential threat to the Grey Wolf *Canis lupus*.

5.1 Persecution

Carnivores are relentlessly persecuted across the Arabian Peninsula. Wolves have always been regarded with enmity by herdsmen, and the larger species are targeted the most intensively, but all carnivore species are subject to indiscriminate trapping, shooting and poisoning, either to protect livestock or chickens, or out of a generalised antipathy to predators that extends even to small species which pose little threat. Even where they are not deliberately targeted, small carnivores are vulnerable to incidental mortality through trapping or feeding on poisoned carcasses left as bait, as are vultures and other birds of prey. Gasperetti *et al.* (1985) recorded a Wolf chased by vehicles until exhausted and then beaten to death.

This pervasive and deep-rooted hostility to predators not only means that they are killed whenever possible, but also leads to the view that their conservation is neither important nor desirable. Persecution may even extend into protected areas where these have as their objective the release of 'priority' taxa such as Arabian Oryx *Oryx leucoryx* or Houbara Bustard *Chlamydotis macqueeni*. The resulting removal or severe depletion of top predators has serious implications for ecosystem function.

5.1.1 Hanging trees

The use of 'hanging trees' (Figure 30) to display the bodies of dead predators is widespread in Saudi Arabia and is also known in UAE and Yemen. Road signs and traffic signals are also used for the same purpose; many cases involve Wolf and Striped Hyaena *Hyaena hyaena*, but Caracal *Caracal caracal*, Rüppell's Fox *Vulpes rueppellii*, Wildcat *Felis silvestris*, and Honey Badger *Mellivora capensis* have also been documented (Gasperetti *et al.* 1985, Nader 1990b, Cunningham 2009, Cunningham *et al.* 2009, D. Stanton *in litt.*, R. Llewellyn-Smith, pers comm.). The bodies of two Arabian Leopards *Panthera pardus nimr* that had been poisoned near Al Namas in SW Saudi Arabia in January 2007 were displayed on rocks by the road (Figure 29).

Figure 29. The bodies of two Arabian Leopards *Panthera pardus nimr* killed and put on display near Al Namas, SW Saudi Arabia. © Khashram.net

5.1.2 *Margaba*

Traditional stone traps used to catch predators and known as *margaba* (Figure 31) are found across the region and are known in Yemen, Oman, UAE, Jordan, and Saudi Arabia, as well as Sinai (Egypt). The best-known use of these traps is in the sub-district of Wada'a, Amran Governorate, in the western highlands of Yemen where people specialised in using them to live-trap Arabian Leopards. Fisher (1999) said they were numerous in the Hajar mountains of Oman and here they may be known as *madhba*, implying that their main target may have been Striped Hyaena (Arabic: *dhaba*; Khalid Al Rasbi pers. comm.). Striped Hyaenas are easily trapped according to Gasperetti *et al*. (1985) so were likely more vulnerable to their use. Wolves are normally very wary and may be less likely to be tempted to enter them.

Margaba consist of an elongated chamber constructed from rocks and large stones, with an entrance at one end. Bait is placed at the other end, tied to a rope which is attached to a flat stone positioned above the entrance. When an animal pulls the bait, the stone falls, closing the trap.

The external dimensions of three traps measured at Wada'a, Yemen, and one in Wadi Hilo, Sharjah, were: 2.75-3 m long; 45-60 cm wide at the entrance, widening to 75-100 cm; 55-60 cm high at the entrance, rising to 1.2 m. Inside, the short entrance section is only about 35-45 cm square, which keeps the size of the 'door stone' to a minimum (an important consideration because of weight). The internal space then becomes wider and higher which allows a trapped animal to turn around, facilitating its transfer to a cage.

Wada'a is well-known as a source of captive Leopards, including some of the founders of the captive breeding population included in the international studbook. Many *margaba* are located in the wadis around the village of Adh Dhilain. Two local families specialised in trapping Leopards. They claimed in December 2007 to have caught 10 and 4 Leopards respectively, apparently during their lifetimes, though over what time span, was not clear. Leopards were transported back to the village in a steel cage then sold to menageries or zoos. Some animals must have ended up in private collections while others are likely to have been killed. During a visit in December 2007 several appeared to be disused and the people said that they had ceased trapping leopards and now wished to conserve them.

5.2 Habitat loss and degradation

Overgrazing by sheep, goats and camels has become widespread across the region, facilitated by shifts in traditional grazing patterns due to increased prosperity,

Figure 30. A pair of Grey Wolves *Canis lupus* hanging from a tree in the An Namas area of Saudi Arabia. © Peter Cunningham.

Figure 31. Margaba in Wada'a, Yemen. © David Mallon.

drilling of bore holes and the use of water tankers that allow permanent occupation of areas that were once only grazed seasonally. Degradation of the natural vegetation impacts negatively on the herbivores that form the carnivore prey base, while increased and more occupation of desert areas extends the effects of persecution.

5.3 Development and expansion

The Arabian Peninsula has developed at a faster rate in the last 50 years than almost anywhere else in the world. The expansion of settlements and industrial and tourism developments have all contributed to loss and degradation of desert habitats. The massive extensions and improvements to road networks greatly facilitate access by hunters to formerly remote areas, potentially contribute to population fragmentation and increase the risk of direct carnivore mortality through collisions with vehicles.

This creeping 'urbanisation of the desert' has two secondary effects: promoting range expansion of the adaptable and partially commensal Red Fox *Vulpes vulpes*, at the expense of smaller, more specialised Fox species; and bringing domestic and feral cats into increasing contact with Wildcats and the resulting threat of hybridization.

6. Conservation Action

6.1 Protected areas

The IUCN Regional Office for West Asia estimates that 29% of the Arabian Peninsula, as defined here, is covered by protected areas (PAs) (Al Omari 2011). This is an extremely high figure, but it includes some very large no hunting zones in Saudi Arabia, such as Rub al Khali, which have no staff or management so are not effective PAs in the conventional sense. There is no strategically planned network of PAs at a regional level incorporating high biodiversity, endemism and representative habitats (Seddon *et al*. 2008, 2009, Al Omari 2011).

Many PAs in the Arabian Peninsula, some of considerable size, are known to harbour predators but no assessment of the effectiveness of the PA network for carnivores has been made and with very few exceptions, information is lacking on carnivore population sizes.

More seriously, PA status may not actually confer protection as carnivores may be controlled within them, where other species are viewed as a priority. For example, Wolves *Canis lupus* were removed from Mahazat as Sayd before it was fenced and Arabian Sand Gazelles *Gazella subgutterosa marica* and Arabian Oryx *Oryx leucoryx* subsequently released (Islam *et al*. 2010). Predation by Honey Badger *Mellivora capensis* on chicks of Houbara Bustard *Chlamydotis macqueeni* that were being bred for release has recently been reported (Islam 2011). There is little doubt the high value placed on houbara in the Arabian Peninsula would lead to intensive predator control around breeding facilities and at release sites if they were considered at risk.

Some PAs are completely fenced to prevent access by poachers or livestock, including very large sites such as the Arabian Oryx Reserve in Abu Dhabi (10,000 km^2). Fences also prevent access in and out, hindering dispersal and connectivity between populations. Fencing may pose a direct threat to smaller species that may be killed as they try to pass through (e.g. Sand Cat *Felis margarita*; Shah and Cunningham 2008).

6.2 Legislation

Carnivore species are frequently given theoretical protection under national wildlife legislation, but enforcement is absent or weak outside protected areas, and may not be effective even within them.

Figure 32. Female Arabian Leopard *Panthera pardus nimr* with her cubs, *ex situ* at BCEAW. © Jane and Kevin Budd, EPAA.

6.3 Captive breeding

The main collections in the region are: Al Ain Wildlife Park and Resort (Abu Dhabi); Al Areen Wildlife Park (Bahrain), Al Wabra (Qatar), Breeding Centre for Endangered Arabian Wildlife (Sharjah), Omani Mammal Breeding Centre, and Saudi Wildlife Commission facilities at the National Wildlife Research Centre (NWRC) in Taif and King Khaled Wildlife Research Centre (KKWRC) in Thummamah. Several zoos in the region also keep carnivores, as do some private collections, including Arabian Leopard. European and American zoos operate cooperative breeding programmes for some species. The Arabian Leopard breeding programme was summarised by Budd and Leus (2011).

6.4 Reintroduction

The Arabian Peninsula has already seen several successful operations to reintroduce Arabian Oryx, Arabian Sand Gazelle, Mountain Gazelle *G. gazella*, Ostrich *Strutio camelus,* and Houbara Bustard. Reintroduction may be the only means of restoring populations of some carnivore species, but would be fraught with difficulty: no such projects are planned at present. For a full discussion of the role of reintroductions in the Arabian Peninsula see Stanley Price (2011).

6.5 Public awareness

The National Wildlife Research Centre in Taif, Saudi Arabia has produced a 15-minute film on predators of Arabia (Leopard, Wolf, Caracal) and circulated it to 300-400 schools in Saudi Arabia. A film on leopards is planned for 2012. The Ministry of Environment in Oman had an exhibition including material on Leopards and other carnivores at the Muscat festival. A short video sequence of a Wolf in northern Saudi Arabia and other materials are available on the website of Tabuk Nature. The Breeding Centre for Endangered Arabian Wildlife has an informative website which provide basic information on almost all the indigenous fauna.

7. Recommendations

- Some specific measures are included in the species assessments. The main points applicable to all carnivores that arose from the workshop were:
- Launch a coordinated campaign across the region to highlight the ecological importance of predators. This should be aimed at all sectors – members of the public, the press and media, decision-makers and national wildlife agencies.
- Increase the effectiveness of law enforcement through training of officers and raising awareness of existing wildlife legislation.
- Identify gaps in geographical coverage and priorities for survey.
- Address the lack of data on population size, density, and trends through a coordinated, systematic monitoring programme, using standardised methodologies.
- Develop a region-wide training programme in modern survey and monitoring methods for protected area staff, wildlife agencies and researchers.
- Carry out a programme of basic ecological research on the carnivores of the region.
- Establish mechanisms for sharing data, distributing reports and coordinating data across the Arabian Peninsula.
- Continue genetic research into Arabian carnivores to clarify the status of named subspecies and identify distinctive regional populations.

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Appendix 1. Species Not Applicable (NA) for regional assessment in the Arabian Peninsula

Asiatic Lion *Panthera leo persica* (Meyer, 1862)

Lions occurred in Syria and Iraq along the Tigris and Euphrates Valleys through to the end of the 19th century and the early years of the 20th century. The last specimen was reportedly killed in 1918 (Harrison 1972). Lions were also known from Jordan and Palestine in the 12th century (Bodenheimer 1935). Schnitzler (2011) listed Neolithic rock engravings of lions in Saudi Arabia and Oman and reported their presence on the Tihama coastal plain of Yemen during the 10th century. Harrison (1972) speculated that lions may have ranged farther into Arabia during the wetter climatic conditions of the Pleistocene but there are no confirmed records from the Arabian Peninsula in recent times. There are sporadic anecdotal reports of Lions in Yemen but these are unconfirmed and may reflect linguistic confusion. Lions are not considered part of Yemen's mammal fauna (M. Al-Jumaily pers. comm.).

Bushy-tailed Mongoose *Bdeogale crassicauda (*Peters, 1852)

Arabic: *nims katheef al thail*

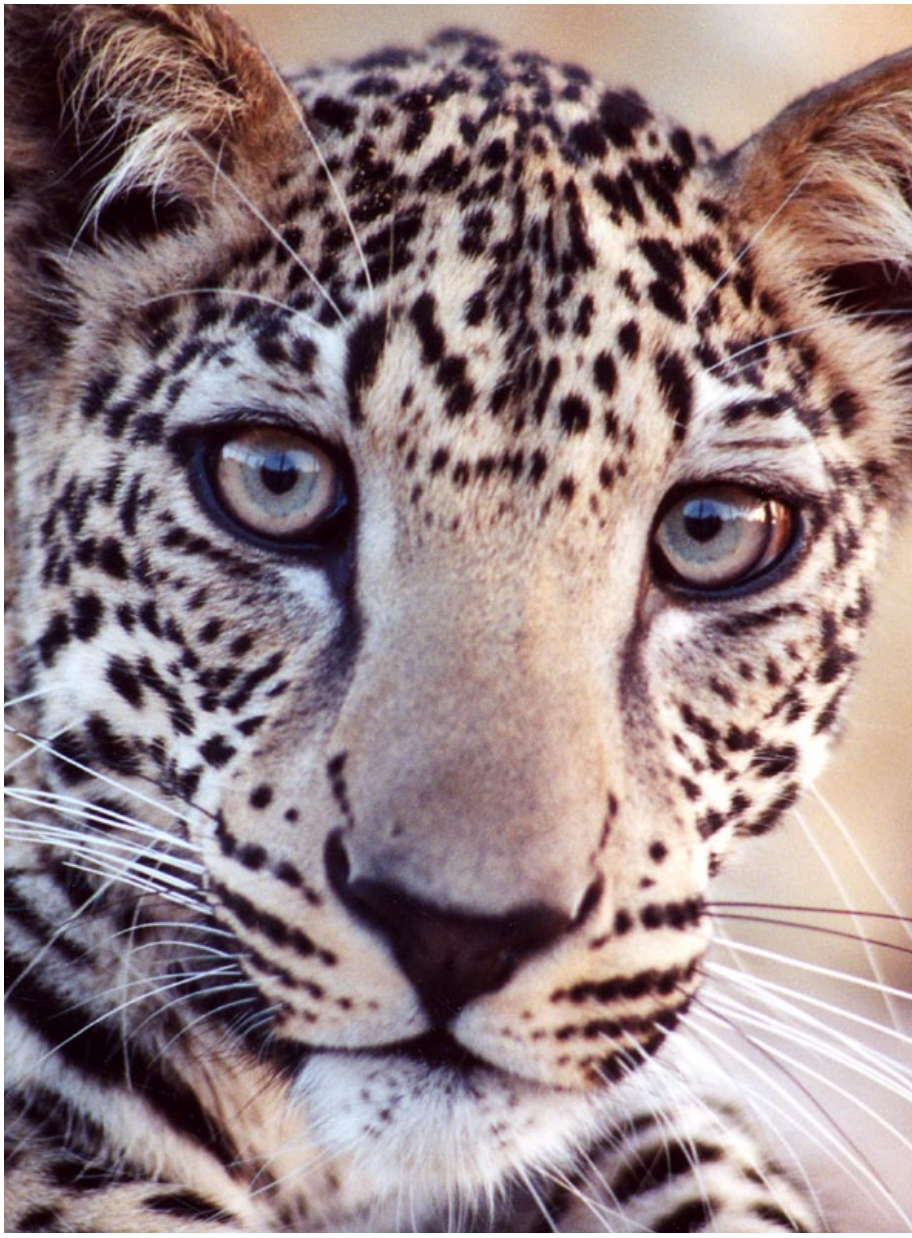
This species is patchily distributed in East Africa. There is only one Arabian specimen, an immature female obtained near Sana'a (Nader and Al Safadi 1991). Simmons (1995) noted that the length of the tail of this specimen exceeded the length considered diagnostic in differentiating the species from White-tailed Mongoose *Ichneumon albicauda* and he recommended that the specimen should be confirmed on craniological evidence. *Bdeogale* is not currently considered part of the Yemen mammal fauna (Dr M. Al-Jumaily, pers comm.).

Marbled Polecat *Vormela peregusna* (Guldenstaedt, 1770)

The distribution of this species extends from Mongolia [and China] across Central Asia and extending to SE Europe, Syria, Palestine and Israel. There are a few records from Jordan (Rifai *et al.* 1999) and a single confirmed record from northern Saudi Arabia. This was a live specimen obtained on 15 April 1990 near Turayf, very close to the border with Jordan (Nader 1991). It is not clear whether this was natural occurrence or the specimen was brought across the border. The habitat in this area (harrat) is atypical for this species (P. Seddon pers. comm.). Occurrence within the assessment region is thus highly marginal.

Eurasian Badger *Meles meles* (Linnaeus, 1759)

A northern species whose distribution extends south along the Mediterranean coast far as Jordan. Here it occurs principally in the Mediterranean biome, but with recent records from Dana reserve and Mujib reserve (Abu Baker and Amr 2002). These locations are on the extreme western edge of the assessment area and its occurrence in the Arabian Peninsula is highly marginal.



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