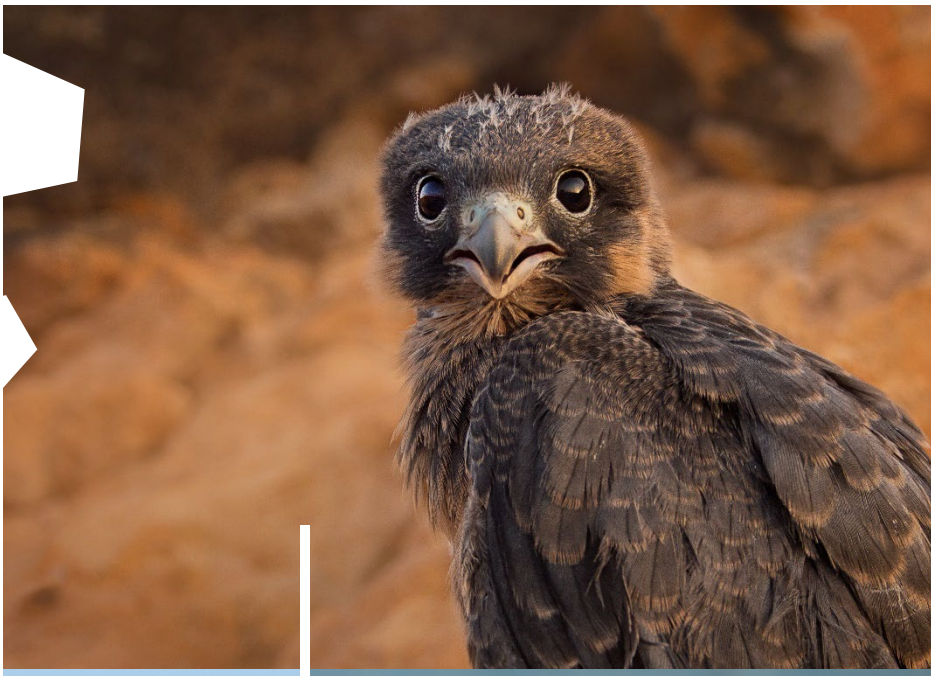
International Single Species Action Plan for the Sooty Falcon

2024 - 2036



CMS

RAPTORS MOU

هيئة البيئة - أبوظبي
Environment Agency - ABU DHABI

International Single Species Action Plan for the Sooty Falcon 2024-2036

Compilation

Giovanni Leonardi (Hierofalcon Research Group), Lauren Lopes (CMS Office – Abu Dhabi), Umberto Gallo Orsi (CMS Office – Abu Dhabi), Sálim Javed (Environment Agency - Abu Dhabi) and Michael McGrady (International Avian Research).

List of contributors 2013-2023 (parentheses indicate questionnaire submission)

Ahmed Ali Mustafa (Egypt), Ahmed Osman (Somalia), Ahmed Salama (Egypt), Ahmed Soliman, Albara Binothman (Saudi Arabia), Alireza Hashemi (Iran [Islamic Republic of]), André Botha (South Africa), Andrew Dixon, Arianna Aradis, Attila D. Sándor (Romania), Charles Musyoki (Kenya), Darcy Ogada (Kenya), Des Thompson, Dick Forsman (Finland), Dietrich Ristow (Germany), Fares Khoury (Jordan), Gilbert Razafimanjato (Madagascar), Hanne Eriksen (Oman), Houssein Rayaleh (Djibouti), Howard King (Bahrain), Humbu Mafumo (South Africa), Ian Burfield, Jean-Marc Thiollay (France), Jens Eriksen (Oman), Jens Hering (Germany), Jorgen Eriksson, Lale Aktay Sözüer (Türkiye), Laith El-Moghrabi (Jordan), Licia Calabrese (Saudi Arabia), Lily Arison Réné de Roland (Madagascar), Liz Baker (United Republic of Tanzania), Marion Gschweng (Germany), Mary Megalli (Egypt), Meidad Goren (Israel), Michael Jennings (Saudi Arabia), Mishari Alghrair (Saudi Arabia), Mohamed Elmi Obsieh (Djibouti), Mohamed Ibrahim Habib (Egypt), Mohammad Tabari, Mohammed Shobrak (Saudi Arabia), Mudhafar A. Salim (Iraq), Muhammad Samar Hussain Khan (Pakistan), Munir Virani, Musa Alshaikh (Saudi Arabia), Nabegh Ghazal Asswad (Syria), Neil Baker (United Republic of Tanzania), Neil Deacon, Ohad Hatzofe (Israel), Omar Al-Saghier (Yemen), Omar Al-Sheikhly (Iraq), Omer Ahmed Baeshen (Yemen), Osama El-Gebaly (Egypt), Roger Safford, Sadegh Sadeghi Zadegan (Iran [Islamic Republic of]), Saleh Buirzayqah (Libya), Shahid Khan (United Arab Emirates), Shaimaa Taha, Simon Thomsett (Kenya), Waheed Abdullah Al-Fazari (Oman), William Mgoola (Malawi), Yoav Perlman (Israel), and Zahra Elahi Rad (Iran [Islamic Republic of]).

Recommended citation

Leonardi G, Lopes L, Gallo Orsi U, Javed S, McGrady M (2024) International Single Species Action Plan for the Sooty Falcon 2024 - 2036. CMS Raptors MOU, Abu Dhabi, United Arab Emirates.

Disclaimer

Financial support

Environment Agency – Abu Dhabi, on behalf of the Government of the United Arab Emirates.

Cover photos

Clockwise, from top-left: © Eyal Bartov, © Waheed Al Fazari, © Waheed Al Fazari, © Environment Agency – Abu Dhabi.

Executive summary

The Sooty Falcon, *Falco concolor*, is a medium-sized falcon with long and narrow wings whose tips extend noticeably beyond the tail when in perched position. A long-distance migrant, the species breeds discontinuously in 16 countries over the vast area ranging from the central-eastern Sahara, along the Red Sea, to the southern Gulf[1] regions—the Red Sea comprising the core of the species' breeding distribution. After reproduction, Sooty Falcons migrate across eastern Africa and the Mozambique Channel towards the south-western and central-western parts of Madagascar, where they winter.

There are 29 Range States to the Sooty Falcon (Bahrain, Central African Republic, Chad, Democratic Republic of the Congo, Djibouti, Egypt, Eritrea, Ethiopia, Iran (Islamic Republic of), Israel, Jordan, Kenya, Kuwait, Libya, Madagascar, Mozambique, Oman, Pakistan, Rwanda, Saudi Arabia, Somalia, South Africa, South Sudan, Sudan, Uganda, United Arab Emirates, United Republic of Tanzania, Yemen and Zambia) and the species is vagrant in an additional 19 countries.

Sooty Falcons face a series of threats across their range: urban, industrial and energy development; disturbance by tourists and fishers; lack of knowledge on the species; introduced terrestrial predators; locust and Quelea control operations; hunting and taking; lack of knowledge on the impacts of climate change; and poisoning and habitat degradation from agricultural intensification. Many of these threats are estimated to be of very high, high or potentially high importance with regards to their scope, severity and irreversibility.

Sooty Falcon population estimates have varied widely and been inconsistent over time. Notwithstanding, the best available data to date indicates that no Sooty Falcon breeding population is increasing; all surveyed populations are either declining or their trend is unknown. Small and medium populations have, in particular, shown marked declines. Overall, the available data indicates that the global population of this species consists of 1,149-1,597 breeding pairs (2,298-3,194 mature individuals), which represents an 18-20% population loss over the past 10 years.

A precautionary approach to the conservation of the Sooty Falcon requires that action be taken to reduce the species' risk of extinction. For this, an International Single Species Action Plan has been developed for the Sooty Falcon using the best information available (in the literature, avian databases, and through expert consultation) on the biology, ecology, conservation status and threats to the species.

The International Single Species Action Plan for the Sooty Falcon 2024 – 2036 aims to reduce the risk of extinction of the Sooty Falcon by halting the decline of its population to a point where it qualifies for downlisting to at least Near Threatened. Ensuring that this is achieved requires Range States and other stakeholders to take concerted, as well as unilateral action.

The 12-year-long Plan covers approximately three generations of the species and puts in place actions under three objectives: (1) protect the species; (2) improve knowledge through monitoring and research; and (3) exchange lessons learnt and raise awareness. Each action of the Plan is accompanied by an outcome, target countries and stakeholders, and an indication of implementation priority. All Range States of the Sooty Falcon are called to implement the Plan.

It is recommended that a mid-term review of the Plan's implementation be undertaken in 2030 and a final review and update in 2036. Lastly, to coordinate, oversee and report on the implementation progress it is also recommended that a dedicated coordinating entity be established.

[1] In the present document, 'the Gulf' means Arabian Gulf and Persian Gulf.

Contents

1. The International Single Species Action Plan

1.1 Aim

The International Single Species Action Plan for the Sooty Falcon 2024 – 2036 (ISSAP) aims to reduce the risk of extinction of the Sooty Falcon (*Falco concolor*) by halting the decline of its population to a point where it qualifies for downlisting to at least Near Threatened. The ISSAP has been developed using the best information available on the biology, ecology, conservation status and threats to the species.

1.2 Geographical scope

The ISSAP applies to the 29 following countries, which are considered Range States of the Sooty Falcon:

Bahrain, Central African Republic, **Chad***, Democratic Republic of the Congo*, **Djibouti***, **Egypt***, **Eritrea**, Ethiopia*, **Iran (Islamic Republic of)***, **Israel***, **Jordan***, Kenya*, **Kuwait**, **Libya***, Madagascar*, Mozambique, **Oman**, **Pakistan***, Rwanda, **Saudi Arabia***, Somalia*, South Africa*, South Sudan, **Sudan***, Uganda, **United Arab Emirates***, United Republic of Tanzania, **Yemen*** and Zambia.[2]

These countries are called to implement the specific actions set forth in this ISSAP.

1.3 Implementation timeframe, oversight and review

The generational length of the Sooty Falcon has been estimated at 4.1 years and the International Union for Conservation of Nature (IUCN) Red List Authority has suggested that future changes to the conservation status of the species be evaluated over a three-generation period (BirdLife International 2021). As such, the present ISSAP is planned for a 12-year period, from 2024 to 2036.

A mid-term review of implementation progress should be undertaken six years following the Plan's commencement (i.e., in 2030), and a final review and update during the last year of implementation (2036). An emergency review and update should be conducted in the event of a sudden, significant negative impact to one or more populations of the Sooty Falcon, or if such an impact is believed likely to occur.

It is recommended that a coordinating entity is established to coordinate, oversee and report on progress in implementing the Plan.

1.4 Methodology

In 2013, the Coordinating Unit of the Memorandum of Understanding on the Conservation of Migratory Birds of Prey in Africa and Eurasia (Raptors MOU) commissioned the development of a draft International Single Species Action Plan for the Sooty Falcon, also establishing at the time a Sooty Falcon Working Group (SFWG) and circulating a questionnaire on the species (see Annexes 7 and 8) to support the development of that action plan. However, due to resource constrains, the draft action plan developed back then (i.e., Gallo-Orsi et al. 2014) could not be finalised (for more information, see document UNEP/CMS/Raptors/MOS3/Doc.13.3).

[2] Countries in **bold** are those in which the species breeds or has bred; the asterisk (*) indicates the countries that are Signatories to the Memorandum of Understanding on the Conservation of Migratory Birds of Prey in Africa and Eurasia (Raptors MOU).

In 2022, the availability of new financial resources enabled the Coordinating Unit to update and finalise the draft ISSAP initiated in 2013. This updating and finalisation work is summarised into the following components:

i) Literature review

A review of literature published between 1825 and 2023 (search engines: BHL[3], Google Scholar[4], ResearchGate[5]) was undertaken to gather the best available scientific information on Sooty Falcon biology, ecology, conservation status and threats across the distribution range of the species. A total of 450 relevant publications were identified, many of which are cited in the present document (see References).

ii) Avian database review

Information on Sooty Falcon distribution was also obtained from relevant avian databases (i.e., African Raptor Data Bank, the Niger Bird Data Base, WABDaB[6], e-bird[7], and GBIF[8]) between 2022 and 2023.

iii) Questionnaires

A questionnaire was developed (see Annex 5) to collect information at national levels on the sizes and trends of breeding, migrating and wintering populations, sites of importance for the species, threats, and conservation actions implemented.

The questionnaire was circulated in November 2022 to 83 non-governmental organisations (most of them from the BirdLife Partnership), local and international species experts, and representatives of Range States of the species. A snowball referral approach was used to identify additional relevant experts. A total of 30 questionnaire responses were received, contributing information on 16 (out of 29) Sooty Falcon Range States. Annex 6 details all contributions received (see Annex 6).

iv) SFWG technical advice

The SFWG was revitalised to support the development of the ISSAP, specifically by sharing technical advice, reviewing iterations of the ISSAP, and sharing relevant data. The SFWG integrated representatives of Sooty Falcon Range States, independent specialist ornithologists, and other individuals working on Sooty Falcon conservation.

As many aspects of the species' biology and ecology are not yet well researched, collecting information from both formal and informal sources (such as expert elicitation, personal communication and personal observation) proved valuable for updating and finalising the ISSAP. The collation of information sourced via the above-described means has resulted in the present document, which comprises the most comprehensive and latest effort to compile and collate all information available on the Sooty Falcon.

The ISSAP contains information on the species' biology, ecology and threats, addressing also protection status, monitoring efforts and relevant international tools and instruments. A precautionary approach to the conservation of the Sooty Falcon requires that action be taken to reduce the species' risk of extinction. As such, the ISSAP culminates with a list of proposed conservation actions to be implemented over the next 12-year period, from 2024 to 2036.

[3] https://www.biodiversitylibrary.org.
[4] https://scholar.google.com.
[5] https://www.researchgate.net.
[6] https://www.wabdab.org.
[7] https://ebird.org/home.
[8] https://www.gbif.org.

2. Biological information

2.1 Taxonomy

Since the first description of the species by C. J. Temminck in 1825 (Table 1; Figure 1), confusion has arisen with two other species of falcon with similar morphological characteristics: *F. eleonorae* Gené 1839 (Eleonora's Falcon) and *F. ardosiaceus* Vieillot 1823 (Grey Kestrel).

Recent genetic analyses have shown that the Sooty Falcon belongs to a single evolutionary group that includes Eleonora's Falcon, the Eurasian Hobby (*F. subbuteo*), African Hobby (*F. cuvierii*), Australian Hobby (*F. longipennis*) and the Oriental Hobby (*F. severus*; Wink and Sauber-Gürth 2004, Wink et al. 2010; Wilcox et al. 2019). According to Wink and Ristow (2000), this group of species appears to have evolved around 1-1.5 million years ago. Among this group of related falcons, the Sooty Falcon is more closely linked to the Eurasian and African Hobbies than to the other species (Fuchs et al. 2015).

The common name of the Sooty Falcon comes from the colour of its feathers when adult. C. J. Temminck named it "*Faucon concolore*", which is the French rendering of the Latin word *concolor* (*con* = same; *color* = colour; Temminck 1825; Table 2).

Figure 1 – Female (left) and male (right) Sooty Falcon syntypes collected by E. Rüppel on the island of Barqan (Gulf of Aqaba; currently at National Museum of Natural History of Leiden; Rüppel 1845).

Table 1 – Biological classification of the Sooty Falcon.

Taxonomic rank	Classification
Order	*Falconiformes*
Suborder	*Falcones*
Family	*Falconidae*
Subfamily	*Falconinae*
Genus	*Falco*
Species	*Falco concolor* Temminck 1825, Barqan Island, Gulf of Aqaba

Table 2 – Common names of the Sooty Falcon in various languages.

Language	Common name
Afrikaans	*Roetvalk*
Arabic	الغروب الصقر (*Saqer al-Ghurub*, Sunset Falcon), الادهم الصقر (*As-Saqer al-Adham*, Black Falcon), السخامي الصقر (*As-Saqer as-Sakhami*, Sooty Falcon), or صقر أسخم (*Saqer Askham*, Sooty Falcon)
English	Sooty Falcon
French	*Faucon Concolore*
Hebrew	בז שחור (*Baz Shachor*, Black Falcon)
Malagasy	*Fandrasambary*, *Firasambalala*, *Tomaimavo*, *Tsipoy Lavelatra*, *Tsiasara*, *Schendic* or *Hila*
Persian	شاہین دودی (*Shāhin-e Dudi*, Black Falcon), دودی شاهین (*Shahin-e-Doodi*, Smoggy Falcon)
Somali	*Shimbira Laaye*
Swahili	*Kozi Mweusi*

2.2 Morphology

The Sooty Falcon is a monotypic, medium-sized falcon with long and narrow wings whose tips extend noticeably beyond the tail when perched (Clark 1999; Ferguson-Lees and Christie 2001; Jennings 2010).

Adult Sooty Falcons have dark plumage (Table 3; Clark 1999; Ferguson-Lees and Christie 2001; Jennings 2010) and females are about 5% larger than males, having darker colouration and less contrast between body plumage and primaries (Figure 2; Clark 1999; Ferguson-Lees and Christie 2001; Gschweng 2013). The crown of adult Sooty Falcons' heads is of a dark slate-grey hue, and their tail is grey with a darker shade towards the tip and broadly bordered by a light buff colour (Clark 1999; Gschweng 2013). They also have a blue cere and eye rings. The annual moulting of adults starts on the breeding grounds, but it may be paused during migration before being completed in wintering areas (Gschweng 2013).

Juvenile Sooty Falcons have distinct plumage from that of mature individuals, though females and males have similar appearance (Clark 1999). Juvenile birds are recognizable by transition in plumage (Clark 1999). These individuals returning from wintering areas have undergone an almost complete moult (Clark 1999). They have considerable grey adult body plumage above and below, but retain juvenile head plumage with whitish cheek-patches and tail with noticeable narrow pale bands (Frumkin 1988; Clark 1999).

Sub-adult Sooty Falcons have adult body and head plumage, but still retain some juvenile wing and tail feathers, though their pale tips are worn off (Gschweng 2013). The moulting of sub-adult birds commences in wintering areas, affecting the body and wing-coverts, while the juvenile primaries and tail feathers are retained but gradually lose their pale tips (Frumkin 1988).

Figure 2 – Adult male (left) and adult female (right) Sooty Falcons; males have paler blue to lead grey upperparts (Egypt; Ph. M.I. Habib).

Table 3 – Main plumage patterns and bare parts of adult Sooty Falcons (Clark 1999; Forsman 1999; Ferguson-Lees and Christie 2001; Gschweng 2013).

Morphological traits	Description
Upperparts	Medium dove-grey, becoming light grey on lower scapulars and back to upper-tail covers
Tail	Light grey, darker towards up, feathers unbarred with blackish shafts
Primaries, primary coverts and alula	Greyish black
Secondaries	Dove-grey
Underwing coverts and axillaries	Light grey with dark shafts
Underside of flight feathers	Silver grey
Bill	Blue-grey, pale at base
Cere and orbital ring	Bright yellow to orangish-yellow
Eyes	Dark brown
Legs	Orange yellow to orange

2.3 Life history

2.3.1 Age at sexual maturity

Sooty Falcons usually reach sexual maturity and commence breeding in their third calendar year, although some individuals have successfully bred in their second calendar year (Orta 1994). However, breeding may be significantly delayed up to the 4th calendar year, depending presumably on environmental conditions and availability of food resources (McGrady et al. 2016). This deferred sexual maturity also occurs in the ecologically similar Eleonora's Falcon (Gangoso et al. 2013).

2.3.2 Breeding phenology

Sooty Falcons show a delayed breeding phenology and it is the only bird in the tropical and sub-tropical zones to start breeding after the summer solstice (Moreau 1969; Mellone 2021). Individuals arrive at their breeding sites between the last week of March (Saudi Arabian coast south of Jeddah) and late April – early May (Egypt and Israel; Figure 3; Frumkin 1993; Gaucher et al. 1994; Coles and Williams 2004). Interestingly, they may spend several weeks in staging areas that are rich in insect prey and located hundreds of kilometres away from their breeding areas (Antinori and Salvadori 1873; Mellone 2021). Their courtship displays take place primarily in June and July (Coles and Williams 2004; Habib 2019).

Overall, the breeding season of the Sooty Falcon corresponds to the trans-Saharan and trans-Arabian migration period of Palearctic birds from Eurasia (Coles and Williams 2004). In fact, hatching in late August and early September means that chicks are fed at the peak of the southward migration of many small bird species (Jennings 2010; Figure 3). For instance, they feed their young on small migrating birds that pass-through Israel during autumn migration, mainly swifts, bee-eaters and hirundines (Goren and Perlman 2016; Figure 3). The presence of migrant birds in certain areas during autumn affects the breeding range of Sooty Falcons (Jennings 2010). Some passerine birds from central Asia usually migrate southward across Arabia, avoiding the Gulf of Aden and Arabian Sea due to strong headwinds from the South-West Monsoon (Shobrak et al. 2003; Jennings 2010). The region between north-east Egypt, Jordan, and north-west Saudi Arabia, which sees high migrant flow from central and eastern Europe and western Asia, is a breeding area for Sooty Falcons (Jennings 2010; Tøttrup et al. 2012). On the other

hand, central and eastern parts of Arabia (excluding Oman), where migrants are dispersed over a wide area, are unlikely to host breeding Sooty Falcons (Jennings 2010).

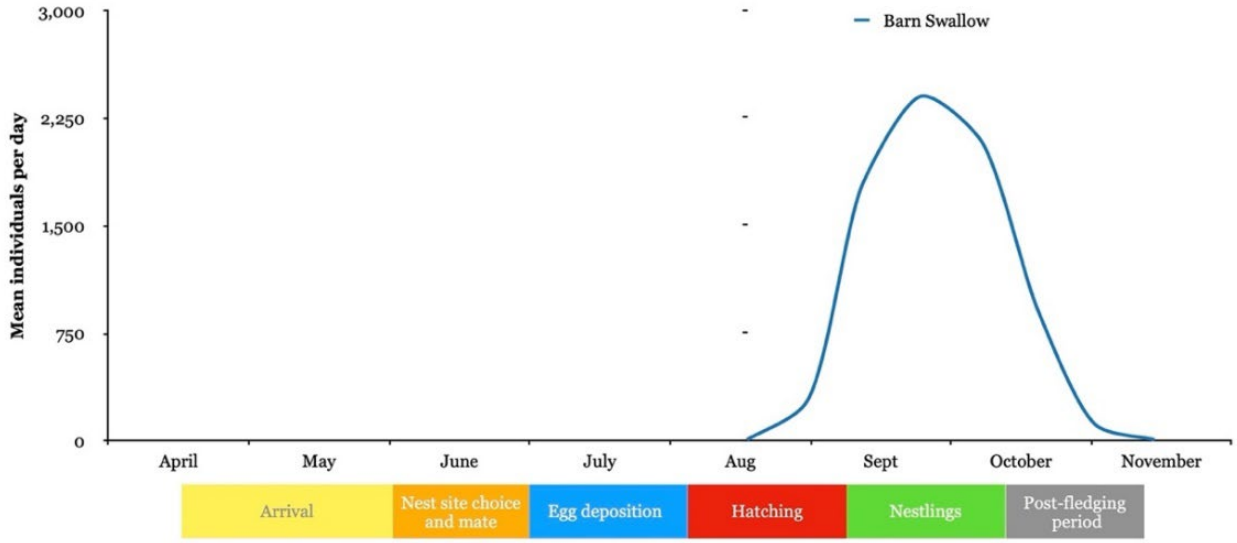


Figure 3 – Timing of the reproduction of Sooty Falcons in Israel in relation to the relative abundance of their main prey, the Barn Swallow, during the autumn passage (Safriel 1968; Frumkin 1993; Roth 2008).

Timing of breeding is not always synchronous across the range: birds in Israel (Frumkin 1993), on the islands of central and southern Red Sea (Gaucher et al. 1994) and in Oman (Walter 1979a) lay their eggs between early July and mid-August, while birds nesting on the Egyptian islands (Baha El Din 1984; Coles and Williams 2004) breed a few weeks later. Breeding dates also vary between sites close to each other (Walter 1979a) and between years (Gaucher et al. 1994).

It appears that most breeding sites are deserted in early November (Frumkin 1993; Jennings 2010) when migration begins, although at some sites in the northern Red Sea, birds leave their breeding sites later with family groups with newly fledged birds still frequenting the breeding areas up to at least 13 November (Baha El Din 1984).

2.3.3 Social behaviour

Sooty Falcons are gregarious birds and have been observed in Madagascar in flocks of up to 20 individuals and, exceptionally, 100 (Rand 1936; Walter 1979).

With regards to nesting, the species exhibits facultative colonial behaviour, with significant variation in nest spacing observed across different types of breeding habitats (Table 4; Williams 1991; Mellone 2021). The spacing between nests is presumably influenced by a combination of factors including prey and nesting site availability, and the level of tolerance among neighbouring pairs (Jennings 2010). Therefore, Sooty Falcons typically choose to nest either solitarily or in loosely-knit colonies where they guard their territories against other individuals of the same species, though they may tolerate their presence (Clapham 1964; Williams 1991; Orta 1994; Jennings 2010). Nevertheless, aggressive attacks have been reported against numerous raptor species, and particularly large corvids that are potential nest robbers (Frumkin 1988).

Dense aggregations seem to occur only on islands and not on mainland. Several pairs, varying from a few to up to 100, may establish nests in close proximity on the same island, with a minimum distance of

approximately 50 meters between nests (Clapham 1964). On islands where conditions are ideal for migratory prey and there are no ground predators, nests of multiple pairs are established very close to one another, with an average distance of only about 25 meters, and a minimum distance of as close as 7 meters (Jennings 2010).

In the arid, mountainous regions of the Negev Highlands and Judaea in Israel, the spacing between breeding pairs ranges from 2.68 to 8.53 kilometres (Goren et al. 2023). However, in the extensive deserts of the Sahara, the species typically nests alone, and the distances between breeding pairs can often be measured in tens of kilometres (Moreau 1969).

Table 4 – Mean nearest neighbour distances between active Sooty Falcon nest-sites (data from Moreau 1969; Frumkin 1988; Jennings 2010; Goren pers. comm. 2023).

Location and sample size (n)	Distance (meters)
Al Jun Island, Oman (n = 13)	77 m
Hazwarah Island, Hawar Islands, Bahrain (n = 11)	90 m
Negev and Judaean Deserts, Israel (n = 9)	1,200 – 5,000 m
Sahara Desert (n = 4)	>10,000 m

Sooty Falcons typically nest in rock crevices or hollows in cliffs, occasionally reusing old nests of Brown-necked Ravens (*Corvus ruficollis*) or herons (Baha El Din 1984; Frumkin 1988). In desert areas that are predominantly flat, they prefer to nest in caves, karst towers, and inselbergs (Salama et al. 2020). In the Libyan Desert, Sooty Falcons have laid eggs under small cairns of sandstone slabs (Booth 1961).

On islands, they may also nest on the ground under bushes when crevices are unavailable (e.g., bushes of *Avicennia*, *Salicornia* and *Euphorbia*), under boulders, or inside holes in outcroppings of coral or rock (Clapham 1964; Gaucher et al. 1988; Coles and Williams 2004). On the volcanic island of Geziret El Zabargad (Egypt), Sooty Falcons breed in long disused mines or on broad ledges (Habib 2019). However, some ground nest sites on islands have been flooded by high tides, and others have been robbed by foxes that walk to the island during low tide (Jennings 2010).

Nests are typically situated where there is shade for all or most of the day. Many face northward, probably because such orientation means the shallower caves and crevices are more likely to be suitably shaded (Williams 1991; Jennings 2010). Pairs often reuse the same nesting site year after year (Orta 1994; Jennings 2010).

2.3.4 Egg stage

Sooty Falcons lay their eggs in shallow depressions or scrapes, typically on an unlined substrate of fine gravel, sand, dust, or soil (Williams 1991). The incubation stage, which starts with the second egg and lasts for 27-29 days, is primarily performed by the female, which hunts irregularly (Williams 1991; Frumkin 1993; Orta 1994). The male hunts alone until two weeks after the chicks have hatched, often passing prey to the female mid-air near the nest (Williams 1991; Orta 1994; Jennings 2010).

Eggs have been recorded mainly from July to August (Figure 3; e.g., Frumkin 1993; Gaucher et al. 1994; Coles and Williams 2004). In the Red Sea, bird nests are somewhat synchronised and around 90% of clutches are laid within a three-week period in July (Jennings 2010). In the Al Wajh lagoon (Saudi Arabia), the majority of clutches are laid mid-August (Calabrese pers. comm. 2023).

The most common clutch size is two to three eggs (range 1-4; Figure 4). Clutches with only one egg are occasionally found, while clutches with four eggs are rare, with only a few recorded instances in the Red Sea and Oman (Figure 4). The average clutch size of Sooty Falcons ranges from 2.31 to 2.95 (Table 5).

Comparing mean clutch sizes for same locations over 30-year periods suggests that mean clutch values have not varied considerably over time (see Oman in Table 5).

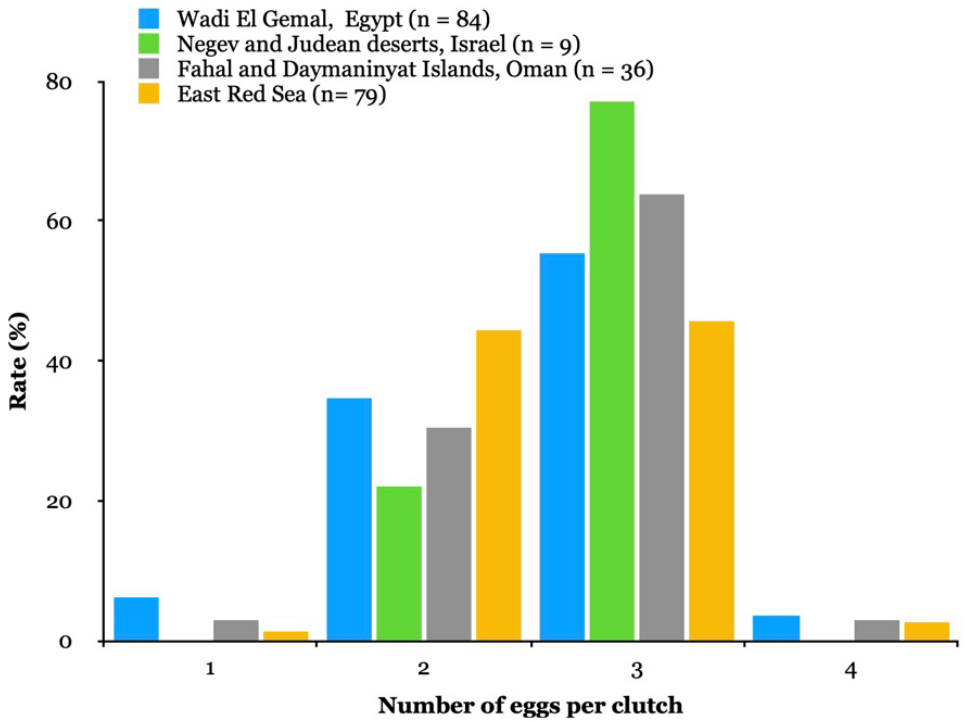


Figure 4 – Frequency of Sooty Falcon clutch sizes in different breeding populations (shown as percentage; data from Clapham 1964; Walter 1979a; Gaucher et al. 1994; Friskin 1993; Coles and Williams 2004).

Table 5 – Average clutch sizes of Sooty Falcons from various breeding populations. Published data with sample sizes of less than 6 clutches were excluded.

Country/Region	Study period	Average clutch size (sample size)	Reference
Egypt			
Wadi El Gemal NP	2004	2.57 (84)	Coles and Williams 2004
Eritrea			
Dahlac Archipelago	1962	2.40 (12)	Clapham 1964
Israel			
Sede Boqer	1978-1983	2.78 (9)	Frumkin 1993
Oman			
Fahal Islands	1978	2.31 (13)	Walter 1979a
Fahal Islands	2007-2014	2.73 (24)	McGrady et al. 2017
Daymaninyat Islands	1978	2.86 (53)	Walter 1979a
Daymaninyat Islands	2007-2014	2.92 (100)	McGrady et al. 2017
Saudi Arabia			
East Red Sea	1989-1991	2.35 (79)	Gaucher et al. 1994
United Arab Emirates	2007	2.80 (7)	Shah et al. 2008

2.3.5 Nestling stage

The hatching of chicks is asynchronous, with eggs hatching one or two days apart within 27 to 29 days of incubation (Williams 1991; Jennings 2010). Newly hatched chicks have white down which turns grey after about 7 days (Williams 1991). Vaned feathers start appearing in the third week after hatching, and the cere and orbital rings are pale blue-grey (Williams 1991).

Females remain with their chicks at the nest for 10-14 days, while males tend to visit infrequently (Williams 1991). Males play a crucial role in providing food for the family by hunting and delivering prey to the females, who in turn feed the young. There is no evidence of males directly feeding chicks (Williams 1991) apart from one male observed feeding his three chicks for two weeks after the female died (Goren pers. obs. Negev Mountain region, Israel, 2021).

Nestlings stay in the nest for approximately 32-38 days, with fledging occurring between September and early October in Israel (Frumkin 1988; Williams 1991; Frumkin 1993). In Oman, fledging takes place between 19 September and the first week of October (Walter 1979a).

The average number of offspring per Sooty Falcon brood ranges from 1.19 to 2.53 (Table 6). Therefore, in relation to the average number of eggs laid (Figure 4; Table 5), the loss is on average 18% (range 9-27%). Gaucher et al. (1994) reported a loss of 20%, with the main causes being unhatched eggs, including those that were infertile or had dead embryos, and a few cases of chicks dying from disease (*Trichomoniasis*). Eggs failing to hatch and predation of chicks have also been observed in Egypt and Israel (Frumkin and Pinshow 1983; Coles and Williams 2004).

Figure 5 – Sooty Falcon chicks in a small, cavernous limestone nest in the White Desert National Park (Egypt; Ph. Nature Conservation Sector, NCS).

Table 6 – Average brood sizes of Sooty Falcons from different breeding locations. Published data with sample sizes of less than six clutches were excluded.

Country/Region	Study period	Average brood bize (sample size)	Reference
Bahrain			
Hawar Island	1998-2006	1.19 (98)	Kavanagh and King 2008
Eritrea			
Dahlac Archipelago	1962	2.27 (12)	Clapham 1964
Israel			
Sede Boqer	1978-1983	2.0 (9)	Frumkin 1993
Oman			
Fahal Islands	1978	2.0 (13)	Walter 1979a
Fahal Islands	2007-2014	2.45 (96)	McGrady et al. 2017
Daymaninyat Islands	1978	2.34 (22)	Walter 1979a
Daymaninyat Islands	2007-2014	1.85 (130)	McGrady et al. 2017
Saudi Arabia			
East Red Sea	1989-1991	2.02 (79)	Gaucher et al. 1994

2.3.5.1 Fledgling success

Up to four chicks fledge, but normally two to three (Orta 1994). In Oman, both Walter (1979a) and McGrady et al. (2017) obtained a fledgling success ratio (no. of fledged chicks/no. of eggs) of 0.88 while Gaucher et al. (1994) in Saudi Arabia found the value ranging between 0.8 and 0.9. Further research is needed to better understand the causes of Sooty Falcon fledgling mortality.

2.3.6 Survival rates and breeding population composition

Very little is known about the age composition of the Sooty Falcon population. For the Omani population, the mean age of falcons at first breeding is 3.76 ± 1.48 (median = 3, range 2–6) years (McGrady et al. 2016). Based on the re-capture of ringed birds, McGrady et al. (2016) found a 57% apparent survival rate to the average age of first breeding, possibly suggesting high natal philopatry (McGrady et al. 2010; 2016).

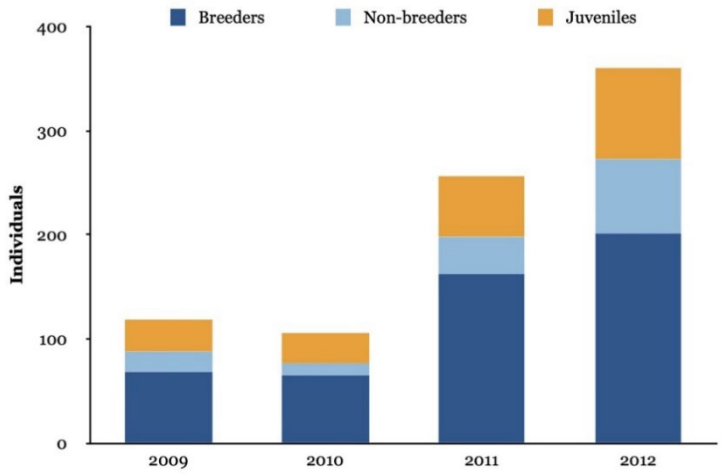


Figure 6 – Breeding population composition of Sooty Falcons breeding in the White Desert, Egypt (data from Salama et al. 2020).

Around 20% of the birds present in the White Desert National Park (Egypt) during the breeding season are non-breeders (floaters), with this data presenting very low deviation (± 0.05) across a 2009-2012 study (Figure 6; Salama et al. 2020). On Wadi El Gemal Island (Egypt), the rate of floaters seems to be lower (6-8%; Coles and Williams 2004). Non-breeders seem to be young birds (second calendar year; Goren pers. comm. 2023).

Figure 7 – Juvenile Sooty Falcons from a nest in an arid inland area (Saudi Arabia; Ph. A. Binothman).

2.3.7 Post-fledging dispersal pattern

The post-fledging period lasts for two to three weeks (Frumkin 1994). Juveniles remain in the vicinity of the nest site after leaving it, and during this period they are protected and fed by their parents (Williams 1991). Then, the entire population migrates south from the northern hemisphere during late October and November (Coles and Williams 2004; AlJahdhami et al. 2020).

2.3.8 Post-fledging mortality

Mortality during migration seems quite high and to occur mainly in Eritrea, Ethiopia, Kenya, Oman and Saudi Arabia (McGrady et al. 2016). Many juvenile deaths occur during their first outward migration towards the wintering grounds in Madagascar (McGrady et al. 2016). Still, a persistent lack of data on the mortality of juveniles prevents a thorough understanding of post-fledging mortality.

2.4 Diet

2.4.1 Hunting behaviour

The Sooty Falcon is a fast, strong, and agile aerial hunter that catches its prey on the wing. It searches for prey up to 5 km or more from its nest, and hunts alone or in pairs; hunting in pairs or groups is more successful than hunting alone (Orta 1994; Jennings 2010). Adult Sooty Falcons may engage in prey piracy and use food caches to store prey items near the nest (Williams 1991; Jennings 2010). Hunting occurs mainly at dawn and dusk, with peak activity between half an hour before sunrise to two hours after, and another peak just before and after sunset, when migrant prey species fly at their lowest altitude (Orta 1994; Jennings 2010). Sooty Falcons breeding on islands often visit the mainland to feed at dusk (Jennings 2010).

2.4.2 Prey composition

Sooty Falcons feed on a wide variety of animals, including flying insects, birds, bats, rodents, and possibly lizards (Williams 1991; Jennings 2010). Skilled hunters, they can catch birds in both desert and marine environments (Coles and Williams 2004). Birds taken include a variety of small passerines, *Meropidae* bee-eaters, Eurasian Golden Oriole (*Oriolus oriolus*), Hoopoe (*Upupa epops*), *Hirundinidae* swallows, *Apodidae* swifts, waders and small seabirds, such as petrels and terns (Williams 1991; Orta 1994; Jennings 2010). There has been one observation of a Sooty Falcon catching a fish (Frumkin and Pinshow 1983), and Gaucher et al. (1988) identified the carapaces of two crabs in a nest.

2.4.2.1 Breeding diet

In the early breeding season, Sooty Falcons primarily feed on a wide range of invertebrates, although they may opportunistically prey on nestlings of breeding seabirds (Jennings 2010; Habib 2019). During the breeding season, they prey primarily on small migrating birds (Orta 1994). Around 80% of remains found around nest sites are from passerines, the remainder being from insects (based on feather samples and pellets; Coles and Williams 2004; Habib 2019).

2.4.2.2 Wintering diet

During the wintering period, insects become a more important food source than birds, which are the main prey consumed during breeding periods (Jennings 2010; Gschweng 2013). Sooty Falcon arrival at wintering grounds (mostly Madagascar) coincides with the emergence of cicadas and presumably other insects (Gschweng 2013). During the wintering season, Sooty Falcons shift their diet to include more insects (Orta 1994; Zefania 2001; Gschweng 2013). These include locusts and crickets (*Orthopterae*), dragonflies (*Odonata*), butterflies, moths, bugs, beetles and probably any large insect species abundant in preferred habitats (Orta 1994; Gschweng 2013). They catch and eat prey on the wing or grab it directly from leaves (Boedts 2010). Sooty Falcons hunt singly or in flocks of up to 50 individuals, typically at dawn and dusk (Zefania 2001; Réné de Roland pers. comm. 2023).

2.5 Distribution and migration

2.5.1 Range States

Today, the Sooty Falcon's distribution is believed to cover a total of 29 Range States: Bahrain, Central African Republic, Chad, Democratic Republic of the Congo, Djibouti, Egypt, Eritrea, Ethiopia, Iran (Islamic Republic of), Israel, Jordan, Kenya, Kuwait, Libya, Madagascar, Mozambique, Oman, Pakistan, Rwanda, Saudi Arabia, Somalia, South Africa, South Sudan, Sudan, Uganda, United Arab Emirates, United Republic of Tanzania, Yemen and Zambia (Table 7). In addition to these Range States, the species is considered vagrant in 19 other countries (Table 7).

Table 7 – Range States of the Sooty Falcon categorised into different phases of their annual cycle, namely, breeding, migration, and wintering. Vagrancy is also depicted.

	Country	Breeding	Migrating	Wintering	Vagrant
1	**Algeria**				●
2	**Bahrain**	●			
3	**Botswana**				●
4	**Cameroon**				●
5	**Central African Republic**		●		
6	**Chad**	●	●		
7	**Comoros**				●
8	**Democratic Republic of the Congo**		●		
9	**Djibouti**	●	●		
10	**Egypt**	●	●		
11	**Eritrea**	●	●		
12	**Ethiopia**		●		
13	**France**				●
	Îles Éparses				●
	Mayotte				●
	Réunion				●
14	**Iran (Islamic Republic of)**	●			
15	**Israel**	●			
16	**Italy**				●
17	**Jordan**	●			
18	**Kenya**		●	●	
19	**Kuwait¥**	●			
20	**Lebanon**				●
21	**Libya**	●			
22	**Mali**				●
23	**Madagascar**			●	
24	**Malawi**				●
25	**Mauritius**				●
26	**Morocco**				●
27	**Mozambique**		●	●	
28	**Namibia**				●
29	**Niger**				●
30	**Oman**	●			
31	**Pakistan**	●			
32	**Rwanda**		●		
33	**Saudi Arabia**	●	●		
34	**Seychelles**				●

	Country	Breeding	Migrating	Wintering	Vagrant
35	**Somalia**		●		
36	**South Africa**			●	
37	**South Sudan**		●		
38	**Syria¥¥**				●
39	**Sudan**	●	●		
40	**Togo**				●
41	**Tunisia**				●
42	**Türkiye**				●
43	**Uganda**		●		
44	**United Arab Emirates**	●	●		
45	**United Republic of Tanzania**		●	●	
46	**Yemen**	●	●		
47	**Zambia**		●		
48	**Zimbabwe**				●

¥ Only one potential breeding record in 2002 (Gregory 2004).
¥¥ Breeding uncertain.

2.5.2 Breeding distribution

The Sooty Falcon breeds discontinuously over a vast area ranging from the central-eastern Sahara to Jordan, as well as along the Red Sea (which represents the core of the species' breeding distribution; Figures 8 and 11) and the southern Gulf[9] regions (Williams 1991; Jennings 2010). The easternmost records of breeding pairs have been reported in Iran (Islamic Republic of) and Pakistan (Khan et al. 2010; Kashfi et al. 2019), and the boundary of the breeding range in the south is defined by the 19th parallel in the Sahara, the Bab-el-Mandeb Strait in the Red Sea, and further east by the Tropic of Cancer (Figure 8). There is one breeding record in the Arabian Sea and there are none in the Gulf of Aden, but the species has been reported in these regions in April, October, and November, suggesting that the sites are used only for migration (Jennings 2010). Sooty Falcons have been claimed to breed in northwestern Somalia (Orta 1994).

Believed to breed in 16 countries (Table 7), Sooty Falcons nest in some of the most desolate and inhospitable environments in the world: open deserts (sand or otherwise) with rocky outcrops (e.g., Libya, western Egypt, etc.); arid mountainous regions (e.g., eastern Egypt, Israel, Jordan, inner Iran (Islamic Republic of) and possibly Pakistan; Figure 9); and, desert archipelagos and islands (e.g., Red Sea, the Gulf, the Sea of Oman). Their breeding distribution seems shaped by their ability to cope with harsh desert conditions, the location of the migratory flyways of their prey and the availability of suitable nesting habitat.

The absence of breeding records for the Gulf of Aden and the Socotra Archipelago (Yemen), and the presence of a single known nest in the Arabian Sea (Al Fazari pers. comm. 2013) may be attributed to the absence of predictable concentrations of migrant birds in those areas during post-breeding migration. The main southward migration flow of passerines from central Asia avoids the Arabian Sea and Gulf of Aden during this period due to the south-west monsoon winds, which create difficult headwinds for birds flying down the east coast of Africa and the south coast of Arabia (Jennings 2010). The different breeding densities on islands of the Red Sea have also been linked to the concentrations of migratory birds, which are affected by local geographical features (Gaucher et al. 1995).

[9] In the present document, 'the Gulf' means Arabian Gulf and Persian Gulf.

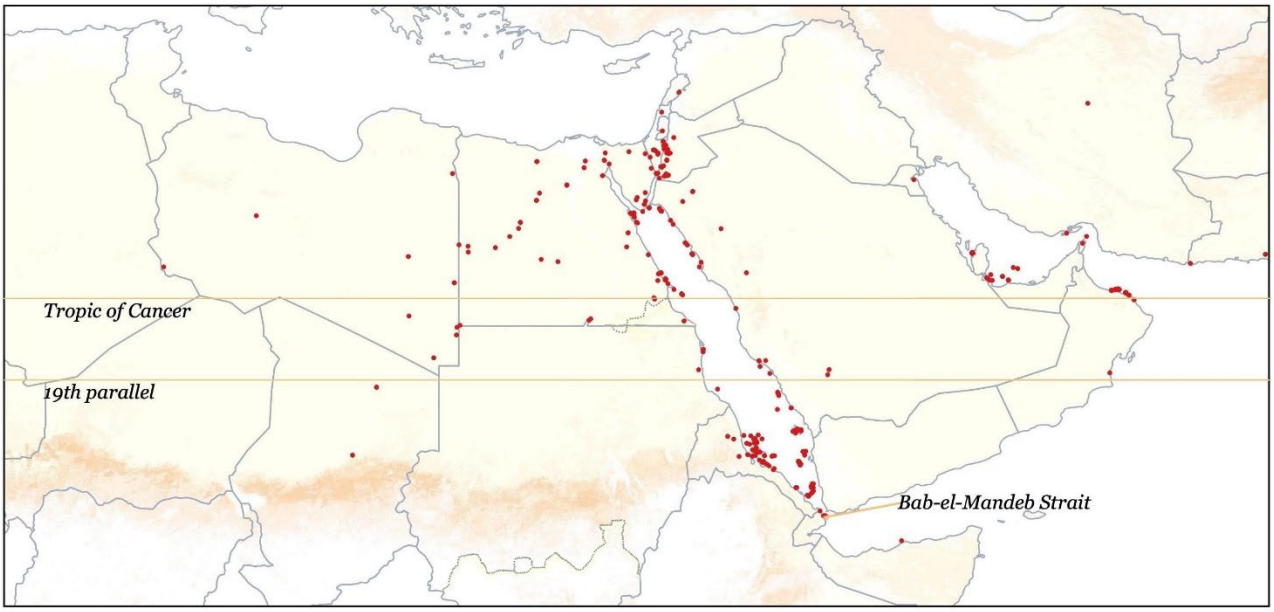


Figure 8 – Breeding distribution of the Sooty Falcon. Deserts and barren soils are represented in yellow, while herbaceous habitats are shown in light brown. Red dots represent confirmed breeding sites. The outliers below the 19th parallel in the Sahara pertain to two observations conducted in the 19th and 20th centuries. The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Figure 9 – Dry, barren landscapes where Sooty Falcons breed (Israel; Ph. E. Bartov).

2.5.3 Post-breeding migration

Sooty Falcons migrate on a broad front, independently of the availability of thermal currents (Mellone 2021). They use flapping flight to cross large water bodies and extend their travel into the night (Javed et al 2012; AlJahdhami et al. 2020; Mellone 2021). Their migration route passes inland across eastern Africa and the Mozambique Channel towards the south-western and central-western parts of Madagascar (Javed et al. 2012; AlJahdhami et al. 2020), where they winter.

The post-breeding migration of an adult tracked by Javed et al. (2012) travelled at least 5,656 km over 13 days before arriving in Madagascar. Migrating individuals reaching eastern Africa then fly south and cross to Madagascar from Mozambique; this post-breeding migration lasts at least a couple of weeks (Javed et al. 2012). A juvenile tracked for its entire journey left the United Arab Emirates on October 29th and reached central Madagascar on December 18th (Javed et al. 2012). Juveniles tend to be slower than adults as they follow a less direct route and perform stopovers in Sahel countries (AlJahdhami et al. 2020).

Main routes of adults after leaving breeding grounds in Arabia and crossing the Gulf of Aden follow the Nile and Rift Valleys. Migrating routes of immature individuals seem to follow a more westerly route over inland Africa (Gschweng 2013).

Significant movements down the Nile Valley to the Lake Victoria basin are likely from the Libyan, Israeli and Egyptian desert populations (Mellone 2021). The northern Red Sea populations utilise the Rift Valley through Ethiopia, Kenya and the United Republic of Tanzania (Williams 1991; Javed et al. 2012). According to Brown et al. (1982), most southward travel is undertaken in small flocks that move through the Somalia-Kenya coastal thornbush. Migration to and from the wintering grounds in Madagascar is marked by high movement rates with long step-lengths (AlJahdham et al. 2020).

The tracking of juvenile Omani birds confirmed that their migration route is less direct compared to that of adults (AlJahdhami et al. 2020). While adult birds typically cross the Gulf of Aden to reach Africa, juveniles tend to have a more northerly migratory path and mostly cross the Red Sea (AlJahdhami et al. 2020). They depart in early November, and after arriving in Africa, they engage in non-directed movements in Chad, Ethiopia, South Sudan, as well as the coastal areas of Eritrea, and these movements can last for two to three weeks (Mellone 2021).

2.5.4 Wintering distribution

After reproduction, Sooty Falcons leave their breeding grounds and reach their wintering areas through a range of migration and dispersal movements (Table 7). Whilst these movements are not yet completely understood (birds have been recorded in a large number of countries), Sooty Falcons are known to migrate mostly to Madagascar, with small numbers wintering in coastal Mozambique and South Africa (Gschweng 2013).

Sooty Falcons arrive in Madagascar starting late October, and last birds leave in early May. They are present on the island from November to April (summer rainy season), with no records during austral winter (Gschweng 2013). They are best known for inhabiting the West's coastal lowlands and for occurring typically in dry, open inland areas in the Southeast (Zefania 2001; Gschweng 2013). Preliminary wintering distribution data, however, suggest that the species is more likely to be present on the western, dry side of the island (Zefania 2001; Javed et al. 2012; Gschweng 2013; AlJahdhami et al. 2020).

In Madagascar, Sooty Falcons occur in areas of savanna, edges of woods, marshy areas and paddy fields (Rand 1936; Orta 1994). An adult Sooty Falcon that was satellite-tracked from the United Arab Emirates used wooded grassland and brush mosaics adjacent to cultivated areas in Madagascar's Mangoky River flood plains (Javed et al. 2012).

Figure 10 – Wintering habitats used by Sooty Falcons in the "Allée des baobabs" (Madagascar; Ph. Lily Arison Réné de Roland).

Prominent trees such as baobabs (*Adansonia* spp.), large dead trees, pines (*Pinus* spp.), *Eucalyptus* trees and sisal (*Agave sisalana*) are used as day-time perches and for roosting (Figure 10). The species also perches on powerlines while hunting insects (Boedts 2010), on aerials and towers in towns, and low anthills in more open areas (Rand 1936).

2.5.5 Post-wintering migration

Northward return migration begins from late March, with most birds departing in March–April. In Madagascar, last bird sightings are recorded in early May (Williams 1991; Gschweng 2013).

An individual tagged in Oman as a chick was able to cross from the central highland of Madagascar to coastal United Republic of Tanzania in 19 hours (ca. 1400 Km; Réné de Roland pers. comm. 2023). Once on mainland Africa, it stopped for several weeks in Ethiopia, before reaching its natal area in the United Arab Emirates in late July (AlJahdhami et al. 2020). In Ethiopia, roughly the same staging area was also used by an adult bird tagged in Madagascar that then arrived on one of the most northern islands of the Dahlak Islands in the Red Sea (AlJahdhami et al. 2020).

A few birds remain south of the known breeding range, and sightings in North Cameroon during May-July (Buij 2011) suggest that some immatures spend their austral winter away from breeding grounds. However, as sightings are limited, the information available on the species' movements is also limited. In Kenya, every year small numbers of birds are observed moving south in late October–November, but records during return migration in April–June are occasional (Lewis and Pomeroy 1989).

2.6 Population size and trend

2.6.1 National estimates

Information on the size of breeding populations of Sooty Falcons is scattered both geographically and chronologically, with many countries lacking recent surveys.

The Red Sea represents the core of the species' breeding distribution, hosting the highest number of breeding sites (Figures 8 and 11), including some islands with the highest density of breeding pairs. It remains unclear how many birds nest in the hyper arid desert areas spanning from Libya to Jordan (south of the Dead Sea) and Arabia, as most of these areas have only been poorly surveyed for the species and typically exhibit low densities. Table 8 summarises he present findings on breeding population sizes across the species' range.

Notwithstanding the fact that the discovery of new breeding populations (Egypt, Libya), the lack of recent surveys (e.g., Djibouti, Eritrea, Sudan, Yemen), or the absence of a clear standard of data quality can impact the assessment of population trends, available data indicate that no Sooty Falcon breeding population is increasing; trends are either declining or unknown (Table 8). Small and medium populations (Bahrain, Oman, United Arab Emirates) have, in particular, shown marked declines.

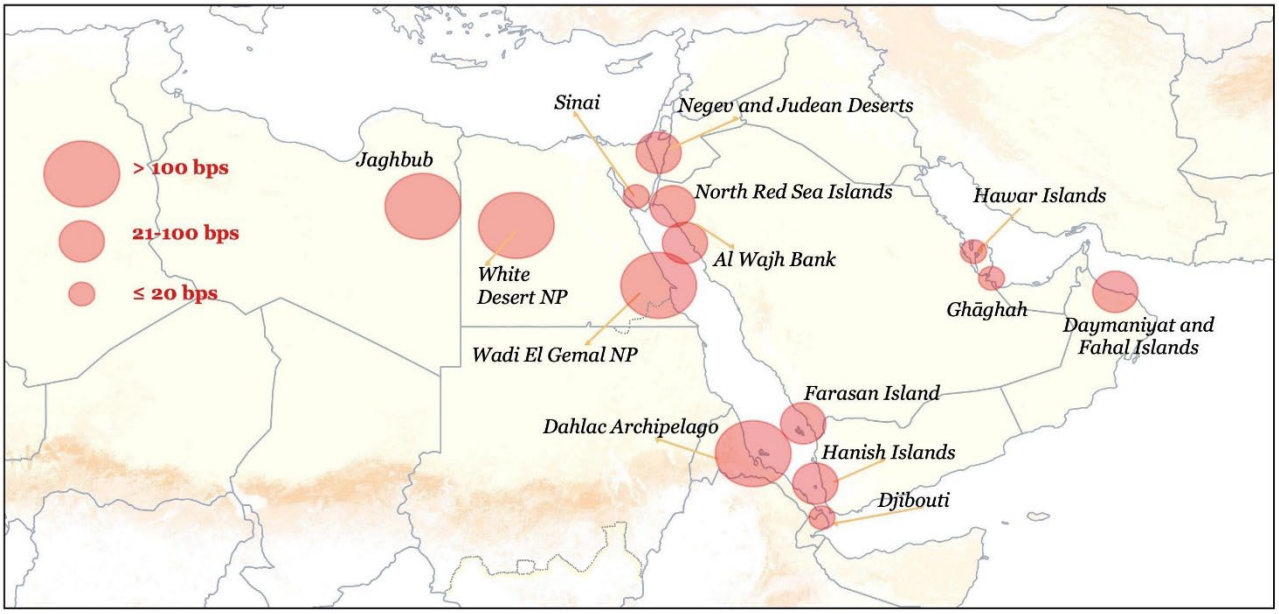


Figure 11 – The main breeding populations of Sooty Falcon, divided into three size classes and mapped throughout the distribution range (bps = breeding pairs). Deserts and barren soils are represented in yellow, while cultivated and managed vegetation are shown in light brown. Data sources (no parentheses = literature; parentheses = questionnaires; see Methodology): Goodman and Meininger 1989; Gaucher et al. 1995; Coles and Williams 2004; Kavanagh and King 2008; O. Al-Saghier (2013); H. Rayaleh (2014); Salama et al. 2020; L. Calabrese (2022); M. Goren (2022); S. Buirzayqah (2022); S. Khan (2022). The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

2.6.2 Global estimates

Sooty Falcon population estimates have varied widely and been inconsistent over time. The species used to be considered common and stable and was believed to outnumber Eleonora's Falcon by 10:1 (Walter 1979). This estimate, which derived from a single observation in Madagascar in December 1973, led to a number of unsupported assumptions and extrapolations on population figures (see appendix to Kavanagh and King [2008]), including a global estimate of 40,000 breeding pairs in the 1980s (Orta 1994; Kavanagh and King 2008). Starting in the early 1990s, these evaluations were challenged and deemed significant overestimations (Williams 1991; Kavanagh and King 2008).

The first inventory (1991) of the global Sooty Falcon breeding population confirmed 550-730 breeding pairs, and considering it was likely under-recorded in perhaps half of the areas assessed, the probable estimate would have been 1,000-2,000 pairs (Williams 1991). Subsequent global assessments reported between 5,000 (Snow and Perrins 1997) and 10,000 breeding pairs (BirdLife International 2016). A second global inventory conducted using data available until 2013 estimated that the global population consisted of 1,400 to 2,000 breeding pairs, equating to 2,800-4,000 mature individuals (Gallo-Orsi et al. 2014; BirdLife International 2017).

At a macro-regional level, Jennings (2010) suggested that the total Arabian breeding population was probably no more than about 500 pairs. According to Riad et al. (2021), there is an estimated 1,100-1,800 mature individuals (600-900 breeding pairs) across an extent of occurrence of 1,921,706 km^2 in north-eastern Africa.

The present analysis (see Methodology) indicates a total of 1,149-1,597 breeding pairs globally, 18-20% less than about 10 years ago. It is important to acknowledge, however, that an unspecified proportion of habitats suitable for the species may not have been surveyed comprehensively. Nevertheless, even if substantial numbers of breeding pairs remain undiscovered, their existence may not compensate for the apparent continuing decline of the species in known breeding areas (Table 8). In any case, any such

discoveries should be considered against the backdrop of a global population estimate that relies in some cases on outdated information (Table 8).

Table 8 – Estimates of the breeding population of Sooty Falcon. Sources include literature (see References) and responses to questionnaires distributed in 2013 and 2022 (in parentheses; see Methodology).

Country	Breeding population (breeding pairs)	Breeding population trend[¥]	Quality[¥¥]	Source
Bahrain	6-10	Declining	Good	H. King (2022)
Chad	2-5	Unknown	-	Booth 1961
Djibouti	18	Unknown	Poor	H. Rayaleh (2022)
Egypt	285-295	Declining	Medium	M.I. Habib (2022), A. Salama (2022)
Eritrea	230	Unknown	Poor	Semere et al. 2008, G. Chiozzi (2013)
Iran (Islamic Republic of)	3	Unknown	Poor	S. Zadeghan (2022), A. Hashemi (2022), Z.E. Rad (2022)
Israel	70-90	Slight decrease	Good	Goren et al. 2023
Jordan	30-90	Unknown	Poor	F. Khoury (2022), L. El Moghrabi (2022)
Kuwait	0-1?	Unknown	Poor	Gregory 2004
Libya	205-500	Unknown	Poor	Riad et al. 2021, S. Buirzayqah (2022)
Oman	84	Declining	Good	W.A. Al Fazari (2013)
Pakistan	Few	Unknown	-	Khan et al. 2010, M.S.H Khan (2013)
Saudi Arabia	171-196	Declining	-	A. Binothman (2022), L. Calabrese (2022), M. Alghrair (2023), M. Alshaikh (2023)
Sudan	-	Unknown	-	Nikolaus 1987
United Arab Emirates	0-5	Declining	Good	S. Khan (2022)
Yemen	45-70	Unknown	-	O.A. Baeshen (2013)
Global	1,149-1,597	Declining	Poor	Present analysis
Global mature individuals[¥¥¥]	2,298-3,194	Declining	Poor	Present analysis

[¥] In the last 12 years (or 3 generations).
[¥¥] Data quality evaluated according to BirdLife International criteria[10]: Good = based on reliable or representative quantitative data derived from complete counts or sampling or interpolation; Medium = based on incomplete quantitative data derived from sampling, interpolation or indirect evidence; Poor = based on no quantitative data, but guesses derived from circumstantial evidence.
[¥¥¥] Global mature individuals = Global breeding population x 2.

The global conservation status of the Sooty Falcon on the IUCN Red List of Threatened Species was Least Concern until 2008, when it was reclassified as Near Threatened (under Criteria C1+2a[ii]), the latter largely as a result of population declines in Arabia (BirdLife International 2008; Jennings 2010).

[10] http://datazone.birdlife.org/species/spcquality.

After the second global inventory of the species (1,400-2,000 breeding pairs), the Sooty Falcon was re-classified in 2017 as Vulnerable C2a(ii) and in continuous decline (BirdLife International 2017).

> **IUCN Red List Criteria C2a(ii)** means: C (Small population size and decline) global population of less than 10,000 mature individuals; (C2) an observed, estimated, projected or inferred continuing decline; and a(ii) 100% mature individuals in one subpopulation.

In the last 10 years, the decline in the global population has become apparent in the overall count of individuals observed during their winter stay in Madagascar (Réné de Roland pers. comm. 2023).

3. Threats

Little information is available on specific threats to Sooty Falcon, and the small size of its population, as well as the limited knowledge on its biology and ecology make it challenging to accurately assess the impact of any threat. Using the information gathered (see Methodology), the present section summarises the best available information on threats to the species across its range.

Known or presumed threats to the species are listed below, and each has been ranked according to its perceived importance, largely based on the best available knowledge, such as expert opinion and recent literature (see References and Annexes 1 and 2). The ranking scheme used accounts for the scope, severity and irreversibility of threats (IUCN-SSC 2017), as follows:

> **Very High -** The threat is likely to be pervasive in its scope, affecting the target across all or most (71-100%) of its occurrence/population. The effects of the threat cannot be reversed, and it is very unlikely the target can be restored, and/or it would take more than 100 years to achieve.
>
> **High -** The threat is likely to be widespread in its scope, affecting the target across much (31-70%) of its occurrence/population. The effects of the threat technically can be reversed, and the target restored but it is not affordable and/or it would take 21-100 years to achieve.
>
> **Medium -** The threat is likely to be restricted in its scope, affecting the target across some (11-30%) of its occurrence/population. The effects of the threat can be reversed, and the target restored with a reasonable commitment of resources and/or within 6-20 years.
>
> **Low -** The threat is likely to be very narrow in its scope, affecting the target across a small proportion (1-10%) of its occurrence/population. The effects of the threat are easily reversible, and the target can be easily restored at a relatively low cost and/or within 0-5 years.

3.1 Urban, industrial and energy development

Importance: *Very High*

Mainly affecting: *Breeding areas*

Development of tourist infrastructure, housing and shrimp farms resulting in the loss of habitat suitable for the species and its prey have been reported in relation to the Arabian Red Sea islands (Shobrak and

Aloufi 2014), Israel (Hatzofe pers. comm. 2013), Oman (Eriksen pers. comm. 2013) and Yemen (Al-Saghier pers. comm. 2013). In the United Arab Emirates, breeding pairs disappeared from the islands of Zarku, Sir Bani Yas and Dalma due to the combination of oil industry development and the establishment of sizeable human populations since about 1980 (Shah et al. 2008; Jennings 2010). The rapid increase in land reclamation in Bahrain has resulted in significant changes to coastal and marine environments, including the devastating loss of 95% of mangrove cover (Naser 2022). The widespread implementation of solar energy facilities in Israel raises the need to evaluate potential detrimental impacts on the species (Goren pers. comm. 2023). For example, in Israel, three individuals were burnt over the period of one year by a solar tower located 16 km from the nearest breeding site (Hatzofe pers. comm. 2023). Negative effects occur not only at or near breeding sites but within a 5 km radius around nesting areas, where falcons hunt (Walter 1979). Mining activity (for the extraction of gold, copper, and other minerals) and its associated roadway construction may also be a rising threat to Sooty Falcons in certain areas, such as in Jordan (Khoury pers. comm. 2023). Ultimately, habitat loss at breeding sites can affect the species by reducing the availability of nesting sites and by reducing the habitat preferred by migrating passerines, therefore reducing prey availability.

3.2 Disturbance by tourists and fishers

Importance: *High*

Mainly affecting: *Breeding areas*

Tourism around the Red Sea and the Sea of Oman has increased significantly in the recent years. Islands that were once only rarely visited by a few fishers or military personnel are now regular destinations for divers, attracted by the coral and the rich underwater biodiversity (Ansari et al. 2022). These visitors frequently camp on the beaches and risk disturbing birds nesting on the ground or in the low cliffs (Williams 1991; Jennings 2010; McGrady et al. 2010; McGrady et al. 2019). Fishers are reported to use a number of Red Sea islands for wood collection or as meeting points and are likely to cause disturbance (PERSGA/GEF 2003; Coles and Williams 2004). Sooty Falcons nesting inland, particularly in Egypt, Israel and Jordan are known to be affected by disturbance from the expansion of rock climbing and hiking activities (Goren and Granit 2014; Salama et al. 2020). Tourism activities in breeding habitat have been found to effectively disturb breeding pairs (Goren and Granit 2014; Salama et al. 2020). When this disturbance occurs during the early stages of pair formation and nest selection, it can substantially reduce nest site availability for prospective breeding pairs (Williams 1991; Coles and Williams 2004). During the incubating period or when chicks are 1-2 weeks old, human presence may force adults to leave their eggs or chicks exposed to the sun and to high temperatures, which may lead to death (Williams 1991). In fact, under such intense conditions, even short periods of exposure can prove lethal.

3.3 Lack of knowledge on the species

Importance: *High*

Mainly affecting: *Breeding and non-breeding areas*

Research conducted on Sooty Falcon has been limited in time, inconsistent and has not provided a comprehensive analysis of the species across its distribution range. This impacts the ability to recognise, evaluate and accurately locate potential threats, as well as to identify and implement measures that can attenuate them. For instance, the poor understanding of breeding population sizes and dynamics across various countries constrains the accurate estimation of the global population's size (see Population size and trend). Furthermore, migratory pathways, mortality factors, and survival rates of young and non-breeding individuals are poorly understood (Javed et al. 2012; McGrady et al. 2016; AlJahdhami et al. 2020). Consequently, the impact of potential threats, such as the use of chemical substances for pest control in regions where birds migrate or winter, cannot be assessed (Mullié et al. 2023). Adding to these

knowledge gaps, a lack of coordination across stakeholders has prevented the implementation of coordinated avian monitoring programmes that could contribute data on Sooty Falcons.

3.4 Introduced terrestrial predators

Importance: *Potentially High*

Mainly affecting: *Breeding areas*

On the many islands that have no mammalian predators, Sooty Falcons sometimes nest on easily accessible sites, including on the ground at the base of cliffs, amongst low vegetation or sometimes in fully open areas. The highest density of breeding pairs recorded has been found on low, sandy or coral islets where the birds nest on the ground (Gaucher et al. 1995; Coles and Williams 2004). Introduced predators on islands are a serious threat particularly for threatened bird species (BirdLife International 2013). Predators may reach the islands during particularly low tides but are most likely to be introduced by humans intentionally or unintentionally (Gaucher et al. 1995). Sooty Falcons do not breed on the Hawar Island (Bahrain) due to the presence of feral cats (Jennings 2010). Pairs often nest in hard-to-access ledges on cliffs, but if ground predators reach islands hosting large populations the impact could be catastrophic for those populations. The introduction of terrestrial predators such as rats, mongooses and cats, would certainly result in the disappearance of the vast majority of breeding pairs that breed in accessible locations.

3.5 Locust and Quelea control operations

Importance: *Potentially High*

Mainly affecting: *Non-breeding areas*

Outside the breeding season, Sooty Falcons are largely insectivorous and during the post nuptial migration they follow rains and the related swarming of colonial insects (Buij 2011), such as ants (Antinori and Salvadori 1873), locusts (Heuglin 1861; Rand 1936) and dragonflies (Zefania 2001). Desert (*Schistocerca gregaria*), Migratory (*Locusta migratoria*) and Red (*Nomadacris septemfasciata*) Locusts are often the target of large-scale pest control operations using conventional pesticides, such as organochlorines, organophosphates, carbamates and synthetic pyrethroids (i.e., Mullié et al. 2023). In east Africa, the locust crisis (2019-2021) resulted in over 1.6 million hectares being treated (Mullié et al. 2023). Insecticides can cause primary but more often secondary poisoning, which can lead to death or reduced fecundity (Xirouchakis 2004; Guitart et al. 2010; Caloni et al. 2018). Likewise, chemical compounds used to control Red-billed Quelea (*Quelea quelea*) are likely to have an adverse impact on non-target species, such as the Sooty Falcon (Bruggers et al. 1989; Ogada 2014). There is no direct evidence of the importance of this threat to the Sooty Falcon, but the potential impact on the species is high, particularly in Kenya and Madagascar. This island has recently experienced two invasions of migratory locusts, one from 1997 to 2000 (covering 4.2 million hectares) and another from 2013 to 2016 (covering 2.3 million hectares; FAO-UN 2018). The management strategy targeting migratory locusts has failed repeatedly despite repeated restructuring projects and significant international assistance (Zhang et al. 2019). The simultaneous presence of large numbers of wintering Sooty Falcons feeding on insects increases the risk of secondary poisoning (Caloni et al. 2018).

3.6 Hunting and taking

Importance: Medium

Mainly affecting: Breeding and non-breeding areas

The species is legally protected in many of its range countries. This excludes Libya and Yemen, both of which host breeding populations. However, law enforcement is often inadequate. Illegal killing of Sooty Falcons has been reported to occur in many countries: Egypt (Sándor pers. comm. 2013, Megalli pers. comm. 2013), Iran (Islamic Republic of) (potential, Zadegan pers. comm. 2013), Jordan (El-Moghrabi pers. comm. 2013), Kenya (Thomsett pers. comm. 2013), Libya (Hering pers. comm. 2013), Madagascar (Réné de Roland pers. comm. 2013, 2023), Saudi Arabia (Gaucher et al. 1995; Shobrak pers. comm. 2013), and Yemen (Al-Saghier pers. comm. 2013). One satellite tagged falcon was reportedly shot in the Democratic Republic of the Congo in 2011 (Gschweng pers. comm. 2013).

Sooty Falcons are known to be taken or trapped in Egypt, Jordan, north Africa, Oman and Saudi Arabia (McGrady et al., 2016, 2018; Riad et al. 2021). Sooty Falcons are not suitable for falconry due to their size and propensity to take insect prey, nevertheless the species is reportedly captured to be used as a lure for trapping Lanner (*F. biarmicus*), Peregrine (*F. peregrinus*) and Saker Falcons (*F. cherrug*; Gaucher et al. 1995; Shobrak pers. comm. 2013; Zadegan pers. comm. 2013). Falcon trappers may catch Sooty Falcons as by-catch, and these may be kept as a curiosity or sold (Jennings 2010). Young individuals have been seen for sale in markets in Bahrain (Jennings 2010). In western Kenya, killing of wild birds for food apparently takes place on a large-scale using poison (Thomsett pers. comm. 2013). In Madagascar, intense rain and strong winds associated with cyclones make the birds easy prey for the local population, who catch them for food (Réné de Roland pers. comm. 2023).

3.7 Lack of knowledge on the impacts of climate change

Importance: Medium

Mainly affecting: Breeding and non-breeding areas

Extensive research has been conducted on the heightened vulnerability of birds to climate change, uncovering substantial effects on their distribution, life-history characteristics, and overall performance (Li et al. 2022; McLean et al. 2022). Increasing temperatures have led to earlier spring migration, affected physical conditions, diminished breeding success, and contributed to declines in certain bird populations Li et al. 2022; McLean et al. 2022). Additionally, climate change has the potential to impact the timing of insect emergence and swarming, consequently threatening to alter the availability of prey during the migration and wintering periods of Sooty Falcons. Overall, species that are already nearing their upper limits of thermal tolerance or inhabit regions with limited water availability are likely to encounter the most immediate threat (Cruz-McDonnell and Wolf 2016; Iknayan and Beissinger 2018).

3.8 Poisoning and habitat degradation from agricultural intensification

Importance: Unknown, possibly Medium

Mainly affecting: Breeding and non-breeding areas

Agricultural intensification and particularly an increase in the use of pesticides in areas frequented by hunting Sooty Falcons may result in the loss of prey species or reduced survival or reproductive success of the Sooty Falcons through pesticide bioaccumulation (Dudley and Alexander 2017; McGrady et al. 2016). This threat occurs not only at or near the breeding sites but also along migration routes and in areas used by floating Sooty Falcons (Maitima et al. 2009; Regasa et al. 2021). Agriculture can also

encroach into natural habitats and the spread of drought-tolerant crops may expand the use of pesticides (Thomsett pers. comm. 2013). In wintering areas (Madagascar, southern Africa) important habitat loss and degradation, driven by agriculture expansion (Botha pers. comm. 2013; Musyoki pers. comm. 2013) and deforestation, are taking place (Maitima et al. 2009). Although the Sooty Falcon seems to utilise a range of natural and semi natural habitats, these changes are affecting its prey and therefore potentially its survival (Magioli et al. 2021; Howes et al. 2023).

4. International instruments

Several international tools and instruments are relevant to the conservation of the Sooty Falcon. This section lists those tools and instruments, explaining their pertinence and, where applicable, the classification or level of protection that they attribute to the Sooty Falcon.

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

Classification attributed to the Sooty Falcon: Appendix II

CMS provides a global platform for the conservation and sustainable use of migratory animals and their habitats, laying the legal foundation for internationally coordinated conservation measures across species' migratory ranges. Under the Convention, Appendix II refers to migratory species that have an unfavourable conservation status or that would benefit significantly from international co-operation. CMS encourages the Range States of such species to conclude global or regional agreements for the conservation and management of such species.

4.2 CMS Memorandum of Understanding on the Conservation of Migratory Birds of Prey in Africa and Eurasia (Raptors MOU)

Classification attributed to the Sooty Falcon: Category 1

The Raptors MOU aims at co-ordinated measures to achieve and maintain the favourable conservation status of birds of prey throughout their African, Asian and European range and to reverse their decline when and where appropriate. Signatories endeavour to take, within the limits of their jurisdiction and having regard to their international obligations, a range of measures specified in the MOU Text and in its annexed Action Plan. Under the MOU, Category 1 species are those defined as Globally Threatened or Near Threatened by the IUCN Red List, and listed as such on the BirdLife International Data Zone. The Raptors MOU encourages Signatories to adopt, implement and enforce such legal, regulatory and administrative measures as may be appropriate to conserve these migratory birds of prey and their habitats.

4.3 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

Classification attributed to the Sooty Falcon: Appendix II

CITES aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival, and this is achieved by subjecting such international trade to certain controls. All import, export, re-export and introduction from the sea of species covered by the Convention has to be authorised through a licensing system. Under the Convention, Appendix II includes all species which although not necessarily now threatened with extinction may become so unless trade in specimens of such species is

subject to strict regulation in order to avoid utilisation incompatible with the species' survival. Any international trade in Appendix II species must comply with the permitting and other requirements set out in the Convention Text.

4.4 Convention on Biological Diversity (CBD)

Classification attributed to the Sooty Falcon: Not Applicable

CBD aims to conserve biological diversity, promote the sustainable use of its components, and encourage the fair and equitable sharing of the benefits arising from the use of genetic resources. Contracting Parties are to implement conservation measures to conserve biological diversity, establish protected area networks, and provide for environmental impact assessment of projects that are likely to adversely affect biodiversity. They aim also to identify components of biological diversity, such as species that are threatened and habitats that are required by migratory species, and monitor them, paying particular attention to those requiring urgent conservation measures. This ambition therefore concerns the Sooty Falcon.

Contracting Parties are to further develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity, and to integrate as far as possible the conservation and sustainable use of biological diversity into relevant sectoral plans, programmes and policies. National Biodiversity Strategies and Action Plans (NBSAPs) are the principal instruments for implementing this requirement at the national level. Contracting Parties must prepare such documents and ensure that they are mainstreamed across sectors and accounted for in conservation planning for specific species and habitats.

4.5 African Convention on the Conservation of Nature and Natural Resources (African Convention)

Classification attributed to the Sooty Falcon: Not Applicable

The African Convention aims to enhance environmental protection; to foster the conservation and sustainable use of natural resources; and to harmonise and coordinate policies in these fields with a view to achieving ecologically rational, economically sound and socially acceptable development policies and programmes. Parties are called to establish and implement policies for the conservation and sustainable use of animal and plant species, paying particular attention to socially, economically and ecologically valuable species, which are threatened and species which are only represented in areas under the jurisdiction of one Party.

Parties are called to identify the factors that are causing the depletion of animal and plant species which are threatened or which may become so, with a view to their elimination, and to grant special protection to such species and to the habitat necessary for their survival. Parties are also to adopt legislation on the protection of those species, taking into particular account the need to develop or maintain throughout the African continent concerted protection measures for such species.

4.6 Convention on the Conservation of Wildlife and their Natural Habitats in the Countries of the Gulf Cooperation Council

Classification attributed to the Sooty Falcon: Appendix III

The Convention aims to conserve ecosystems and wildlife in a sound and growing state, particularly species threatened with extinction, and specifically when the distribution of such species exceeds the

international border of two neighbouring countries or more, or when such species migrate across these countries, including the territorial waters or the airspace under their sovereignty.

Parties are called to enact the necessary legislation and policies to conserve and rehabilitate wildlife and its natural habitats and to ensure sustainable exploitation. For those species listed under Appendix III of the Convention (Animal Species Threatened with Extinction), Parties are called to enact necessary legislation to ensure that all exploitation is carried out in a rationalised way, ensuring that the survival or existence of such species is not threatened.

4.7 Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region (Nairobi Convention)

Classification attributed to the Sooty Falcon: Not Applicable

The Nairobi Convention aims to protect and manage the marine environment and coastal areas of the eastern African region, including by taking appropriate measures to prevent, reduce and combat pollution, and undertaking to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other marine life in specially protected areas. Contracting Parties endeavour to harmonise their policies, co-operate with the competent international, regional and sub-regional organisations to ensure the effective implementation of the Convention and its protocols, and to assist each other in that regard.

A Protocol Concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region has been adopted under the Convention, providing for the protection of threatened and endangered species of flora and fauna, and important natural habitats in eastern Africa. Contracting Parties are called to take appropriate measures to protect listed endangered species of fauna and flora; to protect critical habitats of such species; to co-ordinate efforts to protect migratory species; and to prevent the introduction of potentially harmful alien species. Contracting Parties are also called to establish protected areas to safeguard important ecosystems, including particularly those ecosystems that provide habitat for species of fauna and flora that are endangered, endemic, migratory, or economically important. Whilst the mentioned Protocol does not specifically protect Sooty Falcons, its ambition regarding habitat protection and alien species prevention contribute to Sooty Falcon conservation.

4.8 Regional Convention for the Conservation of the Red Sea and Gulf of Aden Environment (Jeddah Convention)

Classification attributed to the Sooty Falcon: Not Applicable

The Jeddah Convention aims to ensure the conservation of the Red Sea and Gulf of Aden environment including the prevention, abatement and combating of marine pollution. Parties are to co-operate in the adoption of protocols for the implementation of the Convention, and with competent international and regional organisations with a view to adopting regional standards for the conservation of the Red Sea and Gulf of Aden environment. Whilst the Convention does not specifically protect Sooty Falcons, its ambition regarding the prevention and combatting of marine pollution indirectly contribute to Sooty Falcon conservation along coastal areas.

4.9 Regional Convention for Co-operation on the Protection of the Marine Environment from Pollution (Kuwait Convention)

Classification attributed to the Sooty Falcon: Not Applicable

The Kuwait Convention aims to prevent, abate and combat pollution of the marine environment in the area of the Convention. Parties undertake to cooperate in dealing with pollution emergencies, to adopt protocols with measures and standards for implementing the Convention, and to establish legislation and regulations to prevent, abate and combat marine pollution. Whilst the Convention does not specifically protect Sooty Falcons, its ambition regarding the prevention and combatting of marine pollution indirectly contribute to Sooty Falcon conservation along coastal areas.

5. Protection status in Range States and national conservation efforts

The legal protection status of the Sooty Falcon varies across its range, as do the efforts to monitor the species and protect it. This section reports on these aspects for each Range State based on the responses obtained via the distributed questionnaires (see Methodology).

5.1 Bahrain

- **Relevant legal framework** – Resolution No. 16 of 1996 designates the Hawar Islands and the territorial sea surrounding them as a protected area, in accordance with Decree-Law No. 2 of 1995 on Wildlife Protection.
- **Conservation efforts** – The entire national Sooty Falcon population occurs within protected areas. There is no national action plan nor active working group on the species.
- **National monitoring activities** – Not in recent times, nor ongoing.
- **Sources** – Questionnaire: H. King (2022).

5.2 Egypt

- **Relevant legal framework** – Law No. 102/1983 on Natural Protected Areas. Law No. 4/1994 on Environment, amended by Law No. 9/2009 Amending Some Provisions of Law No. 4/1994 on Environment, prohibits the hunting and persecution of raptor species. Sooty Falcons are classified as Highly Protected species.
- **Conservation efforts** – About 97-98% of the national Sooty Falcon population occurs within protected areas. Local actions have been implemented in the Wadi el Gemal National Park. There is no national action plan nor active working group on the species.
- **National monitoring activities** – Some partial monitoring took place between 2009 and 2022, though not regularly. In Wadi el Gemal National Park, Sooty Falcons have been monitored annually since 2004. In addition, an observation and inventory programme was implemented in the White Desert between 2009 and 2013.
- **Sources** – Questionnaires: M.I. Habib (2022); A. Salama (2022). Pers. comm.: Taha 2023.

5.3 Djibouti

- **Relevant legal framework** - Loi n° 10/AN/03/5ème and Loi n° 9/AN/03/5ème L ratify CMS. Loi n° 51/AN/09/6ème L bears the environmental code. Décret n° 2004-0065/PR/MHUEAT concerns biodiversity protection. Loi n° 45/AN/04/5th L concerns the establishment of protected terrestrial and marine areas.
- **Conservation efforts** – Not in recent times, nor ongoing. There is no national action plan nor active working group on the species.
- **National monitoring activities** – Not in recent times, nor ongoing.
- **Sources** – Questionnaires: H. Rayaleh (2022); M. Elmi Obsieh (2022).

5.4 Iran (Islamic Republic of)

- **Relevant legal framework** – Law on Hunting and Fishing (1967). Law of Endangered Species of Wild Fauna and Flora (1974). The Sooty Falcon is classified as a First Level Protected species.
- **Conservation efforts** – Not in recent times, nor ongoing. There is no national action plan nor active working group on the species.
- **National monitoring activities** – Not in recent times, nor ongoing.
- **Sources** – Questionnaires: A. Hashemi (2022); Z. Elahi Rad (2022).

5.5 Iraq

- **Relevant legal framework** – There is no dedicated legal protection for the species in Iraq, but it is covered by the wildlife protection laws issued by the Ministry of Agriculture and the Ministry of Environment. Article 18 of the Environmental Protection and Improvement Law No. 27 of 2009 prohibits the hunting of wild birds that are rare or threatened with extinction. In particular, Article 18 prohibits the following:
  - Harming the biological groups in their habitats;
  - Hunting or trading in fish, birds, wild and aquatic animals that are endangered and semi-threatened with extinction;
  - Hunting, killing, catching, possessing, or transporting birds and wild and aquatic animals specified by the concerned authority, including migratory birds that take Iraqi territory as a resting or unloading station, as well as their habitats and breeding places.
- **Conservation efforts** – Not in recent times, nor ongoing. There is no national action plan nor active working group on the species.
- **National monitoring activities** – Not in recent times, nor ongoing.
- **Sources** – Questionnaire: M. A. Salim (2022).

5.6 Israel

- **Relevant legal framework** – The Animal Protection Law (1994). National Parks, Nature Reserves, National Sites and Memorial Sites Law (1998). The Sooty Falcon has been classified as a Protected species by the Israel Nature and Parks Authorities (INPA) since 1995.
- **Conservation efforts** – About 80-90% of the national population occurs within protected areas. There is no national action plan nor active working group on the species.
- **National monitoring activities** – A survey to monitor Sooty Falcon population dynamics is conducted annually by INPA and BirdLife Israel. Each year, a team of observers studies a different region according to a 2011-2014 pilot study. Each region is visited to identify population trends.
- **Sources** – Questionnaires: M. Goren (2022); Y. Perlman (2022). Pers. comm.: Hatzofe 2023.

5.7 Jordan

- **Relevant legal framework** – Sooty Falcon poaching/catching is banned at national level. The species is listed in Appendix A of the hunting regulations under Article 56 of the Agriculture Law 2015, whereby poaching and catching are forbidden. The Sooty Falcon is classified as a Highly Protected species.
- **Conservation efforts** – Less than 50% of the national population occurs within protected areas. There is no national action plan nor active working group on the species.
- **National monitoring activities** – There are Sooty Falcon monitoring programmes in the protected areas where the species occurs, including Dana Biosphere Reserve and Wadi Rum Protected Area.
- **Sources** – Questionnaires: F. Khoury (2022); L. El-Moghrabi (2022).

5.8 Kenya

- **Relevant legal framework** – Kenya is a Signatory to CMS but it does not currently have a national Red List. Implementation outside protected areas is weak.
- **Conservation efforts** – Not in recent times, nor ongoing. There is no national action plan nor active working group on the species.
- **National monitoring activities** – General surveys for raptors are conducted annually, including using raptor road counts.
- **Sources** – Questionnaire: D. Ogada (2022).

5.9 Libya

- **Relevant legal framework** – Not protected, moral obligation and customary protection only.
- **Conservation efforts** – The Alhaya Organization, together with the University of Derna, developed an individual monitoring plan to monitor, assess, and research the species. There is no active working group on the species.
- **National monitoring activities** – Not in recent times, but planned.
- **Sources** – Questionnaire: S. Buarzaiga (2022).

5.10 Madagascar

- **Relevant legal framework** – Decree No. 2006-400, Classifying Wild Fauna. Ordinance No. 60-126, Establishing the Hunting and Fishing Regime and the Protection of Wildlife.
- **Conservation efforts** – A maximum of 3% of the national population occurs within protected areas. A National Species Action Plan (NSAP) for the Conservation of the Sooty Falcon was produced in 2012 by the Peregrine Fund and the Ministère des Eaux et Forets, Madagascar. There is no active working group on the species.
- **National monitoring activities** – Data are collected and extrapolated through road observations and raptor counts.
- **Sources** – Questionnaires: L.-A. Réné de Roland (2022); G. Razafimanjato (2022).

5.11 Oman

- **Relevant legal framework** – All wildlife in Oman is protected by law.
- **Conservation efforts** – The biggest known breeding area is controlled by the Royal Oman Police and Dayamaniyat Islands are a marine reserve run by the Ministry of Environment and Climate Affairs. There is no national action plan nor active working group on the species.
- **National monitoring activities** – A Sooty Falcon monitoring program was led by the Office for Conservation of Environment (OCE) in collaboration with national and international organisations from 2007-2014. Monitoring was conducted through two annual surveys in the breeding areas. Attempt is currently being made to restart the programme.
- **Sources** – Questionnaire: W.A. Al Fazari (2013). Pers. comm.: McGrady 2023.

5.12 Pakistan

- **Relevant legal framework** – The species is protected under the provincial wildlife laws of the country: Azad Jammu and Kashmir Wildlife (Protection, Preservation, Conservation and Management) Act, 2014; Balochistan (Wildlife Protection, Preservation, Conservation and Management) Act, 2014; Gilgit-Baltistan (Northern Areas) Wildlife Protection Act, 1975; Islamabad Wildlife (Protection, Preservation, Conservation and Management) Ordinance, 1979;

Khyber Pakhtunkhwa Wildlife and Biodiversity (Protection, Preservation, Conservation and Management) Act, 2015; and Sindh Wildlife Protection, Preservation, Conservation and Management Act, 2020.

- **Conservation efforts** – The species breeds largely within Hingol National Park. A National Strategy for Conservation of Raptors is under process. There is no active working group on the species.
- **National monitoring activities** – Not in recent times, nor ongoing. There are projects and other interventions for effective management of protected areas, however there is no monitoring of the species.
- **Sources** – Questionnaire: M. S. H. Khan (2022).

5.13 Saudi Arabia

- **Relevant legal framework** – The Sooty Falcon is a protected species according to Saudi law. It is also included in the list of High Conservation Priority Species for Saudi Arabia. Relevant instruments recently enacted include the Regulation for Hunting Wildlife Species Under Environmental Law (Royal Decree No. (M/165), dated 9/8/2020) and the Regulation for Trade in Wildlife Species, their Products and Derivatives Under Environmental Law, issued by Royal Decree No. M/165, dated 9/8/2020).
- **Conservation efforts** – There is no national action plan but Neom and the Red Sea Project (which includes Amaala) are developing local action plans. There is no active working group on the species.
- **National monitoring activities** – There are monitoring programmes within the Red Sea Project area and in Neom.
- **Sources** – Questionnaires: A. Binothman (2022); L. Calabrese (2022).

5.14 South Africa

- **Relevant legal framework** – The Sooty Falcon is classified as a Protected species.
- **Conservation efforts** – Not in recent times, nor ongoing. About 5-10% of the national population occurs within protected areas. There is no national action plan nor active working group on the species.
- **National monitoring activities** – Not in recent times, nor ongoing.
- **Sources** – Questionnaire: A. Botha (2022).

5.15 United Arab Emirates

- **Relevant legal framework** – The Sooty Falcon is legally protected in the Abu Dhabi Emirate and by Federal Law No. 24 in the United Arab Emirates.
- **Conservation efforts** – There is no national action plan nor active working group on the species.
- **National monitoring activities** – Sooty Falcons have been monitored for the past 20 years as part of a breeding bird monitoring project implemented by the Environment Agency – Abu Dhabi.
- **Sources** – Questionnaire: S. Khan (2022).

5.16 Yemen

- **Relevant legal framework** prohibits trade in endangered and protected species. Cabinet Decision No. 104 of 2002 regarding the Protection of Endangered Species and the Regulation of Trade.
- **Conservation efforts** – Not in recent times, nor ongoing. There is no national action plan nor active working group on the species.

- **National monitoring activities** – Not in recent times, nor ongoing.
- **Sources** – Questionnaire: O. A. Baeshen (2022).

6. Conservation actions

The International Single Species Action Plan for the Sooty Falcon 2024 – 2036 (ISSAP) aims to reduce the risk of extinction of the Sooty Falcon by halting the decline of its population to a point where it qualifies for downlisting to at least Near Threatened. Ensuring that this is achieved requires Range States and other stakeholders to take concerted, as well as unilateral action. The present section lays out a plan for such action over a 12-year period, from 2024 to 2036, which equates to approximately three generations of the species (the generational length of the Sooty Falcon has been estimated at 4.1 years and the IUCN Red List Authority has suggested that future changes to the conservation status of the species be evaluated over a three-generation period; BirdLife International 2021).

The ISSAP contains a series of actions divided into three objectives: (1) protect the species; (2) improve knowledge through monitoring and research; and (3) exchange lessons learnt and raise awareness. Each action of the ISSAP is accompanied by an outcome, target countries and stakeholders, and an indication of implementation priority.

Aim of the International Single Species Action Plan for the Sooty Falcon 2024 – 2036: To reduce the risk of extinction of the Sooty Falcon by halting the decline of its population to a point where it qualifies for downlisting to at least Near Threatened by 2036				
Objective 1 – Protect the species				
Action	**Outcome**	**Countries[11]**	**Stakeholders**	**Priority**
1.1 Enact legislation at national level across the species' range to legally protect it from unsustainable killing and take (including the poaching of eggs and chicks) and disturbance	The species is legally protected across its range against unsustainable killing and take, as well as disturbance	AE, BH, CD, CF, DJ, EG, EH, ER, IL, IR, JO, KE, KW, LY, MG, MZ, OM, PK, RW, SA, SD, SO, SS, TD, TZ, UG, YE, ZA, ZM	Relevant national authorities	High

[11] Bahrain (BH), Central African Republic (CF), Chad (TD), Democratic Republic of the Congo (CD), Djibouti (DJ), Egypt (EG), Eritrea (ER), Ethiopia (EH), Iran (Islamic Republic of) (IR), Israel (IL), Jordan (JO), Kenya (KE), Kuwait (KW), Libya (LY), Madagascar (MG), Mozambique (MZ), Oman (OM), Pakistan (PK), Rwanda (RW), Saudi Arabia (SA), Somalia (SO), South Africa (ZA), South Sudan (SS), Sudan (SD), Uganda (UG), United Arab Emirates (AE), United Republic of Tanzania (TZ), Yemen (YE), Zambia (ZM).

1.2 Ensure adequate national-level enforcement of protective measures against unsustainable killing and take, as well as disturbance	Regulations relating to preventing killing, take and disturbance are adequately enforced at national levels Hatching and fledging success are increased and desertion of nesting sites is reduced	AE, BH, CD, CF, DJ, EG, EH, ER, IL, IR, JO, KE, KW, LY, MG, MZ, OM, PK, RW, SA, SD, SO, SS, TD, TZ, UG, YE, ZA, ZM	Relevant national authorities	High
1.3 Enact legislation at national level to legally protect known breeding sites from damage and disturbance, including through restricting human access by implementing buffer zones and seasonal closures at breeding sites, by regulating outdoor recreational activities (trekking, hiking, camping, bathing, boating, and others) in the vicinity of coastal and inland breeding sites, and by requiring any visitors (particularly to core and island breeding sites) to be accompanied by duly trained guides	Known breeding sites are legally protected from damage and disturbance across the species' range	AE, BH, DJ, EG, ER, IL, IR, JO, LY, OM, PK, SA, YE	Relevant national authorities	High
1.4 Ensure adequate national-level enforcement of protection against damage and disturbance of breeding sites	Regulations relating to preventing damage and disturbance of breeding sites are adequately enforced at national levels Disturbance during the breeding season (1 June – 30 November) is prevented, and the risk of ground predator introduction is minimised all year round Human encroachment into core breeding areas is prevented Nest site disturbance by outdoor recreational activities is avoided and unsuccessful breeding along coastal, island and inland areas is reduced	AE, BH, DJ, EG, ER, IL, IR, JO, LY, OM, PK, SA, YE	Relevant national authorities	High

	The negative impact of human activities on contiguous breeding sites is mitigated			
1.5 Place appropriate signage around core breeding areas to deter human encroachment	Unauthorised visitors are deterred from entering or landing within core breeding areas	AE, BH, DJ, EG, ER, IL, IR, JO, LY, OM, PK, SA, YE	Relevant national authorities	Medium
1.6 Develop and implement control plans for non-native invasive predators in breeding sites	Predation by non-native invasive predators is minimised and eliminated where possible	AE, BH, DJ, EG, ER, IR, OM, SA, YE	Relevant national authorities	High
1.7 Identify and implement pest control strategies that do not cause Sooty Falcon mortality	Strategies and best practice are developed jointly by Range States, CMS, FAO, UNEP and others to reduce the additive mortality of migrating and wintering birds resulting from locust and Red-billed Quelea control operations Range States implement such strategies and best practice	CD, CF, EH, ER, IL, KE, MG, MZ, RW, SA, SD, SO, SS, TD, TZ, UG, ZA, ZM	Relevant national authorities, IGOs, NGOs	Medium
1.8 Develop national action plans for the conservation of the species	Action plans for the conservation of the species are developed by Range States	AE, BH, CD, CF, DJ, EG, EH, ER, IL, IR, JO, KE, KW, LY, MG, MZ, OM, PK, RW, SA, SD, SO, SS, TD, TZ, UG, YE, ZA, ZM	Relevant national authorities, NGOs	Medium
Objective 2 – Improve knowledge through monitoring and research				
Action	**Outcome**	**Countries**	**Stakeholders**	**Priority**
2.1 Improve population estimates across the species' range	Current population sizes are ascertained across the species' distribution range	AE, BH, DJ, EG, ER, IL, IR, JO, MG, LY, OM, PK, SA, YE	Research institutions, relevant national authorities, non-governmental organisations (NGOs)	Medium
2.2 Improve the understanding of the species' distribution range	The present distribution of the species is assessed, and the various areas of its range are identified (core areas of the range that are consistently occupied, peripheral areas that are intermittently occupied, and degraded areas that have experienced population declines)	AE, BH, DJ, EG, ER, IL, IR, JO, LY, OM, PK, SA, YE	Research institutions, relevant national authorities, NGOs	Medium

2.3 Develop and adopt a shared species research and monitoring scheme	A coordinated research and monitoring scheme addressing population status, trends and distribution is implemented and able to inform and evaluate conservation actions on breeding, migration and wintering grounds	AE, BH, DJ, EG, ER, IL, IR, JO, MG, LY, OM, PK, SA, YE	Relevant national authorities, inter-governmental organisations (IGOs), NGOs	High
2.4 Research threats to the species along its migratory routes	Studies utilising Global Positioning System (GPS) tracking and on-the-ground investigations are initiated and continued to assess potential threats to the species during dispersal and seasonal movements	AE, BH, CD, CF, DJ, EG, EH, ER, IL, IR, JO, KE, KW, LY, MG, MZ, OM, PK, RW, SA, SD, SO, SS, TD, TZ, UG, YE, ZA, ZM	Research institutions, relevant national authorities, NGOs	Medium
2.5 Research the causes of post-fledging and adult mortality	The causes of mortality are better comprehended	AE, BH, CD, CF, DJ, EG, EH, ER, IL, IR, JO, KE, KW, LY, MG, MZ, OM, PK, RW, SA, SD, SO, SS, TD, TZ, UG, YE, ZA, ZM	Research institutions, relevant national authorities, NGOs	Medium
2.6 Research the impact of secondary poisoning on populations	Possible impacts of secondary poisoning from pest control programmes on survival rates of migrating individuals are ascertained	CD, CF, ER, ET, KE, MG, MZ, RW, SD, SO, SS, TD, TZ, UG, ZA, ZM	Research institutions, relevant national authorities, NGOs	High
2.7 Research the impact of solar and wind energy infrastructure on populations	Possible impacts of solar and wind energy infrastructure on individuals are ascertained	IL, JO, SA	Power and utility companies, research institutions, relevant national authorities, NGOs	Medium
2.8 Research the impact of climate change on populations	Possible impacts of climate change on survival rates of breeding and migrating individuals are ascertained	AE, BH, DJ, EG, EH, ER, IL, JO, KE, LY, MG, MZ, OM, SA, SO, TZ, YE, ZA	Research institutions, relevant national authorities, NGOs	Medium

2.9 Investigate the viability of artificial nest provision to promote (re)colonisation of suitable breeding sites and deploy such nests where appropriate	The number of nesting locations in areas that are currently populated is enhanced and/or the recolonisation of adjacent areas that have been deserted due to human activities is facilitated	AE, BH, DJ, EG, ER, IL, IR, JO, LY, OM, PK, SA, YE	Research institutions, Relevant national authorities, NGOs	High
2.10 Research Sooty Falcon genomics to better understand the species' vulnerability to threats	The genetic diversity of the species, its migration patterns, threats, and population size, trends and connectivity are better understood	AE, BH, CD, CF, DJ, EG, EH, ER, IL, IR, JO, KE, KW, LY, MG, MZ, OM, PK, RW, SA, SD, SO, SS, TD, TZ, UG, YE, ZA, ZM	Research institutions, Relevant national authorities, NGOs	Medium
Objective 3 – Exchange lessons learnt and raise awareness				
Action	**Outcome**	**Countries**	**Stakeholders**	**Priority**
3.1 Communicate the findings of the ISSAP to governments, researchers, the private sector and the public	Awareness of the latest information available on the species is established	AE, BH, CD, CF, DJ, EG, EH, ER, IL, IR, JO, KE, KW, LY, MG, MZ, OM, PK, RW, SA, SD, SO, SS, TD, TZ, UG, YE, ZA, ZM	Relevant national authorities, IGOs, NGOs	High
3.2 Disseminate experiences in the management of breeding sites	Breeding States learn from one another about best management options	AE, BH, DJ, EG, ER, IL, IR, JO, LY, OM, PK, SA, YE	Relevant national authorities, NGOs	Medium
3.3 Disseminate experiences in adequate management of wintering habitats	Wintering States learn from one another about best management options	KE, MG, MZ, SA, TZ	Relevant national authorities, NGOs	Medium
3.4 Launch national or local campaigns on the importance of protecting the species	Awareness of the need to protect the species and its habitat is raised among individuals, entities and economic sectors with the potential to impact population trends	AE, BH, CD, CF, DJ, EG, EH, ER, IL, IR, JO, KE, KW, LY, MG, MZ, OM, PK, RW, SA,	Relevant national authorities, NGOs, Estate developers	Medium

		SD, SO, SS, TD, TZ, UG, YE, ZA, ZM		
3.5 Establish joint awareness programmes that bring Range States and communities together	Range States and their communities maximise efforts to conserve the species	AE, BH, CD, CF, DJ, EG, EH, ER, IL, IR, JO, KE, KW, LY, MG, MZ, OM, PK, RW, SA, SD, SO, SS, TD, TZ, UG, YE, ZA, ZM	Relevant national authorities, IGOs, NGOs	High
3.6 Establish an International Sooty Falcon Day	Awareness of the need to protect the species and its habitat is raised among the public, entities and economic sectors in Range States and non-Range States	AE, BH, CD, CF, DJ, EG, EH, ER, IL, IR, JO, KE, KW, LY, MG, MZ, OM, PK, RW, SA, SD, SO, SS, TD, TZ, UG, YE, ZA, ZM, Vagrancy States[12]	Relevant international organisations	Medium
3.7 Create enabling conditions for the establishment of sustainable birding tourism	Sustainable birding tourism enterprises are established and contribute awareness on the need to conserve the species	AE, BH, CD, CF, DJ, EG, EH, ER, IL, IR, JO, KE, KW, LY, MG, MZ, OM, PK, RW, SA, SD, SO, SS, TD, TZ, UG, YE, ZA, ZM	Relevant national authorities, NGOs	Medium

[12] Algeria, Botswana, Cameroon, Comoros, France, Italy, Lebanon, Mali, Malawi, Mauritius, Morocco, Namibia, Niger, Seychelles, Syria, Togo, Tunisia, Türkiye, Zimbabwe.

References

AlJahdhami MH, Karelus DL, AlFazari AW, Réné de Roland L-A, Razafimanjato G, McGrady MJ, Oli MK (2020) Movement patterns of Sooty Falcons *Falco concolor* tracked via satellite across their annual cycle. Bird Study 67:505-52

Ansari AA, Siddiqui ZH, Alatawi FA, Alharbi BM, Alotaibi AS (2022) An Assessment of Biodiversity in Tabuk Region of Saudi Arabia: A Comprehensive Review. Sustainability 14:10564

Antinori O, Salvadori T (1873) Viaggio dei Signori O Antinori, O Beccari, A Issel nel mar Rosso nel territorio dei Bogos e regioni circostanti durante gli anni 1870-71 [Trip of Messrs O Antinori, O Beccari and A Issel on the Red Sea in the land of Bogos people and surrounding regions during 1870-1871] Tip del R Istituto sordo-muti, Genova

Baha El Din SM (1984) Notes on the Breeding of the Sooty Falcon *Falco concolor* on Islands in the Red Sea, and their prey. OSME Bull 12:2-3

Baha El Din SM (1999) Directory of Important Bird Areas in Egypt. The Palm Press. Cairo

Booth BO (1961) Breeding of the Sooty Falcon in the Libyan Desert. Ibis 103a:129-130

BirdLife International (2008) *Falco concolor*. The IUCN Red List of Threatened Species 2008: e.T22696446A27974831. Accessed 30/1/2024.

BirdLife International (2013) Small island birds are most at risk from invasive alien species. http://www.birdlife.org/datazone/sowb/casestudy/128. Accessed on 28/12/2013

BirdLife International (2016) *Falco concolor*. The IUCN Red List of Threatened Species 2016: e.T22696446A93562094. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22696446A93562094.en. Accessed 30/1/2024.

BirdLife International (2017) *Falco concolor*. The IUCN Red List of Threatened Species 2017: e.T22696446A119400295. https://dx.doi.org/10.2305/IUCN.UK.2017-3.RLTS.T22696446A119400295.en. Accessed 30/1/2024.

BirdLife International (2021) *Falco concolor*. The IUCN Red List of Threatened Species 2021: e.T22696446A180387681. https://www.iucnredlist.org/species/22696446/180387681. Accessed on 17/08/2023

Boedts B (2010) Observations du Faucon concolore *Falco concolor* dans les environs d'Antananarivo, Madagascar. Bull ABC 17:220-224

Booth BO (1961) Breeding of the Sooty Falcon in the Libyan Desert. Ibis 103a:129-130

Brown LH, Urban EK, Newman K (1982) The Birds of Africa. Vol. I. Academic Press, London, United Kingdom

Bruggers RL, Jaeger MM, Keith JO et al (1989) Impact of fenthion on nontarget birds during quelea control in Kenya. Wildl Soc Bull 17:149–160

Buij R (2011) Sightings of Sooty Falcon *Falco concolor* in the far north of Cameroon. Bull ABC 18:211-214

Cade TJ (1982) The Falcons of the World. London. Collins/Cornell University Press, Ithaca, NY

Caloni F, Berny P, Croubels S, Sachana M, Guitart R (2018) Epidemiology of animal. Poisonings in Europe. In: Gupta RC (ed) Veterinary Toxicology, Basic and Clinical Principles: 3rd Edition. Elsevier/Academic Press, London. Pp 45–56

Clapham CS (1964) The birds of the Dahlac Archipelago. Ibis 106:376-388

Clark WS (1999) A field guide to the raptors of Europe, the Middle East and North Africa. Oxford University Press, Oxford

Coles T, Williams NP (2004) Sooty Falcon *Falco concolor* Baseline Breeding Survey, Wadi El Gemal Island and the Qulân Archipelago, Wadi El Gemal National Park, Red Sea Governorate, 3–10 September, 2004. Unpublished report

Cruz-McDonnell KK, Wolf BO (2016) Rapid warming and drought negatively impact population size and reproductive dynamics of an avian predator in the arid southwest. Glob Chang Biol 22:237–253

Dudley N, Alexander S (2017) Agriculture and biodiversity: a review. Biodiversity 18:45–49

Ferguson-Lees J, Christie DA (2001) Raptors of the World. Christopher Helm/A&C Black, London, United Kingdom

FAO-UN (2018) Madagascar locust crisis. Food and Agricultural Organization of the United Nations. http://www.fao.org/emergencies/crisis/madagascar-locust/en. Accessed on 10/03/2023

Forsman D (1999) The raptors of Europe and the Middle East. C Helm, London

Frumkin R (1988) Biologie und Bestimmung des Schieferfalken. Limicola 2:83-109

Frumkin R (1993) Breeding ecology of the Sooty Falcon in Israel. In: Nicholls MK, Clarke R (eds) Biology and conservation of small falcons. Hawk and Owl Trust, Canterbury, United Kingdom. Pp 51-58

Frumkin R, Pinshow B (1983) Notes on the breeding ecology and distribution of the Sooty Falcon *Falco concolor* in Israel. Ibis 125:251-259
Fuchs J, Johnson JA, Mindell DP (2015) Rapid diversification of falcons (*Aves*: *Falconidae*) due to expansion of open habitats in the Late Miocene. Mol Phylogenet Evol 82:166-182
Gallo-Orsi U, Williams NP, Javed S, McGrady M (2014) Draft International Single Species Action Plan for the Sooty Falcon *Falco concolor*. CMS Raptors MOU. Unpublished report
Gangoso L, López-López P, Grande JM, Mellone U, Limiñana R, Urios V, Ferrer M (2013) Ecological specialization to fluctuating resources prevents long-distance migratory raptors from becoming sedentary on islands. PLoS ONE 8(4):e61615
Gaucher P, Petit T, Symens P (1988) Notes on the study of the Sooty Falcon *Falco concolor* during its breeding season in Saudi Arabia. Alauda 56:277-283
Gaucher P, Daunicht WD, Eichacher X (1994) The Sooty Falcon *Falco concolor* in Saudi Arabia. In: Meyburg B-U, Chancellor RD (eds) Raptor conservation today. World Working Group on Birds of Prey and Owls and Pica Press, Berlin and London. Pp 109-116
Gaucher P, Thiollay J-M, Eichaker X (1995) The sooty falcon (*Falco concolor*) on the Red Sea coast of Saudi Arabia: distribution, numbers and conservation. Ibis 137:29-34
Goodman SM, Meininger PL (1989) The Birds of Egypt. Oxford University Press, Oxford
Goren M, Granit B (2014) Sooty Falcon *Falco concolor* in Israel; A summary of breeding survey 2011-2014 [In Hebrew]. Unpublished report
Goren M, Perlman Y (2016) Sooty Falcon (*Falco concolor*) in Israel – status and trends. Unpublished report
Goren M, Perlman Y, McGrady M (2023) Apparent population decline of Sooty Falcon *Falco concolor* in Israel. Sandgrouse 45:84-93
Gregory G (2004) Breeding Birds in Kuwait, 2003. Phoenix 20:21.
Gschweng M (2013) Sooty falcon, *Falco concolor*. Safford R, Hawkins F (eds) The birds of Africa, vol 8: The Malagasy region. Christopher Helm, London. Pp 231–233
Guitart R, Sachana M, Caloni F, Croubels S, Vandenbroucke V, Berny P (2010) Animal poisoning in Europe. Part 3: wildlife. Vet J 183:260–265
Habib MI (2019) Breeding of Sooty Falcon on Egyptian Red Sea islands in 2012-17. Dutch Birding 41:29-36
Heuglin T von (1861) Beiträge zur Ornithologie Nord-Ost-Afrika's [Contributions to Ornithology North East Africa's]. J Ornitol 6:417-431
Howes B, González-Suárez M, Jeldtoft Jensen H, Dos Anjos L, et al (2023) Deforestation alters species interactions. Natural Sciences 3:e20220027
Iknayan KJ, Beissinger SR (2018) Collapse of a desert bird community over the past century driven by climate change. PNAS 115:8597–8602
IUCN – SSC Species Conservation Planning Sub-Committee (2017) Guidelines for Species Conservation Planning. Version 1.0. IUCN, Gland, Switzerland
Javed S, Douglas DC, Khan S, Shah JN, Al Hammadi AA (2012) First description of autumn migration of Sooty Falcon *Falco concolor* from the United Arab Emirates to Madagascar using satellite telemetry. Bird Conservation International 22:106-119
Jennings MC (2010) Atlas of the Breeding birds of Arabia. Fauna of Saudi Arabia 25. Senckenberg Institute Frankfurt and the King Abdulaziz City for Science and Technology. Frankfurt and Riyadh
Kashfi MR, Nayeri D, Qashqaei AT (2019) High elevation records of Sooty Falcon *Falco concolor* in northern Iran. Sandgrouse 41:98-100
Kavanagh B, King H (2008) Observations from 1998-2006 on the breeding population of sooty falcons *Falco concolor* on the Hawar Islands, Kingdom of Bahrain. Sandgrouse 30:70-76
Khan MZ, Zehra A, Ghalib SA, Siddiqui S, Hussain B (2010) Vertebrate biodiversity and key mammalian species status of Hingol National Park. Can J Pure Appl Sci 4:1151-1162
Lewis A, Pomeroy D (1989) A bird atlas of Kenya. AA Balkema, Rotterdam
Li X, Liu Y, Zhu Y (2022) The effects of climate change on birds and approaches to response. IOP Conf Ser: Earth Environ Sci 1011:1-8
Magioli M, Ferraz KMPM de B (2021) Deforestation leads to prey shrinkage for an apex predator in a biodiversity hotspot. Mammal Res 66:245-255
Maitima JM, Mugatha SM, Reid RS, Gachimbi LN, Majule A, Lyaruu H, Mugisha S (2009) The linkages between land use change, land degradation and biodiversity across East Africa. Afr J Environ Sci Technol 3:310–325
McGrady M, AlFazari W, AlJahdhami MH, Oli MK (2016) Survival of Sooty Falcons (*Falco concolor*) in Oman. J Ornithol 157:427–437
McGrady MJ, Al Fazari WA, Al Jahdhami MH, Nicoll MAC, Oli MK (2017) Sooty Falcon *Falco concolor* reproduction and population dynamics on the islands in the Sea of Oman. Ibis 159:828–840

McGrady MJ, Al Fazari WA, Al Jahdhami MH, Abdusallam Z, Al Owaisi A, Fisher M (2018) Has Sooty Falcon *Falco concolor* distribution contracted in Oman? Sandgrouse 40:75–85
McGrady MJ, Al Fazari W, Al Jahdhami M, Fisher M, Kwarteng AY, Walter H, Oli MK (2019) Island accessibility and distance from beach influence nesting success of Sooty Falcons *Falco concolor* in Oman. Ibis 161:162-171
McLean N, Kruuk LEB, van der Jeugd HP, Leech D, van Turnhout CAM, van de Pol M (2022) Warming temperatures drive at least half of the magnitude of long-term trait changes in European Birds. PNAS 119:10
Mellone U (2021) Sooty falcon, *Falco concolor*. In: Panuccio M, Mellone U, Agostini A (eds) Migration Strategies of Birds of Prey in Western Palearctic. CRC Press, Boca Raton, Florida. Pp 235-237
Moreau RE (1969) The Sooty Falcon *Falco concolor* Temminck. Bull Brit Orn Club 89:62-67
Mullié WC, Prakash A, Müller A, Lazutkaite E (2023) Insecticide use against Desert Locust in the Horn of Africa 2019–2021 reveals a pressing need for change. Agronomy 13:819
Naser HA (2022) Technology for environmental management in Small Island Developing States: the case of Bahrain. Curr Opin Environ Sustain 59:101219
Nikolaus G (1987) Distribution atlas of Sudan's birds with notes on habitat and status. Zoologisches Forschungsinstitut Und Museum Alexander Koenig, Bonn, Germany
Ogada DL (2014) The power of poison: pesticide poisoning of Africa's wildlife. Ann NY Acad Sci 1322:1–20
Orta J (1994) Sooty Falcon. In: del Hoyo J, Elliott A, Sargatal J (eds) Handbook of birds of the world. Vol. 2. New World vultures to guineafowl. Lynx Edicions, Barcelona, Spain
Orta, J, Kirwan, G M, Boesman, P, Marks, J S & Sharpe, C J (2018) Sooty Falcon (*Falco concolor*). In: del Hoyo, J, Elliott, A, Sargatal, J, Christie, D A & de Juana, E (eds) Handbook of the birds of the world Alive, Barcelona. www.hbw.com/node/53229. Accessed on 16/04/2023
PERSGA/GEF (2003) Status of Breeding Seabirds in the Red Sea and Gulf of Aden. PERSGA Technical Series No. 8. PERSGA, Jeddah
Rand AL (1936) The distribution and habits of Madagascar birds. Bull Amer Mus Nat Hist 72:143-499
Regasa MS, Nones M, Adeba DA (2021) Review on land use and land cover change in Ethiopian basins. Land 10:585
Riad A, Buirzayqah S, Haitham O (2021) Sooty falcon, *Falco concolor*. In: Garrido JR, Numa C, Barrios V et al (2021) The conservation status and distribution of the breeding birds of prey of North Africa. IUCN, Gland, Switzerland. Pp 79-80
Roth T (2008) Outward (autumn) bird migration at the Southeastern Peninsula and Cape Greco, Cyprus: the phenologies of regular migrants. Sangrouse 30:77-89
Rüppel E (1845) Vögel Nord-Ost-Afrika's. Frankfurt
Safriel U (1968) Bird migration at Elat, Israel. Ibis 110:283-320
Salama A, El Aref MM, Saleh M, Thabet W, Gebrel M (2020) Geodiversity of karst landforms with high priority conservation areas for Sooty falcon (*Falco concolor*) in the White Desert National Park, Western Desert, Egypt. Parks 26:37-46
Semere D, Hagos T, Seleba G, Gebrezgabhier Y, Haile Z, Chiozzi G, De Marchi G (2008) The status of breeding seabirds and waterbirds on the Eritrean Red Sea islands. Bulletin ABC 15:228-237
Shah JN, Khan SB, Ahmed S, Javed S, Hammadi A (2008) Sooty Falcon in the United Arab Emirates. Falco 32:16-19
Shobrak MY, Aloufi AA (2014) Status of breeding seabirds on the Northern Islands of the Red Sea, Saudi Arabia. Saudi J Biol Sci 21:238–249
Shobrak M, Al-Suhaibany A, Al-Sagheir O (2003) Regional Status of Breeding Seabirds in the Red Sea and the Gulf of Aden. The Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA). Jeddah, Saudi Arabia
Snow DW, Perrins CM (1997) The birds of the western Palearctic, Concise Edition. Vol 2. Oxford University Press, Oxford
Temminck CJ (1825) Faucon concolore. *Falco concolor* Temm. Vol 1, Planche 330. In: Temminck CJ and Laugier M (1820-1839). Nouveau recueil de planches coloriées d'oiseaux. FG Levrault, Paris
Tøttrup AP, Klaasen RHG, Strandberg R, Thorup K, Kristensen MW, Jørgensen PS, Fox J, Afanasyev V, Rahbeck C, Alerstam T (2012) The annual cycle of a trans-equatorial Eurasian-African passerine migrant: different spatio-temporal strategies for autumn and spring migration. Proc R Soc Lond B 279:1008–1016
Walter H (1979) The Sooty Falcon *Falco concolor* in Oman: Results of a breeding survey, 1978. J Oman Studies 5:9-59
Wilcox JJ, Boissinot S, Idaghdour Y (2019) Falcon genomics in the context of conservation, speciation, and human culture. Ecol Evol 9:14523–14537
Williams NP (1991) The Sooty Falcon. Dept Environ, Wildl Inspect, Bristol, United Kingdom

Wink M, Ristow D (2000) Biology and molecular genetics of Eleonora's Falcon *Falco eleonorae*, a colonial raptor of Mediterranean islands. In: Chancellor RD, Meyburg B-U (eds) Raptors at risk. World Working Group on Birds of Prey, Berlin, and Hancock House, Blaine, WA. Pp 653-668
Wink M, Sauer-Gürth H (2004) Phylogenetic relationships in diurnal raptors based on nucleotide sequences of mitochondrial and nuclear marker genes. In: Chancellor RD, Meyburg B-U (eds) Raptors worldwide. World Working Group on Birds of Prey, Berlin, and MME/BirdLife Hungary, Budapest. Pp 483-498
Wink M, El-Sayed A-A, Gonzalez J (2010) Fortschritte in Erforschung der Phylogenie der Greifvögel und der Falken [Progress in phylogeny studies of raptors and owls]. 50 Jahre Orden Deutscher Falkoniere, Pp 22–28
Zefania S (2001) Observation of Sooty and Eleonora's falcons in Madagascar. In: Wings over Africa. International Seminar on Bird Migration: Research, Conservation, Education and Flight Safety. April–May 2001. Tel Aviv, Israel: Society for Protection of Nature. Pp 151–159
Xirouchakis S (2004) Causes of raptor mortality in Crete. In: Chancellor RD, Meyburg B-U (eds) Raptors worldwide. Berlin: WWGBP/MME, Pp 849–860
Zhang L, Lecoq M, Latchininsky A, Hunter D (2019) Locust and grasshopper management. Ann Rev Entomol 64:15–34

Annex 1 – Threats to Sooty Falcon and their importance in breeding countries. Data retrieved from the literature and the Sooty Falcon questionnaires distributed in 2013 and 2022

Threat	Bahrain	Egypt	Iran (Islamic Republic of)	Israel	Jordan	Saudi Arabia	Libya	Oman	United Arab Emirates	Yemen
Urban, industrial and energy development	High	Medium	-	Medium	Medium	Very High	Medium	Medium	Very High	High
Disturbance by tourists and fishers	-	High	High	Medium	High	Medium	-	High	High	-
Poisoning and habitat degradation from agricultural intensification	-	-	Low	-	Medium	-	-	-	-	-
Hunting and taking	-	Low	Very High	-	High	High	High	Low		Medium
Introduced terrestrial predators	-	Medium		-	-	Medium	-	Medium	Medium	Medium

Annex 2 - Threats to Sooty Falcon and their importance in non-breeding countries. Data retrieved from the literature and the Sooty Falcon questionnaires distributed in 2013 and 2022

Threat	Kenya	Madagascar	South Africa
Poisoning and habitat degradation from agricultural intensification	High	High	Medium
Hunting and taking	Medium	High	-
Locust and Quelea control operations	Potentially Very High	Potentially Very High	-

Annex 3 - List of International Bird Areas (IBAs) where the Sooty Falcon triggers the IBA criteria[13]

Country	National name	IBA code	Area (ha)	Latitude[¥]	Longitude
Djibouti	Les Sept Frères	DJ004	4,000	12.43	43.38
Egypt	Hurghada archipelago	EG015	150,000	27.46	33.81
Egypt	Wadi Gimal island	EG017	200	24.66	35.16
Egypt	Qulân islands	EG018	300	24.36	35.38
Egypt	Zabargad island	EG019	450	23.61	36.20
Egypt	Nabq Protected Area	EG022	60,000	28.26	34.43
Egypt	Gebel Elba	EG023	500,000	22.25	36.31
Egypt	The Abraq area	EG024	100,000	23.41	34.80
Egypt	St Katherine Protectorate	EG025	435,000	28.33	33.91
Egypt	Gebel Maghara	EG026	100,000	30.75	33.55
Egypt	Quseima	EG027	20,000	30.65	34.36
Egypt	Wadi Gerafi	EG028	100,000	29.91	34.66
Eritrea	Dehalak Archipelago and offshore islands	ER002	300,000	15.66	40.05
Eritrea	Ghinda	ER006	78,000	15.45	39.08
Libya	Zallaf	LY007	100,000	27.53	14.83
Libya	Ghat oases	LY008	50,000	24.96	10.18
Sudan	Mukawwar island and Dunganab bay	SD002	12,000	20.83	37.28
Sudan	Khor Arba'at	SD003	20,000	19.80	37.05
Chad	Ouadi Rimé: Ouadi Achim	TD003	7,795,000	15.51	19.66
Bahrain	Hawar Islands	BH004	22,800	25.65	50.75
Israel	Judean desert	IL014	57,500	31.26	35.26
Israel	Northern Arava valley	IL016	15,000	30.88	35.31
Israel	Cliffs of Zin and the Negev highlands	IL017	25,000	30.83	34.80
Israel	Southern Arava valley and Elat mountains	IL018	60,000	29.66	35.00
Jordan	Mujib	JO012	20,500	31.46	35.80
Jordan	Dana: Feinan	JO013	31,000	30.68	35.44
Jordan	Petra	JO014	26,700	30.32	35.42
Jordan	Rum: Qa Hizma	JO016	200,000	29.56	35.52
Jordan	Aqaba	JO017	28,300	29.42	35.07
Oman	Juzor ad Daymaniyat	OM007	20,300	23.85	58.08
Oman	Ra's as Sawadi: Juzor as Sawadi	OM008	1,500	23.78	57.80
Oman	Jazirat al Fahl	OM009	600	23.68	58.50
Oman	Bandar Jussah	OM011	700	23.55	58.65
Oman	Ra's Abu Da'ud	OM012	1,500	23.31	58.91
Saudi Arabia	Al-Wajh Bank	SA011	288,000	25.58	36.75
Saudi Arabia	Qishran Bay	SA025	400,000	20.26	40.03
Saudi Arabia	Kutambil island	SA031	8	17.89	41.69
Saudi Arabia	Farasan Islands	SA038	620,000	16.75	42.00
United Arab Emirates	Delma	AE013	500	24.50	52.30
Yemen	Islands north of Al-Hudaydah	YE004	5,000	15.71	42.43

[¥] Coordinates in decimal degrees. Accuracy is about 1 km from the centre of the site.

[13] BirdLife Datazone – http://datazone.birdlife.org/species/factsheet/sooty-falcon-falco-concolor/text.

Annex 4 - Sooty Falcon breeding population survey protocol[14]

1. Main prerequisites

1.1 Use GIS tools for location, study area and distance measurements;
1.2 Visit historical sites first (due to nesting site philopatry);
1.3. Base other areas' surveys on:
- **1.3.1** Unverified information from the public;
- **1.3.2** Nesting habitat suitability;
- **1.3.3** Use of Species Distribution Model algorithms;

1.4. Experienced observers to conduct surveys using binoculars and spotting scopes.

2. Main field procedure (mainland breeding areas and islands)

Mainland and islands

2.1 Observations to be made during mid-morning and mid- to late afternoon;
2.2 Observations to be made from August to October (variable depending on local phenology);
2.3 Search for 2-3 hours ;
2.4 Seek signs of nesting;
2.5 Identify, at a minimum, the location of occupied nesting sites. An occupied nesting site is one where, at least, a single Sooty Falcon has been observed displaying behaviours deemed to be consistent with territory occupancy:
- **2.6.1** Attendance at a site of suitable habitat;
- **2.6.2** Territorial defence behavioural displays;
- **2.6.3** Existence of a presumed mate;
- **2.6.4** Existence of eggs, nestlings or fledglings;

2.7 Record the number of individuals seen and their age/sex;

Island-specific

2.8 Undertake a reconnaissance trip around the breeding islands (landing not necessary) to estimate the numbers of birds and potential pairs present across the entire archipelago;
2.9 Undertake a second, more detailed visit when pair bonding is complete to identify and qualify the numbers of breeding pairs and the location of nest sites being used. Potential nest sites suitable for chick ringing can also be identified;
2.10 Undertake an intensive final seasonal visit to collect, collate and gather additional observational data. This should include visiting locations known to contain inaccessible nests.

3. Constraints

It is not always possible to directly access individual nests. In such cases, confirmation of breeding has to rely on or be based on observational data, primarily on the presence and behaviour of a pair of birds around an assumed nesting site. To minimise uncertainty, additional observation data may need to be gathered across the entire breeding period.

[14] Based on: Goren M, Perlman Y, McGrady MJ (2023) Apparent population decline of Sooty Falcon (*Falco concolor*) in Israel, 2011 – 2014. Sandgrouse 45: 84-93; and King pers. comm. (2023).

Annex 5 - Sooty Falcon questionnaire distributed in November 2022

POPULATION SIZE and TREND

1. How many breeding pairs are there in your country? (in the absence of certainty, please share your best estimate)
2. What is the maximum size of the migrating population?
3. What is the maximum size of the non-breeding population?
4. To which year(s) do those estimates refer?
In order to assess the quality of the population size estimates please indicate which of the sentences in Box 1 (below) best describes the method(s) used:

Box 1	
A	*The figure is based on reliable or representative quantitative data derived from complete counts or comprehensive surveys.*
B	*The figure is based on reliable or representative quantitative data derived from sampling or interpolation.*
C	*The figure is based on incomplete quantitative data derived from sampling or interpolation.*
D	*The figure is based on incomplete or poor quantitative data derived from indirect evidence.*
E	*The figure is not based on quantitative data, but instead on estimates derived from circumstantial evidence.*

5. What was the breeding population trend in your country during the last 10 years?
6. What was the migrating / non-breeding population trend in your country during the last 10 years?
7. In order to assess the quality of the population trend estimates please indicate which of the five sentences in Box 1 (above) better describes the method(s) used:

PROTECTION LEVEL

8. Please describe the kind of legal protection given to the species in your country.
9. Please indicate the title (and, if available, the weblink) of any legal instrument that you are aware of that protects the species in your country.
10. What percentage of the national population occurs within protected areas?
11. In order to assess the quality of the population protection estimate please indicate which of the five sentences in Box 1 (above) better describes the method(s) used:

CONSERVATION AND RESEARCH ACTIVITIES

12. Is there a national action plan for the species, a national raptor conservation strategy covering the species, or any other avian action plan or strategy covering the species in your country?
13. Is there a national or regional Sooty Falcon project /working group?
14. Is there a national or regional monitoring programme for the species?
15. Is there a national or regional monitoring program for the protected areas where the species occurs?
16. Please provide details of the monitoring programme(s):
17. Please provide details of all Sites or Areas in which Sooty Falcons are either known or believed to breed, or regularly occur outside the breeding season. **Please note:** If you wish for some or all of the detailed site information provided to remain strictly confidential, please simply annotate the table accordingly and we will not share it with any third party without seeking your prior permission.

Country/Territory	**Site name and coordinates**	**Population size** (please indicate units: breeding pairs or individuals)	**Population data quality** (see Box 1)	**Study period**	**Trend**	**Time span**
Example: *California*	*Miracle valley NP, 36°14'N 116°46'W*	*10-12 Breeding pairs*		*2014-2016*	*Stable*	*2000-2020*

THREATS

18. Please describe the threats affecting the population in your country and indicate their respective timing, scope and severity level using Box 2 below:

No.	Threat description	Timing	Scope	Severity	References (sources of information)
1	Example: *Development of tourist infrastructure near the most important breeding site in the country*	*C*	*B*	*E*	
2	Illegal killing, direct offtake, hunting, energy, trapping, infrastructures etc.				

Box 2	
Timing	**A** - *Only in the past and unlikely to return* **B** - *In the past but now suspended and likely to return* **C** - *Ongoing* **D** - *Only in the future* **E** - *Unknown*
Scope	**A -** *Affects the whole population (>90%)* **B -** *Affects the majority of the population (50-90%)* **C -** *Affects the minority of the population (<50%)* **D** - *Unknown*
Severity	**A-** *Causing or likely to cause very rapid declines (>30% over 10 years or three generations; whichever is the longer)* **B -** *Causing or likely to cause rapid declines (20–30% over 10 years or three generations; whichever is the longer)* **C -** *Causing or likely to cause relatively slow but significant declines (<20% over 10 years or three generations; whichever is the longer)* **D -** *Causing or likely to cause fluctuations* **E -** *Causing or likely to cause negligible declines* **F** - *No declines* **G -** *Unknown*

SHARING INFORMATION

19. Are you aware of any ornithologists or researchers who have worked on Sooty Falcon or have an interest in the species? If so, please provide details:

Name	Contact details

20. Are you aware of any local reports on the species? If so, please provide details:

Title	Website

21. Is there any additional information you would like to share?

Thank you very much for sharing your knowledge and expertise on Sooty Falcon to help develop an ISSAP for the species.

Annex 6 - Responses to the Sooty Falcon questionnaire contained in Annex 5

Name of respondent	Affiliation	Country	Date of response
Aktay Sözüer L.	Akdeniz University	Türkiye	08/12/2022
Alghrair M.	Neom	Saudi Arabia	28/06/2023
Alshaikh M.	WSP Global Inc	Saudi Arabia	28/06/2023
Baeshen O. A.	Raptors MOU focal point	Yemen	08/12/2022
Binothman A.	Tilad Group ltd	Saudi Arabia	07/12/2022
Botha A.	IUCN – SSC	South Africa	15/11/2022
Buirzayqah S.	ALhaya Organization	Libya	29/11/2022
Calabrese L.	Red Sea Zone Authority	Saudi Arabia	01/12/2022
El-Moghrabi L.	Fieldfare Ecology	Jordan	08/12/2022
Elahi Rad Z.	Pardisan Eco-Park	Iran (Islamic Republic	08/12/2022
Elmi Obsieh M.	Ministere de l'Environment	of)	09/12/2022
Goren M.	BirdLife Israel	Djibouti	27/11/2022
Habib M. I	Independent consultant	Israel	24/11/2022
Hashemi A.	Tarlan Ornithological Society	Egypt	15/11/2022
Khan M. S. H.	Ministry of Climate Change	Iran (Islamic Republic	05/12/2022
Khan S.	Environment Agency	of)	07/12/2022
Khoury F.	Jordan Birdwatch	Pakistan	10/11/2022
King H.	Independent consultant	United Arab Emirates	22/11/2022
Ogada D.	The Peregrine Fund	Jordan	17/11/2022
Perlman Y.	BirdLife Israel	Bahrain	04/11/2022
Rayaleh H.	Association Djibouti Nature	Kenya	08/12/2022
Razafimanjato G.	The Peregrine Fund	Israel	11/11/2022
Réné de Roland L. A.	The Peregrine Fund	Djibouti	08/12/2022
Salama A.	Egyptian Environmental Agency	Madagascar	28/11/2022
Salim M. A.	Iraqi Org. for Cons. Nat.	Madagascar	05/12/2022
		Egypt	
		Iraq	

Annex 7 - Sooty Falcon questionnaire distributed in 2013

POPULATION SIZE and TREND

1. How many breeding pairs are there in your country?
2. What is the maximum size of the migrating or non-breeding population?
3. For which year(s) do these estimates refer?
4. In order to assess the quality of the population size estimates please indicate which of the sentences in Box 1 (below) best describes the method(s) used:

Box 1	
A	*The figure is based on reliable or representative quantitative data derived from complete counts or comprehensive surveys.*
B	*The figure is based on reliable or representative quantitative data derived from sampling or interpolation.*
C	*The figure is based on incomplete quantitative data derived from sampling or interpolation.*
D	*The figure is based on incomplete or poor quantitative data derived from indirect evidence.*
E	*The figure is based on no quantitative data, but estimates derived from circumstantial evidence.*

5. What is the breeding population trend in your country during the last 10 years?
6. What is the migrating / non-breeding population trend in your country during the last 10 years?
7. In order to assess the quality of the population trend estimates please indicate which of the five sentences in Box 1 (above) better describes the method(s) used:

PROTECTION LEVEL

8. Please describe the kind of legal protection given to the species in your country.
9. Which percentage of the national population occurs within protected areas?

CONSERVATION AND RESEARCH ACTIVITIES

10. Is there a national Action Plan for the species?
11. Is there a national Sooty Falcon Project /Working Group?
12. Please provide a copy of /link to the Action Plan and/or contact details for the Project/Working Group.
13. Is there a national survey / monitoring programme for the species?
14. Is there a national monitoring program for the protected areas where the species occurs?
15. Please provide details of the monitoring programme(s):
16. Please provide details of all Sites or Areas in which Sooty Falcons are either known or believed to breed, or regularly occur outside the breeding season. Whenever possible provide a map of the area in electronic format (.jpg, .pdf, .kmz or .shp). **Please note:** If you wish some or all of the detailed site information to remain strictly confidential, please simply annotate the table accordingly and we will not share it with any third party without seeking your agreement beforehand.

Country/Territory	**Site name and coordinates**	**Population size** (please indicate units: breeding pairs or individuals)	**Trend**
Example: *California*	*Miracle valley NP, 36°14'N 116°46'W*	*10-12 Breeding pairs*	*Stable*

THREATS

17. Please list the threats affecting the population in your country and indicate the impact level using the list below:

Threat	Impact Level
Example: *Development of tourist infrastructure near the most important breeding site in the country*	*High*

Impact levels

- **Critical**: a factor causing or likely to cause very rapid declines and/or extinction;
- **High**: a factor causing or likely to cause rapid decline leading to depletion;
- **Medium**: a factor causing or likely to cause relatively slow, but significant, declines;
- **Low**: a factor causing or likely to cause fluctuations;
- **Local**: a factor causing or likely to cause negligible declines in small parts of the population;
- **Unknown**: a factor that is likely to affect the species but it is unknown to what extent.

SHARING INFORMATION

18. Are you aware of any ornithologists or researchers who have worked on Sooty Falcons or have an interest in the species? If so, please provide details:

Name	Contact details

19. Beyond the preparation of the International Single Species Action Plan for the Sooty Falcon, the Working Group aims to gather and share literature and knowledge about the species, including research and conservation methods to promote future implementation of the ISSAP, and to thereby improve the conservation status of the species. Please attach electronic copies of any published and unpublished scientific papers and/or reports on the species? These will be shared through an on-line workspace being developed for the Sooty Falcon Working Group by the Raptors MOU. Thank you for your cooperation.

Annex 8 - Responses to the Sooty Falcon questionnaire contained in Annex 7

Name of respondent	Affiliation	Country	Date of response
Al-Saghier O.		Yemen	2013-2014
Asswad N. G.	Aleppo University	Syria	
Botha A.	Endangered Wildlife Trust	South Africa	
Bouras E.	Protected Areas Section	Libya	
El-Gebaly O.	Migratory Soaring Birds Project	Egypt	
El-Moghrabi L.	Independent consultant	Jordan	
Eriksen J.	Independent photographer	Oman	
Fazari W. A. A.	Office for Conservation of Environment	Oman	
Gschweng M.	University of Ulm	Madagascar	
Habib M. I.	Red Sea Breeding Birds Project	Egypt	
Hatzofe O.	Israel Nature and Parks Authority	Israel	
Hering J.	Co-author of book "Birds of Libya"	Libya	
Khan M. S. H.		Pakistan	
Khoury F.	American University of Madaba	Jordan	
Javed S.	Environment Agency – Abu Dhabi	United Arab Emirates	
Megalli M.		Egypt	
Mgoola W.	Department of National Parks and Wildlife	Malawi	
Mustafa A. A.	Wadi El Gemal National Park – Red Sea	Egypt	
Musyoki C.		Kenya	
Osman A.		Somalia	
Réné de Roland L. A.	The Peregrine Fund	Madagascar	
Salama A.	Egyptian Environmental Affairs Agency	Egypt	
Sándor A. D.	University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca	Egypt	
Shobrak M.	Taif University	Saudi Arabia	
Thiollay J. M.		Saudi Arabia	
Thomsett S.	National Museums of Kenya	Kenya	
Virani M.	The Peregrine Fund	Kenya	
Zadegan S. Z.	Independent consultant	Iran (Islamic Republic of)	