

The Important Bird and Biodiversity Areas of the Socotra archipelago, Yemen

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Lying some 350 km south of the Yemen mainland, the Socotra archipelago (Figures 1, 2) is internationally renowned for its plant and animal biodiversity as well as its cultural richness, with the inhabitants speaking the unique Socotri language (Cheung & DeVantier 2006). For birds, it has one globally endangered breeding species (Egyptian Vulture *Neophron percnopterus*), four globally vulnerable breeding species (Socotra Cormorant *Phalacrocorax nigrogularis*, Socotra Buzzard *Buteo socotraensis*, Abd Al Kuri Sparrow *Passer*

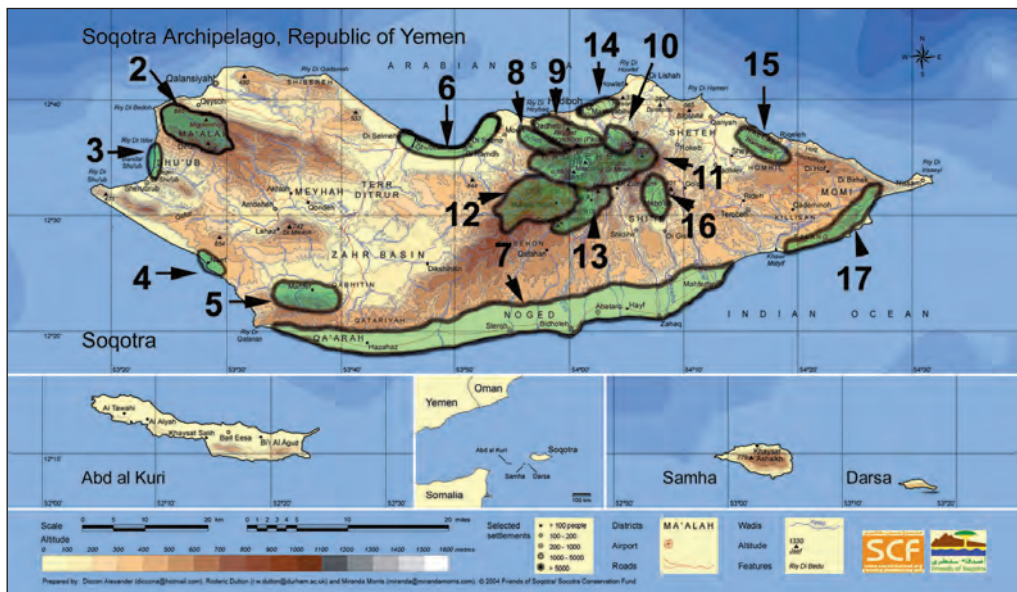


Figure 1. The Socotra archipelago includes the main island (Socotra ie 'Soqatra') and three satellite islands, Abd Al Kuri, Samha and Darsa. Location of IBAs 2–17, on the main island, are shown: 2 Jabal Ma'alaha, 3 Shu'ub, 4 Neet, 5 Limestone plateau above Siko village, 6 North coastal plain: airport to Di Selmehe/Ghubbah, 7 Noged Plain, 8 Wadi Ayhaft, 9 North slopes of the Haggeher mountains, 10 Wadi Di Negehen, 11 Haggeher, 12 Diksam, 13 Firmihin near Jabal Keselah, 14 Hadiboh estuaries of Hadiboh, Sheck and Sirhan, 15 Hamadero Plateau and Scarp, 16 Wadi Merkoh, 17 Falang–Momi coast and cliffs.



Figure 2. The Socotra archipelago comprises the main island (Socotra), three satellite islands (Abd Al Kuri, Samha, Darsa) and the sea stacks of Sabuniya and Kal Farun (of two stacks aka Ka'l Pharoehs). IBAs of the satellite islands and sea stacks are indicated: 18 Abd al-Kuri, 19 Sabuniya, 20 Kal Farun, 21 Darsa.

hemileucus and Socotra Bunting *Emberiza socotrana*) and ten endemic species. The latter resulted in the Socotra archipelago being designated an endemic bird area EBA by BirdLife International (2016). Table 1 lists the breeding birds, their population and conservation Red List status.

Table 1. The breeding birds of the Socotra archipelago, Yemen, with 2016 Red List status (E endangered, VU vulnerable, NT near threatened; those not labelled are least concern) and population estimates (number of individuals, after Porter & Suleiman 2013, 2014).

Persian Shearwater <i>Puffinus persicus</i> , probably >10 000
Jouanin's Petrel <i>Bulweria fallax</i> NT, endemic breeder, probably > 4000
Little Grebe <i>Tachybaptus ruficollis</i> , probably has bred
Red-billed Tropicbird <i>Phaethon aethereus</i> , probably >1600
Yellow Bittern <i>Ixobrychus sinensis</i> , probably breeds, <5
Striated Heron <i>Butorides striata</i> , probably breeds, <20
Indian Pond Heron <i>Ardeola grayii</i> , may breed (present throughout year), <20
Western Cattle Egret <i>Bubulcus ibis</i> , may breed (present throughout year), <50
Masked Booby <i>Sula dactylatra</i> , probably >2600
Brown Booby <i>Sula leucogaster</i> , probably >4000
Socotra Cormorant <i>Phalacrocorax nigrogularis</i> V, 6000–12 000
Western Osprey <i>Pandion haliaetus</i> , <150
Egyptian Vulture <i>Neophron percnopterus</i> E, c1900
Socotra Buzzard <i>Buteo socotraensis</i> V, Figure 3, endemic, c800
Common Kestrel <i>Falco tinnunculus</i> , c700
Peregrine Falcon <i>Falco peregrinus</i> , c100
Common Moorhen <i>Gallinula chloropus</i> , has bred at least once
Black-winged Stilt <i>Himantopus himantopus</i> , c300
Kentish Plover <i>Charadrius alexandrinus</i> , c300
Cream-coloured Courser <i>Cursorius cursor</i> , c1000
Brown Noddy <i>Anous stolidus</i> , c5000
Sooty Gull <i>Larus hemprichii</i> , probably >2000
Saunders's Tern <i>Sternula saundersi</i> , c1000
Bridled Tern <i>Onychoprion anaethetus</i> , probably c2000
Lichtenstein's Sandgrouse <i>Pterocles lichtensteinii</i> , c2200
Feral Rock Dove <i>Columba livia</i> forma <i>domestica</i> , introduced, >10
Laughing Dove <i>Spilopelia senegalensis</i> , c167 000
Bruce's Green Pigeon <i>Treron waalia</i> , c7900
White-browed Coucal <i>Centropus superciliosus</i> , <200
Socotra Scops Owl <i>Otus socotranus</i> , Figure 4, endemic, >2000
Nubian Nightjar <i>Caprimulgus nubicus</i> , <200
Forbes-Watson's Swift <i>Apus berliozi</i> , near endemic, <1000
Southern Grey Shrike <i>Lanius meridionalis</i> , c26 000
House Crow <i>Corvus splendens</i> , accidentally introduced, bred, now eradicated
Brown-necked Raven <i>Corvus ruficollis</i> , c1500
Black-crowned Sparrow-Lark <i>Eremopterix nigriceps</i> , c191 600
Pale Crag Martin <i>Ptyonoprogne obsoleta</i> , <200.
Socotra Cisticola <i>Cisticola haesitatus</i> NT, Figure 5, endemic, c9000
Socotra Warbler <i>Cisticola incanus</i> , Figure 6, endemic, c27 000
Abyssinian White-eye <i>Zosterops abyssinicus</i> , c28 000
Somali Starling <i>Onychognathus blythii</i> , c102 000

Socotra Starling *Onychognathus frater*, Figure 7, endemic, c25 000
Socotra Sunbird *Chalcomitra balfouri*, Figure 8, endemic, c66 000
Socotra Sparrow *Passer insularis*, Figure 9, endemic, c330 000
Abd Al-Kuri Sparrow *Passer hemileucus* V, endemic, <1000
Long-billed Pipit *Anthus similis*, c95 000
Socotra Golden-winged Grosbeak *Rhynchostruthus socotranus*, Figure 10, endemic, c17 000
Cinnamon-breasted Bunting *Emberiza tahapisi*, c38 000
Socotra Bunting *Emberiza socotrana* V, Figure 11, endemic, c3800

The important bird areas IBAs of Yemen were chronicled in Evans (1994). The identification of those on the Socotra archipelago was based largely on the OSME survey of 1993 (Porter & Martins 1996) and botanical surveys by the Royal Botanic Garden Edinburgh (later published in Miller & Morris 2004). Since then bird and habitat surveys led by BirdLife International and Yemen's Environment Protection Authority have greatly increased our knowledge of the status of birds on the archipelago, especially the distribution and populations of breeding species (Porter & Suleiman 2011, 2013, 2014).

In light of the new information gathered, as well as revisions by BirdLife of the IBA selection criteria (Table 2), we have made a complete reassessment of the archipelago's important sites for birds and this is reported below. This site data has now been submitted to BirdLife International for ratification and entry into their global IBA database. It should be noted that the name 'Important Bird and Biodiversity Area' was adopted in place of 'Important Bird Area' by the BirdLife World Congress in Canada in 2014, but the acronym IBA was retained. The main aim of an IBA programme is to promote the protection of IBAs, and the provision of convincing bird data is an essential part of any argument for statutory protection and management.

In July 2003 the Socotra archipelago was named as the first UNESCO Man and Biosphere Reserve for Yemen. In 2007, when Yemen joined the Ramsar Convention, Socotra's Qalansiyah lagoon was the nominated specimen site. Due to limited data no attempt has

Table 2. Criteria for determining Important Bird and Biodiversity Areas (www.birdlife.org/datazone/info/ibacrit-glob).

A1. Species of global conservation concern

The site regularly holds significant numbers of a globally threatened species, or other species of global conservation concern.

A2. Restricted-range species

The site is known or thought to hold a significant component of the restricted-range species whose breeding distributions define an Endemic Bird Area (EBA) or Secondary Area (SA).

A3. Biome-restricted species

The site is known or thought to hold a significant assemblage of the species whose breeding distributions are largely or wholly confined to one biome.

A4. Congregations

- i. The site is known or thought to hold, on a regular basis, $\geq 1\%$ of a biogeographic population of a congregatory waterbird species.
 - ii. The site is known or thought to hold, on a regular basis, $\geq 1\%$ of the global population of a congregatory seabird or terrestrial species.
 - iii. The site is known or thought to hold, on a regular basis, $\geq 20\,000$ waterbirds or $\geq 10\,000$ pairs of seabird of one or more species.
 - iv. The site is known or thought to be a 'bottleneck' site where at least 20 000 storks (Ciconiidae), raptors (Accipitriformes, Falconiformes) or cranes (Gruidae) regularly pass during spring or autumn migration.
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been made by us to catalogue important marine areas in the rich seas around Socotra that are feeding areas for many seabirds, including the globally near-threatened Jouanin’s Petrel *Bulweria fallax* for which Socotra provides the only known breeding site. The archipelago’s seas are very rich in fish, cetaceans and turtles (Cheung & DeVantier 2006).

METHODS

The selection of IBAs is achieved by applying quantitative ornithological criteria, based on up-to-date knowledge of the sizes and trends of bird populations. The criteria (Table 2) ensure that the sites selected as IBAs have true significance for the international conservation of bird populations, and provide a common currency for all IBAs, thus creating national, continental and global consistency and comparability (BirdLife International 2014). It is crucial to understand why a site is important, and to do this it is necessary to examine its international significance in terms of the presence and abundance of species that occur, year round or seasonally. Thus a set of four categories and criteria are used to assess the significance of the site globally.

Systematic surveys led by BLI and Yemen’s EPA of the birds of the archipelago provided the data for this IBA exercise. Between 1999 and 2011 nine surveys (all between October and March) were undertaken with the main aim of mapping and assessing the breeding bird populations. Over 385 km of transects were made throughout the main island, Socotra, covering nearly all its 1/10th degree squares, and in all habitat types and altitudes. These comprehensive data enabled the selection of the most important sites and areas for birds. In addition, from 1999–2007, six visits were made to the outer islands (Abd Al Kuri, Samha and Darsa) and the sea stacks of Sabuniya and Kal Farun largely under the auspices of Yemen’s EPA (Al-Saghier *et al* 2000, Suleiman *et al* 2005, 2007). In 2009 Sabuniya was visited again (Holmstrom & Stahle 2010). For regional and global bird populations, data in Jennings (2010) and Mallon *et al* (2015) were used.

RESULTS

The 21 IBAs listed below are now proposed by us for the Socotra archipelago (in several cases they are similar to, or incorporate those, in Evans 1994, Table 3, and where relevant this is clearly stated). The locations of these IBAs, except IBA 1, are shown in Figures 1 and 2. Detailed maps delineating the sites have been lodged with BLI, Yemen’s EPA, Friends of Socotra and OSME. Population figures in the accounts are given for globally threatened and near-threatened species and are calculated from the database for Porter & Suleiman (2013, 2014). Place name spellings are those recommended by Friends of Socotra, and supersede those used by Evans (1994, Table 3) and the site descriptions, where appropriate, are based on those in Evans (1994). Bird scientific names are given in Table 1.

Table 3. Evans (1994) identified 22 IBAs in the Socotra archipelago. Their numbers and names, from Evans (1994), are presented.

035	Qalansiya lagoon
036	Jabal Ma’lih escarpment/Badiya Qalansiya
037	Ra’s Hebaq
038	Airport dunes
039	Muqadrihon pass
040	Shidahah
041	Wadi Ayhaft
042	Rewgid and Regid plateaux
043	Jabal Jef
044	Rookib hills
045	Hamaderoh plateau and scarp
046	Coast of Bindar Di-Sha’b
047	Hajhir mountains
048	Firjih/Central Socotra
049	Di-lshal foothills
050	Diksam
051	Ra’s Momi and Fikhah
052	Firmihin near Jabal Keseslah
053	Noged plain
054	Sabuniya and Ka’l Fir’awn
055	Abd al-Kuri
056	Al-Ikhwan

IBA 1. 'Jouanin's Petrel Cliffs'

New IBA

A newly identified site since Evans (1994); first surveyed in 2000, qualifies under A1, A4ii.

No location or location name is given for reasons of security as it is the only known breeding colony of the globally near-threatened Jouanin's Petrel in the world (Taleb 2002). The population is probably >4000 individuals. It is a regular loafing area for flocks of the globally vulnerable Socotra Cormorant.

Threats: none known.

IBA 2. Jabal Ma'alalah/Ma'alalah Plateau

Evans IBA 036 (inclusion in Evans 1994 was based on its IBA potential through habitat composition and richness for endemic plants).

12° 38' N, 53° 29' E, c25 km². Plate 1. Area surveyed 2000–2006, qualifies under A1, A2.

An upland limestone plateau in northwest Socotra, rising from 550–700 m, with a rich mosaic of mainly *Lyceum* woodland with grasses and woody herbs, especially *Pulcaria* and some *Tamarix*. An important area for sheep grazing.

One of the most important sites on Socotra for bird biodiversity with good breeding populations of:

A1—Endangered: Egyptian Vulture (probably <3pairs). Vulnerable: Socotra Buzzard (<3 pairs), Socotra Bunting (<20 pairs, >1% of its global population). Near-threatened: Socotra Cisticola (> 1000 individuals, >10% of its global population).

A2—Nine of the eleven range-restricted species confined to the Socotra EBA breed namely Socotra Buzzard, Socotra Scops Owl, Socotra Cisticola, Socotra Warbler, Socotra Starling, Socotra Sunbird, Socotra Sparrow, Socotra Grosbeak, Socotra Bunting. These are all



Plate 1. Jebel Ma'alih, February 2007. © RF Porter

members of the Somali-Masai biome-restricted species assemblage (Stattersfield *et al* 1998, Fishpool & Evans 2001). [A further three species of the latter assemblage, SMbrsa, but which are not species of restricted-range to Socotra, also occur at the site: Forbes-Watson's Swift, Abyssinian White-eye, Somali Starling.]

Threats: fragmentation by road building could lead to development as the area is opened up to access (Miller *et al* 2007). Overgrazing is not likely to be a problem if current, sustainable, grazing management continues.

IBA 3. Shu'ub coast

Evans IBA 046 'Coast of Bindar Di-Sha'b' (inclusion in Evans 1994 due to site being good example of undisturbed coastal flora).

12° 35' N, 53° 23' E, c5 km². Surveyed 1999, qualifies under A1.

Site description. A coastal area comprising dwarf shrubland, dominated by *Zygophyllum*, *Limonium*, *Atriplex* and *Suaeda*, including c3 km² of *Croton* shrubland.

A1—Near-threatened: Socotra Cisticola (>250 individuals, c3% of the global population).

Threats: No immediate threats

IBA 4. Neet

New IBA.

12° 25' N, 53° 28' E, c4 km². Plate 2. Site identified since Evans (1994), surveyed in 2000 and 2007. Qualifies under A1.

Coastal dwarf shrubland dominated by *Zygophyllum*, *Limonium*, *Atriplex* and *Suaeda*.

A1—Near-threatened: Socotra Cisticola (>1000 individuals, >10% of the global population).

Threats: no known threats



Plate 2. The salt flats at Neet, February 2007. © RF Porter

IBA 5. Limestone plateau above Siko village

New IBA

12° 23' N, 53° 38' E, c20 km². Site identified since Evans (1994), surveyed in 2000, qualifies under A1, A2.

A limestone plateau, rising to 650 m asl and comprising *Croton*-covered rocky limestone slopes rising from a *Croton* plain and with hillsides dissected by deep, rocky, well-wooded ravines.

A1—Endangered: Egyptian Vulture (<5 pairs). Vulnerable: Socotra Buzzard (<2 pairs), Socotra Bunting (probably breeding).

A2—Eight of the eleven range-restricted species confined to the Socotra EBA breed: Socotra Buzzard, Socotra Scops Owl, Socotra Warbler, Socotra Starling, Socotra Sunbird, Socotra Sparrow, Socotra Grosbeak, Socotra Bunting (these SMbrsa). A further two SMbrsa spp, not range-restricted, also breed: Abyssinian White-eye, Somali Starling.

Threats: overgrazing may be a threat.

IBA 6. North coastal plain: airport to Di Selmeho/Ghubbah

Extended IBA, includes Evans IBA 038 'Airport Dunes'.

12° 36' N, 53° 50' E, c20 km². Surveyed 1999–2011, qualifies under A1.

Coastal dunes, flats and grazing land with patches of dwarf shrubland dominated by *Zygophyllum*, *Suaeda* and *Pulicaria* (Socotra Cisticola's breeding habitat).

A1—Endangered: important feeding area for Egyptian Vultures. Near-threatened: Socotra Cisticola (> 2500 individuals, >25% of global population). An important breeding area for Cream-coloured Coursers *Cursorius cursor* (>30 pairs) and Saunders's Terns *Sturnula saundersi* (c200 pairs); also main nesting area for marine turtles on Socotra.

Threats: coastal development and overgrazing are most important.

IBA 7. Noged Plain

Evans IBA 053.

12° 21' N, 53° 55' E, 150 km². Plate 3. Surveyed 1999–2011, qualifies under A1, A2.

A relatively flat, barren semi-desert plain along the southern coast of Socotra, traversed by dry wadis and rising to 100 m. Large patches of dwarf shrubland dominated by *Indigofera*, *Limonium*, *Zygophyllum*, *Lycium* and *Suaeda* with scattered *Croton* trees. Several date palm groves.

A1—Endangered: Egyptian Vulture feeding area; breeds and roosts on high cliffs at north edge of plain, probably <10 pairs. Vulnerable: Socotra Buzzard breeds on high cliffs at north edge of plain, probably <5 pairs. Near-threatened: Socotra Cisticola (>2100 individuals, >20% of global population).

A2—Eight of the eleven range-restricted species confined to the Socotra EBA breed: Socotra Buzzard, Socotra Scops Owl, Socotra Cisticola, Socotra Warbler, Socotra Starling, Socotra Sunbird, Socotra Sparrow, Socotra Grosbeak (all SMbrsa). A further three SMbrsa spp, not restricted-range, also breed: Forbes-Watson's Swift *Apus berliozi* (in caves at north edge of plain), Abyssinian White-eye and Somali Starling. This is an important breeding area for Cream-coloured Coursers (probably > 200 pairs).

Threats: fragmentation through road building and associated ribbon development (Miller *et al* 2007). Overgrazing may be a threat.



Plate 3. Typical vegetation of the Noged plain, February 2004. © RF Porter

IBA 8. Wadi Ayhaft

Evans IBA 041.

12° 36' N, 53° 58' E, c15 km². Surveyed 1999–2011, qualifies under A1, A2.

Granite and limestone slopes, 50–800 m asl, in northern Socotra with abundant running water. One of the most densely wooded areas on the island, with sub-montane semi-deciduous thickets rising to montane thicket. The wadi is a source of piped water and a site frequented by tourists.

A1—Endangered: Egyptian Vulture (<5 pairs, also an important feeding and roosting area). Vulnerable: Socotra Buzzard (< 5 pairs).

A2—Seven of the eleven range-restricted species confined to the Socotra EBA breed: Socotra Buzzard, Socotra Scops Owl, Socotra Warbler, Socotra Starling, Socotra Sunbird, Socotra Sparrow, Socotra Grosbeak (these SMbrsa). A further two SMbrsa spp, not range-restricted, also breed: Abyssinian White-eye, Somali Starling.

Threats: timber collection and over-grazing.

IBA 9. North slopes of the Haggeher mountains

Revised IBA which includes Evans IBAs 037 'Ra's Hebaq', 039 'Muqadrihon pass', 042 'Rewgid and Regid plateaux'.

12° 37' N, 54° 01' E, c25 km². Plate 4. Surveyed 1999–2011, qualifies under A1, A2.

Limestone hills, cliffs and plateaux, rising to 700 m, in northern Socotra between Wadi Ayhaft and Wadi Di Negehen. One of the wettest areas on the island, catching monsoon



Plate 4. Northern slopes of the Haggeher, October 2008. © RF Porter

rain (especially June–September) and subject to very strong winds. Vegetation largely comprises sub-montane, semi-deciduous woodland and areas of open shrubland with woody herb communities. Also, areas of luxuriant thicket dominated by *Buxus hildebrandtii* with emergent *Dracaena cinnabari* and other endemic trees and shrubs. Well grazed by goats and harvested for timber.

A1—Endangered: Egyptian Vulture (10–20 pairs, also an important roosting site with over 350 regularly). Vulnerable: Socotra Buzzard (>5 pairs), Socotra Bunting.

A2—Eight of the eleven range-restricted species confined to Socotra EBA breed: Socotra Buzzard, Socotra Scops Owl, Socotra Warbler, Socotra Starling, Socotra Sunbird, Socotra Sparrow, Socotra Grosbeak, Socotra Bunting (all SMbrsa). A further two SMbrsa spp, not range-restricted, also breed: Abyssinian White-eye, Somali Starling.

Threats: apparently none.

IBA 10. Wadi Di Negehen

New IBA.

12° 37' N, 54° 03' E, c10 km². Plate 5. Surveyed 1999–2011, qualifies under criteria A1, A2.

A deep, well-vegetated wadi and hillslopes, rising from 100–400 m asl. The wadi has running water year-round, fed from the Haggehers. Rocky hillsides comprise sub-montane, semi-deciduous woodland with some very large trees, notably *Sterculia africana*.

A1—Endangered: Egyptian Vulture (breeding and particularly roosting site). Vulnerable: Socotra Buzzard (<5 pairs).



Plate 5. Submontane shrubland, Wadi Di Negehan, February 2010. © Lisa Banfield



Plate 6. Montane mosaic, Skand, Haggeher, January 2008. © Lisa Banfield

A2—Seven of the eleven range-restricted species confined to Socotra EBA breed: Socotra Buzzard, Socotra Scops Owl, Socotra Warbler, Socotra Starling, Socotra Sunbird, Socotra Sparrow, Socotra Grosbeak (all SMbrsa). A further two SMbrsa spp, not range-restricted, also breed: Abyssinian White-eye, Somali Starling.

Threats: increasing tourism may pose a threat.

IBA 11. Haggeher

Evans IBA 047; now also combined with Jabal Jaaf (Evans IBA 043). Haggeher spelt 'Hajher' and Jaaf 'Jef' in Evans (1994).

12° 34' N, 54° 03' E, c80 km². Plate 6. One of the richest areas for biodiversity on Socotra and surveyed 1999–2011. Qualifies under criteria A1, A2.

The dramatic Haggeher mountains dominate the Socotran landscape. Barren-looking granite slopes and pinnacles, rising 800–1500 m asl, are vegetated with montane thicket, open grassland plateaux and light scrub. Important pastoral region for cattle, goats and camels.

A1—Endangered: Egyptian Vulture (>20 pairs, also important roosting site). Vulnerable: Socotra Buzzard (>5 pairs), Socotra Bunting.

A2—Eight of the eleven range-restricted species confined to Socotra EBA breed: Socotra Buzzard, Socotra Scops Owl, Socotra Warbler, Socotra Starling, Socotra Sunbird, Socotra Sparrow, Socotra Grosbeak, Socotra Bunting (all SMbrsa). A further two SMbrsa spp, not range-restricted, also breed: Abyssinian White-eye, Somali Starling.

Threats: no apparent threats.

IBA 12. Diksam

Evans IBA 050.

12° 30' N, 53° 58' E, c40 km². Plate 7. Surveyed 1999–2011, qualifies under A1, A2.

Granite and limestone slopes at 550–700 m asl, with sub-montane, semi-deciduous thickets, distinguished by *Punica protopunica* shrubland. Much cattle and goat-grazing.

A1—Endangered: Egyptian Vulture (>5 pairs, also important roosting site). Vulnerable: Socotra Buzzard (<5 pairs), Socotra Bunting.

A2—Eight of the eleven range-restricted species confined to Socotra EBA breed: Socotra Buzzard, Socotra Scops Owl, Socotra Warbler, Socotra Starling, Socotra Sunbird, Socotra Sparrow, Socotra Grosbeak, Socotra Bunting (all SMbrsa). A further two SMbrsa spp, not range-restricted, also breed: Abyssinian White-eye, Somali Starling.

Threats: fragmentation caused by new roads and small-scale built development may pose a threat.

IBA 13. Firmihin near Jabal Keseslah

Evans IBA 052.

12° 33' N, 54° 03' E, c10 km². Plate 8. Surveyed 1999–2011, qualifies under A1, A2.

An upland area, rising to 800 m asl, close to Diksam, with a deep ravine and extensive, dense *Dracaena* woodland and sub-montane, semi-deciduous thicket. Well grazed.

A1—Endangered: Egyptian Vulture (<5 pairs, important roosting area). Vulnerable: Socotra Buzzard (probably >10 pairs, one of the highest breeding concentrations).



Plate 7. Diksam, October 2008. © RF Porter



Plate 8. *Dracaena* woodland at Firmihan, October 2007. © RF Porter

A2—Seven of the eleven range-restricted species confined to Socotra EBA breed: Socotra Buzzard, Socotra Scops Owl, Socotra Warbler, Socotra Starling, Socotra Sunbird, Socotra Sparrow, Socotra Grosbeak (all SMbrsa). A further two SMbrsa spp, not range-restricted, also breed: Abyssinian White-eye, Somali Starling.

Threats: road development is a potential threat causing habitat fragmentation.

IBA 14. Hadiboh estuaries of Hadiboh, Sheck and Sirhan

New IBA.

12° 39' N, 54° 02' E, c5 km². Plate 9. Surveyed 1999–2011, qualifies under A1, A2.

Three palm-fringed, coastal estuaries with permanent water on the edge of the capital, Hadiboh. An important educational site for showing people birds, as close views can be obtained.

A1—Endangered: Egyptian Vulture (display, feeding and watering site).

A2—Two of the eleven range-restricted species confined to Socotra EBA breed: Socotra Scops Owl, Socotra Sparrow (both SMbrsa). A further two SMbrsa spp, not range-restricted, also breed: Abyssinian White-eye, Somali Starling.

This is a key wetland complex for wintering waterfowl, waders, gulls and terns. Ferruginous Ducks *Aythya nyroca* (near-threatened) occur regularly but in small numbers.

Threats: road and ribbon development, pollution from waste emptied into the feeder wadis and human disturbance are considered to be the main threats.



Plate 9. Sirhan lagoon, a Hadiboh estuary, February 2004. © RF Porter

IBA 15. Hamadero Plateau and Scarp

Evans IBA 045.

12° 36' N, 54° 17' E, c25 km². Surveyed 2004, qualifies under A1, A2.

Limestone slopes and rolling plateau rising to 500 m asl with sub-montane, semi-deciduous thicket and mosaic of dwarf *Croton* and *Jatropha*. Important area for livestock grazing.

A1—Endangered: Egyptian Vulture (>5 pairs, also a roosting site). Vulnerable: Socotra Buzzard (>5 pairs).

A2—Seven of the eleven range-restricted species confined to Socotra EBA breed: Socotra Buzzard, Socotra Scops Owl, Socotra Warbler, Socotra Starling, Socotra Sunbird, Socotra Sparrow, Socotra Grosbeak (all SMbrsa). A further two SMbrsa spp, not range-restricted, also breed: Abyssinian White-eye, Somali Starling.

Threats: possibly overgrazing.

IBA 16. Wadi Merkoh

New IBA.

12° 31' N, 54° 08' E, c20 km². Surveyed 1999, 2004, 2007, qualifies under A1, A2.

A palm-fringed wadi with permanent water, running through stony, rocky hills, rising from 200–500 m asl, with semi-evergreen trees and scattered *Jatropha*, *Ziziphus*, *Tamarix* and *Croton*, dense in places.

A1—Endangered: Egyptian Vulture (1–2 pairs, roosting site). Vulnerable: Socotra Buzzard (1–2 pairs).

A2—Seven of the eleven range-restricted species confined to Socotra EBA breed: Socotra Buzzard, Socotra Scops Owl, Socotra Warbler, Socotra Starling, Socotra Sunbird, Socotra Sparrow, Socotra Grosbeak (all SMbrsa). A further two SMbrsa spp, not range-restricted, also breed: Abyssinian White-eye, Somali Starling.

Threats: road construction and ribbon-development are potential threats, resulting in habitat fragmentation (Miller *et al* 2007).

IBA 17. Falang–Momi coast and cliffs

Revised IBA which includes part of Evans IBA 051 'Ra's Momi and Fikhah'.

12° 28' N, 54° 24' E, c50 km². Plate 10. Surveyed 2011, qualifies under A1, A2, A4ii.

Extensive high cliffs, up to 600 m asl, flanking coastal flats at extreme southeast of Socotra. Sparsely vegetated.

A1—Endangered: Egyptian Vulture (>5 pairs, roosting site). Vulnerable: Socotra Buzzard (<5 pairs). Socotra Cormorant (roosting and feeding, up to 12 000).

A2—Five of the eleven range-restricted species confined to Socotra EBA breed: Socotra Buzzard, Socotra Warbler, Socotra Cisticola, Socotra Sunbird, Socotra Sparrow (all SMbrsa). A further SMbrsa sp, not range-restricted, also breeds: Somali Starling.

A4ii—Seabirds: Red-billed Tropicbird *Phaethon aethereus* (breeds on cliffs, >300 recorded displaying, c1.5–6% of global population), Brown Booby *Sula leucogaster* (roosts on cliffs), Jouanin's Petrel (feeds offshore).

Threats: The building of the island's ring road will open the area to built development (Miller *et al* 2007).



Plate 10. The cliffs at Falang, November 2007. © RF Porter



Plate 11. Abd Al Kuri, February 1992. © Tony Miller

IBA 18. Abd al-Kuri

Evans IBA 055.

12° 11' N, 52° 13' E, 130 km². Plate 11. Surveyed 1999–2007, qualifies under criteria A1, A2, A4ii.

Large, well-grazed, populated island, c30 km long × up to 5 km wide and rising to 570 m asl. Sparse vegetation dominated by open shrubland and dwarf-herb communities, containing *Euphorbia*.

A1—Vulnerable: Abd al-Kuri Sparrow (<1000 individuals).

A2—Range-restricted: Abd al-Kuri Sparrow (endemic to Abd al-Kuri).

A4ii—Breeding seabirds: Persian Shearwater *Puffinus persicus*, Red-billed Tropicbird (>50 pairs, 0.5–2% of global population), Saunders's Tern and possibly Brown Noddy *Anous stolidus*, but there have been no dedicated surveys.

Threats: rats and possibly cats might pose a threat to nesting seabirds, but this has not been assessed. Oil spillage would be a threat to nesting seabirds.

IBA 19. Sabuniya

Part of Evans IBA 054.

12° 39' N, 53° 09' E, c100 ha. Plate 12. Surveyed 1999–2009, qualifies under A1.

Small sea-stack to west of Socotra island comprising three peaks, c80 m high. Whitened by guano and bare of vegetation.

A1—Vulnerable: Socotra Cormorant (c250 pairs). Breeding seabirds: Socotra Cormorant (c250 pairs), Masked Booby (c400 pairs), Brown Booby (c10 pairs), Red-billed Tropicbird (c25 pairs), Brown Noddy (250–300 pairs), Bridled Tern (300–500 pairs). These breeding populations do not qualify the site for inclusion under 4ii.

Threats: there would appear to be no threats. Rats are not apparently present.

IBA 20. Kal Farun

Part of Evans IBA 054.

12° 27' N, 52° 07' E, <30 ha. Surveyed 2002–2005, qualifies under A1, A4ii.

Two sea-stacks, c80 m high, lying 30 km north of Abd al-Kuri. Whitened by guano and bare of vegetation.



Plate 12. Sabuniya, October 2009. © Ulf Stahle

A1—Vulnerable: Socotra Cormorant (c2500 pairs).

A4ii—Breeding seabirds: Red-billed Tropicbird (c75 pairs, 0.75–3% of global population), Masked Booby (c900 pairs), Brown Booby (250–300 pairs), Socotra Cormorant (c2500 pairs, >2% of global population), Brown Noddy (c200 pairs), Bridled Tern (c250 pairs).

Threats: apparently none. Seemingly, rats not present.

IBA 21. Darsa

Part of Evans IBA 056 'Al-Ikhwān' ('the Brothers'), comprising islands of Darsa and Samha. 12° 07' N, 53° 18' E, 16 km². Surveyed 2004 and 2005, qualifies under A4ii.

A rather inaccessible flat-topped, sheer-sided island southwest of Socotra, rising to 385 m asl with low shrubland on coastal plain and lower slopes.

A4ii—Seabirds: Red-billed Tropicbird (400–500 pairs, 4–20% of global population), Brown Booby (c1500 pairs, >1% of global population), Brown Noddy (1000–1500 pairs), Sooty Gull (c1000 pairs), Bridled Tern (200–300 pairs).

Threats: rats.

Provisional IBA pending further survey: Samha

Part of Evans IBA 056 'Al-Ikhwān' ('the Brothers'), comprising islands of Darsa and Samha. 12° 10' N, 53° 02' E, 40 km². Plate 13. Surveyed 2004, 2005.

A sheer-sided island southwest of Socotra, rising to 780 m asl with low, open shrubland.

Endangered: Egyptian Vulture probably breeds.

Range-restricted: Socotra Sparrow

SMbrsa: Somali Starling and Socotra Sparrow.



Plate 13. Samha, April 2007. © Lisa Banfield

Seabirds: Persian Shearwater, Red-billed Tropicbird (c5 pairs), Brown Booby (100–150 pairs).

Threats: rats. Oil spillage would be a threat to nesting seabirds.

No longer considered to qualify as IBAs

Evans IBAs 035 'Qalansiya Lagoon' (Yemen's specimen Ramsar site), 040 'Shidahah', 044 'Rookib hills', 048 'Firjih/Central Socotra', 049 'Di-Ishal' foothills.

DISCUSSION

Initially, a radical look at bird biodiversity and distribution suggested that the entire archipelago be designated a single IBA as many of the key species (globally threatened, range-restricted, biome-restricted and endemics) are widespread and found in a range of habitat types (the whole archipelago was designated an EBA, BirdLife International 2016). Figures 3–11 show distribution maps of the endemics, which illustrates this point. However, this approach was rejected as it would not be practical for the important actions that follow site designation: advocacy to ensure site protection, land-management and policing of illegal practices. More seabird data needs collecting for the islands and sea stacks, so the site accounts for these birds should be regarded as somewhat provisional. It is probable that the breeding populations of some seabirds will exceed the 1% regional population threshold.

Determining the threats and potential threats to many sites proved difficult and should include damage by tropical cyclones. The intensity of hurricanes Chapala and Megh in November 2015 impacted the Socotran landscape notably through the destruction of mature trees (Plate 14, Yemen EPA 2015). The destruction of large mature trees including of *Dracaena cinnabari* (already vulnerable due to poor regeneration), *Boswellia* spp, *Sterculia africana*, *Jatropha unicosta*, *Ziziphus spina-cristi* and *Croton socrotanus* in parts of Socotra



Plate 14. Up-rooted *Dracaena cinnabari*—typical of the many trees that were affected by the hurricanes of November 2015. © Abduljameel Abdullah

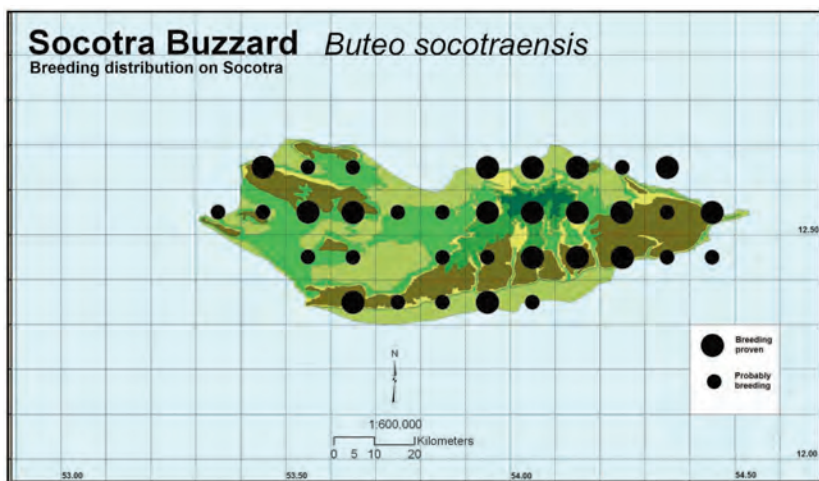


Figure 3.
Socotra Buzzard:
Socotran breeding
distribution.

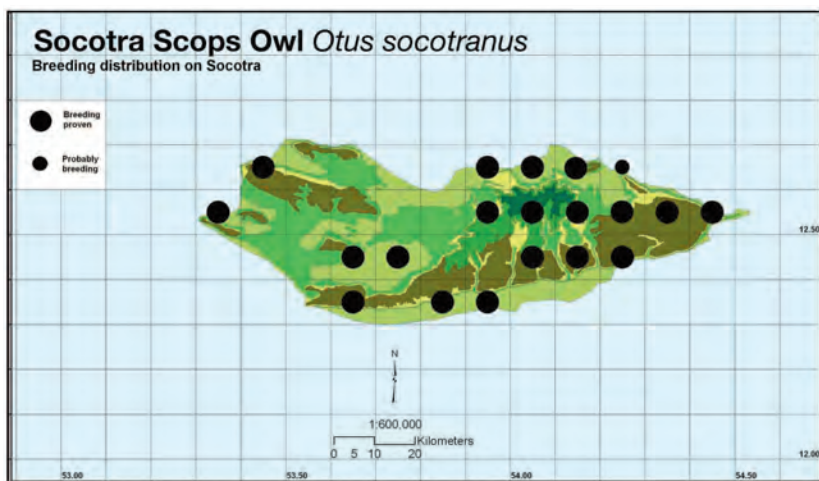


Figure 4. Socotra
Scops Owl:
Socotran breeding
distribution.

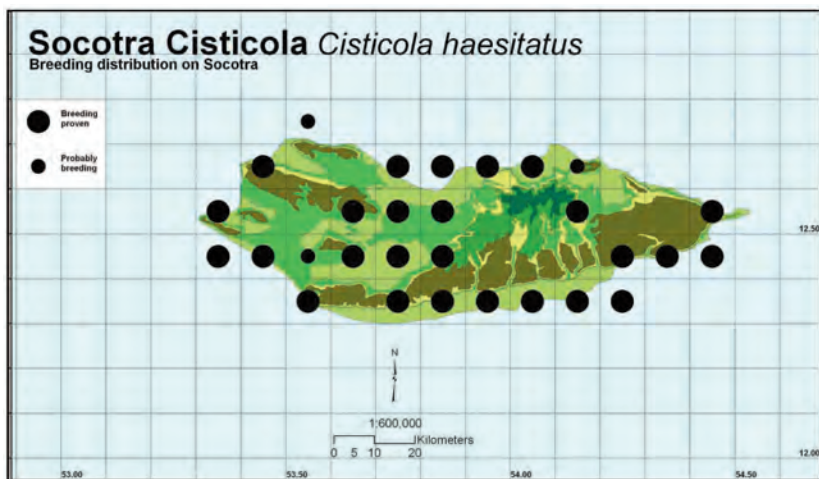


Figure 5.
Socotra Cisticola:
Socotran breeding
distribution.

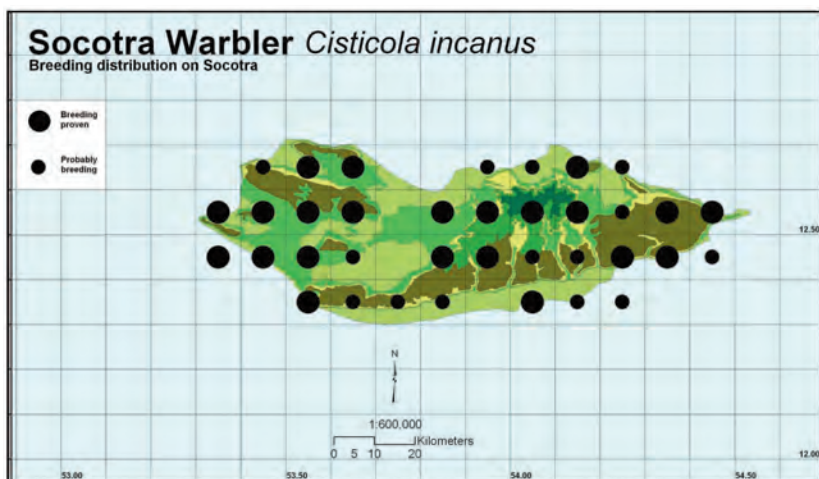


Figure 6.
Socotra Warbler:
Socotran breeding
distribution.

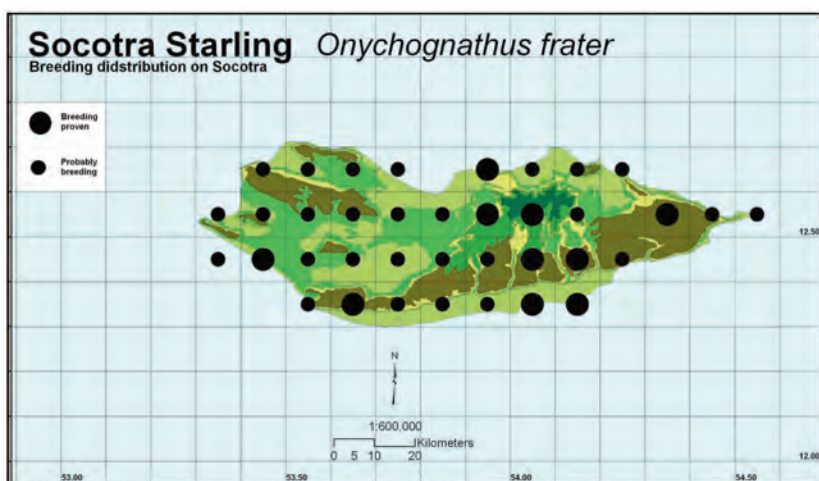


Figure 7.
Socotra Starling:
Socotran breeding
distribution.

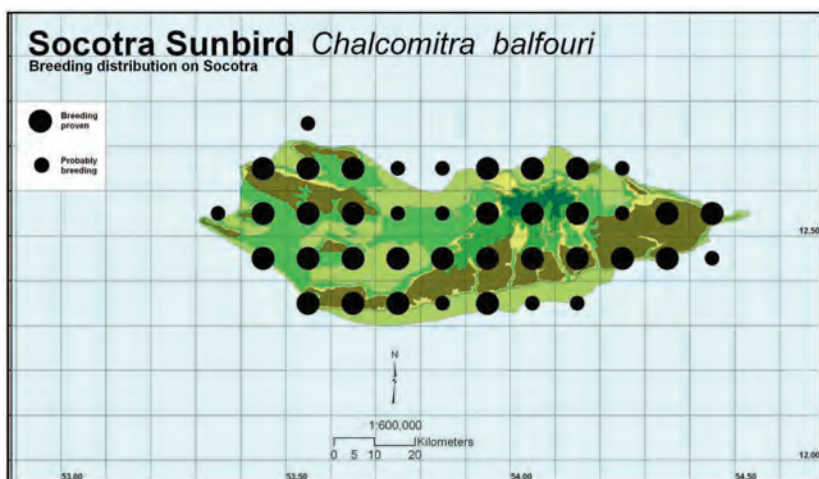


Figure 8.
Socotra Sunbird:
Socotran breeding
distribution.

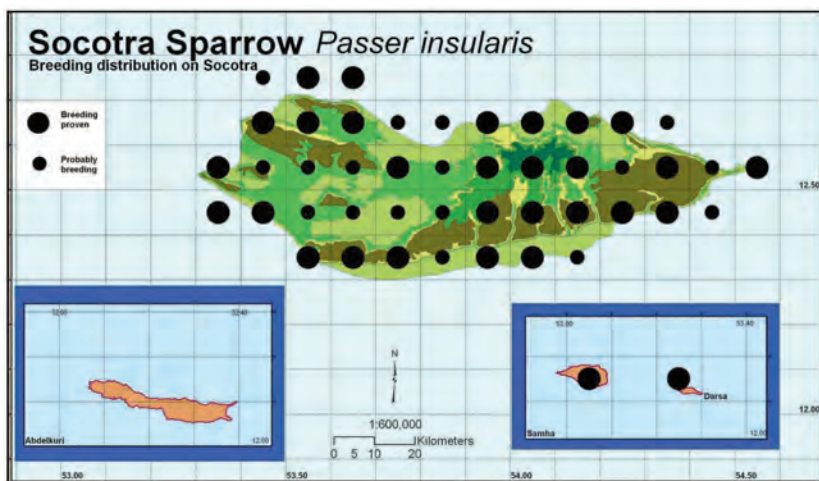


Figure 9.
Socotra Sparrow:
Socotran breeding
distribution.

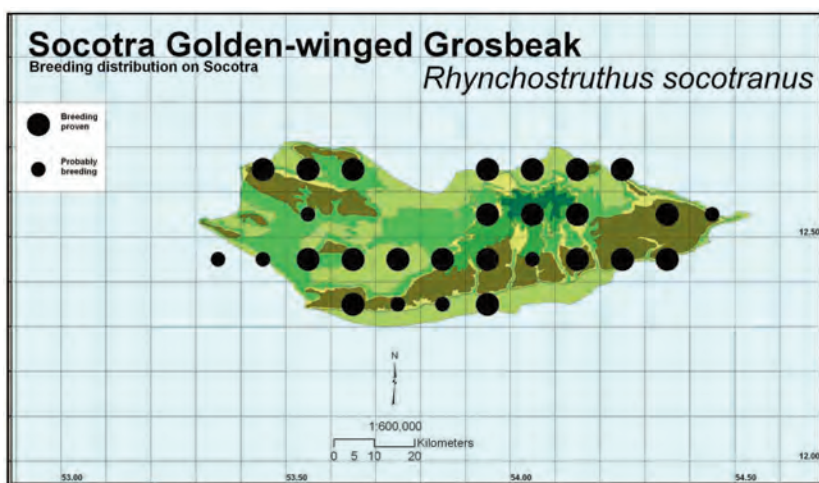


Figure 10.
Socotra Golden-winged
Grosbeak:
Socotran breeding
distribution.

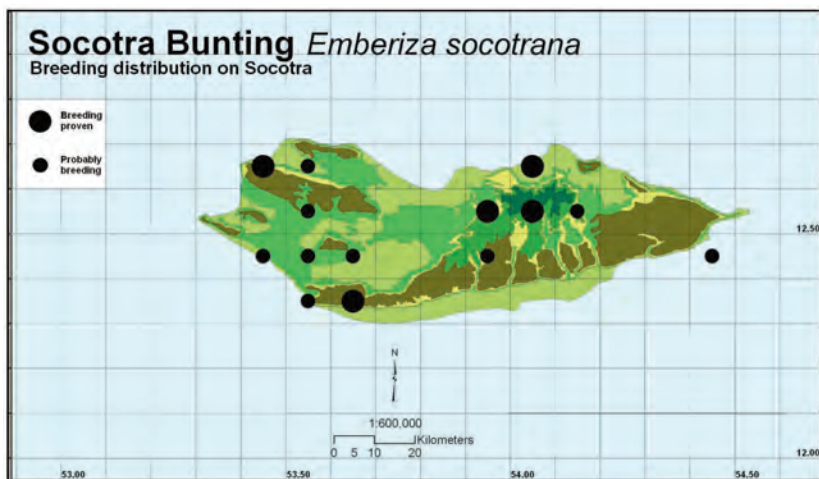


Figure 11.
Socotra Bunting:
Socotran breeding
distribution.

might impact, at least in the short-term, the populations of five of the eleven endemic species (Socotra Scops Owl, Socotra Starling, Socotra Sunbird, Socotra Sparrow and Socotra Grosbeak), which use such trees for nesting and/or feeding. The destruction of palm groves would also affect Socotra Scops Owls as these trees are important for nesting and roosting. Birds are mobile organisms, however, and presumably could move to less or undamaged sites. The IBAs most adversely affected by the hurricanes due to mature tree destruction appear to be Jabal Ma'alalah (IBA 2), Noked Plain (IBA 7), Haggeher (IBA 11), Diksam (IBA 12), Firmihin (IBA 13) and Hamadero Plateau (IBA 15) (Abduljameel Abdullah and Nadim Taleb *in litt*). Furthermore the conflict in mainland Yemen has caused, at least temporarily, an increase in the archipelago's isolation. This has, for example, resulted in a decrease in fuel supplies, thus increasing wood collection (Abduljameel Abdullah *in litt*). This could further impact on bird populations. Clearly, comprehensive site impact assessments are needed to properly assess the impacts of the hurricanes.

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