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The status and distribution of three species of *Sternula* terns on the eastern coast of Africa and in the western Indian Ocean, with two species new for Mozambique

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SUMMARY.—The status of three *Sternula* terns in southern and eastern Africa and the Indian Ocean is updated based on observations in Mozambique during October 2009–August 2021. Damara Tern *S. balaenarum* and Saunders’s Tern *S. saundersi*, both new to Mozambique, were found at the San Sebastian Peninsula in August 2018 and have been recorded regularly since. Damara Tern arrived in May, numbers were lower June–July, with a peak of 100+ in August–October. Breeding plumage was assumed by late October and all departed in early November; those aged were all adults. Observations of ringed birds suggested they originated from colonies in South Africa. Numbers of Damara Tern reached the Key Biodiversity Area designation threshold population for the site in 2020. These are the first records of large numbers of Damara Tern in the Indian Ocean, whilst timings suggest the species is partly transient at the site and may also occur further north. Saunders’s Tern was recorded at San Sebastian in all months except March and April, with 5–80 regularly present, and peak numbers perhaps in October–December. Birds were observed in a range of plumages in all months, from non-breeding, transitional to full breeding. Courtship feeding was observed in September–November suggesting at least some attempt to breed locally, although disturbance is high. Birds in non-breeding plumage may stem from Northern Hemisphere breeding localities. Little Tern *S. albifrons* was a numerous migrant in southern Mozambique in October–May, peaking in April when large numbers were observed during pelagic trips to the continental shelf edge, and at onshore roost sites including San Sebastian. Smaller numbers fed in coastal lagoons and freshwater lakes. Three Little Terns had been colour-ringed in Israel.

Allport (2018) reported significant records of selected tern and gull species from Mozambique for the period October 2010–August 2017. *Sternula* terns were not covered in that paper but the first records of Damara Tern *Sternula balaenarum* and Saunders’s Tern *S. saundersi* in Mozambique along with an update on the status of Little Tern *S. albifrons* are reported herein. The findings provide new insights into the distributions of *Sternula* in eastern Africa and the Indian Ocean which we detail below, with comments on identification and areas for future study.

Observations were made across the range of sites outlined in Allport (2018) plus data from 24 trips to the San Sebastian Peninsula, April 2018–August 2021, in the Santuário Bravio de Vilanculos (22°07'46"S, 35°32'37"E, known as ‘the Sanctuary’) including visits to Ilha Linene sandbanks by boat (see Appendix 1 for dates and observer details). Many of the observers were visiting to see the newly discovered birds reported herein and timings were inconsistent across tides and time of day.

Damara and Saunders’s Terns are monotypic, but Little Tern has at least five subspecies (Gochfeld *et al.* 2020a) of which the nominate occurs widely in eastern and southern Africa.

The East Asian and Australasian race *sinensis* (sometimes treated as a separate species, Eastern Little Tern, the limits of which are still to be defined; Cramp 1985, Higgins & Davies 1996) is a potential visitor to the western Indian Ocean (Urban *et al.* 1986).

Saunders's Tern was treated as a species by Vaurie (1965) and Voous (1973), and all modern taxonomies have followed this (IOC 2020). There has, however, been no comprehensive taxonomic review and no DNA analysis of the Little / Saunders's Tern group to date (J. M. Collinson *in litt.* 2019).

DAMARA TERN *Sternula balaenarum*

Nests colonially on beaches of Angola, Namibia and South Africa, south and east to the Indian Ocean at Algoa Bay, Eastern Cape, where the largest colony in South Africa increased to 45 pairs in 2018/19 (Martin 2019). It breeds in the austral summer with peak laying in late October–December at most colonies (Hockey *et al.* 2005, Whittington *et al.* 2015, Martin 2019). Nearly all leave southern Africa for non-breeding grounds on the West Africa coast. Departure starts in April, with birds moving north and coalescing into larger flocks in northern Namibia. From there, they migrate to the Gulf of Guinea, sparingly reaching as far west as Ghana to Senegal (Wallace 1973, Urban *et al.* 1986, Borrow & Demey 2001, Hockey *et al.* 2005, Braby 2010). Oceanic upwellings off the West African coast peak in September coinciding with the species' presence in the region (Hockey *et al.* 2005).

Damara Tern is considered absent from the Indian Ocean, after Feare & Bourne (1978) demonstrated that accounts of hundreds in Seychelles (Mountford 1971, Penny 1974) were erroneous. More recently there has been three records on the coast of KwaZulu-Natal, in September–October 2013 (KwaZulu-Natal Rare Birds Database; D. Cyrus *in litt.* 2019). The species occurs only in coastal waters with no records at freshwater sites (Hockey *et al.* 2005).

Damara Tern can be identified from other *Sternula* in breeding plumage by its full dark brown cap and nape (appearing black in the field) and uniform grey upperparts, paler than, and without the contrasting paler rump and tail of, adult Little Tern. When not in wing moult, adults show less contrast between the inner and outer primaries than other *Sternula* but can do so when in primary moult (Hockey *et al.* 2005). The bill is black at all ages (with a pale yellowish base to the mandible visible at close range) and, whilst not longer than other *Sternula* (Hockey *et al.* 2005), it appears noticeably slimmer, narrower-tipped and more pointed than sibling species. Non-breeding plumage is not well studied but in Eastern Cape, adults lose their brown cap in April–May, with the lores, forehead and mid-crown white, and grey mottling in the dark brown hindcrown; the breeding head pattern is reassumed in August–September. Adult primary moult probably commences at the end of breeding and has been noted as halfway complete in July (Hockey *et al.* 2005) but is otherwise little known (M. Boorman *in litt.* 2021).

Recent records in Mozambique.—On 6 August 2018 GA & DG visited the tidal roost at Chichuene, colloquially known as 'Ratray's Point', on the ocean beach of the San Sebastian Peninsula, east of Ilha Linene in the Sanctuary (22°07'46.2''S 35°32'37.9''E) where c.1,500 terns were seen and photographed. Some of the images involved c.30 small terns in non-breeding plumage with a grizzled hindcrown, finely tapered all-black bill and uniform pale upperwings showing less contrast in the outer primaries than is usual in Little and Saunders's Terns (Fig. 1). GA suspected they were Damara Terns but was not very familiar with the species and a record involving so many so far outside its known range seemed improbable. After consulting the late A. J. Tree, the record was considered tentative despite the documentation. However, on 28 September 2018 at the same location DG photographed one of six in more advanced breeding plumage with an all-black crown, confirming the identification (Fig. 2). None was recorded during the next visit on 31 December 2018.



Figure 1. Damara Tern *Sterna balaenarum* (above) and Saunders's Tern *S. saundersi* (below; this individual identified from other images), Rattray's Point, San Sebastian Peninsula, Mozambique, 6 August 2018; note fine-tipped all-dark bill, grizzled crown, forehead and above eye, and relatively pale outer primaries of Damara Tern (Gary Allport)



Figure 2. Damara Tern *Sternula balaenarum*, Rattray's Point, San Sebastian Peninsula, Mozambique, 28 September 2018; diagnostic all-dark cap and nape in breeding plumage (David Gilroy)



Figure 3. Part of a flock of Damara Terns *Sternula balaenarum*, including one Saunders's Tern *S. saundersi* and four *Sternula* spp., San Sebastian, Mozambique, 30 October 2019 (Niall Perrins)

On 2 September 2019 CR found 29 Damara Terns in breeding plumage at Rattray's Point, and DG observed 17+ there on 15 September. With increasing observer interest, larger numbers were found, all loafing on the same area of sandbanks, including 75 on 18 September and a max. 100+ on 24–28 October. Numbers then quickly declined to single figures by mid November. In 2020 none was seen in two visits in February, but 15–25 were recorded in May–July. In 2021 none was seen in January, but 80 in May and 106 in August (Appendix 1).

This suggests a decline in numbers at the site from late October and absence from mid November to May (Table 1), consistent with attendance at breeding colonies further south. There is a suggestion of greater numbers on arrival in May (one count of 80), then a continuous presence until peak counts in late August and October. However, data are still meagre and numbers at the one known accessible site in the San Sebastian / Bazaruto area are likely to vary with local conditions.

A single was photographed with a metal ring on its left leg in August 2018, and two ringed birds were seen on 18 September 2019, one with a metal ring on the left leg and a white flag on the right. Details are unclear but it is almost certain that the latter individual was marked at Algoa Bay, South Africa, as a breeding adult on 3 December 2008, making it at least 13 years old at the time (P. Whittington *in litt.* to M. Boorman 2020 and *in litt.* to CR 2021).

The finding of this threatened bird on the Indian Ocean coastline >1,500 km north of all previous records was unexpected. The birds at San Sebastian seem most likely to originate from breeding colonies in the Eastern Cape, South Africa, where recent shifts east in some seabird populations have occurred, possibly due to climate-driven changes in relative

abundance of fish in coastal waters (Blamey *et al.* 2015). Occurrence in Mozambique may be a quite recent phenomenon reflecting a local shift in breeding but a significant change for post-breeding migration, affording more direct access to the Indian Ocean. Indeed, a direct link from the Algoa Bay colony to the Mozambique non-breeders has already been speculated (Martin 2019).

The birds at San Sebastian may involve individuals present throughout the non-breeding season, as well as others on passage to as yet unknown wintering grounds further north. Our limited data show peaks in May and August–October suggesting stop-over and possibly congregating northbound migrants (as in Namibia; Braby 2010), and return to colonies in late October–November. Were these birds to travel as far north as they do in West Africa (*c.*07°N) then the Somali coast would be within range. Observers in eastern Africa should consider this species in the identification of any *Sternula* observed (see below). Further ringing studies of Damara Terns will be attempted at San Sebastian in the near future.

Global conservation importance.—Recent advances in the recognition of sites of global importance for biodiversity conservation have led to the development of the Key Biodiversity Areas programme (KBAs; IUCN 2016). This builds on the Important Bird & Biodiversity Areas (IBA) programme of BirdLife International, to identify sites important for all biodiversity using a new global standard (IUCN 2016). This new methodology has been applied by the Ministry of Land & Environment in Mozambique supported by a working group facilitated by the Wildlife Conservation Society, with ornithological input by national institutions and BirdLife International (GA). The first inventory of Mozambique IBAs (Parker 2001) identified the Bazaruto Archipelago as an IBA, the southern limit of which abuts the northern border of the Sanctuary.

The global population of Damara Tern is estimated at 9,000 birds but is decreasing and the species is considered globally Vulnerable by BirdLife International (Braby *et al.* 1992,

TABLE 1

Counts of *Sternula* terns at Rattray's Point, Santuário Bravio de Vilanculos, San Sebastian Peninsula, Vilanculos District, Mozambique, 2018–21. Site visits were of 1–4 days duration and maxima were taken when there was a range of counts during a site visit. Count data are grouped by month across years and presented in ascending order; zeros indicate that the observers confidently assessed genuine absence (see full data in Appendix 1).

Month	Count visits	Little Tern	Saunders's Tern	Damara Tern
January	2	26	30	0
February	2	206, 1,200	11, 15	0, 0
March	1	230	0	0
April	1	25		
May	2	0, 1	4, 15	40, 80
June	1	0	25	25
July	1	1	20	20
August	3	0, 1, 10	4, 5, 6	29, 80, 106
September	3	1, 200	0, 4, 15	6+, 29, 75
October	4	0, 70, 140	10, 15, 80	0, 2, 50+, 100+
November	3	5, 26, 60	0, 1, 2	0, 8, 11
December	1	70	26	0
Total 24				

Braby 2011, Crawford *et al.* 2018, BirdLife International 2020) and regionally as Critically Endangered (Taylor *et al.* 2015).

The KBA threshold for a site holding a species categorised as Vulnerable is >1% of the global population, which in Damara Tern equates to 90 birds. Counts at the Sanctuary exceeded this in October 2019 and August 2021 (Table 1, Appendix 1), thus the site qualified and is included along with the national park as a single KBA 'Grande Bazaruto' (<https://wcs-global.maps.arcgis.com/apps/Shortlist/index.html?appid=2b6445c402514b81a0ed327b081ea12c>). Bazaruto National Park might also be expected to hold Damara Terns.

LITTLE TERN *S. albifrons* / SAUNDERS'S TERN *S. saundersi*

These are phenotypically and, to a lesser extent, ecologically similar, temperate- to tropical-breeding terns. They range from locally resident to long-distance migrants in the region (Urban *et al.* 1986).

Identification.—The diagnostic characters of Saunders's Tern have been the subject of debate and there is inconsistency in the ornithological literature, but most authors agree (e.g., Cramp 1985, Chandler & Wilds 1994, Olsen & Larsson 1995a,b, Sinclair & Ryan 2010, Gochfeld *et al.* 2020b) that a small suite of characters can be used to distinguish adult Saunders's Tern in breeding plumage from Little Tern (Table 2). These characters are given for breeding-plumaged birds in Afrotropical field guides (e.g., Stevenson & Fanshawe 2002, Sinclair & Ryan 2010).

There has been much discussion in the literature concerning the separation of Little and Saunders's Terns in non-breeding plumages but no consistent characters have emerged (Cramp 1985, Olsen & Larsson 1995a,b). The status of Saunders's Tern, especially in the non-breeding season, is thus tentatively reported in the region's major ornithological works.

A recent detailed analysis based on birds of known identity in the Persian Gulf by Mullarney & Campbell (2022) has advanced the identification criteria of Little and Saunders's Terns. They stressed the importance of inner wing pattern in breeding and non-breeding plumages, finding that fresh-plumaged Little Terns show a relatively darker upperside to the inner wing with a clear white trailing edge to the secondaries; in Saunders's Tern this is consistently paler, often near-white, with less contrast. There is also evidence to suggest that non-breeding head pattern differs, with Saunders's having a narrower dark line through the eye and more white on the rear crown. The status overview of the two species below is as reported in the current literature but this will require significant revision in light of Mullarney & Campbell (2022).

Breeding ranges.—*S. a. albifrons* is a Palearctic–Afrotropical migrant, breeding from coastal north-west Europe through the Mediterranean (Cramp 1985, Habib 2016a) and the Middle East to islands in the Persian Gulf and northern Red Sea (Cramp 1985, Hollom *et al.* 1988). Inland, it breeds widely in Russia east of *c.*28°E and south of *c.*57°N, Central Asia to Afghanistan and, further south-east, the Indus Basin in India (Vaurie 1965, Rasmussen & Anderton 2012). Nesting of *S. a. albifrons* on Diego Garcia, Chagos Archipelago in the central Indian Ocean reported by Carr (2005; based on Bruner 1995 and Symens 1999) represented a significant southward extension of this taxon's breeding range. However, subsequently Carr (2011, 2015) suggested that these breeding birds may be Saunders's Terns, although this remains unclear.

Little Tern is typically a coastal and colonial breeder in north-west Europe and the Mediterranean, but also nests inland on lakes and broad rivers mostly in the Middle East and in its mainland Asian range (Cramp 1985).

Saunders's Tern breeds in small colonies on coasts of the Red Sea, north to at least Yanbu in Saudi Arabia (Boland & Alsuhaybany 2020, Almalki 2021), Eritrea (Semere *et al.*

TABLE 2
 Characters to distinguish breeding plumage adult Saunders's Terns *Sternula saundersi* from Little Tern *S. albifrons* (see text for sources).

Saunders's Tern	Little Tern
White patch on forehead smaller and squarer, ending before leading edge of eye	White patch on forehead more triangular and extends as supercilium above the eye
Black outer primaries with faint grey bloom, forming a clear block of usually three, sometimes more, feathers in outer wing	Normally one or two black outer primaries
Moult of second series of primaries arrested at p7 (hence three outer primaries dark)	Moult arrested at p8 or p9
Paler pearl-grey on upperside, especially mantle, with less contrast to rump and tail	Darker lead-grey back, usually with contrasting paler rump
Olive or brown feet, yellow only on rear tarsus and soles	Yellow or yellowish-orange feet and legs
Preference for saltwater	Found widely in both fresh- and saltwater habitats

2008) and south to Socotra (Porter & Suleiman 2014) and southern Somalia (Ash & Miskell 1983, Urban *et al.* 1986), east on coasts of Oman and the Persian Gulf (Hollom *et al.* 1988) to north-west India and northern Sri Lanka (Rasmussen & Anderton 2012, Panagoda *et al.* 2020). It has not hitherto been clear if it is locally resident in the Red Sea and Persian Gulf, but using new identification characters Mullarney & Campbell (2022) found Saunders's Tern to be absent from this region in September–March.

There have been recent breeding records in Sinai, Egypt (Habib 2014, 2016a,b) but birds showing intermediate characters between *saundersi* and *albifrons* have been found in the northern Red Sea, casting doubt on the status in this region (Y. Perlman *in litt.* 2019). The presence of Saunders's Tern in Sinai is, however, clear (O. Campbell *in litt.* 2021).

It was reported as a 'numerous resident throughout the Maldives' by Ash & Shafeeg (1994) but no specimens in (diagnostic) breeding plumage were located by Rasmussen & Anderton (2012) and the only report of breeding, from North Malé Atoll in March–April (Phillips & Sims 1958), lacks details. There are recent anecdotal reports of breeding at Huvadhoo Atoll (in the south) but these lack confirmation (Shafeeg 1993, Anderson 2007, Anderson & Shimal 2020; C. Anderson *in litt.* 2021). A small number of 'Little Terns' nesting on Diego Garcia (Bruner 1995, Symens 1999, McGowan *et al.* 2008) were implied to be Saunders's Terns by Carr (2015). A single adult Saunders's Tern photographed on Diego Garcia in May 2005 was present in the likely breeding season and was reported at the time as the first record for the territory (Carr 2005: 39). This is potentially the species' southernmost breeding locality.

The breeding ranges of Little and Saunders's Tern reportedly overlap in the northern Red Sea, Persian Gulf and coastal Sri Lanka (Cramp 1985). In the Red Sea and Persian Gulf, the two select different nesting habitats: Saunders's is coastal whilst Little Tern breeds on inland freshwater bodies (Jennings 2010; O. Campbell *in litt.* 2021). Recent work by Panagoda *et al.* (2020) appears to be the first to document syntopic breeding of these species in mixed colonies (estimates of 560 pairs of Saunders's and 115 pairs of Little Terns *S. a. sinensis*; S. Seneviratne *in litt.* 2021) in north-west Sri Lanka. They found Saunders's differed

from Little Tern in smaller clutch and nest size, and nested at higher densities. Previously reported differences between the two species in egg coloration were confirmed (Wait 1931, Baker 1935, Urban *et al.* 1986). There was no difference in courtship displays but also no observations of mixed pairs. This study supported the separation of these two species but further work where *S. saundersi* and *S. a. albifrons* breed in sympatry would help to examine species limits more fully.

The breeding season is earlier in the western part of the range of Saunders's Tern. In the Red Sea nesting is reportedly in February–late April (Newton 2006) or late March–June (Jennings 2010), with egg-laying dates from the end of February to early June on the Farasan Islands, in the southern Red Sea (Almalki 2021). In the Persian Gulf breeders arrive in late February–March and begin breeding immediately, with fledging by mid May, departure commencing June–early July, the majority gone by late August and a few records to October (Mullarney & Campbell 2022; O. Campbell *in litt.* 2021). In Sri Lanka the season is later with birds on eggs and with chicks in May–June, and the season reportedly lasting until September (Panagoda *et al.* 2020; S. Seneviratne *in litt.* 2021). North (1945) reported Saunders's Terns breeding at Brava, Somaliland (now Barawa, Somalia) in August but it is unclear at what stage these birds were.

Non-breeding ranges.—All populations of *S. a. albifrons* migrate south in the boreal winter (Cramp 1985) to western, eastern and southern Africa (Urban *et al.* 1986); it is reported to be absent from North Africa at this season (Hollom *et al.* 1988).

In southern Africa, Little Tern is uncommon in the Western and Eastern Cape but is locally common on lagoons and shores of the Indian Ocean coast from central KwaZulu-Natal north through Mozambique (Clancey 1982, 1996, Hockey *et al.* 2005). Southern African birds are thought to breed in western Europe or the Mediterranean (Cramp 1985), although given the mainly easterly distribution in the region, Central Asian origin has been considered likely (Hockey *et al.* 2005). A lack of inland records suggests birds travel south along the coast but there are few published records to support this (Urban *et al.* 1988). There are no confirmed / published records of Little Tern in Madagascar (Safford & Hawkins 2013) but Mullarney & Campbell (2022) found those non-breeders identifiable to species (photographs on eBird) to be Little Terns. This species initially arrives in southern Africa in August, with peak counts in October–March, but small numbers reportedly occur year-round (Hockey *et al.* 2005).

Nominate *albifrons* also migrates through Afghanistan and Pakistan to the Indian Ocean and winters on the west coast of India south to Mumbai. It may be a regular winter visitor to the Maldives (Phillips 1963, Ash & Shafeeg 1994) but no details have been published (Rasmussen & Anderton 2012). There are, however, five recent sightings of birds in breeding plumage in February–April by observers aware of the identification issues (Anderson 2007; C. Anderson *in litt.* 2021). Little Tern is not thought to occur further south in the central Indian Ocean as all Seychelles records have been carefully assessed and nearly all those positively identified are Saunders's (four records of Little Tern; Skerrett & Disley 2011, Safford & Hawkins 2013, Skerrett *et al.* 2017). Mullarney & Campbell (2022) found one further record of Little Tern in Seychelles (November 2004; <https://ebird.org/checklist/S76069671>) but all other records involved *S. saundersi*. Specimens and sightings of birds with dark primary shafts, previously identified as Saunders's Terns, in western Thailand and Peninsular Malaysia (Sibley & Monroe 1990, Chandler & Wilds 1994) were re-identified by Wells (1999) as *S. a. albifrons* (this taxon's easternmost records). Wells (1999) suggested these birds presumably originate from the Asian breeding range.

Eastern *S. a. sinensis* may occur regularly in Africa in the non-breeding season but the only evidence involves a bird ringed as a chick in Java, Indonesia, recovered in Ghana

(Cramp 1985, Urban *et al.* 1986). This taxon breeds in Sri Lanka (Rasmussen & Anderton 2012) but was found not to occur in the Seychelles by Feare & Bourne (1978), and there is only one record in the Chagos Archipelago (Carr 2005), suggesting it does not regularly reach west of the central Indian Ocean.

Saunders's Tern is thought to winter in the southern Red Sea, Somalia and Socotra where it was reported to be resident by Urban *et al.* (1986), but published accounts are non-committal or lack details (Ash & Miskell 1983, Porter & Suleiman 2014). It was reported to be seasonally present in coastal Kenya and Tanzania (Britton 1980, Urban *et al.* 1986), however Mullarney & Campbell (2022) by reviewing photographs on eBird found that non-breeders from Saudi Arabia, Yemen, Socotra, Oman, Kenya and Tanzania were all Little Terns, thereby significantly altering our understanding of the non-breeding range of both species. In Madagascar, Saunders's Tern has been reported on the west coast south to at least Toliara, in November–March, with some to May and one in July (Safford & Hawkins 2013). Mullarney & Campbell (2022) again found eBird images to be mainly Little Terns but at least one Saunders's Tern was photographed at Nosy Ve.

The full extent of the winter range of Saunders's Tern is unclear, due to identification difficulties, but in the central Indian Ocean it likely involves substantial numbers in the Maldives (Anderson & Shimal 2020; C. Anderson *in litt.* 2021). A careful review of records in Seychelles concluded that it is present September–April with observations in all months except June (Feare & Bourne 1978, Skerrett & Disley 2011, Safford & Hawkins 2013). The largest number is 1,800 at St François Atoll (March 2007), with up to 800 at Aldabra (October) and 200–300 on Bird Island in September–April, with max. 380 in December (Safford & Hawkins 2013). Numbers on St François consistently exceed IBA thresholds (Adam *et al.* 2009). Mullarney & Campbell (2020) confirmed these identifications from a small sample of images, finding Saunders's Terns at Bird and Farquhar Islands and Aldabra. Small numbers have been seen in Comoros, Mauritius and Rodrigues (Safford & Hawkins 2013). It has also been recorded on the west coast of India in winter including the Laccadives (Rasmussen & Anderton 2012, Aju *et al.* 2021) but status in Sri Lanka is unclear. Saunders & Salvin (1896) reported three immature specimens collected by E. W. Oates in 'lower Pegu, Burma' (presumably the Gulf of Martaban near the town of Bago, Myanmar); their identity requires confirmation. There are recent confirmed records on Cocos (Keeling) Island where it has been regularly reported since 2006 (two records accepted by the Birds Australia Rarities Committee; Carter & McAllan 2007, Jackett *et al.* 2020) with up to 15 apparently present November–March (eBird records annual 2010–21). This appears to be the south-eastern limit of non-breeders, as there are no records in Indonesia or continental Australia.

Saunders's Tern was first reported in southern Africa by Saunders & Salvin (1896) based on three specimens from Durban Bay (see Appendix 2) and it was admitted to the southern African list accordingly. Two of these specimens were re-examined by Clancey (1982) and were considered to be *S. a. albifrons*; on which basis he retrospectively substantiated his prior removal of *S. saundersi* from the regional list (Clancey 1980). As part of the present study two of these specimens were examined by GA at the Natural History Museum, Tring, and found to be non-breeding *S. a. albifrons* (using identification criteria in Mullarney & Campbell 2020). Photographs of the third specimen, at Naturalis Biodiversity Center, Leiden, revealed it to be a nominate Little Tern. These findings uphold Clancey's (1980) decision to exclude *S. saundersi* from the southern African list.

Saunders's Tern occurs solely in marine habitats and is rare, possibly unknown, inland, although it has been reported to forage in saline ponds and saltpans (Safford & Hawkins 2013; for reasons given above, the latter may have been Little Terns).



Figure 4. Little Terns *Sternula a. albifrons* were common on pelagic trips off southern Mozambique, October–April, but infrequent and occurred in small numbers onshore except at a small number of undisturbed roost sites, or in bad weather. Maputo Bay, Mozambique, 23 February 2016 (Callan Cohen)

Recent records in Mozambique.—In nine years of observations in southern Mozambique Little / Saunders’s Terns were recorded in every month (2010–19; GA pers. obs.), but positive identifications were determined only for birds in breeding plumage. There were a small number of positively identified Little Terns in late September and more as they attained breeding plumage in February–April. No field observations of birds in the period October–January were considered identifiable to species and they were treated as Little / Saunders’s but all photographs were re-examined in light of Mullarney & Campbell (2020) and all those identifiable were Little. The majority of non-breeding plumage birds were probably Little rather than Saunders’s Terns. Where subspecific identification was possible, all were *S. a. albifrons* and *sinensis* was not suspected.

Little Tern is thus a numerous migrant in southern Mozambique in October–May. They arrived in late September in small numbers and were observed in groups of up to 200 on pelagic trips from Maputo. Despite significant numbers offshore in this period only a few in non-breeding plumage (1–30) were found on beaches or feeding over lagoons and salt pans, usually with other terns but sometimes resting onshore in groups during stormy weather (Fig. 4). Largest numbers were seen from pelagic trips off Maputo in March–April. Tight flocks of up to 300 were observed, presumably on passage over the continental shelf edge, which sometimes paused to join other terns feeding over shoals of Yellowfin Tuna *Thunnus albacares*. The max. count was of 1,000 Little Terns on 25 April 2013 and the latest seasonal records were 140 on 22 May and ten on 30 June. There were six records of Little / Saunders’s Terns in non-breeding plumage (presumably second-calendar-year birds) during June–September, all on coastal beaches and lagoons. The offshore sightings broadly match reports by Lambert (2005) who recorded 50–200 Little / Saunders’s Terns per day offshore from Zavora to Bazaruto in March–April 1987–89.

Observations at San Sebastian showed a similar annual pattern with small numbers in August, then up to 200 in non-breeding plumage during the austral summer followed by a period when breeding-plumaged Little Terns, presumably on passage, were present in larger numbers (max. 1,200 on 11 February 2020; Table 1, Appendix 1). Little Tern has also been reported from the islands of adjacent Bazaruto National Park (Downs & Wirminghaus 1997) with January counts of 90 in 1996 (Kohler & Kohler 1996, Dodman & Taylor 1996), 1,515 in 1997 (Dodman *et al.* 1997) and 831 in 1998 (Dodman *et al.* 1999).

A few Little Terns were seen at inland rain-fed freshwater lagoons in the Sanctuary at San Sebastian and, further south 10–140 birds (max. on 23 May 2015) were seen in December–May on inland freshwater bodies at Lagoa Xingute, Maputo Special Reserve (26°30′28.3″S, 32°48′43.5″E).

Three Little Terns were seen at the Sanctuary bearing white Darvic rings with two-letter codes. Unfortunately, none was legible in the field, but they were almost certainly marked

in Israel (Y. Kiat *in litt.* 2019). This observation supports the hypothesis that Little Terns in Mozambique originate from the eastern European breeding range (Hockey *et al.* 2005).

In summary, the overall pattern of occurrence of Little Tern in southern Mozambique is of coastal passage in September–November with fewer during November–early March and then stronger passage in April. This suggests that most Little Terns in this part of the Indian Ocean spend the boreal winter further south than Mozambique, but it is also possible that there are more substantial numbers offshore at this time.

On 6 August 2018 GA & DG visited the tern and wader roost at Rattray's Point, San Sebastian. A *Sternula* in breeding plumage was found that showed features including reduced square-cut white frons, pale grey mantle and contrastingly dark outer primaries (Fig. 5). GA suspected this to be a Saunders's Tern but as the photographs were not of high quality, none showed the bird in flight and just a singleton was involved—in consultation with the late A. J. Tree—the record was then considered tentative.

However, on 2 September 2019, CR visited the site again and, among several thousand terns, saw a group of four *Sternula* with the features of Saunders's Tern (Fig. 6) confirming the identity of the individual seen in 2018. These birds were in full breeding dress and engaged in courtship-feeding. There were further sightings on 15 September (DG) and 15 were found on 18 September in loose groups of up to six, including four courtship-feeding, probably the same as on 2 September (CR, J. R. Nicolau *et al.*). The species was seen by several observers during 4 October–17 November 2019, including up to 20 in breeding plumage and possibly as many as 60 in non-breeding plumage (Appendix 1).

Saunders's Terns were seen in small numbers (2–30) during nearly all subsequent visits, with records in all months except March and April (Table 1, Appendix 1) and birds in breeding plumage peaked at up to 20 in September–November. Photographs of the birds were checked and the identifications confirmed using the criteria of Mullarney & Campbell (2022). In addition, three birds in transitional plumage and two in non-breeding plumage were identified from photographs taken on 6 August 2018 and at least 26 Saunders's Terns in transitional and full non-breeding plumage on 31 December 2018 (Fig. 7).

Based on Little Terns (Cramp 1985), the behaviours observed in September 2019 were interpreted as at least one pair in courtship with a male carrying fish, 'parading', and a female adopting a receptive 'hunched' posture (Fig. 6A) followed, after presentation of the fish, by 'erect-posture' by both birds (Fig. 6B). This type of courtship-feeding is thought to establish and maintain pair bonds and is normally a pre-requisite to successful copulation, but the behavioural sequence observed in Little Terns prior to copulation is different from courtship-feeding (Cramp 1985) and we did not observe attempted copulation by Saunders's Terns.



Figure 5. Saunders's Tern *Sternula saundersi*, Rattray's Point, San Sebastian Peninsula, Mozambique, 6 August 2018; first record for Mozambique and southern Africa. Note square-cut white forehead not extending above eye, at least three dark outer primaries and contrastingly pale, pearly-washed mantle (vs. blue lead-grey in Little Tern) and dull-coloured legs (Gary Allport)



Figure 6. Courtship-feeding by Saunders's Terns *Sternula saundersi*, San Sebastian Peninsula, Mozambique, 2 September 2019. A. (top) male (left) 'parading', carrying food while female (right) adopts receptive hunched posture. B. (lower) both birds in 'erect posture' after fish presented, with head up and carpal free from body in male; note Damara Tern *S. balaenarum* in foreground (Christine Read)



Figure 7. Part of a group of at least 26 Saunders's Terns *Sternula saundersi*, Rattray's Point, San Sebastian Peninsula, Mozambique, 31 December 2018; non-breeding birds identified using criteria developed by Mullarney & Campbell (2022) for separation from Little Tern *S. albifrons*. The head pattern shows a narrow black line behind the eye with a pure white rear crown and lacks a white 'notch' or hint of eyestripe above the eye, the mantle is pale grey and wings tricoloured, with white secondaries and a contrasting dark carpal bar (Christine Read)

Of particular note, in October 2019, were birds in non-breeding plumage moulting their outer primaries (Fig. 8). There was also at least one that appeared to be in late post-juvenile moult which was seen begging from birds in adult breeding plumage at this time (T. Hardaker *in litt.* 2021). Moulting in *Sternula* is complex (Chandler & Wilds 1994, Olsen & Larsson 1995b, Cherubini *et al.* 1996) and is not well understood in Saunders's Tern, but the late stage of primary moult fits what might be expected for breeders in the Red Sea or Persian Gulf that had commenced primary moult post-breeding. However, the plumage of the breeding-plumaged adults and accompanying juveniles does not match the Red Sea nesting regime. It is notionally possible that the juvenile(s) originated from a colony further east, where the season stretches to September, but juveniles in the Persian Gulf show more abraded plumage by July (see Mullarney & Campbell 2022).

It was noted that the Saunders's Terns did not associate with Little Terns and possibly preferred drier areas of sand for roosting and gathering than Little Terns (E. Marais *in litt.* 2021).

Saunders's Tern is new to Mozambique and a re-addition to the southern African list (T. Hardaker *in litt.* 2019) following its removal by Clancey (1980). Unlike the surprise discovery of Damara Tern, this finding was not unexpected since the migratory range was thought to extend south along the coast of Kenya and Tanzania to latitudes in Madagascar similar to San Sebastian. However, as indicated above, Mullarney & Campbell (2022) suggested that the species has a smaller more oceanic non-breeding range and is probably much less numerous than previously thought (perhaps even warranting a review of its conservation status). This is particularly true in the western Indian Ocean where the species seems to be generally absent or at least greatly outnumbered by Little Tern, and it is possibly mostly limited to Seychelles, the Maldives and other oceanic atolls. Its occurrence in Mozambique may therefore be at the limits of the non-breeding range of birds from the main breeding colonies in the Red Sea and Persian Gulf.

Our evidence suggests that Saunders's Terns in Mozambique may not, or perhaps not only, derive from known breeding populations to the north. We recorded the species in breeding plumage in May–December when courtship-feeding was seen, and well-grown juveniles were begging at adults in September–November coinciding with the non-breeding season for northern breeders, so at least some could form part of a more local (Southern Hemisphere) breeding population. However, some in non-breeding plumage were in primary moult, matching the schedule of the northern breeding population (Figs. 7–8) so it

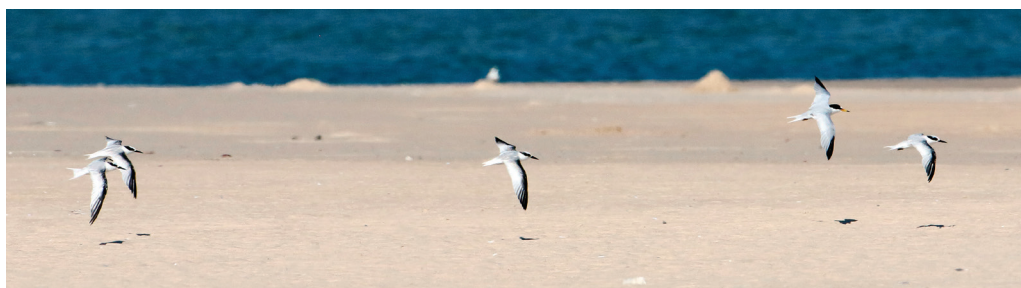


Figure 8. Five Saunders's Terns *Sternula saundersi*, Rattray's Point, San Sebastian Peninsula, Mozambique, 5 October 2019. One adult in breeding plumage (second from right) and three (left and far right) in non-breeding plumage show advanced primary moult. The bird in the centre is a first-calendar-year bird nearly completing post-juvenile body moult, but still with a brownish tinge to median coverts, possibly with some darker markings on mantle, fresh uniform primaries and a shorter, less deeply forked tail. Note contrasting pale secondaries of non-breeders, a feature not shown to same degree by non-breeding Little Terns *S. albigrons* (Mullarney & Campbell 2022) (Trevor Hardaker)

is possible that both migrants from the north and breeders from as yet unknown southern breeding colonies are involved. Saunders's Tern is considered a breeding resident in the southern Red Sea, Somalia and Socotra (although the presence of birds in the non-breeding season in these areas now warrants review given new identification criteria) and it may also breed south of the equator on the Chagos (albeit apparently on a northern timetable). It is noteworthy that Roseate Terns *Sterna dougallii* have also been recorded in breeding plumage and displaying at San Sebastian and other coastal sites nearby (Allport 2018; GA, DG & CR pers. obs. 2019): their breeding sites are unknown. There are, however, no modern records of terns breeding in coastal southern Mozambique and the San Sebastian area is probably too disturbed by people and natural and feral predators for terns to breed successfully without active management. Surveys of the new Grande Bazaruto KBA are needed with particular attention to potential tern breeding areas.

Identification issues

The recent advance in identification of Little and Saunders's Terns (Mullarney & Campbell 2022) is already enabling a better understanding of the non-breeding distributions of these species in the Indian Ocean region. Further research is, however, still needed on field characters and regional distributions (see Mullarney & Campbell 2022).

The findings reported here suggest that Damara Tern may occur in the Indian Ocean, conceivably even as far north as Somalia, in April–September, presenting a new identification challenge in the Indian Ocean. Little Terns should be present in small numbers in the region at this time, but these may be second-calendar-year birds in faded, non-breeding plumage, and probably in active moult. Damara Tern is in non-breeding plumage until at least early September and whilst notionally straightforward to separate from Little / Saunders's Terns by the uniform pearl-grey upperparts, fine-tipped black bill and shorter-legged appearance at rest (pers. obs.), these characters are only diagnostic with good views and in direct comparison. A uniform outer wing and lack of contrasting darker outer primaries is a good feature in freshly moulted Damara Terns, but care is needed as birds in post-breeding primary moult can develop a very similar outer wing pattern to Little / Saunders's Terns, since their older outer primaries darken with age and contrast with the growing inner feathers (Fig. 9). Damara Tern tends to have a dusky, ill-defined carpal bar in fresh non-breeding plumage (Hockey *et al.* 2005) but this fades to leave a more uniform overall tone to the upperwing (pers. obs.). Clear white primary shafts and pale legs are additional features in good views. As yet, there is no good illustration of Damara Tern in non-breeding plumage, the most accurate being in Borrow & Demey (2014).



Figure 9. Damara Tern *Sternula balaenarum*, San Sebastian Peninsula, Mozambique, 9 May 2021. An adult in non-breeding plumage illustrating the dark primary wedge that can be shown in advanced primary moult. The otherwise monotone upperwing, with an ill-defined carpal bar, separates it from Little *S. albifrons* and Saunders's Terns *S. saundersi* in similar plumages; note also pale primary shafts (Niall Perrins)

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Appendix 1: Counts of *Sternula* terns at Rattray's Point, Santuário Bravio de Vilanculos, San Sebastian Peninsula, Vilanculos District, Mozambique, 2018–2021, by ourselves and others. Numbers are maxima from multi-day counts and zeros denote confidently assessed genuine absences. eBird checklists accessible at <https://ebird.org/checklist/xxxx>.

Observers	Date	Little Tern	Saunders's Tern	Damara Tern	<i>Sternula</i> sp(p).	eBird checklist
CR	1 April 2018	25				
GA & DG	6 August 2018	0	5	29		S47777348
DG	28 September 2018	200	0	6+		
CR <i>et al.</i>	31 December 2018	70	26	0	200+	
CR	2 January 2019	26				
CR & DG	9 March 2019	230	0	0		

CR <i>et al.</i>	2 September 2019		4	29		
J. Nicolau, CR <i>et al.</i>	17–21 September 2019		15	75	25	
T. Hardaker <i>et al.</i>	4–7 October 2019	0	80	2		
E. Marais <i>et al.</i>	23 October 2019	70	14–15	0		S60860584; S60905294
CR <i>et al.</i>	24–28 October 2019			100+	14	
N. Perrins <i>et al.</i>	28–31 October 2019	120–140	10	50+		S65417443; S65417442
O. Hamerlynck	30 October–3 November 2019	5	2	11		S61218967
P. Scholtz	14–17 November 2019	60	0	8	70+	
CR	30 November 2019	26	1	0		
E. Marais & A. McLean	11 February 2020	1,200	15	0		S65020517
E. Marais	29 February 2020	206	11	0		S65394214
DG	8 June 2020	0	25	25		
DG	18 July 2020	1	10–20	15–20		
DG	1 January 2021		25–30	0		
CR & N. Perrins	10–14 May 2021	0	12–15	80		S88193201; S88587216
E. Marais	25–28 May 2021	1	4	40		S90788718
E. Marais	1 August 2021	1	6	106		S92617736
J. Hogg	4 August 2021	4–10	4	80	50	S92902659

Appendix 2: Putative specimens of Saunders's Tern *Sternula saundersi* from southern Africa reported by Saunders & Salvin (1896).

Saunders's Tern was considered to occur in the Indian Ocean as far south as South Africa (e.g., by Vaurie 1965) based on three specimens collected in Durban Bay (Saunders & Salvin 1896). Clancey (1982) reported his own attempts to trace and check these specimens, as a result of which he retrospectively justified his prior decision to remove *saundersi* from the southern African list (Clancey 1980).

Saunders & Salvin (1896) mentioned three specimens of *saundersi* from 'Natal' (Table 3): one collected by Verreaux in the early 19th century at the Rijksmuseum Natuurlijke Historie, Leiden (now Naturalis Biodiversity Center), and two in what is now the Natural History Museum, Tring, *ex* Shelley collection. Saunders was mindful of the significance of these records: 'It is certainly remarkable that *saundersi* should go down to Natal (Durban Bay) but after careful examination of the specimens I can come to no other conclusion'. Since the focus of Saunders & Salvin (1896) was the specimens in England it might be inferred that he only examined these two. Clancey (1982) contacted both museums and G. F. Mees (*in litt.*) reported the specimen had by then been catalogued as *S. a. albifrons* which his examination confirmed, but gave no details of the identification. Mees was also of the view that Saunders had not examined the Leiden specimen. The other two birds in Tring were searched for by D. W. Snow at Clancey's request. He was only able to locate one among the *S. albifrons* skins in 1981. The specimen details were not given by Clancey (1982) but D. W. Snow (*in litt.*) reported that 'on the criterion of the three outer primaries it agrees with *albifrons* rather than *saundersi*'. Having received reports on two of the three specimens Clancey (1982) concluded 'the contention that *S. a. saundersi* reaches South Africa rests entirely on incorrectly determined specimens'.

On a visit to NHMUK in December 2019, GA located two specimens among the Little Tern skins, both *ex* Shelley collection and dated 19 March 1878 from Durban Bay. The Shelley Museum label shows them as '*Sterna balaenarum*', i.e. Damara Terns, but this was crossed out on one label, and other labels, presumably added later and bearing the name 'E Mus. Howard Saunders', are both labelled '*Sterna saundersi* Hume'. These are considered to be the specimens to which Saunders & Salvin (1896) referred, one of which was examined by Snow in 1981 (Clancey 1982). J. J. F. J. Jansen and P. Kamminga shared images of the mounted specimen at Naturalis, Leiden. All specimen details are given in Table 3.

TABLE 3

Details of three *Sternula* specimens from South Africa considered by Saunders & Salvin (1896) to be *saundersi*.

Museum	Specimen no.	Collecting date (inferred)	Locality	Species data from labels	Sex	Label and other notes
NHMUK	Unregistered (Shelley no. 3931)	19 March 1878	Durban Bay	Shelley Mus. ' <i>Sterna balaenarum</i> ' E Mus. Howard Saunders ' <i>Sterna saundersi</i> Hume'	M	Sea Gull
NHMUK	Unregistered (Shelley no. 3932)	19 March 1878	Durban Bay	Shelley Mus. <i>Sterna balaenarum</i> E Mus. Howard Saunders ' <i>Sterna saundersi</i> Hume'	F	Common small sea gull found in the Durban Bay. This bird must be a 'mature'
Naturalis	RMNH. AVES.210701	No date	Port Natal	' <i>St. natalensis</i> Verreaux'	F	Schlegel (1863, specimen b) Specimen mounted

NHMUK specimens.—Both are in non-breeding plumage, having a dusky crown with white forehead reaching midway above the eye, dark carpal bar and near-complete moult of the outer primaries with three (specimen 3931) and one (specimen 3932) unmoulted, heavily worn primaries. These outermost primaries show pale shafts in both birds, and on the upperside a blackish shaft to the otherwise greyish, freshly moulted second outermost primary in specimen 3932. The bill is all dark in both. Having been collected in mid March, it might be expected that adults of Little or Saunders's Terns would have plumage and bare-part colours more advanced into breeding condition (Olsen & Larsson 1995a,b). It is therefore likely that both are in their second-calendar year. The timing and unusual plumage of both birds may have been why they were originally identified as Damara then Saunders's Terns. Using Mullarney & Campbell (2022), both can be identified as Little Terns, based on the darker grey mantle and inner wing, as well as broader dark hood on the crown, and blackish shafts on the upperside of the newly moulted primaries is a feature of *S. a. albifrons*.

Naturalis specimen.—Photographed by staff at Naturalis (Fig. 10). There is no collection date, but it appears to be an adult, probably attaining breeding plumage with all-fresh primaries (so had probably recently completed wing moult), and partial breeding head pattern and bill coloration. From these characters, the collecting date is estimated to have been mid February to early April. It has dark primary shafts on the upperside but no clearly darker outer primaries, therefore supporting G. F. Mees' conclusion that this a Little Tern of the nominate race.



Figure 10. Little Tern *Sternula a. albifrons* collected at 'Port Natal' (now Durban), South Africa. Mentioned by Schlegel (1863) but no date of collection given. Cited by Saunders & Salvin (1896) as evidence of *saundersi* occurring in South Africa but lack of black outer primaries and darker grey inner upperwing show this to be a Little Tern (© Naturalis Biodiversity Centre, Leiden)