Status and trends of the seabirds breeding at Tinhosa Grande Island, São Tomé e Príncipe

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BirdLife International

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Table of contents

Introduction .....................................................................................................................................8
Study Area and General Methods ..............................................................................................10
Species accounts ...........................................................................................................................13
    Madeiran Storm-Petrel Oceanodroma castro ....................................................................13
    Brown Booby Sula leucogaster ......................................................................................13
    Methods ...............................................................................................................................13
    Results .................................................................................................................................13
    Discussion ..............................................................................................................................14
Sooty Tern Sterna fuscata .......................................................................................................15
    Methods ...............................................................................................................................15
    Results .................................................................................................................................15
    Discussion ..............................................................................................................................16
Brown noddy Anous stolidus ..................................................................................................17
    Methods ...............................................................................................................................17
    Results .................................................................................................................................17
    Discussion ..............................................................................................................................18
Black noddy Anous minutus ...................................................................................................18
    Methods ...............................................................................................................................19
    Results .................................................................................................................................19
    Discussion ..............................................................................................................................20
General Discussion ...................................................................................................................... 22
References..................................................................................................................................... 25
Summary

The Tinhosas Islands are two islands situated in the waters of São Tomé e Príncipe (STP). They host probably the most important seabird breeding colony in the Gulf of Guinea, but information on the islands’ recent conservation status and population trends was hitherto unpublished or anecdotal. Four of the five seabird species known to breed in São Tomé e Príncipe, namely Brown Booby *Sula leucogaster*, Sooty Tern *Sterna fuscata*, Brown Noddy *Anous stolidus*, and Black Noddy *Anous minutus*, breed in the Tinhosas. The Madeiran Storm-petrel *Oceanodroma castro* is suspected to breed in STP. The last assessment of the Tinhosas colony was completed in 1997; since then anecdotal accounts of exploitation of the birds for human consumption has raised concern about its conservation status. We completed a two day expedition to the Tinhosas islands, estimating status and trends of breeding seabirds. We circumnavigated Tinhosa Pequena, which is ~3 ha in area and is inaccessible by sea due to sheer cliffs. We spent 24 hrs on Tinhosa Grande, which is approximately 20.5 ha in area and is accessible in good sea conditions. We did not encounter any Madeiran Storm-petrels, and the presence of a large population of land crabs makes it extremely unlikely that storm-petrels could breed there. We estimated a breeding population of 300 pairs of Brown Booby, which is 80% less than what was found in the 1997 expedition. There was no direct evidence of exploitation of seabirds. We estimated that 140 000 pairs of Sooty Tern were breeding on Tinhosa Grande, which is 30% more than in 1997. Therefore the site holds ~36% of the species’ regional breeding population, and qualifies as an IBA under the A4i and A4iii Criteria for the species. There were approximately 10 000 (±8 500) Common Noddies on the island, but breeding remains unconfirmed. Finally we estimated a Black Noddy breeding population of 3 500 pairs, which is 12.5% less than was counted in 1997. The site does not qualify as an IBA for this species, as previously thought, because it falls well below the threshold of 1% of the regional population. Apart from a moderate amount of disturbance by fishermen, who land on Tinhosa Grande, there seem to be no immediate threats to the Tinhosas colony. Nevertheless we recommend that multiple visits within and between years should be performed, to census breeders, monitor threats and establish breeding phenologies.
Resumo

As ilhas Tinhosas são duas ilhas situadas nas águas de São Tomé e Príncipe. Acolhem provavelmente a maior colónia de aves marinhas no Golfo da Guiné, no entanto as informações existentes relativas ao seu estado de conservação e tendências populacionais de aves nidificantes estão obsoletas, ou são negligenciáveis. Quatro das cinco espécies de aves marinhas que se sabe nidificarem em São Tomé e Príncipe, nomeadamente o alcatraz-pardo Sula leucogaster, o garajau-preto Sterna fuscata, a tinhosa Anous stolidus, e a tinhosa-de-barrete Anous minutus nidificam nas Tinhosas. Suspeita-se que o roque-de-castro Oceanodroma castro poderá nidificar na área, mas este facto ainda está por provar. A mais recente avaliação da colónia foi concluída em 1997, e desde aí informação proveniente de fontes informais de que aves estariam a ser capturadas para consumo, levantou algumas preocupações sobre o seu estado de conservação. Completámos uma expedição de dois dias às ilhas Tinhosas com o objectivo de estimar o estatuto e tendências populacionais das aves marinhas nidificantes. Circum-navegámos a Tinhosa Pequena, com uma superfície de 3 ha, inacessível devido às suas encostas íngremes. Passámos 24h na Tinhosa Grande, com uma área aproximada de 20,5ha, acessível em condições de mar favoráveis. Não detectámos nenhum roque-de-castro Oceanodroma castro, e a presença de uma numerosa população de caranguejos, faz com que a sua nidificação seja extremamente improvável. Estimámos uma população nidificante de 300 casais de alcatraz-pardo, o que representa um decréscimo de 80% em relação ao que foi descrito pela expedição de 1997. Entendemos que a pressão exercida pela captura será a principal causa de tamanha quebra populacional. No entanto não encontrámos nenhuma indicação que sugerisse que estas capturas persistem. Estimámos que nidificam na Tinhosa Grande 140 000 casais de garajau-preto, o que representa um aumento de 30% em relação a 1997. As ilhas acolhem assim ~36% da população regional nidificante, e preenche os requisitos para ser classificada como uma IBA para esta espécie, segundo os critérios A4i e A4iii. Estavam presentes na ilha aproximadamente 10 000 (±8500) indivíduos de tinhosa, no entanto não foi encontrada nenhuma indicação de que nidifiquem. Finalmente, estimámos uma população nidificante de cerca de 3 500 casais de tinhosa-de-barrete, o que representa um decréscimo de 12,5% em relação a 1997, e ainda assim longe de
representar 1% da população regional nidificante, não preenchendo a ilha os requisitos para classificação como IBA para esta espécie, ao contrário do que se pensava anteriormente. Excluindo um grau de perturbação moderado causado por pescadores que utilizam a Tinhosa Grande como um ponto de paragem, não parecem existir ameaças imediatas às colónias das Tinhosas. Não obstante, recomendamos que sejam realizadas várias visitas ao longo do ano, e em vários anos, com o objectivo de realizar censos das populações nidificantes, monitorizar ameaças, e estabelecer fenologias de reprodução.
Introduction

The pre-historical nature, extent or sizes of seabird communities from the islands of the Gulf of Guinea are unknown, as the human settlement of the main islands (Fernando Po/Bioko, Príncipe, São Tomé and Annobón) happened before accurate records of the breeding seabird species at each island had been quantified (Jones and Tye, 2006). Early researchers focussed on the impressive numbers of endemic landbird forms, which in itself suggests that, if there had been large colonies of breeding seabirds, they were gone by the time biologists began collecting and recording the islands’ biodiversity.

The breeding seabirds of São Tomé e Príncipe (hereafter STP) are common, pan-tropical species of no global conservation concern. Five seabird species are known to breed at STP: White-tailed Tropicbird *Phaeton lepturus*, Brown Booby *Sula leucogaster*, Sooty Tern *Sterna fuscata*, Brown Noddy *Anous stolidus*, and Black Noddy *Anous minutus* (Christy 1995, Jones and Tye 2006). A sixth species, the Madeiran Storm-petrel *Oceanodroma castro*, is believed to breed in the archipelago but this remains to be confirmed (Gascoigne 1995, Monteiro et al. 1997). An exhaustive survey of all potential seabird colonies, including all the uninhabited islands and offshore stacks in STP, was conducted in 1997 by the University of the Azores. The untimely death of the lead author and expedition leader, Luis Monteiro, pre-empted plans to publish the findings (R. Covas pers. comm. to RMW). As a consequence, the findings of the 1997 expedition have languished in the unpublished ‘progress report’ to which we frequently refer here as a means of comparison. For brevity, hereafter we refer to Monteiro et al. (1997) as “the 1997 expedition”.

The 1997 expedition led to two key findings. First, four of the five confirmed breeding species (Brown Booby, Sooty Tern and both noddies) were confined to the Tinhosas islands (Table 1). Second, Tinhosa Grande was accessible and being used by fishermen who were killing booby adults and chicks. Since 2011 we received several informal reports of the establishment of a temporary structure at Tinhosa Grande, likely to be erected by fishermen, suggesting a regular human presence and a possible concomitant exploitation of, and disturbance to, the breeding seabirds.
Table 1. Breeding species at Tinhosas islands. Breeding pairs were estimated in 1997 using several techniques, and from estimated densities at Tinhosa Grande were extrapolated to Tinhosa Pequena. The lower range of estimates is provided here as these reflect more accurately the actual numbers counted.

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Breeding pairs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown Booby</td>
<td>Sula leucogaster</td>
<td>1 500</td>
</tr>
<tr>
<td>Sooty Tern</td>
<td>Sterna fuscata</td>
<td>110 908</td>
</tr>
<tr>
<td>Brown Noddy</td>
<td>Anous stolidus</td>
<td>10 000</td>
</tr>
<tr>
<td>Black Noddy</td>
<td>Anous minutus</td>
<td>4 000</td>
</tr>
</tbody>
</table>

We visited Tinhosa Grande and conducted a census of the breeding seabirds. Here we report on the results, with reference to the 1997 expedition results for comparative purposes.

Figure 1: Aspect of the N ridge of Tinhosa Grande. Photo: Nuno Barros
Study Area and General Methods

São Tomé e Príncipe (01°-00°N, 06°-07°W) lie ca. 250 km west of Africa, in the Gulf of Guinea. The Tinhosas islands comprise two rocky, unvegetated islets ~2 nm apart, lying ~20 nm north of Príncipe. The Tinhosas are classified as an Important Bird Area (IBA) (ST 005), due to large congregations of breeding seabirds (Criterion A4) (BirdLife International, 2013). Tinhosa Pequena (1° 23’N 7° 18’E) (Fig. 1) is approximately 3 ha and has a 0.3-ha stack separated by <100 m of shallow water. Both are completely surrounded by sheer cliffs that we estimate to be ≥15 m high, rendering them completely inaccessible by boat. Tinhosa Grande (1° 21’N 7° 18’E) (Fig. 2) is ca. 20.5 ha and, is also surrounded by steep cliffs. However, there is a small platform on the northern coast where landing is possible under calm-moderate sea conditions. This leads to a gully that is accessible on foot and provide simple access to the interior of the island.

Figure 2: Satellite image of Tinhosa pequena. Source: Instituto Geográfico do Exército
We visited the Tinhosas islands on 13 February 2013, circumnavigating Tinhosa Pequena and its associated stack and then landing on Tinhosa Grande at 8 am. We spent the night on the island and departed at 9 am on 14 February. Breeding birds covered the entire island except for the steepest cliffs (Fig.3), but temporarily abandoned their nests when we approached within 1-50 m (i.e. responses varied considerably between individuals). To minimise heat-stress to exposed eggs and small chicks, we confined work to before 11 am and after 4 pm.
Figure 4: Arrival at Tinhosa Grande. Photo: Nuno Barros

Figure 5: Sooty Tern census field work. Photo: Nuno Barros
Species accounts

Madeiran Storm-Petrel *Oceanodroma castro*

Gascoine (1995) reported it breeding on Tinhosas islands but with no evidence. One individual showing a brood patch was seen and caught at sea off Tinhosas by the 1997 expedition, suggesting it might be breeding nearby. The species is commonly recorded at sea during the dry season (Monteiro et al., 1997; B. Bronkhorst pers. comm.). Due to a large population of land crabs, we consider very unlikely that this species breeds on Tinhosa Grande (or Tinhosa Pequena).

Brown Booby *Sula leucogaster*

**Methods**

In the 1997 expedition the average ratio between Brown Boobies and Sooty Terns was estimated for five density plots of 10x10 m. The total number of individuals was then calculated multiplying the above ratio to the total number of Sooty Terns. Because the species is particularly visible among the other breeding species, we conducted scan counts from vantage points using binoculars (see Ryan et al. 2001 for a full description of this method). We also circumnavigated the island and counted loafers (adults not attending a nest), juveniles and nests likely to have been missed during scan counts. We estimate that we counted 90% of the island.

**Results**

We counted 200 chicks and 88 adults on the nest for a total of 288 nests/breeding pairs. Accounting for the area not counted, we estimate there were 300 pairs of Brown Boobies breeding at Tinhosas Grande. This figure is 80% below the lower estimate from the 1997 expedition, which crudely estimated 1500-3000 nests. There were 323 loafers and juveniles on cliffs, and thus we estimate that 900-1000 birds were attending Tinhosa Grande.
Discussion

Taken at face value, our results indicate that the Tinhosas now hold only 0.45% of the global population. This is below the A4ii criterion (1% of the global population of a congregatory seabird or terrestrial species), disqualifying the site as an IBA for the species.

Due to the aperiodic breeding cycle of many tropical seabirds, including (apparently) the Brown Booby at the Tinhosas, we urge caution in interpreting the smaller numbers of breeding birds in this study compared to 1997. It is possible that our visit coincided with a breeding trough; this can only be ascertained through multiple visits in a single year. However, a significant decrease in breeding population is at least as likely an explanation for the decrease. Fishermen, mostly from São Tomé, have long collected Brown Boobies for sale in São Tomé markets (Christy 1995, Gascoigne 1995). The 1997 expedition found 113 wings, some heads and legs of young (and possibly some adult) on the SE plateau of Tinhosa Grande. We saw no evidence of poaching, but this should be interpreted with caution; the low numbers and dispersed nature of Booby nests would increase the effort required to catch them, but with relatively small returns compared to a colony of >1000 nests. Anecdotally, we noted that all the breeding Brown Boobies were extremely
sensitive to human approach, and all abandoned their nests while we were still some distance from them.

This contrasts with observations of this species being considerably less flight-prone at unexploited islands in the Indian Ocean (RMW pers. obs.). In a more positive vein, if significant exploitation has been the cause of such decline, it remains possible that some breeding pairs have relocated to Tinhosa Pequena or elsewhere.

**Sooty Tern *Sterna fuscata***

*Methods*

The 1997 expedition conducted five density plots of 10x10 m, counting breeding sooty terns and multiplying the results by the total area. We repeated this but conducted nine plots across the island, on slopes facing NE, SW and N. Moreover, we divided the plots equally into three slope categories, these being flat, moderate (<~15°) and steep (≥~15°) in order to do a stratified estimate of the breeding population. The location of plots was semi-random. To minimise disturbance and distances walked through an active colony, we started at our base in the NE corner and chose the closest slope to us, but always moving from flat to moderate to steep slopes. In addition we always moved >50 m between plots to allow incubating or brooding birds to return within 15 minutes of having left their nests.

Once the plot had been demarcated, two counters divided the plot roughly in half and counted all eggs and chicks (i.e. each counter had to count 2.5 m either side). The third person took up a vantage point and counted all chicks that left the plot during the setup and counting stages.

*Results*

We observed all possible stages of reproduction during our visit, including courtship, copulation, incubation, hatching and chicks of all ages including pre-fledging and fully fledged juveniles. Of the nine plots the ratio of eggs:chicks was exactly 2:1 (408 eggs, 202 chicks) and this did not vary meaningfully with slope (Table 2). We estimated a
breeding population of 140 000 pairs at Tinhosa Grande, with a mean density of 0.68 ± 0.36 nests/m² (Table 2).

Table 2. Numbers of Sooty Tern eggs and chicks (with Standard Deviation) at Tinhosas Grande Island, February 2013. Ratio is eggs:chicks, density is based on 100 m² plots and area for the island is based on rough estimates from field sketches and superimposed onto a geo-referenced map.

<table>
<thead>
<tr>
<th>Slope</th>
<th>Eggs</th>
<th>Chicks</th>
<th>Ratio</th>
<th>Nests/m²</th>
<th>Area (ha)</th>
<th>Estimated pairs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flat</td>
<td>64.3 (21.5)</td>
<td>28.7 (2.5)</td>
<td>2.2</td>
<td>0.93</td>
<td>8.2</td>
<td>76 260</td>
</tr>
<tr>
<td>Moderate</td>
<td>44.7 (4.7)</td>
<td>23.3 (14.7)</td>
<td>1.8</td>
<td>0.68</td>
<td>4.1</td>
<td>27 880</td>
</tr>
<tr>
<td>Steep</td>
<td>27.0 (6.7)</td>
<td>15.3 (7.8)</td>
<td>2.0</td>
<td>0.42</td>
<td>8.2</td>
<td>34 686</td>
</tr>
<tr>
<td>Total</td>
<td>(mean)</td>
<td></td>
<td></td>
<td>(mean)</td>
<td>(mean)</td>
<td>(mean)</td>
</tr>
<tr>
<td></td>
<td>408</td>
<td>202</td>
<td>(2.0)</td>
<td>(0.68)</td>
<td>20.5</td>
<td>138 826</td>
</tr>
</tbody>
</table>

Figure 7: Adult Sooty Tern on egg. Photo: Nuno Barros

Discussion

The Sooty Tern is the most abundant breeding species at the Tinhosas and we recorded an increase of 30% compared to the 0.47 nests/m² estimated in 1997. Assuming similar
densities and ratios of flat, moderate and steep slopes between Grande and Pequena, there were ~20 000 nests on Tinhosa Pequena, bringing the total population for the islands to ~160 000 pairs. This can be extrapolated to ~320 000 breeding birds, and assuming an addition of 30% loafers (Harrison, 1974), a total of ~416 000 birds. The Tinhosas islands hold >30% of the species’ regional breeding population i.e. breeding in Gulf of Guinea and South Atlantic, which was estimated at 900 000 individuals in 2002 (Delany Scott, 2006). Thus the Tinhosas islands qualify as an IBA under the A4i and A4iii Criteria for the Sooty Tern. The 1997 expedition recorded almost no eggs, and mostly fledglings in April, and adults on eggs and mainly pre-fledglings in June and July, which suggests an egg-laying peak in February or March 1997. Our data support that periodicity, suggesting an annual cycle with two peaks. Although that is the simplest explanation it requires verification, through repeat surveys within and between years.

**Brown noddy *Anous stolidus***

**Methods**

To estimate numbers of Brown Noddies we used a similar approach to that of the 1997 expedition. In 1997, densities were estimated by counting numbers in transects relative to numbers of Sooty Terns, and extrapolating the resultant ratio to estimate total Brown Noddy density. We took two digital photographs and subsampled four sections on each image. Each Brown Noddy and each Sooty Tern was counted, and the ratio was then applied to the total number of Sooty Terns to give a crude estimate (correct within an order of magnitude) of the numbers of Brown Noddies present. Subsamples were chosen at random and encompassed a full screenshot, with no overlapping sections.

**Results**

The individuals present showed no signs of breeding behaviour and were scattered with no apparent pattern around the island. They were mainly adults, and some fledged young.
We estimate that there were some 200 000 individual Sooty Terns on the island (140 000 birds attending nests and lower numbers of loafers/second members of a pair at nests). The photographic comparison of relative numbers yielded 0.055 (+0.043) Brown Noddies to Sooty Terns. Thus there were approximately 10 000 (+8500) Brown Noddies on the island.

![Perched Brown Noddy with Sooty Tern. Photo: Nuno Barros](image)

**Figure 8:** Perched Brown Noddy with Sooty Tern. Photo: Nuno Barros

**Discussion**

We observed mainly adults and some fledged young. The 1997 expedition recorded adults and fledged young in April, and only roosting adults in July. This suggests a year-round presence (Basilio, 1957), but it probably breeds in the dry season, i.e. July to September (Naurois in Christy 1996). The lack of eggs/active nests might indicate that either the species is not breeding on the island, but maybe on nearby islets, or eggs and nests were overlooked due to similarity with Sooty Tern ones. The claim of a breeding population of 10 000-20 000 pairs is not supported, and we note with concern that breeding has yet to be demonstrated at the Tinhosas islands. Therefore, despite the high numbers of birds present, IBA criteria for breeding species cannot be applied with certainty to this site for Brown Noddy. In order to confirm breeding, census breeders and establish breeding phenologies, there is a requirement for multiple visits within and between years.
Black noddy *Anous minutus*

**Methods**

We estimated Black Noddy nesting densities by counting all nests along a transect from base camp to the lighthouse (Fig. 2). The transect was 500 m long and 30 m wide, i.e. 1.5 ha. We counted numbers of attended nests (i.e. adults sitting on nests with fresh nesting material) and numbers of active nests (i.e. with eggs) per sub-colony. There were no Black Noddy nests in flat areas. To estimate the total breeding population we estimated the area of suitable nesting habitat, and extrapolated the mean density from the transect. We measured 10 eggs (long axis, short axis, weight) using Vernier caliper and a 100 g Pesola spring balance (Table 4).

**Results**

In the 500-m transect there were 17 sub-colonies with 258 occupied nests, of which 69 were active, defined as having an egg or chick (Table 3). The ratio of active to occupied nests was low (0.30), which suggests that the census was prior to peak egg-laying. There were 172 occupied nests/ha. The island has ~16 ha of suitable (sloped) habitat, which equates to 2 750 active nests at the time. We interpret this to equate to a maximum breeding population of ~3000 pairs for Tinhosa Grande.

![Image of Black Noddy colony](image.png)

**Figure 9:** Aspect of Black Noddy colony. Photo: Nuno Barros
Table 3: Active and total number of Black Noddy nests in 17 sub-colonies found along the transect performed

<table>
<thead>
<tr>
<th>Sub-colony</th>
<th>Active nests/ Sub-colony</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean ± SD</td>
<td>15.2 ± 10.5</td>
<td>4.1 ± 4.2</td>
</tr>
<tr>
<td>Range</td>
<td>1 - 36</td>
<td>1 - 16</td>
</tr>
<tr>
<td>Total</td>
<td>258</td>
<td>69</td>
</tr>
</tbody>
</table>

Table 4: Measurements from 10 Black Noddy eggs from Tinhosa Grande Island. Note egg weights not necessarily from fresh eggs.

<table>
<thead>
<tr>
<th>Egg</th>
<th>Long axis (mm)</th>
<th>Short axis (mm)</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egg 1</td>
<td>44.4</td>
<td>31.6</td>
<td>24.0</td>
</tr>
<tr>
<td>Egg 2</td>
<td>46.4</td>
<td>30.6</td>
<td>23.0</td>
</tr>
<tr>
<td>Egg 3</td>
<td>41.9</td>
<td>30.8</td>
<td>21.0</td>
</tr>
<tr>
<td>Egg 4</td>
<td>43.9</td>
<td>30.9</td>
<td>22.5</td>
</tr>
<tr>
<td>Egg 5</td>
<td>42.9</td>
<td>31.0</td>
<td>22.5</td>
</tr>
<tr>
<td>Egg 6</td>
<td>43.5</td>
<td>31.3</td>
<td>22.5</td>
</tr>
<tr>
<td>Egg 7</td>
<td>45.1</td>
<td>31.5</td>
<td>23.5</td>
</tr>
<tr>
<td>Egg 8</td>
<td>47.7</td>
<td>32.2</td>
<td>26.0</td>
</tr>
<tr>
<td>Egg 9</td>
<td>44.2</td>
<td>31.0</td>
<td>22.5</td>
</tr>
<tr>
<td>Egg 10</td>
<td>45.1</td>
<td>32.6</td>
<td>25.5</td>
</tr>
</tbody>
</table>

| Mean | 44.5 | 31.4 | 23.3 |
| SD   | 1.7  | 0.6  | 1.5  |

Discussion

We recorded 2 750 active nests at the time, equivalent to 5 500 breeding birds on Tinhosa Grande. Tinhosa Pequena has ~3 ha of suitable habitat, and the breeding population for this island was extrapolated to ~500 active nests at the time. Tinhosas islands can therefore hold ~6 500 breeding birds. The regional population of Black Noddy, breeding in the tropical Atlantic islands to Gulf of Guinea islands, is estimated to be 1 000 000 individuals (Delaney & Scott, 2006), thus the Tinhosas Islands do not
qualify as an IBA for the species, under A4i criteria, contrary to previous assessments (BirdLife International 2013).

We recorded adults loafing in sub-colonies, attending nests and incubating. In addition we saw two chicks in nests outside the transect. Eggs were also recorded in June (Monteiro et al., 1997) and September – October (Kaestner in litt. to P. Atkinson, in Jones and Tye, 2006). The breeding phenology of Black Noodies lasts ~90 days (Gauger, 1999), meaning that eggs laid in February would result in chicks being present in April. However, the 1997 expedition reported only adults in April, implying that breeding is unlikely to be on a 12-month cycle, in keeping with the breeding phenology of this species on Ascension Island (Ashmole, 1963). This too moots the requirement for multiple visits within and between years, to census breeders and establish breeding phenologies. Some plastic litter was recorded at some nests.

Figure 10: Black Noddy nest with plastic litter. Photo: Nuno Barros
General Discussion

Although none of the seabird species recorded breeding in STP is of global conservation concern (BirdLife International 2013), they are an integral part of the Gulf of Guinea marine ecosystem. Their persistence in the region hinges on the preservation of the Tinhosas islands as breeding sanctuaries. The islands are most probably the most important seabird breeding colony in the Gulf of Guinea and the eastern tropical Atlantic (Jones and Tye 2006). Exploitation of Brown Boobies raises appreciable concern that the region’s main breeding stronghold is under threat. We confirmed the presence of a semi-permanent structure in the NE tip of the island, which can shelter a fishing boat crew (6 – 8 fishermen). This structure showed signs of frequent use, suggesting low to moderate levels of disturbance, which if limited to that section of the island could probably be ignored. However, if visitors regularly venture further, to exploit Booby (or other seabird) resources, the disturbance will be significant.

Figure 11: Fishermen hut at Tinhosa Grande. Note the lighthouse on the skyline at left. Photo: Nuno Barros
Currently, anthropogenic impacts appear to be limited to occasional disturbance. Nevertheless, the colony is still to be considered vulnerable, due to its small size and accessibility. Its remoteness combined with limited resources of
national authorities, mean that realistically, no restriction or ban on access or activities there can be enforced. One option to be considered is the installation of a sign, at the landing site, warning possible visitors of the sensitivity of the colony and of the illegality of exploiting seabirds.

Diminishing returns from a decreasing Brown Booby population at Tinhosa Grande and the complete inaccessibility of Tinhosas Pequena mean that if exploitation is continuing, local extinction is unlikely. However, the capacity of Tinhosas Pequena to support breeding boobies is limited by its size.

According to our latest population estimates, Tinhosas islands still qualifies as an IBA, however classification criteria are to be updated (Table 5).

We recommend at least one annual survey, to access the status of the colony and population trends. We also suggest a number of visits in same year to clarify breeding phenologies.

Table 5: Summary of number of breeding pairs estimated for each species on Tinhosa Grande and % increase or decrease compared to the results of the 1997 expedition.

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Breeding pairs</th>
<th>Increase/ Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown Booby</td>
<td>Sula leucogaster</td>
<td>300</td>
<td>- 80%</td>
</tr>
<tr>
<td>Sooty Tern</td>
<td>Sterna fuscata</td>
<td>140 000</td>
<td>+ 30%</td>
</tr>
<tr>
<td>Brown Noddy</td>
<td>Anous stolidus</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Black Noddy</td>
<td>Anous minutus</td>
<td>3 500</td>
<td>-12,5%</td>
</tr>
</tbody>
</table>
Figure 14: Aspect of the NE slope of Tinhosa Grande. Photo: Nuno Barros

Figure 15: Evening on the NE ridge of Tinhosa Grande. Photo: Nuno Barros
References


BirdLife International (2013) *Important Bird Areas factsheet: Tinhosas islands.* Downloaded from http://www.birdlife.org on 03/03/2013


26