Indian Ocean Seabird Group

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EDITO

Dear seabird lovers, here is the eleventh issue of the Indian Ocean Seabird Group newsletter!

We are traveling through all the Western Indian Ocean here, from Mayotte, Madagascar and Réunion Island to Tromelin, the Seychelles and the Chagos Archipelago.

The emblematic white-tailed tropicbirds are spotlighted in two articles, in two very different environments. Exclusive data are also presented concerning other species but with no more spoil, we wish you a happy reading!

Sabine & Matthieu

ANNOUNCEMENTS

WIOMSA – 12th scientific symposium

The twelfth WIOMSA scientific symposium will be held in Port Elizabeth, South Africa, from 10th to 15th October 2022. This will be a hybrid virtual and in-person symposium.

Several of us will be there and will present various researches on seabirds of the WIO. There will be also a very interesting special session on “Seabird nutrient and rat eradications to bolster island terrestrial ecosystems and coral reef resilience” led by Nick Graham from the University of Lancaster.

We look forward to see you there.

MEMBERS CONTRIBUTIONS

1°) The first multi-site assessment of white-tailed tropicbird population status and breeding trends in Seychelles

Seychelles Islands Foundation

Seychelles supports the greatest abundance of seabirds in the tropical Indian Ocean, but regional seabird population breeding success and trend data are not readily available despite data collection spanning many years at several locations.

Tropicbird on Aldabra (© A. Burt).

White-tailed Tropicbird (*Phaethon lepturus*) breeding success monitoring in particular is standard practice on conservation islands like Cousin, Aride and Aldabra as well as on privately owned islands like Cousine and more recently Denis island. Every year the Seychelles Seabird Meeting, hosted by Nature Seychelles, meets to share information and discuss seabird trends across Seychelles. In 2016, when a decline in tropicbird breeding success was detected at Aldabra we decided to bring together these monitoring datasets from five key nesting sites of white-tailed tropicbirds to present the first nation-wide assessment of the status and trends of breeding success.

Overall, we found that mean annual breeding success was lowest (15%) for Aldabra Atoll and much higher (33–55%) in the inner islands (Aride, Cousine, Denis, and Cousin). In the inner islands the species shows signs of potential population declines despite having stable and comparatively high breeding success. This contrasts with Aldabra where nesting activity has been relatively stable, but a decline in breeding success is causing concern and the findings have highlighted the require of additional research.

Tropicbird monitoring (© A. Burt).

In this context, Dr Annette Fayet, from the University of Oxford, worked with the Seychelles Islands Foundation (SIF) and the Island Conservation Society (ICS) in 2018 and 2019. Tracking devices were deployed on tropicbirds on Aride and Aldabra to test for potential differences in food availability, and camera traps were set to capture the causes of nest failure.

We believe this study demonstrates the great benefit of collaborative multi-site research, monitoring and analysis. Overall, we propose the adoption of standardized monitoring programs and increased site coverage across Seychelles and the broader Western Indian Ocean, to strengthen the collective effort towards the conservation management of this and other seabird species within this global seabird hotspot.

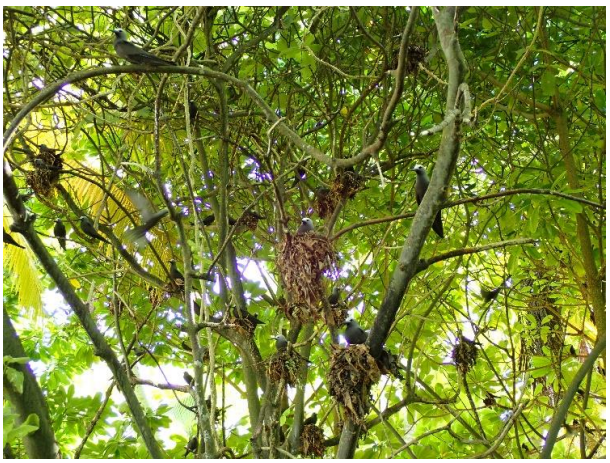
There are additional recommendations to be found in the paper, recently published in the journal *Avian Conservation and Ecology*, which is open access and can be accessed here: https://www.ace-eco.org/vol16/iss2/art28/

Full paper reference:
Burt, A. J., F. Cagua, C. Sanchez, L. Calabrese, J. van de Crommenacker, J. McClelland, N. Shah, H. Richards, and N. Bunbury. 2021. Combining monitoring data from multiple sites to assess population status and trends of White-tailed Tropicbirds (Phaethon lepturus) in the Seychelles. Avian Conservation and Ecology 16(2):28. https://doi.org/10.5751/ACE-01858-160228

2°) Multi-disciplinary research expedition exploring seabird-island-reef systems in the Chagos archipelago

Jennifer Appoo, Nia Stephens, Ruth Dunn, Rucha Karkarey, Ines Lange, Eleanor Thomson & Yadvinder Malhi

The Chagos Archipelago is home to eighteen species of breeding seabirds, many of which are present in globally significant numbers. The breeding colonies of these seabirds are unevenly distributed across the archipelago due to historical clearances of native forests and the introduction of rats. The number of breeding seabirds is substantially higher on islands without rats, and previous studies have established the significant benefits of seabird nutrients on the near-shore coral reef ecosystems surrounding these islands. To extend this research, in January 2022, a team of ecologists from multiple institutions and disciplines embarked on a joint scientific expedition to assess the impacts of seabird nutrient flows and feedbacks across the seabird-island-reef system of the Chagos Archipelago.



Breeding colony of lesser noddies on Grande Ile Coquillage in Peros Banhos atoll (© J. Appoo).

Our research involved conducting seabird censuses to obtain up-to-date information on the status, distributions and phenology of the breeding seabirds. In addition to this, some of the most abundant species of seabirds were sampled to assess the influence of their feeding ecology and physiology on nutrient signals. Samples were taken from both seabird-inhabited and rat-

infested islands. Around these islands, reef organisms were also sampled to assess the spatial patterns of seabird nutrient dispersal along different coral reef trophic pathways. This research was conducted alongside visual surveys of predation rates of fish and benthic communities, to assess the effects of seabird nutrients on key ecosystem functions such as predation, fish nutrient storage, and fish nutrient provisioning.

An emperor fish predating on a crab during a visual survey (© R. Karkarey).

Reef carbonate production and erosion rates were quantified to assess the influence of seabird nutrients on reef geo-ecological functions, such as habitat provision, reef growth and sediment production around rat-free and rat-infested islands. This involves assessing multiple parameters such as coral growth rates, parrotfish bite rates and reef carbonate accretion and erosion through experimental deployments.

Surveying coral reefs in the Chagos archipelago (© I. Lange).

On the islands, fixed long term forest sampling plots were set up to compare the productivity and nutrient status of vegetation growing on seabird and rat-infested islands. Leaves, soil and vegetation characteristics were sampled to quantify the ecosystem productivity and biogeochemical cycling of native and invasive forests. The fixed plots will be revisited to assess the growth and dynamics of the vegetation over time. These plots will form part of a global network of tropical forest plots. Over some sites, multispectral drones were flown to assess if nutrient status could be mapped through drone-based and satellite-based remote sensing.

Drone-collected map of Petit Bois Mangue, a bird-rich island in the Peros Banhos atoll (© Y. Malhi).

Although the fieldwork was impacted by bad weather conditions, the data collected will enable for the first time a multi-disciplinary and collaborative research on the implications of seabird nutrients for island productivity and ecosystem and geo-ecological functioning of coral reefs in the largest marine protected area in the Indian Ocean. A big thank you to Captain Killian and the crew of the Grampian Frontier and the Bertarelli Foundation for making this expedition possible.

The expedition team (© Y. Malhi).

3°) Discovery of a very large bridled tern colony at Nosy Manjaboaka, Madagascar, and first evidence of the possible breeding of wedge-tailed shearwaters on this island

Matthieu Le Corre & Dominique Ponton

Seabirds in Madagascar are threatened by poaching and unregulated egg harvest. Furthermore, many islands are very rarely or have never been visited by seabird ornithologists and the current status of some colonies is unknown. Here we report the incidental finding of a very large bridled tern colony at Nosy Manjaboaka, Morombe, Atsimo-Andrefana, Madagascar.

On 28 December 2021, Dominique Ponton visited Nosy Manjoaboka (22,395 °S, 43,245 °E), a small islet (1.16 km^2) off the village of Ambatomila, 100 km north of Toliara. He immediately noticed a very large number of seabirds flying, roosting on coastal rocks and sit on the ground at nest sites throughout the entire islet. He also found nests with eggs. He did not attempt to enter the colony and count the nests or birds to avoid disturbance but he estimated that there were at least 1000 birds. He identified the species as the bridled tern (*Onychoprion anaethetus*). The photos below clearly confirm this identification.

Various views showing the large number of terns breeding on the islet (© D. Ponton).

Bridled terns of Nosy Manjaboaka (© D. Ponton).

According to local villagers the terns are present every year, during 2 or 3 months at this time of the year. As in other places were terns breed, villagers regularly visit the island to collect eggs and capture adults or possibly large chicks. DP also found several corpses of birds very probably poached (including one bird which may be a wedge-tailed shearwater [*Ardenna pacifica*], another very interesting finding, as this species is known to breed at only one site in Madagascar).

Corpse of a Wedge-tailed shearwater, presumably poached. This is currently the only clue suggesting that the species (very rare in Madagascar) is probably breeding on the islet (© D. Ponton).

There are only three breeding colonies of the bridled tern in Madagascar, and all of them are small: Nosy Hara Marine National Park (30 pairs), Barren Islands (500 pairs) and Nosy Manitra – Nosimborona (100 pairs). Furthermore, at all these places data are old and the current situation is not known (see Le Corre et al. in press). Globally in the western Indian Ocean the largest colonies are in East Africa and in the Seychelles. Only one of these colonies is more than 3000 pairs (in Recif, Seychelles). Thus, the colony of Nosy Manjaboaka may be one of the largest colonies of bridled terns of the western Indian Ocean!

This finding is extremely interesting and shows that we still have a lot to learn about seabirds in many coastal islets of Madagascar. Further investigations will be conducted next year to precisely estimate the colony, to assess the threats and to start discussion with villagers, stakeholders and local authorities to preserve this site.

4°) Evidence of plastic ingestion and impacts on seabirds in Tromelin island

Audrey Cartraud

Tromelin is a small tropical island of about 1 km² located 435 km East of Madagascar and is managed by the Terres Australes et Antarctiques Francaises since 2005. Seven seabirds' species are breeding on Tromelin with over 3,500 pairs present on the island.

Plastic pollution is a worldwide issue affecting all oceans and is nowadays well documented. Impacts on marine wildlife have been reported on numerous species and the most common ones includes entanglement, ingestion, and chemical contamination. A large number of seabirds are affected by this type of pollution, including species found on Tromelin island such as red-footed boobies (*Sula sula*) and masked boobies (*Sula dactylatra*).

A masked booby found with plastic in the digestive track (© A. Cartraud).

In January 2022, a masked booby has been found dead on Tromelin with a piece of plastic of 40 cm long, weighting 33.4 g causing stomach obstruction. The piece of plastic was going from the stomach up to its beak and can be assumed to be the cause of the bird's death. This is the first evidence of plastic ingestion causing death on Tromelin.

Plastic items can also be used by seabirds as building nests material, where it can cause entanglement, resulting in direct injury or death. Photographs of seabirds catching a fragment of plastic fork, a piece of cloth or a rope from the litter on the beach have been taken on Tromelin, and similar items have been photographed as part of nests materials.

A red-footed booby using plastic to build part of its nest (© A. Cartraud).

The plastic items found in nests could be used as an indicator of the litter washed up on Tromelin coastline. This indicator could be studied here, given the large number of seabirds nesting on the island and the presence of anthropogenic nesting materials. Moreover, all nesting seabirds' populations are studied on Tromelin each year or every two years depending on the species as well as marine debris washed up on the beach that are collected and analyzed every three months since October 2020, a study part of the DALI (Data Litter) program, in collaboration with the CEDRE/CNRS.

A young red-footed booby playing with a rope from a fishing net (© A. Cartraud).

Entanglement in plastic items is also recorded on Tromelin, with a red footed booby photographed flying with a piece of plastic around the neck, as shown on the two photos below taken in January 2022. This evidence of entanglement of seabirds has been previously recorded but is one of the first recorded on Tromelin.

Another young red-footed booby entangled with plastic debris (© A. Cartraud).

All these observations have been realized on Tromelin from environmental TAAF officers present all year round on the island, working on the Eparses Islands Biodiversity Action Plan 2020-2025.

5°) Seabirds and the city: a citizen science program to study white-tailed tropicbirds of Réunion Island breeding in urban habitats

Sabine Orlowski, Matthieu Le Corre & François-Xavier Couzi

The white-tailed tropicbird (*Phaethon lepturus*) is a pantropical seabird widely distributed in the Western Indian Ocean. Its natural breeding habitats are islets, coastal or inland cliffs and native lowland forests. However, in Reunion Island, white-tailed tropicbird nests are reported in urban or peri-urban habitats since at least 20 years. This behavior is extremely surprising and has never been documented elsewhere in the world to the best of our knowledge. The negative or positive impacts of this new environment on breeders is unknown.

In this urban context, involving local people is crucial. We implemented a citizen science project named “Paille-en-queue la kour” (which stand for “A tropicbird in your garden” in Reunion’s creole) to investigate this phenomenon. We present here the first results.

A white-tailed tropicbird nesting in a natural environment at Réunion Island (© S. Orlowski).

To date, we have received 60 reports of white-tailed tropicbird nests in (peri-)urban environment, all over the island. Nest types were very diverse: some were similar to natural nests (cavities in rocks or trees) but others were partly or entirely artificial (cavities in concrete walls, in water discharge pipes, in the counterweight of a crane for instance). An adult has even prospected in the bedroom of a woman!

Nest environments were also very diverse, from gardens or parcs to noisy streets or worksites.

Various type of nest sites used by white-tailed tropicbird in urban areas at Réunion Island (© S. Orlowski, T. Fontaine, M. Hoarau, C. Blanc Chane-Waye, M. Sadowski).

We are now monitoring 32 nests, to investigate whether urban nesting could be beneficial or detrimental for tropicbirds. People that reported each nest were invited to realize the monitoring by themselves, recording weekly the adult or chick presence on a technical form, while our team is monitoring 20 nests in their natural habitat. We also deployed camera traps to detect interactions with pets or other potential causes of nest failures. We will soon be able to compare breeding success in urban versus natural environments. These are preliminary results and we are going to extend our dataset. Stay tuned!

https://www.facebook.com/Paille-en-queue-la-kour-108022241429414

6°) Seasonality and trends of migrant terns of Mayotte from 2014 to 2021

Florinah Razafimandimby H., Thomas Ferrari, Emilien Dautrey, François Guilhaumon & Matthieu Le Corre

Located in the Mozambique Channel, Mayotte has a great diversity of coastal habitats (islets, mudflats, mangroves, wetlands) favorable for migrating seabirds, both for roosting and feeding. The archipelago is composed of a large and a small island and 23 uninhabited islets in the lagoon among which 12 are used as roosting sites by terns. Terns are facing increasing human disturbance at these roosts. We analyzed the distribution, seasonal variations and temporal trends in the number of two species of migrant terns: the lesser crested tern (*Thalasseus bengalensis*) originating from the northern Indian Ocean and the Red Sea and the brown noddy (*Anous stodilus*) probably originating from Seychelles, East Africa or Madagascar.

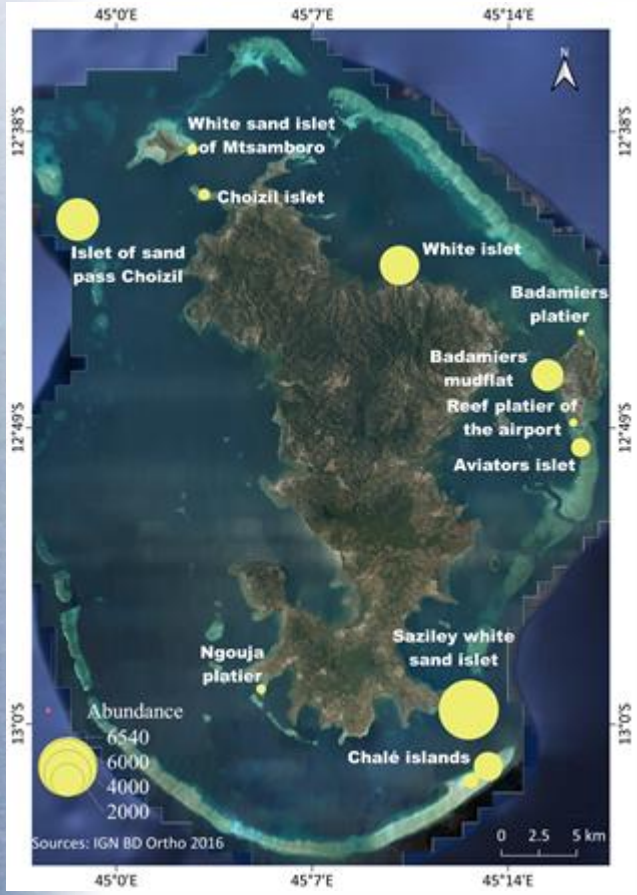
Lesser Crested Tern (© T. Ferrari, GEPOMAY) and Brown Noddy (© G. Adt).

Two remote sandy islets are of major importance for terns with an average of 6540 ± 2607 lesser crested terns and 3329 ± 2443 brown noddies respectively during the peak period (January).

Large roost of lesser crested terns and brown noddies at the Saziley white sand islet (© T.Ferrari GEPOMAY).

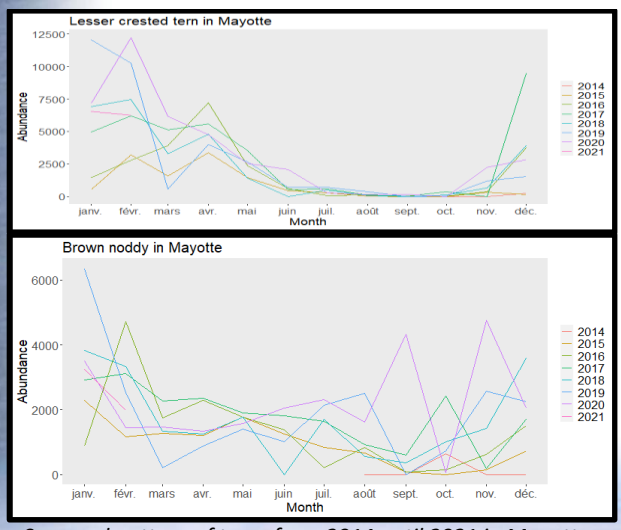
Numbers of the lesser crested tern found wintering in Mayotte represent around 15 to 18% of the biogeographical population which was

estimated between 40,000 and 47,000 individuals (Delany *et al*. 2009, Bird Life International 2017).



Distribution of the main roosts of terns at Mayotte. The abundances are the mean of the maximum of total daily counts in each site.

The lesser crested tern is highly seasonal with an arrival in December and departure in February. The brown noddy is observed all year round with a peak from November to February.



Seasonal pattern of terns from 2014 until 2021 in Mayotte.

Both populations are stable since 2014 or slightly increasing. These results confirm the importance of Mayotte as a wintering site for these two species.

This study is conducted under the framework of the "Observatoire des Oiseaux Côtiers de Mayotte" (OOCM) in order to implement a long-term census scheme for waders and terns migrating or wintering on Mayotte island. We are thankful to the "Direction de l'Environnement de l'Aménagement et du Logement" (DEAL), "Agence Française de la Biodiversité" (AFB) for the funding of this study and "Parc Naturel Marin de Mayotte" (PNMM), "Conseil Départemental de Mayotte (CDM) and "ULM de Mayotte" for their supports. This work is part of the MSc internship of Florinah Razafimandimby which received a "Bourse d'Excellence" from the University of Réunion Island.

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7°) Red-footed boobies nest for the first time on Bird Island, Seychelles

Chris Feare

From the late eighteenth and early nineteenth centuries, human occupation of Indian Ocean islands north of Madagascar had catastrophic effects on seabirds. Harvest for food, and especially habitat change on the small islands, led to decreases or losses of breeding populations, with boobies being particularly hard hit. Ground-nesting masked (*Sula dactylatra*) and brown (*S. leucogaster*) boobies were especially vulnerable to capture for food, either fresh or preserved by salting. Tree-nesting red-footed boobies (*S. sula*) were also harvested for food but were particularly susceptible to habitat changes that involved destruction of their woodland habitats. Felling of trees for construction of accommodation and boats deprived them of nest sites, but total clearance of vegetation to aid guano mining in the late nineteenth and early to mid-twentieth centuries led to extinction of once-large breeding colonies on the raised coral Assumption and St Pierre islands.

While extinction of masked and brown booby colonies continued in to the mid (Bird Island) and late twentieth century (Desnoeufs Island in the Amirantes), red-footed boobies have shown signs of recovery, not on Assumption or St Pierre, but on other islands in the region. In the 1960s and 1970s a small breeding population established in tall Casuarina trees on South Island of Farquhar Atoll. Subsequently, they colonised Casuarina trees on Marie-Louise Island in the southern Amirantes. They also nest on St Francois Atoll in the Amirantes, where large numbers also roost overnight.

On the northernmost island of Seychelles, Bird Island, red-footed boobies, mainly juveniles, have occasionally roosted at night among roosting lesser (and smaller numbers of greater) frigatebirds, in the tops of tall Casuarinas since at least the mid-1970s. Since then the number of night-roosting frigatebirds has increased and smaller numbers can now be found roosting throughout the day.

Since 2015, tens of red-footed boobies, sometimes including adults, have joined the frigatebirds with a few also present during the day. In 2019, >500 boobies were counted in the roost and we noted that evening arrivals of both frigatebirds and boobies were largely from the north-west. In 2021 an evening count revealed 980 boobies, again mainly juveniles in various plumage development stages but including adults, but more than 100 birds were present throughout the day.

The red-footed booby nest found by Darrel in a casuarina (© D. Isaac).

After our departure from the island in late August 2021, Bird Island's tour guide, Darrel Isaac, contacted us to say he had found what appeared to be a nest among the red-footed boobies high in a tall Casuarina. With no climbing equipment, but armed with a camera, Darrel climbed the tree, confirmed that the structure was indeed a nest, and that it contained a downy chick!

Darrel Isaac (© C. Fear).

This is the first record of breeding red-footed boobies from the "central" Seychelles and represents a significant breeding range expansion within the archipelago. For Bird Island, it is a welcome addition to the already huge numbers of breeding seabirds, which includes sooty terns, lesser and brown noddies, white terns, wedge-tailed shearwaters and white-tailed tropicbirds, justifying the island's BirdLife status as an Important Bird Area. In addition, large numbers of both species of frigatebird and bridled terns roost overnight, the last having made on (failed) breeding attempt.

8°) Following the foraging activity of red-footed boobies (*Sula sula*) on Farquhar Atoll to inform conservation management within the Seychelles Marine Spatial Plan

Aurelie Hector & Jake Letori

Seabirds play a fundamental role in marine food webs and their distribution indicative of ocean health. As part of a Seychelles Conservation and Climate Adaptation Trust (SeyCCAT) funded project, Island Conservation Society (ICS) are

collaborating with the Zoological Society of London (ZSL), University of Reunion and the Island Biodiversity and Conservation Centre (UniSey) to investigate the foraging distribution of the red-footed booby (*Sula sula)* that nest on Farquhar Atoll, Seychelles. The results obtained will help inform the protection and conservation management of this species such as in the Seychelles Marine Spatial Planning Assessment.

An adult white morph red-footed booby with a 10-day old chick (left) and an adult white-tailed brown morph (right) (© J. Letori).

In April 2022, a team consisting of Matthieu Le Corre (University of La Reunion), Malcolm Nicoll (ZSL) and Jake Letori and Aurelie Hector (Island Conservation Society) deployed 54 GPS tracking devices (39 CatLog GPS; 15 Axytrek; under-tail mounted) and 41 GLS locators on chick rearing adults. Each bird was ringed with a unique metal band and their neck sprayed blue to ease their identification for tag recovery. The tracking devices were left on the birds for about a week before recovering to download their movements. All the tags were successfully recovered and worked perfectly well. Regurgitates were examined, flying fish and squid being on their menu. Sex was also determined by voice, males being squeaker and higher pitched compared to females; this will be backed up through DNA analysis taken from feather samples.

GPS deployment below the central tail feathers (© J. Appoo).

Initial tracking results demonstrate that almost all of the red-footed boobies forage from dawn to dusk; spending 12hrs at sea, however a few whose nests failed, spent up to three days at sea before returning to the atoll. The breeding birds foraged within a radius of 200 km around Farquhar Atoll in all directions, and one individual travelled as far as 280 km south-east. Axytrek data (speed, rotation, wing beat, and dive depth) will provide a more in-depth look at foraging behaviour, and genetics will help us to understand the population connectivity on a regional and global level.

The happy team (© J. Letori).

The project will provide a detailed assessment to inform management decisions on the way forward to protect marine habitats in Seychelles. Even though there are still many unanswered questions about the red-footed booby, we can already see how important the waters around Farquhar Atoll are for their survival and population growth.

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Call for contributions: This is the eleventh newsletter of the Group. We plan to prepare the next issue for 2023 and you can send your articles to Sabine or Matthieu from now! ☺

Guidelines: articles sent should be around 300 words, written in English, with at least one photo or figure (with credits and legend) to illustrate. Please indicate the author(s) and affiliation(s) and the e-mail address of the contact author. If your article is linked to a scientific publication, you can also include a reference of the paper at the end of the article.