



Status Report for Monteiro's Storm-petrel *Hydrobates monteiroi*

Lisbon, August, 2016



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Status Report for Monteiro's Storm-petrel *Hydrobates monteiroi*. Report of the Action A10, Project LIFE EuroSAP

Sociedade Portuguesa para o Estudo das Aves, 2016

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1. BACKGROUND

Monteiro's Storm-petrel *Hydrobates monteiroi* is a small procellariiform species endemic to the Azores archipelago (subtropical northeastern Atlantic), where it is known to breed only on three islets (Praia, Baixo and Baleia) situated off Graciosa Island, and other two islets (Alagoa) located off Flores Island. Despite any egg or chick was observed on Alagoa and Baleia islets due to the inaccessibility of the nesting areas, the intense call activity recorded during the entire breeding season is assumed as proof for the presence of breeding pairs (Oliveira *et al.* 2016). The species was recently separated from Band-rumped Storm-petrel *Hydrobates castro* (Bolton *et al.* 2008). Total population size was previously estimated at 250-300 breeding pairs by Bolton *et al.* (2008) and recently updated to 328-378 pairs (Oliveira *et al.* 2016). Although Monteiro's Storm-petrels leave their colonies by the end of the breeding period, stable isotopes analysis and at-sea observations indicate that the species may remain in the Azorean waters the whole year round (Bolton *et al.* 2008), though this is yet to be confirm.

2. RATIONALE FOR 2015 POPULATION ASSESSMENT

Monteiro's Storm-petrel has been identified as having an unfavourable conservation status in Europe as it is still listed in his former taxonomic group, together with Band-rumped Storm-petrel, in Annex I of the Birds Directive. The species is classified as 'Vulnerable' in the IUCN Red List as a result of a very small population which is restricted to breeding on few small islets. It is therefore highly susceptible to stochastic events and remains at risk of mammalian introduction and avian predators. A more accurate population assessment for this species is required before any Action Plan is produced/updated particularly as the current size and trend of the population is not known on other than Praia islet. On Praia islet, numbers and breeding success have been monitored each year since 2000 (Bried *et al.* 2009, Bried & Neves, 2015). Under the Monteiro's Storm-petrel Project (phase 1) funded through the Prevention Extinction Programme (PEP) of BirdLife International, data collection and assessment of the species' population status on Praia and Baixo islets began in 2014 and is ongoing. The compilation and identification of further needs for this assessment were supported by a three-day workshop that occurred on Graciosa Island in April 2015. While being mostly technical, an important objective of the workshop is to ensure transparency and endorsement by all concerned parties (relevant experts, Member State, international organizations and other stakeholders) as a springboard for further progress in the development of the Action Plan.

3. HABITAT INFORMATION

Monteiro's Storm-petrel is known to breed on few small islets located off Graciosa Island (Praia, Baixo and Baleia) and Flores Island (Alagoa), on flat low-lying areas but also in cliffs. Both islets are located quite close to the main islands (between 100 m and 1 km). Preliminary results indicate that during the breeding period adults can forage up to 500 km away from their breeding colony (Magalhães *et al.* in prep). The non-breeding distribution of Monteiro's Storm-petrel is currently unknown, although evidences from trophic markers (stable isotope signatures of feathers) and at-sea observations suggest that individuals remain in the Azorean waters throughout the year (Bolton *et al.* 2008).

4. POPULATION SIZE

Population size was first estimated at 250-300 breeding pairs by Bolton *et al.* (2008) based on the latest colonies census during the breeding periods (April-September) of 1993, 1994 (Monteiro *et al.* 1996), and 1996-1998 (Monteiro *et al.* 1999). During the 1993 and 1994 breeding seasons, surveys took place on Praia and Baixo islets, including nest counting and mist-netting. The resulting estimate was 200 breeding pairs (Monteiro *et al.* 1996). 100 additional pairs were estimated to breed on other islets off Ponta da Barca (Graciosa Island) and Alagoa (Flores Island) based on a qualitative comparison of calling intensity, given what was observed at the Praia and Baixo colonies and accounting for the area of suitable breeding habitat (Monteiro *et al.* 1999). During April-August 2001, Opper *et al.* (2013) estimated a total population size of 942 (95% Confidence Intervals were 654-1357) birds on Praia Islet. Recently, population size on Praia Islet was updated to 178 breeding pairs, resulting in a global population size estimated at 328-378 pairs (Oliveira *et al.* 2016). The size of the non-breeding population remains unknown for the entire archipelago, and therefore, globally.

5. BREEDING POPULATION TREND

A lack of data on key sites combined with the absence of up-to-date data from one of the major breeding colonies (namely Baixo Islet) means that it is difficult to determine a global population trend for the species. However, at Praia Islet, the population has been increasing since 2000, mainly due to artificial nest installation (Bried *et al.* 2009, Bried and Neves 2015, Oliveira *et al.* 2016). Breeding in natural nests did not vary significantly over the last fifteen years (Bried and Neves 2015, Oliveira *et al.* 2016). Nevertheless, annual breeding success was found to be quite variable but never exceeded 55% in natural or artificial nests, with a minimum value in artificial nests around 39% (Bried and Neves 2015). It is likely that such a low production occurred as a consequence of predation on chicks by the introduced Madeiran Lizard *Teira dugesi* (Bried and Neves 2015). Procellariiformes have been shown to exhibit a relatively low sensitivity to changes in fecundity, compared to changes in adult survival (Sæther and Bakker 2000, Cuthbert *et al.* 2001, Oro *et al.* 2004, Louzao *et al.* 2006). However, and despite the recent increase observed on Praia Islet, attention must be paid to low productivity rates which could potentially lead to rapid future population declines, and ultimately, to extinction if no generation renewal occurs. Climate stochasticity should also play a role in influencing breeding performance and thus the population dynamics of the species (Robert *et al.* 2014).

The numbers and population trends on Baixo, Baleia and Alagoa islets are currently unknown. Evaluating these populations is urgently needed in order to produce a global population assessment. This will be particularly challenging on Baleia and Alagoa islets where the colonies are very inaccessible.

6. CONSERVATION AND LEGAL STATUS

The Global IUCN Red List Category of Monteiro's Storm-petrel is currently 'Vulnerable' under the criteria D1+2 (Criteria Version 3.1). The population of Monteiro's Storm-petrel comprises fewer than 1000 mature individuals (Criterion D1) and the population has only been confirmed at 5 locations in the Azores (Baixo, Praia, Baleia and Alagoa islets; BirdLife International 2013). The species is sensitive to the effects of human activities or stochastic events within a very short time period (Criteria D2) in an uncertain future, and is thus capable of becoming 'Critically Endangered' or even 'Extinct' in a very short period of time (BirdLife International 2013). The population is considered to be stable, and apart from the increase noted on Praia Islet (Bried and Neves 2015), there is no data on trends for the other main colonies. Habitat restoration, namely the installation of large numbers of artificial nest boxes is responsible for the increase on Praia Islet colony, due to an increase in nest occupancy (Bolton *et al.* 2008, Bried *et al.* 2009, Bried and Neves 2015).

Since the original drafts from the Bird Directive (79/147/EC)¹ there have been only a few taxonomic revisions leading to splits (in two or more species) of species listed in Annex I. Monteiro's Storm-petrel is one of these, according to the Assessment and reporting under Article 12 of the Birds Directive (2011)². As such, Monteiro's Storm-petrel is included in the Annex I of the Birds Directive and in the Annex II (Strictly Protected Fauna species) of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)³, lumped as Band-rumped Storm-Petrel *Hydrobates castro* though. However, the process to update the list of the bird species covered by Article 1 of the Birds Directive is ongoing, and soon the species will be properly refereed.

1 Bird Directive (79/147/EC) available on <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009L0147>

2 Available on https://www.bfn.de/fileadmin/MDB/documents/themen/monitoring/art_12_guidelines_final_dec_11.pdf

3 Convention on the conservation of European wildlife and natural habitats (Bern Convention) available on <http://conventions.coe.int/Treaty/FR/Treaties/Html/104-2.htm>

7. THREATS

Monteiro's Storm-petrel population is thought to be stable, and both breeding islets are free of introduced mammalian predators (Bolton *et al.* 2008, Bried and Neves 2015).

Despite this, it is important to consider potential drivers responsible for the decline of the Azorean seabirds such as: incidental fishery bycatch, introduced mammalian predators (rats, cats, mice, ferrets and weasels), competition for nesting cavities with introduced rabbits, predation by other vertebrates (including native species such as the Long-eared Owl *Asio otus* and Yellow-legged gull *Larus michahellis*; Bolton *et al.* 2008, Oliveira *et al.* 2016), disturbance and habitat loss caused by tourism and urbanization, oil spills, pollution and contaminants, competition with fisheries, wind farms (inshore, onshore and offshore), light pollution, harvesting, intra- and inter-specific competition.

7.1 Introduced Predators

The Madeiran Lizard *Teira dugesii* was introduced on all Azorean islands and most islets. On Praia Islet they are often found near or inside nest boxes even when occupied by breeding birds (Bried *et al.* 2009, Bried and Neves 2015). Dead storm-petrel chicks showing signs of consumption, presumably by lizards, were found out of some artificial nests and strong evidences of body injuries from lizards were also found in live chicks at the nest (Bried and Neves 2015, Bried *pers. comm.*). During the 2015 breeding season predation by lizards was confirmed at Praia islet when a chick close to fledging was observed being *carried* down a cliff and bitten by several lizards (Neves *pers. comm.*). The juvenile was recovered dead with wounds in the head and in the ventral area. The bird was in a good body condition and no other possible cause of death beyond lizard predation was detected. The fact that lizards are able to kill chicks close to fledging poses the threat that they might be able to start preying adults, if they are not yet doing it. It is therefore a high priority to control lizard density in the islet, especially close to the artificial nests. On Selvagem Grande, the Madeiran Lizard preys around 5% of Cory's Shearwater *Calonectris borealis* chicks and predation occurs either during or shortly after hatching. Non-systematic observations also indicated that the chicks of three other species of burrowing petrels (Bulwer's Petrel *Bulweria bulwerii*, Band-rumped Storm-petrel and White-faced Storm-petrel, *Pelagodroma marina*) were preyed upon by Madeiran Lizards on Selvagem Grande (Matias *et al.* 2009).

7.2 Predation by rats

The introduction of invasive mammals, mainly rodents, affects at least 50 species on more than 40 different islands (Oppel *et al.* 2011). Currently, the invasive rodents in the Azores are Black Rat *Rattus rattus*, Brown Rat *Rattus norvegicus* and House Mouse *Mus domesticus*. All of them are pointed out as successful predators of birds in the Azores. On São Miguel Island, invasive rodents predate eggs and chicks of the 'Endangered' Azores Bullfinch *Pyrrhula murina* (Oliveira *et al.* 2008), an endemic laurel forest passerine, with a population estimated at 1265 individuals (Coelho, 2014). On Corvo Island, Black Rats, House Mice and Domestic Cats *Felis catus* are responsible for the low breeding success of Cory's Shearwaters (Hervías *et al.* 2012). Black rats also predate eggs of Common Terns *Sterna hirundo* and Roseate Terns *Sterna dougallii* in the Azores (Amaral *et al.* 2010).

All islets where the species is known to breed are currently free of introduced mammals, but their proximity to the close main islands makes them vulnerable to accidental introductions (Bolton *et al.* 2008). Rats are excellent swimmers and can survive to swimming up to 2 km (Harris *et al.* 2011). A cargo ship containing livestock ran aground on one of the breeding islets in 2000, leading to concerns over contamination, and rodents escaping ashore (Bolton *et al.* 2008).

7.3 Predation by feral cats

All islets are currently free of cats, but their close proximity to the main islands makes them vulnerable to accidental introduction (Bolton *et al.* 2008). Fledglings may also be attracted by artificial lights to Graciosa and Flores islands, and predation upon landed birds by cats may occur.

7.4 Predation by other vertebrates

High predation rates by Long-eared Owls which are resident in the Azores have been reported. Up to 40 adults and prospecting subadults have been killed in some seasons, including some known (from ring recoveries) to be breeders (Bolton *et al.* 2008).

Yellow-legged Gulls *Larus michahellis* are known to prey on storm-petrels, including those from Praia and Baixo islets (Pedro *et al.* 2013, Oliveira *et al.* 2016), but their impact on Monteiro's Storm-petrels is unknown.

7.5 Inter-specific competition

Monteiro's Storm-Petrel annual productivity is reduced by inter-specific competition with large Procellariiformes, essentially Cory's Shearwater, but the impact of this competition remains to be evaluated (Bolton *et al.* 2004 Bried and Neves 2015).

According to Bried *et al.* (2009), Feral Pigeons *Columba livia* may pose problems and might prevent smaller petrels from breeding.

7.6 Disturbance from tourism and urbanization

On Praia Islet, public visitation is allowed, but visitors must be accompanied by a Graciosa Natural Park warden. However, fortuitous visitation still occurs, essentially in summer, during the most sensitive stage of the breeding cycle of most seabirds. Visitors may disturb seabird colonies by displacing the stones covering storm-petrels nest boxes and walking around across tern colonies (Bried *et al.* 2009).

7.7 Legal incompatibilities

Both islets lie within 2 km of the main shipping route for large passenger ferries and container ships docking on Graciosa. A cargo ship containing livestock ran aground on one of the breeding islets in 2000, leading to concerns over pollution (Bolton *et al.* 2008).

7.8 Oil spills, pollution and contaminants

Baixo and Praia islets lie within 2 km of the main shipping route for large passenger ferries and container ships docking on Graciosa. A cargo ship containing livestock ran aground on Praia Islet in 2000, leading to concern regarding contamination (Bolton *et al.* 2008). Graciosa Island main harbour is located 1km away from Praia Islet. A contingency and action plan in case of oil spills and contaminant leakage is inexistent but required, including regular analysis of the surrounding waters.

7.9 Light Pollution

No data is available about light pollution effect on Monteiro's Storm-petrels. However, the fledglings of several Procellariiform species are attracted by artificial lighting and crash into structures after being disoriented, including individuals of other storm-petrel species (Rodríguez *et al.* 2009, Rodríguez *et al.* 2015).

7.10 Climate change

No data available. Increment on sea surface temperature may reduce prey availability and seabird productivity.

7.11 Natural disasters

Azorean islands are affected by strong natural events like earthquakes, heavy raining, landslides and erosion. No data about the impact of such effects is available.

7.12 Competition from fisheries

No data

7.13 Inshore, onshore and offshore wind farms

No data

7.14 Illegal Hunting

Illegal hunting appears not to occur.

7.15 Subsistence harvesting

Despite having been reported during 15th century, direct harvesting (for food and oil) of storm-petrels by the thousands (Frutuoso 1561), presently it is not identified as a threat to the species any longer.

7.16 Incidental fishing bycatch

Little is known about seabird bycatch in the Azores waters, and no data is available on the impact of fisheries on Monteiro's Storm-petrel populations, but this threat is thought to be negligible.

8. FUNDED PROJECTS

8.1 EU Funded Projects

During the last 20 years, 9 projects have been conducted with European Commission support that benefited somehow Monteiro's storm-petrel, namely:

- Conservation of Marine Birds and Their Habitats in the Azores – **LIFE94 NAT/P/001034**
- MARE (Integrated Management of Coastal and Marine Sites of the Azores) – B4-3200 /98-509, **LIFE 98 NAT/P/005275**
- Marine IBA - Important bird areas for seabirds in Portugal – **LIFE04 NAT/P/000213**
- OGAMP (Planning and Management of Marine Protected Areas) - **INTERREG IIIB-MAC/4.2/A2**
- MARMAC (Knowledge, Promotion and Valorization for a Sustainable Utilization of Marine Protected Areas in the Macaronesia) - **INTERREG IIIB/FEDER/MARMAC/003-4/2005-6**
- Mecanismos da dinâmica da biodiversidade insular – **FEDER FCOMP-01-0124-FEDER-007061**
- SAFE ISLANDS FOR SEABIRDS (Safe islands for seabirds/ Initiating the restoration of seabird-driven ecosystems in the Azores) - **LIFE07 NAT/P/000649**
- MACAROAVES (Desenvolvimento rural e turismo ornitológico) - MAC/3/C280
- LIFE Euro SAP (Coordinated Efforts for International Species Recovery)

The project LIFE07 NAT/P/000649, although not working directly with this species, was implemented on Corvo Island where several Monteiro's Storm-petrel individuals were detected by call identification around the cliffs. However, breeding behaviour and locations are still to be confirmed.

8.2 Non-EU Funded Projects

- AMIR (Seabirds as indicators of marine food supplies and structure of the foodwebs in the Azores Region) - PRAXIS XXI/2/2.1/MAR/1680/95. Fundação para a Ciência e Tecnologia (FCT), national funding agency.
- PAINHO (Ecology and conservation of the temporally segregated populations of the Madeiran storm-petrel *Oceanodroma castro* breeding in the Azores) - **POCTI-BIA-13194/98**, PRAXIS/C/BIA/13194/98. Fundação para a Ciência e Tecnologia (FCT), national funding agency.
- Mecanismos da dinâmica da biodiversidade insular - **PTDC/BIA-BDE/67286/2006**. Fundação para a Ciência e Tecnologia (FCT), national funding agency.
- Monteiro's Storm-petrel Project (phase 1) – Preventing Extinctions Programme (PEP), BirdLife International
- MoniAves (Monitorização integrada de aves marinhas nos açores) – Programme launched by the Regional Environment Directorate of the Azores
- Studying relatedness and phenotypic traits of Monteiro's storm-petrels: what do they reveal about mating patterns? Seabird Group grant 2015.

9. STAKEHOLDERS

While implementing “the Monteiro’s Storm-petrel Project (phase 1)”, a list of 14 relevant stakeholders was compiled. It is crucial to involve a large variety and diversity of stakeholders, in order to have all groups and interests represented in the process of population assessment. The stakeholder list includes the Regional Government, the Local Municipality, the Natural Park, BirdLife partners, the Universities of Azores and Coimbra, seabird experts who have been studying the species (e.g. Joël Bried, Mark Bolton), NGO, local fishermen, tourism companies and island inhabitants.

There are four main stages of stakeholders involvement: data compilation; attendance and inputs at species workshop; review and revision of the Monteiro’s Storm-Petrel Status Report (previous population assessment); and plan implementation.

It is important to identify the correct stakeholders for each step of the process and to engage them accordingly. To do so, social, cultural and environmental factors need to be considered. Language, at all stages, should be important. The most obvious issue with language is the simple difficulty in understanding the discussions. Therefore, in all stages of the process it should be ensured that the language of stakeholders is addressed and documents and workshops are clear and understandable. Cultural differences also need to be considered, including values, beliefs, interests, and level of understanding. As such, it is important to approach stakeholders in the most appropriate way, whether through local associations, in-country BirdLife Partners, local government, local experts, etc.

A full list of identified stakeholders and recommended contact is available for the different stages of the process and included:

- SPEA – Portuguese Society for the Study of Birds
- MARE/DOP – University of Azores
- RSPB
- Other seabird experts (e.g. Joël Bried)
- Azores Government – Direção Regional dos Assuntos do Mar
- Azores Government – Direção Regional do Ambiente
- Azores Government – Direção Regional do Turismo
- Azores Government – Direção Regional das Pescas
- Azorina, S. A.
- Graciosa Natural Park
- Turismo dos Açores
- Câmara Municipal de Santa Cruz da Graciosa
- Nautigraciosa
- MARE – University of Coimbra
- Portos dos Açores, S.A.
- BirdLife International
- Local schools (Escola Básica e Secundária da Graciosa)
- Power supply company – Electricidade dos Açores (EDA)
- Polícia Marítima
- Guarda Nacional Republicana
- Junta de Freguesia da Luz
- Junta de Freguesia de São Mateus
- Junta de Freguesia de Santa Cruz
- Junta de Freguesia de Guadalupe

- Associação Cultural, Desportiva e Recreativa da Graciosa
- GRATER (Associação de desenvolvimento local)
- Clube Naval da Graciosa
- Jardim de Infância “O Balão”
- Scouts
- Calypso Açores
- Gracipescas
- Local fishermen association

10. CONSERVATION ACTIONS UNDERWAY

Praia and Baixo islets are Special Protected Areas and natural reserves (Baixo Islet Natural Reserve and Praia Islet Natural Reserve). In 2008, both islets together with Baleia Islet were included in the Graciosa Natural Park, a fact which provides them with regional legal protection⁴. The previous year, Graciosa Island was recognized as an UNESCO Biosphere Reserve.

Research, monitoring and conservation on Praia Islet were initiated by the Department of Fisheries and Oceanography of the Azores University (DOP-UAç) in the early 1990s.- Conservation measures have included rabbit eradication, reduction of soil erosion, reintroduction of indigenous plants and monitoring seabird populations (Bried *et al.* 2009). In 2000-2001 more than 150 nest boxes were installed to increase population size and reduce inter-specific competition with larger Procellariiform species within the framework of a research project conducted by DOP-UAç researchers (Bolton *et al.* 2004). The artificial nests were extremely successful, leading to a large increase in annual productivity (Bolton *et al.* 2004, Bried *et al.* 2009). Nest boxes had higher productivity than natural nests, probably due to the greater degree of protection they provided (Bried *et al.* 2009), and were also easier to monitor. On the same islet, using capture-mark-recapture data, trends were analysed from 1993 to 2012, and a significant variation in breeding success was found among nests (Robert *et al.* 2012, 2014 and unpublished data).

Another possible cause of the higher breeding success in artificial nests can be that these cannot be excavated by Cory's Shearwaters or flooded (Robert *et al.* 2014).

Nowadays, Graciosa Natural Park and MARE/DOP's seabird team ensure the long-term monitoring of the species on Praia Islet. Annually, all nest boxes are monitored in order to study demography, assess breeding success, and ring chicks and any adult not yet ringed. Simultaneously, nest box maintenance is regularly done – e.g. clearing vegetation, replacing old lids, etc. Monteiro's Storm-petrel indirectly benefits from actions put in place targeting the main threats to tern species.

In 2014-2015, SPEA initiated the "Monteiro's Storm-petrel Project (phase 1)" supported by BirdLife through the "Preventing Extinctions Programme". The main goals of the project were to monitor and evaluate the threats to the breeding populations of Monteiro's Storm-Petrel on Baixo and Praia islets; to install 50 nest boxes on Baixo Islet; to cover the nest boxes previously installed by DOP (Oceanography and Fisheries Department) on Praia Islet; and to create a working group with the relevant stakeholders, the *Monteiroi Task Force* in order to compile and identify additional conservation and research priorities for Monteiro's Storm-petrel, and to initiate the process allowing defining the European Plan of Action for this species, which will be followed-up under the current project LIFE EuroSAP.

Since 2013 the Graciosa Natural Park has carried out the control and cutting of the vegetation introduced in 1998, to sustain the soil after the eradication of rabbits, particularly with *Festuca petraea*, in order to preserve the nesting areas of seabirds, especially terns. Simultaneously, African Tamarisk *Tamarix africana* was also controlled as it was completely taking over some parts of the islet.

4 [Decreto Legislativo Regional n.º 45/2008/A, de 5 de novembro](#)

11. CONSERVATION ACTIONS PROPOSED

The proposed conservation actions aim to obtain up-to-date population estimates and to install artificial nest boxes on Baixo Islet, to reduce potential impacts of rodents (if they were to be accidentally introduced) to one of the currently known breeding islets, and to design an emergency plan in case of rodent introduction. It is also proposed to maintain the breeding population monitoring scheme, which simultaneously will allow the early detection of rodent introductions, to assess predation by other potential predators including gulls, Common Starlings *Sturnus vulgaris* and reptiles (particularly Madeiran Lizard), and to consider a possible implementation of a control/eradication plan. In the short-term it is vital to regularly control the density of lizards around the artificial nests, at least until the possibility of eradication is fully investigated.

12. RESEARCH NEEDED

- a. Population size
 - Continuing the annual monitoring of breeding success and population level at Praia and Baixo islets- **High priority**
 - Starting counts (through indirect methods) during the breeding period on other islets situated off Graciosa Island - **High priority**
 - Confirming the existence of colonies on Corvo and Flores islands, particularly on the adjacent islets, and obtain reliable estimates of those breeding population size - **High priority**

- b. Methodology
 - Reaching consensus and develop the best-practice census methodology - **High priority**
 - Standardisation of the methodology and terminology used - **High priority**
 - Call listening on islets located off Graciosa, Corvo and Flores islands to correlate the results with breeding number estimates - **High priority**
 - Studies on the demographic parameters to determine non-breeding population size -**High priority**
 - Ensuring contribution of all data to BirdLife's seabird database - **Medium priority**

- c. Demographic parameters
 - Determining ecological requirements and carry out extensive demographic monitoring, particularly looking at the impact of threats on breeding success, adult survival probabilities and the relative importance of these parameters – **High priority**
 - Selecting a representative number of breeding colonies to conduct demographic studies – **High priority**
 - Conducting simultaneous robust monitoring of population size at the same colonies – **High priority**
 - Gathering oceanographic and fisheries data (identification of prey, distribution of prey, which fish species are being fished, etc.) in the Azorean waters and relate it to seabird data distribution (including which areas are important for the species) – **High priority**

- d. Future work
 - Identifying main foraging and resting areas at sea during the breeding and non breeding seasons – **Medium priority**
 - Developing studies about diet and trophic structure – **Medium priority**
 - Database with all data from occupied colonies on all known colonies – **Low priority**

- e. Threats
 - Determining the impact of climate changes – **High priority**
 - Evaluating inter-specific competition - **High priority**
 - Evaluating the impact of Long-eared Owls on Praia islet – **High priority**
 - Evaluating the impact of Yellow-legged Gull on Baixo and Praia Islets, Graciosa - **High priority**
 - Assessing the impact of introduced mammals (rats, cats and ferrets) and lizards at the colonies (if any) from Corvo and Flores - **High priority**
 - Confirming and evaluate the impact of Madeiran Lizard on Praia and Baixo islets, Graciosa - **Medium priority**

- Researching on the impact of disturbance from tourism on Praia islet - **Medium priority**
- Determining if there is an impact of light pollution - **Medium priority**
- Determining if there is an impact from plastic contaminants – **Medium priority**
- Researching on the possible impact of accidental bycatch in the population - **Low priority**
- Determining whether storm-petrels suffer from competition with fisheries - **Low priority**
- Determining if there is an impact of wind farms – **Low Priority**
- Determining the impact of habitat loss on Flores and Corvo islands- **Low priority**

13. MONITORING NEEDED

- a. Population trends
 - Determining population trends on Baixo islet and continuing to the annual monitoring of Praia Islet population - **High priority**
- b. Threats
 - Monitoring predation impact on Baixo islet, Yellow-legged Gull - **High priority**
 - Monitoring breeding islets, Praia and Baixo for rodent introductions - **High priority**
 - Monitoring predation impact on Praia islet by Madeiran Lizard, Long-eared Owls – **High to medium priority**
 - Monitoring additional threats such as competition with other species (e.g. Cory's Shearwater), light pollution, wind farms, habitat loss, competition with fisheries – **High to medium priority**
 - Monitoring accidental bycatch at sea - **Low priority**

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