Agreement on the Conservation of Albatrosses and Petrels

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Potential role of the Brazilian albatross and petrel sample bank to ACAP species research and conservation

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SUMMARY

The Brazilian Albatrosses and Petrels Sample Bank - BAAP intend to promote quality and standardized storage of samples as well as the communication between educational institutions, museums, researchers interested in projects that benefit Procellariiformes conservation initiatives. BAAP may also help to enhance ornithological collections of Brazilian museums and supply them with new material. The on-line information provided by BAAP should increase the sample number that researchers deal in their projects, once it will be easier and faster to find their target samples. Beyond BAAP's relevance in supporting studies concerning genetics, health, pollution, plastic prevalence and other priority subjects to achieve the National Plan of Action for Procellariiformes Conservation (PLANACAP) and ACAP goals, other South-American countries which ratify the Agreement can take BAAP as a model to implement in their territory.

The Brazilian Albatross and Petrel Sample Bank (*Banco Nacional de Amostras de Albatrozes e Petréis - BAAP*, in Portuguese) is a result of goals proposed by the National Plan of Action (NPOA) for the Conservation of Albatrosses and Petrels (*Plano de Ação para a Conservação de Albatrozes e Petréis - PLANACAP*, in Portuguese). PLANACAP targets both resident and migratory Procellariiformes in Brazilian territory in its goals towards protection. Throughout its two cycles (2006-2011; 2012-2017), PLANACAP developed actions in research, education and conservation areas (Neves et al. 2006). In respect to research, the second cycle of five years of this NPOA focused on the potential of albatrosses and petrels as environmental health indicators.

To answer this question, the proposed tasks were to evaluate health parameters for Procellariiformes by standardized guidelines (developing them, if needed) and inform the results (ICMBio, 2013). PLANACAP is a governmental initiative in partnership with different sectors of Brazilian community (non-governmental organizations, universities, fishing industries, oil companies) and it is currently in its third cycle of implementation (2018-2023).

BAAP is in consonance with the goals proposed by the Agreement for the Conservation of Albatrosses and Petrels – ACAP. ACAP work program discussed within the Tenth Meeting of ACAP's Advisory presented tasks that assisted the establishment of the Brazilian sample bank. Here are some examples: a) *maintain a database of site-specific information on the availability of samples relevant to studies of population genetics of ACAP species*, c) *develop list of researchers/institutions/regional nodes for bycatch sample*, d) *develop guidelines to quantify the ingestion of plastics by albatrosses and petrels*, and e) *develop guidelines for tissue sampling in dead birds* (ACAP, 2017a). Besides these globally proposed actions, Brazil committed specifically to the creation of a national sample bank in 2017 Implementation Report (ACAP, 2017b).

Amongst PLANACAP/ACAP demands on a sample bank creation, since 2013 Projeto Albatroz maintains samples from seabird bycaught in long-line fisheries collected over southwestern Atlantic Ocean. Samples from bycatch birds are crucial as they provide information about health condition of fresh Procellariiformes in their wintering grounds. Those birds have great chance to be in good health, so their samples may serve as a baseline for what is an albatross or petrel in good condition (Mörner, 2002). Aware of the extreme importance of samples from bycatch birds, the National Center for Bird Conservation and Research (*Centro Nacional de Pesquisa e Conservação de Aves Silvestres – ICMBio/CEMAVE*, in Portuguese) in 2015 offered a training course focused on sample collection from bycaught albatrosses and petrels specifically for scientific on-board observers (OBO) from several Brazilian institutions. It magnifies the sample collection from OBO's attending south and southeast Brazilian fleet (ICMBio, 2015).

Samples from beached Procellariiformes are also valuable. Along the South and Southeast Brazilian Coast, since 2015 different institutions on service for the Brazilian oiling company – PETROBRAS, carry out the by the Monitoring of Beached SeabirdsProject of Santos' Basin (*Projeto de Monitoramento de Praias da Bacia de Santos – PMP-BS*, in Portuguese). PMP-BS monitors daily about 1,041 km between

Ubatuba, São Paulo State (23°S) and Laguna, Santa Catarina State (28°S). The 2016-2017 PMP-BS Official Report informed 7,595 beached birds of 53 different species (PETROBRAS, 2018). It offers a unique opportunity of sample exchange since PMP-BS follows strict sampling protocols quite similar to those proposed by Uhart et al. (2016; 2017) in ACAP publications. Hence, a national sample bank capable to manage samples from different sources – bycatch, beach surveys, donation from museum and universities, proved to be a good initiative to gather all this material in one public collection and bring further knowledge about albatrosses and petrels.

Within this context, BAAP aims to (1) catalog, assemble and manage biological samples of albatrosses and petrels from bycatch, beach surveys, wildlife rehabilitation centers, museums and universities donators or others. (2) Promote sample exchange between researchers and institutions enhancing the sample collection of one single carcass. (3) Make all the information about samples in BAAP public. (4) Act as a backup of samples for BAAP partners, thus preventing a total loss in case of a casualty to a partner's collection. (5) Provide an overview of samples available in Brazilian territory to all interested researchers.

BAAP is equipped with ultra-freezer (-80°C) to store samples that require deep freezing (e.g. viral and bacterial culture), freezers -20°C, mobile shelving to store room temperature samples, laminar flow cabinet and other lab equipment to sample processing and organizing. The collected samples may be housed in BAAP's location or may stay with the partner, which in this particular case provides only the information about these samples (Figure 1). Terms of Reference and a Cooperation Agreement are the legal documents that protect BAAP and its partners. BAAP is still in its first years of existence and has potential to grow, nevertheless at the present date has stored samples from 16 species of Procellariiformes in a total of 2,300 samples, numbers given at Table 1. Ten Brazilian institutions cooperate with BAAP.

Figure 1: BAAP flowchart explaining input and output processes.

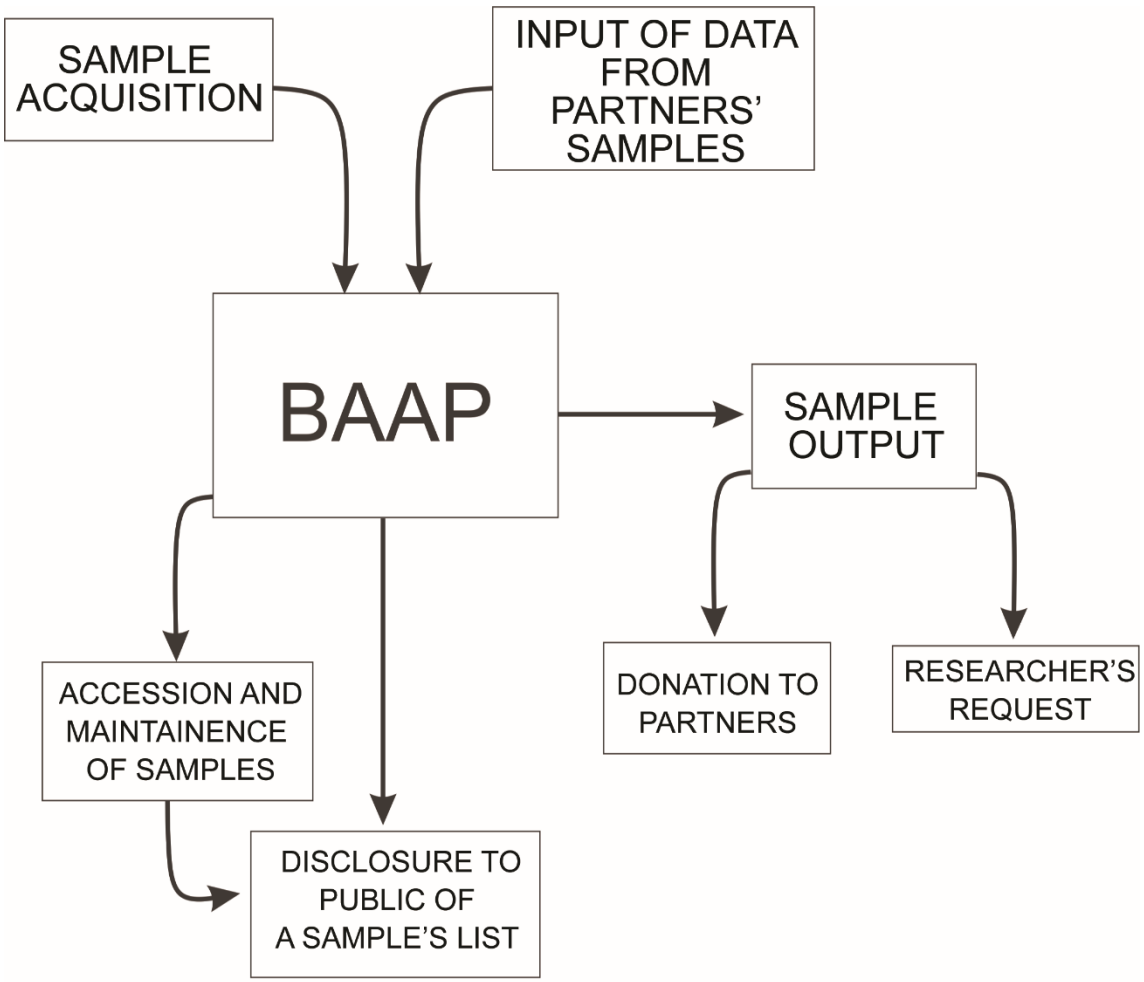

Table 1: Numbers of some of BAAP's samples ordered by type until February 2019

SAMPLE	TOTAL
Whole carcasses	3
Open carcasses (without organs)	15
Muscle tissue	1382
Organ tissues	272
Blood tissue	12
Skeletons	21
Skins (taxidermy)	15
Bacterial culture	331
Feathers	160

Globally, many are the threats to Procellariiformes. Some examples are commercial fishing activities, alien species introduction at breeding sites, pathogens, contamination by plastic polymers, ghost net trapping, bioaccumulation of heavy metals, hydrocarbon pollution and climate change (Croxall, 2012; Phillips et al. 2016). In other to understand and to deal with these threats, researchers need to study each one specifically (Lewinson, 2012). Therefore, biological samples collected under strict protocols are essential to obtain accurate results. We understand that a single carcass can provide an important amount of samples to many different studies. Feathers are used to evaluate bird's diet and pollutant's levels. Swabs are useful to evaluate viruses and bacteria in bird's organism. Blood serves to genetic, biotoxins, serology, hormones, contamination and others. Organ tissues serve for a variety of tests as histopatology and toxicology. Stomach contents reveal not only the bird's preys but also plastic and other residues ingestion. Oil gland may also reveal microplastic contamination. Skeleton are used to systematics, morphometry, toxicology and prey identification (Olson, 2003; Uhart et al. 2016; Uhart et al., 2017). Those were merely few examples of what can be developed from Procellariiformes' biological samples and drivers for the creation of BAAP.

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