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INTERNATIONAL
WHALING COMMISSION

Progress report on the research and conservation of Lahille's bottlenose dolphins - 2021

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INTRODUCTION

Concerns regarding the conservation of Lahille's bottlenose dolphins have been discussed in previous SC meetings, and the Commission has set a series of recommendations. The progress on such recommendations has been tracked and reported systematically since 2019. The formation of the Lahille's Bottlenose Dolphin Task Team (LBD Task Team) was then proposed in 2020 (SC/68B/SM/10) and formally approved by the Task Team Steering Group in March 2021. Last year, the LBD Task Team continued to track SC recommendations and provided updates on the research and conservation of Lahille's bottlenose dolphin along the Atlantic coast of South America, following the previous recommendations made (and reiterated) by the SC (IWC, 2019c, p.49; 2020c, p.88) for:

(a) an assessment of the conservation status of the Argentina population; (b) governments to take immediate action to reduce the level of bycatch, particularly in the southern Brazil MUs; (c) continued monitoring throughout its range to increase knowledge of life-history parameters, assess trends in abundance and document the prevalence and aetiology of chronic skin disease; and (d) recommends that a Lahille's bottlenose dolphin health assessment programme is implemented, including use of the Committees contaminants mapping tools. Regarding the LBD Task Team, the SC encouraged it to: (i) coordinate the regional efforts among Argentina, Uruguay and Brazil to estimate and monitor populations parameters; (ii) seek ways to work cooperatively with fishing communities and fisheries authorities to reduce bycatch; and (iii) explore potential synergies with the Franciscana CMP.

Review of Activities – 2021 SC Meeting

In brief, in SC/68C/SM/17, the LBD Task Team reported that photo-identification surveys and biopsy sampling continued during 2020 in two localities of southern Brazil (the Patos Lagoon Estuary: 42 surveys, 12 biopsy samples; Laguna: 18 surveys conducted; no biopsy sample) but decreased in other locations of southern Brazil, Uruguay and Argentina due to restrictions imposed by the COVID-19 pandemic. At least 54 sightings of Lahille's bottlenose dolphins were reported by Uruguayan citizens in 2020; about half of these sightings took place in the La Plata River estuary, where sightings have been scarce for the last 40 years. Enforcement actions against illegal fisheries were made in Laguna but reduced at Patos Lagoon Estuary, resulting in zero and four bycatch records, respectively. First preliminary results analyzing mark-recapture data from four localities sampled along the southern Brazilian coast estimated a *superpopulation* of only 306 individuals (95% CI = 301 to 310). Although a study started in 2021 to assess the impact of POPs on the Patos Lagoon population's viability, no health assessment plan was implemented. It was also noted no progress on skin disease assessment.

The working plan for small cetaceans of the Scientific Committee Report 2021 (table 18) contained the following actions: (1) to coordinate regional efforts among Argentina, Uruguay, and Brazil to estimate and monitor population parameters; (2) to work cooperatively with fishing communities and fisheries authorities to reduce bycatch; and (3) to explore possible synergies with the Franciscana CMP and the BMI.

The present report aims at updating the Scientific Committee on the progress related to these recommendations, briefly informing them about the work in progress and/or planned.

LBD Task Team Activities in 2021

The LBD Task Team has maintained regular contact to articulate research and conservation actions. Two regional virtual meetings were carried out (one with the group of researchers from southern Brazil and Uruguay and another with researchers from Argentina) to discuss regular activities in each area and the main goals for the following years. A project is being designed to plan priority actions over the next five years along the entire distribution of the subspecies, considering previous recommendations of the SC. Regarding southern Brazil and Uruguay, a specific workshop[1] for training skills, data collection and analysis on mark-recapture protocols was run in Laguna, in Santa Catarina state, between 23 and 25 September 2021. About 40 researchers and local students attended the Workshop, either in person or remotely. Discussions focused on methodology and data analysis. Coordinated field surveys along the subspecies distribution were planned. A standard protocol for data collection and analyses is being developed to assist research groups to standardize baseline data collection procedures to estimate mark-recapture population parameters considering the movement of individuals between sampling sites. The Workshop was crucial for engaging scientists, planning data collection for the end of 2021 and 2022, and discussing the Gephyreus project's[2] future. Apart from the protocol, another important result of the Workshop was the agreement to establish a virtual space for sharing dorsal fin catalogues. Catalogues were uploaded in a shared space and potential re-sightings between areas are available for checking. Catalogues are being routinely updated.

Current conservation status of Lahille's bottlenose dolphins

The subspecies is still listed as VULNERABLE (VU) under criterion D1 by the IUCN (Vermeulen et al., 2019a) and as ENDANGERED (EN) in Brazil and Argentina (Vermeulen et al., 2019b). In Uruguay, the subspecies was recently listed as ENDANGERED in the first conservation status assessment of the National Red List of Threatened Species for mammals.

1(a) an assessment of the conservation status of the Argentina population;

No significant progress was made towards updating the current population status of the Argentine Lahille's bottlenose dolphins.

Hevia et al. (in press) carried out a review of marine protected areas (MPAs) in Argentina and their overlap with the distribution of several cetacean species including *Tursiops truncatus* between 2000-2020. Reference is also made to hydrocarbon exploration, vessel traffic and whale-watching activities (Fig. 1). In this report, *T. t. truncatus* and *T. t. gephyreus* were the two recognized subspecies of *T. truncatus* in the region but they were not always identified to subspecies level at sea. Whenever possible, information on specific subspecies is provided, otherwise reference to *T. truncatus* is made.

One of the recommendations of the report, based on available information (Vermeulen et al., 2019, Vermeulen et al., 2018, Vermeulen and Bräger, 2015 and Coscarella et al., 2012), is for the

1 The workshop was funded by Whitley Fund for Nature as part of the award conceived for Pedro Fruet under the project "Building bridges to encourage the coexistence with Lahille's bottlenose dolphins in southern Brazil".

2 Gephyreus Project: a multi-institutional and transnational project established in late 2018 to estimate population parameters for the Lahille´s bottlenose dolphins in southern Brazil and Uruguay, within a metapopulation context. Photo-identification data is being collected over six sampling sites and financial support is guaranteed until the end of 2022.

inclusion of *T. truncatus gephyreus* in Appendices I and II of CMS at its next CoP in 2023. It also encourages the establishment of new MPAs or the strengthening and implementation of existing MPAs, which benefit this subspecies.

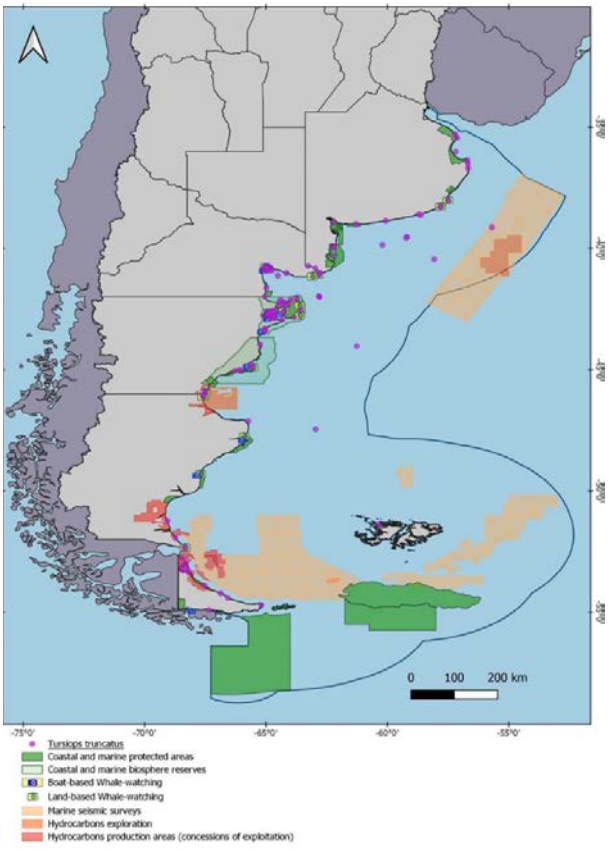

Figure 1. Presence of common bottlenose dolphins and anthropogenic activities in Argentinean waters (2000-2020). Source: Hevia et al. (in press).

1(b) governments to take immediate action to reduce level of bycatch particularly in the southern Brazil MUs;

Patos Lagoon Estuary Management Unit

There were no specific surveillance actions taken to reduce the bycatch of Lahille's bottlenose dolphins inhabiting the Patos Lagoon Estuary (PLE) and adjacent marine coast. Only a few regular enforcement actions were taken, as surveillance focused on the pink-shrimp fisheries – a type of fishery that does not cause direct harm to Lahille's bottlenose dolphins. Inspectors informally reported a low budget and an insufficient number of personnel to conduct specific actions along the protected area.

In October 2021, the NGO Kaosa, in collaboration with the Oceanographic Museum - FURG, provided training for surveillance teams. The training "Combating illegal fishing in southern Brazil" had the participation of 30 agents from three governmental agencies (IBAMA, ICMBio and PATRAM) engaged in surveillance and monitoring of illegal fisheries at a regional scale.

During the training period, it was discussed, among others, the urgent need to protect the Patos Lagoon Estuary from illegal fisheries and other detrimental activities to increase the protection of Lahille's bottlenose dolphins and their habitats. The training session provided an opportunity to exchange knowledge and strengthen institutional relationships to better coordinate surveillance actions in the future. The feedback was encouraging and was the first step to increase engagement of the agents.

A mobile app ("fisheye") has been designed for citizens' surveillance of illegal fisheries around the protected area. The prototype is ready. Evaluation of performance and testing is being conducted and the app is expected to be available for both Android and IOS by the end of May 2022. Specific social groups will be trained to use the app and report illegal fisheries in the area. The app will also provide the opportunity to report at sea sightings and beach strandings.

Strandings of Lahille's bottlenose dolphins on the marine coast adjacent to the Patos Lagoon Estuary declined in 2021. During the last spring/summer period, between October 2021 and March 2022, there was no record of mortality of Lahille's bottlenose dolphins – a rare circumstance over the last 20 years over the long-term dataset continued by the Laboratório de Ecologia e Conservação da Megafauna Marinha/FURG since 1974. Changes in fishery effort are the most likely reason for the abrupt reduction in mortality. Interviews with fishers are being conducted to understand recent changes in fishery patterns.

Laguna Management Unit

In 2019, the Santa Catarina Institute of Environment (IMA) held a Workshop to define a State Action Plan to conserve the Lahille's bottlenose dolphin population in Laguna (Portaria Nº 214/2019). This plan aims to support efforts to: (i) reduce the gillnet bycatch events; (ii) regulate boat traffic and reduce noise pollution; (iii) monitor the dolphins' population parameters and dolphins' health conditions; (iv) monitor and propose actions to improve and guarantee the habitat quality; (v) involve society in conservation actions. The implementation of this Plan intensified the fishing activity enforcement actions and a better engagement of fishers to local rules. As a result, since 2020, no bycatch events have been reported in the area.

An ongoing research projects has been using static acoustic monitoring stations to better understand the habitat use and ranging behaviour of dolphins. This effort aims to better assess the effectiveness of the recent fisheries restrictions and propose complementary measures for reducing bycatch events, with results predicted to be available in late 2022.

In 2021, a Long-Term Ecological Research Program started new efforts to estimate several biological components within the dolphins' home range, including fisheries activities, to build an ecosystem model that will describe the functioning of the ecosystem in different scenarios of variations in fishing and dolphin population dynamics. This effort aims to better understand the ecological role of dolphins for the whole ecosystem, how they interact trophically with fisheries activities, and how their conservation can benefit fisheries and local communities.

1 (c) continued monitoring throughout its range to increase knowledge of life history parameters, assess trends in abundance and document the prevalence and aetiology of chronic skin disease;

After sampling efforts lowered due to COVID-19 pandemic situation during 2020-2021, systematic monitoring for photo-identification and biopsy sampling resumed in late 2021 in most sampling areas and is ongoing in six localities along southern Brazil. The survey effort at Tramandaí River was limited to ten land-based photo-identification and one boat survey. In Florianópolis, only two boat-based surveys were carried out and in Itajaí, the northernmost locality, six boat surveys were carried out in 2021. Monitoring in Uruguay restarted in 2019 and is still ongoing. In Argentina, planned projects were suspended due to COVID but photo-identification effort is planned to initiate in Bahia Blanca in the first half of 2022, as part of the project "population assessment and dynamics of Lahille's bottlenose dolphins in Argentina". Below we provide detailed information on the research effort for specific localities.

Southern Brazil

Patos Lagoon Estuary Management Unit

Due to the COVID-19 pandemic, surveys are being carried out around Patos Lagoon Estuary and surrounding areas with adaptations following WHO (World Health Organization) and FURG's sanitary protocols. A satisfactory survey effort for photo-identification data was obtained along 2021 (30 surveys and 142 photo-identified individuals; five biopsy samples were collected).

No progress was made on the population trends analysis and the prevalence and aetiology of chronic skin disease.

A study initiated in late 2020 to assess the impact of persistent organic pollutants (POPs) on the population viability. The investigation of the bioaccumulation of other organochlorine compounds in the dolphins' subcutaneous adipose tissue has progress well along 2021. A total of seventy samples were analyzed (n=70). Among the studied compounds, ∑PCBs were predominant in the profile in Lahille's bottlenose dolphin, followed by ∑DDTs, mirex and HCB. High levels of PCBs were found (mean: 162994 $ng.g^{-1}$ lw; median 99098 $ng.g^{-1}$ lw). These concentrations are above the thresholds established in literature regarding PCB toxicity, which are: 1.3 μg. g^{-1} lw (1300 $ng.g^{-1}$ lw) for endocrine disruption (Mos et al., 2010), 10 μg g^{-1} (10000 $ng.g^{-1}$ lw) lw for risk of decline in population growth rates (Hall et al., 2006b) and 17 μg g^{-1} lw (17000 $ng.g^{-1}$ lw) in cetaceans' blubber for physiological effects (Kannan et al., 2000). Indeed, many individuals (including females) presented higher than the most conservative threshold considering the impairment in reproduction that these compounds can present (41 μg g^{-1} lw or 41000 $ng.g^{-1}$ lw), including uterus occlusion (Helle et al., 1976; Jepson et al., 2000). It is expected to provide a detailed report on this issue in the next SC meeting.

The project initiated in June 2021 to evaluate the effectiveness of the protected area against bycatch is progressing well. The effectiveness will be assessed by analysing trends in key population parameters such as abundance and survival, which will be derived from marking-recapture data; and mortality, which will be estimated from data on stranded carcasses collected during beach surveys. For this, data collected along 2021-2022 will be integrate into a long-term monitoring database to analyse trends in population parameters before and after the implementation of the

protected area. Photoidentification and beach surveys were regularly conducted along 2021, as planned. Conclusive results from this analysis should be available at the end of 2022.

A work in progress has developed a predictive model to determine the sex of individuals by analysing coverage and intensity of natural marks from photographs of the dorsal fins of Lahille's bottlenose dolphins from Patos Lagoon Estuary. Preliminary results suggest 97% accuracy in determining the sampled individuals' sex (Gurgel, 2022).

Laguna Management Unit
During 2021 and 2022, 18 photo-identification surveys were carried out (also following WHO standards protocols). With the new data collected, population parameters such as abundance and survival were estimated within the scope of the "*Gephyreus Project*" (see below). New population models have also been built to predict population dynamics, accounting for the effects of the foraging tactic used by a subset of dolphins specialized in cooperate with fishers and will be available later in 2022. No progress was made in the analysis of data regarding the prevalence of skin infections.

Uruguay
Since late 2019, Lahille's Bottlenose dolphins photo-identification surveys have been continued along Rocha Department coast in Uruguay, as part of the Gephyreus Project and Toninas Project of Yaqu Pacha Uruguay. A total of 13 surveys were carried out during 2021.

Alliance between Yaqu Pacha Uruguay and Fauna Marina Uruguay was created in order to cooperate and coordinate the monitoring of photo-identified individuals along Rocha and Maldonado departments. Currently, photo-id catalogue is starting to be compared and the elaboration of the Uruguayan Lahille's bottlenose dolphin photo-identification catalogue will be made between both institutions.

Preliminary results show at least five new matches between southern Brazil (Patos Lagoon Estuary and surrounding coastal areas) and Uruguayan coastal waters to add to those 21 previously reported (Laporta et al., 2017). A work in progress will provide a new abundance estimation for Lahille's bottlenose dolphins in Uruguay.

Citizens have recorded Lahille's bottlenose dolphins along La Plata River Estuary and the Atlantic coast of Uruguay through a digital form created by Franca Austral Project and Yaqu Pacha Uruguay civil association, as well as by a Telegram group created by Fauna Marina Uruguay. During 2021, at least 91 sightings of Lahilles's bottlenose dolphin were recorded, 25% of them in La Plata River Estuary, an area where the sighting frequency of this subspecies has been decreasing in the last 40 years.

During the 2021 no records of stranded Lahille's bottlenose dolphin were reported in coastal Uruguayan waters.

Argentina

A project planned to initiate in March 2020 in Bahía Blanca Estuary, southwestern coast of the Province of Buenos Aires, is still on hold due to the COVID-19 pandemic but is planned to start during 2022. Also, due to economic restrictions regarding the income of foreign currency to the country the IWC funded project is still on hold. For these reasons, no further survey effort was conducted at Rio Negro. A regular survey program focusing on the better-studied population at Bahía San Antonio is still required. Surveys are not carried out in the area since 2012. No dedicated surveys for Lahille's bottlenose dolphins were conducted in Bahía Engaño. However, twelve surveys were carried out close to Punta Marques, in the southern limit of Lahille's bottlenose dolphin distribution, from January to March 2020. During these navigations, only one group comprising 20 individuals was spotted, and one biopsy sample was obtained. During January 2022 one solitary individual was spotted during a drone survey in the same area.

iii) The conservation status of the subspecies be prioritized for assessment in the future

The Gephyreus Project – an international research initiative coordinating simultaneous photo-identification sampling effort at six sites along the distribution range of the subspecies to understand the southern Brazil/Uruguay ESU from a metapopulation dynamics perspective have been generating some preliminary results. Mark-recapture models in a Robust Design framework (Kendall et al., 1997) were fitted to data from five sampled sites in southern Brazil and Uruguay, collected during five periods of sampling effort between 2019 and 2021. These models estimated apparent survival probabilities of 0.84 (95%CI: 0.52-0.96) for North Bay, 0.96 (95%CI: 0.90-0.98) for Laguna, 0.73 (95%CI: 0.59-0.83) for Tramandaí, 0.24 (95%CI: 0.09-0.47) for Torres, 0.86 (95%CI: 0.82-0.90) for Patos Lagoon and 0.19 (95%CI: 0.02-0.70) for Uruguay. The estimated survivals for Laguna and Patos Lagoon probably better represent the real survival probabilities for the species. For the other areas, the estimated survivals seem not to reflect only mortality but also the non-occurrence in the area during the sampling effort. In other words, the low estimates observed, especially in Torres and Uruguay, reflects the occasional use of these areas by transient individuals. The model that considers survival constant over time and between areas, for example, suggests a survival for all areas of 0.89 (95%CI: 0.85-0.92).

These models also estimated abundance for each area per period of sampling effort. Abundances ranged from 41 (95%CI: 39-45) to 46 (95%CI: 45-50) in Laguna; from 86 (95%CI: 84-90) to 157 (95%CI: 154-163) in Patos Lagoon and adjacent marine coast; from 15 (95%CI: 12-20) to 25 (95%CI: 22-25) in Tramandaí; from 5 (95%CI: 3-8) to 33 (95%IC: 30-40) in Torres; from 3 (95%CI: 2-7) to 16 (95%CI: 14-21) in North Bay; from 2 (95%CI: 1-7) to 17 (95%CI: 15-21) in Uruguay. Combining these estimates from all areas, the total estimate of Lahille's bottlenose dolphins ranged from 178 (95%CI: 118-238) in the first period of sampling effort to 285 (95%CI: 222-347) in the third period of sampling effort. Assuming the current effort is satisfactory to assess the total number of individuals of the species in the area covered by this coordinated project, it should not exceed 350 animals along the southern Brazil and Uruguay.

Conservation Concern at Tramandaí Inlet, Rio Grande do Sul state

In the Tramandaí inlet, currently, 10 adults and three juvenile dolphins are seen constantly interacting with castnet fishers in the so-called "cooperative fishing". The cooperative fishing is already recognized as Intangible Cultural Heritage in the Rio Grande do Sul state (Law No

15.546/RS since 2020). In the Tramandaí inlet, few locations are suitable for the cooperative fishing, which requires very specific conditions (e.g. depth, declivity, available public space for fishermen) to occurs. In 2021, the Government of Rio Grande do Sul State announced an agreement with the municipality of Imbé to build a new bridge of significant proportions connecting Imbé and Tramandaí, right where the cooperative fishery occurs. The bridge design proposals are completely ignoring the occurrence of cooperative fishing of professional fishers and Lahille's bottlenose dolphins. Artisanal fishermen and researchers are concerned about the possibility that the construction of the bridge following the current project design will affect the cooperative fishing that is also impacted by increasing pollution, recreational and professional fishing, tourism, water sports and navigation in the area.

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