

# **Report of the Workshop on the Conservation Management Plan for the Southern Right Whale Southeast Atlantic Population**

**Curitiba, Brazil, 1-2 June 2022**



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## 1. INTRODUCTION

### 1.1 Chair's welcome and opening remarks

The workshop was opened by Juan Pablo Torres-Florez who welcomed everyone. A list of participants is given in Annex A. He noted that the workshop was originally conceived as an in-person meeting two years ago but due to the Covid-19 pandemic it was postponed until June 2022. The aim of the workshop is to review the information on Southern right whales in the SW Atlantic to revise and update the species Conservation and Management Plan (CMP) actions.

Torres-Florez thanked Miguel Iñíguez, Camila Domit and Alexandre Zerbini for co-organising this workshop. He also thanked Fundo Nacional do Meio Ambiente (FUNBIO), Centro de Mamíferos Aquáticos (CMA, Brazil) and the IWC for sponsoring this workshop.

It should be mentioned that this CMP was proposed by the range states where the Southwest Atlantic Southern Right whale (SRW) population is mainly found (Argentina, Brazil, Chile, and Uruguay). Also, it is worth mentioning that most of the information on the SRW for Chile comes from the Pacific population and is dealt with in the corresponding CMP. The information mentioned in this report for Chile was exclusively for the population of the Southwest Atlantic.

### 1.2 Appointment of chair and rapporteurs

Juan Pablo Torrez-Flores was appointed as Chair. Adriana Miranda and Miguel Iñíguez were appointed as rapporteurs.

### 1.3 Adoption of agenda

The adopted agenda is given in Annex B.

## 2. RESEARCH ACTIONS

### 2.1 Determine movements, migration routes and location of feeding ground RES-01

During the workshop, different information was presented to understand movements, migratory routes and feeding grounds of this population.

#### 2.1.1 Argentina

The workshop received information regarding new analyses by the Instituto de Conservación de Ballenas - Argentina, related with foraging and feeding grounds. During higher-than-normal sea surface temperature (SST) on southern right whales' feeding grounds, whales have fewer calves than expected, and fewer individuals return to their calving grounds possibly due to a significant decrease in the abundance of Antarctic krill (Leaper *et al.*, 2006). When the whales migrate north of 40°S, they are thought to feed predominantly on calanoid copepods, much smaller in size and biomass than Antarctic krill (Tormosov *et al.*, 1998). Moreover, southern right whales (SRWs) learn particular foraging locations from their mothers (Valenzuela *et al.*, 2009). Research is ongoing to understand if the SRW population is flexible enough to change their strategies and switch to prey types with different spatial and temporal distributions. This study aims to determine how oceanographic parameters affect SRW's feeding grounds, migration, and diet using carbon and nitrogen stable isotope analysis of bulk tissue and amino acids in baleen plates. Because baleen plates grow continuously and remain chemically inert after formation, they can be sampled to back-calculate diet composition and geographic movement over time (Rowntree *et al.*, 2008). This will allow determining isotope landscapes. Detailed time-series of isotope-ratio samples from this population could significantly improve our understanding of yearly variations in foraging opportunities and the whales' responses to those challenges. Results will be presented in future meetings as they become available. In discussion, it was noted that it would be important to include phytoplankton data, if available, into the stable isotope analysis and that it would be important to incorporate climate change actions into the CMP. The workshop **agreed** that the analyses discussed above were important and looks forward for new results when they become available.

The Workshop received information on the research program to track Southwest Atlantic right whales using satellite telemetry (Zerbini *et al.*, 2018; 2016). A primary goal of this study is to address one of the research actions of the SWA SRW

<sup>1</sup>Presented to the meeting as SC/69A/REP/05.

CMP to assess movements and to determine migratory routes and destinations of this population. Another goal includes the development of satellite tracking technology to improve performance and minimize tag effects on large cetaceans. Between 2014 and 2021, a total of 65 individuals were instrumented with location only ( $n=59$ ) and archival ( $n=6$ ) consolidated (Type C, (Andrews *et al.*, 2019) tags in the northern Patagonian gulfs off Argentina. Instruments, including long-term and short-term tags, were deployed in solitary individuals ( $n=32$ ) and mothers with calves ( $n=33$ ). Movement models were used to standardize tracks and assess areas of higher use throughout the migratory cycle. Average transmission duration of long-term tags was 139 days (range=18-247) for location-only tags and 95 days (range=71-126) for archival tags. Five of six tags deployed in 2021 were still transmitting at the time the workshop was held (June 2022), approximately 240 days after deployment. Satellite tracking revealed movements of SRWs at various scales. Residency times and occupancy patterns of solitary individuals and mothers with calves in the breeding and calving grounds differ, with the mothers showing more restricted movements and longer residency. Some individual SRWs migrated close to shore along the coast of Argentina before moving offshore towards several feeding habitats, demonstrating the use several coastal areas within the breeding grounds. Feeding destinations for whales tagged in Golfo Nuevo (Península Valdés) and Golfo San Matías were identified in the Patagonian shelf from 35 to 52°S, the western South Atlantic basin, the Scotia Sea, and the northern Weddell Sea. Differential migratory patterns were documented for females with calves and solitary animals, with the former using open-ocean mid-latitude oceanographic eddies, presumably for feeding. Furthermore, one adult female that was tagged in 2015 as a singleton and in 2021 when she had a calf, used different areas of the SW Atlantic each year, likely related to her different reproductive status. This study provides unprecedented information on movements of SRWs, and demonstrates the species inhabits vast areas of the South Atlantic Ocean and visits multiple potential feeding grounds within each season. Long-term monitoring of this population shall provide an understanding on how SRWs respond and adapt to changes in their habitats due to, for example, climate change. Information on satellite tag deployments since 2019 is available at [www.siguiendoballenas.org](http://www.siguiendoballenas.org). The workshop recognized the valuable information and **recommended** the continuity of satellite tagging.

The workshop was also informed that a SRW tagged off South Africa in October 2021 migrated to the eastern coast of South America and is currently (June 2022) located in the Patagonian Sea over the continental shelf (Vermuelen *et al.*, *pers. comm.*) in an area regularly used by SRWs from Argentina. The transatlantic movement of this individual represents evidence that individuals wintering off South Africa may be sharing feeding habitats with SW Atlantic right whales. A search of this whale was done in the Península Valdés and Brazil photo-identification (photo-id) catalogues, but the individual was not found, though the quality of available photo-identification images was limited.

The workshop underlined the importance of raising people's awareness in this kind of project using social networks and updating general public on the results. In discussion, it was noted that an increase in the attack of tagged whales by kelp gulls was not documented after tag implantation.

### 2.1.2 Brazil

The workshop received preliminary results of possible feeding areas for southern Brazil breeding population, presented by the Projeto Franca Austral (ProFRANCA)/Instituto Australis. Isotope analyses have been conducted using samples from adults (not accompanied by calves) and mother/calf pairs ( $n=56$ ) collected in Santa Catarina state since 2020. In addition, twelve skin samples collected in the same area from free-ranging whales in 2012 and nine from strandings were included in the analysis. The collected samples were processed and analysed in the Integrated Analysis Center (CIP) at the Federal University of Rio Grande (FURG).

The amplitude and isotopic niche overlap were calculated using the SIBER tool for each group divided into years, solitary adult, and females with offspring. The results showed that the individuals from this breeding population should be feeding on low latitudes in warmer waters such as the Patagonian continental shelf. The species showed significant differences and partial segregation in the trophic niche between the different years of collection and the groups of adults with and without calves. Interannual differences in foraging may be associated with different feeding areas or differences in the abundance and concentration of available resources. Solitary adults occupied higher trophic positions than females with calves. Allowing a trophic exclusion hypothesis mediated by sex (results should be confirmed by genetics to determine the sex). However, these differences can also be caused by physiological factors. Finally, the results of the  $\delta^{15}\text{N}$  values of the offspring were lower than that of the females. Inverse result of the expected values, such result may be related to a nitrogen imbalance associated with nutritional stress in both females and offspring. During the discussion, it was highlighted that these preliminary results should consider that the samples used, serves to record the feeding activities of the last 3-4 months. As a recommendation of the workshop, it was pointed out the importance of including genetic analysis with this project in order to better understand the relationship of the animals sampled as well as continue carrying-out stable isotope analyses using different tissues together with conducting satellite tagging as a priority.

The workshop received information from Prado and colleagues about research for whale watching activities. Since 2012, Whale Watching is forbidden to occur within Right Whale Environmental Protected Area ('APA da Baleia Franca' – APABF), Santa Catarina State, Brazil. As the activity is about to return to operating, the Brazilian Justice determined the development

of research to assess whale watching impacts on the whales. In 2021, a project started entitled 'Assessment of the effect of the Whale Watching on the behavior of the southern-right-whale (*Eubalaena australis*): building evidence to support tourism management in the APA da Baleia Franca/ICMBio marine reserve'. This project is being carried out in the APABF by: Instituto CAIPORA, APABF, Institute Aqualie, Group of Studies of Marine Mammals of Rio Grande do Sul (GEMARS), State University of Santa Catarina (UDESC), and Federal University of Juiz de Fora (UFJF). Resources to carry out the study comes from the Santa Catarina State Research and Innovation Support Fund (FAPESC), for the period June 2021-August 2024. The project aims to assess the short-term effect of Whale Watching on the behavior of the southern-right-whale in the APABF and to evaluate the measures adopted by the marine protected area to monitor the activity. In brief, data collection occurs during the breeding season of the southern-right-whale (July-November), and consists of to record the behavior of whales using two analytical designs: in the absence (control) and presence (treatment) of the boat and before, during, and after (BDA) the approximation of the boat from a shore station using a surveyor's theodolite. The first year of the project (2021) focused on training the fieldwork staff, establishing connection/affinity with the studied species, promoting discussions about the method, and improving the relationship between government, researchers, and Whale Watching operators. The data collection will start in 2022 (just after the workshop) ending in 2024.

The workshop welcomed this project and looks forward to results and updates for years to come.

**Attention: SC, CMP**

*To increase understanding of movements, migration routes and location of feeding ground, the Workshop Participants recommended that:*

- (1) *satellite tagging should be a priority during next years for the Brazil breeding ground as well as should continue as priority for the breeding grounds in Argentina;*
- (2) *update new isotope landscapes; and*
- (3) *include genetic analyses together with the isotope analyses to know the sex and understand the relationship between animals sampled.*

## **2.2 Development of a GIS (meta) database on information on human activities that might have an adverse impact on whales RES-02**

One of the research actions of the CMP is the establishment of a database with georeferenced information on sources of possible human impacts on the SRW population. This database would be used for mitigation within a geographic information system (GIS) framework as part of one of the CMP mitigation actions (Sensitivity Atlas).

### **2.2.1 Brazil**

The workshop received information from Brazil regarding sources of data for possible human threats. Some public databases are already being queried and the data is being extracted in a georeferenced format. Other databases are not public, but efforts are being made to obtain the data. The databases that are/will be focus of data extraction are the following:

- (1) PMAP-BS (Projeto de Monitoramento de Atividade Pesqueira – Bacia de Santos) Fishing Activity Monitoring Program - not public.
- (2) PREPs (Programa Nacional de Rastreamento de Embarcações Pesqueiras por eliteite), Fishing Activity Monitoring Program) - not public.
- (3) Demersais (Laboratório de Recursos Pesqueiros Demersais e Cefalópodes – FURG), Fishing Activity Monitoring Program - not public.
- (4) Port activity – public.
- (5) SISTRAN (Sistema de Informações Sobre Tráfego Marinho), Marine traffic - not public.
- (6) PETROBRAS (Sistema de Informações da PETROBRAS Sobre Tráfego Marinho), Marine traffic - not public.
- (7) PETROBRAS (Gas and oil exploration) – public.
- (8) IBAMA (Intituto Brasileiro do Meio Ambiente e Recursos Naturais), Seismic traffic – public.
- (9) ANP and IBAMA (Agência Nacional de Petróleo e Intituto Brasileiro do Meio Ambiente e Recursos Naturais) (Seismic traffic) – public.
- (10) PMPs and SIMMAM (Projetos de Monitoramento de Praias e Sistema de Apoio ao Monitoramento de Mamíferos Marinhos), Stranding Monitoring Programmes – public.

Except for two (PREPs and Demersais), all other databases are already in georeferenced format. Relevant data from these two databases should be georeferenced.

The workshop welcomed efforts to make the databases publicly available, and it is expected that the CMP coordinator will take steps to obtain permits for the use of private databases. In addition, the workshop encourages standardization and collation of data on SRW threats by other CMP member countries.

### 2.2.2 Chile

The workshop received new information about an increase in human activities in southern Chile, which is expected to continue due to the use of coastal areas of the north-eastern area of the Strait of Magallanes by large-scale wind energy projects currently under consideration. Development of these projects will result in the construction of new ports and an increase in nearshore maritime traffic. It was noted that the apparently regular presence of the species over the last 20 years at the eastern entrance of the Strait of Magallanes poses a risk of mortality due to ship strikes in this maritime route between the South Atlantic and South Pacific Oceans. Data from different sources can be required if necessary:

- salmon farming industry;
- ENAP (Empresa Nacional de Petroleos) (Chilean national oil company); and
- Sernapesca (Servicio Nacional de Pesca)

It was highlighted that considering degree of uncertainty of the population associated to a scarce and mostly not systematic data, it is not possible to evaluate this risk as well as to design management proposals now. The workshop **agreed** after the presentation of the data, that the contribution and guidance of specialists coordinated by the IWC would be of great help in these scenarios that are cause for caution for the future of the SRW in the Strait of Magellan.

### 2.2.3 Uruguay

The workshop received information about the availability of georeferenced data from human activities in Uruguay and noted that such data is dispersed either in private or public databases and is of variable quality. It was also noted that two databases that should be consulted as a priority: the observer database in the fishing industry (VMS-Vessel Monitoring System: DINARA: Dirección Nacional de Recursos Acuáticos) from Uruguay and the seismic exploration activities database from the government. However, the data is not publicly available for either.

In addition to data on human threats, the workshop noted the importance of obtaining data on SRW distribution in Uruguayan waters from fishing and seismic exploration companies.

Considering the main goal of this action (*Development of a GIS (meta) database on information on human activities that might have an adverse impact on whales*), and its use for a sensitivity atlas, it was discussed the importance of compiling data of animals injured by anthropic actions. Finally, it was discussed the importance of environmental authorities of the range countries to be involved in the requirement of public and private data available.

#### Attention: SC, CMP

To gather data in order to develop a GIS (meta) database on information on human activities that might have an adverse impact on whales the Workshop participants **recommended**:

- (a) the CMP coordinator to make a formal request to the range states for the industry private data (e.g. seismic, fisheries);
- (b) show the importance of this action at the level of the environmental authorities of the range countries, in order to obtain the data required for implementation of the GIS and subsequent establishment of the Sensitivity Atlas;
- (c) collection of data from injured animals; and
- (d) finally, it was also recommended to integrate and analyse the areas of greatest risk for the range states.

## 3. MONITORING ACTIONS

### 3.1 Ensure long-term monitoring of abundance and trends

In order to evaluate the progress in actions related to monitoring of abundance, population trends and biological parameters, the workshop received new information from different research groups in Argentina, Brazil, Chile and Uruguay. This action is related to the RES action (Item 2.1).

#### 3.1.1 Argentina

An update of the information regarding the SRW photo-id catalog of Península Valdés curated by the Instituto de Conservación de Ballenas and Ocean Alliance (ICB/OA) was presented. Photo-identification data have been collected during annual aerial surveys on the Península Valdés calving ground since 1971. The catalog currently includes data through 2018 and life history information for 3,974 individually identified whales. During the 2018 aerial survey, 214 mother-calf pairs and 179 solitary adults and juveniles were counted. A total of 126 mothers, 14 calves, and 72 solitary juveniles/adults were identified. ICB/OA are currently processing the photographs taken during the 2019 survey. The 50th annual aerial survey was conducted in 2021. This is historic landmark for cetacean research worldwide, as it represents half a century of SRW photo-identification research. The workshop was informed that, unfortunately, no flights were performed, and no data were collected in 2020 due to COVID-19 restrictions.

Using the computer-assisted individual whale identification system 'BigFish', ICB/OA began integrating photographs taken on tourist boats by whale-watch photographers throughout the whale season into the catalog. A total of 3,923 boat-based photographs taken between June and November 2003-08 were analysed. ICB/OA identified 297 whales, of which



195 (65%) were added to the catalog as new individuals, and 102 (35%) were previously known whales. The new individuals included 154 adults (77%), six juveniles (3%), and 41 calves (20%). The sightings of known individuals included 39 whales (39%) also identified in each year's aerial survey and 63 whales (61%) not identified in the corresponding aerial survey. Three known individuals were identified in the boat-based photos as calves, which allowed determination of their year of birth and linkage of these known-age calves to their mothers.

During the workshop and considering the high number of photos without been analysed, it was discussed the importance of training new photo-id analysts. It was also mentioned the importance of training new drone pilots.

It was noted that the ICB/OA results come from less than 1% of the 460,000 photographs contributed by the whale-watch photographers. To optimize the analysis, the software development company Vates created an artificial intelligence model, which sorts the photographs according to the presence or absence of whales. Already in this early stage of the analysis, the whale-watch photographs have provided novel, valuable, and supplementary information, including extended information on calving intervals of known females, which is used to infer reproductive success. The close-up photographs taken throughout the calving season will also provide information on the prevalence of anthropogenic injuries, the residency times of different age and sex classes, and the social interactions between individual whales. The present study highlights the value of whale-watch boats as excellent platforms of opportunity for whale research and the relevant contribution that citizen scientists can make.

During the discussion, it was mentioned by some of the participants that there are other platforms for specific areas within the calving grounds in Argentina, such as E-Whale platform<sup>2</sup> in the San Antonio Bay, Province of Rio Negro. The platform can be used by tourists to upload information regarding sightings and photos of right whales in this area.

The workshop congratulated the 50 years of existence of the SRW photo-identification project in Península Valdés and highlighted the importance of long-term research projects.

Considering the photo-id catalogs, and their use for estimating population abundance and for understanding population dynamics of the SRW population, the workshop received information and future work that will be carried-out to understand movement rates and dispersion of SRW between Argentina and Brazil (Agrelo *et al.*, 2021b). Península Valdés in Argentina and Santa Catarina in southern Brazil are the main calving grounds in the Southwest Atlantic. Despite being part of the same population, assessments on dynamics have been conducted separately using two databases (Cooke *et al.*, 2015). A comparison was performed between the photo-identification catalogs from the two areas (Rowntree *et al.*, 2020) and the results were showed and discussed in this report (item 3.2.1). Considering the data available, a multi-state capture-recapture methods within a Bayesian approach will be used to estimate movement probabilities between Argentina and Brazil calving grounds and region-specific survival and recapture probabilities. In addition, this study will address the influence of biological processes in Península Valdés such as gull harassment, calf mortality and density-dependence on movement probabilities. It is expected that this study will improve the knowledge on Southwest Atlantic SRW movement rates between Brazil and Argentina and to contribute for regional population assessment for this species.

The workshop received a new contribution from Sueyro and colleagues, regarding habitat selection and distribution of Southern right whales in Argentina. Spatial distribution models SDMs were used to predict the SRW distribution in the Argentinian Sea territory. The models incorporated environmental data and whale records collected by the CENPAT Marine Mammal Laboratory during coastal aerial surveys. Roughness of the seabed, bathymetry and wave energy were used as potential predictors. Bayesian hierarchical spatial model (BHSM) were applied to identify which environmental variables mostly affect their putative distribution in a growing population scenario. Prediction of the models indicate that besides the current occupied coastal areas, the south of the Buenos Aires Province, and the northern and southern coastal areas of Golfo San Jorge are putative high-density areas. Also, some areas on the slope of the continental shelf were also predicted as suitable areas for SRWs. In discussion, it was noted that the continental shelf is an area used by many of the satellite tracked whales (Zerbini *et al.*, 2018) and highlighted the importance of using different information sources to understand the system dynamics. In addition to understanding that areas other than the Península Valdés are being used, it is important to understand which whale groups would be occupying these areas. Thus, it was mentioned that these areas in the continental shelf and deeper waters outside the Península Valdés, seems to be used by solitary or mating groups, while mother-calf pairs remains in the Península Valdés area. It was discussed that spatial distribution analyses should continue to be carried out considering scenarios of environmental changes to understand possible changes in habitat distribution and changes in population trajectories.

An update on the rate of increase of SRW at Península Valdés (Crespo *et al.*, 2022) was presented. It was estimated that there were 58,000 individuals in the SW Atlantic in the 17<sup>th</sup> century and that the current population is 7,000 whales with a reduction in population rate of increase (from 7% in the past to 0.5% at present). The authors highlighted the importance of continuing to monitor the dynamics of this population due to different changes that have occurred during the last decades (e.g. changes in distribution along the Argentinian coast, high mortality events, kelp gull attacks). Considering the changes

<sup>2</sup><https://experience.arcgis.com/experience/395e1eacdaab4e02915bb67a997004ff/page/page0/?draft=true&org=FrancaAustral>.

in the distribution and the population expand range to Golfo San Matias it was discussed that the interrelation between both areas (Península Valdés and Golfo San Matias) should be explored. Calf mortality trend was discussed during the workshop and viewed as something expected under the population growth scenario. Moreover, considering the estimated population numbers mentioned above (pre-exploitation population size) by Romero *et al.* (2022), it was discussed the rationale of the modelling approach, and the results highlighted the need to continue protecting the population due to the high impact catches have on the population trajectory. The workshop **agreed** that keeping this long-term monitoring program is important as well as gathering data from coastal aerial surveys to validate the model and monitor the ongoing growing face and trends of the population.

In discussion of estimates of pre-exploitation population, it was noted that ongoing environmental changes are such that SRWs may not reach the same abundance this population had in the 17<sup>th</sup> century.

Agrelo *et al.* (2021a) developed a mark-recapture model with a five-decade (1971-2017) data series of individual SRWs photo-identified at Península Valdés and found a marked increase in whale mortality rates following El Niño events. By modeling how the population responds to changes in the frequency and intensity of El Niño events, they found that such events may delay or impede population recovery and could even cause population decline. Such outcomes have the potential to disrupt food-web interactions in the Southern Oceans (SO), weakening that ecosystem's contribution to the mitigation of climate change at a global scale. This last point was made considering that whales contribute to marine ecosystem functioning, and they may play a role in mitigating climate change and supporting the Antarctic krill (*Euphausia superba*) population, a keystone prey species that sustains the entire SO ecosystem.

During the workshop it was discussed about the possibility of some pathogens that could have been enhanced during El Niño events. It was discussed, the importance of this kind of analysis in climate change scenarios for all the population together and not just Argentina.

### 3.1.2 Brazil

New information from the Farol das Baleias project was presented in the workshop. The project began in 2018 with the application of shore-based methods to assess Southern Right Whale (SRW) occurrence and group characteristics in Torres, Rio Grande do Sul, southern Brazil. In 2020, the project expanded its activities to areas to the north to increase its scope and included an extensive drone survey program. Observations and counts from a 45m cliff in Torres showed a significant temporal increase in the proportion of mother-calf present in the area compared to an initial assessment in 2002 (Danilewicz *et al.*, 2016). The proportion of mother-calf pairs increased from 27.3% to 43.5% over this 16-year interval. During the shore-based observations in 2018-19, 147 SRW groups were recorded on 212 days and 1,396 hours, with a peak in occurrence in late August (2018) and late September (2019). The photo-identification catalog includes 56 adult whales identified by high-resolution drone photography by 2021. Behavioral studies are being conducted as part of two master's theses that focus on: (1) behavior development of mother-calf pairs; and (2) evaluation of breathing patterns and surface-diving intervals based on drone footage. A pilot aerial survey to evaluate SRW distribution was conducted in an area of ca. 2,000 km<sup>2</sup> applying line transects 14km long and spaced at 4km in September 2021. As a result, only mother-calf pairs were sighted in very coastal waters <1km from the coast. Future research includes the application of photogrammetry through drones to study SRW ecology and to assess SRW site fidelity in Southern Brazil. Previously, this area was considered a transit area, however the new data showed that some of the animals remain in the region throughout the observation period. The workshop **welcomed** this new study and encouraged it to continue.

New information regarding the Brazilian Right Whale Photo-identification (BRWP) catalog, was received by the workshop. The BRWP Catalog was created in 1987, when the first whales were photographed through aerial surveys along the southern Brazilian coast. The catalogue is currently maintained by the Projeto Franca Austral (ProFRANCA)/Instituto Australis, which was created to continue the long-term research and monitoring program conducted since 1982. The aerial surveys have been conducted using a helicopter along a coastline of about 300km, from Santa Catarina Island (central coast of SC) to the border of the northern coast of Rio Grande do Sul (RS), usually during September, the peak of the season, and in some years, up to five surveys were conducted between July and November. In September 2020 an extended aerial survey was performed, covering 987km of coastline from the north of Santa Catarina State to the south of Rio Grande do Sul State, close to the border with Uruguay. A total of 42 whales were sighted, including 20 mother/calf pairs and 2 adults not accompanied by calves. The number of whales in 2020 was one of the lowest recorded in the last two decades. Considering only the coast between Florianópolis (SC) and Torres (RS); the typical survey area (~300km of coastline), there were 30 whales recorded, which represents about 30% of the mean 107 whales sighted between 2003 and 2021. In contrast, 273 different individuals (including 121 calves) were counted during the aerial survey held in September 2018, representing the highest number of sightings for the species during aerial surveys since monitoring initiated in 1982. In September 2021 120 whales were counted, consisting in 60 mother/calf pairs, in the area where surveys are typically carried out.

Photographs of whales have been analysed with the aid of the 'Right Whale Photo-identification Software' (Hiby and Lovell, 2001). The BRWP Catalog holds photographs of 1,049 individual whales identified up to 2021. A total of 45.5% ( $n=478$ ) are mature females (whales sighted at least once accompanied by a calf), 19.5% ( $n=204$ ) are whales identified



in the year of birth, and 35.0% ( $n=367$ ) are whales never seen with a calf. The catalog includes 10% ( $n=103$ ) of whales presenting dorsal marks and 2.4% ( $n=25$ ) of whales with a partial albinism.

The most updated comparison with the catalog of Península Valdés (PV) (Argentina) resulted in 124 matches until 2017 (BRWP 896 whales x PV 3,813 whales) (Rowntree *et al.*, 2020). A comparison was made with 17 right whales catalogued off Georgias del Sur/South Georgia resulted in one match (the Georgias del Sur/South Georgia catalogue has 76 whales of which 17 were aerial images) (Jackson *et al.*, 2021), which enabled the comparison with the BRWP Catalog). The Georgias del Sur/South Georgia match was with a whale catalogued in Brazil in 2002, as a newborn. The whale was resighted in Brazil in 2005 and 2007 (with calf), and in Georgias del Sur/South Georgia in January 2020. One individual matched between catalogues of Brazil (July) and Uruguay (September) in 2020.

An update on the abundance estimates for the Brazilian calving grounds (Renault-Braga *et al.*, 2021) was presented. The growth rate of this population was estimated at 14%/year (95% CL 7.1, 20.9) in 2005 with a linear regression of the number of reproductive females over time (Groch *et al.*, 2005). A subsequent analysis of mark-recapture data between 1987 and 2010 estimated a rate of increase of 12%/year (CI 8.5– 14.2%) (IWC, 2012). This same study estimated the reproductive female population at 197 mature females (CI 146–234) (IWC, 2012), using photo-id data (mark-recapture methods) obtained from standardized aerial surveys between Florianópolis/SC ( $-27^{\circ}79'N/-48^{\circ}53'W$ ) and Torres/RS ( $29^{\circ}39'N/-49^{\circ}76'W$ ). Survey tracks were 500m off and parallel to the coastline at a mean speed of 100km/h and an altitude of 300 meters. Survival, capture and recruitment probability, and population size were estimated using a POPAN model, and population growth rate was estimated using PRADDEL models (Pradel, 1996). Data analysed were collected in September from 2004–18. The final model was selected by the lowest AIC. GOF tests were used to validate the models. It was tested differences among females (whales with a calf at least once in all datasets) and adults (males or female never spotted with calf) and the effect of time. It was identified 520 whales, 345 females and 175 adults. From the total, 40.58% of females and 3.55% of adults were recaptured at least once. The software 'Right whale photo- identification' (Hiby and Lovell, 2001) was used to analyse the photographs. For the final POPAN model (AIC 1648.4025) the survival rate was fixed in 0.99 for females and adults. Capture probability was different for females and adults having effect of time. Recruitment probability was similar for both classes and had effect of time. Population size was estimated in 569 ('38) for females and 2,626 ('737) for adults. The final PRADDEL model showed that the population growth rate was the same and constant for females and adults (4.8% '1.2%). GOFs tests did not indicated signal of response to capture (TEST2.CT:  $p=1$ ) and there was no evidence of transiency (TEST3.SR:  $p=0.43$ ). This is the first update of the population trends for Southern right whales in Brazilian breeding ground since 2010.

It was discussed that habitat selection could affect the abundance estimates, especially if certain portions of the population use different areas during different times of the year. Thus, it was suggested for future analyses to include temporality in the data. In reply to a question on whether this estimate represented the whole population in Brazil, the authors explained that they believed it to correspond to whales in the area between Florianópolis and Torres.

The workshop recognized the importance of the land-based, aerial, and on-board survey work conducted off Brazil for the maintenance and support of the photo-identification catalogue and for better understanding the ecology of SRWs.

### 3.1.3 Chile

The workshop received new and update information from Southern Chile. The information received mentioned data obtained from non-systematics surveys and historical data. Moreover, Gibbons and colleagues informed about the existence of some whale lateral photos, obtained onboard cruises that could be used for photo-identification. The authors showed data from three main areas, notwithstanding one of them seems to be part of the Pacific Right Whale population (the area from Golfo de Penas south to the northwestern entrance of the Strait of Magellan). The other two areas identified are the: Fuegian channels and fjords (from the Strait of Magellan southwards to Cape Horn) and the Strait of Magellan area. Considering the Fuegian Channels and Fjords, extensive cetacean surveys conducted in 1999 and 2000 yielded no sightings of SRW or other whale species (Gibbons *et al.*, 2006). However, in recent years Palma (2019, pers. comm.), through systematic surveys and literature review analyses, indicates the presence of whales mainly in the Beagle Channel with five sightings of SRW. Moreover, using molecular techniques from whale bones within shell middens dated at 1160 '70 BP from the Argentine coast of the Beagle Channel, Evans *et al.* (2016) identified the species. For the Strait of Magellan, systematic but discontinuous research has been carried out in the central portion of the area since the 1980s, with four SRW sightings and one bone remains recorded. For the western sector of the Strait, and especially in the waters of the Francisco Coloane Marine Park where systematic surveys of cetaceans have been carried out in summer and autumn since 1999, one adult has been reported in February 2011, a mother with a calf in April 2017 and a mother with a calf in September 2020. In Otway Sound which connects to the Strait a lone individual was sighted near Fitz Roy Channel in October 2018. The Eastern entrance of the Strait of Magellan is an area with fewer systematic surveys than other regions of the strait, and during few aerial surveys (1984, 1987, 1989, 1996) non SRW were recorded. However, non-systematic information coming mostly from photographic records provided by third parties, two individual strandings, and data previously reported by Belgrano *et al.* (2008), documents the presence of SRW in the eastern area of the Strait of Magellan. It should be highlighted that 86% of the sightings were during autumn and winter.

The workshop highlighted that more information which pointed to the origins of the individuals in this area should be collected. Thus, it was suggested different sources of data to be collected: DNA and acoustics. And in a future, satellite tagging. Likewise, the importance of training drone pilots to take photographs that allow the identification of individuals that arrive in the Strait of Magellan area was mentioned.

#### 3.1.4 Uruguay

The workshop received information from new individual whales' photo-identified by citizen science in Uruguay. A catalog has been consolidated from different sources. Between 2001 and 2009, FrancaAustral Project conducted line transect aerial surveys along the Uruguayan coast to collect data on SRW, including location (GPS), group composition, behavior, and photographic records for photo-identification purposes. This was the first long term scientific study on the species that collected data systematically. Since 2013 and until 2020, Fauna Marina Uruguay have been conducting non-systematic effort (approximately 400 field days, 2,000 hours) searching for SRW from 28 observational sites located along the oceanic coast and animals were photographed using DSRL cameras and drones. For the period 2001-2009, a total of 38 aerial surveys were conducted and 489 SRW were recorded. SRW photos were pre-classified based on their quality, edited, named and a catalog was built using the Discovery software (version 1.2); then, 194 catalogued individuals were entered into another integrated computer-assisted matching software for photo-identification (BigFish© software version 4.1). Soon, it is expected to integrate SRW records obtained from 2013 to 2020 into the existing catalogue.

The workshop **recommended** to analyse the photo-id data from Uruguay together with the photo-id data from Argentina and Brazil in a multi-state analysis.

Finally, the workshop **agreed** that climate change is an important issue that should be considered for the different CMP actions.

#### Attention: SC, CMP

To ensure long-term monitoring of abundance and trends the Workshop participants **recommended**:

- (a) the continuity of long-term photo-identification projects;
- (b) the comparison of catalogs for multi-state population analyses;
- (c) continue the analyses in order to understand which environmental and oceanographic features influence habitat selection, especially considering climate change scenarios;
- (d) continue with the long term population dynamic analyses and possible trends of the population;
- (e) training of new photo-ID analysts and drone pilots; and
- (f) to consider climate change as a primary environmental factor to guide different CMP actions.

and **encouraged**:

- (g) to collect data (DNA, acoustics) from areas such as the Strait of Magellan in Chile to determine the origins of the animals in this area; and
- (h) photo-ID collection in Chile, with the use of drones.

#### 3.2 Ensure long-term monitoring of biological parameters MON-01b

The workshop received information from the Instituto de Conservación de Ballenas (Argentina) and colleagues on a series of articles and studies that aim to evaluate the effects of kelp gull attacks on behavioral, physiological and mortality parameters.

The main results from the paper 'Acute and chronic behavioral effects of kelp gull micropredation on southern right whale mother-calf pairs off Península Valdés, Argentina' (Azizeh *et al.*, 2021) were presented. Kelp gulls *Larus dominicanus* (KG) feed on the skin and blubber of living southern right whales off Península Valdés (PV), Argentina (see Fig. 1). The whales respond strongly to KG micropredation by changing their immediate (acute) behavior during attacks and their overall (chronic) surfacing pattern and body posture to minimize gull exposure. The energetic and large-scale behavioral consequences of these attacks are unknown. To address this knowledge gap, researchers quantified the effect size of both acute (during attacks) and chronic (not during attacks) responses by comparing the respiration rates, swim speed, and nursing behavior of PV SRWs to undisturbed (control) SRW mother-calf pairs in Head of Bight, Australia, using unmanned aerial vehicle focal follows. Even when gulls were not attacking, PV SRW mothers and calves demonstrated ~50 and ~25% higher respiration rates, respectively, than whales in Australia. During attacks, PV calf respiration rates increased by an additional 10%. PV SRW mothers also frequently (>76% of respirations) exhibited irregular breathing postures, causing the whales to potentially expend extra energy by working against their natural buoyancy. Despite no significant increase in average maternal swim speed, 76 and 90% of gull attacks elicited strong behavioral reactions from mothers and calves, respectively. Overall, PV calves spent less time nursing during individual bouts compared to those in Australia but entered suckling position more frequently. Furthermore, kelp gulls seemed to show a preference for attacking previously wounded calves and at a higher rate. These chronic and acute behavioral effects likely carry energetic costs, which could have long-term consequences for SRW survival and reproduction.

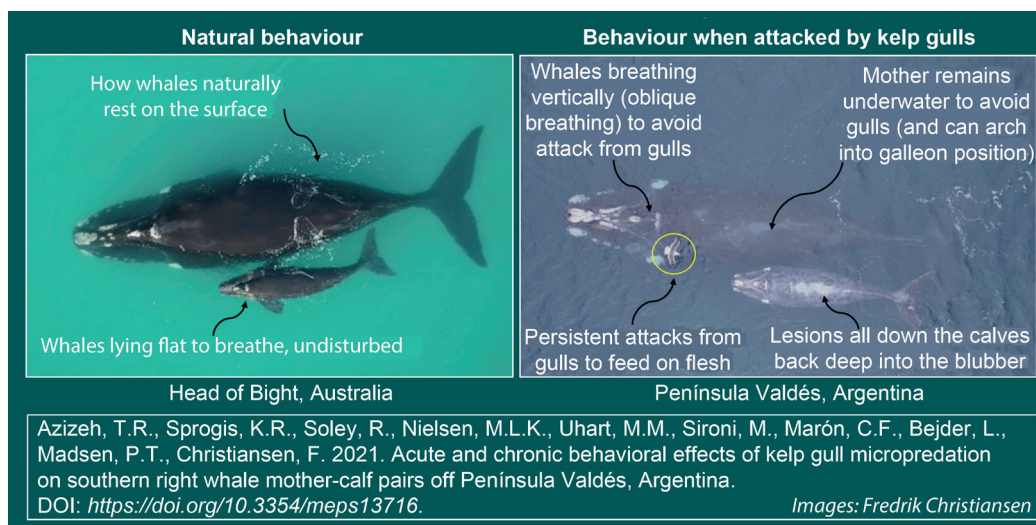


Fig. 1. Comparison of right whale behaviour.

The workshop asked about the control of the kelp gull in Península Valdés; however it was mentioned that this control is very difficult considering the size of the kelp gull population. It was also reinforced that the kelp gull individuals do not specialize in this behavior, but the problem affecting the whales is the size of the kelp gull population that is subsidized by refuse from human activities.

Subsequently, the workshop received the main results from the study 'Retrospective analysis of the lifetime endocrine response of southern right whale calves to gull wounding and harassment: a baleen hormone approach' (Fernandez Ajo *et al.*, 2020). Physiological measurements are informative in assessing the relative importance of stressors that potentially impact the health of wildlife. Kelp gulls, resident to the region of Península Valdés, Argentina, have developed a unique behavior of landing on the backs of southern right whale adults and calves, where they feed on their skin and blubber. This parasitic behavior results in large open wounds on the dorsal surface of the whale. Coincidentally, the SRW population off the coast of Península Valdés has experienced elevated calf mortality in some years since the 2000's. Researchers quantified levels of glucocorticoids and thyroid hormone extracted from baleen of dead calves to evaluate, retrospectively, the endocrine response of whale calves to gull wounding and harassment. Baleen accumulates hormones as it grows, allowing evaluation of long-term trends in physiological condition. While glucocorticoids (GCs) are known to increase in response to stressors such as disturbance, the metabolic hormone triiodothyronine (T3) has been shown to decrease under sustained food deprivation but is largely unaffected by disturbance stress. Researchers quantified lifetime patterns of GCs and T3 in baleen recovered at necropsy from 36 southern right whale calves with varying severity of wounding from kelp gulls. GC levels in baleen correlated positively with the degree of wounding, while T3 levels remained stable irrespective of the severity of the wounding. The results suggest no evidence of malnutrition in low vs. severely wounded whales. However, the positive correlation of GCs with wound severity indicates that heavily wounded calves are suffering high levels of physiological stress before they die. This suggests that kelp gull wounding may have contributed to the high southern right whale calf mortality observed in some years in the Península Valdés region of Argentina.

During the workshop, it was mentioned that this behaviour of kelp gulls' attacks has already been reported in other areas at a smaller scale (e.g. Georgias del Sur/South Georgia, Australia and New Zealand). Also, it was mentioned that although there are no conclusive data, it is observed that the calves would have a window of five weeks to learn oblique breathing as an avoidance behavior. This time would coincide with the reach of high levels of glucocorticoids presented in the work. Finally, it was noted that there are no recent kelp gull population size estimates for Península Valdés and northern Patagonia.

The workshop received additional information concerning how kelp gull wounds can reduce calf survival in southern right whales (Marón *et al.*, 2015). As mentioned before, kelp gulls feed on the skin and blubber of living southern right whales at Península Valdés, modifying their behavior during the critical nursing period. Unusually high calf mortality was recorded in some years between 2003 and 2013. Increasing evidence pointed to kelp gull harassment as a contributing factor to calf deaths. To assess how the occurrence of gull lesions varied through the years and between sites (GN: Golfo Nuevo; GSJ: Golfo San José), photographs were used from the photo-id catalog curated by ICB-OA and two analyses were performed using the number and size of lesions of calves born in Península Valdés between 1982 and 2011. Until the early 2000s, lesions/calf were similar at both sites, but starting around 2002 the increase in GN was much more rapid than in GSJ. Results showed a significant increase in the probability of exhibiting large gull lesions/calf since the 1990s in both sites. A long-term database with 36 years of sighting histories of whales photo-identified in their year of birth, and the number and

size of gull-inflicted lesions on each individual was analysed. Capture-recapture methods were used aiming to investigate the effects of kelp gull harassment on calf survival probability. Considering the effect of gull lesions and the gulf where calves were identified, calf survival probability was modeled. Results showed that the probability of surviving the first year is strongly affected by the number and size of gull-inflicted lesions but presented no differences between sites. This long-term time series supports recent studies that suggest that gull harassment at Península Valdés may affect SRW population parameters and likely influence population dynamics.

During the discussion, reference is made to the fact that micropredation by kelp gulls could be associated with the SRW density dependence.

The results from Maron *et al.* (2021) were presented. Marine mammals rely on blubber mainly for energy storage, buoyancy, and streamlining. Mysticetes are born with a relatively thin fat layer that grows rapidly during nursing. However, little information on blubber deposition patterns is available for baleen whale calves. Marón *et al.* measured blubber thickness at nine body locations in 350 southern right whale newborns to 4-6-month-old calves that died on the Península Valdés (Argentina) calving ground from 2003 to 2019, to document changes in blubber thickness with growth. Additionally, they looked for differences in blubber thickness and lipid content of the outer/superficial blubber in calves that died in years with high (2003, 2005, 2007-13) and low calf mortality (2004, 2006, 2014-19) to test whether the former was suffering from gross nutritional stress. Blubber thickness increased at all body locations with calf length. Along the cranio-caudal axis, blubber increased in the dorsal and ventral planes, but decreased laterally towards the peduncle, possibly to improve streamlining. No difference in blubber thickness and lipid content were found between high and low mortality years, suggesting that individuals were not undernourished. This is the first study to describe progressive increases in calf blubber thickness during growth and contributes knowledge to right whale health and ontogeny.

The workshop reviewed preliminary analysis of anthropogenic injuries in southern right whales off Argentina. Ship strikes and entanglement in fishing gear are major conservation threats for marine mammals. Every year, southern right whales migrate from their calving ground at Península Valdés, Argentina to their feeding grounds in the South Atlantic, where boat traffic and fishing and oil operations occur. To evaluate how anthropogenic injuries have impacted this population over the last five decades, researchers from the Instituto de Conservación de Ballenas (Argentina) analysed photographs of living individuals taken during annual aerial surveys at Península Valdés in 1971-2017, and photographs taken during examinations of dead individuals in 2003-19 by the Southern Right Whale Health Monitoring Program. Injuries recorded in the photographs were classified by type as ship strike, entanglement, or unknown anthropogenic source. A total of 141 living whales with anthropogenic injuries were detected, representing 3.7% of 3,800 whales analysed. Most injuries were present in adults (84%), and the remaining were recorded in calves (8%) and juveniles (5%). A preliminary analysis of the 141 cases shows that 19 individuals (13%) had entanglement injuries and 69 (49%) had signs of ship collisions. Some cases are still under evaluation to confirm the etiology of the injuries. During the 1970s, whales with entanglement injuries represented only 7% of the total whales with injuries, however the percentage increased to ~30% in the 2000s-10s. They found 23 dead whales with anthropogenic injuries (4% of 557 examined whales) of which 70% were calves and the remaining were adults (17%) and juveniles (13%). Most recorded injuries were from ship collisions (87%) and fewer cases were from entanglements (13%). The number of injured whales at Valdés, especially from entanglements has increased in the last two decades. Considering the effects that anthropogenic injuries have in the health and wellbeing of whales in other populations (e.g. the endangered *E. glacialis*), these results suggest that the health of the right whales of Argentina will be affected if management decisions to minimize the impact of collisions and entanglements are not discussed in the short term.

#### Attention: SC, CMP

To ensure long-term monitoring of biological parameters the Workshop participants **recommended**:

- (a) to continue with physiological analyses considering stress of animal after kelp gull attacks;
- (b) to continue with the monitoring of blubber analyses;
- (c) to continue with the calf survival probability analyses after kelp gulls attacks;
- (d) to systematically analysed whether lesions caused by anthropogenic sources have been used by kelp gulls; and
- (e) finally, continue with the monitoring of ship strikes and propose management decisions to minimize the impact of collisions and entanglements in a short term.

### 3.3 Enhance existing stranding networks including the capacity for undertaking post-mortems

#### 3.3.1 Argentina

The Southern Right Whale Health Monitoring Program provided an update on strandings at Península Valdés in 2019 and 2021 (no data were collected in 2020 due to COVID-19 restrictions). Seventeen and 45 dead whales were recorded in 2019 and 2021, respectively. The increase in 2021 was an unexpected return to high mortality seasons not observed since 2015, with deaths doubling the average 21 whales per year between 2016 and 2019 (Fig. 2). Of relevance, the percentage of deaths of newborn calves, the most affected age category in Península Valdés (circa 90% of total annual deaths recorded



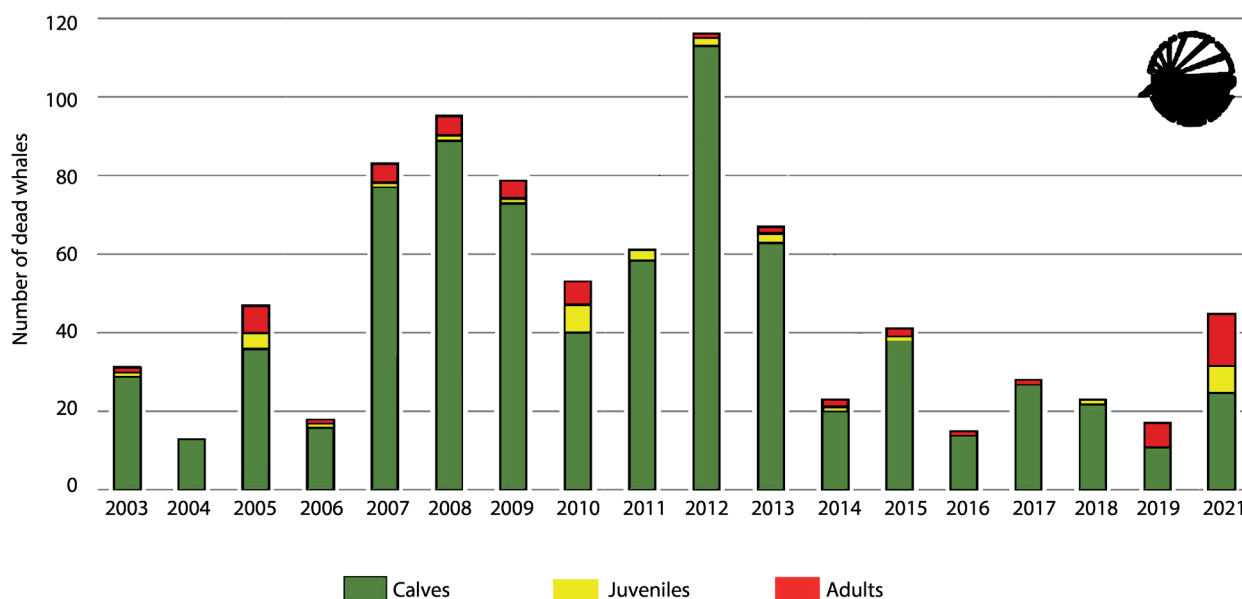


Fig. 2. Total annual number of dead southern right whales recorded at Península Valdés, Argentina by the Southern Right Whale Health Monitoring Program for the period 2003-21 (no data collected in 2020 due to COVID-19 restrictions).

since 2003), dropped to 59% (2019) and 55.5% (2021). In contrast, juveniles and adults represented 41 and 44.5% strandings in 2019 and 2021, respectively, with a total 19 adults (18 females) and 7 juveniles (3 females) lost over the two seasons. Despite limitations from decomposition, all accessible carcasses were examined, and necropsies were performed on 54 (87%). No anthropogenic lesions were identified, and an immediate cause of death was not obvious in any of the dead whales. Of note, shellfish fisheries in Península Valdés were closed at the time of most adult and juvenile deaths due to ongoing blooms of toxin producing plankton. The time and space clustering of the adult and juvenile whale deaths resembled previous similar events in 2005 and 2010. As in those cases, and in the absence of external signs of injury or other cause of acute death, the leading hypothesis for the unusual 2019 and 2021 deaths is exposure to toxins from harmful algal blooms. Diagnostics in specialized laboratories will be pursued. While death from biotoxin exposure has yet to be confirmed in SRW and other mysticete whales, evidence of exposure and potential sublethal effects have been reported for right whales at Península Valdés (D'Agostino *et al.*, 2017; Wilson *et al.*, 2016). Moreover, a recent study by D'Agostino *et al.* (2022) found lower levels of stress hormones (glucocorticoids) in feces of SRW (living and dead) exposed to domoic acid compared to those not exposed. This is relevant because it is thought that lower glucocorticoid levels negatively impact the ability of whales to regulate their metabolism and to cope with stressors.

Difficulties faced by researchers in Argentina due to the prohibition of performing necropsies on some beaches of public use were discussed by the workshop. It was suggested that this problem should be addressed with the local authorities in Chubut. It was also noted that whales have been seen feeding on copepods during algal blooms, so this type of prey could be the source of toxin contamination. It was reinforced that the best techniques for toxin analysis and the possibility of transporting the samples must be addressed. Kidney and urine samples (from carcasses) should be taken to test for the toxin. The permit to facilitate the transport of samples was discussed and it was highlighted that CITES can help with this issue. It was mentioned that these high mortality events could be like those that occurred at the beginning of the CMP when unusual calf mortality events occurred. It was discussed the importance of CMP coordinator to liaise with government authorities for the necropsy beach permits as well as samples transportation. Finally, the slow response to a stranding was discussed, therefore the creation of protocols for effective and rapid response to strandings is recommended.

### 3.3.2 Brazil

The workshop received information from strandings monitored through the APA da Baleia Franca (Right Whale Environmental Protection Area - RWEPA) Stranding Protocol, a partnership between many institutions and NGOs to coordinate stranding response in the area. This protocol has been going on since 2007, where strandings reported to local authorities are examined by the RWEPA Protocol institutions. The Instituto Australis and the other institutions from the RWEPA Stranding Protocol are also part of a national network, REMAB. Since August 2015, the 'Santos Basin Beach Monitoring Program' (Projeto de Monitoramento de Praias da Bacia de Santos - PMP-BS, [www.comunicabaciadesantos.com.br](http://www.comunicabaciadesantos.com.br)) has been underway, recording all marine mammals that strand along the Brazilian coast, from Santa Catarina to

Rio de Janeiro States (in Rio de Janeiro the monitoring began in September 2016). Most of this area is monitored daily<sup>3</sup>. The PMP-BS beach monitoring includes part of the Right Whale EPA in the central-southern coast of Santa Catarina State, the main area of occurrence of right whales.

There were no right whale strandings in Santa Catarina in 2020, and one calf stranded in 2021. In 2020, two strandings of adults were recorded in Rio Grande do Sul State, south of Santa Catarina (Sergio Estima, pers. comm.). In Santa Catarina, Brazil, strandings have been recorded since 2002, and monitored systematically since 2015. From 2002 to 2021 there were 43 right whale strandings, with the highest number recorded in 2018 ( $n=11$ ). From the total, 34 (79%) were calves of the year, 2 (4.7%) were juveniles and 7 (16.3%) were adults. The high number of strandings in 2018 is coincident with the highest number of right whales sighted in the aerial survey for the species conducted in September 2018. Pathologic findings and causes of death were investigated in eight individuals (out of 27) necropsied between 2010 and 2017 (Groch *et al.*, 2019a). The animals were mostly calves (7 new-born/calves, 1 adult) and sex (3 females, 5 males). The main causes of stranding and/or death were neonatal respiratory distress syndrome and trauma of unknown origin. An important finding was that three animals were PCR-positive for cetacean morbillivirus, which has been cause of death in other cetacean species (Groch *et al.*, 2019b).

An update of the REMAB (Brazilian Stranding Network) explained how the network was created and discussed how it could be used as a model for other range countries. The update included details about the stranding response protocols developed by the Aquatic Mammals Center in collaborations with researchers from several organizations and an indication that stranding data should be upload to SIMMAM (public database from the government). Also, there is another database called PMP (as mentioned previously in this same report). During the last year, the Aquatic Mammal Center inputs the PMP data into SIMMAM. Therefore, with the partnership of the member organization of REMAB and with the input of data from the monitoring programs, Brazil can have relevant data on the stranding of aquatic mammals in the Brazilian coast allowing the establishment of conservation policies.

The workshop **recommended** the implementation/renew of stranding networks in Uruguay, Chile, and Argentina. It is suggested that there should be an IWC database on where the samples are stored and what type of samples are available from the different strandings. Finally, it was discussed the importance of necropsy protocols standardized for all the stranding networks of the range states.

### 3.3.3 Uruguay

The strandings of southern right whale recorded on the coasts of Uruguay between January 2021 and April 2022 are reported here. In Uruguay, so far there are no systematic strandings surveys of the entire coast, existing records are obtained mainly opportunistically. The reports presented here were received by the National Directorate of Aquatic Resources (DINARA, Ministry of Livestock, Agriculture and Fisheries) mainly through researchers from the Faculty of Sciences (University of the Republic), by workers from the National System of Protected Areas (Ministry of the Environment), and by members of civil society organizations (e.g. Vida Silvestre Uruguay, Fauna Marina Uruguay, Karumbé and Yaqu Pacha Uruguay) who have been working in the study and/or conservation of marine fauna for several years. Recently, some of the aforementioned organizations have been promoting the use of an application (Epicollect5, proyecto Varamientos Uruguay) so that citizens can report the observed strandings. Once a stranding report was received, depending on the conditions and characteristics of the stranded cetaceans as well as logistics available, members of different organizations mentioned above oversaw collecting samples from the stranded whales. Three southern right whales stranded during August ( $n=2$ ) and September ( $n=1$ ) 2021 on the coasts of Maldonado and Rocha departments, coinciding with the species' sighting season in Uruguay. The individuals were in an advanced state of decomposition and corresponded to two adults and one calf, the latter showing vertebrae with marked cuts that could have been caused by propeller boats. Finally, it is important to emphasize that only with systematic surveys of the Uruguayan coast that are continuous in the long term, it will be possible to detect trends or atypical events in the occurrence of strandings for the species.

#### Attention: SC, CMP

To enhance existing stranding networks including the capacity for undertaking post- mortems the Workshop participants **recommended**:

- (a) to establish and update protocols for all the institutions that participates in necropsy;
- (b) the CMP coordinator must get in contact with the government of the municipalities and range countries in order to obtain permits to carry out necropsies on beaches and to transport samples;
- (c) to organise stranding networks in all the range countries (Brazil could be taken as an example);
- (d) to strengthen the rapid response system to strandings; and
- (e) to contact the IWC to organise in a single database all the strandings by country.

<sup>3</sup>All the data from this monitoring is available at <https://simba.petrobras.com.br/simba/web/>.



## 4. MITIGATION ACTIONS

### 4.1 Development of a regional entanglement response strategy

#### 4.1.1 Brazil

The workshop received an update of the entanglement response strategy in Brazil. Since 2012, when Brazil received the first training from the IWC Global Whale Entanglement Response Network, the country has made efforts trying to develop and build its own whale disentanglement network. The disentanglement courses have been carried out mainly in São Paulo, Santa Catarina, and Pernambuco States in Brazil. Nowadays, there is a trained and well-equipped team in the Baleia Franca Preservation Area in Santa Catarina State and well trained and equipped teams in the State of São Paulo. A new training course was going to be carried out in June 2022 in Santa Catarina, a state where there were a large number of animals entangled in fishing nets (mainly humpback whales). In addition, another training course will be held in the State of Rio de Janeiro. Now in Brazil, at least five teams are completely trained to act in any entanglement emergency. The CMA aims to offer more trainings, as needed, in other states along the country. In the Ministério do Meio Ambiente (MMA), a regulation is being discussed to control and supervise the institutions and people authorized to carry out the disentangling activities. Brazil hopes, soon, to be prepared to minimize the impacts caused by the entanglement of whales in fishing gear, thus contributing to this important conservation and animal welfare work.

New information about entanglements records in southern Brazil was presented. Entanglement of right whales in fishing gear have been recorded in southern Brazil by the Right Whale Research and Conservation Program, currently maintained by Instituto Australis through the Projeto Franca Austral (ProFRANCA), since 1999, through aerial, boat and land-based surveys, regularly conducted for ecological studies, as well as whalewatching companies and citizen reports to Instituto Australis and APA da Baleia Franca (Right Whale Environmental Protection Area – RWEPA). Between 1999 and 2021, 65 cases were recorded in Santa Catarina State (minimal number, excluding possible double records). The majority were adult whales (87.7%,  $n=57$ ), followed by calves (6.1%,  $n=4$ ) and juveniles (6.1%,  $n=4$ ). In 87.7% of the cases, the fishing gear involved consisted of parts of monofilament gillnet (the common type of gear used by artisanal fishery in the region) attached to the whales' callosities. Except for two cases, the entanglements reported here appeared to be superficial and there were no signs of external physical injuries associated to the entanglements. The exception being two calves in 2018, when a disentanglement procedure was necessary. In the two cases a fishing net that was tangled around the calves' head and caudal peduncle. In the first case, the local Disentanglement Team trained by the IWC acted and succeeded to remove most of the net, although the disentanglement kit was not fully available yet. In the second case, before the Disentanglement Team arrived at the local, a surfer jumped in the water to remove the net from the calf, without any safety or appropriate training and technique, putting its life at risk. Photoidentification analysis enabled the individual recognition of 33 (50.7%) whales, a follow up of 19, from which 12 were free of fishing gear when resighted. The resightings of individuals free of fishing gear indicate that in case of the nature of most entanglements reported here, right whales can somehow free themselves or through the disintegration of the net filaments over the time.

A mean of 2.8 entanglements/year were recorded over the entire period. However, the number almost triple from 1.5 entanglements/year in the first decade (1999-2010), to 4.3 entanglements/year (2011-21) in the second decade. An important increase in the proportion of cases was recorded in the second period, which may be related to increase in fishing activities or increase of reporting. The highest number of cases were recorded in the years 2013 ( $n=9$ ) and 2018 ( $n=13$ ). One possible explanation for the number recorded in 2018, is the high number of whales sighted in Santa Catarina in that year, however it was not the case in 2013. Is extremely important to maintain the Right Whale Disentanglement Team and Tool Kit in Santa Catarina State and there is a need to publicize a normative containing regulation for acting in entanglement cases in Brazil. The evaluation of interactions between fishery and whales requires regular monitoring of the whale population and fishing activities, and continuing efforts to document whale entanglements.

During the workshop the need to have more kits and more trained people was discussed. However, Aranha mentioned the high cost of the kits. Given this, Galetti-Vernazanni offered her help to see if it could be cheaper to develop the kits in Chile. Aranha mentioned that entanglement is not a problem of lack of people and equipment, but that public awareness should be created about the problem of fishing and its nets. Iñíguez mentioned that in Argentina there are already two teams trained for disentanglement. The possibility of a training with people from the four range states was discussed.

#### **Attention: SC, CMP**

*To develop a regional entanglement response strategy the Workshop participants **recommended**:*

- (a) *range countries should report the entanglements to the IWC and look for funding to finance the disentanglement trainings;*
- (b) *range countries to develop disentanglement trainings as these are part of a CMP actions; and*
- (c) *at least one training should be carried-out with people from the four range countries together.*

## 5. PUBLIC AWARENESS ACTIONS

### 5.1 Develop a strategy to increase public awareness

#### 5.1.1 Argentina

The workshop received information from the Instituto de Conservación de Ballenas (ICB) about a public campaign in alliance with La Roche-Posay Argentina. 'Guardianas de los Océanos' (Guardians of the Oceans) aims at raising public awareness and to contribute to finding positive solutions to plastic pollution and its impact on whales and the oceans. The goals of the campaign are organised in three themes, and the actions, among others, include:

- (1) Management and training:
  - To recover 200 tn of discarded fishing gear and incorporate them into a circular economy circuit.
  - To provide training to fishermen and ship captains to reduce plastic pollution during fishing operations.
- (2) Public awareness:
  - A beach cleanup was done in Península Valdés in October 2021 with logistic support from the Government of Chubut.
  - An online public webinar 'Plastic Marine Litter: impacts and solutions' was organised in April 2021 with support from the !Foro para la Conservación del Mar Patagónico y Áreas de Influencia.'
  - The documentary 'Revirtiendo la Marea Plástica' (Reversing the Plastic Tide) was produced and published. The film received the Special Mention Award at the Patagonia Eco Film Fest and so far has been viewed by over 5,300 people on YouTube and ICB social networks.
  - Educational content was created for four audio stories that were broadcasted for Children's Day. The short stories tell the lives of Mochita, Docksider, Nube and Pionera, four whales in ICB's Whale Adoption Program.
  - The photographic exhibit 'Guardianas de los Océanos' (Guardians of the Oceans) was opened in October 2021 in Puerto Pirámides to promote the active commitment of visitors on the protection of whales and the ocean.
  - Talks and live events on Instagram (Bioguía, Bioweek and others) were organised, reaching an audience of nearly 17,000 people.
- (3) Research for outreach:
  - A report of the occurrence of entanglement injuries on the southern right whales of Península Valdés was published. It is based on 50 years of photo-identification data. The information was used in press releases and articles for the general public.

The campaign is ongoing. For more information visit Instituto de Conservación de Ballenas and Guardianas de los Océanos.

#### 5.1.2 Brazil

Information regarding public awareness was received by the NGO Mar de Ideias. The information listed a series of environmental education actions currently undergoing in Brazil in relation with the SRW. Educational actions are primarily concentrated in the Right Whale Protection Area (APA BF), in the state of Santa Catarina.

However, it is necessary to expand geographic areas as well as quality information about SRW. Actions from partnerships between APA BF, government and NGOs were pointed out, but educational actions in general are aimed at schools, children and tourists, with a gap in actions that include local fishermen.

An interesting project mentioned during the WS, was the Southern Right Whale Route, which was conceived to increase economic activity in the APA-BF, especially for small businesses during low season. The project was coordinated by Business association with support of the local councils and SEBRAE (Brazilian Service of Support to Micro and Small Enterprises).

It was mentioned that during last year 2021, it was carried-out a public meeting in Itajaí to discuss the prevention of whales and marine animal mortality on the north-central coast of Santa Catarina.

Finally, it was mentioned that since 2020, SRW has an official day in Brazil (31st of July). Other countries also have their own SRW day (Argentina: September 25th; Uruguay: October 10th).

#### 5.1.3 Uruguay

Finally, the workshop received information from Uruguay citizen science programs. These programs are increasingly popular and a useful tool as an alternative way to obtain valuable information on wild populations, especially in areas in which the budget and logistics are limited. The study presented preliminary results of the first citizen science initiative aimed to gather information about cetacean biodiversity in the coast of Uruguay and the San Matias Gulf, Argentina. The platform consists in a web form and an interactive map that allow citizens to observe in real time where the different species of cetaceans are present. A total of 152 (Uruguay) and 1000 individual SRW were recorded during a period of 11 months. This study demonstrates that with a strong network of citizen science that involves the local stakeholders, governments, NGOs, it is possible to obtain data on SRW and cetacean species richness.

Link Argentina: <https://arcg.is/1Hb0TP1>

Link Uruguay: <https://www.arcgis.com/apps/dashboards/862225c441b34e699dc3d18820face63>

Please refer to Integrating citizen-science and mobile web app as a tool for the conservation of cetaceans in San Matias Gulf, Rio Negro province, Argentina (Arias *et al.*, 2022).

**Attention: CMP**

**The Workshop Participants recommended to continue with the development of targeted public awareness campaigns and environmental education programmes.**

## 6. OTHER

Special comment for the 50 years of the Right Whale Research Program from Instituto de Conservación de Ballenas and Ocean Alliance at Península Valdés, Argentina:

*The Right Whale Program began in Argentina in 1971. In that year, Dr. Roger Payne, at the time with the Long-term Research Institute and later the Whale Conservation Institute and Ocean Alliance, conducted the first aerial survey to photo identify the southern right whales of Península Valdés. In the early 1970's, Vicky Rowntree began to work on the photo identification of individuals, using black-and-white and slide photographs. In 1996, the non-governmental organization Instituto de Conservación de Ballenas (ICB) was founded in Buenos Aires by Diego Taboada, Roxana Schteinbarg and Mariano Sironi. Since then, the Program has expanded its mission to include projects and campaigns on whale conservation and environmental education in Argentina and Latin America. The Program reached half a century of scientific activities when it did the 50th annual aerial survey of southern right whales at Península Valdés in September 2021, a world-wide landmark for whale research. At present, the program is conducted by ICB with support from Ocean Alliance.*

The workshop participants commended the researchers with ICB and OA for this scientific landmark.

## 7. CMP ACTIONS (REVIEW AND UPDATE)

The actions were reviewed and updated by all the workshop participants. Annex C summarises the new or update actions for the period of 2022-26.

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## Annex A

### List of Participants (including virtual participants)

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Karina Groch  
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Macarena Agrelo  
Marcela Uhart  
Mariano Alberto Coscarella  
Mariano Sironi  
Miguel Iñiguez  
Milton Marcondes  
Mônica Pontalti  
Santiago Fernández  
Thais Evangelista

# Annex B

## Agenda

### Day 1

- 9:00 Introductory items  
Chair's welcome and opening remarks  
Appointment of rapporteurs  
Meeting procedures and time schedule
- 9:30 Adoption of agenda
- 9:45 Review of available data, documents and reports  
Documents submitted
- 10:00 Research Actions (new information and update previous of information)  
Determine movements, migration routes and location of feeding grounds.  
Development of a GIS[meta] database on information on human activities that might have and adverse impact on whales
- 11:30 *Coffee break*
- 11:45 Monitoring Actions (new information and update of previous information)  
Ensure long-term monitoring of abundance, trends and biological parameters  
Enhance existing stranding networks including the capacity for undertaking post-mortems
- 13:00 *Lunch*
- 14:00 Public Awareness Actions (new information and update of previous information)  
Develop a strategy to increase public awareness  
Build capacity in range state in order to strengthen management systems
- 14:45 Mitigation Actions (new information and update previous information)  
Development of a regional entanglement response strategy  
Develop and implement a strategy to minimize kelp gull harassment  
Establishment of an expert advisory panel (review of the panel)  
Develop mitigation actions to address major threats identified through the Sensitivity Atlas
- 15:45 *Coffee break*
- 16:00 Other data available (new information and update previous information)
- 17:30 *End of the day*

### Day 2

- 9:00 Review of Research Actions (update and proposal of new actions) Discussion
- 10:00 Review of Monitoring Actions (update and proposal of new actions) Discussion
- 11:00 *Coffee break*
- 11:15 Review of Public Awareness Actions (update and proposal of new actions) Discussion
- 12:00 Review of Mitigation Actions (update and proposal of new actions) Discussion
- 13:00 *Lunch*
- 14:30 Writing of the report
- 17:00 *End of the day*



# Annex C

## Summary of new or updated actions for the period 2022-2026

| Actions  | Specific actions   | State of the action   | Where to focus the action (countries, areas)  | Short-term - 2 years  | Prioritisation  | Mid-term - 4 years  |
|--|--|---|---|---|---|---|
| <b>RESEARCH</b><br>Determine movements, migration routes and location of feeding ground(s)                                 | Satellite tagging  | Ongoing in Argentina  | Brazil  | Continue in Argentina. Find funding to develop the action in Brazil   | High priority to continue in Argentina and to begin in Brazil | Chile and Uruguay in the future. Capacity building for Uruguay  |
|  | Photo-Id catalog   | Ongoing in Brazil, Argentina and Uruguay  | All range states  | Update Uruguay catalog. Initiate Chile's catalog  | High priority for the range countries                         | Enhance regional cooperation. Work in coordination with the SRW Consortium  |
|  | Comparison of photo-Id catalogs  | Brazil x Argentina: 124 matches; Brazil x SG/GS: 1 match  | Brazil x Uruguay; Brazil x Rio Negro (Argentina) (FCethus catalog), PV x Rio Negro (Argentina), Uruguay x Argentina | Consult with the SRW consortium ways to compare catalogs at different regional scales   | High priority for the range countries                         |   |
|  | Passive Acoustics  | Ongoing in Brazil, ongoing in Uruguay, beginning in Argentina and Antarctic Peninsula   | Offshore habitats   | Continue studies in Argentina, Brazil, Uruguay and Antarctic/sub-Antarctic area   | High in Antarctic Peninsula                                   | Initiate passive acoustics monitoring in Chile  |
|  | Feeding Ecology  | Ongoing stable isotopes Brazil and in Argentina   | Uruguay stable isotopes. Prey stable isotope analysis   | Continue in Brazil and Argentina (isotope landscapes), begin in Uruguay   | High for Uruguay  | Begin in Chile  |
|  | Habitat Use  | Ongoing in Brazil, Argentina (PV)   | Other regions in Argentina, Chile and Uruguay   | Analyse coastal sighting data for spatial analysis in Uruguay   | Mid in Uruguay  |   |
|  | Genetics/Omics   | Wide population structure analyses  | Chile and Uruguay   | Sampling Southern Chile (Magallanes)  | High for Southern Chile (Magallanes)                          | Uruguay   |
| <b>Development of a GIS (meta) database on information on human activities that might have an adverse impact on whales</b> | Recompilation of existing sources of information on human activities (e.g. fishing, shipping, seismic exploration, gas and oil exploration, and development information) | Uruguay: Data bases in different institutions, needs to be requested<br>- Brazil: Some data already in SIG format, other database needs to be requested. Chile databases needs to be requested. Argentina databases needs to be requested | Argentina, Brazil, Chile, Uruguay   | - Governments commitment to obtained data from private datasets<br>- Gather all the data from the different sources. Create working group from different range states | High for Argentina, Brazil, Chile and Uruguay                 | Finish the complete database for the range countries  |
|  | Compile a SRW Sensitivity Atlas  | Dependent of data compilation of existing sources of information on human activities.   | Argentina, Brazil, Chile, Uruguay   | Find funding to develop this action.  | High for the range countries                                  | Add new data from available sources of human impacts. Identify areas that need more support (hot and cold areas) as well as main threats/cause of death or signs of human interaction that could inform management and threat reduction efforts |

| Actions   | Specific actions  | State of the action   | Where to focus the action (countries, areas) | Short-term - 2 years   | Prioritisation  | Mid-term - 4 years   |
|---|---|---|--|--|---|--|
| <b>MONITORING</b><br>Long-term monitoring of abundance, trends and biological parameters        | Population Modelling/trends   | Ongoing in Brazil and Argentina   | Argentina, Brazil, Uruguay                   | Begin monitoring abundance in Uruguay. Begin monitoring in other regions in Argentina (south of the Buenos Aires Province, and the northern and southern coastal areas of Golfo San Jorge) | High  |  |
|   | Multistate population analyses  | Funding confirmed from the Scientific Committee. Analyses should begin in the next few weeks                | Argentina and Brazil                         | Perform Analysis for Argentina and Brazil: join the existing data and fit the model  | High  | Include Uruguay catalog                                    |
|   | Biological parameters: Calving interval, mortality, survival  | Argentina and Brazil has advance on this action   | All the range countries                      |  |   |  |
|   | Stranding response protocol   | Ongoing in Brazil and Chile. Initial states in Argentina. Initial states of planning in Uruguay             | All the range states                         | Strengthen in Argentina. Start in Uruguay. Database creation   | High  | All the range countries should be with a stranding network |
| <b>Enhance existing strandings networks including the capacity for undertaking post-mortems</b> | Post-mortem examination   | Protocols already established but should be standardized between countries. Permits for in-situ examination | All the range states                         | Coordinator should look for permits for in-situ postmortem examination (numbers, sites, years, etc.) for the region?   | High for Argentina, Brazil and Uruguay                        | Chile  |
| <b>Health Assessment in Living Whales</b>   | Improving and standardizing protocols for health assessment (incl. both qualitative visual health assessment and quantitative, e.g. photogrammetry, blow samples) | Protocols already established but should be standardized between countries                                  | Argentina, Brazil, Uruguay                   | Standardized basic protocols to be used by government agencies   | High for Argentina and Brazil, mid for Uruguay, low for Chile |  |
| <b>MITIGATION</b><br><b>Development of a regional entanglement response strategy</b>            | Region-wide strategy for entanglement response  | Ongoing in Brazil and Chile. Revitalize in Argentina  | Uruguay and Argentina                        | Obtain equipment and trained personnel in Argentina and Uruguay  | Argentina   | Uruguay  |
|   | To work on actions to prevent entanglement  | Some work in Argentina and Brazil, none in Uruguay and Chile  | Argentina, Brazil and Uruguay                | Range countries to develop and established fishing normative for the areas and periods of time of SRW  | Argentina, Brazil, Uruguay                                    | Chile, considering the salmon farming industry             |
|   | Forensic analysis of recovered entanglement material  | Some analyses already conduct in Brazil, however, it depends on the nets being marked                       | Argentina, Brazil                            | It is expected that all range countries will be able to analyse the origin of fishing nets that cause entanglement, especially Argentina, Brazil and Uruguay                               | Argentina, Brazil, Uruguay                                    |  |
| <b>Develop and implement a strategy to minimize kelp gull harassment</b>                        | Keep updated the technical report on gull attack in Peninsula Valdés  | Ongoing in Argentina  | Peninsula Valdés                             | Presentation of the technical report   | High  |  |
|   | To develop a population assessment on gulls in northern Patagonia   | Outdated in Argentina   | Northern Patagonia                           | Seek and secure funds to monitor the kelp gull population. Subsequent technical report with the results  | High  |  |
|   | Continue to monitor gull attacks through the examination of photographs of live whales and post-mortem examinations   | Ongoing in Argentina  | Peninsula Valdés                             | Presentation of a technical report   | High  |  |