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CC Agenda item 9.2.3

Report of the Expert Workshop on the Six-Year Review of the Eastern South Pacific Southern Right Whale Conservation Management Plan

The Workshop was held on 9, 10 and 12 August 2022 virtually via Zoom.

1. WELCOMING REMARKS

The workshop was opened by Barbara Galletti, coordinator of the Eastern South Pacific Southern Right Whale Conservation Management Plan (ESP SRW CMP), who welcomed all participants. A list of participants is provided as Annex A. She specially thanked the speakers for their interest in contributing with new information to the workshop and the invited specialists that would provide valuable advice and enhance discussions. She also thanked the Secretariat of the International Whaling Commission (IWC) for hosting the workshop.

2. APPOINTMENT OF CHAIR AND RAPPORTEURS

Galletti was appointed as chair of workshop and Cabrera and Goya were appointed as rapporteurs to assist in the preparation of the workshop report.

3. ADOPTION OF THE AGENDA

The draft agenda was discussed and adopted (Annex B). Galletti noted that due to differences in time zones among participants from a wide range of geographical areas, the agenda had to be addressed in different order to fit a schedule for everyone. Due to time constraint of the workshop, she also informed that questions and discussion were expected to be taken at the end of all presentations from each section.

4. CMP BACKGROUND AND WORKSHOP OBJECTIVES

Galletti gave a brief overview of the ESP SRW CMP and the six-year review workshop. ESP SRW are distributed along the coast of Chile and Peru and are currently classified as Critically Endangered by the IUCN. This has led the IWC to adopt a CMP for this population in 2012 and in 2016, Peru was welcomed as second Range State at the CMP and a revised CMP was adopted (Galletti Vernazzani *et al.,* 2016). The overall objective of the ESP SRW CMP is "*To guide and encourage range state stakeholders (i.e. government, industry, coastal communities and civil society, among others) and international partners to take steps towards the recovery of this population to levels that will allow the species to withstand both environmental and anthropogenic impacts and ensure its long-term survival".* She also described the activities undertaken under the CMP over the past six years and noted the importance of a Memorandum of Understanding (MoU) to coordinate cooperation for the conservation of SRW that was signed by Chile and Peru in 2018, extending the CMP beyond the scope of the IWC. She informed that during the past CMP Steering Committee meeting it was decided to undertake a six-year review of the CMP after its last revision done in 2016 (IWC, 2021). The expert workshop is a critical part of this six-year review and is aimed to a) review historical and recent data on Chile-Peru southern right whales in order to inform and update the scientific information under the CMP and b) review and identify new short-term, medium-term and long-term research, monitoring and mitigation actions. It was noted that the report of the expert workshop will be considered at the IV CMP Steering Committee meeting in October 2022, in Lima, Peru to update and adopt a new CMP for the next 6-year period.

5. REVIEW OF HISTORICAL CATCHES AND DISTRIBUTION

Quiroz presented a review of historical catches of SRW in Chile based on a Fondecyt project to study whaling in Chile. Traditional and modern commercial whaling begun in Chile in the 18th century and ended in 1983, comprising mostly American, Norwegian and Japanese companies, including several whale species. While there is information on the occurrence of some aboriginal whaling, before the arrival of American and European whaling (1790), that are inferred from ancient drawings in northern Chile showing whaling activities that could be attributed to the processing of dead and/or stranded specimens. It is also known that the Kawésqar people (Magellan region, austral Chile) processed stranded whales for food. Traditional coastal whaling in the late 19th century in Chile shows the hunting and processing of SRW in Chome (Talcahuano). There are not estimated of catches from traditional Chilean whaling. Pelagic traditional or pre-modern whaling occurred by 1890, but the main target were sperm whales and SRW followed next. Pelagic SRW modern whaling begun in 1903 by American and European whalers. An estimate suggests that 2500 SRW were captured by American whalers, 2381 by French whalers and 458 captured by other modern whalers. This is an initial estimate that does not include inshore whaling. Offshore SRW whaling was conducted mainly between Talcahuano and Chiloe. Modern whaling stations were found in Punta Arenas, Quellon (Chiloe Island), Guafo Island, San Pedro, Chome, Santa Maria (Talcahuano), Quintay and further north. Quiroz proposed that to have a sound estimate about the number of SRW hunted along the Chilean coast, more systematic review of logbooks is necessary as well as archives that might have information on whale captures (for example Talcahuano customs archives, etc.), and records of catches in local newspapers.

Rodriguez presented preliminary results of an on-going work on historical whaling reconstruction of SRW in Chile between the 18th and 20th Centuries and its contribution to understanding its current conservation status. The study comprises a review of whaling records from 1789 to 1976, using information from American, French and Chilean whaling that operated between 17ºS and 56ºS. A database is being built to systematize available information. French whaling has not yet been included on the analyses. Only American pelagic whaling and Chilean inshore whaling has been considered. The main results show that at least 471 SRW were taken in that period, mostly by American whaling fleets, from which 120 captures do not have information on location. The whaling peaks during this period occurred between 1831/1850 and 1931/1950 and the main whaling areas were in southern Chile (Biobio to Magellan regions). The analyses show that the first half of the 19th century was the golden age of SRW whaling in Chile. However, more research is needed to understand the impact of SWR whaling in the Chile-Peru population.

During discussions, questions about areas and seasonality of SRW whaling in Chile were raised. It was noted that many catches occurred in southern-austral Chile and it was informed that most whalers conducted operation from September to March but that during July and October they mostly occurred in the north (Coquimbo and Tongoy). In response to a question, it was noted that some SRW were taken by Norwegian in San Pedro (Los Lagos Region) but opportunistically, as their main target species were blue and fin whales. Clarification was given to the fact that French whalers operated usually near shore and American whalers more offshore.

Congratulations were given to the authors for the amount of work these efforts represented and it was noted that although it provided a considerable improvement in understanding SRW catches, there was still far to explaining the dramatic drop of this population. It was recalled that similar studies undertaken in New Zealand show that logbooks represent a small proportion of the number of vessels that visited whaling areas and that this number needs to be extrapolated to correct the available data to the total number of estimated voyages visiting the region. Also, it was suggested that the dramatic drop of the ESP SRW population could probably be due to the hunting of mother and calves as bay whaling can be very effective in removing them. Another problem to understand the impacts of SRW whaling in Chile and Peru is that some whaling vessels passed through these waters while travelling to different target destinations and therefore catches are more difficult to locate. It was also highlighted that any information gathered on struck and loss whales need to be included in the estimates. It was also highlighted that there is a new resource for British whaling catches, https://whalinghistory.org/bv/, that could be used for further investigation.

6. POPULATION STRUCTURE

As species recover from exploitation, continued assessments of connectivity and population structure are warranted to provide information for conservation and management. This is particularly true in species with high dispersal capacity, such as migratory whales, where patterns of connectivity could change rapidly. Genetic tools have been used successfully to understanding the stock identity and connectivity of southern right whale (SRW) wintering grounds around the Southern Hemisphere, and their links to summer feeding grounds.

Carroll presented her work published in 2020 that used maternally inherited mitochondrial DNA (mtDNA) and bi-parentally inherited microsatellite data from all major wintering grounds and the South Georgia (Islas Georgias del Sur: SG) feeding grounds. Specifically, data from Argentina (mtDNA/microsatellite = 208/46), Brazil (mtDNA/microsatellite = 50/50), South Africa (mtDNA/microsatellite = 416/124), Chile–Peru (mtDNA/ microsatellite = 1/1), the Indo-Pacific (mtDNA/microsatellite = 769/126), and SG (mtDNA/ microsatellite = 11/11) was included to investigate population structure and the position of previously unstudied habitats in the migratory network: Brazil, SG, and Chile–Peru. Overall, there is significant genetic differentiation among wintering grounds in mtDNA and microsatellite loci, as previously found (Carroll *et al*., 2019). The single sample from Chile–Peru had an mtDNA haplotype previously only observed in the Indo-Pacific and had a nuclear genotype that appeared admixed between the Indo-Pacific and South Atlantic, based on genetic clustering and assignment algorithms. Conclusions cannot be drawn from the analysis of one sample, but the study authors hypothesise that Chile-Peru may have been a stepping stone for migration between the Indo-Pacific and South Atlantic (Carroll *et al.,* 2020).

Furthermore, Carroll talked about the impact of genetic monitoring and assessments of connectivity in the Aotearoa New Zealand context (NZ). NZ has very long, often sparsely populated coastline, similar to Chile, making the assessment of recovery around mainland NZ difficult. In contrast, regular surveys to the subantarctic Auckland Islands where large aggregations form during winter have been possible, a context that is more similar to field work in Península Valdés or Western Australia. Between 2003 and 2010, the New Zealand Department of Conservation, in collaboration with the University of Auckland and with permission from Indigenous groups, conducted opportunistic field work to collect photo-ID and skin biopsy samples from around mainland NZ. A total of 64 samples were collected over 7 years (1-23 samples collected per year), representing 47 unique individuals (as there were within- and between-year recaptures). Genetic analyses revealed that the Auckland Islands and mainland NZ were the same breeding stock, and both genetic and photo-ID recaptures were identified between the two regions (Carroll *et al*., 2014). In contrast, stable isotope analyses of the skin samples suggest that the NZ whales forage over a broader range than the whales from the Auckland Islands (Derville *et al*., In Review). Based on these results, the NZ government recognises one breeding stock of SRW in NZ waters. However, similar genetic analyses on southeast Australian SRW (Carroll *et al*., 2015) has been based on a smaller number of reproductive females, as it is the sample size relative to the estimated population size that is important for it to be representative. Therefore, even a small number of additional genetic samples from Chile-Peru could be useful to understand population structure and connectivity, particularly given the extensive existing genetic dataset and collaboration underpinned by the SRW consortium and IWC-SORP program.

During discussion, it was noted that one genetic sample was very low and that efforts to increase the availability of genetic samples should be done. It was proposed that capacity for sample collection could be implemented in Range States, since DNA can provide information on genetically distinct populations, even with a small number of samples, so it would be advisable for a small population like the one in Chile and Peru. However, it was highlighted that more funds are needed for training, vessel operation, sampling and analyses. The possibility of collecting genetic samples from mother-calf pairs was considered valuable and recommended using crossbows, but it was noted that the behavior of the whales, which is different in each area, needed to be considered. It was agreed to include these issues for consideration at the "Workshop on Experience Exchange on Whale Watching Regulations and Research Permits" that will be conducted in Lima, Peru in October 2022 to further advance in the design of biopsy sampling protocols.

Regarding sex determination, it was confirmed that the only genetic sample available from Chile corresponded to a male SWR. Finally, it was stated that environmental DNA (eDNA) is a new promising field

of study, however, it does not give the same information as biopsies. Also, eDNA samples normally are taken from a vessel, possibly disturbing the animals. However, the collection of slough skin was highlighted as a useful non-intrusive method since they come out of the whales naturally, might give a wide range of information, however, it may provide lower amount/quality of DNA compared to biopsies.

7. DISTRIBUTION, MIGRATION AND MOVEMENTS

7.1. Acoustic information

Buchan and Rojas-Cerda presented advances of the CMP Passive Acoustic Monitoring Project that is being supported by the IWC to identify possible breeding/calving areas (Rojas-Cerda *et al*., 2022). Twelve-months of continuous recording were collected between 2018 and 2019 off Punihuil, northwerstern Isla de Chiloé, austral Chile and five months between 2019 and 2020 off Arauco Gulf, southern Chile. Isla de Chiloé was selected based on the number of sightings, observation of reproductive behaviors of surface-active groups (SAG), and presence of mothers with calves, the latter was selected as it was a former whaling station. Acoustic data was analyzed using an automatic detector specially developed under this project for right whale upcall vocalizations in the LFDCS software. The detections were reviewed and validated by an analyst, and the false negative rate of the detector was calculated by the manual annotation of days with true detections and aleatory days (N= 100 days) selected from the Puñihuil dataset. 189 true positive detections were found off Punihuil in the 2018-2019 period, with calls present during the austral summer, autumn and winter with no clear seasonal trend. While in the Arauco Gulf, no true positive detections were found. There were two peaks of detections off Punihuil, one in December 2018, and the second in March 2019. The false negative rate of the automatic detector was 68%, although the detector was effective in detecting days with acoustic presence (16 of 19 days). Therefore, the relative abundance of signals might be underestimated by the automatic detector. Gunshots were found along with upcalls during March 2019, which is of relevance, because they have been associated with mating or agonistic behavior between males in other populations. The presence of upcalls in almost all seasons suggest Isla de Chiloé as an important area for the species. In Arauco Gulf, a more extended monitoring was recommended to have a longer dataset of all annual seasons in the area. It was informed that current efforts are being conducted in Mejillones (Antofagasta) and future efforts include Golfo de Penas (Chilean Patagonia) and southern Peru.

Jacobs presented results on temporal trends and effects of noise on upsweep calls of ESP SRW (Jacobs *et al.,* In Press). To test for the efficacy of passive acoustic monitoring of this population, five months of continuous acoustic data (January-June 2012) was recorded off the southwestern tip of Isla de Chiloé. To test for trends in occurrence, 11,313 individual ESP SRW upsweep calls were identified, which have been associated with maintaining contact with conspecifics. Call occurrence increased over the course of the deployment and peaked between April and June, indicating an increase in use of this area. A clear diel pattern in which upsweep calls were predominately detected during dusk and night hours was identified, indicating ESP SRW are likely foraging during daylight hours, as upsweep calls are inversely related to foraging behavior. Noise levels in the frequency range of their communication (100 Hz third octave) was quantified to understand the change in active space whales may be experiencing. Noise levels from 90 dB re 1 µPa to 111 dB re 1 µPa (5th and 95th percentile) was measured, a 21 dB fluctuation that results in an order-of-magnitude decrease in active space area. Sources of high noise at or above the 75th percentile were identified as predominately blue whale calls (occurring in 71.6% of total sampled minutes) and ship noise (occurring in 69.4% of total sampled minutes). Ship noise was responsible for outliers in excess of 140 dB re 1 µPa. In a population as diminished as ESP SRW, such disruptions of their communication range could result in significant barriers to maintaining contact with conspecifics. Passive acoustic monitoring is a powerful tool for monitoring populations as rarely sighted as ESP SRW. Understanding trends in presence and behavior as well as potential sources of disruption to their calling behavior is vital to determining conservation measures that will be most effective toward helping this critically endangered population.

In relation to the possibility of assessing the number of animals based on acoustic records, it was stated that there is no data to make an estimate. However, propagation modelling is being conducted to define trends and densities using a single microphone, but abundance estimate from this data is unlikely. Also, a distribution of animal cycle can be determined with the available data and calibrated core densities between the different

locations monitored could be made but more funding was required. It was agreed that similar acoustic projects on other species conducted currently in Range States could render useful data for ESP SRW but more funding was also required for analysts.

Caution in linking call densities to animal density was made due to the difficulties to interpret acoustic data. It was agreed that with small populations such as ESP SRW, manual annotations should be considered including other type of calls to have more detailed information.

Questions regarding the differences of about one order magnitude found between the number of call detections obtained in northern and southern Isla de Chiloé were raised. It was suggested that these could be explained to either a shift in the acoustic presence of SRW between 2012 and 2018-2019, a difference in the use of SRW off northern and southern area of Isla de Chiloé, or due to differences in methods used between the automatic detector and the manual annotations but the latter could not possibly explain all the differences. Considering that manual annotations have already been done over the southern Chiloé dataset, it was suggested to run the automatic detector on this dataset to compare its results with manual annotations. It was also noted that this could be useful to provide more insights into the performance of the automatic detector.

A recommendation on reducing speed limit to decrease collision risk and ambient noise on the ESP SRW environment was proposed as a conservation measure. Also, it was considered of importance to identify the source of vessel noise (cargo, fishing, etc) and the distribution of vessels to better assist in management measures.

It was also clarified that calves cannot be detected from acoustic data since there are not differentiable, and that mothers with calves tend to be quieter too. Gunshots are primary emitted by males, but there is also information that can be produce by females.

7.2. Sighting information

Galletti provided an overview of the sightings of SRW off Chile and Peru from 1964 to 2021. The results are based on a list of accepted sightings up to 2011 (Galletti Vernazzani *et al.,* 2014) and recent sightings collected since 2012 through the CMP Steering Committee. Grouped sightings were considered when these were in proximity and within a short period of time (or proved by photo identification). A total of 161 sightings, comprising 275 individuals and 69 mother-calf pairs have been reported from 1964 to 2021. The highest number of sightings have been recorded between 25°S to 33°S latitude, but it was noted that this area also overlapped with high human population density and thus could reflect a higher reporting of sightings. An increase in sightings after 2000's can also be inferred. However, this may also be due to increasing access to new technology (cellphone, social networks, etc.) that confirms the presence of the species and that more people are actively engaged in reporting sightings. Similar to other SRW populations, annual sightings are more frequent in austral spring (August – October). Galletti also provided more details on the Southern Chile area (39°S to 44°S) as other speakers were presenting information on other important regions. She recalled that Isla de Chiloe has been previously highlighted as possible part of breeding area because it is the only area that has recorded a between year photo-ID recapture, the presence of surface active groups (SAG) with likely reproductive behavior and the presence of cow-calf pairs (Galletti Vernazzani *et al*., 2014). She also reminded that the only stranded dead whale due to entanglement occurred in this area (Galletti Vernazzani *et al*., 2017). She noted that sightings in this region have been reported from January to October, and therefore with occurrence during almost the entire year. 7 out of the 11 sightings records between January to April for ESP SRW population occurred in this area. In addition, she reported recent sightings during February 2022 of seven SRW that defecated and were likely involved in feeding activities. This new data combined with recent findings on the acoustic presence with peaks in austral summer can also suggest that this area may also be important for feeding activities.

Garcia-Cegarra presented information on recent SRW sightings in Northern Chile and Northern Peru during 2019-2022. In July 2019 a solitary southern right whale was observed close to shore in the south of Antofagasta city (23º39'S, 70º24'W) and researchers were able to fly a drone and identify the individual with a large white patch in its back. One month later, on August 8, the same individual was observed in the north of Antofagasta city (23º35.058'S, 70º23.811'W) very close to shore with the presence of a newborn calf.

Using a drone, it was found it corresponded to the same individual observed in July, providing evidence that the birth occurred near the region (García-Cegarra *et al*., 2021). On July 20, 2022 a mother and calf SRW were observed in Taltal (25º24.252'S, 70º31.296'W), a fishermen registered the sighting from the coast recording a video with his mobile phone. In the video the head of the calf was observed out of the water on several occasions swimming over the head of the mother. More recently, on August 8, 2022 a mother and calf SRW were observed in northern Peru (4°13.476'S, 81° 12.225'W). During a research vessel survey a drone was used to identify the head of the mother and the calf. They were swimming slowly in northward direction, very close to shore. This is the new northernmost sighting for ESP SRW population. The data suggest that northern Chile and northern Peru could be calving areas for this population.[1]

Aguilar provided an overview of confirmed records of SRW in Peruvian waters. There are 8 confirmed sightings of SRW in Peruvian waters (which include 6 mother-calf pairs) until 2018, comprising 15 whales that have been recorded from 12° to 17°S between 1987 and 2018. The first sighting was reported in 1987 off the port of Ilo (at 17°S) (Van Waerebeek *et al.,* 1992), and the last, in 2018, within San Fernando National Reserve (15° 02' 51"; 75°24'46") (Ma. Andrea Meza, IMARPE, personal communication). The first record of mother-calf pair in Peru was registered from the port of Atico, Arequipa, Peru (16°13'08"S, 73° 42'06"W) in September 1996 (Van Waerebeek *et al.,* 1998). The northermost sighting was reported in 2012 at Chorrillos, Lima (12°10'02"S, 77°02'17"W) (Orihuela & Cortegana-Arias, 2013). Two mother-calf pairs have stayed about a month on the areas nearby Atico and San Fernando (Van Waerebeek *et al.,* 1998; Santillán *et al*., 2004). On July 2005, a mother-calf pair was seen in Pucusana – Lima (12°29'S, 76°48'W**)** and an industrial purse-seiner was also seen crossing the 'footprints' of the whales where they had submerged seconds earlier (Van Waerebeek *et al*., 2009). Aguilar also reported information on one stranding documented at Playa Los Palos in Tacna (18°S, southern Peru) during January 2006. The carcass was in an advanced stage of decomposition and no cause of death was mentioned (Pizarro-Nayra, 2010). Group size ranged from one to two individuals and most of the records were reported for the second half of the year (in austral winter and spring) with calves mainly observed in August. It was noted that sightings in recent decades have occurred further north (12°S) than those reported at the end of the last century. Possible explanations include that the distribution range is apparently expanding northwards and/or the awareness about whalewatching and reporting are increasing. Also, localities at 12°S (around Lima) are more inhabited and the probability of people reporting whales is higher. Systematic shore-based and boat-based coastal surveys will be required to assess trends in occurrence, photo-identify individuals, reveal habitat use as well as document anthropogenic threats (mainly: collisions, entanglements, disturbance).

Olavarria presented information on recent sightings of mother-calf pairs at Golfo de Penas, austral Chile. Although a number of sightings of the species have been recorded from northern Peru (4°S) to Cape Horn (56°S), breeding and calving grounds are still unknown. Following bibliographic review of population parameters from other SRW populations, from the ESP SRW population and Chilean geography, Olavarria and colleagues hypothesize that the ESP SRW population could number in the low thousands, and breeding and calving grounds could be located in remote areas of southern Chile. Multiple sightings of cow-calves and adult whales at San Quintin bay, Golfo de Penas (46°S) have been recorded during the austral winter in 2017, 2020 and 2021 indicating that this area could be an unknown breeding and/or calving ground for this population. More intensive survey efforts are planned for future seasons to gather basic biological and ecological data on this species.

During discussions, it was suggested that an analysis of the relation of body length between the cow and its calf recorded at the recent northernmost sighting of ESP SRW made in Peru should be conducted to estimate calf age and determine if the whale was born near that area. It was informed that data collected could be used for that purpose and that also audio recordings from this sighting were available.

It was reminded that the collection of genetic samples are a priority of the ESP SRW CMP and that national authorities from the Range States in charge of granting permits needs to be approached. In Chile, the responsible institution is the Undersecretariat of Fisheries and Aquaculture and in Peru, the Ministry of

[1] **Note added after the workshop**: On August 14, a mother and calf were also observed in Reserva Marina La Rinconada, Antofagasta (23° 28.397'S, 70° 30.404'W) and a drone was again used to photo-ID the whales. This pair was not the same as the one observed in 2019. On August 17, the mother and calf remained in La Rinconada, swimming very close to shore in nursing behavior.

Production. It was informed that protocols for sampling individuals are likely to be discussed at the workshop on Experience Exchange that will address research permit and will be conducted in Lima, Peru in October 2022.

A question on criteria to determine a breeding area was raised. In Chile the presence of calves extends along the coast and it has been difficult to identify an aggregation and therefore this is one of the PAM project goals. In the North Atlantic calving areas are defined where females are with very young calves, although is true that mother migrate with their calves. No breeding activity has been identified in the North Atlantic calving area, probably because of separation in space and time. In New Zealand, cow-calf pairs are frequently sighted throughout the mainland but no real aggregation found. In the Auckland Islands, breeding behaviour has been observed in the same location as cow-calf pairs. This information should also be consistent in the work conducted in the southern hemisphere.

Golfo de Penas was mentioned as an area with consistent presence of mother and calves, with records of cow-calf during three out of five different years in a same area. It was also clarified that the number of sightings most probably included duplicate individuals as no photo-identification work was conducted. It was agreed that more resources are needed to understand the dynamic of this area and it was proposed to also use passive acoustic monitoring and satellite imaginary to detect the presence of southern right whales in this area and for a longer period. It was also noted that the area with reported recent sightings off southern and austral Chile (from Isla de Chiloe to Golfo de Penas) overlapped with historical distribution of catches in Los Lagos and Aysen region.

Periodicity of SRW sightings every two to three years such as it occurs in Antofagasta and Golfo de Penas was discussed. Monitoring efforts were mentioned as one reason but most probably this would be due to the low number of whales on this population and the Three Year Calving Interval observed often in this species.

8. BASIC BIOLOGY

As there is no data available on basic biology for the ESP SRW population, Sironi gave an overview on the basic biology of SRW based on other populations.

Three right whale species are currently accepted: the north Pacific right whale, north Atlantic right whale and the southern right whale in the Southern Hemisphere. The collection of scientific information from the SRW Program in Chubut, Argentina was initiated in 1971. It is the longest continuous study of SRW based on Photo ID, with more than four thousand known individuals to date. Their characteristic callosities are used to individually identify each animal and are also considered a sensory organ. Mother-calf pairs usually stay together for 1 year and after they are weaned, the yearlings become independent. Juvenile males spend more time with other juvenile males and females spend more time with mother-calf pairs, probably learning social skills. Adults of both sexes gather in surface active groups where courtship and mating occurs.

Regarding population dynamics, Sironi presented detailed information to better understand the calving intervals. Females reproduce on average once every three years. A normal cycle is described as 1 year gestation, 1 year lactation and 1 year recovery before the following pregnancy, on what is called Three Year Calving Interval. The three-year calving interval can be affected by loss of calf during gestation, failure to conceive (resulting in 4-year calving interval) or loss of calf during lactation (5-year calving interval). The median age of females at first calving is 9 years. The youngest recorded females with calves are 7 years, meaning that they become pregnant at 6 years, but there are recent records of females that got pregnant at 5 years of age.

SRW migrate from feeding grounds (summer/fall) to calving grounds during winter and spring. They are very social and coastal in calving grounds. They mostly feed on copepods and krill in their feeding areas and in calving grounds they mostly fast, although some opportunistic feeding occurs in these areas. They are very dependent on krill, that hibernates under the sea ice. As sea surface temperature increases as a consequence of climate change, krill abundance decreases and thus, this will affect SRW nutritional condition. The body condition of the whales can be assessed from aerial photographs taken from drones. It was suggested that

body condition studies based on drone photogrammetry could be implemented in Chile to do comparative studies with SRW from other populations because there is no data available today for ESP SRW population.

A question on general patterns and concentration areas of the SW Atlantic SRW population was raised and Sironi informed that during the calving season major concentrations occur in Peninsula Valdes (Argentina) and Santa Catarina (Brazil) with a smaller concentration off the coast of Uruguay, that mostly comprises adults and juveniles. However, geographical changes have been recorded in distribution during some years.

It was suggested that drone images available from the SRW of Chile and Peru can be compiled and made available for analysis and comparisons with other populations. It was recalled that the SRW Consortium is using its data for comparison between different populations.

On the possibility for a female to become pregnant twice in a period of five years, it was stated that this could be possible only for whales in excellent body condition, but evidence shows that the five-year calving interval happens when the calf dies shortly after birth. It was also noted that the number of records of mother-calf pairs in Chile is still too small to estimate calving intervals for this population.

9. ABUNDANCE AND TRENDS

There is no data currently available on abundance estimates or trends for the ESP SRW population. Moreover, it was noted that the CMP identified four primary "attributes" (*i.e.* quantifiable characteristics) of the population that need to be monitored. **Abundance** (number of individuals in the population) and **overall trends in abundance** (whether the population is growing, declining or constant) are two of them.

It was noted that most research efforts conducted under the CMP (such as to document all sightings, increase photo-identification and the PAM project) have been oriented to facilitate the collection of data to assess these attributes.

Discussions focused on the best approach for ESP SRW population to obtain abundance estimates and whether it would be more feasible using genetic data or photo-ID data. It was noted that recaptures are needed for any model to work. Considering that it may be easier to get photo-ID from individuals rather than genetic samples, it was agreed that photo ID is very important to advance information on this field.

It was also suggested to use new approaches to predict habitat use using a Bayesian hierarchical approach from ad-hoc sightings data. This method could be used for ESP SRW to predict habitat use of these rare whales using the opportunistic sightings reports available.

10. IDENTIFICATION OF THREATS AND RISK ASSESSMENT

10.1. Identification of threats

Ulloa informed on threats to large whales and highlighted that the main threats to SRW are entanglements particularly in industrial fishing gears and collisions. In 2014, an individual was recorded entangled, probably in crustacean traps or gill nets but although efforts were made to locate it, it was not sighted again (Galletti Vernazzani, 2015). In 2017 another individual was recorded alive in northwestern Isla de Chiloe (Los Lagos region) in poor health conditions and was found dead and stranded a few miles away at a beach in Maullin. Centro de Conservación Cetacea attended the event and later published a report that evidence that the most probable cause of death was entanglement in fishing gear (Galletti Vernazzani *et al*., 2017). Samples were also taken, including the only DNA sample available for SRW in Chile and Peru that was later analyzed. These events highlight the importance of implementing recommendations, such as develop secure fishing gear like PCCS and sinking ground lines, that can reduce entanglements by 70 per cent. Regarding collisions, the Undersecretariat of Fisheries is coordinating a group of multidisciplinary specialists to design mitigation measures. It was also stated that to reduce these and other emerging threats education, collaboration between stakeholders, development of technical solutions and their implementation are needed.

Rivadeneyra presented cetaceans threats and opportunities in Peru. Although there are not many records on SRW, they are subject to the same threats as other marine mammals, particularly anthropogenic interactions. Based on a program of on-board observer, they found that main threat to marine mammal includes fisheries interactions, specially from commercial fleets. In 2014 the country established a stranding attention program and have attended almost every event. Entanglement has been identified as one of the main threats, with 12% of cetacean's deaths related to entanglement and human interactions. Other threats include ship strikes, overfishing, illegal hunting, pollution, and emerging diseases. To reduce negative impacts from human interactions due to whale-watching, in 2019 national authorities set a minimum distance to watch small and large species of cetaceans. Since 2020, Peru was selected as one of the countries to develop the By-catch Mitigation Initiative of the IWC that seeks to reduce these events in small scale fisheries and end harmful practices such as the use of cetaceans for shark bait and ghost nets, among others. Also, IMARPE organized a workshop to establish guidelines to address by-catch with other national institutions, stakeholders, and NGOs. Main areas of actions were determined including research, existent data collation, regulation, education, and control.

Cardenas provided information on the threats from salmon farming to whales in southern Chile. Chile is the second producer of farmed salmon in the and largest producer of rainbow trout. There are more than 1400 aquaculture concessions between 41ºS and 54ºS. The development of this industry has been exponential, with concerning problems such as very poor regulations and monitoring, lack of transparency, etc. Since 1990 to 2020 the production increased by more than 3600%, and the Ministry of Economy is working to increase it even further to produce 1.3 million tons per year under the More Sustainable Salmon Strategic Program. Official information about the negative interactions between the salmon industry and marine mammal populations is limited. Entanglement of large whales in gears and nets used to prevent sea lion interactions have been reported, being the first official record made by the government in 2020 of a sei whale. Ship strikes are another cause of great concern. Salmon farming vessels are the largest and are densely distribute in southern Chile waters. 729 industrial vessels, corresponding to 82% of total ship trips are linking to salmon farming and overlap other large whales feeding areas such as for blue and humpback whales. In addition, 65 new salmon cargo vessels (wellboats) are being delivered between 2020-2025. At least 40 death of large whales or injured by ship strike have been reported by researchers over the last decade. Indirect threats include physical modification of coastal zones; habitat degradation due to abusive use of antibiotics, organic pollutants, oil spills and noise pollution; and massive escapes of salmonids that impact the trophic chain, among others. In spite of these negative impacts, the industry continues to operate inside 12 Patagonian national parks and five marine protected areas. Upcoming threats include the beginning of the oceanic and offshore salmon farming cluster (2019-2030) and increasing wellboats accidents with antibiotic spills, etc. During the last six years, 12 accidents and sinking of wellboats and barges have occurred. Proposal for actions to reduce these threats include a historical statement signed by a large coalition of NGOs, specialists, etc. demanding the exit of salmon farming from vulnerable ecosystems, the establishment of a moratorium on the expansion of the industry, the cessation of the delivery of new concessions and the limitation to the increasing of the surface and biomass available at current centers of cultivation.

Sepulveda made a presentation on the project "Marine Mammal Bycatch Risk Assessment (ByRA) in Chile". Due to its high level of fish production, the Unites States import provision rule and its effects on fisheries management in Chile could impact the country. Current data shows that the main marine mammal species involved in fisheries interactions is the south American sea lion. And according to NOAA, small cetaceans such as Peale´s dolphins are subject to interactions with southern king crab, false king crab and crab fisheries. Fisheries by-catch of marine mammals is poorly monitored in Chile and the main goal of the ByRA project is to determine the distribution of marine mammal species and assess their potential impacts from different fisheries. Therefore, the project analyzes existent data while gathering new data on 18 different fisheries to determine areas and seasons with more probability of by-catch risk. These areas were selected based on existent information of some level of impacts to marine mammals and data collected by observers from the Institute for Fisheries Development (IFOP). The data collected will be analyzed to develop risk assessments, (based on the consequences for the species and its exposure) and to inform national authorities and design mitigation measures. To date the project started with modeling the interaction of South American sea lions with the Chilean common hake industrial trawl, as there was good data and quality to assess it. It was found that the model overlapped in more than 90% with the real by-catch data. The project is now moving forward

to evaluate other fisheries and they are considering to also include the potential risk for southern right whales interaction with crab traps, as there have been some previous documented cases of interactions between this fisheries and large whales.

Perez gave an overview on applied conservation genetics for SRW in Chile-Peru. Genetic analysis can give information to collect data on sex identification, individual movements, and population structure, among others, that can facilitate the definition of units of conservation for the targeted species. Chile has two genetically units of SRW: the Chile-Peru population and southern Atlantic population. The main goal of using these techniques could be to evaluate population differentiation between the southern hemisphere grounds, including Chile-Peru subpopulation individuals. Other goals could include: to evaluate population genetic differentiation between south American grounds, including Chile-Peru individuals and these considered from the south Atlantic (Magellan Strait); to evaluate population differentiation/connectivity between sub-units of the Chile-Peru subpopulation (southern Peru, northern Chile, southern Chile, etc.); and evaluate intra-subunits of Chile-Peru individuals (sex identification, kin relationship, etc.). The sources of DNA samples include skin biopsy, sloughed skin, strandings, environmental DNA and samples obtained from entanglements and genetics analysis. Currently, there is a collaboration between the National Fisheries Service (SERNAPESCA) and the University of Chile to analyze samples collected along Chile.

During discussions, it was raised the question on the level of entanglements of SRW in lobster traps, it was informed that this was unknown but that crab traps are widely used. Bigger crab traps in Punta Areas (Magellan region) have been reported to cause the entanglement of humpback whales. It was also informed that many entanglements go unreported since the animals sink to the seafloor. The National Fisheries Service (Sernapesca) provided information on the development of a new approach related to the mandatory use of cameras on industrial fishing vessels and artisanal fleets. This will facilitate collection of data on entanglements, the species involved and the company responsible in order to reduce these events and timely inform authorities.

The need for more training courses along the distribution range for the species was highlighted, including handling materials to attend entanglements based on IWC protocols. It was informed that 11 locations along Chile have already received training and material, but that the main problem that still needs to be solved is the timing of the first report of an event, as this delays the entire process and sometimes made impossible the resighting of the whale.

In relation to applied conservation genetics, it was mentioned that stable isotopes are also helpful in combination with genetic analysis. In this sense, because samples are very rare and difficult to collect, it was stated that all potential sources need to be used, such as searching for baleen plates in Peru and Chile museums and double check European museums that have very old specimens collected in distant areas.

Regarding the impacts of salmon farming, participants congratulated the work done by Cardenas and its team to monitor this industry and expressed great concern on the serious threat the current levels of salmon farming and its expected expansion, that seeks to double its production by 2050, poses to the whales in the region. It was also noted that sometimes such conservation work can pose a real risk to the life of the activists that denounce it.

It was highlighted that the salmon farming industry currently overlap with the main areas of historical catches of SRW and recent important data reported for Los Lagos and Aysen region. The intentions of the industry to develop offshore salmon farming were also mentioned as a threat to other whale species, such as the sei whale. The leaking of ballast water in Golfo de Penas, the mass mortality of salmons and the discard of their decomposing remains into the marine ecosystem were highlighted as examples. It was also said that the blooming of toxic algae (*Karenia genus*) has even caused the death of salmons passing on wellboats through Golfo de Penas. On this regard, it was stated that the number of toxic algae blooming has increased in past years and that the modelling of the movement of algae blooms in southern Chile could help to assess the impacts of the industry, considering other parameters, such as climate change. It was also highlighted that the expansion of the salmon farming industry to the Magellan Strait will overlap with other whale populations, including the south Atlantic SRW.

It was informed that in response to public pressure, the industry had taken small steps like reducing the use of antibiotics, but its impact is systemic on the biodiversity and will be intensified because of its expansion in the upcoming years. On current measures, it was stated that the congress is considering a bill for a moratorium on salmon farming and a bill to take out salmon farms from protected and vulnerable areas and that civil society is also increasing pressure to boycott the consumption of Chilean salmon in the United States. It was noted that as the USA new MMPA measures will soon started to be applied and therefore the Aquaculture regulations have been modified and will require the mandatory reporting when interactions with marine mammal occur. However, it was also noted that such reporting system will be provided by the industry itself as an auto-reporting and not through a governmental monitoring/enforcement program, therefore there was uncertainty if it will likely be accepted by the USA.

10.2. Update risk assessment

Galletti introduced the threats currently identified under the CMP. The CMP state that any anthropogenic mortality should be kept at zero. Major direct threats continue to be entanglement and ship strike. She noted that between 2014-2017 there have been at least two severe entanglements that most likely caused the dead of the individuals (Galletti Vernazzani *et al*., 2015, 2017). In addition, SRW areas of interest overlap with high shipping traffic, such as near Antofagasta/Mejillones ports and Puerto Montt port where there have already been records of other large whales dead because of ship strike. CMP also includes indirect threats, with some of them that have not been addressed during this workshop. Indirect threats include harassing mother-calf pairs when sighted near the coast, that may seriously disrupt nursing behaviour altering energetic expenditure of the animals and in extreme cases, it may even cause the death of the calf (Canto *et al*., 1991). Only land-based observations are allowed in Chile for the species and a contingency protocol is implemented when coastal sightings are recorded. Other indirect threat include noise due to increase shipping traffic and large-scale coastal energy and mining projects; habitat degradation (oil spills, excessive use of chemicals by salmon farming industry, waste waters from urban centers and others) and physical modification in coastal areas. Climate change and prey availability, including the expected increase in krill fisheries, are also considered a threat.

During 2012, a risk assessment for each threat have been undertaken and update in 2016 (Galletti Vernazzani *et al*., 2016). Priority for Actions are determined based on a risk assessment matrix that considers likelihood and possible impact (Figure 1).

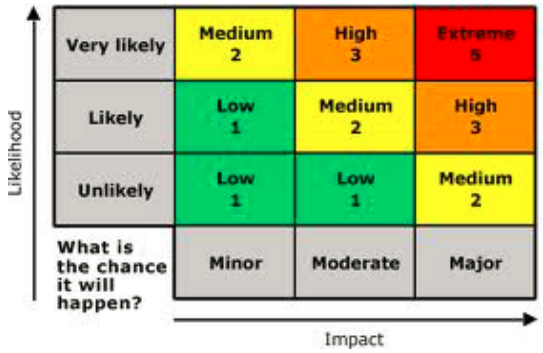

Figure 1 – Risk assessment matrix

At the workshop, the risk assessment was also discussed and updated. It was decided to include additional columns to the risk assessment table in order to quantify improvements, maintenance or detriments for each threat to better evaluate the measures taken, as well as a one column for comments. New institutions or companies have been included under Party Responsible as it was considered they were missing from the list at previous risk assessments. Several categories were break up on different sub-categories (such as harassment, habitat degradation and physical modification of coastal areas) to reflect new threats and/or were considered that their impacts varied depending on the specific related activity. It was also proposed to change the name of some categories for more consistency. The summary of threats and their risk assessment is provided in table 1.

Table 1 – Summary of threats and updated risk assessment

Actual/ Potential Threat	Cause or related activity	Likelihood	Possible Impact (at population level)	Priority for Action	Relevant Actions	Party Responsible	Change	Comments
Entanglement	gillnet, aquaculture gear, trap fishing, coastal fishing gear	Very likely	Major	Extreme	RES-01to05 MON-01&02 PACB-01&02 MIT-01&04	Subpesca, Sernapesca, Directemar, Ministerio de la Producción (Produce), Imarpe, MINAM, research institutions, NGOs	Stay extreme	Subpesca could be involved in the prevention of entanglement by promoting the design of secure fishing gear for whales.
Ship Strikes	shipping in general	Very likely	Major	Extreme	RES-01to05 MON-01&02 PACB-01 MIT-02,04&07	Ministry of Foreign Affairs,Directemar, NGOs, shipping companies (Ultraport and Ultramar in northern Chile), Ministry of Economy Perú: Dirección de Capitanías de Puertos (DICAPI), Ministerio del Ambiente (MINAM), SENACE (Servicio Nacional de Certificación Ambiental para las Inversiones Sostenibles)	Increases to Very likely	Ship traffic is increasing and reported cases of large whales with ship strikes have also increased (ScienceMag, 2021). It is crucial to increase the diagnostic capabilities in the region to scientifically confirm that deaths are caused by collisions before the animal passed since the doubts are still present as to whether the collision was before or after death. It is suggested to use necropsy protocols from IWC or North Atlantic Right whale consortium.
Harassment	regulated whale watching where that happen	Likely	Moderate	Medium	RES-01to05 MON-01&02 PACB-01&03 MIT-03&04	Directemar, Sernapesca, Subpesca, Subsecretaria de Turismo, NGOs Perú: Ministerio de la Producción (Produce)	Decrease to likely and moderate impact at population level	With current WW regulations it is unlikely that regulated WW could cause today a death to an individual (major impact to population level)
	unregulated whale watching	Very likely	Major to moderate	Extreme to High		Directemar, Sernapesca Perú: Ministerio de la Producción (Produce), Ministerio de Comercio Exterior y Turismo (MINCETUR), Ministerio del Ambiente (MINAM), Ministerio de Transportes y Comunicaciones (MTC), DICAPI	Stayed the same	For unregulated WW, it is very likely that the whale will be harrassed and it may also be the possibility to even cause the death of a calf. Also there is increased chance of collision or ship strike with vessels with no experience driving around whales.
	swimmers/divers	Likely	Minor	Low		Directemar	Not previously considered.	There have been documented cases of swimmers/divers approaching SRW but it seems its impact at population level could be considered minor. However attention should be given to this situation as it may be very dangerous for the person itself.

								Specially in case of disentanglement procedures.
	drones	Very likely	Minor	Medium		Subpesca, Sernapesca, Directemar, Dirección General de Aeronáutica Civil, Ministerio de Transportes y Comunicaciones (MTC)	Not previously considered.	Drones are frequently used to takes photographs of the whales. Although they can provide important information such as photo-ID, proliferation of recreational use of drones over whales can be disturbing for the whales. It was proposed that regulations should be considered. However it was also noted that the evidence suggests that drones do not cause a change in the behaviour of southern right whales (Christiansen *et al*.,2020). Test flights up to 5 m above mother-calf pairs for up to 10 mins did not change their breathing rate. Therefore, it is considered that the impact at population level should be minor.
Noise	marine ship traffic, Construction, seismic survey, wind turbines, military exercises	Very likely	Major to moderate	Extreme to High	RES-01to05 MON-01&02 MIT-05	Directemar, Subsecretaria de Pesca, research institutions, NGOs DICAPI, Ministerio de Energía y Minas, Ministerio del Ambiente, SENACE	Increased to very likely and impact ranging from moderate to major	Data from acoustic analysis presented during workshop is from 10 years ago and shipping industry is increasing. Expansion of salmon farming and associated marine traffic is increasing. Impact may be major at population level as they can decrease reproductive success. Small vessel traffic can also have significant impact and it is important to monitor.
Water pollution[2]	oil spills	Likely	Minor	Low	RES-01to05, MON-01&02, MIT-05&06	Subsecretaría de Pesca, research institutions, NGOs DICAPI, MINAM, Imarpe, OEFA (Organismo de Evaluación y Fiscalización Ambiental)	Stayed the same	
	aquaculture	Very Likely	Major to moderate	Extreme to High		Subsecretaría de Pesca, research institutions, NGOs	Increased. Impact at population level to be ranged from	Aquaculture situation is much worst due to their expansion in a critical area for SRW. Associated toxic algal bloom due to water pollution can

[2] Name of the threat changed from habitat degradation to water pollution as noise is also part of habitat degradation

						Produce, Imarpe, Instituto Tecnológico de la Producción (ITP)	moderate to "major to moderate"	cause major problems at population levels.
	waste water	Likely	Moderate	Medium		Subsecretaría de Pesca, NGOs MINAM, research institutions, DICAPI	Stayed the same	There are many other institutions involved in waste water that should be included on the list. The institutions involved would depend on the activity and source of pollution.
Physical modification of coastal zone	Aquaculture	Very likely	Moderate	High	RES-01to05 MON-01&02 PACB-01 MIT-04&05	Subsecretaría de Pesca, Sernapesca, Directemar, research institutions, NGOs Imarpe, Produce	Increase to Very likely	Aquaculture situation is much worst due to their expansion in a critical area for SRW. Physical occupation of areas can be of moderate impact to populaion level.
	Ports	Likely	Moderate	Medium		DICAPI, MINAM	Stayed the same	
	Other coastal developments (such as energy projects)	Likely	Moderate	Medium		MINAM, Ministerio de Energía y Minas	Stayed the same	
Prey depletion	climate change, overfishing of krill, habitat degradation due to pollution	Very likely	Major	Extreme	MON-02 MIT-07	Ministry of Foreign Affairs, NGO's, Subpesca Produce, Imarpe, MINAM	Increase to Very likely	Krill fisheries can be considered as an increasing threat in the Southern Ocean. In addition Climate change can also be considered as an increasing threat worldwide. However, it was also noted that climate change may have heterogeneous impacts around the Southern Ocean. Some areas like Southeast Australia and New Zealand have shown expansion in foraging areas in recent decades, whereas others like South Africa have shown changes. Therefore this will depend where the Chile-Peru whales are feeding. It is proposed to work on a modification of the Fisheries´Law.

11. IDENTIFICATION OF POSSIBLE MITIGATION MEASURES

Due to time constraints at the virtual meeting, it was proposed to discuss agenda item 11 in conjunction with agenda item 12 related to identification of short-term and long-term research, monitoring and mitigation actions as possible mitigation measures are also discussed and mentioned.

12. IDENTIFICATION OF SHORT-TERM, MEDIUM-TERM AND LONG-TERM RESEARCH, MONITORING AND MITIGATION ACTIONS

The priority actions identified under previous CMP versions were reviewed and updated. New priority actions and sub-actions were also proposed. A summary of the 2022 version for CMP priority actions is provided on table 2.

Table 2 – Summary and implementation of action

ID	*Action*	*Importance*	*Feasibility*	*Responsible*	*Priority*	*Implementation to date*	*New proposals*
COORD-02	Development of a Web-based exchange of scientific information	High	High	Research institutions, NGOs	Medium-term		Explore use of open web-based platforms such as Happywhale
RES-01	Development of a web-based platform to report southern right whale sightings	High	High	Directemar, NGOs, research institutions	Short-term		Explore whalemap.org
RES-02	Increase documentation of sightings and photo-identification of individuals	High	Medium-High	NGOs, research institutions	Short-term	Opportunistic	1.- Increase the search effort in Peru 2.- Involve local actors and communities
RES-03	Increase collection of biopsy samples for genetics, stables isotopes and fatty acids analyses	High	Medium-High	Subsecretaría de Pesca, Directemar, Sernapesca, NGOs, research institutions Imarpe, PRODUCE, research institutions, NGO's	Short-term	Opportunistic	1.- Include option to biopsy sample mother-calf pairs 2.- Search historical samples on museum or others. 3.- Collect samples from stranding 4.- Check nets of entanglement 5.- Collect e-DNA (non-invasive) and sloughed skin 6.- Understand stock identity of SRW from Magallanes compared to ESP 7.- Develop the biopsy sampling procedure in Peru and the legal frame.
RES-04	Develop a GIS database and identify areas where southern right whales & potential threats overlap	Medium-High	To be evaluated	NGOs, research institutions	Medium-term		
RES-05	Identify breeding area(s) for southern right whales	High	Medium - High	NGOs, research institutions	Short-term	Passive acoustic monitoring and visual surveys	1.- Implement PAM in Peru and Gulf of Penas 2.- Use acoustic detector of PAM on southern Chiloe data and other existing datasets. 3.- Conduct manual annotations of acoustic detections on other datasets collected under PAM 4.- Use satellite Imagery at Golfo de Penas 5.- Visual surveys at Golfo de Penas and other areas around Los Lagos (Chiloe) and Aysen 6. - Increase the search effort in Peru
RES-06	Reconstruct historical catches series	High	Medium	NGOs, research institutions	Medium-term	NEW	1.- Systematic review of logbooks 2.- Review of official archives (Navy, customs, etc.) 3.- Review newspapers from Concepcion, Lebu, Puerto Montt and Ancud 4.- Extrapolate data to other voyages 5.- Collect data on strike and lost when checking logbooks 6.- Include all whaling countries, not only Americans and

							French (for example missing British, Dutch, etc...) 7.- Collect data for seasonality when checking logbooks
RES-07	Evaluate body condition	High	High	NGOs, research institutions	Short-term	NEW	Compile available data of drones
RES-08	Satelite tagging to identify migratory patterns, feeding grounds and better understand habitat use	Medium-High	To be evaluated	Undersecretariat of Fisheries, Produce, NGOs, research institutions	Medium-term	NEW	Law restrictions are currently in place that do not allow this type of research to be conducted
RES-09	Identify the source of vessel noise (cargo, fishing, etc) and the distribution of vessels	Medium-High	High	NGOs, research institutions Produce, Dirección General de Capitanias y Guardacostas (DICAPI). MINAM, SENACE	Short-term	NEW	
MON-01	Ensure long-term monitoring of distribution, abundance and trends of southern right whales	High	High	Directemar, Sernapesca, NGOs, research institutions	Medium-term		1.- Modelling habitat use from ad-hoc sightings data 2.- Focus on photo-ID for small populations, if possible, genetics also
MON-02	Ensure long-term monitoring of potential threats & effectiveness of mitigation measures	High	High	Sernapesca, NGOs, research institutions	Medium-term		1.- Modelling of the movement of algae blooms in southern Chile 2.- Design and implement a monitoring program on interactions between marine mammals and salmon farming (not dependent of the industry) 3.- Establish a working group with government representatives, salmon farming industry, coastal communities, indigenous communities, NGOs and USA consumers. 4. Implement a monitoring program in Peru
MIT-01	Release entangled whales and prevent entanglements	High	Medium	Sernapesca, NGOs, research institutions	Short-term	Workshop Experience Exchange & Disentanglement trainings	1.- Develop secure fishing gear 2.- Coordinate disentanglement teams 3.- Use cameras on industrial vessels the artisanal fleet 4.- Develop protocol for disentanglement 5.- Repeat periodically trainings at local and national level
MIT-02	Adopt a warning system and the proper regulation to reduce ship strikes in areas of high concentration of SRW	High	Medium	Directemar DICAPI	Short-term		1.- Advance in regulations to reduce speed limit to decrease collision risk and ambient noise in areas of concerns (Los Lagos Region/Antofagasta) 2.- Consider SRW in the acoustic warning system currently under development in southern Chile 3.- Limit the expansion of wellboats and cargo shipping related to salmon farming industry
MIT-03	Develop and implement contingency plan to afford maximum protection when a sighting is recorded	High	High	Directemar, Sernapesca, NGO's, PRODUCE.	Short-term	Workshop Experience Exchange	

MIT-04	Designation of areas for protection of the species	Medium-High	Medium	Subsecretaria de Pesca, Sernapesca, Subsecretaria de Turismo MINAM, SERNANP	Medium-term		Consider candidates IMMAS as some includes southern right whales
MIT-05	Inclusion of Right Whale Conservation Considerations and Mitigation Measures in the Environmental Impact Evaluation and Permitting System for Large-Scale Coastal/Marine Projects	High	High	Subsecretaria de Pesca Companies, Sernapesca, Servicio de Evaluación Ambiental MINAM, PRODUCE, SENACE	Medium-term		1.- Consider the potential impact of off-shore salmon farming (including increase in marine traffic) in SRW distribution, particularly off Los Lagos and Aysen region. 2.- Consider the increase of mining projects with the consequent increase of marine facilities construction in the southern coast of Peru.
MIT-05 bis	Minimize habitat loss				Medium-term		Establish a moratorium on the expansion of salmon farming industry until proper habitat modelling is conducted
MIT-06	Prevention and fight pollution on Marine Environment	High	Medium	Directemar, Ministerio de Medio Ambiente, NGOs, research institutions MINAM, DICAPI, PRODUCE.	Short-term	Separated from habitat loss and re-named from minimize water pollution to "Prevention and fight pollution on Marine Environment"	1.- Remove salmon farming cages from vulnerable ecosystems and protected areas in southern and austral Chile 2.- Limit the increase surface and biomass available at current centers of salmon farming.
MIT-07	Coordinate actions with intergovernmental organizations such as CCAMLR, IMO, IWC, etc. to address specific threats.	Medium-High	To be evaluated	Ministry of Foreign Affairs of Chile and Perú, DIRECTEMAR DICAPI	Medium-term		

13. OTHER

Over the workshop and during discussion on priority actions, it was noted the benefits that could provide to obtain genetic samples from mother-calf pairs, and it was also proposed to consider over the next 6-year period the possibility to undertake satellite tagging research activities to better understand habitat use and migratory movements of ESP SRW. Both activities require that scientific permits are issued by national authorities.

It was also noted that "Workshop on Experience Exchange on Whale Watching Regulations and Research Permits" will be held on October 3-4, 2022 in Lima, Peru. The workshop will advance discussions among national authorities from Chile and Peru to standardizing processes and norms in order to have consistent regulations and norms throughout its distribution, which will facilitate the protection of the few remaining individuals. The workshop represents an opportunity to provide further detailed information on the usefulness and impacts of genetic sampling and satellite tagging.

Carroll offered her support to provide a summary of her work in New Zealand biopsy sampling mother-calf pair, their protocols and importance to improve understanding on rare animals, such as population structure or stress and physiology. Olavarria also offered his support to develop a summary about the importance and impacts that satellite tagging have had on other whale populations.

14. ADOPTION OF THE REPORT

The report was adopted by correspondence.

ANNEX A – LIST OF PARTICIPANTS AND AFFILIATION

Aguilar, Regina – Instituto del Mar del Perú, Perú
Brownell Jr., Robert L. – Convenor CMP Sub-Committee, IWC Scientific Committee and NOAA Southwest Fisheries Science Center, USA
Buchan, Susannah - Centro de Investigación Oceanográfica COPAS Sur-Austral, Chile
Cabrera, Elsa – Centro de Conservación Cetacea, Chile
Cárdenas, Juan Carlos – Centro Ecoceanos, Chile
Carroll, Emma – University of Auckland, New Zealand
Cholewiak, Danielle - NOAA Northeast Fisheries Science Center, USA
Galletti, Bárbara –CMP Coordinator and Centro de Conservación Cetacea, Chile
Garcia-Cegara, Ana - Centro de Investigación de Fauna Marina y Avistamiento de Cetáceos and Universidad de Antofagasta, Chile
Goya, Elisa – Instituto del Mar del Perú, Perú
Guerra Münchmeyer, Jorge – Subsecretaría de Pesca y Acuicultura, Chile
Jackson, Jennifer – Convenor SH Sub-Committee, IWC Scientific Committee and British Antarctic Survey, UK
Jacobs, Ellen - Georgetown University, USA
Olavarria, Carlos - Centro de Estudios Avanzados en Zonas Áridas, Chile
Pérez Alvarez, María José – Universidad Mayor, Chile
Quiñones, Javier - Instituto del Mar del Perú, Perú
Quiroz, Daniel – Servicio Nacional del Patrimonio Cultural, Chile
Rivadeneyra, Sofia – Instituto del Mar del Perú, Perú
Rodriguez, Francisca – Universidad de Chile
Rodriguez, Frida - Ministerio del Ambiente, Perú
Rojas-Cerda, Constanza - Pontificia Universidad Católica de Chile, Chile
Santillán, Luis - Universidad San Ignacio de Loyola, Perú
Sepúlveda, Maritza – Universidad de Valparaíso, Chile
Sironi, Mariano – Instituto de Conservación de Ballenas, Argentina
Ulloa, Mauricio – Servicio Nacional de Pesca y Acuicultura, Chile
Zerbini, Alex – Chair IWC Scientific Committee and NOAA Alaska Fisheries Science Center, USA

IWC Secretariat
Campbell, Elizabeth
Thomas, Stewart
Sow, Moussa

ANNEX B - WORKSHOP AGENDA

1. Welcoming Remarks
2. Appointment of Chair and Rapporteurs
3. Adoption of the Agenda
4. CMP background and workshop objectives
5. Review of historical catches and distribution
6. Population structure
7. Distribution, migration and movements
8. Basic biology
9. Abundance and trends
10. Identification of threats and risk assessment
11. Identification of possible mitigation measures
12. Identification of short-term and long-term research, monitoring and mitigation actions
13. Other
14. Adoption of the report

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