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2023 Version - Conservation Management Plan for Eastern South Pacific Southern Right Whale Population (Eubalaena australis)

Governments Of Chile And Peru

2023 VERSION
Conservation Management Plan for Eastern South Pacific Southern Right Whale Population (*Eubalaena australis*)

Submitted by Chile and Peru

April 2023

By Steering Committee[1]

[1] Annex A

EXECUTIVE SUMMARY

Heavily impacted by whaling operations during centuries, eastern South Pacific (ESP) southern right whales are classified as Critically Endangered by the IUCN. The population does not show increasing rates observed in other regions (e.g. the eastern South American seaboard, Southern Africa and Australia), and has a possible mature population size of around 50 individuals (Reilly *et al.*, 2008).

Distributed along the coast of Chile and Peru the IWC adopted a CMP for this population in 2012 (Galletti Vernazzani *et al*. 2012) and in 2016, Peru was welcomed as second Range State and a revised CMP was endorsed (Galletti Vernazzani *et al.,* 2016). In 2018, the Governments of Chile and Peru signed a Memorandum of Understanding (MoU) to coordinate cooperation for the conservation of ESP southern right whale, extending the CMP beyond the scope of the IWC. Over the years, several priority actions have been implemented and new information have become available, making it necessary to undertake a 6-year review and update the CMP version.

The ESP southern right whales Conservation Management Plan aims 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**.

In the short term, it will be required to **1) obtain baseline data, particularly referring to population size, areas of concentration of the species (breeding or feeding areas) and stock structure; 2) conduct a detailed assessment of potential impacts in identify areas of concentration and; 3) develop specific mitigation strategies.**

The ESP southern right whale CMP includes several sections that: summarize why this CMP is needed; review national and international legal framework; review historical catches and recent scientific information available on the population and identify current knowledge gaps; identify current and potential threats; perform a risk assessment of the threats and propose mitigation measures and priority of actions to improve conservation of this critically endangered population as well as a governance framework for the implementation of this CMP.

Depending on the information available, some actions can be achievable in short term. Actions of high priority identified that should be addressed in the short-term include:

ID	***Action***
COORD-01	Implementation of the Conservation Management Plan: Establishment of a Co-ordinator & Steering Committee
PACB-01	Development of a strategy to raise public awareness and increase capacity of range states
PACB-02	Strengthen capacities to respond to entanglements and strandings in both countries
PACB-03	Increase capacities in coastal communities on species identification and sightings reporting and documentation, with special emphasis on the southern right whale
RES-01	Development of a web-based platform to report southern right whale sightings
RES-02	Increase documentation of sightings and photo-identification of individuals
RES-03	Increase collection of biopsy samples for genetics, stables isotopes and fatty acids analyses
RES-05	Identify breeding area(s) for southern right whales
RES-07	Evaluate body condition of southern right whales
RES-09	Identify the source of vessel noise (cargo, fishing, etc.) and the distribution of vessels

MIT-01	Release entangled whales and prevent entanglements
MIT-02	Adopt a warning system and the proper regulation to reduce ship strikes in areas of high concentration of southern right whales
MIT-03	Provide advice on regulations for whale watching tourism for this population
MIT-06	Preventing and combating pollution of the aquatic environment

1. INTRODUCTION

1.1. Why a Conservation Management Plan is needed for eastern South Pacific southern right whale population

Despite an observed increase of several populations of whales in the Southern Hemisphere over the last few decades, the Southern Right Whale (*Eubalaena australis*) is still one of the large cetacean species with fewer individuals worldwide; the eastern South Pacific (ESP) breeding population, located off Chile and Peru, is likely the smallest surviving population of the species.

Since 2000 systematic scientific information has been collected about this population in Chilean waters through sightings networks. The information highlighted that the population continues to be very depleted (Galletti Vernazzani *et al.,* 2008, 2011). The government of Chile therefore decided to propose its inclusion in the IWC Conservation Committee agenda (IWC, 2008).

Heavily impacted by whaling operations during centuries, ESP southern right whales were classified as Critically Endangered by the IUCN. The population does not show increasing rates observed in other regions (*e.g*. the eastern South American seaboard, Southern Africa and Australia), and has a possible mature population size of around 50 individuals (Reilly *et al.*, 2008). Any anthropogenic removal would be very detrimental to the population and therefore urgent efforts must be undertaken to ensure that it recovers from its current status and in particular receives protection from further anthropogenic disturbances that may hamper such recovery.

Additional efforts have also been done in Chile to afford maximum protection to southern right whales at individual level and to develop regulations that only allow land-based whale watching operations for this population. Furthermore, a proposal for a national action plan for the recovery of the species in Chilean waters (Palazzo and Galletti Vernazzani, 2011) was developed and presented by Chile at IWC Conservation Committee in 2011. The proposal provided a very useful starting point for the development of this Conservation Management Plan (CMP) for ESP southern right whales and therefore most of its contents were included in consecutive CMP versions. The IWC adopted the first CMP version for this population in 2012 (Galletti Vernazzani *et al*. 2012) and in 2016, Peru was welcomed as second Range State and a revised CMP was endorsed (Galletti Vernazzani *et al.,* 2016). Furthermore, in 2018, the Governments of Chile and Peru signed a Memorandum of Understanding (MoU) to coordinate cooperation for the conservation of ESP southern right whale, extending the CMP beyond the scope of the IWC. Extensive amount of work and progress have been made over the past years and the CMP and MoU have proved to be effective tools to enhance coordination among Range States for the conservation of this Critically Endangered population.

This CMP is in line with national policies for the protection of cetacean and this species as well as the fulfillment of Range States' obligations under international law to promote the best possible management of shared cetacean resources that occur in its jurisdictional waters. It is hoped that, in return, the international community will provide the necessary support both to implement the measures

recommended in this Plan and, moreover, to ensure that these and other whale species of the Southern Hemisphere are adequately protected when spending part of their life cycle in international waters.

1.2. Overall Objectives of ESP southern right whales CMP

The CMP for the ESP southern right whales aims 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.

To achieve this long-term objective, medium term objectives focus in monitoring population status, anthropogenic threats and effectiveness of conservation measures implemented. In the short term, it is required to 1) obtain baseline data, particularly referring to population size, areas of concentration of the species (breeding or feeding areas) and stock structure; 2) conduct a detailed assessment of potential impacts in identify areas of concentration and; 3) develop specific mitigation strategies.

Ideally, all management actions are based on adequate scientific data. However, the ESP southern right whale population has considerable research gaps and when the potential conservation consequences of waiting for confirmatory scientific evidence are so serious, it is better to take action immediately and apply the "precautionary principle" whilst collecting the necessary information.

2. LEGAL FRAMEWORK

2.1. International Conventions and Agreements

Right whales have been afforded formal international protection since the early 19th century, when the impacts of whaling on its populations worldwide were already widely recognized. Upon negotiation by the League of Nations of the 1931 Geneva Convention on the Regulation of Whaling, it was agreed that the killing of right whales would be prohibited. The Convention entered into force in 1935, but the turmoil caused by the II World War largely prevented its proper implementation. In 1946 the International Convention for the Regulation of Whaling (ICRW) was signed and protection for right whales upheld. The International Whaling Commission, formed by the parties to the ICRW in 1949, has since its inception reviewed the status of right whales worldwide and makes recommendations concerning their protection. Chile and Peru adhered to the Convention in 1946 but only ratified it in 1979 and national regulations started to be implemented according to the IWC procedures and decisions.

Chile, Peru and Ecuador were founding parties to the Permanent Commission of the South Pacific (CPPS), now comprised also of Colombia. CPPS was formed in 1952 and among its initial activities established a whaling normative, *Regulations For Maritime Hunting Operations In The Waters Of The South Pacific,* with detailed measures aimed at ensuring the sustainability of whaling operations[2]; it established that "the hunting and treatment of grey or right whales shall be permitted only in cases where the meat and by-products of these whales are to be used exclusively for consumption by the local population". It introduced a system to record and monitor the activities, establishing catching quotas and forbidding the take of cetaceans according to body size and reproductive status. Whales under 10.70 meters in length were not to be hunted under any circumstances.

[2]<http://untreaty.un.org/unts/1_60000/28/18/00054894.pdf>. Donwloaded on **04 June 2011.**

This normative has later been abandoned as the ICRW entered into force for Chile and Peru and finally when nations in the region abandoned whaling altogether.

In 1982, the IWC adopted the moratorium on commercial whaling and since then, Chile and Peru stopped whaling activities and there were completely banned in 1984 and 1985 respectively.

In 1973, Chile adhered to the Convention on the International Trade in Endangered Species of Wild Fauna and Flora – CITES, and ratified it in 14 February 1975. Southern right whales are listed in its Appendix I (full prohibition of international trade).

Southern right whales are also listed in Appendix I (comprising migratory species threatened with extinction) of the Convention on Migratory Species – CMS, to which Chile has been a Party since 1983.

Peru is also signatory of CITES since September 1975 and CMS since June 1997.

2.2. National Legislation and Management Arrangements

2.2.1. Chile

The first-time large cetaceans were awarded a certain degree of protection against indiscriminate killing under Chilean law was under the declaration of its Exclusive Economic Zone in 23 June 1947, aiming *inter alia* at putting an end to the abuses of the foreign whaling fleets which were decimating whale populations along the coasts of Chile.

The last three whaling stations in Chile operated as joint venture with Japanese companies since 1960's until 1984 when Chile finally suspended the hunting in its waters to comply with the global commercial whaling moratorium adopted by the International Whaling Commission. In 1995, Chile adopted Decree 225 from Ministry of Economy that banned whaling operation for a period of 30 years.

In 2008, Chile has enacted a series of legal instruments consolidating a State policy for the protection and non-lethal use of cetaceans. These are Decrees 179 and 230 from the Ministry of Economy and Environment which respectively prohibit whaling permanently and declare Chilean cetaceans - including the southern right whale -as Natural Monuments. A landmark achievement was the unanimous enactment of the Law for the Protection of Cetaceans (Law 20.293) which bans any type of whaling operations in Chilean jurisdictional waters and set the legal frameworks of additional measures such as penalties, whale watching regulations, and marine protected areas for cetaceans among others.

As mandated by the Law for the Protection of Cetaceans, Chile created a regulatory framework and established the General Regulations for the Observation of Hydrobiological Mammals, Reptiles and Birds and the Cetacean Sighting Registry (Decree 38-2011, Ministry of Economy). A special case is considered for the southern right whale, where observation can only be carried out on land-based platforms; for that purpose, they have a contingency plan to control this special measure.

Whale species are a fundamental part of Chilean natural and cultural patrimony. Its conservation is a national responsibility and whale populations are considered relevant for marine conservation, science, education and also, as an economical touristic source for coastal communities. Sustainability is a key component of the National Strategy of Tourism and therefore it promotes a sustainable tourism to preserve whale species for future generations.

2.2.2.Peru

The legislation that protects cetaceans in Peru is aimed to conserve different species. Law 26.585 banned the taking, commercialization and consumption of all small cetaceans.

Also Decree DS 026-2001-PE is the only regulation on great whales since Peru joined the IWC and it maintains the ban on whaling under Peruvian territory, including minke (*Balaenoptera acutorostrata*), sei (*Balaenoptera borealis*), fin (*Balaenoptera physalus*), blue (*Balaenoptera musculus*), humpback (*Megaptera novaeangliae*), Bryde (*Balaenoptera edeni*), southern right and sperm (*Physeter macrocephalus*) whales.

A broader framework for regulating cetacean watching is currently ongoing, however a Ministerial Resolution 451-2019 from the Ministry of Production regulates the minimum approach distance to marine cetaceans, with special considerations for mother-calf pairs. Recently, a manual of good practices for the observation of marine fauna, including cetaceans, has also been delivered by the Ministry of Foreign Trade and Tourism and is oriented exclusively to the management of tourism activities that conduct wildlife watching.

3. FROM WHALING TO CONSERVATION

3.1. Historical catches

Right whales of the genus *Eubalaena* earned their common name due to their being considered the 'right whale to kill'; relatively slow-moving, easy to approach, coming very close to shore during the mating and calving season and yielding a large amount of oil from its blubber. Small wonder then that right whales were the first species to be decimated by the thousands. In Europe, Basque whalers wiped out the Northern right whales (*Eubalaena glacialis*) from the Bay of Biscay and surroundings already between the 11th and the 16th centuries, moving to the North and South American shores afterwards, literally 'mining' the right whales in their breeding grounds until the targeted populations were either extinct, as the European ones, or brought to the brink of extinction.

Along South Atlantic shores, coastal whaling established by the Basques in 1602 for the southern right whale spread all the way from Salvador de Bahia to Imbituba, Brazil at approximately 27 degrees South (Palazzo *et al.,* 2007), and by the middle of the 18th century French, British and American whaling fleets were plundering the South Atlantic for the remnants of this population. The quest for sperm whales and their valuable spermaceti made whalers venture round Cape Horn in large numbers, already as early as the mid-18th century, and killing right whales on the way was commonplace (Richards, 1994). There is a paucity of solid data, however, related to the potential captures of right whales off Chile, which were likely very abundant at the time of European settlement and into the 19th Century according to historic reports[3]; it is known that British, French and American whalers - of which in 1792 approximately 40 whaling ships were recorded in Chilean waters (Pereira Salas, 1971) - killed large whales off Chile between the 18th and 19th centuries (Martinique, 1973); whaling grounds extended between approximately 30 and 50 degrees South, with most right whale catches concentrated near the coast (Clarke, 1965). Along the coast of Chile,.

Occasional whaling activities from Chilean nationals started in 1852, when Casa Lopez y Sartori from Valparaiso send a vessel to the Artic and on the way back collected 800 barrels of whale oil and 50 from sperm oil. From 1867 onwards Chilean nationals entered commercial whaling, with at least 20 sailboats (D. Quiroz pers. comm.) and the Macaya family presided over a coastal whaling enterprise (Sepulveda, 1997)

[3]<http://openlibrary.org/books/OL17774091M/Un_testigo_en_la_alborada_de_Chile_%281826-1829%29> Downloaded on **06 June 2011**.

which also took Southern right besides blue and sperm whales. Several other whaling firms, employing second-hand foreign vessels mostly, would register in Chile at the end of the 19th century (Quiroz and Careño, 2010).

At 2022 virtual expert workshop, Quiroz presented results from a Fondecyt project to study whaling in Chile. Pre-modern coastal whaling in the late 19th century in Chile shows the hunting and processing of southern right whales in Chome (Talcahuano). There are not estimated of catches from pre-modern Chilean whaling. Pelagic pre-modern whaling occurred by 1890, but the main target were sperm whales and southern right whales followed next. Pelagic southern right whale modern whaling begun in 1903 by American and European whalers. An estimate suggests that 2500 southern right whales were captured by American whalers and 458 captured by other modern whalers (IWC, 2022) In addition, 2,372 right whales were taken by French whalers in the 19th century (DuPasquier, 1986). These are preliminary estimates that does not include inshore whaling, nor struck and loss. Offshore southern right whale whaling was conducted mainly between Talcahuano and Chiloe.

The establishment of the Macaya Brothers whaling firm in Chome (Bio Bio Region), which only closed its doors in the 1980´s forced by the global whaling moratorium, was followed in a few decades by other enterprises aimed at 'mining' the large whales off Chile from coastal stations strategically positioned along the coast or using whaling vessels scouting the southern channels of Magellan. In 1904 Punta Arenas already had its first whaling company, Valdivia/San Carlos de Corral hosted their first ones in 1906, and Ancud/Isla San Pedro, Chiloe Island, in 1908 (D. Quiroz, pers. comm.). Other modern whaling stations were also found at Santa Maria (Talcahuano), Quintay and further north.

Most likely, these whaling operations had very little regard for discriminating among species, and whenever encountered right whales should have fallen prey to them. Records kept by the International Bureau of Whaling Statistics between 1909 and 1983 show catches in Chilean waters of 45,194 whales, of which 209 were right whales, including 32 killed after the first international bans on the species were established in 1936. In the 1934-35 season alone, 43 right whales were reported killed off Chile.

Preliminary results of an on-going work on historical whaling reconstruction of southern right whales in Chile between the 18th and 20th Centuries presented by Rodriguez during the 2022 virtual expert workshop revealed whaling peaks occurred between 1831/1850 and 1931/1950 and that the main whaling areas were in southern Chile (Biobio to Magellan regions). It was also informed that most catches occurred in southern-austral Chile from September to March but that during July and October they mostly occurred in the north (Coquimbo and Tongoy) (IWC, 2022a).

In Peru, whaling activities on the past century hunted all great whale species but was more focused on the catches of sperm whales. Before 1951, the catches of whales were conducted by whaling fleets on pelagic waters using factory ships. After 1951, four whaling stations were built on the coast of Peru in the areas of Pisco, Chancay and Paita. Combined statistics from coastal and offshore whaling from different sources (Valdivia, 1978; Clarke *et al*., 1988; Ramirez 1989) considered a total of 87,983 whales hunted, including 78,649 sperm whales that represents almost 90% of all cathes.

Intensive exploitation of sperm whales in Peru quickly brought overexploitation levels in 1961, one decade after the species started to be taken from coastal stations.

Although the country was an important area for the taken of sperm whales and had constant whaling activities since XVIII century, there are no confirmed reports of catches of southern right whales off Peru. Records of catches comes from central Chile to the south (Reyes, 2009).

On the other side of the Pacific, Northern right whales were extirpated by Japanese whalers already in the 17th century, and newly discovered populations of Southern right whales were systematically destroyed by European settlers in New Zealand and Australia in the 18th and early 19th centuries.

Best (1987) estimated that approximately 14,600 right whales were killed by American fleets in the South Pacific between 1815 and 1909, but he did not allocated the catch to geographic regions and this number does not even take into account British, French and German whaling in the region nor struck and lost animals.

One particular case of misreporting and under-reporting, however, sheds some light on the fate of Southern Hemisphere whales impacted by commercial whaling was the deliberate catch of southern right whales and other protected species by the fleets of the Union of Soviet Socialist Republics (USSR) in the 1960´s and 70´s. The breakup of the former Soviet Union allowed for the discovery of extensive under-reporting in its whaling records. Southern Hemisphere whale populations, of supposedly protected species, were particularly impacted. It is estimated that illegal Soviet operations between 1951 and 1971 killed at least 3,349 Southern right whales. No known Soviet pelagic catches of right whales were reported from Chilean and Peruvian waters during this period (Tormosov *et al.,* 1998).

Information gaps: Logbooks represent a small proportion of the number of vessels that visited whaling areas and there is needed to extrapolate to other voyages to correct the available catch data and include strike and loss on the estimates. Bay whaling can be very effective in removing mother and calf and further study to on the hunting of this target group hunting could provide further explanation on the dramatic drop for this population.

3.2. Whales as a Non-Lethal Use Asset

Whale watching revenues total more than US$ 2.1 billion annually, benefitting coastal communities in 119 countries and territories (O'Connor *et al*., 2009). In Latin America, country-by-country studies indicate that the region already earns revenues totaling approximately US$ 278 million/year Chile, one of the countries in the region with the fastest recent growth (19.5% between 1998 and 2006) and strongest potential for further development of the activity, already earns around US$ 2,450,000 annually (Hoyt and Iniguez, 2008).

In Peru, whale and dolphin watching for touristic purposes has been significantly increasing over the past decade. The oldest recorded activity started only around 2008 off the northern coast of Peru (Piura and Tumbes) with humpback whales tours offered by local companies and fishermen.

As member of the IWC, Peru agreed and complied with the global moratorium on commercial whaling on large whales. In 2002, the government of Peru made great efforts to ensure its active participation with voting rights at IWC meetings. Since then, the government of Peru has a policy to ensure the protection and conservation of living marine resources, within an appropriate scientifically based management. In this sense, it promotes the non-lethal use of cetaceans.

The Chilean transition from whaling to whale conservation nation was strongly influenced by the input of civil society towards the consolidation of a sovereign State policy based on the best national interests. Among such interests the *non-lethal use of whale resources* stands out as a major incentive for sustaining such a policy over time.

There is great potential for watching several cetacean species along the Chilean coast, and southern right whales, as the population recovers, are among those. However, because of the very small size of the surviving population, particular care should be taken so as not to add tourism as a potential source of disturbance or harassment.

More recently, increasing scientific evidence on nutrient circulation, ocean fertilization, whale falls and cetaceans as predators has demonstrated that the conservation of cetaceans is essential for the functioning of the ecosystem and to mitigate the climate crisis (IWC, 2021). The IWC was the first international organization to recognize the importance of cetaceans in the functioning of the ecosystems when Resolution 2016-3. Chile and Peru, with the other Latin American countries, where the proponents of the resolution and further represents and strengthen the commitment of both countries to the non-lethal use of cetaceans.

Since then, other international organizations have started to consider its importance, including the Convention on Migratory Species, the Intergovernmental Panel on Climate Change, the International Monetary Fund, among others.

Moreover, the economic value of the whales as ocean gardeners and carbon sequestration were firstly explored at the International Monetary Fund by Chami *et al.* (2019) that estimated that each great whale sequesters 33 tons of CO_2 on average equivalent to over 30,000 trees. Using conservative estimates, the authors value the average of one great whale, based on its various activities, at more than $2 million, and easily over $1 trillion for the current stock of great whales.

4. GOVERNANCE

4.1. Coordination of a CMP

In order to be effective, experience suggests that CMPs must have a recognized, dedicated co-ordinator. This is particularly true for an international initiative such as this where effective conservation requires action (including legislative action) by a number of stakeholders including: intergovernmental and national authorities; representatives from industry; local communities; NGOs; and scientists from several disciplines. Ideally, the Co-ordinator should have a scientific and management background and be an effective communicator to the various stakeholders. The importance of actively involving stakeholders, especially those whose livelihoods may be affected (*e.g.* fishermen, whalewatchers), cannot be overemphasised.

The Co-ordinator should report to a Steering Committee appointed with close collaboration between appropriate authorities (see also Action COORD-01).

Inter alia, the Co-ordinator/Steering Committee should:

- promote and coordinate the implementation of the CMP (including investigating funding) with particular attention paid to direct stakeholders;
- gather information on its implementation, results obtained, objectives reached, and difficulties encountered;
- communicate this information to the general public through regular reporting in an accessible format;
- appoint a group of experts to evaluate the effectiveness of the CMP every six years (see below) and to update it. The conclusions of this group should be made public.

Finally, it has to be stressed that the CMP will not be effective without sufficient funding. At the very least, sufficient funds must be made available for the appointment of a co-ordinator and the functioning of the Steering Groupat a regular basis.

4.2. Timeline for a CMP

No CMP should be regarded as a definitive and unalterable document. It is rather a document that covers a temporal phase within the framework of the efforts for the conservation of a species, and therefore needs to be reviewed periodically to adjust the actions to the diverse changes that can occur, either in response to the results of the monitoring of the CMP actions themselves or to changing external factors.

The 2023 updated version is the third version of the CMP for this population. It is proposed that this CMP is reviewed annually and updated as needed but that a more thorough review is conducted every six years.

The most important *initial stages (within 1 year of approval of this revised CMP)* are:

(1) appointment of a bi-national Steering Group and co-ordinator;

(2) development of the actions outlined below, including all aspects of funding and, as appropriate, contracts to undertake actions.

5. SCIENCE

5.1. Biology, Status and Environmental Parameters

5.1.1. Population structure

The IWC has identified several calving grounds for southern right whales in the Southern Hemisphere (IWC, 2001). In particular, along the east coast of South America, important calving grounds have been identified off Brazil (8-32^{o}S) and Argentina (42-43^{o}S). It is not known if the Uruguayan coast was an historical reproductive ground that is now being repopulated (Piedra *et al.*, 2006).

ESP population of southern right whales is found along the coast of Chile and Peru. Reported sightings from the Magellan Straits and Beagle Channel are likely to correspond to individuals from the Southwest Atlantic population (Goodall and Galeazzi, 1986; Gibbons *et al.*, 2006; Belgrano *et al*., 2008.).

Although more data are needed, particularly from photo-identification and genetics analyses, the population off the west coast of Chile and Peru may be considered one population, classified Critically Endangered, while the individuals in Magellan Straits and Beagle Channel may be considered individuals of the Southwest Atlantic population.

In the past, matching of available individual photo-identifications from Centro de Conservacion Cetacea Chile with catalogue from Instituto de Conservacion de Ballenas, Argentina has not provided evidence for exchange.

Carroll et al. (2020) investigated the population structure of different southern right whale populations using maternally inherited mitochondrial DNA (mtDNA) and bi-parentally inherited microsatellite data. She compared all major wintering grounds from Argentina, Brazil, South Africa and the Indo-Pacific as well as the South Georgia (Islas Georgias del Sur: SG) feeding grounds and included one sample of Chile-Peru population obtained from an entangled and stranded southern right whale. 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 hypothesize that Chile-Peru may have been a stepping stone for migration between the Indo-Pacific and South Atlantic (Carroll *et al.,* 2020).

For smaller populations the possibility of collecting genetic samples from mother-calf pairs was considered valuable and recommended using crossbows (IWC, 2022a). However, the current legal framework on both countries are more protective to southern right whales and may be reluctant to provide research permits to sample mother-calf pairs. On the IV CMP coordination meeting, it was agreed to develop a scientific and technical document on recommendations and protocols for the collection of biopsy samples to be submitted to the Scientific Committee in order to get advice/endorsement (IWC, 2022b).

Information Gaps: Efforts are needed to increase collection of biopsy samples for genetics, stables isotopes and fatty acids analyses. It should also be considered search historical samples on museums, collect samples from stranded animals, check nets of entanglement and colled e-DNA (non-invasive) and sloughed skin. Matching of available individual photo-identification of Chile with other regional catalogues from Indo-Pacific and South Atlantic should continue. Genetic and photo-identification comparisons need to be undertaken between the Chile-Peru population and the Magellan Straits/Beagle Channel individuals to understand stock identity.

5.1.2. Distribution, migration and movements

Southern right whale distribution in the eastern South Pacific is primarily unknown due to the small population size and limited number of sightings.

Main aggregation areas are likely found in northern Chile (23ºS to 25ºS) and in central and southern Chile (33ºS to 42ºS) Similar to other southern right whale populations, annual sightings are more frequent in austral spring (August – October) (Galletti Vernazzani *et al*., 2008, 2011).

New important information revealed additional sightings off southern Chile (40º-46ºS). 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). Sightings in this region have been reported from January to October, and therefore with occurrence during almost the entire year. In addition, recent sightings were reported off Isla de Chiloé during February 2022 of seven southern right whales that defecated and were likely involved in feeding activities (Galletti Vernazzani, 2022). This new data can also suggest that this area may also be important for feeding activities (IWC, 2022). A stranded dead southern right whale due to entanglement occurred also in the same area (Galletti Vernazzani *et al*., 2017)

Niebaum (2022) also reported three sightings of single individuals recorded on Winter (June-July) and spring (October) 2013-2014 from the northward to the adjacent Los Ríos Region (near 40° S) where data are scarce.

During the 2022 virtual expert workshop, Olavarría reported multiple sightings of cow-calf pairs and adult whales at San Quintin bay, Golfo de Penas (46°S) during the austral winter on three out of five different years (2017, 2020 and 2021). The number of sightings most probably included duplicate individuals as no photo-identification work was conducted. The consistent presence of mother and calves at Golfo de Penas

may indicate that this area could be part of an unknown breeding and/or calving ground for this population (IWC, 2022a)

These events confirm the importance of southern Chile waters (40-46ºS) for the species and highlights the urgent need to further monitor the area in order to identify the boundaries of a probable breeding and/or feeding area.

On winter 2019, a solitary southern right whale was observed in Northern Chile (Antofagasta, 23ºS) and using drone photo-identification the same whale was found with a newborn calf one month later near the same location, providing evidence that the birth occurred near the region (García-Cegarra *et al*., 2021). At the 2022 virtual expert workshop, García-Cegarra provided additional sighting records from 2022 in northern Chile, near Taltal (25ºS) and near Antofagasta that further strengthen the importance of these northern area for this population.

In general, observations north of 20ºS are infrequent, however in recent years eight sightings (which include 6 mother-calf pairs) have been reported off the coast of Peru from 12° to 17°S between 1987 and 2018 (Van Waerebeek *et al*., 1992, 1998, 2009; Santillán *et al*., 2004; Orihuela and Cortegana-Arias, 2013; IWC, 2022a). Pizarro-Neyra (2010) reported on January 2006 a stranded individual of *E. australis* in the vicinity of Los Palos (18º17'S – 70º27'W), Tacna.

During the 2022 virtual expert workshop, Aguilar noted that sightings in recent decades have occurred further north (12°S) than those reported at the end of the last century. This could suggest that the distribution range is apparently expanding northwards (Van Waerebeek *et al*., 1992) 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. García-Cegara also reported a recent sighting of mother-calf pair that occurred in northern Peru (4ºS) on August 2022, becoming the northernmost sighting recorded on Peruvian waters (IWC, 2022a).

The increasing data on that region suggest that northern Chile and Peru could also be part of calving areas for this population. (IWC, 2022a)

During the IV CMP coordination meeting, Castro provided information on a mother-calf pair sighting in Ecuador during September 2022. This record represents the northernmost reported sighting for this population and the first record in waters of Ecuador (IWC, 2022b).

Since 2021 and during 2022, there was the Niña phenomena recorded along the Southeast Pacific, that influence sea surface temperatures (SST) and made them colder than the average SST. It has to be considered that these oceanographic events may likely have influenced these two newly northernmost reported sightings off northern Peru and Ecuador.

As in the western part of South America, it is probable that there are two major calving areas within the range of the Chile/Peru population; somewhere in northern (15-25ºS) and central/southern (33-46ºS) areas. Additionally, based on movements of cow-calf pairs, all coastal waters appear to be used as migratory corridors (Galletti Vernazzani *et al.,* 2008, 2011) and an aggregation area has been difficult to locate.

Therefore, one of the priority actions under the CMP since 2016 has been the development of a Passive Acoustic Monitoring (PAM) Project to identify possible breeding/calving areas along its distribution range.

Twelve-months of continuous recording were collected between 2018 and 2019 off Punihuil, northwestern Isla de Chiloé, austral Chile and five months between 2019 and 2020 off Arauco Gulf, southern Chile. Calls have been present during the austral summer, autumn and winter with no clear seasonal trend off

northwestern Isla de Chiloé, with two peaks of detections off Punihuil, one in December 2018, and the second in March 2019. 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. In the Arauco Gulf, no true positive detections were found. 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 is recommended to have a longer dataset of all annual seasons in the area. (Rojas-Cerda *et al*., 2022). The PAM has also been conducted in Antofagasta between 2022 and 2023 and data is still being analyzed and future efforts include Golfo de Penas (Chilean Patagonia) and Peruvian waters.

Using five months of continuous acoustic data (January-June 2012) collected off the southwestern tip of Isla de Chiloé, Jacobs *et al.* (2019) also detected the presence of southern right whale calls. 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 southern right whales are likely foraging during daylight hours, as upsweep calls are inversely related to foraging behavior.

The acoustic data off Isla de Chiloé also strengthen the likely year-round presence of the species inferred through sightings and further supports the possibility of both breeding and feeding activities occurring on the same area.

It is also important to highlight those recent sightings and acoustic data 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 (IWC, 2022a).

Periodicity of southern right whale sightings every two to three years such as it occurs in Antofagasta and Golfo de Penas was discussed during the 2022 virtual expert workshop. 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 (IWC, 2022a).

Information Gaps: There is an urgent need to identify a calving/feeding ground for this population to start monitoring the population systematically. Specific efforts should be conducted on the southern and northern Chile area that are likely part of a breeding ground. Complete PAM project to compare call presence at different areas. Increase the search effort in Peru. Use satellite imagery at Golfo de Penas and increase visual surveys around Los Lagos (Chiloe) and Aysen.

5.1.3. Basic biology

E. australis make long annual migrations between mid-latitude coastal winter nursery grounds and high-latitude offshore summer feeding grounds where they feed primarily on euphausiids (krill) and copepods. The IWC has identified five feeding areas (IWC, 2001). Based on geographical considerations, it has been proposed that southern right whales off Chile may feed in Antarctic Peninsula (Aguayo *et al*., 1992).

At the 2022 virtual expert workshop, Sironi warned that as sea surface temperature increases as a consequence of climate change, krill abundance decreases and thus, this will affect southern right whales nutritional condition. The body condition of the whales can be assessed from aerial photographs taken from drones (Christiansen *et al*., 2020a). It was suggested that body condition studies based on drone photogrammetry could be implemented in Chile to do comparative studies with southern right whales from other populations because there is no data available today for eastern South Pacific population (IWC, 2022a).

Major wintering grounds have been identified off South America, Australia, New Zealand and South Africa. Southern right whales show maternally inherited site fidelity to near-shore winter nursery grounds and based on female right whales calving at Peninsula Valdés, Argentina, the maternally directed site fidelity is also to feeding grounds (Valenzuela *et al*., 2009).

Calving intervals are most frequently every three years (Burnell, 2001; Best *et al*., 2001a; Cooke *et al*., 2001). Cows reach sexual maturity around nine years (Best *et al*., 2001a; Cooke *et al*., 2001) and gestation and weaning take approximately one year each (Kenney, 2002).

During the 2022 virtual expert workshop, Sironi informed that 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 youngest recorded females with calves are 7 years. 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 (IWC, 2022a).

Deleterious impacts of inbreeding depression are potentially the greatest among small populations. The IWC has recognized inbreeding depression as a factor potentially affecting the recovery of right whales and that the threats may only exist for some of the smaller breeding populations such as those off New Zealand and Chile/Peru (IWC, 2001).

Information Gaps: No data on calving intervals, reproduction or survivorship are available for this population, nor feeding or breeding ecology. Increase efforts on photo-identification are necessary to assess calving internals. It was suggested that drone images available from the southern right whales of Chile and Peru can be compiled and made available for analysis and comparisons with other populations. It was recalled that the Southern Right Whale Consortium is using its data for comparison between different populations.

5.1.4. Abundance and trends

Aguayo *et al.* (2008) compiled 124 southern right whale sightings from 1976 to 2008 but these include animals from Magellan Straits - considered to belong to southwest Atlantic population - and Antarctic Peninsula. Furthermore, there is concern about the accuracy of species identifications in the database since sightings reports often come from non-specialists without photographs and even some reports are inconsistent with right whale behaviour/ecology (IWC 2011a).

Using a filtered database and based on 79 southern right whales sightings reported from 1975 to 2010, the Chile-Peru population does not show any trend of increase in numbers of sightings nor individuals, however a small increase in number of calves has been detected by simple linear regression (Galletti Vernazzani *et al.,* 2011).

Although there is no abundance estimates for this population, based on limited sighting data, it is possible that the current population size is below 50 mature individuals (Reilly *et al*., 2008).

During the 2022 expert workshop, 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 abundance and trends. It was noted that recaptures are needed for any model to work and that it may be easier to get photo-ID from individuals rather than genetic samples (IWC, 2022a).

New approaches to predict habitat use using a Bayesian hierarchical approach from ad-hoc sightings data are available and this method could be used to predict habitat use of these rare whales using the opportunistic sightings reports available (IWC, 2022a).

Information Gaps: Systematic collection of individual identification photographs and genetic samples are needed to estimate population size and continual monitoring through years to obtain trend in abundance. Modelling habitat use from ad-hoc sightings data.

5.2. Attributes of the Population to be Monitored

Little is known for the ESP southern right whale population and most data comes from opportunistic sightings contributed by sighting network members during last decade or research programmes on other target species. Few systematic efforts to survey areas of historical catches or presumed sightings have been conducted with little or no results.

It is critical to start systematic efforts through time to document all sightings and photo-identify all individuals reported. The primary 'attributes' (*i.e.* quantifiable characteristics) of the population that need to be monitored are **abundance** (number of individuals in the population), **whale distribution** as a population attribute that may reflect range contraction or expansion, **calving interval** to assess reproductive rates, and **overall trends in abundance** (whether the population is growing, declining or constant).

It is important to establish a reliable funding base and scientific capacity to assure monitoring into the future.

6. THREATS, MITIGATION MEASURES AND MONITORING

The CMP will intend to address mainly short term, immediate threats to this small Critically Endangered population. This is not to say that other issues should not be identified in the CMP but that these will not form the focus for action of the CMP. Such issues might include oil spills, inbreeding depression and climate change.

During the 2022 virtual expert workshop, the threats and risk assessment were also discussed and updated. It was decided to include additional columns to the risk assessment (table 1) 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 (IWC, 2022a).

6.1. Identification of Threats

ESP southern right whales face a number of both direct and indirect threats throughout their range (Table 1). Direct threats include entrapment and entanglement in fishing gear and collisions with vessels (vessel strikes). Deliberate killing has been reported on one occasion in 1980's (Aguayo *et al*., 1992) and is considered no longer a threat. Indirect threats include harassment, noise, water pollution, physical modification of coastal zone and prey depletion.

Priority for Actions is determined based on a risk assessment matrix that considers likelihood and possible impact (Figure 1).

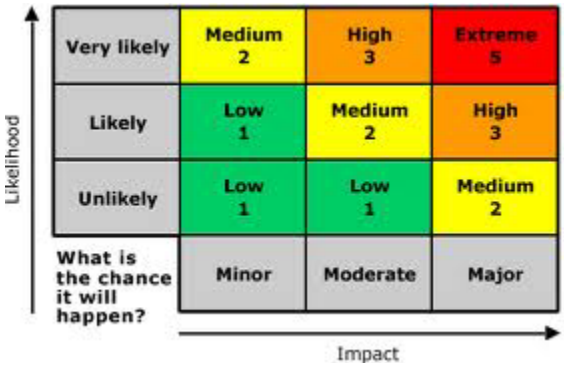

Figure 1 – Risk Assessment Matrix

6.1.1. Entanglement and vessel strikes

Due in part to its biological imperatives of concentrating during the mating/calving season along coastal areas, right whales are particularly vulnerable to negative physical interactions with man-made devices, and have been subject to entanglement in fishing gear and collisions with ships, to the extent that the survival of at least one species, the North Atlantic right whale (*Eubalaena glacialis*), may be impaired by these events (Knowlton and Kraus, 2001). In the Southern Hemisphere, entanglements and ship strikes of several southern right whales were recorded in Brazil (Pontalti and Danielski, 2011; Greig *et al*., 2001) and South Africa (Best *et al.*, 2001b). Although in these countries the population recovery rate is likely satisfactory enough to overcome the impact of these events, the Chilean right whale population is probably smaller than the western gray whale (Brownell *et al*., 2010). Any anthropogenic removal would be very detrimental to the population and therefore potential impact from entanglement/vessel strike at population level is **major.**

In Chile, a calf that bore both net marks (apparently from entanglement) and small-boat propeller stranded and died in central-southern Chile (37ºS) in 1986 (Canto *et al.,* 1991). On July 2009, a dead southern right whale, probably from the southwest Atlantic Population, was photographed floating at sea in Punta Delgada, Strait of Magellan showing evenly spaced abrasions/gouges in the blubber. Possible reasons attributed were either the whale was hit by a ship or the wounds were deep line abrasions from entanglement (MFA, 2010).

During the IWC southern right whale assessment workshop in 2011, it was noted that two mortality events related to ship strike and/or entanglement in Chile was very high compared to mortality events from South Africa and other regions where the populations are much larger than the ESP (IWC, 2011a). Furthermore, an entangled southern right whale was reported on October 2014 with at least three ropes that were wrapped on the right fin and over the head. The case was considered a "complex" entanglement

(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 provided evidence that the most probable cause of death was entanglement in fishing gear (Galletti Vernazzani *et al*., 2017).

During the 2020 virtual expert workshop, Ulloa informed on threats to large whales and highlighted that the main threats to southern right whales in Chile are entanglements particularly in industrial fishing gears and collisions. Rivadeneyra reported that, based on a program of on-board observer, main threat to marine mammals in Peru include fisheries interactions, specially from commercial fleets. She also reported that in 2014 the country established a stranding attention program that 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. Even if there are not many records on southern right whales in Peru, they are subject to the same threats as other marine mammals, particularly anthropogenic interactions (IWC, 2022a).

Southern right whale 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. In northern Chile

Specially in southern Chile (40ºS-46ºS), workshop participants 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. 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, representing about 82% of total ship trips. Upcoming threats include the beginning of the oceanic and offshore salmon farming cluster (2019-2030) and increasing wellboats fleet. It was highlighted that the salmon farming industry currently overlap with the main areas of historical catches of southern right whales 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 blue and sei whale (IWC, 2022a).

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 southern right whale that is also subject to another CMP (IWC, 2022a).

Ship traffic is increasing and reported cases of large whales with ship strikes have also increased, therefore the likelihood for ship strike has increased since last CMP version.

Given the **strong** likelihood for these threats to occur and its **serious impact** at population level, priority for action are **EXTREME** in both cases.

6.1.2. Harassment

There are three recorded cases in Chile of mother/calf pairs being harassed by opportunistic whale watching by private marine vessels off Arauco Gulf in 1986 (Canto *et al.*, 1991), Quintay (CCC, 2008) and Laguna Verde in 2008 (BGV pers. obs.). The first event resulted in the death of the calf while in the second, a contingency plan was implemented by the Chilean Navy and National Fisheries Service to afford maximum protection to the cow-calf pair. Navy personnel were assigned to monitor that no one disturbed the animals. Only land-based whale watching was allowed and no fishing operations were conducted in the area used by the mother and calf during the period of their stay (two weeks). In the third

case, it was not necessary to implement the contingency plan since the pair stayed less than half a day in that area.

Unregulated approaches to mothers and calves may seriously disrupt nursing behavior and result in impacts such as displacement of mother-calf pairs (Salden, 1998) and increases in swim speed (Scheidat *et al*., 2004), thereby altering the energetic expenditure of the animals, these being of critical importance on such a small surviving population.

Harassment was break up on different sub-categories (regulated whale watching where that happen, unregulated whale watching, divers and drones) as their impacts varied depending on the specific activity.

With current whale watching regulations it is unlikely that regulated WW could cause today a death to an individual (major impact to population level). It was considered that the likelihood decreased as well as impact at population level from previous CMP versions, therefore its priority action is **MEDIUM**.

For unregulated whale watching, it is very likely that the whale will be harassed, and it may also be the possibility to even cause the death of a calf. Therefore, the likelihood and impact on population stayed the same in previous CMP version and the priority for action is **EXTREME to MEDIUM-**

Divers and Drones were not previously considered under CMP. There have been documented cases of swimmers/divers approaching southern right whales but it seems its impact at population level could be considered minor. The priority for action is **LOW** from the species perspective. However, attention should be given to this situation as it may be very dangerous for the person itself, especially in case of disentanglement procedures.

Drones are frequently used to take 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*., 2020b). 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 and priority for action **MEDIUM**.

6.1.3.Noise

Over the last few decades, background noise in the world´s oceans have increased enormously, in particular due to increased ship traffic and the expansion of seismic surveys for oil and gas (Potter and Delory, 1996). This has led, in some areas, to a detectable impact on whale communication, to the extent that some species have increased the level and frequency of their vocalizations (Parks e*t al.*, 2007), such as happened with the North Atlantic right whale.

In coastal areas, although noise emitted locally can be muffled somewhat in the shallower depths it can still have a severe localized impact in increasing background noise, thereby increasing the risk of disruption in cetacean communication.

Of particular concern for the ESP southern right whales is the increase in traffic noise and prospect of developing large scale coastal energy projects.

In this regard, increasing concerns on impacts on cetaceans from costal wind farms and associated ports have been raised by Scientific Committee of IWC (IWC, 2012, 2013, 2014). A possible breeding area has

been reported off Isla de Chiloé and concerns have been raised on the building of coastal wind farm (Galletti Vernazzani *et al.*, 2014).

Jacobs *et al.* (2022) analyzed acoustic data obtained over five months during 2012 off the southwestern tip of Isla de Chiloe to assess effects of noise on upsweep calls of ESP southern right whales. 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 southern right whales, such disruptions of their communication range could result in significant barriers to maintaining contact with conspecifics.

Data from Jacobs *et al.* (2022) acoustic analysis was obtained about a decade ago and shipping industry has been increasing. Furthermore, expansion of salmon farming and associated marine traffic in southern Chile is increasing. Impact may be major at population level as they can decrease reproductive success (IWC, 2022a). Small vessel traffic can also have significant impact and it is important to monitor.

The increase in ship traffic due to the expansion both of coastal development and international trade also increases anthropogenic noise. Chilean ship traffic has steadily increased over container port traffic in 2020 reached 4,119,000 TEUs (twenty-foot equivalent units, or a standard-sized container), reaching almost 5,000,000 TEUs before the COVID-19 pandemic [4] This represents more than 30% increase from 2008 to 2020. Traffic statistics from selected ports in northern Chile show that Arica already handled around 1.5 million tons of cargo in 2007; Iquique, 2.58 million tons; and Antofagasta, 2.44 million tons[5]. Such installations have been increasing and continue to have plans for operational expansion, thereby increasing potential impacts both on noise generation and ship strike probability as mentioned under 5.1.

Therefore, the probability that this impact occurs increases to very likely since last CMP version and impact on population is ranging from moderate to major, thus priority for action ranges from **EXTREME to HIGH**.

6.1.4. Water pollution

Initially, this threat was considered as "Habitat degradation" however the name was changed to water pollution as noise is also part of habitat degradation. Water pollution considers oil spills, aquaculture and waste water.

Oil spills from extraction, transport and storage operations are known to produce severe impacts on the marine biota (O'Rourke and Connolly, 2003). If caught in such disastrous events, large whales are known to be negatively impacted. The Gulf of Mexico oil spill has shown to have direct detrimental effect on cetacean species (IWC, 2011b). In Chile, recorded spill events in suspected right whale habitat such as San Vicente/Talcahuano, Valparaiso/San Antonio and Antofagasta have occurred. During January 2022, there was an oil spill recorded at central coast of Peru that affected 1,800,490 m^2 of soil and 7,139,571 m^2 of sea. During this event there were various marine species and hydrobiological resources affected. Although no cetaceans were reported on the affected list of animals when the oil spill occurred, it can't be ruled out that some impacts may arise on a medium or longer term.

[4]<http://www.tradingeconomics.com/chile/container-port-traffic-teu-20-foot-equivalent-units-wb-data.html> Downloaded on **30 March 2023**
[5]< http://www.worldportsource.com/ports/index/CHL.php> Downloaded on **30 June 2011**

Expansion of activities in these and other areas may represent a further risk to the survival of the species as it recovers. The likelihood that these events occur is considered **moderate**. However, Chile has no oil extraction activities, except in Magellan Straits, and therefore the impact of oil spills from transport and storage are localized and its impact to population level is considered to be **minor**. Priority for action is therefore **LOW**. Since last CMP version, the status of this threat has not changed and priority for action continue to be considered the same.

In Chile, aquaculture experienced a fast growth since 1980's (about 3600% over past 40 years) as the country has become a leading producer of salmon farming, concentrating most of its production in southern Chile fjords (IWC, 2022a). Excessive use of antibiotics and copper antifouling, considered an environmental toxin, has been reported (Cabello, 2005; Bravo *et al*., 2005; Willoughby, 1999). In addition, organic residuals from aquaculture and waste waters from urban centers have been associated to toxic algal bloom (Cabello 2004, 2005).

In southern Chilean fjords, tattoos and tattoo-like lesions have been reported in bottlenose dolphins, *Tursiops truncatus*, and Chilean dolphins, *Cephalorhynchus eutropia* (Viddi *et al*., 2005) and blue whales, *Balaenoptera musculus* (Brownell *et al*., 2008). Van Bressem *et al*. (2003a) suggested that tattoo disease in small cetaceans is a potential indicator of a degraded or stressful environment and if tattoo-like skin disease is a cetacean poxvirus, it could have conservation implications. It has been hypothesized that in small cetaceans this infection may kill neonates that do not have protective immunity (Van Bressem *et al*., 1999). Based on studies of resident bottlenose dolphins with tattoo skin disease in the Sado Estuary, Portugal, it has been shown that the disease prevalence was significantly higher in immatures than in adults and that the population in this area is declining (Van Bressem *et al*., 2003b).

The recent leaking of ballast water in Golfo de Penas, the mass mortality of salmons and the discard of their decomposing remains and food (organic pollutants) into the marine ecosystem as well as the intensive use of antibiotics were highlighted as examples of water pollution from salmon farming. Increasing wellboats accidents with oil and antibiotic spills are additional cause of concern. During the last six years, 12 accidents and sinking of wellboats and barges have occurred (IWC, 2022a)

Aquaculture situation is now much worst since the last CMP version due to their recent and expected future expansion in southern Chile (IWC, 2022a). It has to be recalled, that due to recent sightings and acoustic data, as well as historical catches, this area has been recently considered as probable one of the most critical area for ESP southern right whales.

Associated toxic algal bloom due to water pollution can cause major problems at population levels. Therefore, the threat occurrence increases to very likely its impact at population level may range from major to moderate (IWC, 2022a). Priority action is considered **EXTREME TO HIGH**.

On the other hand, waste waters from urban centers, mining activities and other industrial activities, particularly in northern and central Chile, may pollute coastal waters. Considering the relative distance between discharged points, the likelihood is considered **moderate** and the effect at population level **moderate**, therefore priority action is **MEDIUM**. Since last CMP version, the status of this threat has not changed and priority for action continue to be considered the same. However, it was noted that many other institutions are involved in waste water that should be included on the list (Table 1) and that the institutions involved would depend on the activity and source of pollution (IWC, 2022a).

6.1.5. Physical modification of coastal zones

Right whales are closely dependent of coastal/inshore zones for their breeding. It is not known to which extent coastal features may affect breeding right whale distribution, other than in some regions they seem

to prefer particular embayments for calving (Rowntree *et al*., 2001). Modification of coastal features such as man-made structures extending out to sea – in particular those that may affect water and sediment dynamics - in areas of potentially vital coastal breeding habitat may result in changes in whale distribution or perhaps abandonment of breeding habitat.

Due to its nature, this threat differentiated between aquaculture, ports and other coastal developments such as energy projects. Under this threat, aquaculture refers more specifically to the location of cages on the water and may refer to either salmon or mussel farming.

No recent sightings have been documented in San Jorge Bay, near Antofagasta, an area were several sightings occurred during 1980's. Today, the Bay is being used for aquaculture of scallops (Galletti Vernazzani *et al*., 2008). The occupation of some areas by extensive mariculture & aquaculture enterprises (e.g. salmon farming) is a cause for concern, not only due to the physical occupation of habitat and hence the increase in the possibility of interactions, but also for the pollution that was already referred previously.

In southern Chile, the salmon farming industry is predominant over mussels farming. In particular, it is known that salmon farming 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) (IWC, 2022a)

Although 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, it is not known if these measures will be approved and offshore areas are still not even considered.

Physical occupation of coastal areas from these enterprises as well as coastal developments entering to sea has a **moderate** impact at population level due to habitat.

Aquaculture situation is much worst due to their expansion in a critical area for southern right whale, therefore it occurrence increased to **very likely** while for ports and other coastal developments is stayed the same. Therefore, priority of action is considered **HIGH TO MEDIUM**:

6.1.6. Prey depletion

There are many dimensions in which human-induced climate change, now an established fact and a serious concern shared by the vast majority of expert scientists (Pachauri and Reisinger, 2007) is likely impacting the ecology of cetaceans and the characteristics of their environment. Right whales, however, have been proven to be particularly sensitive to climate oscillations. Studies conducted in the South Atlantic indicate that southern right whale breeding success is affected by climate changes expressed in e.g., sea surface temperature (SST), and even quite small changes in oceanographic conditions in the Southern Ocean could affect right whale population dynamics (Leaper *et al*., 2006). High-SST have been correlated with periods of low krill abundance (Trathan *et al*., 2003). Matrilineal site fidelity to feeding grounds may limit the exploration of new feeding opportunities (Valenzuela *et al*., 2009), and therefore it raises concern a significant impact on krill abundance (Atkinson *et al*., 2004.).

In addition, increasing krill fisheries in Southern Ocean has been highlighted as an additional cause of concern (IWC, 2011a).

Since last CMP version, 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, 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 impact from threat will depend where the Chile-Peru whales are feeding (IWC, 2022a).

The likelihood of prey depletion increases to **very likely** and its impact at population level continue to be considered as **major**, therefore priority action is now **EXTREME**.

6.1.7.Summary of threats and impacts

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 southern right whales 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*., 2020b). 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[6]	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 Produce, Imarpe, Instituto Tecnológico de la Producción (ITP)	Increased. Impact at population level to be ranged from moderate to "major to moderate"	Aquaculture situation is much worst due to their expansion in a critical area for southern right whales. Associated toxic algal bloom due to water pollution can 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.

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

								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 southern right whales. 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.

Table 1 – Summary of threats and impacts

6.2. Mitigation Measures and Monitoring

Threats that are considered at this stage to be of medium to extreme priority and where mitigation measures can be identified are included. This continue to exclude oil spills which priority for actions was considered low and also the harassment from divers, although it has been noted that this should be taken in consideration for the safety of the divers.

At this stage, research priorities should be focused on the collection of sufficient scientific information to accurately assess the status of the population as a baseline for the future monitoring of the species and the effectiveness of the conservation management plan. In this sense all research actions (Res01-09) and monitoring action (MON01-02) are essential for almost all mitigations measures, and therefore will not be listed below unless specific aspects are related to threats.

In southern Chile, salmon farming overlap with southern right whale recent and historical distribution. Priority actions for all related threats such as entanglement, ship strike, noise, water pollution and physical modification of coastal areas have been considered as Extreme to High. In this sense, it would be critical and applicable to all threats from this industry that any development includes southern right whale conservation considerations and mitigation measures in the environmental impact evaluation and permitting system (MIT-05)

6.2.1. Entanglement

One of the first priorities should be to release entangled whales and prevent entanglements (MIT-01)

These events highlight the importance of implementing recommendations, such as developing secure fishing gear like PCCS and sinking ground lines, that can reduce entanglements by 70 per cent (IWC, 2022a). Subpesca could be involved in the prevention of entanglement in Chile by promoting the design of secure fishing gear for whales.

To reduce these and other emerging threats a strategy to raise public awareness and increase the capacity of the Range States (PACB-01) that encompasses education, collaboration between stakeholders, development of technical solutions and their implementation are needed.

Mitigating large whale mortality from entanglements is most efficiently implemented by establishing ‘disentanglement networks’ such as those in Australia, Canada, Mexico, New Zealand, South Africa, United Kingdom and United States of America. The establishment of emergency disentanglement teams’ needs to be pursuit and capacity building workshops conducted to strengthen capacities to respond to entanglement and strandings in both countries (PACB-02).

IWC entanglement response trainings have been conducted in Chile on 2015, in Peru on 2016 and a multi-nationally training workshop in Peru on 2018. There have also been efforts to create national disentanglements team. Along Chile, 11 locations 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 (RES-01), as this delays the entire process and sometimes made impossible the resighting of the whale. The continual implementation of training courses along the distribution range for the species is important and should include handling materials to attend entanglements based on IWC protocols (IWC, 2022a, 2022b).

During the 2022 expert virtual workshop, Sepulveda informed about the project "Marine Mammal Bycatch Risk Assessment (ByRA) in Chile". 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. The project has been developed in response to the Unites States import provision rule and its effects on fisheries management in Chile could impact the country, due to its high level of fish production. Currently, the project is considering 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.

The National Fisheries Service (Sernapesca) also 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 (IWC, 2022a).

As more information become available for such small population, the development of a GIS database that map areas with different sighting rates of the southern right whales along with current and potential threats (RES-04) will become an important source for decision making. GIS database will help to identify areas with risk for the conservation of the species and provide useful management advice on where mitigation measures should be applied.

In the short-term, including the species in monitoring program to better assess the extent of this threat should also be considered, either by investigating carcasses or examining photographs of live animals.

If breeding areas are identified (RES-05), establishment of protected areas (MIT-04) need to be considered.

6.2.2. Ship strikes

As suggested in 6.1.1, there is some overlap between high-volume vessel traffic from major harbors and areas when sightings of southern right whales occur, particularly in northern and southern Chile. One of the highest priorities would be to adopt a warning system and the proper regulation to reduce ship strikes in areas of high concentration of southern right whales. (MIT02)

The most effective mitigation measures will be the proper regulation to reduce ship strikes in areas of high concentration of whales, either by changing vessel routing or by reducing vessel speeds when such avoidance is impractical (MIT02).

In this sense, it was suggested to advance in regulations to reduce speed limit to decrease collision risk and noise as well in areas of concerns (Los Lagos Region/Antofagasta) and limit the expansion of wellboats and cargo shipping related to salmon farming industry in southern Chile.

It is also proposed to consider southern right whale call in the acoustic warning system currently under development in southern Chile

Similarly, to previous threat, a GIS database that map areas with different sighting rates of the southern right whales along with current and potential threats (RES-04) should be developed when more data become available. This will improve the state of knowledge on the overlap of ship strikes and southern right whales to better inform the implementation of mitigation measures in the highest-risk areas.

To ensure compliance with regulations, it will be needed to adopt a warning system in sensitive areas and create awareness among vessel crews (PACB-01).

Monitoring (MON01-02) should be an essential part for this threat as well as improve reporting to relevant databases on ship strikes in intergovernmental organizations such as IMO and IWC (MIT-07) in order to improve knowledge on this threat.

It is also crucial to increase the diagnostic capabilities in the region to scientifically confirm that deaths are caused by collisions before the animal passed or after death. It is suggested to use necropsy protocols from IWC or North Atlantic Right whale consortium (IWC, 2022a).

If breeding areas are identified (RES-05), establishment of protected areas (MIT-04) should be considered.

6.2.3. Harassment

As explained in 6.1.2, harassment may be a major concern for unregulated approaches but is one of the few threats that may be address in the short term since it is related to a protection at an individual level, whenever an animal approach the coast.

National whale watching regulations in Chile (MFA, 2014) includes special considerations for southern right whales other than the ones found in the waters of Magellan Straits and only land-based observations are allowed.

In Peru, a 2019 resolution regulates the minimum approach distance to marine cetaceans, with special considerations for mother-calf pairs. During the IV coordination meeting, Peru informed that will work to make consistent regulations with those enforced in Chile.

In this sense, the most efficient mitigation measure is to provide advice on regulations for whale watching tourism for this population that may include the development and implementation of a contingency plan to afford maximum protection when a sighting is recorded (MIT-03). To improve effectiveness of this measure, it would be necessary to conduct public awareness on its critically endangered status in coastal communities, fishermen, sailboats, etc. (PACB-01) in order to avoid harassment. This can also be accompanied by capacity building on species identification and sighting reporting and documentation in order to involve people along coast in the collection of sighting records (PACB-03) and the immediate reporting that will improve conservation and research effectiveness (RES-01).

If breeding areas are identified (RES-05), establishment of protected areas (MIT-04) should be considered.

6.2.4. Noise

Most concerns arise from overlap of major harbours and sightings of southern right whales where marine traffic increases. In addition, new planned developments of large scale projects, including coastal and marine arrays of renewable energy, should be considered.

Reducing speed limit to decrease collision risk and ambient noise on the ESP southern right whale (MIT-02) should be considered as a critical conservation measure. Identify the source of vessel noise (cargo, fishing, etc.) and the distribution of vessels (RES-09) is also proposed to better assist in management measures (IWC, 2022a). Such measures should be implemented in the short term in northern and southern Chile.

As immediate action, inclusion of southern right whale conservation considerations and mitigation measures in the environmental impact evaluation and permitting system for large-scale coastal/marine projects should be enforced (MIT-05).

Development of a GIS database that map areas with different sighting rates of the southern right whales along with current and potential threats would help in identifying areas of concerns (RES-04).

6.2.5. Water pollution

Water pollution, is a cause of concerns for this population. Although aquaculture has extreme to high priority of action and waste water has only been considered of medium priority of action, both have similar proposed mitigation strategies.

As immediate action, inclusion of southern right whale conservation considerations and mitigation measures in the environmental impact evaluation and permitting system for large-scale coastal/marine projects should be enforced (MIT-05). In addition, develop regulations to prevent and fight pollution on marine environment (MIT-06) and continual monitoring of water quality (MON-02) should be considered.

At previous CMP coordination meetings MIT-06 related to water pollution was separated from habitat loss (MIT5bis) related to physical modification of coastal areas.

In response to public pressure, salmon farming industry had taken some steps like reducing the use of antibiotics, but its impact is systemic on the biodiversity and will likely be intensified because of its expansion in the upcoming years (IWC, 2022a).

To decrease the impact from aquaculture water pollution in southern Chile, priority should be given to limit the increase surface and biomass available at current centers of salmon farming (MIT-06). Considering that the number of toxic algae blooming has increased in past years, the modelling of the movement of algae blooms in southern Chile could help to assess the impacts of the industry (MON-02), in relations to other parameters, such as climate change (IWC, 2022a).

6.2.6. Physical modification of coastal zone

Physical occupation of habitat, or habitat loss, and hence the increase in the possibility of interactions, are a cause of concern in areas known to be used by southern right whales.

Inclusion of southern right whale conservation considerations and mitigation measures in the environmental impact evaluation and permitting system for large-scale coastal/marine projects should be enforced (MIT-05). Of particular importance should be to assess the potential impact of off-shore salmon farming (including increase in marine traffic) in southern right whale distribution (MIT-05), particularly off Los Lagos and Aysen region. The latter can also be applied to other whale populations.

To further strengthen such priority actions in southern Chile to face these threats, it should be considered to establish a moratorium on the expansion of salmon farming industry until proper habitat modelling is conducted (MIT-05bis) and to remove salmon farming cages from vulnerable ecosystems and protected areas in southern and austral Chile (MIT-05bis, MIT-06).

In southern coast of Peru, it is also a priority action to consider the increase of mining projects with the consequent increase of marine facilities construction (MIT-05).

As in previous threats, when data is available, developing a GIS database that map areas with different sighting rates of the southern right whales along with current and potential coastal and marine developments (RES-04) will be helpful to better assess critical areas and the impact of such threats.

6.2.7. Prey depletion

Although climate change can't be address in the short term, krill fisheries may be regulated in Southern Ocean within CCAMLR. Mitigation measure should be to coordinate actions with this intergovernmental organization to ensure sustainability of this fishery (MIT-07).

It is also proposed to work on a modification of the Fisheries Law (IWC, 2022a) regarding krill fisheries elsewhere.

7. ACTIONS

7.1. Stakeholder Engagement, Public Awareness and Education

Considering that ESP southern right whale range extends more than 4,000km of coastline, sightings are difficult to document. Since *E. australis* is a coastal species at their wintering breeding grounds, it is important to strengthen public participation in the reporting of sightings.

Sighting networks have already shown to be a cost-effective tool and to play a key role in increasing sighting records of the species (Cabrera *et al*., 2007). In Chile, during the 1980's a sighting network was established and coordinated by CODEFF and in 2000's, Centro de Conservacion Cetacea established the National Marine Mammal Sighting Network to promote the active involvement of a variety of stakeholders in the collection of sighting data of the species in Chilean waters and to create awareness about their conservation needs. Afterwards, the Law for the Protection of Cetaceans (Law 20.293 of 2008), includes national whale watching regulations that have special considerations for southern right whales (DS38 del Minecon, 2012). Law 20.293 also institutionalizes a Cetacean Sighting Network under management of the Chilean Navy.

Most sighting records have been reported while sighting networks have been in place and therefore it is critical to strengthen sighting network (RES-01) to ensure conservation goals for this population are achieved.

Providing range state, groups, organizations, governments and societies with suitable access to information and knowledge about the status of southern right whales in the eastern South Pacific has been essential for meeting the conservation objectives detailed herein. This outreach could be effectively undertaken by the use of the mass media and social networks, including: internet, newspaper, radio and television. Other activities, including public lectures, forums, education programmes for teachers and students of all ages, and dissemination of information in written would also be an effective means of increasing public awareness (PACB-01). This priority activity is considered to have on one side activities for public outreach and on other hand oriented to environmental educational. Capacity building, while similar to public outreach, differs somewhat in that the overarching objective is to foster the procurement of skills and abilities of key individuals and organizations within each of the range states. Example of capacity building have been the training of coastal communities, maritime authorities, etc. to release southern right whales from entanglement or to train in species identification and sighting documentation (MIT-02, PACB-02 and PACB-03). The strengthening of sighting networks and transfer of necessary skills are the initial step in this process. The establishment and strengthening of disentanglement networks follow.

7.2. Summary and Implementation of Actions

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

ID	*Action*	*Importance*	*Feasibility*	*Responsible*	*Priority*	*Implementation to date*	*New proposals*
COORD-01	Implementation of the Conservation and Management Plan: Periodical meetings of Co-ordinator and Steering Committee	Essential	High	All	Short-term	Four coordination meetings from 2016-2022	
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
PACB-01	Development of a strategy to increase public awareness and build capacity in range states	High	High	Subsecretaria de Turismo, Directemar, Sernapesca, NGOs	Short-term	Development of CMP logo and banners. P ress releases and media coverage, Educational lectures to local schools, fishermen and tourist operators from coastal communities. Translate MoU.,	1. Establish a southern right whale day 2. Continue with press release and media coverage 3. Contact and inform about CMP other international organizations. 4. Develop an educational kit for media, schools, etc.
PACB-02	Strengthen capacities to respond to entanglements and strandings in both countries	High	High	Sernapesca, Directemar, NGOs, research institutions	Short-term	Bi-national disentanglement and stranding workshop. 11 training workshops and establishment of governmental disentanglement network in Chile.	1. Draft protocols for stranding and entanglement care 2. Create of a list of experts on the subject, 3. Continue to strengthen national networks for stranding/entanglement care. 4. Develop a catalog of fishing gears used in fisheries and geographic areas, 5. Workshop on disentanglement of whales in southern Peru
PACB-03	Create capacities in coastal communities on species identification and sightings reporting and documentation	High	High	Subpesca, Sernapesca, Directemar, NGOs	Short-term	Sernapesca distributed 2,000 informative posters to 500 communities in Chile	1. Develop informative bi-national poster on the conservation status of this population 2. Develop specific chapter on the southern right whale to be included in the existing training courses. 3. Identification training workshop for on-board observers

RES-01	Development of a web-based platform to report southern right whale sightings	High	High	Directemar, NGOs, research institutions	Short-term		1. Explore whalemap.org 2. Evaluate advantages and disadvantages of different platforms to report sightings
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 southern right whales 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	1. Compile available data of drones 2. Training on drone techniques
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	Short-term	NEW	

				Guardacostas (DICAPI). MINAM, SENACE			
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 southern right whales	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 southern right whale 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	Provide advice on regulations for whale watching tourism for this population	High	High	Directemar, Sernapesca, NGO's, PRODUCE.	Short-term	Workshop Experience Exchange	1.- Consider a more general regulation regarding cetaceans, and then something more specific for species such as the southern right whale 2.- Exchange of information on whale watching 3.- Advance to standardize minimum distance of approach (only land based) and contingency protocols to enforce measures
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 southern right whale 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, etc. to address specific threats.	Medium-High	To be evaluated	Ministry of Foreign Affairs of Chile and Perú, DIRECTEMAR DICAPI	Medium-term		

Table 2 – Summary of Priority Actions

7.3. Reporting Process

It is the responsibility of the appointed Co-ordinator and Steering Group to provide annual progress reports on work undertaken as part of the CMP to the IWC, through its Scientific and Conservation Committees. A major review of work, including the possibility of updating the CMP should occur every six years.

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ANNEX A – MEMBERSHIP OF CMP STEERING COMMITTEE AS OF MARCH 2023

Chile

Minister José Fernández, Chilean Commissioner to the International Whaling Commission, Deputy Director of the Directorate of Environment and Ocean Affairs, Ministry of Foreign Affairs of Chile

Jorge Guerra Münchmeyer, Biodiversity and Aquatic Heritage Unit, Fisheries Administration Division, Undersecretariat of Fisheries and Aquaculture. Chile

Mauricio Ulloa, National Fisheries and Aquaculture Service of Chile

Betsabé Hurtado, Department of International Affairs, General Directorate of Maritime Territory and Merchant Marine, Chilean Navy

Peru

Minister Gonzalo Bonifaz Tweddle, Peruvian Commissioner to the International Whaling Commission, Director of Maritime Affairs, Directorate General of Sovereignty, Limits and Antarctic Affairs, Ministry of Foreign Affairs of Peru.

Alejandra Paz Ramos, Department of Specialized Maritime Agencies, Directorate of Maritime Affairs, Directorate General of Sovereignty, Limits and Antarctic Affairs, Ministry of Foreign Affairs of Peru.

Sara Dueñas, Directorate of Maritime Affairs, Directorate General of Sovereignty, Limits and Antarctic Affairs, Ministry of Foreign Affairs, Peru

Elisa Goya (full member), CMP sub-coordinator for Peru - Regina Aguilar (alternate member) Instituto del Mar del Perú

Frida Rodríguez, Directorate of Sustainable Conservation of Ecosystems and Species - General Directorate of Biological Diversity, Ministry of Environment of Peru.

Representative of the Peruvian Coast Guard and Coast Guard Directorate.

Representative of the Vice-Ministerial Office of Fisheries and Aquaculture of the Peruvian Ministry of Production.

IWC

Barbara Galletti Vernazzani, Coordinator of IWC Eastern South Pacific Southern Right Whale Conservation Management Plan.

Robert L. Brownell Jr., convenor of the Conservation Management Plan sub-committee of the IWC Scientific Committee.

Annie Robinson, chair of IWC Conservation Committee Standing Working Group on Conservation Management Plan