

SC/69B/CMP/11Rev2

Sub-committees/working group name: CMP

Two dead calves of Critically Endangered Chile-Peru Southern Right Whale (*Eubalaena australis*) stranded in 2023 with evidence on human interactions

Barbara Galletti Vernazzani, Cristina Castro, Elsa Cabrera, Fernando Felix, Mauricio Ulloa, Mariano Sironi and Robert L. Brownell Jr.



**INTERNATIONAL
WHALING COMMISSION**

Papers submitted to the IWC are produced to advance discussions within that meeting; they may be preliminary or exploratory.

It is important that if you wish to cite this paper outside the context of an IWC meeting, you notify the author at least six weeks before it is cited to ensure that it has not been superseded or found to contain errors.

Two dead calves of Critically Endangered Chile-Peru Southern Right Whale (*Eubalaena australis*) stranded in 2023 with evidence on human interactions

Barbara Galletti Vernazzani^{1,2}, Cristina Castro², Elsa Cabrera¹, Fernando Felix^{3,4}, Mauricio Ulloa^{5,6}, Mariano Sironi^{1,7} and Robert L. Brownell Jr.⁸

¹*Centro de Conservación Cetacea, Santiago, Chile*

Email: barbara@ccc-chile.org

²*Pacific Whale Foundation, Maui, Hawaii, USA*

³*Museo de Zoología, Escuela de Ciencias Biológicas, Pontificia Universidad Católica del Ecuador (PUCE), Quito, Ecuador*

⁴*Museo de Ballenas, Salinas, Ecuador*

⁵*Servicio Nacional de Pesca y Acuicultura, Valparaíso, Chile*

⁶*Veterinary Histology and Pathology, Institute of Animal Health and Food Safety, Veterinary School, University of las Palmas de Gran Canaria, las Palmas de Gran Canaria, Spain*

⁷*Instituto de Conservación de Ballenas, O'Higgins 4380, 1429 Buenos Aires, Argentina*

⁸*Southwest Fisheries Science Center, NOAA Fisheries, 34500 Highway 1, Monterrey, California, 93940, USA*

Abstract

Entanglement in fishing gear is one of the most serious threats to large whales. Chile-Peru southern right whales are Critically Endangered and any anthropogenic mortality should be kept to zero. During 2023, two dead calves stranded in southern Chile and northern Ecuador. The first (9.1 m, TL) in Melinka, Chile, had fishing gear and ropes severely entangled around the mouth as well as propeller cuts around the abdomen. The second (6.2 m, TL), in Tongorachi Beach, Ecuador, is a new northern record for this population. The carcass had fishing net marks and a deep hole in its dorsal area, possibly caused by a gunshot. Two deaths with evidence of anthropogenic interactions in such small population are alarming and it is unacceptable that all strandings for this population to date have evidence of human interactions. The negative impact this threat is causing to the recovery of this population is of great concern. Urgent actions are needed to prevent further entanglements of Chile-Peru southern right whales in fishing gear and speed limits for vessels to reduce ship strikes.

Introduction

Southern right whales (*Eubalaena australis*, SRW) from the eastern South Pacific along the coast of Chile and Peru are classified as “Critically Endangered” in the International Union for the Conservation of Nature’s Red List of Threatened Species (Cooke, 2018). Severely hunted during commercial whaling between 1789 and 1976 (DuPasquier, 1986; Aguayo et al., 1998; Pastene & Quiroz, 2010), today the population is too depleted to determine whether there is a trend in abundance, although it is reasonable to infer that there are fewer than 50 mature individuals (Cooke, 2018).

A Conservation Management Plan (CMP) for this population was adopted by the International Whaling Commission in 2012. The CMP states that any anthropogenic removal would be very detrimental to the population. Potential impacts from entanglements and vessel strikes are a major concern and should be kept to zero according to the CMP (Galletti Vernazzani et al., 2016; IWC, 2023).

Entanglement of marine mammals in fixed or drifting (passive) fishing gear is increasingly recognized as a serious source of human-caused mortality worldwide. In 2006, scientists estimated that over 300,000 whales and dolphins globally continue to die entangled in fishing gear annually (Read et al., 2006). Right whales are no exception. The North Atlantic right whale (*E. glacialis*) has been subject to entanglement in fishing gear and collisions with ships to the extent its recovery may be impaired by these human threats (Knowlton & Kraus, 2001). In the Southern Hemisphere, several entanglements and ship strikes with southern right whales have been recorded in Australia (Lanyon & Janetzki, 2016), Argentina (Sironi, 2004; Bellazzi et al., 2012), Brazil (Greig et al., 2001; Pontalti & Danielski, 2011) and South Africa (Best et al., 2001).

The first reported stranding in Chile occurred in 1986 in the Arauco Gulf (37°S-73°W). A calf stranded and bore both net (apparently from entanglement) and small-boat propeller marks (Canto et al., 1991). In 2017, an adult stranded dead in Carelmapu, Chile with clear evidence of entanglement (Galletti Vernazzani et al. 2017). Any anthropogenic lethal impact for this Critically Endangered population raises increasing concerns about its recovery and the welfare of the individuals.

During 2023, two calves stranded off Melinka, Chile and Tongorachi Beach, Ecuador. Here we report details on the strandings and provide evidence of fatal human interaction.

Methodology

Two dead SRW were reported in 2023: the first in June near Melinka in southern Chile, and the second in August in Tongorachi Beach, Ecuador.

Both cases were studied by trained specialists and followed similar cetacean stranding protocols (Geraci et al., 1993; McLellan et al., 2004), including the right whale necropsy protocol developed by researchers from the Southern Right Whale Health Monitoring Program (SRWHMP) in Puerto Madryn, Argentina (Chirife et al., 2014).

The animal was first photographed and then an external exam was performed to detect any visible signs of injury. A special emphasis was made to detect those injuries that could be involved in the death of the animal, for example, signs of human interaction like entanglement in ropes or propellers marks. Body and blubber measurements were taken, and samples were collected. Limited time was available at both locations due to logistics and conditions in the field and prevented to conduct full necropsy on the animals.

Skin samples (with and without lesions), baleen plates, blubber (with and without lesions), barnacles, cyamids, among other tissue samples were collected and preserved in alcohol, RNAlater, frozen and/or buffered 10% formalin.

Photographs obtained from the strandings have been shared with stranding and entanglement specialists.

Results

Melinka event

The animal was first seen floating dead on 21st June near Melinka, at Isla Santa Julia (43°56,864' S - 73°38,534' W), Chile. At the time the team attended the stranding (25th June 2023), the carcass was still fresh (code 2, Geraci *et al.* (1993)). Estimated time after death was probably less than 10 days.

Total length of the animal was 9.1m and sex could not be determined *in situ* due to the carcass' position and the unviability to conduct a full internal exam. However, genetic sex identification will be used to determine it. According to its body size, the carcass corresponded to a calf from previous season with more than 6 months.

Most of the skin was present due to fresh carcass condition. External examination revealed the whale was severely entangled around the mouth carrying several meters of monofilament gill net for hake fishing and part of the headrope around the tongue, baleens, and flippers. A 9cm depth laceration around the tip of the snout was already healed with the net filaments and rope inside, suggesting that the calf had grown and survived for a long period entangled with this net (Figure 1). The nylon monofilament gillnet found had a 6x6cm² mesh size and an 8mm headrope which could perfectly fit with the central and southern areas of hake fisheries operations in Chile. Skin abrasions, impressions and lacerations (adjacent blubber affected) from ropes were found through the left and right side of the head, the right flipper and the tail (Figure 2 to 4). Above the baleen on the lip of the whale, a number of white scars that appear to have been caused by the gillnet can be seen but these marks are healed (Fig. 5). The likely rope impression behind the blowhole was of 3cm (Fig. 6) that would have corresponded to a thicker rope (i.e. the buoy rope) than the one found on the mouth or the rope around the tail. The multiple healed rope and fishing net marks along its body and the deep laceration healed around the tip of the snout suggest that this whale was entangled in this gillnet on different parts of their body for a long time.

In addition, two sharp cuts of at least 15cm long, and spaced by 30cm, were found on the abdomen near the genitals (Fig.7a and 7b). The sharp cuts penetrated all the blubber thickness at least until the muscle. According to local fishermen, they could see three sharp cuts when the whale was floating but it was not possible to find the third one. Most of the intestines were going out of the body and covered the area, so it was only possible to locate the second sharp cut but not the third one. It seems that the intestines were coming out of the second cut (Fig.7b). These 2-3 sharp cuts correspond to propeller cuts and could be

ultimately the cause of death of this previously entangled calf.

Blubber thickness measured along the lateral anterior upper line was at least 9cm including 1cm of skin thickness. Blubber thickness was considered normal for the species (i.e. it was not “skinny”).

Stomach content was also collected. The substance was a white colored liquid and smell like rotten milk. It is hypothesis that the calf was near weaning and had been able to survive for long period thanks to the mother's milk despite the fishing net. Further analysis of stomach content will be conducted to determine if it corresponded to milk.

Live cyamids were found around the whale head and also Rabbit-ear barnacle (*Conchoderma* sp.) near the mouth and flipper and attached to *Tubicinella* (Fig. 8) as well as the gillnet.

Tongorachi event

The dead whale washed ashore on 29 August 2023 at Tongorachi beach (0.67 N, 80.10 W) in northern Ecuador. On 30 august, the team attend the stranding and the carcass was also fresh (code 2, Geraci *et al.* (1993)).

The whale was a male calf of 6.2m. The calf was small and should be very young of around 2 months according to Christiansen et al (2022) based on body size and age.

The whale had the presence of parallel lines along the peduncle and near the tail (Fig. 9 and 10). These are marks caused by fishing nets. In Ecuador, transparent plastic gillnets, which could cause such injuries, are commonly used.

Another deep rounded hole was found on the dorsal side of the whale. It does not seem to be of animal origin, and it may be attributed to a gunshot (Fig. 11 and 12). Upon *in-situ* examination, its depth crossed the blubber layer.

The black and white coloration on the belly was natural pigmentation, not indicating areas of trauma (Fig. 13).

Discussion

Our findings clearly show that the whale stranded off Chile had been severely entangled for an extended period and the carcass had propeller cuts on the abdomen. The whale died because of anthropogenic causes, wearing evidence of both entanglement and ship strike.

The second stranded whale is the new northermost record for this population and crossed the equator until 6°N. Although ropes or nets were not present on the animal stranded off Ecuador, there were clear fishing net marks around its tail.

On both cases, the dead whales were calves and on both cases they had evidence of human interactions.

Entanglement in fishing gear can lead to emaciation and energy budget depletion (van der Hoop et al., 2014), stress (Pettis et al., 2017; Rolland et al., 2017) and a decrease in reproductive success (Knowlton et al., 2012) in cases where it is not fatal.

Southern Chile appears to be more utilized by right whales than previously thought, which encompasses the stranding location. Based on historical and recent sightings off southern Chile (40°-44°S), Isla de Chiloe has been proposed as part of a possible breeding and calving area (Galletti Vernazzani et al. 2014) and more recently, large aggregations have been found feeding in the area (Galletti Vernazzani et al. 2023). Isla de Chiloe was also a former whaling ground for southern right whales. Between 1830 and 1832, 91 British whaling vessels operated around Isla de Chiloe (Gay, 1847). Therefore, it is crucial to increase efforts in this important area to identify key habitats and prevent any future entanglements at local level.

These are two out of the four reported dead strandings for this population since the end of commercial whaling until date. All of them have been reported with evidence of human interactions, including entanglement and/or ship strikes. Any anthropogenic mortality is detrimental at the population level and should be kept to zero (Galletti Vernazzani et al., 2016). This threat is likely to be hampering the recovery of this population and every effort should be made to eliminate it along all the population's distribution range. Efforts to quantify this impact, such as identification of anthropogenic scarring in the existing photo-ID catalogue, would help to understand the scale of the problem.

Although the coordination of rescue teams is valuable and necessary to rapid response to entanglement events, it has several limitations. It is likely that many whale entanglements events are not reported (Read et al., 2006). Furthermore, the chances of finding and releasing an entangled whale are usually very limited, given the extensive and, in places, inaccessible coastline of Chile. A more effective strategy would be to prevent entanglements occurring, due to the long-term sublethal effects of entanglement on individuals and the resulting population-level impacts (e.g., Rolland et al., 2016). As a first step in mitigating this threat, the types of fishing gear more likely to entangle southern right whales should be identified and mitigation measures adopted (i.e. cetacean friendly fishing gear), including closure areas or seasons. The identification of aggregation areas for this Critically Endangered population of southern right whales, particularly in southern Chile, should facilitate the adoption of more effective measures such as designation of protected areas with restrictions on the deployment of fishing gear likely to result in entanglement.

Conclusions

Entanglements are one of the most severe anthropogenic threats to large whales (Thomas et al., 2016). Bycatch is a major threat to a number of endangered populations of baleen whales, including southern right whales in Chile and Peru (Brownell & Mallette,

2018). The specimen reported off southern Chile was severely entangled for an extended period and had propeller cuts that very likely caused its death. The small calf reported off northern Ecuador had also mark of entanglements on its peduncle and tail that likely caused its death. These events raise extreme concern for the continued existence of this population. Any human caused mortality is detrimental to this population and entanglement in fishing gear is certainly hampering any chance for this small whale population to increase. Urgent actions are needed to prevent future entanglement in fishing gear and ship strikes. These may include inter alia identification of types of fishing gear involved; adoption of mandatory fishing regulations on the obligatory use of cetacean-friendly gear to reduce the entanglement events as well as speed limits for vessels entering or departing at least from areas with a seasonal aggregation of this species; and the future creation of marine protected areas. In the short-term, an increased effort is needed to report entangled southern right whales and release them alive.

Acknowledgements

We thank the Centro de Conservación Cetacea, the Pacific Whale Foundation and the National Fisheries and Aquaculture Service for the support in attending the southern Chile Stranding. We also express our gratitude to Daniel Caniullan and Hector Villegas for their support and guidance at the stranding work near Melinka. We thank the Southern Right Whale Health Monitoring Program in Argentina for necropsy protocols. We want to specially thank Marcela Uhart, Michael Moore, Emma Carroll and David Matilla for their advice.

Literature Cited

- Aguayo-Lobo, A., Torres, D., & Acevedo, J. (1998). Los mamíferos marinos de Chile: I. Cetacea. [Marine Mammals of Chile: I. Cetacea] *Serie Científica Instituto Nacional Antártico Chileno (Chile)*, 48, 19-159.
- Bellazzi, G., Orri, R., & Montanelli, S. (2012, June). Entanglement of Southern Right Whales (*Eubalaena australis*) in Gulf Nuevo, Chubut, Argentina. Document SC/64/BC1 presented to the International Whaling Commission Scientific Committee meeting, Panama City, Panama. Retrieved from <https://iwc.int>.
- Best, P. B., Peddemors, V. M., Cockcroft, V. G., & Rice, N. (2001). Mortalities of right whales and related anthropogenic factors in South African waters, 1963-1998. *Journal of Cetacean Research and Management, Special Issue 2*, 171-176.
- Brownell Jr., R.L., & Mallette, S.D. (2018, May). Global baleen whale bycatch: the most threatened populations. Document SC/67B/HIM/09Rev1 presented to the International Whaling Commission Scientific Committee meeting, Bled, Slovenia. Retrieved from <https://iwc.int>.
- Canto, J., Ruiz, P., & Cardenas, J. C. (1991). Necropsia de ballena franca austral *Eubalaena australis* y consideraciones sobre manejo de la especie. [Necropsy of a southern right whale *Eubalaena australis* and management considerations for the species] *Boletín Museo Nacional Historia Natural Chile* 42:105–111.

- Christiansen, Fredrik & Uhart, Marcela & Bejder, Lars & Clapham, Phil & Ivashchenko, Yulia & Tormosov, Dmitry & Lewin, Nicolás & Sironi, Mariano. (2022). Fetal growth, birth size and energetic cost of gestation in southern right whales. *The Journal of Physiology*. 600. 10.1113/JP282351.
- Chirife, A., Uhart, M., Sironi, M., Rago, R., & Rowntree, V. (2014). Protocolo de necropsia ballena franca austral (*Eubalaena australis*), Península Valdés, Argentina. Informe técnico. 103 págs. [Southern right whale (*Eubalaena Australis*) Necropsy protocol, Peninsula Valdés, Argentina. Technical Report. 103pg] https://www.researchgate.net/publication/336107388_PROTOCOLO_DE_NECROPSIA_BALLENA_FRANCA_AUSTRAL_VERSION_PRELIMINAR_2014
- Cooke, J. G. (2018). *Eubalaena australis Chile-Peru subpopulation*. *The IUCN Red List of Threatened Species* 2018: e.T133704A50385137. <http://dx.doi.org/10.2305/IUCN.UK.2018-1.RLTS.T133704A50385137.en>. Downloaded on 20 August 2019.
- Du Pasquier, T. (1986). Catch history of French right whaling mainly in the South Atlantic. *Report of the International Whaling Commission, Special Issue 10*, 269–274.
- Galletti Vernazzani, B., Cabrera, E., & Brownell Jr, R. L. (2014). Eastern South Pacific southern right whale photo-identification catalogue reveals behavior and habitat use patterns. *Marine Mammal Science*, 30(1), 389–398. doi: 10.1111/mms.12030
- Galletti Vernazzani, B., Arroyo, P., Goya, E., & Palma, A. (2016, June). Revised Conservation Management Plan for Eastern South Pacific Southern Right Whale Population (*Eubalaena australis*). Document SC/66b/BRG/23 presented to the International Whaling Commission Scientific Committee meeting, Bled, Slovenia. Retrieved from <https://iwc.int>.
- Galletti Vernazzani, B., Chirife, A., Cabrera, E., Sironi, M. and Brownell Jr., R.L. 2017. Entanglement and death of a Critically Endangered Eastern South Pacific southern right whale (*Eubalaena australis*) in Chile. Paper SC/67a/HIM/14 presented to the IWC Scientific Committee, May 2017 (unpublished). 10pp. [Available from the IWC]
- Galletti Vernazzani, B. et al. 2023. Largest aggregation of eastern South Pacific southern right whales found off Isla de Chiloe. Paper SC/69A/CMP/19 presented to the IWC Scientific Committee, May 2022 (unpublished). 5pp. [Available from the IWC]
- Gay, C. (Ed.) (1847). Historia física y política de Chile según documentos adquiridos en esta república durante doce años de residencia en ella y publicada bajo los auspicios del Supremo Gobierno. [The physical and political history of Chile according to documents obtained from this republic during twelve years of time spend on it and published under the auspice of the Supreme Government]. *Zoología. Tomo primero*. En casa del autor, Paris, France and Museo de historia natural de Santiago, Santiago, Chile.
- Geraci, J. R., & Lounsbury, V. J. (Eds.) (1993). *Marine mammals ashore. A field guide for strandings*. Texas A&M Sea Grant Publication. Texas, USA.
- Greig, A. B., Secchi, E., Zerbini, A., & Dalla-Rosa, L. (2001). Stranding events of southern right whales, *Eubalaena australis*, in southern Brazil. *Journal of Cetacean Research and Management*, (Special Issue) 2, 157-160.

- International Whaling Commission. IWC. 2023. 2023 Version - Conservation Management Plan for Eastern South Pacific Southern Right Whale Population (*Eubalaena australis*). Document SC/69A/CMP/23
- Knowlton, A. R., & Kraus, S. (2001). Mortality and serious injury of northern right whales (*Eubalaena glacialis*) in the western North Atlantic Ocean. *Journal of Cetacean Research and Management (Special Issue) 2*: 193–208.
- Knowlton, A. R., Hamilton, P. K., & Pettis, H. M. (2012). Status of Reproductive Females in the North Atlantic Right Whale Population and Impacts of Human Activities on Their Reproductive Success. *Silver Spring, MD: NOAA, 41*.
- Lanyon, J. M., & Janetzki, H. (2016). Mortalities of Southern right whales (*Eubalaena australis*) in a subtropical wintering ground, Southeast Queensland. *Aquatic Mammals, 42*, 470. doi: 10.1578/AM.42.4.2016.470
- McLellan, W., Rommel, S., Moore, M. & Pabst, D. (2004). *Right Whale Necropsy Protocol*. Final Report to NOAA Fisheries for contract # 40AANF112525 U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Office of Protected Resources, Silver Spring, Maryland.
- Pastene, L. A., & Quiroz, D. (2010). An Outline of the history of whaling in Chile. In International Center for Folk Culture Studies (Ed.) *Human culture from the perspective of traditional maritime communities*. International Symposium Report No. 1. (pp 73-98), Kanagawa Shimibun Press, Kanagawa, Japan.
- Pettis, H. M., Rolland, R. M., Hamilton, P. K., Brault, S., Knowlton, A. R., & Kraus, S. D. (2004). Visual health assessment of North Atlantic right whales (*Eubalaena glacialis*) using photographs. *Canadian Journal of Zoology, 82*, 8–19. doi: 10.1139/z03-207
- Pettis, H. M., Rolland, R. M., Hamilton, P. K., Knowlton, A. R., Burgess, E. A., & Kraus, S. D. (2017). Body condition changes arising from natural factors and fishing gear entanglements in North Atlantic right whales *Eubalaena glacialis*. *Endangered Species Research, 32*, 237–249. doi: 10.3354/esr00800
- Pontalti, M., & Danielski, M. (2011). Registros de enredamentos de baleia-franca, *Eubalaena australis* (Cetacea, Mysticeti), na temporada reprodutiva de 2010, em Santa Catarina, Brasil. [Entanglement records of southern right whales, *Eubalaena australis* (Cetacea, Mysticeti) during 2010 reproductive season in Santa Catarina, Brazil] *Biotemas, 24*(2), 109-112.
- Read, A.J., Drinker, P.m & Northridge, S. (2006). Bycatch of Marine Mammals in U.S. and Global Fisheries. *Conservation Biology, 20*(1), 163–169. doi: 10.1111/j.1523-1739.2006.00338.x
- Rolland, R. M., Schick, R. S., Pettis, H. M., Knowlton, A. R., Hamilton, P. K., Clark, J. S., & Kraus, S.D. (2016). Health of North Atlantic right whales *Eubalaena glacialis* over three decades: from individual health to demographic and population health trends. *Marine Ecology Progress Series, 542*, 265–282. doi: 10.3354/meps11547
- Rolland, R. M., McLellan, W. A., Moore, M. J., Harms, C. A., Burgess, E. A., & Hunt, K. E. (2017). Fecal glucocorticoids and anthropogenic injury and mortality in North Atlantic right whales *Eubalaena glacialis*. *Endangered Species Research, 34*, 417–429. doi: 10.3354/esr00866
- Sironi, M. (2004). Behavior and social development of juvenile southern right whales (*Eubalaena australis*) and interspecific interactions at Península Valdés, Argentina.

Do not cite without author's permission

(Doctoral dissertation). University of Wisconsin, Madison. Retrieved from
<https://ballenas.org.ar/investigacion/publicaciones-cientificas/>

- Thomas, P. O., Reeves, R. R., & Brownell, R. L. (2016) Status of the world's baleen whales. *Marine Mammal Science*, 32, 682–734. doi:10.1111/mms.12281
- van der Hoop, J., Moore, M., Fahlman, A., Bocconcelli, A., George, C., Jackson, K., ...Zoodsma, B. (2014) Behavioral impacts of disentanglement of a right whale under sedation and the energetic cost of entanglement. *Marine Mammal Science*, 30, 282–307. doi:10.1111/mms.12042

Figures



Figure 1 – Severe entanglement on southern right whale mouth - Isla Santa Julia, 25th June 2023



Figure 2 – Laceration of rope penetrating the tip of the snout - Isla Santa Julia, 25th June 2023



Figure 3 – Linear marks around the right flipper - Isla Santa Julia, 25th June 2023



Figure 4 – Linear marks around the tail - Isla Santa Julia, 25th June 2023



Figure 5 – Linear white marks on top the mouth - Isla Santa Julia, 25th June 2023



Figure 6 – Linear mark behind the blowhole - Isla Santa Julia, 25th June 2023



a) b)
Figure 7 – a) first sharp cut near the abdomen; b) second sharp cut near the abdomen, separated 30cm from first cut (already sampled) - Isla Santa Julia, 25th June 2023



Figure 8 – Cyamids, barnacles and *Tubicinella* - Isla Santa Julia, 25th June 2023



Figure 9 – Linear marks on the southern right whale peduncle – Tongorachi, 30 August 2023



Figure 10 – Linear marks on the tail – Tongorachi, 30 August 2023



Figure 11 – Deep rounded wound on the dorsal area – Tongorachi, 30 August 2023



Figure 12 – Detail on deep rounded wound– Tongorachi, 30 August 2023



Figure 13 – Natural pigmentation pattern on the belly – Tongorachi, 30 August 2023