

SC/67B/CMP/14

Southern right whale of the SW Atlantic: An update on the CMP actions in Argentina (2017-2018)

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INTERNATIONAL
WHALING COMMISSION

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Compiled from the Progress Report of Argentina 2018

The Conservation Management Plan for the Southern right whale (SRW) Southwest Atlantic population was adopted in 2012 following the recommendations of the IWC and particularly considering the SRW die-off event in Península Valdés (PV) area, Argentina. This plan started to be implemented after the meeting held in 2013 in Buenos Aires (IWC, 2016a).

The overall objective of the CMP is to protect Southern right whales (SRW) habitat and minimize anthropogenic threats to maximize the likelihood that SRW will recover to healthy levels and recolonize their historical range.

This working paper summarizes those actions developed in Argentina and related to the CMP for the period June 2017 – April 2018.

ACTIONS

MON-01: Ensure long-term monitoring of abundance, trends and biological parameters.

-The Marine Mammal Lab of the Centro Nacional Patagónico (LAMAMA-CENPAT)

The Marine Mammal Lab of the Centro Nacional Patagónico (LAMAMA-CENPAT) conducted 73 aerial surveys between May 1999 to December 2000 and from June 2005 to November 2017. The results of its work support that the SRW population is still increasing in the nursing area around PV. In spite that the number of whales in the surveyed area is increasing, the rate is steadily decreasing. The rate of increase decreased from near 7% in 2007 to a 0.5% and 2.40% for total number of whales and number of calves, respectively for 2017. Trends in the rates of increase for total number of whales and number of calves were negative (-0.732% and -0.376%, respectively). We conclude that whales are still increasing their abundance, while the rate of increase is decreasing. Differences in the rates of increase of the group types and changes in habitat use are thought to be consequence of a density dependence process (SC/67B/CMP/05). As a consequence of population increase changes in distribution and density in the core area were suspected. The information gathered in aerial surveys were divided into 4 periods. A geographical analysis of 620 km of coast revealed that in 5 km-length segments the density of whales increased to a maximum near to 3 whales per km². This figure is proposed as a threshold that elicits a density dependence response, where the Mother-calf pairs remain in the area, while the other groups decreased their density, forcing them to move to other areas (SC/67B/CMP/02). The presence of SRW was also monitored in Golfo San Matías using coastal aerial surveys between 2007 and 2016. Whales were observed from August to October, with a peak in late August-early September, and the solitary individuals were the predominant group type along the surveyed area. Finally we reported evidence of the presence of whales in Golfo San Matías previous to the commercial whaling, highlighting the recolonization process (SC/67B/CMP/01).

-- Instituto de Conservación de Ballenas (ICB) and Ocean Alliance (OA)

-Aerial surveys of southern right whales off the coast of Península Valdés, Argentina, were conducted on September 9 and 10, 2017. The purpose of the surveys was to document the presence and distribution of southern right whales along the perimeter of the Península by photo-identifying individuals from the callosity patterns on their heads and recording their locations and the presence of calves.

A total of 788 southern right whales including 302 calves were counted, and 12,200 photographs were taken. The total count of 788 whales is the highest ICB/OA have ever recorded since the beginning of the study in 1970. Final results of photo-identification analyses are not yet available. The following table summarizes the number of whales counted by area: Golfo San José (GSJ), Golfo Nuevo (GN) and the total in Península Valdés (PV).

Date	Area	Mothers	Calves	Adults	Juveniles	TOTAL
9-Sep-17	Golfo San José	78	78	20	20	196
10-Sep 17	Golfo Nuevo	224	224	57	87	592
TOTAL	Península Valdés	302	302	77	107	788

Analyses of photographs in the right whale catalogue of ICB-OA are available for the years 1970-2015. Number of individuals photo-identified: 3,200.

- In 2016, ICB developed an agreement with the Association of Whale Watch Guides (AGB) of Puerto Pirámides, Argentina. Based on this agreement, whale watch captains, guides and photographers contributed 460,000 photographs of whales taken during whale-watch trips to ICB researchers in exchange for life history information on the whales they are seeing.

ICB researcher, Florencia Vilches has started to enter the callosity patterns of the 3,200 individuals identified during 45 years of aerial surveys (Hiby and Lovell 2001) into a database used for identifying right whales from boats (BigFish, Pirzl et al., 2006), which categorizes the features present in a whale's callosity pattern such as the number of callosity islands on the left and right sides of the whale's head. We began analyzing the 460,000 whale-watch photographs taken from 2003 through 2016. First results include adding new information to the sightings of 151 whales of which 46 were previously identified and 105 have been incorporated into the catalogue as new individuals.

The photographs obtained during aerial surveys and from the tourist boats provide important and complementary information. Their combination will greatly increase what we know about individual right whales at Península Valdés. The analyses of the whale-watch photographs will allow us to: • add new individuals to the catalogue • add new sightings of known individuals • identify calves in their year of birth and thus enrich our understanding of activities of different age groups • increase the number of inter-birth interval record, a key factor in assessing the reproductive health of the population • expand existing information on the residence times of whales in different age/sex and reproductive states • evaluate the general state of the population through an analysis of wounds and scars. ICB/OA thank the AGB and the Patagonia Digital Project for joining this initiative and especially Alexis Fioramonti, Ángel Vélez, Hernán Romero, Luis Burgueño, Luis Pettite, Stephen Johnson, Paula Faiferman and Jorge Barone for having contributed their valuable photographs. We give special thanks to the Marine Conservation Action Fund of the New England Aquarium for their support of this project.

Preliminary results from this study will be presented at the IWC Scientific Committee Meeting in Bled, Slovenia in April, 2018.

--Fundación Patagonia Natural (FPN) and Wildlife Conservation Society (WCS)

Censuses of Southern Right whales off the coast of the natural protected area "El Doradillo", Golfo Nuevo, Chubut Province, Argentina (2012-2016).

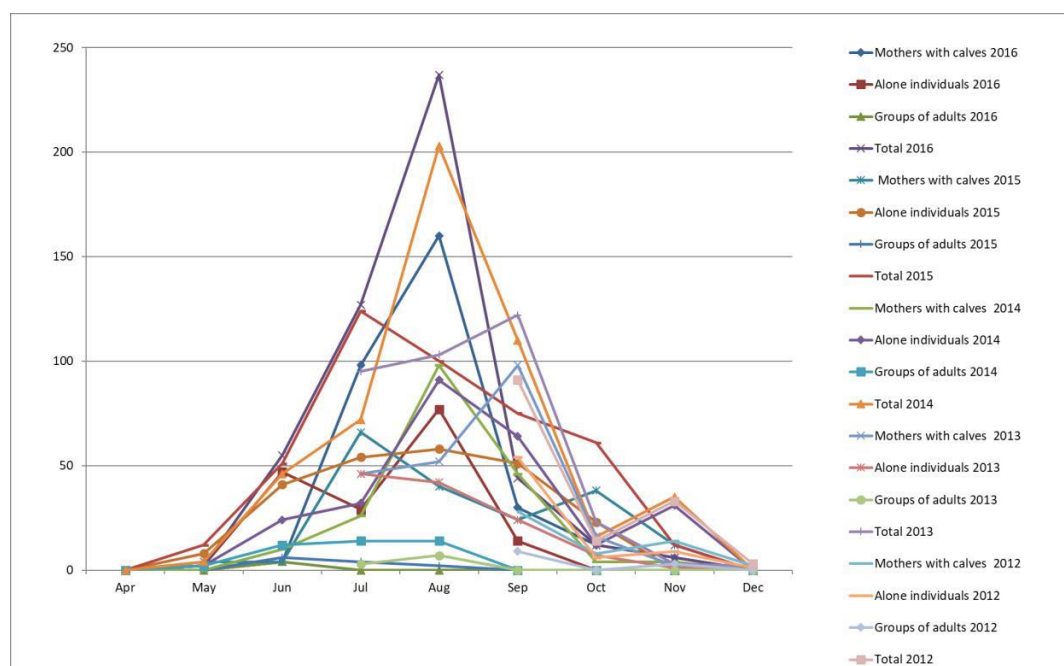
During the seasons 2012 through 2016 (5 years) in which the Southern Right Whales remain in waters of the Península Valdés, 45 censuses were carried out in total (9 censuses/year on average) between the months of April and December, from the observatory of "Punta Flecha" (42° 40'S/ 64° 56'W), on the coast of the Golfo Nuevo, Chubut Province, Patagonia Argentina.

The censuses were carried out following the methodology and observation protocols developed by FPN and WCS in 2012 (Morand *et al.* 2013), which were adjusted in the following seasons (Morand *et al.* 2014, Caille *et al.* 2015a, 2015b, Caille *et al.* 2017).

The total number of whales counted produced a maximum of 91 individuals in September 2012, 122 in September 2013, 203 in August 2014, 124 in July 2015 and 237 in August 2016 (See figure below). The number of mothers with calves counted had maximums of 28 individuals (14 mothers and 14 calves) in September 2012, of 98 (49 and 49) in September 2013, 98 (49 and 49) in August 2014, 66 (33 and 33) in July 2015 and 160 (80 and 80) in August 2016; coinciding with maximums recorded for the total number of whales in the area.

The number of solitary adults had a maximum of 54 individuals in September 2012, of 46 in July 2013, of 92 in August 2014, of 58 in August of 2015 and of 77 in August 2016. Adult groups (copulation groups, between 2 and 4 individuals), had maximums of 2 groups in September 2012, 2 in August 2013, 6 in June 2014, 3 in July 2015 and 4 in June 2016.

There were no individuals observed in the censuses carried out in April 2014, 2015 and 2016 (the firsts for these seasons) and in the censuses made in December 2014, 2015 and 2016 (the lasts for these seasons).



The data confirms that the months with the greatest number of Southern Right whales, in the waters of the Golfo Nuevo adjoining the Natural Protected Area of "El Doradillo", occurs between June-July and September of each year (3-4 months); and that the category of "mothers with calves" make up, on average, more than half of the specimens recorded during these months (mean 52%; standard deviation \pm 16.3%).

MON-02: enhance existing strandings networks including the capacity for undertaking post-mortems

--Laboratorio de Ecofisiología aplicada al manejo y conservación de la fauna silvestre (GEA-CESIMAR-CCT-CONICET-CENPAT)

-The Chubut Stranding Network (CSN) began in 2009 but since 2012 have actively participated in stranding report and response. The CSN is conformed by research centers, governmental agencies, and locals NGO's.

Carla Fiorito (GEA-CESIMAR-CONICET) participate as veterinary at the Necropsy Team of the CSN. The Necropsy Team (NT-CSN) conduct post-mortem examinations on stranded cetaceans and other marine mammals. Fiorito collects biological samples in order to determinate causes of death and infectious diseases.

--The Southern Right Whale Health Monitoring Program (SRWHMP)

The SRWHMP at Península Valdés, Chubut, Argentina began in 2003 with support from the US National Marine Fisheries Service. The Program is a collaboration between local NGOs, research centers, and governmental agencies. At present, the Program operates as a collaboration of the Instituto de Conservación de Ballenas (ICB), Ocean Alliance (OA), University of California, Davis, University of Utah, Wildlife Conservation Society (WCS) and Fundación Patagonia Natural (FPN), with funds from the member organizations and donations from private foundations and individuals.

Since its beginning in 2003, the Program has recorded 774 dead right whales found on the shores of Península Valdés (Di Martino et al. 2017), with an annual maximum of 116 dead whales in 2012 (Rowntree et al. 2013; Wilson et al. 2015; McAloose et al. 2016). No other stranding research program in the world has documented such a high number of dead right whales or created such complete database on the health of southern right whales.

A Contact Network (CN) has been essential to the success of the Program. Members of the CN include: park rangers, fishermen, local citizens, whale watch companies, dive companies, tourism companies, nature guides, sailors, airplane pilots, artisanal fishermen, researchers, NGOs, and local authorities such as the Argentine Navy and the Argentine Coastguard. In addition to reports from the CN, the Program surveys the beaches in both gulfs in regions where the whales concentrate and are inaccessible to people through aerial surveys. These are done systematically at monthly intervals, with a minimum of 6 and maximum of 8 flights per season since 2010. Regular aerial surveys encompass the entire perimeter of Golfos Nuevo and San José, and the external coast of the peninsula is added once or twice during the season.

In 2017, the Program studied and collected samples from a total of 28 stranded whales that died at Península Valdés, including 27 calves (96%) and 1 adult (4%). The stranded whales included 14 females (50%), 8 males (39%) and 6 whales (21%) of unknown sex. Most whales (20) died in the southern gulf (Golfo Nuevo) and 8 whales in the northern gulf (Golfo San José). We conducted post-mortem examinations on the stranded whales and when conditions permitted, we collected biological samples that will be analyzed for infectious diseases, biotoxins, contaminants, nutritional status, foraging locations, diet, genetics, and other potential factors contributing to mortality. No live strandings were recorded.

We conducted 5 aerial surveys between June and December to search for stranded whales in Península Valdés, totalling 16h of flight time. We detected 12 (43%) right whale carcasses stranded in inaccessible areas. Members of the Contact Network reported the remaining 16 strandings (57%).

RES-01: determine movements, migration routes and location of feeding ground(s)

-- Laboratorio de Mamíferos Marinos, Centro Nacional Patagónico/CONICET, NOAA/Cascadia Research Collective, the Wildlife Conservation Society, Instituto Aqualie, Universidad Nacional de Comahue/CONICET, Fundación Patagonia Natural, Instituto de Conservación de Ballenas, and University of California Davis

Satellite telemetry studies continued to be undertaken to assess movements and the location of the feeding grounds of Southern right whales wintering off the coast of Argentina. This project is developed by a large group of collaborating organizations in Argentina, Brazil and the United States, including the Laboratorio de Mamíferos Marinos, Centro Nacional Patagónico/CONICET, NOAA/Cascadia Research Collective, the Wildlife Conservation Society, Instituto Aqualie, Universidad Nacional de Comahue/CONICET, Fundación Patagonia Natural, Instituto de Conservación de Ballenas, and University of California Davis. Satellite transmitters were deployed on nine southern right whales in a new location – the northern Golfo San Matías, Province of Rio Negro, Argentina – in October 2016 (n=1) and in September 2017 (n=8). This site is located nearly 200 km north of Península Valdés (PV), the main breeding and calving grounds of this species in the western South Atlantic Ocean. Tag duration varied between 46 and 204 days (average of 117 days). Movement patterns continue to show marked individual variation. Four individuals moved southwards towards Golfo San José and Golfo Nuevo, in PV shortly after tagging. Five other whales moved north along the coast towards the northern coast of Argentina and Uruguay. All whales eventually moved east towards offshore waters of the outer continental shelf and shelf break along the coast of Argentina (from the La Plata River to the Islas Malvinas/Falkland Islands). Most whales tracked until later in the season (after January) migrated east/southeast towards Islas Georgias del Sur/South Georgia and the Scotia Sea, where they remained for the duration of their tags. One individual was migrating east past 22°W of longitude when the tags stopped transmitting. Behavioral states estimated by space-state modelling indicate areas of potential foraging importance in the outer continental Shelf off southern South America, the South Atlantic Basin, the Eastern Scotia Sea and the northern Weddell Sea. These findings complements those previously reported from tag deployment in PV and, overall, reveals that SRWs present a relatively complex movement pattern when they leave their wintering grounds in the western South Atlantic with individuals visiting multiple potential foraging habitats each season. A report with the findings of the 2016 and 2017 deployments will be presented by the collaborating scientists at SC67b.

-- Fundación Cethus

- Line-transect visual observations were made from Buenos Aires (Bs.As.) port (34°35.95'S/ 058°22.28'W) to Ushuaia port (54°48.52'S/ 068°18.17'W), Argentina, on waters above the Argentinean shelf (including the Patagonian Shelf), from 12 to 20 January 2018 and from Ushuaia to Bs.As. from 22 to 28 February 2018. Observations were collected by two dedicated observers from an Argentinean Coast Guard's vessel used as platform of opportunity. Total effort was 92.4hs covering 782nm. A total of 44 groups and 58 individuals were observed in an area restricted from 44°48.363'S/ 060°58.800'W to 48°1.322'S/ 063°17.155'W between 100 and 200 nm from the coastline. The mean encounter rate (ER) estimated for the area of the Patagonian shelf between 43° and 47° S, and the 100m and 200m isobaths was 0.52 ± 0.55 whales/nm during January. No SRW were observed within this area during the survey in February. This area has been pointed out as a potential foraging ground based on catch records, telemetry satellite data and stable isotope analysis. January 2018 ER estimation is similar to results obtained during January 2016 for the same area from a similar survey,

and both are significantly higher than ER estimated for February 2016 and 2018 ($H=18.51$, $p<0.0001$).

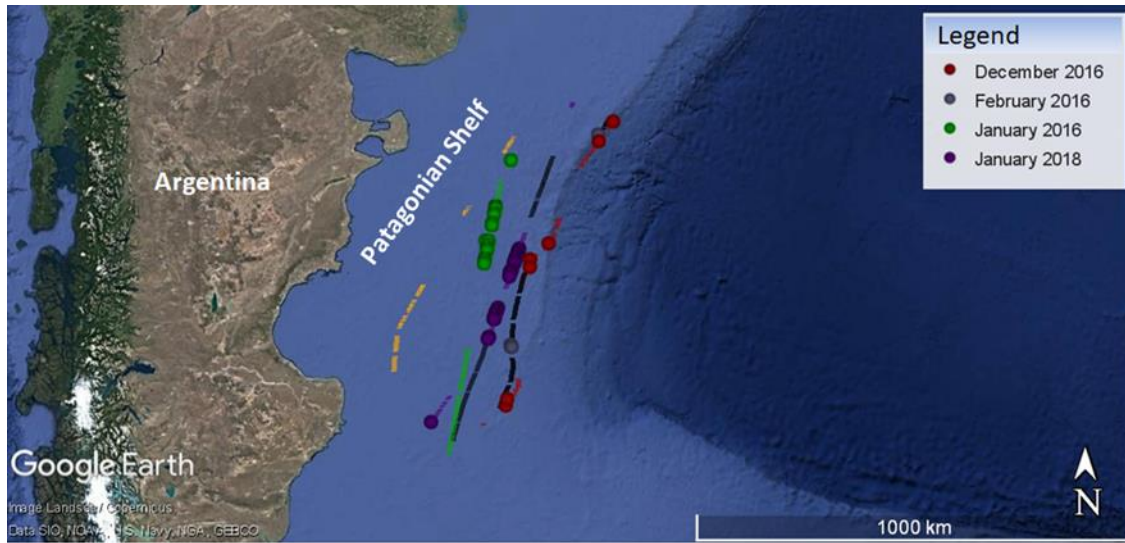


Fig.1. On effort survey tracks (lines) and distribution of sightings (circles) of Southern right whales off Argentina. Color represents months as follows: green = January 2016, dark grey = February 2016, red = December 2016, violet = January 2018, and orange = February 2018.

- In 2017 Fundación Cethus continue the systematic survey started in 2016, in order to establish the seasonality and habitat use of the Southern right whales in Miramar, province of Buenos Aires. The survey was conducted between January 2016 to March 2017. The peak of sighting occurred in August (89 whales) and September (96 whales). The catalogue from Miramar was created with 8 SRW identified.

-- *Laboratorio de Ecofisiología aplicada al manejo y conservación de la fauna silvestre (GEA-CESIMAR-CCT-CONICET-CENPAT)*

-Systematic censuses of southern right whales are done each year from a research vessel. Number of whales, age classes and type of group are identified. Since 2017, census is being complemented with the use of a drone.

Date	Area	Methods/effort	Parameters/ factors measured
July-Nov 2017	Golfo Nuevo	Line transect survey	Distribution; sighting frequency.
July-Nov 2017	Golfo Nuevo	Raspiwhale - Tag	Whale behaviour

-GEA have been tagging whales since 2015 with a suction cup device called raspiwhale (rW). Raspiwhale was designed by Daniel Pérez-Martínez in cooperation with the Group of Applied Ecophysiology, led by Dr. Bertellotti. rW is a device used for measuring physiological, behavioral and environmental parameters in whales using an open source microcomputer *Raspberry pi*. The model was specifically developed for measuring temperature, pressure, three-dimensional movements (speed, rotation, and pitch), sound and video recording. Rw is attached to the whales via suction cups that are released from the whale by a programmable electronic system. Rw has operating autonomy, is waterproof, withstands pressure to 100 m deep and fleet what permit it to be recovered and reused. Rw represents the first tag *non-invasive* created with this technology.

-- *Biología, Ecología y Conservación de Mamíferos Marinos. Instituto de Investigaciones Marinas y Costeras. Universidad Nacional de Mar del Plata (BECMM-IIMyC-UNMDP-CONICET)*

Systematic observations from the coast: Whale monitoring is carried out through systematic weekly surveys in different points of the urban area of Mar del Plata city. Sightings are performed at different times of the day using binoculars. Geographical position, photographs, number of individuals, presence or absence of calves and types of behavior displayed is recorded at each sighting. Period: September – October 2017. Number of sightings: 15.

--*MARYBIO*

A dedicated acoustical study of southern right whales was conducted in Bahía San Antonio during the season 2017. An array of five hydrophones recorded simultaneously for a total of 18 days between 2nd September 2017 and 19th September 2017. The five hydrophones were suspended moored to the sea bed, in water of depth 5-18m. The array was spaced in a square with sides of 4km length, with the fifth hydrophone in the centre.

The instrumentation successfully collected acoustic recordings, containing southern right whale vocalisations. The aim of the research is to localise the vocalising southern right whales and subsequently estimate animal density in the bay. In addition, the vocal repertoire of the southern right whale will be catalogued and the most comprehensive acoustic study of this stock (Clark, 1982) will be updated. Post-processing of the data is currently on-going.

MIT-02: develop and implement a strategy to minimize kelp gull harassment

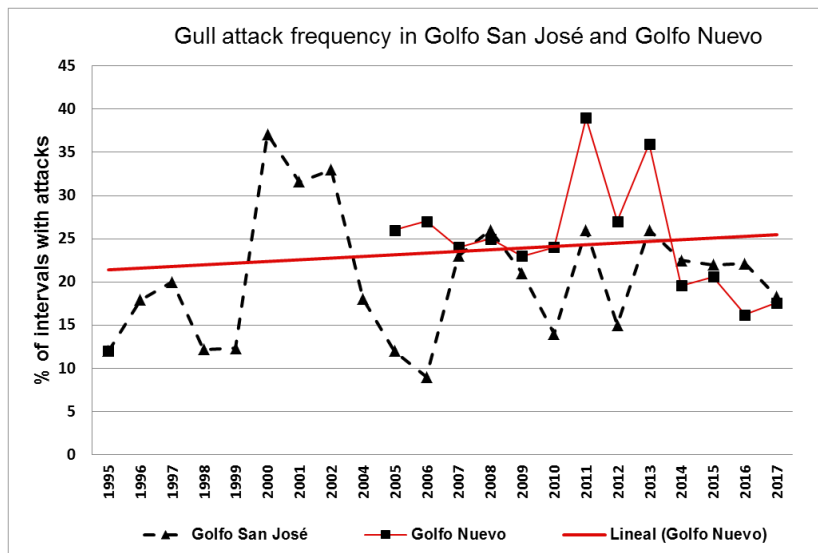
-- *ICB/OA*

-Kelp gull lesions on southern right whales at Península Valdés

Kelp gulls at Península Valdés feed on the skin and blubber of live southern right whales and cause the whales to flee the attacks or maintain body postures that keep their backs underwater. Calves have to learn this avoidance behavior. Researchers from the Instituto de Conservación de Ballenas (ICB) and the Ocean Alliance (OA) have recorded the frequency of the attacks at different sites of the Península annually since 1995 to gauge the success of government efforts to curb gull attacks by gull culling. This is the longest database in the world on this parasitic behavior (Rowntree et al., 1998; Sironi et al., 2009).

In September, we observed 135 mother/calf pairs during 1,555 5-min intervals in 25 observation days (Sironi and Rowntree 2017). We recorded 537 gull attacks, of which 79% were aimed at the calves and the remaining 21% were aimed at the mothers. The gulls attacked the whales in 18.3% of the 5-minute intervals recorded in Golfo San José and in 17.6% of the intervals recorded in Golfo Nuevo. Of 217 attacking gulls, 94% were adults and 6% were juveniles.

The following figure shows the annual frequency of gull attacks in Golfo Nuevo and Golfo San José since 1995.



A proposed hypothesis to guide the evaluation of the possible contribution of gull attacks to the ongoing calf mortality at Península Valdés states that “high levels of harassment by kelp gulls that peck on a calf’s exposed skin and then feed on the underlying blubber, cause significant physical injuries, energetically expensive avoidance behavior, and reductions in suckling time. This syndrome may result in, *inter alia*, decreased food intake, increased energy expenditure, exhaustion, catabolism, dehydration, and thermoregulatory stress, with cumulative and cascading effects that can lead to calf death” (Thomas et al., 2013). Gulls aim the vast majority of their attacks at newborn calves, which raises concerns about the impact that this parasitic behavior has on the health and welfare of this highly sensitive age class.

Monitoring and controlling the gull harassment problem has become a joint initiative with NGOs and national research centers (CENPAT-CONICET) and government officials of Chubut Province.

-Stress and conservation physiology in baleen whales: Hormone extraction method testing and optimization.

ICB researcher and Ph.D. student Alejandro Fernández Ajó has started testing the hypothesis that stress from injuries in southern right whales (predominantly due to Kelp Gull attacks) negatively affects their physiological homeostasis. Specifically, we predict that increased severity and extent of wounds will correlate significantly and positively with increased concentrations of glucocorticoids (GCs) in baleen, and that baleen GCs will be higher in calves with many wounds, lower in calves with fewer wounds, and least in calves that died due to acute trauma (e.g. ship strike). This research seeks to further develop the baleen hormone technique for assessment of the effects of stress on health and mortality of right whale calves in Península Valdés. Results may be applicable to stress associated with other types of wounds and injuries in *Eubalaena spp.* generally, such as entanglement injuries and ship strike injuries commonly suffered by the North Atlantic right whale.

ICB have determined the optimal mass to solvent ratio for immunoreactive glucocorticoid (GCs; cortisol and corticosterone) extraction from calf baleen, have verified detectability of both GCs along the full length of both species of right whale calf baleen plates, and have successfully validated two commercial enzyme immunoassays with standard parallelism and accuracy tests. We have also quantified GCs along the full length of baleen plates from 11 southern right whale calves with or without gull wounds, and with varying degrees of wound severity and additionally a North Atlantic Right Whale calf killed by ship strike.

Preliminary data indicate a likely correlation of baleen GC content with wounding severity, indicating effects of wounding on physiological stress of calves. Preliminary data also show a trend of elevated

GCs prenatally, potentially indicating physiological stress of late pregnancy in the mother (e.g. the glucocorticoids in certain regions of the calf baleen may be of maternal origin).

This research is conducted at Northern Arizona University in collaboration with Dr. Loren Buck and Dr. Kathleen Hunt. Preliminary results from this study will be presented at the IWC Scientific Committee Meeting in Bled, Slovenia in April, 2018.

-ICB researcher and CONICET post-doctoral student, Dr. Carina Marón is studying the nutritional condition of the Península Valdés southern right whales by analyzing the fatty acid profiles and lipid content of their blubber. The goal of the study is to identify indicators of nutritional stress and create guidelines that will contribute to the management of right whales. Specifically, we are: (1) documenting the lipid profiles of mothers and their calves to explore whether they are related to calf survival, and 2) comparing lipid profiles of living and dead calves to look for differences that might inform on cause of death. In 2016 and 2017, we collected 31 and 52 skin and blubber samples, respectively, totaling 83 biopsies. The 31 samples collected in 2016 were analyzed in collaboration with Dr. Carla Lábaque at the *Instituto de Ciencia y Tecnología de los Alimentos* (ICTA-CONICET) in Córdoba, Argentina, while analyses of samples collected in 2017 are pending. Preliminary analyses indicate that the nutritional condition does not significantly differ among living and dead calves, and that dead calves do not show signs of malnutrition. Preliminary results from this study will be presented at the IWC Scientific Committee Meeting in Bled, Slovenia in April, 2018.

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Carla Fiorito (GEA-CESIMAR-CONICET) participate as veterinary at the Necropsy Team of the CSN. The Necropsy Team (NT-CSN) conduct post-mortem examinations on stranded cetaceans and other marine mammals. Fiorito collects biological samples in order to determinate causes of death and infectious diseases.

-Between 2014 and 2016 whale season, several samples from living SRW were collected. Swabs of skin lesions (kelp gull injuries) were performed on living whales and cultured for bacteria and fungi isolation. Swabs were taken using an extensible pole with a sterile swab attached. The technique developed by Dra. Fiorito (GEA-CESIMAR, FCV-UBA) consisted of rubbing the swab over whale wounds while whale breathe.

Also, blows samples were taken using an extensible pole with 4 sterile petri dishes attached. Samples were cultured for bacteria and fungi isolation and used for microbiome and hormone determination.

Currently the results have been sent for publication.

During 2017 whale season, samples from 2 stranded calves were collected in Península Valdés. A total post-mortem examination was conducted and samples were collected and analyzed for infectious diseases. *Enterococcus* sp and *Streptococcus* sp were isolated from several samples. Histopathology and other analyses are undergoing.

Date	Area	Methods/effort	Parameters/ factors measured
July-Nov 2017	Golfo Nuevo	Skin samples (normal and lesions)	Study of skin lesions and microbiome.
July-Nov 2017	Golfo Nuevo	Blow samples	Microbiome and hormones determination.

References

Clark, C.W. 1982. The acoustic repertoire of the southern right whale, a quantitative analysis. *Anim. Behav.* 30:1060-71.

Di Martino, M., Rago V., Sironi M., Rowntree V. and M. Uhart. 2017. Annual Report of the Southern Right Whale Health Monitoring Program. 12 pp. Available at <http://bit.ly/InformePMSBFA2017>

Hiby, L. and Lovell, P. 2001. A note on an automated system for matching the callosity patterns on aerial photographs of southern right whales. *J. Cetacean Res. Manage.* (special issue) 2: 291-95.

McAloose D., Rago, V., Di Martino M., Chirife A., Olson S., Beltramino L., Pozzi L., Musmeci L., La Sala L., Mohamed N., Sala J., Bandieri L., Andrejuk, J., Tomaszewicz, A., Seimon T., Sironi M., Samartino L., Rowntree V., Uhart M. 2016. Post-mortem findings in southern right whales (*Eubalaena australis*) at Península Valdés, Argentina, 2003 – 2012. *Diseases of Aquatic Organisms* 119: 17-36, 2016. doi: 10.3354/dao02986

Pirzl R., Murdoch G., Lawton K. 2006. BigFish—computer assisted matching software and data management system for photo-identification. Skadia Pty Ltd. <http://www.skadia.com.au>, Australia

Rowntree, V., P. MacGuinness, K. Marshall, R. Payne, Sironi, M. and J. Seger. 1998. Increased harassment of right whales (*Eubalaena australis*) by kelp gulls (*Larus dominicanus*) at Península Valdés, Argentina. *Marine Mammal Science* 14(1):99-115 (USA).

Rowntree V.J., Uhart M.M., Sironi M., Chirife A., Di Martino M., La Sala L., Musmeci L., Mohamed N., Andrejuk J., McAloose D., Sala J.E., Carribero A., Rally H., Franco M., Adler F.R., Brownell, R.L. Jr, Seger J., Rowles. T. 2013. Unexplained recurring high mortality of southern right whale *Eubalaena australis* calves at Península Valdés, Argentina. *Mar. Ecol. Prog. Ser.* **493**: 275–289. doi:10.3354/meps10506.

Sironi, M. Rowntree, V.J., Snowdon, C.T., Valenzuela, L. and C. Marón. 2009. Kelp Gulls (*Larus dominicanus*) feeding on southern right whales (*Eubalaena australis*) at Peninsula Valdes, Argentina: updated estimates and conservation implications. Paper SC/61/BRG19 presented to the International Whaling Commission Scientific Committee, Portugal, June 2009 (unpublished). [Available from the IWC Office]. 12pp

Sironi, M. and V. J. Rowntree. 2017. Annual Report of the Right Whale Research Program at Península Valdés, Argentina (in Spanish and English). Instituto de Conservación de Ballenas / Ocean Alliance. Available from icb@icb.org.ar

Thomas, Peter; Marcela Uhart, Denise McAloose, Mariano Sironi, Victoria J. Rowntree, Robert L. Brownell Jr., Frances M.D. Gulland, Michael J. Moore, Carina Marón, Cara Wilson. 2013. Workshop on the Southern right whale die-off at Península Valdés, Argentina. SC/65/BRG15 presented to the International Whaling Commission Scientific Committee, South Korea. [Available from the IWC Office]. 5pp.

Wilson, C., Sastre, A. V., Hoffmeyer, M., Rowntree, V. J., Fire, S. E., Santinelli, N. H., Ovejero, S. D., D'Agostino, V., Marón, C. F., Doucette, G. J., Broadwater, M. H., Wang, Z., Montoya, N., Seger, J., Adler, F. R., Sironi, M. and Uhart, M. 2015. Southern right whale (*Eubalaena australis*) calf mortality at Península Valdés, Argentina: Are harmful algal blooms to blame?. *Marine Mammal Science*. doi: 10.1111/mms.12263

PUBLICATIONS

1. Published or 'In Press' papers only

--GEA --CESIMAR-CCT-CONICET-CENPAT

Argüelles, M.B., Coscarella, M., Fazio, A., Bertellotti, M. 2016. "Impact of whale-watching on the short-term behavior of Southern right whales (*Eubalaena australis*) in Patagonia, Argentina". *Tourism Management Perspectives* 18: 118–124. DOI 10.1016/j.tmp.2016.02.002.

Argüelles, M.B., Fazio, A., Fiorito, C., Pérez-Martínez, D., Coscarella, M. y Bertellotti, M. 2016. Diving behavior of Southern right whales (*Eubalaena australis*) in a maritime traffic area in Patagonia, Argentina. *Aquatic Mammals* 42(1): 104-108, DOI 10.1578/AM.42.1.2016.104.

Fiorito, C., Palacios, C., Golemba, M., Bratanich, A., Argüelles, M.B., Fazio, A., Bertellotti, M. y Lombardo, D. 2015. Identification, molecular and phylogenetic analysis of poxvirus in skin lesions of southern right whale. *Dis Aquat Org* 116: 157–163. doi: 10.3354/dao02918.

Fazio, A., Argüelles, M.B., Bertellotti, M. 2015. Change in southern right whale breathing behavior in response to gull attacks. *Mar. Biol.* 162(2):267-273. doi: 10.1007/s00227-014-2576-6.

Bertellotti, M., Pérez, D., Argüelles M.B. 2015. –“ID 17742 – Desarrollo de una plataforma de registro de datos comportamentales y fisiológicos para mamíferos marinos basado en Raspberry. Décima Primera Edición del Concurso Nacional de Innovaciones, INNOVAR 2015. Premio en la categoría Nuevas Tecnologías en Investigación Científica. Ministerio de Ciencia, Tecnología e Innovación Productiva de la Nación. Octubre 2015. Catálogo

Fiorito C., Bentancor A., Lombardo D., Bertellotti M. 2016. Erysipelothrix rhusiopathiae isolated from gull-inflicted wounds in southern right whale calves. *Diseases of Aquatic Organisms*, Vol. 121:67-73. DOI: 10.3354/dao03041

--ICB - OA

Rowntree VJ. 2018. Callosities. In *Encyclopedia of Marine Mammals, Third Edition* ed Würsig B, Thewissen JGM, Kovacs KM), pp 157-158. Academic Press/Elsevier, San Diego, CA, USA ISBN: 978-0-12-804327-1

Seeger J, Rowntree VJ. 2018. Whale lice. In *Encyclopedia of Marine Mammals, Third Edition* (ed B Würsig, JGM Thewissen, KM Kovacs), pp 1051-1054. Elsevier. ISBN: 978-0-12-804327-1

Nijs, G., Rowntree, V.J. 2017. Rare sightings of southern right whales (*Eubalaena australis*) on a feeding ground off the South Sandwich Islands, including a known individual from Peninsula Valdes, Argentina. *MMS* 33(1): 342–349 (January 2017) DOI: 10.1111/mms.12354

Eroh G.D., Clayton F.C., Florell S.R., Cassidy P.B., Chirife A., Marón C.F., Valenzuela L.O., Campbell Michael S., Seeger J., Rowntree V.J., Leachman S.A. 2017. Cellular and ultrastructural characterization of the grey-morph phenotype in southern right whales (*Eubalaena australis*). *PLoS ONE* 12(2): e0171449. doi:10.1371/journal.pone.0171449

Karenina K., Giljov A., Ingram J., Rowntree V.J., Yegor M. 2017. Lateralization of mother–infant interactions in a diverse range of mammal species. *Nature Ecology & Evolution* 1, 0030. doi:10.1038/s41559-016-0030

--FPN & WCS

Caille G., Rodríguez A. & G. Harris. 2017. Censos de ballenas francas australes en ANP “El Doradillo”, golfo Nuevo, provincia del Chubut, Argentina: Temporada 2016. *El Bohío boletín electrónico*, Vol. 7, No. 1. Cuba, ISSN 2223-8409: 21-28.

2. Unpublished literature

--BECMM-IIMYC-UNMDP-CONICET

Mandiola, M.A., G. V. Giardino, J. Bastida, S. Moron, D. Rodríguez & R. Bastida. Under review. The recovery of a giant: Southern Right Whale sightings for half a century on its coastal migratory route off Mar del Plata city (Buenos Aires, Argentina). *Mastozoología neotropical*, (75-283-1-SM)

--ICB - OA

Sironi, M. and V.J. Rowntree. 2017. Annual Report of the Right Whale Research Program at Península Valdés, Argentina (in Spanish and English). Instituto de Conservación de Ballenas and Ocean Alliance. Available from icb@icb.org.ar

Frasier, Campbell, Hernandez, Dalley, Eroh, Brown, Ford, Kraus, Chirife, DiMartino, Sironi, Valenzuela, Uhart, Rowntree, Leachman, White, Yandell, Seeger. 2017. Genomic resource for studies of right-whale population history and health. 22nd Biennial Conference on the Biology of Marine Mammals, Halifax, Canada, 22-27 October.

Kerr, Iain, Andy Rogan, John Graham, Christian Miller, Mariano Sironi, Fred Sharpe, Jorge Urbán. 2017. SnotBot: Drones for whale research. 22nd Biennial Conference on the Biology of Marine Mammals, Halifax, Canada, 22-27 October.

Rogan, Andy, Iain Kerr, John Graham, Christian Miller, Mariano Sironi, Fred Sharpe, Jorge Urbán. 2017. SnotBot: visual data streams from drones. 22nd Biennial Conference on the Biology of Marine Mammals, Halifax, Canada, 22-27 October.

Galletti Vernazzani, Barbara, Andrea Chirife, Elsa Cabrera, Mariano Sironi and Robert L. Brownell Jr. 2017. Entanglement and death of a Critically Endangered Eastern South Pacific southern right whale (*Eubalaena australis*) in Chile. Document SC/67A/HIM/14 presented to the International Whaling Commission Scientific Committee, Bled, Slovenia, May 2017. [Available from <https://iwc.int/home>]. 9pp.

--CTH

Reyes Reyes, MV, Hevia, M, Marino, A and Iñíguez Bessega, MA. Presence of Southern right whales on the Patagonian shelf off Argentina during summer from opportunistic sightings. Paper SC/67a/CMP/08 presented to the IWC Scientific Committee, May 2017

Zuazquita, E. & Belgrano, J. 2017. Ballena franca austral (*Eubalaena australis*) en Miramar, pcia. de Buenos Aires: Investigación y Conservación. Poster presentation at II Jornadas Bonaerenses sobre Conservación de Ambientes y Patrimonio Costero. 9-11th November, Villa Gesell, Buenos Aires, Argentina.

--FPN & WCS

Caille G., Harris G., Rodríguez A., Morand S. & M. Sánchez. (*In preparation*). Results of censuses of Southern Right whales (*Eubalaena australis*) off the coast of the Natural Protected Area "El Doradillo", Nuevo gulf, Chubut Province, Argentina: Seasons 2012, 2013, 2014, 2015 and 2016.