

The impact of the SAR-Cov 2 pandemic on the whale-watching activity in Puerto Pirámide (Península Valdés, Chubut, Argentina): Social and ecological aspects

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SUMMARY

Whale watching in Patagonia began in 1973, with the southern right whale (*Eubalaena australis*) as target species. The number of visitors doing this activity has increased over the years. Whale-watching pressure to meet current demands may be changing the distribution of whales in the area. The cessation of activities due to the SAR-Cov 2 pandemic could be a unique opportunity to assess the effect of the vessel-whale interaction, and to analyze the socio-economic aspects of the actors involved in this activity.

Project Description

General description:

Whale-watching is a commercial activity that has increased exponentially in recent times (Hoyt 2001; O'Connor et al. 2009). In Chubut province, Argentina, whale-watching activity started in Puerto Pirámide, a little town located inside the Península Valdés Protected Area (Rivarola et al. 2001), in 1973, with the Southern Right whale (*Eubalaena australis*, SRW) as the target species. In the beginning, very few visitors arrived to the area. This has changed, and nowadays it is one of the places chosen by national and international tourists, with more than 100,000 visitors in 2010. This annual demand makes it the main economic and social activity in Puerto Pirámide and one of the top 3 in the region (Chalcobsky et al. 2017). There are currently six companies licenced to carry out these whale-watching trips performing between 24 to 48 daily departures (Chalcobsky et al. 2017).

Southern Right whales arrive at the gulfs that surround Península Valdés between April and May of each year, remaining in the area until the end of November or the beginning of December, where part of their reproductive cycle takes place. Since the cessation of commercial SRW hunting, a series of changes in the distribution of the different social classes in the Península Valdés breeding area have been observed. These changes are related to density-dependent processes (Arias et al. 2018; Sueyro et al. 2018; Crespo et al. 2019). At the beginning of the season, whales, especially mothers with calves, are found mainly in shallow waters near the coastline (10 to 100 m from the coast and 5 m deep; Payne 1986); where they remain long periods of time on the surface (Fazio et al. 2015). With the advance of the season and the growth of the calves, the mother-calves pairs start occupying deeper waters, which are also used by solitary individuals (Fazio et al. 2015; Fernández et al. 2018, unpublished data). This dynamic in the distribution of the species is reflected in the routes taken by the whale-watching boats. At the beginning of the season the sightings take place less than 1000 m from the port, while, in the end of the season, the boats have to travel greater distances to be able to watch the whales (Fazio et al. 2015). The possibility of making a large number of sightings in a short distance from the coast is what makes visitors, both national and foreign, prefer Península Valdés. Because of this, the area has been ranked as one of the best places for whale-watching on the planet (Tagliorete et al. 2008; National Geographic, 2016).

The current global pandemic of SAR-Cov 2 has forced most countries to establish measures of social distancing and quarantine of the population, causing momentary closure of borders (international,

interprovincial and between cities) with the concomitant reduction in many economic and social activities, with tourism being one of the most affected. This drastic slowdown of anthropogenic activities has made animals never seen in cities appear in urban areas (i.e.

<http://www.rfi.fr/en/international/20200330-wild-animals-wander-through-deserted-cities-under-covid-19-lockdown-ducks-paris-puma-santiago-civet-kerala>). The decrease in marine traffic could improve the living conditions of marine mammals, allowing them to approach to areas where it was unlikely see them, as was the case of fin whales in Marseille (<https://www.conexionfrance.com/French-news/Two-huge-fin-whales-seen-off-coast-of-Marseille>).

The Chubut province is no exception. Authorities have declared the suspension of all tourist activities and the closure of all Protected Areas throughout the territory, including sightings of marine wildlife. So far, this force majeure has caused a delay in the onset of tourism activities in the region, which is expected to start in September. This delay would imply at least three months less of tourist activity compared to previous years, in which the season-opening was in mid-June. In addition to this, even during open season, the growing fear of infection could produce a significant decrease in tourist demand and a marked decrease in the income of the local population related directly or indirectly to this activity. Faced with an unprecedented scenario, it is interesting to analyze the ecological aspects of the whale population, emphasizing the possible changes in the occupation of the whale-watching area that may occur with the decrease in pressure of sighting, and also, analyze the socioeconomic aspects of the different actors involved in the tourist activity in the context of the pandemic, where demand could be much lower than in previous years.

Research goals

Evaluate the functioning of the socio-ecological system of Southern Right whales (*Eubalaena australis*) whale-watching in Puerto Pirámide (Península Valdés, Chubut, Argentina) in the period previous, during and post SAR-Cov 2 pandemic to identify, contrast and evaluate the different scenarios and/or changes that could take place due to an abrupt decrease in tourist demand.

Particular aims:

- 1- Assess possible changes in the distribution of whales in the area used for sighting where the activity has been carried out uninterruptedly for 47 years.
- 2- Evaluate the socio-economic situation of the population of Puerto Pirámide concerning the imminent decrease in tourism demand for whale-watching due to the current situation of the pandemic.

Methods:

The information required to estimate the distribution of the whales will be collected by censuses, scanning the area from an advantageous location on the ground (Lehner 1998). From the land station, individuals within a radius of approximately 8km can be observed, covering the area allowed for whale watching. The location where the sampling will be carried out is the same one used by Chalcobsky et al. (2020). This location is elevated above sea level in Punta Pirámide, 5km away from Puerto Pirámide town, and from there most of the area where the vessel-whale interaction takes place can be seen. The positions of the whales will be recorded using a total station (Pentax V-227), through which the vertical angles to the zenith, and horizontal to the magnetic north, of the position of each individual will be obtained (Chalcobsky et al. 2020). Taking into account the tidal altitude, the time of the data recording and the height of the sampling station, these angles will be converted to geographic coordinates to obtain the positions of the individuals (latitude and longitude) with Pythagoras software (Gailey 2002).

Census data will be obtained at different times of the day and between July and November of the 2020 season to contemplate the daily and seasonal variation, respectively. Sampling effort will be at least three days a week, however, fieldwork will be subject to weather conditions. The information obtained will be compared with SRW distribution data obtained during the coastal censuses flights carried out by LAMAMA for 21 years, almost uninterruptedly (Sueyro et al. 2018; Crespo et al. 2019), the data obtained by a total station during the 2017 season (Chalcobsky et al. 2020), and the information obtained from 46 tagged whales with satellite telemetry devices during 2014-2017 and 2019 (Fernández et al. unpublished data).

By conducting personal interviews aimed at residents, whaler guides (whale-watching specialized guides) and owners of whale-watching companies, data on their current socio-economic situation and the impact that the decrease in their main economic activity may cause soon will be collected. To respect the protocols recommended by health experts, and accomplish with social distancing measures, personal interviews will be conducted using digital media (e-mail, Google forms, video calling, etc.) and/or over a telephone call to decrease the chances of spread of the SAR-Cov 2 virus. The interviewee will be chosen through two techniques, randomly and through the “snowball” technique, where each interviewee is asked to provide two contact whom they consider that could participate in the study (Guber 2001). At least 10% of the population will be interviewed to consider a representative sample of the population. Before conducting the interview, the objectives of the work and how data obtained will be used will be informed. After that, the consent of the interviewees will be requested. The socioeconomic data collection will be carried out in the shortest time possible. Data will be analyzed using basic statistics. The main strengths and weaknesses of the social-ecological system will be identified, on which work could be done to avoid future socio-economic problems that could make the system unsustainable.

Significance:

Due to the global situation we are experiencing, this is a unique opportunity to study whether the presence of vessels can affect the distribution of animals. By having a scenario where sighting pressure drops to zero over an extended period within the season, we will be able to demonstrate, by comparing animal positions with previous seasons, how the interaction affects the distribution of the animals. In the case of finding differences in the distribution of individuals, these results could be made available to government authorities to assess the pressure exerted on the system by whale-watching.

Interviews with workers and other actors related to whale-watching will permit us understanding how a fortuitous case affects the dynamics of social and economic aspects in the sector. Also, they allow us assessing how residents perceive the not being able to work with whales, as always did. Moreover, identifying the main strengths and weaknesses of the social-ecological system could be used by governments to avoid future socio-economic problems that could make the system unsustainable. Besides, the results will be presented to the regional and international community.

Timeline:

This project is to be completed during 2020-2021, according to the following schedule:

- July- November 2020: Fieldwork (census, 3 times per week * 5 months)
- July-October 2020: Fieldwork (Interviews)
- December 2020-February 2021: Data analyzing
- March-June 2021: manuscript preparation (paper and report)

Budget:

Because whale season is already underway, and to avoid the loss of data, fieldwork will be covered with personal funds until the resolution of this request

Society for Marine Mammalogy (required grant):

Fuel Track: US\$ 600 (Puerto Madryn-Puerto Pirámide (100km), US\$ 120/month * 5 months)

Accommodation: US\$ 430 (Hotel Puerto Pirámide: US\$ 43/person, 2 rooms, 5 days)

Fieldwork expenses: US\$ 600 (meals: US\$ 120/month * 5 months)

Insurance: US\$ 45 (life insurance: US\$ 15/person, 3 people)

Total: US\$ 1675

Other funds available (US\$ 1 ≈ AR\$95):

Chubut province Government: US\$ 150 (entrance Peninsula Valdés protected area)

CESIMAR - CCT CONICET CENPAT: US\$ 950 (vehicle rent: US\$ 190/month * 5 months)

LAMAMA-Aerial census: US\$ 450 (Airplane rent: US\$ 225/hour * 2 hours)

Total: US\$ 1550

Legal permits:

The LAMAMA (CESIMAR-CCT CONICET CENPAT) will provide logistic support. This project has been approved by the Subsecretaría de Conservación y Áreas Protegidas from the Chubut province and I am awaiting official permit number.

Literature cited:

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Short CV

Education:

- 2017-to date. PhD student in Biological Sciences. Universidad Nacional de la Patagonia San Juan Bosco (UNPSJB), Chubut, Argentina. Project: "Use of satellite telemetry to infer the uses of space and behavioral state in the southern right whale (*Eubalaena australis*) within the North Patagonian Gulf of Argentina". Director: Dr Coscarella Mariano; Co-Director: Dr Zerbini Alexandre.
- 2017. Bachelor of Biological Science. Universidad Nacional de la Patagonia San Juan Bosco (UNPSJB), Puerto Madryn, Chubut, Argentina.

Scientific publications:

- Fernández S. J., Yorio P. y Ciancio J (2019). Diet composition of expanding breeding populations of the Magellanic Penguin. *Marine Biology Research*, 15(1), 84-96.
- Ciancio, J. E., Bartes, S., Fernández S. J., Harillo, C. y Lancelotti, J. (2020). Energy density predictors for Argentine Anchovy *Engraulis anchoita*, a key species of the Southwestern Atlantic Ocean. *Transactions of the American Fisheries Society*, 149(2), 204-212.

Conference and meetings:

- 2009. Fernández, S. J.; Crespi Abril, A. C. y Morsan, E. M. Análisis de la variación ontogenética de la forma del cuerpo de *Illex argentinus* (Cephalopoda: Ommastreohidae) mediante técnicas de morfometría geométrica. VII Jornadas Nacionales de Ciencias del Mar, Bahía Blanca, Buenos Aires, Argentina.
- 2015. Caille, G., Fernández, S., Delfino-Schenke, R. y Fernández, S. J. Promoción de buenas prácticas:

Avistaje embarcado de toninas overas desde el puerto de Rawson, provincia del Chubut, Patagonia Argentina. II Jornadas patagónicas de ciencias ambientales, III Jornadas patagónicas de biología, V Jornadas estudiantiles de ciencias biológicas, Trelew, Chubut, Argentina.

- 2017. Fernández S. J., Zerbini A. y Coscarella M. Utilización de telemetría satelital para inferir los usos del espacio y el estado comportamental en la ballena franca austral (*Eubalaena australis*) dentro del Golfo Nuevo, Chubut, Argentina. VII Jornadas de Becarios, Puerto Madryn, Chubut, Argentina.
- 2017. Bartes S., Fernández S. J., Harillo C., Ciancio J.. Densidad energética de anchoíta (*Engraulis anchoita*), especie importante en las comunidades marinas del norte y centro de Patagonia. V Congreso Nacional de Conservación de la Biodiversidad, Las Grutas, Río Negro, Argentina.
- 2018. Workshop: "Identifying key questions in future research on whale watching impact". 18va Reunión de Trabajo de Expertos en Mamíferos Acuáticos de América del Sur y 12do Congreso SOLAMAC and Universidad Peruana Cayetano Heredia, Lima, Perú.
- 2018. Workshop: "Introduction to mapping and spatial analysis in R: examples with marine mammals". 18va Reunión de Trabajo de Expertos en Mamíferos Acuáticos de América del Sur y 12do Congreso SOLAMAC and Universidad Peruana Cayetano Heredia, Lima, Perú.
- 2018. Fernández S. J., Coscarella M., Crespo E., Harris G., Méndez M., Rosebaum H., Zerbini A.. Uso diferencial del Golfo Nuevo por parte de las Ballenas Franca Austral. 18va Reunión de Trabajo de Expertos en Mamíferos Acuáticos de América del Sur y 12no Congreso SOLAMAC, Lima, Perú.
- 2019. Uhart, M. M., Crespo, E. A., Grandi, M. F., Loizaga, R., Degradi, M., García, N. A., ... & Fernández, S. Investigation of a mass stranding of 68 short-beaked common dolphins in Golfo Nuevo, Península Valdés, Argentina. Report Scientific Committee International Whaling Commission SC/68A/E/08, Nairobi, Kenia.
- 2019. Workshop (Expositor): "Telemetry data analysis". Marine Mammal Laboratory- Alaska Fisheries Science Centre- National Oceanic and Atmospheric Administration, Seattle, Estados Unidos.

Scholarship and grants:

- 2017-2022. Postgrade Scholarship. Consejo Nacional de Investigaciones Científicas y Técnicas (CCT CONICET CENPAT). Advisors: Dr. Coscarella Mariano and Dr. Zerbini Alexandre
- 2018. Secretaría de Ciencia y Técnica-UNPSJB. Ayuda Económica para Estadías Cortas. Project: "Utilización de telemetría satelital para inferir los usos del espacio y el estado comportamental en la ballena franca austral (*Eubalaena australis*) dentro de los Golfos norpatagónicos de Argentina". Grant: US\$2400.
- 2018. Cetacean Society International- Fund travel cost. Project: "Habitat use of Southern right whales (*Eubalaena australis*) at Península Valdés, Argentina". Grant: US\$1000.

Short-term stay:

- 01/2019-07/2019. Marine Mammal Laboratory- Alaska Fisheries Science Center- National Oceanic and Atmospheric Administration (MML- AFSC NOAA), Seattle, WA, USA