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# Prospective new whale watching site based on sei (*Balaenoptera borealis*) and other whale species in Punta Marqués (Chubut Province, Argentina)

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## ABSTRACT

In the past few years, different whale species have been increasingly observed in Golfo San Jorge. In Chubut province, Argentina, occurrence of these whales may attract the attention of the local community as a potential resource for tourism-related activities, since the region has a long history on whale watching targeting the southern right whale. To assess the viability of the site as a future whale watching operation site systematic visual surveys have been conducted from September 2019 to October 2021. The observations were made from the top of a 160 m high cliff to assess the seasonal occurrence and relative abundance the species, following a scan method with the aid of a spotting scope. A total of 316 scans were performed in which 764 sei whales, 46 southern right whales and 32 humpback whales were recorded. The Sighting per Unit Effort indicates that during the summer and autumn months the frequency of sightings increase. Sei whales were spotted while feeding on squat lobster, being one of the main observed behavioural states. For humpback and southern right whale, the main behavioural state recorded was socializing. Golfo San Jorge could be regarded as a previously unreported feeding summer ground for sei whales. The continuation of this study will provide a better understanding of the habitat use and the factors that influence seasonal patterns of rorquals in the area and generate baseline knowledge to contribute to the conservation and assist in developing management actions.

KEYWORDS: *Balaenoptera borealis*; SOUTH ATLANTIC; SEASONAL ABUNDANCE

## INTRODUCTION

Golfo San Jorge is an area where in recent years the number of rorquals have significantly increased (Reyes, 2006; Iñíguez et al., 2010; Páez et al., 2017; Retana & Lewis, 2017; Páez et al., 2018). Every year rorquals can be observed close to the shore, and the few data available seems to indicate that whales are more abundant during the austral summer. Little is known of the different species of rorquals in the Southwestern South Atlantic, except for the humpback whale (*Megaptera novaeangliae*). The humpback whale population of the WSA it breeds in the Brazilian coast, from Natal (41°S) to Cabo Frio (23°S), while the feeding grounds are off South Georgia and South Sandwich Islands have increased in the last decades (Bortolotto et al., 2016). Other species that has shown evidence of an expansion is the sei whale (*Balaenoptera borealis*) although no updated population estimate is available for the Southwestern Atlantic (IWC 2018).

Despite the observations of the increase in the sightings of rorquals along the Argentinian coast, no systematic surveys have been conducted to assess seasonal distribution and abundance for these species. The steady increase of rorqual sightings may in the future be regarded as a potential resource to perform whale watching activities. This is highly probably due to the long history on whale watching activities carried out in Chubut province for the last 40 years targeting southern right whales (Chalcobsky et al., 2017). For proper implementation and regulation of these activities, a better understanding of their seasonal patterns, behaviour and habitat use is needed.

## MATERIALS AND METHODS

### *Study Area*

The study was carried out in the coastal region of Punta Marqués, in the south of the province of Chubut (Figure 1).

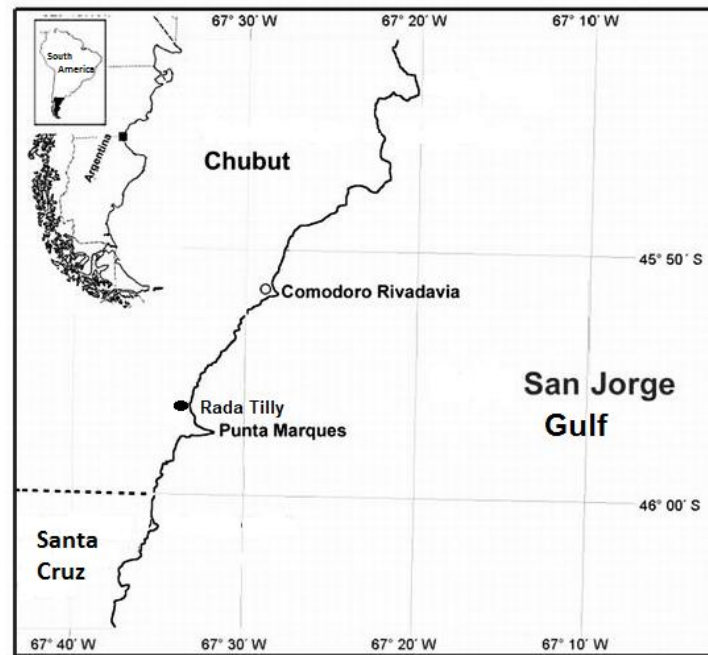


Figure 1. Punta Marqués, Chubut province.

Daily land-based observations were conducted from September 2019 to October 2021. The observations were made from the top of a 160 m high cliff that goes 2 km into the sea (45°57'32.7"S; 67°32'6.5"W). Fieldwork was conducted only when the environmental conditions (low wind intensity, sea state Beaufort  $\leq 3$ ) were appropriate for visual surveys. The area was scanned for whales using an instant group scan as described by Lehner 1998 and with the aid of a Celestron – Ultima 100–zoom 22-66x100mm. Two scans a day were performed, one during the morning and one during the afternoon. Each sighting was defined as an independent event and groups were defined as individuals swimming close to each other, within a 100 m of each other performing similar behaviour. For each group whales, swimming direction, behaviour, group size and bearing were recorded. Also, as ancillary information Beaufort state and wind direction were recorded and observations regarding the presence of whales no registered during the scan. In some scans, species determination of the rorquals was not conclusive. Nevertheless, they are likely to be sei whales, as the notes on the side of the data sheet register sei whales outside the scans. Also, as an independent way to confirm the species a UAV was flown over the closest whales and in every single case, they were sei whales. A similar situation was reported for the Malvinas/Falkland island, where all large rorquals sighted off the transect line were later identified as sei whales (Baines & Weir, 2020; Weir et al., 2021). Again, reinforcing the fact that most indetermined rorquals were sei whales the mean group size presented no significant differences between both groups (t test,  $p=0.71$ ) and hence all indetermined rorquals were assigned to sei whales.

## RESULTS AND DISCUSSION

A total of total of 316 scans were performed in which 764 were sei whales (*Balaenoptera borealis*), 32 humpback whales (*Megaptera novaeangliae*) and 46 southern right whales (*Eubalaena australis*). The number of scans performed each month is shown in Figure 2. The mean size of the group was 1.78 (SD=1.27) individuals for the sei whale with a maximum of 10 individuals in the same group: 1.1 (SD= 0.31) individuals for humpback whales with the larger group comprising only 2 individuals, and 1.84 (SD= 0.89) for southern right whales with a maximum of 4 individuals per group. Only one fin whale was spotted during the scans.

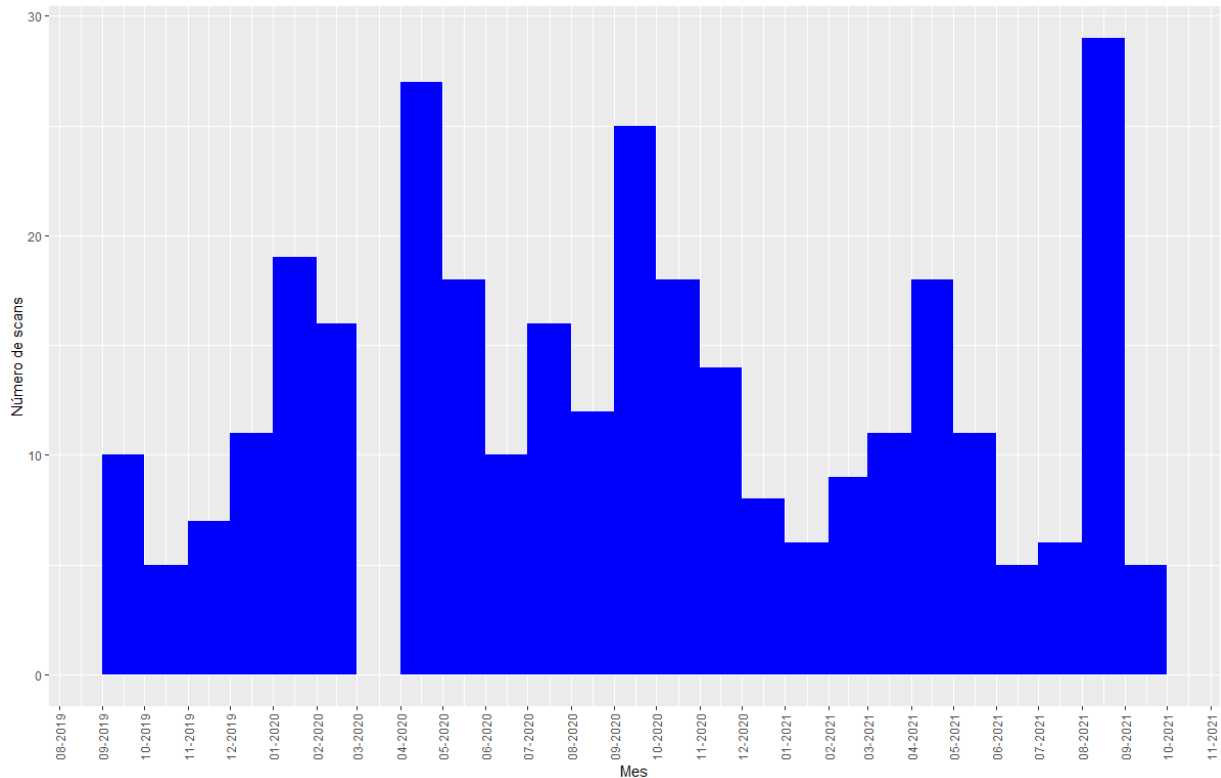


Figure 2. Number of scans (effort) by month.

Sighting per Unit Effort was calculated for each month as:

$$SPUE = \frac{N^{\circ} \text{ of animals in month}_i}{N^{\circ} \text{ of scans in month}_i}$$

Rorquals were present most of the year, except for August 2020 and 2021 (Figure 3). Southern right whales are present from August to October, when rorquals seems to be at their lowest.

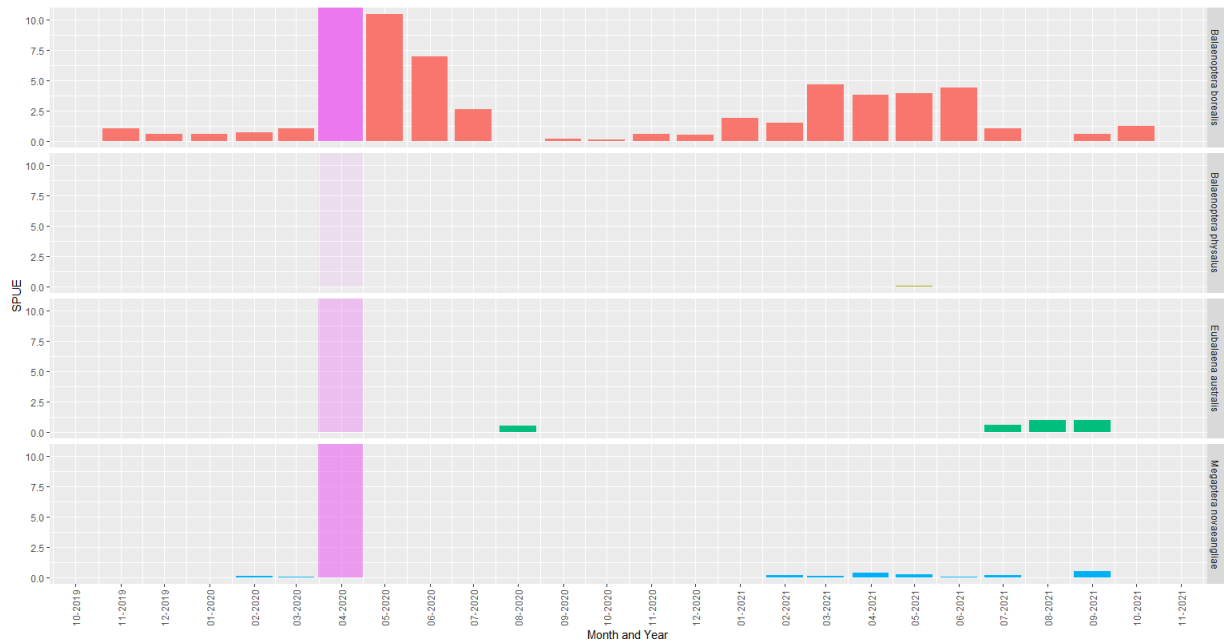


Figure 3. Sighting per Unit Effort from scans performed at Punta del Marqués, Chubut.

The SPUE increased every year in early autumn specially for the sei whales. During 2020 sampling season there is a peak of 10 sei whales/scan, which is extremely high. This probably was due to the COVID-19 lockdown since no sailing was allowed in the area. Nevertheless, between 2 to 10 sei whales are sighted on each scan, with counts as high as 54 individuals, and naked eye counts reaching up to 70. These figures are an order of magnitude higher than any other whale in the area. Humpback whales are less abundant but during 2021 they were present from February until September. There is no obvious reason why humpback whales were not detected during 2020. Most individuals seems to be juveniles, and probably are sighted during their migration from and to the southern Brazilian waters (Riera et al., 2022). In the case of the fin whales, their sightings are anecdotal, and only one opportunity they were registered during a scan, although several other individuals were spotted during biopsy sampling surveys. Southern right whales are spotted during a shorter period than the reproductive season that takes place at Península Valdés (Crespo et al., 2019), and most were mating groups.

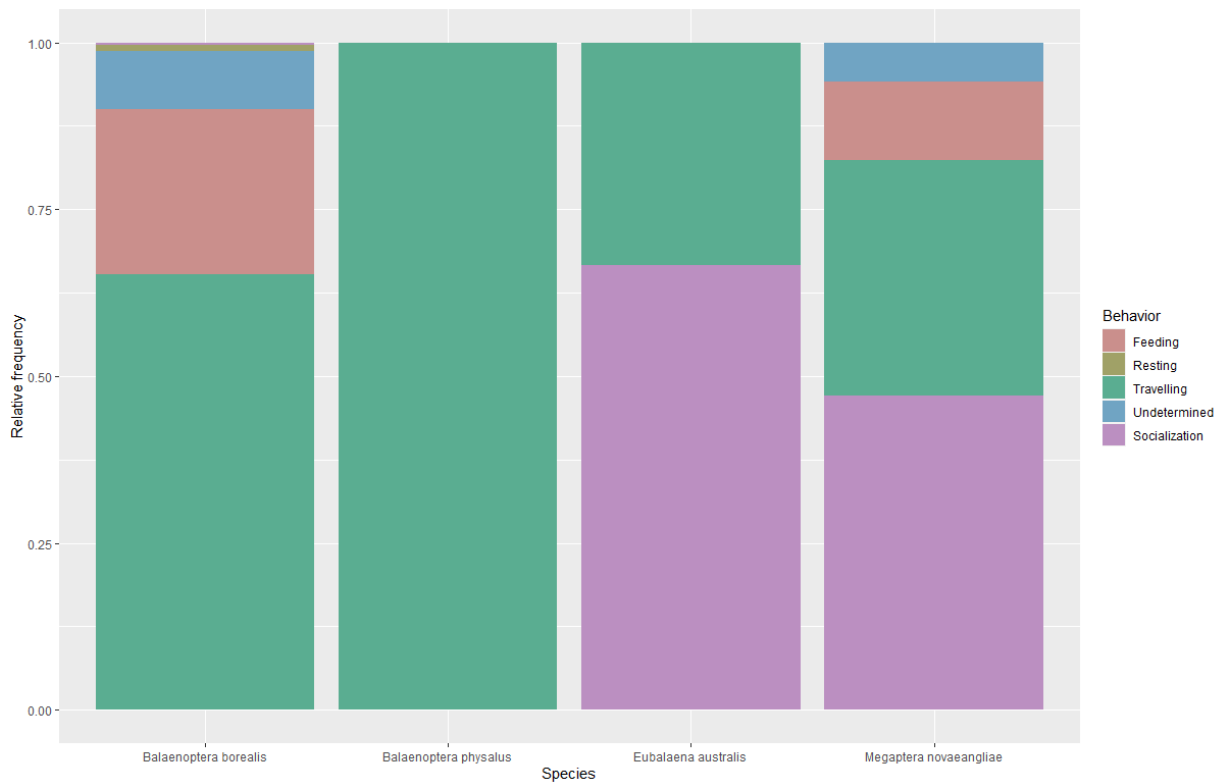


Figure 4. Behaviours by species at Punta Marqués, Chubut.

The recorded behavioural states were *Travelling* and *Feeding* for the sei whales. In the case of the sei whales this can reflect the importance of the area as a not previously reported feeding ground in this Patagonian coastal area. It is quite common to observe this species feeding on squat lobster swarms (*Munida greraria*) or (probably) copepods (Figure. 5). A similar feeding behaviour was reported recently near Malvinas/Falkland island (Baines & Weir, 2020). For humpback whales *Socialization* (Figure 4), related to surface behaviours such as tail or pectoral fin slapping, breaching and jumps. Also humpback whales were spotted feeding in the area, mainly on silversides (*Odonthestes* sp.) using a recently described technique named *Natural Barrier Feeding* (Riera et al., 2022). Southern right whales were socializing in mating groups or just travelling; no feeding events were recorded. The only fin whale spotted was travelling.

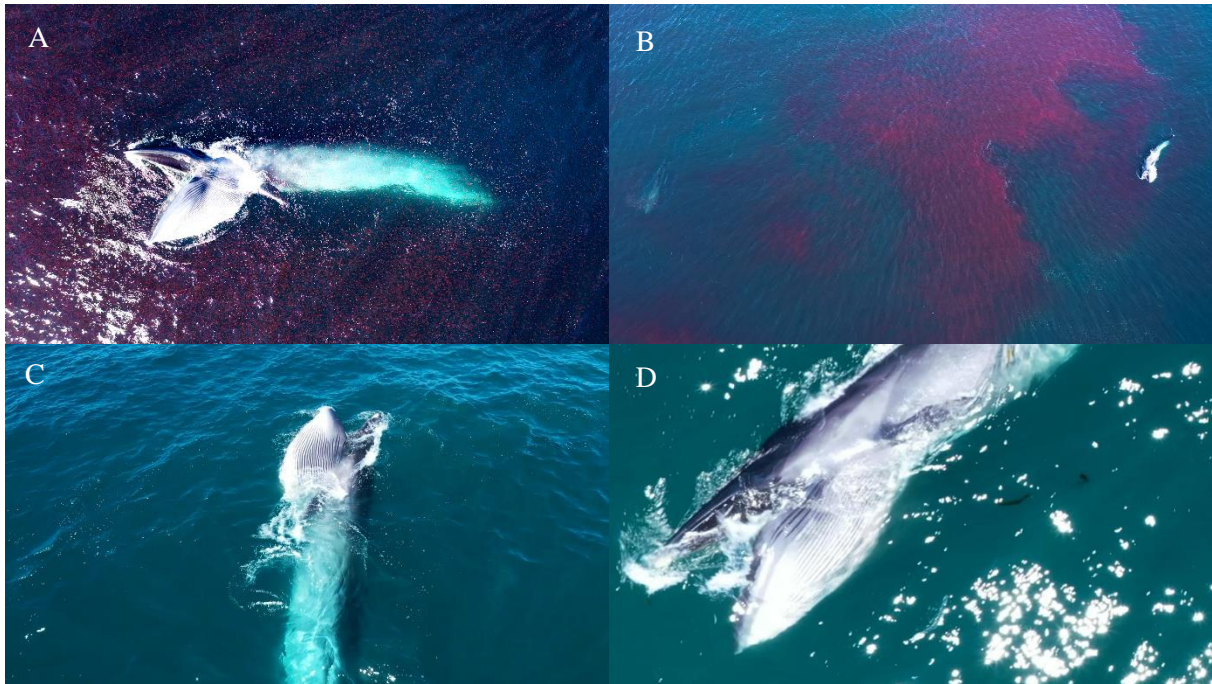


Figure 5: A-B. Sei whale feeding on squid swarms (*Munida gregaria*). C-D. Feeding on copepods.

As a result of this short first systematic study of the rorquals in Chubut Province, data suggest that the seasonality of the species in the area would have its peak during the second trimester of each year, namely April-June. Nevertheless, sei whales are sighted year-round, in lesser numbers. Although these data are preliminary this loosely coincides with the previous works in the area (Reyes, 2006; Iñíguez et al., 2010; Páez et al., 2017; Retana & Lewis, 2017; Páez et al., 2018). The information on the humpback whales is much scarce in this study but they are frequently sighted, at a very close range from the shore.

The continuation of this study is important to better understand the habitat use and the factors that influence seasonal patterns of rorquals occurrence in Golfo San Jorge. It will also provide behavioural information on the presence of this species near the coast. Such data will be important to develop the guidelines, and will aid the local authorities to implement and regulate whale watching activities in the future.

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