
Cetacean acoustics in the Golfo de Penas

Blue Marine Foundation and Patagonia Projects
Project overview - June 2020



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Cetacean acoustics in the Golfo de Penas

Headlines

- Sound travels five times faster in water than in air, making it the most effective method of communication for cetaceans.
- Patagonia projects deploys short and long-term hydrophones to monitor which species' vocalisations are present in the Golfo de Penas.
- The Patagonia Projects team were part of the first documentation of sei whale vocalisations in the south eastern Pacific.
- The frequency of sei whale vocalisations in the Golfo de Penas ranged between 35.6 – 105.6 Hz
- Pairing acoustic and behavioural data will help us to understand which cetaceans are in the Golfo de Penas and what they are using the area for.

Story

The remote location, unpredictable weather and large size of Patagonia Project's study area around the Golfo de Penas makes it difficult to study the whales and dolphins (cetaceans) that use the area. Since sound travels five times faster in water than in air, and given that both toothed whales (e.g. orcas, dolphins, sperm whales) and baleen whales (e.g. sei, blue, humpback) use sound to communicate and navigate, acoustic data is the ideal tool to help answer our questions. Given the complete lack of research on cetaceans in the Golfo de Penas region, the Patagonia Projects team is collaborating with acoustic scientists to ask which species are in the area, when they are present and whether they are feeding or just passing through. This knowledge will be invaluable in proposing appropriate protection for the area. A concurrent goal is to pair the acoustic data with behavioural observations, to investigate which vocalisations are paired with certain behaviours (see killer whale footage). OceanSonics (Halifax, Canada) have collaborated with the team to provide several cutting-edge hydrophones, where some can be left under the water for months at a time, and others are deployed in the short term and can feed real-time data back to the boat using WiFi. The scientists working on data collected on Patagonia Project expeditions- Dr Sonia Español (Fundacion Meri) and others- have been the first to characterise the sei whale calls found in this area. The next goal is understand the abundance of sei whales and other cetaceans in the Golfo de Penas over the year, to understand which species may be transient, resident, or show some site fidelity to the area- all critical information in terms of establishing marine protected areas (MPAs).

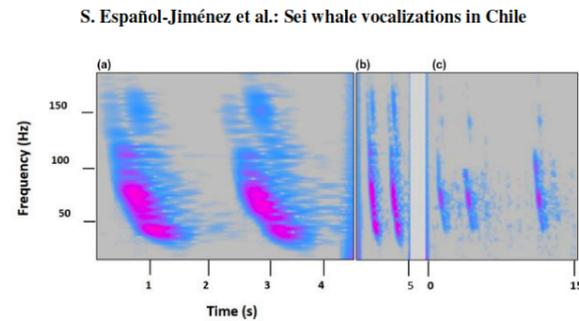


Top image: The hydrophone is deployed by the team. Credit: Keri-Lee Pashuk
 This image: A pod of killer whales. Credit: Will Darwin
 Front cover: Putting out the hydrophone. Credit: Keri Lee Pashuk

Papers

Directly from PP expeditions:

- Español-Jiménez, S., Bahamonde, P. A., Chiang, G., & Häussermann, V. (2019). Discovering sounds in Patagonia: characterizing sei whale (*Balaenoptera borealis*) downsweeps in the south-eastern Pacific Ocean. *Ocean Science*, 15(1), 75-82.



By PP scientists on the same topic:

- Español-Jiménez, S., & van der Schaar, M. (2018). First record of humpback whale songs in Southern Chile: Analysis of seasonal and diel variation. *Marine Mammal Science*, 34(3), 718-733.

Activities

- Deploy long-term (one week+) hydrophones in Golfo de Penas to collect multi-species acoustic data.
- Deploy hydrophones when cetaceans are observed on expedition, to be able to pair acoustic with behavioural data (from the boat and from drones, killer whale video).
- Analyse past acoustic data to study cetacean abundance (engage Chilean and International students).

Targets

- A near-constant hydrophone presence in the Golfo de Penas.
- Develop software to automatically detect sei whale sounds from acoustic data.
- Match cetacean sounds to observable behaviours such as socialising and feeding.

Outcomes

- Provide new information on sei whale acoustics and behaviour.
- Understand what times of year sei whales and others are in the Golfo de Penas.
- Based on this data, advocate for an MPA of the inner fjords (possibly seasonally) and higher level MPAs for the Gulf.



BLUE MARINE
FOUNDATION

3rd Floor South Building,
Somerset House, Strand, London,
WC2R 1LA

+44 0207 845 5850
info@bluemarinefoundation.com
www.bluemarinefoundation.com