



# Behavioural ecology of killer whales at Sea Lion Island, Falkland Islands



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## Introduction

Killer whales (KW) are a charismatic species with a worldwide distribution. The coast of Argentinean Patagonia is one of the KW sightings hotspots. KW are also observed in the nearby Falkland Islands, but their distribution and ecology in these islands is almost unknown. Here we present the results of a pilot study carried on KW at Sea Lion Island (SLI), from September 2013 to March 2014. Anecdotal information and a previous short term study showed that KW are present at SLI during the Austral Spring and Summer, being semi-resident. One of the reason why KW gather around this specific island, could be that it shelters the biggest breeding colony of southern elephant seals in the islands (approx 650 breeding females), a species that is often predated by KW.

## Methods

Observers (2-7) did daily surveys of the SLI coastline (6641 hours, 5542 km), focusing on the breeding areas of the main potential preys, southern elephant seals (SES) and sea lions (SSL). We also carried out observation periods of 2 hours length from vantage points, obtaining full coverage of the daylight at the main KW sighting hotspots.



Fig. 1 – Killer whale jumping.

We mapped locations of KW sightings by GPS and we took digital pictures to photo-identify the KW. We carried out counts of potential preys and necropsies of dead seals found on the beaches.

## Results

• The distribution of KW sightings showed two peaks, in November, at the end of the SES breeding when the density of weaned pups is higher, and in February, at the end of the SSL breeding when pups start moving into the water (Fig. 2).

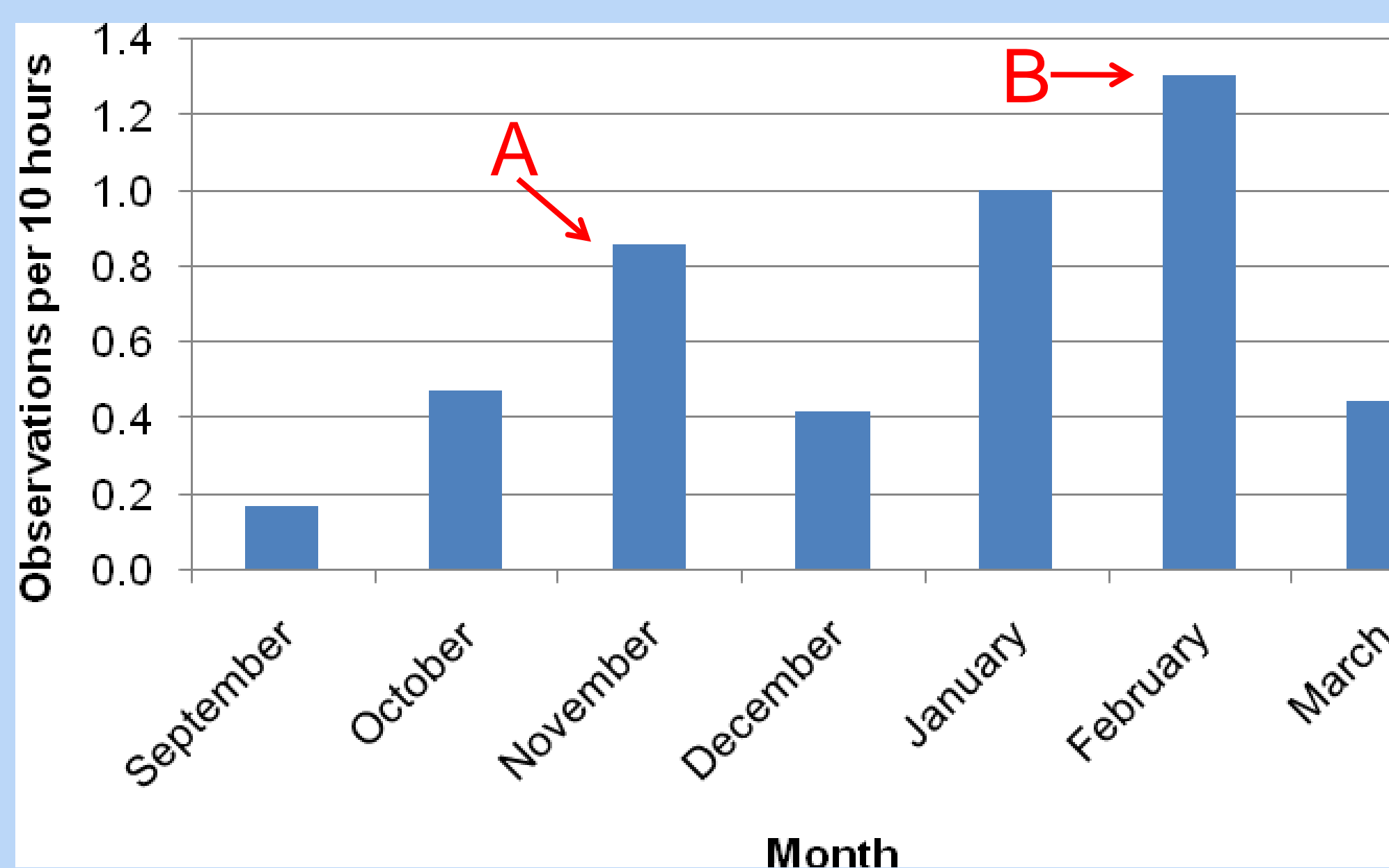


Fig. 2 – Effort-weighted number of KW observations per month. A) maximum density of SES weaned pups; B) SSL pups entering water.

• The spatial distribution of KW sightings was uneven. Observations were clumped in the area with higher SES weaned pups density during the first part of the season, and along the SSL breeding area during the second part of it.

• The mean number of KW per sighting was 3.37 (median = 3, maximum = 9), with a gradual increase from September (2.76) to February (4.06).

• On average 62.8% of the KW were adults, and the mean size class composition of sightings was 17.8% extra small, 19.3% small, 39.4% medium, and 23.5% large individuals.

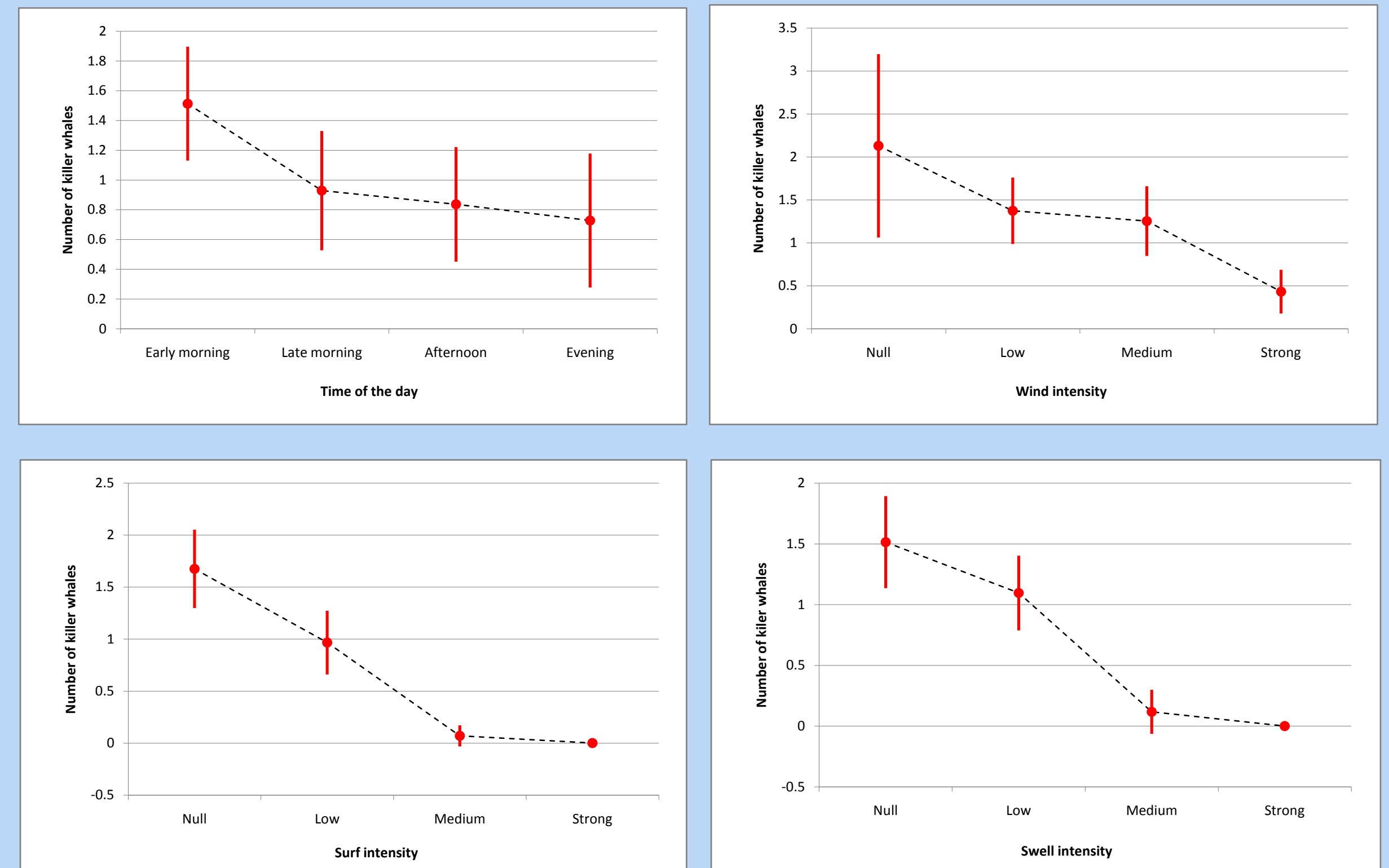


Fig. 3 – Effect of environmental condition on KW presence. Top left: time of the day, top right: wind speed, bottom left: surf height, bottom right: swell strength. Points are means and vertical lines are 95% confidence intervals.

- The number of KW was higher in the early morning, and decreased with increasing wind speed, surf height and swell strength (Fig. 3).
- We photo-identified 16 individuals, including 7 that regularly visited SLI; we also observed a possibly large number of KW that visited SLI only once, but that we were not able to identify.

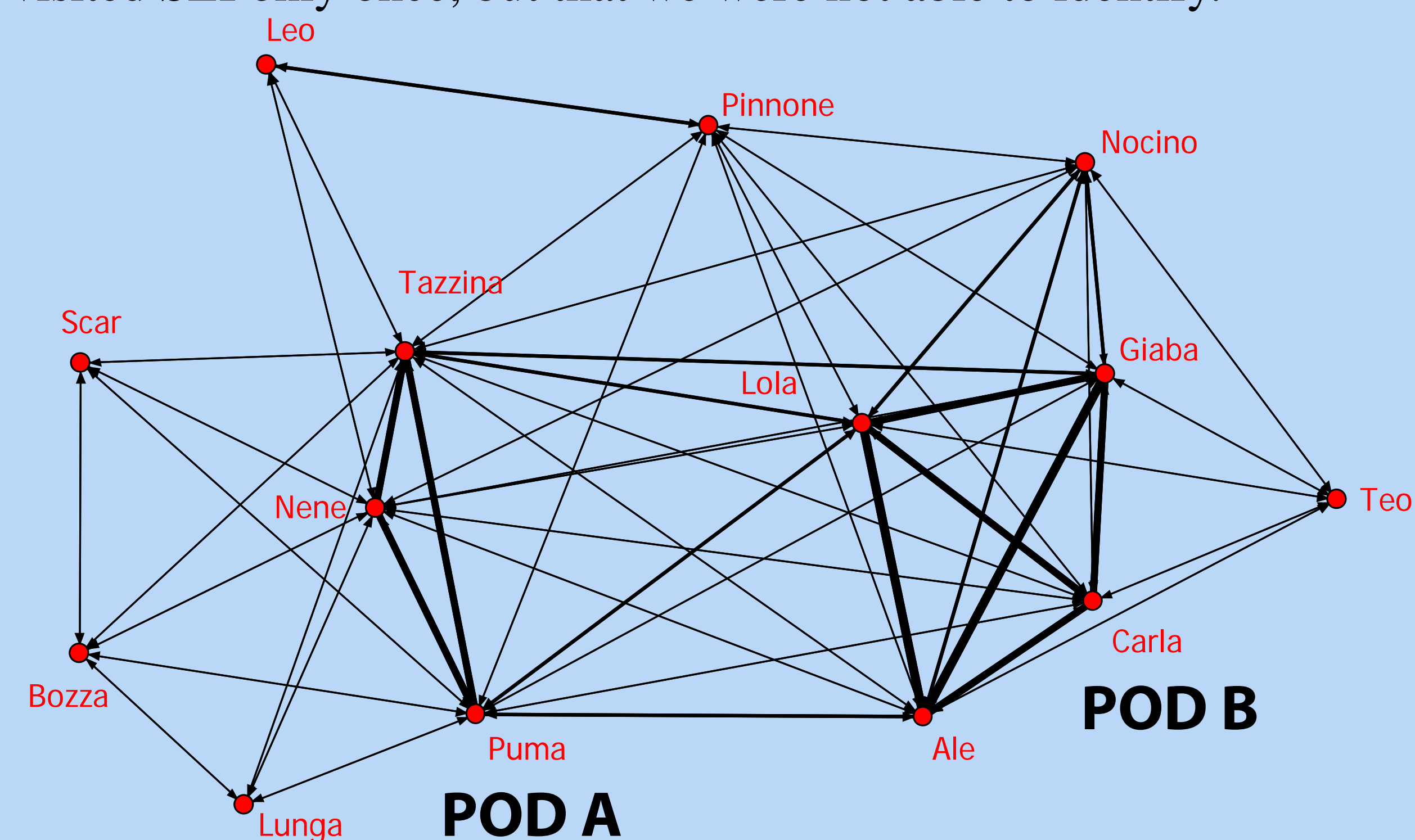


Fig. 4 – Graph of the social organization of Sea Lion Island KW. Line width = strength of association = number of sightings in which individuals were seen together.

• The basic unit of KW social organization was the mother-calf pair or trio (including previous calf); we observed two pods (= social units stable in time): pod A was mother + calf + previous calf, and pod B was two mother-pup pairs (Fig. 4).

• The two pods were often observed together during the first part of the season, even if pod A was rarely seen in the main SSL breeding and SES moulting areas during the second part of the season.

• We observed 71 possible predations: 34 surely on SES, 5 on SSL.

## Conclusions

• Temporal and spatial distribution of KW sightings at SLI is related to the presence of breeding SES and SSL, which are probably the main reason of their presence around the island.

• KW presence at SLI is deeply influenced by environmental conditions, that alter their chance to prey on SES and/or SSL.

• The social organization of KW at SLI is more complex and flexible than expected.

• The predation on SES and SSL, although the reason of KW presence at SLI, is less frequent and effective than expected, and surely does not cover their energetic requirements.