

## **Old and new bones: Assessing the historical ecology of otariids in the Southeastern coast of the South Pacific Ocean**

Ana Valenzuela Toro

PhD candidate, Ecology and Evolutionary Biology

University of California Santa Cruz

The general goal of this project is to investigate the foraging ecology of sympatric species of otariids from the southeastern coast of the South Pacific Ocean, using stable isotopes in bone collagen in historical and archaeological specimens. In specific, I attempt to examine and quantify the isotopic niches of these species, as well as their dynamic through time. Initially, the species considered for this project were the South American sea lion (*Otaria flavescens*) and the South American fur seal (*Arctocephalus australis*); however, the study was expanded to include the Juan Fernandez fur seal (*A. philippii*), which also occurs along the central and southern coast of Chile, and in the Juan Fernandez Island. This project is part of a larger research effort focused on the investigation of patterns of foraging ecology and habitat preferences of sympatric species of otariids from the Northern and Southern Hemisphere. Two visits to Chile (between September 2018 and March 2019) were performed to collect the samples required. The institutions visited were the Museo Nacional de Historia Natural de Santiago, Museo de Historia Natural de San Antonio, Museo de Historia Natural de Rio Seco, Laboratorio de Zoología de Vertebrados de la Facultad de Ciencias de la Universidad de Chile, and Facultad de Ciencias Sociales de la Universidad de Chile. For the historical component of this project, samples from specimens of South American sea lions ( $n = 37$ ), South American fur seals ( $n = 6$ ), and Juan Fernandez fur seals ( $n = 6$ ) were collected. Also, I collected samples of archaeological specimens of South American and Juan Fernandez fur seals, as well as another indeterminate otariids ( $n = 41$ ). Preliminary results show that the  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  values for South American sea lions ranged between  $-16.7$  and  $-11.4\text{‰}$ , and between  $18.2$  and  $24.2\text{‰}$ . The  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  values for Juan Fernandez fur seals ranged between  $-13.4$  and  $-14.1\text{‰}$ , and between  $21.4$  and  $23\text{‰}$ . Finally, the  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  values for South American fur seals ranged between  $-13.9$  and  $-19.6$ , and between  $17.4$  and  $19.6\text{‰}$ . The standard ellipses of South American sea lions and Juan Fernandez fur seals from Central and Northern Chile overlapped, suggesting that those species are potentially preying on shared resources. Further, the standard ellipse areas of the South American sea lions and Juan Fernandez fur seals were  $2.6\text{‰}^2$  and  $0.8\text{‰}^2$ , respectively, suggesting South American sea lions have a comparative wider isotopic niche than Juan Fernandez fur seals. These results are the first records of  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  values in bone collagen from species of otariids from Chile. The archaeological samples have not been analyzed yet because of a delay in their exportation process. Nevertheless, these materials are expected to be analyzed within the first semester of this year in a Chilean institution instead. The results of these analysis will be compared with the historical specimens to estimate potential changes in their foraging ecology and habitat preferences over time. The support provided by this award made it possible to broaden the geographic and taxonomic scope of my dissertation research, increasing its significance. I am grateful to the Society for Marine Mammalogy for the vital financial support provided. The research findings will ultimately be part of my PhD dissertation and published in a peer-reviewed journal. I expect to submit the manuscript within the second semester of this year.