

What's Bugging Otago's Sea Lions?

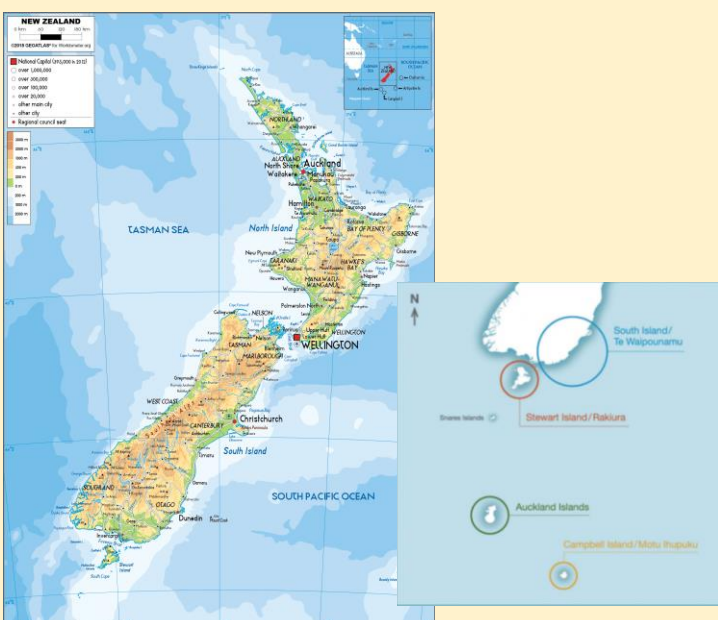
A study of parasites in a synanthropic sea lion population in New Zealand

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Map of New Zealand, with current NZSL breeding sites shown on inset (DOC 2017)

Background:

New Zealand sea lions (*Phocarctos hookeri*) once ranged around the whole of the South Island of New Zealand. By 1900 hunting had reduced their population to a small number of breeding colonies on subantarctic islands at the southernmost reaches of their habitable range. Currently, their main threats are commercial fisheries, and disease.

New Zealand sea lions returned to Stewart Island and the south-eastern coast of the South Island in the 1990s and these populations are growing. Those breeding on subantarctic islands have experienced severe respiratory disease outbreaks and have a poor pup survival rate relative to those breeding on mainland NZ (~50% and 90% respectively).

The sea lions in coastal Otago share their habitat with humans, livestock, and pets, and are vulnerable to the effects of pollution from urban and agricultural areas.

Aims:

This study aims to collect faecal samples from sea lions in the coastal Otago region and identify the parasites present, particularly those of human, livestock, or domestic pet origin. It is the first study of sea lion health using non-invasive sampling methods in sea lions on mainland New Zealand.

Hypotheses:

- There will be a difference in parasites present and their diversity between demographic groups
- NZSL sampled in the Otago region will be infected with parasites and/or pathogens of human/livestock/pet origin: this will vary with time spent in proximity to urban and agricultural land



Sea lions in Dunedin: left - disrupting a picnic (ODT 2021), right - confrontation with a dog (DOC 2020), top - sea lion group 7km from the city centre (N.Weinzweig 2021)

Study Design:

- Collect faecal samples from Dunedin, Otago Peninsula, Catlins
- Record identity and location in relation to proximity to urban or agricultural areas
- Identify parasites present
- Statistical analysis of parasite communities
- Disease risk analysis – zoonoses, threats to vulnerable subantarctic populations

Methods:

Sample collection:

- Every faecal sample connected to an individual
- Location
- Identification (tag, microchip, scars etc.)
- Life stage (pup, juvenile, subadult, adult)
- Other significant details

Parasite Identification:

- Coproscopic analysis:
 - Faecal smears - protozoa, acid-fast bacteria
 - Faecal flotation - oocysts of protozoa, helminths, trematodes
 - Baermann's technique - lungworm larvae
- Coproantigen ELISA for Giardia
- Molecular methods of parasite identification by RNA sequencing and analysis



Images:

- a) female suckling 3 month old pup
- b) adult male in poor body condition, showing scarring from recent breeding season
- c) young female with her faecal sample
- d) Coccidial oocyst detected on examination of a faecal smear

Photographs by N. Weinzweig 2022

Expected outcomes:

- Provide baseline information on the parasites and pathogens present in the sea lions of coastal Otago
- Analyse the disease risk posed to vulnerable subantarctic populations by migrating males
- Promote the use of a One Health approach to environmental protection, conservation, and public health in the region as the sea lion population continues to grow.

