
A. Title of Research Project

Southern Ocean connections: a metacommunity approach to understanding changes in the marine predator guild

B. Details of Proposed Activity

Take Hold X Import X Export

Please note: This application is not for the research activity itself... it is only for the import/export of Weddell seal biological samples into New Zealand, some of which will be exported to the USA and to South Korea for analysis.

C. Applicants/Key Researchers

List the names and institutional affiliations of all the key individuals involved with the research. List any convictions or offences, of any of the applicants or key researchers, against the MMPA 1978 or any other Act involving the mistreatment of animals.

No one on the team has any convictions or offences against the MMPA 1978 or any other Act involving the mistreatment of animals. Lead investigators responsible for sedation of the seals will be Professor Dan Costa, Dr. Rachel Holser, Associate Professor Gitte McDonald, Dr. Luis Huckstadt, Dr. Michelle Shero, Dr Kim Goetz, and/or Dr. Clive McMahon, all of whom are world-renowned experts in animal tracking with dozens to hundreds of animal sedations and deployments to each of their names.

Herein are the intended/possible team members and their primary roles on the project:

Key: PI = principal investigator; FP = flipper tagging; ST = satellite tagging; DR = drugging; AW = animal welfare; GH = general handling; SG = sample gathering; ALL = all roles mentioned except PI

Associate Professor Michelle LaRue, University of Canterbury, NZ – PI, FP, ST, GH, SG
Dr. Rachel Holser, University of California Santa Cruz, USA – ALL
Professor Dan Costa, University of California Santa Cruz, USA – ALL
Dr Grant Ballard, Point Blue Conservation Science, USA – GH, SG
Dr Annie Schmidt, Point Blue Conservation Science, USA – GH, SG
Dr Leo Salas, Point Blue Conservation Science, USA – GH, SG
Associate Professor Birgitte McDonald, Moss Landing Marine Laboratory, USA – ALL
Dr Michelle Shero, Woods Hole Oceanographic Institute, USA – ALL
Dr Luis Huckstadt, Exeter University, UK – ALL
Dr Kim Goetz, National Oceanic and Atmospheric Administration, USA – ALL
Dr Jane Younger, University of Tasmania, Australia – GH, SG
Dr Clive McMahon, University of Tasmania, Australia – ALL
Dr Sarah Michael, Department of Natural Resources and Environment, Tasmania, Australia (marine mammal vet) – DR, AW
Dr Baukje Lenting, Ministry of Primary Industries, NZ (veterinarian) – DR, AW
Dr David Thompson, NIWA, NZ – SG, GH, ST, FP
Dr Rachel Hickcox, Proteus, NZ – FP, ST, GH, SG
Dr Sara Labrousse, Sorbonne University, France – ALL
Dr Jay Rotella, Montana State University, USA – FP, SG, GH
Ms. Parker Levinson, Montana State University, USA – FP, SG, GH
Dr Mia Wege, University of Canterbury, NZ – FP, ST, SG, GH
Dr Sarah Flanagan, University of Canterbury, NZ – FP, SG, ST, GH
Professor Elissa Cameron, University of Canterbury, NZ – FP, SG, GH, ST
Ms Emilija Reuter, University of Canterbury, NZ – FP, SG, GH, ST
Ms Alexandra Strang, University of Canterbury, NZ – FP, SG, GH, ST
Ms Rose Foster-Dyer, University of Canterbury, NZ – FP, SG, GH, ST
Ms Alexa Hasselman, University of Canterbury, NZ – FP, SG, GH, ST

Ms Georgia Gwatkin, University of Canterbury, NZ– FP, SG, GH, ST
Ms Shanae Kirk, University of Canterbury, NZ– FP, SG, GH, ST
Mr Arek Aspinwall, University of Canterbury, NZ– FP, SG, GH, ST
Mr Thomas Hildebrand, Ngāi Tahu Seafoods, NZ– FP, SG, GH, ST
Professor Rochelle Constantine, University of Auckland, NZ– FP, SG, GH, ST
Associate Professor Emma Carroll, University of Auckland, NZ– FP, SG, GH, ST
Ms Daphne Shen, University of California Santa Cruz, USA – ALL
Dr Arina Favilla, University of California Santa Cruz, USA – ALL
Dr Logan Pallin, University of California Santa Cruz, USA – ALL
Dr Megan Moriarty, University of California Santa Cruz, USA (marine mammal vet); DR, AW
Dr Emily Whitmer, University of California Santa Cruz, USA (marine mammal vet); DR, AW
Dr Jeong-Hoon Kim, Korean Polar Research Institute, South Korea
Dr Jong-U Kim, Korean Polar Research Institute, South Korea

D. Description of Proposed Research

- Abstract

Provide an abstract of the proposed research project, emphasising the research objectives and the manner in which such activity involves the taking, import or export of marine mammals.

A “living laboratory”, the Southern Ocean is an ideal system to test new models in community ecology.

This application is in regard to Weddell seal research, understanding their diet, genetics, population health, and movement over a three-year period.

- Duration of Proposed Research

Provide a detailed description of the overall duration of the proposed research.

The duration of the project will be from October 1, 2024 through April 30, 2027 and will consist of three field seasons to study the movements of the seals.

*We note that this application is time-constrained, as we cannot amend or extend the Antarctic field season due to availability of transport both to Scott Base and then out to the field site.

- Location of Proposed Research

Provide a detailed description of the overall location of the proposed research. Supply a map detailing the location if appropriate.

The research of Weddell Seals will take place on Ross Island in the southern part of the Ross Sea, Antarctica, in and around Scott Base (e.g., Pram Point, Erebus Bay) and in and around Cape Crozier. The biological samples (blood, whiskers, fur, skin punches, feces, urine, milk) that are collected in the Ross Dependency will return with the research team to New Zealand. All sample types will remain at the University of Canterbury and some blood will be exported to the United States (University of California Santa Cruz) for analysis. Some fecal material will be exported to the Korean Polar Research Institute in South Korea.

- Species Name and Status

Provide a list of all the species (common and scientific names) involved in the research activities. Describe the status and factors that affect the species i.e., incidental bycatch, pollution etc.

Weddell seals (*Leptonychotes weddellii*) are considered a species of Least Concern according to the International Union on the Conservation of Nature (IUCN) Red List due to its circum-Antarctic

distribution, population size (>200,000 individuals) and few threats. In New Zealand, Weddell seals are listed as non-resident Native/Migrant as 'secure overseas'.

- Sample Size

Provide sample size for each species, method of sampling and location.

The project proposed to use long-term tags for Weddell seals for up to 20 deployments per year for three years (minimum is 10 per year). This sample size will allow for inter- and intra-seasonal analysis. Blood, fur, skin punches, urine and feces, and whisker samples will be collected on all seals, inclusive of animals that do not require satellite tracking deployments. We will target adult animals for this project and milk may be collected from reproductive females.

We will therefore be transporting a maximum of 30 sample types per year. We intend to collect a maximum of seven sample types per animal (blood, fur, whiskers, skin punch, feces, urine, milk) per year, bringing the total number of physical biological samples obtained from Weddell seals per year to 210 samples.

- Proposed Methodology

Provide a detailed description of the methodology proposed ie aerial/boat/drone surveys, photo-identification, biopsy sampling, etc. Include a brief description of any statistical modelling used to justify sample size. Clearly indicate the actual or estimated age (i.e., neonate, pup/calf, juvenile, adult), size, sex and reproductive condition of the animals at the time of taking.

Our research work in the Ross Dependency has all relevant Marine Mammal Permitting required from the United States (Antarctic Conservation Act permit, National Marine Fisheries Service permit. This project has Animal Ethics Approval from (University of California Santa Cruz) as of (14 September 2021).

The samples will be shipped at -20°C, to prevent heat-based degradation before analysis. Analysis of these samples will occur within 6 months of collecting them.

- Justification of Proposed Research

Describe why this work is necessary, clarify if it has been done before and if so why it needs to be repeated. It is especially important to identify and justify all procedures, which have the potential to cause pain or distress to the animal(s), and details of the steps to be taken to avoid or minimise the pain or distress.

These samples will enable the research that forms part of a Rutherford Discovery Fellowship.

Essentially, we wish to determine movement and foraging behavior for seals and penguins when they are collocated at Cape Crozier in springtime. With respect to seals in particular, we wish to determine their fine-scale foraging behavior in relation to their demography, and we wish to determine what the seals are eating (e.g., during a time when they may be competing with emperor penguins and Adelie penguins). We also wish to have a comparison where no potential competition is taking place, and hence the reason for data collection near Scott Base.

- Risk Mitigation

Outline what steps you will take to limit or mitigate any potential adverse impacts the proposed research may have. Impacts include any aspect that may affect the health and safety to the animal, or to members of the public; adverse effects on public relations, or any loss or destruction of cultural or historic resources.

As stated above, our research work in the Ross Dependency has all relevant Marine Mammal Permitting required from the United States. This project has Animal Ethics Approval.

I have discussed our teams' work with the DOC Marine Species team, who highlighted no concerns with our team's proposed work or our planned storage of samples.

E. Other

Is there any further information you wish to supply in support of your application?

No further information.

F. Consultation Undertaken

Some applications require consultation with whānau/hapū/iwi (local Māori), and other interested parties. Please contact the nearest Department of Conservation office to discuss what is required. Written expert views, advice or opinions concerning your proposal may also be attached to support the application. Attach any proof of consultation to the application.

In order to assist consultation please discuss how you believe the research may have an impact on cultural values and measures you will take to mitigate their effects. An example is discussing the research with local Maori.

Seals are taonga species and we expect that this project is of interest to iwi, who have been consulted with independently (specifically, Ngāi Tahu), see previous letter of support from the Ngāi Tahu Research Centre at University of Canterbury.