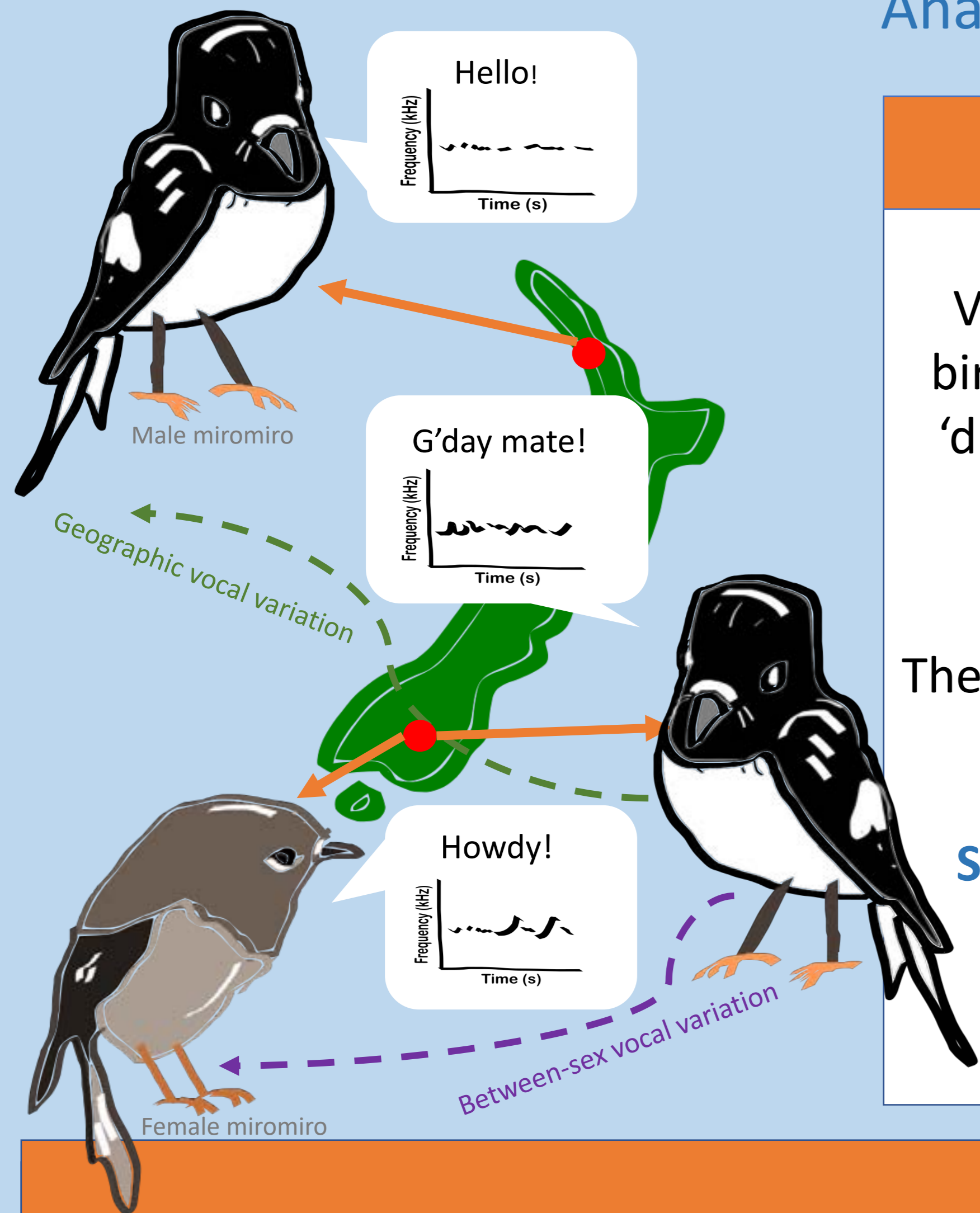


# Vocal Variation in Miromiro: *does it exist and what can it tell us?*

Ana Menzies, Kristal Cain



SCIENCE  
SCHOOL OF BIOLOGICAL SCIENCES



## Background

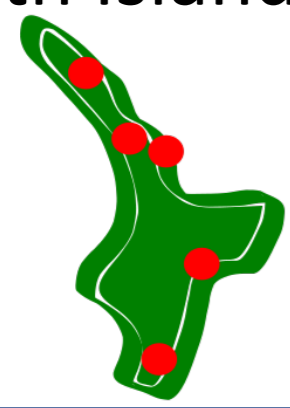
Vocalisations (songs and calls) are a **key form of communication** for birds. Bird vocalisations **can vary** within a species **geographically** (bird 'dialects'), and **between sexes**<sup>1,2</sup> by frequency, duration, composition and complexity<sup>3,4</sup>.

There is a **historic study bias** towards **Northern Hemisphere, male song**.

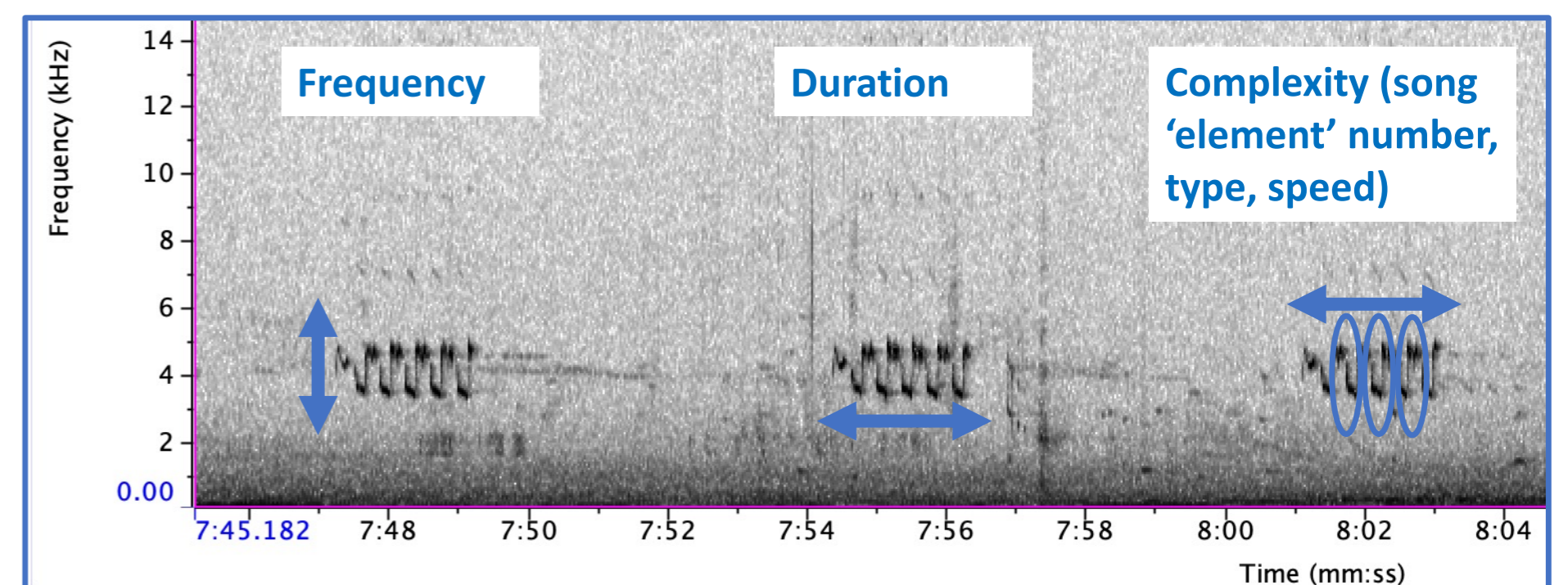
**Study Aim:** Investigate geographic and between-sex vocal variation in a native New Zealand bird, the miromiro/tomtit (*Petroica macrocephala*)

## Methods

- Collect vocalisations from**
  - Public bird song archives (North and South Island miromiro)
  - 5 North Island field sites

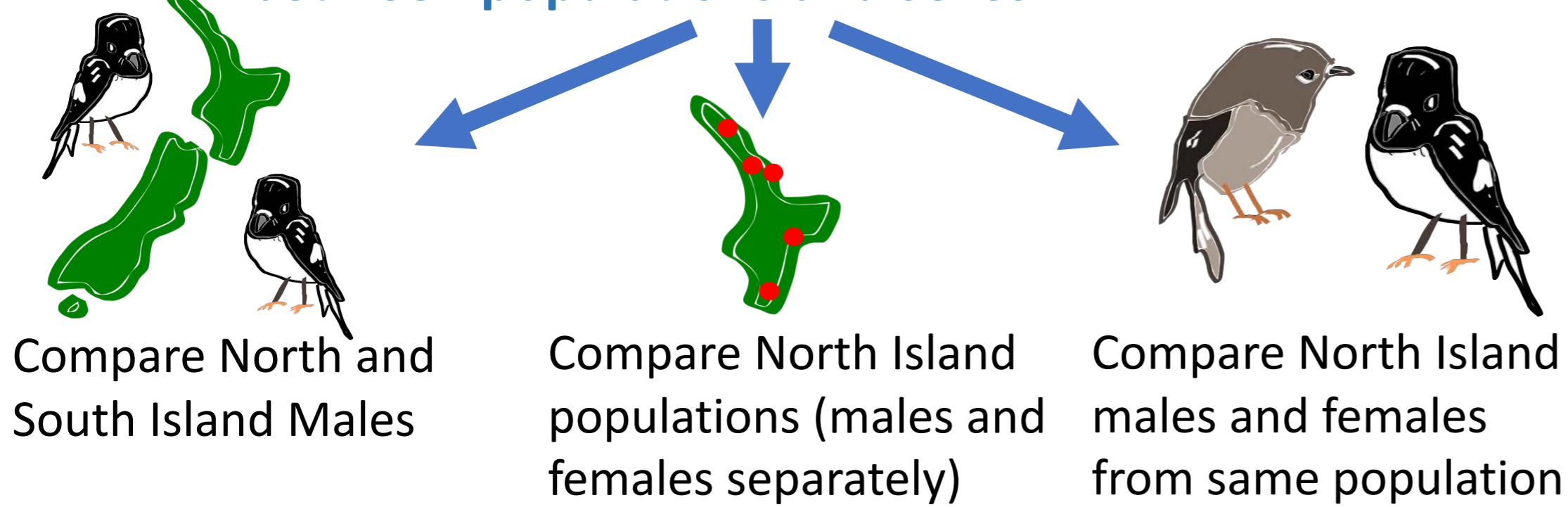


- Extract bioacoustic data from vocalisations**



Spectrogram of male miromiro song from Moturua Island, Bay of Islands, with annotation showing how bioacoustics variables are measured. Created using Raven

- Use bioacoustic data to compare vocalisations between populations and sexes**



## What Can Vocal Variation Tell Us?

Gene Flow and Dispersal Patterns

Sex-differences in vocalisation learning mechanisms and functions

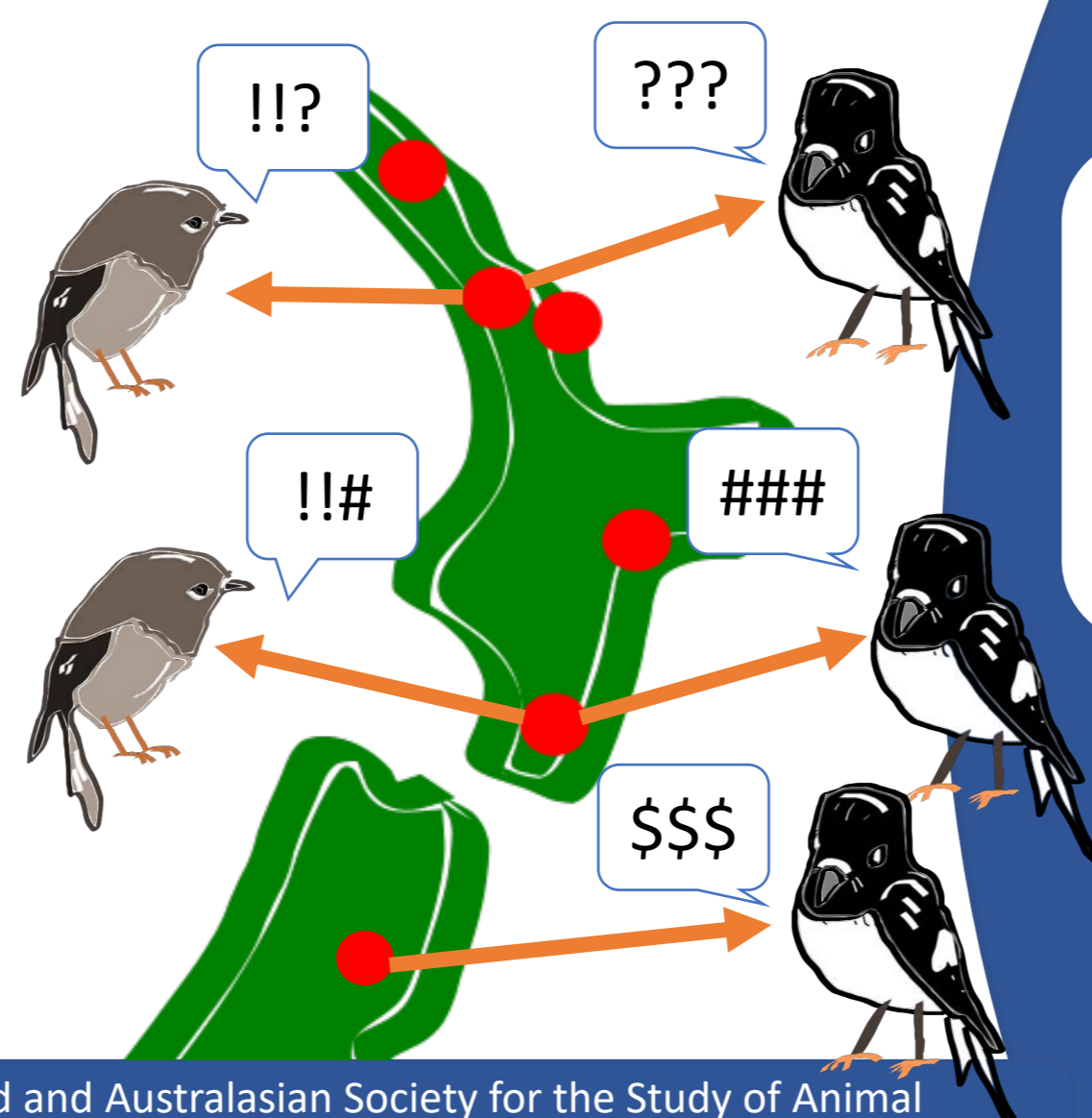
Female Vocalisation function and evolution

Useful for Bioacoustic Wildlife Monitoring

Informs Cultural Conservation of animal cultural diversity

## We Expect to Find...

- Dialects between and within miromiro subspecies
- More geographically separated populations will have greater dialect differences
- Between-sex vocal differences
- Dialect differences will be greater between males than females (indicating female-biased dispersal)



This Project is funded by the Birds New Zealand Research Fund and Australasian Society for the Study of Animal Behaviour Student Research Grant

- References
- Podols, J., & Warren, P. S. (2007). The evolution of geographic variation in birdsong. *Advances in the Study of Behavior*, 37, 403-458.
  - Riebel, K., Odom, K. J., Langmore, N. E., & Hall, M. L. (2019). New insights from female bird song: Towards an integrated approach to studying male and female communication roles. *Biology Letters* (2005), 15(4), 20190059.
  - Heaphy, K., & Cain, K. (2021). Song variation between sexes and among subspecies of new Zealand fantail (*Rhipidura fuliginosa*). *Emu*, 121(3), 198-210.
  - Sawant, S., Arvind, C., Joshi, V., & Robin, V. V. (2022). Spectrogram cross-correlation can be used to measure the complexity of bird vocalizations. *Methods in Ecology and Evolution*, 13(2), 459-472.

amen879@aucklanduni.ac.nz