

**Are Sooty shearwaters undertaking a range retraction within New Zealand?**  
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The overall goal of this work is to improve the conservation of seabirds in New Zealand. As the seabird capital of the world, New Zealand is uniquely placed to begin documenting the effects of climate change on seabirds and develop effective responses. A common response by seabirds to a warming climate are range retractions to more amenable conditions.

To investigate this, I wish to undertake a pilot study comparing physiological stress of sooty shearwater (*Puffinus griseus*) adults and chicks from northern, central, and southern New Zealand. Even with predator control, bird survey data shows sooty shearwater numbers to be in decline at the northern boundaries of their distribution suggesting a range retraction to the south. This species is highly sensitive to temperature increases and anecdotal evidence suggests that warming seas throughout the waters of New Zealand (and beyond) may be driving this observed pattern of decline locally.

The proposed study has two aims:

- 1) *Compare foraging and stress levels of sooty shearwaters across their range.* It is hypothesised that northern adults/chicks may exhibit differences in prey trophic level and higher stress hormone titre in their blood and feathers compared to their southern counterparts.

*Conservation goal:* identify colonies where birds (particularly chicks) are exhibiting greater stress. Such baseline data can then be used to inform management responses.

- 2) *Compare stress levels of sooty shearwaters with sympatric flesh-footed shearwaters, a warm water species, breeding at the same site.* We hypothesise that the flesh-footed shearwaters co-occurring at northern colonies are less stressed than sooty

shearwaters and are better adapted to cope with warmer water conditions. Moreover, we expect this may explain why flesh-footed shearwater numbers are increasing in the north, as sooty shearwaters pull back to the southern edges of their range.

*Conservation goal:* identify if flesh-footed shearwaters exhibit less chick and adult baseline stress levels, potentially explaining their increasing population sizes in northern colonies.