



**Date:** 24 June 2024

**To:** Paul Jansen

**CC:** Bruce McKinlay,

**From:** Mike Ogle, Technical adviser, Marine Species Team

**Subject:** Seal records from New Zealand and Antarctica in relation to HPAI

## Purpose

This file note is in response to your question “How often do Antarctic seals/leopard seals end up in NZ waters and when do they usually arrive”. This in relation to the potential for seals from Antarctica being a vector for highly pathogenic avian influenza (HPAI) from Antarctica to New Zealand.

## Summary

The species with the greatest number of records in New Zealand (and also recorded in Antarctica) are leopard seals and elephant seals. Leopard seals are known to eat a wide range of prey (other seals, birds etc.). Elephant seal diet is less well known, but main prey is squid and fish. Given this, leopard seals could be the most likely seal vector for HPAI from Antarctica to New Zealand. This conclusion is from distribution of records and diet, it does not consider other important behavioural factors (e.g. frequency of coexisting near other seal species at haul outs). I recommend input from species specific seal researchers if you wish to consider other behavioural factors. A summary of records is given in Table 1 below.

**Table 1: Occurrence in Antarctica and New Zealand mainland (i.e. Northern, Central and Southern Zones)**

Species	Records in...			Comment
	Antarctic	NZ	Both	
Antarctic fur seal	N	Y	N	Only one record, which was reported from the Central Zone. Abundant seal with main distribution south of Atlantic and Indian oceans, eastern extent of distribution reaches Macquarie Island.
crabeater seal	Y	Y	Y	Only 20 records from NZ mainland (Central & Southern Zones), all late summer to winter. No records from Subantarctic Islands or Chatham Zones.
leopard seal	Y	Y	Y	Over 200 records on NZ mainland, throughout the year, peak late winter and spring. Mostly inhabit Antarctic pack ice.
New Zealand fur seal	N	Y	N	Common around New Zealand and offshore islands, not recorded from Antarctic Zone.
New Zealand sea lion	N	Y	N	Most records around Auckland and Campbell Island and Southern Zone. Few records from Central and Northern Zone. No records from Chathams or Antarctica.
ross seal	Y	N	N	Records limited to within a few hundred kilometres of Antarctic coastline.
southern elephant seal	Y	Y	Y	Over 200 records from NZ mainland, throughout the year, summer peak. Breed on Subantarctic islands, but travel to NZ and Antarctica.
subantarctic fur	N	Y	N	Only 14 records from NZ mainland, no records from Antarctic Zone.
Weddel seal	Y	Y	Y	Only 12 records from NZ mainland and none from Subantarctic Islands Zone. Mostly restricted to Antarctica.

## Method

Seal records (species, date, latitude & longitude etc.) were extracted for nine seal species from two sources:

- (1) NZ Marine mammal Database (NZMMDB) which includes incidents and sightings (114 seal records).
- (2) Global Biodiversity Information Facility ([GBIF](#) 2024) which includes observations and satellite tracking records. Records were extracted from the area shown in Figure 1 (46,362 seal records), using package `rgbif` (Chamberlain et al 2024) in R (R Core Team 2022).

Records are mapped and figures 2 to 7 by 'Zone'; with timing by month in a side panel. Zone extents were based on your email comments but can be altered or new ones added if needed. The Kermadecs were included in data extraction, but no seal records were found to be there and so no Zone specific map or graph was made. Many of the elephant seal and Weddel seal records from the GBIF are machine generated tracking records. While these records do dominate some maps (and are indicated by their 'trail' placement) they provide useful information on distribution and timing, so were seen as essential to retain.

The key caveat to keep in mind is that many of these records are casual observation records, i.e. they are biased to where people go and choose to report them. Areas where people do not go or do not choose to report absences are not included.

## Results

A summary of results is in **Table 1** and discussed above. Figures 2 to 7 show, for each Zone, maps of locations and graphs of timing by month (separate for each species). Maps and graphs are based on records specific to that Zone (i.e. if a species is not found in a Zone, no map or graph is provided in that figure).

The elephant seal and Weddel seal records are heavily biased by a large number of remote device tracking records. As such timing graphs should be interpreted with caution. There is little impact on the Weddel seal timing graph, because this species is largely confined to the Antarctica Zone and tracking effort spread over all twelve months. Elephant seals occur mostly in the Antarctica Zone and Subantarctic Islands Zone, and, are present in these Zones at more or less similar numbers throughout the year. A trail of elephant seal records is present in the south east of maps for Chatham Zone and Southern Zone. Removing the tracking records, and using just human observation records, shows there is a strong summer peak in these two Zones.

### Mike Ogle

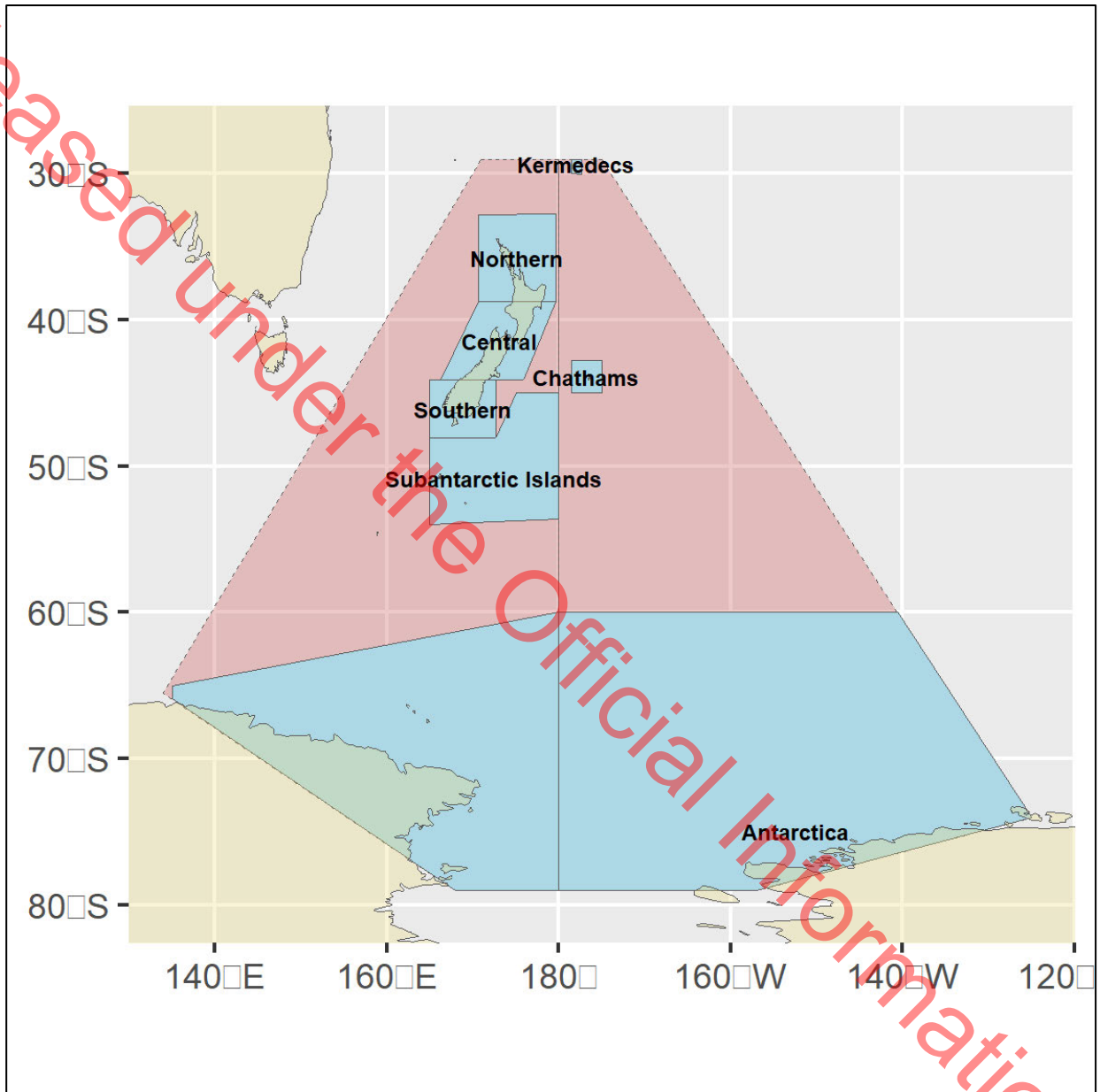
Technical adviser marine | Kaitiaki, Kanorau Koiora  
Marine Species Team

## References

- Chamberlain S, Barve V, Mcglinn D, Oldoni D, Desmet P, Geffert L, Ram K (2024). `_rgbif`: Interface to the Global Biodiversity Information Facility API. R package version 3.8.0, <<https://CRAN.R-project.org/package=rgbif>>.
- R Core Team (2022). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>.
- GBIF (2024) GBIF Occurrence Download 14 June 2024, accessed from R via `rgbif` (<https://github.com/ropensci/rgbif>)<https://doi.org/10.15468/dl.7sd8n4>

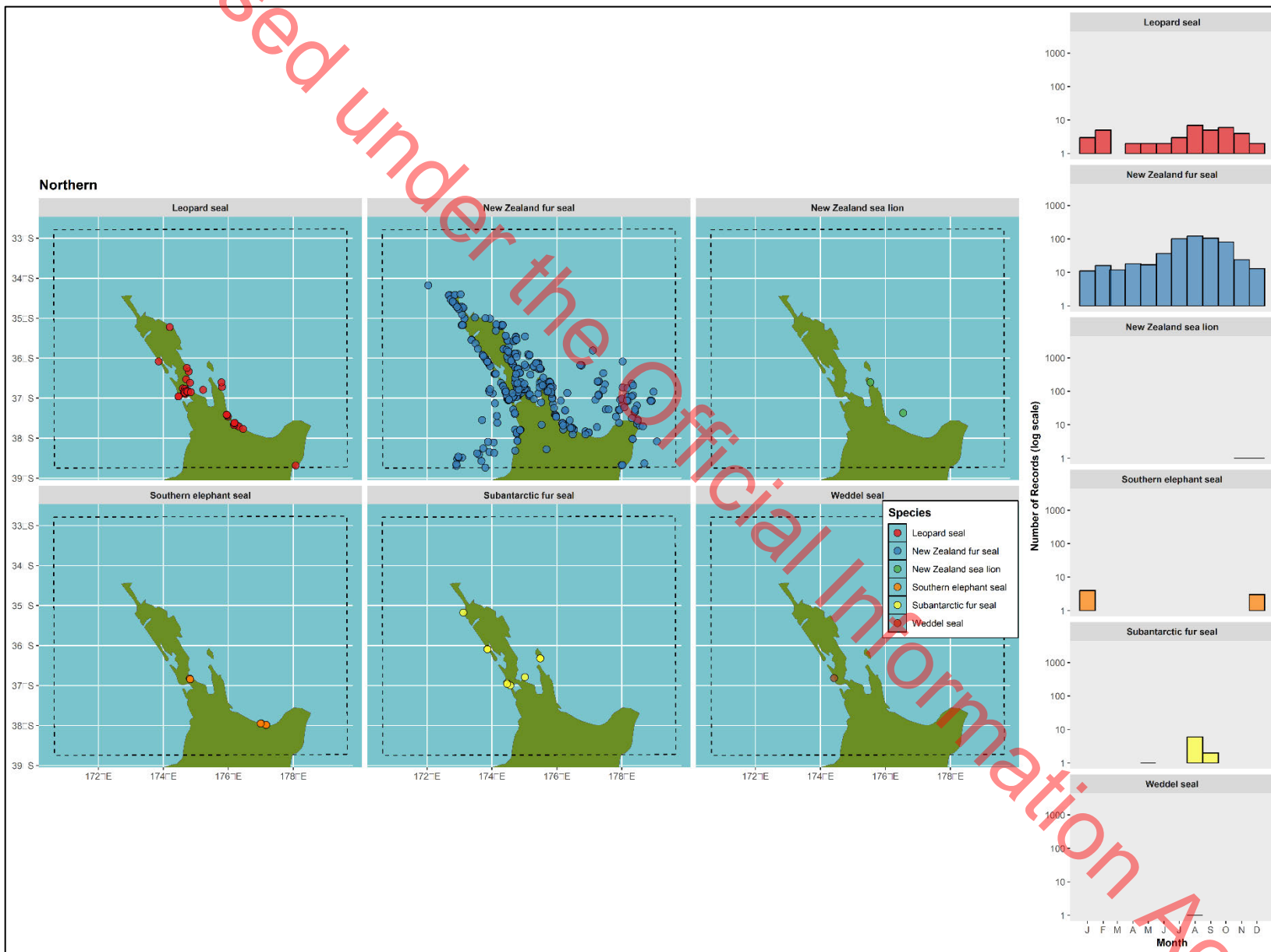
Figure 1: Overview of locations

Zones (blue with label), GBIF data extraction area (pale red, dashed line), land (fawn).



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Figure 2: Northern Zone













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Figure 7: Antarctica Zone

