

# Marine mammals around fishing vessels

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# Introduction

INT2022-06 The distribution and abundance of marine mammals observed around fishing vessels in New Zealand waters



# Project plan

- Goal is to include observer sightings of marine mammals in the Marine Mammal Database.
- We will be focussed on data preparation. While the data could be used for carrying out analysis of marine mammal distributions, this analysis will not be carried out as part of this project.
- Interactive mapping of the sightings will be carried out to allow for quality control by the CSP team.
- No standardisation of observation effort (no zero count records).



# Observer data on marine mammals

- Counts of protected species on Nomad devices. Originally used for monitoring Hector's and Māui dolphin abundance, other marine mammals are also recorded.
- Sightings data from CSP protected species abundance forms. These record daily counts of protected species around fishing vessels in deep water fisheries. The marine mammal sightings in this dataset have never been analysed.
- Bycatch data, as recorded in the Protected Species Captures Database and used in estimating marine mammal captures.



# Nomad data



# Marine mammal sightings and events

Detailed records of marine mammals. Data are stored in the Centralised Observer Database.

This is an example of records of a pod of common dolphin. Each sighting records a sequence of events. In this case of a pod of common dolphin on 31 January 2009:

1. Approaching vessel (6 adults)
2. Interacting with vessel (6 adults)
3. Leaving vicinity of Vessel (10 adults)
4. Visible at a distance (10 adults)
5. No Longer Visible (10 adults)



# Number of sightings

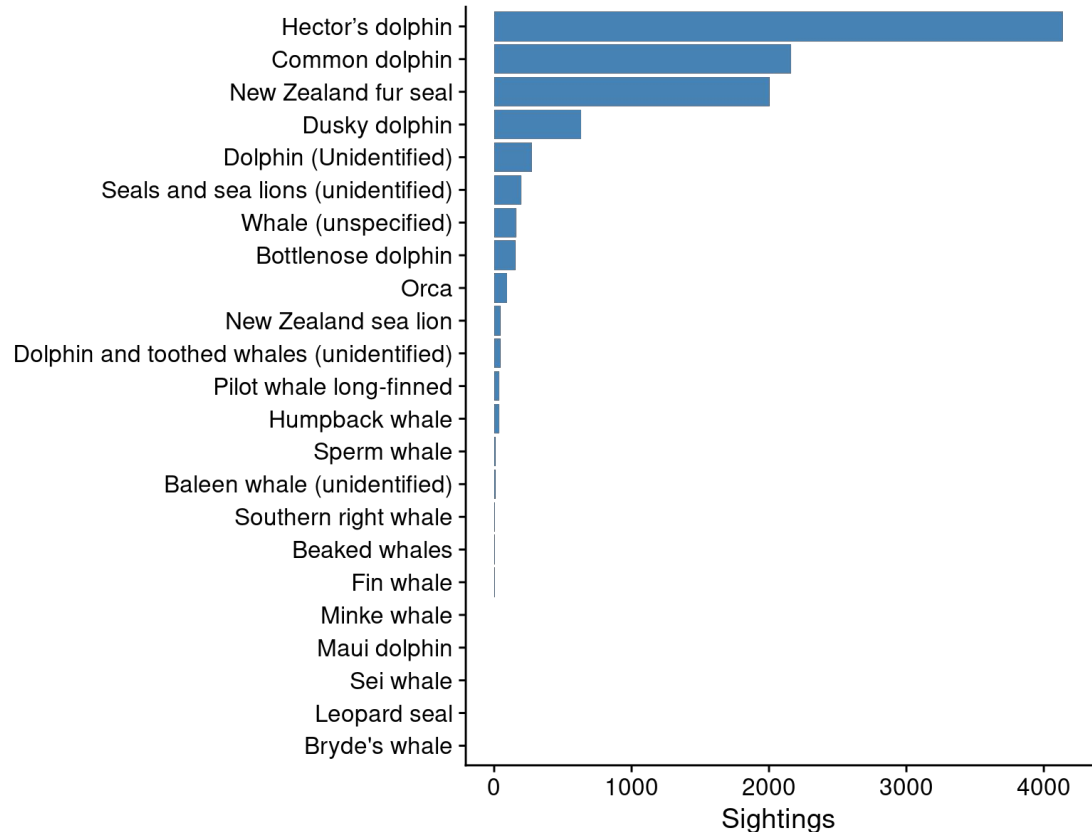
- A total of 24 909 events, between 9 Jan 2009 and 31 Oct 2022
- A total of 10 635 unique pods
- A total of 10 361 unique pods, with a location
- A total of 10 287 unique pods, with a location, and an event other than ‘No longer visible’

In preparing the data, we will create a single sighting record for each located pod. We will pick the event that has the largest number of animals, and within those the event that had the greatest interaction with the fishing vessel. There are some (83) pod split events. We will treat child and parent pods as a single sighting.



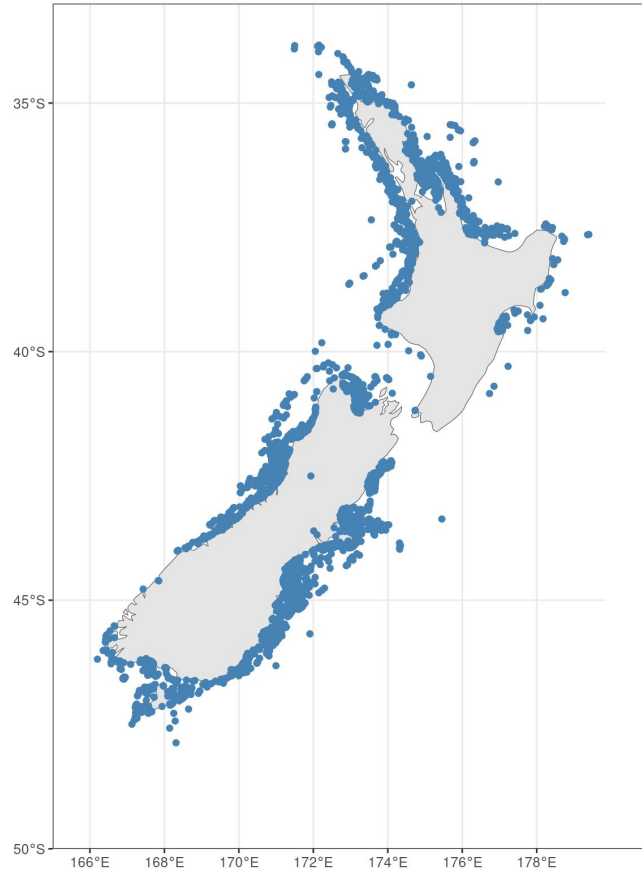
# Taxa

- Hector's dolphin the most frequently sighted, followed by Common Dolphin.
- Sightings of 17 different taxa (as well as unidentified species).

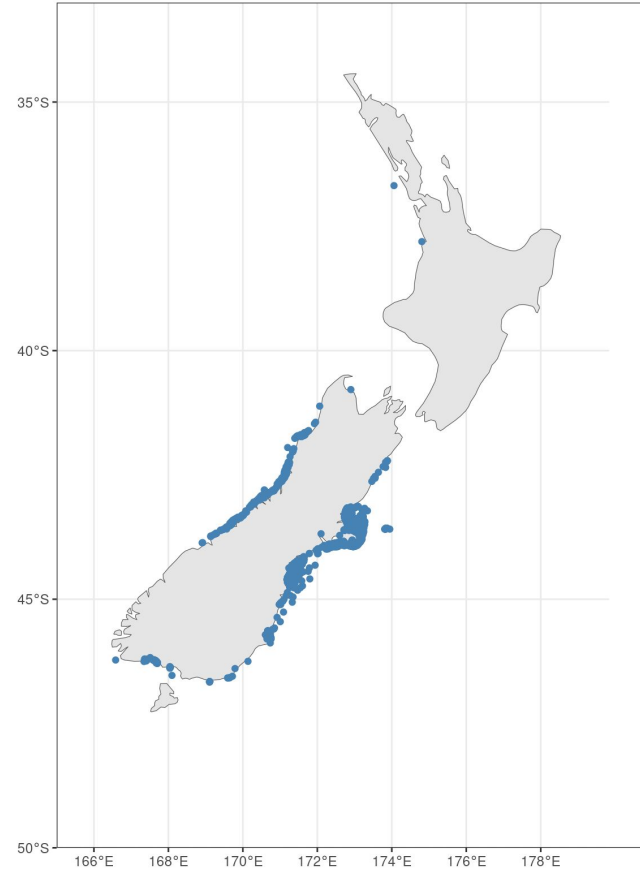




# All sightings



# Hector's dolphin



# Data grooming

- Link to observer data to determine fishing method, and to help identify stray positions.
- Prepare an interactive map, allowing the CSP team to mark or correct any identifications. It is possible that other information may be available (photographs, trip reports) that can help with the quality control.
- Align fields with the records of the Marine Mammal Database.
- Check for any duplicate records.



# Marine Mammal Database (Observation table)

- External observation ID
- Observation scenario
- Observation type (DwC)
- Gear type
- Platform
- Vessel name
- Original report held by
- Vernacular name (DwC)
- Scientific name (DwC)
- Individual or group
- Number of adults
- Number of juveniles
- Latitude (DwC)
- Longitude (DwC)
- Date event observed
- Date event observed confidence
- Created By
- Created Date
- DOC Comments



# Protected species abundance data



## CSP Protected Species Abundance Form

Trip: \_\_\_\_\_

Page 1

| Observation Data |               |            |                      |      |         |              |           | Species Code (number) |     |     |     |     |     |     |     |     |     |  |  |  |  |  |  |
|------------------|---------------|------------|----------------------|------|---------|--------------|-----------|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|--|--|--|--|
| Count No.        | Tow / Set No. | Set / Haul | Start / Middle / End | Time | Date 08 | < or > 100 m | Sea State | XRA                   | XWM | XKM | XBM | XCP | XSH | XTP | XCI | XWA | XBC |  |  |  |  |  |  |
| 1                | 1             | H          | Mid                  | 1128 | 17/10   | <            | 2         | 3                     | 10  | 20  | 40  | 15  | 20  | 0   | 0   | 0   |     |  |  |  |  |  |  |
| 2                | 1             | H          | Mid                  | 1128 | 17/10   | >            | 2         | 0                     | 50  | 20  | 20  | 30  | 10  | 0   | 0   | 0   |     |  |  |  |  |  |  |
| 3                | 4             | H          | Mid                  | 1812 | 18/10   | <            | 2         | 13                    | 10  | 20  | 350 | 40  | 10  | 0   | 0   | 0   |     |  |  |  |  |  |  |
| 4                | 4             | H          | Mid                  | 1812 | 18/10   | >            | 2         | 0                     | 0   | 5   | 50  | 0   | 0   | 0   | 0   | 0   |     |  |  |  |  |  |  |
| 5                | 5             | H          | Mid                  | 1254 | 19/10   | <            | 4         | 10                    | 0   | 0   | 200 | 100 | 10  | 0   | 0   | 0   |     |  |  |  |  |  |  |
| 6                | 5             | H          | Mid                  | 1254 | 19/10   | >            | 4         | 2                     | 0   | 0   | 200 | 100 | 0   | 0   | 0   | 0   |     |  |  |  |  |  |  |
| 7                | 7             | H          | Mid                  | 1308 | 20/10   | <            | 4         | 20                    | 0   | 0   | 300 | 30  | 15  | 5   | 20  | 0   |     |  |  |  |  |  |  |
| 8                | 7             | H          | Mid                  | 1308 | 20/10   | >            | 4         | 5                     | 0   | 0   | 100 | 0   | 5   | 0   | 0   | 0   |     |  |  |  |  |  |  |
| 9                | 9             | H          | Mid                  | 0823 | 21/10   | <            | 2         | 2                     | 10  | 0   | 38  | 10  | 0   | 5   | 0   | 0   |     |  |  |  |  |  |  |
| 10               | 9             | H          | Mid                  | 0823 | 21/10   | >            | 2         | 0                     | 10  | 0   | 10  | 0   | 0   | 10  | 0   | 0   |     |  |  |  |  |  |  |
| 11               | 12            | H          | Mid                  | 1429 | 22/10   | <            | 3         | 4                     | 10  | 0   | 100 | 50  | 0   | 5   | 50  | 0   |     |  |  |  |  |  |  |
| 12               | 12            | H          | Mid                  | 1429 | 22/10   | >            | 3         | 0                     | 10  | 0   | 100 | 50  | 0   | 0   | 0   | 0   |     |  |  |  |  |  |  |
| 13               | 14            | H          | Mid                  | 1116 | 23/10   | <            | 3         | 40                    | 0   | 2   | 110 | 30  | 5   | 15  | 25  | 2   |     |  |  |  |  |  |  |
| 14               | 14            | H          | Mid                  | 1116 | 23/10   | >            | 3         | 5                     | 0   | 0   | 40  | 0   | 15  | 0   | 5   | 0   |     |  |  |  |  |  |  |
| 15               | 16            | H          | Mid                  | 1030 | 24/10   | <            | 2         | 2                     | 1   | 1   | 10  | 30  | 10  | 0   | 0   | 1   |     |  |  |  |  |  |  |
| 16               | 16            | H          | Mid                  | 1030 | 24/10   | >            | 2         | 4                     | 0   | 0   | 20  | 20  | 0   | 5   | 0   | 0   |     |  |  |  |  |  |  |
| 17               | 19            | H          | Mid                  | 1308 | 25/10   | <            | 2         | 35                    | 20  | 1   | 400 | 10  | 40  | 6   | 30  | 2   |     |  |  |  |  |  |  |
| 18               | 19            | H          | Mid                  | 1308 | 25/10   | >            | 2         | 20                    | 20  | 0   | 300 | 30  | 50  | 2   | 10  | 0   |     |  |  |  |  |  |  |
| 19               | 21            | H          | Mid                  | 1031 | 26/10   | <            | 5         | 15                    | 10  | 0   | 180 | 20  | 30  | 5   | 10  | 0   |     |  |  |  |  |  |  |
| 20               | 21            | H          | Mid                  | 1031 | 26/10   | >            | 5         | 10                    | 10  | 0   | 100 | 30  | 30  | 0   | 5   | 0   |     |  |  |  |  |  |  |
| 21               | 24            | H          | Mid                  | 1600 | 27/10   | <            | 3         | 2                     | 40  | 5   | 40  | 30  | 20  | 0   | 0   | 0   | 50  |  |  |  |  |  |  |
| 22               | 24            | H          | Mid                  | 1600 | 27/10   | >            | 3         | 0                     | 20  | 0   | 40  | 40  | 0   | 0   | 0   | 0   | 100 |  |  |  |  |  |  |
| 23               | 27            | H          | Mid                  | 1217 | 28/10   | <            | 3         | 4                     | 40  | 1   | 150 | 50  | 40  | 3   | 0   | 2   | 0   |  |  |  |  |  |  |
| 24               | 27            | H          | Mid                  | 1217 | 28/10   | >            | 3         | 1                     | 20  | 0   | 70  | 30  | 20  | 0   | 0   | 0   | 0   |  |  |  |  |  |  |
| 25               | 30            | H          | Mid                  | 1725 | 29/10   | <            | 2         | 5                     | 30  | 1   | 80  | 20  | 2   | 2   | 0   | 0   | 0   |  |  |  |  |  |  |
| 26               | 30            | H          | Mid                  | 1725 | 29/10   | >            | 2         | 3                     | 20  | 0   | 30  | 150 | 3   | 0   | 0   | 0   | 0   |  |  |  |  |  |  |
| 27               | 32            | H          | Mid                  | 1756 | 30/10   | <            | 2         | 5                     | 30  | 0   | 150 | 200 | 0   | 0   | 0   | 0   | 0   |  |  |  |  |  |  |
| 28               | 32            | H          | Mid                  | 1756 | 30/10   | >            | 2         | 2                     | 30  | 0   | 70  | 50  | 0   | 0   | 0   | 0   | 0   |  |  |  |  |  |  |



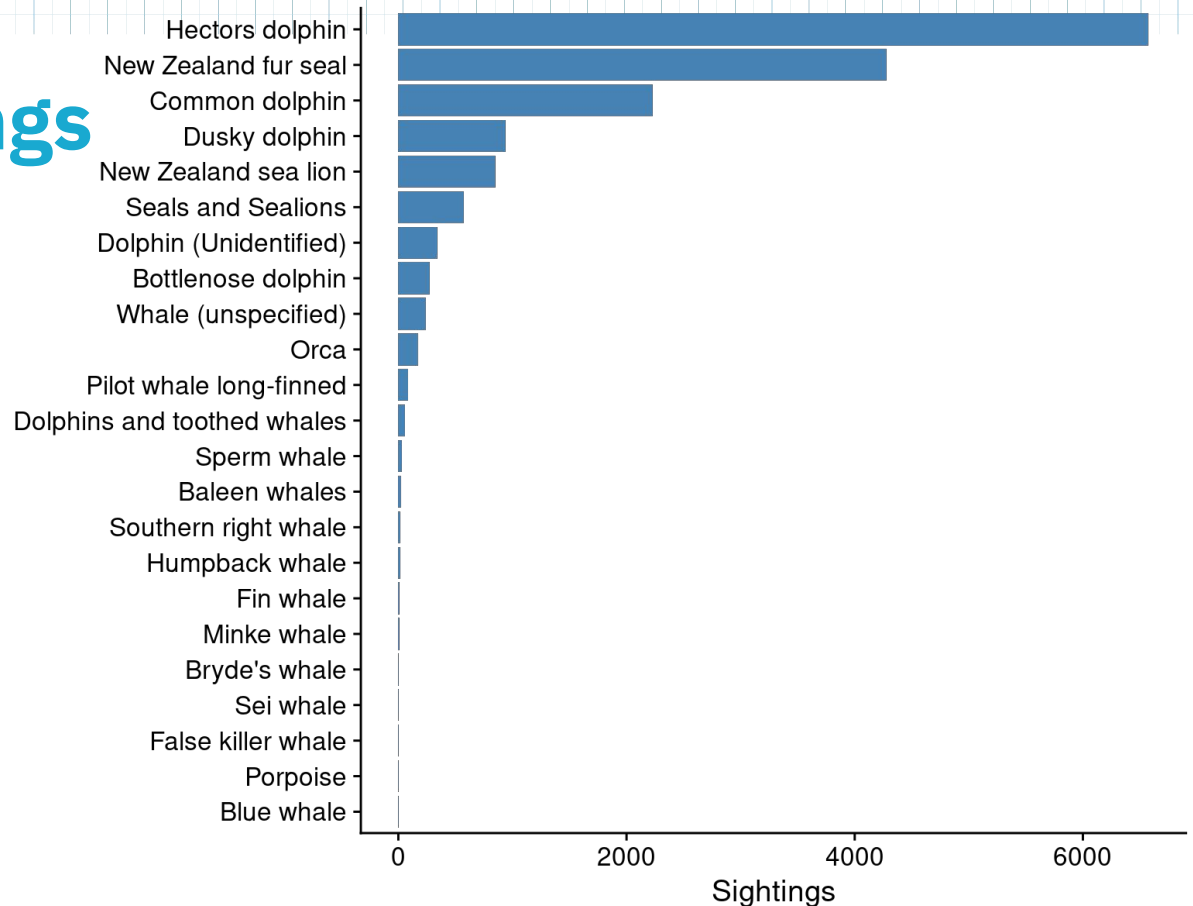
# The dataset

- Data from January 2008 to November 2018 processed to extract seabird counts  
[https://files.dragonfly.co.nz/publications/pdf/Richardetal\\_2020\\_seabird-counts.pdf](https://files.dragonfly.co.nz/publications/pdf/Richardetal_2020_seabird-counts.pdf)
- 45 325 observations, from 1 493 fishing trips and 36 781 fishing events
- In processing the abundance data for seabirds, 16 748 records of marine mammals were set aside
- Considerable grooming was required to correct errors, especially in data from the handwritten forms
- Recent data are yet to be looked at



# Mammal sightings

- Hector's dolphin the most frequently sighted, followed by fur seal.
- Sightings of 19 different taxa (as well as unidentified species).



# Grooming

- Keep records irrespective of distance from the vessel
- Link to the observer data to get other metadata, such as the fishing method and vessel name
- Merge in more recent data (possibly including some data entry of a small number of scanned forms)
- Follow a similar process as with the seabird abundance data, to identify data entry errors
- Map and make available to the CSP team for manual data quality checking
- Prepare into a format for loading into the Marine Mammal Database



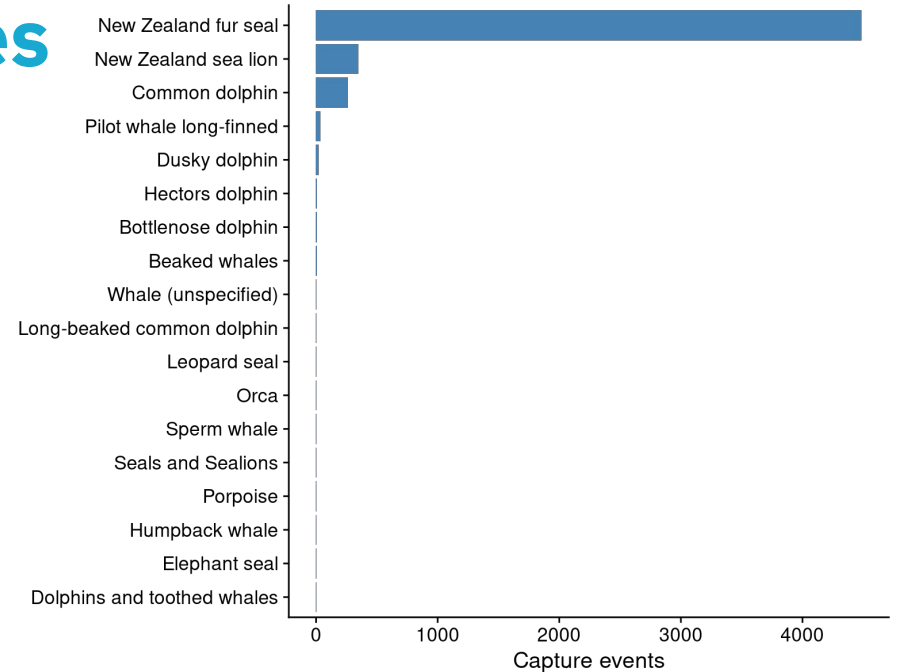


# Protected species captures



# Marine mammal captures

- Capture data are already thoroughly groomed.
- Between October 1992 and September 2018 there were 4841 pinniped and 351 cetacean capture events (yet to analyse more recent data).
- Will map for quality control and transform for loading into the Marine Mammal Database.



**A total of over 30 000 records to be added to the Marine Mammal Database**



# Ngā mihi