INT2023-04 Identification of marine mammals, turtles and protected fishes captured in New Zealand commercial fisheries

Annual summary of photographs assessed (2023/24).

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4 April 2025

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Introduction

This project forms part of the Conservation Services Programme (CSP), which is administered by the Department of Conservation (DOC). The purpose of the project is to determine, primarily through examination of photographs, the taxon and where possible sex, age-class and provenance of marine mammals, turtles and protected fishes observed in interactions with New Zealand commercial fisheries (including dead specimens discarded at sea and animals released alive). In this case observed means captures recorded by Ministry for Primary Industries fisheries observers.

Fisheries observers generally do not retain carcasses of protected species killed incidentally in commercial fisheries. All observed protected species interactions with fisheries are documented digitally, including with digital imagery (still images and sometimes video). This project provides a check on the identifications made by fisheries observers at sea and attempts to capture as much information on the biology of the species concerned and nature of the interactions as is possible from images.

The key deliverables are:

1. Creation of marine mammal, turtle and protected fish ID spreadsheet for upload to Fisheries New Zealand.
2. Annual report summarising the photographs assessed.

Methods

Access to a DropBox folder containing image files of protected species bycatch (marine mammals, protected fishes, marine reptiles) and an extract from the Central Observer Database (COD) for the corresponding period was provided by the CSP team on 3 December 2024, with images from a further five trips (6858, 6962, 6964, 6967, 6986) added on 6 March 2025.

Image files were provided archived in folders by trip. As well as the metadata, the information recorded in the images included the file name, views of part or all the bycaught animal, associated species, observer labels and tags, measure mats and tape measures and occasionally gear and/or structures that could be used to identify the vessel type. This information was captured in an Excel spreadsheet and provided separately to the CSP team.

Protected species and where possible any associated species were identified to the lowest taxon possible using standard identification guides and expert knowledge (King 1995; Roberts et al. 2015; Department of Conservation 2024).

Results

The COD extract recorded 117 observed captures of protected fishes and marine mammals, of which images were available for 101 (85.6%).

A total of 506 images taken during 44 trips were reviewed. These images documented captures of 90 New Zealand fur seals (*Arctocephalus forsteri*), 2 New Zealand sealions (*Phocarctos hookeri*), 3 bottlenose dolphins (*Tursiops truncatus*), 1 common dolphin (*Delphinus delphis*), 2 white sharks (*Carcharodon carcharias*) and 3 basking sharks (*Cetorhinus maximus*). One photograph of a shortfin mako (*Isurus oxyrinchus*), an unprotected species, was included in the folder for Trip 6914. Protected species catches are summarized by method in Table 1.

The misidentification of an adult male fur seal as a New Zealand sealion (Trip 6938, CSP tag. 12440) was the only misidentification by a fishery observer noted.

New Zealand fur seals comprised the bulk (89%) of bycaught protected species photographed by observers. Most of these were taken by trawl (91%), with almost equal numbers taken in hoki (38%) and squid (43%) trawls. Although the sex and maturity were sometimes difficult to determine from the images, the majority (c. 62%) appeared to be mature males. Bycaught fur seals were photographed during 37 trips (84%). The average number photographed per trip was 2.4 (range 0-10, sd. 2.4).

Only one New Zealand sealion, one white shark and one basking shark were photographed per trip. Two of the three bottlenose dolphins reported were caught in the same trawl (Trip 6984). Both New Zealand sealions appeared to be sub-adult males. The sex of the only common dolphin reported could not be determined. The sex of one of the bottlenose dolphins could not be determined, the others were a male and female. Both animals taken in Trip 6984 were large adults around 290 cm length. Both white sharks were juveniles, one was a male the other a female. Two of the basking sharks were judged to be mature based upon their size. One was a male with large claspers, the sex of the other could not be determined. The third basking shark was a juvenile male estimated to be between 3.5-4 m total length.

Species	**SLL** (1)	**SN** (3)	**TWL** (40)	**Total**
New Zealand fur seal *Arctocephalus forsteri*	2	6	82	90
White pointer shark *Carcharodon carcharias*			2	2
Basking shark *Cetorhinus maximus*			3	3
Common dolphin *Delphinus delphis*			1	1
New Zealand sea lion *Phocarctos hookeri*			2	2
Bottlenose dolphin *Tursiops truncatus*			3	3
Total	**2**	**6**	**93**	**101**

Table 1. Captures of protected species documented in images taken by fishery observers during the 2023/24 commercial fishing year. Methods are surface longline (SLL), set net (SN) and trawl (TWL). The number of trips is indicated in brackets after the method.

CSP tags were shown attached to seventy bycaught animals. In only one case was the number on the tag unreadable in all images taken of it.

While dates and times recorded in the photograph metadata were sometimes helpful in assigning images without observer labels in them to bycatch events, in general the metadata was unreliable. This was because in many instances the date and time were incorrect, sometimes even the year was incorrect.

Discussion

The accuracy of fishery observer identifications was very high (99%). However, some issues associated with the images taken by observers were:

- Difficulty reading what was written on the labels and/or the graduations on the measure mats due to over exposure of the white material these are made of. This could potentially be improved by changing the colour of the label material. The yellow tape measures used by some observers and CSP tags were generally easier to read than the measure mats.
- Incorrect dates and times recorded in the image meta-data.
- Out of focus or poorly lit images. While this generally did not affect species identification it did affect the ability to sex animals, particularly the pinnipeds. It is also likely to hinder the identification of protected fishes such as *Epinephelus daemelii* and *E. lanceolatus* which have unprotected lookalike species.
- Sex and maturity often could not be determined due to the position of the animals.

Unfortunately, no images were taken of any of the four spinetail devil rays (*Mobula mobular*) reported by observers during the 2023/24 commercial fishing year. At least two species of devil ray occur in New Zealand waters, spinetailed devil ray and oceanic manta ray (*M. birostris*). Due to their morphological similarity these species are regularly confused with each other and other species of devil ray occurring in the southwest Pacific. Clear images of morphologically conservative species such as devil rays and groupers are the easiest way of confirming the species identifications and detecting the occurrence of other related species in New Zealand waters. In this case two aborted spinetail devil ray embryos were found in the catch when it was landed and the species could be confirmed that way.

Acknowledgements

Observer images, trip and event data, and review of this report were provided by Hollie McGovern and Erin Hewetson, Conservation Services, Marine Bycatch and Threats Team, Department of Conservation. Suzanne Histen, Research Development Lead, Auckland War Memorial Museum Tāmaki Paenga Hira, provided contract management support. This work is an output from Conservation Services Contract *INT2023-04 Identification of marine mammals, turtles and protected fish captured in New Zealand fisheries*.

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