



INT 2010/02 IDENTIFICATION OF SEABIRD CAPTURED IN NEW ZEALAND FISHERIES

QUARTERLY REPORT: 1 July 2011 to 31 December 2011.

Elizabeth Bell ¹

1. Wildlife Management International Ltd, 35 Selmes Road, Rapaura, RD3, Blenheim 7273

Introduction:

New Zealand waters support a large and diverse range of seabird species. Much of the commercial fishing activity within New Zealand waters overlap with these seabirds. The accurate identification of seabirds captured in New Zealand fisheries is vital to determine the potential impact of fisheries interaction with these seabird populations. New Zealand Government observers are placed on commercial vessels in order to investigate interactions with seabird species. These observers are not always able to identify seabirds at sea with high precision. The autopsy programme has been in place to accurately determine the identification (and age, sex, diet and provenance) of specimens recovered dead by observers, but the identification reported for seabirds released alive were often poor and were not confirmed by an expert. The photography programme was developed to enable observers to capture and return images of birds interacting with vessels (whether alive or dead) which would enable correct identification to be determined.

Observers present on fishing trips within New Zealand's Exclusive Economic Zone have to return all seabirds caught and killed as incidental bycatch during fishing operations for necropsy. Additional information such as vessel name, location of capture (latitude and longitude) and date of capture is also recorded. Specific catch locations and vessel names have not been provided in this report on the grounds of commercial sensitivity. All autopsies were performed for the Department of Conservation (DOC) as part of Conservation Services Programme (CSP) project INT2010/02.

Objectives:

The overall objective is to determine which seabird species are captured in New Zealand commercial fisheries and the mode of capture.

The specific objectives are:

1. To determine, through examination of returned seabird specimens, the taxon, sex and where possible age class and provenance of seabirds killed in New Zealand fisheries (for returned dead specimens).
2. To detail the injuries, body condition and stomach contents and, where possible, the likely cause of mortality (for returned dead specimens).
3. To report any changes in the protocol used for necropsy of seabirds (for returned dead specimens).

4. To determine, through examination of photographs, the taxon and where possible, sex, age-class and provenance of seabirds captured in New Zealand fisheries (for live captures or dead specimens discarded at sea).

Scope of work completed:

This report summarises identification work completed on dead birds caught and returned and/or using photographs from 1 July 2011 to 31 December 2011.

There have been 40 birds necropsied from this period. Due to the length of some fishing trips and subsequent transport it is possible some birds captured in this period may not have been received at the time of writing. Any further specimens received will be reported at a later date.

Extracts of seabird captures from the Ministry of Fisheries Central Observer Database (“COD”) and examination of photographs gave a total of 19 birds that were reported captured or photographed as bird interactions with fishing vessels (and may include some non-capture interactions) between 1 July 2011 and 30 September 2011. Unfortunately, although photographs have been received for the period 1 October 2011 to 31 December 2011 the COD extract has not been received to date. These photographs will be reported at a later date.

Methods:

The necropsy methods followed those described by Bartle (2000) and used in autopsies in subsequent fishing years (Robertson 2000; Robertson & Bell 2002a, b; Robertson et al. 2003, 2004; Conservation Services Programme 2008; Thompson 2009, 2010a, b). Common and scientific names of all species caught and returned are provided in Table 1. Nomenclature generally follows Marchant & Higgins (1990), but for the albatrosses where current taxonomy and nomenclature is in a state of flux, a combination of Nunn et al. (1996) and Robertson & Nunn (1998) has been used.

Table 1 List of common and scientific names of seabirds captured and returned or photographed from New Zealand fisheries between 1 July 2011 and 31 December 2011.

| COMMON NAME | SCIENTIFIC NAME |
|--|--|
| Albatross (unidentified) | Diomedidae (Family) |
| Antipodean albatross | <i>Diomedea antipodensis antipodensis</i> |
| Buller’s albatross | <i>Thalassarche bulleri bulleri</i> |
| Cape petrels (unidentified) | <i>Daption</i> spp. |
| Campbell albatross | <i>Thalassarche impavida</i> |
| Giant petrels (Unidentified) | <i>Macronectes</i> spp. |
| Grey petrel | <i>Procellaria cinerea</i> |
| New Zealand banded dotterel | <i>Charadrius bicinctus</i> |
| New Zealand White-capped albatross | <i>Thalassarche steadi</i> |
| Petrels, Prions and Shearwaters (unidentified) | Hydrobatidae, Procellariidae & Pelecanoididae (Families) |
| Prions (Unidentified) | <i>Pachyptila</i> spp. |
| Salvin’s albatross | <i>Thalassarche salvini</i> |
| Sooty shearwater | <i>Puffinus griseus</i> |
| Southern Royal albatross | <i>Diomedea epomophora</i> |
| Storm petrels (unidentified) | Hydrobatidae (Family) |
| Westland petrel | <i>Procellaria westlandica</i> |
| White-chinned petrel | <i>Procellaria aequinoctialis</i> |

Birds were sexed by internal examination during necropsy except when birds were damaged by fishing gear and/or machinery, or from sea lice. Birds were characterised as either adult, breeding adult, non-breeding adult, sub-adult (pre-breeder), immature or juvenile based on a combination of plumage, morphological (such as bill size and colour), gonadal and brood patch characteristics.

Adults were birds of breeding morphology, but that active breeding could not be confirmed; breeding adults were considered to be actively breeding at the time of capture and non-breeding adults were identified by feather moult and gonadal evidence. Sub-adults (pre-breeders) were those birds in mostly adult or near adult plumage, but that had no gonadal evidence of obtaining breeding condition and immatures and juveniles were birds in non-adult plumage and/or morphology.

Body condition was determined by assigning a fat score based on the relative amount of subcutaneous fat and fat on and around organs. Fat scores go from '1' = no fat, to '5' = extremely fat (where internal examination becomes difficult).

Feather moult and the condition of the brood patch were recorded. For each bird, any injuries were recorded, and together with observer comments on the autopsy label, likely cause of death was determined.

Stomach and gizzard contents were identified to broad dietary groupings (squid, fish, crustaceans) and any hard parts (squid beaks, otoliths) were retained for future identification where possible. Additionally, any bait material was recorded, as was offal or discarded material, plastic, stones, algae and goose barnacle plates. All autopsy specimens were allocated a unique number.

Details relating to each specimen are available on request from the Manager, Marine Conservation Services, DOC (email csp@doc.govt.nz). In some cases (i.e. those specimens damaged by fishing gear and machinery, or by sea lice) it was not possible to collect all data; these are reported as 'unknown', and appear as such in the relevant tables.

Photographs will be provided in electronic format with associated observer information (such as vessel name, date of capture, time of capture etc.) from the Ministry of Fisheries Central Observer Database in an Excel spreadsheet. Individual seabirds were allocated a unique autopsy number. The photograph (or photographs), the information from the observers and any other information observed in the photograph was entered into an Access database.

Where possible, the taxon, age, sex and provenance of the seabirds pictured were determined. Bill and head morphology and colour was usually sufficient to allow identification of albatross and larger petrels to species, but other key features (such as size, shape, foot colour, and wing markings) were needed for other smaller species. If key features were not visible in the photograph or the image was out of focus, identification to species was not possible. Common and scientific names of all species caught and photographed are provided in Table 1.

Results:

A total of 40 seabirds (comprising of 11 taxa) were returned from 10 vessels between 1 July 2011 and 31 December 2011 (Table 2). Seabirds returned to date were dominated by three species (sooty shearwater *Puffinus griseus* (12, 30%), Salvin's albatross *Thalassarche salvini* (8, 20%) and grey petrel *Procellaria cinerea* (5, 12.5%)) (Table 2). These three species accounted for 62.5% of all returns to date (Table 2). The remaining 7 taxa had single captures.

Table 2 Species and numbers of seabirds killed and returned from observed fishing vessels between 1 July 2011 and 31 December 2011, by month of capture, sex (M = male, F = female, U = unknown) and age (A = adult, B = breeding, N = non-breeding, SA = sub-adult, I = immature and J = juvenile, U = unknown).

| SPECIES | MONTH | | | | | | | | | | | | SEX | | | AGE | | | | | | TOTAL | % TOTAL | |
|---------------------------|-------|---|---|---|---|-------------|--------------|-------------|------------|--------------|-----------|---|--------------|--------------|---|------------|--------------|------------|----|-------------|-----------|-------|-----------|-------|
| | J | F | M | A | M | J | J | A | S | O | N | D | M | F | U | A | B | N | SA | I | J | | | U |
| Antipodean albatross | | | | | | | | | | | | 2 | 2 | | | 2 | | 2 | | | | | 2 | 5% |
| Buller's albatross | | | | | | 2 | | | | | | | 2 | | | 2 | 1 | 1 | | | | | 2 | 5% |
| Campbell albatross | | | | | | | 1 | | 1 | | | | 2 | | | 1 | 1 | | | 1 | | | 2 | 5% |
| Grey petrel | | | | | | | 5 | | | | | | 3 | 2 | | 5 | 4 | 1 | | | | | 5 | 12.5% |
| NZ banded dotterel | | | | | | | 1 | | | | | | 1 | | | 1 | | | | | | 1 | 1 | 2.5% |
| NZ White-capped albatross | | | | | | 1 | 1 | | 1 | | | | 3 | | | 3 | 2 | 1 | | | | | 3 | 7.5% |
| Salvin's albatross | | | | | | | | 1 | 3 | 4 | | | 4 | 4 | | 8 | 8 | | | | | | 8 | 20% |
| Sooty shearwater | | | | | | | | | 11 | 1 | | | 12 | | | 12 | 12 | | | | | | 12 | 30% |
| Southern Royal albatross | | | | | | | 1 | | | | | | 1 | | | 1 | 1 | | | | | | 1 | 2.5% |
| Westland petrel | | | | | | | | | 1 | | | | 1 | | | 1 | | 1 | | | | | 1 | 2.5% |
| White-chinned petrel | | | | | | | | | 1 | 2 | | | 2 | 1 | | 2 | 2 | | | | | 1 | 3 | 7.5% |
| TOTAL | | | | | | 3 | 9 | 1 | 18 | 7 | 2 | | 33 | 7 | | 38 | 31 | 6 | | 1 | 2 | | 40 | |
| % TOTAL | | | | | | 7.5% | 22.5% | 2.5% | 45% | 17.5% | 5% | | 82.5% | 17.5% | | 95% | 77.5% | 15% | | 2.5% | 5% | | | |

Table 3 Comparison of fat scores in the returned birds between 1 July 2011 and 31 December 2011 (1= no fat to 5 = extremely fat, U = unknown).

| SPECIES | FAT SCORE | | | | | | TOTAL | MEAN (\pm SE) |
|---------------------------|--------------|------------|------------|-------------|-------------|-------------|-----------|------------------|
| | 1 | 2 | 3 | 4 | 5 | U | | |
| Antipodean albatross | 2 | | | | | | 2 | 1 \pm 0 |
| Buller's albatross | 1 | | 1 | | | | 2 | 2 \pm 1 |
| Campbell albatross | | 1 | 1 | | | | 2 | 2.5 \pm 0.5 |
| Grey petrel | 4 | | 1 | | | | 5 | 1.4 \pm 0.4 |
| NZ banded dotterel | 1 | | | | | | 1 | 1 \pm 0 |
| NZ White-capped albatross | | | 1 | | 1 | 1 | 3 | 4 \pm 1 |
| Salvin's albatross | 3 | 2 | 3 | | | | 8 | 2 \pm 0.3 |
| Sooty shearwater | 4 | 5 | 2 | 1 | | | 12 | 2 \pm 0.3 |
| Southern Royal albatross | | 1 | | | | | 1 | 2 \pm 0 |
| Westland petrel | 1 | | | | | | 1 | 1 \pm 0 |
| White-chinned petrel | 1 | 1 | 1 | | | | 3 | 2 \pm 0.6 |
| TOTAL | 17 | 10 | 10 | 1 | 1 | 1 | 40 | |
| % TOTAL | 42.5% | 25% | 25% | 2.5% | 2.5% | 2.5% | | |

Table 4 Stomach contents of seabirds killed and returned on fishing vessels between 1 July 2011 and 31 December 2011.

| SPECIES | EMPTY | GONE | BAIT | OFFAL (OR DISCARDS) | NATURAL | SLUDGE | PROVENTRICULAR OIL |
|---------------------------|--------------|-------------|------|---------------------|--------------|--------------|--------------------|
| Antipodean albatross | | | | | 2 | | |
| Buller's albatross | 2 | | | | | | |
| Campbell albatross | | | | | 1 | 1 | |
| Grey petrel | | | | 5 | | | 4 |
| NZ banded dotterel | 1 | | | | | | |
| NZ White-capped albatross | | 1 | | 2 | 1 | | |
| Salvin's albatross | 2 | | | 3 | 1 | 2 | 1 |
| Sooty shearwater | 6 | | | 7 | 2 | | |
| Southern Royal albatross | 1 | | | | | | |
| Westland petrel | | | | | | 1 | 1 |
| White-chinned petrel | 1 | | | 1 | | 1 | |
| TOTAL | 13 | 1 | | 18 | 7 | 5 | 6 |
| % TOTAL | 32.5% | 2.5% | | 45% | 17.5% | 12.5% | 15% |

Table 5 Gizzard contents of seabirds killed and returned on fishing vessels between 1 July 2011 and 31 December 2011.

| SPECIES | EMPTY | GONE | SQUID BEAKS | OTOLITHS | FISH OR SQUID EYEBALLS | FISH BONES OR SKIN | PLASTIC | SEEDS OR STONE | WORMS | SEAWEED |
|---------------------------|--------------|------|----------------|--------------|------------------------------|--------------------------|--------------|-------------------|-------------|---------|
| Antipodean albatross | | | 2 | | | | | | | |
| Buller's albatross | 2 | | | | | | | | | |
| Campbell albatross | | | 1 | | 1 | 1 | | | | |
| Grey petrel | 1 | | 5 | 1 | | 2 | | | | |
| NZ banded dotterel | 1 | | | | | | | | | |
| NZ White-capped albatross | 2 | | | | | 1 | | | | |
| Salvin's albatross | 1 | | 1 | 2 | 2 | 6 | | | 1 | |
| Sooty shearwater | 1 | | 7 | 3 | 1 | 6 | 7 | 3 | 1 | |
| Southern Royal albatross | | | 1 | 1 | 1 | | | | 1 | |
| Westland petrel | | | | | 2 | 1 | | | | |
| White-chinned petrel | 1 | | 1 | | 4 | | | | | |
| TOTAL | 9 | | 18 | 7 | 11 | 3 | 7 | 3 | 3 | |
| % TOTAL | 22.5% | | 45% | 17.5% | 8% | 7.5% | 17.5% | 7.5 | 7.5% | |

Figure 1 Catch locations of all seabirds killed and returned in New Zealand fisheries for necropsy between 1 July and 31 December 2011.

Note: some catch location symbols may be obscured by overlying symbols (e.g. where several individuals were captured from the same tow or set, each bird will have the same catch location and appear on the maps as a single symbol).

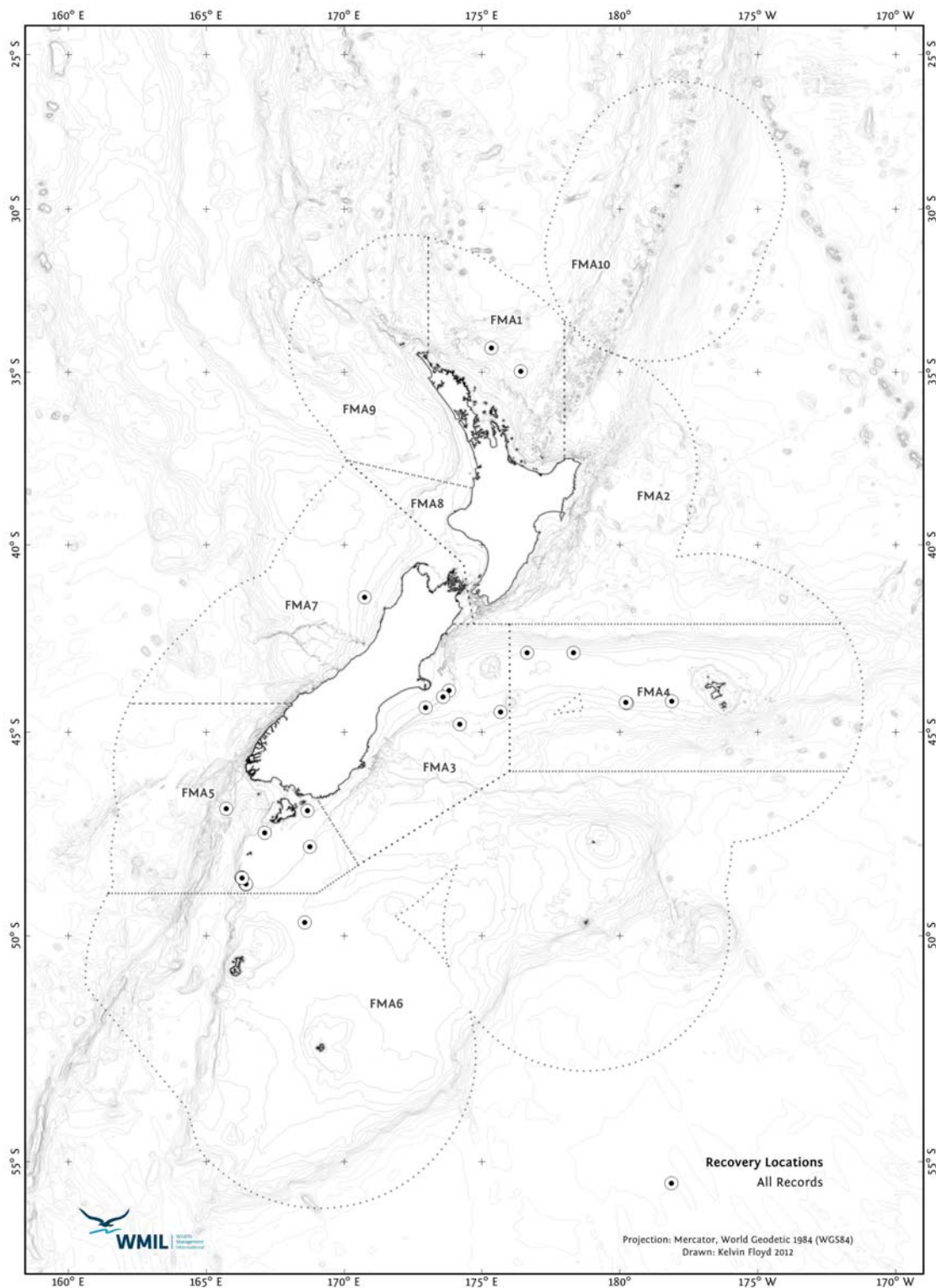
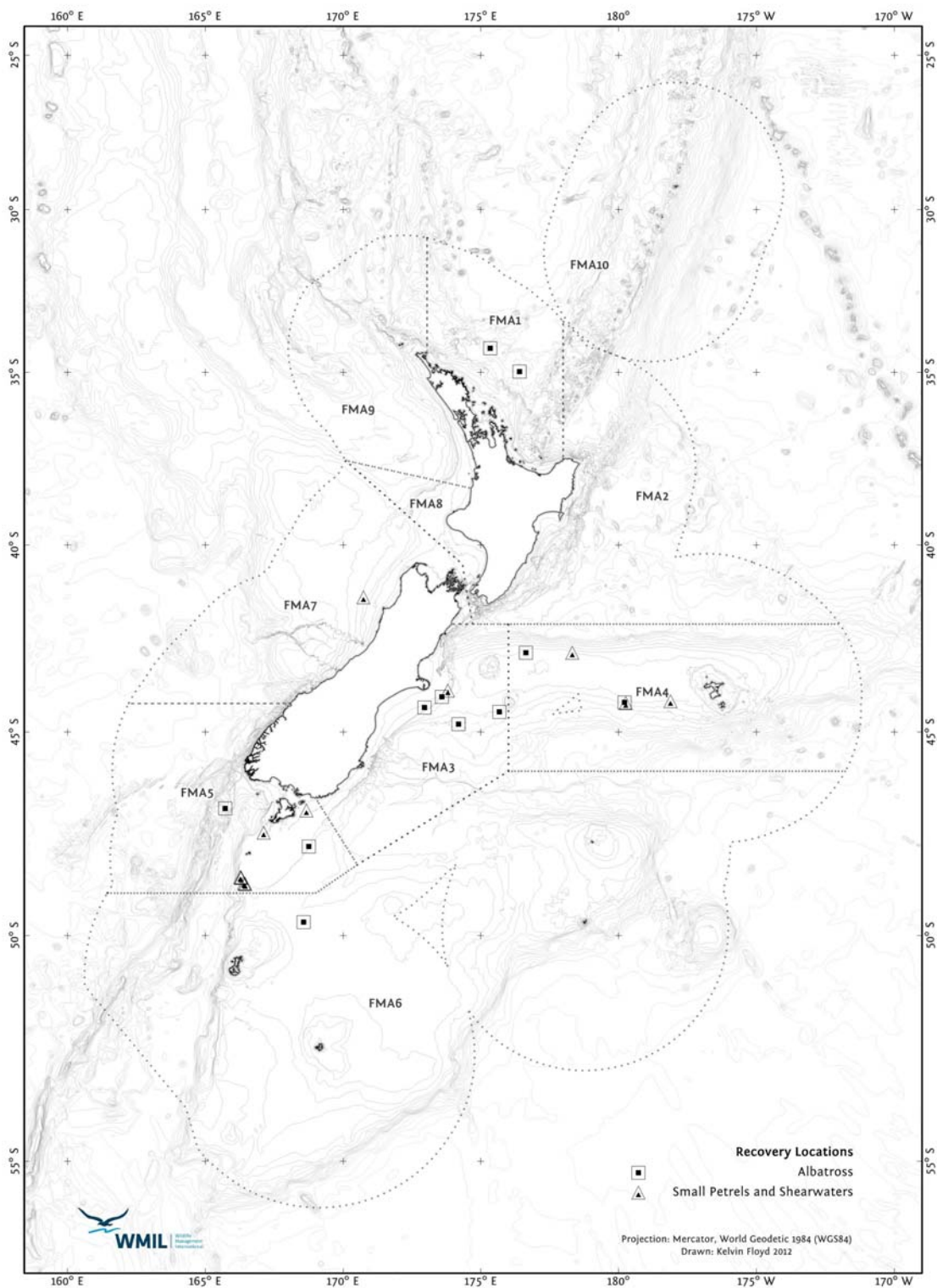


Figure 2 Catch locations of all seabirds killed and returned in NZ fisheries for necropsy between 1 July and 31 December 2011, split into (i) small petrels and shearwaters, and (ii) albatross.

Note: some catch location symbols may be obscured by overlying symbols (e.g. where several individuals were captured from the same tow or set, each bird will have the same catch location and appear on the maps as a single symbol).



One specimen had a uniquely numbered bands; an Antipodean albatross (metal R-56019 on right and blue darvic (983) on left) that was banded on Antipodes Island on 23 January 2003. Specimens still need to be checked for PTT tags (PTT tag reader to be provided by DOC).

The monthly distribution of returned specimens was not evenly spread across the fishing year with most birds returned to date being caught in October (18, 45%) (Table 2). However this is to be expected as these specimens were only returned from those vessels fishing at sea between 1 July 2011 and 31 December 2011. It is likely that this distribution pattern will change as further specimens are returned through the remainder of the reporting period (i.e. last $\frac{1}{4}$ of the 2010/11 and $\frac{3}{4}$ of the 2011/12 fishing years).

The majority of all birds returned were males (33, 82.5%); with only Salvin's albatross (n=4) and white-chinned (n=1) and grey petrels having females returned (n=2) (Table 2). Also, with the exception of the Campbell albatross, the majority of the birds returned were adults (38, 95%) (Table 2).

Surface long-liner and trawl vessels have returned birds to date. Detailed analysis of captures per vessel type and target fisheries will be undertaken at the end of the reporting year when this information has been collated from CSP and Ministry of Fisheries.

Most of the returned birds to date had a range of injuries from 'no obvious injury' to 'mangled' (EAB, pers. obs.). Many birds (n=28) had been caught in the trawl nets and were very wet and sandy. Other birds (n=8) showed injuries suggesting entanglement and crush injuries from the trawl warp and blocks. Five birds had grease covering part or all of the body. Both Antipodean albatross were hooked. As stated in the first quarterly report, the NZ banded dotterel had hit the vessel (deck strike) and had a crushed skull. More detailed reporting of injuries and cause of death will be reported at the end of the reporting year.

Fat scores of 1, 2 and 3 were most often recorded in the birds returned between 1 July 2011 and 31 December 2011 (Table 3). Only two birds (New Zealand white-capped albatross and sooty shearwater) had fat scores higher than 3 (Table 3). Using this preliminary data, it appears that the mean fat scores will be similar to other fishing years (Thompson 2009, 2010 a, b).

Stomach contents have been identified into main groups following a similar method to Thompson (2009, 2010a, b) and are shown in Table 4. Nearly 50% of the birds had offal or discards in their stomachs and another 32.5% had empty stomachs (Table 4).

Most of the gizzard contents were natural food items (squid beaks, fish bones and eyeballs and otoliths), but 22.5% of the birds returned had empty gizzards (Table 5). Samples (e.g. squid beaks and otoliths) have been collected for further analysis. Photographs of plastic content have been taken.

The majority (n=28, 70%) of the returned seabirds between 1 July 2011 and 31 December 2011 were identified correctly by the observers. There was 1 (2.5%) identified to the correct group, but wrong species code (although this may relate to changes in the coding system), 3 (7.5%) were identified as small petrels, 2 (5%) were identified as large albatross, 1 (2.5%) needed a new code as it was the first of this species to be returned (i.e. Banded Dotterel), 2 (5%) did not have a code on the label and 3 (7.5%) were identified wrong.

The birds killed and returned to date were caught in a range of Fishing Management Areas (FMA 1, 3, 4, 5, 6 and 7) and general positions are show in Figures 1-2.

As stated in the previous quarterly report, extracts of seabird captures from the Ministry of Fisheries Central Observer Database ("COD") and examination of photographs gave a total of 19 birds that were reported captured or photographed as bird interactions with fishing vessels (and may include some non-capture interactions). A total of 6 seabirds were photographed by observers for the period 1 July to 30

September 2011; in addition to these photographs, there were 13 observed seabird captures that had no photographs taken (Table 6). Of the 19 records, nearly three quarters were of live bird interactions (n=14, 74%, Table 6). The photographs for this period, 1 October 2011 to 31 December 2011 will be completed in the next period when the COD extract has been received from Ministry of Fisheries.

Table 6 Number of seabird interactions photographed or recorded on fishing vessels between 1 July and 30 September 2011.

| | Dead | Alive | Unknown | Total |
|---|-----------|------------|------------|-----------|
| Photographed & listed in Ministry of Fisheries extract | 0 | 6 | 0 | 6 |
| Photographed, but not listed in Ministry of Fisheries extract | 0 | 0 | 0 | 0 |
| No photograph, but listed in Ministry of Fisheries extract | 1 | 8 | 4 | 13 |
| Total | 1 | 14 | 4 | 19 |
| % Total | 5% | 74% | 21% | |

Examination of photographs (with COD extract information) confirmed the identification made by observers in 100% of the time (n=6, Table 7). It should be noted that the majority of the specimens were easily identifiable albatross or petrel species.

Table 7 Analysis of 6 seabird species observer identifications made at sea from the Ministry of Fisheries extract information from fishing vessels between 1 July and 30 September 2011 when compared with photograph identification.

Where: Confirmed = identification confirmed observer identification; New, consistent = identification was to a lower taxonomic group and consistent with the observer identification; and New, not consistent = identification was not consistent with observer identification.

| Species (observer) | Confirmed | New, consistent | New, not confirmed | Total |
|----------------------|-----------|-----------------|--------------------|----------|
| Buller's albatross | 1 | | | 1 |
| Common diving petrel | 1 | | | 1 |
| Grey petrel | 1 | | | 1 |
| Salvin's albatross | 3 | | | 3 |
| Total | 6 | | | 6 |

The quality of the images varied widely. There were a number of issues including only one photograph for some seabirds, not all key features were photographed, poor focus, and under or over-exposure. Poor images were common for birds that were alive and seen onboard for short periods (when photographs were taken from a long distance). A number of seabirds were recorded as having an interaction with the vessel, but no images were taken of these birds and as a result, identification of these birds could not be confirmed. It is important that more photographs are taken of each seabird and that there are images of head, bill, feet, wings (upper and lower) and whole body shots taken. Photographs need to be taken of all bird interactions (as much as possible) and if a photograph of a seabird is taken, data relevant to that bird should be recorded (i.e. observer identification, date, time, haul, sample etc.).

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