



INT 2013/02 IDENTIFICATION OF SEABIRDS CAPTURED IN NEW ZEALAND FISHERIES

QUARTERLY REPORT: 1 July 2013 to 31 December 2013.

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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 INT2013/02.

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 2013 to 31 December 2013.

There have been 128 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.

Examination of photographs from Ministry of Primary Industries observers gave a total of 42 birds that were reported captured or photographed as bird interactions with fishing vessels (and may include some non-capture interactions) for this period. The extract of seabird captures from the Ministry of Primary Industries Central Observer Database ("COD") was received, but only covered the period up to 31 October 2013.

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 Common and scientific names of seabirds captured and returned or photographed from New Zealand fisheries between 1 July 2013 and 31 December 2013.

COMMON NAME	SCIENTIFIC NAME	AUTOPSY	PHOTO
Albatross (unidentified)	Diomedidae		✓
Buller's albatross	<i>Thalassarche bulleri bulleri</i>	✓	✓
Campbell albatross	<i>Thalassarche impavida</i>	✓	
Cape petrel (unidentified)	<i>Daption spp.</i>		✓
Chatham albatross	<i>Thalassarche eremita</i>	✓	
Common Diving Petrel	<i>Pelecanoides urinatrix</i>		✓
Fairy prion	<i>Pachyptila turtur</i>		✓
Giant petrel (unidentified)	<i>Macronectes spp.</i>		✓
Grey petrel	<i>Procellaria cinerea</i>	✓	✓
New Zealand White-capped albatross	<i>Thalassarche steadi</i>	✓	✓
Petrel (unidentified)	Procellariidae		✓
Prion (unidentified)	<i>Pachyptila spp.</i>		✓
Salvin's albatross	<i>Thalassarche salvini</i>	✓	✓
Short-tailed shearwater	<i>Puffinus tenuirostris</i>	✓	
Snares cape petrel	<i>Daption capense australe</i>	✓	✓
Sooty shearwater	<i>Puffinus griseus</i>	✓	
Southern Royal albatross	<i>Diomedea epomophora</i>	✓	
Wandering albatross (unidentified)	<i>Diomedea exulans spp.</i>	✓	
Westland petrel	<i>Procellaria westlandica</i>	✓	✓
White-chinned petrel	<i>Procellaria aequinoctialis</i>	✓	✓
White-faced storm petrel			✓

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 128 seabirds (comprising of 13 taxa) were returned from 23 vessels between 1 July 2013 and 31 December 2013 (Table 2).

The monthly distribution of returned specimens was not evenly spread across the fishing year with most birds returned to date being caught in October (49, 38.3%) (Table 2). However this is to be expected as these specimens were only returned from those vessels fishing at sea between 1 July 2013 and 31

December 2013. It is likely that this distribution pattern will change as further specimens are returned through the remainder of the reporting period (i.e. first ½ of the 2013/14 fishing years).

Table 2 Species and numbers of seabirds killed and returned from observed fishing vessels between 1 July 2013 and 31 December 2013, by month of capture.

SPECIES	MONTH												TOTAL	% TOTAL
	J	F	M	A	M	J	J	A	S	O	N	D		
Buller's albatross							4	2	1		1	2	10	7.8%
Campbell albatross							1		1				2	1.6%
Chatham albatross										1			1	0.8%
Grey petrel								9					9	7.0%
NZ White-capped albatross							2		1		2	1	6	4.7%
Salvin's albatross								7	12	12	8	1	40	31.3%
Short-tailed shearwater										3			3	2.3%
Snares Cape petrel								1					1	0.8%
Sooty shearwater									1	9	3	2	15	11.7%
Southern Royal albatross							1						1	0.8%
Wandering albatross (unidentified)											1		1	0.8%
Westland petrel								1					1	0.8%
White-chinned petrel										24	9	5	38	29.7%
TOTAL	0	0	0	0	0	0	8	20	16	49	24	11	128	
% TOTAL	0	0	0	0	0	0	6.25%	15.6%	12.5%	38.3%	18.8%	8.6%		

Table 3 Species and numbers of seabirds killed and returned from observed fishing vessels between 1 July 2013 and 31 December 2013, by sex (M = male, F = female, U = unknown) and age (A = adult, BA = breeding adult, N = non-breeding adult, SA = sub-adult, I = immature and J = juvenile, U = unknown).

SPECIES	SEX			AGE							TOTAL	% TOTAL	
	M	F	U	A	BA	N	SA	I	J	U			
Buller's albatross	8	1	1	10	8	1					1	10	7.8%
Campbell albatross	1		1	1					1			2	1.6%
Chatham albatross	1			1	1							1	0.8%
Grey petrel	9			9	9							9	7.0%
NZ White-capped albatross	4	1	1	6	2						4	6	4.7%
Salvin's albatross	19	18	3	40	26	1					13	40	31.3%
Short-tailed shearwater	2	1		3		2					1	3	2.3%
Snares Cape petrel		1					1					1	0.8%
Sooty shearwater	15			15	5	6					4	15	11.7%
Southern Royal albatross	1			1							1	1	0.8%
Wandering albatross (unidentified)		1		1	1							1	0.8%
Westland petrel		1		1	1							1	0.8%
White-chinned petrel	18	13	7	38	16	8					14	38	29.7%
TOTAL	78	37	13	126	69	18	1	1	0	0	38	128	
% TOTAL	60.9%	28.9%	10.2%	98.4%	53.9%	14.1%	0.8%	0.8%	0	0	29.7%		

Table 4 Comparison of fat scores in the returned birds between 1 July 2013 and 31 December 2013 (1= no fat to 5 = extremely fat, U = unknown).

SPECIES	FAT SCORE						TOTAL	MEAN (\pm SE)
	1	2	3	4	5	U		
Buller's albatross	5	4				1	10	1.4 \pm 0.2
Campbell albatross	1					1	2	1.0 \pm 0.0
Chatham albatross	1						1	1.0 \pm 0.0
Grey petrel	5	4					9	1.4 \pm 0.2
NZ White-capped albatross	2	1	2			1	6	2.0 \pm 0.4
Salvin's albatross	15	13	5	4		3	40	1.9 \pm 0.2
Short-tailed shearwater	3						3	1.0 \pm 0.0
Snares Cape petrel	1						1	1.0 \pm 0.0
Sooty shearwater	11	4					15	1.3 \pm 0.1
Southern Royal albatross	1						1	1.0 \pm 0.0
Wandering albatross (unidentified)	1						1	1.0 \pm 0.0
Westland petrel			1				1	3.0 \pm 0.0
White-chinned petrel	14	11	6			7	38	1.7 \pm 0.1
TOTAL	60	37	14	4	0	13	128	1.7 \pm 0.1
% TOTAL	46.9%	28.9%	10.9%	3.1%	0%	10.2%		

Table 5 Stomach contents of seabirds killed and returned on fishing vessels between 1 July 2013 and 31 December 2013.

Note: Birds can have multiple items in the stomachs resulting in higher content figures than the total number of seabirds killed and returned ($n = 128$).

SPECIES	EMPTY	GONE	BAIT	OFFAL (OR DISCARDS)	NATURAL	SLUDGE	PROVENTRICULAR OIL
Buller's albatross	3	1	1	5			1
Campbell albatross	1						
Chatham albatross				1			
Grey petrel	3			2			6
NZ White-capped albatross	1	1		6	2	2	
Salvin's albatross	12	3		27	14		
Short-tailed shearwater				1	4		
Snares Cape petrel	1						
Sooty shearwater	6			2	8		1
Southern Royal albatross					1		
Wandering albatross (unidentified)	1						
Westland petrel						1	1
White-chinned petrel	9	6	2	13	14		
TOTAL	37	11	3	57	43	3	9
% TOTAL	28.9%	8.6%	2.3%	44.5%	33.6%	2.3%	7.0%

Table 6 Gizzard contents of seabirds killed and returned on fishing vessels between 1 July 2013 and 31 December 2013.

Note: Birds can have multiple items in the gizzard resulting in higher content figures than the total number of seabirds killed and returned ($n = 128$).

SPECIES	EMPTY	GONE	SQUID BEAKS	OTOLITHS	FISH OR SQUID EYEBALLS	FISH BONES, FLESH OR SKIN	PLASTIC	SEEDS, SHELL OR STONE	WORMS	SEAWEED
Buller's albatross	5	1	2		2	2			3	
Campbell albatross	1									
Chatham albatross			1					1		1
Grey petrel			9	3	4	2			4	
NZ White-capped albatross	1	1	1	1	3	4			1	
Salvin's albatross	9	3	8	14	14	21		4	5	3
Short-tailed shearwater			2			1	1	3		
Snares Cape petrel			1					4		
Sooty shearwater				7	2	3	5	15	1	
Southern Royal albatross				1	1					
Wandering albatross (unidentified)			1							
Westland petrel			1			1				
White-chinned petrel	1	7	30	9	2	3		4	5	
TOTAL	17	12	56	35	28	38	6	31	19	4
% TOTAL	13.3%	9.4%	44.8%	27.3%	21.9%	29.7%	4.7%	24.2%	14.8%	3.1%

Seabirds returned to date were dominated by five species (Salvin's albatross *Thalassarche salvini* ($n = 40$, 31.3%), white-chinned petrel *Procellaria aequinoctialis* ($n = 38$, 29.7%), sooty shearwater *Puffinus griseus* ($n = 15$, 11.7%), Buller's albatross *Thalassarche bulleri bulleri* ($n = 10$, 7.8%) and grey petrel *Procellaria cinerea* ($n = 9$, 7.0%)) (Table 2). These five species accounted for 87.5% of all returns to date (Table 2). The remaining 8 taxa had either captures of two, three or six individuals or single captures (Table 2).

One adult female Salvin's albatross had a uniquely numbered metal band (O-37151), having been banded in October 2012 as an adult on Proclamation Island (The Bounties); this bird was also carrying a geolocator device as part of a tracking study by NIWA (P. Sagar, pers. comm.). Banded specimens provide valuable longevity, survival and at-sea distribution data. Specimens still need to be checked for PTT tags (PTT tag reader to be provided by DOC).

The majority of all birds returned were males ($n = 78$, 60.9%); with Salvin's albatross having similar numbers of males and females and all the Wandering albatross, Westland petrel and Snares cape petrel that were returned were female (Table 3). Also, with the exception of the Snares cape petrel and Campbell albatross, the majority of the birds returned were adults ($n = 126$, 98.4%) (Table 3).

Fat scores of 1 and 2 were most often recorded in the birds returned between 1 July 2013 and 31 December 2013 (Table 4). Only four birds had fat scores higher than 3 and no bird had maximum fat scores of 5 (Table 4). The mean fat score was 1.7 ± 0.1 (Table 4). 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 5. Over 44% of the birds had offal or discards in their stomachs, 3 birds had bait in their stomachs (2.3%) and another 37 (28.9%) had empty stomachs (Table 5).

Most of the gizzard contents were natural food items (squid beaks, fish bones, fish skin and eyeballs and otoliths), but 13.3% of the birds returned had empty gizzards (Table 6). Samples (e.g. squid beaks and otoliths) have been collected for further analysis. Six birds had plastic in their stomachs (4.7%); these were either short-tailed shearwaters or sooty shearwaters (Table 6). Photographs of plastic content have been taken (if present).

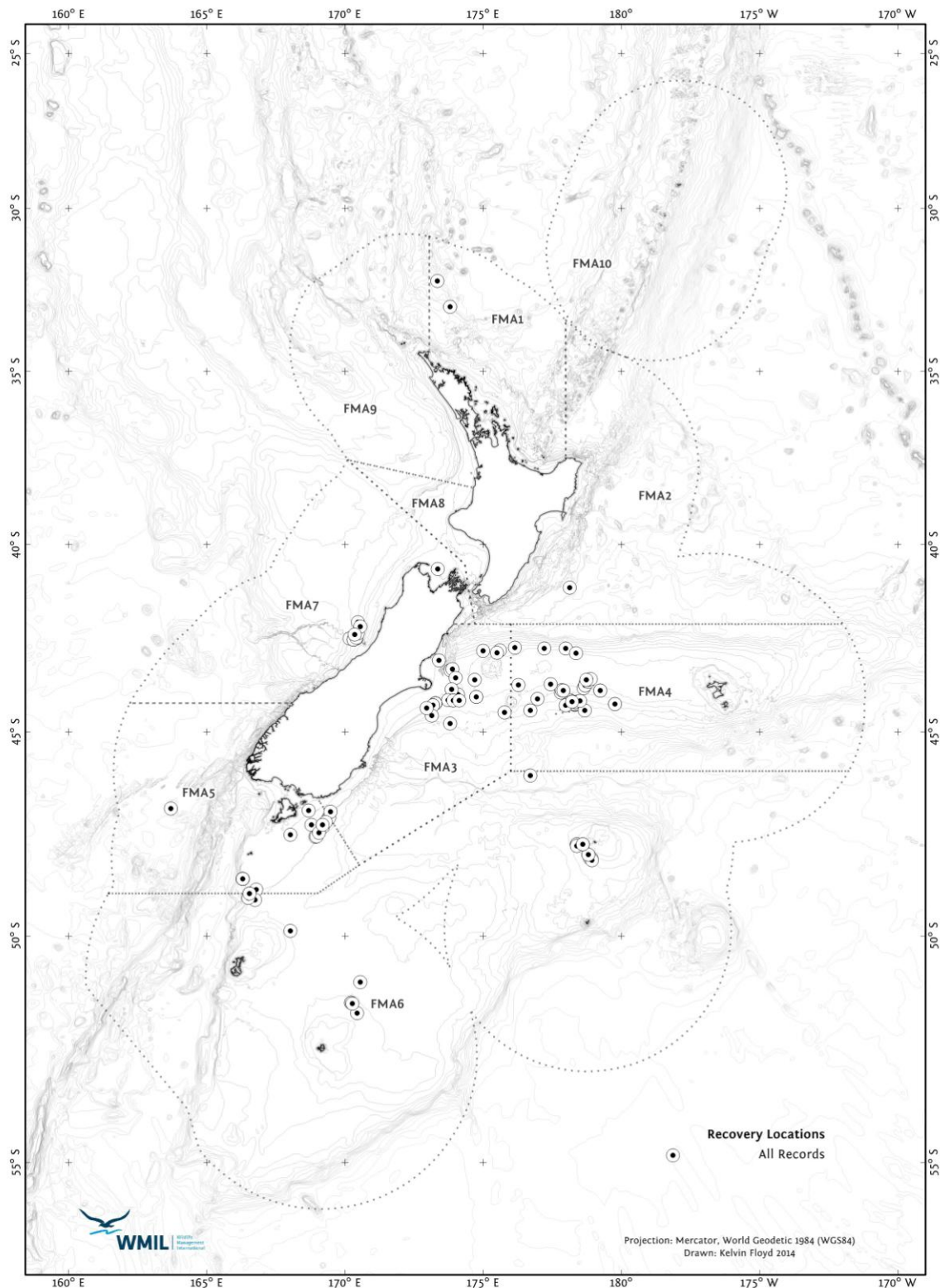
Most of the returned birds to date had a range of injuries from 'no obvious injury' to 'mangled' (EAB, pers. obs.). There were 18 birds (14.1%) that had hooks in the bill or wing. Nearly three-quarters of the birds ($n = 95$, 74.2%) had been caught in the trawl nets and were very wet and sandy. Other birds ($n = 24$, 18.8%) showed injuries suggesting entanglement and crush injuries from the trawl warp and blocks. Twenty-one birds (16.4%) had grease covering part or all of the body. More detailed reporting of injuries and cause of death will be reported at the end of the reporting year.

The majority (76.6%) of the returned seabirds between 1 July 2013 and 31 December 2013 were identified correctly by the observers. There were 3 (2.3%) identified to the correct group, but wrong species code (although this may relate to changes in the coding system), 1 (0.8%) identified as large seabird, 4 (3.1%) did not have a code on the label, 1 (0.8%) species code did not exist and 21 (16.4%) was identified wrong. The birds that were incorrectly identified were Salvin's albatross ($n = 10$), white-chinned petrels ($n = 4$) and short-tailed shearwaters ($n = 3$) and one Buller's albatross, Campbell albatross and grey petrel.

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

Figure 1 Catch locations of all seabirds killed and returned in New Zealand fisheries for necropsy between 1 July 2013 and 31 December 2013.

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).



Both trawl and longline vessels have returned birds to date and preliminary data are shown in Table 7. 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.

Table 7 Number of seabirds of each species killed and returned from observed fishing vessels between 1 July 2013 and 31 December 2013, by fisheries type.

Species	Bottom/Midwater Trawl	Surface Longline	Total
Buller's albatross	8	2	10
Campbell albatross	2		2
Chatham albatross		1	1
Grey petrel	9		9
NZ White-capped albatross	6		6
Salvin's albatross	33	7	40
Short-tailed shearwater	3		3
Snares Cape petrel	1		1
Sooty shearwater	12	3	15
Southern Royal albatross	1		1
Wandering albatross (unidentified)		1	1
Westland petrel		1	1
White-chinned petrel	37	1	38
Total	112	16	128
% Total	87.5%	12.5%	

Examination of photographs gave a total of 42 birds that were reported captured or photographed as bird interactions with fishing vessels (and may include some non-capture interactions) between 1 July 2013 and 31 December 2013. Complete examination of these photographs could not be compared with the full (1 July 2013 to 31 December 2013) COD extract information as WMIL has only received an extract up to 31 October 2013. A total of 14 seabirds were photographed and another 28 interactions were recorded by observers for the period 1 July 2013 to 31 December 2013 (Table 8). Of these records, 38 were of live bird interactions and 4 birds were dead (Table 8).

Table 8 Number of seabird interactions photographed or recorded on fishing vessels between 1 July 2013 and 31 December 2013.

	Dead	Alive	Total
Photograph & listed in Ministry of Primary Industries COD extract	0	3	3
Photograph; not listed in Ministry of Primary Industries COD extract	1	10	11
No photograph; listed in Ministry of Primary Industries COD extract	3	25	28
Total	4	38	42
% Total	9.5%	90.5%	

The quality of the images continues to vary 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. Several images showed crewmembers or observers holding or releasing the birds, but do not have any other identifying photographs (many of these are taken from a distance). 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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