



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

### **QUARTERLY REPORT: October 2010 to March 2011.**

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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 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 in New Zealand fisheries and/or using photographs between 1 January and 31 March 2011. It also includes the earlier data (1 October to 31 December 2010) from the first quarterly report (Bell 2011). There have been a total of 120 birds necropsied from this period (59 between 1 October to 31 December 2010 and 61 between 1 January and 31 March 2011). 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. No photographs have been received to date. Analysis of photographs from this period 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 from New Zealand fisheries between 1 October 2010 and 31 March 2011.

COMMON NAME	SCIENTIFIC NAME
Black petrel	<i>Procellaria parkinsoni</i>
Common diving petrel	<i>Pelecanoides urinatrix</i>
Flesh-footed shearwater	<i>Puffinus carneipes</i>
Gibson's albatross	<i>Diomedea antipodensis gibsoni</i>
Salvin's albatross	<i>Thalassarche salvini</i>
Short-tailed shearwater	<i>Puffinus tenuirostris</i>
Sooty shearwater	<i>Puffinus griseus</i>
Southern Black-browed albatross	<i>Thalassarche melanophris</i>
Southern Royal albatross	<i>Diomedea epomophora</i>
White-capped albatross	<i>Thalassarche steadi</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). In instances where the birds have been damaged by sea lice the fat score is listed as unknown.

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](mailto: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.). Where possible, the taxon, age, sex and provenance of the seabirds pictured will be determined.

### **Results:**

A total of 120 seabirds (comprising of 11 taxa) were returned from 17 vessels between 1 October 2010 and 31 March 2011 (59 between 1 October to 31 December 2010 and 61 between 1 January and 31 March 2011, Table 2). Seabirds returned to date were dominated by four species (sooty shearwater (41, 34%), white-chinned petrel (38, 32%), flesh-footed shearwater (15, 13%) and white-capped albatross (13, 11%), Table 2). These four species, together with Salvin's albatross (7, 6%) accounted for 96% of all returns to date (Table 2). The remaining 6 taxa had only single captures (Table 2).

No specimens had uniquely numbered bands. 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 (34, 28%), February (27, 23%) or March (29, 24%, Table 2). However this is to be expected as these specimens were only returned from those vessels fishing at sea between 1 October 2010 and 31 March 2011. It is likely that this distribution pattern will change as further specimens are returned through the remainder of the 2010/11 fishing year.

The majority of all birds returned were males (85, 71%); however flesh-footed shearwater (11, 73%) returns were dominated by females (Table 3). Also, with the exception of the Salvin's albatross where all birds were either sub-adults or immatures, the majority of the birds returned were adults (113, 94%, Table 3). Of the 113 adults, 79 (70%) were breeding, 31 (27%) were non-breeding and 3 (3%) could not have the breeding status confirmed due to sea lice damage.

**Table 2** Species and numbers of seabirds killed and returned from observed fishing vessels between 1 October 2010 and 31 March 2011, by month of capture.

SPECIES	MONTH												TOTAL	% TOTAL
	J	F	M	A	M	J	J	A	S	O	N	D		
Black petrel											1		<b>1</b>	<b>1</b>
Common diving petrel			1										<b>1</b>	<b>1</b>
Flesh-footed shearwater										15			<b>15</b>	<b>13</b>
Gibson's albatross											1		<b>1</b>	<b>1</b>
Salvin's albatross		1								3	2	1	<b>7</b>	<b>6</b>
Short-tailed shearwater										1			<b>1</b>	<b>1</b>
Sooty shearwater		16	13	1						11			<b>41</b>	<b>34</b>
Southern Black-browed albatross											1		<b>1</b>	<b>1</b>
Southern Royal albatross	1												<b>1</b>	<b>1</b>
White-capped albatross	2	4	4	2						1			<b>13</b>	<b>11</b>
White-chinned petrel		6	11	1						3	14	3	<b>38</b>	<b>32</b>
<b>TOTAL</b>	<b>3</b>	<b>27</b>	<b>29</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>34</b>	<b>19</b>	<b>4</b>	<b>120</b>	
<b>% TOTAL</b>	<b>3</b>	<b>23</b>	<b>24</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>28</b>	<b>16</b>	<b>3</b>		

**Table 3** Species and numbers of seabirds killed and returned from observed fishing vessels between 1 October 2010 and 31 March 2011, by Sex (M = male, F = female, U = unknown) and age (TA = total adults, 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	ADULTS				PRE-BREEDERS						
				TA	BA	N	U	SA	I	J	U			
Black petrel	1			1		1							1	1
Common diving petrel	1			1		1							1	1
Flesh-footed shearwater	4	11		15	9	6							15	13
Gibson's albatross	1			1		1							1	1
Salvin's albatross	4	3						6	1				7	6
Short-tailed shearwater		1		1		1							1	1
Sooty shearwater	37	4		41	30	11							41	34
Southern Black-browed albatross		1		1	1								1	1
Southern Royal albatross	1			1	1								1	1
White-capped albatross	8	5		13	11	2							13	11
White-chinned petrel	29	6	3	38	27	8	3						38	32
<b>TOTAL</b>	<b>85</b>	<b>32</b>	<b>3</b>	<b>113</b>	<b>79</b>	<b>31</b>	<b>3</b>	<b>6</b>	<b>1</b>				<b>120</b>	
<b>% TOTAL</b>	<b>70.8</b>	<b>26.7</b>	<b>2.5</b>	<b>94</b>	<b>70</b>	<b>27</b>	<b>3</b>	<b>5</b>	<b>1</b>					

**Table 4** Comparison of fat scores in the returned birds between 1 October 2010 and 31 March 2011 (1= no fat to 5 = extremely fat, U = unknown).

SPECIES	FAT SCORE						TOTAL	MEAN ( $\pm$ SE)
	1	2	3	4	5	U		
Black petrel			1				<b>1</b>	<b>3 <math>\pm</math> 0</b>
Common diving petrel			1				<b>1</b>	<b>3 <math>\pm</math> 0</b>
Flesh-footed shearwater		5	10				<b>15</b>	<b>2.7 <math>\pm</math> 0.1</b>
Gibson's albatross	1						<b>1</b>	<b>1 <math>\pm</math> 0</b>
Salvin's albatross	4	2	1				<b>7</b>	<b>1.6 <math>\pm</math> 0.3</b>
Short-tailed shearwater	1						<b>1</b>	<b>1 <math>\pm</math> 0</b>
Sooty shearwater	12	23	5			1	<b>41</b>	<b>1.8 <math>\pm</math> 0.1</b>
Southern Black-browed albatross		1					<b>1</b>	<b>2 <math>\pm</math> 0</b>
Southern Royal albatross	1						<b>1</b>	<b>1 <math>\pm</math> 0</b>
White-capped albatross	8	3	2				<b>13</b>	<b>1.5 <math>\pm</math> 0.2</b>
White-chinned petrel	18	8	5	3	1	3	<b>38</b>	<b>1.9 <math>\pm</math> 0.2</b>
<b>TOTAL</b>	<b>45</b>	<b>42</b>	<b>25</b>	<b>3</b>	<b>1</b>	<b>4</b>	<b>120</b>	
<b>% TOTAL</b>	<b>37.5</b>	<b>35</b>	<b>21</b>	<b>3</b>	<b>1</b>	<b>3</b>		

**Table 5** Stomach contents of seabirds killed and returned on fishing vessels between 1 October 2010 and 31 March 2011.

SPECIES	EMPTY	GONE <sup>1</sup>	BAIT <sup>2</sup>	OFFAL (OR DISCARDS) <sup>3</sup>	NATURAL <sup>4</sup>	SLUDGE <sup>5</sup>	PROVENTRICULAR OIL
Black petrel	1						
Common diving petrel	1						
Flesh-footed shearwater	4			10	1		
Gibson's albatross					1		
Salvin's albatross	2	1		3	1		
Short-tailed shearwater				1			
Sooty shearwater	10		1	20	3	6	1
Southern Black-browed albatross	1						
Southern Royal albatross	1						
White-capped albatross	4			7		1	1
White-chinned petrel	9	3	5	14	3	4	1
<b>TOTAL</b>	<b>33</b>	<b>4</b>	<b>6</b>	<b>55</b>	<b>9</b>	<b>11</b>	<b>3</b>
<b>% TOTAL</b>	<b>27.5</b>	<b>3</b>	<b>5</b>	<b>45.5</b>	<b>7.5</b>	<b>9</b>	<b>2.5</b>

<sup>1</sup> Gone = stomach missing or damaged by sea lice

<sup>2</sup> Bait = identifiable (regularly sized) pieces of fish or squid

<sup>3</sup> Discards or Offal = whole fish (usually small bycatch fish); fish heads, fillets, vertebrae and skin or squid tentacles, heads and beaks

<sup>4</sup> Natural = identifiable prey fish or squid (whole or parts), salps and krill

<sup>5</sup> Sludge = usually fish sludge (minced fish or squid), could be offal or discards or natural

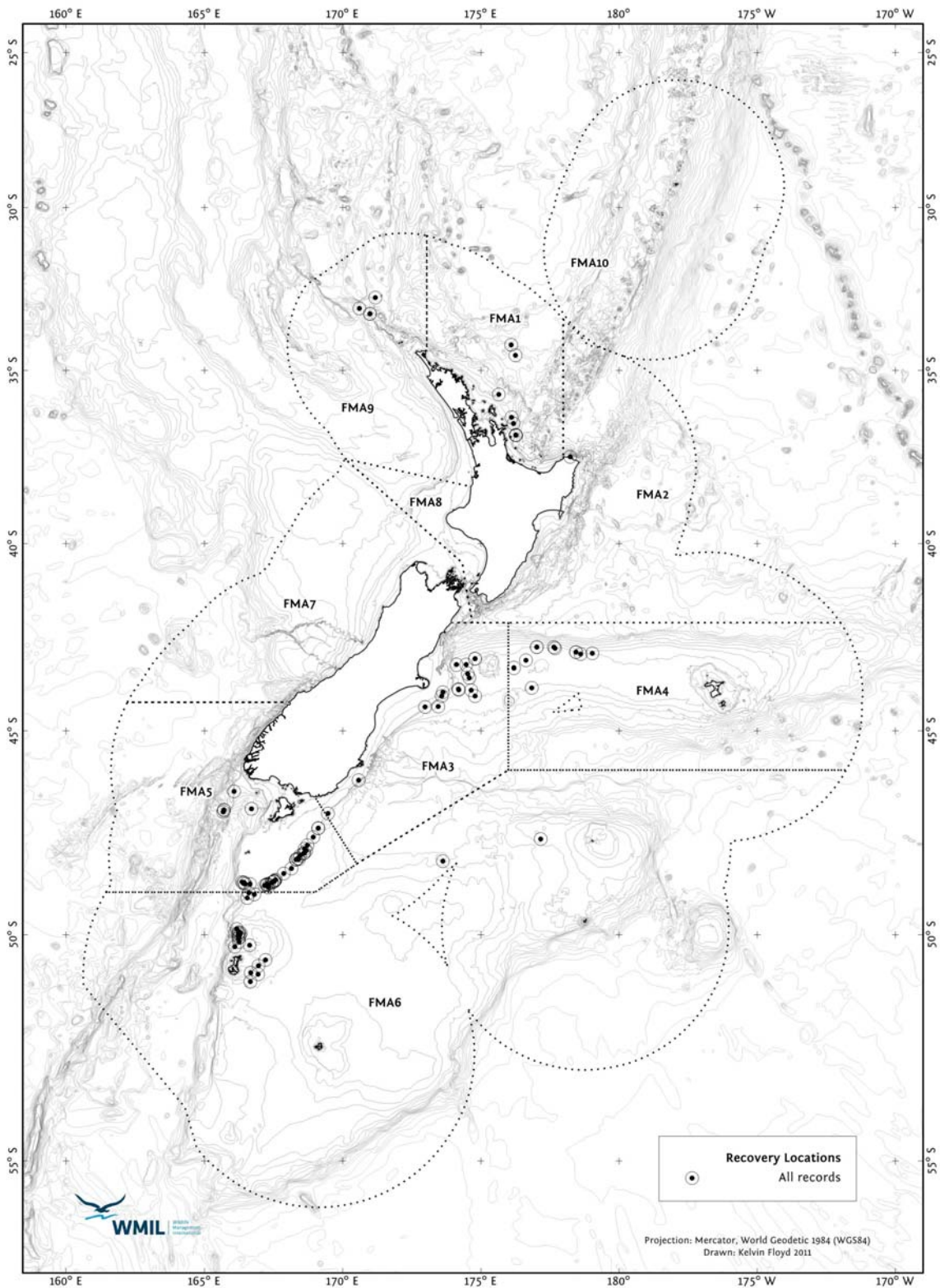
**Table 6** Gizzard contents of seabirds killed and returned on fishing vessels between 1 October 2010 and 31 March 2011.

SPECIES	EMPTY	GONE	SQUID BEAKS	BILE	OTOLITHS	EYEBALLS (fish or squid)	FISH BONES	SLUDGE	SKIN (fish)	FLESH (squid or fish)	FEATHERS	PROVENTRICULAR OIL	PLASTIC	SEEDS OR STONE	WORMS	SEAWEED	EGG SHELL	STRING OR TWINE
Black petrel			1															1
Common diving petrel	1																	
Flesh-footed shearwater			8		5	2	3						13	1	1			
Gibson's albatross			1				1											
Salvin's albatross	1		2	1	3	5	4											
Short-tailed shearwater													1					
Sooty shearwater	6		12		5	6	4		1	2		2	18	3	2			2
Southern Black-browed albatross			1															
Southern Royal albatross			1			1							1				1	
White-capped albatross	5		3		2	6	4	1					1			1		
White-chinned petrel	1	3	34		3	2	10		3	1	1		2	1	6			3
<b>TOTAL</b>	<b>14</b>	<b>3</b>	<b>63</b>	<b>1</b>	<b>18</b>	<b>22</b>	<b>26</b>	<b>1</b>	<b>4</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>36</b>	<b>5</b>	<b>9</b>	<b>1</b>	<b>1</b>	<b>6</b>
<b>% TOTAL</b>	<b>12</b>	<b>2.5</b>	<b>52.5</b>	<b>1</b>	<b>15</b>	<b>18</b>	<b>22</b>	<b>1</b>	<b>3</b>	<b>2.5</b>	<b>1</b>	<b>2</b>	<b>30</b>	<b>4</b>	<b>7.5</b>	<b>1</b>	<b>1</b>	<b>5</b>



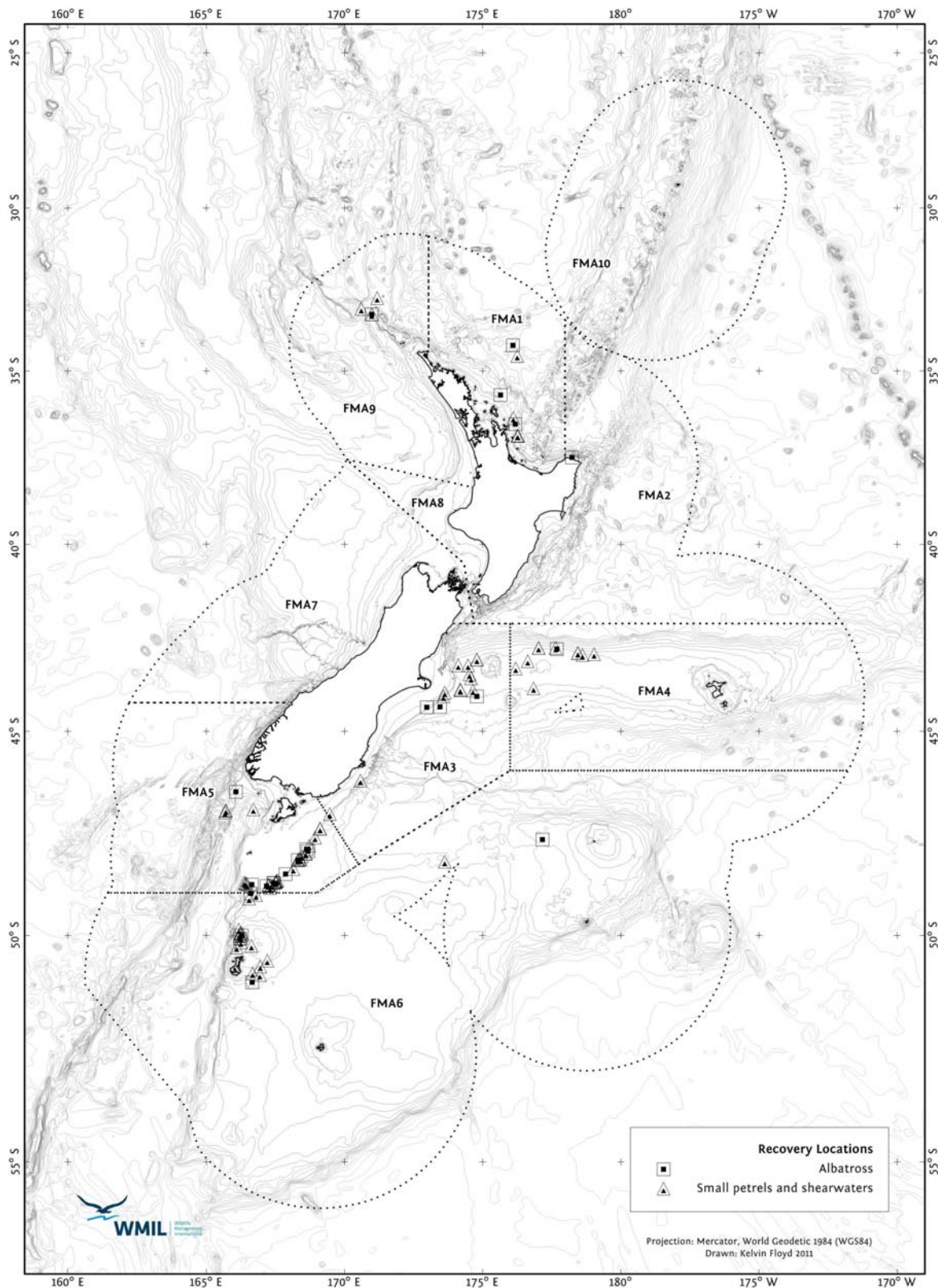
**Figure 1** Catch locations of all seabirds killed and returned in New Zealand fisheries for necropsy between 1 October 2010 and 31 March 2011.

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 October 2010 and 31 March 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).



Fat scores less than 3 were recorded 73% of the time in returned birds between 1 October 2010 and 31 March 2011 (Table 4). Fat scores of 3 were recorded 21% of the time. Only 4% of the birds (all white-chinned petrels) returned had fat scores over 3 (Table 4). There were four birds (4%) that could not have fat scores confirmed due to sea lice damage (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. There were 55 birds (46%) that had offal or discards in their stomachs and five white-chinned petrels and one sooty shearwater had bait in their stomachs (Table 5). Two birds (one black petrel and one white-chinned petrel) had blue dyed bait or traces of blue dye in their stomachs (EAB, pers. obs.). Most of the gizzard contents were natural food items (squid beaks, fish bones and eyeballs and otoliths), but 30% of the birds returned also had ingested plastic and 5% had ingested string or twine (Table 6). In addition, 12% of the birds had empty stomachs (Table 6). Samples (e.g. squid beaks and otoliths) have been collected for further analysis.

Both long-line and trawl vessels returned birds to date. There have been 6 birds returned from surface long-line vessels, 10 from bottom long-line vessels and the remaining 104 birds have been returned from bottom or mid water trawl vessels. Detailed analysis of captures per vessel type and target fisheries will be undertaken at the end of the observer 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 had been caught in the trawl nets or recovered in the pounds and were very wet and sandy (i.e. drowned, n=91). Other birds showed injuries suggesting entanglement and crush injuries from the trawl warp and blocks (n=11). There were 17 birds that had hook injuries and two had hooks still present (both on the wing). There were 15 birds with grease covering part or all of the body. One bird had the remains of a hook in the belly. More detailed reporting of injuries and cause of death will be reported at the end of the observer year.

The majority (82%) of the returned seabirds between 1 October 2010 and 31 March 2011 were identified correctly by the observers. There were 11 (9%) identified to the correct group or size class, but wrong species code (although this may relate to changes in the coding system) and 4 (3%) were identified incorrectly. In addition, 7 birds (6%) did not have an observer identification code on the return label.

The birds killed and returned to date were caught in a range of Fishing Management Areas (FMA 1, 2, 3, 4, 5, 6 and 9) and general positions are shown in Figures 1-2.

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