

Autopsy report for seabirds killed
and returned from New Zealand
fisheries 1 October 1996 to
31 December 1997
Birds returned by Ministry of Fisheries
observers to the Museum of New
Zealand Te Papa Tongarewa

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1. Introduction

During the reporting period 1 October 1996 to 31 December 1997, some 350 seabirds were returned to the Museum of New Zealand Te Papa Tongarewa from the Ministry of Fisheries Observer Programme for definitive identification and autopsy. This work was undertaken for the Department of Conservation as CSL Contract 96/3050. Costs of labels for specimens, importing them under the Biosecurity Act, transporting them from Port of Landing to the Museum by refrigerated truck, and storing them in cold stores were met by the Museum, with other expenses being partly met by the Conservation Services Levy.

In 1996/97 birds were received from trawlers, domestic tuna longliners, chartered joint Venture Japanese tuna longliners, and domestic bottom (ling) longliners (Tables 1-3). The number of specimens returned does not in any way indicate probable catch rates for differing classes of vessel or fishing method, as the observer coverage was not equally distributed throughout the fishing effort. Specific catch locations for the specimens returned are not provided here on the grounds of commercial sensitivity as required by the Ministry of Fisheries and some parts of the fishing industry. However, the maps (Figures 1-5) provide the general location of catches and species returned for the period covered by this report. The distribution shown does not imply any relationship with fishing effort or method as indicated above.

2. Methods

2.1 IDENTIFICATION

A proposed new classification of albatross species based on DNA analyses has increased the number of recognised albatross species (Nunn et al. 1996; Robertson & Nunn 1998; Croxall & Gales 1998). The practical implication of these changes for New Zealand are that many of our distinctive albatross subspecies will henceforward be treated as full species. However, in New Zealand fishery databases, albatrosses have always been listed by subspecies, where this was determinable. Thus these taxonomic changes will not reduce the value of the New Zealand data already collected, and comparability between years will not be jeopardised. The names used throughout the report reflect these name changes.

In 1997 all birds returned to the Museum were sufficiently well preserved to allow identification to species and subspecies. All birds were identified by the author using standard external morphological characters, supplemented, where necessary, by measurements. Banding details are shown in Table 3, where they are available. Representative specimens of most species caught were retained for reference in the Te Papa collection. This is the world's most comprehensive albatross and petrel collection, and is a valuable tool for verifying identifications.

2.2 SEXING AND AGEING BIRDS

Noel Hyde sexed all birds by dissection, except those which had been disembowelled on the longline by scavengers such as sharks. Birds were aged by a combination of plumage, gonadal, and brood patch characters. Age categories used were:

- *juveniles* - birds in their first year of life (first plumage)
- *immatures* - older birds in non-adult plumage
- *subadults* - birds in adult plumage which have not yet bred (gonadal evidence)
- *adults* - birds in adult plumage where breeding status could not be determined
- *breeding adults* - birds which were breeding at the time of capture (gonadal and brood patch evidence)
- *non-breeding adults* - adults which were definitely not breeding at the time of capture (flight-feather moult, gonadal, and brood patch evidence)

Determination of the breeding status of adults: Breeding status could be assessed for many individuals by looking at their flight-feather moult, gonad development, and brood patch, in relation to the date caught. *Non-breeders:* Adult birds in active flight-feather moult are not breeders. Other non-breeders were classed as such by their enlarged gonads during the incubation period, when breeders' gonads have already regressed. Also, although brood patches of non-breeders become clear of down several weeks later than those of breeders, they remain bare longer (Bartle 1968). At nesting time *breeders* show no moult except for contour feather (= body) moult, gonads are (briefly) much enlarged, and the brood patch is bare. Males tend to have whitish or bicoloured testes, and females greatly enlarged ovules. An independent check on the assessment of breeding status was sometimes available from banding data.

2.3 SUBCUTANEOUS FAT SCORE

The amount of subcutaneous fat was scored by Noel Hyde to obtain a general idea of body condition as follows: 1 = no fat; 2 = little fat; 3 = moderate fat; 4 = fat; 5 = very fat

2.4. STOMACH CONTENTS

The contents of the gizzard and proventriculus was examined by Noel Hyde and identified as to major animal group, e.g. fish, squid, etc.

2.5. MOULT AND BROOD PATCH DEVELOPMENT

Active wing or tail moult was noted by Noel Hyde, as well as the active moult of body (= contour) feathers, which is most evident when the skin is turned inside out. Presence or absence of down on the brood patch was recorded.

3. Results

Composition of catch: Thirteen taxa of albatrosses and six petrel species were recovered. Details of numbers recorded caught by each vessel type appear in Table 1, including a detailed breakdown of the sex and age frequency of species caught. All species had previously been recorded as caught in New Zealand fisheries, except for the Pacific (previously Northern Buller's) albatross.

Species caught: 65% of the total birds returned were albatrosses, and 84% of these were caught by the joint Venture Japanese tuna longliners. Also noteworthy, was the capture of several endangered Chatham albatross and black petrels by domestic tuna and ling (bottom) longline vessels. Species caught for which population declines have been documented included snowy and Gibson's (Auckland Is wandering) albatross, Campbell (previously New Zealand black-browed) albatross, and light-mantled sooty albatross.

The most frequently caught species were grey petrel, Antipodean (wandering) albatross, Campbell albatross, and light-mantled sooty albatross, in that order. Among these, the numbers of Antipodean (wandering) albatross and light-mantled sooty albatross were much higher than recorded in previous years, probably reflecting a concentration of observed sets in the Bounty Trough early in the season.

Sex ratios: Males were most frequently caught among the three "wandering" albatrosses, white-capped, Buller's and light-mantled sooty albatrosses, as well as white-chinned petrel (Table 1). Females predominated for grey petrels caught.

Age composition of the seabird catch: In five species (white-capped, Salvin's, Campbell and black-browed albatross, and northern giant petrel), immatures formed a significant proportion of the returned catch (Tables 1, 2) whereas, in all others, breeding adults were the most frequently caught (Tables 1, 2).

Stomach contents and subcutaneous fat levels - their significance: Fewer than 11% of the birds had significant food remains left in the stomach (Table 2). This is similar to results obtained in New Zealand in previous years. There was no evidence that birds had regurgitated food when hooked (*contra* Klages et al. 1995), but rather that a contributing factor to the birds' capture was hunger. Six stomachs contained either the remains of other birds, or plastic pellets, an indication that birds are hungry (Harper & Fowler 1987). However, of the 350 birds caught, all but 9 were classed as moderate to very fat,

and thus I concluded that most birds caught were not starved, nor adversely affected by El Nino.

4. Acknowledgements

New Zealand Scientific Observers dedicated hard work over long hours to recording data on seabird mortality and to retaining seabirds for autopsy. This report is principally based on their valuable work. Noel Hyde, Collection Manager (Birds) at Te Papa, performed the autopsies. Lynda Griggs at NIWA and Reg Blezard at DOC were helpful in providing data that was inadvertently omitted by observers. I also wish to thank Ian West at DOC for his untiring support and patience and CJR Robertson for assistance in the formatting of the report.

Seabed Mapping New Zealand Ltd constructed the maps from position data supplied from the autopsy database. Bernie and Jack also helped with recording the label data.

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TABLE 1.
Species and numbers of seabirds returned from various fisheries in 1996-1997

	Domestic bottom longliner	Domestic tuna longliner	Joint venture tuna longliner	Scampi trawler	Squid trawler	Trawler	TOTALS	Male sex	Female sex	Unknown sex	Adult	Non-adult	Unknown age
Antipodean (Wandering) Albatross	-	-	52	-	-	-	52	31	19	2	48	4	-
Black Petrel	-	2	-	-	-	-	2	1	1	-	2	-	-
Black-browed Albatross	-	-	18	-	-	-	18	8	10	-	6	12	-
Buller's Albatross	-	-	8	-	-	-	8	6	2	-	8	-	-
Campbell Albatross	-	2	42	-	1	-	45	23	19	3	31	14	-
Chatham Albatross	4	-	1	-	-	-	5	4	1	-	4	1	-
Flesh-footed Shearwater	-	7	-	-	-	-	7	3	4	-	7	-	-
Gibson's (Wandering) Albatross	-	2	8	-	-	-	10	5	3	2	10	-	-
Grey Petrel	4	-	62	-	-	-	66	18	48	-	66	-	-
Light-mantled Sooty Albatross	-	-	36	-	-	-	36	27	9	-	34	2	-
Northern Royal Albatross	-	-	2	-	-	-	2	-	2	-	2	-	-
Northern Giant Petrel	-	-	5	-	-	-	5	3	2	-	-	5	-
Pacific Albatross	-	-	-	1	-	-	1	-	-	1	1	-	-
Salvin's Albatross	5	-	9	-	-	-	14	8	5	1	8	6	-
Snowy (Wandering) Albatross	-	-	2	-	-	-	2	2	-	-	2	-	-
Sooty Shearwater	-	-	-	-	-	21	21	18	3	-	21	-	-
Southern Royal Albatross	-	-	1	-	-	1	2	1	1	-	2	-	-
White-capped Albatross	-	-	12	-	15	6	33	16	15	2	24	9	-
White-chinned Petrel	2	-	16	-	3	-	21	14	7	-	20	1	-
TOTALS	15	13	274	1	19	28	350	188	151	11	296	54	0

TABLE 2
AUTOPSY IDENTIFICATIONS AND DETAILS

List by vessel type, of birds from observed vessels, for period 1 October 1996 to 31 December 1997.

AUTOPSY #	Vessel type	Trip no.	Haul no.	Sample no.	Date	General Position	Species english name	Species scientific name
970133	domestic tuna longliner	992	7	97	21.4.97	NE Great Barrier Is.	Black Petrel	<i>Procellaria parkinsoni</i>
970020	domestic tuna longliner	964	26	243	26.2.97	Bay of Plenty	Black Petrel	<i>Procellaria parkinsoni</i>
970282	domestic tuna longliner	1001	39	477	17.6.97	off West Coast South Is.	Campbell Albatross	<i>Thalassarche impavida</i>
970134	domestic tuna longliner	992	7	96	21.4.97	NE Great Barrier Is.	Campbell Albatross	<i>Thalassarche impavida</i>
970038	domestic tuna longliner	978	13	112	16.3.97	Bay of Plenty	Flesh-footed Shearwater	<i>Puffinus carneipes hullianus</i>
970108	domestic tuna longliner	989	20	1	16.4.97	Bay of Plenty	Flesh-footed Shearwater	<i>Puffinus carneipes hullianus</i>
970004	domestic tuna longliner	961	18	434	18.2.97	East Cape	Flesh-footed Shearwater	<i>Puffinus carneipes hullianus</i>
970017	domestic tuna longliner	964	6	54	21.1.97	East Cape	Flesh-footed Shearwater	<i>Puffinus carneipes hullianus</i>
970018	domestic tuna longliner	964	7	60	23.1.97	East Cape	Flesh-footed Shearwater	<i>Puffinus carneipes hullianus</i>
970019	domestic tuna longliner	964	24	232	23.2.97	East Cape	Flesh-footed Shearwater	<i>Puffinus carneipes hullianus</i>
970135	domestic tuna longliner	992	9	114	23.4.97	NE Great Barrier Is.	Flesh-footed Shearwater	<i>Puffinus carneipes hullianus</i>
970283	domestic tuna longliner	1001	39	479	17.6.97	off West Coast South Is.	Gibson's (Wandering) Albatross	<i>Diomedea gibsoni</i>
970281	domestic tuna longliner	1001	13	338	21.5.97	off Fiordland	Gibson's (Wandering) Albatross	<i>Diomedea gibsoni</i>
970164	joint venture tuna longliner	995	71	780	10.7.97	East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970173	joint venture tuna longliner	995	74	838	13.7.97	East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970194	joint venture tuna longliner	995	77	923	16.7.97	East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970205	joint venture tuna longliner	995	78	948	17.7.97	East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970221	joint venture tuna longliner	995	79	964	18.7.97	East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970222	joint venture tuna longliner	995	79	965	18.7.97	East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970223	joint venture tuna longliner	995	79	967	18.7.97	East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970224	joint venture tuna longliner	995	79	972	18.7.97	East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>

TABLE 2 continued
 AUTOPSY IDENTIFICATIONS AND DETAILS for period 1 October 1996 to 31 December 1997.

AUTOPSY #	age	sex	fat score	stomach contents	moult
970133	adult	male	-	empty	brood patch downy
970020	breeding adult	female	4	unidentifiable fish remains & fish eye lenses	brood patch bare, no body moult
970282	adult	male	4	squid beaks & fish vertebrae	brood patch downy, full body moult
970134	breeding adult	female	-	empty	brood patch downy
970038	adult	male	3	unidentifiable fish remains	brood patch downy, no body moult
970108	breeding adult	female	-	squid beaks only	brood patch downy
970004	adult	male	4	unidentifiable fish remains	brood patch downy, no body moult
970017	adult	male	4	squid beaks only	brood patch bare, no body moult
970018	adult	female	4	pebbles, plastic chips & squid beaks	brood patch bare, no body moult
970019	adult	female	4	pebbles, plastic & fish eye lenses	brood patch downy, no body moult
970135	breeding adult	female	-	empty	brood patch downy
970283	non-breeding adult	female	4	squid beaks only	brood patch downy, full body moult
970281	non-breeding adult	female	5	empty	brood patch downy, body & tail moult
970164	adult	female	-	-	-
970173	adult	male	3	empty	brood patch downy, full moult
970194	adult	female	4	squid remains	brood patch downy, full moult
970205	adult	male	3	squid beaks only	brood patch downy, full moult
970221	adult	male	4	squid beaks only	brood patch downy, some body moult
970222	adult	female	5	squid remains	brood patch downy, some body moult
970223	adult	male	5	fish eye lenses only	brood patch downy, full moult
970224	adult	-	2	-	body & wing moult

TABLE 2 continued
 AUTOPSY IDENTIFICATIONS AND DETAILS for period 1 October 1996 to 31 December 1997.

AUTOPSY #	Vessel type	Trip no.	Haul no.	Sample no.	Date	General Position	Species english name	Species scientific name
970225	joint venture tuna longliner	995	79	973	18.7.97	East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970240	joint venture tuna longliner	995	80	993	19.7.97	East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970288	joint venture tuna longliner	1005	27	476	20.6.97	off East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970289	joint venture tuna longliner	1005	27	479	20.6.97	off East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970290	joint venture tuna longliner	1005	27	485	20.6.97	off East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970291	joint venture tuna longliner	1005	27	502	20.6.97	off East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970292	joint venture tuna longliner	1005	27	489	20.6.97	off East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970246	joint venture tuna longliner	995	81	997	20.7.97	East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970247	joint venture tuna longliner	995	81	999	20.7.97	East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970248	joint venture tuna longliner	995	81	1001	20.7.97	East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970304	joint venture tuna longliner	1005	28	511	21.6.97	off East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970305	joint venture tuna longliner	1005	28	518	21.6.97	off East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970306	joint venture tuna longliner	1005	28	520	21.6.97	off East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970307	joint venture tuna longliner	1005	28	523	21.6.97	off East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970308	joint venture tuna longliner	1005	28	528	21.6.97	off East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970309	joint venture tuna longliner	1005	28	530	21.6.97	off East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970310	joint venture tuna longliner	1005	28	533	21.6.97	off East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>

TABLE 2 continued
 AUTOPSY IDENTIFICATIONS AND DETAILS for period 1 October 1996 to 31 December 1997.

AUTOPSY #	age	sex	fat score	stomach contents	moult
970225	adult	male	4	empty	brood patch downy, full moult
970240	adult	male	4	empty	brood patch downy, full moult
970288	adult	male	5	squid beaks & eye lenses	brood patch downy, full moult
970289	breeding adult	male	4	empty	brood patch partly downy, no body moult
970290	adult	female	-	squid beaks & eye lenses	brood patch downy, some body moult
970291	adult	male	4	fish eye lenses & vertebrae	wing & body moult
970292	breeding adult	female	4	empty	brood patch downy, some body moult
970246	adult	male	4	fish eye lenses only	brood patch downy, full moult
970247	adult	female	4	empty	brood patch downy, some body moult
970248	adult	male	5	empty	brood patch downy, full moult
970304	adult	male	4	-	body moult
970305	non-breeding adult	male	4	squid beaks only	brood patch downy, full moult
970306	non-breeding adult	female	4	empty	brood patch downy, full moult
970307	non-breeding adult	female	5	squid beaks & eye lenses	brood patch downy, full moult
970308	adult	male	4	eye lenses	brood patch downy
970309	non-breeding adult	male	5	squid beaks only	brood patch downy, some body moult
970310	adult	male	5	-	some body moult

TABLE 2 continued
 AUTOPSY IDENTIFICATIONS AND DETAILS for period 1 October 1996 to 31 December 1997.

AUTOPSY #	Vessel type	Trip no.	Haul no.	Sample no.	Date	General Position	Species english name	Species scientific name
970311	joint venture tuna longliner	1005	28	534	21.6.97	off East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970051	joint venture tuna longliner	982	32	639	22.4.97	Bounty Trough	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970052	joint venture tuna longliner	982	32	641	22.4.97	Bounty Trough	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970053	joint venture tuna longliner	982	32	642	22.4.97	Bounty Trough	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970054	joint venture tuna longliner	982	32	644	22.4.97	Bounty Trough	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970055	joint venture tuna longliner	982	32	651	22.4.97	Bounty Trough	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970058	joint venture tuna longliner	982	33	672	23.4.97	Bounty Trough	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970059	joint venture tuna longliner	982	33	677	23.4.97	Bounty Trough	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970062	joint venture tuna longliner	982	34	685	24.4.97	Bounty Trough	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970063	joint venture tuna longliner	982	34	688	24.4.97	Bounty Trough	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970067	joint venture tuna longliner	982	35	717	25.4.97	Bounty Trough	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970068	joint venture tuna longliner	982	35	729	25.4.97	Bounty Trough	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970258	joint venture tuna longliner	995	86	1036	25.7.97	East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970259	joint venture tuna longliner	995	86	1039	25.7.97	East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970260	joint venture tuna longliner	995	86	1040	25.7.97	East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970261	joint venture tuna longliner	995	86	1042	25.7.97	East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>
970262	joint venture tuna longliner	995	86	1043	25.7.97	East Cape	Antipodean (Wandering) Albatross	<i>Diomedea antipodensis</i>