

Cetacean research in New Zealand 2004/05

Simon Childerhouse (Comp.)

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CONTENTS

Abstract	5
<hr/>	
1. Introduction	6
<hr/>	
2. New Zealand progress report on cetacean research 2004/05	7
<hr/>	
3. Acknowledgements	7
<hr/>	
4. References	7
<hr/>	
Appendix 1	
<hr/>	
New Zealand progress report on cetacean research, April 2004 to March 2005, with statistical data for the calendar year 2004	9

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Simon Childerhouse (Comp.)

Marine Conservation Unit, Department of Conservation, PO Box 10-420,
Wellington, New Zealand

ABSTRACT

This report summarises cetacean (i.e. whale and dolphin) research undertaken in New Zealand over the period from April 2004 to March 2005, with statistical information for the 2004 calendar year. The report summarises cetacean research undertaken by a wide range of researchers including government, university, and non-governmental agencies and individuals. Information presented includes details of species studied, strandings, summaries of collections and catalogues, research projects undertaken, samples collected, and publications resulting from research. Data are included from 23 species, from 13 different institutions/agencies and over 40 researchers. Although this is a comprehensive collection of research for 2004/05, it does not include all cetacean research carried out in New Zealand over the period as some researchers did not provide a report of their work to the Department of Conservation.

Keywords: cetacean, research, marine mammal, IWC

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1. Introduction

This report follows on from previous reports which have summarised cetacean research in New Zealand over the period 1997-2004 (Childerhouse 2002, 2004, 2005; Childerhouse & Donoghue 2002). This report provides updated information about recent research in New Zealand. For a full description of the format and explanation of the sections in the report, please refer to Childerhouse & Donoghue (2002). This report and the previous yearly reports are published records of the 'New Zealand national progress report on cetacean research' which is presented annually to the Scientific Committee of the International Whaling Commission (IWC).

The IWC is the international agency responsible for the 'conservation of whale stocks and the orderly development of the whaling industry' and has approximately 45 member nations including New Zealand. New Zealand has been a member of the IWC since 1948 (Friedheim 2001). One of the obligations of member nations is the provision annually to the IWC of a national progress report on cetacean research. This report includes details such as the number and location of cetaceans taken commercially or incidentally in fishing operations, numbers of stranded cetaceans, and status of ongoing research projects. One of the original aims of these reports was to provide data on the commercial catch of large whales to facilitate the management of whaling. However, over time, national progress reports have been modified to include the reporting of additional information such as levels of bycatch and other data on dolphins. Prior to 1997, national progress reports were published in their entirety in IWC volumes but since then only a small summary of the full report has been published.

The national progress reports have been compiled annually by the New Zealand Department of Conservation (DOC), and are based on reports from researchers. Although a considerable amount of effort has been made to contact all researchers who have undertaken cetacean research in New Zealand, and encourage them to provide details of their research, this has not always been completely successful. As a result, the reports presented in this document cover most of the work undertaken in New Zealand, but some research which has not been reported to the Government does not appear. However, only a small proportion of the cetacean research carried out in New Zealand over the 2004/05 period has not been included in this document.

The aim of compiling and publishing these reports is to make the information accessible and useful as a tool in the management and protection of cetaceans in New Zealand. These reports are a useful resource for summarising New Zealand-based research projects and for identifying researchers who are working on species or projects. Obviously, research is ongoing and these reports will continue to be published in the future.

2. New Zealand progress report on cetacean research 2004/05

The New Zealand progress report on Cetacean Research for 2004/05 is included as Appendix 1. It covers the period from April 2004 through to March 2005 and includes statistical data for the 2004 calendar year. An earlier draft of this work was presented to the Scientific Committee of the International Whaling Commission in June 2005.

3. Acknowledgements

This project would not have been possible without the support of researchers who have provided summaries of their work over the last year. It is a tribute to researchers that the high quality and quantity of work is reflected in this document. I would like to thank all those who made the effort to contribute and hope that we can continue with the high standard in the future. I would especially like to thank M. Donoghue for his support and guidance when compiling these reports. Thanks to Lynette Clelland and H. McConnell for useful comments on this document.

4. References

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Appendix 1

NEW ZEALAND PROGRESS REPORT ON
CETACEAN RESEARCH, APRIL 2004 TO
MARCH 2005, WITH STATISTICAL DATA
FOR THE CALENDAR YEAR 2004

**NEW ZEALAND PROGRESS REPORT ON CETACEAN RESEARCH, APRIL 2004 TO MARCH 2005,
WITH STATISTICAL DATA FOR THE CALENDAR YEAR 2004**

Compiled by S. Childerhouse
Department of Conservation, PO Box 10-420, Wellington, New Zealand
Email: schilderhouse@doc.govt.nz

This report summarises information obtained from: Auckland (AU), Massey (MU), and Otago (OU) Universities, Auckland University of Technology (AUT), Te Papa Tongarewa Museum of New Zealand (TP), Department of Conservation (DOC), Texas A&M University (TAMU), Orca Research Trust (ORT), Smithsonian Institution (SI), New England Aquarium (NEA), LGL Ecological, Alaska (LGL), Dolphin Watch Ecotours, Picton (DWE), WWF-New Zealand (WWF-NZ) and independent researchers.

1. Species and stocks studied

Common name	Scientific name	Area/stock(s)	Appropriate sections in text
Andrew's beaked whale	<i>Mesoplodon bowdoini</i>	NZ	4.3, 8
Antarctic minke whale	<i>Balaenoptera acutorostrata</i>	Area V	4.3, 8
Beaked whales	Family <i>Ziphiidae</i>	NZ	4.3, 8
Bottlenose dolphin	<i>Tursiops truncatus</i>	NZ	2.1.1, 2.1.2, 3.1.1, 4.1, 4.2, 4.3, 4.4, 8, 9
Bryde's whale	<i>Balaenoptera edeni</i>	NZ	2.1.2, 3.1.1, 4.1, 4.4, 8
Common dolphin	<i>Delphinus delphis</i>	NZ	2.1.1, 2.1.2, 3.1.1, 4.2, 4.3, 7.1, 8, 9
Cuvier's beaked whale	<i>Ziphius cavirostris</i>	NZ	3.1.1, 4.3, 8
Dusky dolphin	<i>Lagenorhynchus obscurus</i>	NZ	2.1.1, 2.1.2, 4.3, 8, 9
Dwarf sperm whale	<i>Kogia sima</i>	Samoa	4.3, 4.4
False killer whale	<i>Pseudorca crassidens</i>	NZ	8
Ginkgo-toothed beaked whale	<i>Mesoplodon ginkgodens</i>	NZ	4.3, 8
Gray's beaked whale	<i>Mesoplodon grayi</i>	NZ	4.3, 8
Hector's dolphin	<i>Cephalorynchus hectori hectori</i>	NZ	2.1.1, 2.1.2, 3.1.1, 3.1.3, 4.1, 4.4, 8, 9
Humpback whale	<i>Megaptera novaeangliae</i>	NZ; Tonga	2.1.1, 3.1.1, 4.1, 4.3, 4.4, 8, 9
Killer whale	<i>Orcinus orca</i>	NZ; Antarctica; Argentina	2.1.1, 3.1.1, 4.3, 4.4, 8, 9
Maui's dolphin	<i>Cephalorynchus hectori maui</i>	North Island, NZ	2.1.1, 3.1.1, 4.1, 4.4, 9
Long finned pilot whale	<i>Globicephala melas</i>	NZ; Samoa	4.3, 8, 9
Pygmy right whale	<i>Caperea marginata</i>	NZ	8
Pygmy sperm whale	<i>Kogia breviceps</i>	NZ	4.3, 8, 9
Shepherd's beaked whale	<i>Tasmacetus shepberdi</i>	NZ	8
Southern right whale	<i>Eubalaena australis</i>	NZ	2.1.2, 3.1.1, 4.1, 9
Sperm whale	<i>Physeter macrocephalus</i>	NZ	3.1.1, 4.3, 8, 9
Strap-toothed whale	<i>Mesoplodon layardi</i>	NZ	4.3, 8

2. Sightings data

2.1 Field work

2.1.1 Systematic

J. Weir and B. Würsig (TAMU) conducted systematic boat surveys between Kaikoura Peninsula and Haumuri Bluffs between January and May 2005. Surveys were conducted to find nursery groups of dusky dolphins in the Kaikoura area. The focus of the study was behavioural ecology, habitat preference and locality, and investigation of the potential influence of tour boats on these. Photo-ID of individuals in nursery groups was also initiated.

T. Markowitz (LGL), J. Weir and B. Würsig (TAMU) conducted surveys of inner and outer Admiralty Bay in Marlborough Sounds between June and August 2004. Research focused on the behavioural ecology, feeding ecology, and habitat use of dusky dolphins and bottlenose dolphins. Photo-ID work continued from previous years and interactions with mussel farms were also investigated.

I. Visser (ORT) continued field work on killer whales around New Zealand, with most work conducted in the north of the North Island. Emphasis was on photo-ID, foraging behaviour and associations whilst foraging. Field work was also undertaken in Antarctica (based at the Antarctic Peninsula and the Ross Sea) and at Peninsula Valdez, Argentina.

M. Richlen, E. Slooten and S. Dawson (OU) carried out a study of Maui's dolphin use of the Manukau Harbour on the North Island west coast. Part of the Manukau harbour is included in a protected area created by the Ministry of Fisheries to reduce dolphin bycatch in fisheries. PODs (Porpoise Detector Devices) were used to make 19 acoustic detections of Maui's dolphins inside the harbour. In addition, eight sightings were also made. Two of the acoustic detections matched Maui's dolphin sightings. All acoustic detections and one of the sightings were to the east of the protected area, in the inner part of the harbour where commercial and amateur gillnetting continues. This study will soon be extended to other harbours on the North Island west coast to assess the continued entanglement risk for this Critically Endangered population.

W. Rayment, E. Slooten, S. Dawson, T. Webster (OU) and S. Childerhouse (DOC) carried out a series of offshore aerial surveys for Hector's dolphins at Banks Peninsula. The project is nearing completion and, so far, three summer surveys and two winter surveys have been carried out. The third and final winter survey will be carried out in June 2005. Preliminary analysis indicates that, in summer, 82% of the population is inside the sanctuary (where commercial gillnetting is prohibited and amateur gillnetting is restricted). However, in winter, only 39% of the population is protected. This is consistent with research by S. DuFresne (OU) indicating that survival rates for the Banks Peninsula population are very low and the population is still slowly declining. Also at Banks Peninsula, Rayment and Webster continue acoustic monitoring of Hector's dolphins (using PODs) and gathering photo-ID data as part of an ongoing study.

E. Slooten, S. Dawson, W. Rayment (OU) and S. Childerhouse (DOC) undertook aerial surveys of Maui's dolphin and estimated a population of 111 (CV 0.44) individuals and confirmed the Critically Endangered status of the subspecies. The population is found within the offshore boundary of the Ministry of Fisheries protected area (4 nautical miles offshore) year-round with a strong preference for close inshore waters during summer. Seasonal differences in offshore distribution are similar to those in other areas, with dolphins strongly concentrated close to shore during summer and more evenly distributed throughout their depth range during winter.

J. Rodda (OU) has completed the first year of a three-year study of the population of Hector's Dolphins at Te Waewae Bay, Southland. The study is compiling a photo-ID catalogue to be used for analysis of spatial and temporal dolphin distribution, density, and fine-scale habitat usage within the bay. Investigations of prey distribution are planned.

R. Currey (OU) is carrying out PhD research on the conservation biology and behaviour of resident bottlenose dolphins in Doubtful Sound, Fiordland. Based on recent intensive photo-ID work, there are between 54 and 56 individuals in the population. There have been eight births in the last 12 months, of which only four have survived. In addition, two other individuals are known to have died; one from a mako shark attack and one from unknown causes (awaiting autopsy results from Massey University). The level of mortality is unusually high for this population. A long-term dataset will be used to estimate survival rates since the study began in 1990, and will allow comparison with other bottlenose dolphin populations. A further focus of the research is to assess critical habitats based on spatial patterns in dolphin distribution and behaviour. A two-element hydrophone array was used to estimate foraging depths through the localisation of dolphin vocalisations. D. Rundgren (OU) continued research on distribution of bottlenose dolphins in Fiordland.

E. Green (DOC) completed 19 boat-based surveys of Hector's dolphins at Te Waewae Bay between 14 April and 30 June 2004. The outward survey route followed the coast and then returned along one of three offshore transect lines back across the bay. Photo-IDs were taken during surveys and the location and nature of all fishing activity observed in the bay were recorded. Maps of dolphin density standardised by survey effort showed that Hector's dolphins were concentrated within 1 km of the coast along the extent of Te Waewae Bay. Two areas of high density were apparent, one off the Waiau River and the other west of the Rowallen Burn. Density was low along the eastern and very western edges of the bay. A photographic catalogue of 65 naturally marked dolphins was created. Very few observations of fishing activity were made during the period of field work. However, setnet and trawl fisheries are known to operate more frequently within the bay at other times of the year. Research is required to assess the overlap in distribution of fisheries and Hector's dolphins in and around Te Waewae Bay, to determine whether this population is being affected by bycatch mortalities. While data collection for this study was limited to a 3-month period, and few generalisations can be drawn from it, this work constitutes the first intensive research on this isolated population of Hector's dolphins. Future research can utilise and build upon data gathered in this study to further investigate distribution, estimate abundance and assess threats. In addition, surveys along the coast to explore the alongshore distribution of the Porpoise Bay and Te Waewae populations would aid in management of these southern Hector's dolphins. The survey work was repeated between December 2004 and February 2005 but results have yet to be analysed.

N. Gibbs, S. Childerhouse (DOC), and D. and E. Englehaupt (DWE) undertook a land- and boat-based survey of humpback whales in Cook Strait between 12 and 26 June 2004. This was the first dedicated humpback whale survey in New Zealand since whaling finished in 1964. Ex-whalers were the primary land-based spotters, and the support vessel was a local dolphin watch operator. From 131 hours (land) and 13 hours (boat) observation, 30 pods of humpback whales were observed, with a total of 41 whales. Ten photo-IDs and 12 genetic samples were obtained from 15 encounters with whales. Eight of these were from animals that were both photographed and biopsy-sampled. Another survey is planned for 18 June – 3 July 2005, which was traditionally the peak time for humpback whales on their northerly migration through Cook Strait.

K. Russell and S. Baker (AU) undertook field research in the Vava'u group, Tonga, which has been the site of standardised field research since 1999. A live-aboard catamaran was used as the research platform, with the survey carried out from 4 to 25 September. The methodology employed was the established technique of photo-ID; collection of biopsy and sloughed skin samples for DNA analysis; and collection of acoustic data. Despite poor weather, the field season achieved 37.5 hours of humpback whale interactions, with 50 encounters (96 animals) over the 18 days on water. Forty-six skin samples were collected from the whales, and 30 photographic identification images obtained and added to the Tonga catalogue. Of these, ten were photo-IDs matched to skin samples.

G. de Tezanos Pinto (AU) is in the third year of her PhD research. She is investigating the genetic structure and demographics of bottlenose dolphins in New Zealand. This research aims to model trends in abundance for the North Island population, to investigate the genetic structure of the species in coastal New Zealand waters, and its relationship to other bottlenose dolphin populations around the South Pacific. Field work areas have included the Bay of Islands (19 days), Hauraki Gulf (10 days) and Doubtful Sound, Fiordland (12 days). The primary aim of these surveys is to collect individual photo-ID data and biopsy samples from bottlenose dolphins.

M. Merriman (MU) undertook boat-based surveys in the Marlborough Sounds from April 2004 to April 2005. Seventy-three surveys were conducted: Queen Charlotte Sound ($n = 46$), Admiralty Bay ($n = 16$) and Pelorus Sound ($n = 11$). Four different cetacean species were encountered over this period: bottlenose dolphin ($n = 22$), common dolphin ($n = 5$), Hector's dolphin ($n = 12$) and dusky dolphin ($n = 15$).

DOC contracted Auckland University (K. Russell, Principal Investigator) to undertake a trial study of Hector's dolphins in South Westland over a 30-day period in late autumn to early winter of 2004. The work involved boat transect surveys at three levels of detail covering 850 nautical miles of track, and theodolite tracking of a smaller area within Jackson Bay. Photo-ID and biopsy sampling work was undertaken in addition to sighting information. The research recorded 36 sightings of Hector's dolphins between Hanata Island and Awarua, as well as documenting the occurrence of bottlenose dolphins in the Jackson Bay area. Some individually identifiable bottlenose dolphins were matched to individuals previously seen in Milford Sounds. DOC also contracted D. Clement (OU) to trial and undertake a helicopter survey of Hector's dolphin along the South Island's northern West Coast in April 2004, particularly to assess the distribution of mother/calf groupings, and identify important inshore areas for this population. A total of 364 adult and 13 calf sightings were made during the survey which covered 245 km of coastline.

K. Stockin and M. Orams (MU) completed 3 years of dedicated field research on common dolphins in February 2004 as part of an ongoing doctoral study of New Zealand common dolphins. Vessel-based surveys were conducted from a 5.5-m rigid-hulled inflatable boat (RIB) throughout all seasons in the inner Hauraki Gulf, Auckland. Focal follows and photo-identification methods were used to examine distribution, population size, site fidelity, behavioural ecology and inter-specific relationships. Results are currently being analysed.

2.1.2 Opportunistic, platforms of opportunity

N. Duprey, J. Weir and B. Würsig (TAMU) undertook non-systematic surveys for dusky dolphins from Kaikoura Peninsula to Haumuri Bluffs between January and August 2004. Occasionally, more northern and southern areas were surveyed, but the focus of the survey area was between the Peninsula and the bluffs. Behavioural ecology, photo-ID records and habitat use were the main focus of research conducted during this time. Duprey and Würsig used theodolites to track large groups of dusky dolphins in the same area between January and March 2005. Groups were tracked for long periods, which has provided detailed information on diurnal movement patterns and interactions with both commercial and recreational vessels. Movement patterns relative to the number of boats present and amount of time vessels spent with large dolphin groups were quantified. Duprey and Würsig also undertook theodolite surveys in the Admiralty Bay region of the Marlborough Sounds during winter 2004. Movement patterns, habitat use and behavioural ecology of dusky dolphins were the focus of the research. This research will be instrumental to better understanding the interactions of dusky dolphins and current mussel farms in the area. Results will also provide patterns of use so that proposed mussel farms can be placed for least disturbance to dolphin activities.

H. McConnell and R. Suisted (DOC) coordinated the collection of opportunistic sightings of southern right whales around the New Zealand mainland provided by researchers, the public and DOC staff. From April 2004 to March 2005, 48 sightings were made (67 whales). Verified public sightings were also included.

A. and D. Englehaupt (DWE) collected opportunistic data on all dolphin groups (e.g. bottlenose, Hector's, dusky) encountered in the Marlborough Sounds during dolphin-watching trips throughout the year. Locations and estimated group sizes were collected for all groups and photo-IDs and behavioural states were collected when possible.

An investigation of the social organisation of bottlenose dolphins in the Bay of Islands is being continued by F. Mourao (AU). The aim of this study is to find out whether individually identified bottlenose dolphins preferentially associate with specific individuals, and whether association patterns vary between sexes. A total of 68 surveys were conducted during 2004 on board permitted marine mammal tour vessels in the Bay of Islands. The primary objective of these surveys was to photo-ID individual bottlenose dolphins in the Bay of Islands and therefore record associations between individuals. Approximately 140 individuals were recorded during 67 independent encounters from 272 h spent on the water. Data gathered in 2004 have been explored using the statistical modules SOCPROG 2.2. In addition, these surveys contribute to the long-term photo-ID study on Northland bottlenose dolphins that has been conducted since 1994.

N. Wiseman and S. Baker (AU) are investigating the population ecology of Bryde's whales in the Hauraki Gulf. The primary aims of the research are to investigate the seasonal abundance and presence/absence of individual whales and the reproductive isolation of the Hauraki Gulf Bryde's whale population and adjacent populations. This will be investigated by collecting biopsy samples from Bryde's whales in the Hauraki Gulf. Ten samples were collected between April 2004 to March 2005, and 25 new individuals were added to the photo-ID catalogue. Preliminary results suggest that there were higher encounter rates with Bryde's whales during the winter.

N. Wiseman (AU), G. de Tezanos Pinto (AU) and K. Stockin (MU) continue surveys of the outer Hauraki Gulf area. This research aims to obtain individual photo-ID photographs to provide information on population structure, demography and habitat use for Bryde's whales, bottlenose dolphins and common dolphins respectively. In addition, skin samples are collected from Bryde's whales and bottlenose dolphins to continue genetic analyses of these species.

WWF-NZ is undertaking an analysis of Hector's dolphin autopsy information relating to strandings since 1997 to establish the extent to which known Hector's dolphin deaths can be attributed to incidental capture in fishing.

K. Stockin (MU) continues to undertake opportunistic surveys onboard the commercial dolphin tourism platform 'Dolphin Explorer'. Data and photo-ids recorded for 2004/2005 include the following species: common dolphin, Bryde's whale, bottlenose dolphin, killer whale, striped dolphin and dwarf minke whale.

2.2 Analyses/development of techniques

None reported.

3. Marking data

3.1 Field work

3.1.1 Natural marking data

Species	Feature	Area/stock	Calendar year(s)/season (number photographed)	Catalogued Y/N	Catalogue total	Contact person (Institution)
Bottlenose dolphin	Dorsal fin	Te Waewae Bay	2004/05 (10)	N	0	R. Cole (DOC)
Bottlenose dolphin	Dorsal fin	NZ	2003-05 (300)	Y	150	A. Englehaupt (DWE)
Bottlenose dolphin	Dorsal fin	Westland, South Island	2004 (29)	Y	29	K. Russell (AU)
Bottlenose dolphin	Fin/Body	Marlborough Sounds	2003-05 (262)	Y	< 300	M. Merriman (MU)
Bottlenose dolphin	Dorsal fin	Fiordland, north	2000-04 (?)	Y	47	S. Dawson (OU)
Bottlenose dolphin	Dorsal fin	Fiordland, south	2000-04 (?)	Y	53	D. Rundgren (OU)
Bottlenose dolphin	Dorsal fin	Doubtful Sound	1990-2005 (?)	Y	62	R. Currey (OU)
Bottlenose dolphin	Dorsal fin	North Island	1998-2005 (150)	Y	412	G. de Tezanos Pinto and F. Mourao (AU)

Table continued on next page

Table continued from page 13

Species	Feature	Area/stock	Calendar year(s)/season (number photographed)	Catalogued Y/N	Catalogue total	Contact person (Institution)
Bottlenose dolphin	Dorsal fin	North Island	1998-2005 (150)	Y	412	G. de Tezanos Pinto and F. Mourao (AU)
Bryde's whale	Dorsal fin	Hauraki Gulf	2003-05 (25)	Y	?	N. Wiseman (AU)
Common dolphin	Fin/Body	Hauraki Gulf	2002-04 (?)	Y	> 300	K. Stockin (MU)
Common dolphin	Fin/Body	Marlborough Sounds	2003-05 (6)	N	?	M. Merriman (MU)
Dusky dolphin	Fin/body	Kaikoura	2005 (?)	Y	> 70	J. Weir (TAMU)
Dusky dolphin	Fin/body	Kaikoura and Marlborough Sounds	2004 (?)	Y	?	T. Markowitz (LGL)
Dusky dolphin	Dorsal fin	NZ	2003-05 (500)	Y	350	A. Englehaupt (DWE)
Dusky dolphin	Fin/body	Marlborough Sounds	2003-05 (12)	N	?	M. Merriman (MU)
Hector's dolphin	Fin/body	Banks Peninsula	1984-2005 (?)	Y	497	W. Rayment (OU)
Hector's Dolphin	Dorsal fin	Te Waewae Bay	2004/05 (?)	N	60+	J. Rodda (OU)
Hector's dolphin	Dorsal fin	Te Waewae Bay	2004/05 (?)	Y	65	R. Cole (DOC)
Hector's dolphin	Dorsal fin	NZ	2003-05 (100)	Y	20	A. Englehaupt (DWE)
Hector's dolphin	Dorsal	Westland, South Island	2004 (?)	Y	52	K. Russell (AU)
Hector's dolphin	Fin/body	Marlborough Sounds	2003-05 (219)	N	?	M. Merriman (MU)
Humpback whale	Tail flukes	NZ	2004 (10)	Y	10	N. Gibbs (DOC)
Humpback whale	Tail flukes	NZ	?-2005 (?)	Y	12	K. Russell and R. Constantine (AU)
Humpback whale	Tail flukes	Tonga	1991-2004 (30)	Y	573	K. Russell (AU)
Killer whale	Fins/saddle patches/eye patches	NZ	1993-2005 (5)	Y	130	I. Visser (ORT)
Killer whale	Fins/saddle patches/eye patches	Antarctica	2000-05 (8)	Y	27	I. Visser (ORT)
Killer whale	Fins/saddle patches/ eye patches	Peninsula Valdez, Argentina	2000-05 (5)	Y	24	I. Visser (ORT)
Maui's dolphin	Dorsal fin	West Coast, North Island	1998-2005 (?)	Y	25	K. Russell (AU)
Southern right whale	Callosities/lip lines	NZ mainland	?-2005 (3)	Y	> 30	N. Patenaude (AU)
Sperm whales	Tail flukes	Kaikoura, NZ	1990-2002 (?)	Y	202	S. Dawson (OU)

3.1.2 Artificial marking data

None.

3.1.3 Telemetry data

Species	Tag type	No. successfully deployed	Maximum time transmitting	Contact person (Institution)
Hector's dolphin	Satellite	3	6 months	G. Stone (NEA)

3.2 Analyses/development of techniques

None reported.

4. Tissue/biological samples collected

4.1 Biopsy samples

Species	Area/stock	No. collected in 2004/05	Archived Y/N	No. analysed	Total holdings	Contact person (Institution)
Bottlenose dolphin	Westland, South Island	6	Y	6	6	K. Russell (AU)
Bottlenose dolphins	NZ	?	Y	73	99	G. de Tezanos Pinto (AU)
Bryde's whale	Hauraki Gulf	10	Y	10	?	N. Wiseman (AU)
Hector's dolphin	Westland	19	Y	19	19	K. Russell (AU)
Hector's dolphin	Banks Peninsula	4	Y	4	34	K. Russell (AU)
Hector's dolphin	Te Waewae Bay		Y	5	5	K. Russell (AU)
Humpback whale	NZ mainland	2	Y	11	11	C. Olavarria (AU)
Humpback whale	Tonga	46	Y	46	> 500	C. Olavarria (AU)
Maui's dolphin	West Coast, North Island	12	Y	12	72	K. Russell (AU)
Southern right whale	NZ mainland	1	Y	1	13	N. Patenaude (AU)

4.2 Samples from directed bycatches

Species	Area/stock	Calendar year/ (season total)	Archived Y/N	Tissue type(s)	Contact person (Institution)
Common dolphin	New Zealand	2004-05 (25)	Y	Skin	K. Stockin, P. Duignan (MU)
Common dolphin	New Zealand	2004-05 (10)	Y	Stomachs, skulls teeth, blubber, fixed tissues	K. Stockin, P. Duignan (MU); A. Van Helden (TP)

4.3 Samples from stranded animals

Species	Area/stock	Total	Archived Y/N	Tissue type(s)	Contact person (Institution)
Andrew's beaked whale	NZ	2	Y	Skin and blubber	D. Steel (AU)
Antarctic minke whale	NZ	1	Y	Skin and blubber	D. Steel (AU)
Bottlenose dolphin	NZ	10	Y	Skin and blubber	D. Steel (AU)
Common dolphin	NZ	17	Y	Skin and blubber	D. Steel (AU)
Common dolphin	NZ	30	Y	Skin	K. Stockin and P. Duignan (AU)
Common dolphin	NZ	20	Y	Stomachs, skulls, teeth, blubber, fixed tissues	K. Stockin, P. Duignan (MU); A. Van Helden (TP)
Cuvier's beaked whale	NZ	1	Y	Skin and blubber	D. Steel (AU)
Dusky dolphin	NZ	1	Y	Skin and blubber	D. Steel (AU)
Dwarf minke whale	NZ	2	Y	Skin and blubber	D. Steel (AU)
Dwarf sperm whale	Samoa	1	Y	Skin	C. Olavarria (AU)
Gingko-toothed beaked whale	NZ	1	Y	Skin and blubber	D. Steel (AU)
Gray's beaked whale	NZ	13	Y	Skin and blubber	D. Steel (AU)
Humpback whale	NZ	2	Y	Skin and blubber	D. Steel (AU)
Killer whale	NZ	2	Y	Skin and blubber	D. Steel (AU)
Pilot whale sp.	NZ	75	Y	Skin and blubber	D. Steel (AU)
Pygmy sperm whale	NZ	13	Y	Skin and blubber	D. Steel (AU)
Sperm whale	NZ	7	Y	Skin and blubber	D. Steel (AU)
Straptooth beaked whale	NZ	3	Y	Skin and blubber	D. Steel (AU)
Unknown beaked whale sp.	NZ	2	Y	Skin and blubber	D. Steel (AU)
Unknown cetacean sp.	NZ	4	Y	Skin and blubber	D. Steel (AU)

P. Duignan and colleagues (MU) continue to undertake autopsies of stranded and bycaught marine mammals to investigate cause of death and biology and ecology.

4.4 Analyses/development of techniques

C. Olavarria (AU) analysed ten killer whale samples collected around the North Island, the South Island and the Chatham islands in NZ and near the Ross Sea. The analysis of mtDNA control region sequences revealed four haplotypes defined by ten polymorphic sites. One of them—the most common—was observed in all the samples from the North Island and one sample from the northern part of the South Island. The samples from the more distant locations (Chatham I., south of South Island and Ross Sea) showed unique haplotypes. Despite the small sample size, the observed diversity and geographic haplotypic segregation suggest a strong phylopatry and population structure.

C. Olavarria (AU) continues with his doctoral research on South Pacific humpback whale population structure using molecular markers. A recent analysis of over a thousand mtDNA control region sequences showed significant differentiation between six breeding grounds (Western Australia (D stock), New Caledonia (Eii1 sub-stock), Tonga (Eii2 sub-stock), Cook Islands (F stock), French Polynesia (F stock) and the Pacific coast of Colombia (G stock)), suggesting that the Cook Islands and French Polynesia should be considered two stocks, not the single F stock proposed previously. Other research is investigating an apparent sampling sex bias on breeding grounds, rate of interchange between New Caledonia and Tonga breeding grounds and the differentiation between feeding areas of the Antarctic Stock I.

C. Olavarria and M. Oremus (AU) and J. Ward (Samoa) analysed a skin sample collected from a *Kogia* sp. specimen, stranded in Upolu, Samoa. The genetic analyses identified it as a male dwarf sperm whale *Kogia sima*. This is the first record of this species in Samoan waters.

G. de Tezanos Pinto (AU) completed preliminary analysis of mitochondrial DNA of bottlenose dolphins from three New Zealand populations (North Island, Marlborough Sounds and Fiordland). Results showed significant genetic differentiation and relative isolation between them. The North Island population had higher genetic diversity values than expected, which suggested possible augmentation by a pelagic population, although further research is needed.

K. Russell (AU) has continued analysis of biopsy samples collected from various species. Samples have been extracted, sexed and the mitochondrial haplotype determined. Analysis of various microsatellite loci from Maui's and Hector's dolphins is used to individually genotype each sample and individuals are added to a genotype catalogue. Genotypes are being used in a mark-recapture study to estimate the population size of the Maui's dolphin. Investigation of the part of the immune system, DQB, is also used to assess genetic diversity in the species. This research is part of an ongoing project started in 1998.

N. Wiseman (AU) continued to collect skin samples from Bryde's whales in the Hauraki Gulf. All stranded samples and three biopsy samples have been extracted, sexed and sequenced (D-loop region of the mtDNA) and genotyped.

K. Stockin, P. Duignan, D. Lambert, J. Allsop and M. Orams (MU) continue to collect and analyse skin samples from common dolphins. All samples (beachcast and bycaught animals only) to date have been extracted, sexed, sequenced (D-loop region of the mtDNA) and analysis of the results is currently being undertaken.

5. Pollution studies

None reported.

6. Statistics for large cetaceans

6.1 Direct catches (commercial, aboriginal and scientific permits) for the calendar year 2004

None.

6.2 Other non-natural mortality for the calendar year 2004

One whale (unidentified species) was reported entangled in a long line but was released alive.

6.3 Earlier years' statistics

No changes required.

7. Statistics for small cetaceans

7.1 For the calendar year 2004

Species	Area/stock	Directed catch		Incidental mortality			Live-capture
		Reported	Est. total	Reported	Est. total	Source	Reported
Common dolphin	NZ	0	0	23 ^a	?	Trawl	0
Hector's dolphin	NZ	0	0	2 ^b	?	Gillnet	0
Pilot whale	NZ	0	0	6 ^a	?	Trawl	2 ^a

^a Figures provided by D. Fairfax, DOC.

^b Figure provided by A. Hutt, DOC.

7.2 Earlier years' statistics

No changes required.

8. Strandings

The total number of reported strandings for the period April 2004 to March 2005 is 83 incidents involving 225 animals. This excludes those animals that have been reported but for which stranding data forms had not been received by the Museum of New Zealand/Te Papa Tongarewa before the end of March. At least 19 different species were added to the database for this period. The number of incidents of strandings for the different families that stranded in this period are: *Neobalaenidae* 1.2%, *Balaenopteridae* 6.0%, *Ziphiidae* 21.7%, *Delphinidae* 53.0%, *Physeteridae* 18.1%. The number of animals for the different families that stranded in this period are: *Neobalaenidae* 0.4%, *Balaenopteridae* 2.2%, *Ziphiidae* 11.6%, *Delphinidae* 76.9% and *Physeteridae* 8%. The species with the highest incidents of strandings were common dolphins with 14 incidents, closely followed by Hector's dolphins *Cephalorhynchus hectori* (including subspecies *C. hectori maui*) with 13 incidents. The largest number of animals of a species to strand was 77 for pilot whales *Globicephala* sp. (most likely *G. Melas*). The total number of animals refloated for this period was 31, five of which restranded and died; therefore, 26 are presumed to have survived.

Species:	No. of strandings	No. of animals	No. refloated	No. restranded	No. animals rescued
Andrew's beaked whale	1	2	0	0	0
Antarctic minke whale	2	2	0	0	0
Beaked whale ¹	1	2	0	0	0
Bottlenose dolphin	6	7	2	0	2
Bryde's whale	2	2	0	0	0
Common dolphin	14	17	2	1	1
Cuvier's beaked whale	2	2	0	0	0
Dusky dolphin	5	5	1	0	1
False killer whale	1	52	0	0	0
Ginkgo-toothed beaked whale	1	1	0	0	0
<i>Globicephala</i> spp. ^a	2	75	21	3	18
Gray's beaked whale	10	16	0	0	0
Hector's dolphin	13	13	0	0	0
Humpback whale	1	1	0	0	0
Killer whale	1	2	2	0	2
Pilot whale	2	2	0	0	0
Pygmy right whale	1	1	0	0	0
Pygmy sperm whale	5	8	3	1	2
Shepherd's beaked whale	1	1	0	0	0
Sperm whale	10	10	0	0	0
Strap-toothed whale	2	2	0	0	0
Total:	83	225	31	5	26

^a These are not species but, rather, reflect broad groups of cetaceans.

S. O'Shea (AUT) continues to collect stomach samples of teuthophagous whales to investigate diet.

K. Stockin, P. Duignan, G. Jones and M. Orams (MU) collected biological samples/data from the Lucas Creek common dolphin mass stranding. During each necropsy the following samples were taken: teeth (age determination), stomachs (diet determination), blubber and various organs (toxicology), bloods (health and disease) and reproductive organs (life history).

9. Other studies and analyses

G. Barnes and C. Johnson (MU) are working on investigating the use of EEG techniques in understanding the humane killing of whales. Auditory evoked potentials have been recorded from captive dolphins and it is planned to undertake similar procedures on stranded cetaceans (along with several reflex tests) as possible indicators of vitality and candidature for refloating. In addition, auditory evoked response work in association with euthanasia of stranded cetaceans will be undertaken, as an objective indicator of brain death. Further work focuses on the use of EEG techniques in our research of the response of farm animals to noxious stimuli—castration, dehorning, and slaughter. We expect to be able to apply the understanding of perception of noxious stimulation that we are gaining from these studies in terrestrial mammals (especially slaughter) to the hunted whale.

A. Schaffar-Delaney (MU) completed her MSc entitled 'Female reproductive strategies and mother-calf relationships of common dolphins in the Hauraki Gulf, New Zealand'. This study reviewed the habitat use, social organisation and behaviour of common dolphin groups categorised by their youngest member, as well as the behaviour of common dolphin calves of different age classes. Most neonate calves were sighted over late spring and early summer, and in water temperatures warmer than for other groups. A high percentage of groups encountered contained calves (82.5%), suggesting the importance of the Hauraki Gulf for common dolphins' reproduction. Groups which included neonates were significantly less likely to be seen associated with whales and birds. Groups of common dolphins as a whole did not show a differential reaction to the survey boat according to the age class of their youngest member. However, mothers with young calves kept greater distances from the boat than mothers and older calves did, suggesting that the boat may be perceived as a threat during the neonate period. Most of the behaviours that characterise mother-calf relationships varied according to calf age class. The occurrence, frequency, duration and distance of separations increased with older-aged calves. A similar increase was found in the time spent without the mother, in the occurrence of association with non-mother dolphins, in the time spent in 'echelon position', and in both mothers' and calves' dive time. Results from this study have extended our knowledge of common dolphins' reproductive ecology, demonstrated that studies of mother-calf relationships in pelagic species of dolphins can be achieved, and have allowed future research needs to be identified and management recommendations to be made.

I. Visser (ORT) continues to collect data from aboard eco-tourism vessels around Antarctic waters. Sixty days were spent at sea and killer whales were sighted on seven occasions. Three 'Types' of orca were seen—'Type A', 'Type B' and 'Type C'. A further 22 sighting reports were collected from the public and other scientists. I. Visser also continues land-based surveys at Punta Norte, Peninsula Valdez, Argentina which were conducted for 14 days. Killer whales were sighted on 12 occasions, including times when they were observed hunting on the beach. Photo-IDs were made and contributed to the on-going catalogue held by Juan Copello, La Ernestina, Punta Norte.

S. DuFresne (OU) completed his PhD research on the conservation biology of Hector's dolphins. Using photo-ID data gathered between 1985 and 2002 in the Banks Peninsula Marine Mammal Sanctuary, an overall survival estimate of 0.9042 (SE = 0.0104) was calculated. It is thought that this is too low to allow for population growth, and current focus is on using existing population models to thoroughly investigate the status of this population. Modifications of the survival model were made to estimate juvenile and adult survival separately. A temporal symmetry modelling approach was used to estimate population growth. This analysis proved to be somewhat less informative due to the confounding effects of mark acquisition.

R. Suisted, H. McConnell (DOC), N. Patenaude and S. Baker (AU) continue investigations into stock structure of southern right whales in New Zealand. The focus of the work is investigation of the degree of genetic relatedness of individuals seen around the New Zealand mainland and those from the subantarctic and Australia. To date, sample sizes are too low to answer this question with an acceptable degree of certainty.

The 6th Annual Meeting of the South Pacific Whale Research Consortium was held at the University of Auckland on 11–13 March, 2005. Thirty-three participants attended, including researchers and wildlife managers from throughout the region. As usual, much of the meeting was devoted to the consideration of data collected during synoptic humpback whale research programmes, including the matching of fluke catalogues and genetic analyses. Several new matches were made between existing catalogues, demonstrating a significant degree of interchange between over-wintering grounds. Of particular interest was the discovery of nine new matches between French Polynesia and other areas of the South Pacific, viz. Cook Islands (1), American Samoa (2), Tonga (5) and New Caledonia (1). Inclusion of the new catalogue from American Samoa also provided several new matches, between American Samoa and French Polynesia, Cook Islands and Tonga. This further demonstrates the complexity of interchanges between the various populations of humpback whales in the South Pacific region.

Since April 2004, a total of 66 new skin samples from long-finned pilot whales stranded around New Zealand were collected in collaboration with DOC. These were added to the existing database held at the University of Auckland, which now contains samples from 285 individuals. As part of his PhD project, Marc Oremus (AU), has been analysing samples from six mass strandings ($n = 246$). These analyses include molecular sexing, sequencing four genes of the mitochondrial DNA and genotyping 16 microsatellite loci. Results are currently being collated and the aim is to investigate the genetic diversity and relatedness of long-finned pilot whales within and between mass strandings.

S. O'Shea (AUT) continues to investigate the diet of cetaceans in New Zealand, with special reference to cephalopod prey. Cephalopods are now recognised to be the sole component of sperm whale diet, and a large proportion of pygmy sperm whale diet. Currently, research being conducted at AUT is focussing on collecting and archiving stomach contents of stranded teuthophagous whales from New Zealand waters, reconstructing life histories of the primary prey species, and preparing identification guides for both upper and lower squid beaks. Stomach content collections are the

subject of two postgraduate theses: those of F. Gomez, on the diet of the sperm whale, and E. Beatson, on the diet of the pygmy sperm whale. These projects are expected to be completed in 2006. Based on an analysis of diet, it is speculated that the diet of teuthophagous whales will be affected by any change in either the diversity or size-class composition of regionally occurring cephalopod taxa, and that temporal trends in prey species diversity or size-class composition will become apparent. Preliminary analyses of sperm whale stomach contents indicate that beak numbers vary from very low (e.g. with several stomachs being empty or containing one or two Antarctic squid beaks only) to more than 800 lower beaks (with most containing several hundred lower beaks). In general, there are low ratios of locally occurring squid to Antarctic squid in stomach contents. An exception is for *Histioteuthis* species, where sperm whales appear to have fed on locally occurring squid prior to stranding. The diet of the pygmy sperm whale differs substantially from that of the sperm whale, in terms of prey size class composition and diversity.

D. Heimeier (AU) used whole blood samples from two South Island Hector's dolphins collected during a recent satellite tagging program under the supervision of G. Stone (NEA) and P. Duignan (MU). RNA extracted from blood samples was used to confirm the expression of one class I and two class II Major Histocompatibility Complex (MHC) genes and to assess the genetic variability at the MHC in the Hector's dolphin as well as in other dolphin species.

E. Carroll (AU) is starting an MSc on the recent population bottleneck in the New Zealand southern right whale. It is a continuation of the work on the sub-Antarctic/remnant New Zealand population carried out by N. Patenaude. This study aims to reconstruct the population and putative genetic bottleneck using genetic analysis and computer modelling.

D. Neale and R. Suisted (DOC) published the NZ Marine Mammal Action Plan for 2005–2010. The report is a collaborative achievement prepared with input from a wide range of DOC staff and others. It provides a guide for conservation management and research of New Zealand's marine mammals by DOC over the next five years, and represents an active interpretation of priorities across a broad work area using key strategic documents and directive government policies. DOC's work takes two general approaches: first, to protect species; and second, to manage human interactions and use. These are undertaken with careful regard to the Crown's interests, safety and welfare, understanding and co-operation and quality performance. Both of the two general approaches may be further divided into a range of topics (species and issues) that are arranged in a broad order of priority. For each topic, DOC's key objectives and their necessary actions are listed, and the responsibilities and priority levels are specified for each action. The Plan is available at www.doc.govt.nz/Conservation/001~Plants-and-animals/003~Marine-Mammals/The-marine-mammal-action-plan.pdf. (Viewed 20 March 2006.)

S. Childerhouse (DOC) and A. Baker are developing a National Cetacean Sighting database which aims to collate all cetacean sightings reported to DOC. The first stage has been completed with 1400 records entered, and the next stage is to seek additional information from other DOC offices and other researchers. The long-term aim is to have this database available to researchers and the public over the internet. A. Baker is managing the construction of a GIS database of cetacean sightings in the Northland region, using data from DOC, dolphin-watching tourist operators, and researchers.

WWF-NZ set up a Maui's dolphin Sightings Network in 2000 in order to find out more about the dolphin's distribution on the North Island west coast. Since 2000, more than 90 Maui's dolphin sightings have been reported by the public, including seven validated sightings in west coast harbours. Since October 2004, all reported Maui's dolphin sightings are now professionally validated on behalf of WWF.

E. Fordyce (OU) has continued work with J.G. Mead (SI) on osteology of the bottlenose dolphin, and researching the osteology and functional morphology of the skull of the Ganges River dolphin. Collaborative research with Professor N. Okada (Tokyo Institute of Technology) has involved calibration of cetacean molecular clocks, as summarised in a recent article in 'Systematic biology'.

K. Stockin, L. Meynier, M. Bando, and P. Duignan (MU) continue research on the diet of common dolphins from New Zealand beachcast and bycaught animals. To date, stomach content analyses have been conducted on 20 common dolphins. K. Stockin, M. Orams and P. Duignan (MU) continue to collect common dolphin skulls for morphometric analyses. L. Burgess and M. Orams (MU) begin a baseline study of common dolphin acoustics in the Hauraki Gulf, Auckland. V. Binedell (MU) completed a statistical analysis of the New Zealand whale stranding database.

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None.

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