

Cetacean research in New Zealand 2005/06

Simon Childerhouse (Comp.)

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CONTENTS

Abstract	5
<hr/>	
1. Introduction	6
<hr/>	
2. Species and stocks studied	7
<hr/>	
3. Sightings data	8
<hr/>	
3.1 Field work	8
3.1.1 Systematic	8
3.1.2 Opportunistic, platforms of opportunity	11
3.2 Analyses/development of techniques	12
<hr/>	
4. Marking data	13
<hr/>	
4.1 Field work	13
4.1.1 Natural marking data	13
4.1.2 Artificial marking data	13
4.1.3 Telemetry data	13
4.2 Analyses/development of techniques	13
<hr/>	
5. Tissue/biological samples collected	14
<hr/>	
5.1 Biopsy samples	14
5.2 Samples from directed catches or bycatches	14
5.3 Samples from stranded animals	14
5.4 Analyses/development of techniques	15
<hr/>	
6. Pollution studies	17
<hr/>	
7. Statistics for large cetaceans	17
<hr/>	
7.1 Direct catches (commercial, aboriginal and scientific permits) for the calendar year 2005	17
7.2 Non-natural mortality for the calendar year 2005	17
7.2.1 Strandings or dead whales encountered at sea	17
7.2.2 Observed or reported ship strikes	17
7.2.3 Fishery bycatch	17
7.3 Earlier years' statistics	17
<hr/>	
8. Statistics for small cetaceans	18
<hr/>	
8.1 For the calendar year 2005	18
8.2 Direct catches (commercial, aboriginal and scientific permits) for the calendar year 2005	18
8.3 Non-natural mortality for the calendar year 2005	18
8.3.1 Strandings or dead small cetaceans encountered at sea	18
8.3.2 Observed or reported ship strikes	18
8.3.3 Fishery bycatch	18
8.4 Earlier years' statistics	18

9.	Strandings	19
10.	Other studies and analyses	20
11.	Acknowledgements	22
12.	References	22
<hr/>		
Appendix 1		
<hr/>		
	Published or 'in press' papers	23
	Unpublished literature	24

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Simon Childerhouse (Comp.)

Marine Conservation Team, Department of Conservation, PO Box 10420,
Wellington 6143, New Zealand

Present address: Australian Antarctic Division, Kingston, Tasmania 7050,
Australia. Email: simon.childerhouse@aad.gov.au

ABSTRACT

This report summarises cetacean (i.e. whale and dolphin) research undertaken in New Zealand over the period from April 2005 to March 2006, with statistical information for the 2005 calendar year. It covers 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 26 species, from 14 different institutions and agencies and over 40 researchers. Although this is a comprehensive collection of research for 2005/06, 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 New Zealand Department of Conservation. This report provides a published record of the New Zealand National Progress Report on Cetacean Research for 2005/06, which was presented to the Scientific Committee of the International Whaling Commission.

Keywords: cetacean, research, marine mammal, International Whaling Commission

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1. Introduction

This report follows on from previous reports which have summarised cetacean research in New Zealand over the period 1997–2005 (Childerhouse 2002, 2004, 2005, 2006). It provides updated information about research in New Zealand from April 2005 to March 2006. For a full description of the format and explanation of the sections in the report, please refer to Childerhouse & Donoghue (2002). This report and previous 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 88 member nations including New Zealand. New Zealand has been a member of the IWC since 1948 (Fredheim 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) 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 to encourage them to provide details of their research, this has not always been completely successful. As such, this report covers most of the work undertaken in New Zealand in 2005/06; but some research, which has not been reported to the Government, does not appear. However, overall, only a small proportion of the active cetacean research in New Zealand 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.

This report summarises information obtained from: Auckland (AU), Massey (MU), and Otago (OU) Universities, Auckland University of Technology (AUT), Dalhousie University (DAL), Museum of New Zealand Te Papa Tongarewa (TP), Department of Conservation (DOC), Operation Cétacés (OC), Orca Research Trust (ORT), Dolphin Watch Ecotours Picton (DWE), National Institute of Water and Atmospheric Science (NIWA), South Pacific Whale Research Consortium (SPWRC), Ministry of Fisheries (MFish), Cawthorn & Associates (CAW), and independent researchers.

A list of published reports and other material relating to cetacean research in New Zealand in 2005/06 and presented in the report to the IWC is provided in Appendix 1.

2. Species and stocks studied

The cetacean species and stocks studied in New Zealand in 2005/06 are listed in Table 1.

TABLE 1. CETACEAN SPECIES AND STOCKS STUDIED IN NEW ZEALAND IN 2005/06.

COMMON NAME	SCIENTIFIC NAME	AREA/STOCK(S)	RELEVANT SECTIONS IN TEXT
Antarctic minke whale	<i>Balaenoptera bonarensis</i>	Area V	5.3, 9
Arnoux's beaked whale	<i>Berardius arnuxii</i>	NZ	5.3, 9
Beaked whales	Family Ziphiidae	NZ	5.3
Blainville's beaked whale	<i>Mesoplodon densirostris</i>	NZ	5.3
Bottlenose dolphin	<i>Tursiops truncatus</i>	NZ	3.1.1, 3.1.2, 4.1.1, 5.1, 5.3, 5.4, 9
Bryde's whale	<i>Balaenoptera edeni</i>	NZ	3.1.1, 4.1.1, 5.1, 5.3, 5.4, 9
Common dolphin	<i>Delphinus delphis</i>	NZ	3.1.1, 3.1.2, 4.1.1, 5.2, 5.3, 5.4, 6, 8.1, 9, 10
Cuvier's beaked whale	<i>Ziphius cavirostris</i>	NZ	5.3, 9
Dense-beaked whale	<i>Mesoplodon densirostris</i>	NZ	9
Dusky dolphin	<i>Lagenorhynchus obscurus</i>	NZ	3.1.2, 4.1.1, 9
Dwarf minke whale	<i>Balaenoptera acutorostrata</i>	NZ	5.3
Gray's beaked whale	<i>Mesoplodon grayi</i>	NZ	5.3, 9
Hector's dolphin	<i>Cephalorynchus hectori hectori</i>	South Island, NZ	3.1.1, 3.1.2, 4.1.1, 8.1, 9, 10
Humpback whale	<i>Megaptera novaeangliae</i>	NZ, Tonga, New Caledonia	3.1.1, 4.1.1, 5.1, 5.3, 5.4
Killer whale	<i>Orcinus orca</i>	NZ, Antarctica	3.1.1, 3.1.2, 4.1.1, 5.1, 5.4
Long-finned pilot whale	<i>Globicephala melas</i>	NZ, Samoa	3.1.1, 5.3, 9
Maui's dolphin	<i>Cephalorynchus hectori maui</i>	North Island, NZ	3.1.1, 10
Pygmy blue whale	<i>Balaenoptera musculus brevicauda</i>	NZ	5.3
Pygmy right whale	<i>Caperea marginata</i>	NZ	5.3, 9
Pygmy sperm whale	<i>Kogia breviceps</i>	NZ	5.3, 9, 10
Southern bottlenose whale	<i>Hyperoodons planifrons</i>	NZ	5.3, 9
Southern right whale	<i>Eubalaena australis</i>	NZ	3.1.2, 5.1, 5.3
Southern right whale dolphin	<i>Lissodelphis peronii</i>	NZ	9
Sperm whale	<i>Physeter macrocephalus</i>	NZ	2.1.1, 8, 9
Straptooth whale	<i>Mesoplodon layardii</i>	NZ	4.3, 8
Striped dolphin	<i>Stenella coeruleoalba</i>	NZ	3.1.2

3. Sightings data

3.1 FIELD WORK

3.1.1 Systematic

A. Schaffar and C. Garrigue (OC) completed a pilot study investigating whale watching activities in the southern lagoon of New Caledonia. This project was part of an on-going (since 1995) research programme on the biology and ecology of humpback whales wintering in New Caledonia. Land-based surveys using a theodolite were conducted from 14 July to 4 September 2005 and resulted in 40 independent tracking sessions of humpback whales. Vessels were present within 1000 m of monitored whales 70% of the time, with a mean number of 2.3 vessels present. Mothers and calves were exposed to greater levels of whale-watching activity than any other age/sex class. Further research is planned over the next 2 years to investigate whether the presence of vessels affects the behaviour of humpback whales in New Caledonia.

E. Martinez and M. Orams (MU) completed the first year of a 3-year field study looking at the impacts of vessel activity on the behaviour of Hector's Dolphins in Akaroa Harbour, Banks Peninsula, Canterbury. This study aims to determine and quantify the current level of vessel activity; whether any potential impacts are significant for the local Hector's dolphin population; and whether these can be mitigated by appropriate management recommendations, including possible changes to the dolphin-watching permit conditions. Land-based surveys were conducted between 1 November 2005 and 31 March 2006.

W. Rayment and T. Webster (OU) compiled a photo-ID catalogue of Hector's dolphins in Akaroa Harbour during summer 2005/06. This research is to be used as part of an ongoing study looking at the long-term impacts of vessel activity on Hector's dolphins.

G. de Tezanos Pinto and C.S. Baker (AU) continued investigating the genetic diversity and population structure of bottlenose dolphins in New Zealand. This research aims to model trends in abundance for the Northland population; to investigate the population structure and genetic diversity of the species in coastal New Zealand waters; and their relationship to other bottlenose dolphin populations around the world. From February 2005 until March 2006, a total of 49 daily surveys were undertaken in the Bay of Islands, Northland, and eight in the Hauraki Gulf, Auckland. The primary aims of these surveys were to collect individual photo-ID data and biopsy samples from bottlenose dolphins. Photo-ID effort included collection of more than 4000 photographs from 60 encounters. Combining photo-ID effort with that of MSc student F. Mourao (AU) resulted in the addition of approximately 33 new individuals to the current photo-ID catalogue.

D. Lusseau (DAL), in collaboration with the Marine Mammal Research Group (OU) and other groups, continued to investigate the dynamics and social relationships of bottlenose dolphins in Doubtful Sound, Fiordland. S.M. Lusseau and S. Wing (OU) published the results of a stable isotope study showing that bottlenose dolphins in Doubtful Sound rely heavily on locally produced prey items. D. Lusseau (OU) published further work on the impact of dolphin-watching on bottlenose

dolphins in Doubtful Sound. This work showed that habitat displacement can occur and recommended the creation of a multi-level marine protected area to manage dolphin-watching in Doubtful Sound.

M. Oremus (AU) completed genetic analyses of long-finned pilot whale samples collected from strandings around New Zealand between 1992 and 2005 ($n = 344$). Mitochondrial DNA genes and microsatellite genetic loci were analysed to clarify the social organisation of this species. In contrast to the findings of previous investigations in the North Atlantic, the results support the existence of unrelated matrilineal pods within the pods formed by this species. Analyses of kinship and relatedness were also undertaken to investigate the social dynamics of mass strandings. These revealed a puzzling disruption of social bonds during these tragic events. Collaboration was initiated with the Department of Primary Industries, Water and Environment, Tasmania, to investigate further the population structure of long-finned pilot whales in the Southern Hemisphere and the social dynamics of mass strandings. From April 2005 to March 2006, a total of 54 new skin samples from long-finned pilot whales stranded around New Zealand were collected (in collaboration with DOC) and added to the existing database held at AU. This database now contains samples from 408 individuals.

S. Scali, M. Richlen, E. Slooten and S. Dawson (OU) carried out research on Maui's dolphins' use of the harbours on the west coast of the North Island. Porpoise Detectors (PODs) have been used to make acoustic detections of Maui's dolphins, and sightings have also been made from vessels and cliff-top observation posts. So far, research has been carried out over two summers in the Manukau Harbour, and over one summer in the Kaipara Harbour. Part of the Manukau harbour (the entrance) is included in a protected area created by the Ministry of Fisheries (MFish) along the west coast of the North Island from Northland to Taranaki to reduce dolphin bycatch in fisheries. PODs recorded acoustic detections of Maui's dolphins inside both harbours. In the Manukau Harbour, Maui's dolphins regularly venture to the east of the protected area, into the inner part of the harbour where commercial and amateur gillnetting continues. None of the Kaipara Harbour area is protected, and the dolphins that enter this harbour are therefore exposed to commercial and recreational gillnet fisheries. 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 species.

W. Rayment, E. Slooten, S. Dawson, T. Webster (OU) and S. Childerhouse (DOC) completed a series of offshore aerial surveys for Hector's dolphins at Banks Peninsula, including three summer and three winter surveys. These surveys have found that, in summer, 80% of the population is usually resident inside the Banks Peninsula Marine Mammal Sanctuary (where commercial gillnetting is prohibited and amateur gillnetting is restricted); while in winter, only 44% of the population is resident there. These results are consistent with research by S. DuFresne (OU), which indicates that survival rates of the Hector's dolphin population at Banks Peninsula are very low and that the population is still slowly declining. Rayment and Webster have continued acoustic monitoring of Hector's dolphins (using PODs) and gathering photo-ID data. Rayment recently completed fieldwork for a PhD studying the conservation biology of Hector's dolphins at Banks Peninsula. Fieldwork involved aerial surveys to investigate offshore distribution, acoustic monitoring to study habitat use and continuation of the long term photo-ID catalogue (started in 1984). Analysis will focus on providing information to improve the effectiveness of the Banks Peninsula Marine Mammal Sanctuary.

B. Miller, S. Dawson and E. Slooten (OU) carried out research on the acoustic behaviour of sperm whales at Kaikoura. Acoustic arrays were used to determine the whales' underwater movements and sound production. This research programme included acoustic abundance estimates, localisation of whales during diving, acoustic length estimates based on inter-pulse-interval measurements, and acoustic identification based on wavelet coefficients.

J. Rodda (OU) completed the second year of a 3-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, population density, and fine-scale habitat usage within the bay. Investigations of prey distribution are planned.

R. Currey (OU) carried out PhD research on the conservation biology and behaviour of bottlenose dolphins resident in Doubtful Sound, Fiordland. Based on recent intensive photo-ID work, there are between 54 and 56 individuals in the population. The level of mortality has been unusually high for this population in the last 2 years. 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 hydrophone array has been used to estimate foraging depths through the localisation of dolphin vocalisations. D. Rundgren (OU) continued research on distribution of bottlenose dolphins in Fiordland.

AU and SPWRC conducted humpback whale research in the Vava'u island group in Tonga between 4 and 22 September 2005. Methods included the collection of images for photo-ID; biopsy samples and sloughed skin for DNA analysis; and acoustic data. During the 2005 field season, 73 pods of humpback whales were encountered (135 individual whales) over 18 days (163 hours on-effort time). Of all pods encountered, 49% ($n = 36$) were solitary whales, 11% ($n = 8$) were cow-calf pairs; 7% ($n = 5$) were cow-calf-escort pods, and the remaining 33% ($n = 24$) were pods of two or more whales. Of the solitary whales, 39% (14/36) were singers. Forty-three whales were individually photo-identified and added to the Tonga catalogue. Of these, eight individuals had been photo-identified previously in Vava'u. Eighteen photo-identified whales were also matched with a skin sample. Skin samples were collected from a total of 46 humpback whales (41 biopsy and five sloughed skin samples). Four hours of song was recorded from ten whales. Data analysis, including reconciling the photo-IDs with other catalogues and extracting DNA from the skin samples, is currently underway in collaboration with other members of the SPWRC.

In January 2005, E. Burgess and M. Orams (MU) began dedicated field-based research on the foraging ecology of common dolphins in the Hauraki Gulf, as part of an on-going long-term research programme. A 5.6-m research vessel was used to carry out vessel-based surveys in the inner Hauraki Gulf. Focal follows and acoustic methods were also used to examine the foraging strategies and inter-specific relationships of feeding groups.

M. Merriman and M. Orams (MU) completed a 2-year dedicated field-based research project on the behavioural ecology of bottlenose dolphins in the Marlborough Sounds, South Island. Vessel-based surveys were conducted from January to September 2005.

J. Smith and M. Orams (MU) carried out a quantitative analysis of the effects of vessel traffic on the behaviour of east Australian humpback whales off Cape Moreton, Queensland. Methods included observations from a land-based observational platform (Cape Moreton, Moreton Island) using a digital video camera attached to a theodolite scope to record position and behaviour of both vessels and whales.

N. Wiseman and C.S. Baker (AU) continued investigating the population ecology of Bryde's whales in the Hauraki Gulf. The primary aims of the research are to investigate seasonal abundance, presence/absence of individual whales, and whether the Hauraki Gulf Bryde's whales are reproductively isolated from populations in adjacent areas. This is being investigated by collecting biopsy samples from Bryde's whales in the Hauraki Gulf. Fifteen samples were collected between April 2005 and April 2006, and 13 new individuals were added to the photo-ID catalogue. Contrary to previous assumptions, preliminary results suggest that the highest seasonal encounter rates with Bryde's whales are during winter.

N. Wiseman, G. de Tezanos Pinto (AU) and K. Stockin (MU) have continued 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, a Paxarms biopsy system is being used to collect skin samples from Bryde's whales and bottlenose dolphins to continue genetic analyses of these species.

P. Ensor participated as a team leader during the 2005 NILS cruise in the North Atlantic, and also acted as cruise leader on the 2005/06 IWC-SOWER cruise, Area III of the Antarctic.

N. Gibbs and S. Childerhouse (DOC), with the support of many volunteers, undertook a land- and vessel-based survey of humpback whales in Cook Strait between 18 June and 2 July 2005. This was the second dedicated humpback whale survey in New Zealand since whaling finished in 1964. Ex-whalers were the primary land-based spotters. From 139 hours of land-based and 12 hours of vessel-based observation, 12 pods of 18 humpback whales were seen. Ten photo-IDs and 11 genetic samples were obtained. Seven individuals were both photographed and biopsy sampled.

I. Visser (ORT) continued research 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.

3.1.2 Opportunistic, platforms of opportunity

A. & D. Englehaupt (DWE) collected opportunistic data on all dolphin groups (bottlenose, common, dusky, Hector's) encountered during Dolphin Watch Ecotours trips in the Marlborough Sounds throughout the year. Location, estimated group size and presence of calves were recorded for all groups, including images for photo-ID and descriptions of behavioural states.

M. Cawthorn (CA) continued to collate incidental sightings of whales in the southwest Pacific and examine historical whale distribution records with regard to modern bathymetry. He also continued to develop and test equipment to mitigate the accidental bycatch of pinnipeds and cetaceans in commercial fisheries.

G. de Tezanos Pinto (AU) conducted a total of seven surveys during 2005 on board permitted marine mammal tour vessels in the Bay of Islands. The primary objective of these surveys was to collect individual photo-ID data of bottlenose dolphins in the area, including data on mother-calf associations, group size and composition, location and behaviour. Individual photo-IDs were opportunistically collected from encounters with killer whales in the Bay of Islands, along with two biopsy samples.

H. McConnell (DOC) coordinated the collection of opportunistic sightings of southern right whales around the New Zealand mainland from researchers, the public and DOC staff. In addition to opportunistic sightings, genetic samples were also collected to determine whether individuals seen around the main two islands are genetically or geographically isolated from subantarctic populations. A total of six genetic samples were collected in the 2005 season.

J. Berghan and R. Constantine (AU) continued research on bottlenose dolphins in Northland and Auckland. Photo-ID images have been collected opportunistically since 1999. This has involved efforts by researchers from UA, MU, and the whale-watch company, Dolphin Explorer. Currently, there are approximately 150 dolphins in the catalogue, which is now being updated following comparison with the Bay of Islands catalogue held at the University of Auckland. The results of resightings within the Hauraki Gulf, and between the Gulf and the Bay of Islands, was being prepared for publication.

K. Stockin and E. Burgess (MU) continued to undertake opportunistic surveys onboard the whale-watch vessel 'Dolphin Explorer'. Photo-IDs recorded for 2004/2005 included the following species: common dolphin, Bryde's whale, bottlenose dolphin, killer whale and striped dolphin.

E. Martinez (MU) continued opportunistic vessel-based surveys, using local tour operators' boats, for her PhD research. Data collection focussed on the behavioural ecology of Hector's dolphins in the presence of vessels and/or swimmers in Akaroa Harbour. Photo identification of Hector's dolphins encountered around dolphin-watching and dolphin-swimming operations has also been initiated.

3.2 ANALYSES/DEVELOPMENT OF TECHNIQUES

None.

4. Marking data

4.1 FIELD WORK

4.1.1 Natural marking data

Details of photo-ID catalogues held and maintained by researchers in New Zealand are provided in this section. Only the catalogues that have been actively maintained, added to, and reported on in 2005/06 have been reported here. For a more detailed list of existing catalogues, please consult previous national progress reports and individual researchers. Table 2 provides details of photo-ID catalogues of cetaceans held and maintained by researchers in New Zealand in 2005/06.

TABLE 2. DETAILS OF PHOTO-ID CATALOGUES FOR CETACEANS HELD AND MAINTAINED BY RESEARCHERS IN NEW ZEALAND IN 2005/06.

SPECIES	FEATURE	AREA/ STOCK	CALENDAR YEAR(S) OR SEASON (NUMBER PHOTOGRAPHED)	CATALOGUED Y/N	CATALOGUE TOTAL	CONTACT PEOPLE (INSTITUTION)
Bottlenose dolphin	Dorsal fin	NZ	2005 (150)	Y	170	A. Englehaupt (DWE)
Bottlenose dolphin	Dorsal fin	Marlborough Sounds	2003–2005 (?)	Y	> 300	M. Merriman (MU)
Bottlenose dolphin	Dorsal fin	North Island	2005 (150)	Y	423	G. de Tezanos Pinto, F. Mourao (AU)
Bottlenose dolphin	Dorsal fin	Northland, Hauraki Gulf	2005 (?)	Y	150	R. Constantine, J. Berghan (AU)
Bryde's whale	Dorsal fin	Hauraki Gulf	2005/06 (13)	Y	74	N. Wiseman, C.S. Baker (AU)
Common dolphin	Dorsal fin	NZ	2005 (15)	Y	10	A. Englehaupt (DWE)
Common dolphin	Dorsal fin	Hauraki Gulf	2002–2006 (?)	Y	> 350	K. Stockin (MU)
Dusky dolphin	Dorsal fin	NZ	2005 (300)	Y	400	A. Englehaupt (DWE)
Hector's dolphin	Fin/body	Akaroa Harbour, Banks Peninsula	2005 (39)	Y	39	L. Allum (DOC)
Hector's dolphin	Dorsal fin	NZ	2005 (150)	Y	20	A. Englehaupt (DWE)
Hector's dolphin	Dorsal fin	Banks Peninsula	2005/06 (?)	Y	?	E. Martinez (MU)
Humpback whale	Fluke	NZ	2005 (10)	Y	26	N. Gibbs (DOC), R. Constantine (AU)
Humpback whale	Fluke	Tonga	2005 (43)	Y	616	R. Constantine (AU)
Killer whale	Dorsal fin	NZ	2005 (30)	N	?	A. Englehaupt (DWE)

4.1.2 Artificial marking data

None.

4.1.3 Telemetry data

None.

4.2 ANALYSES/DEVELOPMENT OF TECHNIQUES

None.

5. Tissue/biological samples collected

5.1 BIOPSY SAMPLES

Details of biopsy samples of cetaceans collected in 2005/06 are provided in Table 3.

TABLE 3. BIOPSY SAMPLES OF CETACEANS COLLECTED IN 2005/06.

SPECIES	AREA/ STOCK	NO. SAMPLES COLLECTED IN 2005/06	ARCHIVED Y/N	NO. ANALYSED	TOTAL HOLDINGS	CONTACT PEOPLE (INSTITUTION)
Bottlenose dolphin	NZ	50	Y	50	149	C.S. Baker, G. de Tezanos Pinto (AU)
Bryde's whale	Hauraki Gulf	27	Y	18	27	C.S. Baker, N. Wiseman (AU)
Humpback whale	NZ mainland	11	Y	11	23	C.S. Baker, D. Steel (AU)
Humpback whale	Tonga	46	Y	46	>500	C.S. Baker, D. Steel (AU)
Killer whale	NZ	2	Y	2	?	C.S. Baker, G. de Tezanos Pinto (AU)
Southern right whale	NZ mainland	6	Y	19	19	C.S. Baker, D. Steel (AU)

5.2 SAMPLES FROM DIRECTED CATCHES OR BYCATCHES

DOC field staff and other researchers continued to collect samples from bycaught and beachcast cetaceans. Details of samples collected in 2005/06 are provided in Table 4.

TABLE 4. DETAILS OF SAMPLES COLLECTED IN 2005/06 FROM BYCAUGHT OR BEACHCAST CETACEANS.

SPECIES	AREA/ STOCK	NO. SAMPLES COLLECTED IN 2005/06	ARCHIVED Y/N	TISSUE TYPES	CONTACT PEOPLE (INSTITUTION)
Common dolphin	NZ	25	Y	Skin	K. Stockin, P. Duignan (MU)
Common dolphin	NZ	10	Y	Stomachs, skulls, teeth, blubber, fixed tissues	K. Stockin, P. Duignan (MU); A. van Helden (TP)

5.3 SAMPLES FROM STRANDED ANIMALS

Details of samples collected from stranded animals in 2005/06 are provided in Table 5. P. Duignan, G. Jones and colleagues (MU) continued to undertake autopsies of stranded and bycaught marine mammals to investigate cause of death and species biology and ecology.

TABLE 5. SAMPLES COLLECTED FROM STRANDED CETACEANS IN 2005/06.

SPECIES*	AREA/ STOCK	NO. SAMPLES COLLECTED IN 2005/06	ARCHIVED Y/N	TISSUE TYPES	CONTACT PEOPLE (INSTITUTION)
Arnoux's beaked whale	NZ	1	Y	Skin and blubber	C.S. Baker, D. Steel (AU)
Blainville's beaked whale	NZ	1	Y	Skin and blubber	C.S. Baker, D. Steel (AU)
Bottlenose dolphin	NZ	1	Y	Skin and blubber	C.S. Baker, D. Steel (AU)
Bryde's whale	NZ	1	Y	Skin and blubber	C.S. Baker, D. Steel (AU)
Common dolphin	NZ	13	Y	Skin and blubber	C.S. Baker, D. Steel (AU)
Common dolphin	NZ	?	Y	Skin, blubber stomachs, teeth	K. Stockin, P. Duignan (MU)
Common dolphin	NZ	?	Y	Skulls	K. Stockin, P. Duignan (MU)
Cuvier's beaked whale	NZ	3	Y	Skin and blubber	C.S. Baker, D. Steel (AU)
Dwarf minke whale	NZ	1	Y	Skin and blubber	C.S. Baker, D. Steel (AU)
Gray's beaked whale	NZ	14	Y	Skin and blubber	C.S. Baker, D. Steel (AU)
Humpback whale	NZ	1	Y	Skin and blubber	C.S. Baker, D. Steel (AU)
Long-finned pilot whale	NZ	53	Y	Skin and blubber	C.S. Baker, D. Steel (AU)
Pygmy blue whale	NZ	1	Y	Skin and blubber	C.S. Baker, D. Steel (AU)
Pygmy right whale	NZ	1	Y	Skin and blubber	C.S. Baker, D. Steel (AU)
Pygmy sperm whale	NZ	13	Y	Skin and blubber	C.S. Baker, D. Steel (AU)
Southern bottlenose whale	NZ	2	Y	Skin and blubber	C.S. Baker, D. Steel (AU)
Southern minke whale	NZ	2	Y	Skin and blubber	C.S. Baker, D. Steel (AU)
Southern right whale	NZ	1	Y	Skin and blubber	C.S. Baker, D. Steel (AU)
Sperm whale	NZ	1	Y	Skin and blubber	C.S. Baker, D. Steel (AU)
Straptooth whale	NZ	1	Y	Skin and blubber	C.S. Baker, D. Steel (AU)
Unknown	NZ	6	Y	Skin and blubber	C.S. Baker, D. Steel (AU)
^a Unknown beaked	NZ	1	Y	Skin and blubber	C.S. Baker, D. Steel (AU)

* Two of the minke whales, the pygmy blue whale, three of the Gray's beaked whales and the straptooth whale were all primarily identified to species level by genetic analysis with comparison to reference sequences held at www.dna-surveillance.auckland.ac.nz. For the remaining samples, genetic analysis confirmed morphological identification made by DOC field staff or A. van Helden (TP).

5.4 ANALYSES/DEVELOPMENT OF TECHNIQUES

G. de Tezanos Pinto and C.S. Baker (AU) continued to investigate the molecular ecology of bottlenose dolphins in New Zealand. Fourteen unique haplotypes (maternal lineages) were identified for Northland ($n = 44$). The frequency of haplotypes by sex showed no strong evidence of sex bias. One haplotype dominated by males was not found in the other populations. The relatively large number of representative haplotypes found in Northland provides the potential for more detailed analysis of habitat usage and social association patterns among maternal lineages. Analysis of the mitochondrial DNA control region between the three New Zealand populations (Northland, Marlborough Sounds and Fiordland) showed significant genetic differentiation and relative isolation between them. Northland had higher genetic diversity values than expected, which suggests genetic interchange with a pelagic population or a more recent colonisation event. There was one New Zealand maternal lineage (haplotype) that was shared with Samoa, although there were no shared haplotypes between New Zealand and other populations in the Pacific Ocean (French Polynesia, Japan, China, Kiribati and Hawaii). Moreover, a hierarchical analysis by ocean basin did not show any shared haplotypes between basins.

J. Jackson (AU) investigated the relationship between demographic and genetic estimates of cetacean abundance, with a view to improving existing logistic demographic and coalescent-based genetic simulation programmes by incorporating the influence of one on the other. This work was done in collaboration with A. Rodrigo and A. Drummond (AU). Humpback mitochondrial control region data amplified by members of SPWRC were also analysed in order to refine estimates of mutation rate, diversity and migration rates between breeding populations across the South Pacific.

E. Carroll (AU) has recently completed an MSc on the demographic and genetic bottleneck of the southern right whale in conjunction with C.S. Baker (AU) and N. Patenaude (MU).

C. Olavarria, C.S. Baker and G. de Tezanos Pinto (AU) continued to investigate the molecular ecology of killer whales. The analysis of mtDNA control region sequences (12) from samples collected from strandings and biopsy samples in the North Island, South Island, Chatham Islands and near the Ross Sea revealed five unique haplotypes defined by 11 variable sites. The most common haplotype was found in all except two samples, one from the North Island and another one from the South Island. Samples from more distant locations (Chatham Islands, south of the South Island and the Ross Sea) represented unique maternal lineages. The observed diversity and geographic maternal segregation may be the result of a strong phyloptry and population structuring or, less likely, the presence of different morpho-types in the data set.

K. Stockin and D. Lambert (MU) continued to collect and analyse skin samples from common dolphins. All samples (beachcast animals only) have been extracted, sexed, sequenced (D-loop region of the mtDNA) and the results are currently being analysed.

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

C. Olavarria (AU) continued with his doctoral research on South Pacific humpback whales population structure using molecular markers. A recent analysis of over a thousand mtDNA control region sequences showed significant differentiation between populations associated with the six breeding grounds (Western Australia (D stock), New Caledonia (E1 sub-stock), Tonga (E2 sub-stock), Cook Islands (F stock), French Polynesia (F stock) and the Pacific coast of Colombia (G stock)), and indicated that the Cook Islands and French Polynesia populations should be considered to be two stocks, not the single F stock proposed previously. Other research related to sex bias on population structure of breeding grounds, rate of interchange between New Caledonia and Tonga breeding grounds and the differentiation between feeding areas of the Antarctic Stock I was also carried out.

6. Pollution studies

K. Stockin, P. Duignan and M. Orams (MU) continued to process blubber, liver and kidney samples from beachcast and bycaught common dolphins around the North Island of New Zealand. Samples were analysed for trace metals, PCBs and organochlorines. Pollutant levels and off-loading between genetically determined mother-calf pairs have been examined. An analysis of results is currently being undertaken.

7. Statistics for large cetaceans

7.1 DIRECT CATCHES (COMMERCIAL, ABORIGINAL AND SCIENTIFIC PERMITS) FOR THE CALENDAR YEAR 2005

None.

7.2 NON-NATURAL MORTALITY FOR THE CALENDAR YEAR 2005

None.

7.2.1 **Strandings or dead whales encountered at sea**

See section 9 for a summary of strandings. Full details of individual strandings are held in the New Zealand National Stranding Database and requests for this information should be made to A. van Helden (TP).

7.2.2 **Observed or reported ship strikes**

None.

7.2.3 **Fishery bycatch**

None.

7.3 EARLIER YEARS' STATISTICS

No changes.

8. Statistics for small cetaceans

8.1 FOR THE CALENDAR YEAR 2005

Details of small cetaceans (e.g. dolphins) incidentally or deliberately caught in fishing or other operations in calendar year 2005 are provided in Table 6.

TABLE 6. DETAILS OF SMALL CETACEANS CAUGHT IN FISHERIES IN CALENDAR YEAR 2005.

SPECIES	NO.	DATE	LOCATION	FATE	TARGETED FISH SPECIES	GEAR	HOW OBSERVED	SOURCE OR CONTACT (INSTITUTION)
Common dolphin*	1	Aug 2005	42°39'S; 170°03'E	Dead	Barracouta <i>Thyrsites atun</i>	Trawl	F [†]	MFish
Hector's dolphin	14	Various	Various	Dead	Various demersal spp.	GNS	DA [‡]	H. McConnell (DOC)

* Landed dead, marked and discarded. Information provided by S. Baird (NIWA) under contract to MFish.

[†] F = record collected by onboard fisheries monitor.

[‡] A = anecdotal reports from any reliable source; DA indicates it was documented (e.g. photos, rescue teams, etc.).

8.2 DIRECT CATCHES (COMMERCIAL, ABORIGINAL AND SCIENTIFIC PERMITS) FOR THE CALENDAR YEAR 2005

None.

8.3 NON-NATURAL MORTALITY FOR THE CALENDAR YEAR 2005

None.

8.3.1 Strandings or dead small cetaceans encountered at sea

See section 9 for a summary of strandings. Full details of individual strandings are held in the New Zealand National Stranding Database and requests for this information should be made to A. van Helden (TP).

8.3.2 Observed or reported ship strikes

None.

8.3.3 Fishery bycatch

See section 8.1.

8.4 EARLIER YEARS' STATISTICS

No changes.

9. Strandings

A. van Helden (TP) continued to maintain the New Zealand National Stranding Database. The total number of reported strandings for the period April 2005 to March 2006 was 92 incidents involving 562 animals. This excludes those animals that were reported, but for which stranding data forms were not received by TP before the end of March 2006. At least 17 different species were recorded in the database for this period. The representation in the number of incidents for the different families that stranded in this period are: Neobalaenidae (1.1%), Balaenopteridae (6.5%), Ziphiidae (15.2%), Delphinidae (57.6%) and Physeteridae (including Kogiidae) (19.6%). The representation in number of animals for the different families that stranded in this period are: Neobalaenidae (0.02%), Balaenopteridae (1.1%), Ziphiidae (3.2%), Delphinidae (85.4%) and Physeteridae (4.4%). The species with the highest number of incidents of strandings was long-finned pilot whale with 23 incidents, but some of these represent beachcast animals that may have come from previous strandings. The second most commonly stranded cetacean was common dolphin with 19 incidents. The largest number of individuals of a species to strand was 475 for long-finned pilot whale. The total number of animals refloated for this period was 119. Twelve of these restranded and died; 107 are therefore presumed to have survived. Details of the number and species of stranded cetaceans in 2005/06 are provided in Table 7.

S. O'Shea and colleagues (AUT) continued to investigate strandings of cetaceans in New Zealand. Research included undertaking a detailed examination of one dead pilot whale, including a CT scan (in conjunction with Middlemore Hospital), forensic pathology report (in conjunction with Auckland Hospital), and a parasitology report (in conjunction with Cawthron Institute). S. O'Shea (AUT) continued to collect stomach samples of teuthophagous whales to investigate diet.

In 2005/06, the tissue and DNA archive held at the University of Auckland (curated by C.S. Baker and D. Steel) contained approximately 1000 samples from 34 species, including one porpoise, 9 mysticete, 14 odontocete and 11 beaked whale species.

K. Stockin, P. Duignan, G. Jones and M. Orams (MU) collected all available 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).

TABLE 7. DETAILS AND NUMBER OF STRANDED CETACEANS IN 2005/06.

SPECIES	NO. OF STRANDINGS	NO. OF INDIVIDUALS	NO. RE-FLOATED	NO. RE-STRANDED
RIGHT WHALE				
Pygmy right whale	1	1	0	0
Total for right whale	1	1	0	0
RORQUAL				
Antarctic minke whale	4	4	2	1
<i>Balaenoptera</i> sp.	1	1	0	0
Bryde's whale	1	1	0	0
Total for rorqual	6	6	2	1
BEAKED WHALE				
Arnoux's beaked whale	1	1	0	0
Cuvier's beaked whale	1	1	0	0
Gray's beaked whale	7	9	0	0
Dense beaked whale	1	1	0	0
<i>Mesoplodon</i> sp.	1	1	0	0
Southern bottlenose whale	2	4	0	0
Straptooth whale	1	1	0	0
Total for beaked whale	14	18	0	0
DOLPHIN				
Bottlenose dolphin	2	2	0	0
Common dolphin	19	23	5	0
Dusky dolphin	2	2	1	0
Hector's dolphin	6	9	1	1
Long finned pilot whale	23	475	109	10
Southern right whale dolphin	1	1	0	0
Total for dolphin	53	512	116	11
SPERM WHALE				
Pygmy sperm whale	16	23	1	0
Sperm whale	2	2	0	0
Total for sperm whale	18	25	1	0
Total	92	562	119	12

10. Other studies and analyses

During 2005/06, DOC continued to manage and advocate for the improved protection of cetaceans in New Zealand waters. Several key initiatives included:

- A draft marine protected areas policy. This was released for public comment and identifies marine mammal sanctuaries, as provided for under the Marine Mammals Protection Act 1978, as possible tools that could contribute to the envisaged network of Marine Protected Areas.
- A threat management plan for the endemic Hector's dolphin found around the South Island, and its closely related North Island cogener, Maui's dolphin. This was being prepared jointly by DOC and MFish. Both subspecies are threatened by incidental take in coastal gill nets. The plan will identify all the threats that these dolphins are subject to, including other forms of fishing, tourism impacts, pollution, etc. and will recommend actions to mitigate these threats.

- A set of guidelines to minimise the impacts of seismic surveys on marine mammals. These were developed by H. McConnell and other DOC staff, along with other government agencies and industry. They represent the first comprehensive work that has been undertaken in New Zealand to address the issue of impacts of seismic surveys on marine mammals, and herald a sound progression towards mitigating potential impacts of these surveys in New Zealand waters. The guidelines are non-statutory and will be adopted on a voluntary basis. To date, industry has been very positive towards adopting the recommendations given. The guidelines are available through the following link: www.pepanz.org/downloads/Offshore_Seismic_Guidelines.pdf. Associated reference documentation is available from: www.pepanz.org/downloads/Offshore_Seismic_Guidelines-background.pdf.

F. Gomez-Villota and S. O'Shea (AUT) investigated the diet of sperm whales in New Zealand. The cephalopod prey items from 15 male sperm whales were described. These comprised 37 species in 16 families. Twenty-three species are likely to be consumed in New Zealand waters, and a further ten and four species are considered to be preyed upon in South Tasmanian and Antarctic waters, respectively. An apparent shift in the diet of sperm whales in New Zealand since the 1960s probably reflects changes in the abundance of important prey species. E. Beatson and S. O'Shea (AUT) have been investigating the diet of pygmy sperm whales. The stomach contents of 25 pygmy sperm whales stranded in New Zealand between 1991 and 2003 were examined. Diet included fish and crustaceans, but was mainly cephalopods. The cephalopod prey comprised 31 species in 14 families, dominated by juveniles of Histioteuthididae and Cranchiidae.

A. Gormley (OU) continued development of a Bayesian estimate of adult survival using long-term mark-recapture data that also includes covariates for capture probability. The estimate will be one input into a stochastic matrix population model. The model itself will then become an input into a Bayesian decision analysis model that will provide a formal way of ranking and/or choosing an optimal management decision. This model will be used for Hector's dolphins in the first instance, but will also be suitable for other marine mammal populations.

K. Stockin, L. Meynier, M. Bando, P. Duignan (MU) continued research on the diet of common dolphins from New Zealand beachcast and bycaught animals. To date, stomach contents of 38 common dolphins have been analysed. K. Stockin, M. Orams and P. Duignan (MU) and A. van Helden (TP) have continued collection of common dolphin skulls for morphometric analyses. K. Stockin, V. Binedell, M. Orams (MU) and D. Lusseau (DAL) used Markov-chain analysis to analyse the behavioural ecology of common dolphins in the Hauraki Gulf in relation to the tour vessel 'Dolphin Explorer'.

The 8th Annual Meeting of the South Pacific Whale Research Consortium (SPWRC) was held at the University of Auckland on 8-12 February, 2005. Over 30 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.

11. 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.

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Appendix 1

This is a summary of published, 'in press' and unpublished reports relating to cetacean research in 2005/06, as compiled for the New Zealand National Progress Report on Cetacean Research and presented to the Scientific Committee of the International Whaling Commission.

PUBLISHED OR 'IN PRESS' PAPERS

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