

SC/57/ProgRepNew Zealand

**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](mailto: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)	Items referred to
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 dolphins	<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	2.1.2, 3.1.1, 4.3, 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 minke whale		NZ	4.3
Dwarf sperm whale		Samoa	4.3, 4.4
False killer whale	<i>Psuedorca 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>Cephalorhynchus 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>Cephalorhynchus hectori maui</i>	North Island, NZ	2.1.1, 3.1.1, 4.1, 4.4, 9
Pilot whale	<i>Globicephala melaena</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 shepherdi</i>	NZ	8
Southern right whale	<i>Eubalaena australis</i>	NZ	2.1.2, 3.1.1, 4.1, 9
Southern right whale dolphin	<i>Lissodelphis peronii</i>	NZ	
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 including 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 groups 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 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 this harbour is included in the protected area created by the Ministry of Fisheries to reduce dolphin bycatch in fisheries. PODs were used to make 19 acoustic detections of Maui's dolphins inside the harbour. In addition, 8 sightings were 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.

A series of offshore aerial surveys for Hector's dolphins at Banks Peninsula carried out by W.Rayment, E.Slooten, S.Dawson, T.Webster (OU) and S.Childerhouse (DOC) is nearing completion. 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. The data so far, indicate 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.

Aerial surveys of Maui's dolphin by E.Slooten, S.Dawson, W.Rayment (OU) and S.Childerhouse (DOC) resulted in a population estimate 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 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 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, 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 intensive recent 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 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). This 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 is 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 dolphin 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 dolphin in and around Te Waewae Bay, and determine whether this population is being affected by bycatch mortalities. While data collection for this study was limited to a consecutive three month period from which few generalisations can be drawn, it 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. This work was repeated between December 2004 and February 2005 but results have yet to be analysed.

N.Gibbs, S.Childerhouse (DOC), and D. & E.Englehaupt (DWE) undertook a land and boat-based survey of Cook Strait between 12 and 6 June 2004. This was the first dedicated humpback whale survey in New Zealand since whaling finished in the 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. A 2005 survey is planned for 18 June – 3 July, which was traditionally the peak time for humpback whales on their northerly migration through Cook Strait.

K.Russell, C.Olavarria 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, from 4-25 September. The methodology employed was the established technique of photo-ID; collection of biopsy & sloughed skin samples for DNA analysis; and collection of acoustic data. Despite poor weather, the field season achieved 37.5 hours of humpback whale encounters, with 50 encounters (96 animals) over the 18 days on water. 46 skin samples were collected from humpback whales and 30 photographic identification images were obtained and added to the Tonga catalogue. Of these, 10 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 their relationship to other bottlenose dolphin populations around the South Pacific. Field work has included the Bay of Islands (19d), Hauraki Gulf (10d - see Wiseman report) and Doubtful Sound, Fiordland (12). The primary aim of these surveys is to collect individual photo-ID data and biopsy samples from bottlenose dolphins.

K.Russell et al. (AU) undertook systematic, boat-based surveys along the south Westland coastline of the South Island. These were undertaken to assist in identifying cetacean species usage of this isolated part of New Zealand's coastal waters. Surveys were undertaken during May 2004, and encounters were made with both bottlenose and Hector's dolphins. The individually identifiable (by dorsal fin markings) bottlenose dolphins were matched to individuals previously seen in Milford Sounds.

M.Merriman (MU) undertook boat based surveys in the Marlborough Sounds from April 2004 – April 2005. Seventy-three surveys were conducted: Queen Charlotte Sound (n=46), Admiralty Bay (n=16) and Pelorus Sound (n=11). Four different marine mammal species were encountered over this period, bottlenose dolphin (n=22), common dolphin (n=5), Hector's dolphin (n=12) and dusky dolphin (n=15). Figure 1 shows the number of sightings for each species in each region.

DOC contracted Auckland University to undertake a trial study of Hector's dolphins in South Westland over a 30 day period in late autumn - 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. 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 important inshore areas for this population of the species. A total of 364 adult and 13 calf sightings were made during the survey which covered 245 kilometres of coastline.

### **2.1.2 OPPORTUNISTIC, PLATFORMS OF OPPORTUNITY**

N.Duprey, J.Weir and B.Würsig (TAMU) undertook non-systematic surveys for dusky dolphins between Kaikoura Peninsula and 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 was the main focus of research conducted during this time. Duprey and Würsig collected theodolite tracks of large groups of dusky dolphins in the same area between the January and March 2005. Groups were tracked for long periods resulting in detailed 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 better placed for least disturbance to dolphin activities.

H.McConnell (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 – March 2005 48 sightings were made (67 whales). Verified public sightings were also included.

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

An investigation on the social organisation of bottlenose dolphins in the Bay of Islands is being continued by F.Mourao (AU). This research aims to investigate 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 onboard 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 hours 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 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 the Bryde's whales in the Hauraki Gulf, 10 samples were collected between April 2004 to March 2005, and through photo-ID with 25 new individuals added to the catalogue between April 2004 and March 2005. With the research conducted to date, it seems there were higher encounter rates with Bryde's whales during the winter.

N. Wiseman, G.de Tezanos Pinto (AU) and K.Stockin (MU) continue surveys of the outer Hauraki Gulf for Bryde's whales, bottlenose and common dolphins, respectively.

## 2.2 Analyses/development of techniques

None.

## 3. Marking data

## 3.1 Field work

## 3.1.1 NATURAL MARKING DATA

Species	Feature	Area/stock	Calendar year / no. photographed	Catalogued (Y/N)	Catalogue total	Contact person/institute
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	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	2000-2004	Y	47	S.Dawson/OU
Bottlenose dolphin	Dorsal fin	Fiordland, south	2000-2004	Y	53	D.Rundgren/OU
Bottlenose dolphin	Dorsal fin	Doubtful Sound	1990-2005	Y	62	R.Currey/OU
Bottlenose dolphin	Dorsal fin	North Island	1998-05/150	Y	412	G.de Tezanos Pinto & F.Mourao (AU)
Brydes whale	Body	Hauraki Gulf	2003-05/25	Y	?	N.Wiseman/AU
Common dolphin	Fin/Body	Marlborough Sounds	2003-05/86	N	?	M.Merriman/MU
Dusky dolphin	Fin/body	Kaikoura	2005	Y	>70	J.Weir/TAMU
Dusky dolphin	Fin/body	Kaikoura & 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	2004-2005	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	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 & R.Constantine /AU
Humpback whale	Tail flukes	Tonga	1991-2004/30	Y	573	K.Russell/AU
Killer whale	Fins/saddle patches/eye patches	NZ	1993-05/5	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	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****3.1.3 TELEMETRY DATA**

Species	Tag type	No. successfully deployed	Maximum time transmitting	Contact person/institute
Hector's dolphin	Satellite	3	> 3 months	G. Stone/NEA

**3.2 Analyses/development of techniques**

None.

**4. Tissue/biological samples collected****4.1 Biopsy samples**

Species	Area/stock	Calendar year/ season no. collected	Archived (Y/N)	No. analysed	Total holdings	Contact person/institute
Bottlenose dolphin	Westland	2004/6	Y	6	6	K.Russell/AU
Bottlenose dolphins	NZ	2004-2005	Y	73	99	G.de Tezanos Pinto/AU
Brydes whale	Hauraki Gulf	2004-05/10	Y	10	?	N.Wiseman/AU
Hector's dolphin	Westland	2004	Y	19	19	K.Russell/AU
Hector's dolphin	Banks Peninsula	2004	Y	4	34	K.Russell/AU
Hector's dolphin	Te Waewae Bay	April 2004	Y	5	5	K.Russell/AU
Humpback whale	NZ mainland	2004 / 11	Y	12	?	C.Olavarria/AU
Humpback whale	Tonga	1991-04/46	Y	46	>500	C.Olavarria/AU
Maui's dolphin	West Coast, North Island	2004/2005	Y	12	72	K.Russell/AU
Southern right whales	NZ mainland	2003-04 / 1	Y	1	12	N.Patenaude/AU

**4.2 Samples from directed catches or bycatches**

None.

**4.3 Samples from stranded animals**

Species	Area/stock	Calendar year/ season total	Archived (Y/N)	Tissue type(s)	Contact person/institute
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
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
Ginkgo-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	NZ	2	Y	Skin and blubber	D.Steel/AU

whale sp.					
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 investigation of 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 10 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 Is. The samples from the more distant locations (Chatham I., south of South Is. and Ross Sea) showed unique haplotypes. Despite the small sample size, the observed diversity and geographic haplotypic segregation suggest a strong phyloptry and population structure. Alternatively, it may be the result of the presence of different types in the data set.

C.Olavarria (AU) continues 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 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 (see SC/57/For Information 8). Other research is 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 (see SC/57/SH3).

C.Olavarria and M.Oremus (AU) and J.Ward (Samoa) analysed a skin sample was collected from this *Kogia* sp. specimen, stranded in Upolu, Samoa. The genetic analyses identified 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 3 biopsy samples have been extracted, sexed and sequenced (D-loop region of the mtDNA) and genotyped.

## 5. Pollution studies

None.

## 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

None.

## 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 <sup>1</sup>	?	Trawl	0
Hector's dolphin	NZ	0	0	2 <sup>2</sup>	?	Gillnet	0
Pilot whale	NZ	0	0	6 <sup>1</sup>	?	Trawl	2 <sup>1</sup>

<sup>1</sup> Figures provided by D.Fairfax, DOC

<sup>2</sup> Figure provided by A.Hutt, DOC

### 7.2 Earlier years' statistics

## 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 recorded in the database for this period. The representation in 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 representation in 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, but 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, 5 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	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 sp</i>	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
<b>Total:</b>	<b>83</b>	<b>225</b>	<b>31</b>	<b>5</b>	<b>26</b>

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

WWF-New Zealand 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.



## 9. Other studies and analyses

N.Duprey and B.Würsig (TAMU) began theodolite studies focused on investigating the current levels of boat traffic around large groups of dusky dolphins in the Kaikoura area. J.Weir and B.Würsig (TAMU) are examining the way that nursery groups use the Kaikoura area. By looking at behavioural data from focal follows and habitat preferences we aim to give a better representation of how these groups utilize the area and how this may be influenced by tourism activities. Duprey and Würsig also began theodolite work in Admiralty Bay focusing on dusky dolphin movement patterns, behaviours and influences from aquaculture. Results will give a better understanding of how dusky dolphins use the inner parts of Admiralty Bay, and provide better resources for management of aquaculture and vessel traffic.

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 the captive dolphins and it is planned to undertake similar procedures on stranded cetaceans (along with several reflex tests) as possible indicators of vitality and candidacy 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) completion her MSc entitled 'Female reproductive strategies and mother-calf relationships of common dolphins (*Delphinus delphis*) 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 newborn 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 newborns 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 boat according to the age class of their youngest member. However, mothers and their young calves kept greater distances to the boat than mothers and older calves did, suggesting that the boat may be perceived as a threat during the newborn 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 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 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 hunting on the beach. Photo identifications 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 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 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 6 mass strandings ( $n = 246$ ). These analyses include molecular sexing, sequencing 4 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, and a large proportion of, pygmy sperm whale diet. Currently, research being conducted at AUT is focussing on collecting and archiving of 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: F.Gomez researching the diet of the sperm whale, and E.Beatson researching the diet of the pygmy sperm whale. These projects are expected to be completed 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 are very low, with several stomachs being empty or containing 1 or 2 Antarctic squid beaks only, to stomachs containing more than 800 lower beaks (with most containing several hundred lower beaks), with low ratios of locally occurring to Antarctic squid in stomach contents (with the exception of *Histioteuthis* spp., sperm whales appear to have fed on few locally occurring squid prior to stranding). The diet of the pygmy sperm whale differs substantially from that of the sperm whale, in terms of 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 access 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 right whale 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 Department staff and others. It provides a guide for conservation management and research of New Zealand's marine mammals by the Department of Conservation 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. The Department's work takes two general approaches: firstly to protect species, and secondly to manage human interactions and use. These are undertaken with careful regard to the Crown's interests, safety & welfare, understanding & co-operation and quality performance. Both of the 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, the Department's key objectives and their necessary actions are listed, and the responsibilities and priority levels are specified for each action.

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-New Zealand set up a Maui's dolphin Sightings Network in 2000 in order to find out more about the dolphin's distribution on the West Coast North Island. Since 2000, more than 90 Maui's dolphin sightings have been reported by the public, including seven validated sightings in West Coast harbours. Since Oct 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.

## 10. Literature cited

None.

## 11. Publications

### 11.1 Published or 'In Press' papers only

- Au, W., B. Würsig. 2004. Echolocation signals of dusky dolphins (*Lagenorhynchus obscurus*) in Kaikoura, New Zealand. *Journal of the Acoustic Society of America*. 115(5):2307-2313.
- Benoit-Bird, K.J., B. Würsig, C. McFadden. 2004. Dusky dolphin (*Lagenorhynchus obscurus*) foraging in two different habitats: active acoustic detection and their prey. *Marine Mammal Science* 20(2):215-231.
- Dalebout, M.L., Russell, K.G., Little, M.J. & Ensor, P. (2004). Observations of live Gray's beaked whale (*Mesoplodon grayi*) in Mahurangi Harbour, North Island, New Zealand, with a summary of at-sea sightings. *Journal of the Royal Society of New Zealand*, 34(4): 347-356.
- Dawson, S.M. & Slooten, E. Management of gillnet bycatch of cetaceans in New Zealand. *Journal of Cetacean Research and Management*. In Press.
- Dawson, S.M. and Lusseau, D. Pseudoreplication problems in studies of dolphin and porpoise reactions to pingers. *Marine Mammal Science* 21(1). 175-176. 2005
- Dawson, S.M., Slooten, E. DuFresne, S.D., Wade, P.R. and Clement, D.M. Small-boat surveys for coastal dolphins: Line-transect surveys of Hector's dolphins (*Cephalorhynchus hectori*). *Fishery Bulletin* 102(3): 441-451. 2004
- Douglas, L., Dawson, S.M. and Jaquet, N. Click rates and silences in sperm whales at Kaikoura, New Zealand. *Journal of the Acoustical Society of America*. In Press.
- Gormley, A.M., Dawson, S.M., Slooten, E. and Bräger, S. Capture-recapture estimates of Hector's dolphin abundance at Banks Peninsula, New Zealand. *Marine Mammal Science* 21: 204-216 (2005)
- Harlin, A.D., T. Markowitz, C.S. Baker, B. Würsig, and R.L. Honeycutt. 2003. Genetic structure, diversity, and historical demography of New Zealand's dusky dolphin (*Lagenorhynchus obscurus*). *J. of Mammalogy* 84:702-717.
- Hillman, G.R., B. Würsig, G.A. Gailey, N. Kehtarnavaz, A. Drobyshevsky, B.N. Araabi, H.D. Tagare, and D. Weller. 2003. Computer-assisted photo-identification of individual marine vertebrates: A multispecies approach. *Aquatic Mammals* 29:117-123.
- Kehtarnavaz, N., V. Peddigari, W. Syed, G. Hillman, and B. Würsig. 2003. Photo-identification of humpback and gray whales using affine moment invariants. *Proceedings of the SCIA Image Analysis Conference*, Göteborg, Sweden. Springer Verlag.
- Kemper, C.M., D. Pemberton, M. Cawthorn, S. Heinrich, J. Mann, B. Würsig, P. Shaughnessy, and R. Gales. 2003. Aquaculture and marine mammals: Co-existence or conflict? In: *Marine Mammals: Fisheries, Tourism, and Management Issues*, ed. by N. Gales, M. Hindell, and R. Kirkwood. CSIRO Publ., Melbourne, Australia.
- Lusseau D. The hidden cost of tourism: Effects of interactions with tour boats on the behavioural budget of two populations of bottlenose dolphins in Fiordland, New Zealand. *Ecology and Society* 9(1): 2 (2004)
- Lusseau, D. and Higham, J.E.S. Managing the impacts of dolphin-based tourism through the definition of critical habitats: the case of bottlenose dolphins in Doubtful Sound, New Zealand. *Tourism Management* 25: 657-667 (2004)
- Lusseau, D. and Newman, M.E.J. Identifying the role that animals play in their social networks. *Proceedings of the Royal Society of London B* 271: S477-S481 (2004)
- Lusseau, D. The state of the scenic cruise industry in Doubtful Sound in relation to a key natural resource: bottlenose dolphins. In: *Nature-based tourism in peripheral Areas: Development or disaster?* (M. Hall and S. Boyd eds.) Channelview Publications (2004)
- Markowitz, T. 2004. Social Organization of the New Zealand Dusky Dolphin. Ph.D. Dissertation. Texas A&M University, Texas, USA. 225pp.
- Markowitz, T.M., A.D. Harlin and B. Würsig. 2003. Digital photography improves efficiency of individual dolphin identification. *Marine Mammal Science* 19:217-223.
- Markowitz, T.M., A.D. Harlin and B. Würsig. 2003. Digital photography improves efficiency of individual dolphin identification: A reply to Mizroch. *Marine Mammal Science* 19:608-612.
- Markowitz, T.M., A.D. Harlin, B. Würsig, and C.J. McFadden. 2004. Dusky dolphin foraging habitat: Overlap with aquaculture in New Zealand. *Aquatic Conservation: Marine and Freshwater Ecosystems*. 14:133-149.
- McFadden, C.J. 2003. Behavioral Flexibility of Feeding Dusky Dolphins (*Lagenorhynchus obscurus*) in Admiralty Bay, New Zealand. M.Sc. Thesis. Texas A&M University, Texas, USA. 81 pp.

- Rhineland, M.Q. and Dawson, S.M. Measuring sperm whales from their clicks: stability of inter-pulse intervals and validation that they indicate whale length. *Journal of the Acoustical Society of America*. 115(4): 1826-1831. 2004.
- Richter, C., Dawson, S.M. and Slooten, E. Impacts of commercial whale-watching on male sperm whales at Kaikoura, New Zealand. *Marine Mammal Science*. In Press.
- Sasaki, Takeshi; Nikaido, Masato; Hamilton, Healy; Goto, Mutsuo; Kato, Hidehiro; Kanda, Naohisa; Pastene, Luis A.; Cao, Ying; Fordyce, R Ewan; Hasegawa, Masami; and Okada, Norihiro. 2005. Mitochondrial phylogenetics and evolution of mysticete whales. *Systematic biology* 54 (1): 77-90.
- Slooten, E., Dawson, S.M. and Rayment, W.J. Aerial surveys for coastal dolphins: Abundance of Hector's dolphins off the South Island west coast, New Zealand. *Marine Mammal Science* 20(3): 477-490. 2004
- Stockin, K. A. & Visser, I. N. (2005) Anomalously pigmented common dolphins (*Delphinus* sp.) off Northern New Zealand. *Aquatic Mammals* 31, 43-51.
- Visser, I. N. (2005) First observations of feeding on thresher (*Alopias vulpinus*) and hammerhead (*Sphyrna zygaena*) sharks by killer whales (*Orcinus orca*) which specialise on elasmobranchs as prey. *Aquatic Mammals* 31, 83-88.
- Visser, I. N., Fertl, D. & Pusser, L. T. (2004) Melanistic southern right-whale dolphins (*Lissodelphis peronii*) off Kaikoura, New Zealand, with records of other anomalously all-black cetaceans. *New Zealand Journal of Marine and Freshwater Research* 38, 833-836.
- Whitehead, H., L. Rendell, R.W. Osborne, and B. Würsig. 2004. Culture and conservation of non-humans with reference to whales and dolphins: Review and new directions. *Biological Conservation* 120:431-441.

### 11.2 Unpublished literature

- Aline Schaffar-Delaney (2004) Female reproductive strategies and mother-calf relationships of common dolphins (*Delphinus delphis*) in the Hauraki Gulf, New Zealand. Massey University, Albany Campus, New Zealand.
- Green, E (2004). Preliminary boat-based surveys to investigate distribution of Hector's dolphin in Te Waewae Bay, Southland. Department of Conservation. 34 pp.
- Stockin, K. A. & Visser, I. N. (2005) A summary of anomalously pigmented common dolphins (*Delphinus* sp.) off Northern New Zealand. 19th Annual Conference of the European Cetacean Society, La Rochelle, France, p 70.