

New Zealand progress report on cetacean research, April 2006 to March 2007, with statistical data for the calendar year 2006.

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1. SPECIES AND STOCKS STUDIED

IWC common name	IWC recommended scientific name	Area/stock(s)	Items referred to
Antarctic minke whale	<i>Balaenoptera bonarensis</i>	NZ	4.1, 4.2
Bottlenose dolphin	<i>Tursiops truncatus</i>	NZ	2.1.1, 2.1.2, 3.1.1, 4.1, 4.2, 4.4, 8, 9
Bryde's whale	<i>Balaenoptera edeni</i>	NZ	2.1.2, 3.1.1, 4.1, 4.2, 6.3.1, 8
Common dolphin	<i>Delphinus delphis</i>	NZ	2.1.2, 4.1, 4.2, 7.3.2, 8, 9
Cuvier's beaked whale	<i>Ziphius cavirostris</i>	NZ	4.1, 4.2, 8
Dusky dolphin	<i>Lagenorhynchus obscurus</i>	NZ	2.1.1, 2.1.2, 3.1.1, 7.3.2, 8, 9
Dwarf minke whale	<i>Balaenoptera acutorostrata</i>	NZ	8
Gray's beaked whale	<i>Mesoplodon grayi</i>	NZ	4.1, 4.2, 8
Hector's dolphin	<i>Cephalorhynchus hectori hectori</i>	NZ	2.1.1, 2.1.2, 3.1.1, 4.1, 4.2, 4.4, 7.3.2, 8, 9
Humpback whale	<i>Megaptera novaeangliae</i>	NZ, Tonga, New Caledonia	2.1.1, 3.1.1, 4.1, 4.2, 8, 9
Killer whale	<i>Orcinus orca</i>	NZ	2.1.1, 2.1.2, 3.1.1, 8, 9
Long finned pilot whale	<i>Globicephala melas</i>	NZ	4.1, 4.2, 4.4, 8
Maui's dolphin	<i>Cephalorhynchus hectori maui</i>	NZ	2.1.1, 2.1.2, 3.1.1, 4.4
Melon headed whale	<i>Peponocephala electra</i>	NZ	4.1, 4.2
Pygmy blue whale	<i>Balaenoptera musculus brevicauda</i>	NZ	4.1, 4.2
Pygmy right whale	<i>Caperea marginata</i>	NZ	4.1, 4.2, 8
Pygmy sperm whale	<i>Kogia breviceps</i>	NZ	4.2, 6.3.1, 8
Short finned pilot whale	<i>Globicephala macrorhynchus</i>	NZ	4.1, 4.2
Southern right whale	<i>Eubalaena australis</i>	NZ	3.1.1, 4.1, 4.2, 9
Sperm whale	<i>Physeter macrocephalus</i>	NZ	2.1.1, 3.1.1, 4.1, 4.2, 8, 9
Straptoothed whale	<i>Mesoplodon layardi</i>	NZ	4.1, 4.2, 8

2. SIGHTINGS DATA

2.1 Field work

2.1.1 Systematic

D. Lusseau (DAL), in collaboration with the Marine Mammal Research Group at OU and other groups, continues to investigate the dynamics of the social relationships of bottlenose dolphins in Doubtful Sound. D. Lusseau (OU) published further work on the impact of dolphin watching on bottlenose dolphins in Doubtful Sound.

A. Schaffar and C. Garrigue (OC) completed the second field season of a 3-year research project investigating the potential effects of whale watching boats on the behaviour of humpback whales wintering in the Southern Lagoon of New Caledonia. This project is assessing the temporal and spatial use of this area by humpback whales and boats (recreational and commercial), working towards the implementation of whale watching regulations based on scientific data. Using a theodolite, land-based surveys were conducted and surveys resulted in 67 independent tracking sessions of humpback whales. On average, humpback whales were in the presence of 3 or more boats during 105 minutes each day. Boats spent an average of 63 minutes with each group of whales. Photo-ID data indicates that humpback whales are likely to be exposed to boats repeatedly within and between seasons, raising the issue of a potential cumulative impact.

S. Scali, E. Slooten and S. Dawson (OU) carried out research on Maui's dolphin use of the harbours on the North Island west coast. Porpoise Detector Devices (T-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. Consistent sightings and acoustic detections of Maui's dolphins in the Manukau Harbour over a two and a half year period show that Maui's dolphins use the harbour on a regular basis, including the inner part of the harbour where commercial and amateur gillnetting continues. Maui's dolphin sightings have been made in at least 3 of the 5 harbours within their range on the North Island west coast. None of the three Harbour areas are protected, and the dolphins that entered these harbours are therefore potentially exposed to commercial and recreational gillnet fisheries.

R. Currey, S. Dawson and E. Slooten (OU) are continuing research on the conservation biology and behaviour of resident bottlenose dolphins in Doubtful Sound, Fiordland. Based on recent intensive photo-ID work, there are between 55 and 57 individuals in the population, representing a considerable decline in recent years. A long-term dataset will be used to estimate survival rates since the study began in 1990. A further focus of the research is to assess critical habitats based on spatial patterns in dolphin distribution and behaviour.

C. Schweder and colleagues (BOP) conducted humpback whale research in the Vava'u group of Tongan islands in 2006. Forty three pods of humpback whales were encountered (97 individual whales). Of all pods encountered, 19% (n=8) were cow-calf pairs, 14% (n=6) were cow-calf-escort or cow-males pods, 37% (n=16) were pods of two or more whales, and the remaining 30% (n=13) were solitary whales. Twenty one whales were individually by photo-ID and will be added to the Tonga catalogue. Data analysis, including reconciling the photo-IDs with other catalogues is currently underway in collaboration with other members of the SPWRC.

E. Martinez and D. Brunton (MU-A) have completed the second year of a three-year field study looking at the impacts of vessel activity on the behaviour of Hector's Dolphins in Akaroa Harbour, Banks Peninsula. This study aims to determine and quantify the current level of vessel activity; identify whether such impacts are significant for the local Hector dolphin population; and assess whether these can be mitigated by appropriate changes to the dolphin-watching permit conditions. The research utilises theodolite tracking and three-minute focal group scan sampling methodology from land and vessel based platforms.

A. Dahood and B. Würsig (TAMU) conducted theodolite observations in Kaikoura from January-December 2006. Systematic sunrise and sunset observations were conducted from three cliff-top stations to describe dusky dolphin habitat use and movement patterns. Two hundred twenty-seven observation sessions were conducted over 156 days, during which 127 hours were spent scanning for small groups (<150 individuals) and 485 hours were spent attempting to track large groups (>150 individuals). In total, 694 small groups and 173 large groups were located. Results show that, in summer, dusky dolphins were typically seen in large groups moving between the Ota Matu Station and Mikonui Beach. In winter, the largest groups of the year were recorded and groups tended to be farther offshore than during other seasons. Spring and fall patterns were highly variable, but small scattered groups were most common in spring.

J. Weir and B. Würsig (TAMU) conducted boat-based surveys off Kaikoura from January-May 2006. Photo-ID and focal follows were used to quantify the distribution, behaviour, and composition of dusky dolphin nursery groups. Surveys were conducted over 33 days during which 28 nursery groups, 18 mating groups, 85 non-mating groups, and 28 large dusky dolphin groups were recorded. Results show that nursery groups prefer shallow water, spend most of their time resting, and have a median group size of 14 individuals.

H. Pearson and B. Würsig (TAMU) conducted boat-based surveys in Admiralty Bay, Marlborough Sounds from May-October 2006. Photo-ID and focal follows were used to examine abundance, distribution, and social

strategies of dusky dolphins, and to describe interactions between dusky dolphins and mussel farms. Systematic surveys were conducted for 100 hours over 62 days. One hundred fifty focal follows totalling 160 observation hours were conducted over 60 days. Results show that mean group size was 7 individuals; feeding groups were larger than resting, social, and travelling groups; and groups spent more time resting and travelling and less time feeding and socializing than expected by chance. Dolphins entered mussel farms during 5% ($n = 8$) of focal follows and were observed spending less than 1% of their time inside mussel farms.

R. Vaughn and B. Würsig (TAMU) conducted boat-based surveys in Admiralty Bay, Marlborough Sounds from May-August 2006. Focal follows and underwater video were used to describe dusky dolphin feeding tactics and predator associations; investigate how dusky dolphins influence feeding efficiency of other predators; and determine how other predators, dolphin group sizes, and area of prey balls influence dolphin feeding efficiency. Systematic surveys were conducted for 63 hours over 40 days, during which 51 dusky dolphin groups were encountered. Seventy-two focal follows totalling 94 observation hours were conducted over 44 days. Results show that dolphin feeding bouts were very mobile and short in duration (mean = 3 min.); locations changed from early to late winter; and there was a mean of 8 dolphins present during feeding. Stationary feeding bouts were seldom observed (7% of the time), but observed prey balls were typically small (mean = 5 m²). Fluttering shearwaters were the main predator observed feeding with dusky dolphins, and were present for 88% of feeding bouts; however, gannets were present for 24% of feeding bouts, and fur seals were present for 18% of feeding bouts.

M. Srinivasan and B. Würsig (TAMU) conducted theodolite observations in Admiralty Bay, Marlborough Sounds from June to August 2006. Dusky dolphin movement and habitat use was assessed by tracking individual groups, with periodic scans between tracking. Twenty-two groups of dusky dolphins were tracked and 33 dusky dolphin groups were observed during 25 scans over 15 field days. An average of 1.3 groups was observed during each scan, with an average of 1.7 scans/day. Average group size was 3.95 individuals and ranged from 1-19 individuals.

S. Deutsch and B. Würsig (TAMU) commenced boat-based observations of dusky dolphin nursery groups off Kaikoura in October 2006. Focal follows, photo-ID, and underwater video are being used to describe social development and social learning of dusky dolphins. A total of 25 surveys were conducted during which 55 nursery groups were encountered. This research will continue until June 2007.

M. van der Linde, S. Dawson and E. Slooten (OU) are working on an ongoing research programme into the abundance and distribution of sperm whales at Kaikoura. Since April 2006, 23 new individuals have been photo-ID'd and added to an existing catalogue, resulting in an updated photographic catalogue containing a total of 227 individuals. A measure of field effort will be incorporated into an existing photographic mark-recapture model of abundance estimation, in order to improve on the accuracy of estimating sperm whale abundance. A GIS model will be used to investigate distribution of individual sperm whales, in particular, spatial and temporal variation in habitat utilisation and relative range and movements of individual whales.

R. Mattlin (Independent), S DuFresne (DEL), D. Clement (OU) and M. Cawthorn (CA) completed the first year of a series of aerial line-transect surveys of Hector's dolphins in Cloudy and Clifford Bays. The study is being carried out through NIWA, and is designed to assess seasonal abundance and distribution of Hector's dolphins. The three year study will provide baseline data with which to assess potential impacts of a proposed marine farm. The study is a requirement under the resource consent monitoring conditions.

G. de Tezanos Pinto and C.S. Baker (UA) are investigating the genetic diversity and population structure of bottlenose dolphins in NZ. 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 NZ waters, and their relationship to other bottlenose dolphin populations around the world. Since January 2006, a total of 16 daily surveys were undertaken in the Bay of Islands (Northland); in which 25 groups of bottlenose dolphins were encountered including 60 individuals previously photo-identified and nine new individuals that were added to the photo-ID catalogue. The primary aims of these surveys were to collect individual photo-ID data and biopsy samples from bottlenose dolphins.

J. Rodda (OU) finished 24 consecutive months research on Hector's dolphin in November 2006 at Te Waewae Bay, Southland. A photo-ID catalogue is being compiled that will be used to analyse spatial and temporal movements of the dolphin distribution, density, and fine scale habitat usage.

W. Rayment and T. Webster (OU) continue to compile a photo-ID catalogue of Hector's dolphins around Banks Peninsula. The research is to be used as part of an ongoing long term study looking at the biology and anthropogenic impacts on Hector's dolphins.

UA and SPWRC conducted humpback whale research in the Vava'u group of Tongan islands between 11 September and 2 October 2006. Methods included the collection of photo-ID, biopsy samples and sloughed skin for DNA analysis, and the collection of acoustic data. There were 17 days on the water (129 hours). A total of 56 encounters with whales: 11 mother/calf pairs, 10 mother/calf and escort groups, 23 multi-whale groups and 12

singletons. A total of 52 individual were identified by fluke photos, of which, to date, six matched to previous years. There were 14 hours of song recordings. Matches from Tonga to other places have involved locations well to the west and east; suggesting that Tonga forms a kind of crossroads for humpback whales in the South Pacific. 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

P. Ensor participated as a team leader during the 2006 NILS cruise in the North Atlantic, and also acted as cruise leader on the 2006/07 IWC-SOWER cruise, Area III of the Antarctic.

S.Childerhouse and N. Gibbs (DOC), with the support of many volunteers, undertook a land and vessel-based survey of humpback whales in Cook Strait for two weeks in June. This was the third year of a dedicated humpback whale survey in NZ since whaling finished in 1964. Ex-whalers were the primary land-based spotters. From 128 hours of land based observation, 10 pods of 15 humpback whales were observed. Three photo-IDs and 8 genetic samples were obtained.

I. Visser (ORT) continued research on killer whales around NZ, with most work conducted in the north of the North Island. Emphasis was on photo-ID, foraging behaviour and associations whilst foraging.

D. Breen and colleagues (DOC) continue aerial surveys of Maui's dolphins on the west coast of the North Island including alongshore between New Plymouth and North Cape, cross shelf between Manukau and Raglan to 10nm, and cross shelf to 5nm in the New Plymouth region between Oakura and the southern set net closure area.

2.1.2 Opportunistic, platforms of opportunity

Primary species	Area	Data type/method	Collected by	Platform	Contact person/institute and refs
Bottlenose dolphin	Marlborough Sounds	Location, group sizes, dorsal fin photos	crew	Eco-tour vessel	Amy Engelhaupt/ DWE
Common dolphin	Marlborough Sounds	Location, group sizes, dorsal fin photos	crew	Eco-tour vessel	Amy Engelhaupt/ DWE
Dusky dolphin	Marlborough Sounds	Location, group sizes, dorsal fin photos	crew	Eco-tour vessel	Amy Engelhaupt/ DWE
Hector's dolphin	Marlborough Sounds	Location, group sizes, dorsal fin photos	crew	Eco-tour vessel	Amy Engelhaupt/ DWE
Killer whale	Marlborough Sounds	Location, group sizes, dorsal fin photos	crew	Eco-tour vessel	Amy Engelhaupt/ DWE

R. Currey and E. Sloten (OU) conducted a 6 day survey of Dusky Sound on the charter vessel, Breaksea Girl. Photo identification of resident bottlenose dolphins was undertaken to establish a catalogue. One common dolphin was observed with the bottlenose dolphin group.

E. Martinez (MU-A) continues to undertake opportunistic surveys onboard dolphin-watching/swimming vessels in Akaroa Harbour as support vessels for her PhD research (n = 142 trips in 2005/2006 and n = 229 in 2006/2007). Data collection is focused on the behavioural ecology of Hector's dolphins in the presence of vessels and/or swimmers in Akaroa Harbour. Individual photo-ID of Hector's dolphins encountered around dolphin-watching and dolphin-swimming operations is opportunistically collected.

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. Locations, estimated group sizes and presence of calves were collected for all groups and photo-ID's and behavioural states were collected when possible. Opportunistic data was collected on all dolphin groups encountered during Dolphin Watch Ecotours trips throughout the year. Locations, estimated group sizes and presence of calves were collected for all groups and photo-ID's and behavioural states were collected when possible.

N. Wiseman and S. Baker (UA) investigated the genetic identity and ecology of Bryde's whales in the Hauraki Gulf. The primary aims of the research were 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 was investigated by collecting biopsy samples from Bryde's whales in the Hauraki Gulf. Nine samples were collected between April 2006 to March 2007, as fieldwork other than biopsy collection was completed by March 2006, no new individuals were added to the photo-ID catalogue. The results suggested that there were higher encounter rates with Bryde's whales during the winter.

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

G. de Tezanos Pinto (UA) conducted a total of six surveys during 2006 onboard permitted marine mammal tour vessel operators in the Bay of Islands (Northland). The primary objective of these surveys was to collect individual photo-ID data on 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 other species including Killer and Bryde's whales.

G. de Tezanos Pinto, in collaboration with J. Berghan, K. Algie, N. Wiseman and K. Stockin, is currently curating the Hauraki Gulf (HG) Bottlenose Dolphins Catalogue that includes photo-IDs collected opportunistically in the HG since 2000. Photographs from 2003-2006 are currently being analyzed and unique individuals will be added into the HG catalogue and sighting database. This research aims to improve abundance estimates for the Northland population, provide a better understanding of demographic parameters, habitat usage and social organization of bottlenose dolphins in the Hauraki Gulf.

2.2 Analyses/development of techniques

None.

3. MARKING DATA

3.1 Field work

3.1.1 Natural marking data

Species	Feature	Area/stock	No. photo-id'd	Catalogue (Y/N)	Catalogue total	Contact person/institute; refs
Bottlenose dolphin	Dorsal fin	Marlborough Sounds	500	Y	170	A. Englehaupt/ DWE
Bottlenose dolphin	Dorsal fin	Hauraki Gulf	150	Y	?	G. de Tezanos Pinto/ UA & J. Berghan
Bottlenose dolphin	Dorsal fin	Bay of Islands	60	Y	435	G. de Tezanos Pinto/ UA
Bottlenose dolphin	Dorsal fin	Doubtful Sound	60	Y	64	R. Currey/ OU
Bryde's whale	Dorsal fin	Hauraki Gulf	0	Y	72	N. Wiseman/ UA
Common dolphin	Dorsal fin	Marlborough Sounds	150	Y	30	A. Englehaupt/ DWE
Dusky dolphin	Dorsal fin/body	Kaikoura (nursery goups)	82	Y	260	J. Weir/ TAMU
Dusky dolphin	Dorsal fin/body	Kaikoura (nursery goups)	?	Y	>260	S. Deutsch/ TAMU
Dusky dolphin	Dorsal fin/body	Marlborough Sounds	>100	Y	>600	H. Pearson/ TAMU
Dusky dolphin	Dorsal fin	Marlborough Sounds	850	Y	450	A. Englehaupt/ DWE
Hector's dolphin	Dorsal fin/body	Banks Peninsula	223	Y	849	T. Webster/ OU
Hector's Dolphin	Dorsal fin/Body marking	Banks Peninsula	?	Y	?	E. Martinez/ MU-A
Hector's dolphin	Dorsal fin	Marlborough Sounds	100	Y	20	A. Englehaupt/ DWE
Hector's Dolphin	Dorsal fin	Te Waewae Bay, Southland	70	Y	250	R. Cole/ DOC
Killer whale	Dorsal fin	Marlborough Sounds	75	Y	?	A. Englehaupt/ DWE & I. Visser/ ORT
Right Whale	Side/back	Marlborough Sounds	1	Y	?	A. Englehaupt/ DWE H. McConnell/ DOC
Southern right whale	Head callosities	Auckland Islands	>50	Y	>200	S.Childerhouse/ DOC & G. Dunshea/ AAD
Sperm whale	Tail fluke	Kaikoura	23	Y	227	M. van der Linde & L. Slooten/ OU

There are other photo-ID catalogues held and maintained by researchers in NZ. Only the catalogues that have been actively maintained, added to, and reported on in 2006/07 have been reported here. For a more detailed list of existing catalogues please consult previous National Progress Reports and individual researchers.

3.1.2. Artificial marking data

None.

3.1.3 Telemetry data

None.

3.2 Analyses/development of techniques

4. TISSUE/BIOLOGICAL SAMPLES COLLECTED

4.1 Biopsy samples (summary only)

Species	Area/stock	Calendar year/ season - no. collected	Archived (Y/N)	No. analysed	Total holdings	Contact person/institute
Bottlenose dolphin	Northland & Hauraki Gulf	12	Y	12	151	G. de Tezabos Pinto/ UA
Bryde's whale	Hauraki Gulf	9	Y	29	29	N. Wiseman/ UA
Humpback whale	NZ	9	Y	1	32	D. Steel & R. Constantine/ UA
Southern right whale	NZ mainland	1	Y	1	20	D. Steel & R. Constantine/ UA
Southern right whale	Auckland Islands	142	Y	142	>300	D. Steel & R. Constantine/ UA

4.2 Samples from directed catches (commercial, aboriginal and scientific permits) or bycatches

None.

4.3 Samples from stranded animals

Species	Area/stock	Tissue type(s)*	No. collected	Archived (Y/N)	No. analysed	Contact person/institute
Bottlenose dolphin	NZ	Skin and blubber	3	Y	?	R. Constantine/ UA
Bryde's whale	NZ	Skin and blubber	3	Y	?	R. Constantine/ UA
Common dolphin	NZ	Skin and blubber	6	Y	?	R. Constantine/ UA
Cuvier's beaked whale	NZ	Skin and blubber	3	Y	?	R. Constantine/ UA
Gray's beaked whale	NZ	Skin and blubber	7	Y	?	R. Constantine/ UA
Hector's dolphin	NZ	Skin and blubber	14	Y	?	R. Constantine/ UA
Humpback whale	NZ	Skin and blubber	1	Y	?	R. Constantine/ UA
Long-finned pilot whale	NZ	Skin and blubber	2	Y	?	R. Constantine/ UA
Melon-headed whale	NZ	Skin and blubber	1	Y	?	R. Constantine/ UA
Pygmy blue whale	NZ	Skin and blubber	1	Y	?	R. Constantine/ UA
Pygmy right whale	NZ	Skin and blubber	1	Y	?	R. Constantine/ UA
Pygmy sperm whale	NZ	Skin and blubber	11	Y	?	R. Constantine/ UA
Short-finned pilot whale	NZ	Skin and blubber	81	Y	?	R. Constantine/ UA
Southern minke whale	NZ	Skin and blubber	1	Y	?	R. Constantine/ UA

Southern right whale	NZ	Skin and blubber	1	Y	?	R. Constantine/ UA
Sperm whale	NZ	Skin and blubber	2	Y	?	R. Constantine/ UA
Straptooth whale	NZ	Skin and blubber	5	Y	?	R. Constantine/ UA
Unknown	NZ	Skin and blubber	11	Y	?	R. Constantine/ UA
Unknown beaked	NZ	Skin and blubber	2	Y	?	R. Constantine/ UA

Several samples were 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). The tissue and DNA archive held at UA currently contains approximately 1300 samples from 35 species, including one porpoise, 9 mysticete, 15 odontocete and 11 beaked whale species. This archive is curated by C.S. Baker and R. Constantine (UA).

4.4 Analyses/development of techniques

W. Roe (MU-P) currently holds a contract with the DOC to undertake necropsies on all beachcast Hector's and Maui dolphins. Cause of mortality and general health status are assessed at gross post mortem, and tissue samples are collected and stored for subsequent histological, toxicological, bacteriological or molecular biological testing. Skeletons are sent to TP; genetic samples are collected and sent to UA; stomach contents are sent to L. Slooten (OU) (for Hector's) or K. Russell (DOC) (for Maui's); and morphometric, reproductive and age class data are entered into the Huia wildlife database maintained by the NZWHC. Where specific diseases are diagnosed, more detailed investigations are instigated where funding is available. The NZWHC also collaborates with common dolphin research being carried out by K. Stockin (MU-A) providing gross post mortem and diagnostic histopathology services when required. In the past 12 months opportunistic necropsies have also been carried out neonatal pilot whales and several beaked whales. Research on these species is not presently funded, but when fresh beachcast animals are found and transport to MU-P is possible the NZWHC has provided a necropsy service.

M. Oremus (UA) continues genetic analyses on long-finned pilot whale samples collected from around New Zealand (NZ) since 1994. These analyses aim at investigating the population structure and social organisation of this species in its Southern Hemisphere range. Further analyses are also conducted on mass stranding datasets in order to elucidate the social dynamic of these events. Collaboration with the Department of Primary Industries and Water from Tasmania continues. The analysis of 201 samples from Tasmania will be completed within the next few months and compared to results from NZ, offering detailed information on the population structure in this region. A study of the worldwide phylogeography and genetic diversity of long-finned and short-finned pilot whales was also undertaken using new and previously published sequences of the mitochondrial DNA control region ($n = 568$). Since April 2005, a total of 84 new skin samples from long-finned pilot whales stranded around NZ were collected in collaboration with DOC. The tissue archive held at the University of Auckland contains now 492 samples of this species.

N. Wiseman (UA) completed the extraction, sexing and sequencing (D-loop region of the mtDNA) and genotyping of all stranded samples and biopsy samples held at UA.

D. Heimeier (UA) is investigating nucleotide diversity at two genes (DQA and DQB) of the Major Histocompatibility Complex (MHC) in populations of Hector's and Maui's dolphins ($n = 223$) as well as in five mass-stranding events of long-finned pilot whales ($n = 230$) around NZ. Besides characterizing MHC diversity in these populations, the evolution of DQB genes within various cetacean species is being investigated. The results are being compiled as part of her PhD thesis and will be available later this year.

G. de Tezanos Pinto and C.S. Baker in collaboration with R. Constantine, J. Berghan, F. Mourao, S. Wells and A. Ryding (UA) continue investigation on the trends of abundance of bottlenose dolphins using the Bay of Islands. Both closed and open population models were used to generate abundance estimates and trends over 13 years of studies. Further analyses and individual based models are currently being assayed to identify critical factors and understand the long-term persistence of this population.

5. POLLUTION STUDIES

None.

6. STATISTICS FOR LARGE CETACEANS

6.1 Corrections to earlier years' statistics for large whales

None.

6.2 Direct catches of large whales (commercial, aboriginal and scientific permits) for the calendar year 2007

None.

6.3 Anthropogenic mortality of large whales for the calendar year 2007

6.3.1 Observed or reported ship strikes of large whales (including non-fatal events)

Whale species	Sex	No.	Date	Location	Vessel type	Speed	Fate	How observed	Contact person/ institute and refs
Pygmy sperm whale	U	1	28/12/06	Mahia Peninsula	U	U	D	DOC	K.McLeod/ DOC
Bryde's whale	U	1	31/12/06	Hauraki Gulf	U	U	D	DOC	K.McLeod/ DOC

6.3.2 Fishery bycatch of large whales

Whale species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
Unidentified whale	U	1	??/08/06	West Coast, South Island	D	<i>Macruronus</i>	TM	F	S. Rowe/ DOC

7. STATISTICS FOR SMALL CETACEANS

7.1 Corrections to earlier years' statistics for small cetaceans

None.

7.2 Direct catches of small cetaceans for the calendar year 2007

None.

7.3 Anthropogenic mortality of small cetaceans for the calendar year 2007

7.3.1 Observed or reported ship strikes of small cetaceans (including non-fatal events)

None.

7.3.2 Fishery bycatch of small cetaceans

Species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
Common dolphin	U	3	??/10/06	Taranaki	D	<i>Trachurus</i>	TM	F	S. Rowe/ DOC
Dusky dolphin	F	1	??/03/06	Banks Penla	D	<i>Trachurus</i>	TM	F	S. Baird/NIWA
Dusky dolphin	U	1	??/11/06	Marlborough	D	U	GNS	F	S. Rowe/ DOC
Hector's dolphin	M	1	06/12/06	Marlborough	D	U	GNS	F	H. McConnell/ DOC
Hector's dolphin	U	3	03/04/06	Marlborough	D	U	TBB/TM	F	H. McConnell/ DOC

Note: These bycatch reports represent only those individuals that were reported to DOC or the Ministry of Fisheries and were confirmed as fisheries bycatch from Government observers in fisheries or from autopsies of beach cast specimens. There is no estimate of total bycatch in NZ and the individuals reported here represent a minimum.

8. STRANDINGS

A. van Helden (TP) maintains the NZ National Stranding Database. The total number of reported strandings for this period is 98 incidents involving 355 animals. This excludes those animals that have been reported but for which stranding data forms had not been received by TP before the end of March. At least 15 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%, *Balaenopteridae* 6.1%, *Ziphiidae* 25.5%, *Delphinidae* 50%, *Physeteridae* (including *Kogiidae*) 16.3%. The representation in number of animals for the different families that stranded in this period are: *Neobalaenidae* 0.3%, *Balaenopteridae* 1.7%, *Ziphiidae* 7%, *Delphinidae* 85.4% and *Physeteridae* 5.4%. The species with the highest incidents of strandings is common dolphins with 15 incidents. The largest number of animals of a species to strand was 261 for Long finned Pilot whales. The total number of animals refloated for this period was 60, 23 of which restranded and died, therefore 37 are presumed to have survived.

Species:	No. of strandings	No. of individuals	No. refloated	No. restranded	No. animals rescued
<i>Baleen whale</i>	1	1	0	0	0
<i>Beaked whale</i>	1	1	0	0	0
Bottlenose dolphins	6	6	1	0	1
Bryde's whale	3	3	0	0	0
Common dolphin	15	19	5	0	5
Cuvier's beaked whale	4	4	0	0	0
Dusky dolphin	2	4	1	0	1
Dwarf minke whale	1	1	0	0	0
Gray's beaked whale	12	12	0	0	0
Hector's dolphin	11	12	0	0	0
Humpback whale	1	1	0	0	0
Killer whale	1	1	0	0	0
Long finned pilot whale	14	261	51	21	30
<i>Mesoplodon sp</i>	2	2	0	0	0
Pygmy right whale	1	1	0	0	0
Pygmy sperm whale	12	15	0	0	0
Sperm whale	4	4	0	0	0
Straptoothed whale	6	6	2	2	0
<i>Unknown</i>	1	1	0	0	0
Total:	98	355	60	23	37

S. O'Shea and colleagues (AUT) continue to investigate strandings of cetaceans in NZ in particular, they continue to collect stomach samples of teuthophagous whales to investigate diet.

9. OTHER STUDIES AND ANALYSES

B. Madon (UA) continues joint modelling of two sources of live-recapture data applied to the South Pacific Humpback whale population to estimate population size. A technique for combining photo- and genetic-identification techniques in population assessment is being developed. The proposed model is a likelihood-based model that would allow the use of the capture of animals by two live-recapture data: genetics and photo-identification. The idea is to join the likelihood using the genetic data, the one using the photo-identification data and the one using the data of individuals that have been simultaneously captured by genetics and photo-identification. But because there is an overlap between the two datasets (whales can have been captured separately by genetic and photo-identification without the researchers knowing if the individuals have never been captured simultaneously by the 2 methods), we have to introduce the probability of being in both data set.

There is a moratorium on new commercial dolphin viewing/swimming permits at Kaikoura, NZ. In anticipation of this moratorium expiring in November 2009, the DOC has commissioned a research programme to investigate effects of current and potential future tourism activity on dusky dolphins at Kaikoura. In particular the research programme aims to: (i) Quantify and document the type, level and operational extent of existing dusky dolphin

tourism activity; (ii) Determine the effect of existing tourism activity on the behaviour and welfare of dusky dolphins; and (iii) Assess the likely effects of any future expansion in commercial dusky dolphin viewing/swimming effort at Kaikoura. The research commenced in January 2007 and is due to be completed by June 2009. It is being carried out by a team comprising Drs T. Markowitz, B. Würsig, S. DuFresne and M. Orams.

T. Webster (OU) is continuing the Hector's dolphin photo-id catalogue at Banks Peninsula and collecting additional data on group composition and spatial and temporal distribution of mother-calf pairs. An underwater pole camera setup is being used to look at the sex of individuals. A new laser system mounted on a digital camera is also being trialled, which it is hoped will enable fin measurements to be obtained non-invasively in the field. Using allometric relationships from stranded animals, estimates of body length and age will then be obtained.

M. Pinkerton, S. Hanchet and colleagues (NIWA) are developing an ecosystem model of the Ross Sea as part of a FRST contract (CO1X0505). The aim of the work is to understand food-web relationships between organisms in the Ross Sea, their response to environmental drivers and anthropogenic influences, and the key factors influencing the sustainability of the ecosystem. A carbon budget trophic model for the Ross Sea is currently under development. The model consists of 8 main trophic groups including top predators, middle predators, zooplankton, phytoplankton, bacteria, sea ice biota, benthic fauna, and detritus, each further subdivided into 3–5 smaller component groups, making 28 components in all. This includes separate compartments for top and middle predator groups such as toothed whales, baleen whales, seals, birds, and Antarctic toothfish. The focus to date has been on the consequences for ecosystem function of removing a proportion of the toothfish biomass. Natural predators of toothfish in the Ross Sea may include sperm whales, type-C killer whales, Weddell seals and large squids. Preliminary budget considerations suggest that Antarctic toothfish are unlikely to be a major component of the overall diets of these predators. However, there may be important localised effects, where the consumption of toothfish in particular locations, at particular times of the year, or by particular parts of the predator population is important, even though the total consumption of toothfish by all individuals of a species is relatively low. We cannot currently evaluate localised effects of fishing on toothfish predators.

B. Miller, S. Dawson, and E. Slooten (OU) are carrying out research on the acoustic behaviour of sperm whales at Kaikoura. Passive acoustic arrays are being developed and used to determine the whales' underwater movements. This research programme includes 3D localisation of whales during diving, acoustic length and growth rate estimates based on inter-pulse-interval of sperm whale vocalizations, and acoustic identification using wavelets and software based.

L. Rowe (OU) Field work for my masters thesis begun in January 2007 in conjunction with R. Currey in Doubtful Sound. Parallel laser pointers were mounted within a block that is attached to a photo ID camera. The lasers were calibrated to 100mm and projected on to bottlenose dolphin dorsal fins. Measurements are then made from digital photos using the laser dots as a 100mm scale. The research aims to investigate size sexual dimorphism, percentage area marked, and marking rates.

B. Lloyd, P. Fisher, and L. Boren (DOC) are continuing research on cetaceans and aquaculture, mainly focused on dusky dolphins but has opportunistically involved, bottlenose, common, and Hector's dolphin, as well as killer whales. While the main focus of the study is to devise methods for investigating the impact of mussel farms on marine wildlife, the methods being developed will also be efficient for tourism impact studies, fisheries monitoring and general wildlife population status and behaviour. The field work was carried out from February 2006 to March 2007 in Admiralty Bay and Current Basin in the Marlborough Sounds on the South Island of NZ. Distance sampling from boat surveys was carried out over the course of thirteen months to determine numbers of dolphins in Admiralty Bay their seasonality, and habitat use. Photo-ID was undertaken, photos catalogues and compared with images from other researchers. Other methods being used include a passive acoustic dolphin click detector, TPOD, which are moored in the bay and allow monitoring of dolphin presence and behaviour remotely both day and night. A land-based method, incorporating traditional theodolite tracking mounted with a digital video camera allows for tracking of individuals within a group and detailed analysis of individual behaviour. It also allows the user to calculate distances between the target species and tour boats etc. and can be employed to monitor marine reserves and dolphin behaviour around mussel farms. All data from this project has been collected and analysis is underway, results and conclusions will be presented over the upcoming year.

E. Slooten (OU) completed a Population Viability Analysis for Hector's dolphin populations around NZ, which confirms the IUCN classification of the species as Endangered and the North Island subspecies as Critically Endangered. The analysis used the latest abundance estimates, from a recent series of line transect surveys carried out by OU, and the latest estimate of bycatch in commercial gillnet fisheries from an observer programme. No quantitative estimates are available for bycatch in recreational gillnets or trawl fisheries. The analysis results in relatively optimistic predictions as these two sources of mortality could not be included. In 1970, before a major expansion of commercial gillnetting, Hector's dolphin populations were at least twice their current size and some populations were about ten times their current size. If fishing impacts continue at the current level, Hector's dolphin populations are likely to be still heavily depleted in 2100, with most populations still below half of their 1970 population size. Current management, which includes two protected areas, is not

sufficient to halt population declines. Creating four more strategically placed protected areas would substantially reduce the risk of further population declines and fragmentation. Even then, four populations would remain at very low levels (<50 individuals) by 2050. Fisheries mortality would need to be reduced to levels approaching zero (as recommended in the NZ Marine Mammal Action Plan) to achieve national and international goals for managing marine mammal populations. This could be achieved by using only selective fishing methods, known not to cause dolphin mortality, in areas where Hector's dolphins are found and would allow almost all populations to recover to at least 50 individuals by 2050.

J. Jackson (UA) is investigating the relationship between demographic and genetic estimates of cetacean abundance, in collaboration with C.S. Baker, A. Rodrigo and A. Drummond (UA), using population demographic models in conjunction with haplotypic population estimates. Humpback mitochondrial control region data amplified by members of SPWRC have also been analysed in order to refine estimates of mutation rate, diversity and migration rates between breeding populations across humpbacks worldwide, and a paper on this topic is currently in preparation. Her post-doctoral position at the University of Auckland will end in May, at which point she will take up a position at Oregon State University with Professor C. S. Baker.

D. Cairney (NIWA) and S. DuFresne (DEL) initiated a NIWA study to assess usage by Hector's dolphins of a proposed marine farm site in Jackson's Bay. The study utilises T-PODs and is a requirement under the resource consent monitoring conditions.

H. McConnell (DOC) coordinated the collection of opportunistic sightings of southern right whales around the NZ mainland provided by researchers, the public and DOC staff. In addition to opportunistic sightings, genetic sample collection was also being undertaken around NZ to determine if individuals seen around the main two islands of NZ are genetically or geographically isolated from our sub-Antarctic populations. One genetic sample was collected in the 2006 season. D. Steel, E. Carroll, N. Patenaude and C.S. Baker (UA) continue molecular identification of southern right whales around NZ. No between-year matches of genotypes were found among samples from any of the four study years. The four adults from the 2005/06 collection and the nine adults from the 2003/04 collection represented six mitochondrial (mt)DNA haplotypes, all of which are found around the Auckland Islands. Sample size for the mainland was too small for a robust analysis of population differentiation.

N. Patenaude (MU-A) continues photographic matching of southern right whales from around mainland NZ. There have been several within season but no between season resights. There have also been no resights of whales seen around the mainland and in the sub-antarctic breeding areas.

The 9th Annual Meeting of the SPWRC was held at the University of Auckland 29 January to 2 February, 2006. Over thirty 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.

E. Fordyce (OU) continues work with J.G. Mead (National Museum of Natural History, Smithsonian Institution) on osteology of the bottlenose dolphin based on museum specimens. Other research involves higher systematics of odontocetes and mysticetes, especially the initial radiation of the Neoceti, and also osteological cladistics of Delphinidae with I. Moreno (Grupo de Estudos de Mamíferos Aquáticos do Rio Grande do Sul - GEMARS, Brazil, currently visiting researcher, University of Otago).

E. Beatson, S. O'Shea and colleagues (AUT) continue to investigate strandings of cetaceans in NZ. Research conducted at AUT currently focuses on collecting and archiving of stomach contents of stranded teuthophagus whales from NZ waters and reconstructing life histories of the primary prey species. Based on analysis of diet, it is speculated that the diet of teuthophagus 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.

F. Gomez-Villota (AUT) has recently completed his MAppSc thesis titled 'Sperm whale diet in NZ'. The cephalopod prey from the stomach contents of 16 sperm whales stranded on the NZ coast between early 1990s and 2004 are described, comprising at least 36 species in 17 families. Twenty four species are likely to be consumed in NZ waters and a further 9 and 3 species are considered to be preyed upon in South Tasmanian and Antarctic waters respectively. An apparent shift in the diet of sperm whales in NZ since the 1960's probably reflects changes in the abundance of important prey species.

E. Beatson (AUT) has also recently submitted her BAppSc (Hons) dissertation on the diet of pygmy sperm whales stranded on NZ beaches. The stomachs of 25 pygmy sperm whales stranded between 1991 and 2006 were examined. Diet included fish and crustaceans, but was mainly comprised of cephalopods. Cephalopod prey is attributed to 23 species from 13 families, dominated by juveniles of Histioteuthidae and Cranchiidae. The diet of the pygmy sperm whale differs substantially from that of the sperm whale, in terms of diversity and size-class composition.

E. Beatson and S. O'Shea (AUT) continue to investigate the diet of stranded pilot whales. Stomach contents of the long-finned pilot whale have been reported for the first time based on ten whales that were part of a mass stranding event on Farewell Spit, Golden Bay in December 2005. Stomach contents collected from a further eleven pilot whales involved in a mass stranding event near Marsden Point, Ruakaka in November 2006 are currently being investigated. Of the 21 pilot whale stomachs examined thus far, 10 were empty and the remaining eleven stomachs contained small numbers of cephalopod beaks attributed to 6 species from 6 families.

K. Stockin, and colleagues (MU) continue research on the diet, morphometrics and behaviour of common dolphins from around NZ.

S. Childerhouse (OU), G. Dunshea (AAD) and colleagues undertook a three week survey of southern right whales at the Auckland Islands in winter 2006. A systematic survey of Port Ross and the northern end of the Auckland Islands counted a total of 208 SRWs, including 34 cow-calf pairs, a density of approximately 4 whales per square km in the survey area. An identical count in 1997 yielded 146 SRWs (including 18 cow-calf pairs). A total of 142 biopsies were collected and a similar number of photo-IDs were collected. These will be matched with the existing material collected from the Auckland Islands in 1995-98 and more recently around mainland NZ.

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None.

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