

Cetacean research in New Zealand 2002/03

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A B S T R A C T

This report summarises cetacean (i.e. whale and dolphin) research undertaken in New Zealand over the period from April 2002 to March 2003, with statistical information for the 2002 calendar year. The report covers cetacean research undertaken by a wide range of researchers including government, university, and non-governmental agencies and individuals. Information presented includes details of species studied, strandings, summaries of collections and of catalogues, research projects undertaken, samples collected, and publications resulting from research. Data are included from 25 species, from 8 different institutions/agencies and over 40 researchers. Although this is a comprehensive collection of research reported for 2002/03, it does not include all cetacean research carried out in New Zealand.

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

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1. Introduction

This report follows on from previous reports which summarised cetacean research in New Zealand over the period 1997-2000 (Childerhouse & Donoghue 2002) and 2001 (Childerhouse 2002). It provides updated information about recent research in New Zealand. For a full description of the format and explanation of the sections in the report please refer to Childerhouse & Donoghue (2002). This, and previous reports, are published records of the New Zealand National Progress Report on Cetacean Research which is presented annually to the Scientific Committee of the International Whaling Commission (IWC).

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

The National Progress Reports have been compiled annually by the Department of Conservation based on reports from researchers. Although a considerable amount of effort has been made to contact all researchers who have undertaken cetacean research in New Zealand, and encourage them to provide details of their research, this has not always been completely successful. As such, the report presented in this document covers most of the work undertaken in New Zealand, but some research, which has not been reported to the Government, does not appear. Overall, however, only a small proportion of the active cetacean research in New Zealand is not included in this document.

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

A copy of the New Zealand National Progress Report for 2002/03 is appended to this report (see Appendix 1).

2. Acknowledgements

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

3. References

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Appendix 1

NEW ZEALAND PROGRESS REPORT ON
CETACEAN RESEARCH, APRIL 2002 TO
MARCH 2003, WITH STATISTICAL DATA FOR
THE CALENDAR YEAR 2002

**NEW ZEALAND PROGRESS REPORT ON CETACEAN RESEARCH, APRIL 2002 TO MARCH 2003,
WITH STATISTICAL DATA FOR THE CALENDAR YEAR 2002**

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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), Ministry of Fisheries (MFish), National Institute of Water & Atmospheric Research Ltd (NIWA), Texas A&M University (TAM) and independent researchers.

1. Species and stocks studied

Common name	Scientific name	Area/ stock(s)	Numbered Sections referred to in text below
Antarctic minke whale	<i>Balaenoptera acutorostrata</i>	Area V	4.3
Beaked whales	Family <i>Ziphiidae</i>	NZ	9
Bottlenose dolphins	<i>Tursiops truncatus</i>	NZ	2.1.1, 2.1.2, 3.1.1, 4.1, 4.3, 4.4, 8, 9
Bryde's whale	<i>Balaenoptera edeni</i>	NZ	2.1.1, 3.1.1, 4.3, 6.2
Common dolphin	<i>Delphinus delphis</i>	NZ	2.1.2, 3.1.1, 4.2, 7.1, 8, 9
Cuvier's beaked whale	<i>Ziphius cavirostris</i>	NZ	4.3, 8
Dusky dolphin	<i>Lagenorhynchus obscurus</i>	NZ	2.1.1, 3.1.1, 4.3, 8, 9
Dwarf minke whale	<i>Balaenoptera bonarensis</i>	Tonga	4.1, 9
Gray's beaked whale	<i>Mesoplodon grayi</i>	NZ	4.3, 8
Hector's dolphin	<i>Cephalorhynchus hectori hectori</i>	NZ	2.1.1, 3.1.1, 4.1, 4.2, 4.3, 7.1, 8, 9
Humpback whale	<i>Megaptera novaeangliae</i>	Area V	3.1.1, 4.1, 8, 9
Killer whale	<i>Orcinus orca</i>	NZ	3.1.1, 4.3, 7.1, 8, 9
Longman's beaked whale	<i>Indopacetus pacificus</i>	NZ	9
Maui's dolphin	<i>Cephalorhynchus hectori maui</i>	North Island, NZ	2.1.1, 3.1.1, 4.1, 4.2, 4.3, 4.4, 7.1, 9
Perrin's beaked whale	<i>Mesoplodon perrini</i>	NZ	9
Pilot whale	<i>Globicephala melaena</i>	NZ	3.1.1, 4.3, 7.1, 8, 9
Pygmy right whale	<i>Caperea marginata</i>	NZ	8
Pygmy sperm whale	<i>Kogia breviceps</i>	S. Hemisphere	4.3, 8
Shepherd's beaked whale	<i>Tasmacetus shepherdi</i>	NZ	4.3, 8
Southern bottlenose whale	<i>Hyperoodons planifrons</i>	NZ	8
Southern right dolphin	<i>Lissodelphis peronii</i>	NZ	4.3
Southern right whale	<i>Eubalaena australis</i>	NZ	3.1.1,
Sperm whale	<i>Physeter macrocephalus</i>	NZ	2.1.1, 3.1.1, 4.3, 8
Strap-toothed whale	<i>Mesoplodon layardi</i>	NZ	8
Spinner dolphin	<i>Stenella longirostris</i>	Tonga	4.1, 9
Striped dolphin	<i>Stenella coeruleoalba</i>	NZ	4.3

2. Sightings data

2.1 Field work

2.1.1 Systematic

The final year of a three-year aerial survey of Bryde's whales was conducted off New Zealand's north-eastern coast between Cape Colville and North Cape by A. Baker (DOC). Flights were undertaken along a predetermined track at monthly intervals, and whale sightings were logged on a GPS.

E. Slooten, S. Dawson, W. Rayment (OU) continued aerial surveys to estimate the proportion of the Hector's dolphin population found within the four nautical mile offshore boundary of the Banks Peninsula Marine Mammal Sanctuary. This was a line-transect survey, with lines running at a 45-degree angle from the coastline, out to 15 nautical miles offshore. Preliminary analysis indicates that in mid-summer approximately 20% of the population is found offshore of the sanctuary boundaries. The survey has been repeated in winter to quantify seasonal changes in distribution, and the effectiveness of the sanctuary.

B. Wursig (Principal Investigator) (TAM) continues research on dusky dolphins. Surveys were conducted on 50 days between January 2002 and May 2002 within 25 km of the head of the Kaikoura Canyon, Kaikoura. Dolphins were encountered on approximately 95% of days. Group sizes ranged from 4 to about 2,000 dolphins. April and May had the

largest groups. Surveys for dusky dolphins were conducted on 42 days in Admiralty Bay in the Marlborough Sounds from June 2002 through August 2002. A total of 253 groups were encountered, with a mean group size of 6.1 dolphins. Surveys for dusky dolphins were also undertaken from January 2003 through the end of this report period, 31 March 2003. Data are not yet analyzed but dolphins were surveyed on about 45 days in those three months, with contact of about 95% on those good weather days.

D. Lusseau, O. Boisseau, D. Rundgren and S. Maersk Lusseau (OU) studied the population size, residency pattern, behavioural ecology, feeding ecology, acoustic behaviour and offshore distribution of bottlenose dolphins in Fiordland. From March 2002 to March 2003 they spent 108 days in Doubtful and Milford sounds looking for bottlenose dolphins, with effort concentrated evenly between both fiords. Dolphins were sighted on 72 days. During this period, three large scale offshore surveys were conducted, incorporating 100 days of effort throughout all of the fiords. In Milford Sound and Doubtful Sound the focus of research was the impact of tourism activities upon the dolphins and also vocalisation patterns. A further study was conducted in Doubtful Sound addressing the feeding ecology of the dolphins. Work in the other fiords concerned coastal distribution and movement patterns of bottlenose dolphins, both within and between fiords.

E. Secchi (OU) has been collecting data on the West coast of the South Island on the recreational set net fishery through fishing diaries distributed to amateur fishers and by beach surveys. The aim is to assess the extent of the overlap between the distribution of Hector's dolphin and fisheries (on a spatial and temporal basis) along the northeast coast of the Buller Region. Data on commercial set net fishing effort and distribution was obtained from records supplied by the MFish (Wellington). Since March 2000, seasonal patterns of dolphin distribution and density have been studied through systematic boat surveys. Two different sampling designs (one set of transects parallel to the coast and another set of transects perpendicular to coast) were used to test for seasonal differences in dolphin distribution and density, according to distance from shore. Almost 2000 km of surveys have been completed. The information on potential overlap between fisheries and Hector's dolphins will be used to estimate the 'expected' by-catch of these dolphins along the West Coast. The numbers will be used as inputs to model the effect of by-catch on the Hector's dolphins population off the West Coast.

K. Russell (AU) continued research on Maui's dolphin. A total of 12 days of fieldwork were undertaken off the west coast of the North Island this summer season. During this time 24 groups of Maui's dolphins were encountered. Group size ranged from one to seven. Only one calf and three juveniles were encountered. A total of 23 biopsy samples were collected for genetic analysis. Several new dolphins were added to the North Island photo-ID catalogue, and many were re-sighted over the season. No beach cast dolphins were reported this season.

P. Ensor participated as a team leader during the 2002 NILS cruise in the North Atlantic, and also acted as cruise leader on the 2002–2003 IWC-SOWER circumpolar cruise, Area V of the Antarctic.

S. DuFresne (OU) has completed 3 years of a long-term photo-ID study of Hector's dolphins within the Banks Peninsula Marine Mammal Sanctuary. Effort for the period January 2000 to September 2002 totalled 152 field days, resulting in 3700 km of sighting effort and nearly 1500 sightings. Data analysis is focussing on survival estimates and is expected to be completed in late 2003. W. Rayment (OU) commenced a three-year study examining movements and fine scale habitat use by Hector's dolphins at Banks Peninsula. The project will involve aerial surveys to further investigate seasonal changes in offshore distribution, photo-ID to investigate alongshore movements of individuals and acoustic monitoring using click detectors (PODs) to investigate fine scale habitat use.

D. Clement (OU) concluded fine-scale (spatial and temporal) distribution surveys of Hector's dolphins and the investigation of localised population movements within the Banks Peninsula Sanctuary and around Westport in 2002. An ongoing evaluation aiming to compare the changing oceanography of the study areas with seasonal and inter-annual fluctuations in relative distribution and densities of dolphins will be completed in 2003.

S. Dawson and E. Slooten (OU) continued their research on sperm whales off Kaikoura investigating abundance, residency and the effects of tourism.

E. Green (OU) is investigating the effects of tourism on Hector's dolphins in Porpoise Bay. The two-year study is also investigating population size, range and habitat utilisation of the summer resident group. Potential impacts from the sole boat operator and beach swimmers were measured with the use of a theodolite, and behavioural assessments made in the presence and absence of boats and swimmers. Photo-ID and surveys for alongshore range of the dolphins were carried out by boat. Results to date indicate an adult population size of 40 dolphins and a range that extends at least 40 km along the coast. Further results will be available this year, and will be compared with a previous study carried out five years earlier.

S. Dawson, E. Slooten, W. Rayment and H. Nollens (OU) completed two aerial surveys to investigate the offshore distribution of Hector's dolphins at Banks Peninsula. Transect lines were flown from the coast to 15 nautical miles offshore. In the summer survey, nearly 80% of dolphin groups were sighted within the four nautical mile Marine Mammal Sanctuary boundary. In the winter, only 35% were sighted within the same area suggesting that the majority of

Hector's dolphins move offshore in winter and outside the protection of the Marine Mammal Sanctuary. W. Rayment, D. Clement, and E. Secchi (OU) and D. Neale (DOC) completed the first part of aerial surveys to investigate the offshore distribution of Hector's dolphins in the Buller region of the South Island's west coast. Transect lines were flown from the coast to 15 nautical miles offshore. The surveys revealed that Hector's dolphins have a near shore distribution in March with 99% of groups seen within 5 nautical miles of the coast. A winter survey will be undertaken in July 2003.

2.1.2 Opportunistic, Platforms of opportunity

J. Berghan has been collecting photo-IDs of bottlenose dolphins in the Hauraki Gulf. In addition, ongoing photo-ID research on bottlenose dolphins by A. Fleming (DOC), R. Constantine (AU) and J. Berghan continued in the Bay of Islands using the dolphin-tour boats and independent vessels.

K. Stockin and M. Orams (MU) are investigating the relationship between ecotourism and common dolphins in the Hauraki Gulf. The primary aims of the research are to investigate the behavioural ecology of dolphins targeted by tourist operators by assessing behavioural states of dolphins before, during and after tourist encounters. The study aims to assess the discreteness of the Hauraki Gulf population to that of adjacent populations by monitoring parameters relating to behavioural ecology, habitat use and population biology. The outcomes from the study will be useful in designing appropriate management strategies to minimise disturbance of common dolphins from other recreational boat traffic 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	Calendar year/ season	Catalogued	Catalogue total	Contact person/ institute
Bottlenose dolphin	Fin/body	Doubtful Sound	1990–2003	Yes	>83	O. Boisseau/ OU
Bottlenose dolphin	Fin/body	Milford Sound	2000–2003	Yes	50	O. Boisseau/ OU
Bottlenose dolphin	Fin/body	Fiordland	2000–2003	Yes	c. 200	O. Boisseau/ OU
Bottlenose dolphin	Fin/body	Bay of Islands	1993–2003	Yes	397	R. Constantine, G. de Tezanos Pinto / AU
Bottlenose dolphin	Fin/body	Hauraki Gulf	2000–2003	Yes	102	J. Berghan
Bryde's whale	Fin/body	Hauraki Gulf	2002	Yes	>20	C.S. Baker/ AU
Common dolphin	Fin/body	Whitianga/ Whakatane	1998–2002	Yes	408	D. Neumann/ MU
Dusky dolphin	Fin/body	Kaikoura and Admiralty Bay	1997–2003	Yes	>4000	Tim Markowitz, TAM
Hector's dolphin	Fin/body	East South I.	1984–2003, 1994–	Yes	515	S. DuFresne,
		West South I.	97, 2001–2003			E. Slooten/ OU
Humpback whale	Fluke	Area V	1991–2003	Yes	452	C. S. Baker/ AU
Humpback whale	Fluke	New Zealand	1995–2003	Yes	11	R. Constantine/ AU
Killer whale	Fins/saddles/ eye patches	New Zealand	1993–2003	Yes	117	I. Visser/ The Orca Project
Killer whale	Fins/saddles/ eye patches	Antarctica	2000–2003	Yes	15	I. Visser/ The Orca Project
Killer whale	Fins/saddles/ eye patches	Area V	2001	Yes	11	C. Olavarría/ AU
Maui's dolphin	Fin/body	North I.	1998–2003	Yes	>34	K. Russell/ AU
Pilot whale	Fins/saddles	New Zealand	?–2003	Yes	84	T. O'Callaghan/
Southern right	Callosities/ lip	Area V	2001	Yes	2	C. Olavarría/ AU

whale	lines					
Southern right whale	Callosities/ lip lines	New Zealand mainland	1995–2003	Yes	23	N. Patenaude/ AU
Southern right whale	Callosities/ lip lines	NZ sub-antarctic	1995–99	Yes	402	N. Patenaude/ AU; B. Todd/ Project Tohora
Sperm whale	Fluke	Kaikoura	1990–2003	Yes	190	E. Slooten/ OU

3.1.2 Artificial marking data

None

3.1.3 Telemetry data

None

3.2 Analyses/development of techniques

None

4. Tissue/biological samples collected

4.1 Biopsy samples (including sloughed skin samples)

Species	Area/ stock	Calendar year/ season no. collected	Archived	No. analysed	Total holdings	Contact person/ institute
Bottlenose dolphin	Northland	38	Yes	0	38	G. de Tezanos Pinto/ AU
Bottlenose dolphin	Queen Charlotte Sound	45	Yes	0	45	G. de Tezanos Pinto/ AU
Bottlenose dolphin	Doubtful Sound	15	Yes	15	15	S. Maersk Lusseau/ OU
Hector's dolphin	Marlborough Sounds and Kaikoura	25	Yes	?	141	K. Russell/ AU
Humpback whale	Tonga	113	Yes	113	410	C. Olavarría, K. Russell/ AU
Maui's dolphin	North Island	23	Yes	23	41	K. Russell/ AU
Spinner dolphin	Tonga	1	Yes	?	?	C. Olavarría, K. Russell/ AU

4.2 Samples from directed catches or by-catches

Species	Area/ stock	Calendar year/ season total	Archived	Tissue type(s)	Contact person/ institute
Common dolphin	NZ	2	Yes	Skin, blubber, fixed tissues, skeletons	P. Duignan/ MU
Hector's dolphin	South Island	6	Yes	Skin, blubber, fixed tissues, skeletons	P. Duignan/ MU; A. van Helden/ TP
Maui's dolphin	North Island	2	Yes	Skin, blubber, fixed tissues, skeletons	P. Duignan/ MU; A. van Helden/ TP

4.3 Samples from stranded animals

Species	Area/ stock	Calendar year (total)	Archived	Tissue type(s)	Contact person/ institution
Bottlenose dolphin	NZ	1	Yes	Skin/blubber	D. Steel/ AU
Bryde's whale	NZ	4	Yes	Skin/blubber	D. Steel/ AU
Common dolphin	NZ	6	Yes	Skin/blubber	D. Steel/ AU
Common dolphin	NZ	4	Yes	Skin, blubber, fixed tissues	P. Duignan/ MU
Cuvier's beaked whale	NZ	2	Yes	Skin/blubber	D. Steel/ AU
Cuvier's beaked whale	NZ	1	Yes	Skin, blubber, fixed tissues	P. Duignan/ MU
Dusky dolphin	NZ	1	Yes	Skin, blubber, fixed tissues	P. Duignan/ MU
Gray's beaked whale	NZ	7	Yes	Skin/blubber	D. Steel/ AU

Gray's beaked whale	NZ	1	Yes	Skin, blubber, fixed tissues	P. Duignan/ MU
Hector's dolphin	South Island	5	Yes	Skin, blubber, fixed tissues, skeletons	P. Duignan/ MU; A. van Helden/ TP
Killer whale	NZ	1	Yes	Skin/blubber	D. Steel/ AU
Long finned pilot whale	NZ	126	Yes	Skin/blubber	D. Steel/ AU
Maui's dolphin	North Island	1	Yes	Skin, blubber, fixed tissues, skeletons	P. Duignan/ MU; A. van Helden/ TP
Minke whale	NZ	1	Yes	Skin/blubber	D. Steel/ AU
Minke whale	NZ	2	Yes	Skin, blubber, fixed tissues	P. Duignan/ MU
Pilot whale	NZ	4	Yes	Skin, blubber, fixed tissues	P. Duignan/ MU
Pygmy sperm whale	NZ	5	Yes	Skin/blubber	D. Steel/ AU
Pygmy sperm whale	NZ	10	Yes	Skin, blubber, fixed tissues	P. Duignan/ MU
Shepherd's beaked whale	NZ	1	Yes	Skin/blubber	D. Steel/ AU
Southern right whale dolphin	NZ	1	Yes	Skin/blubber	D. Steel/ AU
Sperm whale	NZ	4	Yes	Skin/blubber	D. Steel/ AU
Striped dolphin	NZ	1	Yes	Skin/blubber	D. Steel/ AU

4.4 Analyses/development of techniques

D. Steel (AU) continued to collect and analyse samples collected as part of an ongoing project to archive tissue and DNA from all New Zealand strandings.

S. Maersk Lusseau and D. Lusseau (OU) collected skin samples from bottlenose dolphins in Doubtful Sound. Samples were collected using a modified version of the Harling et al. technique. Fifteen exfoliated skin samples were collected for a stable isotope study of Carbon and Nitrogen.

K. Russell (AU) continued to collect skin samples from Maui's dolphins. All skin samples (biopsy and beachcast) from previous seasons (total 41) have been extracted, sexed, and sequenced (D-loop region of the mtDNA) and genotyping is currently being undertaken.

5. Pollution studies

None

6. Statistics for large cetaceans

6.1 Direct catches (commercial, aboriginal and scientific permits) for the calendar year 2002

None

6.2 Other non-natural mortality for the calendar year 2002

A Bryde's whale was entangled and apparently drowned in a marine farm in Coromandel.

6.3 Earlier years' statistics

No amendments

7. Statistics for small cetaceans

7.1 For the calendar year 2002

Species	Area/stock	Directed catch		Incidental mortality			Live-capture
		Reported	Est. total	Reported	Est. total	Source	Reported
Common dolphin	New Zealand	Nil	Nil	2 ^{a, b}	?	Trawl	Nil
Hectors dolphin	South Island, West Coast	Nil	Nil	3 ^b	?	Gillnet	Nil
Hectors dolphin	South Island, East Coast	Nil	Nil	3 ^b	?	Gillnet	Nil
Killer whale	Bay of Plenty	Nil	Nil	1 ^c	?	Long line	Nil
Long finned pilot whale	New Zealand	Nil	Nil	1 ^a	?	Bottom long line	1
Maui's dolphin	North Island, West Coast	Nil	Nil	2 ^b	?	Gillnet	Nil

^a Details provided by R. Blezard (DOC) and S. Baird (NIWA) from data collected by Scientific Observer Programme of MFish.

^b Details provided by P. Duignan (MU) from data collected from the DOC Carcass Recovery Programme.

^c Details provided by R. Suisted (DOC).

7.2 Earlier years' statistics

No amendments

8. Strandings

A. van Helden (Te Papa Tongarewa/Museum of New Zealand) maintains the New Zealand stranding database and the national marine mammal collection. The total number of reported strandings for this period is 86 incidents involving 252 animals. This excludes those animals that have been reported but for which stranding data forms have not been received by the Museum of New Zealand Te Papa Tongarewa before the end of March. At least 18 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 2.3%, Balaenopteridae 8.1%, Ziphiidae 17.4%, Delphinidae 54.7%, Physeteridae 17.4%. The representation in number of animals for the different families that stranded in this period are: Neobalaenidae 0.7%, Balaenopteridae 2.7%, Ziphiidae 6.6%, Delphinidae 82.9% and Physeteridae 6.6%. The species with the highest incidents of strandings were common dolphins with 15 incidents and long-finned pilot whales also with 15 incidents. The largest number of animals of a species to strand was 179 for long-finned pilot whales. The total number of animals refloated for this period was 49, 7 of which restranded and died, therefore 42 are presumed to have survived. Interestingly there continues to be a high number of strandings of Gray's beaked whales, 10 incidents involving 12 animals and pygmy sperm whales, 10 incidents involving 11 animals. Total strandings are shown below.

Species strandings	No. of strandings	No. of animals
<i>Balaenoptera</i> sp	1	1
Baleen whale	1	1
Bottlenose dolphin	3	3
Common dolphin	15	17
Cuvier's beaked whale	2	2
Dusky dolphin	5	5
Gray's beaked whale	10	12
Hector's dolphin	7	7
Humpback whale	1	1
Killer whale	1	1
Pilot whale	15	179
Pygmy right whale	2	2
Pygmy sperm whale	10	11
Shepherd's beaked whale	1	1
Southern bottlenose whale	1	1
Southern right whale dolphin	1	1
Sperm whale	5	6
Strap-toothed whale	1	1
Total	86	252

P. Duignan, N. Gibbs, G. Jones and M. Stratton (MU) continue to autopsy stranded cetaceans and/or those killed in fishing operations to determine cause of death and investigate their biology including any evidence of disease.

9. Other studies and analyses

A. Baker, A. Smith (DOC) and F. Pichler (AU) described a new subspecies of Hector's dolphin (*Cephalorhynchus hectori hectori*), Maui's dolphin (*C. hectori maui*) restricted to the west coast of the North Island.

B. Wursig (Principal Investigator) (TAM) continues research providing information on the effects of dolphin watching and swim-with-dolphin activities off Kaikoura. In Admiralty Bay, ongoing studies of habitat use are directly applicable to the presence and proposed further development of the mussel farming industry in and near the Marlborough Sounds. These studies are also helping to unravel the genetic relatedness of dusky dolphins throughout New Zealand.

M. Dalebout (previously at AU) will be taking up a postdoctoral position with H. Whitehead at Dalhousie University to investigate population structure and gene flow in northern bottlenose whales. The following papers have been published: Dalebout et al. (2002a) describes a new species of beaked whale, *Mesoplodon perrini*, discovered through phylogenetic analysis of mitochondrial DNA sequences; Dalebout & Baker (2002) further discusses this finding, which prompted clarification of the role of holotypes and genetic evidence in species descriptions (Wakeham-Dawson et al. 2002); and Dalebout et al. (2003) describes new specimens of Longman's beaked whale. In addition, Dalebout et al. (2002b) presents work resulting from the genetic monitoring of the whale meat markets in Japan and the Republic of (South) Korea, including an estimate of numbers of protected J-stock minke whales sold annually on these markets. Other publications describe the utility of the DNA-surveillance website (www.DNA-surveillance.auckland.ac.nz)

established at the University of Auckland to enable on-line identification of whales, dolphins and porpoises from mtDNA sequence data (Ross et al. 2003; Baker et al. 2003).

M. Cawthorn continues to collate incidental sightings of whales from commercial vessels at sea and other offshore sources; transfer the Townsend data from original collation sheets to computer; investigate historical whaling in the south west Pacific and relate these activities to modern bathymetry and other oceanographic data; develop and improve marine mammal escape devices for use in commercial mid-water and bottom trawl fishing gear.

T.O'Callaghan has initiated a long-finned pilot whale photo-identification catalogue. The primary aim of this catalogue is to estimate the long-term survival rates following refloating of stranded animals. To date, the catalogue contains 84 individually identified animals (53 live, 31 dead). Identification images from stranded and free-swimming animals are added to the catalogue on an opportunistic basis. Additional historical images are continuously being added.

A. Schaffar-Delaney and M. Orams (MU) are investigating the reproductive patterns of common dolphins in the Hauraki Gulf, New Zealand. This project aims to assess common dolphin breeding patterns, specifically female reproductive strategies. Data will be recorded from a commercial tourist boat 'Dolphin Explorer' and from a small research boat. This project will provide valuable information useful in setting appropriate permit conditions for tourism operations and management strategies, as well as guidelines for dolphin-watching operators.

A. Taylor (AUT) and M. Orams (MU) are assessing the impacts of an environmental education programme on a marine mammal tour. Numerous studies have been conducted to assess the effects of eco-tourism on cetaceans, yet relatively few studies have assessed the effects of eco-tourism on the participating tourists. It has been identified that the ultimate goal of an eco-tourism education program is to prompt behaviour change that benefits the environment upon which the eco-tourism is based. This project plans to evaluate the effectiveness of an education program for tourists onboard 'Dolphin Explorer', an ecotourism venture based in Auckland. A survey was conducted over the 2001/02 summer period, with 11 trips being randomly selected and all passengers over 15 years of age being approached to complete a two-part self-reply questionnaire (n = 300). Three indicators were used in the evaluation: increase of knowledge, the changing of attitudes to those that are more environmentally sound, and intentions to change behaviours to those that are more environmentally responsible. A comparison of data collected before the trips, with data collected afterwards, showed that changes did occur as a result of the education programme. In particular, it was found that significant learning occurred ($z = -3.08$, $p = 0.001$), and chi-square tests revealed that respondents were more likely to behave in an environmentally responsible way subsequent to the trip ($df = 5$, $p = 0.000$). These results contribute to the evidence that effective environmental programs can help prompt greater environmental awareness and responsibility in tourists and can contribute to ecotourism achieving its lofty aspirations of contributing to conservation objectives.

Researchers at Auckland University and the South Pacific Humpback Whale Consortium continue humpback whale research in Tonga. The work focuses on the collection of ID photographs and biopsy samples. Spatial coverage has mostly focused on the island of Vava'u, but has expanded considerably in recent years. In 2002, field work was conducted at three sites, as follows: Vava'u (25 working days), E'ua (8 working days) and Ha'apai (8 working days). Sightings of humpback whales were as follows: E'ua (20 sightings of 52 whales, with no calves); Ha'apai (47 sightings of 85 whales, including 3 calves); and Vava'u 76 sightings of 159 whales, including 32 calves. Nine individuals were re-sighted in E'ua, and 16 in Vava'u. There were no matches between the two areas. Samples for genetic analysis were obtained as follows: E'ua (17 sloughed skin in 10 encounters, representing fewer than 13 individuals); Ha'apai (20 sloughed skin in two encounters, representing fewer than 5 individuals); and Vava'u (70 biopsies and 6 sloughed skin). A biopsy sample was also obtained from a spinner dolphin. A sample of sloughed skin was obtained from an unidentified whale was determined from genetic analysis to be a dwarf minke whale (*Balaenoptera bonarensis* sp.). Other species encountered included spinner dolphins, bottlenose dolphins and pilot whales.

I. Visser (Orca Project) continues research on killer whales around New Zealand. Research uses photo-ID and both surface and underwater behavioural observations to investigate ecology and behaviour.

G. de Tezanos Pinto and R. Constantine (AU) continue ongoing research on bottlenose dolphins in the Bay of Islands. The primary aim of this research is to collect ongoing photo-identification data on the bottlenose dolphins that use the Bay of Islands as part of their home range. A total of 26 days of fieldwork have been undertaken in the Bay of Islands since March 2002. Three dolphins were added to the Bay of Islands bottlenose dolphin photo-ID catalogue. A digital version of this catalogue contains 553 high-resolution photographs from 397 individuals. This confirms that the Bay of Islands is an important area to this relatively closed population (Constantine 2002). During the research period 45 groups of bottlenose dolphins were encountered with group sizes ranging from 5 to 30 dolphins. These groups contained a cumulative total of 18 neonates, 60 calves and 19 juveniles. New PhD research on the genetics and demographics of the Northland bottlenose dolphin population was initiated in February 2003 and is being conducted by G. de Tezanos Pinto at the University of Auckland. This research aims to model demographic trends and investigate the genetic structure of bottlenose dolphins in Northland, and their relationship with other coastal populations in New Zealand. J. Berghan and R. Constantine continue research on bottlenose dolphins in the Hauraki Gulf. Preliminary analysis suggests that of the 102 individuals in the catalogue, at least 40% have a match in the Bay of Islands catalogue.

S. Ferreira and F. Jonker (DOC) are continuing research on Maui's dolphin on the west coast of the North Island. A population estimate based on aerial surveys constrained by availability and perception bias suggests that the population could be as small as 75 individuals (CI = 48–130). There is ongoing genetics work in conjunction with Auckland University with the key aspect being the determination of population size using a mark–recapture approach with genetic markers as the marking technique. During 2003 a pilot study was initiated to look at the feasibility of using Porpoise Detection Devices (PODs) to define the use of harbours by Maui dolphins along the west coast of the North Island. The conceptual framework is directed at establishing an 'acoustic fence' using PODs across the width of the harbour mouth entrance with a second 'acoustic fence' further inside the harbour. Analysis of time specific data may allow the determination of direction of movement and time spend inside the harbour. The pilot study is focused at calibrating the PODs and determining the feasibility of the concept.

A. Gormley (OU) assessed the appropriateness of applying mark–recapture techniques and photo-ID of natural markings to the problem of estimating the abundance of sperm whales in Kaikoura, bottlenose dolphins in Doubtful Sound and Hector's dolphins around Banks Peninsula. The current catalogue held by Otago University was used for analysis. In the case of Hector's dolphins, this was also the opportunity to compare the mark–recapture estimate against a previously obtained line-transect estimate.

C. Richter's (OU) 4-year study concluded that the current whale-watching effort of sperm whales at Kaikoura was sustainable yet recommended no further permits be granted at this time. Transient whales were found to be much more sensitive to disturbance than residents. The study concluded that resident whales react less and bear the majority of whale-watching activity. Reactions of the residents to whale-watching vessels varied significantly among different individuals. While these whale-watching effects on the resident whales are statistically detectable, there appears to be no serious biological consequences.

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