Cetacean research in New Zealand 2001

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ABSTRACT

This report summarises cetacean (i.e. whales and dolphins) research undertaken in New Zealand over the period April 2001 to March 2002 with statistical information for the 2001 calendar year. It covers cetacean research by a wide range of researchers including Government, University and non-governmental agencies and individuals. Information is presented on species studied, strandings, research projects undertaken, samples collected and references to the publications resulting from research. Data of 18 species, from 8 different institutions/agencies and 47 researchers are included. Although the report is comprehensive for work reported to Government in 2001, it does not include all cetacean research currently carried out in New Zealand.

1. Overview

The International Whaling Commission (IWC) is the international agency responsible for the 'conservation of whale stocks and the orderly development of the whaling industry' and has approximately 40 member nations including New Zealand (ICRW 1946). New Zealand has been a member of the IWC since its inception in 1946 (Friedheim 2001). One of the obligations of member nations is the provision of a National Progress Report on cetacean research annually to the IWC. Such reports include 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 for management of whaling. Over time, however, National Progress Reports have been modified to include the reporting of additional information such as levels of bycatch and data on dolphins. Until 1997, National Progress Reports were published in their entirety in IWC volumes; since then only a small summary of each full report is published by the IWC.

Childerhouse, S. 2002: Cetacean research in New Zealand 2001. *DOC Science Internal Series 87*. 18 p.

The National Progress Reports have been compiled annually by a Government official 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. Therefore, the reports presented here cover most but not all work undertaken in New Zealand. Only a small proportion of the active cetacean research in New Zealand has not been reported to the Government and hence has not been included in this document.

The present report, provided here as Appendix 1, updates a report which summarised cetacean research in New Zealand over the period 1997 to 2000 and which explained the format and sections of the report (Childerhouse & Donoghue 2002).

Compiling and publishing these reports aims to make the information accessible and useful as a tool in the management and protection of cetaceans in New Zealand. They provide a useful resource for identifying New Zealand-based research projects and for identifying researchers who are working on species or projects.

2. Acknowledgements

This project would not have been possible without the support of researchers who have provided summaries of their work over the years. The high quality and quantity of work reflected in this document is a tribute to the researchers. I thank all who made the effort to contribute and hope we will maintain this high standard in the future. I especially thank M. Donoghue for his support and guidance when compiling the report, and J. Jasperse for comments on the document.

3. References

Childerhouse, S.; Donogue, M. 2002: Cetacean research in New Zealand 1997–2000. *DOC Science Internal Series 46*. 48 p. Department of Conservation, Wellington.

Friedheim, R.L. (Ed.) 2001. Towards a sustainable whaling regime. University of Washington Press, USA, p. 382.

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Appendix 1

NEW ZEALAND PROGRESS REPORT ON CETACEAN RESEARCH, APRIL 2001 TO MARCH 2002, WITH STATISTICAL DATA FOR THE CALENDAR YEAR 2001

NEW ZEALAND PROGRESS REPORT ON CETACEAN RESEARCH, APRIL 2001 TO MARCH 2002, WITH STATISTICAL DATA FOR THE CALENDAR YEAR 2001

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This report summarises information obtained from: Auckland, Massey, and Otago Universities, Te Papa Tongarewa Museum of New Zealand, Department of Conservation, Ministry of Fisheries, New England Aquarium, National Institute of Water & Atmospheric Research Ltd (NIWA) , and independent researchers.

1. Species and stocks studied

Common name	Scientific name	Area/stock(s)	Items referred to
Andrews' beaked whale	*Mesoplodon bowdoini*	NZ	4.3
Beaked whales	Family *Ziphiidae*	NZ	9
Bottlenose dolphins	*Tursiops truncatus*	NZ	2.1.1, 2.1.2, 3.1.1, 4.1, 4.3, 9
Bryde's whale	*Balaenoptera edeni*	NZ	2.1.1, 2.1.2, 3.1.1, 4.3
Common dolphin	*Delphinus delphis*	NZ	2.1.1, 3.1.1, 4.2, 4.3, 7.1, 8
Dusky dolphin	*Lagenorhynchus obscurus*	NZ	4.2, 4.3, 7.1
Gray's beaked whale	*Mesoplodon grayi*	NZ	4.3
Hector's dolphin	*Cephalorynchus hectori*	NZ	2.1.1, 3.1.1, 4.1, 4.2, 7.1, 9
Humpback whale	*Megaptera novaeangliae*	Area V	3.1.1, 6.2, 9
Killer whale	*Orcinus orca*	NZ	2.1.1, 3.1.1, 4.1, 9
Longman's beaked whale	*Indopacetus pacificus*	NZ	9
Minke whale	*Balaenoptera acutorostrata*	Area V	2.1.1
Pygmy right whale	*Caperea marginata*	NZ	4.3
Pygmy sperm whale	*Kogia breviceps*	S. Hemisphere	4.3, 8
Southern right whale	*Eubalaena australis*	NZ	3.1.1, 4.1, 9
Sperm whale	*Physeter macrocephalus*	NZ	2.1.1, 3.1.1, 4.3
Strap-toothed whale	*Mesoplodon layardi*	NZ	4.3
Striped dolphin	*Stenella caeruleoalba*	NZ	4.3

2. Sightings data

2.1 Field work

2.1.1 Systematic

The second 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 (Dept of Conservation). Flights were undertaken along a predetermined track at monthly intervals, and whale sightings were logged on a GPS. Bryde's whales were present in inshore coastal waters in all months. Numbers increased in October through March, coinciding with increasing spring sea surface temperature. Associated species were common dolphins, bottlenose dolphins and killer whales. Gannets, petrels and dolphins associate with Bryde's whales in differing ratios when feeding, depending on food source. Calves have been sighted in summer, and a foetus was recorded in late December.

D. Neumann and M. Orams (Massey Univ.) have completed a 3-year investigation of the behaviour and ecology of short-beaked common dolphins. This includes collecting data on activity budgets, seasonal movements, feeding strategies, and interactions with swim-with-dolphin tourism using photo-ID and boat-based behavioural observations. The bulk of the study was conducted around Whitianga on the Coromandel Peninsula, and comparative observations were undertaken around Whakatane in the Bay of Plenty. 408 distinct individuals have been identified, 18 of them were resighted at some stage over the 3-year period. K. Stockin and M. Orams (Massey Univ.) continue research on common dolphins in the Hauraki Gulf investigating ecology and the impacts of tourism.

P. Ensor has been involved with the NILS 2001 and SOWER 2001/02 line transect research cruises investigating the distribution and abundance of whales, primarily minke.

C. Nichols, G. Stone (New England Aquarium) and A. Hutt (Dept of Conservation) completed the second field season in a 2-year project to observe Hector's dolphin behaviour around swim/tour boats from aboard the tour vessels, with simultaneous cliff-side theodolite observations in Akaroa Harbour. G.Stone, A.Yoshinaga (New England Aquarium) and A. Hutt also continued a mother/calf pair habitat use study in the Banks Peninsula area.

E. Slooten, S. Dawson, W. Rayment and H. Nollens (Otago Univ.) carried out an aerial survey 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 will be repeated in winter to quantify seasonal changes in distribution, and in the effectiveness of the sanctuary.

D. Lusseau, D. Rundgren, S. M. Lusseau and O. Boisseau (Otago Univ.) studied the population size, residency pattern, acoustic behaviour, diet and behavioural ecology of bottlenose dolphins in Fiordland. From January 2001 to January 2002 they spent 108 days in Doubtful and Milford on effort. In both fiords the impact of tourism activities on the resident populations was assessed and a study of the vocalisation pattern of bottlenose dolphins was made. Three Fiordland-wide distribution surveys were conducted from the research vessel *Malaika wai peponii*. Further investigation next year of vessel impacts will focus on assessing the impact of the research vessel using land-based observations. A new part of the project was started by S. Maersk (Otago Univ.) in January 2002 looking at the food web position of the dolphins in Doubtful Sound using carbon/nitrogen stable isotopes. Initial trials with taking skin scrapings, using a velcro pad, were abandoned due to difficulties of obtaining samples and the dolphins' responses to sampling. Trials with nets, sampling containers and pumps are underway to obtain faecal samples, and intestinal skin. It is also planned to develop a hydrophone array to assess spatial variations in vocalisations, 3-D movements and behaviour of dolphins.

S. DuFresne, S. Dawson and E. Slooten (Otago Univ.) continued an on-going program of photo-ID surveys of Hector's dolphin in the Banks Peninsula Marine Mammal Sanctuary. The primary objective is to provide a quantitative assessment of the effectiveness of the sanctuary by refining estimates of adult survival rates. It is expected that the study will be completed in late 2003.

S. Dawson and E. Slooten (Otago Univ.) collected skin samples from Hector's dolphins at Porpoise Bay (Southland) to provide information on population structure. F. Pichler and K. Russell (Auckland Univ.) will be carrying out the genetic analysis of these samples. S. DuFresne, D. Clement, E. Slooten and W. Rayment (Otago Univ.) wrote several reports summarising research data on Hector's dolphins, to inform decisions on mussel farming applications (see publications below).

A three-year project by D. Clement (Otago Univ.) continued to collect distribution and density data for Hector's dolphins in both the Banks Peninsula and Westport areas between April 2001 and April 2002. This study aims to compare the changing oceanography of the study areas with seasonal and inter-annual fluctuations in relative distribution and densities of dolphins to investigate high and low areas of use. Approximately 4228 km of perpendicular and alongshore line-transects were surveyed comprising 700 dolphin sightings and 830 oceanographic samplings.

Researchers from Otago University (C. Richter, M. Q. Rhinelander, N. Jaquet) continued their fieldwork on sperm whales off Kaikoura. C. Richter, S. Dawson and E. Slooten completed their study to assess the impact of current whale watching activities on sperm whales. Over four years (1998-2001), 1676 sightings from the research vessel and 435 from shore were recorded. Blow interval decreased in the presence of the research vessel and/or whale-watching platforms. Whale-watching boats and planes, individually or together, caused increases in time spent at the surface, the frequency and amount of heading changes, and in the case of boats, a decrease in the time to the first click. Behavioural changes were more severe in transient whales, which are probably less acclimatised to boats. Current whale-watching effort is high, in good weather on a typical summer's day, an individual resident whale is accompanied by one or more whalewatch boats for 40% of his surfacings in daylight hours. This research on the effects of whale watching is part of a wider ecological research program that uses oceanographic data collection, photographic identification, acoustics and photogrammetric measurements of whale length in order to study distribution, residency, habitat use, diving, foraging behaviour and vocal behaviour.

Aiming 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 New Zealand' South Island (Buller Region), Eduardo Secchi (Otago Univ.) has been collecting data on recreational set-net fishery through fishing diaries distributed to amateur fishers and by beach surveys. Data on commercial set-net fishing effort and distribution was obtained from records supplied by the Ministry of Agriculture and Fisheries (Wellington). Since March 2000, seasonal patterns of dolphin's distribution and density have been studied through systematic boat surveys. Two different sampling designs (one set of transects parallel to coast and another set of transects perpendicular to coast) were used to test for differences in

dolphin's distribution and density according to distance from shore on a seasonal basis. Almost 2000km of transect lines have been run. E. Secchi has also been carrying out a photographic identification study of Hector's dolphins in the Buller region. About 350 photos have been taken. All photographs of dolphins with conspicuous marks have been stored in a catalogue and will be compared with photos from the previous studies (by Stephan Bräger), which contain photos of dolphins from most of the West Coast (from 1994 to 1997). This will be used to investigate if Hector's dolphin have a highly clumped and restricted distribution or if they move through adjacent areas. The photos will also be used to complement studies on site fidelity.

E. Martinez (Otago Univ.) is investigating the effects of dolphin watching on Hector's dolphins at Motunau. The research uses clifftop observations (with a theodolite) and vessel based observations (including photo-ID) to study the movements and behaviour of Hector's dolphins in the presence and absence of boats. One of the aims is to compare results from Motunau with those previously gathered at Porpoise Bay. E.Green and E. Martinez (Otago Univ.) are also investigating the effects of dolphin watching on Hector's dolphins in Porpoise Bay, Catlins. They use clifftop (with a theodolite) and boat observations to study the movements and behaviour of Hector's dolphins in the presence and absence of boats and swimmers. The main aims are to compare results with data previously gathered at Porpoise Bay by Lars Bejder during the austral summers 1996/1996 and 1996/1997; and to provide the Department of Conservation with recommendations for the management of tourist activities.

2.1.2 Opportunistic, Platforms of Opportunity
K. Thompson (Auckland Univ.) carried out sighting surveys in the Hauraki Gulf (36°10'S to 36°60'S) on board the commercial whale watch vessel *Dolphin Explorer*. This study is investigating the local Bryde's whale population using photo-identification and behavioural observation. Thirty surveys (e.g. 150 hours of on-water effort) were conducted between 4 October 2001 and 15 March 2002. Twelve whales were sighted during eight encounters and a further 38 whales were sighted by Dolphin Explorer crew during 21 encounters. Of these, 47 whales were confirmed as Bryde's whales by direct observation and photography of lateral rostral ridges. Preliminary analysis of minimum residency times from animals seen at least twice during the sampling period (n = 6 of 12 identified individuals) suggest that whales spend periods of at least 20 days in the Gulf. Single animals were most frequently encountered (54%, n = 14 of 26). One mother-calf pair was seen during February/March 2002.

Ongoing photo-ID research on bottlenose dolphins, using the dolphin-tour boats as the research platform, continues in the Bay of Islands. J. Berghan and R. Constantine (Auckland Univ.) have continued to take photographs on an opportunistic basis and there have been 18 new dolphins photo-identified during the past year. Further work by R. Constantine found that this population ranges along the north-eastern coast of the North Island between Doubtless Bay and Tauranga. Comparison of the catalogue to bottlenose dolphin images from the Marlborough Sounds (taken by S. Brager, R. Constantine, and I. Visser) suggests that this is an isolated population. A closed population estimate found there are 446 (95% CI 418-487) dolphins that use the Bay of Islands as part of their home range, although no dolphins are resident in the Bay of Islands. J. Berghan and A. Fleming (Dept of Conservation) continue to monitor the type and duration of vessel contact with bottlenose dolphins in the Bay of Islands.

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/insititute
Bottlenose dolphin	Fin/body	Doubtful Sound	1990-2002	Yes	83	D. Lusseau/ Otago Univ.
Bottlenose dolphin	Fin/body	Milford Sound	2000-02	Yes	50	D. Lusseau/ Otago Univ.
Bottlenose dolphin	Fin/body	Bay of Islands	1993-2002	Yes	392	R. Constantine/ Auckland Univ.
Bryde's whale	Fin/body	Hauraki Gulf	2001/02	Yes	>20	K. Thompson/ Auckland Univ.
Common dolphin	Fin/body	Whitianga/ Whakatane	1998-2001	Yes	408	D. Neumann/ Massey Univ.
Hector's dolphin	Fin/body	North I.	1998-2002	Yes	34	K. Russell/ Auckland Univ.

Hector's dolphin	Fin/body	East South I. West South I.	1984-2002 1994-97, 2001-2002	Yes	500	E. Slooten/ Otago Univ.
Humpback whale	Fluke	Area V	1991-2002	Yes	440	R. Constantine, C. S. Baker/ Auckland Univ.
Humpback whale	Fluke	New Zealand	1995-2002	Yes	6	R. Constantine/ Auckland Univ.
Killer whale	Fins/saddles/ eye patches	New Zealand	1993-2000	Yes	117	I. Visser/ The Orca Project
Killer whale	Fins/saddles/ eye patches	Area V	2001	Yes	11	C. Olavarría/ Auckland Univ.
Southern right whale	Callosities/ lip lines	Area V	2001	Yes	2	C. Olavarría/ Auckland Univ.
Southern right whale	Callosities/ lip lines	NZ sub-antarctic	1995-99	Yes	402	N. Patenaude/ Auckland Univ.; B. Todd/ Project Tohora
Sperm whale	Fluke	Kaikoura	1990-2002	Yes	190	E. Slooten/ Otago Univ.

3.1.2. Artificial Marking Data
None

3.1.3 Telemetry Data
None

4. Tissue/biological samples collected

4.1 Biopsy samples

Species	Area/stock	Calendar year/ season no. collected	Archived	No. analysed	Total holdings	Contact person/institute
Bottlenose dolphin	NZ	9	No	0	9	D. Neumann/ Massey Univ.; K. Russell/ Auckland Univ.
Hector's dolphin	NZ	24	Yes	23	116	K. Russell, F. Pichler/ Auckland Univ.
Hector's dolphin	Porpoise Bay	21	Yes	0	?	E. Slooten, S. Dawson/Otago Univ., K. Russell, F. Pichler/ Auckland Univ.
Killer whale	Area V	1	Yes	0	1	C. Olavarría/ Auckland Univ.
Southern right whale	Area V	1	Yes	0	1	C. Olavarría/ Auckland Univ.

4.2 Samples from directed catches or bycatches

Species	Area/stock	Calendar year/ season total	Archived	Tissue type(s)	Contact person/institute
Common dolphin	NZ	10	Yes	Skin, blubber, fixed tissues, skeletons	P. Duignan/ Massey Univ.
Dusky dolphin	NZ	3	Yes	Skin, blubber, fixed tissues, skull	P. Duignan/ Massey Univ.
Hector's dolphin	NZ	23	Yes	Skin, blubber, fixed tissues, skeletons	P. Duignan/ Massey Univ.; A. van Helden/ Museum of NZ

4.3 Samples from stranded animals

Species	Area/stock	Calendar year (total)	Archived	Tissue type(s)	Contact person/institute
Andrews' beaked whale	NZ	1	Yes	Skin, blubber	M. Dalebout/ Auckland Univ.
Bottlenose dolphin	NZ	1	Yes	Skin, blubber	D. Steel & M. Dalebout/ Auckland Univ.
Bottlenose dolphin	NZ	1	Yes	Skin, blubber, fixed tissues	P. Duignan/ Massey Univ.
Bryde's whale	NZ	1	Yes	Skin, blubber	D. Steel & M. Dalebout/ Auckland Univ.
Common dolphin	NZ	5	Yes	Skin, blubber	D. Steel & M. Dalebout/ Auckland Univ.
Common dolphin	NZ	3	Yes	Skin, blubber, fixed tissues	P. Duignan/Massey Univ.
Dusky dolphin	NZ	4	Yes	Skin, blubber	D. Steel & M. Dalebout/ Auckland Univ.
Dusky dolphin	NZ	1	Yes	Skin, blubber, fixed tissues	M. Dalebout/ Auckland Univ.
Gray's beaked whale	NZ	6	Yes	Skin, blubber	M. Dalebout/ Auckland Univ.
Gray's beaked whale	NZ	1	Yes	Skin,blubber	M. Dalebout/ Auckland Univ.; P. Duignan/ Massey Univ.
Pygmy right whale	NZ	2	Yes	Skin, blubber, fixed tissues	P. Duignan/ Massey Univ.
Pygmy sperm whale	NZ	1	Yes	Skin, blubber	D. Steel & M. Dalebout/ Auckland Univ.
Pygmy sperm whale	NZ	8	Yes	Skin, blubber, fixed tissues	P. Duignan/ Massey Univ.
Sperm whale	NZ	1	Yes	Skin, blubber	D. Steel & M. Dalebout/ Auckland Univ.
Strap-toothed whale	NZ	3	Yes	Skin, blubber	M. Dalebout/ Auckland Univ.
Strap-toothed whale	NZ	1	Yes	Skin, blubber, fixed tissues	P. Duignan/ Massey Univ.
Striped dolphin	NZ	2	Yes	Skin, blubber	D. Steel & M. Dalebout/ Auckland Univ.
Striped dolphin	NZ	3	Yes	Skin, blubber, fixed tissues	P. Duignan/ Massey Univ.

4.4 Analyses/development of techniques
None.

5. Pollution studies
None.

6. Statistics for large cetaceans
6.1 Direct catches (commercial, aboriginal and scientific permits) for the calendar year 2001
None.

6.2 Other non-natural mortality for the calendar year 2001
R. Constantine (Auckland Univ.) compiled reports of two humpback whales entangled in crayfish pots in June 2001. One whale was off the Kaikoura Peninsula and the other was to the north of Kaikoura. One whale was entangled by its pectoral fin and was cut free by a local whale-watching boat. The other whale was more severely entangled, with a line wrapped around its rostrum and peduncle, but this was also cut free by a local fisherman. Both whales were released alive.

6.3 Earlier years' statistics
No amendments.

7. Statistics for small cetaceans
7.1 For the calendar year 2001

		Directed catch		Incidental mortality			Live-capture
Species	Area/stock	Reported	Est. total	Reported	Est. total	Source	Reported
Common dolphin	New Zealand	Nil	Nil	3 [a,b]	?	Gillnet/ Trawl	Nil
Dusky dolphin	New Zealand	Nil	Nil	3 [a,b]	?	Trawl	Nil
Hector's dolphin	North Island, West Coast	Nil	Nil	3 [b]	?	Gillnet	Nil
Hector's dolphin	South Island, West Coast	Nil	Nil	6 [b]	?	Gillnet	Nil
Hector's dolphin	South Island, East Coast	Nil	Nil	4 [b]	?	Gillnet	Nil

[a] *details provided by R. Blezard, Dept of Conservation and S. Baird, NIWA from data collected by Scientific Observer Programme of Ministry of Fisheries,*
[b] *details provided by N. Gibbs, Massey Univ. from data collected from Carcass Recovery Programme of Dept of Conservation*

7.2 Earlier years' statistics
No amendments.

8. Strandings
A. van Helden (Te Papa Tongarewa Museum of NZ) maintains the NZ stranding database on behalf of the Dept of Conservation and the national marine mammal collection. The total number of reported strandings for this period is 59 incidents involving 70 animals. This total excludes strandings that have been reported but for which stranding data forms have not been received by the Te Papa Tongarewa Museum of New Zealand before the end of March. At least 16 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: *Balaenidae* 3.4%, *Balaenopteridae* 3.4%, *Ziphiidae* 11.7%, *Delphinidae* 57.6%, *Physeteridae* 23.7%. The representation in number of animals for the different families that stranded in this period are: *Balaenidae* 2.9%, *Balaenopteridae* 2.9%, *Ziphiidae* 10.0%, *Delphinidae* 64.3% and *Physeteridae* 20.0%. The species with the highest incidents of strandings were Common dolphins with 14 incidents and Pygmy sperm whales with 13 incidents. The largest number of animals of a species to strand was 21 for Common dolphins. The total number of animals refloated for this period was 12, of which 2 restranded and died, therefore 10 are presumed to have survived.

P. Duignan and N. Gibbs (Massey Univ.) continue to autopsy stranded cetaceans and/or those killed in fishing operations to determine cause of death, disease, and investigate biology.

9. Other studies and analyses
R. Constantine (Auckland Univ.) continues to collate fluke photos of humpback whales in the New Zealand region. Fluke photos of three humpback whales were taken off Kaikoura in June 2001 and another fluke photo taken in 1995 was also supplied. Two whales photographed off New Zealand have been matched to whales photographed in New Caledonia (catalogue curated by C. Garrigue) but no further matches have been made to photos from other areas of Oceania (catalogues curated by members of the South Pacific Whale Consortium).

M. Dalebout (Auckland Univ.) completed her PhD dissertation entitled, "Species identity, genetic diversity and molecular systematic relationships among the Ziphiidae (beaked whales)". A brief summary of the findings of this research follows. A reference database of mitochondrial DNA sequences was compiled for all 20 recognised ziphiid species to aid in species identification. All reference sequences were derived from validated specimens, which were often represented only by bone or teeth. For three species, holotypes were sampled. Phylogenetic analyses using this database led to the discovery of a new, previously unrecognised species of beaked whale (Dalebout *et al.* 2002), new specimens of Longman's beaked whale (*Indopacetus pacificus*, a species known previously from only two partial skulls) and the synonymy of a third (*M. traversii = M. bahamondi*; see also van Helden *et al.* (2002). Phylogenetic reconstructions based on sequence data from three mitochondrial and two nuclear loci (total 2815 bp) using neighbour-joining, parsimony, and maximum likelihood methods, resolved many of the sister-species relationships in

this group. Inferred relationships among *Mesoplodon* beaked whales indicated that cranial and tooth morphology may be far more variable between closely related species than previously assumed. It is suggested that the geographic distribution of *Mesoplodon* species with similar or divergent tooth morphology is likely to be due to a combination of sexual selection and selection for species recognition. Investigation of mtDNA diversity among a number of beaked whale species indicated that nucleotide diversity was generally lower in this group than in other wide-ranging oceanic cetaceans. The cause of this low diversity was not clear but may be indicative of overall low abundance. Particularly low levels of diversity were found in Baird's beaked whale *Berardius bairdii*, Arnoux's beaked whale *B. arnuxii* and the northern bottlenose whale *Hyperoodon ampullatus*. Strong geographic structure in haplotype frequencies was observed among a worldwide sample of Cuvier's beaked whales *Ziphius cavirostris*.

N. Patenaude (Auckland Univ.) completed her PhD dissertation entitled, "Demographic and genetic status of southern right whales at the Auckland Islands, New Zealand". The distribution of southern right whales at the Auckland Is was restricted to waters surrounding Port Ross where up to 165 whales could be found on a single day. The yearly winter presence of a large number of whales, the presence of mothers and calves, and the frequency of social groups confirm that the Auckland Is are a primary wintering habitat and calving ground for southern right whales in New Zealand waters. Of 30 southern right whales photo-identified at Campbell Is, four showed within- and/or between-year movements with the Auckland Islands suggesting that right whales from both island groups are part of one intermingling sub-Antarctic population. The New Zealand sub-Antarctic stock was estimated at 936 whales (95% C.I. 740-1140), including 330 reproductive females, based on capture-recapture analysis using natural markings. Significant mitochondrial DNA differentiation (FST = 0.14150; FST= 0.23701; $p < 0.001$) among four wintering southern right populations (South Africa, Argentina, Western Australia and sub-Antarctic New Zealand) suggested low levels of interchange, limited largely to adjacent populations within ocean basins. The historical abundance of New Zealand southern right whales was estimated at between 15000 and 17000 using historical catch records and a deterministic density-dependent demographic model. Genetic modeling of the impact of past whaling suggested that the current low mtDNA diversity of the New Zealand southern right whale is likely the outcome of a severe and prolonged bottleneck. The recent illegal Soviet whaling, although brief, hindered the demographic and genetic recovery of this population.

K. Russell (Auckland Univ.) collected a total of 24 biopsy samples from North Island Hector's dolphins during the summer of 2000/01. Amplification and sequencing of the mtDNA control region revealed only the single haplotype reported previously by Pichler & Baker (2000). The sex ratio of the sampled animals was approximately equal. A set of 20 microsatellites has been screened for potential use in DNA profiling for individual identification. Continued collection of photographs confirmed that the number of distinctively marked individuals in this population is low, without only an additional six dolphins added to the catalogue in the past 12 months. The rate of public sighting reports increased during 2000/2001, as has the incidence of beachcast animals. In the last 12 months, six Hector's dolphins have been found beachcast along the West Coast of the North Island. Information on each of these animals has been added to the Stranding Database. A North Island Hector's dolphin sighting network has been operating since 1997 in conjunction with Dept of Conservation. In November 2000, WWF-NZ became active in soliciting public sighting reports by the implementation of a 0800 hotline to report sightings. All sighting reports are forwarded to K. Russell and added to the sighting log, a total of 68 in the past year.

K. Russell, R. Constantine, C.S. Baker, C. Olvarría (Auckland Univ.) and M. Donoghue (Dept of Conservation) continued ongoing humpback whale research around the island group of Vava'u, the Kingdom of Tonga. This was the 9th year of research in this region. Research was undertaken during part of the austral winter. Over the 33-day research period, 117 groups of whales were encountered equating to a total of 271 whales (cumulative figures). Photographs and/or biopsies were obtained from all but seven encounters. A total 81 individual fluke identification photographs were added to the Tonga Humpback whale catalogue this season. Biopsy samples were collected from 86 whales, of these 12 were slough skin samples and 74 were biopsy samples. All the samples were successfully extracted. Sequencing for the control region of mtDNA has been undertaken and the results are currently in the process of analysed. Of the 81 whales identified from fluke photographs, eleven were also biopsied and their sex was determined and added to the photo-ID catalogue. Fourteen recording of humpback whale song were obtained during the field season. For each animal an entire cycle of its song was recorded, this equates to 560 minutes of song.

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.

Preliminary results of D. Clement (Otago Univ.) confirm earlier research on seasonal changes in the offshore distribution of Hector's dolphins. Of sightings made out to four nautical miles off Banks Peninsula, 92% were within 1 nautical mile (1.853 km) from shore during summer. During the colder winter months this drops to 59% and

dolphins are more commonly seen along or outside the Sanctuary's (4 nautical mile) offshore boundary. Seasonal differences in sighting rates suggest that the Sanctuary protects less than 23% of the population during the winter months. Aerial surveys would be conducted the coming winter, specifically designed to provide data on the proportion of the population that is found within the sanctuary boundaries.

Preliminary analysis by D. Clement (Otago Univ.) of summer abundance and distribution data from the 1980s and 1990s has revealed "hotspots" of Hector's dolphin density around the South Island. These analyses also yielded localised dolphin "hot spots" around Banks Peninsula and random sub-sampling of the sixteen-year dataset helped determine the consistency of these summer "hot spots" over time. The results, if they remain consistent during the current studies, indicate that the dolphins have consistent preferences for specific areas around the Peninsula.

E. Fordyce (Otago Univ.) has been carrying out studies on the comparative osteology and cranial anatomy of bottlenose dolphins, using skeletons at the National Museum of Natural History, Smithsonian Institution.

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