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Marine Mammals Within Gisborne District Coastal Waters





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Deanna Clement

Prepared for Gisborne District Council

Cawthron Institute 98 Halifax Street East, Private Bag 2 Nelson, New Zealand Ph. +64 3 548 2319 Fax. + 64 3 546 9464 www.cawthron.org.nz

Reviewed by: Robyn Dunmore

Approved for release by:

Rowan Strickland

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EXECUTIVE SUMMARY

The Gisborne District Council (GDC) is in the process of reviewing provisions regarding natural heritage for their Regional Coastal Environment Plan, one of which is to identify the presence of any valuable indigenous marine mammal populations. GDC contracted Cawthron Institute to collate and review all available records of marine mammal species that might reside or migrate along the North Island's central and southern coastal waters, specifically focusing on GDC's territorial waters. These records were used to create species sighting maps and identify any potentially important habitat regions and/or migration routes.

New Zealand is unique in that its landmass sits over two major oceanic convergence zones and serves as one of the main southern migratory corridors for marine mammal species that travel to and from Antarctic regions. As a result of this position, more than half of all the known cetaceans (whales, dolphins and porpoises) and pinnipeds (seals and sea lions) species live or migrate through New Zealand waters. At least 25 cetacean and two pinniped species have stranded or been sighted within Gisborne District coastal regions alone.

Marine mammals have been opportunistically sighted throughout GDC's territorial waters, most generally within inshore regions near East Cape and Gisborne or over the continental shelf break (*c*. 150m isobath) and near offshore trenches; areas visited often by many different recreational and commercial activities. Numerous sightings of different marine mammal species around East Cape and associated waters are not surprising due to its headland nature, complex mixture of strong currents and persistent eddies, and proximity to the productive waters of the Ranfurly Banks and Kermadec Trench. Stranding records were reported along the entire coastline, but most occurred near Gisborne and northern Mahia Peninsula.

More than half of all opportunistic sightings were reported over the warmer summer and autumn months. However, as noted below, it is difficult to separate any fine-scale, seasonal trends in species' movement within GDC waters from seasonal trends in human marine activities. Instead, the species found to frequent GDC waters were defined into three broad-scale categories ("residents", "migrants" or "visitors") that describe their general distribution patterns and any seasonal trends within this particular region. Species defined as "residents" were those that regularly utilise (either remaining to feed and/or breed) GDC and nearby waters either permanently (year-round) or for regular time periods (seasonally). Known residents of GDC waters include common dolphins, New Zealand fur seals, orca (killer whales) and bottlenose dolphins, while potential offshore residents are long-finned pilot whales, pygmy sperm whales and at least three species of beaked whales.

East Cape also appears to serve as an important migration landmark for several migrant species. "Migrants" are those species that travel through part of GDC and surrounding waters, remaining for only short or temporary time periods that may be predictable seasonally. Southern right, humpbacks, minke and sperm whales appear to use East Cape, and to a lesser extent Mahia Peninsula, to navigate along New Zealand's east coast on both their northern and/or southern migrations. Alternatively, GDC waters mark the most northern range of other species, like dusky dolphins and leopard seals, which tend to migrate from southern regions to GDC's warmer waters over the colder winter months. For migrating female southern right whales, the waters between Mount Maunganui and Napier are a destination as this area is currently considered the species' primary winter calving habitat.

The other remaining species sighted or stranded within GDC waters are considered "visitors". Visiting species were those marine mammals that may wander into GDC and surrounding waters intermittently, depending on GDC's proximity to the species' normal distribution range.

No specific, fine-scale breeding habitats were evident from the available data, with the exception of New Zealand fur seals. However at least two other species are known, or strongly suspected, of using GDC waters as one of their main breeding and/or nursery grounds. These species include southern right whales and pygmy sperm whales. However based on sightings and stranding records from neighbouring Hawke's Bay waters, it seems calf presence within GDC may be underestimated by current sighting records. Other species sighted or stranded with calves, mainly from October to July, include common dolphins, orca, sperm whales, beaked whales, false killer whales, long-finned pilot whales and dusky dolphins.

Specific feeding habitats could not be identified for any particular species. However in general, feeding animals were mainly observed in deeper waters along the shelf break, near the Hikurangi Trench off Gisborne or within East Cape and Ranfurly Bank waters.

The GDC intends to utilise this review, along with information on indigenous marine fauna, when assessing applications for land use and coastal permits for activities adjacent to the coastal marine area to ensure sustainable management of coastal resources. New Zealand marine mammals have the highest percentage (16.7%) of species under threat after seabirds within New Zealand coastal waters due mainly to human-related factors (State of Environment 2007). Modern anthropogenic activities that are likely to affect marine mammals include coastal development, coastal and offshore aquaculture, coastal pollution, marine traffic, marine tourism and fishing. This review of marine mammal populations residing or migrating through GDC's and neighbouring waters describes the general distribution and broad-scale regional habitat use of these populations in the absence of more scientifically rigorous data. For more site-specific information concerning future coastal consent or permit applications, more scientifically rigorous and fine-scale data would need to be collected in order to ensure no adverse effect on New Zealand's marine mammals.

Note: most of the sightings and strandings used in this review were opportunistic (*e.g.* Department of Conservation database, public sightings, tourism reports, fisheries' observers *etc.*) and did not involve systematic searches nor accounts of search effort. Without specific effort information, statistically valid assessments of species' abundance or concentrations within a particular area are not possible. Instead, the locations and the time of year that most opportunistic sightings are recorded may reflect a closer proximity to larger towns or harbours and/or where the majority of coastal activities (*e.g.* tour boats, commercial and recreational fishing, diving *etc.*) tend to occur. Hence the distribution and commonality inferences for species described in this review are subject and expected to change with time and more scientific information.



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1 INTRODUCTION

1.1 New Zealand's marine mammals

Out of the more than 84 species of cetaceans (whales, dolphins and porpoises) and 36 species of pinnipeds (seals and sea lions) known to exist world-wide, over 50 of these different species live or migrate through New Zealand waters. Collectively called marine mammals, these species are highly mobile, exhibiting home ranges of hundreds and thousands of square kilometres. The two main factors defining the distribution patterns of marine mammal species are thought to be the position of the land (and its surrounding shelf) and water temperature (Martin & Reeves 2002).

New Zealand sits within one of the main southern migratory corridors for marine mammal species that travel to and from the rich, summer feeding grounds in Antarctic regions to warmer tropical-temperate breeding grounds over winter. The landmass itself is unique in its orientation and the fact that it straddles two convergence zones; one between warmer tropical and sub-tropical waters to the north and the other between sub-tropical with cooler sub-Antarctic waters to the south (Figure 1). As a result of this position, a handful of tropical and/or sub-Antarctic species may frequent New Zealand waters, especially the North Island's east coast, in addition to the numerous temperate marine mammal species already present.



Figure 1. The blue area surrounding New Zealand is sub-tropical water (STW 8-20°C) and the red lines represent the main currents. These waters are bounded to the north by the Tropical Front (TF) and to the south by the Sub Tropical Front (STF). Note the complex currents along the south-eastern coast of the North Island. SAW = Sub-Antarctic Water (from National Institute of Water and Atmospheric Research).



1.2 Scope

The Gisborne District Council (GDC) is in the process of reviewing provisions regarding natural heritage for their Regional Coastal Environment Plan. In order to identify the presence of any valuable indigenous populations, GDC commissioned Cawthron Institute to undertake a review of marine mammal species, and any important habitat regions, within their coastal waters.

New Zealand marine mammals have the highest percentage (16.7%) of species under threat after seabirds due to human-related factors (State of Environment 2007). Modern anthropogenic activities that are likely to affect marine mammals include coastal development (port and harbour development, dredging, coastal reclamation, marine energy generation), coastal and offshore aquaculture, coastal pollution (wastewater discharge, land development), marine traffic (boat strikes, acoustic disturbance from underwater noise), marine tourism and fishing (incidental bycatch, direct/indirect ecosystem effects).

GDC intends to utilise this review, along with information on other indigenous marine fauna, when assessing applications for land use and coastal permits and land use permits for activities adjacent to the coastal marine area to ensure sustainable management of coastal resources. The resulting information will ensure future decisions about coastal use and development (*e.g.* for subdivision, recreation, energy transmission, aquaculture *etc.*) within GDC waters do not have an adverse effect on New Zealand's marine mammals. In addition, the Department of Conservation is also interested in using this information for assessing the management of Te Tapuwae O Rongokako Marine Reserve.

The scope of this review was to collate all available records of marine mammal species that might reside or migrate along the North Island's central and southern coastal waters, specifically focusing on GDC's territorial waters. Sighting and stranding records were used to create species sighting maps and identify any potentially important habitat regions and/or migration routes. Supplementary profiles of the different species were then compiled, describing any relevant distribution and abundance patterns, life-history dynamics and listing the species' current conservation status world-wide and within New Zealand waters. Profiles were used to summarise species into one of three residency categories that illustrates their distribution patterns within GDC waters.

1.2.1 New Zealand whale stranding database

Detailed information on abundance and distribution patterns is only available for a handful of New Zealand's marine mammals, despite recent advances in survey techniques and large-scale improvement in data quality from remote sensing technology. Much of the information that is known has come from marine mammal strandings –a dead or live marine mammal that washes on to the shore and is unable to return by itself.

In 1988, the New Zealand Whale Stranding Database (NZWSDB) was established by the Department of Conservation and Museum of New Zealand (Te Papa), who are responsible for the recording of all marine mammal strandings. The first recorded whale stranding was in 1840, however, such records are scant and often concealed among museum and whaling records or newspaper articles. It was not until the Marine Mammals Protection Act was ratified in 1978 that it became the legal obligation of the government to record all strandings (Brabyn 1990). Brabyn's (1990) analysis of the stranding database found that the distribution of single –dead strandings was a good indicator of a species' natural distribution range.

1.2.2 Department of Conservation Marine Mammal Sighting database

Since the 1970s, the Department of Conservation has also collected public sightings of marine mammals around New Zealand. Only within the last decade has this sighting database been managed and expert sightings from commercial observers, ecotourism and some researchers been included more regularly. As such, sightings are opportunistic and do not involve systematic searches nor accounts of search effort. Without search effort information, statistically valid assessments of species' abundance or concentrations within a particular area are not possible. Instead, most sighting locations and the time of year that they are recorded will often reflect a closer proximity to larger cities or towns and/or where the majority of coastal activities (*e.g.* tour boats, commercial and recreational fishing, diving *etc.*) tends to occur.

Despite this bias, the long-term and repetitive nature (*i.e.* multiple sightings of the same group) of this sighting database makes it possible to draw conclusions about general distribution and regional habitat use in the absence of more scientifically rigorous data by comparing it with the stranding database and other historical records. In addition, the review attempted to validate any GDC sighting results with those in neighbouring regions.

2 NORTH ISLAND'S SOUTH-EASTERN COAST

Over 1348 separate marine mammal sightings and 677 stranding events have been reported along the North Island's south-eastern coastline, from Cape Colville (Coromandel) to Cape Palliser (southeast of Wellington – Figure 2A). Sightings ranged from one individual animal up to 1000 animals, and strandings numbered from one animal to 100s. It is important to note that each reported sighting does not necessarily represent unique animals. One group of animals may be reported by several different boats during the same day or even consecutive days as the group travels along the coastline. Consequently, the number of sightings in an area does not equate to the number of animals known to occur there.

Most sightings were reported around inshore islands within the south-eastern Bay of Plenty and throughout the northern coast of East Cape. Strandings were more evenly spread along the entire coastline. Historically Mahia Peninsula (particularly Opoutama Beach), Napier and to a lesser extent Te Kaha are particular hotspots for strandings (Brabyn 1990).

Around 60% of all sightings in these regions are of common dolphins (*Delphinus delphis*) and over half of all strandings are by pygmy sperm whales (*Kogia breviceps* - 34%) or various species of beaked whales (Ziphiidae - 25%). However, even when these species are excluded from the database results, similar patterns in distribution are still prevalent (Figure 2B).

The most notable cluster is the inshore regions of the Bay of Plenty. The large number of reported sightings in this particular area is most likely a reflection of the number of marine tour companies operating within the vicinity of Whakaari (White) Island and Moutohora (Whale) Island, several of which advertise marine mammal tours and swims. On the other hand, historical records note the general frequency in which several whale species regularly occurred close to shore to feed and rest, as evident by the large number of small whaling stations (~17) maintained along this short stretch of coastline during the 19th and early half of the 20th century (Dawbin 1956).

The cluster of sightings around East Cape waters is not surprising due to its headland nature, complex mixture of strong currents and persistent eddies and its proximity to the Kermadec Trench (Figure 1). Headlands are generally known to be highly productive regions (*e.g.* Pingree *et al.* 1978; Mann & Lazier 1991). Combined with the highly dynamic East Cape Current running past and offshore, the resulting currents may create a more prolific area than other nearby coastal regions. Garner (1959), and later Heath (1975), noted the frequent occurrence of upwellings between East Cape and Ranfurly Banks due to this southward current against these shelf edge regions. Upwelling events involve cooler, mid to bottom waters being forced to the surface and displacing warmer surface waters. Coastal upwelling events along New Zealand's east coast waters occur more often in the late spring and summer months, when more favourable strong weather conditions tend to prevail (Garner 1959; Carter & Herzer 1979).

In addition, the boundary region where the East Cape Current meets the Southland Current is situated between Cook Strait and Cape Turnagain however, the exact location tends to meander seasonally (Figure 1). A tongue of the East Cape Current is known to flow as far south as the Mernoo Saddle (east of Banks Peninsula on the South Island) in winter and early spring (Shaw 1998), while sub-tropical waters from the Southland Current generally push into lower east coast waters over some summer and autumn (Garner 1961). As with wind or current-forced upwellings, converging water masses tend to bring deeper waters to the surface. The cooler, upwelled waters often carry suspended nutrients and sediments to the surface with them, creating a productive opportunity for phyto- and zooplankton and their predators. Consequently, the aggregation of marine mammals visiting or travelling through this region may be strongly influenced by its unique oceanographic and biological productivity.



Ν

Selected Marine Mammal Strandings

Selected Marine Mammal Sightings

Gilometres

120

100m Isobath

80

150m

--- 175m

- 200m

0 20 40



Figure 2. The distribution of strandings and sightings between Cape Colville and Cape Palliser of A) all marine mammals, and B) all sightings, excluding common dolphins and all strandings, excluding pygmy sperm whales and beaked whales.



3 MARINE MAMMALS WITHIN GDC WATERS

As most marine mammal species regularly travel large distances (100 to 1000 km), any regional development plans need to take into account how these species might be using GDC's coastline in relation to neighbouring areas. For instance, humpback whales are known to migrate through GDC waters. While this species may be considered only a seasonal migrant to the GDC coastline, this particular stretch of water may provide an important corridor that these animals use to locate or travel to important habitats, such as resting or feeding grounds in Bay of Plenty. Hence, all discussions of species distributions include their possible movement patterns to the north (*e.g.* Coromandel, Bay of Plenty) and south (*e.g.* Hawke's Bay, Wellington) of GDC's coastal area

3.1 General findings

At least 25 cetacean and two pinniped species have stranded or been sighted within Gisborne District coastal regions. All of the 197 recorded marine mammal sightings have been reported within the last 10-20 years while the 109 strandings events date as far back as 1881 and 1912.

Cetacean sightings occurred throughout inshore and offshore regions of GDC territorial waters, but were generally more frequent around East Cape and Gisborne or within deeper waters associated with the continental shelf break (*c.* 150 m isobath) and offshore trenches (Hikurangi Trench and Kermadec Trench – Figure 3A). Strandings were spread along the coastline, but over half occurred near Gisborne or northern Mahia Peninsula (Figure 3A).

Without more detailed surveys, no specific breeding grounds were evident with the exception of New Zealand fur seal breeding colonies. However, at least two species are known, or strongly suspected, of using GDC waters as one of their main breeding and/or nursery grounds. These species include southern right whales and pygmy sperm whales. Most marine temperate species give birth just before or during the warmer months of the year (*e.g.* early spring to late autumn). This trend is also seen in most New Zealand marine mammals and may account for the timing of calf sightings along the GDC coastline. Other species observed with calves over the main breeding season (October to July), included only common dolphins and orca. Calves were present within 7% of sightings in GDC waters, a higher rate than the 2% reported for the Cape Colville to Cape Palliser coastal area.

Only four strandings in GDC waters involved calves, occurring between Gisborne and Mahia Peninsula. However, at least 49 strandings with calves were recorded nearby in Hawke's Bay waters between Mahia Peninsula and Cape Kidnappers (mainly over summer and autumn months), suggesting calf presence in GDC waters might be underestimated in the stranding and sighting databases. Species that stranded with calves were pygmy sperm whales, sperm whales, beaked whales, false killer whales, long-finned pilot whales, dusky dolphins and common dolphins.





Figure 3. A) The distribution of all reported marine mammal strandings and sightings within Gisborne District coastal waters. B) The distribution of all marine mammals in GDC waters with highlighted sightings (blue circles) representing locations of observed feeding behaviour. Note the pink shaded area representing the extent of GDC territorial waters (12 nautical miles).

Of those cetacean sightings in which the animals' behaviour was noted, the vast majority of animals were either travelling or playing. Approximately 14% of sightings were observed or thought to be feeding. Feeding animals were mainly observed in deeper waters along the shelf break and/or Hikurangi Trench off Gisborne or within East Cape and Ranfurly Bank waters (Figure 3B). The occurrence of several deeper water species that have a diet centred on cephalopods (squid and octopus) suggests GDC's offshore regions may potentially serve as productive, deep-water feeding grounds.

No strong, overall seasonal pattern in species' movements was found. However, more than half of all opportunistic sightings occurred over the warmer summer and autumn months. Stranding events were reported year-round. As noted earlier, it is difficult to separate any fine-scale, seasonal trends among opportunistic data from seasonal trends in human marine activities, for example a general increase in recreational boating and marine sports over summer months. Instead, broad-scale evidence of general distribution patterns, and any associated seasonal trends, were analysed separately for each species. Species were then grouped into residency categories that generally described their distribution and seasonal trends within GDC waters (see next section).

3.2 Species residency patterns within GDC and neighbouring waters

Until more systemic and dedicated surveys are completed, species residency and general movement patterns within GDC waters can only be estimated from opportunistic sightings and strandings (*e.g.* DoC database), tourism and fisheries reports and any past/present research in nearby areas. As such, any discussions about specific habitat use and/or fine-scale analysis of distribution within a specific area (*i.e.* marine reserves) can only be assessed at a general and usually fairly broad scale. Hence the distribution and commonality inferences for species described below are subject and expected to change with time and more information.

The marine mammal species found to frequent GDC and neighbouring waters have been defined into three main categories that describe their distribution trends within this particular region only.

- Resident a species that lives (either remaining to feed and/or breed) within GDC and surrounding waters either permanently (year-round)) or for regular time periods (seasonally).
- Migrant a species that travels through part of GDC and surrounding waters, remaining for only short or temporary time periods that may be predictable seasonally.
- Visitor a species that may wander into GDC and surrounding waters intermittently, depending on GDC's proximity to the species' normal distribution range; visits may occur seasonally, infrequently or rarely.

A list of species within each specific residency category is given in Tables 1-3 along with a brief species synopsis. More complete and detailed description of each of the different cetacean and pinniped species listed in Tables 1-3 can be found in the appendices. The current



knowledge of each species is described relative to their worldwide and New Zealand status in order to put GDC's situation in context.

3.2.1 Residents

Common dolphins are the most frequently sighted and stranded dolphins between Bay of Plenty and Hawke's Bay coastal waters. Dense areas of sightings included the Bay of Plenty's inshore islands, northern East Cape bays, offshore of East Cape and just south of Mahia Peninsula. They are generally more prevalent in summer and autumn making them at least seasonal, if not year-round, residents of this region.

No clear patterns of feeding and/or breeding grounds were apparent. However, this species was repeatedly observed feeding over East Cape shelf waters. Common dolphins are known to feed within inshore waters during daylight hours and migrate into deeper shelf waters at night to take advantage of vertically migrating prey. In addition, this is one of the few species regularly sighted with calves throughout GDC waters.

Despite their commonality, especially in nearby Bay of Plenty and Hauraki Gulf waters, very little is known about their population size or regular movement patterns. They are an active species that is known for its more pelagic distribution and affinity for following warm water currents, such as the subtropical East Cape Current, and thermoclines. Common dolphins are considered *not threatened* in New Zealand.

New Zealand fur seals are well established along the North Island's south-eastern coastline, with at least 15 distinct haul-out sites and three known breeding colonies spread from Bay of Plenty to Cape Palliser. Seals can be observed year-round within GDC waters, but are more densely clumped within breeding colonies from last spring to summer. Pups generally are weaned and leave these colonies around late winter/spring months. This species is considered non-migratory and generally thought to return to the same breeding colony once they are sexually mature.

Fur seals are known to travel long distances to find food. Some adults will travel out to open waters over winter while younger animals focus on shelf waters and vertically migrating myctophid fish. Fur seals are the most common pinniped species observed within New Zealand waters today. However, even with a strong growth rate (~15-24%) this species has only started breeding on the North Island again since 1991. Due to their general abundance and sustained growth, New Zealand fur seals are considered *not threatened* by the New Zealand Threat Classification System.

Table 1.The residency patterns of "resident" marine mammal species found within GDC coastal waters. Species' threat classification is listed for both the New Zealand system
and internationally by the IUCN.

Common Name	Species Name	NZ Threat Classification		IUCN Red Listing	Residency Category in GDC Waters		
RESIDENTS							
Common dolphin	Delphinus delphis/capensis	NZ native & resident, evaluated	Not Threatened	Data Deficient to Least Concern	Seasonal to Year-Round Resident		
NZ fur seal	Arctocephalus forsteri	NZ native & resident, evaluated	Not Threatened	Least Concern	Seasonal to Year-Round Resident		
Orca (killer whale)	Orcinus orca	NZ native & resident, evaluated, threatened	Nationally Critical	Data Deficient	Seasonal to Year-Round Resident		
Bottlenose dolphin	Tursiops truncatus	NZ native & resident, evaluated	Range Restricted	Least Concern	Seasonal Resident		
Long-finned pilot whale	Globicephala melas	NZ native & resident, evaluated	Not Threatened	Data Deficient	Potential Offshore Resident		
Pygmy sperm whale	Kogia breviceps	NZ native & resident, not evaluated	Data Deficient	Data Deficient	Potential Offshore Resident		
Beaked whales (see p. 30 for more details)	Ziphiidae (7 species)	NZ native & resident, not evaluated	Data Deficient	Data Deficient to Least Concern	Potential Offshore Resident to Rare Visitors		



Orcas (often known as killer whales) are regularly reported within GDC's coastal waters. The east coast of the North Island, in general, appears to be an important region for both the North Island and the North-South sub-populations. Previous studies and current sighting databases note their presence from the inshore waters in the Bay of Plenty, and offshore areas of East Cape (near and past the Ranfurly Banks) to Napier. They appear to be more frequent in GDC waters during winter and spring months, and are usually found further offshore (~10-80 n mi.) over winter months.

While some New Zealand orcas seem to remain within fairly small home ranges, other orcas have travelled 3800 km, averaging 111 km per day. Groups sighted off GDC waters were generally small (<10 animals) and only a few reported calves present. Nearby Bay of Plenty waters may represent an important feeding habitat for these animals based on opportunistic sightings. This species is listed as one of New Zealand's *nationally critical* marine mammal species, due to an extremely low population estimate (<200 animals).

Bottlenose dolphins seem to have a similar pattern of distribution to orca. South-eastern sightings and strandings of this species are mainly around East Cape bays and near offshore banks with only a few records further south. These dolphins were more prevalent within inshore waters during summer and autumn, and further offshore in winter. The exception was animals reported year-round within nearby inshore Bay of Plenty waters. Opportunistic sightings of feeding dolphins and/or calves were only reported within the Bay of Plenty.

As with common dolphins, research on this species has mainly focused on bottlenose dolphins between the Bay of Islands and Bay of Plenty with little known about their movements further south. While bottlenose dolphins are prevalent in New Zealand, they are *range restricted* meaning residential populations are fairly isolated from each other.

Potential offshore residents

Several species of cetacean may potentially be residents along this particular area of the North Island's south-eastern coast, but as they mainly occupy offshore waters (near and/or along the edge of the continental shelf), little is known about their regular and/or seasonal movement patterns. Almost all of these species are listed as *data deficient* meaning that very little information has been collected and/or is available. Their assumed residency is instead estimated from well established and long-term stranding records (some since 1840). These records include frequent and year-round accounts of both single and group strandings as well as occasional sighting reports along this particular coastline.

Fairly large groups of **pilot whales** are sighted year-round in more offshore GDC waters (~10-50 n mi.) as well as regions to the north and as far south as Napier. It is assumed this species feeds along GDC's shelf waters based on sighting observations and their cephalopod-based diet. They are also one of the few species sighted with calves, but only in Bay of Plenty. In addition, this species regularly strands along the GDC coastline, in particular just north of Gisborne, as well as Bay of Plenty and south of Mahia Peninsula, and mostly between spring and autumn months. Long-finned pilot whales are the more prevalent of the two species in New Zealand based on sighting and stranding records. However, few details are known about the abundance or movements of these species within New Zealand or world-wide. According to the New Zealand classification scheme, short-finned pilot whales are listed as *migrant* and the more common long-finned as *not threatened*

Pygmy sperm whales are the most frequently reported cetacean to strand in New Zealand waters. This species mostly strands around the North Island, with the majority along East Cape and Hawke's Bay shorelines. These animals are generally thought to prefer deeper, shelf waters as evident by a diet centred around oceanic and mesopelagic cephalopod (squid and octopus). Strandings of pygmy sperm whales occur year-round in GDC waters with more reported over the summer and autumn months. It is thought that the Hawke's Bay offshore region may be an important calving and/or nursery habitat for this species as a large portion of strandings reported there are pregnant females or females with a calf.

This species' frequent and long-term stranding record suggests it is not uncommon in New Zealand waters. It is thought that the lack of live sighting information on this species may be due more to their subtle behaviour at the surface and long dive periods than actual rarity. However with such limited data, pygmy sperm whales are listed as *data deficient* in New Zealand waters.

North Island's east coast appears to be one of three hotspots for beaked whale strandings. At least eight of the 11 species of **beaked whales** found in New Zealand are known to strand between Bay of Plenty and Hawke's Bay waters. The strong prevalence of strandings from late spring to autumn suggests a general inshore movement towards south-eastern coastal waters for some species over summer months. The lower east coast of the North Island may serve as important habitat for at least three of these species; **Andrew's, Arnoux's** and **Gray's beaked whales**.

Beaked whales are rarely seen at sea. A few live sightings of these species have occurred in offshore waters of Bay of Plenty and East Cape. In general it is thought that beaked whales occur largely in deep waters, often associated near ocean trenches where they are thought to feed mainly on cephalopods.

Table 2.The residency patterns of "migrant" marine mammal species found within GDC coastal waters. Species' threat classification is listed for both the New Zealand system
and internationally by the IUCN.

Common Name	Species Name	NZ Threat Classification		IUCN Red Listing	Residency Category in GDC Waters	
MIGRANTS						
Southern right whale	Eubalaena australis	NZ native & resident, evaluated, threatened	Nationally Endangered	Least Concern	Seasonal Migrants	
Humpback whale (Oceanic population only)	Megaptera novaeangliae	NZ native	Threatened Migrant	Endangered	Seasonal Migrants	
Sperm whale	Physeter macrocephalus	NZ native	Migrant	Vulnerable	Seasonal Offshore Migrants	
Antarctic minke whale	Balaenotpera bonarensis	NZ native	Migrant	Data Deficient	Seasonal Migrants	
Dusky dolphin	Lagenorhynchus obscurus	NZ native & resident, evaluated	Not Threatened	Data Deficient	Seasonal Migrants (Infrequent)	
Leopard Seal	Hydrurga leptonyx	NZ native	Migrant	Least Concern	Seasonal Migrants (Infrequent)	



3.2.2 Migrants

Regular sightings of **southern right whales** occur off the GDC coastline, in particular East Cape, each year as whales migrate back to traditional wintering grounds around New Zealand over the colder months. The primary calving habitat for right whales around New Zealand is currently the coastal regions between Mt Manganui and Napier. More than half of all cow/calf pairs sighted within this region occurred between August and November, with some pairs remaining for up to four weeks

Due to their low numbers around mainland New Zealand (less than 50 animals), southern right whales are listed as *nationally endangered*. While researchers believe whales around mainland New Zealand are potentially increasing, as of 2002 there has been no increase in the number of cow/calf pairs sighted in the last 25 years. Instead, the recent increase in sighting numbers is attributed to the increase in public awareness. Right whales' tendency to remain within coastal surface waters while feeding and migrating, and their natural curiosity places them at greater risk of interactions with human activities.

Humpback whales also regularly occur off the North Island's east coast during both their northern and southern migrations with at least 1-2 animals reported between Bay of Plenty and Hawke's Bay annually. They are thought to be more prevalent within Hawke's Bay and GDC waters during their winter migration (June and July) as they move north up the length of the country. However, many humpbacks, along with calves, are reported in Bay of Plenty inshore waters over spring months. Within these waters, humpbacks are observed feeding and resting before continuing further offshore of East Cape on their south-bound migration. As these particular whales are part of the Oceanic subpopulation that continued to be severely depleted from recent illegal whaling, they are considered a *threatened migrant* within New Zealand waters.

While male **sperm whales** are semi-residents in areas around Kaikoura, both male and female sperm whales appear to migrate through offshore regions of Bay of Plenty and Hawke's Bay waters during summer and autumn months. Almost half of all sperm whale strandings have occurred along these same coastlines with multiple strandings centred around Mahia Peninsula. This species is a deep-water cetacean, associating more with the continental slope and as such is rarely observed within 10 n. miles of the coast. This species is listed as a *migrant* within New Zealand waters.

Minke whales are also known to seasonally migrate through GDC waters between mid-winter and summer. At least one to two minke whales are sighted each year within Bay of Plenty and northern East Cape waters, and generally consist of single or small groups of animals. Their higher sighting rate compared to other rorqual whales may be due to their tendency to enter estuaries, bays and harbours. As with the other rorqual species, minke whales may be attracted to this region to feed on the productive waters off the East Cape headland. **Dwarf minke whales** tend to prefer higher latitudes and as such are assumed to be only an infrequent visitor to this region.



Only small and fairly infrequent sightings of **dusky dolphins** have been recorded from East Cape and Hawke's Bay waters during winter and spring months only. This species appears to prefer colder temperature waters and are thought to mainly associate with the Subtropical Convergence, a branch of which can occasionally push up to the east coast as far as Gisborne. As such, the region between Gisborne and East Cape is considered the northern extent of their winter migration range. Despite their general abundance around most of the South Island and lower North Island, little is known about this species outside of Kaikoura and the Marlborough Sounds. Dusky dolphins are listed as *not threatened* in New Zealand.

Leopard seals are infrequent migrants to the East Cape/Hawke's Bay coastline, preferring the colder waters of the Antarctic and sub-Antarctic islands during most of the year. Only a small number of sightings have been reported with GDC waters during the colder months of winter and spring when they migrate away from more southern waters. Like dusky dolphins, this region may represent the northern limit of their winter migration range. As such, all sightings were of solitary animals. This species is considered a *migrant* within New Zealand waters.

3.2.3 Visitors

Based on stranding data and nearby sightings, **Bryde's whales** are thought to be infrequent visitors to GDC waters, only occasionally meandering south of East Cape. This is despite their year-round commonality within Hauraki Gulf and north-eastern coastal waters. Bryde's whales sighted within nearby Bay of Plenty are common over warmer months and may represent wandering residents from the Hauraki Gulf or other transients. Little is known about this species' movements in other regions of New Zealand. Their small population size and vulnerability to vessel strikes and entanglement means this species is listed as *nationally critical* within New Zealand waters.

Three other species of rorqual whales are also thought to occasionally visit GDC waters; **sei**, **fin and blue whales**. At least one sei or fin whale is seen each year, most likely within Bay of Plenty waters, northern bays of East Cape or offshore of the Gisborne coastline. Fin whales are more commonly seen than sei whales. When these species do wander near GDC waters, they generally are seen between mid-winter and summer months. Sightings of blue whales are rarer and most likely are the **pygmy blue whale** subspecies as they prefer warm waters than the Antarctic subspecies. While these rorqual species all migrate to Antarctic and sub-Antarctic waters to feed in summer, little is known about their winter distribution or migration patterns.

False killer whale generally prefers warmer subtropical waters, indicating that the North Island may sit just on the edge of its distribution limits. Strandings of both single and groups of false killer whales have been reported irregularly along East Cape and Hawke's Bay coastlines (mostly around Mahia Peninsula) since the 1930s. One stranding involved over 300 individual whales. This species' preference for deeper, more open waters may account for the lack of corresponding live sightings. However recent sightings have indicated a more regular



presence of this species within inshore Bay of Plenty, mainly over summer months, than previously thought. False killer whales are listed as *not threatened* in New Zealand waters.

Several species are thought to be more infrequent and/or rare visitors to GDC waters. This listing indicates that the species has only been sighted and/or stranded within this general coastal region less than five times. **Hector's dolphins** are the only marine mammal species found solely within New Zealand waters. The current North Island population (known as Maui's dolphin – a subspecies) is restricted to the west coast, but historical research indicates this species may once have been more prevalent along south-eastern regions as well. A few recent sightings of individuals or small groups suggest this species, or its southern cousin, may still occasionally visit GDC and nearby coastal waters. **Risso's dolphins** are also known for their irregular presence around the North Island, and at least northern waters of the South Island. While occasional live sightings are reported in other regions, only a small number of strandings by this species has occurred in GDC and nearby regions.

Similar to Risso's dolphins, **pygmy right whales** are thought to occur around the North Island but so far this information is based only on strandings. Only one stranding has occurred in nearby Hawke's Bay waters. This species is thought to be naturally rare and not at risk of extinction. Rare and single strandings of **melon-headed whales, rough-tooted dolphin and southern right-whale dolphin** have also occurred between Bay of Plenty and Hawke's Bay coastlines. Like pygmy right whales, few details are known about these species due to their offshore distribution around more remote regions. However, these species are fairly common throughout their respective ranges, despite a rarity in live sightings, and as such are either listed as *not threatened* or *vagrants* to New Zealand waters.

Table 3.	The residency patterns of "visitor"	marine mammal species found within GDC coastal waters.	Species' threat classification is listed for both the New Zealand syste	m
	and internationally by the IUCN.			

Common Name	Species Name	NZ Threat Classification		IUCN Red Listing	Residency Category in GDC Waters		
VISITORS							
Bryde's whale	Balaenoptera brydei/edeni	NZ native & resident, evaluated, threatened	Nationally Critical	Data Deficient	Seasonal to Infrequent Visitor		
Sei whale	Balaenoptera borealis	NZ native	Migrant	Endangered	Seasonal to Infrequent Visitor		
Fin whale	Balaenoptera physalus	NZ native	Migrant	Endangered	Seasonal to Infrequent Visitor		
Blue whale	Balaenoptera musculus (spp. brevicauda & intermedia)	NZ native	Migrant	Critically Endangered to Data Deficient	Infrequent to Rare Visitor		
Short-finned pilot whale	Globicephala macrorhynchus	NZ native	Migrant	Data Deficient	Regular to Infrequent Visitors		
Dwarf Minke whale	Balaenoptera acutorostrata	NZ native & resident, evaluated	Not threatened	Least Concern	Seasonal to Infrequent Visitor		
False killer whale	Pseudorca crassidens	NZ native & resident, evaluated	Not threatened	Data Deficient	Seasonal to Infrequent Visitor		
Hector's dolphin	Cephalorhynchus hectori	NZ native & resident, evaluated, threatened	Nationally Endangered	Endangered	Infrequent to Rare Visitor		
Risso's dolphin	Grampus griseus	NZ native	Vagrant	Least Concern	Rare Visitor		
Pgymy right whale	Caperea marginata	NZ native & resident, not evaluated	Data Deficient	Data Deficient	Rare Visitor		
Melon-headed whale	Peponocephala electra	NZ native	Vagrant	Least Concern	Rare Visitor		
Rough-toothed dolphin	Steno bredanensis	NZ native	Vagrant	Least Concern	Rare Visitor		
Southern right whale dolphin	Lissodelphis peronii	NZ native & resident, evaluated	Not threatened	Data Deficient	Rare Visitor		



4 SUMMARY

4.1 Limitations and biases

Summarising which marine mammal populations might be utilising GDC waters, and any important habitat areas within, requires careful consideration given this review's reliance on mainly opportunistic databases rather than scientific surveys. The main weaknesses of such data are two-fold. Any perceived high use area (*e.g.* lots of sightings) may not necessarily be an important area for the species; instead a high number of sightings can simply indicate an increased number of people using the same area. Consequently, the number of sightings in an area does not equate to the number of animals known to occur there.

Similarly, the lack or lower number of sightings for a particular species within GDC waters does not mean they are necessarily absent or less abundant compared to other marine mammals. Several species are known for their inconspicuous surface behaviour and/or body shapes (*i.e.* long and thin with little to no dorsal fin evident) or difficulty in identifying unless experienced and within close range.

In an attempt to counter these biases, this review also relied on sighting data from neighbouring waters, which may have more people out on the water looking (*e.g.* regular dive, fishing and tourism charters to particular islands in the Bay of Plenty), as well as the New Zealand stranding database, historical records and general knowledge about the species. In particular, this approach helped in assessing the possible importance of GDC waters to migrating whales and which species may be considered as residents.

4.2 Identifying important habitats

Based on frequency of occurrence and multiple species' presence (>12 species), the coastal waters out to 12 n. miles from Lottin Point to Waikori Bluff, and including Ranfurly Banks, constitute important year-round habitats for most resident and several migrant marine mammal populations. This conclusion is validated by the year-round and seasonal occurrence of the same species within inshore regions of eastern Bay of Plenty between Whakaari (White) and Moutohora (Whale) Islands and Cape Runaway, and the historical presence of numerous whaling stations along the northern East Cape headland alone.

It is more difficult to determine if the general absence of sightings between Poverty Bay and East Cape is real or an artefact of low search effort. Similar species were sighted both near Poverty Bay and Mahia Peninsula as well as East Cape. These species were mainly seasonal migrants, such as the southern right and humpback whales, and resident species. Based on known species' movement patterns, these animals are most likely regularly travelling through these northern GDC coastal areas as well.

In terms of important feeding or breeding habitats of review species, little can be said with the exception of a few species. While most resident species have been sighted with calves in GDC



and/or neighbouring waters over summer months, the inshore coastal bays and waters between Bay of Plenty and Hawke's Bay are critical calving habitats for southern right whales over winter and spring. Based on stranding records, it is also suggested that offshore waters between East Cape and Hawke's Bay represent the main calving and nursery grounds for pygmy sperm whales. The presence of several beaked whale species (eight species) and other deep-water species within GDC waters suggests that offshore shelf waters may be particularly rich in certain deep-water prey species such as cephalopods.

4.3 Coastal development

While the scope of this review was not to examine the potential impact of coastal development on marine mammal species with GDC waters, a few generalisations can be made based on the review's findings.

Most coastal developments are expected to influence those species that utilise more inshore regions of the coastline for feeding, resting and/or breeding. Within GDC waters, such species include but are not limited to; common and bottlenose dolphins, fur seals and southern right whales. Within inshore waters, those developments that involve the removal of potential habitat, involve ropes or lines that could cause entanglement, are generally 'noisy', increase the chances of colliding with an animal or that could irreversibly change the ecosystem dynamics would have the greatest negative impact on resident and/or recovering populations.

More offshore species are potentially removed from most of the impacts of coastal development. However, particular types of fishing techniques, offshore mining and seismic exploration and/or large-scale ecosystem changes can greatly affect these more specialised species. In particular, species that depend solely on cephalopods for their diet (such as pygmy sperm whales, pilot whales and some beaked whale species) may be very sensitive to any changes in their prey's abundance or distribution, even possibly resulting in their abandonment of regional waters.

Migrating species, while generally only present in GDC waters over certain seasons and often found in more offshore waters, are potentially vulnerable to entanglement in surface structures or floating lines within their traditional migration paths, large vessel strike and noise produced from offshore mining and seismic exploration.

When considering potential implications of coastal developments on local marine mammal population, the importance of GDC waters to the species' New Zealand-wide distribution as well as the species' threat classification both within New Zealand and worldwide need to be considered. For example, southern right whales are generally found throughout most of the Southern Hemisphere, yet animals migrating through New Zealand waters are part of a semi-isolated, small population that is trying to re-establish as well as utilise their traditional calving grounds within GDC and neighbouring waters. While regular sightings of this species are expected each winter, they should be considered differently in terms of coastal development

priorities to a rare sighting of a species in GDC waters (*e.g.* melon-headed whale) which is considered common in all tropical seas worldwide.

The North Island's eastern coastline, particular south-eastern regions, represents the largest known groupings of common dolphins, orca, pygmy sperm whales, several beaked whale species and false killer whales while potentially supporting isolated subpopulations of bottlenose dolphins, southern right whales, humpback whales and Bryde's whale. Currently six marine mammal species are considered "threatened" (*i.e.* nationally critical, nationally endangered, or nationally vulnerable) by New Zealand's threat management classification; these include orcas, bottlenose dolphins (due to range restriction), southern right whales, humpback whales, Bryde's whales and Hector's dolphins. These listings are mostly based on low population numbers and/or semi-isolated populations but also include species' sensitivity to certain anthropogenic activities.

Finally, the lack of scientific marine mammal surveys means that this review cannot determine if possible resident populations within GDC waters constitute a small subpopulation that remains within the general region, moving more north or south with the seasons, or one large population that meanders throughout the south-eastern region from Hawke's Bay to Bay of Plenty or further. Such information is important for assessing the level of effect coastal developments might have on a population and in turn, its ability to withstand it. For more site-specific information concerning future coastal consent or permit applications, more scientifically rigorous and fine-scale data would need to be collected.

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7 APPENDIX

1 Species-specific profiles for cetaceans

All discussions of species-specific distributions entail details of their possible movement patterns to the north (*e.g.* Coromandel, Bay of Plenty) and south (*e.g.* Hawke's Bay, Wellington) of Gisborne District Council (GDC)'s coastal area. As most marine mammal species regularly travel large distances, any regional development plans need to take into account how these species might be using GDC's coastline in relation to neighbouring waters. For instance, humpback whales are known to migrate through GDC waters. While this species may be considered only a seasonal migrant to the GDC coastline, this particular stretch of water may provide an important corridor that these animals use to locate or travel to important habitats, such as resting or feeding grounds in Bay of Plenty.

Species are examined in order of their commonality in GDC waters and as listed in Tables 1-3.

1.1 Common dolphins (Delphinus delphis/capensis)

Distribution and abundance

Common dolphins are one of the most abundant species of dolphin found worldwide with a global distribution in temperate to tropical waters (Carwardine 1995). They are an active species that is known for its more pelagic distribution and affinity for following warm water currents and thermoclines.

Common dolphins are found around most of coastal New Zealand in schools of just a few individuals to several thousand (Baker 1999). They are particularly prevalent off the east coast of the North Island from the Bay of Islands (Constantine & Baker 1997), Hauraki Gulf (Stockin *et al.* 2008b) and the Bay of Plenty (Neumann *et al.* 2002), but also regularly sighted as far south as Kaikoura (Würsig *et al.* 1997, Figure 1-1A). Gaskin (1968a) suggested New Zealand common dolphins mostly associate with warmer waters (>14°C) of the subtropical East Cape Current and thus may be limited by its southward extent (Banks Peninsula). While they are perhaps the most common of all the cetaceans inhabiting New Zealand waters, very little is known about their population size, behaviour or movement patterns in New Zealand (Dawson 1985).

Common dolphins are present in New Zealand coastal waters year round. Some localised populations in the Bay of Plenty and Bay of Islands tend to be more prevalent within coastal waters in summer and offshore waters in winter (Constantine & Baker 1997; Neumann 2001). Gaskin (1968a) also found common dolphins to be more prevalent along the Wairarapa coast during summer and autumn. The reverse trend is observed in the Hauraki Gulf as greater numbers of dolphins are observed in the winter and spring months (Stockin *et al.* 2008b).







Figure 1-1. A) Summer distribution of common dolphins (*Delphinus delphis*) around New Zealand as described by Gaskin 1968a and modified by Stockin 2008. B) Opportunistic sightings and strandings of common dolphins reported along the Gisborne District coastline and nearby waters (DoC database).



Recent sightings of common dolphins (2001-2008) have been recorded opportunistically by the Department of Conservation (Figure 1-1B). Sightings between the Bay of Plenty and Hawke's Bay regions were more frequent between December and April, with only 10% reported in winter and spring. Neumann *et al.* (2002) hypothesised that common dolphins in the Bay of Plenty may follow the East Cape Eddy as it tends to funnel warmer water into the southeast corner of the bay and offshore of East Cape. Dense areas of sightings included the Bay of Plenty's inshore islands, northern East Cape bays, offshore of East Cape and just south of Mahia Peninsula. A large number of sightings also tended to parallel the continental shelf in this region.

Frequent strandings of common dolphins also highlight their regular presence within East Cape and Hawke's Bay waters (Figure 1-1B). Since 1968, at least 1-2 common dolphin strandings were reported each year and throughout all months between Cape Colville and Cape Palliser. Except for four events, all strandings were of single dolphins.

Life-history dynamics

Group size averaged around 50 animals in the Bay of Plenty (Neumann & Orams 2005) but ranges between 2 to at least 400 animals. Similar numbers were observed with GDC waters with some groups as large as 1000. Group sizes were smaller in the Hauraki Gulf averaging between 20-30 dolphins and often had neonates (recently born) and/or calves (up to 2 years old) present (Stockin *et al.* 2008b). Several opportunistic sightings of calves have been recorded between East Cape and Mahia Peninsula.

Common dolphins often occur over continental shelf regions where they feed on the animals within the deep scattering layer (DSL); groups of relatively small invertebrates and fish that migrate to surface waters at night and return to depths during the day. In the Bay of Islands, dolphins were observed feeding mainly on schooling pilchards (*Sardinops neopilchardus*) (Constantine & Baker 1997). Neumann & Orams (2005) videotaped dolphins in the Bay of Plenty region feeding on jack mackerel (*Trachurus* spp.), kahawai (*Arripis trutta*), yellow-eyed mullet (*Aldrichetta forsteri*), flying fish (*Cypselurus lineatus*), parore (*Girella tricuspidata*), and garfish (*Hyporamphus ihi*).

A diet analysis based on the stomach contents of stranded and by-caught common dolphins around the North Island found prey species from both oceanic and coastal waters, including anchovy (*Engraulis australis*), lanternfish (Myctophidae), jack mackeral and arrow squid (*Nototodarus* spp. - Meynier *et al.* 2008). The authors suggest that these findings point to short-term movements between daytime feeding areas within inshore waters and night feeding on DSL organisms in offshore waters by these dolphins. Numerous sightings of common dolphins feeding over East Cape shelf waters were reported in the DoC database.

Conservation status

Since 1994, two distinct common dolphin species have been recognised – the short-beaked (*D. delphis*) and the long-beaked (*D. capensis*) – with some overlap in their distributions (Hammond *et al.* 2008a). At present the short-beaked common dolphin is listed as a species of

least concern due to its global abundance and despite some threats to local populations (IUCN 2009). The long-beaked form is listed as *data deficient* due to past ambiguity in its correct classification (IUCN 2009).

Recent mitochondrial DNA analysis has found that New Zealand common dolphins are most similar to the short-beaked form, yet past hybridisation with the long-beaked form prevent making any clear taxonomic distinctions at this time (Stockin 2008). According to the current New Zealand Threat Classification System, common dolphins are still listed as *Delphinus delphis* and considered *not threatened* (Hitchmough *et al.* 2007). However Meynier *et al.* (2008) consider this classification as "ambiguous given that no population estimates exist for this species within New Zealand waters."

The greatest risk to common dolphins in New Zealand waters appears to be entanglement in mid-water trawl fisheries (DuFresne *et al.* 2007). However recent findings suggest that Hauraki Gulf populations may also be under additional anthropogenic stress from coastal pollution (Stockin *et al.* 2007) and eco-tourism (Stockin *et al.* 2008a) due to their proximity to Auckland.

1.2 Orca (Orcinus orca)

Distribution and abundance

Orcas occur in all oceans from the equator to polar regions, yet generally prefer cooler waters (Carwardine 1995). Although they are most frequently seen within continental coasts, they may also be found mid-ocean (Leatherwood *et al.* 1983). Discrete communities of resident and transient orca are known to co-exist within the same general area (Taylor *et al.* 2008a).

A long-term study of orca sightings around New Zealand estimated an abundance of 119 (95% CI=71-167) individuals (Visser 2000). At least three sub-populations of orca are thought to exist; a regional North Island population, a regional South Island population, and a population that travels back and forth between the two islands (Figure1-2). The east coast of the North Island appears to be an important region for both the North Island and the North-South sub-populations (Visser 2000).

Visser (2000) reported almost 200 orca sightings by the general public between 1992 and 1997 along the south-eastern coastline of the North Island (Bay of Plenty to north of Cape Palliser – no figure available). DoC's sighting database has over 80 recent records of orca from the inshore waters in the Bay of Plenty, offshore areas of East Cape (near and past the Ranfurly Banks) down to Napier (Figure 1-3). Strandings, while fairly infrequent, reflect a similar trend (Figure 1-3). The majority of sightings (Visser and DoC), as well as strandings, occurred during early winter and most spring months. Most winter sightings tended to be much further offshore; 10-80 n. miles. Occasional sightings of orca were reported in summer and autumn as well.





Figure 1-2. The general distribution pattern of orca around New Zealand (left) and within GDC's coastal waters based on New Zealand's National Aquatic Biodiversity Information System (NABIS) sighting database (modified from https://www.nabis.govt.nz/nabis_prd/map.jsp accessed September 2009). The yellow line distinguishes the 100 m depth contour with additional blue lines representing increased bathymetry.





Figure 1-3. Opportunistic sightings and strandings of killer whales (*Orcinus orca*) reported along the Gisborne District coastline and nearby waters (DoC database).

Life-history dynamics

Orcas are a moderately gregarious species, being found in pods numbering a few to 30 individuals. Their group structure is fairly stable as they usually maintain close family groups (Carwardine 1995). The most common group size of orca in GDC waters was nine animals, however groups can range from 2 to 22 (Visser 2000). Only a few of the orca recorded within GDC waters were observed with a calf or calves.

In New Zealand, orca most commonly forage on rays (Visser 1999a). They also feed on pelagic and reef fish (Visser 2000) and other cetaceans including common dolphins, dusky dolphins, bottlenose dolphins, humpback whales and sperm whales (Visser 1999b). The majority of killer whales sighted within Bay of Plenty and offshore regions were reported as feeding (DoC sighting database.)

Conservation status

The orca is listed as *data deficient* by the IUCN (2009), mainly due to the ambiguity around its current taxonomic unit. It is felt that this species will be divided into several smaller new species or

sub-species with new research, many of which will warrant higher categories of risk due to localised effects of impacts. According to New Zealand's Threat Classification, this species is listed as *nationally critical* due to lack of data and low abundance (Hitchmough *et al.* 2007).

The main threats facing orca in New Zealand involve potentially heavy pollutant loads, interactions and/or incidental mortality with fisheries and the risk of vessel strike near busy ports and harbours (Visser 2000).

1.3 Bottlenose Dolphins (*Tursiops truncatus*)

Distribution and abundance

Bottlenose dolphins are cosmopolitan and generally found between latitude 60° North to 47° South. In most parts of the world where bottlenose dolphins are found, there is a coastal and offshore ecotype (Carwardine 1995). Inshore bottlenose dolphins frequent estuaries, river mouths, bays, harbours and lagoons while offshore populations tend to range over large coastal or oceanic areas that are generally very productive.

In New Zealand waters, bottlenose dolphins are known to inhabit the coastal waters of Northland, the Marlborough Sounds and Fiordland with occasional sightings of animals around most other regions (Tezanos-Pinto *et al.* 2008 – Figure 1-4). Bottlenose dolphins sampled from these main regions were found to be genetically more similar to offshore ecotypes, particularly those found in other Pacific regions (Tezanos-Pinto *et al.* 2008), despite living mainly in waters less than 500 m deep (Constantine *et al.* 2003). In addition, the three regional populations showed evidence of high genetic differentiation between them with very low rates of estimated migration (Tezanos-Pinto *et al.* 2008).

Constantine *et al.* (2003) estimated that the Bay of Islands (Northland) population included 446 animals (95% CI = 418-487), however additional photographic identification work by Berghan *et al.* (2008) suggests that this population may be much larger. The north-eastern population is highly mobile and is known to range between Doubtless Bay in the north and Tauranga in the south (a length of ~400 km, Constantine 2002), using the Bay of Islands and Hauraki Gulf as a regular part of their home range. However little is known about their movements further south.

According to DoC's sighting database, opportunistic sightings of bottlenose dolphins have been recorded around Bay of Plenty and offshore of the East Cape region. Only one sighting has been reported further south, offshore of Cape Turnagain (Figure 1-5). The national stranding database shows a similar trend with only two strandings recorded further south than East Cape, near Tatapouri Point (north of Gisborne) and Mahia Peninsula (Figure 1-5). Bottlenose sightings and strandings occurred year-round with most reported in summer and autumn. Sightings reported during winter months tended to be far offshore (>20 n. miles).





Figure 1-4. The general distribution pattern of bottlenose dolphins around New Zealand (left) and within GDC's coastal waters based on New Zealand's National Aquatic Biodiversity Information System (NABIS) sighting database (modified from https://www.nabis.govt.nz/nabis_prd/map.jsp accessed September 2009). The yellow line distinguishes the 100 m depth contour with additional blue lines representing increased bathymetry.





Figure 1-5. Opportunistic sightings and strandings of bottlenose dolphins (*Tursiops truncatus*) reported along the Gisborne District coastline and nearby waters (DoC database).

Life-history dynamics

Group sizes of bottlenose dolphin are highly variable ranging from lone individuals to hundreds of animals (Carwardine 1995). Bottlenose dolphins in New Zealand waters tend to travel in groups of up to 30 animals (Baker 1999) however several sightings up to 100 were reported by the DoC database. The average group size was closer to 15 animals, similar to group sizes in the Bay of Islands (Constantine & Baker 1997).

Most bottlenose dolphin groups are generalists in their feeding preferences. However, they can be quite adaptive in their feeding styles. Inshore populations are known to feed on coastal benthic fish and some invertebrates while more offshore populations feed on pelagic and mid-water fish species. Constantine & Baker (1997) observed bottlenose dolphins in the Bay of Islands feeding on flounder (*Rhombosolea* spp.), yellow-eyed mullet (*Aldrichetta forsteri*), kahawai (*Arripis trutta*), parore (*Girella tricuspidata*), piper (*Hyporhampbus ihi*), blue

maomao (*Scorpis violaceus*) and leatherjacket (*Parika scaber*). Feeding observations from opportunistic sightings were only noted in Bay of Plenty waters.

Conservation status

Due to this species commonality and global distribution, they are listed by the IUCN (2009) as *least concern*. In New Zealand, bottlenose dolphins are classified as *range restricted* (Hitchmough *et al.* 2007), which means New Zealand populations have demonstrated demographic isolation and appear to be limited in their overall home range (Townsend *et al.* 2007).

Bottlenose dolphin populations in New Zealand are exposed to a growing eco-tourism industry throughout their range (Constantine *et al.* 2003). In addition to the increasing risks of harassment from eco-tourism, this species is occasionally reported as by-catch in the New Zealand trawl fishery (DuFresne *et al.* 2007).

1.4 Pilot whales (*Globicephala* spp.)

Distribution and abundance

Both long-finned pilot whales (*Globicephala melas*) and short-finned pilot whales (*G. macrorhynchus*) occur in New Zealand waters. The long-finned pilot whale is widely distributed in the cold temperate waters of the North Atlantic and Southern Hemisphere. The short-finned is more cosmopolitan in tropical and warm temperate waters between 50°N and 40°S, however the two species overlap in some regions. Both species have a predominantly offshore distribution, preferring areas over the outer continental shelf and/or slope (Leatherwood *et al.* 1983). Migrations are not well documented and thought to be generally nomadic. Although some populations are thought to move inshore during summer and autumn and then offshore again over the winter and spring, most groups of pilot whales likely follow prey trends (Carwardine 1995).

Pilot whales are assumed to regularly travel through New Zealand waters as they strand frequently and often in very large numbers (*e.g.* >200 animals; Gaskin 1968b; Brabyn 1990). For example, between 2005 and 2008 pilot whales accounted for 73% of all strandings (Beatson & O'Shea 2009). Before 1977, only the long-finned pilot whale had been recorded in New Zealand (Gaskin 1968b). Most likely due to mis-identification, the first record of the short-finned pilot whale was in 1977, when 94 stranded on Farewell Spit, and since then there have been reports of several more short-finned pilot whales strandings within northern New Zealand regions (see Baker 1983).

Strandings of long-finned pilot whales have been reported year-round, although they are slightly more frequent over summer months (Brabyn 1991). These whales seem to be particularly susceptible to stranding along Whangarei, Hawke's Bay, Golden Bay, Stewart and Chatham Islands (Brabyn 1990). Recent strandings (since 1990) of *Globicephala* spp. reported from Bay of Plenty to Hawke's Bay have been fairly spread along the coastline with some clusters near Gisborne and Mahia Peninsula (Figure 1-6). Only two of the 48 strandings

were identified as short-finned pilot whales, both occurring in 1996 near Napier and East Cape. Over 80% of the strandings in these regions occurred between October and May, with only a few over winter months.

Despite regular sightings of pilot whales, little is known about their abundance or seasonal distribution patterns around New Zealand. They have been reported as far south as Fiordland (Lusseau & Slooten 2002) and as far north as Northland (DoC sighting database). Of the 98 opportunistic sightings reported off Bay of Plenty and Hawke's Bay regions, most occurred between 10 and 50 n mile from shore, and were as frequently seen over winter months as summer (Figure 1-6). Only nine of these sightings were able to identify the pilot whales to species level, which were long-finned.



Figure 1-6. Opportunistic sightings and strandings of long-finned pilot whales (*Globicephala melas*) and short-finned pilot whales (*G. macrorhynchus*) reported along the Gisborne District coastline and nearby waters (DoC database).



Life-history dynamics

Pilot whales are highly gregarious, sometimes forming pods of several hundred to more than 1000, although they are typically sighted in groups numbering fewer than 50 (Leatherwood *et al.* 1983). Group sizes reported along the Bay of Plenty and Hawke's Bay coastlines varied from one to as large as 80 whales with most sightings comprised of at least 10 or more animals. Several sightings also reported calves present with in Bay of Plenty waters only.

As with other deep water cetaceans, pilot whales tend to forage at night over shelf waters in order to take advantage of vertically migrating prey. They are also known for their deep diving abilities (Taylor *et al.* 2008b). Stomach contents from long-finned pilot whales stranded in New Zealand waters demonstrate a diet based solely on cephalopods; mainly squid (*Nototodarus* spp. and *Chiroteuthis* sp.) and octopus (*Pinnoctopus cordiformis* – Beaston *et al.* 2007, Beaston & O'Shea 2009). Little is known about the short-finned pilot whale diet in New Zealand, but worldwide they also feed primarily on squid along with some fish (Taylor *et al.* 2008c).

Conservation status

Both *Globicephala* species are listed by the IUCN as *data deficient* (IUCN 2009). The worldwide status of both pilot whales is not clear as there is evidence that each may consist of two or more different species. According to the New Zealand classification scheme, short-finned pilot whales are listed as *migrant* and the long-finned as *not threatened* (Hitchmough *et al.* 2007).

Being deep water species means that pilot whales are generally less susceptible to coastal threats. However, several hundreds of short-finned pilot whales are taken as by-catch in both the squid round-haul and long-line fisheries in the western and eastern Pacific (Taylor *et al.* 2008c). There are few reported accounts of long-finned pilot whales accidentally caught in Southern Hemisphere fisheries, with the exception of the pelagic driftnet fishery off Brazil (Taylor *et al.* 2008b). There is also evidence that these species, like beaked whales, are particularly vulnerable to loud anthropogenic sound in the ocean, such as navy sonar and seismic exploration.

1.5 Pygmy sperm whales (*Kogia breviceps*)

Distribution and abundance

This species is one of the smallest toothed whales with a square head, similar to a sperm whale, and robust body. The full range and abundance of the pygmy sperm whale is uncertain as until 1966 it had not been distinguished from the dwarf sperm whale (*Kogia sima*). Most information has come from strandings as very few live sightings exist worldwide. This species appears to prefer deep, continental shelf waters within warm temperate, subtropical and tropical seas (Taylor *et al.* 2008d). They are thought to be relatively inconspicuous at the surface as well as diving for long periods. As such, the lack of live sighting information may be due more to their subtle behaviour than actual rarity.



Pygmy sperm whales are the cetacean that strand most frequently in New Zealand, suggesting that pygmy sperm whales are not uncommon in New Zealand waters. Brabyn (1990) recorded 147 stranding events in New Zealand waters between 1840 and 1989. Almost all of these strandings occurred around the North Island with the majority recorded along Hawke's Bay coasts (Brabyn 1990). Over 120 additional strandings have been reported since 1989 between the Bay of Plenty and Hawke's Bay coastlines alone (Figure 1-7), with most centred between East Cape and Napier. As with earlier findings, strandings occurred year-round but fewer were reported over late winter and early spring months (Brabyn 1990; DoC stranding database). Most strandings were of single, live animals with only a few small group strandings. A large portion of the Hawke's Bay strandings were females that were pregnant or with a calf, which may suggest that this region is an important calving area (Beaston 2007).

In February 2004, an opportunistic and rare sighting of five *Kogia* was reported 17 n miles north of Hicks Bay (Figure 1-7).



Figure 1-7. Opportunistic sightings and strandings of pygmy sperm whales (*Kogia breviceps*) reported along the Gisborne District coastline and nearby waters (DoC database).



Life-history dynamics

Little is known about pygmy sperm whale group dynamics. Group sizes have ranged from a single animal to groups as large as 10 (Carwardine 1995).

The diet of this species in northern New Zealand waters was found to be primarily cephalopods (23 different species) with some fish and crustaceans (Beaston 2007). The cephalopods found in *Kogia* stomachs were exclusively oceanic and mesopelagic, mostly juvenile and known to undergo vertical migration. Up to 77 different prey species were also found in the stomach of a pygmy sperm whale off South Africa, suggesting *Kogia* are perhaps more opportunistic feeders (Plön *et al.* 1999).

Conservation status

Pygmy sperm whales are listed as *data deficient* by both the IUCN (2009) and New Zealand Threat Classification System (Hitchmough *et al.* 2007). In terms of the New Zealand system, this particular classification recognises that this species may be a resident, and as such has not been sufficiently evaluated due to lack of information.

Threats to this species are unknown but are potentially thought to include an indirect impact from any localised depletion of deep-sea squid species, due to their dietary reliance, and low level bycatch. Beaston (2007) noted that the intensive scampi fishery off Hawke's Bay has the potential to affect local *Kogia* in both ways, and even more so if it proves to be a nursery ground for calves.

1.6 Beaked whales (Ziphiidae family)

Distribution and abundance

The whales of the family Ziphiidae, collectively known as beaked whales, are among the least known of all marine mammals. They are rarely seen at sea, spending long periods underwater and are relatively inconspicuous at the surface (Carwardine 1995). The sightings that have been recorded suggest that beaked whales occur largely offshore and in deep waters, often associated near ocean trenches where they are thought to feed mainly on cephalopods (Baker 1999; Taylor *et al.* 2008e,f,g). Most sightings are of single animals and as such, most species are thought to travel alone or in small groups. Very little is known concerning the population status of the different beaked whale species.

Of the twenty known species, 11 have been sighted or found stranded around New Zealand (Table 1-1). In general, the North Island's east coast, Cook Strait and the Chatham Islands appear to be hotspots for beaked whale strandings (Brabyn 1990). Numerous strandings of beaked whales (c. 173) have occurred from Cape Colville to Cape Palliser, of which eight different species have been identified (Figure 1-8). The stronger prevalence of strandings from late spring to autumn months may suggest a general inshore movement towards New Zealand coastal water for some species over summer. The few reported sightings in which beaked whales could be identified were generally offshore of Bay of Plenty, where tour boats with

experienced guides are available, and/or offshore of East Cape from commercial boats with marine mammal observers on-board (Figure 1-8).

Common Name	Scientific Name	Stranded in NZ	Stranded in Eastern NI	IUCN Status	Status in GDC Waters
Andrew's beaked whale	Mesoplodon bowdoini	\checkmark	\checkmark	Data Deficient	Potential Offshore Resident
Arnoux's beaked whale	Berardius arnuxii	\checkmark	\checkmark	Data Deficient	Potential Offshore Resident
Gray's beaked whale (Scamperdown whale)	Mesoplodon grayi	\checkmark	\checkmark	Data Deficient	Potential Offshore Resident
Cuvier's beaked whale	Ziphius cavirostris	\checkmark	\checkmark	Least Concern	Regular to Frequent Visitor
Strap-toothed whale	Mesoplodon layardii	\checkmark	\checkmark	Data Deficient	Regular to Frequent Visitor
Southern bottlenose whale	Hyperodon planifrons	~	\checkmark	Least Concern	Infrequent Visitor
Hector's beaked whale	Mesoplodon hectori	~	\checkmark	Data Deficient	Infrequent Visitor
Blainville's beaked whale	Mesoplodon densirostris	~	\checkmark	Data Deficient	Rare to Infrequent Visitor
Ginkgo-toothed beaked whale	Mesoplodon ginkgodens	~		Data Deficient	Unknown
Lesser beaked whale	Mesoplodon peruvianusi	\checkmark		Data Deficient	Unknown
Shepherd's beaked whale	Tasmacetus shepherdi	~		Data Deficient	Unknown

 Table 1-1.
 The species and status of beaked whale species found around New Zealand and the eastern North Island coastline.





Figure 1-8. Opportunistic strandings and sightings of beaked whale species reported along the Gisborne District coastline and nearby waters (DoC database).



Species-specific information

Some beaked whale species are fairly cosmopolitan in their distribution and even abundant within their range, such as the Cuvier's beaked whale or southern bottlenose whale, hence their IUCN listing of *least concern* (IUCN 2009). With other species, too little is known to make any assumptions in regards to their possible distribution. However it is believed that the East Cape/Hawke's Bay offshore waters may represent important habitats for at least three species of beaked whales.

Andrew's Beaked Whale (Mesoplodon bowdoini)

Little can be discussed about the Andrew's beaked whale as there are only 34 world-wide strandings, the majority occurring around New Zealand (nine of these between northern East Cape bays and Cape Palliser; Baker 2001, Figure 1-8A). Taylor *et al.* (2008f) suggest New Zealand may represent an area of concentration for this poorly known species.

Arnoux's Beaked Whale (Berardius arnuxii)

The Arnoux's beaked whale, on the other hand, is a Southern Hemisphere species most commonly found south of 34°S (Taylor *et al.* 2008e). The frequent stranding record of this species in New Zealand seems to support its relative abundance around Cook Strait and the Hawke's Bay region over the summer months (Baker 1983 – no figure available, Figure 1-8B). At least one live sighting of this species has been reported near Whale Island in the Bay of Plenty – an area known for a few unidentified beaked whale sightings (Figure 1-8B).

Gray's Beaked Whale (Mesoplodon grayi)

Gray's beaked whale is New Zealand's most frequently stranded beaked whale (Brabyn 1990). It is also thought to be circumpolar below 30°S (Taylor *et al.* 2008g). Approximately 188 stranding events, including several rare mass strandings, of this species have occurred around New Zealand since 1873. Seventy-nine strandings are spread along the coastline from Cape Colville to Napier, mainly during summer and autumn months (Figure 1-8A). In June 2001, a rare sighting of two whales occurred in Mahurangi Harbour, near Warkworth over several days (Dalebout *et al.* 2004). Dalebout *et al.* (2004) suggests this species may concentrate in a "hotspot" of water between the North/South Islands and the Chatham Rise region based on additional offshore sightings.

Conservation status

Beaked whale species are listed by the IUCN as *data deficient* to *least concern* (IUCN 2009) and *data deficient* by the New Zealand Threat Classification System (Hitchmough *et al.* 2007). In general, beaked whales suffer from few anthropogenic threats, with the exception of some low level bycatch in fisheries, due to their deep water distribution. Recent evidence has suggested that beaked whales are extremely sensitive to high levels of anthropogenic sound, especially military sonar and seismic surveys. The use of active sonar during military trials and exercises has been correlated with a number of mass strandings of beaked whale species around the world (Taylor *et al.* 2008e,f,g).



1.7 Southern right whale (*Eubalaena australis*)

Distribution and abundance

Historical populations of Southern Hemisphere right whales (also known as southern right whales) were estimated at 100,000 (Chapman 1974; Anonymous 1986). Today, the overall abundance of southern right whales in the Southern Hemisphere is estimated between 7,000 and 8,000, which is only 10% of pre-whaling numbers (Baker & Clapham 2004).

Their historical distribution in the Southern Hemisphere was between 20°S and 60°S (Carwardine 1995), and thought to be abundant along all major land masses within these latitudes. Present populations of southern right whales continue to follow a seasonal north-south migration pattern, in which they spend the warmer summer months feeding in unknown locations within the Southern Ocean (Patenaude 2000). During autumn, whales migrate back to warmer, temperate waters north of 50°S and winter breeding/calving grounds (Carwardine 1995; Patenaude 2000).

It has been estimated, based on historical whaling catches, that more than 16,000 southern right whales once occurred around New Zealand (Patenaude 2003), using mainland waters as one of their traditional winter calving grounds (IWC 1998). The preference of sheltered and shallow bays in New Zealand by pregnant and/or nursing female right whales was so predictable that 19th century bay-whalers simply anchored in a favourite bay and waited for the whales to come to the boat (Richards 2002).

Within New Zealand today, a small recovery in population numbers has been observed within the traditional breeding grounds of the sub-Antarctic islands. Researchers estimate the Auckland Island population to be between 740 and 1,140 animals (Patenaude 2000). While this remnant population has been known to exist off the Campbell and Auckland Islands since the 1940s, the first re-sighting of a right whale off the New Zealand mainland did not occur until 1963 (Gaskin 1964).

Since 1963, only occasional and opportunistic sightings of southern right whales have been reported along New Zealand's mainland coasts (Cawthorn 1995). A review of mainland whale sightings by Patenaude (2003) confirmed 110 sightings of southern right whales between 1976 and 2002 (Figure 1-9). It is believed that these mainland sightings represent as few as 30 to 50 animals of a highly depleted coastal population that are considered separate from the sub-Antarctic population due to distinct and different migration routes (Patenaude 2003; Suisted & Neale 2004).

Patenaude (2003) found that 30% of right whale sightings where along the east coast of the North Island (Figure 1-10A). The majority of these (n=19) were within the coastal boundaries of the East Coast/Hawke's Bay conservancy. Thirty additional sightings have been reported between the Bay of Plenty and Hawke's Bay coastal regions since 2008, with most recorded in spring and mainly near/around the East Cape headland (Figure 1-10B). Very few strandings of southern right whales occur (Brabyn 1990), and none have been recorded in these regions.





Figure 1-9. The general distribution pattern of southern right whales around New Zealand (left) and within GDC's coastal waters based on New Zealand's National Aquatic Biodiversity Information System (NABIS) sighting database (modified from https://www.nabis.govt.nz/nabis_prd/map.jsp accessed September 2009). The yellow line distinguishes the 100 m depth contour with additional blue lines representing increased bathymetry.





Figure 1-10. A) Known sightings of southern right whales around mainland New Zealand between 1976 and June 2002 from Patenaude 2003. B) Opportunistic sightings of southern right whales reported along the Gisborne District coastline and nearby waters (DoC database).



Based on historical whaling data and these sightings, Patenaude (2003) concluded that the primary calving habitat for right whales around New Zealand is currently the coastal regions between Mt Manganui and Napier. More than half of all cow/calf pairs sighted occurred along these coastlines between August and November, traditional calving months, and some remained within the area for up to four weeks (Patenaude 2003).

Life-history dynamics

New Zealand right whales are fairly solitary animals that usually travel alone or in small groups of 2-3 individuals. However, breeding aggregations wintering off the Auckland Islands have been reported as large as 70 whales (Patenaude 2000).

Right whales feed mainly on krill, specialising on copepods and euphausiids. Due to their prey location, right whales spend the majority of their time at the surface. When feeding, they are most often seen skimming the water surface with their mouths open (Carwardine 1995). Only a few sightings of right whales feeding have been recorded in GDC waters.

Conservation status

Southern right whales are considered a species of *least concern* (IUCN 2009) as most southern populations are demonstrating large rates of increase (Reilly *et al.* 2008a). This classification recognises the species is well below historical numbers but considers most populations are exposed to low level threats at present.

However, under the New Zealand Threat Classification System southern right whales are classified as *nationally endangered* (Hitchmough *et al.* 2007). If ongoing research determines that mainland sightings represent a separate population from the Auckland Island population, these animals will be one of the most depleted of all southern right whale populations (Patenaude 2003). Patenaude (2003) specifically points out the importance of the coastal bays and waters between Bay of Plenty and Hawke's Bay as critical habitat for right whales, particularly cow/calf pairs, within New Zealand mainland waters. Patenaude (2003) recommends strong enforcement of existing marine mammal guidelines in this area (*e.g.* approach distances of vessels, vessel behaviour around whales) and careful evaluation and/or monitoring of any new coastal developments.

Currently, the most significant threat to right whale populations worldwide is habitat change due to coastal development. These changes include anthropogenic activities such as increased vessel traffic, aquaculture, oil/gas exploration, fishing and general pollution (Kraus & Rolland 2007).

1.8 Humpback whales (*Megaptera novaeangliae*)

Distribution and abundance

Similar to right whales, humpback whales in the Southern Hemisphere numbered more than 100,000 in the pre-whaling era, but currently total only 15,000 (Leatherwood *et al.* 1983). Within the Southern Hemisphere, six distinct and isolated stocks are recognised. The Area V

stock, known as the Oceania subpopulation, was reduced to only approximately 250-500 animals at the turn of the century due to intensive whaling (Chittleborough 1965). A subgroup of this whale stock is thought to winter off Tonga, Samoa and Fiji, passing through New Zealand's coastal waters while migrating to and from the Antarctic (Constantine *et al.* 2007).

From detailed whaling logs, humpbacks on their north-bound migration were known to travel more offshore until coming into contact with New Zealand's eastern coastline (Dawbin 1956). These whales were then forced to follow the north-easterly orientation of the coastline, at least to Cook Strait and/or East Cape, before being able to head in a more northerly direction again. Whalers and local trawlers reported the highest numbers of humpbacks traveling 5-10 n. miles offshore from south of Cape Kidnappers up to Mahia Peninsula between May and August (Dawbin 1956 - Figure 1-11A).

Unlike right whales, humpbacks tend to travel in straight lines from headland to headland, only occasionally passing inshore to bays, bights, and/or harbours. After coming around East Cape, some north-bound whales continue to generally follow the coastline but few travel into Bay of Plenty's inshore waters (Dawbin 1956). Instead, whales generally travel offshore towards the headland near Whangaruru (just north of Bream Bay), where they continue north.

Whales returning on their south-bound migrations, between September and late November/December, tended to stay close to the shore along the northern and western coastlines (Dawbin 1956). Historically this species was particularly prevalent within the Bay of Plenty waters where they would feed. Bay of Plenty and East Cape whaling stations mainly focused on humpbacks during the spring migration as most hunting could be done close to shore (Dawbin 1956). Once around East Cape, few humpbacks were sighted along more south-eastern coastlines (Figure 1-11B).

From 1970 to 1999, 157 sightings of humpback whales were recorded around New Zealand (Gibbs & Childerhouse 2000). Since then, at least one to two whales have been reported annually between Bay of Plenty and Hawke's Bay regions, accounting for over 30 additional sightings (Figure 1-12). Most sightings within the GDC region were reported during June - July off Mahia Peninsula or the coastal region between Tuaheni Rocks (Gisborne) and Tolaga Bay to the north. Whales sighted between August and January occurred almost exclusively in Bay of Plenty waters, often near small inshore islands.





Figure 1-11. The (a) northern and (b) southern migratory routes of humpback whales in NZ waters. Fanned lines indicate main areas where humpbacks are thought to approach or leave coastal waters (from Gibbs & Childerhouse 2000 modified originally from Dawbin 1956).





Figure 1-12. Opportunistic sightings and strandings of humpback whales (*Megaptera novaeangliae*) reported along the Gisborne District coastline and nearby waters (DoC database).

Life-history dynamics

While known to gather in large aggregations while feeding and/or breeding, humpbacks are usually found alone or in small groups. As they migrate north past New Zealand, most humpbacks traditionally travelled singly or in pairs (Dawbin 1956). On their south-bound return, they tended to occur more in groups, most often with calves.

Humpback's main prey items include krill and schooling fish from Antarctic waters (Leatherwood *et al.* 1983). It is thought this species does not feed over winter while in tropical breeding grounds. Like right whales, humpbacks are often seen feeding along or just below the surface, although they are known for their innovative feeding techniques (Carwardine 1995). Their most well-known technique involves driving schools of fish to the surface using a cooperative feeding behaviour known as "bubble netting".



Conservation status

Due to the recent publication of illegal commercial whaling in the 1960s and 1970s by the Soviets within Southern Ocean waters (Clapham *et al.* 2009) and the slow population recovery (Childerhouse & Gibbs 2006), the Oceania stock of humpback whales is considered *endangered* by the IUCN (Childerhouse *et al.* 2008). This species is classified as a *migrant* under the New Zealand Threat Classification System, (Hitchmough *et al.* 2007) and considered as a *threatened migrant* by the DoC's Marine Mammal Action Plan (Suisted & Neale 2004) due to the small number of animals regularly migrating through New Zealand waters.

In the absence of whaling, the greatest impact to this species is habitat competition and/or degradation, entanglements and ship strikes. Due to the overlap in food-rich habitats and their surface and sub-surface behaviours, humpbacks in the Southern Hemisphere are often entangled in fixed fishing gear within inshore waters (Leatherwood *et al.* 1983). Between 2001 and 2003, four humpbacks were reported entangled in craypot lines within New Zealand waters (Suisted & Neale 2004). The incidents of Australian humpback whales entanglements between 1985 and 2001 have ranged from craypot and crab lines to aquaculture farms and fishing lines/nets (data obtained from New South Wales, Queensland, Western Australia Department of Conservation and Land Management).

1.9 Sperm whales (*Physeter macrocephalus*)

Distribution and abundance

This large and very distinct species is widely distributed in all oceans of the world, from the equator to the edges of polar ice (Leatherwood *et al.* 1983; Taylor *et al.* 2008h). In most areas sperm whales prefer deeper waters, near the continental slope and/or submarine canyons. Mature males occur at higher latitudes than females and juveniles, which are rarely sighted at latitudes greater than 40-50°S. Most sperm whales migrate towards the poles in spring and summer returning to lower latitudes in winter (Carwardine 1995). However some populations are resident year-round (Leatherwood *et al.* 1983).

Large-scale exploitation of sperm whales, primarily for their spermaceti oil, has resulted in substantial reduction of most stocks (Leatherwood *et al.* 1983). Whitehead (2002) estimated a pre-whaling population size of around one million that was reduced to 100,000s by the 1980s when all illegal whaling ceased. Low genetic differentiation among ocean basins currently suggests that sperm whales may maintain a fairly global population structure, with a few local exceptions.

Since they favour deep water, sperm whales are rarely seen close to the coast in New Zealand, except in regions with extreme bathymetry such as Kaikoura and Fiordland. From whaling catches, Gaskin (1973) found that sperm whales off the east of New Zealand congregated over the continental slope as they associated with the seasonal location of the Subtropical Convergence (as dictated by the East Cape and Southland Currents), and its eastern flow towards the Chatham Rise.

Sperm whales were historically whaled along North Cape, East Cape, Foveaux Strait and the Kermadec Islands (located northeast of East Cape), however most male sperm whales were caught around Cook Strait and Kaikoura (Gaskin 1968b). Male whales around Kaikoura exhibit a seasonal residency, in which they regularly return to this area as they presumably migrate to and from polar regions. There are no known coastal regions in New Zealand in which groups of female sperm whales (known as harems – see below) are consistently found year-round (Jaquet *et al.* 2001).

Recent sightings of this species have increased along the Bay of Plenty and Hawke's Bay regions with an increase in ecotourism and marine mammal observers on offshore fisheries boats (DoC sighting database). Most sightings are between 10 and 100 n. miles from shore and occur mainly during summer and autumn months (Figure 1-13).

Brabyn (1990) reported over 100 strandings of sperm whales around New Zealand with approximately 43 spread along the Bay of Plenty and Hawke's Bay coastlines (Figure 1-13). Concentrations of single animal strandings occur near Wellington, Mahia Peninsula and Kaipara Harbour. Female sperm whales have had only one stranding around the North Island, with a nursery/harem stranding of 59 animals off Gisborne in 1970.

Life history dynamics

Sperm whales are sexually dimorphic in size, distribution and social structure. Male sperm whales are much larger than females. They generally tend to be solitary, forming only temporary aggregations with other males known as 'bachelor groups' when they are young and sexually immature (Lettevall *et al.* 2002). Females tend to group in more permanent 'harems' made up of different age classes of females and calves. Harem aggregations have complex social structures with members forming long-term bonds (Lettevall *et al.* 2002). As such group sizes in sperm whales vary between single animals to hundreds depending on the type of group.

Sperm whales feed on deep-water squid and fish, such as groper and ling (Gaskin & Cawthorn 1967). This species is fairly unique in that they dive to deep depths to search out prey while most other cetaceans depend on diel vertical migrations to bring deeper prey within their foraging limits. Sperm whale diets off Cook Strait are thought to change seasonally depending on the distribution of their prey (Jaquet *et al.* 2001).

Conservation status

The sperm whale is listed by the IUCN as *vulnerable* (IUCN 2009), due to a population reduction of at least 20% over the last three generations and the continuation of illegal whaling by the USSR until the early 1980s. The New Zealand Threat Classification System lists this species as a *migrant*, with semi-residency at some locations (Suisted & Neale 2004).

With the cessation of whaling, sperm whales face very few threats. Low numbers of entanglements in fishing gear and boat strikes occur but tend to be more of a localised problem in certain regions. Of more concern is the low level of growth (\sim 1% per year), perhaps due to





localised depletion of mainly male whales during whaling years, which seem to be preventing some regional populations from recovering.

Figure 1-13. Opportunistic sightings and strandings of sperm whales (*Physeter macrocephalus*) reported along the Gisborne District coastline and nearby waters (DoC database).

1.10 Minke whales (Balaenoptera acuotostrata/bonaerensis)

This species is discussed with the other rorqual whales below (1.13 Rorqual whales (Balaenoptera sp.)).

1.11 Dusky dolphins (Lagenorhynchus obscurus)

Distribution and abundance

Dusky dolphins are widespread across the Southern Hemisphere with a patchy distribution pattern associated with geographically isolated populations (Würsig *et al.* 2007). Recent genetic evidence suggests that up to three subspecies exist, with one isolated subpopulation

centred around New Zealand (Hammond *et al.* 2008b). They are generally regarded as a coastal and/or semi-pelagic species and are rarely sighted far from shore, shallow shelves and/or slopes (Würsig *et al.* 1997).

In New Zealand, Markowitz (2004) estimated between 12,000 and 20,000 dusky dolphins occur around most of the South Island and are rarely seen north of East Cape on the North Island (about 37°S – Baker 1999; Figure 1-14). This species appears to prefer colder temperature waters in New Zealand (Gaskin 1972), in particularly off Kaikoura, Otago Peninsula , and the Marlborough Sounds as well as occasional visits to Fiordland and the South Island's west coast. Gaskin (1968a) suggested that these dolphins associate with the Subtropical Convergence, a branch of which can occasionally push up to the east coast of the North Island as far as Gisborne (Brodie 1960).

Some dusky dolphins in New Zealand may be year-round residents (*e.g.* Cipriano 1992) while others make seasonal migrations, some as far as *c*. 1000 km (Harlin *et al.* 2001; Markowitz 2004). However, genetic analyses have found no population differentiation between animals sampled around the South Island (Harlin *et al.* 2003). In general, this species is known to migrate north to warmer waters in winter and south again in summer (Gaskin 1968a; Würsig *et al.* 1997). Historical observations noted that dusky sightings off the Hawke's Bay area generally only occurred during winter and spring months (Gaskin 1968a).

Only two recent sightings of dusky dolphins have been reported along the GDC region and associated southern coastlines (Figure 1-15). In June 2006, a group of 10 animals was sighted as far north as Gable End Foreland and in deep waters off the Ariel Bank. The other sighting, in June 2007, reported four animals along the south-eastern coast near Tora. Of the five recorded dusky dolphin strandings, all were near Napier bay or Gisborne region and occurred in the 1970s and 1980s (Figure 1-15).

Life-history dynamics

Dusky dolphins in New Zealand are known for their gregarious social gatherings, particularly in summer. They are rarely sighted alone, but may be found in smaller groups of six to 15 (Carwardine 1995). Large groups can vary daily from 10s to 100s up to several thousand in more open waters (Würsig *et al* 1997).

Dusky dolphins are thought to follow prey inshore during the spring and early summer and offshore into deeper waters in late summer and autumn. Not known as deep-divers, this species seem to feed more at night when their prey vertically migrates to within 50 to 100 m of the surface (Barr 1999). From stomach contents, Cipriano (1992) found dolphins off Kaikoura mainly fed on squid (*Nototodarus/Todaroides* spp.) and lanternfish (Myctophidae) as well as hoki (*Macruronus novaezelandiae*). While in Admiralty Bay (Marlborough Sounds), they switched to smaller schooling fish such as pilchard (*Sardinops sagax*), yellow-eyed mullet (*Aldrichetta forsteri*) and sprat (*Sprattus antipodum*).





Figure 1-14. The general distribution pattern of dusky dolphins around New Zealand and within GDC's coastal waters based on New Zealand's National Aquatic Biodiversity Information System (NABIS) sighting database (modified from https://www.nabis.govt.nz/nabis_prd/map.jsp accessed September 2009). The yellow line distinguishes the 100 m depth contour with additional blue lines representing increased bathymetry.





Figure 1-15. Opportunistic sightings and strandings of dusky dolphins (*Lagenorhynchus obscurus*) reported along the Gisborne District coastline and nearby waters (DoC database).

Conservation status

Dusky dolphins are listed as *not threatened* by New Zealand's Threat Classification System (Hitchmough *et al.* 2007) and are *data deficient* under IUCN (2009), meaning there is insufficient data on abundance and/or distribution to assess its risk of extinction.

Like other small dolphins, dusky dolphins are known to be vulnerable to incidental mortality in fishing gear and nets. Würsig *et al.* (1997) reported that 50-150 individuals were caught per year between the 1984-1988 periods in the gillnet fishery off Kaikoura. In 1997-1998, Ministry of Fisheries' observers reported two dusky dolphins caught during trawl fishing operations and they were also occasionally caught in tuna longlines (Baird 1999, 2000). More recently, the large increase in marine aquaculture farms in the Marlborough Sounds has raised concern as they may potentially fragment and/or compete for critical habitat needed by dusky dolphins wintering there (Markowitz 2004).



1.12 Bryde's whale (Balaenoptera brydei/edeni)

Distribution and abundance

While Bryde's whales are found in most temperate oceans, they remain mainly between the latitudes of 40°N and 40°S (Carwardine 1995). This whale is one of the only large rorqual whales that do not migrate to Antarctic feeding grounds in summer. It is believed they number around 90,000 worldwide, although recent molecular work has suggested the presence of three distinct species of Bryde's whale (Reilly *et al.* 2008b).

In New Zealand, Bryde's whales are one of most commonly observed whales in northern waters, frequently reported off the North Island between North Cape and East Cape (Gaskin 1968b; Figure 1-16). They are thought to seasonally migrate along the north-eastern coast of the North Island to and from the subtropics (Gaskin 1972; Baker 1999).

An inshore population is known to occur year-round in the Hauraki Gulf (Gaskin 1968b, 1972) with greater numbers occurring in summer than winter months (Baker & Madon 2007). Wiseman (2008) estimated that a small, approximately 46 individuals (CV=0.08), yet open population of whales (residents and transients) may be found within the Gulf on an annual basis. Researchers suggest that particular parts of the Hauraki Gulf are important for these whales in terms of feeding (Baker & Madon 2007) and calving habitats (Wiseman 2008). This particular population of Bryde's whales was identified through mtDNA as genetically consistent with *B. brydei* (Wiseman 2008).

Several sightings (~ 25) of Bryde's whales have been reported since 2000 within Coromandel and Bay of Plenty waters (Figure 1-17). All sightings occurred between late spring and late autumn. The Department of Conservation has not been notified of any recent sightings of this species south of East Cape, although stranded animals have been found north of Gisborne and as far south as Mahia Peninsula (Figure 1-17).

Life-history dynamics

In New Zealand waters, Bryde's whales are usually observed individually or in small feeding groups (O'Callaghan & Baker 2002), but can occur in groups as large as 30 animals. Large feeding aggregations are often loosely spread over several square kilometres (Carwardine 1995).

Like other rorqual whales, Bryde's whales feed mainly on shoals of small fish (Baker & Madon 2007) and only occasionally on krill as its baleen is not as fine as other whales (Baker 1999). This species feeds year-round, usually by sudden lunges at the surface or just underneath.





Figure 1-16. The general distribution pattern of Bryde's whales around the North Island and within GDC's coastal waters based on New Zealand's National Aquatic Biodiversity Information System (NABIS) sighting database (modified from https://www.nabis.govt.nz/nabis_prd/map.jsp accessed September 2009). The yellow line distinguishes the 100 m depth contour with additional blue lines representing increased bathymetry.





Figure 1-17. Opportunistic sightings and strandings of Bryde's whales (*Balaenoptera edeni*) reported along the Gisborne District coastline and nearby waters (DoC database).

Conservation status

Bryde's whale is listed as *data deficient* worldwide (IUCN 2009). This category is used when there is not enough information to assess risk of extinction, particular in situations where possible subspecies or localised sub-population might be present. The New Zealand Threat Classification System lists this species as *nationally critical* within New Zealand waters (Hitchmough *et al.* 2007). This listing is based on the small number of whales using the Hauraki Gulf, New Zealand's largest and busiest port, as a potential feeding and breeding ground (Gaskin 1972).

As with most large whale species, threats include possible ship strike due to a distribution that overlaps with heavy vessel traffic (Baker & Madon 2007) and entanglement in fishing gear and/or aquaculture farms (Lloyd 2003). In particular, Bryde's whales are exposed to a growing eco-tourism industry off along the north-eastern coast of the North Island (Stockin *et al.* 2008a).



1.13 Rorqual whales (Balaenoptera sp.)

All six species of rorqual whales (*i.e.* whales with throat grooves) are known to occur in New Zealand waters: blue whale (*Balaenoptera musculus*), sei whale (*Balaenoptera borealis*), fin whale (*Balaenoptera physalus*), minke whale (*Balaenoptera acuotostrata/ bonaerensis*), and humpback and Bryde's whales, which have been discussed above. Other than the Bryde's whale, these species have similar distributions, migrating from warm water breeding grounds in winter towards Antarctic waters to feed on krill and schooling fish in the summer (Leatherwood *et al.* 1983). The tendency of some of these species to migrate through deeper, more offshore routes means that sightings and strandings in New Zealand can be relatively rare.

Minke whale

The minke whale is the smallest in size yet more widely distributed of the rorquals and is thought to number close to one million world-wide. Since 2000, two distinct species have been recognised in the Southern Hemisphere – the dwarf minke whale (*B. acuotostrata* – Reilly *et al.* 2008c) and the Antarctic minke whale (*B. bonaerensis* – Reilly *et al.* 2008d). The dwarf minke whale is thought to occur in higher latitudes and be much less common than the Antarctic minke. However, as these two species are partially sympatric (occur in the same habitats), it is often difficult to reliably distinguish them. As such, the abundance of these species is unknown but thought to be in the hundreds of thousands (Reilly *et al.* 2008d).

Some minke populations are resident year-round, but populations around New Zealand are more migratory (Baker 1983). Of all the rorqual whales, the minke whale is one of the more frequently seen in New Zealand waters, possibly due to their tendency to approach close to the shore and enter bays, inlets and estuaries (Leatherwood *et al.* 1983). At least one to two minke whales are sighted each year off the central to southeast coast of the North Island (Figure 1-18). Most of these sightings have occurred within Bay of Plenty and northern East Cape waters from mid-winter to early summer, and generally consist of single or small groups of animals. These animals are known to feed around headlands and small islands (Carwardine 1995), especially over summer months, which might explain their recurrence around the East Cape region.

Since 1885, strandings of mainly live or sick minke whales have been reported along both the Bay of Plenty and Hawke's Bay coastlines. These occurrences indicate that this species has maintained regular and long-term movements through these waters over several decades, if not longer (Figure 1-18).

The Antarctic minke whale has recently been re-listed by the IUCN as *data deficient* and the dwarf minke whale as *least concern* due to generally large population sizes but poor overall information. The New Zealand Threat Classification System lists the Antarctic minke as a *migrant* and the dwarf minke as *not threatened* within New Zealand waters.





Figure 1-18. Opportunistic sightings and strandings of minke whales (*Balaenoptera acutorostrata*) reported along the Gisborne District coastline and nearby waters (DoC database).

Sei and fin whales

Sei and fin whales are probably the next most frequently seen rorqual off New Zealand after the humpback, Bryde's and minke whales. Sei whales are similar in size and appearance to Bryde's whale and can often be confused from a distance. Little is known about the sei's migration paths as they are more of an offshore species. They tend to favour water temperatures between 8-18°C and feed more in subpolar latitudes (45-60°S) than other rorquals (Reilly *et al.* 2008e). A rough population estimate of this species in the Southern Hemisphere is thought to be around 10,000 and it is not known whether sei whales are increasing or not from their depletion due to whaling (Reilly *et al.* 2008e).

Both large groups (>100 animals) and single sei whales have been spotted within the Bay of Plenty and Hawke's Bay coastal regions (Figure 1-19). Sightings are not predictable with an occasional sighting every few years, mainly between the months of October to April. This



species' more sporadic migrations and offshore tendencies may explain the lack of stranding data as well.



Figure 1-19. Opportunistic sightings and strandings of rorqual whales reported along the Gisborne District coastline and nearby waters (DoC database).

As with sei whales, little is known about fin whale migration in the Southern Hemisphere (Reilly *et al.* 2008f). It is thought that most animals are found between latitude 40-65°S in the summer but their winter distribution is still unknown. There are no current population estimates but indirect estimates have calculated around 15,000 animals in the Southern Hemisphere (Reilly *et al.* 2008f).

Fin whales have been mainly sighted between East Cape and the inshore waters of the Bay of Plenty (DoC sighting database – Figure 1-19). They are generally sighted more frequently than sei whales, with at least one whale spotted in this region between late winter and late summer each year. At least two live strandings of this species have been reported along the


Hawke's Bay coast close to Napier (Figure 1-19). However as these strandings occurred in the 1920s, they most likely do not represent a current nor inshore migration pattern.

Blue whales

Despite being the largest mammal, little is known about blue whales, particularly in the southern Pacific waters. It has been estimated that only 2% of the pre-whaling population exists currently (Reilly *et al.* 2008g). There are currently two recognised subspecies in the Southern Hemisphere - the Antarctic form (*B. musculus ssp, intermedia*) and the pygmy blue whale (*B. musculus ssp, brevicauda* - (Reilly *et al.* 2008g). The Antarctic form, thought to be the more abundant prior to whaling, spends most of the summer feeding in Antarctic waters. Their winter distributions are still unknown. The pygmy blue whale prefers warmer waters found mainly north of 55°S year-round. They are patchy in their distribution but a fairly continuous population is thought to exist from Indonesia to Tasmania (around Western Australia - Reilly *et al.* 2008g).

Blue whale sightings within New Zealand waters are infrequent but less rare in more recent years. Between 2000 and 2007, at least three blue whales were sighted close to shore within Bay of Plenty and northern East Cape waters between August and February (Figure 1-19). Only one stranding of a blue whale has been reported along the Hawke's Bay region in 1920 near Napier (Figure 1-19).

Conservation status

Southern hemisphere sei whales are thought to be more common than their northern hemisphere relatives, but due to lack of knowledge about current population trends and large declines due to whaling, this species has been listed as *endangered* (IUCN 2009). Even less is known about the current status of fin and blue whale populations. According to the IUCN, these species are listed as *endangered* on the basis of a reduction in the population of at least 50% over the last three generations (IUCN 2009). All three species are listed as *migrants* within New Zealand waters (Hitchmough *et al.* 2007)

It should be noted that although the IWC agreed a moratorium on commercial whaling in 1982, hunting of some rorqual whales still continues. Recent Japanese catch plans included taking up to 50 fin, 100 sei and 850 minke whales per year from the Antarctic stocks for research purposes (IUCN 2009). These stocks include whales that migrate through New Zealand waters. In addition to continued whaling, rorqual whales are also susceptible to vessel collisions and entanglement in fishing gear. Fin whales, in particular, account for a large number of fatal collisions along the United States of America eastern seaboard and Mediterranean area (Reilly *et al.* 2008f). Sei and blue whales are perhaps the exceptions as their more offshore distribution appears to prevent most human-related risks/threats. Climate change and its reduction in the extent of Antarctic sea ice will possibly have the greatest impact on rorqual species in the future.



1.14 False killer whales (Pseudorca crassidens)

Distribution and abundance

This completely black, slender, large toothed whale somewhat resembles a pilot and/or melonheaded whale. False killer whales are widely distributed throughout all tropical and subtropical waters, yet are not considered common or abundant in any particular region (Carwardine 1995). The false killer whale is another primarily open-ocean species that frequents semi-enclosed seas (*e.g.* Red Sea), some warmer temperate waters and deep coastal regions. This species currently is not known for any distinct migrations patterns, although evidence of long-term site fidelity and seasonal north-south movements has been noted in local regions (*e.g.* Baird *et al.* 2008). There are no global estimates of abundance for false killer whales as there is evidence of both broad-scale and small-scale limits on gene flow, indicating additional sub-species or subpopulation structure (Baird *et al.* 2008).

While New Zealand sits potentially at the edge of its distribution limits, several sightings and strandings of false killer whales have been recorded around mainly North Island waters. Of the more than 20 reported strandings events, 13 have occurred between East Cape and Hawke's Bay coastlines (Brabyn 1990; DoC stranding database - Figure 1-20). Despite this area being an apparent 'hotspot' for false killer whale strandings, these events were irregular at best, spanning from 1933 to 2000 and occurring mainly from late summer to late winter.

Live sightings of this species in New Zealand waters are more recent events, perhaps due to better identification information and the increase in ecotourism. Opportunistic sightings of false killer whales within Bay of Plenty waters were first reported in 2004 with at least one sighting recorded each year since (Figure 1-20). Both recent sightings and the presence of single and herd strandings in this region indicate that these particular waters might be more regularly frequented by this species than previous thought.

Life-history dynamics

Group sizes within Bay of Plenty waters have ranged from 10 to 40 with calves often observed. These findings match reports from other regions in which average group sizes were 30, but several hundred animals have been sighted in active and very social groups. Strandings of false killer whales along the Hawke's Bay region have been as large as 300 animals.

The diet of false killer whales is based primarily on larger fish, such as mahi-mahi and tuna, and a variety of cephalopods (Carwardine 1995). Despite often associating with other cetaceans while travelling, they have been seen eating other dolphins and even attacking baleen calves (Taylor *et al.* 2008i).

Conservation status

The false killer whale is listed by the IUCN as *data deficient* (IUCN 2009) and within the New Zealand as *not threatened* (Hitchmough *et al* 2007). The main threats to this species include bycatch in several long-line and driftnet fisheries around the world and hunted for meat by some smaller island nations, such as Indonesia and Taiwan.







1.15 Hector's dolphins (Cephalorhynchus hectori hectori/maui)

Distribution and abundance

Hector's dolphin is the only dolphin species endemic to New Zealand (Baker 1978). The majority of Hector's dolphins occur within inshore waters around the South Island while only an estimated 110 animals of the subspecies (*C. hectori maui*) are found along the west coast of the North Island (Slooten *et al.* 2002).

Two rare and recent sightings of Hector's dolphin were reported in Hawke's Bay and East Cape inshore waters (Figure 1-21). In 1998, a single animal was reported off Whareongaonga and in 2001 a small group was seen near Napier's Marine Parade. Historically Hector's dolphins were thought to inhabit southern and eastern waters along the North Island (Russell 1999). There have been several unconfirmed sightings of this species between Mahia Peninsula and Wellington in more recent years (Freeman 2003). It is not known whether these animals are stragglers originally from the South Island and/or North Island subpopulations or



possibly an extremely small remnant subpopulation, since little research has focused on these regions.

Conservation status

As these dolphins are highly clumped in their regional distribution (Clement 2005), do not migrate long distances (>106 km – Bräger 1998) and have a fairly low abundance (*c*. 7000-8000), they have been listed as a *nationally endangered* species by New Zealand's Threat Classification (Hitchmough *et al.* 2007) and as *endangered* by the IUCN (2009).



Figure 1-21. Opportunistic sightings and strandings of rare marine mammal species – Hector's dolphin (*Cephalorhynchus hectori*), Risso's dolphin (*Grampus griseus*), pygmy right whale (*Caperea marginata*), rough-toothed dolphin (*Steno bredanensis*), melon-headed whale (*Peponocephala electra*) and southern right whale dolphin (*Lissodelphis peronii*) - reported along the Gisborne District coastline and nearby waters (DoC database).



1.16 Risso's dolphins (Grampus griseus)

Distribution and abundance

Risso's dolphin is typically a temperate and tropical waters species in both hemispheres with an offshore, pelagic distribution (Leatherwood *et al.* 1983). They are generally found along continental slopes and outer shelves with steep topography, preferring to remain around continents rather than more open waters. No global estimates or population trends are known but this species appears to be generally abundant in several areas. Risso's dolphins are mainly present year-round in most regions but may exhibit seasonal inshore-offshore movements while following prey (Carwardine 1995).

While Risso's dolphins are fairly abundant worldwide, they are not frequently seen in southern Pacific waters including New Zealand (Baker 1999), although Taylor *et al.* (2008j) notes they were found as far south as southern New Zealand. Baker (1999) documented only 14 sightings of Risso's dolphins in New Zealand waters. In addition, he confirmed that "Pelorus Jack", a lone dolphin that bow-rode waves of steamers passing across the outside of Pelorus Sound between 1888 and 1912, was a Risso's dolphin.

While no live sightings of Risso's have been reported in GDC and nearby regions, at least four strandings have been recorded (DoC stranding database – Figure 1-21). Brabyn (1990) reported all seven strandings of Risso's dolphins occurring around North Island regions only.

Life-history dynamics

This species is generally gregarious with typical group sizes between three and 50, but observed as large as several hundred (Leatherwood *et al.* 1983).

Like other deep water species, Risso's dolphins tend to feed at night mainly on vertically migrating cephalopods (*e.g.* squid and even cuttlefish *Sepia officinalis*) and crustaceans (Taylor *et al.* 2008j). It is believed that the distinctive scarring along their melon and body is partial due to squid bites and aggressive encounters with con-specifics.

Conservation status

Risso's dolphin is listed by the IUCN as *least concern* given its wide distribution and general abundance (IUCN 2009). In New Zealand waters, Risso's are listed as *vagrant* (Hitchmough *et al* 2007), meaning that they are rarely found in New Zealand waters, are naturally transitory and/or have failed to establish a breeding population (Townsend *et al*. 2007).

Current threats to this species still include directed hunts in Japan (up to 250-500 individuals annually) and Sri Lanka (1,300 annually) and some incidental by-catch in fisheries around small island countries (Taylor *et al.* 2008j). In addition, this species is most likely susceptible to loud anthropogenic sounds, like other pelagic, deep-diving odontocete species.



1.17 Pygmy right whales (*Caperea marginata*)

Distribution and abundance

Pygmy right whales are the smallest and least known of all the baleen whales, with most information collected from strandings (Reilly *et al.* 2008h). This species is thought to only occur from temperate and sub-Antarctic waters of the Southern Hemisphere between approximately 19°S and 52°S (Kemper 2002). They are known to be present, at least seasonally, along the coasts of southern Australia, South Africa and New Zealand, and these regions are where the majority of strandings occur (Baker 1983; Leatherwood *et al.* 1983).

No long distance migrations have been documented, but there is some evidence of an inshore movement in spring with a strong preference for shallow, sheltered bays (Leatherwood *et al.* 1983). Kemper (2002) found that strandings of this species occurred all months of the year around the New Zealand coastline, suggesting no general migrations patterns in this region. Sixteen of 35 strandings of pygmy right whales in New Zealand occurred around the North Island, of which only one was reported off Napier in 1966 (Figure 1-21). In Tasmania, a population of pygmy rights are known to be year-round residents, however no evidence of residency has yet been observed around New Zealand.

Life-history dynamics

Pygmy right whales have been observed in groups of up to eight, but most sightings are of lone individuals or pairs (Leatherwood *et al.* 1983). The copepod and euphasuiid diet of animals from both New Zealand and Australia supports the suggestion that they surface-skim to feed (Kemper 2002). It is thought that the coastal shelf waters off southern Australia and New Zealand may be productive areas in which pygmy right whales are feeding, especially cow/calf pairs (Kemper 2002).

Conservation status

The global status of the pygmy right whale is unclear due to the paucity of live sightings. As such the species has been listed as *data deficient* by both the IUCN and New Zealand Threat Classification System (IUCN 2009, Hitchmough *et al* 2007). However, due to its wide distribution; it is not currently thought to be at risk of extinction due to anthropogenic influences and may be just naturally rare (Reilly *et al*. 2008h).



2 Other rare species

Rare and single strandings of other offshore cetaceans have also occurred between Bay of Plenty and Hawke's Bay coastlines. These include the melon-headed whales (*Peponocephala electra*), rough-toothed dolphins (*Steno bredanensis*) and southern right-whale dolphins (*Lissodelphis peronii*). Due to their offshore distribution around more remote regions, few details are known about this species (Carwardine 1995). However, despite the rarity in live sightings, these species are considered to be fairly common throughout their respective ranges (Hammond *et al.* 2008c,d; Taylor *et al.* 2008k).

Melon-headed whales are pantropical in their distribution, occurring usually as far south as 35°S (Taylor *et al.* 2008k). It is thought that strandings outside this range represent rare events and may be due to this species following warm water currents. Only one stranding of this species has been recently reported in New Zealand. A single, wounded animal was found along the Coromandel in January 2007 (Figure 1-21).

Similarly, rough-toothed dolphins occur in more tropical and subtropical oceans and rarely travel south of 35°S (Hammond *et al.* 2008c). Their full distribution is not known to include New Zealand, but Baker (1999) has reported two records of their presence in Bay of Plenty (Figure 1-21) and Cloudy Bay (Marlborough Sounds).

Southern right-whale dolphins are known to occur in coastal waters off New Zealand where waters deeper than 200 m come close to the coast (Carwardine 1995). In recent years, large groups (*e.g.* 100 to 500+) have been sighted travelling past Kaikoura (Richter pers. Comm.., Visser *et al.* 2004) and the Chatham Islands (Hammond *et al.* 2008d). Over 10 strandings of this species have occurred in New Zealand from Whananaki (north) to Foveaux Strait in the south. Only a single stranded southern right-whale dolphin has been reported near Cape Kidnappers in June 2007 (Figure 1-21).

Both melon-headed whales and rough-toothed dolphins are listed as species of *least concern* due to potential wide-spread abundance and no major threats identified (IUCN 2009). In New Zealand waters, these species are considered *vagrants* (Hitchmough *et al.* 2007).

Due to lack of information on population assessment and possible impacts, the IUCN has listed southern right-whale dolphins as *data deficient*. While this species is considered native and fairly rare in New Zealand waters, it is listed as *not threatened* by the New Zealand Threat Classification System (Hitchmough *et al.* 2007). This classification is based on an estimated abundance between 20,000 and 100,000 with a population trend of increase greater than 10%.



3 Species-specific profiles for pinnipeds

Each of the different pinniped species listed in Tables 1-3 are discussed in detail below. Only two species of pinnipeds have been reported within GDC and/or neighbouring regions; New Zealand fur seals and leopard seals.

Pinnipeds are not listed in the DoC/Te Papa stranding database as they do not strand instead, as air-breathing animals, they regularly haul-out on land to breed and rest. Most pinniped sightings that are reported to DoC are generally opportunistic and more often unusual events (*i.e.* rare species on beach, dead or sick animal on beach) or from regular monitoring of haul-out and breeding colonies. Similar to cetacean sightings, this information is useful for determining where these species may occur, but without systematic surveys of surrounding areas, cannot tell us where they are more (or less) prevalent or where they are absent.

3.1 New Zealand fur seals (Arctocephalus forsteri)

Distribution and abundance

New Zealand fur seals are found around New Zealand as well as western and southern Australia and several of the sub-Antarctic islands. They are the most common pinniped species observed within New Zealand waters today, despite being harvested to near extinction by the mid-1800s by European sealers.

This species is considered non-migratory but is known to easily and repeatedly cover large distances within their currently defined range (Figure 3-1). Tagged pups have been known to turn up anywhere around New Zealand, even crossing over to Australia (Goldsworthy & Gales 2008). As they are good swimmers, they regularly travel out to the continental shelf and more open-ocean waters to feed.

In New Zealand, current estimates of fur seals number around 100,000 with some local populations increasing between 12% and 25% a year (Goldsworthy & Gales 2008). As the population has recovered and spread north into former territories, they have re-established breeding colonies/rookeries. Since 1991, fur seals have started breeding again on the North Island. Known breeding colonies along the North Island's lower east coast include Cape Palliser, Castle Point and Whale Island (Bay of Plenty) (DoC database, Figure 3-2).

Haul-out sites are rocky shore regions where fur seals tend to regularly come ashore and rest. Fur seals tend to haul-out for extended periods of time over the colder winter months. At least 15 distinct fur seal haul-out sites are spread from Bay of Plenty to Cape Palliser, with four of these sites along GDC's rocky shorelines (DoC database, Figure 3-2).

The Department of Conservation keeps records of pinniped sightings reported by staff and members of the public. Often those animals that are reported occur on land and are usually sick or dead. Nine reports of dead fur seals were recorded within the last nine years, most of which were near East Cape (DoC database, Figure 3-2).





Figure 3-1. The general distribution pattern of fur seals around the North Island and within GDC's coastal waters based on New Zealand's National Aquatic Biodiversity Information System (NABIS) sighting database (modified from https://www.nabis.govt.nz/nabis_prd/map.jsp accessed September 2009). The yellow line distinguishes the 100 m depth contour with additional blue lines representing increased bathymetry.







Life-history dynamics

Females generally give birth every year once they have reached sexual maturity. The breeding season lasts from mid-November to mid-January (Goldsworthy & Gales 2008). However, pups will remain within the colony, nursing from the female until they are weaned around late winter/spring. After that they disperse, and are generally thought to return to the same breeding colony once they are sexually mature.

Like most pinnipeds, fur seals are sexually dimorphic, with males reaching 1.3 times the length and three times the weight of females (Goldsworthy & Gales 2008). As they have a polymorphic breeding system, males arrive in breeding rookeries to gain and hold territories. Males generally defend and breed with a harem of up to 5-8 females in their territory each year. By January most males are returning to sea.



Fur seals feed on a large variety of prey items that can include fish, cephalopods and even birds. Nursing females will often travel further out into open water over winter to forage while juveniles feed on vertically migrating myctophid fish (Goldsworthy & Gales 2008).

Conservation status

Due to their general abundance and sustained growth, New Zealand fur seals have been listed as *least concern* by IUCN (IUCN 2009) and *not threatened* by the New Zealand Threat Classification System (Hitchmough *et al.* 2007). Current threats at sea include entanglement in trawl fisheries, particularly squid, and pollution such as oil spills (Goldsworthy & Gales 2008). On land, fur seals are susceptible to disturbance from humans and domestic animals, such as dogs, within breeding colonies causing disruption in breeding and even site abandonment.

3.2 Leopard seals (*Hydrurga leptonyx*)

Distribution and abundance

Leopard seals are found exclusively in the Southern Hemisphere, yet wide-spread within Antarctic and sub-Antarctic waters. They haul-out on the ice of the Antarctic continent, rocky shores of sub-Antarctic islands and floating pack ice. Population estimates range from 100,000 to 440,000 animals (Southwell 2008).

Leopard seals are generally found near Antarctic pack ice. However, juvenile and sub-adult animals tend to range further often visiting New Zealand waters over winter months. Leopard seals are known to annually visit Auckland and Campbell Islands, and are regularly sighted along mainland New Zealand as well (DoC database).

These animals are assumed to occur infrequently within more northern waters. However, since 2000, five leopard seals, ranging from healthy to injured to dead, have been sighted along the East Cape/Hawke's Bay coastline between the months of July and November. These sightings were concentrated near Gisborne and south along Riversdale Beach (Figure 3-3).

Life-history dynamics

There is no distinct sexual dimorphism in leopard seals with females growing as large as, or even slightly larger, than males (Southwell 2008). Males do not haul-out at breeding sites as mating takes place in the water. Pups are usually born during the warmer months of summer and weaned in approximately four weeks. This species tends to be solitary at sea and on land.

Leopard seals are ferocious and opportunistic predators, being fairly eclectic in what they eat. This species has been known to eat penguins, fish, other seal pups, cephalopods and even krill (Southwell 2008).



Conservation status

As leopard seals are abundant throughout their range and have few unnatural threats, the IUCN has listed them as a species of *least concern* (IUCN 2009). Within New Zealand waters, they are listed as a *migrant* (Hitchmough *et al.* 2007).



Figure 3-3. Opportunistic sightings of leopard seals reported along the Gisborne District coastline and nearby waters (DoC database).