Current State of Knowledge of Cetacean Threats, Diversity and Habitats in the Pacific Islands Region

A Report by the Whale and Dolphin Conservation Society for the First Meeting of the Signatories to the Memorandum of Understanding for the Conservation of Cetaceans and Their Habitats in the Pacific Islands Region

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WDCS, the Whale and Dolphin Conservation Society, is pleased to be a formal Collaborating Organisation to the Convention of Migratory Species (CMS) Memorandum of Understanding for the Conservation of Cetaceans and their Habitats in the Pacific Island Region (MoU) and a Partner Orgainsation to CMS.

WDCS regards investment and focus on the activities of the CMS MoU as being of critical importance, benefiting the Pacific Islands Region by:

- facilitating deeper region-wide cooperation to address issues of shared responsibility including threat reduction, habitat protection and the establishment of migratory corridors, research, monitoring, and information exchange, regional capacity building, the development of sustainable and responsible cetacean-based tourism;
- increasing international awareness and coordination about the issues and threats to cetaceans in the Pacific Islands Region;
- networking the Pacific Islands Region with other similar cetacean agreement regions, increasing technical information flow and capacity sharing; and
- providing an effective channel for international funding.

WDCS has completed this report as a technical contribution to support the implementation of the CMS MoU and the domestic work of its signatories, by providing a baseline of current knowledge of cetacean threats, diversity and habitats in the Pacific Islands Region.

We look forward to the ongoing development of this knowledge and to contributing to the implementation of the CMS MoU and its Action Plan

Current State of Knowledge of Cetacean Threats, Diversity, and Habitats in the Pacific Islands Region

Executive Summary

This report provides an overview of current state of knowledge of cetacean diversity, habitat and threats in the Pacific Islands Region. The boundaries of the Pacific Islands Region (Chapter 1), as defined by the Convention of Migratory Species (CMS) Memorandum of Understanding (MoU) for the Conservation of Cetaceans and their Habitats in the Pacific Islands Region (CMS 2006), are the marine areas under the jurisdiction of each Country or Territory of the Pacific Islands Region, and extend to the area defined by the Noumea Convention, i.e., between the Tropic of Cancer and 60° South latitude, and between 130° East longitude and 120° West longitude. The region stretches over some 10,000 kilometres from east to west and 5,000 kilometres from north to south, with a combined economic exclusion zone (EEZ) of approximately 30 million km².

This region contains 22 Pacific Island Countries and Territories, as well as a portion of the Australian continent, both the North and South Islands of New Zealand, and a portion of the Hawaiian Islands. The region is purported to hold the most extensive and biologically diverse reefs in the world, the deepest ocean trenches, the world's largest tuna fishery, as well as a range of globally threatened species such as sea turtles, dugongs and cetaceans (UNDP 1999).

Whilst there are unique differences across the region, the 22 Pacific Island Countries and Territories do share some common characteristics, including: small physical size, geographical isolation, endemic ecosystems vulnerable to destruction or damage, rapid human population growth rates, limited land area, dependence on marine resources, and economic and environmental vulnerability (SPREP 1992, SPREP/ESCAP 1996). In turn, these features give rise to a general list of priority environmental concerns for the region (Chapter 2), including: loss of biodiversity, land degradation, freshwater resources, degradation of coastal environments, pollution, poor environmental management, and climate change (SPREP 2004). This report provides an overview of these concerns as context for the investigation of direct, indirect and potential threats to cetaceans inhabiting the Pacific Islands Region (Chapter 3). Threats discussed in this chapter include: climate change and habitat degradation, chemical pollution and disease, noise, cetacean tourism, fisheries bycatch and entanglement, fisheries depredation interactions, ship strikes, hunting, 'scientific whaling', drive hunts, and, live captures for display.

In most cases the ability to further quantify and address these threats is heavily hampered by gaps in basic species knowledge, as well as lack of monitoring or assessment in the region. Nevertheless, the collation of known information is a practical beginning to future mitigation and abatement measures.

The diverse and expansive Pacific Islands Region serves as habitat to a multitude of cetacean species that selectively use the region on a year-round, seasonal, or more sporadic basis (Reeves et al. 1999). However, for a vast majority of cetacean species a detailed understanding of the life history, geographic range, and habitat of individuals and populations is lacking. Therefore an initial examination of country-specific cetacean diversity in the region was conducted (Chapter 4). This chapter acts as a checklist of cetacean diversity rather than an analysis of relative composition and densities of the cetacean fauna in this region as it is important to note that the information is heavily influenced by uneven effort both between countries and also over time. Nevertheless, this analysis did indicate that a core group of species made up the majority of cetacean records for the nations of the Pacific Islands Region.

Focussing on the 22 Island Countries and Territories (i.e., excluding records from Australia, New Zealand and Hawaii) the list of species that appear to be resident or typically migrant are: minke whales (two

species and multiple subspecies), sei whale, Bryde's whales (two species), blue whales (multiple subspecies), humpback whale, pygmy killer whale, short-finned pilot whale, Risso's dolphin, Fraser's dolphin, orca, melon-headed whale, false killer whale, pantropical spotted dolphin, striped dolphin, spinner dolphin, rough-toothed dolphin, bottlenose dolphin (two species), dwarf sperm whale, pygmy sperm whale, sperm whale, Blainville's beaked whale, and Cuvier's beaked whale.

It is plausible that ongoing taxonomic investigations may indicate that the current species and subspecies designations are inadequate to display the diversity of these records. In addition there are numerous rare and vagrant species with records within this same region, including: fin whale, common dolphins (two species), Irrawaddy dolphins (possibly two species, although unresolved), Indo-Pacific humpback dolphin, southern right whale, southern bottlenose whale, and tentative records of both Peale's dolphin and southern right whale dolphin.

Of course, the limited research efforts in this region coupled with the very large expanse of the Pacific Islands Region marine coverage makes it plausible that there may also be as yet unreported species that inhabit these waters. One such example is the numerous unconfirmed sightings of additional beaked whale species (for e.g., Reeves et al. 1999, Kahn 2004). In addition there are 21 cetacean species for which there are records only from Australian, New Zealand and/or Hawaiian waters. These species are: spectacled porpoise, Arnoux's beaked whale, pygmy right whale, long-finned pilot whale, Indo-Pacific beaked whale, hourglass dolphin, dusky dolphin, Andrew's beaked whale, gingko-toothed beaked whale, Gray's beaked whale, Hector's beaked whale, Layard's beaked whale, True's beaked whale, Tasman's beaked whale, Hubb's beaked whale, Hector's dolphin, Longman's beaked whale, Perrin's beaked whale, pygmy beaked whale, spade-toothed beaked whale, and finless porpoise. It is hoped that this country-specific information will assist national management plans and objectives, as well as demonstrate the benefit of increased survey and monitoring efforts in uncovering the diversity of cetaceans that appear to be evident within Pacific Island waters. Finally, a complete listing of the species identified as occurring within the Pacific Islands Region was produced (Chapter 5). For each of cetacean species habitat description, subspecies classification, possible issues with identification, and status (in terms of IUCN criteria) are listed. This list also includes some tentative inclusions for the region.

The Pacific Islands Region

The boundaries of the Pacific Islands Region, as defined by the Convention of Migratory Species (CMS) Memorandum of Understanding (MoU) for the Conservation of Cetaceans and their Habitats in the Pacific Island region (CMS 2006), are the marine areas under the jurisdiction of each State or Territory of the Pacific Islands Region, and extend to the area defined by the Noumea Convention, i.e., between the Tropic of Cancer and 60° South latitude, and between 130° East longitude and 120° West longitude. The region stretches over some 10,000 kilometres from east to west and 5,000 kilometres from north to south, with a combined economic exclusion zone (EEZ) of approximately 30 million km² (Figure 1). This region contains 22 Pacific Island nations and territories, as well as a portion of the Australian continent, both the North and South Islands of New Zealand, and a portion of the Hawaiian Islands.

The Countries and Territories of the Pacific Islands Region are:

1. American Samoa
2. Australia
3. Cook Islands
4. Federated States of Micronesia
5. Fiji
6. French Polynesia
7. Guam
8. Kiribati
9. Marshall Islands
10. Nauru
11. New Caledonia and Dependencies
12. New Zealand
13. Niue
14. Northern Mariana Islands
15. Palau
16. Papua New Guinea
17. Pitcairn Islands
18. Samoa
19. Solomon Islands
20. Tokelau
21. Tonga
22. Tuvalu
23. Vanuatu
24. Wallis and Futuna

The limited land base of the 22 Pacific Island Countries and Territories is distributed among 200 high islands and 2,500 low islands and atolls. In general, the islands increase in size from east to west (SPREP 2004). In total, the land area covers just over 500,000 km² – of which Papua New Guinea accounts for 83%, while Nauru, Pitcairn, Tokelau and Tuvalu each measure less than 30 km2 (Figure 2). Within the Pacific Island nations there are three distinct sub-regions, i.e., Polynesia, Micronesia and Melanesia. The size and ecological diversity of these countries is believed to decline from the southwest to the northeast, tapering from the larger and higher, forested islands of Melanesia to a high number of tiny, sparsely vegetated atolls scattered across the central Pacific. The three cultural areas have quite different access to economic opportunities. In general, Melanesian countries have almost all the land and land-based mineral resources, Micronesia occupies the greatest sea areas with the largest tuna resources, and Polynesian regions focus on agriculture and marine resources. In general, there is a high degree of economic and cultural dependence on the natural environment (SPREP 2004).

The vast and complex marine systems of the Pacific Islands Region contain an enormous array of diversity. The region is purported to hold the most extensive and biologically diverse reefs in the world, the deepest ocean trenches, deep-sea minerals, the world's largest tuna fishery, as well as a range of globally threatened species such as sea turtles, dugongs and cetaceans (UNDP 1999). The many thousands of islands are, with the exception of some larger Melanesian islands, entirely coastal in nature. The surrounding ecosystems include mangroves, lagoons, rocky shores, seagrass beds, estuarine lagoons and coral reefs (Bleakley 1995, SPREP 2004). Most islands have been formed as a result of either volcanic activity or coral reef

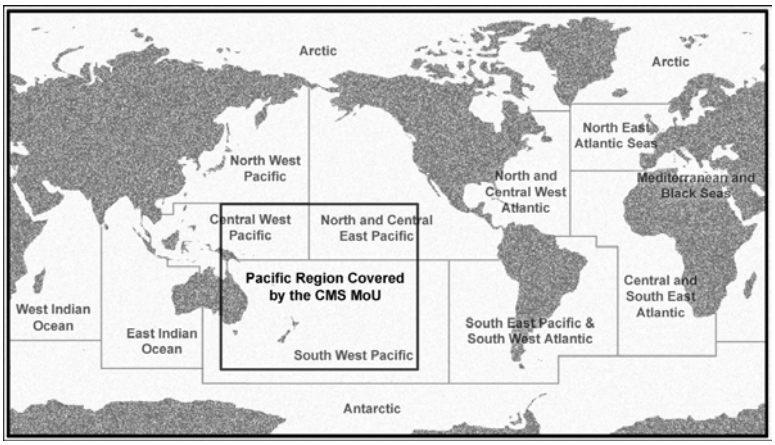

Figure 1. Geographic boundaries of the Pacific region

development. Islands in the Pacific may be classified into four general types: atolls, raised coral islands, volcanic islands and continental islands. It is possible to find intermediates between these types, such as a volcano surrounded by an atoll-like lagoon and barrier reef, or elevated reef attached to a continental or volcanic island (Dahl 1984). Island arcs form an almost continuous chain of islands or shallows stretching from New Zealand, through Tonga, the Solomon Islands, the Bismarck Archipelago, Palau and the Marianas to Japan. The island arcs are bounded on the east by deep trenches, the most distinctive of which are the Marianas Trench at 10,915 metres, the world's deepest. Other deep trenches in the area include Palau, Bougainville, New Hebrides, Tonga, and Kermadec (Bleakley 1995).

Sea surface temperatures in the Pacific Island Countries and Territories tend to be relatively warm throughout the year, for e.g. waters just south of New Caledonia typically only drop to 22°C in the austral winter, and north of the Marianas waters remain at approximately 24°C during the northern winter. Summer months bring water temperatures in the high twenties both north and south of the equator (Bleakley 1995). The salinity of waters in the region varies from approximately 34 to 36 parts per thousand. Lowest salinities occur in the western parts of Micronesia where rainfall is greater than evaporation. Evaporation exceeds precipitation around subtropical gyres in the north (around the Northern Mariana Islands) and south (east of French Polynesia) thereby maximizing salinity levels (Bleakley 1995).

Oceanographic features play a critical role in shaping the productivity and diversity of the region (Bleakley 1995). Equatorial currents are active in the region either side of the equator. The Northern Equatorial Current flows west as a zonal band between 8–10°N and the Tropic of Cancer to the west of 180°. The South Equatorial Current flows as a westerly current between the Tropic of Capricorn and 10°S. The Equatorial Current flows west between 5°N and 5°S and is generated by trade winds. Several jet streams and counter currents are also active in this area (Bleakley 1995). These systems enable nutrients to flow into the region from areas of upwelling off the coast of Peru and California. These waters quickly become impoverished as they are warmed at the surface and nutrients are consumed by

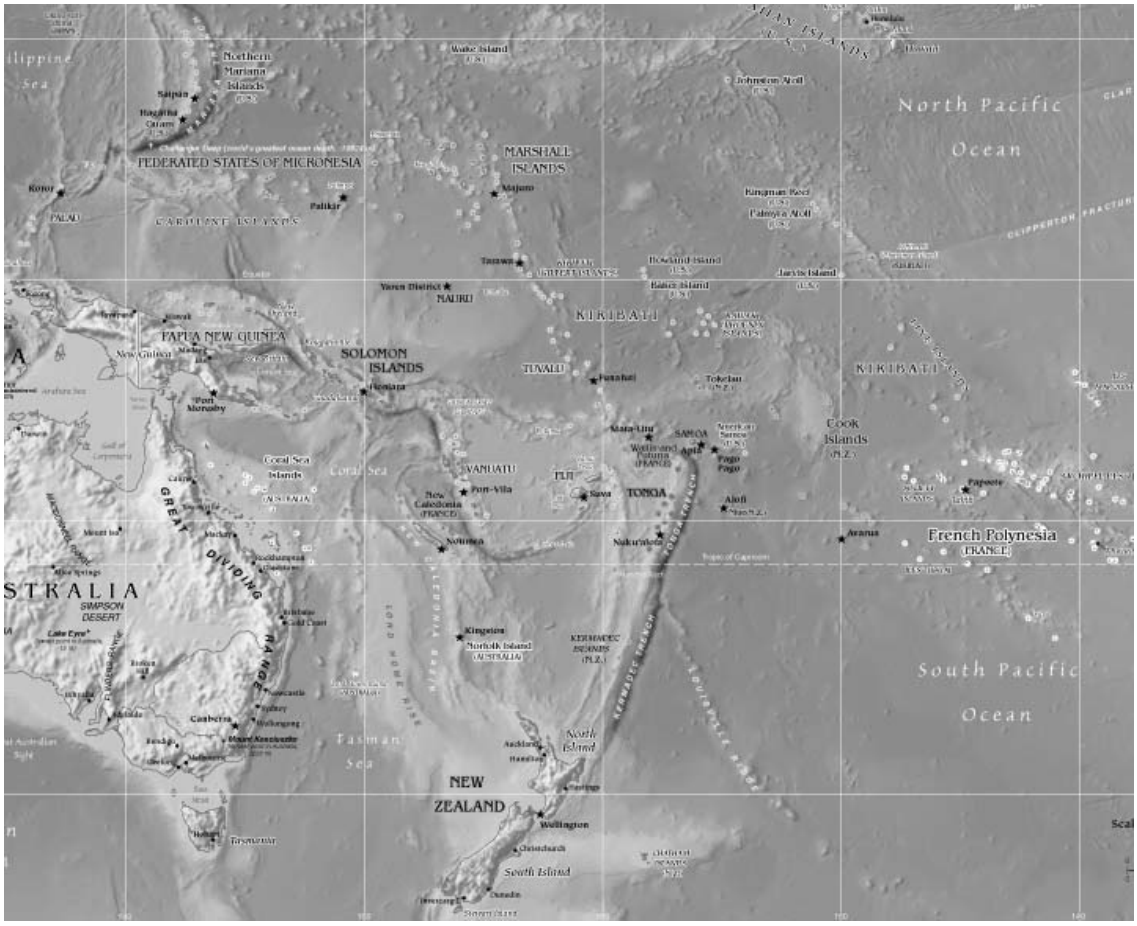

Figure 2. The Countries and Territories of the Pacific Islands Region

photosynthesis. On the equator, the divergence in the westward surface flow of the Equatorial Current as a result of the earth's rotation causes some upwelling of subsurface water, colder and richer in nutrients. The waters of the Pacific Region are generally considered nutrient poor although coastal waters are higher in nutrients as a result of weathering, leaching and runoff from islands. These inputs do play an important localized role in sustaining coastal marine ecosystems (Bleakley 1995). Major meteorological and oceanographic influences on the region are El Niño and La Niña. The effects of these phenomena on marine ecosystems and cetaceans are discussed further in Chapters 2 and 3.

Concerns and Threats for the Marine Environment in the Pacific Islands Region

Whilst there is strong diversity across the Pacific Islands Region, the 22 Pacific Island Countries and Territories do share some common characteristics, including: small physical size, geographical isolation, unique endemic ecosystems vulnerable to destruction or damage, rapid human population growth rates, limited land area, dependence on marine resources, and economic and environmental vulnerability (SPREP 1992, SPREP/ESCAP 1996). In turn, these features give rise to a general list of priority environmental protection and sustainable development issues for the region (SPREP 2004):

1. Loss of biological diversity
2. Land degradation
3. Lack of (and threats to) freshwater resources
4. Degradation of coastal environments
5. Land and sea-based waste and pollution
6. Poor environmental planning, management, and urbanization
7. Climate change

Each issue is briefly discussed below to provide context for the discussion on direct, indirect and potential threats to cetaceans inhabiting the Pacific Islands Region (Chapter 3). Focus has also been placed on those concerns that are of more immediate consequence to marine ecosystems. Several of the concerns mentioned in this section overlap and therefore appear under multiple headings.

Loss of Biological Diversity

In the Pacific Islands Region it has been demonstrated that there is a gradient of decreasing numbers of marine species from west to east, and a second gradient from warm equatorial waters to more temperate waters as distance from the equator increases (Dahl 1984). However it is acknowledged that overall the current understanding of biological diversity in the Pacific Islands is quite conservative (SPREP 2004). This assertion is in line with studies that estimate only 10% of tropical species have been described (UNEP 2004). Despite the limited knowledge, research that has

been conducted in the Pacific infers relatively high levels of biological diversity. Examples include an exceptionally large number of species found within a single coral reef system, areas within Melanesia and Polynesia that have been identified as global biodiversity 'hotspots', and significant numbers of endemic bird species (Aswani and Hamilton 2004, SPREP 2004, UNEP 2004, Mittermeier et al. 2005). However, extinction rates in the region are amongst the highest in the world (SPREP 2004). In fact, the Pacific Islands Region has more globally threatened species per capita than any other region, including at least 858 species with a high probability of extinction in the medium-term (SPREP 2004). In the marine realm it has been assessed that 31% of Pacific Island coral reefs are at medium risk and 10% at high risk of further degradation (Bryant et al. 1998). The major threat to faunal biodiversity in the region is habitat loss through activities such as large-scale forest logging, commercial agriculture, land clearing and fires, clearance of wetlands and mangroves, mining, sedimentation and nutrient flows, and urbanization (Thaman 2002). Native species are also threatened by the introduction of alien invasive species. Besides habitat degradation the greatest threats to marine biodiversity are land-based sources of pollution (such as eroded soils, pesticides, heavy metals, nitrates and chlorinated hydrocarbons), overexploitation of living resources, and invasive species (Sherley 2000). It has been noted that introduced fishes, amphibians and crustaceans have impacted native marine and coastal biodiversity by altering habitats, competing for food and living space, introducing pathogens, and hybridising with native species (Eldredge 2000).

Land Degradation

Due to the limited amount of land area in the Pacific Islands Region, infrastructure development and urban sprawl have made significant contributions to land and coastal degradation (SPREP 2004). Such development has resulted in increased soil erosion and compaction, loss of ecosystems, pressures on food security, and sedimentation of water systems and reefs (Thaman 2002). In many cases unsustainable land-use practices such as export market oriented cash cropping have progressed towards even more aggressive practices such as large-scale intensive developments including logging, mining, plantation, and grazing development. Extractive industries such as logging and mining are (or have) been significant industries in Countries and Territories including Fiji, Nauru, New Caledonia, Papua New Guinea and the Solomon Islands (McDaniel 2001). The development of the tourism industry in countries such as Fiji, the Cook Islands, French Polynesia, Tonga, Commonwealth of the Northern Mariana Islands and Guam again places stress on terrestrial development and space (Twining-Ward 2005).

Lack of (and Threats to) Freshwater Resources

Reserves of fresh potable water supplies are restricted throughout most of the Pacific Islands. These limited supplies are in part due to contamination of urban systems, industrial run-off, effluent, and poisoning of many river systems via extractive industries. Furthermore, in the low lying atolls land-cover loss and rising seas enable pollution to infiltrate the ground water lens. Limited water supplies have also been attributed to changes in the frequency and patterns of rainfall that have occurred in association with large-scale weather disruption events such as El Niño and La Niña (SPREP 2004).

Degradation of Coastal Environments

Uses and activities of the coastal zone typical for small Pacific Island Countries and Territories since the 1970s were associated with fishing, coastal shipping, port and harbour development, coastal construction (houses and hotels), infrastructure development (roads, power and water supply), sewage treatment and disposal, and rubbish dumping. During the 1980s and 1990s the intensity and scale of development increased with major hotels, water-based recreation such as diving, other tourism-related activities, intensive agriculture, industries and commerce, discharge of factory effluent, and increased waste disposal. In short, increased population densities combined with new technology and changing development priorities have had a

profound impact on coastal environments (Thaman 2002, SPREP 2004).

More specifically, the region's coastal and marine resources are threatened by: (i) introduced marine species, (ii) ship wrecks and marine spills (oil, chemicals and other hazardous materials), (iii) ships' waste (oil, sewage, chemicals and garbage, antifouling paints on vessels), (iv) physical impacts and pollution from dredging, sand extraction and sea-bed mining, (v) nutrients derived from sewage, soil erosion and agricultural fertilizers, (vi) solid waste disposal particularly in urban areas, (vii) sedimentation resulting from land clearance and increased erosion, (viii) physical alterations through destruction of fringing reefs, beaches, wetlands and mangroves for coastal development and by sand extraction, (ix) over-exploitation of coastal food fisheries, particularly through destructive fishing methods (for e.g., 'Papua New Guinea weed', explosives, use of scuba gear when spear-fishing, and mechanized equipment), (x) cumulative breakdown in traditional protection mechanisms, and (xi) damage to tropical marine ecosystems from global climate change (Thaman 2002, Ram-Bidesi 2004, SPREP 2004, UNEP 2004). Fragmented laws, information gaps, and poor institutional framework exacerbate these impacts.

Waste and Pollution

Pollution from solid, hazardous and toxic wastes is now widely recognized as one of the major threats to sustainable development in the Pacific Islands Region (SPREP 2004). Many Pacific Island Countries and Territories do not have the capacity for waste management by way of inadequate mechanisms and legislation, and lack of suitable available land for waste disposal. In addition, the last decade has seen an increase in the importation of goods and has resulted in dramatic shifts in the amount of plastics, cardboard, and paper matter in some countries. Increased urbanization also places greater demands on infrastructure including sewage, disposal of animal wastes (especially from pigs) and household garbage, power, communications and transportation services. In particular, inadequate sewage has severe health and environmental implications causing degradation of river, sub-surface and coastal water quality (such as high coliform contamination) with adverse effects on recreational and fishing activities. The increased nutrient load to the marine environment also threatens the coral reef ecosystems, weakening the reef carbonate skeleton and smothering the reef with algae (SPREP 2004).

A study of persistent organic pollutants in the region found that considerable stockpiles exist in some countries and that a number of sites had been contaminated through past disposal or storage of these chemicals (SPREP/AusAID 1999). Incidents of dangerous pollutants being discharged illegally into streams and oceans have increased in synchrony with growing urbanization and establishment of manufacturing industries. Activities in the 1950 to 1960s, which led to widespread radioactive and chemical contamination of land, continued in the 1970s through to the 1980s in northern Polynesia and into the 1990s in the French Territories. Military nuclear testing has made parts of the Marshall Islands permanently uninhabitable. Furthermore, many northern PICTs have significant concerns over military materials remaining from World War II. The threats of waste and chemical pollution are aggravated by a typical absence of occupational health and safety guidelines, and a lack of disaster management technology for spills, fires, and chemical leaks (SPREP 2004).

Environmental Planning, Management, and Urbanization

In the Pacific Islands Region the population size grew by 1.9 million people between 1994 and 2004 although the distribution of population remained largely unchanged. Over five million people inhabit Papua New Guinea while Countries and Territories such as Niue and Tokelau have a total population of less than 2,000, and the Pitcairn Islands are inhabited by approximately 50 people. There is concern that in some areas population size exceeds the level that local resources can sustain. For example in South Tarawa, Kiribati, there is an estimated 1,596 persons per km2 that makes it one of the highest population densities in the world (SPREP 2004). At times this rapid population growth has encouraged poor land use, overcrowding, high intensity of land use, sprawled

settlement, poorly timed and designed development, and resource use extraction. Degradation of ecosystems and resources is most evident where population density and economic activity are concentrated together, particularly around towns, alongside industries such as fisheries, logging, and mining (Mosley and Aalbersberg 2003).

Land use planning is crucial in areas where soils and substrate are either volatile in terms of disturbance or geological event, suffer from limitations to various nutrients for agriculture, and/or are subject to high rainfall. Lack of planning may lead to erosion, soil leaching, landslides and land structure decline. Issues of land tenure and resource access are also important considerations for sustainable development and planning in the region (SPREP 2004).

Climate Change

Pacific Island Countries and Territories are extremely vulnerable to many of the effects of climate change such as variations in weather and sea level rise. For the coastal communities where up to 70% of islanders live (Jones et al. 1999) the incidence of increased frequency of extreme weather events and natural disasters such as cyclones and floods is concerning. Areas under most threat have been identified as marine and coastal ecosystems, tourism assets, human settlements and infrastructure (IPCC 1998). Coupled with El Niño, the impacts have included water shortages and drought in Papua New Guinea, the Marshall Islands, Federated States of Micronesia, American Samoa, Samoa and Fiji. Current risks are likely to persist (Jones et al. 1999). Sea-level rise is obviously a major concern for the low-lying atoll islands as repercussions of encroachment are already being felt (Govt of Samoa 1999, Hsu 1999, Govt of the Republic of the Marshall Islands 2000, WWF 2003, Hunt 2002, Thaman 2002).

Additional potential impacts of climate change on the marine environment include: sea temperature rise, changes in ocean circulation, changes in salinity, ocean acidification, changes in rainfall patterns, and an increase in storm frequency (Hansen et al. 2001, IPCC 2001, Sear et al. 2001, Hulme et al. 2002, ICES 2004, Bass et al. 2006). Although the biological consequences of a changing climate upon the ocean are far from being understood, it is plausible there could be strong implications in terms of nutrient availability, biological productivity, and the structure and functions of marine ecosystems (Gillespie 2002). In the Pacific Islands Region there have already been noted ramifications on coral reefs, tuna distribution, and mangrove systems (Hoegh-Guldberg et al. 2000, Lehodey 2001, Crosby et al. 2002, Hunt 2002, Thaman 2002, UNEP 2006). These marine ecosystem implications will be expanded on in the next chapter.

Threats to Cetaceans in the Pacific Islands Region

The diverse and expansive Pacific Islands Region serves as habitat to a multitude of cetacean species that selectively use the region on a year-round, seasonal, or more sporadic basis (Reeves et al. 1999). Despite relatively little research and sighting effort the number of species documented in the region is relatively high (Reeves et al. 1999, SPREP 2004). However, for a vast majority of cetacean species a detailed understanding of the life history, geographic range, and habitat of individuals and populations is lacking.

Global reviews of cetacean status and threats have given useful synopsis and context for serious cetacean threats (e.g., Rice 1988, Reeves et al. 2003, IUCN 2006) and provided a starting point for identifying threats to cetaceans in the Pacific Islands Region. However, in most cases the ability to further quantify and address these threats is heavily hampered by gaps in basic species knowledge, as well as lack of monitoring or assessment in the region. Nevertheless, the collation of known information is a practical beginning to future mitigation and abatement measures. Threats discussed in this chapter include: climate change and habitat degradation, chemical pollution and disease, noise, cetacean tourism, fisheries bycatch and entanglement, fisheries depredation interactions, ship strikes, hunting, 'scientific whaling', drive hunts, and live captures for display. In the absence of specific regional information threats are discussed in a more global sense (Reeves et al. 2003).

Climate Change and Habitat Degradation

Global and region-wide impacts of climate change on the marine environment that have already been observed and are predicted to occur include: temperature rise, sea-level increase, changes in ocean circulation, retreat in sea-ice, changes in salinity, increases in CO2 concentrations, ocean acidification, changes in rainfall patterns, changes in climate pattern/variability, an increase in storm frequency and storm surges, an increase in wind speeds and changes in wave conditions, and extreme weather events (Hansen et al. 2001, IPCC 2001, Sear et al. 2001, Hulme et al. 2002, ICES 2004, Bass et al. 2006, UNEP/CMS 2006). The projected increase in sea level rise of 0.09 to 0.88m for 1990 to 2100 (IPCC 2001) makes low-latitude tropical and subtropical coastlines highly susceptible. Important nursery grounds for many fish and invertebrate species such as coral reefs and atolls, salt marshes and mangrove forests, and submerged aquatic vegetation will be directly impacted by sea-level rise (IPCC 2001, UNEP 2006). Increased run-off due to both rainfall and inundation may also cause an increase in pollutants, including sewage, into the marine environment. Furthermore, decreased salinity due to increased rainfall will also likely affect the distribution and abundance of prey species. Increases in natural disasters also add to the factors that may increase coastal erosion and damage to coastal ecosystems (IPCC 2001). The consequences of climate change are being taken very seriously in the low-lying Pacific Island nations (for e.g., Govt of Samoa 1999, Govt of the Republic of the Marshall Islands 2000, Thaman 2002) as in some cases the effects on regional marine ecosystems are already being observed (Hoegh-Guldberg et al. 2000, Lehodey et al. 2001, Crosby et al. 2002, Hunt 2002, Thaman 2002, UNEP 2006).

The potential impacts of climate change on cetaceans are in many cases speculative (Simmonds and Isaac In press), but it is contended that they will be (i) direct, such as when a species may have to change their typical geographic distribution as a result of an oceanographic shift, and (ii) indirect, such as implications for reproductive success when prey distribution, abundance or composition is altered (Learmouth et al. 2006). A couple of examples of both direct and indirect impacts follow.

The distribution of Pacific Ocean tuna populations appears to change during the years when El Niño is in effect (Hunt 2002). This change in distribution is likely a result of changes in tuna prey such as krill. In an El Niño year the pressure gradient between the east and west Pacific Ocean lessens and therefore causes the equatorial waters of the Central and Western Pacific to become cooler. Lehodey (2001) note that tuna catches are highest in the western equatorial Pacific warm pool but can be displaced by as much as 50° of longitude eastward (which may alter the jurisdiction

of these catches from national waters to the high seas) during El Niño episodes. During La Niña years when the westerly trades blow more strongly, tuna catches tend to move westward (Hunt 2002). These changes in the marine ecosystem obviously have both direct and run-on effects to cetacean populations in the region.

Decline in the health of coral reef systems in areas of the Pacific Ocean has also raised serious concerns (Crosby et al. 2002, Hoegh-Guldberg et al. 2000). Notably, the reduction of calcification rates coupled with higher sea temperatures has intensified coral bleaching events. Many are particularly concerned about the implications of changes in ocean pH resulting from increased atmospheric carbon dioxide, or ocean acidification (Pörtner et al. 2004, Bass et al. 2006). An increase in CO2 concentration will act to reduce the availability of carbonates necessary for the growth of corals and molluscs. The physiological effects are also implicated to adversely influence the metabolic function in sensitive creatures such as the ommastrephid squid (Pörtner et al. 2004). Increases in atmospheric CO2 concentrations due to greenhouse gas emissions are partly to blame (Hunt 2002), although it has been noted that coral degradation is most aggravated in urban areas (Hoegh-Guldberg et al. 2000). Additional factors contributing to coral habitat decline include: soil erosion and sedimentation of volcanic islands, coastal construction, sewage and industrial discharges, overfishing of subsistence resources and excessive commercial exploitation of other fisheries, increased flooding and discharge of fertilizers and toxic chemicals, and destructive fishing techniques, especially explosives. In addition, the corals themselves are being extracted for the marine aquarium and curio trade (Lovell and Tumuri 1999). In response to these imminent ecological problems many monitoring programs have been established in locations including American Samoa (Craig and Basch 2001), and Fiji (Harborne et al. 2001). It is probable that fish production will suffer as these reef habitats continue to be degraded or are lost (Hunt 2002). Once again the impact on the surrounding marine ecosystem is undetermined.

The Antarctic is the feeding ground of many of the great whale species that migrate to the Pacific Islands Region during their breeding season in the austral winter, however, these ecosystems are also undergoing significant changes as a result of global warming (Moline et al. 2004). Clapham et al. (1999) note that the blue whales' nearly exclusive dependence upon euphausiids, especially krill (Euphausia superba) in the Antarctic, could make blue whales vulnerable to large-scale changes in ocean productivity. Specifically, if the extent of sea ice decreases larval krill may not be able to endure the extended periods in which they do not have access to under-ice algae for feeding. Accordingly, krill abundance has decreased in the northern western Antarctic Peninsula during the last decade (Fraser and Hofmann 2003). Glacial melt-water runoff and reduced surface water salinities have also resulted in shifts in phytoplankton community structure along the Antarctic Peninsula (Moline et al. 2004). Changes in the spatial and temporal distribution and abundance of krill will have severe implications for marine species such as baleen whales that rely on krill as their main prey, or are important in their respective food webs.

The fate of cetaceans as a result of climate change is largely speculative, but the Intergovernmental Panel on Climate Change (IPCC) (2001) asserts that: "Wild species have three possible responses to climate change: (i) change geographical distribution to track environmental changes; (ii) remain in the same place but change to match the new environment, through either plastic response, such as shifts in phenology (for example timing of growth, breeding etc.), or, genetic response, such as an increase in the proportion of heat tolerant individuals; or (iii) extinction." It is therefore critical that projected impacts of climate change are taken into account when addressing conservation and management plans for cetaceans (Simmonds and Isaac In press).

Chemical Pollution and Disease

Between June 1946 and October 1958, the Enewetak and Bikini Atolls of the Marshall Islands were used as testing grounds for 66 nuclear devices (Reeves et al. 1999). This testing produced close-in fallout debris that was contaminated with quantities of radioactive fission and particle activated products, and unspent

radioactive nuclear fuel that entered the aquatic environment of the atolls (Robinson et al. 1998). Today, the sediments in the lagoons are reservoirs for transuranics and some long-lived fission and activation products, although the larger amounts of contamination are associated with fine and coarse sediment material adjacent to the locations of the high yield explosions. Radionuclides are also distributed vertically in the sediment column to various depths in all regions of the lagoons (Robinson et al. 1998). Concentrations greater than fallout background levels are found in filtered water sampled over several decades from all locations and depths in the lagoons. Of particular importance is the fact that the long-lived radionuclides are accumulated to different levels by indigenous aquatic plants and organisms that are used as food by resident people and quite possibly animals. Various isotopes of plutonium have been found in reef fish including mullet, convict surgeonfish and goatfish (Robinson et al. 1998, Noshkin et al.1998). The resultant long-term implications for the marine ecosystems and marine mammals in this area are unknown.

A comprehensive study of water quality of the U.S. Pacific Island territories revealed levels of contaminants in vacation beaches that have caused many beach closures (Dorfman 2004). Examples from Guam beaches indicate elevated levels of enterococcus while estuarine areas are subject to organic enrichment, pathogens, increased salinity and nutrients, and high pH from municipal point sources and urban runoff. Information from Northern Mariana beaches indicates that runoff, and, faulty septic and sewage systems are part of the reason for beach-water contamination. In addition, sedimentation from unpaved roads and development, stormwater and urban runoff, reverse osmosis discharges, and nutrients from golf courses and agriculture were cited as problematic in this area. In addition, landfills are believed to leach metals and synthetic organic compounds (Dorfman 2004).

High nutrient levels of phosphate and nitrate have been noted proximal to human activities along the Coral Coast of Vitu Levu in Fiji (Mosley and Aalsbersberg 2003) in quantities believed to be harmful to coral reef ecosystems. Coupled with overfishing of herbivore species these elevated nutrient levels are believed to be a contributor to the recent widespread growth of macro-algae species along this coast. The authors noted that nutrient levels were highest at sites located near hotels and other populated sites (Mosley and Aalsbersberg 2003).

Mining operations in the Pacific Islands Region presently (or have historically) exist in Papua New Guinea, Fiji, Nauru, Solomon Islands and, New Caledonia and are feared to be placing a heavy environmental toll on the landscape (SPREP 2004). Dumping of mine tailings into submarine canyons occurs very close to the Pacific Islands Region. Of concern is that several large mines in nearby Sulawesi, Indonesia dispose of their tailings in deep ocean canyons known to support populations of sperm whales and various beaked whales (Kahn 2000). In addition to point-source pollution, the atmospheric transport of contaminants from these operations also represents a danger.

The input of such toxins into the marine environment likely has grave consequences for cetaceans. A recent global survey of toxicity levels in marine mammals has found that even in mid-Pacific regions where the environment was regarded as relatively pristine, persistent organic pollutants were found to be accumulating in sperm whales (Ferber 2005). In fact there is a growing concern that exposure to contaminants can increase susceptibility to disease and affect reproductive performance in cetaceans (Reijnders et al. 1999). Although it is difficult to definitively assign cause-and-effect between pollutants and cetacean response – possible sublethal effects include: increased susceptibility to disease, impairment of reproduction and early development, immune suppression, cancer induction and mutagenic effects, changes in behaviour, and occurrence of epizootics (Reijnders et al. 1999). A few examples exist for the Pacific Islands Region. In New Zealand waters a Hector's dolphin died from complications associated with Aspergillus fumigatus infection of the lungs (Duignan and Jones 2005). Analysis of samples from Tursiops aduncus individuals in the Solomon Islands suggests the presence of Brucella spp. or a Brucella-like organism (Tachibana et al. 2006) in this region also. Furthermore, Omata et al. (2005) detected the presence of Toxoplasma gondii for this same species again in the

Solomon Islands region. East of the Pacific Islands Region (in Peruvian waters) tattoo skin lesions characteristic of poxvirus infection were found in small cetaceans captured in the gillnet fisheries (Van Bressem and Van Waerebeek 1996). Infected species included Lagenorhynchus obscurus, Delphinus capenensis, Phocoena spinipinnis, and Tursiops truncatus. The pattern of prevalence was indicative of an endemic infection. Serological evidence from these same species types again in Peruvian waters also indicated the presence of Brucella species antibodies (Van Bressem et al. 2001).

Noise

It is becoming increasingly evident that underwater noise can be lethal or chronically damaging to cetaceans (Simmonds et al. 2004, Jasny et al. 2005). Sublethal effects of noise may also strongly disrupt cetacean activities by causing whales to vacate former feeding and mating grounds (Morton and Symonds 2002, Weller et al. 2002), change migratory routes (e.g. Richardson et al. 1995), and altering calls (Miller et al. 2000). Major concerns regarding underwater noise for cetaceans are shipping and boat traffic, seismic activity, and military activity (Simmonds et al. 2004, Jasny et al. 2005). All three sources have been documented in the Pacific Islands Region although the ability to quantify the extent and ramifications of these noise sources is difficult. Of greatest concern are situations in which heavy vessel traffic, seismic testing, dredging, and, military activities occur in or near areas where cetacean populations engage in vital activities such as calving, calf-rearing, resting, migration, and feeding (Simmonds et al. 2004).

In general it has been asserted that ocean background noise levels have doubled every decade for the last six decades in some areas (IWC 2004). This increase has been primarily attributed to shipping activity (IWC 2004) and it is plausible that noise levels in the Pacific Islands are in line with this global average. Other noise pollution sources include seismic air guns used in marine exploration activities that in some instances are thought to be a contributing factor to whale stranding events (Taylor et al. 2004, Engel et al. 2004). Estimates indicate that noise from the airguns can reportedly flood through a region of almost 300,000 km2, raising noise levels 100 times higher on a continuous basis for days at a time (IWC 2004). In the Pacific region mining operations currently occur in Fiji, New Caledonia, Papua New Guinea, the Solomon Islands and until recently Nauru (SPREP 2004). Although a majority of these operations are land-based, due to the small island size the associated noise issues of drilling, machinery and transport still present a noise source for the proximal and surrounding marine environment (Simmonds et al. 2004).

The deployment of low frequency active sonar (LFAS) and mid-frequency tactical sonar by the military is of particular concern due to the powerful nature of these systems (Simmonds 2004). Military operations involving the use of high-intensity sonar, explosive devices, and other intense noise sources pose both lethal and non-lethal threats to cetaceans (Whitehead and Weilgart 1995). Military training and testing activities have been conducted in the Line Islands, Marshall Islands, and French Polynesia (for nuclear weapons testing), with additional islands in Hawaii and elsewhere used for bombing (Crosby et al. 2002). Currently, LFAS activities have been restricted to an area around the Marshall Islands. Some cetacean species appear to be particularly susceptible to acoustic trauma – i.e., ziphiids and other deep diving species (Rowles et al. 2000). Notably in some areas there have been several mass strandings of Cuvier's beaked whales coincident with military exercises involving the use of very loud, low frequency and/or mid-frequency tactical sonar activities (Frantzis 1998, Rowles et al. 2000). War games planned for regions around the Hawaiian Islands were stalled in July 2006 due to environmental concerns for marine life, particularly cetaceans (ENS 2006). The proposed expansion of military presence and operations in Guam will likely increase military activity in this region in the future (Pacific Islands Report 2007).

Cetacean Tourism

Cetacean tourism is a growing industry in the Pacific Islands Region that has provided economic opportunities in numerous locations (Hoyt 2001, O'Connor

In press). Commercial marine wildlife viewing operators exist within Federated States of Micronesia (spinner dolphins, bottlenose dolphins, and pilot whales), Fiji (spinner dolphins), French Polynesia (spinner dolphins and other tropical dolphins), Guam (spinner dolphins, pilot whales), New Caledonia (humpback whales, spinner dolphins), Niue (humpback whales, spinner dolphins), Solomon Islands (tropical dolphins), and Tonga (humpback whales, pilot whales, spinner dolphins, sperm whales) (Hoyt 2001). Many operations also exist within Australia (humpback whales, dwarf minke whales, bottlenose dolphins, Indo-Pacific humpbacked dolphins, southern right whales), New Zealand (sperm whales, dusky dolphins, Hector's dolphins, bottlenose dolphins, common dolphins, orcas, long-finned pilot whales, Bryde's whales, false killer whales, southern right whales, southern right dolphins, minke whales), and the Hawaiian Islands (humpback whales, spinner dolphins, bottlenose dolphins, short-finned pilot whales, sperm whales) (Hoyt 2001). Many of these tours include close interactions, including swimming, scuba diving and snorkelling with cetaceans (Samuels et al. 2003). In some instances animals have become habituated: for example, food provisioning to bottlenose dolphins in Tangalooma (Orams 1995) and Indo-Pacific humpback dolphins in Tin Can Bay. In Australia, swim-with operators work within the Great Barrier Reef with dwarf minke whales (Valentine et al. 2004) and bottlenose dolphins at Port Stephens and Port Phillip Bay. Around New Zealand dusky dolphins, bottlenose dolphins, common dolphins, and Hector's dolphins are the subject of swim-with operations. In-water operations also exist in various locations of French Polynesia (melon-headed whale and humpback whales), humpback whales in both Tonga (Orams 2001, 2004) and New Caledonia (Garrigue and Virly 2000), and, spinner dolphins and humpback whales in Niue. Swim-with operations in Hawaii focus on spinner dolphins and pilot whales.

Although these operations signify an important way of making money it is important to note that intensive, persistent, and unregulated vessel traffic that focuses on animals while they are resting, feeding, nursing their young, or socializing can disrupt those activities, and possibly cause long-term problems for populations (Reeves et al. 2003, Bejder et al. 2006). Notably, it has recently been asserted that one of the worldwide threats to flora and fauna is tourism (IUCN 2000, UNEP/CMS 2006). Studies of the effects of vessel-based tourism within New Zealand waters has found important behavioural responses such as decreased resting and socialising behaviour (Constantine et al. 2004) and increased diving (Lusseau 2003) in bottlenose dolphins, mass movement of cetaceans away from areas where boat-based tourism occurs (Lusseau 2005), and a variety of behavioural changes in common dolphins (Neuman and Orams 2005). Hector's dolphins have also shown avoidance behaviour and changes in dispersion of the group (Bejder et al. 1999). Lusseau and Higham (2003) have also looked at behavioural responses to boats in the context of spatial and temporal norms of the population under study. Studies in southeastern Australia have revealed avoidance behaviour of bottlenose dolphins as a response to tour boat presence (Hale 2002) as well as a lack of compliance to watching and interaction regulations by the operators (Scarpaci 2003, 2004). Off Shark Bay, Western Australia, Bejder (2005) has demonstrated significant impact on the reproductive success of bottlenose dolphins targeted by tourism. Humpback whales in eastern Australian waters have also shown responses to commercial whale watching operators – in particular pods that contain calves (Corkeron 1995). The necessity of sound and appropriate management strategies, including enforcement of any measures, is vital for the sustainability of Pacific Islands whale watching operations.

Fisheries: Introduction

The Food and Agricultural Organization (FAO) of the United Nations divides the world's oceans into 18 fishing areas. The Pacific Islands Region covers all or part of four of these areas, namely: the Western Central Pacific, the Southwest Pacific, the Eastern Central Pacific, and Southeast Pacific. The Western Central Pacific area produces the highest catches of these four regions and also has a significant bearing on the economies of several Pacific Island nations (SPREP 2004). In fact, the fisheries industry contributes an average of 11% of

the GDP of all Pacific Islands nations. The regional Western and Central Pacific tuna fishery is the world's largest tuna fishery and showed an approximately 230% increase from 1976-1996 however the economic returns to Pacific nations through fishing access fees from foreign fleets represent a relatively small proportion of an approximately 1.7 billion (US) dollar industry (Preston 1997). Coastal fisheries are an important resource for local communities' in terms of food, lifestyle, custom, and employment. On average 77% of coastal fisheries landings are utilized for home consumption (World Bank 2000) although there are limited management or protection mechanisms in place to sustain and monitor coastal fisheries.

A general summary of fish landings, species, and gear types of the four relevant FAO regions is presented below (Sea Around Us 2006). In the Western Central Pacific over 3 million tonnes of fish are landed annually. More than half of this catch is from tuna and billfish species, with yellow fin tuna being the greatest contributor. Hooks, purse seines and troll lines are the most common gear type although bottom trawls, gillnets, squid hooks, mid-water trawls, and, traps are also used. In the Southwest Pacific catches are smaller with just less than 400,000 tonnes being landed annually. Blue grenadier, Wellington flying squid, and, the southern blue whiting make up a majority of these catches. Approximately 50% of catches are derived through destructive bottom trawling activities. Portions of both the Eastern Central Pacific and Southeast Pacific areas fall outside of the Pacific Islands Region. Catches in the Eastern Central Pacific are primarily from tuna (yellow fin, skipjack, and big eye) yet with totals of approximately 750,000 tonnes the production does not match that of the Western Central Pacific. Finally, the Southeast Pacific catches are dominated by the Inca scad – in fact of the over 2.2 million tonnes of fish landed in this region per year almost 1.5 million is from this species. The most common fishing methods are purse seine and mid-water trawls, although gillnets and hooks are also used (Sea Around Us 2006).

Fisheries: Bycatch and entanglement

Fishing gear bycatch and entanglement is regarded as a very serious threat to cetaceans worldwide (Northridge 1991, Lewison et al. 2004, Read et al. 2006). However, the estimate of cetacean bycatch within the Pacific Islands is limited by the small amount of fishing vessel monitoring (Lawson 2001). Onboard observer programs do exist within the region but their overall coverage is not comprehensive. Specifically, on average less than 1% of all long-line fishing vessels within the western, central and South Pacific waters had independent observers aboard between 1987 and 2000 (Lawson 2001). Between 1994 and 2000, the maximum observer coverage on purse-seiners was only 5%, and for a single year of coverage (1988) observers were present aboard line-and-pole boats in the Solomon Islands for just 2% of total fishing trips (Lawson 2001). Such level of observer coverage is inadequate to reflect the actual bycatch situation. Major gaps in current observer coverage include data from distant-water long-liners of Korea and Taiwan, and Japanese vessels fishing in international waters. Coverage of certain domestic fleets of Pacific Island nations has also been poor. Some assert that the bycatch of domestic fleets is less than that of distant foreign fleets (Chapman 2001) but the limited datasets fail to confirm or deny this.

The sections below provide details on bycatch and entanglement of cetaceans divided into individual gear-types when sufficient information was available. Records containing less specific information on gear type and/or information follow. Finally records on bycatch and entanglement from the Hawaiian Islands are presented.

a. Long-line

Lawson (2001) summarized observer bycatch data held by the Oceanic Fisheries Program (OFP) of the Secretariat for the Pacific Community (SPC) from the western and central Pacific tuna fisheries. However, in the western Pacific, observer activity on the long-line vessels remains low and is not considered adequate to provide reliable indications of overall levels of bycatch and discards in the tropical waters of the western Pacific Ocean (Manzurek 2004).

The long-line observer data held by the OFP were obtained from eight observer programs, i.e. the national programs of Australia (1987–1997), Federated States of Micronesia (1992–1999), Marshall Islands (1995, 1997), New Zealand (1987–1999), Palau (1999), Papua New Guinea (1999) and Solomon Islands (1996, 1998–1999), and the SPC regional program (1992–2000). This final program covered long-liners operating in the waters of American Samoa, Cook Islands, Fiji, Federated States of Micronesia, French Polynesia, Kiribati, Marshall Islands, New Caledonia, Papua New Guinea, Palau, Samoa, Solomon Islands and Tonga. Most data were derived from Australian and New Zealand monitoring schemes (42.6 and 38.2 percent respectively) while other national programs and the SPC program accounted for approximately 10 percent each. Bycatch data was largely presented as summary and overall data, so it was difficult to attribute species information to location or fishing nation. However, species that were recorded within the collective datasets included: Tursiops truncatus, Delphinus delphis, Lagenorhynchus obscurus, Megaptera novaeangliae, Orcinus orca, and Physeter macrocephalus. In addition there were five unidentified Delphinidae, one unidentified whale, and eight unidentified marine mammals. Country information indicated that the South Pacific nations reported twelve marine mammals, New Zealand caught 330 individuals (although these were primarily pinnipeds), and Australia recorded none. It was noted that Australia's report seemed incomplete (as bird and reptile numbers were also unusually low) and this data was being further investigated for accuracy. Of the marine mammals that were bycaught, a total of 20 were retained, 320 were discarded and for 2 individuals this information was unknown. Of the discarded marine mammals, twenty were already dead and four were of unknown condition while the remainder were reported to be alive. Again, species and location was not attached to this information, which makes it of limited use. More recently Molony (2005) has collated records from 1980-2004 for long-line observer data in the SPC region. Species (and number recorded) for this period were: bottlenose dolphin (3), common dolphin (3), dusky dolphin (1), humpback whale (2), Risso's dolphin (7), short-finned pilot whale (4), sperm whale (2), spinner dolphin (2), "blackfish" (2), dolphins/porpoise (unidentified) (2), and whale (unidentified) (11). This information did not include condition of the animal. Obviously this data overlaps with Lawson's (2001) review.

Williams (1996) summarized bycatch numbers of the western and central Pacific tuna fisheries and noted that on rare occasion catches of D. delphis and other (unidentified) marine mammals occurred, as well as 'possible' catches of P. crassidens within the long-line fisheries of the western and central sub-tropical Pacific (WSP). Long-line fisheries in the western and central tropical Pacific (WTP) on rare occasion take unidentified marine mammals. O. orca takes within the western and central temperate Pacific (WteP) have also been documented from long-lining vessels.

The distant-water fleets of Taiwan have been reported to have 'relatively frequent cetacean interactions within the Pacific Islands Region (Donoghue et al. 2003). During 1994-1995 a total of 100 cetaceans were landed at two Taiwanese fishing ports as a result of long-line operations. Of these, 23 had been hooked in the mouth or throat region, 11 had been entangled, and 53 had been harpooned while poor condition of 13 carcasses prohibited deciding the nature of the interaction. Most of the pantropical spotted (S. attenuata), spinner (S. longirostris) and striped (S. coeruleoalba) dolphins appeared to have died after becoming entangled in lines. A very small proportion (i.e., less than 1%) of the total number of cetaceans landed at either port were "blackfish" (i.e., killer, false killer, pilot, or possibly pygmy killer or melon headed whales), although none of the deaths could be attributed directly to long-line gear. It is likely that these numbers are conservative as cetaceans may have been discarded at sea or consumed onboard. Hence, the number of carcasses recorded at the fishing ports should be considered an underestimate of the total number killed (Donoghue et al. 2003).

In New Zealand waters, entanglements in long-line fishing gear have been documented for humpback whales (SPWRC 2005), orca and sperm whales (M. Donoghue pers comm.). Humpbacks and sperm whales have also become entangled

in Hawaii (Manzurek 2004). These Hawaiian records did result in successful disentanglements, yet the ultimate fate of these animals is unknown.

b. Purse-seine

The purse-seine observer data held by the OFP (Lawson 2001) were obtained from seven observer programs, i.e. the national programs of the Federated States of Micronesia (1994–1999), Nauru (1996), Papua New Guinea (1996–1999) and Solomon Islands (1998–1999), and the regional programs of the Federated States of Micronesia Arrangement (1998–2000), SPC (1995–2000) and the US treaty (1994–2000). The US Treaty data account for 66.6 percent of the data, the national programs account for 24.6 percent and the other regional programs make up 8.8 percent. These purse seine fisheries reported a total of 127 marine mammals as bycatch: 24 when nets were set without any school association, 41 when the net was set on a drifting log or debris, 45 when a raft, fish aggregating device or payoa was set on (32 if drifting, 13 if anchored), 15 when on a whale, and 1 each when a whale shark or unknown conditions were set on. No species were identified in any of the bycatch incidents and all individuals were reportedly discarded (Lawson 2001). Post-release survivorship, if any, is unknown for these records. Although not bycatch it is also interesting to note that in 102 of 6580 instances a whale was observed in association with the school of fish set on. In addition, Coan et al. (1999) reported that U.S. tuna purse-seiners caught 12 cetaceans (classified as "porpoise/dolphin") in the central-western Pacific during 1988. Eleven of the twelve animals were discarded at sea. It is unclear whether this information was included in Lawson's (2001) summary. More recently Molony (2005) has collated records from 1980-2004 for purse-seine observer data in the SPC region. Species (and number recorded) for this period were: bottlenose dolphin (18), common dolphin (24), pygmy killer whale (1), short-finned pilot whale (2), spinner dolphin (4), "blackfish" (19), unidentified whale (5), and unidentified dolphins/porpoises (33). This information did not include condition of the animal and once again, it overlaps in content with Lawson's (2001) review.

c. Drift-nets

A few records exist for drift-net fishing, although the global moratorium (on high-seas drift-net fishing) as well as concern by South Pacific countries of the navigational hazards, and prevalence of 'ghost net' fishing has largely limited this fishing practice (Wright and Doulman 1991). In one case prior to the moratorium, four Taiwanese drift-net vessels were running a trial fishery for squid in New Zealand's EEZ in early 1981. Inspection of the vessels during their fishing operations documented a frozen common dolphin and southern pilot whale in addition to shark, tuna and mackerels aboard the vessel. As a result, licences were suspended. In a second case, there are general reports of hourglass dolphin (Lagenorhynchus cruciger) deaths in South Pacific driftnets, although specific geographic information is not available (Goodall et al., 1997). Little is known about the incidental catch of marine mammals in historical driftnet fishing for tuna in the Pacific region (Sharples et al. 1991, Richards 1994).

d. Gill-nets

Information on gillnet fisheries throughout most of the South Pacific Ocean is inadequate to judge effects on marine mammals although some assert that bycatch is relatively probable in areas where cetacean habitat intersects with gillnet deployment (Nitta 1994). However, it is reported that from 1984 to 1988, at least 230 Hector's dolphins were killed in groundfish gillnets by commercial and amateur fishermen in the Canterbury region. Over 90% of catches occurred during the austral summer, and younger animals were particularly vulnerable to entanglement (Dawson 1991). Based on a sensitivity analysis, Martien et al. (1999) predicted the extinction of the North Island population within the next few decades unless gillnet fishing effort was substantially reduced (Dawson et al. 2001). Entanglement in fishing gear, especially gillnets in deep water (e.g., for billfish and tuna), is cited as one of the most significant threats to ziphiids, including Cuvier's beaked whales (Reeves et al. 2003). Human-related mortality of Orcaella brevirostris in north-eastern Australian waters is largely attributed to drowning in inshore gillnets set across creeks, rivers and shallow estuaries for barramundi and threadfin salmon (Parra et al. 2002).

e. Other gear types

Relatively recent reports show that both long- and short-beaked common dolphins are also captured in New Zealand commercial nets (Duignan and Jones 2005) and bottlenose dolphins have been observed entangled and stranded on the shore. Hector's dolphins, bottlenose dolphins and common dolphins are reported to be taken in both trawl and set net fisheries in New Zealand waters and numbers reported by fishermen are believed to be underestimates (Cawthorn 1988). In fact, it is believed that up to 100 Hector's dolphins were taken and not reported in some fisheries/regions (Cawthorn 1988). Fisheries capture of Tursiops sp. in a set-net mesh and an inshore finfish fishery has taken place in the Gulf of Carpentaria, Australia (Haines and Limpus 2001, Limpus et al. 2002). Finally, a few Hourglass dolphin individuals were reported to be taken in set nets off New Zealand (Goodall et al. 1997), and at least four humpback whales have been entangled in crayfish pot lines off Kaikoura between 2003 and 2006 (SPWRC 2004, Donoghue pers. comm.).

f. Unspecified gear types and general concerns

Dawbin (1972) reported that Irrawaddy dolphins were taken accidentally in fishing nets in the Gulf of Papua, and that false killer whales had been taken between Papua New Guinea and Australia. Some mortality of spectacled porpoises Phocoena dioptrica occurs in fishing gear, but the scale of this mortality relative to abundance and population recruitment is unknown (Reeves et al. 2003). Small numbers of Peponocephala are taken in nets and by harpooning throughout the tropics (Reeves et al. 2003). In January 2004 a humpback whale was found dead on the coast near Kaikoura. This whale had a large, fresh wound across its back consistent with entanglement in a rope or line but whether the cause of death was related to this injury was not ascertained (SPWRC 2004). Tursiops sp. have been washed ashore entangled in fishing net of unidentified origin in Australia (Limpus et al. 2002). Poole (1993) also reported that rough-toothed dolphins were implicated in interactions with fisheries in French Polynesia.

g. Bycatch in Hawaii

The incidence of marine mammal interactions is documented in a consistent manner within Hawaiian waters and may provide insights into species susceptible to bycatch and entanglement in the Pacific Islands Region given the proximity (and partial inclusion) of this region (NMFS 2001, 2002, 2003, 2004, 2005, Bass and Clemens 2005,). This information is summarized below.

Between 2001-2005 thirty-eight individuals were recorded in interactions with long-line vessels (NMFS 2001, 2002, 2003, 2004, 2005). Five animals were released dead and thirty-three were released injured. Animals that died as a result of interaction included – two false killer whales, one Blainville's beaked whale (Mesoplodon densirostris), one bottlenose dolphin, and a spotted dolphin. The remaining animals released injured from their interactions comprised the following: 2 unidentified whale, 6 unidentified cetacean, 4 short-finned pilot whale, 2 Risso's dolphin, 1 Blainville's beaked whale, 15 false killer whales, and 3 humpback whales. The serious injury and mortality rate of false killer whales as a result of pelagic longlining is considered above the "potential biological removal" (PBR) levels set by the National Marine Fisheries Service (Caretta et al. 2005). Additionally, in 2005, a Risso's dolphin, Bryde's whale and unidentified whale were each released injured after interactions within the shallow set fisheries.

Other reports of fishery interactions with protected cetaceans have also previously been reported within the Hawaiian fisheries (Nitta and Henderson 1993). Specifically, bottlenose dolphins, rough-toothed dolphins and possibly false killer whales take bait from troll fisheries for billfish, and false killer whales are also believed to take catch from the long-line fishery for tuna and billfish (Nitta et al. 1993).

h. Bycatch in Australian shark control nets

New South Wales (NSW) and Queensland (QLD) are the only two states in Australia that have shark control programs. Nets and/or baited drum-lines are set off beaches along the coastline with the purpose of keeping sharks active in

feeding and territorial movements up and down the coast away from swimming beaches. In NSW the shark control program relies solely on beach meshing to achieve this goal while QLD employs both mesh nets and baited drum-lines. Between 1967 and 1992 at least 544 cetaceans were caught in shark nets set for bather protection along the Queensland coast (Paterson 1990). Species that have been (and continue to be) caught in these nets include: D. delphis, O. brevirostris, Sousa chinensis, S. longirostris, Tursiops sp., possibly P. crassidens and Megaptera novaeangliae (Bannister 1977, Paterson 1990, Haines and Limpus 2000, Haines and Limpus 2001, Humane Society International 2002, Limpus et al. 2002). In NSW an average of 5.75 dolphins (speculated to be primarily bottlenose and common dolphins) were caught per year between 1966 and 1981 (Humane Society International 2002). Regulations to reduce bycatch such as net attendance rules and gear modifications have been introduced, but enforcement is lacking in remote areas (Hale 1997).

Fisheries: Depredation Interactions

In the past decade fishermen from Pacific Island Countries and Territories have become increasingly concerned about the potential effects of the removal of hooked fish or bait from long-lines by cetaceans (termed depredation), however, the extent and complexity of the issue is not well understood (Donoghue et al. 2003) and incidence reports have not been scientifically verified. Anecdotal reports of depredation have been given from various locations including the Cook Islands, Samoa, Federated States of Micronesia, Fiji, Papua New Guinea, the northern Coral Sea, and New Zealand, with a variety of cetacean species reported to be involved. Specifically, orca, false killer whales, pilot whales, and sperm whales were highlighted by the fishermen as being the most problematic. Additionally, rough-toothed dolphin, spinner dolphin, pantropical spotted dolphin, bottlenose dolphin, Risso's dolphin, striped dolphin, common dolphin, and Fraser's dolphin may occasionally be involved in interactions (Donoghue et al. 2003). Tuna long-line vessels are the fishing vessels where depredation most often occurs.

It is unclear whether reported increases in removal of fish and bait is due to an increase in the number of cetaceans in the fishing areas, the result of learned behaviour being transferred from one group of cetaceans to another, the incidence of shark damage being falsely attributed to cetacean interactions, an actual increase in this activity in the region, or, an increase in reporting (Donoghue et al. 2003). Despite these uncertainties, the possible and/or perceived financial loss by individual fisherman can and do lead to actions that harm cetaceans. Some dangerous and inappropriate techniques have been used to deter marine mammals from interacting with the fishing lines, including: shooting and harpooning animals, and the use of "tuna bombs" (underwater explosives). These techniques are not always fatal, although mortalities have occurred. Some fishermen also hang parts of bodies of cetaceans on lines in an attempt to deter them (Donoghue et al. 2003).

Ship Strikes

Although collisions with motorized ships are a recognized source of cetacean fatality and injury, until recently there has been little comprehensive or global assessment of these activities (Laist et al. 2001, Jensen and Silber 2003, Van Waerebeek et al. 2006) although regional and species-specific reviews have appeared (for e.g., Best et al. 2001, Tregenza et al. 2002). Because records are accumulated from a variety of sources including historical records, stranding databases published reports and personal observations a constant issue for examining the occurrence of ship strike injuries in cetaceans is quality of data and condition of carcasses when autopsies are performed (Laist et al. 2001, Jensen and Silber 2003, Van Waerebeek et al. 2006). Furthermore, it is also plausible that vessels may strike floating carcasses. Therefore, at times it is difficult to definitively determine the cause of death of an animal even when it appears to have injuries consistent with a ship strike (Van Waerebeek et al. 2006).

Van Waerebeek et al. (2006) recently compiled records of ship strike records for small cetaceans worldwide and large whales in the Southern Hemisphere. A majority of the summary below is taken from this report yet it is important to note

that records were sourced on an opportunistic basis. Hence, the authors recognize that this report is heavily weighted towards areas and countries where: expertise is available to document such records, reporting legislation is in place, and, research, survey and/or whale watching boats frequent.

Within the Pacific Islands Region twelve different species have been documented as suffering collisions with ships. Several of the great whale species such as the Bryde's whale, sei whale, and the pygmy blue whale experienced fatal collisions that were not discovered until reaching port. In this case it could be confirmed that all of these collisions were made within the New Zealand EEZ. A dead minke whale has also been found in New Zealand with ship-strike wounds. In addition, several humpback whales have been struck (some by whale-watching vessels) in Hawaiian waters (Weinrich 2005).

Several beaked whales have also shown injuries of ship collisions (Van Waerebeek et al. 2006). Once again, all of these records come from New Zealand. Stranded Cuvier's beaked whale, Arnoux's beaked whale, Andrew's beaked whale and Hector's beaked whale individuals each showed signs of trauma, injury or bruising indicative of an interaction with a vessel that was possibly the cause of the fatality. Deep indentations and scars observed during a sighting of a Gray's beaked whale adult suggested a non-fatal ship or propeller collision had previously occurred.

For smaller cetaceans a few additional records exist. An Indo-Pacific humpback dolphin was killed by a propeller, and washed ashore in Queensland, Australia (Stranding Database, Queensland). Vessel collisions are also a factor in the mortality of the threatened Hector's dolphins in New Zealand (Stone and Yoshinaga 2000). Orca with known home range around New Zealand have been noted to have a series of deep scars in their lumbar-caudal regions which suggest they were caused by propellers (Visser 1999). Another juvenile orca was observed to be hit by a boat and incur serious injuries from which it submerged and did not resurface (Visser 1999b). Again in New Zealand waters, a solitary Tursiops sp. individual was noted to display a ship collision injury (Gales et al. 2003). In 1985 a specimen of Kogia sp. was found stranded on the beach of Plum in the extreme southwest of New Caledonia reportedly displaying wounds sustained by the propeller of a boat (Sylvestre 1988). Finally, collisions between high-speed ferries and whales have been reported in French Polynesian waters (Miller 2003).

Hunting

Commercial whaling probably began in the tropical Pacific Ocean in the early to mid 1800s (Reeves et al. 1999). Unrestricted whaling left southern right whales virtually commercially extinct by 1850, and the larger population of sperm whales severely diminished also. During the 19th century whaling effort was additionally directed towards humpback whales proximal to numerous Pacific Island nations (i.e., Tonga, Fiji, New Caledonia, French Polynesia, and Kiribati) (Reeves et al. 1999). Eventually effort was shifted to Bryde's whales as humpback quotas were decreased (Reeves et al. 1999). Baker and Clapham (2002) estimate that between 1904 and 1980 approximately two million whales were killed in the Southern Hemisphere. This figure includes over 200,000 humpbacks, 350,000 blue whales, almost 400,000 sperm whales, and 725,000 fin whales (Baker and Clapham 2002).

Of further detriment to species' recovery were the illegal and unreported takes by Russia from shortly after World War II until the late 1970s (Baker and Clapham 2002). This falsification included the omission of over 45,000 humpbacks and 3,300 southern right whales (Tormosov et al. 1998) from initial records. Between 80 and 95% of the estimated number of individuals in each of these commercially whaled species were killed during this period (Baker and Clapham 2002). Additional humpback whaling was undertaken by Tonga throughout the 20th Century until banned by royal decree in 1978, and whales have remained protected in Tongan waters since that time (Orams 2004). Recent information (Perrin 2006) indicates Bryde's whales (possibly also the pygmy sub-species) were taken by pelagic Philippines operations working within the Federated States of Micronesia and Palau. In addition some takes have been made by native Pacific Islanders for cultural reasons (Reeves et al. 1999). Many of these exploited whales are present now in only relatively low numbers (for e.g., humpback

whales see Walsh and Paton 2003, Garrigue et al. 2004, SPWRC 2004) while the status and abundance of other species remains depleted but unknown (Reeves et al. 2003).

'Scientific' Whaling

Although the International Whaling Commission (IWC) placed a moratorium on commercial whaling (coming into effect in 1986) Japan, Norway and Iceland have all at some time issued scientific permits to conduct lethal sampling, and Norway and Iceland now allocate themselves commercial whaling quotas each year. Japan is the only nation that conducts whaling activities for commercial purposes in Southern Hemisphere waters (www.iwcoffice.org).

Japanese 'scientific' whaling in the Southern Hemisphere commenced in 1987 and has continued to the present day under two JARPA (Japanese research in the Antarctic) programs. JARPA I was conducted between the 1987/1988 and 2004/2005 seasons and resulted in the lethal sampling of approximately 6800 Antarctic minke whales (IWC 2006). This program was reviewed in December 2006, by which time JARPA II had already commenced (www.iwcoffice.org). On an annual basis JARPA II proposes to kill up to 935 (850 ± 10%) Antarctic minke whales (from the Eastern Indian Ocean and Western South Pacific IWC-defined stocks), 50 humpback whales (from D and E IWC-defined stocks) and 50 fin whales (from the Indian Ocean and the Western South Pacific IWC-defined stocks) for a period of 16 years. This program is preceded by a 2-year feasibility study in which a maximum of 935 Antarctic minke whales and ten fin whales will be killed and sampled in each season. The first year of the feasibility study was conducted during the austral summer 2005/2006 and resulted in 853 minke whales and 10 fin whales being killed (IWC 2006), the second year is being implemented.

It is plausible that some humpback whale individuals that will be taken during Japanese 'scientific' whaling activities in the Antarctic migrate to the Oceania region for breeding purposes during the austral winter (Chittleborough 1965). Breeding populations of humpbacks in several of the Pacific Islands Region sites remain low and well below pre-exploitation levels (Walsh and Paton 2003, Garrigue et al. 2004, SPWRC 2004). Hence, the future JARPA II 'scientific' whaling activities of humpbacks in the Southern Ocean poses a serious threat for further decline or even local extinction of Pacific Islands Region humpback whale populations (SPWRC 2004). The effects of the JARPA programs for fin and minke whales is difficult to assess due to the absence of any agreed abundance estimates for these species (IWC 2006). Furthermore, concentrated and region-wide studies on stock structure, habitat requirements, and, life-history characteristics for these two species have not been conducted in the Pacific Islands Region.

Bryde's whales have also been taken in the Pacific Islands Region under scientific permit. Previous to the IWC moratorium Japan took 120 Bryde's whales in the Coral Sea during the 1976 Antarctic season (October-November). Seven of these individuals were taken just south of the Solomon Islands and 113 were taken in the waters between Fiji and New Zealand (Kawamura 1977). Once again, due to an incomplete understanding of the distribution of this species in the region it is difficult to assess the implications of these takes.

Drive Hunts

A drive hunt for small cetaceans has been practiced in certain islands of the Solomon Islands group for many years (Reeves et al. 1999). A majority of dolphins taken in this hunt (termed 'porpoise hunts') are apparently long-snouted oceanic forms, including spinner, pantropical spotted, striped, common and rough-toothed dolphins (Dawbin 1972). The primary objective of these hunts is to obtain teeth that are used as local currency and for collars or headbands and necklaces, as well as for meat. Risso's dolphin have also been taken on occasion, but due to their lower tooth count they were apparently of lesser value to the Malaitans (Dawbin 1966). Other species involved in the hunt have included melon-headed whale (whose teeth were the most highly prized), bottlenose dolphin, and, possibly Fraser's dolphin (Takekawa 1996, Reeves et al. 1999). Takekawa (1996) indicated that the take of melon-headed whale has been reduced in response to population decline. An average

of 840 (approximate range = 50 – 2000) small cetaceans were taken per year at the islands of Fanalei from 1976 to 1993 (Reeves et al. 1999). More recent reports indicate that the hunts now occur about three times a year, mostly in the Malaita area, when 100-200 animals may be taken per hunt (Ross et al. 2003). It has also been suggested that 'porpoise' teeth were imported from Micronesia to the Solomon Islands around the middle of the 20th century but no further details of this hunt are available (Reeves et al. 1999).

Reeves et al. (1999) also refer to several other drive hunts in the Pacific Islands Region including the Mariana Islands (during the late 19th and early 20th century), Gilbert Islands (where some drive hunting occurred until the 1980s), the western Caroline Islands, French Polynesia (believed to focus on spinner dolphins), and Papua New Guinea. Akimichi's (1993) review of cetacean hunting in Oceania includes references to the driving or harpooning of small cetaceans at Manus, Malaita, Tuamoto, Marquesas, Tonga, the Caroline Islands, and Mokil in eastern Micronesia. Singular occurrences of cetacean hunting have also been recorded. People in the Marshall Islands and Kiribati hunted small cetaceans for food, particularly after the animals have become disoriented and trapped inside atoll lagoons (Nitta 1994). Reeves et al. (1999) reported on a Fraser's dolphin allegedly speared in Fiji, and Rancurel (1973) noted that a pilot whale was stranded on the reef and killed by native fishermen at Efate, Vanuatu in 1972.

Live Captures for Display

During 2003 more than one hundred dolphins were live-captured in waters surrounding Solomon Islands and then kept in sea pens in several locations including on the Island of Gela off the capital Honiara (Ross et al. 2003). Concern for welfare of these animals and uncertainty about species involved prompted a fact-finding visit by the IUCN/SSC Cetacean and Veterinary Specialist groups (Ross et al. 2003). From this two-day visit it was determined that a minimum of 94 animals were held in the Gavutu and/or Honiara facilities, of which at least 27 were subsequently released. Most individuals were determined to be Tursiops aduncus, although some Tursiops truncatus were present, as well as at least one Stenella attenuata individual. The precise circumstances of the capture(s), including when they occurred, were unknown, but their capture method was believed to be in seine nets from a small motorboat (Ross et al. 2003). It was noted that 28 individuals had been exported to Mexico for display in a tourist facility (Ross et al. 2003). It was reported that one of the individuals died a week after arriving in Mexico, another within a month, with several others demonstrating very poor condition (WDCS 2006). In 2004, at least 40 dolphins were held in the Solomon Islands sea pens (Fisher and Reeves 2006). The conditions within these pens were noted to be of small size and poor quality with shallow and murky water. Several individuals were reported to have died - including a calf that became entangled in the sea pen netting. In January 2005 Solomon Islands announced a ban on dolphin exports, and it has been suggested that the company holding these animals may set up a tourist facility within the Solomon Islands (WDCS 2006). Controversy again began in 2005 when it was asserted (Taipei Times 2005) that 40 dolphins were being readied for shipment to the Bahamas in November 2005. Further such assertions have occurred since, but no further dolphin exports have been confirmed.

Several other facilities within the Pacific Island nations hold cetaceans in captivity. In January 2002, 'Dolphin Bay', a facility displaying 11 dolphins, opened in Palau. This facility offers interaction programs such as swimming with dolphins and dolphin-assisted therapy. Reports suggest the animals in this facility were exported from Japan after being captured in drive-hunts (WDCS 2006). In early 1994 a facility live-captured seven small cetaceans (3 rough-toothed dolphins and 4 melon-headed whales) in Tahitian waters and held them in a sea pen in the Moorea lagoon (Reeves et al. 1999). The melon-headed whales did not adjust to captivity and were released within a few weeks of capture yet two were reported to have died shortly thereafter. At the start of 1996 two of the rough-toothed dolphins remained within the facility (Reeves et al. 1999). At times cetaceans (primarily Tursiops and Pseudorca) have been taken under licence

in Australian waters for public display (Bannister 1977). Oceanariums still exist in Queensland (Sea World: 30 bottlenose dolphins and 1 Indo-Pacific humpback dolphin), and New South Wales (Pet Porpoise Pool: 3 bottlenose dolphins) (Gales et al. 2003). Additionally, bottlenose dolphins are fed in a program at Tangalooma, and several Indo-Pacific dolphins are provisioned in Tin Can Bay (Gales et al. 2003). In Marineland in Napier, New Zealand, one common dolphin is on display although the facility would like to add another individual. Finally, a facility in Port Moresby, Papua New Guinea, had at least one dolphin in residence. Details of which species this was were not provided and the facility is now closed (Reeves et al. 1999).

Summary

This review presents an initial collation of threats to cetaceans in the Pacific Islands Region. However, it is plausible that in some cases the lack of monitoring and reporting has failed to highlight the severity of the issues discussed above. Another caveat to this review chapter is that the data presented on cetacean threats has often been collected opportunistically. This mode of assessment clearly produces bias towards instances where records are documented and reported consistently, research is conducted, and/or cetacean tourism is present. This uneven method of collation may also open the possibility of certain threats being left undocumented and therefore omitted at this point. In addition, it is important to note that the impact of individual pressures is heightened in many instances where it is likely that threats act in concert and cumulatively. Translating these ambiguities to enable an assessment of threats to cetaceans within the region is therefore extrapolative, yet necessary to develop appropriate strategies to enable long-term conservation of cetaceans and their habitats in the Pacific Islands Region.

Checklist of Country-specific Cetacean Records in the Pacific Islands Region

Although a basic overview of the cetacean species found within the Pacific Islands Region has been explored (Reeves et al. 1999) country-specific diversity records for the Pacific Islands Countries and Territories are not well established. The primary reason for the relatively unknown status, geographic distribution and population structure of most cetaceans in the Pacific Islands is the lack of directed research that has been conducted across the region. Therefore this initial examination of country-specific cetacean diversity in the region necessarily is a collation of records that have subsequently been referenced to geographic location and reliability. It is important to realize that the information provided is heavily influenced by uneven effort both between countries and also over time. Hence, this chapter acts as a checklist of cetacean diversity rather than an analysis of relative composition and densities of the cetacean fauna in this region.

A concentrated effort was made to collect all references relating to cetaceans within the Pacific Islands Region. Records were garnered from a variety of sources including peer-reviewed journals, field reports, museum stranding records, whaling ship reports, internal records, personal unpublished sightings and communications, anecdotal reports and newspaper reports. A particularly useful resource for this undertaking was Reeves et al. (1999) in a document entitled "Marine Mammals in the Area Served by the South Pacific Regional Environment Programme (SPREP)". This review provided substantial summarization of historical knowledge, unpublished anecdotal sightings, and museum records. The information within the comprehensive Reeves et al. report has been accepted and transposed to fit within the present report. However, the current chapter adds to the Reeves et al. (1999) review in several ways:

(1) As information gathering for the Reeves et al. report concluded in 1996 this chapter incorporates research and records from this time until the present.

(2) The South Pacific region focused on by Reeves et al. (1999) represents a portion of the Pacific Islands Region yet not all of it.

Therefore, a broader geographic range is covered in this chapter. The boundaries of the Pacific region are the marine areas under the jurisdiction of each State or Territory of the Pacific Islands Region, and extends to the area defined by the Noumea Convention, as the area between the Tropic of Cancer and 60° South latitude and between 130° East longitude and 120° West longitude. The region stretches over 10,000 km from east to west and 5,000 km from north to south, with a combined EEZ of close to 30 million km². See Chapter 1 for more details.

(3) An attempt has been made to qualify each cetacean record included in this chapter. This classification was intended to provide a means of indicating relative confidence in a given record in terms of current presence of a particular cetacean species within a given nation's waters. Three classifications of records were designated.

Class 1 refers to a relatively recent field (or specimen record) confirmation of the given species within the EEZ of a nation.

Class 2 refers to a potential Class 1 record that is either dated, or may be marginally outside of a given EEZ.

Unconfirmed refers to records that either were not definitively identified, have not been confirmed by field observations, are from an unobserved stranding event (which therefore may not indicate geographic distribution of the species), or is an anecdotal report that for various reasons may be difficult to corroborate.

Understandably not all records fell easily into these general characterizations, however, attempts were made to ensure that classifications were relatively consistent in regard to the level of confidence in present-day distribution.

(4) Each record has been converted into a country-specific reference. When only island name and not nation was given for a record, care was taken to correctly trace this record to a given country. Records given only as a latitude-longitude location were assessed by best approximation as to their position within a given EEZ. For simplicity some records that did not add to geographic distributional information are omitted from this chapter yet many additional citations appear in the References chapter. Records from Australia, New Zealand and the Hawaiian Islands are presented only as species-listings falling into the Class 1 criteria listed above. These listings are presented for comparison purposes and also to facilitate potential listings for neighbouring nations.

Country-specific listings for cetacean records are listed below. Information on land and EEZ area for each Pacific Island nation was sourced from SPREP (2006) and the BBC (2006). Each table provides a list of both the scientific name and common name for records (with references) that could be attributed to a given EEZ. Records have been adapted in instances where there are noted difficulties with individual species identification or subspecies differentiation, and/or instances where taxonomic nomenclature is unresolved or has changed. Specifically, Tursiops, Delphinus, and Kogia individuals have been listed as sp. (respectively) in cases where there was insufficient genetic or morphological evidence provided to determine species. In the case of Kogia sp. the common name used is "diminutive sperm whale". When insufficient evidence for minke whale sightings was presented, records have been listed as Balaenoptera sp. regardless of which species or subspecies was inferred by the author. The same is true for Bryde's whales – with the additional inclusion of sei whale records when insufficient evidence for separation exists. In these cases the combined Bryde's and sei records are referred to as "Bryde's-like" whales. This step was deemed necessary due to historic difficulties with distinguishing these species from one another at sea. Finally, in cases where the UNEP-WCMC has listed species these have been retained.

American Samoa

Land Area (km2): 200
Sea Area (EEZ) (thousands of km2): 390

American Samoa is comprised of five main islands (Tutuila, Ta'u, Ofu, Olosega, and Rose atoll) and a few rocky outcrops.

A recent collation of research in American Samoan waters outlines the variety of cetacean diversity in these waters (Craig 2005). Much of the research efforts have focussed on humpback whales (Craig 2005, SPWRC 2005, Jooke and Mattila 2006) and it has been found that this species is present on a seasonal-basis in American Samoan waters primarily between August and October.

Additional survey work has positively identified sperm whales, short-finned pilot whales, and false killer whales at sea (Craig 2005). Prior field observations and stranding events have also noted these species in American Samoa waters (Reeves et al. 1999). Skulls and/or stranding records have also been reported for rough-toothed dolphin, bottlenose dolphin and Cuvier's beaked whale (Craig 2005). America Samoa was also one of the regions in which Kasamatsu et al. (1995) recorded relatively high encounter rates of minke whales. These sightings were made during October and December. Unpublished reports of orca seen "on occasion", and both spinner and pantropical dolphins seen "commonly" in America Samoa waters were relayed in Reeves et al. (1999). In addition dwarf sperm whale have recently also been reported within these waters (D. Johnston, pers. comm.).

Records of Cetaceans in the Waters of American Samoa		
Scientific Name Common Name	Citations	Class
Balaenoptera sp. Minke whale	Kasamatsu et al. 1995, Craig 2005	1
Megaptera novaeangliae Humpback whale	Reeves et al. 1999, UNEP-WCMC 2003, Craig 2005, Jooke and Mattila 2006	1
Globicephala macrorhynchus Short-finned pilot whale	Reeves et al. 1999, Craig 2005	1
Orcinus orca Orca	Reeves et al. 1999, Craig 2005	2
Pseudorca crassidens False killer whale	Craig 2005	1
Stenella attenuata Pantropical spotted dolphin	Reeves et al. 1999, Craig 2005	2
Stenella longirostris Spinner dolphin	Reeves et al. 1999, Craig 2005	2
Steno bredanensis Rough-toothed dolphin	Craig 2005	2
Tursiops sp. Bottlenose dolphin	Reeves et al. 1999, Craig 2005	2
Physeter macrocephalus Sperm whale	Lever 1964, Grant 1995, Reeves et al. 1999, Craig 2005	1
Ziphius cavirostris Cuvier's beaked whale	Craig 2005	2
Unconfirmed Species		
Kogia sima, Dwarf sperm whale (D. Johnston pers. comm.)		

Cook Islands

Land Area (km^2): 237
Sea Area (EEZ) (thousands of km^2): 1,830

The 15 volcanic islands and coral atolls of the Cook Islands are scattered over 2 million square kilometres of the South Pacific, between American Samoa to the west and French Polynesia to the east.

Cetacean research in the Cook Islands region has focussed on humpback whales with their presence in the region being concentrated during the austral winter months (SPWRC 2000 – 2005, Hauser et al. 2000, Hauser 2002, Olavarria et al. 2003). Humpback population substructure is unresolved in the Cook Islands, as individuals have not been re-sighted in other Pacific Island locations (SPWRC 2004). A checklist of other cetaceans within the Cook Islands has been developed in conjunction with humpback whale surveys (SPWRC 2004). Sighting, photographic and genetic evidence has been gathered for spinner dolphin, Fraser's dolphin, and Blainville's beaked whales. Sighting and photographic evidence is available for bottlenose dolphin (species unspecified), melon-headed whale, short-finned pilot whale, orca, Cuvier's beaked whale, sperm whale, and blue whale (species uncertain). Sighting records exist for pantropical spotted dolphin, common dolphin (species uncertain), minke whale (*B. acutorostrata* subspecies), and sei whale (SPWRC 2004). In addition a *Balaenoptera bonaerensis* individual was reported to Hauser (2002), and Kasamatsu et al. (1995) has sighted *Balaenoptera* sp. in this area. A sighting of a Bryde's whale has also been recorded (Hauser 2000). A rare sighting of several individuals near Palmerston Atoll, apparently from the genus *Lagenorhynchus* has also been documented (Leatherwood et al. 1991). The species could not be unequivocally verified (Van Waerebeek et al. 1997) although Leatherwood et al. (1991) believed it to be *Lagenorhynchus australis*. The Cook Islands Biodiversity database (2006) also lists Risso's dolphin, false killer whale, striped dolphin, and bottlenose dolphin (*Turiops* sp.) as being present in Cook Islands waters.

Records of Cetaceans in the Waters of Cook Islands		
Scientific Name Common Name	Citation	Class
Balaenoptera sp. Minke whale	SPWRC 2004	2
Balaenoptera musculus sp. Blue whale	SPWRC 2004	2
Megaptera novaeangliae Humpback whale	Hauser et al. 2000, Hauser 2002, SPWRC 2002 and 2004, Olavarria et al. 2003	1
Delphinus sp. Common dolphin	SPWRC 2004	2
Globicephala macrorhynchus Short-finned pilot whale	SPWRC 2004	1
Lagenodelphis hosei Fraser's dolphin	Hauser 2002, SPWRC 2004	1
Orcinus orca Orca	Reeves et al. 1999, SPWRC 2004	1
Peponocephala electra Melon-headed whale	Hauser 2002, SPWRC 2004	1
Stenella attenuata Pantropical spotted dolphin	SPWRC 2004	1
Stenella longirostris Spinner dolphin	SPWRC 2004	1
Physeter macrocephalus Sperm whale	Hauser 2002, SPWRC 2004	1
Mesoplodon densirostris Blainville's beaked whale	SPWRC 2004	1
Ziphius cavirostris Cuvier's beaked whale	SPWRC 2004	1
Unconfirmed Species		
Balaenoptera sp., Bryde's whale (Hauser 2000)		

Balaenoptera borealis, Sei whale (SPWRC 2004) *Grampus griseus*, Risso's dolphin (Cook Islands Biodiversity database 2006) *Lagenorhynchus* sp. (tentatively - Peale's dolphin) (Leatherwood et al. 1991) *Pseudorca crassidens*, False killer whale (Cook Islands Biodiversity database 2006) *Stenella coeruleoalba*, Striped dolphin (Cook Islands Biodiversity database 2006) *Tursiops* sp., Bottlenose dolphin (Cook Islands Biodiversity database 2006)

Federated States of Micronesia

Land Area (km^2): 701
Sea Area (EEZ) (thousands of km^2): 2,780

Micronesia, in the western Pacific, consists of some 600 islands grouped into four states: Kosrae, Pohnpei, Chuuk (Truk) and Yap.

To date there have been no dedicated surveys to study the marine mammal diversity within the waters of the Federated States of Micronesia. Therefore it is primarily anecdotal reports that have been used to identify species within these waters. Bryde's whales were reported from a tuna vessel within the FSM EEZ during June and July of 1982. This observation is tentative as these whales were initially identified as sei whales yet the record was later amended (Reeves et al. 1999). However confirmed individuals have been seen north of New Guinea in the vicinity of Nauru. Bryde's whales have also been reportedly seen in relatively high densities along the equator between 130°E and 180°W in the mid 1970's (Ohsumi 1978). Furthermore, Bryde's whales were taken in the Philippine fishery for Bryde's whales from 1983-1986 including from locations proximal to the Caroline Islands located within FSM however, the species could not be definitively determined whether these were Bryde's whales or the pygmy species (Perrin 2006). Since 1988 ecotourism ventures have relied upon the presence of spinner dolphins, bottlenose dolphins and pilot whales (assumed to be short-finned) in FSM waters (Hoyt 2001). Miyazaki and Wada (1978) reported herds of Fraser's dolphin (40 – 50 individuals) associated with schools of melon-headed whales. Documented sightings of sperm whale in the vicinity of FSM have been established as well as several anecdotal reports (Patterson and Alverson 1986). An unconfirmed report of orca occurring near Yap was also reported in Rock (1993). General distribution of striped dolphin includes FSM (Perrin et al. 1994) and Miyazaki and Wada (1978) confirm their presence in the region. Distribution records from *Stenella attenuata* suggest that this species occurs in Micronesian waters (Gilpatrick et al. 1987). Lastly, a single skull of a *Ziphius cavirostris* individual was found in Ponape, Micronesia (Reeves et al. 1999).

Records of Cetaceans in the Waters of the Federated States of Micronesia		
Scientific Name Common Name	Citation	Class
Balaenoptera sp. Bryde's whale	Eldredge 1991, Patterson and Alverson 1986, Perrin 2006	1
Globicephala macrorhynchus Short-finned pilot whale	Patterson and Alverson 1986, Hoyt 2001	1
Lagenodelphis hosei Fraser's dolphin	Miyazaki and Wada 1978, Eldredge 1991	1
Peponocephala electra Melon-headed whale	Miyazaki and Wada 1978, Eldredge 1991	1
Stenella coeruleoalba Striped dolphin	Eldredge 1991, Miyazaki and Wada 1978	1
Stenella longirostris Spinner dolphin	Eldredge 1991, Hoyt 2001	1
Tursiops sp. Bottlenose dolphin	Hoyt 2001	2
Physeter macrocephalus Sperm whale	Eldredge 1991, Patterson and Alverson 1986	2
Unconfirmed Species		
Orcinus orca, Orca (Eldredge 1991, Rock 1993) *Stenella attenuata,* Pantropical spotted dolphin (Gilpatrick et al. 1987 *in* Wiles 2005)		

Ziphius cavirostris, Cuvier's beaked whale (Reeves et al. 1999)

Fiji

Land Area (km^2): 18,333
Sea Area (EEZ) (thousands of km^2): 1,290

The Pacific nation of Fiji experiences a tropical climate and contains over 800 volcanic and coral islands.

In 1976, between October and November, a Japanese whaling expedition caught Bryde's whales (*Balaenoptera brydei*) in a region just south of the Fiji EEZ (Kawamura 1980). Bryde's whales were also observed during the same expedition between New Caledonia and Fiji (Ohsumi 1978). In late October and early November of 1977, Japanese whalers observed, marked and killed Bryde's whales in a large area between the Tuamotu Archipelago and Fiji. More recent anecdotal observations indicate that Bryde's whales do visit the Fijian EEZ although *B. edeni* was reported in this case (Paton and Gibbs 2002). Paton and Gibbs (2002) also indicated that Dawbin (1959) occasionally observed sei whales in Fijian waters and physically tagged seven individuals between 1956 and 1958 although no data was recovered from these discovery tags. A report from Ohsumi (1977) also indicated that sei whales had been observed in this region although location may not have definitively been within Fijian waters.

Anecdotal reports indicate that fin whales have been sighted in waters just south of Fiji (Paton and Gibbs 2002) and are supported by Japanese whaling ship records (Ohsumi 1979). These same surveys reported minke whales, as did more recent Japanese sighting surveys (Kasamatsu et al. 1995) and anecdotal observations (Paton and Gibbs 2002, C. Miller pers. comm.). Sperm whales have been well documented in Fijian waters historically. Townsend (1931, 1935) indicated that individuals were sighted year-round although at higher rates during the winter and spring. Unpublished surveys of Dawbin (reported in Paton and Gibbs 2002) in the mid-fifties also reported sperm whales. Discovery tags were deployed during this time period but none were recovered. More recent anecdotal reporting indicates that this species is still seen on occasion in Fiji. Blue whales may also be occasional visitors to Fiji as a survey by Ohsumi (1979) indicated that a pair of blue whales was sighted west of Tonga.

Recent visual sighting surveys from a land-based site in Levuka, Ovalu during 2003 confirmed the presence of humpback whale, sperm whale, short-finned pilot whale, false killer whale, pantropical spotted dolphin, and spinner dolphin (Gibbs and Paton 2003 *in* Bourke and Powell 2004). Reeves et al. (1999) indicated anecdotal reports of short-finned pilot whales, orca, bottlenose dolphins, Fraser's dolphin (a single photograph from the 1930's), and common dolphin (although this sighting was possibly due south of the Fiji EEZ). Rough-toothed dolphins have also been sighted on occasion in Fijian waters (Paton and Gibbs 2002). A recent stranding of a female Blainville's beaked whale near Viti Levu was confirmed by genetic analysis (Leslie et al. 2005). Finally, in the CITES register (UNEP-WCMC 2003) the geographic range of *Kogia breviceps* included Fiji, yet no further reference was provided to substantiate this range.

Records of Cetaceans in the Waters of Fiji

Scientific name Common name	Citation	Class
Balaenoptera sp. Minke whale	Ohsumi 1979, Kasamatsu et al. 1995, Paton and Gibbs 2002	1
Balaenoptera sp. "Bryde's-like" whale	Dawbin 1959, Ohsumi 1979	2
Balaenoptera sp. Bryde's whale	Ohsumi 1978, Kawamura 1980, Paton and Gibbs 2002	1
Balaenoptera physalus Fin whale	Ohsumi 1979, Paton and Gibbs 2002	2
Megaptera novaeangliae Humpback whale	Dawbin 1964, Paterson 2001, Paton and Gibbs 2002	1
Globicephala macrorhynchus	Dawbin 1974, Gibbs and Paton	1

Short-finned pilot whale	2003	
Pseudorca crassidens False killer whale	Paton and Gibbs 2002, Gibbs and Paton 2003	1
Stenella attenuata Pantropical spotted dolphin	Gibbs and Paton 2003, UNEP-WCMC 2003	1
Stenella longirostris Spinner dolphin	Gibbs and Paton 2003, Bourke and Powell 2004	1
Tursiops *sp.* Bottlenose dolphin	Reeves et al. 1999	2
Physeter macrocephalus Sperm whale	Lever 1964, Paton and Gibbs 2002	1
Mesoplodon densirostris Blainville's beaked whale	Leslie et al. 2005	2
Unconfirmed Species		
Balaenoptera musculus, Blue whale (Ohsumi 1979) *Delphinus* sp., Common dolphin (Reeves et al. 1999) Lagenodelphis hosei, *Fraser's dolphin (Baker 1983 in Reeves et al. 1999)* Orcinus orca, *Orca (Anonymous 1995)* *Steno bredanensis,* Rough-toothed dolphin (Paton and Gibbs 2002) *Kogia breviceps*, Pygmy sperm whale (UNEP-WCMC 2003)		

French Polynesia

Land Area (km^2): 3,521
Sea Area (EEZ) (thousands of km^2): 5,030

French Polynesia is made up of 118 volcanic and coral islands and atolls. There are five island groups - the Society islands, the Tuamotu archipelago, the Gambier islands, the Marquesas islands and the Tubuai islands.

Numerous recent sighting surveys within French Polynesian waters have added to the understanding of cetacean diversity within this nation's waters (Gannier 2000 and 2002a, Laran and Gannier 2001). In addition specific effort has been invested in humpback whale research (Poole 1993, Bourreau and Gannier 2001, Gannier 2004, Olavarría et al. 2005) as well as some directed studies towards smaller odontocetes (Gannier and West 2005, Gannier and Petiau 2006). Humpback whale investigations have highlighted that on occasion some individuals from French Polynesia are sighted in other parts of the Pacific Islands Region (Garrigue et al. 2002).

Small boat surveys off the Society Islands during the years 1996 to 1999 confirmed the presence of humpback whales, sperm whale, dwarf sperm whale, Blainville's beaked whale, Cuvier's beaked whale, spinner dolphin, rough-toothed dolphin, short-finned pilot whale, melon-headed whale, Fraser's dolphin, bottlenose dolphin and Risso's dolphin (Gannier 2000). Over the austral summer of 1998-1999 within the Marquesas Islands pantropical spotted dolphin, spinner dolphin, bottlenose dolphin, melon-headed whale, rough-toothed dolphin, Risso's dolphin, orca, false killer whale, short-finned pilot whale, and, pygmy killer whale were sighted (Gannier 2002a). Historical records also exist for short-finned pilot whale (Rancurel 1973).

UNEP-WCMC (2003) reports French Polynesia is part of the geographic range of fin and pygmy Bryde's whales. A species of common dolphin, minke whale, sei whale, and blue whale have all tentatively been identified as occurring within French Polynesian waters yet have not been confirmed (SPWRC 2004). Rorquals (species unknown) have also been reported (Kasamatsu et al. 1995).

Records of Cetaceans in the Waters of French Polynesia		
Scientific Name Common Name	Citation	Class
Megaptera novaeangliae	Lefèvre et al. 1999, Gannier 2000 and	1

Humpback whale	2004, SPWRC 2002 and 2004, Bourreau and Gannier 2001, Olavarria et al. 2003	
Feresa attenuata Pygmy killer whale	Gannier 2002a, SPWRC 2004	1
Globicephala macrorhynchus Short-finned pilot whale	Rancurel 1973, Gannier 2000 and 2002a, SPWRC 2004	1
Grampus griseus Risso's dolphin	Gannier 2000 and 2002a, SPWRC 2004	1
Lagenodelphis hosei Fraser's dolphin	Gannier 2000, SPWRC 2004	1
Orcinus orca Orca	Gannier 2002a, Eldredge 1991, SPWRC 2004	1
Peponocephala electra Melon-headed whale	Gannier 2000 and 2002a, SPWRC 2004	1
Pseudorca crassidens False killer whale	Gannier 2002a, SPWRC 2004	1
Stenella attenuata Pantropical spotted dolphin	Gannier 2002a, SPWRC 2004	1
Stenella longirostris Spinner dolphin	Gannier 2000 and 2002b, SPWRC 2002 and 2004	1
Steno bredanensis Rough-toothed dolphin	Gannier 2000 and 2002a, SPWRC 2002 and 2004, Gannier 2003, Gannier and West 2005	1
Tursiops sp. Bottlenose dolphin	Gannier 2000 and 2002a, Brasseur et al. 2002, SPWRC 2004	1
Kogia sp. Diminutive sperm whale	Gannier 2000, SPWRC 2004	1
Physeter macrocephalus Sperm whale	Jacquet et al. 1996, Gannier 2000, SPWRC 2004	1
Mesoplodon densirostris Blainville's beaked whale	Gannier 2000, SPWRC 2004	1
Ziphius cavirostris Cuvier's beaked whale	Gannier 2000, SPWRC 2004	1
Unconfirmed Species		
Balaenoptera *sp., Minke whale (A. Gannier pers. comm.)* Balaenoptera edeni, *Pygmy Bryde's whale (UNEP-WCMC 2003)* *Balaenoptera physalus*, Fin whale (UNEP-WCMC 2003)		

Guam

Land Area (km^2): 541
Sea Area (EEZ) (thousands of km^2): 218

Guam is the largest and most southerly of the Mariana Islands in the western Pacific Ocean. The country is divided into a northern plateau and a southern chain of volcanic hills.

Cetacean records for the small nation of Guam include numerous stranding records. More specifically, the following species have been reported in a stranding or beaching event: Bryde's whale, pygmy sperm whale, dwarf sperm whale, orca, melon-headed whale, sperm whale, striped dolphin, and spinner dolphin (Eldredge 1991, Kami and Lujan 1976, Reeves et al. 1999, Trianni and Kessler 2002). It is difficult to be certain whether these species inhabit Guam on a regular basis as they may have been washed ashore.

Spinner dolphins have been observed swimming in the Saipan Lagoon area (Trianni and Kessler 2002). Kami and Hosmer (1982) indicated that short-finned pilot whales were very common around Guam and others confirmed their presence in these waters (Birkeland 1977 *in*

Reeves et al. 1999). Miyazaki and Wada (1978) reported on the presence of Risso's dolphin in this area. The geographic range of dwarf sperm whale includes Guam (UNEP-WCMC 2003). Humpback whales have also been sighted in Guam waters yet it is unclear whether these individuals are northern or southern hemisphere humpback whale species (Eads 1991, Eldredge 1991).

Records of Cetaceans in the Waters of Guam		
Scientific Name Common Name	Citation	Class
Megaptera novaeangliae Humpback whale	Eads 1991, Eldredge 1991	2
Globicephala macrorhynchus Short-finned pilot whale	Birkeland 1977, Kami and Hosmer 1982, Eldredge 1991	2
Grampus griseus Risso's dolphin	Miyazaki and Wada 1978, Eldredge 1991, Miyashita et al. 1996	2
Stenella longirostris Spinner dolphin	Eldredge 1991, Trianni and Kessler 2002	2
Kogia sp. Diminutive sperm whale	Kami and Lujan 1976, Eldredge 1991, Reeves et al. 1999, UNEP-WCMC 2003, Eldredge 2003	2
Unconfirmed Species		
Balaenoptera *sp., Bryde's whale (Eldredge 1991, Eldredge 2003)* Balaenptera borealis, *Sei whale (D. Johnston pers. comm.)* Orcinus orca, *Orca (Kami and Hosmer 1982*) *Peponocephala electra*, Melon-headed whale (Kami and Hosmer 1982, Eldredge 2003) *Physeter macrocephalus,* Sperm whale (Eldredge 1991, Reeves et al. 1999) *Stenella attenuatu,* Pantropical spotted dolphin (Wada 1981) *Stenella coeruleoalba,* Striped dolphin (Eldredge 1991, Eldredge 2003) *Tursiops* sp., Bottlenose dolphin (Wada 1981) *Ziphius cavirostris*, Cuvier's beaked whale (D. Johnston pers. comm.)		

Kiribati

Land Area (km^2): 811
Sea Area (EEZ) (thousands of km^2): 3,550

The 33 atolls that make up Kiribati - the former Gilbert Islands - occupy a vast area in the Pacific. They stretch nearly 4000 km from east to west, more than 2000 km from north to south, and span the Equator.

The State of the Environment report for Kiribati (Wilson 1994) listed five species as occurring within the EEZ: Fraser's dolphin, spinner dolphin, blue whale, southern right whale, and sperm whale. Recent reports indicate that spinner dolphins are present in both the Line Islands and Phoenix Islands (Reeves et al. 1999, Stone et al. 2001). The first record of Fraser's dolphin in the central Pacific occurred within Kiribati waters northeast of the Phoenix Islands along the equator (Perrin et al. 1973). The presence of Fraser's dolphin has also been indicated by Miyazaki and Wada (1978) and within the UNEP-WCMC (2003). Quite a number of whaling records indicate that sperm whalers were active in Kiribati waters – particularly along the equator or "along the line" as it is often referred (*see* Lever 1964, Reeves et al. 1999). More recent observations indicate that this species is still relatively common around both the Line and Phoenix Islands (Dufault and Whitehead 1995, Reeves et al. 1999). Additional records for blue whale and southern right whale have not been found elsewhere. All five of these cetacean species are considered threatened or endangered by the Kiribati government.

Reports of orca have included the area between the Phoenix Islands and Tonga, as well as a single male seen in 1995 in the vicinity of Baker Island just north of the Kiribati EEZ (Miyashita et al. 1995). Four melon-headed whales washed ashore at Palmyra Island (just north of the Line Islands) in 1964. One skull was maintained for museum records from this event (Reeves et al. 1999). Another skull of a *Ziphius cavirostris* individual was retrieved from the Phoenix Island and remains in collection (Reeves et al. 1999). Although an unusual inclusion, southern

bottlenose whales have been observed "northeast of the Phoenix Islands along the equator" in the mid-1960s yet again in the same general vicinity more recently (Reeves et al. 1999). A range map of rough-toothed dolphins (Miyazaki and Perrin 1994) indicates several records near the Line Islands. Sightings from commercial tuna seiners of pilot whales (assumed by distribution to be *G. macrocephalus*) placed them close to the northern Line Islands (Patterson and Alverson 1986 *in* Reeves et al. 1999). A skeleton was found off the northwest of the Line Islands of *Pseudorca crassidens* (Reeves et al. 1999).

Pantropical spotted dolphin have been anecdotally recorded north of the western Phoenix Islands (Reeves et al. 1999) and a specimen from this same region has been identified (Perrin 1975). An unpublished record cited in Reeves et al. (1999) indicates that striped dolphins may also be present within Kiribati as a sighting made from near the Gilbert Islands is mentioned. Several stranding events, sightings and museum specimens of *T. truncatus* bottlenose dolphins have occurred around both the northern Line Islands and the Phoenix Islands (Reeves et al. 1999) and a recent survey in the Phoenix Islands identified the common bottlenose dolphins as the most frequently sighted cetacean during 21 days of survey work (Stone et al. 2001). This survey also sighted an unidentified beaked whale and a possible humpback whale yet these records could not be confirmed.

Additional records may have been obtained during the "Voyage of the Odyssey" (*see* www.pbs.org/odyssey) that travelled through Kiribati waters. Logbook reports from this trip indicate other species of cetacean were seen within Kiribati waters, including Blainville's beaked whales.

Records of Cetaceans in the Waters of Kiribati		
Scientific Name Common Name	Citation	Class
Globicephala macrorhynchus Short-finned pilot whale	Patterson and Alverson 1986, Odyssey logbook report 2000	2
Lagenodelphis hosei Fraser's dolphin	Perrin et al. 1973, Miyazaki and Wada 1986, Wilson 1994, UNEP-WCMC 2003	1
Orcinus orca Orca	Miyashita et al. 1995	2
Stenella attenuata Pantropical spotted dolphin	Perrin 1975, Reeves et al. 1999	2
Stenella longirostris Spinner dolphin	Wilson 1994, Reeves et al. 1999, Stone et al. 2001	1
Steno bredanensis Rough-toothed dolphin	Miyazaki and Perrin 1994	2
Tursiops sp. Bottlenose dolphin	Patterson and Alverson 1986, Reeves et al. 1999, Stone et al. 2001	1
Physeter macrocephalus Sperm whale	Lever 1964, Patterson and Alverson 1986, Eldredge 1991, Wilson 1994, Dufault and Whitehead 1995, Reeves et al. 1999	1
Hyperoodon planifrons Southern bottlenose whale	Wade and Gerrodette 1993, Reeves et al. 1999	2
Unconfirmed Species		
Balaenoptera musculus, Blue whale (Wilson 1994) *Eubalaena australis,* Southern right whale (Wilson 1994) *Mesoplodon densirostris*, Blainville's beaked whale (Odyssey logbook report 2000) Peponocephala electra, *Melon-headed whale (Reeves et al. 1999)* *Pseudorca crassidens*, False killer whale (Reeves et al. 1999) *Stenella coeruleoalba,* Striped dolphin (Reeves et al. 1999) *Ziphius cavirostris,* Cuvier's beaked whale (Reeves et al. 1999)		

Marshall Islands

Land Area (km²): 181
Sea Area (EEZ) (thousands of km²): 2,131

The Marshall Islands consist of two chains of coral atolls, together with more than 1,000 islets, just north of the Equator.

A checklist of mammal fauna in the Marshall Islands identified a number of marine species in these waters (Reese 1984), including: minke whale, sei whale, blue whale, fin whale, common dolphin, short-finned pilot whale, orca, pantropical spotted dolphin, and bottlenose dolphin. There is also a record for sei whale (Reese 1984) however these individuals were later believed to be Bryde's whales (Reeves et al. 1999). Historical records refer to humpback whales in this region (Kellogg 1928) and this species is presently listed in the UNEP-WCMC (2003) as having Marshall Islands constitute part of its range. A group of sperm whales was sighted near Bikini Atoll in 1947 (unpublished account *in* Reeves et al. 1999) yet more recent reports have not been documented. Other odontocete sightings in the area include a group of 5 melon-headed whales, striped dolphins and spinner dolphins although not much detail is provided (Reeves et al. 1999). Lastly, a skull of a *Steno bredanensis* individual is at the US National Museum after being collected from Rongerik Atoll in 1946 (Reeves et al. 1999).

Records of Cetaceans in the Waters of the Marshall Islands

Scientific Name Common Name	Citation	Class
Balaenoptera *sp.* Minke whale	Reese 1984, Crawford 1993	2
Balaenoptera musculus Blue whale	Reese 1984, Crawford 1993	2
Balaenoptera physalus Fin whale	Reese 1984, Crawford 1993	2
Megaptera novaeangliae Humpback whale	UNEP-WCMC 2003, Kellogg 1928 *in* Wiles 2005	2
Delphinus sp. Common dolphin	Reese 1984, Crawford 1993	2
Globicephala macrorhynchus Short-finned pilot whale	Reese 1984, Crawford 1993	2
Orcinus orca Orca	Reese 1984, Crawford 1993	2
Peponocephala electra Melon-headed whale	Eldredge 1991	2
Stenella attenuata Pantropical spotted dolphin	Reese 1984, Crawford 1993	2
Stenella coeruleabla Striped dolphin	Reeves et al. 1999	2
Stenella longirostris Spinner dolphin	Eldredge 1991	2
Tursiops sp. Bottlenose dolphin	Reese 1984, Crawford 1993	2

Unconfirmed Species

Balaenoptera sp., Bryde's whale (Patterson and Alverson 1986)
Steno bredanensis, Rough-toothed dolphin (Reeves et al. 1999)
Physeter macrocephalus, Sperm whale (Reeves et al. 1999)

Nauru

Land Area (km²): 21
Sea Area (EEZ) (thousands of km²): 320

Nauru is a remote uplifted coral formation that is one of the smallest nations on earth.

Nauru has limited records that can definitively be attributed to its relatively small EEZ. Bryde's whales marked with discovery tags in the general vicinity of Nauru (Ohsumi 1978) were later killed on Japanese pelagic whaling grounds (Ohsumi 1978, 1979, 1980). In 1976 a herd of melon-headed whales was sighted (and a female collected) north of Nauru (Miyazaki and Wada 1978). This group was reported as swimming with a very large (400-500) group of Fraser's dolphins (Miyazaki and Wada 1978). *Ziphius cavirostris* have been sighted in areas around Nauru (Miyazaki and Wada 1978) although these records were qualified by noting the difficulty of identifying these cryptic species at sea. Finally, large numbers of sperm whale were historically sighted off Nauru (Lever 1964, Berzin 1972) yet there have been no subsequent sightings of this species.

Records of Cetaceans in the Waters of Nauru		
Scientific Name Common Name	Citation	Class
Balaenoptera *sp.* Bryde's whale	Ohsumi 1978, Eldredge 1991	2
Lagenodelphis hosei Fraser's dolphin	Miyazaki and Wada 1978	2
Peponocephala electra Melon-headed whale	Miyazaki and Wada 1978	2
Physeter macrocephalus Sperm whale	Lever 1964, Berzin 1972, Eldredge 1991	2
Unconfirmed Species		
Ziphius cavirostris, Cuvier's beaked whale (Miyazaki and Wada 1978)		

New Caledonia and Dependencies

Land Area (km^2): 18,576
Sea Area (EEZ) (thousands of km^2): 1,740

A French overseas territory in the Pacific, New Caledonia is comprised of the islands of New Caledonia, the Isle of Pines, the Loyalty Islands, Walpole Island, and the Huon, Chesterfield, and Belep groups.

The cetacean fauna of New Caledonia is one of the most studied in the Pacific Islands. Most survey work has concentrated on the migratory humpback whales which breed in New Caledonian waters during the austral winter (Dawbin 1964, Eldredge 1991, Garrigue and Gill 1994, Gill et al. 1995, Garrigue and Greaves 2000, Garrigue et al. 2001, Paterson 2001, Garrigue et al. 2002, SPWRC 2002, Olavarria et al. 2003, Garrigue et al. 2004, SPWRC 2004, Baker et al. 2005, Palsbøll et al. 2005). Numerous international matches have been made between individual humpbacks seen in New Caledonian waters with New Zealand, French Polynesia, Tonga, and Vanuatu (Garrigue et al. 2002).

Sighting, photographs and genetic samples have recently been taken from spinner dolphin, bottlenose dolphin, short-finned pilot whale, false killer whale, sperm whale, humpback, dwarf minke whale, and, blue whale species within New Caledonian waters (SPWRC 2004). Sighting and photographic data have been collected for pantropical spotted dolphin and Risso's dolphin, whereas photographic and genetic information exists for Blainville's beaked whale, pygmy sperm whale, and dwarf sperm whale (SPWRC 2004). Sighting data also exists for orca (SPWRC 2004), and a genetic sample has been obtained from a *Ziphius cavirostris* individual in these waters (C. Garrigue pers. comm.). Furthermore, sei whale, pygmy killer whale, melon-headed whale, and the Indo-Pacific bottlenose dolphin have been reported as occurring in the region (C. Garrigue pers. comm.). Documented evidence for the presence of dwarf minke whale (*B. acutorostrata*) and the common bottlenose dolphin (*T. truncatus*) has also been published (Garrigue and Greaves 2001), and Kawamura (1980) reported on catches of Bryde's whale being taken in southeast area of New Caledonia waters. Short-beaked common dolphins were reported to occur within New Caledonian waters by Heyning and Perrin (1994). Possible spinner dolphins, a "*Prodelphinus*", described as a long-beaked dolphin by Rancurel (1973) have

also been reported. Lastly, New Caledonia is listed as part of the geographic range of the Antarctic minke whale in UNEP-WCMC (2003).

Records of Cetaceans in the Waters of New Caledonia		
Scientific Name Common Name	Citation	Class
Balaenoptera acutorostrata subsp. Minke whale	Arnold et al. 1987, Garrigue and Greaves 2001	1
Balaenoptera bonaerensis, Antarctic minke whale	UNEP-WCMC 2003, Borsa 2006	2
Balaenoptera borealis Sei whale	Garrigue unpub.	2
Balaenoptera sp. Bryde's whale	Kawamura 1980, Reeves et al. 1999	1
Balaenoptera musculus brevicauda Pygmy Blue whale	Garrigue et al. 2003	1
Megaptera novaeangliae Humpback whale	Dawbin 1964, Eldredge 1991, Garrigue and Gill 1994, Gill et al. 1995, Garrigue and Greaves 2000, Garrigue et al. 2001, Paterson 2001, Garrigue et al. 2002, SPWRC 2002, Olavarria et al. 2003, Garrigue et al. 2004, SPWRC 2004, Baker et al. 2005, Palsbøll et al. 2005	1
Delphinus sp. Common dolphin	Heyning and Perrin 1994, Reeves et al. 1999	2
Feresa attenuata Pygmy killer whale	Garrigue unpub.	2
Globicephala macrorohynchus Short-finned pilot whale	Garrigue and Greaves 2001, Bustamante et al. 2003, UNEP-WCMC 2003	1
Grampus griseus Risso's dolphin	Garrigue and Greaves 2001, UNEP-WCMC 2003	1
Orcinus orca Orca	Garrigue and Greaves 2001	1
Peponocephala electra Melon-headed whale	C. Garrigue pers. comm.	1
Pseudorca crassidens False killer whale	Greaves and Garrigue 1999, SPWRC 2004	1
Stenella attenuata Pantropical spotted dolphin	Garrigue and Greaves 2001, UNEP-WCMC 2003	1
Stenella longirostris Spinner dolphin	Garrigue and Greaves 2001	1
Tursiops aduncus Indo-Pacific bottlenose dolphin	Garrigue unpub.	1
Tursiops truncatus Common bottlenose dolphin	Garrigue and Greaves 2001	1
Kogia breviceps Pygmy sperm whale	Sylvestre 1988, Bustamante et al. 2003	1
Physeter macrocephalus Sperm whale	Garrigue and Greaves 2001, UNEP-WCMC 2003	1
Mesoplodon densirostris Blainville's beaked whale	Garrigue and Greaves 2001, UNEP-WCMC 2003, Borsa 2005	1

Ziphius cavirostris Cuvier's beaked whale	Garrigue unpub.	1
Unconfirmed Species		
Kogia sima, Dwarf sperm whale (Rancurel 1973, Reeves et al. 1999, SPWRC 2004)		

Niue

Land Area (km²): 259
Sea Area (EEZ) (thousands of km²): 390

Niue is a small coral atoll with steep limestone cliffs along coast, central plateau situated in the South Pacific Ocean, east of Tonga.

The small island of Niue is situated amid regions where research has been conducted (i.e., Tonga, American Samoa and Cook Islands) yet has not itself been subject to dedicated surveys. Reports from Japanese researchers (Kasamatsu et al. 1995) indicated that minke whales were present from American Samoa and Niue east to Tahiti although species was not indicated. However, Constantine (1999a) documented records that indicated *Balaenoptera acutorostrata* individuals were seen on rare occasion in offshore waters. Constantine's (1999a) report also indicated that spinner dolphins were seen year-round. This reliability in Niue waters is reinforced by the small ecotourism industry that has developed around this species (Hoyt 2001). Humpbacks are seen seasonally in these waters (Constantine 1999a, Reeves et al. 1999). Three species that were cited as being rarely observed within these waters were orca, false killer whale, and pilot whale (believed to be short-finned) (Constantine 1999a). Ohsumi (1979) describe the distribution of sperm whales in this area to begin west (Fiji) and extend east to the waters between Niue and Raratonga.

Records of Cetaceans in the Waters of Niue		
Scientific Name Common Name	Citation	Class
Balaenoptera sp. Minke whale	Kasamatsu et al. 1995, Constantine 1999a	1
Megaptera novaeangliae Humpback whale	Constantine 1999a, Reeves et al. 1999, SPWRC 2002 and 2004	1
Globicephala macrorhynchus Short-finned pilot whale	Constantine 1999a	2
Orcinus orca Orca	Constantine 1999a	1
Pseudorca crassidens False killer whale	Constantine 1999a	1
Stenella longirostris Spinner dolphin	Constantine 1999a, Hoyt 2001	1
Physeter macrocephalus Sperm whale	Ohsumi 1979	2

Northern Mariana Islands

Land Area (km²): 471
Sea Area (EEZ) (thousands of km²): 777

The Commonwealth of the Northern Mariana Islands is a chain of 16 islands that extend 563 km in the northwest Pacific. The northern islands are composed of volcanic rock, the southern islands of madrepore limestone covering a volcanic base.

Horwood (1987) reported that two sei whales were tagged in the vicinity of the Northern Mariana Islands. Japanese sighting surveys and tuna vessels have also recorded short-finned pilot whales, Risso's and rough-toothed dolphins within this area (Patterson and Alverson 1986, Miyashita et al. 1995). A recent encounter again confirmed rough-toothed dolphins associated with a large (500-700 individuals) group of melon-headed whales (Jeffersen et al. 2006). Spinner

dolphin presence has also been confirmed in the Northern Marianas Islands (D. Johnston pers. comm.). More dated records provide evidence that Cuvier's beaked whale, common dolphin and false killer whales have been observed in the Mariana and Bonin Islands areas (Masaki 1972).

UNEP-WCMC (2003) notes Northern Mariana Islands as part of the geographic range of *Kogia breviceps*, while Kami and Lujan (1976) noted an anecdotal report of small sperm whales (species not given) being driven from a shallow lagoon onto shore. The UNEP-WCMC (2003) also includes the Northern Mariana Islands as part of the geographic range of bottlenose dolphins and humpback whales. The presence of the latter species was tentatively confirmed in Reeves et al. (1999) who indicated that northern hemisphere populations (specifically the Asian stock) might move into these waters during the austral summer. Humpback whale presence has been confirmed by recent observation (D. Johnston pers. comm.).

Japanese shore whalers took sperm whales from around the NMI area in the 1980s, (Kasuya and Miyashita 1988) and other sighting surveys around this region indicated that orca and striped dolphin had been observed although both of the species identifications were made in locations close to the outer boundary of the NMI EEZ (Miyashita et al. 1995 and 1996).

Records of Cetaceans in the Waters of the Northern Mariana Islands		
Scientific Name Common Name	Citation	Class
Megaptera novaeangliae Humpback whale	Eldredge 1991, Reeves et al 1999, UNEP-WCMC 2003, D. Johnston pers. comm.	1
Globicephala macrorhynchus Short-finned pilot whale	Miyashita et al. 1995	2
Grampus griseus Risso's dolphin	Miyashita et al. 1996	1
Peponcephala electra Melon-headed whale	Jeffersen et al. 2006	1
Stenella longirostris Spinner dolphin	Stinson 1994, D. Johnston pers. comm.	1
Steno bredanensis Rough-toothed dolphin	Miyashita et al. 1996, Jeffersen et al. 2006	1
Kogia sp. Diminuitive sperm whale	Kami and Lujan 1976, UNEP-WCMC 2003	2
Physeter macrocephalus Sperm whale	Kasuya and Miyashita 1988, Eldredge 1991	2
Ziphius cavirostris Cuvier's beaked whale	Masaki 1982 *in* Eldredge 2003	2
Unconfirmed Species		
Balaenoptera sp., "Bryde's-like" whale (Horwood 1987, Eldredge 2003) *Delphinus* sp., Common dolphin (Masaki 1972 *in* Eldredge 1991) *Orcinus orca,* Orca (Miyashita et al. 1995) *Pseudorca crassidens,* False killer whale (Masaki 1972 (*in* Wiles 2005)) *Stenella coeruleoalba,* Striped dolphin (Miyashita et al. 1996) *Tursiops truncatus,* Common bottlenose dolphin (UNEP-WCMC 2003)		

Palau

Land Area (km^2): 488
Sea Area (EEZ) (thousands of km^2): 629

More than 200 volcanic and coral islands, many of them surrounded by a single barrier reef, make up the northern Pacific nation of Palau.

Anecdotal reports dominate the cetacean listing available for Palau. Such reports include a pod of orca photographed in April 1993 (Rock 1993 *in* Reeves et al. 1999) and it was inferred from local reports that their presence was not unusual. Other reports also affirm the presence of orca in Palau (Iwashita 1963, Reeves et al. 1999) as did relatively recent community

consultations that identified both orca and sperm whale in the region (PCS 2003). Melon-headed whales have been documented to strand on the Palau coast (Donaldson 1983). Anecdotal reports have also placed short-finned pilot whales (in Reeves et al. 1999) and striped dolphins (Miyazaki and Wada 1978) in Palau waters yet further details around each of these sightings is not given.

Dated records for false killer whale and pantropical spotted dolphin have been reported (Eldredge 1991). Reports of Risso's, Fraser's, and spinner dolphin, as well as Cuvier's beaked whale that appear to be within (or very close to) the Palau EEZ were summarized by Eldredge (1991). Finally, careful review of whaling records showed that takes of Bryde's whales (species not confirmed) occurred within the Palau EEZ in the 1980s (Perrin 2006).

Records of Cetaceans in the Waters of Palau		
Scientific Name Common Name	Citation	Class
Balaenoptera sp. Bryde's whale	Eldredge 1991, Perrin 2006	2
Orcinus orca Orca	Iwashita 1963 *in* Visser and Bonoccorso 2003, Rock 1993, PCS 2003	2
Stenella coeruleabla Striped dolphin	Miyazaki and Wada 1978	2
Unconfirmed Species		
Balaenoptera sp., Minke whale (A. Bauman pers. comm.) *Feresa attenuata*, Pygmy killer whale (A. Bauman pers. comm.) Globicephala macrorhynchus, *Short-finned pilot whale (Reeves et al. 1999, Wiles 2005)* Grampus griseus, *Risso's dolphin (Eldredge 1991, A. Bauman pers. comm.)* Lagenodelphis hosei, *Fraser's dolphin (Eldredge 1991)* *Peponocephala electra,* Melon-headed whale (Donaldson 1983, Eldredge 1991, A. Bauman pers. comm.) *Physeter macrocephalus,* Sperm whale (PCS 2003, Wiles 2005) *Pseudorca crassidens,* False killer whale (Eldredge 1991, A. Bauman pers. comm.) *Stenella attenuata,* Pantropical spotted dolphin (Eldredge 1991) *Stenella longirostris*, Spinner dolphin (Eldredge 1991, A. Bauman pers. comm.) *Tursiops* sp., Bottlenose dolphin (A. Bauman pers. comm.) *Ziphius cavirostris,* Cuvier's beaked whale (Eldredge 1991, Wiles 2005)		

Papua New Guinea

Land Area (km^2): 462,243
Sea Area (EEZ) (thousands of km^2): 3,120

Papua New Guinea encompasses the eastern half of the island of New Guinea, as well as the Bismarck Archipelago, the Trobriand Islands, Samarai Island, Woodlark Island, D'Entrecasteaux Islands, the Louisiade Archipelago, and the northernmost Solomon Islands of Buka and Bougainville.

Two dedicated marine mammal surveys have been conducted in Kimbe Bay, West Britain, to investigate diversity within this region (Munday 1994, Visser 2003). Munday's work summarized previous sightings and reports as well as his own records to produce a preliminary cetacean checklist of sperm whale, short-finned pilot whale, orca, false killer whale, melon-headed whale, bottlenose dolphin, and spinner dolphin. In addition anecdotal reports of humpback and pygmy killer whale were documented. Sightings and acoustic data taken by Visser (2003) in a similar region during April 2003 confirmed seven species: pygmy sperm whale, Cuvier's beaked whale, bottlenose dolphin, Indo-Pacific bottlenose dolphin, pantropical spotted dolphin, spinner dolphin and Risso's dolphin. Preliminary work conducted by Visser identified an additional four species (i.e., melon-headed, false killer whale, short-finned pilot whale, and orca). Tentative identifications of Blainville's beaked whale and rough-toothed dolphin were also made.

Bryde's whales were documented to receive discovery tags around the PNG region (Ohsumi 1978). Large numbers of both Fraser's dolphins and melon-headed dolphins were sighted

between New Guinea and Micronesia in the mid 70s (Miyazaki and Wada 1978) and more recently Fraser's dolphins have again been sighted (Odyssey web logbook 2001). Irrawaddy dolphin may frequent Papua New Guinean waters, as incidental takes in the Gulf of Papua have been noted (Dawbin 1972, Stacey and Arnold 1999) and this species lists PNG within its geographic range (UNEP-WCMC 2003). Papua New Guinea is also listed as part of the geographic range of the southern right whale dolphin (UNEP-WCMC 2003), almost certainly erroneously.

The presence of the Indo-Pacific humpback dolphin in Papua New Guinean waters is a unique addition to the Pacific Islands cetacean fauna (Dawbin 1972, Jefferson and Karczmarski 2001, UNEP-WCMC 2003). However, its presence has been documented in areas of close proximity to Papua New Guinea rather than directly in the EEZ.

Records of Cetaceans in the Waters of Papua New Guinea		
Scientific Name Common Name	Citation	Class
Balaenoptera borealis Sei whale	Odyssey logbook 2001	1
Globicephala macrorhynchus Short-finned pilot whale	Munday 1994, Visser 2002	1
Grampus griseus Risso's dolphin	Visser 2003	1
Lagenodelphis hosei Fraser's dolphin	Miyazaki and Wada 1978, Odyssey logbook 2001	1
Orcaella brevirostris Irrawaddy dolphin	Dawbin 1972, Mitchell 1975, UNEP-WCMC 2003	2
Orcinus orca Orca	Munday 1994, Visser and Bonoccorso 2003	1
Peponocephala electra Melon-headed whale	Munday 1994, Reeves et al. 1999, Visser 2002, UNEP-WCMC 2003	1
Pseudorca crassidens False killer whale	Munday 1994, Visser 2002	1
Sousa chinensis Indo-Pacific humpback dolphin	Dawbin 1972, Jefferson and Karczmarski 2001, UNEP-WCMC 2003	2
Stenella attenuata Pantropical spotted dolphin	UNEP-WCMC 2003, Visser 2003	1
Stenella longirostris Spinner dolphin	Munday 1994, Visser 2003, Visser and Bonoccorso 2003,	1
Tursiops sp. Bottlenose dolphin	Munday 1994, Visser 2003	1
Kogia *sp.* Diminutive sperm whale	Visser 2003	1
Physeter macrocephalus Sperm whale	Lever 1964, Berzin 1972, Dawbin 1972, Munday 1994, Visser and Bonoccorso 2003	1
Ziphius cavirostris Cuvier's beaked whale	Visser 2003	1
Unconfirmed Species		
Balaenoptera *sp., Bryde's whale (Ohsumi 1978)* Feresa attenuata, *Pygmy killer whale (Munday 1994)* Lissodelphis peronii, *Southern right whale dolphin (UNEP-WCMC 2003) (see text)* Megaptera novaeangliae, *Humpback whale (Munday 1994)* *Mesoplodon densirostris*, Blainville's beaked whale (Visser 2003) *Steno bredanensis,* Rough-toothed dolphin (Visser 2003)		

Pitcairn Islands

Land Area (km²): 39
Sea Area (EEZ) (thousands of km²): 800

The Pitcairn Island group is a British overseas territory in the south-central Pacific Ocean and includes Pitcairn, Henderson, Ducie, and Oeno islands.

Very few records exist for the four coral islands that constitute the Pitcairn group. A relatively recent biodiversity report for this UK territory did not list any marine mammals for the region (Proctor and Fleming 1999). Observations of *Globicephala macrorhynchus* within the Pitcairn group reported in Reeves et al. (1999) and referenced to unpublished data by S. Leatherwood as the source of this information. Sperm whale is also believed to historically occur within this remote group of islands (Lever 1964). The geographic range of humpback whales has recently been amended to include the Pitcairn group (IUCN 2006) and their presence has been confirmed by sightings (G. Wragg, pers. comm.). Minke whales, Cuvier's beaked whale and unidentified dolphins have been reported in the region but are not documented (G. Wragg, pers. comm.).

Records of Cetaceans in the Waters of the Pitcairn Islands		
Scientific Name Common Name	Citation	Class
Globicephala macrorhynchus Short-finned pilot whale	Reeves et al. 1999, G. Wragg pers. comm.	2
Unconfirmed Species		
Balaenoptera sp., Minke whale (G. Wragg pers. comm.) *Megaptera novaeangliae,* Humpback whale (IUCN 2006, G. Wragg pers. comm.) *Physeter macrocephalus,* Sperm whale (Lever 1964)		

Samoa

Land Area (km²): 2,935
Sea Area (EEZ) (thousands of km²): 120

The Independent State of Samoa is made up of nine volcanic islands, two of which - Savai'i and Upolu - comprise a vast majority of the land area.

The Fisheries Department of Samoa holds many records for species that have stranded on their shores (Samoa Stranding Database 2006). Current specimen records indicate the following have been stranded and/or sighted in Samoan waters: Bryde's whale, Risso's dolphin, dwarf sperm whale, Fraser's dolphin, melon-headed whale, striped dolphin, and Cuvier's beaked whale. Concentrations of orca have also been recorded within the Samoan EEZ (Miyashita et al. 1995). Japanese fishing vessels indicated that minke whales were sighted in the Samoan region (Kasamatsu et al. 1995). Genetic samples were taken from rough-toothed dolphin, spinner dolphin, short-finned pilot whale, and common bottlenose dolphins in Samoan waters (Childerhouse 2005). Humpback whales have also been studied during additional work in Samoan waters (SPWRC 2002, 2004), and acoustic and visual surveys conducted in these waters in 2001 suggested the presence of humpback whale, sperm whale, false killer whale, and spinner dolphin (Noad et al. unpublished). This survey work also observed some unidentified beaked whales that were tentatively believed to be Blainville's beaked whales (Noad et al. unpublished, Bourke and Powell 2003). Other reports suggest that pantropical spotted dolphins may occur within Samoan waters (Paton and Gibbs 2002).

Records of Cetaceans in the Waters of Samoa		
Scientific Name Common Name	Citation	Class
Balaenoptera edeni Pygmy Bryde's whale	Samoa Stranding Database 2006	1
Megaptera novaeangliae Humpback whale	Paterson 2001, Paton and Gibbs 2002, Noad et al. unpub.	1
Globicephala macrorhynchus	Paton and Gibbs 2002,	1

Short-finned pilot whale	Childerhouse 2005	
Grampus griseus Risso's dolphin	Samoa Stranding Database 2006	1
Lagenodelphis hosei Fraser's dolphin	Samoa Stranding Database 2006	1
Orcinus orca Orca	Miyashita et al. 1995	1
Peponocephala electra Melon-headed whale	Samoa Stranding Database 2006	2
Pseudorca crassidens False killer whale	Paton and Gibbs 2002, Noad et al. unpub.	1
Stenella coeruleabla Striped dolphin	Samoa Stranding Database 2006	1
Stenella longirostris Spinner dolphin	Paton and Gibbs 2002, Childerhouse 2005, Noad et al. unpub.	1
Steno bredanensis Rough-toothed dolphin	SPWRC 2004, Childerhouse 2005	1
Tursiops sp. Bottlenose dolphin	Bourke and Powell 2003, UNEP-WCMC 2003, SPWRC 2004, Childerhouse 2005	1
Kogia sima Dwarf sperm whale	Olavarría et al. 2005, Samoa Stranding Database 2006	1
Physeter macrocephalus Sperm whale	Townsend 1935, SPWRC 2004, Noad et al. unpub.	1
Ziphius cavirostris Cuvier's beaked whale	Samoa Stranding Database 2006	1
Unconfirmed Species		
Balaenoptera sp., Minke whale (Kasamatsu et al. 1995 *in* Paton and Gibbs 2002) *Mesoplodon* sp., Beaked whale sp. (Olavarría et al. 2005)		

Solomon Islands

Land Area (km^2): 28,370
Sea Area (EEZ) (thousands of km^2): 1,340

This island country of the southwestern South Pacific Ocean includes the islands of Guadalcanal, Malaita, San Cristobal, Choiseul, Santa Isabel, and Rennell; the Russell, Florida, Shortland, Santa Cruz, and New Georgia island groups; and small islands and reefs.

A rapid ecological assessment of Solomon Island oceanic cetaceans and associated habitats took place during May and June of 2004 (Kahn 2004). Acoustic and visual surveys identified spinner dolphin, pantropical spotted dolphin, common bottlenose dolphins, Indo-Pacific bottlenose dolphin, orca, Risso's dolphin, rough-toothed dolphin, short-finned pilot whale, Mesoplodon beaked whale, *Balaenoptera* sp. (tentatively indicated to be Bryde's or Sei whale) and sperm whale. The certainty of this last record is also further clouded by whether it may have been a South East Asian dwarf form of sperm whale. Several unidentified beaked whales were also observed. Irrawaddy dolphin was also listed within the literature review of species occurring within the Solomon Islands (Hill 1989 *in* Kahn 2004).

Anecdotal reports of possible blue whales (Kahn 2004) are supported by Japanese sighting surveys (Ohsumi and Shigemune 1993 *in* Shimada and Pastene 1995) that encountered over 40 individuals in August 1957. Other mysticetes sighted within the waters of the Solomon Islands include Bryde's and sei whales (Miyazaki and Wada 1978, Ohsumi 1981). However, the *B. borealis* record is tentative as there is a possibility it may have been a misidentified Bryde's whale (*see* Chapter 5 for more detail).

Sperm whales have been recorded throughout the region with the bulk of sightings being recorded during the spring, summer and autumn (Berzin 1972, Shimada and Pastene 1995). Berzin (1972 *in* Reeves et al. 1999) reported that Soviet "research whalers" saw groups of 100 - 200 sperm whales in the Solomon Island region during the Northern Hemisphere spring and summer periods of the 1960's.

Most of the cetaceans taken in the Solomon drive fishery are reported to be long-snouted oceanic forms, including spinner, pantropical spotted, striped, common (*Delphinus delphis*) and rough-toothed dolphins, along with false killer whales (Dawbin 1972, Takekawa 1996). Risso's dolphins and melon-headed whales have also been taken on occasion as have bottlenose dolphins (Takekawa 1996). In addition short-finned pilot whales have been reported around the Solomon Islands (Dawbin 1974, Shimada and Pastene 1995). A sighting cruise in late November and early December of 1993 observed a pod of five killer whales and 30 Fraser's dolphins off the southeastern end of the Solomon archipelago. Two pods of false killer whales totalling 17 individuals off the Pacific side of the Solomon's were also observed (Shimada and Pastene 1996). In addition, a skull of a Cuvier's beaked whale was found at Treasury Harbour (Dawbin 1972) and Dawbin (1974 *in* Reeves et al. 1999) referred to a record of a Blainville's beaked whale from the Solomon Islands but provided no details. Lastly, the Solomon Islands have been identified as part of the geographic range of humpback whales (UNEP-WCMC 2003).

Records of Cetaceans in the Waters of Solomon Islands		
Scientific Name Common Name	Citation	Class
Balaenoptera musculus Blue whale	Ohsumi and Shigemune 1993 *in* Shimada and Pastene 1995	2
Globicephala macrorhynchus Short-finned pilot whale	Shimada and Pastene 1995, Kahn 2004	1
Grampus griseus Risso's dolphin	Shimada and Pastene 1995, Kahn 2004	1
Lagenodelphis hosei Fraser's dolphin	Shimada and Pastene 1995	2
Orcinus orca Orca	Shimada and Pastene 1995, Kahn 2004	1
Peponocephala electra Melon-headed whale	Shimada and Pastene 1995	2
Pseudorca crassidens False killer whale	Dawbin 1972, Shimada and Pastene 1995	2
Stenella attenuata Pantropical spotted dolphin	Dawbin 1972, Shimada and Pastene 1995, Kahn 2004	1
Stenella coerulealba Striped dolphin	Dawbin 1972, Takekawa 1996	2
Stenella longirostris Spinner dolphin	Shimada and Pastene 1995, Kahn 2004	1
Steno bredanensis Rough-toothed dolphin	Dawbin 1972, Kahn 2004	1
Tursiops sp. Bottlenose dolphin	Kahn 2004	1
Physeter macrocephalus Sperm whale	Berzin 1972, Shimada and Pastene 1995	1
Unconfirmed Species		
Balaenoptera sp., "Bryde's-like" whale (Miyazaki and Wada 1978, Ohsumi 1981) *Balaenoptera* sp., Bryde's whale (Shimada and Pastene 1995, Reeves et al. 1999) *Delphinus* sp., Common dolphin (Dawbin 1972) *Megaptera novaeangliae,* Humpback whale (UNEP-WCMC 2003) *Mesoplodon densirostris,* Blainville's beaked whale (Dawbin 1974)		

Orcaella brevirostris, Irrawaddy dolphin (Hill 1989 *in* Kahn 2004) *Ziphius cavirostris,* Cuvier's beaked whale (Dawbin 1974)

Tokelau

Land Area (km²): 12
Sea Area (EEZ) (thousands of km²): 290

The Polynesian territory of New Zealand consists of three coral atolls - Atafu, Nukunonu and Fakaofo.

Only two records were found for the waters within the EEZ of the small nation of Tokelau. The first is a tentative record of *Orcinus orca* that were reported in small concentrations between the Phoenix Islands of Kiribati and Tonga – it is possible that these observations included Tokelauan waters (Miyashita et al. 1995). There is more certain evidence of sperm whale within this region, albeit rare as a single male was observed in Tokelau in October of 1992 (Dufault and Whitehead 1995).

Records of Cetaceans in the Waters of Tokelau		
Scientific Name Common Name	Citation	Class
Physeter macrocephalus Sperm whale	Dufault and Whitehead 1995	1
Unconfirmed Species		
Orcinus orca, Orca (Miyashita et al. 1995)		

Tonga

Land Area (km²): 649
Sea Area (EEZ) (thousands of km²): 700

Tonga is an archipelago of more than 170 islands spread over four major island groups – Tongatapu, Ha'apai, Vava'u and the Niuas.

Tongan waters are well known for their yearly humpback migration (Dawbin 1964, Eldredge 1991, Paterson 2001, SPWRC 2002, Olavarria et al. 2003, SPWRC 2004, Eriksen et al. 2005) and many whale watch operators make use of this cycle (Orams 2001 and 2004).

Researchers have documented additional cetacean species within these waters (SPWRC 2004). Specifically, spinner dolphins have been sighted, photographed and genetic samples taken. Sighting and photographs have been made of bottlenose dolphin, melon-headed whale, orca, pygmy killer whale, false killer whale, and sperm whale. Sightings of Risso's, short-finned pilot and minke subspecies have been made, and a genetic sample from a dwarf minke whale has been obtained.

Incidental reports also place false killer whales and sperm whales within Tongan waters in the early 1990s (Reeves et al. 1999, Dufault and Whitehead 1995). A group of about 40 common dolphins were sighted southwest of Tonga during a 1992 survey yet the location was not overly specific (Reeves et al. 1999).

Records of Cetaceans in the Waters of Tonga		
Scientific Name Common Name	Citation	Class
Balaenoptera acutorostrata subsp. Dwarf minke whale	SPWRC 2004	1
Balaenoptera bonaerensis Antarctic minke whale	SPWRC 2002 and 2004	2
Megaptera novaeangliae Humpback whale	Dawbin 1964, Eldredge 1991, Paterson 2001, SPWRC 2002, Olavarria et al. 2003, SPWRC 2004, Eriksen et al. 2005	1

Feresa attenuata Pygmy killer whale	SPWRC 2004	1
Globicephala macrorhynchus Short-finned pilot whale	Hoyt 2001, SPWRC 2004	1
Grampus griseus Risso's dolphin	SPWRC 2004	1
Orcinus orca Orca	Visser and Bonoccorso 2003, SPWRC 2004	1
Peponocephala electra Melon-headed whale	SPWRC 2004	1
Pseudorca crassidens False killer whale	Reeves et al. 1999, SPWRC 2004, Childerhouse 2005	1
Stenella attenuata Pantropical spotted dolphin	SPWRC 2004	1
Stenella longirostris Spinner dolphin	UNEP-WCMC 2003, SPWRC 2004, C. Miller pers. comm.	1
Tursiops sp. Bottlenose dolphin	SPWRC 2004	1
Physeter macrocephalus Sperm whale	Dufault and Whitehead 1995, SPWRC 2004	1

Tuvalu

Land Area (km²): 26
Sea Area (EEZ) (thousands of km²): 900

Tuvalu is a group of nine low-lying islands that includes five atolls and four coral islands.

The small nation of Tuvalu has only five cetacean records. Sightings from Japanese whaling vessels (Miyashita et al. 1995) refer to small concentrations of orca between the Phoenix Islands of Kiribati and Tonga – both Tuvalu and Samoa lie directly between these two locations. Historically the distribution of *Physeter macrocephalus* was purported to occur along the south side of one of Tuvalu's islands - Ellice Island (Berzin 1972). Tuvalu is also recorded as part of the geographic range of pantropical spotted dolphin according to the UNEP-WCMC checklist (2003). Recent sightings in Tuvalu indicate that both spinner dolphins (M. Donoghue pers. comm.) and bottlenose dolphins (Anonymous 2006, Reeves 2006) are also present in Tuvaluan waters.

Records of Cetaceans in the Waters of Tuvalu		
Scientific Name Common Name	Citation	Class
Orcinus orca Orca	Miyashita et al. 1995	2
Stenella longirostris Spinner dolphin	M. Donoghue pers. comm.	1
Tursiops sp. Bottlenose dolphin	Anon. 2006, Reeves 2006	2
Physeter macrocephalus Sperm whale	Berzin 1972	2
Unconfirmed Species		
Stenella attenuata, Pantropical spotted dolphin (UNEP-WCMC 2003)		

Vanuatu

Land Area (km²): 12,190
Sea Area (EEZ) (thousands of km²): 680

Vanuatu is a string of more than 80 islands once known as the New Hebrides. The two largest islands, Espiritu Santo and Malakula account for nearly one half of the total land area.

A number of cetacean species have been found in Vanuatu waters. A very large mass stranding of an estimated 231 melon-headed whales occurred on Malekula Island in November of 1972 (Rancurel 1973). One month later a stranded female short-finned pilot whale was found on the nearby island of Efate (Rancurel 1973) and photographic evidence confirms this identification. A possible sighting of Bryde's whales in these waters was reported by Ohsumi (1978) as individuals were taken in the waters between Fiji and New Caledonia. A portion of the Vanuatu EEZ was also described as containing "noticeable concentrations" of Bryde's whales (Ivashin 1980). Historical records indicate that large aggregations of sperm whales were seen off Vanuatu (Berzin 1972). Humpback whales were also seen in Vanuatu waters historically (Dawbin 1964) as well as more recently (SPWRC 2004). Pantropical spotted dolphins have also been sighted and photographed (Decloitre 1995).

Bottlenose dolphins have been reported between Fiji and Papua New Guinea as well as New Caledonian waters (Reeves et el. 1999) so it would seem that Vanuatu waters would also be included in their range. A recent report from a dive trip indicated the presence of bottlenose dolphins in Vanuatu waters (R. Barrell pers. comm.). More recent surveys in Vanuatu waters have confirmed the presence of many of the above species, and also indicated that orca use these waters (C. Garrigue pers. comm.). Finally, Vanuatu is indicated as a geographic range state for striped dolphin (UNEP-WCMC 2003).

Records of Cetaceans in the Waters of Vanuatu		
Scientific Name Common Name	Citation	Class
Megaptera novaeangliae Humpback whale	Dawbin 1964, SPWRC 2004	1
Globicephala macrorohynchus Short-finned pilot whale	Rancurel 1973, SPWRC 2004	2
Orcinus orca Orca	C. Garrigue pers. comm.	1
Peponocephala electra Melon-headed whale	Rancurel 1973, SPWRC 2004	2
Stenella attenuata Pantropical spotted dolphin	SPWRC 2004	1
Stenella longirostris Spinner dolphin	Delcloitre 1995, SPWRC 2004	1
Tursiops sp. Bottlenose dolphin	Reeves et al. 1999	2
Physeter macrocephalus Sperm whale	Berzin 1972, SPWRC 2004	2
Unconfirmed Species		
Balaenoptera sp., Bryde's whale (Ohsumi 1978, Ivashin 1980) *Stenella coeruleoalba,* Striped dolphin (UNEP-WCMC 2003)		

Wallis and Futuna

Land Area (km^2): 255
Sea Area (EEZ) (thousands of km^2): 300

Consists of primarily volcanic islands including Wallis, Futuna and Alofi as well as approximately 20 islets.

The nation of Wallis and Futuna has had no directed research into marine mammal diversity. A speculative cetacean record was the historical distribution range of sperm whales noted to include the region south of Ellice Islands (Tuvalu) to the north of the Fiji Islands (Berzin 1972) which would likely encompass Wallis and Futuna waters. In addition personal communication with C. Garrigue has indicated that humpback whale are also present in these waters.

Records of Cetaceans in the Waters of Wallis and Futuna		
Scientific Name Common Name	Citation	Class
Megaptera novaeangliae Humpback whale	C. Garrigue pers. comm.	1
Unconfirmed Species		
Physeter macrocephalus, Sperm whale (Berzin 1972)		

Australia

Species recorded within Australian waters (Bannister et al. 1996, Smith 2001, Ross 2006):

spectacled porpoise, minke whale, Antarctic minke whale, sei whale, Bryde's whale, blue whale, fin whale, Arnoux's beaked whale, pygmy right whale, common dolphin, southern right whale, pygmy killer whale, short-finned pilot whale, long-finned pilot whale, Risso's dolphin, southern bottlenose whale, Indo-Pacific beaked whale, pygmy sperm whale, dwarf sperm whale, Fraser's dolphin, hourglass dolphin, dusky dolphin, southern right whale dolphin, humpback whale, Longman's beaked whale, Andrew's beaked whale, Blainville's beaked whale, gingko-toothed beaked whale, Gray's beaked whale, Hector's beaked whale, Layard's beaked whale, True's beaked whale, Irrawaddy, snubfin dolphin, orca, melon-headed whale, sperm whale, false killer whale, Indo-Pacific hump-backed dolphin, pantropical spotted dolphin, striped dolphin, spinner dolphin, rough-toothed dolphin, Tasman's beaked whale, Indo-Pacific bottlenose dolphin, common bottlenose dolphin, Cuvier's beaked whale.

New Zealand

Species recorded within New Zealand waters (Department of Conservation 2006):

spectacled porpoise, minke whale, Antarctic minke whale, sei whale, Bryde's whale, Arnoux's beaked whale, pygmy right whale, Hector's dolphin, common dolphin, southern right whale, short-finned pilot whale, long-finned pilot whale, Risso's dolphin, southern bottlenose whale, Longman's beaked whale, pygmy sperm whale, dwarf sperm whale, Fraser's dolphin, hourglass dolphin, dusky dolphin, southern right whale dolphin, humpback whale, Andrew's beaked whale, Blainville's beaked whale, gingko-toothed beaked whale, Gray's beaked whale, Hector's beaked whale, True's beaked whale, Layard's beaked whale, Perrins' beaked whale, pygmy beaked whale, spade-toothed beaked whale, finless porpoise, orca, sperm whale, false killer whale, pantropical spotted dolphin, striped dolphin, spinner dolphin, Tasman's beaked whale, bottlenose dolphin, Cuvier's beaked whale.

USA, Hawaii

Species recorded within Hawaiian waters (U.S.) (Caretta et al. 2005):

minke whale, sei whale, Bryde's whale, blue whale, fin whale, pygmy killer whale, short-finned pilot whale, Risso's dolphin, Longman's beaked whale, pygmy sperm whale, dwarf sperm whale, Fraser's dolphin, humpback whale, Blainville's beaked whale, orca, melon-headed whale, sperm whale, false killer whale, pantropical spotted dolphin, striped dolphin, spinner dolphin, rough-toothed dolphin, common bottlenose dolphin, Cuvier's beaked whale.

Pacific Islands Region Country-specific Cetacean Record Summary

After analysis of records it became apparent that a core group of species made up the majority of cetacean records for the Pacific Islands Region. Focussing on the 22 Island Countries and Territories (i.e., excluding records from Australia, New Zealand and Hawaii) the list of species that appear to be resident or typically migrant are: minke whales (two species and multiple subspecies), sei whale, Bryde's whales (two species), blue whales (multiple subspecies), humpback whale, pygmy killer whale, short-finned pilot whale, Risso's dolphin, Fraser's dolphin, orca, melon-headed whale, false killer whale, pantropical spotted dolphin, striped dolphin, spinner dolphin, rough-toothed

dolphin, bottlenose dolphin (two species), dwarf sperm whale, pygmy sperm whale, sperm whale, Blainville's beaked whale, and Cuvier's beaked whale. It is plausible that ongoing taxonomic investigations may indicate that the current species and subspecies designations are inadequate to display the diversity of these records. In addition there are numerous rare and vagrant species with records within this same region, including: fin whale, common dolphin (two species), Irrawaddy dolphin (possibly two species, although unresolved), Indo-Pacific humpback dolphin, southern right whale, southern bottlenose whale, and tentative records of both Peale's dolphin and southern right whale dolphin. Of course, the limited research efforts in this region coupled with the very large expanse of the Pacific Islands Region marine coverage makes it plausible that there may also be as yet unreported species that inhabit these waters. One such example is the numerous unconfirmed sightings of additional beaked whale species (for e.g., Reeves et al. 1999, Kahn 2004). In addition there are 21 cetacean species for which there are records only from Australian, New Zealand and/or Hawaiian waters. In many cases these represent more temperate species. These species are: spectacled porpoise, Arnoux's beaked whale, pygmy right whale, long-finned pilot whale, Indo-Pacific beaked whale, hourglass dolphin, dusky dolphin, Andrew's beaked whale, gingko-toothed beaked whale, Gray's beaked whale, Hector's beaked whale, Layard's beaked whale, True's beaked whale, Tasman's beaked whale, Hubb's beaked whale, Hector's dolphin, Longman's beaked whale, Perrin's beaked whale, pygmy beaked whale, spade-toothed beaked whale, and finless porpoise.

Cetacean Species in the Pacific Islands Region

Regular, irregular and sometimes vast migrations

The migration of many cetacean species is cyclical and predictable, coinciding with changes in season and the recurring changes in food availability. The period spent between the ends of a cetacean's migration is also important parts of their life cycle. The migration routes of many species cross regularly between the national jurisdiction of coastal and island Countries and Territories. Some species regularly cross from national jurisdictions into the high seas. Other cetacean migrations are less predictable. There are movements within some of the enormous 'home ranges' which constitute migrations in the sense that such forays might involve the animal travelling the length and breadth of its normal home range, comprising several thousand miles and sometimes entirely on the high seas. Such journeys are often undertaken with less predictability. These movements can appear random, or driven by unique circumstances, and may not appear to be cyclic. However the subtleties and extent of such migrations are difficult to evaluate without continuously monitoring individuals and the components of their habitats to determine the impetus for such movements. For many species this data is not yet available. Such long journeys may still constitute migration under the working definition of CMS, even though the cyclical nature and predictability of these migrations may, at present, be unclear.

Considering species and populations

Many cetacean species inhabit vast marine regions. Some species are thought to have movements between populations on a regular basis, whereas other populations remain more distinct. Overlapping migrations may occur, but specific populations may remain isolated from each other. The conservation status of a migratory species means the sum of the influences acting on the migratory species that may affect its long-term distribution and abundance. For this reason the assessment of population status is critical. There can be little doubt that there are a

number of significant pressures which act independently and cumulatively to influence not only the migration of cetaceans but also their long-term population distribution abundance and survival.

Status and habitat of recorded and potential Cetacean Species in the Pacific Islands Region

Knowledge regarding population size, dynamics and migration patterns of cetaceans within the Pacific Islands is largely unknown with the possible exception of humpback whales as a species (e.g., Garrigue et al. 2002, SPWRC 2004). In this chapter, habitat descriptions are based on general reviews (i.e., Carwardine (1995) or Reeves et al. (1999, 2003) unless otherwise indicated), classifications to the level of subspecies have been adapted from Reeves et al. (2003), and IUCN criteria have been taken from the most recent Red List (IUCN 2006). Difficulties associated with individual species identification, sub-species differentiation, and recent nomenclature changes (which many records pre-date) are briefly discussed where appropriate. Table 2 provides status and species listing, whilst habitat and identification issues are listed in the text. Descriptions of the IUCN categories are provided in the Appendix.

Suborder Mysticeti

FAMILY Balaenidae

Eubalaena australis, Southern Right Whale

Habitat: Cold waters of temperate and subpolar Southern hemisphere waters.

Southern right whale populations are circumpolar between approximately 30° and 60°S with generalized movement from higher latitudes where feeding occurs in summer to warmer, lower latitudes for breeding in winter. During the austral winter this species can often be found close to the coast.

ID: It is reported that Eubalaena japonica may occur in northern areas of the Pacific Islands Region including the Hawaiian Islands (Reeves et al. 1999) and therefore may occasionally visit other northerly nations such as Marshall Islands and the Northern Mariana Islands.

FAMILY Balaenopteridae

Balaenoptera acutorostrata subspp., Common and dwarf minke whales

Habitat: Virtually worldwide in tropical, temperate, and polar waters of both hemispheres. It is probable but uncertain whether minke whale breeding occurs in discrete populations in the eastern and western South Pacific Ocean, or if individuals are perhaps assembled in open waters during the breeding season. The dwarf form apparently moves to high latitudes (at least 65°S) in summer.

ID: It is unclear whether records collated in this report consistently and accurately differentiate between the common minke whale and the dwarf form. Furthermore, some difficulty has been noted in distinguishing the acutorostrata species from Antarctic minke whale. The present convention is to regard this species as consisting of two, and possibly three subspecies; the North Atlantic population B. a. acutorostrata, the North Pacific population B. a. scammoni, and the "dwarf" minke whale, B. a. unnamed subsp., which is found in parts of the Southern Ocean (Rice 1998).

Balaenoptera bonaerensis, Antarctic minke whale

Habitat: The Antarctic minke whale occurs in highest densities in the Antarctic during the summer feeding season. During the winter breeding season, individuals are believed to disperse in open ocean areas in tropical and subtropical latitudes (Kasamatsu et al. 1995).

ID: As mentioned under B. acutorostrata it is unlikely that all collected records differentiate between the common minke whale, the dwarf minke whale, and the Antarctic minke whale. Therefore, in cases where insufficient genetic and/or morphological evidence was provided the record was listed only as Balaenoptera sp.

Balaenoptera borealis sp., Sei whales

Habitat: Worldwide distribution, but primarily in deep, temperate oceanic waters.

ID: The difficulty of distinguishing Sei whales from Bryde's whales has confounded much of the historical literature, and even some modern survey data. Reports in the literature from any time before the mid-1970s are suspect because of the frequent failure to distinguish Sei from Bryde's whales,

particularly in tropical to warm temperate waters where Bryde's whales are generally more common than Sei whales (Reeves et al. 1999).

Balaenoptera brydei, Common Bryde's whale

Habitat: Bryde's whales are regarded as having a pantropical distribution, and in some areas (e.g., the western Pacific) they move seasonally into warm temperate latitudes.

ID: The difficulty of distinguishing Bryde's whales from Sei whales has confounded much of the historical literature, and even some modern survey data (Reeves et al. 1999, see Sei whale ID also). Furthermore, the animals traditionally called Bryde's whales fall into two groups based on consistent size differences. Therefore in cases where insufficient genetic and/or morphological evidence was provided B. edeni and B. brydei records are not distinguished from one another.

Balaenoptera edeni, Eden's whale

Habitat: Worldwide in tropical, subtropical, and some warm temperate waters. Small-form Bryde's whales have been documented in only a few specific areas (e.g., Solomon Sea, South China Sea, south-eastern Indian Ocean and possibly Southern Japan). However, quite a few records exist for this species in the western central Pacific.

ID: There has been difficulty in consistently distinguishing between Sei and Bryde's whales (see Sei Whale ID above) as well as separating pygmy and common Bryde's forms. Therefore, several of the Bryde's and Sei identifications are considered tentative.

Balaenoptera musculus subspp., Blue whales

Habitat: Patchily distributed worldwide, mainly in cold waters and open seas.

ID: It is possible that both Antarctic true blue whales (Balaenoptera musculus intermedia) and "pygmy" blue whales (Balaenoptera musculus brevicauda) are present in the Pacific Islands Regions, yet most records found did not distinguish to the sub-species level. Therefore, records in this report typically refer to blue whales, without further division.

Balaenoptera physalus, Fin whale

Habitat: Worldwide distribution, but most common in temperate waters and in the Southern Hemisphere. It has been proposed that Fin whales tend to become widely dispersed in winter, with some possibly migrating into tropical waters, many being scattered in the open ocean in subtropical and sub-Antarctic waters, and some remaining in the Antarctic.

Megaptera novaeangliae, Humpback whale

Habitat: Humpback whales have a cosmopolitan distribution that generally involves long migrations between high-latitude summer feeding grounds and tropical breeding grounds (Clapham 2000). Several sites within the Pacific region have been identified as present-day wintering grounds for humpback whales presumed to belong to southern hemisphere populations. The Area V IWC-defined Antarctic stock of humpback whales has two migratory "streams", one passing the east coast of Australia and the other passing New Zealand and Norfolk Island, the latter thought to winter in proximity to many of the Pacific Islands nations (Dawbin 1964). It is also possible that northern hemisphere individuals may migrate further south than Hawaii into the Pacific Islands Region.

FAMILY Neobalaenidae

Caperea marginata, Pygmy right whale

Habitat: Circumpolar distribution in both temperate and subantarctic waters of the Southern Ocean. Individuals are purported to occur both inshore and offshore with preferred temperature ranges reported to between 5 and 20°C (Baker 1985).

Suborder Odontoceti

FAMILY Delphinidae

Cephalorhynchus hectori, Hector's dolphin

Habitat: This species is endemic to New Zealand waters and occurs in the coastal waters, especially around the South island and the western coast of the North Island. The aggregate population is fragmented into at least three genetically isolated, regional groups.

Delphinus capensis, Long-beaked Common Dolphin

Habitat: The long-beaked common dolphin occurs in continental near-shore tropical and warm temperate waters of at least the Pacific, Atlantic, and western Indian oceans.

ID: At sea identification between long and short-beaked common dolphins is very difficult. Therefore, even though relatively few records exist for D. capensis it is possible that this species is more widespread than records indicate.

Delphinus delphis, Short-beaked common dolphin

Habitat: Warm temperate, subtropical, and tropical waters worldwide.

ID: At sea identification between long and short-beaked common dolphins is very difficult – however a majority of common dolphin records from the Pacific Islands Region indicate that the short-beaked subspecies is the more frequently sighted of the two.

Feresa attenuata, Pygmy Killer Whale

Habitat: The pygmy killer whale is patchily distributed in tropical and subtropical offshore waters around the world.

ID: There has been some confusion with correctly identifying this species at sea particularly as there have been some possible misidentifications with other "blackfish", in particular melon-headed whales.

Globicephala macrorhynchus, Short-finned Pilot Whale

Habitat: Tropical, subtropical, and warm temperate oceans around the world as well as cold-temperate North Pacific waters (Bernard and Reilly 1999). Different populations are purported yet not well described.

ID: Short-finned and long-finned pilot whales may be difficult to distinguish at sea, though distributional limits make the plausibility of G. macrorhynchus in the Pacific region higher than G. melas.

Globicephala melas, Long-finned Pilot Whale

Habitat: Cold temperate and subpolar waters of all oceans, except the North Pacific. One subspecies occurs in temperate to subantarctic waters of the Southern Hemisphere (Bernard and Reilly 1999).

ID: Short-finned and long-finned pilot whales may be difficult to distinguish at sea, though water temperatures make the likelihood of G. melas within much of the Pacific region low.

Grampus griseus, Risso's dolphin

Habitat: Deep tropical and warm temperate waters in northern and southern hemispheres, and notably in the Pacific sightings have been made in equatorial waters.

Lagenodelphis hosei, Fraser's dolphin

Habitat: Deep tropical and warm temperate waters of the Pacific, Atlantic, and Indian Oceans.

Lagenorhynchus australis, Peale's dolphin

Habitat: In general this species is only known to be endemic to coastal and shelf waters of the southern cone of South America, from central Chile to northern Argentina. However a tentative (and rare) sighting was made in Cook Island waters (Leatherwood et al. 1991).

Lagenorhynchus cruciger, Hourglass dolphin

Habitat: Oceanic circumpolar cold waters of the southern hemisphere, predominantly between 45°S and 65°S.

Lagenorhynchus obscurus, Dusky dolphin

Habitat: Coastal temperate waters of New Zealand, southern Africa, South America, and, Australia (Gill et al. 2000).

Lissodelphis peronii, Southern Right Whale Dolphin

Habitat: Deep, cold temperate waters of the southern hemisphere, mainly between the Subtropical and Antarctic Convergence (Newcomer et al. 1996).

Orcaella brevirostris, Irrawaddy dolphin

Habitat: Warm coastal waters and rivers from the Bay of Bengal to northern Australia. Irrawaddy dolphins are patchily distributed in shallow, near-shore tropical and subtropical marine waters of the Indo-Pacific, from northern Australia in the south, north to the Philippines (Dolar et al. 2002) and west to India (Stacey and

Leatherwood 1997, Stacey and Arnold 1999). Their distribution is centered in estuaries and mangrove areas. Sub-population structure is reported throughout this species range.

ID: Recent information has been presented for the existence of a second Orcaella species within Australian waters (Beasley et al. 2005). This differentiation potentially confounds historical distribution records.

Orcaella heinsohni, Snubfin dolphin

Habitat: Warm coastal waters and rivers of northern Australia.

ID: Recent information has been presented for the existence of the snubfin dolphin as a distinct species within Australian waters (Beasley et al. 2005). This differentiation potentially confounds historical Orcaella distribution records.

Orcinus orca, Orca

Habitat: All oceans of the world, particularly polar. This cosmopolitan species occurs both sporadically and possibly seasonally in many parts of the Pacific region.

Peponocephala electra, Melon-headed whale

Habitat: This poorly known species is distributed in deep oceanic waters at tropical and subtropical latitudes worldwide (Jefferson and Barros 1997).

Pseudorca crassidens, False killer whale

Habitat: Deep tropical, subtropical, and warm temperate waters, mainly offshore.

Sousa chinensis, Indo-Pacific humpback dolphin

Habitat: Shallow coastal waters of the Indian and Western Pacific Oceans. Humpback dolphins are coastal animals and are usually observed in water less than 20m deep.

Stenella attenuata, Pantropical spotted dolphin

Habitat: Tropical and some warm temperate waters of the Atlantic, Pacific, and Indian Oceans. This species lives in both coastal and oceanic waters. In the eastern tropical Pacific they occur in tropical, equatorial and southern subtropical water masses and often in aggregations that include spinner dolphins, yellow fin tuna, skipjack tuna, and various oceanic bird species.

Stenella coeruleoalba, Striped dolphin

Habitat: Warm temperate, subtropical, and tropical waters around the world. The species appears to prefer areas with large seasonal changes in surface temperatures and thermocline depth, as well as seasonal upwelling.

Stenella longirostris, Spinner dolphin

Habitat: Tropical and subtropical waters in the Atlantic, Indian, and Pacific Oceans. Spinner dolphins occur in large schools throughout the tropics, with numerous locally resident populations centred around islands or archipelagos (Norris et al. 1994, Perrin 1998). Subspecies S. l. longirostris occurs in all tropical seas, S. l. orientalis in pelagic waters of the eastern tropical Pacific, and there is morphological evidence for a fourth subspecies S. l. roseiventris, a dwarf form found in shallow, protected waters of Southeast Asia and northern Australia (Perrin et al. 1999).

Steno bredanensis, Rough-toothed dolphin

Habitat: Deep tropical, subtropical, and warm temperate waters around the world. In some areas they occur in aggregations with birds and near-surface fish schools (Poole 1993).

Tursiops aduncus, Indo-Pacific bottlenose dolphin

Habitat: Shallow temperate to tropical waters.

ID: Morphologically distinguishing Tursiops species at sea is difficult and some records pre-date Tursiops species differentiation. Therefore, most Tursiops records in this report are not differentiated as species.

Tursiops truncatus, Common bottlenose dolphin

Habitat: Widely distributed in cold temperate to tropical seas worldwide.

ID: Morphologically distinguishing Tursiops species at sea is difficult and some records pre-date Tursiops species differentiation. Therefore, most Tursiops records are not differentiated to the species level.

FAMILY Phocoenidae

Phocoena dioptrica, Spectacled porpoise

Habitat: Fairly broad distribution in subantarctic and cold temperate waters of the Southern Hemisphere (Goodall and Schiavini 1995, Brownell and Clapham 1999). It is uncertain whether the animals near large islands and island groups constitute separate populations. Some sightings suggest that there may be some movement across expanses of open oceans.

FAMILY Kogiidae

Kogia breviceps, Pygmy sperm whale

Habitat: Deep temperate, subtropical, and tropical waters beyond the continental shelf.

ID: There is some difficulty in distinguishing between Kogia species, especially observations made at sea. Furthermore, several records in the report are sourced from stranding events that again confounds distribution records as these observations may not be consistent with typical geographic range.

Kogia sima, Dwarf sperm whale

Habitat: Deep temperate, subtropical, and tropical waters of the northern and southern hemispheres. Species distribution is largely inferred from stranding events.

ID: There is some difficulty in distinguishing between Kogia species, especially observations made at sea. Furthermore, several records in the report are sourced from stranding events that again confounds distribution records as these observations may not be consistent with typical geographic range.

FAMILY Physeteridae

Physeter macrocephalus, Sperm whale

Habitat: Widely distributed in deep waters worldwide, both offshore and inshore.

FAMILY Ziphiidae

Berardius arnuxii, Arnoux's beaked whale

Habitat: Deep offshore waters in the Southern Hemisphere, south of 34°S.

Hyperoodon planifrons, Southern bottlenose whale

Habitat: Cold, deep waters of the southern hemisphere from Antarctica north to at least 30°S.

Indopacetus pacificus, Longman's beaked whale

Habitat: For a long time this species was known only from a few skeletal records although observations of this species in Pacific and Indian Oceans appears to be this species (Pitman et al. 1999, Pitman 2002).

Mesoplodon densirostris, Blainville's beaked whale

Habitat: Widely distributed in warm temperate and tropical waters.

Mesoplodonts (beaked whales of the genus Mesoplodon)

Habitat: Mesoplodonts are generally deep-water animals; they occur from cold temperate and sub-polar latitudes to the tropics.

ID: Individuals purported to be Mesoplodon are sometimes reported in Pacific Island nations yet their cryptic and shy behaviour often make species confirmation difficult. However, it is plausible that the following species are present in the region: Andrew's beaked whale (Mesoplodon bowdoini), Hubb's beaked whale (Mesoplodon carlhubbsi), Ginkgo-toothed beaked whale (Mesoplodon ginkgodens), Gray's beaked whale (Mesoplodon grayi), Hector's beaked whale (Mesoplodon hectori), Layard's beaked (or strap-toothed) whale (Mesoplodon layardii), True's beaked whale (Mesoplodon mirus), Pygmy beaked whale (Mesoplodon peruvianus), and Spade-toothed whale (Mesoplodon traversii).

Tasmacetus shepherdi, Tasman's beaked whale

Habitat: Cold temperate waters of the Southern Ocean.

Ziphius cavirostris, Cuvier's beaked whale

Habitat: Worldwide distribution in tropical, subtropical, and temperate waters.

References

Abernethy, R. B., C. S. Baker, and M. W. Cawthorn. 1992. Abundance and genetic identity of humpback whales Megaptera novaeangliae in the Southwest Pacific. IWC Scientific Committee Document SC/44/O 20.

Akimichi, T. 1993. The surviving whale-tooth: Cultural significances of whale products in Oceania. Bulletin National Museum Ethnology 17:121-142.

Akin, D. 1981. Porpoise teeth in East Kwaio Artwork. Journal of traditional money association 2(1):4-7.

Ali, S. H. and A. Singh Grewal. 2006. The ecology and economy of indigenouse resistance: divergent perspectives on mining in New Caledonia. The Contemporary Pacific 18(2):361-392.

Allen, S. and L. Bejder. In press. Southern Right Whale (Eubalaena australis) sightings on the Australian coast and the increasing potential for entanglement. Pacific Conservation Biology.

Anderson, P. K. 2001. Marine mammals in the next one hundred years: twilight for a Pleistocene megafauna? Journal of Mammalogy 82(3):623-629.

Andrady, A. L. 2000. Plastics and Their Impacts in the Marine Environment. Proceedings of the International Marine Debris Conference on Derelict Fishing Gear and the Ocean Environment, August 6-11, 2000 Hawai'i Convention Center Honolulu, Hawai'i

Andrews, O. 2005. Plan of Management for the Niue Whale Sanctuary (Draft July 2005). 12p.

Anonymous. 1995. Meanwhile, killer whales make rare appearance. Pacific Magazine 20(2): 45.

Anonymous. 1997. Conservation and management of whales and dolphins in Queensland 1997–2001. Department of Environment, Brisbane, QLD, Australia.

Anonymous. 2003. Goro nickel project – evaluation de niveau de bruit du diffuseur. Bechtel Technip Joint Venture Rescan™ Environmental Services Ltd. (Project 644-1). 45p.

Anonymous. 2006. Kiribati designates large MPA, to be funded by endowment. MPA News 7(9).

Anonymous. 2006. New CMS MoU to conserve Pacific Island whales and dolphins – Year of the dolphin 2007 campaign. MEA Bulletin 13:2.

Anonymous. 2006. Pacific nations sign up for whale and dolphin protection. Pacific Magazine 15th September 2006.

Anonymous. 2006. Tuvalu's whales. Coff's Coast Advocate, 13/5/2006.

Arnold, P., H. Marsh, and G. Heinsohn. 1987. The occurrence of two forms of minke whales in east Australian waters with a description of external characters and skeleton of the diminuitive or dwarf form. Scientific Report of the Whales Research Institute 38:1-46.

Ashby, G. 1995. Sperm whale found beached on Pohnpei. Pacific Magazine 20(6):33-34.

Aswani, S. and R. Hamilton. 2004. The value of many small vs. few large protected areas in the Western Solomon Islands. SPC Traditional Marine Resource Management and Knowledge Information Bulletin #16:3-14.

Bailey, K., P. Williams, and D. G. Itano. 1996. By-catch and discards in central and western Pacific tuna fisheries: A review of SPC data holdings and literature. OFP Technical Report No. 34: Tuna and Billfish Assessment Program (TBAP). South Pacific Commission, Noumea, New Caledonia.

Baird, R. 2003. Studies of odontocete population structure in Hawaiian waters: results of a survey through the main Hawaiian Islands in May and June 2003. Report prepared under Contract no. AB133F-02-CN-0106 from the National Oceanic and Atmospheric Administration. 26p.

Baird, R. 2005. Sightings of dwarf and pygmy sperm whales in Hawaiian waters. Pacific Science 59(3):461-466.

Baird, S. J. and E. Bradford. 2000. Estimation of Hector's dolphin bycatch from inshore fisheries, 1997-98 fishing year. Published Client Report on Contract 3024, Funded by Conservation Services Levy. Wellington, Department of Conservation. 20 p.

Baker, A. N. 1985. Pygmy right whale Caperea marginata (Gray, 1846). Pp. 345-354 in S. H. Ridgway and R. Harrison (eds.), Handbook of Marine Mammals. Vol. 3: The Sirenians and Baleen whales. Academic Press, London. 362 p.

Baker, A. N. 1990. Whales and dolphins of New Zealand and Australia: An identification guide. Victoria University Press, Wellington.

Baker, C. S. and P. J. Clapham. 2002. Marine Mammal Exploitation: Whales and Whaling In Volume 3, Causes and consequences of global environmental change (ed. I. Douglas) In Encyclopedia of Global Environmental Change p. 446–450. John Wiley and Sons, Ltd, Chichester.

Baker, C. S., M. Donoghue and R. Constantine. 2001. Population status and genetic identity of humpback whales on the wintering grounds of Tonga—a slow recovery or colonization? XIVth Biennial Conference Biology of Marine Mammals, November 28 to December 3, 2001, Vancouver, Canada.

Baker, C. S., L. Florez-Gonzalez, B. Abernethy, H. C. Rosenbaum, R. W. Slade, J. Capella, J. L. and Bannister. 1998. Mitochondrial DNA variation and maternal gene flow among humpback whales of the Southern Hemisphere. Marine Mammal Science 14(4):721-737.

Baker, C. S., C. Garrigue, R. Dodemont and D. Steel. 2005. Reply Comment - Statistical power and plausible alternate hypotheses of gametic recapture estimates from wintering grounds of humpback whales. Marine Ecology Progress Series 295:309–311.

Baker, C. S. and L. Herman. 1981. Migration and local movement of humpback whales (Megaptera novaeangliae) through Hawaiian waters. Canadian Journal of Zoology 59(3):460-469.

Baker, C. S. and L. M. Herman. 1984. Aggressive behaviour between humpback whales Megaptera novaeangliae wintering in Hawaiian waters. Canadian Journal of Zoology 62:1922-1937.

Baker, C. S., A. Perry, J. L. Bannister, M. T. Weinrich, R. B. Abernethy, J. Calambokodis, J. Lien, R. H. Lambertsen, J. Urban Ramirez, O. Vasquez, P. J. Clapham, A. Alling, S. J. O'Brien, and S. R. Palumbi. 1993. Abundant mitochondrial DNA variation and world-wide population structure in humpback whales. Proceedings of the National Academy of Sciences of the United States of America 90:8239-8243.

Balcomb, K. C. III. 1987. The Whales of Hawaii. Marine Mammal Fund, San Francisco, California 99p.

Bannister, J. L. 1977. Incidental catches of small cetacean off Australia. Report of the International Whaling Commission 27:506.

Bannister, J. L., C. M. Kemper and R. M. Warneke. 1996. The Action Plan for Australian Cetaceans. Australian Nature Conservation Agency.

Barnett, J. and M. Busse. 2001. Ethnographic perspectives on resilience to climate variability in Pacific Islands Countries. Final Activity Report APN Project Reference:2001-11.

Barr, K. 1997. The impacts of marine tourism on the behaviour and movement patterns of dusky dolphins (Lagenorhynchus obscurus) at Kaikoura, New Zealand. Unpublished MSc. thesis, University of Otago, Dunedin, New Zealand.

Bass, C. and A. Clemens. 2005. Annual report on seabird interactions and mitigation efforts in the Hawaii-based longline fishery for calendar year 2004. National Marine Fisheries Service, Pacific Islands Regional Office, Honolulu, Hawai'i, USA. 27p.

Bass, C. L., M. P. Simmonds and S. J. Isaac. 2006. An overview of the potential consequences for cetaceans of oceanic acidification. IWC Scientific Committee Document SC/58/E10.

BBC (British Broadcasting Company. 2006. Country Profiles. Accessed on November 15th 2006 from http://news.bbc.co.uk/2/hi/country_profiles/default.stm

Bearzi, G., E. Politi, S. Agazzi and A. Azzellinno. 2005. Prey depletion caused by overfishing and the decline of marine megafauna in eastern Ionian Sea coastal waters (central Mediterranean). Biological Conservation 127:373–382.

Beasley, I., K. M. Robertson and P. Arnold. 2005. Description of a new dolphin, the Australian Snubfin dolphin Orcaella heinsohni sp. N. (Cetacea, Delphinidae). Marine Mammal Science 21(3):365-400.

Bejder, L. 1997. Behaviour, ecology and impact of tourism on Hector's dolphins (Cephalorhynchus hectori) in Porpoise Bay, New Zealand. Unpublished MSc thesis, University of Otago, Dunedin, New Zealand.

Bejder, L. and S. Dawson. 2001. Abundance, residency, and habitat utilization of Hector's dolphins (Cephalorhynchus hectori) in Porpoise Bay, New Zealand. New Zealand Journal of Marine and Freshwater Research 35:277–287.

Bejder, L., S. M. Dawson and J. Harraway. 1999. Responses by Hector's dolphins to boats and swimmers in Porpoise Bay, New Zealand. Marine Mammal Science 15(3):738–750.

Bejder, L., A. Samuels, H. Whitehead, and N. Gales. 2006. Interpreting short-term behavioural responses to disturbance within a longitudinal perspective. Animal Behaviour 72:1149-1158.

Bell, J. 1999. Aquaculture: a development opportunity for Pacific Islands (Information paper 19). Secretariat of the Pacific Community (1st SPC Heads of Fisheries Meeting, Noumea, New Caledonia, 9-13 Aug 1999) 10 p.

Benoit-Bird, K. J. 2001. The mesopelagic community and spinner dolphin foraging. Pacific Science 55(1):99.

Bernard, H. J. and S. B. Reilly. 1999. Pilot whales Globicephala Lesson, 1828 in: Handbook of Marine Mammals. Volume 6: The Second Book of Dolphins and Porpoises (eds. S. H. Ridgway and R. Harrison). Academic Press, San Diego.

Bertignac, M., H. F. Campbell, J. Hampton and A. J. Hand. Yr? Maximizing resource rent from the western and central Pacific tuna fisheries. 44 p.

Berzin, A. A. 1972. The Sperm Whale (kashalot). Israel Programme for Scientific Translations, Jerusalem, 394 pp.

Best, P. B., V. M. Peddemors, V. G. Cockcroft and N. Rice. 2001. Mortalities of right whales and related anthropogenic factors in South African waters, 1963-1998. Journal of Cetacean Research and Management (special issue) 2:171-176.

Birkeland, C. 1977. Surrounded by Whales. Islander (Guam), 12 June, p 12-14.

Bleakley, C (ed). 1995. A global representative system of marine protected areas – Volume 4: Marine Region 14: South Pacific. A Report to the World Bank Environment Department.

Bonaccorso, F. J. 2000. Preliminary Field Guide to the Marine Mammals of Melanesia: Whales, Dolphins, Porpoises, and Dugongs (working draft), Conservation Melanesia, National Museum and Art Gallery.

Bonn, D. 2003. Whales find sanctuary off Fiji's coasts. Frontiers in ecology and the environment 1(4):177.

Borsa, P. 2005. Blainville's Beaked Whale in New Caledonia. Pacific Science 59(3):467-472.

Borsa, P. 2006. Marine mammal strandings in the New Caledonia region, Southwest Pacific. Comptes rendus Biologies 329(4):277-288.

Bourke, D. and S. Powell. 2004. Australia. Progress Report on Cetacean Research, January 2003 to December 2003, with statistical data for the calendar year 2003.

Bourreau, S. and A. Gannier. 2001. First results of the distribution of wintering humpback whales (Megaptera novaeangliae) in French Polynesia 1997-2000. European Research on Cetaceans Conference.

Bowen, W.B. and D. B. Siniff. 1999. Distribution, population biology and feeding ecology of marine mammals in J. E. Reynolds and S. E. Rommel (eds), Biology of Marine Mammals. Smithsonian Institution Press, Washington DC and London.

Bräger, S. 1998. Behavioural ecology and population structure of Hector's dolphins. Unpublished PhD thesis, University of Otago, Dunedin, New Zealand.

Bräger, S., S. M. Dawson, E. Slooten, S. Smith, G. S. Stone, and A. Yoshinaga. 2002. Site fidelity and along-shore range in Hector's dolphin, an endangered marine dolphin from New Zealand. Biological Conservation 108:281-287.

Bräger, S., J. A. Harraway, and B. F. J. Manly. 2003. Habitat selection in a coastal dolphin species (Cephalorhynchus hectori). Marine Biology 143:233-244.

Bräger, S., and K. Schneider. 1998. Near-shore distribution and abundance of dolphins along the West Coast of the South Island, New Zealand. New Zealand Journal of Marine and Freshwater Research 32:105–112.

Brasseur, I., M. Gruselle, A. Gannier, C. Border, and P. Rohde. 2002. New results on a bottlenose dolphin (Tursiops truncatus) community at Rangiroa Island (French Polynesia). European Conference on Cetaceans.

Brigden, J. 2001. Southern right whales, Eubalaena australis (Desmoulins, 1822), in Hervey Bay, Queensland. Memoirs of the Queensland Museum 47(2):430.

Brown, S. G. 1973. Recent sight records of southern right whale dolphins in the Pacific Ocean. The Marine Observer 43:78-80.

Brown, S. G. 1981. Movements of marked sperm whales in the southern hemisphere. Report of the International Whaling Commission 31:835-837.

Brownell, R. L. and P. J. Clapham. 1999. Spectacled porpoise Phocoena dioptrica (Lahille, 1912) pp. 379-391 in: Handbook of Marine Mammals. Volume 6: The Second Book of Dolphins and the Porpoises (eds. S. H. Ridgway and R. Harrison). Academic Press, San Diego.

Bryant, D., L. Burke, J. McManus, and M. Spalding. 1998. Reefs at Risk - a map based indicator of the threats to the world's coral reefs. A joint WRI, ICLARM, WCMC and UNEP publication. 5pp

Bryden, M. M. 1978. Whales and whaling in Queensland waters. Proceedings of the Royal Society of Queensland 89:5–18.

Burkhart, S. M. and E. Slooten. 2003. Population viability analysis for Hector's dolphin (Cephalorhynchus hectori): a stochastic model for local populations. New Zealand Journal of Marine and Freshwater Research 37: 553-566.

Bustamante, P., C. Garrigue, L. Breau, F. Caurant, W. Dabin, J. Greaves, and R. Dodemont. 2003. Trace elements in two odontocete species (Kogia breviceps and Globicephala macrorhynchus) stranded in New Caledonia (South Pacific). Environmental Pollution 124(2):263-271.

Butler, D. J. 2004. National Assessment of the Priority Environmental Concerns of Niue – consultancy report. SPREP, Apia, Samoa.

Calamia, M. A. 1999. A methodology for incorporating traditional ecological knowledge with geographic information systems for marine resource management in the Pacific. SPC Traditional Marine Resource Management and Knowledge Information Bulletin 10:2-12.

Caretta, J. V., K. A. Forney, M. M. Muto, J. Barlow, J. Baker, B. Hanson, and M. S. Lowry. 2005. U.S. Pacific Marine Mammal Stock Assessments: 2004. NOAA Technical Memorandum NMFS.

Carwardine, M. 1995. Whales, dolphins and porpoises. Dorling Kindersley Limited, London, UK. 256 p.

Cawthorn, M. W. 1988. Recent observations of Hector's dolphin, Cephalorhynchus hectori, in New Zealand. Report of the International Whaling Commission (Special Issue 9):303-314.

Cerchio, S. 1998. Estimates of humpback whale abundance off Kauai, 1989 to 1993: evaluating biases associated with sampling the Hawaiian Islands breeding assemblage. Marine Ecology Progress Series 175: 23-34.

Cerchio, S., C. M. Gabriele, T. F. Norris and L. M. Herman. 1998. Movements of humpback whales between Kauai and Hawaii: implications for population structure and abundance estimation in the Hawaiian Islands. Marine Ecology Progress Series 175:13-22.

Chaloupka, M., M. Osmond and G. Kaufman. 1999. Estimating seasonal abundance trends and survival probabilities of humpback whales in Hervey Bay (east coast Australia). Marine Ecology Progress Series 184:291-391.

Chapman, L. 2001. Bycatch in the tuna longline fishery (working paper 5). 2nd SPC Heads of Fisheries Meeting (Noumea, New Caledonia, 23-27 July 2001). 33 p.

Childerhouse, S. 2001. New Zealand. Progress Report on Cetacean Research, January 2000 to December 2000, with statistical data for the calendar year 2000.

Childerhouse, S. 2001. New Zealand progress report on cetacean research, April 2000 to March 2001, with statistical data for the calendar year 2000.

Childerhouse, S. 2002. Cetacean research in New Zealand 2001. DOC Science internal series 87.

Childerhouse, S. 2004. Cetacean research in New Zealand 2002/2003. DOC Science Internal Series 158.

Childerhouse, S. 2005. Cetacean research in New Zealand 2003/2004. DOC Science Internal Series 214.

Childerhouse, S. 2005. New Zealand progress report on cetacean research, April 2004 to March 2005, with statistical data for the calendar year 2004. SC/57/ProgRepNew Zealand.

Childerhouse, S. and M. Donoghue. 2000. Cetacean Research in New Zealand 1997 – 2000. DOC Science Internal Series 46.

Chilvers, B. L. 2000. Southern Right whales, Eubalaena australis, (Desmoulins, 1822) in Moreton Bay, Queensland. Memoirs of the Queensland Museum 45:576.

Chilvers, B. L. 2001. Behavioural ecology of bottlenose dolphins (Tursiops aduncus) in S.E. Queensland, Australia: Adaptations to ecological and anthropogenic influences. Ph.D. Thesis, James Cook University, Townsville.

Chilvers, B. L. and P. J. Corkeron. 2001. Trawlers and bottlenose dolphins social structure. Proceedings of the Royal Society of London B 268:1901–1905.

Chilvers, B. L. and P. J. Corkeron. 2003. Abundance of Indo-Pacific bottlenose dolphins, Tursiops aduncus, off Point Lookout, Queensland, Australia. Marine Mammal Science 19(1):85-95.

Chilvers, B. L., I. R. Lawler, F. MacKnight, H. Marsh, M. Noad and R. Paterson. 2005. Moreton Bay, Queensland, Australia: an example of the co-existence of significant marine mammal populations and large-scale coastal development. Biological Conservation 122:559–571.

Chittleborough, R. G. 1959. Australian marking of humpback whales. Norsk Hvalfangst-Tidende 2:47-55.

Chittleborough. R. G. 1965. Dynamics of two populations of the humpback whale, Megaptera novaeangliae (Borowski). Australian Journal of Marine and Freshwater Research 16:33-128.

Clapham, P. J. 2000. The humpback whale: seasonal feeding and breeding in a baleen whale. Pp. 173-196 in: Cetacean Societies: Field Studies of Dolphins and Whales (eds. J. Mann, R. C. Connor, P. L. Tyack, and H. Whitehead). University of Chicago Press, Chicago. 433pp.

Clapham, P. J., S. B. Young, and R. L. Brownell Jr. 1999. Baleen whales: conservation issues and the status of most endangered populations. Mammal Review 29:35-60.

CMS (Convention of Migratory Species of Wild Animals). 2006. CMS Memorandum of Understanding for the Conservation of Cetaceans and their Habitats in the Pacific Island Region, New Caledonia

CMS. 2006. Press release available at http://www.cms.int/news/PRESS/nwPR2006/sprep17_prE_sep06.pdf.

Coan, A. L., G. T. Sakagawa, D. Prescott, P. Williams and G. Yamasaki. 1999. The 1988 U.S. Tropical tuna purse seine fishery in the central-western Pacific Ocean. Working document for the 12th Standing Committee on Tuna and Billfish, Papeete, Tahiti, June 16-23. 23p.

Constantine, R. 1995. Monitoring the Commercial Swim-With-Dolphin Operations with the Bottlenose (Tursiops truncatus) and Common Dolphins (Delphinus delphis) in the Bay of Islands, New Zealand. MSc thesis. University of Auckland, Auckland, New Zealand.

Constantine, R. 1999a. Whale, dolphin and turtle based tourism in Niue.Report submitted to the Niuean Tourism and Private Sector Development Implementing Agency of the Niue Government and Niue Tourist Authority.

Constantine, R. 1999. Effects of Tourism on Marine Mammals in New Zealand. Science for Conservation Series No. 106. Department of Conservation, Wellington, New Zealand.

Constantine, R. 2001. Increased avoidance of swimmers by wild bottlenose dolphins (Tursiops truncatus) due to long-term exposure to swim-with-dolphin tourism. Marine Mammal Science 17:689–702.

Constantine, R. 2002. The Behavioural Ecology of the Bottlenose Dolphins (Tursiops truncatus) of Northeastern New Zealand: A Population Exposed to Tourism. PhD thesis. University of Auckland, Auckland, New Zealand.

Constantine, R., D. H. Brunton and C. S. Baker. 2003. Effects of tourism on behavioural ecology of bottlenose dolphins of northeastern New Zealand. DOC Science Internal Series 153.

Constantine, R., D. H. Brunton, and T. Dennis. 2004. Dolphin-watching tour boats change bottlenose dolphin (Tursiops truncatus) behaviour. Biological Conservation 117:299–307.

Constantine, R., I. N. Visser, D. Buurman, R. Buurman and B. McFadden. 1998. Killer whale (Orcinus orca) predation on dusky dolphins (Lagenorhynchus obscurus) in Kaikoura, New Zealand. Marine Mammal Science 14: 324-330.

Cook Islands Biodiversity Database. 2006. Accessed on 1st November 2006 at http://cookislands.bishopmuseum.org/

Corkeron, P. 1989. Studies of inshore dolphins, Tursiops and Sousa, in the Moreton Bay region. Ph.D. thesis, University of Queensland, Brisbane. 198p.

Corkeron, P. 1995. Humpback whales (Megaptera novaeangliae) in Hervey Bay, Queensland: behaviour and responses to whale-watching vessels. Canadian Journal of Zoology 73:1290–1299.

Corkeron, P. 2004. Whale watching, iconography, and marine conservation. Conservation Biology 18(3):847-849.

Corkeron, P., M. Brown, R. W. Slade and M. M. Bryden. 1994. Humpback whales, Megaptera novaeangliae (Cetacea: Balaenopteridae) in Hervey Bay, Queensland. Wildlife Research 21:293-305.

Corkeron, P. J., N. M. Morisette, L. Porter and H. Marsh. 1997. Distribution and status of humpbacked dolphins, Sousa chinensis, in Australian waters. Asian Marine Biology 14:49-57.

Corkeron P. J., R. J. Morris, and M. M. Bryden. 1987. Interactions between bottlenose dolphins and sharks in Moreton Bay, Queensland. Aquatic Mammals 13:109–113.

Cousteau, J-M. and M. Richards. 1989. Cousteau's Papua New Guinea Journey. Harry N. Abrams, Incorporated, New York.

Craig, A. S and L. Herman. 1997. Sex differences in the site fidelity and migration of humpback whales (Megaptera novaeangliae) to the Hawaiian Islands. Canadian Journal of Zoology 75:1923-1933.

Craig, P. (ed.) 2005. Natural history guide to American Samoa, 2nd edition. National Park of American Samoa, Dept. Marine and Wildlife Resources, American Samoa Community College. 97p.

Craig, P. and L. Basch. 2001. Developing a coral reef monitoring program for the national park of American Samoa: a practical, management-driven approach for small marine protected areas (available at http://www.nature.nps.gov/im/units/nw31/monitoring/vs-marine-npsa.pdf).

Crawford, M. J. 1993. Republic of the Marshall Islands: State of the Environment report 1992. SPREP, Apia, Western Samoa.

Crosby, M. P. G. Brighouse and M. Pichon. 2002. Priorities and strategies for addressing natural and anthropogenic threats to coral reefs in Pacific Island Nations. Ocean and Coastal Management 45:121-137.

Dahl, A. L. 1984. Biogeographical aspects of isolation in the Pacific. Ambio XIII(5–6).

Dalebout, M. L., K. M. Robertson, A. Frantzis, D. Engelhaupt, A. A. Mignucci-Giannoni, R.J. Rosario-Delestre, and C. S. Baker. 2005. Worldwide structure of mtDNA diversity among Cuvier's beaked whales (Ziphius cavirostris); implications for threatened populations. Molecular Ecology 14:3353–3371.

Dalebout, M. L., K. G. Russell, M. J. Little and P. Ensor. 2004. Observations of live Gray's beaked whales (Mesoplodon grayi) in Mahurangi Harbour, North Island, New Zealand, with a summary of at-sea sightings. Journal of the Royal Society of New Zealand 34:347-356.

Dalzell, P. and D. M. Schug. 2002. A synopsis of information relating to sustainable coastal fisheries – vol. 4. SPREP, Apia, Samoa.

Dawbin, W. H. 1956. Whale marking in South Pacific waters. Norsk Hvalfangst-Tidende 9:485-508.

Dawbin, W. H. 1959. New Zealand and South Pacific whale marking and recoveries to the end of 1958. Norsk Hvalfangst-tidende 48(5):213-238.

Dawbin, W. H. 1964. Movements of humpback whales marked in the southwest Pacific Ocean 1952-1962. Norsk Hvalfangst-tidende 53(3):68-78.

Dawbin, W. H. 1966. Porpoise and porpoise hunting in Malaita. Australian Natural History 15(7):207-211.

Dawbin, W. H. 1972. Dolphins and whales in P. Ryan (ed.) Encyclopedia of Papua and New Guinea, Melbourne University Press, in association with the University of Papua New Guinea, Melbourne, 270-276.

Dawbin, W. H. 1974. Cetacea of the south western Pacific Ocean. Background paper to FAO/ACMRR, La Jolla, USA.

Dawson, S. M. 1991. Incidental catch of Hector's dolphin in inshore gill nets. Marine Mammal Science 7(3):283-295.

Dawson, S., F. Pichler, E. Slooten, K. Russell, and C. S. Baker. 2001. The North Island Hector's dolphin is vulnerable to extinction. Marine Mammal Science 17:366-371.

Dawson, S. M., A. Read, and E. Slooten. 1998. Pingers, porpoises and power: Uncertainties with using pingers to reduce bycatch of small cetaceans. Biological Conservation 84(2):141-146.

Dawson, S. M. and E. Slooten. 1988. Hector's dolphin Cephaloryhynchus hectori: distribution and abundance. Report of the International Whaling Commission (Special Issue 9):315-324.

De Haas, H. C. 2002. Sustainability of small-scale ecotourism: the case of Niue, South Pacific. Current Issues in Tourism 5(3-4):319-337.

Decloitre, P. 1995. Saving the dolphins. Pacific Islands Monthly 65(2):8-9.

DeMaster, D. P., C. W. Fowler, S. L. Perry and M. F. Richlen. 2001. Predation and competition: the impact of fisheries on marine mammal populations over the next one hundred years. Journal of Mammalogy 82:641–651.

Department of Conservation (NZ). 2006. Marine Mammal List.

Department of Fisheries and Marine Resources. 2003. Dolphin Assessment and Monitoring Project. Solomon Islands Government. 10 pp.

Dodemont R., Garrigue C., Greaves J. and Chambellant M. 2001. Behaviour of singing humpback whales in New Caledonia (South Pacific Ocean). XIV ème Marine Mammal Conference, 28 November - 3rd December 2001, Vancouver, Canada).

Dolar, M. L. L., W. F. Perrin, J. P. Gaudiano, A. A. S. P. Yaptinchay, and J. M. L. Tan. 2002. Preliminary report on a small estuarine population of Irrawaddy dolphins Orcaella brevirostris in the Philippines.

Raffles Bulletin of Zoology, Supplement, 155-160.

Donaldson, T. J. 1983. Further investigations of the whales Peponcephala electra and Globicephala macrorhynchus (reported from Guam). Micronesica 19(1-2):173-181.

Donoghue, M. 2000. Whales of Oceania and the South Pacific Whale Sanctuary. Presentation to the Humpback Whales of the South Pacific Symposium, University of Auckland, 4-6 March.

Donoghue, M., R. R. Reeves, and G. S. Stone (eds). 2003. Report of the workshop on interactions between cetaceans and longline fisheries. Apia, Samoa: November 2002. New England Aquarium Aquatic Forum Series 03-1, Boston, MA, U.S.A. 49p.

Dorfman, M. 2004. Testing the waters 2004 – A guide to water quality at vacation beaches. Natural Resources Defense Council (USA). 231 p.

Duda, A. M. and K. Sherman. 2002. A new imperative for improving management of large marine ecosystems. Ocean and Coastal Management 45: 797-833.

Dufault, S. and H. Whitehead. 1995. The geographic stock structure of female and immature sperm whales in the South Pacific. Report of the International Whaling Commission 45:401-405.

Duignan, P. J. 2003. Disease investigations in stranded marine mammals, 1999-2002. DOC Science Internal Series 104.

Duignan, P. J., N. J. Gibbs, and G. W. Jones. 2003. Autopsy of cetaceans incidentally caught in fishing operations 1997/98, 1999/2000, and 2000/01. DOC Science Internal Series 119.

Duignan, P. J., N. J. Gibbs and G. W. Jones. 2004. Autopsy of cetaceans incidentally caught in commercial fisheries, and all beachcast specimens of Hector's dolphins, 2001/02. DOC Science Internal Series 176.

Duignan, P. J. and G. W. Jones. 2005. Autopsy of cetaceans including those incidentally caught in commercial fisheries, 2002/2003. DOC Science Internal Series 195.

Eads, J. 1991. Alupang's whales were humpbacks, probably resting. Pacific Daily News (Agana, Guam), 13 February, p 1-8.

Edwards, M. and A. J. Richardson. 2004. Impact of climate change on marine pelagic phenology and trophic mismatch. Nature 430:881-884.

Eldredge, L. G. 1991. Annotated checklist of the marine mammals of Micronesia. Micronesica 24:217-230.

Eldredge, L. G. 2000. Non indigenous freshwater fishes, amphibians, and crustaceans of the Pacific and Hawaiian islands. In: Invasive Species in the Pacific: A Technical Review and Draft Regional Strategy. Sherley, G. (Ed.). SPREP, Apia.

Eldredge, L. G. 2003. Marine reptiles and mammals from Guam. Micronesica 35-36:654-657.

Elsa, P. 2004. Inventory and Monitoring Program – Pacific Island Network Monitoring Program – Supporting Documents: Puuhonua o Honaunau National Historical Park Resource Overview. National Park Service, U.S. Department of the Interior. 15 p. http://science.nature.nps.gov/im/units/pacn/monitoring/plan

Engel, M. H., M. C. C. Marcondes, C. C. A. Martins, F. O. Luna, R. P. Lima, and A. Campos. 2004. Are seismic surveys responsible for cetacean strandings? An unusual mortality of adult humpback whales in Abrolhos Bank, northeastern coast of Brazil. IWC Scientific Document SC/56/E28.

Eriksen, N., L. A. Miller, J. Tougaard and D. A. Helweg. 2005. Cultural change in the songs of humpback whales (Megaptera novaeangliae) from Tonga. Behaviour 142:305-328.

Evans, K., C. Kemper and M. Hill. 2001. First records of the spectacled porpoise Phocoena dioptrica in continental Australian waters. Marine Mammal Science 17(1):161-169.

Evans, K., R. Thresher, R. M. Warneke, C. J. A. Bradshaw, M. Pook, D. Thiele and M. A. Hindell. 2005. Periodic variability in cetacean strandings: links to large-scale climate events. Biology Letters doi:10.1098/rsbl.2005.0313.

Federal Governments of Australia and New Zealand. 2001. A South Pacific Whale Sanctuary (Protection for whales: Benefits for the South Pacific) Agenda Paper IWC53 - Agenda Item 7.4 53rd Annual Meeting of the International Whaling Commission.

Ferber, D. 2005. Sperm whales bear testimony to worldwide pollution. Science 309:1166.

Ferreira, S. M. and C. C. Roberts. 2003. Distribution and abundance of Maui's dolphins (Cephalorhynchus hectori maui) along the North Island west coast, New Zealand. DOC Science Internal Series 93.

Findlay, K. P. 2000. A review of humpback whale catches by modern whaling operations in the southern hemisphere. Memoirs of the Queensland Museum 47(2):411-420.

Fisher, S. and R. Reeves. 2005. Global trade in live cetaceans: implications for conservation. Journal of International Wildlife Law and Policy 8:315-340.

Florez-Gonzalez, L., J. Capelia A., B. Haase, G. A. Bravo, F. Felix, and T. Gerrodette. 1998. Changes in winter destinations and the northernmost record of southeastern Pacific humpback whales. Marine Mammal Science 14(1): 189-196.

Forest, A. M. 2001. The Hawai'ian Spinner Dolphin, Stenella longirostris: Effects of Tourism. MSc thesis. Texas A&M University, College Station, USA.

Forestell, P.H. and G. D. Kaufman. 1990. The history of whale-watching in Hawaii and its role in enhancing visitor appreciation for endangered species. in M.L. Miller and J. Auyong (eds), Proceedings of the 1990 Congress on Coastal and Marine Tourism Vol 1. National Coastal Resources Research Institute, Corvallis, Oregon.

Forestell, P.H. and G. D. Kaufman. 1996. Whale-watching in Hawaii as a model for development of the industry worldwide. In Encounters With Whales. 1995 Proceedings. K. Colgan, S. Prasser and A. Jeffery (eds). Australian Nature Conservation Agency, Canberra, pp 53-65.

Forestell, P. H., D. A. Paton, P. Hodda, and G. D. Kaufman. 2001. Observations of a hypo-pigmented humpback whale (Megaptera novaeangliae) off east coast Australia: 1991-2000. Memoirs of the Queensland Museum Vol? 171-184.

Forney, K. A., J. Barlow, M. M. Muto, M. Lowry, J. Baker, G. Cameron, J. Mobley, C. Stinchcomb, and J. V. Caretta. 2000. U.S. Pacific Marine Mammal Stock Assessments: 2000. US Department of Commerce – National Oceanic and Atmospheric Administration. 281p.

Frantzis, A. 1998. Does acoustic testing strand whales? Nature 392: 29.

Fraser, W. R. and E. E. Hofmann. 2003. A predator's perspective on causal links between climate change, physical forcing and ecosystem response. Marine Ecology Progress Series 265:1-15.

Gales, N., M. Hindell and R. Kirkwood (eds.) Marine Mammals: Fisheries, Tourism and Management Issues. CSIRO Publishing. 480 pp.

Gannier, A. 2000. Distribution of cetaceans off the Society Islands (French Polynesia) as obtained from dedicated survey. Aquatic Mammals 26:111-126.

Gannier, A. 2002a. Distribution of cetaceans off the Marquesas Islands (French Polynesia) as obtained from a small boat dedicated survey. Aquatic Mammals 28:198-210.

Gannier, A. 2002b. Temporal variability of spinner dolphin residency in a bay of Tahiti Island (1995-2001). European Research on Cetacean.

Gannier, A. 2004. The large-scale distribution of humpback whales (Megaptera novaeangliae) wintering in French Polynesia During 1997-2002. Aquatic Mammals 30(2):227-236.

Gannier, A., S. Bourreau and C. Casacci. 2000. Preliminary results on the distribution of wintering humpback whales in French Polynesia 1997-1999. IWC Scientific Document SC/52/IA9.

Gannier, O. and A. Gannier. 1998. First results on the distribution of cetaceans in the Society Islands (French Polynesia). European Research on Cetaceans 12:54-58.

Gannier, A. and E. Petiau. 2006. Environmental Variables Affecting the Residence of Spinner Dolphins (Stenella longirostris) in a Bay of Tahiti (French Polynesia). Aquatic Mammals 32(2):202-211.

Gannier, A. and K. L. West. 2005. Distribution of the Rough-Toothed Dolphin (Steno bredanensis) around the Windward Islands (French Polynesia). Pacific Science 59(1):17-24.

Garcia, S. M. 1994. FAO Fisheries Technical Paper 337: World Review of Highly Migratory Species and Straddling Stocks. Rome, United Nations Food and Agriculture Organization:70.

Claire Garrigue, C. Unpublished. Marine mammals of New Caledonia and the Loyalty islands. Check list of the species. 9p.

Garrigue, C., A. Aguayo, V. L. U. Amante-Helweg, C. S. Baker, S. Caballero, P. Clapham, R. Constantine, J. Denkinger, M. Donoghue, L. Flórez-González, J. Greaves, N. Hauser, C. Olavarría, C. Pairoa, H. Peckham and M. Poole. 2002. Movements of humpback whales in Oceania, South Pacific. Journal of Cetacean Research and Management 4(3):255-260.

Garrigue C., C. S. Baker, R. Dodemont and D. Steel. 2002. Estimating the abundance of humpback whales in New Caledonia using DNA genotyping and photo-identification. IWC Scientific Document SC/54/H9.

Garrigue C., E. Clua and D. Breitenstein. 2003. Identification of a pygmy blue whale (Balaenoptera musculus brevicauda) in New Caledonia, South West Pacific. IWC Scientific Document SC/55/H4.

Garrigue, C., R. Dodemont, D. Steel and C. S. Baker. 2004. Organismal and 'gametic' capture-recapture using microsatellite genotyping confirm low abundance and reproductive autonomy of humpback whales on the wintering grounds of New Caledonia. Marine Ecology Progress Series 274:251-262.

Garrigue C., J. M. Fernandez, J. M. Badie, C. Bernard, J. Greaves, J. Rivaton, and M. Trescinski. 2000. Impact of the human activities on cetaceans in the South West Pacific Ocean by measuring Cs-137, K-40 and Pb-210. SPERA 2000, Nouméa, New Caledonia.

Garrigue C., J. M. Fernandez, J. M. Badie, Ch. Bernard, J. Greaves, J. Rivaton, and M. Trescinski. 2000. Impact of the human activities in short-finned pilot whales (Globicephala macrorhynchus) and pygmy sperm whale (Kogia breviceps) of the South West Pacific ocean by mesuring Cs-137, K-40 and Pb-210. SPERA 2000, June 2000, Nouméa, New Caledonia.

Garrigue, C., P. Forestell, J. Greaves, P. Gill, P. Naessig, N. M. Patenaude and C. S. Baker. 2000. Migratory movement of humpback whales (Megaptera novaeangliae) between New Caledonia, East Australia and New Zealand. Journal of Cetacean Research and Management 2(2):111-115.

Garrigue, C. and P. Gill. 1994. Observations of humpback whales Megaptera novaeangliae in New Caledonian waters during 1991-1993. Biological Conservation 70:211-218.

Garrigue C. and J. Greaves. 2000. The status of humpback whales in New Caledonia (South Pacific). IWC Scientific Document SC/52/IA8.

Garrigue, C. and J. Greaves. 2001. Cetacean records for the New Caledonian area (Southwest Pacific Ocean). Micronesica 34(1):27-33.

Garrigue, C., J. Greaves and M. Chambellant. 2001. Characteristics of the New Caledonian humpback whale population. Memoirs of Queenland Museum 47(2):539-546.

Garrigue, C and K. Russell. 2004. Report of the first assessment of marine mammals in Vanuatu waters. Contract for the Natural Heritage Trust, Department of Environment, Australia. 42 p.

Garrigue, C., K. Russell and R. Dodemont. 2004. A preliminary survey of humpback whales and other cetaceans in Vanuatu, South-West Pacific. IWC Scientific Document SC/56/SH18.

Garrigue, C. and S. Virly. 2000. Whale watching in New Caledonia : a new industry. Humpback 2000 conference, 29 august to 1 september 2000, Brisbane, Australia (poster abstract).

Gaskin, D. E. 1968. Analysis of sightings and catches of sperm whales (Physeter catodon L.) in the Cook Strait area of New Zealand in 1963-4. New Zealand Journal of Marine and Freshwater Research 2:260-272.

Gaskin, D. E. 1968. Distribution of delphinidae (cetacean) in relation to sea surface temperatures off eastern and southern New Zealand. New Zealand Journal of Marine and Freshwater Research 2:527-534.

Gerrodette, T. and J. Forcada. 2002. Estimates of abundance of western southern spotted, whitebelly spinner, striped and common dolphins, and pilot, sperm and Bryde's whales in the eastern tropical Pacific Ocean. SWFSC Administration Report LJ-02-20. 24p.

Gerrodette, T. and J. Forcada. 2005. Non-recovery of two spotted and spinner dolphin populations in the eastern tropical Pacific Ocean. Marine Ecology Progress Series 291:1-21.

Gibbs, N. and D. Paton. 2003. Preliminary report on the survey of whales and dolphins in the Lomaiviti Island group of Fiji August-September 2003. Report to Australian Department of Environment and Heritage and Fijian Department of Environment.

Gill, P., E. J. Eyre, C. Garrigue and W. H. Dawbin. 1995. Observations of humpback whales (Megaptera novaeangliae) on a cruise to New Caledonia and the Chesterfield reefs. Memoirs of the Queensland Museum 38(2):505-511.

Gill, P. C., G. J. B. Ross, W. H. Dawbin, and H. Wapstra. 2000. Confirmed sightings of dusky dolphins (Lagenorhynchus obscurus) in southern Australian waters. Marine Mammal Science 16(2):452-458.

Gillepsie, A. 2002. Protecting Cetaceans in the South Pacific: The Dynamics of a Regional Agreement. Asia Pacific Journal of Environmental Law cite?

Gillepsie, A. 2005. The Dugong Action Plan for the South Pacific: An evaluation based on the need for international and regional conservation of Sirenians. Ocean Development and International Law 36(2):135-158.

Gillett, R., M. Pelasio and E. Kirschner. 1991. Kiribati fisheries bibliography. FAO/UNDP Regional fishery support programme, Suva, Fiji. 101 p.

Gilpatrick, J. W. Jr., W. F. Perrin, S. Leatherwood and L. Shiroma. 1987. Summary of distribution of records of the spinner dolphin, Stenella longirostris, and the Pantropical spotted dolphin, Stenella attenuata, from the Western Pacific Ocean, Indin Ocean and Red Sea. NOAA Technical memorandum NMFS-SWFC-89. 42 pp.

Godard, C., R. Clark, I. Kerr, P. Teglberg Madsen and R. Payne. Preliminary report on the sperm whale data collected during the Voyage of the Odyssey.

Goldman, B. 1994. Environmental management in Yap, Caroline Islands: Can the dream be realized? Marine Pollution Bulletin 29(1-3): 42-51. (abstract)

Goodall, R. N. P. 1995. An annotated bibliography of the spectacled porpoise, Australophocaena dioptrica. Report of the International Whaling Commission (Special Issue 16):454-473.

Goodall, R. N. P., A. N. Baker, P. B. Best, M. Meyer, and N. Miyazaki. 1997. On the biology of the hourglass dolphin, Lagenorhynchus cruciger (Quoy and Gaimard, 1824). Report of the International Whaling Commission 47:985-999.

Goodall, R. N. P and A. C. M. Schiavini. 1995. On the biology of the spectacled porpoise, Australophocaena dioptrica. Report fo the International Whaling Commission (Special Issue) 16:411-453.

Gordon, D. P. 2000. The Pacific Ocean and global OBIS: a New Zealand perspective. Oceanography 13:42-47.

Goto, M., I. Nagatome and H. Shimada. Cruise report of the cetacean sighting survey in waters off the Solomon Islands in 1994. IWC Scientific Document SC/47/SH12.

Government of Kiribati. 1999a. Country report for CPBD and CBD Kiribati. Ministry of Environment and Social Development, Tarawa, Kiribati. 21p.

Government of Kiribati. 1999b. Initial communication under the United Nations Convention on Climate Change. 69p.

Government of Kiribati. 2002. Kiribati report to the National Summit on Sustainable Development. 80p.

Government of Samoa. 1998. National Report to the Convention of Biological Diversity. Division of Environment and Conservation, Department of Land Survey and Environment, Apia, Samoa. 24p.

Government of Samoa. 1999. First National Communication to the UNFCCC. Government of Samoa, Department of Lands, Surveys and Environment. 59p.

Government of the Republic of the Marshall Islands. 2000. Initial communication under the United Nations Framework Convention on Climate Change. Republic of the Marshall Islands Environmental Protection Authority, Majuro, Marshall Islands. 72p.

Grant, G. S. 1995. Thar she blows! Sperm whales in Samoa. Pp. 33-35 in American Samoa: Natural History and Conservation Topics. Vol. 2. Department of Marine and Wildlife Resources, Biological Report Series 67.

Greaves, J. and C. Garrigue. 1998. Preliminary estimation of humpback whales (Megaptera novaeangliae) in New Caledonia, South Pacific. World Marine Mammal Science Conference, Monaco, January 1998.

Greaves, J. and C. Garrigue. 1999. First record of false killer whales (Pseudorca crassidens) in New Caledonia, South Pacific. Memoirs of Queensland Museum 43(2): 588.

Gribble, N. A., G. McPherson and B. Lane. 1998. Effect of the Queensland shark control program on non-target species: whale dugong, turtle and dolphin: a review. Australian Journal of Marine and Freshwater Research 49: 645-651.

Haines, J. A. and C. J. Limpus. 2000. Marine wildlife stranding and mortality database annual report 2000. II. Cetacean and pinniped. Queensland Parks and Wildlife Service. 20p.

Haines, J. A. and C. J. Limpus. 2001. Marine wildlife stranding and mortality database annual report 2001. II. Cetacean and pinniped. Conservation technical and data report 2(2). Queensland Parks and Wildlife Service. 27p.

Hale, P. 1997. Conservation of inshore dolphins in Australia. Asian Marine Biology 14:83–91.

Hale, P. 2000. Stock structure in "Australian" humpback whales revisited. Memoirs of the Queensland Museum 524.

Hale, P. 2002. Interactions between vessels and dolphins in Port Phillip Bay, final report, September 2002. Report to NRE on vessel interactions with dolphins. 71p.

Halliday I., J. Ley, A. Tobin, R. Garrett, N. Gribble, and D. Mayer. 1998. The effects of net fishing: addressing biodiversity and bycatch issues in Queensland inshore waters. Queensland Department of Primary Industries. Queensland Government, FRDC 97/206.

Hansen, B., W. R. Turrell, and S. Østerhus. 2001. Decreasing overflow from the Nordic seas into the Atlantic Ocean through the Faroe Bank channel since 1950. Nature 411:927-930.

Harborne, A., J. Solandt, D. Afzal, M. Andrews, and P. Raines. 2001. Mamanuca coral reef conservation project – Fiji 2001. Report summary. Ministry of Tourism and Transport, and, Coral Cay Conservation Ltd.

Harlin, A. D., T. Markowitz, C. S. Baker, B. Wursig and R. L. Honeycutt. 2003. Genetic structure, diversity, and historical demography of New Zealand's dusky dolphin (Lagenorhynchus obscurus). Journal of Mammalogy 84(2):702-717.

Harwood, J. 2001. Marine mammals and their environment in the twenty-first century. Journal of Mammalogy 82(3):630-640.

Harwood, M. B. and D. Hembree. 1987. Incidental catch of small cetaceans in the offshore gillnet fishery in northern Australian waters: 1981-1985. Report of the International Whaling Commission 37:363-367.

Harwood, M. B., K. J. McNamara and G. R. V. Anderson. 1984. Incidental catch of small cetaceans in a gillnet fishery in northern Australian waters. Report of the International Whaling Commission 34:555-559.

Hauser, N. 2002. The Center for Cetacean Research and Conservation Cook Islands Whale Research Project report.

Hauser, N., H. Peckham and P. J. Clapham. 2000. Humpback whales in the Southern Cook Islands, South Pacific. Journal of Cetacean Research and Management 2(3):159-164.

Heathcote, P. and S. Nawadra. 2003. Global Environmental Conventions and their Pacific regional counterparts. 22 p.

Helweg, D. A., D. H. Cato, P. F. Jenkins, C. Garrigue, and R. D. McCauley. 1998. Geographic variation in South Pacific humpback whale songs. Behaviour 135:1-27.

Herzig, P. and S. Petersen. Chapter 7: Technical requirements for the exploration and mining of seafloor massive sulphides deposits and cobalt-rich ferromanganese crusts in International Seabed Authority 303-331.

Heyning, J. E. and W. F. Perrin. 1994. Evidence for two species of common dolphins (genus Delphinus) from the eastern North Pacific. Contributions in Science 442.

Hickey, F. R. and R. E. Johannes. 2002. Recent evolution of village-based marine resource management in Vanuatu. SPC Traditional Marine Resource Management and Knowledge Information Bulletin 14:8-21.

Hill, L. 1989. Traditional porpoise harvest in the Solomon Islands. A preliminary report from the University of Papua New Guinea, Port Moresby, Papua New Guinea.

Hinke, J. T., I. C. Kaplan, K. Aydin, G. M Watters, R. J. Olson and J. F. Kitchell. 2004. Visualizing the food-web effects of fishing for tunas in the Pacific Ocean. Ecology and Society 9(1).

Hinrichsen, D. 2000. The Oceans are Coming Ashore. Worldwatch November/December 26-35.

Hoegh-Guldberg, O., H. Hoegh-Guldberg, D. K. Stout, H. Cesar and A. Timmerman. 2000. Pacific in peril – Biological, economic and social impacts of climate change on Pacific coral reefs. Greenpeace. 72 p.

Holt, S. 2004. In defense of the Southern Ocean Whale Sanctuary. IFAW.

Holthus, P. 1992. Marine biological diversity in the central/south pacific realm with emphasis on the small island states. SPREP, Apia, Samoa.

Horn, C., D. G. Simmons and J. R. Fairweather. 1998. Evolution and Change in Kaikoura: Responses to Tourism Development. Tourism Research and Education Centre Report No. 6, Lincoln University, Canterbury, New Zealand.

Horwood, J. 1987. The Sei whale: Population biology, ecology and management. Croom Helm, London. 375p.

Hopquin, Benoit. 2002 (February 28). Nouvelle-barriere de corail. Le Monde, p. 12.

Hoyt, E. 2001. Whale-watching 2000: Worldwide Tourism Numbers, Expenditures, and Expanding Economic Impacts. International Fund for Animal Welfare, Crowborough, UK.

Hoyt, E. 2004. Marine Protected Areas for Whales, Dolphins and Porpoises: A World Handbook for Cetacean Habitat Conservation. Whale and Dolphin Conservation Society and Earthscan Publishers. London, UK. 512p.

HSI (Humane Society International). 2002. Nomination of 'Death or injury to marine species following capture in beach meshing (nets) and drumlines used in Shark Control Programs' as a Key Threatening Process under the Environment Protection and Biodiversity Conservation Act 1999.

Hsu, G. K. 1999. Live on borrowed time? 1999 Workshop on Sustainable and Peaceful Energy Future in Asia, Phuket Island, Thailand, November 25 to 26, 1999. 8p.

Hucke-Gaete, R., C. A. Moreno and J. Arata. 2004. Operational interactions of sperm whales and killer whales with the Patagonian toothfish industrial fishery off southern Chile. CCAMLR Science 11:127-140.

Hulme, M., R. M. Doherty, T. Ngara,, M. G. New, and D. Lister. 2001. African climate change: 1900-2100. Climate Research 17:145-168.

Hunt, C. 2002. Economic globalisation impacts on Pacific marine resources. Marine Policy. 13p.

ICES. 2004. The Annual ICES Ocean Climate Status Summary 2003/2004. ICES Cooperative Research Report 269:32.

IFAW (International Fund for Animal Welfare). 1998. Report of the Workshop on the Socioeconomic Aspects of Whale-watching. Kaikoura, New Zealand 8-12 December 1997.

IFAW (International Fund for Animal Welfare). 2004. From whalers to whale watchers – the growth of whale watching tourism in Australia. 34p.

Ioane, M. K. 1994. Tokelau: State of the Environment Report. SPREP, Apia, Western Samoa.

IPCC (Intergovernmental Panel on Climate Change). 2001. Climate Change 2001: impacts, adaptation and vulnerability. Cambridge University Press, Cambridge.

IUCN. 2000. Hilton-Taylor, C. (compiler). 2000. IUCN Red List of Threatened Species. International Union for the Conservation of Nature, Gland, Switzerland and Cambridge, United Kingdom. xviii+61 pp.

IUCN. 2006. 2006 IUCN Red List of Threatened Species. www.iucnredlist.org. Downloaded on 14 November 2006.

Ivashin, M. V. 1980. On the populations of Bryde's whales (Balaenoptera edeni, Anderson, 1878). Report of the International Whaling Commission 30:233-236.

Iwashita, M., M. Inoue and Y. Iwasaki. 1963. On the distribution of Orcinus in the northern and southern Pacific equatorial waters as observed from reports of Orcinus predation. Bulletin of the Fisheries Research Laboratory of Tokai University 1(1):24-30. (In Japanese – English abstract)

IWC (International Whaling Commission). 1997. Report of the IWC Workshop on Climate Change and Cetaceans, Rep. Int. Whaling Commission 47:293–313.

IWC (International Whaling Commission). 2004. Scientific Committee - Annex K: Report of the Standing Working Group on Environmental Concerns. Annual IWC meeting, Sorrento, Italy, 29 June - 10 July 2004. 56 pp.

IWC (International Whaling Commission). 2005. Annex M: Report of the sub-committee of whalewatching. IWC SC report, 10p.

IWC (International Whaling Commission). 2005. Annex K: Report of the sub-committee on small cetaceans. IWC SC report, 14p.

IWC (International Whaling Commission). 2006. Report of the Scientific Committee.

Jacob, P. 1998. The status of marine resources and coral reefs of Nauru. Coral reefs in the Pacific: Status and monitoring, resources and management 207-316.

Jacquet, N., S. Dawson, and E. Slooten. 2000. Seasonal distribution and diving behaviour of male sperm whales off Kaikoura: foraging implications. Canadian Journal of Zoology 78(3):407-419.

Jacquet, N. and H. Whitehead. 1996. Scale-dependent correlation of sperm whale distribution with environmental features and productivity in the south Pacific. Marine Ecology Progress Series 135:1-9.

Jacquet, N., H. Whitehead and M. Lewis. 1996. Coherence between 19th century sperm whale distributions and satellite-derived pigements in the tropical Pacific. Marine Ecology Progress Series 145:1-10.

Jasny, M., J. Reynolds, C. Horowitz and A. Wetzler. 2005. Sounding the Depths II. The rising toll of sonar, shipping and industrial ocean noise on marine life. Natural Resources Defense Council, November 2005. 84p.

Jefferson, T. A. and N. B. Barros. 1997. Peponocephala electra. Mammalian Species (American Society of Mammalogists) 553, 6p.

Jefferson, T. A. and B. E. Curry. 1996. Acoustic methods of reducing or eliminating marine mammal-fishery interactions: Do they work? Ocean and Coastal Management 31(1):41-70.

Jefferson, T. A., D. Fertl, M. Michael and T. D. Fagin. 2006. An unusual encounter with a mixed school of melon-headed whales (Peponocephala electra) and rough-toothed dolphin (Steno bredanensis) at Rota, Northern Mariana Islands. Micronesica 38(2):239-244.

Jefferson, T. A. and L. Karczmarski. 2001. Sousa chinensis. Mammalian species 655:1-9.

Jefferson, T. A., S. Leatherwood and M. A. Webber. 1993. FAO species identification guide. Marine mammals of the world. FAO, Rome.

Jensen, A. S. and G. K. Silber. 2003. Large Whale Ship Strike Database. U.S. Department of Commerce, NOAA Technical Memorandum. NMFS-OPR 37p.

Jha, R. 2004. Alleviating environmental degradation in the Asia-Pacific region: international cooperation and the role of issue-linkage. 45 p.

Johannes, R. E. 2002. Did indigenous conservation ethics exist? SPC Traditional Marine Resource Management and Knowledge Information Bulletin 14:3-7.

Johannes, R. E. 2002. The renaissance of community-based marine resource management in Oceania. Annual Review of Ecological Systems 33:317-340.

Johannes, R. E. and B. Yeeting. 2000. I-Kiribati knowledge and management of Tarawa's lagoon resources. Atoll Research Bulletin 489:24.

Johnson C. M. and K. S. Norris. 1994. Social behavior in The Hawaiian spinner dolphin (1st ed) by Norris, K. S., B. Wursig, R. S. Wells, M. Wursig, S. M. Brownlee, C. M. Johnson and J. Solow (eds). Berkeley: University of California Press; 243–286.

Jones, P. D., D. J. Hannah, S. J. Buckland, T. Van Maanen, S. V. Leathem, S. Dawson, E. Slooten, A. Van Helden, and M. Donoghue. 1999. Polychlorinated dibenzo-p-dioxins, dibenzofurans and polychlorinated biphenyls in New Zealand cetaceans. Journal of Cetacean Research and Management (Special Issue 1):157-167.

Jones, R., K. J. Hennessy, C. M. Page, A. B. Pittock, R. Suppiah, K. J. E. Walsh, and P. H. Whetton. 1999. An Analysis of the Impacts of the Kyoto Protocol on Pacific Island Countries. Part Two: Regional Climate Change Scenarios and Risk Assessment Methods. A research report prepared for the South Pacific Regional Environment Programme, Apia

Jonker, F. C. and S. M. Ferreria. 2004. Can echolocation devices be used to define harbour use by Maui's dolphins? DOC Science Internal Series 181.

Jooke, R. and D. K. Mattila. 2006. Summary of humpback whale research at American Samoa, 2003-2005. IWC SC document SC/58/SH5.

Kahn, B. 2000. Komodo National Park cetacean surveys 1999 – a rapid ecological assessment of cetacean diversity, abundance, and distribution. Report to the Nature Conservancy – Indonesia Coastal and Marine Program. 29pp.

Kahn, B. 2001. Important criteria for selecting/establishing protected habitat regions in Papua New Guinea. Papua New Guinea Marine Mammal Forum keynote speech.

Kahn, B. 2004. Solomon Islands Rapid Ecological Assessment – Oceanic Cetaceans and Associated Habitats: May-June 2004. Technical report prepared for the Solomon Islands marine assessment coordinating committee (SIMACC).

Kahn, B., H. Whitehead and M. Dillon. 1993. Indications of density-dependent effects from comparisons of sperm whale populations. Marine Ecology Progress Series 93:1-7.

Kaly, U. and C. Pratt. 2000. Environmental Vulnerability Index: Development and provisional indices and profiles for Fiji, Samoa, Tuvalu, and Vanuatu. Phase II Report for NZODA. SOPAC Technical Report 306 89p.

Kami, H. T. and A. J. Hosmer. 1982. Recent beachings of whales on Guam. Micronesica 18:133-135.

Kami, H. T. and R. J. Lujan. 1976. Records of the dwarf sperm whale Kogia simus Owen from Guam. Micronesica 12:327-332.

Karczmarski, L., B. Wursig, G. Gailey, K. W. Larson, and C. Vanderlip. 2005. Spinner dolphins in a remote Hawaiian atoll: social grouping and population structure. Behavioral Ecology doi:10.1093/beheco/ari028.

Kasamatsu, F., G. G. Joyce, P. Ensor and J. Mermoz. 1990. Current occurrence of cetacea in the Southern Hemisphere; results from the IWC/IDCR Southern Hemisphere minke whale assessment cruises, 1978/79-1987/88. Report of the International Whaling Commission.

Kasamatsu, F., Joyce, G.G. Ensor, P. and Mermoz, J. 1996. Current occurrence of baleen whales in Antarctic waters. Report of International Whaling Commission 46:293-304.

Kasamatsu, F., S. Nishiwaki, and H. Ishikawah. 1995. Breeding areas and southbound migrations of southern minke whales Balaenoptera acutorostrata. Marine Ecology Progress Series 119(1-3):1-10.

Kasuya, T. and T. Miyashita. 1988. Distribution of sperm whale stocks in the North Pacific. Scientific Reports of the Whales Research Institute (Tokyo) 39: 31-75.

Kaschner, K. 2004. Modelling and Mapping Resource overlap between Marine Mammals and Fisheries on a Global Scale. Ph.D dissertation University of British Columbia.

Kawamura, A. 1977. On the food of Bryde's whales caught in the South Pacific and Indian oceans. Scientific Reports of the Whales Research Institute (Tokyo) 29:49-58.

Kawamura, A. 1980. Food habits of the Bryde's whales taken in the South Pacific and Indian Oceans. Scientific Reports of the Whales Research Institute 32:1-23.

Kellogg, R. 1928. What is known of the migration of some of the whale bone whales. Annual Report of the Board of Regents of the Smithsonian Institution 1928:467-494.

Kemper, C., P. Gibbs, D. Obendorf, S. Marvanek and C. Lenghaus. 1994. A review of heavy-metal and organochlorine levels in marine mammals in Australia. Science of the total environment 154(2-3):129-139.

Kiessling, I and C. Booth. 2004. Marine Conservation Priorities for the Gulf of Carpentaria (Queensland), WWF, Sydney.

Kile, N. 2000. Solomon Islands marine resources overview. Pacific Economic Bulletin 15(1):143-147.

Kile, N. and A. Watah. 2003. The dolphin fishery of the Solomon Islands. Statement by the Minster of the Department of Fisheries and Marine Resources, Solomon Islands Government. 9p.

Kirby, D. 2006. Ecological risk assessment for species caught in WCPO tuna fisheries: inherent risk as determined by productivity-susceptibility analysis. Paper EB WP–1 at the 2nd Meeting of the Scientific Committee of the Western and Central Pacific Fisheries Commission WCPFC–SC1, Manila, Philippines 7–18 August 2006.

Laist, D., A. R. Knowlton, J. G. Read, A. S. Collet and M. Podesta. 2001. Collisions between whales and ships. Marine Mammal Science 17(1):35–75.

Lal, P. Coral reef use and management – the need, role, and prospects of economic valuation in the Pacific In Economic Valuation and Policy Priorities for Sustainable Management of Coral Reefs. Worldfish Center 59–78.

Lane, J. 1993. Tuvalu: State of the Environment Report. SPREP, Apia, Western Samoa.

Laran, S. and A. Gannier. 2001. Distribution of cetaceans in the Marquesas Islands (French Polynesia). European Research on Cetaceans 15:426-430.

Larmour, G. 2000. Australia. Progress Report on Cetacean Research, January 1999 to December 1999, with statistical data for the calendar year 1999.

Lawson, T. 2001. Predation of tuna by whales and sharks in the western and central Pacific Ocean. 14th Meeting of the Standing Committee on Tuna and Billfish, Noumea, New Caledonia, 9-16 August 2001. 8p.

Lawson, T. 2001. Observer data held by the oceanic fisheries programme covering tuna fishery bycatches in the western and central Pacific Ocean. 14th Meeting of the Standing Committee on the Tuna and Billfish, SCTB 14, Noumea, New Caledonia, 9-16 August, 2001. 42p.

Lawson, T. 2005. Data-related tasks for the WCPCF Scientific Committee. 1st Meeting of the Scientific Committee of the Western and Central Pacific Fisheries Commission WCPFC-SC1, Noumea, New Caledonia, 8-19 August, 2005.

Learmouth, J.A., C.D. MacLeod, M. B. Santos, G.J. Pierce, H.Q.P. Crick, and R.A. Robinson. 2006. Potential effects of climate change on marine mammals. Oceanography and Marine Biology: An Annual Review 44:431-464

Leatherwood, S., J. S. Grove and A. E. Zuckerman. 1991. Dolphins of the genus Lagenorhynchus in the tropical South Pacific. Marine Mammal Science 7:194-197.

Lefèvre, Y., E. Leborgne and A. Gannier. 1999. An abnormal calf of humpback whale observed off Rurutu island (French Polynesia). European Research on Cetaceans 13:367-368.

Lehodey, P. 2001. The pelagic ecosystem in the tropical Pacific Ocean: dynamic spatial

modelling and biological consequences of ENSO. Progress in Oceanography 49:439-468.

Lennert, C. and M. A. Hall. 1995. Estimates of incidental mortality of dolphins in the Eastern Pacific Ocean Tuna Fishery in 1993. Report of the International Whaling Commission 45:387-390.

Leslie, M S., A. Batibasaga, D. S. Weber, D. Olson, and H. C. Rosenbaum. 2005. First record of Blainville's beaked whale Mesoplodon densirostris in Fiji. Pacific Conservation Biology 11(4):302-304.

Lever, R. J. A. W. 1964. Whales and whaling in the western Pacific. South Pacific Bulletin 14(2):33-36.

Lewison, R. L., S. A. Freeman and L. B. Crowder. 2004. Quantifying the effects of fisheries on threatened species: the impact of pelagic longlines on loggerhead and leatherback sea turtles. Ecology Letters 7:221-231.

Limpus, C. J., K. J. Currie and J. A. Haines. 2002. Marine wildlife stranding and mortality database annual report 2002. II. Cetacean and pinniped. Conservation technical and data report 2002(2). Queensland Parks and Wildlife Service. 43p.

Lindsay, S. R., E. Ledua and J. Stanley. 2004. Regional assessment of the commercial viability for marine ornamental aquaculture within the Pacific Islands (giant clam, hard and soft coral, finfish, live rock and marine shrimp). Noumea, New Caledonia: Secretariat of the Pacific Community. 99p.

Lokani, P. and A. Green. 2004. A rapid ecological assessment of the marine ecosystems of the Solomon Islands. Report prepared for the Nature Conservancy Pacific Islands Program. 15p.

Lovell, E. R. and M. Tumuri. 1999. Provisional environmental impact assessment for the extraction of coral reef products for the marine aquarium and curio trade in Fiji. A report prepared for the Fisheries Division, Government of Fiji. 116p.

Lusseau, D. 2003. Male and female bottlenose dolphins Tursiops spp. have different strategies to avoid interactions with tour boats in Doubtful Sound, New Zealand. Marine Ecology Progress Series 257:267–274.

Lusseau, D., 2003. How do tour boats affect the behavioral state of bottlenose dolphins (Tursiops sp.)? Applying Markov chain modeling to the field study of behavior. Conservation Biology 17:1785–1793.

Lusseau, D. 2005. Residency pattern of bottlenose dolphins Tursiops spp. in Milford Sound, New Zealand is related to boat traffic. Marine Ecology Progress Series 295:265-272.

Lusseau, D. and J. E. S. Higham. 2004. Managing the impacts of dolphin-based tourism through the definition of critical habitats: the case of bottlenose dolphins (Tursiops spp.) in Doubtful Sound, New Zealand. Tourism Management 25:657-667.

Lyrolm, T., O. Leimar, B. Johanneson and U. Glyllensten. 1999. Sex-biased dispersal in sperm whales: contrasting mitochondrial and nuclear genetic structure of global populations. Proceedings of the Royal Society of London B 266:347-354.

Malm, T. 2001. The tragedy of the Commoners: The decline of the customary marine tenure systems of Tonga. Managing Common Resources – What is the Solution? Lund University, Sweden, 10-11 September 2001 (author permission required?)

Manly, B. F. J., C. Cameron and D. J. Fletcher. 2002. Longline bycatch of birds and mammals in New Zealand fisheries, 1990/91 – 1995/96, and observer coverage. Wellington, New Zealand: Department of Conservation. DOC Science International Series 43.

Manzurek, R. 2004. MBA Seafood Watch – Hawaii Seafood Report: Blue and Striped Marlin. MBA Seafood Watch Report. 33p.

Markowitz, T. M., A. D. Harlin, B. Wursig and C. J. McFadden. 2004. Dusky dolphin foraging habitat: overlap with aquaculture in New Zealand. Aquatic Conservation: marine and freshwater ecosystems 14:133-149.

Martien, K. K., B. L. Taylor, E. Slooten, and S. Dawson. 1999. A sensitivity analysis to guide research and management for Hector's dolphin. Biological Conservation 90:183-191.

Martinez, E. and E. Slooten. 2003. A selective, annotated bibliography for Hector's dolphin (Cephalorhynchus hectori). DOC Science Internal Series 124.

Masaki, Y. 1972. Tagging investigations of whales in the seas near the Ogasawara and Mariana Islands. Geiken Tsushin 249:35-42 (In Japanese).

Masaki, Y. 1979. Fiscal 1978 winter whale sighting and marking survey in the low latitude areas of the North Pacific Ocean. Geiken Tsushin 324:15-24. (In Japanese).

Matsuoka, K., R. L. Pitman, and F. F. C. Marquez. 2005. A note on a pygmy right whale (Caperea marginata) sighting in the southwestern Pacific Ocean. Journal of Cetacean Research and Management 7(1):71-73.

McCoy, M. 1987. Marine mammal troubles in Western Samoa. SPC Fisheries Newsletter 43:5-6.

McCracken, M. L. 2000. Estimation of sea turtle take and mortality in the Hawaiian longline fisheries, National Marine Fisheries Service, NOAA, Southwest Fisheries Science Center, 2570 Dole St, Honolulu, HI 96822-2396: 29p.

McPherson, G. R., J. Lien, N. A. Gribble and B. Lane. 2001. Review of an acoustic alarm strategy to minimize bycatch of humpback whales in Queensland coastal gill net fisheries. Memoirs of the Queensland Museum 47(2):499-506.

McPherson, G., P. Turner, C. McPherson and D. Cato. 2003. Testing of acoustic tracking system for toothed whales around longline and gillnet fishing gear, and preliminary trials of depredation mitigation devices for longline fisheries. Project Report (R02/0923). 37p.

Medrano-Gonzalez, L., C. S. Baker, M. R. Robles-Saavedra, J. Murrell, M. J. Vazquez-Cuevas, B. C. Congdon, J. M Straley, J. Calambokidis, J. Urban-Ramirez, L. Florez-Gonzalez, C. Olavarria-Barrera, A. Aguayo-Lobo, J. Nolasco-Soto, R. A. Juarez-Salas and K. Villavicencio-Llamosas. 2001. Trans-oceanic population genetic structure of humpback whales in the north and south Pacific. Memoirs of the Queensland Museum 47(2):465-479.

Miller, P. J. O., N. Biasson, A. Samuels and P. L. Tyack. 2000. Whale songs lengthen in response to sonar. Nature 405:903.

Miller, S. 2003. Marine Mammals in the Pacific Islands Region: 1993-2003. A summary report of SPREP's regional marine mammal conservation programme and associated marine mammal issues and work carried out in the Pacific Islands region 1993-2003. RMMCP 2 Information Paper SPREP.

Mitchell, E. 1975. Review of biology and fisheries for smaller cetaceans. Report and papers from a meeting of the Subcommittee on Smaller Cetaceans, International Whaling Commission, in Montreal, April 1-11, 1974. Journal of the Fisheries Research Board of Canada 32(7): 887-983.

Mittermeier, R. A., P. Robles Gil, M. Hoffman, J. Pilgrim, T. Brooks, C. Goettsch Mittermeier, J. Lamoreux, and G. A. B. da Fonseca. 2005. Hotspots revisited: Earth's biologically richest and most threatened terrestrial ecoregions. Conservation International, Washington, D. C.

Miyashita, T., H. Kato, and T. Kasuya (eds). 1995. Worldwide map of cetacean distribution based on Japanese sighting data (Volume 1). National Research Institute of Far Seas Fisheries. Shizuoka, Japan. 140p.

Miyashita, T., T. Kishiro, N. Higashi, F. Sato, K. Mori and H. Kato. 1996. Winter distribution of cetaceans in the western North Pacific inferred from sighting cruises 1993-1995. Report of the International Whaling Commission 46:437-441.

Miyazaki, N. and W. F. Perrin. 1994. Rough-toothed dolphin Steno bredanensis (Lesson, 1828). Pp 1-21 in S. H. Ridgeway and R. Harrison (eds.), Handbook of Marine Mammals, Vol. 5: The First Book of Dolphins. Academic Press, London. 416pp.

Miyazaki, N. and S. Wada. 1978. Observations of cetacea during whale marking cruise in the western tropical Pacific, 1976. Scientific Reports of the Whales Research Institute, Tokyo 30:179-195.

Miyazaki, N. and S. Wada. 1978. Fraser's dolphin, Lagenodelphis hosei in the western North Pacific. Scientific Reports of the Whales Research Institute, Tokyo 30:231-244.

Moline, M. A., H. Claustre, T. K. Frazer, O. Schofields and M. Vernet. 2004. Alterations of the food web along the Antarctic Peninsula in response to a regional warming trend. Global Change Biology 10:1973-1980.

Moller, L. M. and L. B. Beheregaray. 2004. Genetic evidence for sex-biased dispersal in resident bottlenose dolphins (Tursiops aduncus). Molecular Ecology 13:1607-1612.

Moller, L. M. and R. G. Harcourt. 1998. Social dynamics and activity patterns of bottlenose dolphins, Tursiops truncatus, in Jervis Bay, southeastern Australia. Proceedings of the Linnean Society NSW 120:181-189.

Molony, B. 2005. Estimates of the mortality of non-target species with an initial focus on seabirds, turtles and sharks. Paper EB WP–1 at the 1st Meeting of the Scientific Committee of the Western and Central Pacific Fisheries Commission WCPFC–SC1, Noumea, New Caledonia 8–19 August 2005.

Monniot, F., R. Martoja and C. Monniot. 1994. Cellular sites of iron and nickel accumulation in ascidians related to the naturally and anthropic enriched New Caledonian environment. Annales de l'Institut Oce´ anographique 70 (2), 205–216.

Morton, A.B. and H.K. Symonds. 2002. Displacement of Orcinus orca (L.) by high amplitude sound in British Columbia. ICES Journal of Marine Science 59:71-80.

Mosley, L. M. and W. G. L. Aalbersberg. 2003. Nutrient levels in sea and river water along the 'Coral Coast' of Viti Levu, Fiji. South Pacific Journal of Natural Science 21:35-40.

Munday, P. 1994. Kimbe Bay Rapid Ecological Assessment: The coral reefs of Kimbe Bay (West New Britain, Papua New Guinea). Volume 7: Marine Mammals. Unpublished report to The Nature Conservancy.

Myers, R.A. and C.A. Ottensmeyer. 2005. Extinction Risk in Marine Species in Norse, E.A. and L.B. Crowder (eds), Marine Conservation Biology: The Science of Maintaining the Sea's Biodiversity. Island Press, Washington DC (USA).

Neumann, D. R. and M. B. Orams. 2005. Behaviour and ecology of common dolphins (Delphinus delphis) and the impact of tourism in Mercury Bay, North Island, New Zealand. Science for Conservation 254. 40p.

Newcomer, M. W., T. A. Jefferson, and R. L. Brownell Jr. 1996. Lissodelphis peronii. Mammalian Species (American Society of Mammalogists) 531, 5pp.

Nitta, E. T. 1994. A review of gillnet and trap fisheries in Micronesia and the Central Pacific. Report of the International Whaling Commission (Special Issue 15):619.

Nitta, E. T. and J. R. Henderson. 1993. A review of interactions between Hawaii's fisheries and protected species. Marine Fisheries Review 55(2):83-92.

NMFS (National Marine Fisheries Service). 2001. Pacific Islands Regional Observer Program Deep Set Annual Status Report. Jan 1 2001 – Dec 31 2001, Pacific Islands Regional Office, National Marine Fisheries Service.

NMFS (National Marine Fisheries Service). 2002. Pacific Islands Regional Observer Program Deep Set Annual Status Report. Jan 1 2002 – Dec 31 2002, Pacific Islands Regional Office, National Marine Fisheries Service.

NMFS (National Marine Fisheries Service). 2003. Pacific Islands Regional Observer Program Deep Set Annual Status Report. Jan 1 2003 – Dec 31 2003, Pacific Islands Regional Office, National Marine Fisheries Service.

NMFS (National Marine Fisheries Service). 2004. Hawaii observer program Bottomfish annual status report. Jan 1 2004 – Dec 31 2004, Pacific Islands Regional Office, National Marine Fisheries Service.

NMFS (National Marine Fisheries Service). 2004. Pacific Islands Regional Observer Program Deep Set Annual Status Report. Jan 1 2004 – Dec 31 2004, Pacific Islands Regional Office, National Marine Fisheries Service.

NMFS (National Marine Fisheries Service). 2004. Hawaii longline quarterly summary report. Pacific Islands Fisheries Science Center. Accessed 2004. Available at http://www.nmfs.hawaii.edu/fmep/hilong/othersummary.htm.

NMFS (National Marine Fisheries Service). 2005. Pacific Islands Regional Observer Program Deep Set Annual Status Report. Jan 1 2005 – Dec 31 2005, Pacific Islands Regional Office, National Marine Fisheries Service.

Noad, M. J. 2000. A southern right whale Eubalaena australis (Desmoulins, 1822) in southern Queensland waters. Memoirs of the Queensland Museum 45: 556.

Noad, M. J. 2002. The use of songs by humpback whales (Megaptera novaeangliae) during migration off the east coast of Australia. PhD thesis, University of Sydney, NSW, Australia.

Noad, M. J. and D. H. Cato. 2001. A combined acoustic and visual survey of humpback whales off southeast Queensland. Memoirs of the Queensland Museum 47(2):507-523.

Noad, M. J., D. H. Cato, M. M. Bryden, M-N. Jenner and K. C. S. Jenner. 2000. Cultural revolution in whale songs. Nature 408:537.

Noad, M. J., D. Paton, N. Gibbs and S. Childerhouse. Unpublished. A combined visual and acoustic survey of the cetaceans of Independent Samoa.

Norris, K. S., B. Wursig, R. S. Wells, and M. Wursig. 1994. The Hawaiian Spinner Dolphin. University of California Press, Berkeley. 408pp.

Northridge, S. P. 1984. World review of interactions between marine mammals and fisheries. FAO Fisheries Technical Paper 251. 190p.

Northridge, S. P. 1991. An updated world review of interactions between marine mammals and fisheries. FAO Fisheries Technical Paper 251, Supplement 1. 58p.

Northridge, S. P. 1991. Driftnet fisheries and their impacts on non-target species: a worldwide review. FAO Fisheries Technical Paper 320, FAO, Rome. 115p.

Northridge, S. and G. Pelleri. 1986. A review of human impact on small cetaceans. Investigations on Cetacea 18:222-261.

Northrop, J., W. C. Cummings and P. O. Thompson. 1968. 20-Hz signals observed in the central Pacific. Journal of Acoustical Society of America 43:383-384.

Noshkin, V. E., W. L. Robison, K. M. Wong and R. J. Eagle. 1998. Behaviour of plutonium isotopes in the marine environment of Enewetak atoll. Journal of radioanalytical and nuclear chemistry 234(1-2):243-249.

O'Callaghan, T. M. and C. S. Baker. 2002. Summer cetacean community, with particular reference to Bryde's whales, in the Hauraki Gulf, New Zealand. DOC Science internal series 55.

O'Connor, S. In press. Pacific Islands Whale Watch Tourism: 2005 - A Region Wide Review of Activity. July 2006. Prepared by EcoLarge. 58 p.

Odyssey logbook report. 2000. Accessed on November 3rd 2006 from www.pbs.org/odyssey

Ohizumi, H., T. Matsuishi and H. Kishino. 2002. Winter sightings of Humpback and Bryde's whales in tropical waters of the western and central North Pacific. Aquatic Mammals 28:73-77.

Ohsumi, S. 1978. Bryde's whales in the pelagic whaling ground of the North Pacific. Report of the International Whaling Commission (Special Issue 1):140-150.

Ohsumi, S. 1978. Provisional report on the Brydes whales caught under special permit in the Southern Hemisphere. Report of the International Whaling Commission 28:281-287.

Ohsumi, S. 1979. Bryde's whales in the North Pacific in 1977. Report of the International Whaling Commission 29:265-266.

Ohsumi, S. 1979. Provisional report of the Bryde's whales caught under special permit in the southern hemisphere in 1977/78 and a research programme for 1978/79. Report of the International Whaling Commission 29:267-273.

Ohsumi, S. 1980. Bryde's whales in the North Pacific in 1978. Report of the International Whaling Commission 30:315-318.

Ohsumi, S. 1980. Population study of the Bryde's whale in the southern hemisphere under scientific permit in the three seasons, 1976/77-1978/79. Report of the International Whaling Commission 30:319-331.

Ohsumi, S. 1981. Further estimation of population sizes of Bryde's whales in the South Pacific and Indian Oceans using sightings data. Report of the International Whaling Commission 31: 407-415.

Ohsumi, S. and Shigemune 1993 in Shimada and Pastene (Reeves et al. 1999)

Olavarría, C., A. Aguayo, J. Acevedo, L. Medrano and C. S. Baker. 2005. Genetic differentiation between two feeding areas of the Eastern South Pacific humpback whale population. IWC Scientific Document SC/57/SH3.

Olavarría, C., C. S. Baker and C. Garrigue. 2001. Genetic "assignment" of humpback whales from the Southern Hemisphere feeding grounds to breeding grounds: a no-cost request for access to IDCR-SOWER biopsy samples (1996-2000). Research Proposal to the IWC 12p.

Olavarría, C., C. S. Baker, C. Garrigue, M. Poole, N. Hauser, S. Caballero, L. Flórez-González, M. Brasseur, J. Bannister, J. Capella, P. Clapham, R. Dodemont, M. Donoghue, C. Jenner, M-N. Jenner, D. Moro, M. Oremus, D. Paton and K. Russell. 2005. Population structure of humpback whales throughout the South Pacific with reference to the origins of the eastern Polynesian breeding grounds. IWC Science Document SC/57/For Information 8.

Olavarría, C., C. S. Baker, L. Medrano, A. Aguayo, S. Caballero, L. Florez-Gonzalez, J. Capella, H. C. Rosenbaum, C. Garrigue, J. Greaves, M. Jenner, C. Jenner and J. L. Bannister. 2000. Stock identity of Antarctic Peninsula Humpback whales inferred from mtDNA variation. IWC Science Document SC/52/IA15.

Olavarría, C., M. Oremus, G. de Tezanos Pinto, D. Steel, D. Paton and C. S. Baker. 2004. Genetic identification of small cetaceans from the waters of Samoa, South Pacific. IWC Science Document SC/56/SM25.

Olavarría, C., M. Oremus, J. Ward and S. Plön. 2005. Genetic analysis of a Kogia sp. Skin sample collected in Samoa in 2005.

Unpublished report, Auckland August 2005, 18 p.

Olavarría, C., M. Poole, N. Hauser, C. Garrigue, S. Caballero, M. Brasseur, K. Martien, K. Russell, M. Oremus, R. Dodemont, L. Florez-Gonzalez, J. Capella, H. Rosenbaum, D. Moro, C. Jenner, M-N Jenner, J. Bannister, and C. S. Baker. 2003. Population differentiation of humpback whales from far Polynesia (Group F breeding grounds) based on mitochondrial DNA sequences. IWC Science Document SH/55/SH11.

Omata, Y., T. Hammond, K. Itoh, and K. Murata. 2005. Antibodies Against Toxoplasma gondii in the Pacific Bottlenose Dolphin (Tursiops aduncus) From the Solomon Islands. Journal of Parasitology 91(4):965–967.

Orams, M. B. 1995. Development and management of a feeding program for wild bottlenose dolphins at Tangalooma, Australia. Aquatic Mammals 23:154-168.

Orams, M. B. 2001. From whale hunting to whale watching in Tonga: A sustainable future? Journal of Sustainable Tourism 9(2):128-146.

Orams, M. B. 2002. Humpback Whales in Tonga: An Economic Resource for Tourism. Coastal Management 30(4):361-380.

Orams, M. B. 2004. Tonga - A new battleground in the war over whales. Sea Technology 45(10):25-30.

Otobed, D. O. and I. A. Maiava. Republic of Palau: State of the Environment Report. SPREP, Apia, Western Samoa.

Pacific Islands Report. 2007. Retired Major General to head Guam buildup. January 11, 2007. Available at: http://pidp.eastwestcenter.org/pireport/2007/January/01-11-07.htm

Palsbøll, P. J., M. Bérubé, E. C. Anderson and K. K. Dunham. 2005. Comment - High levels of statistical uncertainty in 'gametic' recapture estimates of male abundance in humpback whales. Marine Ecology Progress Series 295:305-307.

Papastavrou, V. and R. Leaper. 2005. Debating whale sanctuaries. Science 309:51.

Parra, G. J., C. Azuma, A. R. Preen, P. J. Corkeron and H. Marsh. 2002. Distribution of Irrawaddy dolphins, Orcaella brevirostris, in Australian waters. The Raffles Bulletin of Zoology 10:141-154.

Parra, G. J. and P. J. Corkeron. 2001. Feasibility of using photo-identification techniques to study the Irrawaddy dolphin, Orcaella brevirostris (Owen in Gray 1866). Aquatic Mammals 27.1:45-49.

Parra, G. J. and H. Marsh. 2003. Status of marine mammals in the Australian waters of South East Asia. SEAMAMII Conference.

Passfield, K. 1998. A report of a survey of the marine resources of Fakaofo Atoll, Tokelau. Fisheries and Environmental Resource Consultants Ltd. 34p.

Paterson, R. A. 1986. A list of specimens of the order Cetacea in the Queensland museum. Memoirs of the Queensland Museum 46:631–645. ?? ref incorrect

Paterson, R. A. 1990. Effects of long-term anti-shark measures on target and non-target species in Queensland, Australia. Biological Conservation 52:147-159.

Paterson, R. A. 1991. The migration of humpback whales Megaptera novaeangliae in east Australian waters. Memoirs of the Queensland Museum, 30,333–341.

Paterson, R. A. 1994. An annotated list of recent additions to the cetacean collection in the Queensland Museum. Memoirs of the Queensland Museum 35:217–223.

Paterson, R. A. 2001. A presumed killer whale (Orcinus orca) attack on humpback whales (Megaptera novaeangliae) at Point Lookout, Queensland. Memoirs of the Queensland Museum 47:436.

Paterson, R. A. 2001. Exploitation of humpback whales, Megaptera novaeangliae, in the South West Pacific and adjacent Antartctic water during the 19th and 20th centuries. Memoirs of the Queensland Museum 47, 421–429.

Paterson, R. and P. Paterson. 1989. The status of the recovering stock of humpback whales Megaptera novaeangliae in east Australian waters. Biological Conservation 47:33–48.

Paterson, R., P. Paterson and D. H. Cato. 1994. The status of humpback whales Megaptera novaeangliae in east Australia thirty years after whaling. Biological Conservation 70:135-142.

Paterson, R.A., P. Paterson and D. H. Cato. 2001. Status of humpback whales, Megaptera novaeangliae, in east Australia at the end of the 20th century. Memoirs of the Queensland Museum 47:579–586.

Paterson, R.A., Quayle, C.J., Van Dyck, S.M., 1993. A humpback whale calf and two sub-adult Dense-beaked whales recently stranded in SE Queensland. Memoirs of the Queensland Museum 33:291–297.

Paterson, R.A., S. M. Van Dyck and I. C. Gynther. 1998. Irrawaddy dolphins Orcaella brevirostris (Owen in Gray) from southern Queensland. Memoirs of the Queensland Museum 42:554.

Paton D. and P. Clapham. 2002. Preliminary analysis of humpback whale sighting survey data collected in Fiji, 1956 – 1958. IWC Scientific Document SC/54/H7.

Paton, D. and N. J. Gibbs. 2002. Documented and anecdotal cetacean sightings, 1761-2001, in the Samoa, Fiji, Vanuatu and Solomon Island regions. Report to Environment Australia (Australian Commonwealth Department of Environment and Heritage).

Patterson, P. and F. Alverson. 1986. Summary of Spotted, Spinner, Unidentified and Other Identified Porpoise sightings reported by commercial tuna vessels fishing in the tropical central and western Pacific Ocean. National Marine Fisheries Service, Southwest Fisheries Center, La Jolla, California, Administrative Report LJ-86-06.

Pauly, D., A. W. Trites, E. Capuli and V. Christensen. 1998. Diet composition and trophic levels of marine mammals. ICES Journal of Marine Science 55(3): 467-481.

PCS (Palau Conservation Society). 2003. Community Consultations on Marine and Terrestrial Resource Uses submitted as information for Palau's National Biodiversity Strategy and Action Plan, March 2003. 131p.

Perrin, W. F. 1975. Variation of spotted and spinner porpoise (genus Stenella) in the eastern tropical Pacific and Hawaii. Bulletin of the Scripps Institution of Oceanography 21:1-206.

Perrin, W. F. 1998. Stenella longirostris. Mammalian species (American Society of Mammalogists) 599:1-7.

Perrin, W. F. 2006. The Philippine fishery for Bryde's whales in the western Northern Pacific, 1983-1986. IWC Scientific document SC/58/RMP1.

Perrin, W. F., P. B. Best, W. H. Dawbin, K. C. Balcomb, R. Gambell and G. J. B. Ross. 1973. Rediscovery of Fraser's dolphin Lagenodelphis hosei. Nature 241(5388):345-350.

Perrin, W. F., G. P. Donovan and J. Barlow (eds). 1994. Gillnets and cetaceans, incorporating the proceedings of the Symposium and Workshop on the Mortality of Cetaceans in Passive Fishing Nets and Traps. Report of the International Whaling Commission (Special Issue 15).

Perrin, W. F., M. L. L. Dolar and D. Robineau. 1999. Spinner dolphins (Stenella longirostris) of the western Pacific and Southeast Asia: Pelagic and shallow-water forms. Marine Mammal Science 15(4):1029-105.

Perrin, W. F., R. R. Reeves, M. L. L. Dolar, T. A. Jefferson, H. Marsh, J. Y. Wang, and J. Estacion (Eds). 2002. Report of the Second Workshop on the Biology and Conservation of Small Cetaceans and Dugongs of South-East Asia. UNEP/CMS Secretariat, Bonn, Germany, 161 pages.

Perrin, W. F., P. A. Sloan, and J. R. Henderson. 1979. Taxonomic status of the "south-western stocks of spinner dolphin Stenella longirostris and spotted dolphin S. attenuata". Report of the International Whaling Commission 29:175-184.

Perrin, W. F., C. E. Wilson, and F. I. Archer II. 1994. Striped dolphin Stenella coeruleoalba (Meyen 1833) in S. H. Ridgeway and R. Harrison (eds.), Handbook of Marine Mammals. Vol. 5: The First Book of Dolphins. Academic Press, London.

Pichler F. B. and C. S. Baker. 2000. Loss of genetic diversity in the endemic Hector's dolphin due to fisheries-related mortality. Proceedings of the Royal Society of London B Biological Sciences 267:97–102

Pichler, F., C. S. Baker, S. M. Dawson and E. Slooten. 1998. Geographic isolation of Hector's dolphin populations described by mitochondrial DNA sequences. Conservation Biology 12(3):1-8.

Pitman, R. L. 2002. Indo-Pacific beaked whale Indopacetus pacificus. Pp. 615-617 in: Encyclopedia of Marine Mammals (eds. W. F. Perrin, B. Wursig, and J. G. M. Thewissen). Academic Press, San Diego, California.

Pitman, R. L., D. M. Palacios, P. L. R. Brennan, B. J. Brennan, K. C. Balcomb III, and T. Miyashita. 1999. Sightings and possible identity of a bottlenose whale in the tropical Indo-Pacific: Indopacetus pacificus? Marine Mammal Science 15:531-549.

Poole, M. M. 1991. Environmental determinants of spinner dolphin habitat use in the barrier reef-lagoon system waters of Moorea, French Polynesia. Abstract, International Society for Reef Studies, Annual Meeting, Berkeley, California, 13-16 December.

Poole, M. M. 1991. The behavioural ecology of Tahitian spinner dolphins. 9th Biennial Conference on the Biology of Marine Mammals, Chicago, Illinois, December 5-9, 1991.

Poole, M. M. 1993. A sighting/stranding network in French Polynesia. P. 87 in Abstracts, 10th Biennial Conference on the Biology of Marine Mammals, Galveston, Texas, November 11-15, 1993.

Poole, M. M. 1995. Aspects of behavioral ecology of spinner dolphins (Stenella longirostris) in the nearshore waters of Mo'orea, French Polynesia (Ph.D dissertation). Santa Cruz: University of California.

Poole, M., and J. Darling. 1999. Occurrence of humpback whales (Megaptera novaeangliae) in French Polynesia. Abstract from the Thirteenth Biennial Conference Biology of Marine Mammals, Maui, Hawaii.

Pörtner, H. O., M. Langenburgh, and A. Reipschläger. 2004. Biological impact of elevated ocean CO2 concentrations: lessons from animal physiology and earth history. Journal of Oceanography 60:705-718.

Powell, S. 2002. Australia. Progress Report on Cetacean Research, January 2001 to December 2001, with statistical data for the calendar year 2001.

Powell, S. 2003. Australia. Progress Report on Cetacean Research, January 2002 to December 2002, with statistical data for the calendar year 2002.

Powell, S. and M. Rafic. 2001. Australia. Progress Report on Cetacean Research, January 2000 to December 2000, with statistical data for the calendar year 2000.

Preen, T. 1999. Dugongs, boats, dolphins and turtles in the Townsville-Cardwell region and recommendations for a boat traffic management plan for the Hinchinbrook Dugong Protection Area. GBRMPA Research Publication No. 67. 48p.

Preston, G. 1997. Review of Management Regimes for coastal and oceanic resources in Pacific Island countries. SPREP, Apia, Samoa.

Pretes, M. and E. Petersen. 2004. Rethinking fisheries policy in the Pacific. Marine Policy 28:297-309.

Pridell, D. and R. Wheeler. 1998. Hematology and blood chemistry of a Bryde's whale, Balaenoptera edeni, entrapped in the Manning River, New South Wales, Australia. Ref?

Proctor, D. and L. V. Fleming (eds). 1999. Biodiversity: the UK overseas territories. Peterborough, Joint Nature Conservation Committee. 131p.

Purves, M. G., D. J. Agnew, E. Balguerias, C. A. Moreno and B. Watkins. 2004. Killer whale (Orcinus orca) and sperm whale (Physeter macrocephalus) interactions with longline vessels in the patagonian toothfish fishery at South Georgia, South Atlantic. CCAMLR Science 11:111-126.

Ram-Bidesi, V. 2004. Sustainable use of marine resources: lessons from the Pacific Islands. UNU Global Seminar – 5th Shimane Session "Oceans: Interaction between man and maritime environments", 2-5 August 2004, The University of Shimane, Japan.

Rancurel, P. 1973. The strandings of sea mammals in the South-west Pacific in 1972. South Pacific Bulletin 23(4):1-21.

Randall, R. H., R. T. Tsuda, R. S Jones, M. J. Gawel, J. A. Chase and R. Rechebie. 1975. Marine Biological survey of the Cocos Barrier Reefs and Enclosed lagoon. University of Guam Marine Laboratory Technical Report 17.

Read, A. J., P. Drinker and S. Northridge. 2006. Bycatch of Marine Mammals in U.S. and Global Fisheries. Conservation Biology 20(1):163–169.

Read, T. 2002. Navigating a new course – stories in community-based conservation in the pacific islands. UNDP, New York, USA.

Reese, E. S. 1984. "Mammals of the Enewetak atoll" in The Natural History of Enewetak Atoll, vol. 2, Biogeography and Systematics. Eds. D. M. Devaney et al., United States Department of Energy, DOE/EV/00703-T1-vol. 2, Office of Health and Environmental Research, Oak Ridge, Tennessee, USA.

Reeves, E. 2006. Tuvalu cultural survey – waiting to be sent.

Reeves, R. R., S. Leatherwood, G. S. Stone and L. G. Eldredge. 1999. Marine Mammals in the Area served by the South Pacific regional environment programme (SPREP). South Pacific Regional Environment Programme (SPREP), Apia, Samoa.

Reeves, R. R., B. D. Smith, E. A. Crespo and G. Notarbartolo di Sciara (compilers). 2003. Dolphins, whales and Porpoises: 202-2010 Conservation Action Plan for the World's Cetaceans. IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. xi + 139pp.

Reijnders, P. J. H., G. P. Donovan, A. Aguilar and A. Bjoerge. 1999. Report of the workshop on chemical pollution and cetaceans. Journal of Cetacean Research and Management supplement I:1-42.

Reilly, S. B. and V. G. Thayer. 1990. Blue whale (Balaenoptera musculus) distribution in the eastern tropical Pacific. Marine Mammal Science 6(4):265-277.

Reynolds, J. E. and S. A. Rommel (eds). 1999. Biology of Marine Mammals. Melbourne University Press, Australia.

Rice, D. W. 1977. Sperm whales in the equatorial eastern Pacific: population size and social organisation. Report of the International Whaling Commission 27: 333-336.

Rice, D. W. 1977. Bryde's whales in the equatorial eastern Pacific. Report of the International Whaling Commission 27:321-324.

Rice, D. W. 1998. Marine mammals of the world: Systematics and distribution. Special Publication No. 4, Society of Marine Mammalogy, Lawrence, Kansas.

Richards, A. H. 1994. Problems in drift-net fisheries in the South Pacific. Marine Pollution Bulletin 29:106-111.

Richardson, W.J., C. R. Greene, C. I. Mame, and D. H. Thomson. 1995. Marine Mammals and Noise. Academic Press Inc, San Diego, USA.

Robineau, D. and P. Rancurel. 1981. On 2 specimens of the genus Kogia (Cetacea, Physeteridae) from New Caledonia. Journal of Mammalian Biology 46(1):56-58. (French version 1980)

Robinson, R. A., J. A. Learmonth, A. M. Hutson, C. D. Macleod, T. H. Sparks, D. I. Leech, G. J. Pierce, M. M. Rehfisch and H. Q. P. Crick. 2005. Climate change and migratory species. British Trust for Ornithology Report 414. 306p.

Robinson, W. L. and V. E. Noshkin. 1998). Radionuclide characterization and associated dose from long-lived radionuclides in close-in fallout delivered to the marine environment at Bikini and Enewetak atolls. Pre-print from The Science of the Total Environment Conference Proceedings for International Symposium on Marine Pollution, 5-9 October, Monte-Carlo, Principality of Monaco.

Rock, T. 1993. Killer whales of the tropics. Pacific Daily News, 12 April 1993.

Rosenbaum, H. C., Y. Razafindrakoto, L. Florez-Gonzalez, J. Capella, C. Garrigue, J. Greaves, C. Jenner, M-N. Jenner, M.R. Robles-saavedra, R. DeSalle and C.S. Baker. 1998. Variation and geographic structure of humpback whale mitochondrial DNA from the wintering grounds of Areas III, IV, V and VI in the Southern Hemisphere. IWC Scientific Document SC/50/CAWS35.

Ross, G. 2006. A review of the conservation status of Australia's smaller whales and dolphins. Australian Government. 124p.

Ross, G., F. Guilland, N. Gales, R. Brownell and R. Reeves. 2003. A report of a fact-finding visit to the Solomon Islands. Report by the IUCN Species Survival Commission – Cetacean Specialist Group. 9p

Rougerie, F. and R. Rancher. 1994. The Polynesian South Ocean: Features and circulation. Marine Pollution Bulletin 29:14-25.

Rowles, T., D. Ketten, R. Ewing, J. Whaley, A. Bater, and R. Gentry. 2000. Mass stranding of multiple cetacean species in the Bahamas on March 15-17, 2000. IWC Scientific Document SC/52/E28.

Samoa Stranding Database. 2006. Division of Environment and Conservation, Ministry of Natural Resources and Environment, Samoa.

Samuels, A., L. Bejder, R. Constantine and S. Heinrich. 2003. A review of swimming with wild cetaceans with a special focus on the Southern Hemisphere In Gales, N., M. Hindell and R. Kirkwood (eds.), Marine Mammals and Humans: Towards a Sustainable Balance. CSIRO Publishing, Collingwood, Australia.

Samuels, A., L. Bejder and S. Heinrich. 2000. A review of the literature pertaining to swimming with wild dolphins. Prepared for the Marine Mammal Commission, Bethesda, Maryland. Contract No. T74463123. 58p.

Scarpaci, C., P. J. Corkeron and N. Dayanthi. 2004. No detectable improvement by "swim-with-dolphin" operators in Port Phillip Bay, Victoria, Australia. Journal of Tourism in Marine Environments (in press) – need full ref.

Scarpaci, C., N. Dayanthi, and P. J. Corkeron. 2003. Compliance with regulations by "swim-with-dolphins" operations in Port Phillip Bay, Victoria, Australia. Environmental Management 31(3):342-347.

Schlais, J. F. 1984. Thieving dolphins: a growing problem in Hawaii's fisheries. Sea Frontiers 30(5):293-298.

Schneider, K. 1999. Behaviour and Ecology of Bottlenose Dolphins in Doubtful Sound, Fiordland, New Zealand. PhD thesis. University of Otago, Dunedin, New Zealand.

Scott, M. D. and S. J. Chivers. 1990. Distribution and herd structure of bottlenose dolphins in the eastern tropical Pacific Ocean in The Bottlenose Dolphin by S. Leatherwood

and R. R. Reeves (eds.), Academic Press, San Diego, California. 553p.

Sea Around Us. 2006. A global database on marine fisheries and ecosystems. World Wide Web site: www.seaaroundus.org. Fisheries Centre, University of British Columbia, Vancouver (British Columbia, Canada) [Visited 25 June 2006]

Sear, C., M. Hulme, N. Adger, and K. Brown. 2001. The impacts of climate change on the UK Overseas Territories. Natural Resources Institute, Chatham Maritime, Kent/Tyndall Centre for Climate Change Research, Norwich.

Sharples, P., K. Bailey, P. Williams and A. Allan. 1991. Report of Observer Activity on board JAMARC Driftnet Vessel R. V. Shinhoyo Maru Fishing for Albacore in the South Pacific Ocean, 22 November-23 December 1989 and 10 February-3 March 1990. Tuna and Billfish Assessment Programme Technical Report No. 24. South Pacific Commission, Noumea, New Caledonia. 24p.

Sherley, G. 2000. Invasive Species in the Pacific: A Technical Review and Draft Regional Strategy. SPREP, Apia.

Shimada, H. and L. A. Pastene. 1995. Report of a sighting survey off Solomon Islands with comments on Bryde's whale distribution. Report of the International Whaling Commission 45:413-418.

Simmonds, M., S. Dolman, and L. Weilgart. 2004. Oceans of Noise. Whale and Dolphin Conservation Society, UK 169p.

Simmonds, M. and S. Isaac. 2006. Climate change and marine apex predators: some warning signals in UNEP climate change booklet.

Simmonds, M. and S. Isaac. In press. The impacts of climate change on marine mammals: early signs of significant problems. Oryx Vol 41.

Slooten, E., S. Dawson, W. Rayment and S. Childerhouse. 2006. A new abundance estimate for Maui's dolphin: What does it mean for managing this critically endangered species? Biological Conservation 128:576-581.

Slooten, E., D. Fletcher and B. L. Taylor. 2000. Accounting for uncertainty in risk assessment: case study of Hector's dolphin mortality due to gillnet entanglement. Conservation Biology 14:1264-1270.

Slooten, E. and F. Lad. 1991. Population biology and conservation of Hector's dolphin. Canadian Journal of Zoology 69:1701-1707.

Smith, B. 2001. Review of the Conservation Status of Marine Mammal Species in New South Wales. Report to the NSW Scientific Committee. 119p.

Space, J. C. and T. Flynn. 2002. Report to the Government of the Cook Islands on Invasive Plant Species of Environmental Concern. U.S.D.A. Forest Service, Pacific Southwest Research Station, Institute of Pacific Islands Forestry, Honolulu, Hawai'i, USA. 148p.

SPREP (Secretariat of the Pacific Regional Environment Programme). 1992. The Pacific Way: Pacific island developing countries report to the United Nations Conference on Environment and Development. SPREP, Apia, Samoa.

SPREP (Secretariat of the Pacific Regional Environment Programme). 1993. Cook Islands: National Environmental Management Strategies. SPREP, Apia, Western Samoa.

SPREP (South Pacific Regional Environment Programme). 1993. Micronesia (Federated States) National environment management strategy. SPREP, Apia, Western Samoa.

SPREP (South Pacific Regional Environment Programme). 1999. Whales are not big fish. (reprinted from Islands Business www.islandsbusiness.com/fib/fbcontents/htm)

SPREP (South Pacific Regional Environment Programme). 2002. Annual Report 2001. SPREP, Apia, Samoa.

SPREP (South Pacific Regional Environment Programme). 2002. Cetacean interactions with commercial longline fisheries in the South Pacific Region: Approaches to mitigation. SPREP Technical Workshop 11-15 November 2002, Apia, Samoa

SPREP (Secretariat of the Pacific Regional Environment Programme). 2004. Action strategy for nature conservation in the Pacific Islands region: 2003-2007. SPREP, Apia, Samoa.

SPREP (Secretariat of the Pacific Regional Environment Programme). 2004. Pacific Islands Environment Outlook 2004 (draft).

SPREP (Secretariat of the Pacific Regional Environment Programme). 2005. Strategic programmes: 2004-2013. SPREP. Apia, Samoa.

SPREP. 2006. Pacific Island Countries Sign New Agreement to Conserve Whales and Dolphins and their Habitats. SPREP press release September 15th 2006. http://www.sprep.org/article/news_detail.asp?id=312

SPREP. 2006. Accessed on November 5th 2006 at www.sprep.org

SPREP/AusAID. 1999. Assessment of persistent organic pollutant in Pacific island countries. SPREP/AusAID.

SPREP/ESCAP. 1996. Report to the United Nations Commission on Sustainable Development on Activities to Implement the Barbados Programme of Action in the Pacific Region. SPREP/ESCAP.

SPWRC (South Pacific Whale Research Consortium). 2002. Report of the Annual Meeting of the South Pacific Whale Research Consortium, 24-28 February 2002, Auckland, New Zealand.

SPWRC (South Pacific Whale Research Consortium). 2003. Report of the Annual Meeting of the South Pacific Whale Research Consortium, 13-17 February 2003, Auckland, New Zealand.

SPWRC (South Pacific Whale Research Consortium). 2004. Report of the fifth annual meeting of the South Pacific Whale Research Consortium, 2-6 April 2004, Byron Bay, NSW, Australia.

SPWRC (South Pacific Whale Research Consortium). 2005. Report of the Annual Meeting of the South Pacific Whale Research Consortium, Auckland, New Zealand: 11-13 March 2005. IWC Scientific Document SC/57/SH9.

Stacey, P. J. and P. W. Arnold. 1999. Orcaella brevirostris. Mammalian Species 616:1-8.

Stachowitsch, M., E. C. M. Parsons and N. A. Rose. 2004. State of the Environment Report (SOCER) – Pacific Ocean. IWC Scientific Document SC/56/E29.

Stafford, K. M., S. L. Nieukirk and C. G. Fox. 2001. Geographic and seasonal variation of Blue Whale calls in the North Pacific. Journal of Cetacean Research and Management 3:65-76.

Stamer, J. 2002. Marine Resources of the Mariana Islands: an Annotated Bibliography. Coastal Resource Management Office, Saipan,Commonwealth of the Northern Mariana Islands, USA.

Stern, S.J. 2002. Migration and movement patterns In Encyclopedia of Marine Mammals by Perrin, W.F., B. Würsig and J. G. Thewissen (eds.). Academic Press, San Diego.

Stevick, P. T., A. Aguayo, J. Allen, I. C. Avila, J. Capella, C. Castro, K. Chater, L. Dalla Rosa, M. H. Engel, F. Felix, L. Florez-Gonzalez, A. Freitas, B. Haase, M. Llanno, L. Lodi, E. Munoz, C. Olavarria, E. Secchi, M. Scheidat and S. Sicilliano. 2004. Migrations of individually identified humpback whales between the Antarctic Peninsula and South America. Journal of Cetacean Research Management 6(2):109-113.

Stinson, D.W. 1994. Birds and mammals recorded from the Marianas Islands. Nat. Hist. Research, Special Issue 1:333-344.

Stockin, K. A. and E. A. Burgess. 2005. Opportunistic feeding of an adult humpback whale (Megaptera novaeangliae) migrating along the coast of Southeastern Queensland, Australia. Aquatic Mammals 31(1):120-123.

Stone, G., M. Donoghue, and S. Leatherwood. 1992. South Pacific marine mammal research plan. Scientific Information Bulletin 17(1):137-140.

Stone, G., D. Obura, S. Bailey, A. Yoshinaga, C. Holloway, R. Barrel and S. Mangubhai. 2001. Marine biological surveys of the Phoenix Islands. Summary of Expedition Conducted from June 24 – July 15, 2000. New England Aquarium. 107p.

Stone, G. and A. Yoshinaga. 2000. Hector's dolphin (Cephalorhynchus hectori) calf mortalities may indicate new risks from boat traffic and habituation. Pacific Conservation Biology 6:162-171.

Strandings database QLD – Indo-Pacific hb d killed by propeller and washed ashore.

Sylvestre, J-P. 1988. On a specimen of pygmy sperm whale Kogia breviceps (Blainville, 1838) from New Caledonia. Aquatic Mammals 14.2:76-77.

Tachibana, M., K. Watanabe, S. Kim, Y. Omata, K. Murata, T. Hammond, and M. Watarai. 2006. Antibodies to Brucella spp. in Pacific Bottlenose Dolphins from the Solomon Islands. Journal of Wildlife Diseases 42(2).

Taipei Times. 2005. Solomon Islands say dolphin export ban in place. Tuesday November 15, 2005. Available at: http://www.taipeitimes.com/News/world/archives/2005/11/15/2003280220

Takekawa, D. 1996. Hunting method and the ecological knowledge of dolphins among the Fanalei villagers of Malaita, Solomon Islands. SPC Traditional Marine Resource Management and Knowledge Information Bulletin #12.

Takekawa, D. 1996. Ecological knowledge of Fanalei villagers about dolphins: dolphin hunting in Solomon

Islands 1. Senri Ethnological Studies Osaka: National Museum of Ethnology 42:55-65.

Takekawa, D. 1996. The method of dolphin hunting and the distribution of teeth and meat: dolphin hunting in Solomon Islands 2. Senri Ethnological Studies Osaka: National Museum of Ethnology 42:67-80.

Taylor, B., J. Barlow, R. Pitman, L. Ballance, T. Klinger, D. DeMaster, J. Hildebrand, J. Urban, D. Palacios and J. Mead. 2004. A call for research to assess risk of acoustic impact on beaked whale populations. IWC Scientific Document SC/56/E36.

TCSP (Tourism Council of the South Pacific). 1995. Tonga Tourism Sector Review. Report prepared by Peter Kendall, Touche Ross Management Consultants for the Tourism Council of the South Pacific, Suva, Fiji.

TCSP (Tourism Council of the South Pacific). 1997. Economic Impact Analysis of Tourism in Tonga. Report prepared by Deloitte & Touche for the Tourism Council of the South Pacific, Suva, Fiji.

Tenakanai, C. and K. R. Uwate. 1984. Porpoise/Dolphin interference in Fisheries: Considerations for Kiribati. Report to the Ministry of Natural Resources Development, Republic of Kiribati. Prepared by Pacific Islands Development Programme, East-West Center, Honolulu, Hawaii. 21p.

Thaman, R. 2002. Threats to Pacific Island biodiversity and biodiversity conservation in the Pacific Islands. Development Bulletin 58:23-27.

Thaman, R. R. and D. C. Hassall. 1998. Republic of Nauru: National Environmental Management Strategy and National Environmental Action Plan. SPREP. Apia, Western Samoa.

Thistlethwaite, R., D. Sheppard and, N. Precott. 1993. The Kingdom of Tonga: Action strategy for managing the environment. SPREP, Apia, Western Samoa.

Toloa, F. 2000. Tokelau Environmental Management Strategy: action strategy for strengthening management and sustainable development (Tokelau 2000). SPREP, Apia, Western Samoa.

Tormosov, D. D., Y. A. Mikhaliev, P. B. Best, V. A. Zemsky, K. Sekiguchi, and R. L. Brownell Jr. 1998. Soviet catches of southern right whales Eubalaena australis, 1951-1971, Biological data and conservation implications. Biological Conservation 86:185-197.

Tortell, P. and S. Tarte. 2004. Terminal evaluation of the Oceanic Fisheries Management Component (RAS/98/G32). SPREP, Apia, Samoa.

Townsend, C. H. 1931. Where the nineteenth century whaler made his catch. Bulletin? New York Zoological Society 34(6):173-179.

Townsend, C. H. 1935. The distribution of certain whales as shown by logbook records of American whaleships. Zoologica 19:1-50.

Tregenza, N., N. Aguilar, M. Carrillo, I. Delgado and F. Díaz. 2002. Collisions between fast ferries and whales in the Canary Islands: observational data and theoretical limits. IWC Scientific Document SC/54/BC4.

Trianni, M. S. and C. C. Kessler. 2002. Incidence and strandings of the Spinner Dolphin, Stenella longirostris, in Saipan Lagoon. Micronesica 34:249-260.

Trites, A. W., V. Christensen and D. Pauly. 1997. Competition Between Fisheries and Marine Mammals for Prey and Primary Production in the Pacific Ocean. Journal of Northwest Atlantic Fisheries Science 22:173-187.

Twining-Ward, L. 2005. Planning and Management of Sustainable Tourism. Presentation at the "Sustainable Tourism Development Workshop" held in Nadi, Fiji, June 7th 2005.

Twiss, J. R. and R. R. Reeves (eds). 1999. Conservation and Management of Marine Mammals. Melbourne University Press, Australia.

UNDP (United Nations Development Programme). 1999. Pacific Human Development Report, United Nations Development Programme.

UNEP (United Nations Enivronment Programme). 2004. Environmental Indicators - South Pacific. United Nations Environment Programme/Regional Resource Centre for Asia and the Pacific. 78p.

UNEP (United Nations Enivronment Programme). 2006. Pacific Islands Mangroves in a Changing Climate and Rising Sea. UNEP Regional Seas Reports and Studies No. 179. 70p.

UNEP/CMS (United Nations Enivronment Programme / Convention on Migratory Species). 2006. Wildlife watching and tourism: A study of the benefits and risks of a fast growing tourism activity and its impacts on species. UNEP/CMS Secretariat, Bonn, Germany. 68p.

UNEP-WCMC (United Nations Enivronment Programme – World Conservation Monitoring Centre). . 2003. Checklist of mammals listed in the CITES appendices and in EC regulation 338/97. 6th Edition. JNCC Report No. 342.

U.S. Department of Defense. 2004. Missile Defense Agency Mobile Launch Platform (MLP) – Environmental Assessment. 170p.

Valentine, P. S., A. Birtles, M. Curnock, P. Arnold and A. Dunstan. 2004. Getting closer to whales – passenger expectations and experiences and the management of swim with dwarf minke whale interactions in the Great Barrier Reef. Tourism Management 25(6):647-655

Van Bressem, M. F. and K. Van Waerebeek. 1996. Epidemiology of poxvirus in small cetaceans from the Eastern South Pacific. Marine Mammal Science 12(3):371-382.

Van Bressem, M. F., K. Van Waerebeek and J. A. Raga. 1999. A review of virus infections of cetaceans and the potential impact of morbilliviruses, poxviruses and papillomaviruses on host population dynamics. Dis Aquatic Organ 38(1):53-65.

Van Bressem, M. F., K. Van Waerebeek, J. A. Raga, J. Godfroid, S. D. Brew and A. P. MacMillan. 2001. Serological evidence of Brucella species infection in odontocetes from the south Pacific and the Mediterranean. Veterinary Record 148(21):657-661.

Van der Velde, M., M. Vanclooster, V. Snow, S. Green, V. Manu, B. Clothier, V. Minoneti, G. Pochet and C. Dijssel. 2003. Fertilisers and the contamination risk to groundwater and the lagoon of Tongatapu Island, Kingdom of Tonga. (Carried out under the EU and NZ Aid funded CROPPRO – project www.alterra.dlo.nl/websites/croppro/default.htm)

Van Parijs, S. M. and P. J. Corkeron. 2001. Evidence for signature whistle production by Pacific humpback dolphin, Sousa chinensis. Marine Mammal Science 17(4):944-948.

Van Pel, H. 1961. A guide to South Pacific Fisheries. South Pacific Commission, Noumea, New Caledonia. 78p.

Van Waerebeek, K., A. N. Baker, F. Félix, J. Gedamke, M. Iñiguez, G. P. Sanino, E. Secchi, D. Sutaria, A. van Helden and Y. Wang. 2006. Vessel collisions with small cetaceans worldwide and with large whales in the Southern Hemisphere; building a standardized database. IWC Scientific Document SC/58/BC6.

Van Waerebeek, K., R. Leaper, A. N. Baker, V. Papastavrou, and D. Thiele. 2004. Odontocetes of the Southern Ocean Sanctuary. IWC Scientific Document SC/56/SOS1.

Vang, L. 2002. Distribution, abundance and biology of Group V humpback whales Megaptera novaeangliae: A review. Conservation management report, Environmental Protection Agency, Queensland government. 22p.

Visser, I. N. 1999a. Benthic foraging on stingrays by killer whales (Orcinus orca) in New Zealand waters. Marine Mammal Science 15(1):220-226.

Visser, I. N. 1999b. A summary of interactions between orca (Orcinus orca) and other cetaceans in New Zealand waters. New Zealand Natural Sciences 24: 101-112.

Visser, I. N. 1999c. Propeller scars on and known home range of two orca (Orcinus orca) in New Zealand waters. New Zealand Journal of Marine and Freshwater Research 33:635-642.

Visser, I. N. 2000. Killer whale (Orcinus orca) interactions with longlines fisheries in New Zealand waters. Aquatic mammals 26:241-252.

Visser, I. N. 2002. Kimbe Bay Preliminary Cetacean Survey Report. Unpublished report submitted to Walindi Plantation Resort and Mahonia na Dari Conservation and Research Centre, Papua New Guinea.

Visser, I. 2003. Kimbe Bay Second Marine Mammal Rapid Ecological Assessment (REA) April 2003, The Nature Conservancy: 14.

Visser, I. N. and F. Bonoccorso. 2003. New observations and a review of killer whale (Orcinus orca) sightings in Papua New Guinea waters. Aquatic Mammals 29(1):150-172.

Visser, I. N., D. Fertl, and T. Pusser. 2004. Melanistic southern right-whale dolphins (Lissodelphis peronii) off Kaikoura, New Zealand, with records of other anomalously all-black cetaceans. New Zealand Journal of Marine and Freshwater Research 38:833-836.

Wada, S. 1981. Japanese whaling and whale sighting in the North Pacific 1979 season. Report of the International Whaling Commission 31:783-790.

Wade, P. R. and T. Gerrodette. 1993. Estimates of cetacean abundance and distribution in the eastern tropical Pacific. Report of the International Whaling Commission 43: 477-493.

Walsh, S. A. and D. A. Paton. 2003. Final Report on the survey of Whales and Dolphins in Samoa. September 2003. 68p.

Watanabe, Y. 1994. The Japanese large-mesh driftnet fishery in the Pacific Ocean. Report of the International Whaling Commission (Special Issue 15): 385-392.

WDCS (Whale and Dolphin Conservation Society). 2006. Driven by Demand - Dolphin drive hunts in Japan and the involvement of the aquarium industry. WDCS, Chipenham, U.K.

Webb, B. F. 1973. Dolphin sightings, Tasman Bay to Cook Strait, New Zealand, September 1968-June 1969. New Zealand Journal of Marine and Freshwater Research 7(4):399-405.

Weinrich, M. 2005. A review of collisions between whales and whale watch boats. IWC Scientific Document SC/57/WW8.

Weller, D. W., Y. V. Ivashchenko, G. A. Tsidulko, A. M. Burdin and R.L. Brownell, Jr. 2002. Influence of seismic surveys on western Grey Whales off Sakhalin Island, Russia in 2001. IWC Scientific Document SC/54/BRG14.

Whitehead, H. 1995. Status of Pacific Sperm whale stocks before modern whaling. Report of the International Whaling Commission 45:407-412.

Whitehead, H., M. Dillon, S. Dufault, L. Weilgart and J. Wright. 1998. Non-geographically based population structure of South Pacific sperm whales: dialects, fluke-markings and genetics. Journal of Animal Ecology 67(2):253-262.

Whitehead, H. and L. Rendall. 2004. Movements, habitat use and feeding success of cultural clans of South Pacific sperm whales. Journal of Animal Ecology 73:190-196.

Whitehead, H. and Weilgart, L. 1995. Marine mammal science, the U.S. Navy and academic freedom. Marine Mammal Science 11:260-263.

Wiles, G. J. 2005. A checklist of the birds and mammals of Micronesia. Micronesica 38(1):141-189.

Williams, J. A., S. M. Dawson and E. Slooten. 1993. The abundance and distribution of bottlenosed dolphins (Tursiops truncatus) in Doubtful Sound, New Zealand. Canadian Journal of Zoology 71:2080-2088.

Williams, P. G. 1996. An update of by-catch issues in the western and central Pacific Ocean tuna fisheries. Asia-Pacific Fisheries Commission (APFIC) Symposium on Environmental Aspects of Responsible Fisheries, Seoul, Korea, 15-18th October, 1996. 14p.

Wilson, B., R. J. Reid, K. Grellier, P. M. Thompson and P. S. Hammond. 2004. Considering the temporal when managing the spatial: a population range expansion impacts protected areas-based management for bottlenose dolphins. Animal Conservation 7:331-338.

Wilson, C. 1994. Kiribati: State of the Environment Report. SPREP, Apia, Western Samoa.

WPFMC (Western Pacific Fishery Management Council). 1987. Fishery Management Plan for the Pelagic Fisheries of the Western Pacific Region. Honolulu, HI, Western Pacific Fishery Management Council.

WPFMC (Western Pacific Fishery Management Council). 1995. Summary Review of the Pelagic Fisheries Management Plan. Honolulu, HI, Western Pacific Fisheries Management Council.

WPFMC (Western Pacific Fishery Management Council). 2003. Pelagic fisheries of the Western Pacific Region: 2001 Annual Report. Honolulu, Hawaii, Western Pacific Regional fishery Management Council, 1164 Bishop Street, Suite 1400, Honolulu HI 96813.

WPFMC (Western Pacific Fishery Management Council). 2004. Pelagic fisheries of the Western Pacific Region: 2002 Annual Report. Honolulu, Hawaii, Western Pacific Regional fishery Management Council, 1164 Bishop Street, Suite 1400, Honolulu HI 96813.

World Bank. 2000. Managing Change in Pacific Economies, Volume III, Managing the Use of the Ocean, Washington, D.C.

Wright, A. and D. Doulman. 1991. Drift-net fishing in the South Pacific: from controversy to management. Marine Policy 15:303-337.

Wright, D. J., B. T. Donahue and D. F. Naar. 2002. Seafloor mapping and GIS coordination at America's remotest national Marine Sanctuary (American Samoa) in Undersea with GIS by Wright, D. J. (ed.). ESRI Press, Redlands, California.

WWF (World Wildlife Fund). 2001. Marine resource management and conservation planning. Bismarck-Solomon Seas Ecoregions: Papua New Guinea Solomon Islands. 92p.

WWF (World Wildlife Fund). 2002. Mainstreaming nature conservation in the South Pacific – the ngo experience.

WWF (World Wildlife Fund). 2003. Bismarck Solomon Seas Ecoregion – A cradle of marine biodiversity. Ecoregional vision workshop report published by WWF South Pacific Programme. 25p.

Yablokov, A. V. 1994. Validity of whaling data. Nature 367:108.

Young, J. W. 2000. Do large whales have an impact on commercial fishing in the South Pacific Ocean? Journal of International Wildlife Law and Policy? 3(3):253-275.

Zann, L.P. 1992. The State of the Fiji's Marine Environment, National Environmental Management Project Report. TA No. 1206. Department of Town and Country Planning, Government of Fiji.

Zann, L. P. 1994. The status of coral reefs in south western Pacific islands. Marine Pollution Bulletin 29(1-3): 52-61