



CONVENTION ON MIGRATORY SPECIES

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THIRD MEETING OF THE SIGNATORIES TO THE
MEMORANDUM OF UNDERSTANDING FOR THE
CONSERVATION OF CETACEANS AND THEIR
HABITATS IN THE PACIFIC ISLANDS REGION
Noumea, New Caledonia, 8 September 2012
Agenda Item 4.2

ENDORSEMENT OF THE OCEANIA HUMPBACK WHALE RECOVERY PLAN (2013-2017)

(prepared by SPREP)

1. The Second Meeting of the Signatories to the Pacific Islands Cetacean MoU, Auckland, New Zealand, 28-29 July 2009, endorsed the discussion paper on the development of an Oceania Humpback whale recovery plan as tabled by the South Pacific Whale Research Consortium (SPWRC). The paper was also endorsed by 20th SPREP Meeting in the same year.
2. The development of the recovery plan was proposed as a joint coordinated undertaking between the SPWRC and SPREP involving input from a multidisciplinary recovery team.
3. The 2008 IUCN Red List update of threat listing for cetaceans moved humpback whales globally from “vulnerable” to “least concern”. However, an exception was made for the Oceania humpback population (as well as that in the Arabian Sea) which was re-classified from “vulnerable” to “endangered”. This decision was based on the fact that this humpback population is likely to have declined more than 70 per cent in the last three generations (since 1942), i.e. from the population size prior to whaling. While humpback whales in many parts of the world are showing signs of recovery from whaling, most of the small breeding populations in the South Pacific remain at extremely low levels with some (e.g. Fiji) still remaining vulnerable to local extinction. The Oceania humpback population is genetically and demographically isolated from adjacent breeding stocks and includes sub-stocks in Eastern Australia, New Caledonia, Tonga, Cook Islands and French Polynesia.
4. Humpback whales also underpin the economic benefits derived from the whale watching industry in many Pacific Island states, recently valued at more than USD \$21 million.
5. The Pacific Cetacean MoU action plan highlights objectives and actions that promote recovery of depleted cetacean stocks and reducing threats to them. The recovery plan will contribute to eight of the nine theme areas of the action plan, including capacity-building.

6. The general outline of steps undertaken in developing the recovery plan included the:
 - a) development of an issues and options concept paper by the Steering Group with input from a multidisciplinary recovery team. This paper was submitted to and endorsed by the Second Meeting of the Signatories to the Pacific Islands Cetacean MoU, Auckland, New Zealand, 28-29 July 2009, as mentioned above;
 - b) drafting of a recovery plan by Steering Group, with input from the recovery team;
 - c) circulation of a draft recovery plan to SPREP members for comments; and
 - d) finalization by the Steering Group.
 - e) Endorsement by the SPREP Meeting in 2011 with a recommendation of modifying Figure 2 to also reflect existing legislation.
7. The draft Oceania Humpback Whale Recovery Plan is attached as Annex 1. The figure to be inserted in order to finalize the document can be found in Annex 2.

Action requested:

The Signatories, and where appropriate other meeting participants, are requested to:

- Endorse the Oceania Humpback Whale Recovery Plan.



The Oceania Humpback Whale Recovery Plan

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I. ACKNOWLEDGEMENTS:

This document has been prepared by Olive Andrews on behalf of the Steering Group of the Oceania Humpback Whale Recovery Plan with the Discussion Paper and planning process lead by David Paton, Lui Bell and Sue Taii with the aid of funding provided by Pew Environment Group and IFAW.

The plan has been prepared using information from a wide range of sources. Much of the information in relation to the current knowledge on population structure, distribution, abundance and trends of humpback whales within the Oceania region contained in this document has been provided directly from a submission prepared by Simon Childerhouse, Jennifer Jackson, Scott Baker, Nick Gales, Philip Clapham and Robert Brownell (2008) IUCN Proposal for separate listing for Oceania sub-population of humpbacks.

Information on threats was collated by Kirsten Thompson, Mike Donoghue, Lui Bell and Sue Taii from the SPREP (in prep 2010) Pacific Islands Cetacean Report. Additional text and information was provided by Cara Miller, WDCS and presented in the 2007 report on the State of Knowledge of Cetacean Threats, Diversity and habitats in the Pacific Islands region.

Both the Australian Humpback Whale Recovery Plan (DEH 2005) compiled by Rochelle Constantine, Rob Harcourt & Natalie Patenaude, and the USA Recovery Plan for the Humpback Whale (NMFS 1991) have also provided invaluable examples through the document.

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II. EXECUTIVE SUMMARY

Oceania's humpback whales are of global conservation concern having recently been re-classified from "Threatened" to "Endangered" by the International Union for the Conservation of Nature (IUCN). Although humpback whales in many parts of the world are showing encouraging signs of recovery from past exploitation, the small breeding populations in the South Pacific Islands region remain vulnerable to extinction.

The Oceania Humpback Whale Recovery Plan (OHWRP) herein was written by the Humpback Whale Recovery Team at the request of the project partners, South Pacific Whale Research Consortium (SPWRC) and the Secretariat of the Pacific Regional Environment Program (SPREP). The Recovery Team includes experts on marine mammals from governments, academia and the private sector. The plan summarises current information on Oceania humpback whales, identifies problems that may interfere with recovery, and recommends research and management actions to restore and maintain Oceania humpbacks as a viable member of the ecosystem.

Oceania encompasses the ethno-cultural regions of Polynesia, Melanesia and Micronesia covering around 32 million km² of ocean including the combined territorial seas of 14 countries and 16 territories across the South and North Pacific Oceans, as well as the high seas connecting them. However, for the purpose of this plan, the planning boundaries are delineated by the known breeding range of the Southern Hemisphere humpback whale breeding stocks.

The Plan is organised into five major sections. Following a review of the Plans regional context and objectives, it provides details on the natural history and population status of Oceania humpback whales. A discussion on known and potential threats to the species and its habitats is followed by recommended recovery program. Appendices highlight valuable information that provide additional background and support the main text.

The initiative for an Oceania Humpback Whale Recovery Plan under the auspices of the SPWRC and SPREP partnership has been endorsed by parties to the CMS Memorandum of Understanding for the Conservation of Cetaceans and their Habitats in the Pacific Islands Region, and SPREP member governments as part of the implementation of their Whale and Dolphin Action Plan. This will provide a strong foundation and set of partnerships to raise funding, resources and build capacity to implement this plan over its 5 year duration.



III. INTRODUCTION


Humpback whales (*Megaptera novaeangliae*) are found throughout the oceans of the world. In the Southern Hemisphere humpback whales undertake an annual migration during the austral winter months from their Antarctic feeding areas in higher latitudes to their low latitude tropical breeding areas, including a number of locations within the Oceania region (Chittleborough 1965). The IWC has classified a number of populations of Southern Hemisphere humpback whales based on breeding stocks. Within the Oceania region, there are currently five identified humpback whale breeding stocks which annually migrate to the South West and South Central Pacific to breed in the warm waters of this region.

During the 19th and 20th centuries, humpback whale populations throughout the Southern Hemisphere were subjected to both shore-based and pelagic hunting throughout their migratory range including intensive illegal pelagic whaling in the Southern Ocean. This whaling activity resulted in a major collapse of whale populations throughout the Southern Hemisphere with approximately 95% of humpback whales being killed. The International Whaling Commission (IWC) imposed a ban on humpback whaling in the Southern Hemisphere in 1963 and an international moratorium on commercial whaling came into effect in 1985-86. Although there are some signs of recovery for a number of populations in the Southern Hemisphere (i.e. Eastern Australia), recent research has shown that humpback whale populations in the Oceania region are showing limited, if any sign of recovery and are still well below their pre whaling numbers within the region.

In 2008, the IUCN reviewed the conservation status of cetacean populations worldwide. As a consequence of this review, humpback whales have been down listed on a worldwide basis from “Threatened” to “Least Concern”. However, the Oceania sub-population of humpback whales has been re-classified from “Threatened” to “Endangered”. This is in recognition that, although humpback whales in many parts of the world are showing encouraging signs of recovery from whaling, most of the small breeding populations in the South Pacific remain at extremely low levels and some remain vulnerable to extinction.

Working in close consultation with Pacific Island countries, institutions and NGOs within the Oceania region, the South Pacific Whale Research Consortium (SPWRC) in partnership with SPREP has developed the Oceania Humpback Whale Recovery Plan (OHWRP) presented herein. This plan will use best practice recovery planning to bring together governments, researchers, NGOs and stakeholders in a coordinated effort to identify and address threats and issues for recovery of this species within the Oceania region.

In most cases the need for the development of a recovery plan is driven either by scientific evidence which identifies the requirement for additional measures needed to conserve a species or a population, or in other cases it may be a requirement under relevant legislation. In this case, the development of an OHWRP is the logical and necessary response to the change in the threat status for the Oceania populations of humpback whales.



Additionally it is important to note that:

- Humpback whales are also listed as a target species for Japan’s scientific whaling programme in the Southern Ocean (JARPA II), although Japan has voluntarily agreed not to hunt humpback whales in the Southern Ocean while negotiations were in progress on the future of the International Whaling Commission (IWC). Since the failure of these negotiations and early withdrawal of the Japanese whaling fleet in the 2010/11 season, it is assumed that humpback whales remain on the JARPA II programme. Concerns have been widely raised about the potential impact of the proposed JARPA II take of humpbacks on some of the vulnerable populations in the South Pacific.
- Humpback whales are an iconic species for the South Pacific; they also underpin the economic benefits derived from whale watching in many Pacific Island states. In Tonga, humpback whale watching was recently estimated to have grown by 20% per annum since 1998. Whale watching there now generates a total estimated tourist expenditure of almost USD\$ 1.2 million (IFAW, 2008a). A region-wide review of whale and dolphin watching tourism in 2008 found an increase of 45% per annum in the number of people going whale watching, and that this industry is now valued at more than USD \$21 million to the Pacific Islands region (IFAW, 2008b).
- Many cetacean species have cultural and spiritual significance and are important to the legends, traditions and heritage of many Pacific Island peoples.
- The Plan, which will be the region’s first cetacean recovery plan, will significantly contribute to 8 of the 9 key theme areas of the regional SPREP Whale and Dolphin Action Plan 2008-2012 (WDAP) and more than 18 of the WDAP’s key objectives. Capacity-building will also be enhanced in several Pacific Island states as part of the recovery planning process. In doing so, the OHWRP will significantly contribute to the implementation of the MoU on the Conservation of cetaceans and their habitats in the Pacific Islands Region concluded under the auspices of the Convention on Migratory Species (CMS) in partnership with SPREP.
- The implementation of the OHWRP will also complement and support the existing whale management policies that Pacific Island Countries and Territories (PICTs) have in place throughout the Oceania region. The OHWRP could be developed as an example or model of ‘Conservation Management Plans’ for improved cetacean management under the auspices of the International Whaling Commission.


A. Vision Statement

Promote the conservation and recovery of Oceania’s humpback whales.

B. Objectives

The objectives of this plan are to promote:

1. The recovery of populations of humpback whales utilising waters of the Oceania region to the point at which these populations can be considered at very low or no risk from human impacts;

- 
2. The recovery of the distribution and abundance of humpback whales utilising the Oceania region to their pre-exploitation levels;
 3. Increased public awareness and Pacific Island stewardship of humpback whales and their habitat requirements within the Oceania region;
 4. The sustainable development of whale watching tourism for the socio-economic benefit of Pacific Island communities.

Further it is recognised these efforts for humpback whales act as a flagship or model for raising awareness and support for wider marine mammal conservation in the Pacific Islands region.

C Measurable Goal

Given the history of intense exploitation, and the apparent slow rate of recovery, as recognized in the current listing by the IUCN as 'Endangered A1 ad' (IUCN Red List Criteria), the Plan considers that measurable criteria for monitoring its effectiveness would be an increase in absolute abundance of humpback whales in Oceania.

An increase in absolute abundance to 50% of the pre-exploitation abundance and/or a doubling of abundance of Oceania humpback whales within 10 years would be evidence of robust recovery.

D Duration of the Plan

The life of the Plan spans 5 years from 2011 when it is endorsed by members at the SPREP annual meeting, through to 2016 as this time frame is perceived feasible and achievable by stakeholders. In addition it will correspond with the time frame of the next SPREP Whale and Dolphin Action Plan 2012 - 2016.

E Geographic Boundaries for the OHWRP

Although the Oceania region of the south west and South Central Pacific includes a total of 14 countries (Australia, Fiji, Kiribati, Marshall Islands, Federated States of Micronesia, Nauru, New Zealand, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu) and 16 dependencies or territories (American Samoa, Ashmore and Cartier Islands, Cook Islands, Coral Sea Islands, Easter Island, French Polynesia, Guam, Hawaii, New Caledonia, Rotuma, Niue, Norfolk Island, Northern Mariana Islands, Pitcairn Islands, Tokelau and Wallis and Futuna) (Wikipedia, 2009), the primary focus of this plan will be the known breeding range and migratory corridors for breeding stocks E (ii & iii) and F (i & ii) within the region (Fig 1).

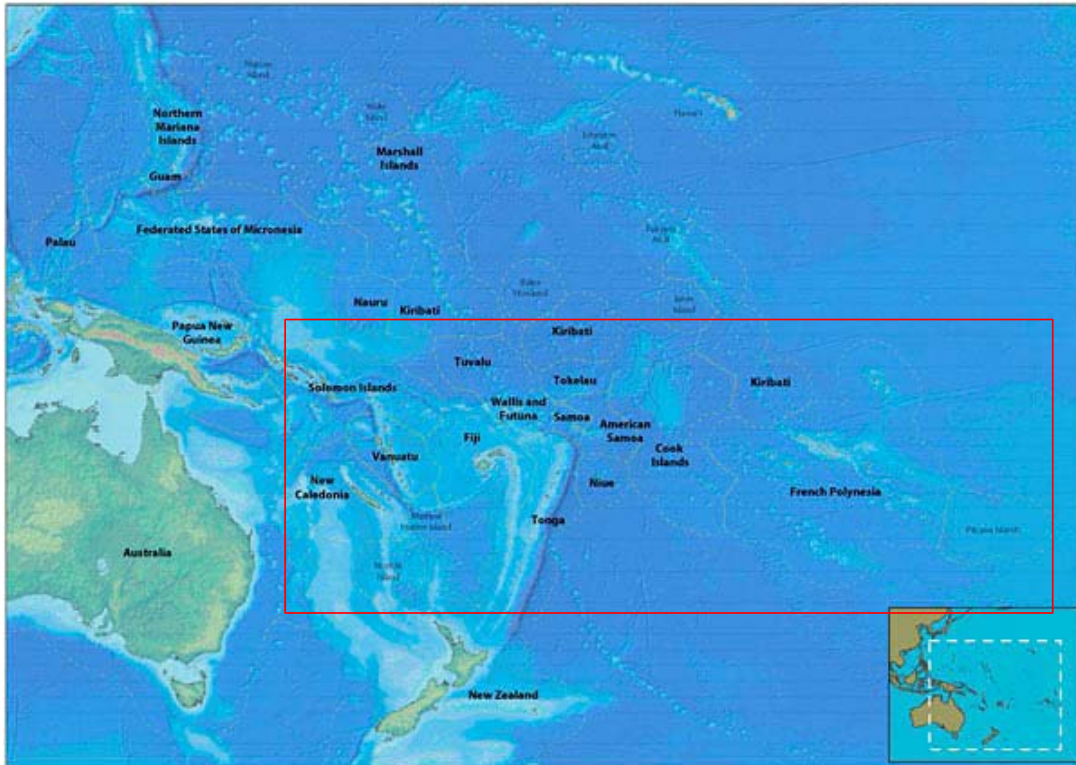


Figure 1 Oceania Humpback Whale Recovery Plan Planning Boundary.


The Oceania sub-population of humpback whales are delineated by their breeding range, with approximate boundaries in the west at 160°E (between Australia and New Caledonia), in the east at 120°W (between French Polynesia and South America), in the north at the equator at 0°S, and in the south to approximately 30°S. Therefore the OHWRP is proposed to cover the Exclusive Economic Zones (EEZ) and high seas that fall within the breeding range of the Oceania sub-population of humpback whales. See Figure 1.

The boundaries of the Plan therefore includes the following 17 Pacific Island countries and territories: American Samoa, Cook Islands, Fiji, French Polynesia (France), Republic of Kiribati, New Caledonia (France), Nauru, Niue, Norfolk Island (Australia), Pitcairn Islands (UK), Samoa, Solomon Islands, Tokelau (NZ), Tonga, Tuvalu, Vanuatu, Wallis and Futuna (France).

F. Existing Cetacean Conservation Mechanisms within the Region

1. SPREP Regional Whale and Dolphin Action Plan

SPREP is responsible for the development and implementation of the Whale and Dolphin Action Plan 2008-2012, developed in consultation with its members as part of the regional Marine Species Programme. This is the third such regional plan and the first regional cetacean action planning effort in the world and is the result of a progression in research and management of cetaceans throughout the Pacific Island Region over the last decade. The Whale and Dolphin Action Plan (WDAP) was adopted by SPREP members, to provide a



structured collaborative effort to conserve cetaceans within the Pacific Islands region through research, monitoring, education and management.

This Action Plan has also been adopted, with minor additions, as the Action Plan for the Memorandum of Understanding (MoU) for the Conservation of Cetaceans and Their Habitats in the Pacific Island Region, concluded under the auspices of CMS in partnership with SPREP. This MoU has 14 signatory states of which 13 are SPREP member countries.

The goal of the regional whale and dolphin action plan 2008-2012 is: 'To conserve whales and dolphins and their habitats for the peoples of the Pacific Islands region'. This goal is to be achieved through the following nine themes:

- National, Regional and International Collaboration and Cooperation.
- Threat Reduction.
- Ecosystem/Habitat Protection.
- Capacity Building.
- Education and Awareness.
- Cultural Significance and Value.
- Legislation and Policy.
- Research and Monitoring.
- Whale and Dolphin-based Tourism.

The WDAP identifies a number of threats to cetaceans within the Pacific Islands region and through its endorsement have agreed to address them.

2. Convention on Migratory Species of Wild Animals (CMS)

The Convention on Migratory Species (the Bonn Convention) provides for the conservation of migratory species that regularly and predictably cross national boundaries. Within the Pacific Islands region, the Cook Islands, Palau and Samoa, are members of CMS, as well as Australia, France and New Zealand. CMS encourages its members (and non-member Range States) to develop collaborative arrangements for migratory species.

Migratory species threatened with extinction are listed on Appendix I of the Convention. CMS Parties strive towards strictly protecting these animals, conserving or restoring the places where they live, mitigating obstacles to migration and controlling other factors that might endanger them. Besides establishing obligations for each State joining the Convention, CMS promotes concerted action among the Range States of many of these species. Migratory species that need or would significantly benefit from international co-operation are listed in Appendix II of the Convention. For this reason, the Convention encourages the Range States to conclude global or regional Agreements.

In this respect, CMS acts as a framework Convention. The Agreements may range from legally binding treaties (called Agreements) to less formal instruments, such as a Memorandum of Understanding (MoU), which is not legally-binding and can be adapted to the requirements of particular regions.

The CMS MoU for the Conservation of Cetaceans and their Habitats in the Pacific Islands Region took effect when it was opened for signature in September 2006. The Pacific Cetaceans MoU now has 14 Country and Territory signatories: Australia, Cook Is, Federated

States of Micronesia, Fiji, France (on behalf of New Caledonia, French Polynesia and Wallis and Futuna), New Zealand, Niue, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, United Kingdom (on behalf of Pitcairn Islands), and Vanuatu. The MoU also has 7 collaborating organisation signatories which include: CMS, WDCS, Whales Alive, SPREP, SPWRC, WWF and IFAW.

There have been two meetings of Signatories of the Pacific Islands Cetacean MoU. At the most recent meeting (July 2009), an Action Plan was adopted, based on the plan developed by SPREP for its Whale and Dolphin Action Plan 2008-2012. Further details can be found on the CMS website: <http://www.pacificcetaceans.org/>

3. National Sanctuaries

PICTs have recognised from the history of exploitation of humpback whales that they need to take urgent and coordinated action for the conservation and management of cetaceans in the region. Since 2001, the following PICTs have declared whale/ marine sanctuaries in their waters (Fig 2): American Samoa, Australia, Cook Islands, Fiji, French Polynesia, New Caledonia, Niue, Palau, Papua New Guinea, Samoa, and Vanuatu. In addition, the Tokelau Council (Fono) has endorsed the proposal to declare a whale sanctuary in Tokelau waters.

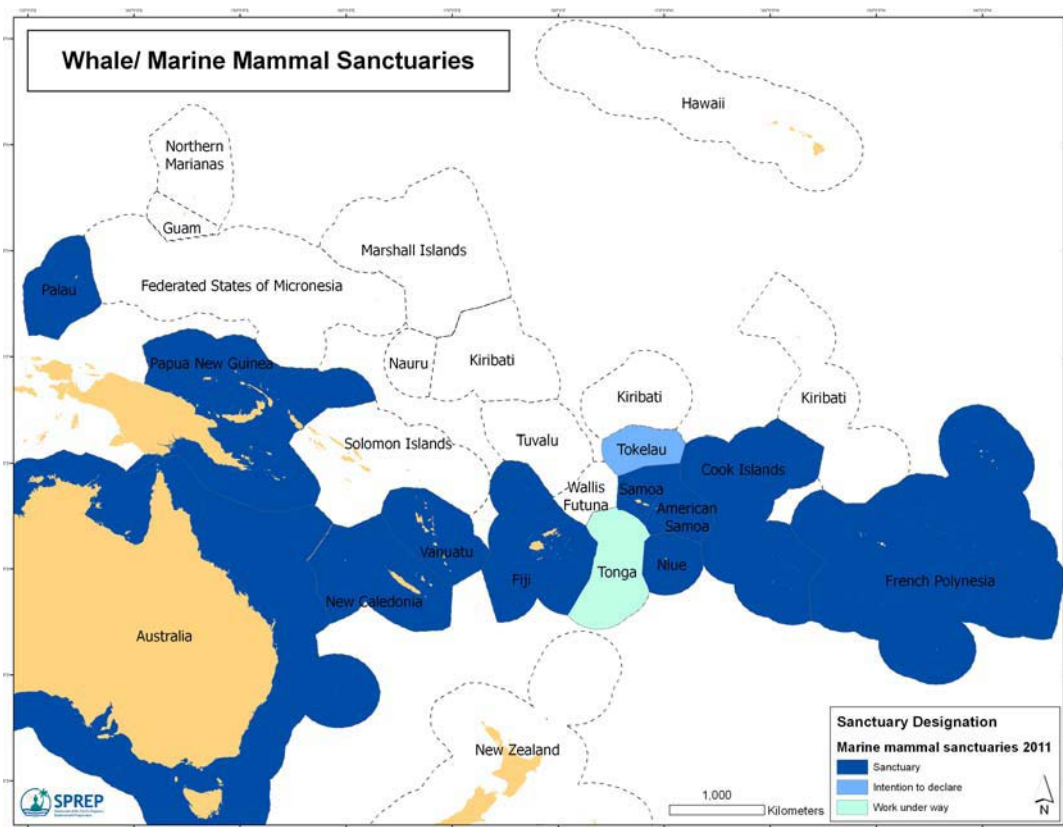



Figure 2: Whale/Marine Mammal Sanctuaries in the PIR

Though there has been significant progress made for the conservation of cetaceans at a national level with the establishment of these national whale sanctuaries or marine sanctuaries that include whales, and in fact many countries provide for the protection of



marine mammals under existing Fisheries or Environment legislation, gaps in protection measures for cetaceans exist in many SPREP member states (Andrews, 2006).

Among those countries that have national whale sanctuaries there appears to be limited management frameworks to underpin and add full conservation value to the sanctuary initiatives. Countries that have declared sanctuaries and/ or undergone the development of a management plan for their national whale sanctuary are limited in their ability to implement them, not due of lack of commitment or skill but due to lack of capacity and funds.

4. National Legislation

In most PICT's within the geographic boundary of the plan, thorough national legislation and policy frameworks exist concerning the protection of marine mammals. Many of the national resource management policies allow for ministerial discretion in the management and protection of marine species, including marine mammals. Correspondingly, opportunities for increasing national protection measures for marine mammals have been pursued in recent times and along with the national sanctuaries there has been the introduction of regulations, bills and other legislation detailing fines associated with harming marine mammals including the regulation of whale watching activities.

Of the 17 PICT's within the boundary of the plan, 10 have formally declared national whale sanctuaries, and 2 more are in progress. In addition, 12 out of 17 have legislated protection for marine mammals in their existing fisheries/and or environment laws. There remains 5 PICT's within the boundary of the plan that do not afford any protection to humpback or other whale species.

5. Participation in Global Species Conventions

Sixteen of the 17 PICTs within the boundary of the plan are members of the Convention on Biological Diversity (CBD) under which countries are obligated to aim to reach specific targets for marine protection including protecting threatened species such as Oceania humpback whales.

Conversely, there are 8 SPREP member countries that are members of the International Whaling Commission (IWC). Of the 4 of these that fall within the plan's boundary, all have a historical record of not supporting whale conservation initiatives at IWC commission meetings.

There are also 10 SPREP countries that are members of the Convention on International Trade in Endangered Species (CITES); 9 of these are within the plan's boundary. As humpback whales are listed on CITES Appendix II (detailed below in section IV.B) the convention provides an overarching protection mechanism for Oceania humpback whales.

IV. BACKGROUND

A. Species Description and Taxonomy

The humpback whale (*Megaptera novaeangliae*) is a large filter feeding, or baleen whale belonging to the taxonomic order Cetacea, family Balaenopteridae. Distinguishing anatomical features include tubercles, large hair follicles on the head, and pectoral fins of around 5m long, about 1/3 of the length of their body. The maximum recorded length for the species is 17.4m and females are most commonly 1.0-1.5m longer than males (Chittleborough 1965). The gestation is between 11-12 months and females give birth to one calf on average every 2.4 years (Clapham 2000). Humpback whales are black and white and have distinctive markings on the underside and trailing edge of their tail flukes that are used to identify individuals. Male humpback whales sing long and complex mating songs during their migration to and from and at their breeding grounds (Noad 2002). These songs are used by researchers to identify different populations of whales and understand relationships between these populations (Helweg et al. 1998).

B. Conservation Status

Oceania humpback whales (*Megaptera novaeangliae*) are listed as:

- Endangered on the International Union for the Conservation of Nature Red List (IUCN 2008)
- Vulnerable under Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival.
- Endangered under Appendix I of the Convention of Migratory Species of Wild Animals (CMS/Bonn Convention). Appendix I includes migratory species that have been categorized as being in danger of extinction throughout all or a significant proportion of their range.

C. Habitat and Ecology Information

Humpback whales have been recorded across most of the South Pacific, although densities vary from large numbers in East Australia to very low numbers in Fiji (in E3) and parts of French Polynesia. They are regularly found around island groups but are also observed in open water away from islands. Oceania humpback whales occur throughout the southern ocean and the Ross Sea yet their feeding grounds are poorly described and not well understood. Recent research describing the migration of an individual humpback whale from the Antarctic Peninsula to American Samoa shows they may travel considerable distances to feeding grounds further afield than previously documented (Robbins et al. 2011).

Little is known regarding life history parameters for Oceania's humpback whales, although it is assumed that these rates are similar to those described from whaling records in Australia and

New Zealand (Dawbin 1956, 1964, 1966, Chittleborough 1965). One rate that has been preliminarily investigated in the region is calving interval, which is approximately 2-3 years (consistent with that reported from other oceans). The diet of these humpback whales consists mainly of krill, which they consume while in Antarctic waters. They are not known to feed while in tropical breeding grounds.

D. Population Structure


The International Whaling Commission (IWC) currently recognises four breeding stocks around the South Pacific and Australia based on Discovery mark recoveries, demographic isolation, and genetic differentiation (Olavarria et al. 2007):

- 1 north of feeding area IV (referred to as Stock D including Western Australia),
- 1 north of feeding Area V (referred to as Stock E including Eastern Australia, New Caledonia and Tonga),
- 1 north of feeding Area VI (Stock F including Cook Islands and French Polynesia), and
- 1 north of feeding Area I (Stock G including Colombia).

The IWC also recognises further stock sub-division of breeding stock E and F into sub-stocks supported by demographic isolation and genetic differentiation (Olavarria et al. 2006). Breeding stock E is sub-divided into E1 (Eastern Australia), E2 (New Caledonia) and E3 (Tonga) and breeding stock F into F1 (Cook Islands) and F2 (French Polynesia). These breeding stocks are shown in Appendix 2. We use the terminology breeding stock (e.g. D, E, F, G) to refer to breeding stocks based on demographic isolation and genetic differentiation, and sub-stock to refer to sub-divisions within these breeding stocks, as currently recognised by the IWC (e.g. E1, E2, E3, F1, F2).

Olavarria et al. (2007) found significant differentiation of maternally inherited mitochondrial (mt) DNA at both the haplotype and nucleotide level ($F_{ST} = 0.033$; $\Phi_{ST} = 0.022$), between breeding stocks D, G and four of the Oceania sub-stocks (E2, E3, F1, F2). When sub-stock E1 is included in this comparison (Olavarria et al. 2006), the estimated differentiation among stocks by F_{ST} is ~ 0.02 . Based on standard population genetic models (e.g. Wright 1978, Waples & Gaggiotti 2006), F_{ST} values of 0.01 correspond to approximately 25 migrant individuals per generation (or less than one migrant individual per year in the case of humpback whales and other long lived mammals). These breeding stock boundaries, and the sub-stocks within them, are also supported by the analysis of movements by individuals based on photo-identification and microsatellite genotyping (DNA profiling).

An extensive comparison of photo-identification catalogues by sub-stock, found only four matches between the migratory corridor of East Australia (E1 represented by Hervey Bay and Byron Bay, with a catalogue size of 1,242 individuals) and breeding grounds in Oceania (E2, E3, F1 and F2, with a catalogue size of 679 individuals) (Garrigue et al. In Press a). This level of



interchange is surprisingly small, given the relatively large catalogues used in the comparison, and provides strong evidence for sub-division within Breeding Stock E (Garrigue et al. In Press a).

An additional photo-identification comparison among regions of Oceania (E2, E3, F1 and F2 with a combined catalogue size of 679) documented 20 records of interchange, mostly between neighbouring regions (Garrigue et al. In Press b). Overall, the limited movement of individuals between adjacent sites within Oceania is consistent with the significant (but low) level of differentiation observed in mtDNA from these regions (Olavarria et al. 2007) and suggests that humpback whales wintering in E2, E3, F1 and F2 have varying levels of independence and should, for now, be recognised as individual management stocks (Garrigue et al. In Press b).

Comparisons of historical sighting data and whaling records (Dawbin 1956, 1959, 1964) with recent sighting survey data from New Zealand, Fiji and Norfolk Island demonstrate a lack of (or at the very least a slow) recovery at these sites (Childerhouse & Gibbs 2006, Gibbs et al. 2006, Paton et al. 2006, Oosterman & Whicker 2008). These surveys returned to the same survey sites used by Dr. W. Dawbin and replicated his earlier surveys as closely as possible. Results from these re-surveys include (i) sighting rates in Fiji over the period 1956-58 were between 0.15-0.58 whales per hour and were significantly higher than equivalent sighting rates observed of between 0.01-0.03 in 2002-03 (Paton et al. 2006) and, (ii) surveys in New Zealand indicate that between 2004-2006 sightings were 29% of what there were in 1960 (Childerhouse & Gibbs 2006). It is important to note that the baseline data for these surveys in the 1950s and 1960s were from populations that had already been whaled for more than 50 years. It is not possible to directly assess the rates of increase for these sites but what is clear is that any population increases appear to be lacking or very low. In contrast, the East Australian stock is increasing at 10-11% per annum (Noad et al. 2006).

These indications of demographic independence are likely sufficiently strong to provide evidence for further sub-populations within Oceania, however, such partitioning presents difficulties in assessing population status (discussed below) that have not been overcome at present. Furthermore, problems with the allocation of commercial catches on the feeding grounds to the appropriate sub-stock breeding area make the assessment even more challenging. Given it is not possible to assess the status of each sub-stock, we have therefore used a model that can assess the South Pacific as though it is a single stock (i.e. E and F).

In conclusion, the presently recognised IWC stock and sub-stock boundaries are consistent with available evidence. With respect to the South Pacific, the relevant sub-stock divisions are East Australia (E1), New Caledonia (E2), Tonga (E3), Cook Islands (F1), French Polynesia (F2), and Colombia (G). The taxon assessed here is, therefore, called the Oceania sub-population, which consists of IWC breeding stocks E and F as a distinct sub-population of humpback whales. It should be identified separately based on population isolation and a demonstrated high level of depletion (see below). We propose this sub-population specifically for the purposes of the IUCN threat ranking process as it is consistent with the existing IWC recognised breeding stock boundaries.

E Distribution

Humpback whales have a global distribution. Individual humpbacks have been observed to travel more than 8000km between their high-latitude summer feeding grounds and low-latitude winter mating and calving range in tropical waters (Rasmussen et al. 2007). The Oceania population is delineated by its breeding range, with approximate boundaries in the west at 160°E (between Australia and New Caledonia), in the east at 120°W (between French Polynesia and South America), in the north at the equator at 0°S, and in the south to approximately 30°S.

During the austral autumn and winter, humpback whales in Oceania are spread across lower latitudes from approximately 30°S northwards to the equator. The South Pacific is a vast area with thousands of islands and there has not yet been a comprehensive survey of the entire region. However, localised research by members of the South Pacific Whale Research Consortium (SPWRC 2008) and others has identified at least 9 Pacific Island Countries and Territories whose waters are host to humpback whales. Linkages to summer feeding grounds have been demonstrated through Discovery tagging, photo-identification and, most recently, genotype matching and satellite telemetry (Mackintosh 1942, Chittleborough 1965, Dawbin 1966, Mikhalev 2000, Franklin et al. 2007).

F Migration

During winter months, humpback whales migrate from their polar, summer feeding grounds to their sub-tropical winter breeding grounds (e.g Clapham 2000). This migration of around 5000km each way takes several months to complete and individuals travel alone or in temporary aggregations of generally non-related individuals (mother-calf pairs being the exception) (Valsecchi et al. 2002). New information about known links between humpback whales from Antarctica and Pacific islands such as New Caledonia (Constantine 2011) has been identified through the Southern Ocean Research Partnership (SORP). Humpback whales are usually sighted between July and November in the Pacific Islands.

Research on humpback whales in the North Atlantic show that migration timing is influenced by the feeding ground origin (Stevick et al. 2003). It also appears that water-temperature, the extent of the sea-ice, predation risk, prey abundance and location affect the timing of migration (Clapham 2000). In the Eastern Australian population there appears to be a temporal separation of individuals on their migration route related to sex and reproductive status (Table 1, from (Dawbin 1997, Vang 2002). It has been observed by SPWRC that this pattern in migration timing extends to Oceania humpbacks.

Table 1. Summary of the distribution of migrating humpback whales related to sex and reproductive status (Constantine et al. 2003).

Northern migration	Southern migration
Lactating females accompanied by weaning yearlings.	Mixed females (including those in early pregnancy) and immature males and females.
Immature males and females.	Mature males.
Mature males together with resting females.	Females in early lactation.
Pregnant females.	

G. Abundance and Trends

A comprehensive assessment of the abundance of humpback whales on known breeding grounds across the South Pacific region, using data from photo-identification and DNA-based techniques, suggests an upper-bound estimate of 3,520 whales in 2005. This estimate of abundance would represent a decline of over 70% from former levels (Constantine et al. 2010). There are no estimates of rate of increase available for this area however a second assessment is planned by SPWRC under this plan in order to establish reliable population growth information.

By comparison, Noad et al. (2006) estimated from land-based sighting surveys that population size of E1 (Eastern Australia) was 7,090 (95% CI \pm 660) for 2004 with an annual rate of increase of 10.6 (95% CI \pm 0.5%) for 1987 - 2004.

The IWC is presently engaged in a Comprehensive Assessment of Southern Hemisphere humpback whales and research on the South Pacific breeding stocks of E1, E2, E3, and F are ongoing. The IWC (2007) Comprehensive Assessment of Southern Hemisphere Humpback workshop in 2006 agreed that, “the situation for Breeding Stocks E and F is complex and currently unresolved, and therefore that it was not possible to construct stock structure hypotheses for assessment modelling, particularly with respect to the assignment to Breeding Stocks of catches taken on the feeding grounds”.

For example, while east Australia and New Caledonia (E1 and E2) are within the longitudinal boundaries of Antarctic Area V, and French Polynesia and the Cook Islands (F) are within the longitudinal boundaries of Area VI, Tonga (E3) and the Samoan Archipelago fall close to the boundary between the two Areas. Thus, in the current assessment, the approach of pooling demographically independent sub-populations was necessary for practical reasons to develop catch allocation scenarios. However, this approach is likely to be conservative in ignoring potential differences in variable rates of recovery from the regional impacts of whaling. Soviet whaling on the Antarctic feeding grounds in the early sixties was extremely intense, with over 27,300 whales taken during two summers (1959-1961) alone. Maternal site fidelity together

with a hunt concentrated both in time and space may have resulted in more extreme declines in some of the far-flung wintering stocks of the South-western Pacific.


Jackson et al. (2006) explored a number of catch allocation scenarios for the combined sub-stocks of Oceania and east Australia. In their combined assessment of sub-stocks E1, E2, E3 and F, median population recovery toward historical levels in 2005 was estimated at between 15.9-24.8% (95% probability intervals (PI) 11.1-30.5%; prior population growth rate mean = 6.7% after Branch et al. (2004)). The most appropriate interpolation between these two recovery estimates depended on the degree of interchange between east Australia and Oceania (15.9% is complete interchange, 24.8% is no interchange). Recent photo-identification surveys (Garrigue et al. In Press a) and molecular data (Anderson et al. 2010) indicate that interchange between these regions is relatively low, suggesting that the 'no interchange' scenario may be more appropriate for the region. Under this interchange scenario, estimated abundance in 1942 was 41,356 (95% PI 36,800-53,580). Recovery of the population three generations later (in 2005) is 26.6% (95% PI 18.2-33.5%) relative to 1942. This is using an estimate of 21.5 years/generation (Taylor et al. 2007).

- How many humpback whales prior to whaling?
 - East Australia, 22,000-25,700
 - Oceania, 17,800-20,600
- How fast are these populations growing?
 - East Australia, 10.4-10.5%/ year
 - Oceania, 5.1-6.4%/ year
- What is the current level of recovery?
 - East Australia, 44-46%
 - Oceania, 21-30%
- How long to 'ecological' recovery?
 - 2061 (50 years)

H Traditional Knowledge and Custom

Whales are important to the cultures, legends, traditions and heritage of many Pacific Island peoples. Migrations of whales are used as an environmental cue on some islands, signifying the time to yield or plant crops, and ceremonies and ritual surround cetaceans across the region. In some traditions, they are viewed as incarnations of humans.

Whales are considered 'Tapu' or sacred in most parts of Polynesia due to legends attached to their contribution to society (Andrews 2005). Most Pacific Islands do not have a history of eating whales and, though most have a long history of going to sea; there is no history of whaling. There is limited evidence of traditional whaling activities in the South Pacific prior to the introduction of commercial whaling by Europeans in the 19th century. However whaling of humpback whales was undertaken by Tonga during the 20th century until a moratorium was implemented by a royal decree in 1978, and whales have remained protected in Tongan waters (Orams 2004).



One of the most well documented legends about whales in the Pacific is the story of Matalingi Fale - a Niuean midwife who went to Tonga in the mouth of a whale and became the first female doctor in Tonga, teaching midwifery. There are strong links between whales and pregnant women and birth in Niue. Mother/calf pods of whales are considered a sign of good luck, health and fertility if observed by pregnant women.

Though some stories or legends such as these are well known, there is a lack of documented community and traditional knowledge about the relationship between Pacific Islanders and humpback whales.

V. KNOWN AND POTENTIAL THREATS TO OCEANIA HUMPBACK WHALES

To understand the potential impacts of any current or future threats to humpback whale populations in the Oceania region, a detailed understanding of their historical abundance and distribution, life history, stock structure, current abundance, distribution and habitat requirements is essential. Although the SPWRC are starting to piece together some of this information, much of this vital knowledge is still lacking for humpback populations within the region.

In addition to the lack of the knowledge on the current population structure, distribution, abundance and trends of humpback whales within Oceania, information on the current impacts from many of the potential threats within the region are not known.

Therefore further research and monitoring are required to build on the current knowledge for the biological information for the Oceania populations of humpback whales and the current and potential threats to humpback whales within the region.

While populations of humpback whales are still at very low levels in Oceania, the current or potential impact of an action or an activity on these populations of humpback whales could be significant. A number of authors, such as Rice (1988), Reeves et al. (2003) and IUCN (2006) have undertaken global reviews of cetacean status and threats while Miller (2007) has reviewed the cetacean status and threats within the Pacific Islands region. The overview below of the current and potential threats to humpback whale populations in the Oceania region is largely contributed from SPREP's report on Cetaceans in the Pacific Islands Region (in prep 2010).

1. Climate change

Global climate change has already resulted in a rise in oceanic water temperatures and a further rise is predicted. 88% of cetacean species may be affected by these changes and for 47% of these, the changes are anticipated to have serious adverse consequences (MacLeod 2009). The effects from climate change are likely to be most severe at the poles, with predicted changes in oceanographic processes such as upwelling events. Studies off the coast of California during

these types of events show that distributions and densities of cetaceans change as a response to these large scale changes in oceanic conditions (Benson et al. 2002).

With a demonstrated 20% reduction in Antarctic sea ice since 1953, critical foraging habitat for species relying on krill as their major food source, (such as humpback whales)...is likely to be reduced (Curran et al. 2003).

'Ocean acidification' is the term given to the reduction in the pH of the Earth's oceans, caused by their uptake of anthropogenic carbon dioxide from the atmosphere. Species that are dependent on plankton such as humpback whales may be especially vulnerable (Raven 2005, Bass et al. 2010). It is predicted that ocean acidification will result in changes in the blood chemistry of cetacean prey species which may alter their ability to form shells or transport respiratory gases, and may change the structure and biodiversity of high-latitude ecosystems (Bass et al. 2010). This will have direct consequences for many Pacific Island region cetaceans, especially those which are dependent on the Southern Ocean as a primary feeding ground.

2. Habitat Degradation and Modification


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 from Miller, 2007).

Coastal development could have particularly significant impacts on breeding aggregations of Oceania humpback whales. According to NMFS (1991), it may not be a coincidence that the primary breeding site of Silver Bank humpback whales in the Caribbean, is located over 100 km from land, relatively inaccessible to people, and protected from much ship traffic by a fringing reef. Similarly for humpback whales on the East coast of Australia, migratory and breeding and calving habitat is exposed to rapid growth of human populations, and concomitant increases in industry, shipping, harbor construction and dredging, small boat recreation, fishing, tourism and resort development, and local pollution.

The degree to which coastal development activities may restrict repopulation of Oceania humpback breeding grounds is not known.

3. Pollution (both chemical and waste)

Pollution may involve many different substances which degrade available habitat for cetaceans and/or adversely affect their health. These substances can be derived from agricultural or



sewage-related runoff, marine debris, oil-pollution related chemicals, heavy metals, radio- nucleotides and chemical compounds such as POPs (persistent organic pollutants).

It has been suggested that 60 - 80% of the marine litter found both on beaches and in the ocean is made up of plastic (Gregory & Ryan 1997). The effects of this litter are varied - cetaceans can either become directly entangled in plastic (e.g. netting or strapping bands), ingest it or accumulate PCBs (polychlorinated biphenyls) and other chemicals through leaching. In the North Pacific Ocean there are thought to be around 100 million tonnes of plastic floating just under the surface and covering an area twice the size of Texas. Two massive patches of circulating rubbish contain around 2.5% of all the plastics made since 1950. The plastic slowly photo-degrades into smaller and smaller pieces which in turn cause a further hazard to marine life through ingestion. During a 2008 cleanup of oceans and waterways in 104 countries, volunteers coordinated by the Ocean Project collected 3.2 thousand tonnes of rubbish, 11.4 million items. The Project listed cigarette butts, plastic bags, food containers and fishing nets as the most common item found on beaches. Plastic bags can be a particular hazard for cetaceans and are not just ingested by toothed whales but also baleen whales. The necropsy of a Bryde's whale that stranded near Cairns, QLD, Australia in 2000 found almost 6 cubic meters of plastic, mostly plastic bags possibly mistaken for squid in dark deep water, completely obstructing its digestive system (EPA 2000).

Some substances we use in everyday life which end up in waterways, sea and the air can be extremely persistent and toxic. Persistent organic pollutants (POPs) include organochlorines which are a chemical combination of chlorine and carbon and include PCBs, pesticides, CFCs (chloroflouorocarbons), dioxins, DDTs among others; and the heavy metals such as methyl- mercury, lead and cadmium.

Due to their extreme persistence in the environment these chemicals can be found in all living things and tend to bioaccumulate. POPs build up in fatty tissues such as the blubber of whales, biomagnifying as they are eaten, sometimes resulting in very high levels in top predators such as humans, marine mammals and some large fish. Organochlorines are transferred from mother to offspring through the placenta and through the fatty content of milk, which may provide a high initial contaminant burden for the calf.

Pollutant loads of 955 skin biopsies collected during a global expedition from 2000 - 2005, showed significant levels of a number of chemical contaminants in sperm whales in the Pacific Islands region, comparable with levels in more industrialised locations (Ocean Alliance 2010). Other studies within the Pacific have highlighted that monitoring of persistent organic pollutants in wild cetacean populations in the region is essential for assessment of the potential impacts (Ylitalo et al. 2009).

The effects of chemical pollutants are numerous, widespread and largely fall into three categories - impaired reproduction, indirect mortality through immuno-suppression and direct mortality from poisoning (Ylitalo et al. 2009).

4. Noise

Whales use sound in order to communicate with each other, find prey, and avoid predators and some larger baleen whales use low frequency sounds as active sonar with which to navigate across wide open ocean basins. Industrialisation of the oceans has created a wide range of anthropogenic ocean sounds, such as shipping; offshore construction; and drilling, sonar and seismic testing during oil and gas exploration, all of which can mask the sounds that whales use to function in their environment.

Industrial sounds are likely to be perceived by cetaceans as 'noise' when the frequency of those sounds overlaps with that used by the animal in daily life (Wursig & Richardson 2009). Some anthropogenic noise can be extremely pervasive in the acoustic environment of the oceans. For example, airgun noise from seismic exploration can be heard across ocean basins, 3,000km from its source. Where humpback whales have migratory routes or breeding grounds in coastal areas, they may be required to access some of the noisiest and most heavily impacted habitats.


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 from Miller 2007). 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 & Weilgart 1995).

Humpback whales are vulnerable to the noise of large vessels, oil and gas activities, marine construction, and active sonar. These activities could potentially adversely affect humpback whales by disrupting resting, feeding, courtship, calving, nursing migration or other activities (NMFS 1991).

5 Whale watching

The potential impacts of cetacean-based tourism have been widely studied in other areas of the world and on a great variety of species (Constantine 2002, Stamation et al. 2010, Bejder 2005, Bejder et al. 2006, Corkeron 1995, Scheidat et al. 2004, Weinrich & Corbelli 2009 and Williams et al. 2002). Cetacean watching in the Pacific Islands region relies largely on the seasonal and opportunistic watching of humpback whales from boats, and a number of studies have concluded that the potential impact may be of concern (O'Connor, 2008a, Kessler & Harcourt 2010, Schaffer et al. In Press a).

A recent study on the potential effects of whale watching on humpback whales, by the then unregulated industry in New Caledonia, conducted over three seasons - 2005 through 2007 - showed that whales swam significantly faster along a path that was significantly more erratic in the presence of boats within 1000m than prior to their arrival (Schaffer et al. In Press a). These changes in behaviour in the presence of whale watch boats are consistent with responses to boats by humpback whales in other areas of the world and other species where cetaceans show evasive action (Scheidat et al. 2004, Nowacek et al. 2001, Schaffer et al. 2009). There may be energetic costs to the animals with possible population level consequences (Schaffer et al. 2009,



Schaffer et al. In Press a). During the period of the study in New Caledonia, the whales were on average exposed to boats 1.86 hrs per day, with 80% of these encounters involving the boats approaching the animals to within 100m (Schaffer et al. In Press b). This population has less than 500 individuals, which show strong site fidelity. Its demographic and reproductive isolation suggest a greater risk from cumulative exposure over years (Garrigue et al. 2001, Baker et al. 2006, Garrigue et al. 2002, Garrigue et al. 2004, Schaffar & Garrigue 2006).

In the Kingdom of Tonga, whale watching also extends to visitors swimming with humpback whales, primarily with groups of whales containing calves (Kessler & Harcourt 2010). It has been recommended that to ensure the long-term sustainability of these operations, commercial swim programmes should be accompanied by ongoing research to monitor and track changes in behaviour that may have implications for the animals or people involved (Carlson 2008). Apart from New Caledonia, the effects of whale watching activities on the Oceania humpback whale population are currently unknown and considering their endangered IUCN listing and apparent lack of recovery from extensive whaling, a conservative approach to management would be appropriate as exemplified in the SPREP endorsed Pacific Islands regional Guidelines for Whale & Dolphin Watching.


Concerns are increasing over the risks presented by the repeated exposure of cetaceans to boats and their long term impacts, particularly on critical mating, calving, feeding and resting areas (Hoyt 2009).

It is clear that the monitoring, regulation and enforcement of responsible cetacean watching is a priority within the Pacific Island region. Given the level of economic interest associated with this industry, this should be a region wide collaborative effort between members of the industry, managers and researchers.

6 Fisheries interactions

Bycatch from fisheries interactions is recognised as one of the most significant sources of mortality for many cetacean species (Northridge 2009, Read 2008, Reeves et al. 2003). Gill nets, made of very fine yet strong nylon twine, pose the greatest threat to marine mammal species and make up 84% of cetacean bycatch worldwide (Read et al. 2006).

Entrapment and entanglement in active fishing gear (O'Hara et al. 1986) is the most frequently identified source of human caused injury or mortality to humpback whales (NMFS 1991). Humpback whales are large enough to break through netting before becoming entangled, but they occasionally entangle in the lead or anchor ropes which they cannot break. Drowning or starvation may result if humans do not interfere to free the whales. The incidence of entanglements could at least slow, and perhaps prevent population recovery, especially if human efforts to rescue the whales were reduced or if fishing effort increased. Entanglement in debris, especially lost or discarded fishing gear, could be another source of mortality.



Mortality due to bycatch from fisheries may be a serious threat to cetacean populations in the Pacific Islands region (Miller 2007), but estimates of cetacean mortality due to by-catch are limited by the low levels of observer coverage across the region. On average less than 1% of all long-line vessels operating in the South Pacific between 1987 and 2000 carried independent observers (Lawson 2001). Such low levels of observer coverage of fishing activities in the Pacific Island region make any estimation of actual mortality of cetaceans impossible (Reeves & Brownell 2009). Details of fishery types and cetacean species mostly commonly bycaught in the Pacific Island region can be found in Miller (2007) and are summarised in Table 6.

7 Ship strike

Humpback whales are vulnerable to collision with shipping traffic. Large ships (>80m) travelling faster than 14kn pose the greatest threat to whales although there are numerous incidences of trauma inflicted by boat traffic of all types, from propeller scarring to death. Cetaceans are long-lived with low reproductive rates, so increases in the number of mortalities can significantly impact small populations (Laist et al. 2001).

In the Pacific Island region humpback whales have reportedly been the subject of vessel strikes although information is largely dependent on the level of expertise in diagnosing and reporting such incidents (Miller 2007, Van Waerebeek et al. 2006). Cetaceans are particularly at risk in areas of heavy boat traffic such as shipping lanes. Large whales including humpback and Bryde's whales have been involved in suspected fatal collisions in Hawaii, Tonga and New Zealand (Weinrich 2005, Behrens 2009). Several large whales have been reported as struck by high speed ferries in French Polynesia (Van Waerebeek et al. 2006, Miller 2003).

8 Whaling (including 'scientific' whaling)

Between 1904 and 2005, more than 2 million large whales were killed in the Southern Hemisphere alone - including 360,000 blue whales, 400,000 sperm whales, at least 200,000 humpback whales and around 725,000 fin whales (Clapham & Baker 2009). Concerns over extermination of whales were voiced as early as 1915 (Anon. 1915).

Recent publications on illegal whaling that was carried out by the USSR and other nations between 1947 - 1972, have revealed that catch records were grossly under-reported, with some species being over reported to disguise much larger takes of other protected species (Clapham & Ivashenko 2009, Barthelmeß 2010). In addition to those catches that were reported to the IWC, in excess of 91,000 whales were killed in the Southern Hemisphere, (Brownell & Yablokov 2009, Clapham & Ivashenko 2009), many of them on the feeding grounds for whales that would overwinter in the Pacific Islands region. At least 43,000 more humpback whales were killed than had previously been thought (Brownell & Yablokov 2009), many of them from the Oceania population.

Illegal whaling operations conducted in the Antarctic over fifty years ago have seriously affected the numbers of whales seen in the Pacific Islands region today and have had a direct effect on the recovery of populations breeding throughout the Pacific Islands region (Reeves et al. 1999).

9 Depletion of prey species

Antarctic krill, *Euphasia superba*, is a keystone species for the Southern Ocean ecosystem, and the main prey item for baleen whales overwintering in the Pacific Islands. Increases in commercial harvesting of krill may have a direct impact on prey availability for cetaceans (Nicol & Foster 2003, Gascon & Werner 2005). The recovery of large whale species within this ecosystem is predicted to increase Southern Ocean productivity through the production of faeces and enhancing iron levels in the surface level (Nicol et al. 2010)

10 Cumulative impacts.

It is likely that, given the size and relative inaccessibility of areas of Oceania, the lack of monitoring and reporting has failed to highlight the severity of the issues discussed above. Opportunistic and unsystematic collection of records may also mean that certain threats are not being documented or are under-reported. 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 cumulatively (Miller 2007).

VI. RECOVERY PROGRAM

A Strategy

This Plan recommends actions designed to help humpback whale populations across Oceania to increase to at least 50% of their original abundance before commercial hunting, and to expand into formerly occupied ranges. Corresponding to the four major objectives of the plan there are recommended legislative, enforcement, management, and research tasks detailed below which address key issues of: habitat protection; identifying and reducing human-related mortality, injury and disturbance; measuring and monitoring key population parameters to determine if recommended actions are successful; sustainable tourism; and public awareness.

B. Management, Legislation and Enforcement Measures

The potential for the success of the plan to achieve its goal will depend on the research actions being supported by consistent efforts by countries to enforce regulations and manage protected areas for whales. Oceania humpbacks are susceptible to the highest level of disturbance in coastal areas and as such legislating and enforcing regulations in relation to reducing disturbance is critical.

C Research

Research and monitoring priorities have been developed by the SPWRC at the 2010 and 2011 meetings with input from the majority of the Recovery Team. These priorities are based on existing knowledge of humpback whales in the Oceania region and the gaps that have been highlighted over a 10 year program of work by the SPWRC and are informed by the priorities of the SPREP Whale and Dolphin Action Plan. The research actions not only include new studies but recommend reviewing of existing data sets to identify further information that could be gained without the cost of further field work.

In addition to researching key questions in relation to the biology and ecology of Oceania humpback whales, The Plan addresses the need for research into habitat requirements and quantification of threats such as tourism interactions so that mitigation and management can be developed.

D. Coordination, Evaluation and Monitoring

The process of developing, implementing and reviewing the OHWRP will rely on input of a multi disciplinary Recovery Team drawn from throughout the Oceania Region range states for southern hemisphere humpback whales and project partners. The Recovery Team includes (but is not limited to) the people listed in Appendix 2. SPREP members who are range states of humpback whales are invited to nominate additional members to join the Recovery Team.

A smaller Steering Group (Appendix 1) made up of core members of project partners, SPWRC and SPREP, will be responsible for the coordination and planning process, reporting first to the Recovery Team and then to broader SPWRC and SPREP member stakeholders.


The Recovery Team and Steering Group will meet within the agenda of the SPWRC annual meeting (Feb/March) to evaluate progress and set priorities for the year ahead in line with funding options and partners. This annual meeting together with consultation with key PICTs will monitor the plans implementation and evaluate whether the management measures are meeting the plans objectives and having a positive conservation outcome.

E Strategic Partnerships

The development and implementation of the OHWRP brings about opportunities for the development of strategic partnerships to be formed within the Oceania region. The strategic partnership and MoU between SPREP and SPWRC is the backbone of the OHWRP. These partners will work closely with PICTs, intergovernmental agencies, NGO's within the region working on whales (i.e. CI, IFAW, Whales Alive, WDCS WWF, and others), educational institutions (i.e. University of the South Pacific), and community members with the Oceania region to ensure the Plan is funded and supported at a national level.

F. Capacity Building

The OHWRP provides opportunities for capacity building within the Oceania region. The implementation of the OHWRP will result in a coordinated and strategic approach to whale



conservation and research activities within the region. This will provide opportunities for Pacific Islanders (Government Officers, NGOs, students, community members) to become familiar with the skills and research techniques used for non lethal research and monitoring to gain a better understanding of the current status of cetacean populations within the Oceania region. The annual meetings of the Recovery Team will also encourage interested PICTs to become abreast of planning, budgeting and reporting processes associated with regional scale programs.

G. Communication, Advocacy and Awareness

An annual status/progress report outlining priorities for the year ahead and achievements of the previous year will be developed by the Recovery Team post the annual meeting. This report will be distributed by SPREP to SPREP members and focal points, and by PICT partner governments to relevant stakeholders and networks. It is a recommendation in the Plan that any in-country research and management work be partnered with the delivery of public education to promote understanding and awareness of the need for conservation of humpback whales and their habitats.

H. Synergies with International and Regional Arrangements

The Plan mirrors the priority actions under SPREP's WDAP and the CMS MoU for Pacific Cetaceans. In addition there are opportunities to learn lessons from Australia and the USA on the successes and failures of their humpback whale recovery plans.

Cetaceans are noted in many SPREP member's National Biodiversity Strategy Action Plans (NBSAP's) under their commitments as signatories to the Convention on Biological Diversity (CBD). The recovery process for Oceania humpback whales presents a good regional case study under CBD.

VII. RECOVERY OBJECTIVES, ACTIONS AND CRITERIA



Objective 1: The recovery of populations of humpback whales utilising waters of the Oceania region so that these populations can be considered at very low or no risk from human impacts				
Criteria for measuring achievement of the objective	Recovery Action:	Lead agency/PI	Estimated duration during life of this recovery plan	Estimated cost USD during life of this recovery plan
	<u>Research</u>			
1. Whale strandings are well documented in the region and information gained from events is maximised and delivered to appropriate agencies	Report strandings and take measurements, photographs and tissue samples for genetic analysis.	Te Papa Tongarewa - National Museum of New Zealand, Anton van Helden marine mammal curator for stranding protocols and advice. University of Auckland, Australian Antarctic Division for molecular analyses. SPREP (Datasheets, basic equipment, training and database)/Members	ongoing	4,000
2. Areas of habitat essential to the continued recovery of Oceania humpback whales are well defined	Identify and increase knowledge of habitat (hotspots) essential to the survival of humpback whales (calving, mating, migrating and feeding). Establish a working group on habitat protection in line with WDAP action 3.2	SPWRC SPREP/Members SORP	Ongoing as part of action 2.7 below	NA



3. Initiation of large scale fisheries for humpback primary prey is prevented	Identify and evaluate prey and fisheries competition	AMMC/SORP SPWRC	Ongoing	NA
4. Levels of anthropogenic contaminant levels in whale tissues are monitored	Initiate baseline study of pathogens and biotoxins in whale tissues	Scientists Regional universities	2012 -2016	40,000
	<u>Management, Legislation and Enforcement:</u>			
5. A range of mitigation recommendations/measures are in place to reduce or eliminate impacts of direct threats	Identify and reduce direct human related injury and mortality to humpback whales by developing a regional reporting system to quantify direct threats to whales (e.g., fishing gear entanglement, vessel strike, underwater noise/explosions, direct takes, physical habitat modification).	SPREP IWC ship strike reporting database: http://www.iwcoffice.org/sci_co m/shipstrikes.htm Australian Antarctic Division by-catch mitigation programme. National Governments	2012 -2016	200,000
6. Threats to whales are well documented and submitted to regional reporting system	Document incidents of anthropogenic threats (e.g. as appropriate - photographs, vessel type, gear type, purpose of underwater noise - military, seismic, research).	National Governments SPREP	2012 -2016	NA
7. Protected areas and their management are in effect in range states of Oceania humpback whales	Institute and encourage legislative protection and management of essential habitat under the jurisdiction of SPREP members including the development of sanctuaries, MPA's, special/temporal closures to activities, and management plans	National Governments SPREP NGO's SPWRC CWG	2012 -2016	40,000



8. SPREP endorsed regional seismic guidelines are developed	Evaluate the current guidelines in SPREP member countries with regard to seismic activities and develop SPREP regional guidelines to assist countries to mitigate seismic impacts on whales and ensure these are used in national permitting systems for seismic activities	SPREP Regional governments NGO's	2013	16,000
	<u>Capacity Building:</u>			
9. PICTS knowledge of the management of marine mammal protected areas is increased	PICT delegation to attend the 2 nd International Conference on Marine Mammal Protected Areas OR if not achievable in time frameother relevant conferences/symposiums	SPREP ICMMPA	2011	25,000
10. PICTS knowledge of the management of marine mammal protected areas is increased	Convene workshop on Habitat Protection of humpback whales as a side meeting of SPREP WDAP review meeting. Bring resource people from ICMMPA	SPREP Scientists NGO's ICMMPA	2012	8,000
11. PICTS are empowered to respond to entanglements thus reducing entanglement mortalities	Run regional whale disentanglement workshop for PICTS and provide gear for 10 countries	Doug Cochrane SPREP NGO's OZ/NZ Governments	2013	65,000
	<u>Communication, Advocacy and Awareness:</u>			
12. General public of range states of humpback whales are aware of the threats to their survival	Develop and distribute education materials in support of recovery plan objective 1: Threats to whales	SPREP NGOs	2012	8,000



Objective 2: The recovery of the distribution and abundance of humpback whales utilising the Oceania region to their pre-exploitation levels				
Criteria for measuring achievement of the objective	Recovery Action:	Lead agency/ PI	Estimated duration during life of this recovery plan	Estimated cost NZD during life of this recovery plan
	<u>Research:</u>			
1. A current and confident abundance estimate for Oceania humpback whales is produced	Abundance estimate undertaken in winter breeding seasons of 2013 & 2014 in synoptic PI regions.	SPWRC members/ scientists	Completed 2015	\$490,000
2. Doubling of abundance of Oceania humpback whales within 10 years as evidence of robust recovery is apparent	Monitor trends in recovery 10 years after last abundance estimate (1999-2004).	SPWRC members/ scientists Governments of interest	Completed 2015	\$80,000
3. A significant increase in precision of estimates of rates of increase (or decrease), of population size of humpback whales	Population dynamic model development.	SPWRC members/ scientists	Completed 2015 as part of 2.2 above	NA
4. Current stock structure and distribution of humpback whales compared to historical records is well understood	Continued monitoring of trends in areas with historically high whale density but now low abundance of whales (e.g., Cook Strait, Norfolk Island, Fiji, Vanuatu, Chesterfield Reef complex).	SPWRC members/ scientists Governments of interest	2012 - 2014	240,000



5. Distribution of humpback whales and their breeding areas, aggregation, and migratory paths are well understood	Investigate emerging areas of interest with little or no historical records of whales (e.g., Niue, Pitcairn Island, eastern French Polynesia, sea mounts) and determine importance as breeding grounds or migratory corridors.	SPWRC members/ scientists Governments of interest	2012 - 2014	240,000
6. Connectivity between feeding and breeding grounds of humpback whales is identified	Improve understanding of connectivity between breeding and feeding grounds using photo-ID, molecular markers, song and satellite tagging to link regions.	SPWRC members/ scientists Southern Ocean Research Partnership (SORP) - 'Humpback whale connectivity' project Governments of interest	Ongoing	\$800,000
7. A significant increase in precision of, and confidence in stock structure of Oceania humpback whales	Improve the understanding of breeding stock structure including e.g., genetics, photo-ID, acoustic monitoring of song transmission, modeling, habitat identification.	SPWRC members/ scientists	Ongoing	800,000
8. Seasonal movements of humpback whales are well understood	Research to improve understand of the use of migratory corridors and transit times (e.g., Cook Strait, Norfolk Island, Kermadec Islands, southern Cook Islands. Deploy sat tags.	SPWRC members/ scientists Governments of interest	2012 - 2014	100,000
9. Calf survivorship is estimated	Examine rates of Birth, survivorship and mortality based on existing photo ID information	SPWRC Scientists	2012 - 2014	25,000
	<u>Management, Legislation and Enforcement:</u>			
10. Continued ban on any directed take of humpback whales	Support a continued ban on any directed take of humpback whales, and support international efforts to detect and prevent illegal whaling through convention membership (IWC, CITES, CMS, CCAMLR etc)	SPREP National governments NGO's	Ongoing	NA



	<u>Capacity Building:</u>			
11. Capacity of PICT government personnel to conduct whale research is enhanced	Work with and include where ever possible, staff of the Ministries of Environment, Fisheries and Tourism when conducting in-country whale research	SPWRC Scientists NGO's	Ongoing	NA
	<u>Communication, Advocacy and Awareness:</u>			
12. General public of range states of humpback whales are aware of the slow recovery of Oceania humpback whales	Develop and distribute education materials in support of recovery plan objective 2: Distribution and abundance of whales	SPREP	2012	8,000
13. Recovery program for Oceania humpback whales is presented at CBD COP 11	The recovery process for Oceania humpback whales as a regional case study under CBD, to be presented by SPREP at CBD COP 11 in 2012.	SPREP	2012	4,000

Objective 3: Increased public awareness and Pacific Island stewardship of humpback whales and their habitat requirements within the Oceania region				
Criteria for measuring achievement of the objective	Recovery Action:	Lead agency/ PI	Estimated duration during life of this recovery plan	Estimated cost NZD during life of this recovery plan
	<u>Research:</u>			
1. Historical relationship between whales and Pacific people is documented	Investigate historical records and stories about humpback whales and Pacific Island people	SPREP NGO's National Governments and communities	2012 - 2016	8,000



2. Community leaders are champions for whale research and conservation	Identify community leaders as champions for whale conservation	SPREP NGO's National Governments and communities	2012 - 2016	NA
	<u>Management, Legislation and Enforcement:</u>			
3. More PICs become parties to CMS and PICTS sign CMS PI Cetacean MoU	Encourage PICTs to join multilateral agreements protecting whales such as CMS MOU for Pacific Cetaceans	SPREP NGO's	Ongoing	NA
	<u>Capacity Building:</u>			
4. PICT government representatives contribute to annual research and conservation planning for humpback whales	PICT delegation to attend SPWRC annual meeting	SPREP SPWRC National government representatives	2012 - 2016	40,000
	<u>Communication, Advocacy and Awareness:</u>			
5. Range states of Oceania humpback whales are aware of and able to implement the OHWRP	Distribute OHWRP to range states and provide follow up communication and support as appropriate	SPREP SPWRC	2012	NA
6. Regional Year of the Whale program highlights OHWRP	Pursue SPREP and SORP year of the Whale	SPREP SORP	2014	40,000
7. Materials are developed and distributed	Develop education materials in support of recovery plan objective 3: Stewardship of humpback whales	SPREP	2012	8,000



Objective 4: The sustainable development of humpback whale watching tourism for the socio-economic benefit of Pacific Island communities.				
Criteria for measuring achievement of the objective	Recovery Action:	Lead agency/ PI	Estimated duration during life of this recovery plan	Estimated cost NZD during life of this recovery plan
	<u>Research:</u>			
1. Impacts of whale watching and swimming are quantified and mitigated	Asses and quantify impacts of already established whale-watch/swim activities to evaluate potential cumulative effects and/or changes over time. Priority Tonga, French Polynesia	Scientists Regional universities SPWRC tech support National Governments	2012 - 2015	160,000
2. Feasibility and sustainability of new whale watch industries is determined prior to commencement	Conduct feasibility assessment for whale watching activities in countries aiming to establish whale watch tourism including data collection on whales and infrastructure pre-whale watch or swim-with whale industry establishment. Priority Vanuatu, Fiji	Scientists Whales Alive SPREP	Ongoing	16,000
	<u>Management, Legislation and Enforcement:</u>			
3. Pacific regional whale and dolphin watching guidelines are well used as a template to develop and legislate national regulations in PICTS	Run stakeholder workshops to develop national regulations based on regional guidelines. Priority Vanuatu, Fiji, Tokelau	SPREP Whales Alive National Governments	2012 - 2014	25,000
4. National whale watching regulations are legislated and penalties assigned	Assist PICTs with existing whale watching guidelines to review in line with regional guidelines and legislate as regulations. Priority Tonga, Niue, Samoa	SPREP/National Govs SPWRC CWG Whales Alive Lawyers	2012 - 2016	16,000



5. Improved understanding of whale watch industry dynamics, issues and animal interactions	Assist national governments to design and implement whale watch industry reporting systems on passenger numbers, effort, whale sightings, activities and incidents.	Government departments of interest SPREP Whales Alive SPWRC	2012 - 2016	NA
6. Whale watching and swimming operations are licensed	Assist national governments to develop and implement permit/licensing systems that limit vessel numbers and activities	SPREP Whales Alive National Governments	2012 - 2016	NA
	<u>Capacity Building:</u>			
7. Whale watching regulations are enforced nationally	Run training workshops to increase knowledge and capacity of enforcement officers and provide assistance to develop enforcement strategy. Priority Tonga, Niue, Samoa, French Polynesia	SPREP Whales Alive National governments	2012 - 2016	80,000
8. Operators fully understand and comply with whale watching regulations	Run annual training workshops for whale watching industry to maximise education and minimise impacts. Priority French Polynesia, New Caledonia, Tonga	Whales Alive National Governments SPREP	2012 - 2016	80,000
	<u>Communication, Advocacy and Awareness</u>			
9. Improved communication and cooperation with whale watching industry	Develop regional whale watch operators contact list for ease of communication and consultation	SPREP	2012	NA
10. Private boaters are aware of national and regional whale watching regulations and guidelines	Develop education programs to inform the general public of all regulations involving behaviours when in the presence of whales	SPREP National Governments NGO's	2012 - 2016	8,000

VIII. IMPLEMENTATION

A. Planning Process

The summary of the steps in developing the recovery plan is as follows:

Action	Timing	Funding NZD
<input type="checkbox"/> Development of OHWRP Steering Group and a multidisciplinary Recovery Team by project partners	Feb 2009	
<input type="checkbox"/> Development of a discussion paper by the Steering Group	May 2009	Pew 10,000
<input type="checkbox"/> Submission of discussion paper for endorsement by CMS Cetacean MoU signatories at Meeting of Parties in Auckland	July, 2009	
<input type="checkbox"/> Invitation of nominations of appropriate national officials to be included in the Recovery Team and endorsement of discussion paper at SPREP annual meeting	September 2009	
<input type="checkbox"/> PICT's and Recovery Team meeting on OHWRP Auckland	March, 2010	IFAW 10,000 Pew 20,000
<input type="checkbox"/> Plan concept launched by partners SPWRC, SPREP, PICTs, IFAW and Pew at the International Ocean Voices event, Auckland	March 2010	
<input type="checkbox"/> Conservation and research priorities for the Plan developed at SPWRC annual meeting	2010/2011	
<input type="checkbox"/> Drafting of Recovery Plan by Steering Group in consultation with the Recovery Team	March 2011	Pew 10,000
<input type="checkbox"/> Circulation of Draft 1 Recovery Plan to all members of the Steering Group and Recovery Team for comments	April 2011	
<input type="checkbox"/> Steering Group develops Draft 2	April 2011	
<input type="checkbox"/> Steering group consultation process on Draft 2 with humpback range state PICT's	April 2011	
<input type="checkbox"/> Steering Group develop Draft 3 Final circulation for final comments	May 2011	
<input type="checkbox"/> Finalisation and submission of Final Recovery Plan for SPREP and CMS Cetacean MOU Party endorsement at 2011 annual meeting in September	June 2011	

B. Annual work plan and funding options

The Recovery Actions Table under VII above outlines the timeframe, within the 5 year life of the plan, for each action's delivery. A yearly schedule of which action is being completed, by which institution, and the funding options sought/secured, is to be outlined for the year ahead at the annual meeting of the Recovery Team in conjunction with the SPWRC annual meeting. Delivery of the annual work plan can form the basis of an annual report on achievements at the end of each year distributed by SPREP and SPWRC to PICTS and project partners.

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Appendices

Appendix 1: OHWRP Steering Group

Participant	Affiliations
Lui Bell	SPREP
Rochelle Constantine	School of Biological Sciences, University of Auckland, New Zealand /SPWRC
Mike Donoghue	Pacific Regional Director, Conservation International/SPWRC
Aisake Batibasaga	Department of Fisheries, Fiji
Phil Clapham	National Marine Mammal Laboratory, Alaska Fisheries Science Center, USA/SPWRC
Scott Baker	Marine Mammal Institute, Oregon State University Molecular Ecology and Evolution, USA/ University of Auckland/SPWRC
Olive Andrews	Whales Alive/SPWRC
Sue Miller Taei	CI/SPWRC/Pew
David Paton	Blue Planet Marine/SPWRC

Appendix 2: Recovery Team

Participant	Affiliations
Lui Bell	SPREP
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Juney Ward	Ministry of Environment, Samoa/SPWRC
Olive Andrews	Whales Alive/SPWRC
Cara Miller	University of the South Pacific /WDCS, Fiji
Penina Solomona	WWF, Fiji
Rochelle Constantine	School of Biological Sciences University of Auckland, New Zealand /SPWRC
Scott Baker	Marine Mammal Institute, Oregon State University Molecular Ecology and Evolution, USA/ University of Auckland/SPWRC

Phil Clapham	National Marine Mammal Laboratory, Alaska Fisheries Science Center, USA/SPWRC
Sue Taei	CI/Pew Foundation/SPWRC
Claire Garrigue	Operation Cetaces, New Caledonia/SPWRC
David Paton	Blue Planet Marine, Australia/SPWRC
Nan Hauser	Center for Cetacean Research and Conservation, Cook Islands/SPWRC
Michael Poole	Marine Mammal Research Programme, French Polynesia & National Oceanic Society, USA /SPWRC
Mike Donoghue	Pacific Regional Director, Conservation International/SPWRC
Mike Noad	Cetacean Ecology and Acoustics Laboratory, School of Veterinary Science, The University of Queensland, Australia /SPWRC
Simon Childerhouse	Australian Marine Mammal Centre/SPWRC
Vaipule Foua Toloa	Ulu Tokelau
Robert Sine	Principal Marine Ecologist, Department of Environment & Conservation Sustainable Environment Program Wing, Marine Division, PNG
Samiuela Pakileata	Ministry of Environment and Climate Change, Tonga
Agnetha Vave	Senior Conservation Officer, Environment & Conservation Division, Min Environment, Conservation & Meteorology, Solomon Islands
Alana Fiafia Rex	Oma Tafua` Niue
Sompert Gereva	Principal Fisheries Biologist, Ministry of Fisheries, Vanuatu
Other PIC Members	Other PIC members as nominated by PICs following the CMS MoP and SPREP annual meetings.

Appendix 3

International Whaling Commission recognised stock structure of humpback whales in the Southern Hemisphere. Reprinted from IWC 2005.

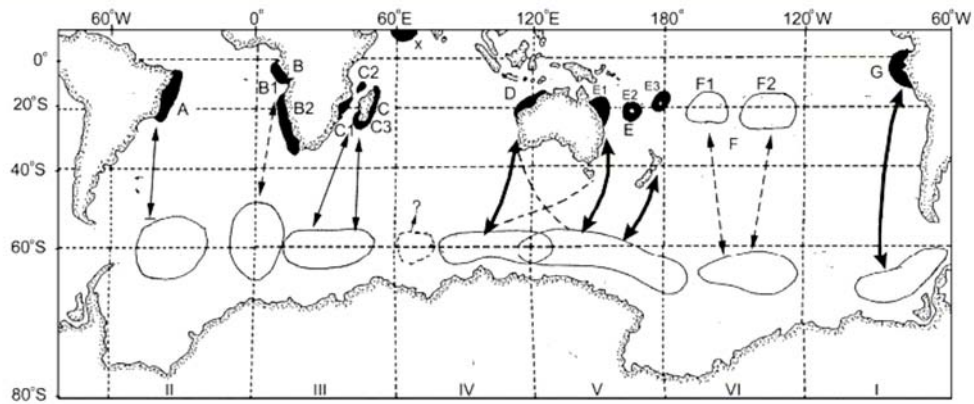


Fig. 1. New hypothetical stock structure for Southern Hemisphere humpback whales. This is for illustrative and discussion purposes only. The areas and sub areas identified reflect approximate, rather than necessarily exact, boundaries. A dotted line represents hypothetical connection, thin lines represent a small number of documented connections between areas from resights using Discovery tags, photo-id or genetics, or satellite tracked whales, and thick lines represent a large number of documented connections between areas from resights using Discovery tags, photo-id or genetics, or satellite tracked whales.

Annex 2

of CMS/PIC/MoS3/Doc.4.2

