DRAFT RECOVERY PLAN FOR BLUE WHALES *Balaenoptera musculus* IN AUSTRALIAN WATERS

PHASE 1
2000 - 2004

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LIST OF ABBREVIATIONS

AAD	Australian Antarctic Division
AAT	Australian Antarctic Territory
AFFA	Agriculture, Fisheries & Forestry Australia
AFMA	Australian Fisheries Management Authority
AMSA	Australian Maritime Safety Authority
ANARE	Australian National Antarctic Research Expeditions
ANCA	Australian Nature Conservation Agency
ANPWS	Australian National Parks and Wildlife Service
ANZECC	Australian and New Zealand Environment and Conservation Council
APPEA	Australian Petroleum Production Exploration Association
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on the Conservation of Migratory Species of Wild Animals (also known as the Bonn Convention)
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DFAT	Department of Foreign Affairs and Trade
EA	Environment Australia
EEZ	Exclusive Economic Zone
ESAC	Endangered Species Advisory Council
ESP Act	*Endangered Species Protection Act 1992*
GBRMPA	Great Barrier Reef Marine Park Authority
ICRW	International Convention for the Regulation of Whaling
IDCR	International Decade for Cetacean Research
IOS	Indian Ocean Sanctuary
IUCN	International Union for the Conservation of Nature
IWC	International Whaling Commission
JARPA	Japanese Whale Research Program under Special Permit in the Antarctic
NHT	Natural Heritage Trust
NSW	New South Wales
NT	Northern Territory
Qld	Queensland
SA	South Australia
SOPEM	Southern Ocean Pelagic Ecosystem Monitoring Program
SOS	Southern Ocean Sanctuary
SOWER	Southern Ocean Whale and Ecosystem Research
Tas	Tasmania
Vic	Victoria
WA	Western Australia
WP Act	*Whale Protection Act 1980*
WCMC	World Conservation Monitoring Centre

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Cover photograph: Blue whale off western Victorian coast. Courtesy of Peter Gill, Australocetus.

SUMMARY

Current Species Status
Blue whales are listed as endangered on Schedule 1 of the *Endangered Species Protection Act 1992* (ESP Act). The ESP Act identifies the need for preparation of a recovery plan and specifies the content of the plan. This plan is written for both subspecies of blue whale found in Australian waters: the 'true' blue whale of the Southern Hemisphere, and the 'pygmy' blue whale.

The International Whaling Commission (IWC), the international body regulating whaling, banned blue whale takes from 1966, due to the significant reduction in population numbers. The decline of blue whale numbers has also been recognised by the International Union for the Conservation of Nature (IUCN), which has listed blue whales in their endangered category. Similarly, blue whales have been listed in the appendices of the Convention on the Conservation of Migratory Species of Wild Animals (CMS) and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Listings under these appendices apply protection to blue whales from nations that are signatories to the conventions.

Habitat Requirements and Limiting Factors
Blue whales feed in mid-high latitudes and migrate to lower temperate/tropical waters to mate and breed. Blue whale habitat in Australian waters is not clearly defined and this plan identifies actions to address this lack of information.

Biodiversity Benefits
The benefits to biodiversity of the actions identified in this plan are that:

- human-induced threats will be reduced for all large cetaceans in Australian waters;
- protection of critical habitat will also protect marine communities in those areas;
- programs of international cooperation will benefit cetaceans worldwide.

Recovery Plan Objectives
The overall objective is:

- *To promote the recovery of blue whale numbers in Australian waters (including the AAT), and where appropriate initiate complementary conservation measures with regional and global partners (given the highly migratory and highly dispersed nature of the species) to a level that will see the species removed from the endangered category in the ESP Act*

Full recovery of blue whale numbers is not achievable within the five-year life of this plan. As noted in the Introduction section of this plan, blue whale ecology makes determining population and species status difficult. The specific objectives listed below address this issue and are achievable in the timeframe prescribed. The recovery of a species such as blue whales may take many years and long-term commitments are necessary to ensure that any measures introduced are making positive impacts on blue whale numbers.

Specific objectives are:

1. Determine the abundance, distribution, genetic relationships and seasonal movements of blue and pygmy blue whales in Australian waters.
2. Determine and define calving, mating and feeding areas, and the extent to which physical and biological processes determine distribution, movements and behaviour. Protect critical habitat areas once defined.
3. Design and commence a long-term monitoring program to assess trends in abundance and to monitor recovery of blue whale populations.
4. Determine the extent to which human-induced injuries/mortalities affect the recovery of blue whales and implement measures in consultation with marine based industries to ensure that these impacts are kept to a minimum.

5. Ensure maximum scientific data is collected from any blue whale that may have stranded, by supporting museums, universities and other organisations prepared to collect, archive and display material. Continue to provide support for scientists involved in established cetacean stranding programs around Australia.
6. Implement, expand and support 'platforms of opportunity' studies in Australian and Southern Ocean waters. Implement and maintain sightings and photo-identification databases.
7. Continue to participate in international fora and support programs of cetacean conservation worldwide. Continue to implement the recommendations of the Report of the National Task Force on Whaling.

Recovery Criteria

Criteria against which the success of the Recovery Plan actions can be measured are:

1. identification of the population size, structure and abundance of blue whales in Australian and AAT waters
2. determination of the feeding, calving and mating areas of those populations
3. protection and management of critical blue whale habitat
4. implementation of a long-term program to monitor trends in abundance of blue whales
5. assessment of human-induced injuries/mortalities and development of reduction strategies
6. implementation and maintenance of databases that collate information from monitoring and stranding data
7. increase in programs of joint initiatives and 'platforms of opportunity' studies
8. continuation of cooperation with international fora to promote programs that reduce threats to the recovery of blue whale numbers.

Research Actions Needed

1. conduct surveys of the blue whale population in Australian waters
2. conduct research to define critical habitat for blue whales
3. design a long-term monitoring program based on data from research actions 1 and 2
4. assess the level of human-induced activity impacting on blue whale recovery
5. ensure collection and collation of all sightings and strandings information available

Management Actions Needed

1. protect identified critical habitat
2. implement programs for reduction of human-induced mortalities
3. maintain sightings and strandings database
4. continue to cooperate with international programs of recovery and threat reduction

Timeframes

	Year 1	Year 2	Year 3	Year 4	Year 5
Specific Objectives	1, 5 ⇨ 7	1, 5 ⇨ 7	1 ⇨ 7	2, 4 ⇨ 7	2 ⇨ 7
Recovery Criteria	1, 6 ⇨ 8	1, 6 ⇨ 8	1 ⇨ 8	2, 3, 5 ⇨ 8	2 ⇨ 8
Research Actions	1, 5	1, 5	1 ⇨ 5	2, 4, 5	2 ⇨ 5
Management Actions	3, 4	3, 4	1 ⇨ 4	1 ⇨ 4	1 ⇨ 4

Estimated Cost of Implementing Actions in Recovery Plan
The following summary table lists the costs associated with the actions under Specific Objectives as detailed in pages 21 to 25.

Details are provided for the following costs on pages 26-29. The figures are in $000s.

Action	Priority	Year 1	2	3	4	5	Total
1.1, 1.2	1	120	120	120			360
1.3	2	3	2				5
2.1, 2.2	1			40	60	60	160
3.1	1			60		60	120
4.1	1			10	5	5	20
5.4	2	10	10	10	10	10	50
6.1	2	20	20	20	20	20	100
7.2	1	10	10	10	10	10	50
Total		**163**	**162**	**270**	**105**	**165**	**865**

PART 1. INTRODUCTION

Blue whales are currently recognised in Australia as one species with two major subspecies: the 'true' blue whale and the 'pygmy' blue whale (Bannister *et al*, 1996). Blue whales (no distinction as to sub-species) are listed on Schedule 1 of the *Endangered Species Protection Act 1992* (C'lth). As a consequence of the listing, a recovery plan must be prepared that identifies the objectives, criteria and actions for the recovery of the species. The life of this recovery plan is five years, although recovery of blue whale numbers is expected to take significantly longer.

Blue whales were very highly exploited particularly in the Antarctic regions and there is uncertainty over the level of some catches. Blue whales have not been the object of an indigenous take in Australian waters, and were only captured incidentally during Australian commercial whaling activities. They were a targeted species in other pelagic operations in Australian waters, including illegal Soviet takes in the 1960s and 70s.

The current status of the species in the Southern Hemisphere, especially of the 'true' blue whale, remains a matter of concern. Recovery efforts are complicated by a lack of information on current population levels, although at least for 'true' blue whales, numbers remain very low. Most information on past distribution, biology and feeding ecology of Southern Hemisphere blue whales has come from whaling records and study of carcasses obtained in whaling. There is little knowledge of their current numbers, past or present migration routes, or breeding grounds in the Southern Hemisphere. The determination of abundance, and trends in abundance is critical to assessing the recovery of blue whale populations (NMFS, 1998). It is important to address this lack of information in the recovery plan.

The behavioural ecology of blue whales makes it significantly difficult to introduce conservation measures for recovery. For example it is difficult to determine the current size and status of populations because:

- their lives are spent in the marine environment where they are widely dispersed at a low density;
- they are highly migratory, crossing State, Territory, Commonwealth and international boundaries;
- they are long lived and slow to mature;
- they have a low reproductive rate;
- there are currently so few that it is difficult to locate blue whales in order to study them; and
- current dispersal on feeding grounds makes it hard to assess absolute numbers from sightings surveys.

These factors highlight the importance of studying concentrations such as those that may exist off Rottnest Island (Western Australia), Portland (Victoria) and in some areas of the Antarctic.

This plan aims to identify the steps necessary to begin the recovery of blue whales in Australian waters. The information contained in this recovery plan is based on data available at the time of drafting. Information that becomes available after the publication of the draft plan can be incorporated in the review process that will follow the public comment period.

A. Status of Blue Whales in Australia

All cetaceans in Australian waters are protected under State legislation to three nautical miles from the coastline, and under Commonwealth legislation from 3 to 200 nautical miles (Australia's Exclusive Economic Zone). Blue whales have been recorded in all Australian State waters and are protected under State/Territory and Commonwealth legislation as follows:

Jurisdiction	**Statute**
Commonwealth	*Endangered Species Protection Act 1992* *Whale Protection Act 1980* *National Parks and Wildlife Conservation Act 1975* *Great Barrier Reef Marine Park Act 1975*
New South Wales	*National Parks and Wildlife Act 1974* *National Parks and Wildlife (Fauna Protection) Regulation 1994* *Threatened Species Conservation Act 1995*
Northern Territory	*Territory Parks and Wildlife Conservation Act 1996*
Queensland	*Nature Conservation Act 1992*
South Australia	*National Parks and Wildlife Act 1972* *Fisheries Act 1982*
Tasmania	*Whales Protection Act 1988* *Threatened Species Protection Act 1995*
Victoria	*Wildlife Act 1975* *Flora and Fauna Guarantee Act 1988* *Wildlife (Whales) Regulations 1997*
Western Australia	*Wildlife Conservation Act 1950* *Conservation and Land Management Act 1984*

Blue whales are listed under Part 1 of Schedule 1 of the *Endangered Species Protection Act 1992*, which provides for the listing of species that are considered to be endangered[1]. True blue whales are also assigned to the Endangered category of the Action Plan for Australian Cetaceans (Bannister *et al*, 1996), with pygmy blue whales included in the 'No Category Assigned - (a) because of insufficient information'.

B. Status of Blue Whales Internationally[2]

	IUCN STATUS	**CITES**	**CMS**
True blue whale (southern hemisphere)	Endangered (EN A1abd)	Appendix I	Appendix I
Pygmy blue whale	Data Deficient	Not listed separately	Not listed separately

Note that in August 1998, the IUCN Red List of Threatened Animals website[3] classifies some blue whale populations in the Northern Hemisphere in vulnerable or lower risk categories. All Antarctic blue whale populations are listed under the endangered category D1 'Population estimated to number less than 250 mature individuals'.

[1] See Appendix 2
[2] See Appendix 3
[3] See internet site: www.wcmc.org.uk/species/animals/animal_redlist.html

C. Reasons for Listing on Endangered Species Protection Act

The listing of blue whales on Schedule 1 of the *Endangered Species Protection Act 1992* (ESP Act) reflected their status on the 1991 ANZECC List of Threatened Australian Vertebrate Animals. Species were nominated to that list by one or more ANZECC agencies and required the unanimous agreement by ANZECC's Standing Committee on Conservation to be accepted. The list was used to formulate the ESP Act schedule.

D. Existing Conservation Measures and Funding

Traditionally, the means of protecting wildlife and their habitats has been the declaration of a protected areas regime. The *Whale Protection Act 1980* (WP Act) banned whaling within Australian waters, and legislated against killing, injuring, taking, or interfering with any cetacean. It does not, however, offer protection to areas of critical habitat[4].

The Commonwealth Government released Australia's Oceans Policy in 1998, stating that new legislation would be introduced to create an 'Australian Whale Sanctuary'. The Oceans Policy also notes Australia's intention to promote the establishment of a sanctuary in the South Pacific, complementing the Southern Hemisphere IWC sanctuaries and as a step in working towards a Global Whale Sanctuary. The IWC currently has declared two sanctuaries in the Southern Hemisphere where commercial whaling is not permitted: the Indian Ocean Sanctuary (IOS) in 1979; and the Southern Ocean Sanctuary (SOS) in 1994. Initially these sanctuaries are designated for periods of 10 years. The IOS is due for its next review at the IWC meeting in 2002, and the SOS will have its first review in the year 2004.[5]

Historically, Environment Australia has provided funding for research on other cetacean species, particularly for humpback and southern right whale projects. The Commonwealth Government has also contributed funding to IWC blue whale surveys off the Southern Hemisphere continents. Future funding, from the Environment portfolio, will be available from the Natural Heritage Trust (NHT).

In 1997 the Commonwealth Government established the Natural Heritage Trust (NHT) with the enabling legislation, *Natural Heritage Trust of Australia Act 1997*. The Trust is a suite of funding initiatives managed jointly by Environment Australia and Agriculture, Fisheries & Forestry Australia (AFFA). Funding programs are grouped under the broad divisions: land, vegetation, rivers, biodiversity, and coasts and marine.

The National Task Force on Whaling released its findings and recommendations in a Report made public on the 12 September 1997[6]. Recommendation 11 states 'The Government should demonstrate clearly its commitment to cetacean conservation through continued support and encouragement for non-lethal research to address effectively the threats posed to Australian and Southern Ocean whale populations by marine resource exploitation, habitat degradation and environmental change'. The Commonwealth Government's response to the Task Force recommendations was released on 20 October 1997 and included an acceptance of Recommendation 11, noting that resources for the conservation of endangered, vulnerable and threatened marine species would come from the Coast and Clean Seas Initiative under the Natural Heritage Trust.

[4] See Appendix 2
[5] See Appendix 3
[6] See Appendix 4

E. Benefits to Nontarget Species

Section 32(2)(g) of the ESP Act indicates the need to identify the activities in this plan that will benefit species other than blue whales. These species will occur within the various habitats that blue whales use. As blue whales are a wide ranging species, any marine management protection regime will have benefit for almost all the cetaceans found within Australian waters, in particular other oceanic mysticete species such as fin, sei, Bryde's and minke whales, as well as humpback and southern right whales.

Conservation measures that will benefit blue whales and their habitat will also benefit offshore marine communities, sub-antarctic and Antarctic communities.

F. Affected Parties

Section 32(2)(f)(i) of the ESP Act states the need to identify organisations likely to be affected by the actions proposed in this plan. The list below is not exhaustive.

Commonwealth
Biodiversity Group and Marine Group, Environment Australia
Australian Antarctic Division
Australian Maritime Safety Authority
Australian Fisheries Management Authority
Agriculture, Fisheries & Forestry Australia
Department of Defence
Department of Foreign Affairs and Trade
Great Barrier Reef Marine Park Authority

State/Territory Governments
South Australia - Department of Environment, Heritage and Aboriginal Affairs
Victoria - Department of Natural Resources and Environment
Northern Territory - Parks and Wildlife Commission
Western Australia - Department of Conservation and Land Management
Tasmania - Department of Primary Industry, Water and Environment
New South Wales - National Parks and Wildlife Service
Queensland - Parks and Wildlife Service
Museums
State Fisheries Agencies

Non-government organisations
Oil and gas production industry - (eg APPEA)
Universities throughout Australia
Conservation groups
Whalewatching industry and Association
Tourism industry (including Antarctic tourism)
Shipping and fisheries companies

Environment Australia currently maintains a contact database of government departments, organisations and people involved in or interested in cetacean management. Consultation between Environment Australia and affected parties would be ongoing and meetings with interested stakeholders may be required dependent on the action being undertaken. Representation on a recovery team would be drawn from a cross-section of affected and interested parties.

G. Evaluation and Review

Section 32(2)(f)(ii) of the ESP Act states that those organisations or persons who will be involved in evaluating the performance of the recovery plan need to be identified. An annual review will be carried out by a recovery team, to be established, and all reports will be forwarded to ESAC (Endangered Species Advisory Council). Section 43 of the ESP Act states that the recovery plan may be varied at any time on the request of the Director of National Parks and Wildlife, or the Minister.

An evaluation of the plan will be undertaken after five years by ESAC and the recovery team, who may amend the plan in accordance with the results of the previous five years. A report of the evaluation will be presented to the Director of National Parks and Wildlife, as noted in Section 43(2) of the ESP Act.

H. Social and Economic Impacts

ESP Act section 32(3)(c) states that in preparing recovery plans, regard must be had to minimising any significant adverse social and economic impacts. Objectives and actions in this plan have been formulated with this in mind. No changes of current policy or process are advocated. Recommended programs of data collection and threat reduction will augment existing marine wildlife research and protection programs.

Governments will need to allocate funds to implement recovery actions specified in this plan. Beyond this, implementation of this plan will not have significant economic impact in the short-term. Long-term recovery of blue whale numbers may have beneficial economic impacts, particularly for the tourism industry.

PART 2. BIOLOGICAL DESCRIPTION OF BLUE WHALES

General Biology

Blue whales belong to the Order Cetacea, an order that comprises all the known whales, dolphins and porpoises. Two extant suborders are recognised: Mysticeti - comprises all the baleen or 'whalebone' whales; and Odontoceti - the toothed whales. Baleen whales are so named for the series of bristly horny plates (baleen) arranged along the upper jaw, that are used as a filtering mechanism to trap and sieve prey from the water. The larger whales, sometimes referred to as the 'great' whales, are (apart from sperm whales) all baleen whales, and include blue, fin, sei, humpback, and right whales.

Blue whales are the largest animals to have lived on the earth: they can grow to a length of over 30m and weigh up to 180 tonnes. Blue whales are a cosmopolitan, oceanic species found in all oceans of the world (Gambell, 1979; Mizroch *et al*, 1984). They are usually of a bluish grey colour but with a paler underside. The back and sides are generally mottled. Yellowish diatom films on the whale have given it the alternative name of 'sulphur-bottomed whale' (Jefferson *et al*, 1993).

Blue whales migrate from their mid-to-high latitude summer feeding grounds to breeding areas ranging across the lower latitudes. No specific breeding ground has been identified. Most knowledge of blue whale biology comes from whaling catch data and recent information obtained through the blue whale cruises operated by the IWC in conjunction with the Japanese Government.

'True' and 'pygmy' blue whales

Three subspecies of blue whale have been recognised (eg LeDuc *et al*, 1997; Klinowska, 1991; Yochem and Leatherwood, 1985):

the 'true' blue whale of the Northern Hemisphere *Balaenoptera musculus musculus* (Linnaeus, 1758);

the 'true' blue whale of the Southern Hemisphere *Balaenoptera musculus intermedia* (Burmeister, 1871); and

the 'pygmy' blue whale, *Balaenoptera musculus brevicauda* (Ichihara, 1966).

This document will be referring mainly to 'pygmy' blue whales (*B.m.brevicauda*) and Southern Hemisphere 'true' blue whales (*B.m.intermedia)*.

Differences between pygmy blue whales and blue whales are found in the following characteristics (Ichihara, 1981): body proportion, shape of baleen plate, growth, migratory range and distinctive osteological information. There is, as yet, no confirmed set of features that make the subspecies distinguishable from each other at sea. Selective direct exploitation or conservation of either subspecies is therefore not possible. Ichihara (1981) notes that for these reasons the pygmy blue whale was included in the complete protection of blue whales by the IWC in 1965/66. The IWC is conducting research to determine whether identifications made at sea between the two subspecies are reliable, and which features, if any, allow such an identification (Kato *et al*, 1996; LeDuc *et al*, 1997). Acoustic studies are being evaluated as a scientific technique to enable differentiation between 'true' and 'pygmy' blue whales (Ljungblad *et al*, 1997; Ljungblad and Clark, 1998).

Female blue whales become sexually mature at 23 to 24m in the Southern Hemisphere and length at physical maturity is 26 to 27m (Yochem and Leatherwood, 1985). Female pygmy blue whales are sexually mature at about 19m and physically mature at about 22m (Ichihara, 1966). Male blue whales are 22m at sexual maturity and 24 to 25m at physical maturity in the Southern Hemisphere (Yochem and Leatherwood, 1985). Male pygmy blue whales mature sexually at less than 19m, and are physically mature at 21m (Ichihara, 1966). The longest recorded blue whale was a female from the Antarctic of 33.58m, and the longest pygmy blue whale was 24.4m (Ichihara, 1966). Females are slightly larger than males of the same age (Klinowska, 1991).

After attaining sexual maturity, female blue whales give birth to a single calf every two to three years, following a gestation period of 10-11 months. Multiple embryos have been reported, but are apparently rare. Calves are 6-7m long at birth and 2.7 to 3.6 tonnes in weight, and are weaned at 7 months, by which time they are 16m long (Yochem and Leatherwood 1985; Bannister *et al*, 1996). Mother and calf pairs are often observed away from schools of males and other females (Klinowska, 1991).

Feeding Ecology

Blue whales feed almost exclusively on a few species of euphausiids commonly referred to as krill. A review of prey items for blue whales (Yochem and Leatherwood, 1985) found Northern Hemisphere blues feed on *Euphausia pacifica* and *Thysanoessa spp.* while Southern Hemisphere blue whales feed mostly on *Euphausia superba*, with supplementary prey items including *E. crystallarophias*, copepods and amphipods. A recent study on blue whales in the Channel Islands off California (Fiedler *et al*, 1998) found two euphausiid species were being consumed, *Thysanoessa spinifera* and *Euphausia pacifica*. *Euphausia vallentini* has been reported as the main prey of the pygmy blue whale in the Antarctic (Yochem and Leatherwood, 1985). Recently it has been shown that blue whales, thought to be pygmy blues, feed on the neritic euphausiid *Nyctiphanes australis* off western Victoria (P. Gill *pers comm*). Yochem and Leatherwood (1985) also note that although some Northern Hemisphere blue whales have been reported to feed on sardines and capelin and other small fish, they suggest that such fish are probably ingested incidentally.

Blue whales feed in the summer months in polar and cold temperate waters, and there have been some reports of blue whales feeding in sub-tropical waters as noted in Yochem and Leatherwood (1985) and Reilly and Thayer (1990). Studies by Nemoto (1957, in Klinowska, 1991) observed that blue whale migration into feeding areas has been linked to krill concentration peaks. When the krill bloom occurred early in the season, migration would occur earlier in that year. He also found linkages with the vertical daily movements of the krill. Stomach content analyses showed a feeding peak during the early morning and evening, seemingly corresponding to the vertical daily movements of the prey.

Yochem and Leatherwood (1985) found that most large groupings of blue whales are generally to be found associated with feeding grounds. This was also noted in observations in the Channel Islands off California by Fiedler *et al* (1997), in the southern Chilean fjords by Thiele *et al* (1998), and in Japanese data collected in the Antarctic and off Southern Hemisphere continents (Kato *et al*, 1995).

Natural Mortality

There is little knowledge about natural mortality of blue whales in the Southern Hemisphere. Northern Hemisphere blue whales have been known to become entrapped in ice with injuries and deaths reported along the south-west coast of Newfoundland (Beamish, 1979). Sears *et al* (1990) reported scarring on the dorsal surface of blue whales in the Gulf of St Lawrence to be possibly the result of contact with ice. No similar reports have been found for Antarctic regions. Killer whales have been documented attacking a blue whale off the coast of Baja California (Tarpy, 1979) and scarring and injuries may be attributed to encounters with killer whales (Sears *et al* 1990). Yochem and Leatherwood (1985) note that estimates of maximum age for blue whales range from 30 years to 80-90 years.

Blue whales in Australian Waters.
A blue whale sightings cruise off the southern coast of Australia in 1995-96 was the first in a series of IWC/SOWER (Southern Ocean Whale and Ecosystem Research) blue whale cruises using research sighting vessels provided by the Government of Japan. Concentrations of blue whales were seen off Rottnest Island, WA and south of Portland, Victoria, where feeding has been recorded along the edge of the continental shelf. Most of the animals sighted were identified as pygmy blue whales by crew members experienced in past commercial whaling operations for both pygmy and true blue whales (Kato *et al*, 1996). Other sightings indicate blue whales can be seen in the Great Australian Bight, Bass Strait, off the continental shelf along eastern Australia from southern Queensland to northern Victoria, and along the east and west coasts of Tasmania. Bannister *et al* (1996) noted that blue whales have stranded in Victoria, South Australia, Tasmania, Western Australia and Queensland. Most of the recent strandings and coastal sightings have been identified as pygmy blue whales. Analyses of sightings data from a variety of whaling expeditions and sightings surveys, also confirmed concentrations of blue whales in the area off south-western Western Australia and Portland, Victoria (Kato *et al* 1995). Recent yacht-based and aerial surveys in the waters around Portland, Victoria, have consistently found blue whales in cooler upwelled waters along the continental shelf, throughout the summer months. Feeding has been observed from vessels and from the air, and abundant surface swarming prey has been identified as the neritic euphausiid *Nyctiphanes australis* (P. Gill *pers comm*).

Blue whales are found in the waters off Australia's Antarctic Territory (Kato *et al* 1995), where they feed on euphausiids found primarily near the ice edge. Migration routes are speculated to lead from this area up along both eastern and western coasts of Australia, into the South Pacific and Indian Oceans in the Southern Hemisphere winter (Gambell, 1979). Since the end of whaling, most sightings in this area of the AAT have come from the IWC/IDCR (International Decade for Cetacean Research, now called IWC/SOWER) cruises and the Japanese JARPA (Japanese Whale Research Program under Special Permit in the Antarctic) surveys. Australia now has a program of cetacean surveys associated with the Southern Ocean Pelagic Ecosystem Monitoring Program (SOPEM) which has also reported blue whale sightings and concentrations (Thiele *et al*, 1997). This program uses the Australian Antarctic Division's research and resupply ship, *Aurora Australis*, as a platform of opportunity to conduct cetacean surveys on the Australian National Antarctic Research Expeditions (ANARE) voyages into the Southern Ocean (Thiele and Gill, 1998).

Research Tools and Priorities
The Action Plan for Australian Cetaceans (Bannister *et al*, 1996) has listed the following research as necessary for blue whale conservation objectives and actions:

- Investigate identity, distribution, abundance and pollutant levels, to provide information on current status of both forms
- Minimise possible detrimental effects on population(s) in Australian waters, to permit recovery if possible, particularly of 'true' blue whales
- Investigate feasibility of undertaking acoustic and shipboard/aircraft surveys for distribution/abundance in Australian waters, particularly where species is known to occur, eg off Eden, New South Wales, south-western Western Australia, in eastern Great Australian Bight and Bass Strait
- Ensure continued co-operation with other national agencies, eg Japan, IWC, conducting research cruises in relevant Southern Ocean areas in the context of the Australian Government initiatives for research in the Southern Ocean Sanctuary
- Ensure regular collation of strandings and sightings data, including genetic and pollutant analysis.

The Action Plan for Australian Cetaceans also recommends special funding to undertake feasibility studies on current status, ensure genetic analysis and co-operation with overseas agencies. The

authors conclude that it is possible to obtain information on both blue whales and pygmy blue whales in Australian and AAT waters from the studies mentioned above. These research proposals have been taken into account in the actions of this plan.

Research on vocalizations of whales using hydrophones can give vital information about whale distribution and movements (Thompson *et al*, 1979; Ljungblad and Clark, 1998). Acoustic research is a non-interfering tool that can add significant data to visual observations but can also be used when visual observations are not possible. Vocalizations from whales can be picked up by hydrophones at night and in difficult weather conditions. Hydrophones can be deployed at remote monitoring stations to gather data automatically for extended periods of time. This is especially useful in studies in the Southern Ocean where voyages are not made throughout the year and can only access a limited part of the Antarctic ecosystem.

The National Task Force on Whaling (1997) included in its report a recommendation that a commitment to cetacean conservation required continued support for research on whale populations in Australian and Southern Ocean waters. Non-lethal research was important to identify and reduce threats to whales including habitat degradation, environmental change and marine resource exploitation.

PART 3. THREATS, IMPACTS AND ISSUES FOR BLUE WHALES

Threats to blue whales in Australian waters have been identified in Bannister *et al*, (1996), as including seismic operations; collision with large vessels; defence operations; entanglement in fishing gear; and pollution (including oil spills, increased amounts of plastic debris at sea, industrial waste dumped in waterways and at sea, and bio-accumulation of toxins in body tissues). Although not listed currently as a threat to blue whales, commercial whaling is discussed as it was directly responsible for the significant worldwide decline in large whale populations.

The *Whale Protection Act 1980* bans commercial whaling in Australia's EEZ and is a component of the strong stand the Government has taken against whaling. The Australian Government's policy against commercial whaling was developed further by the National Task Force on Whaling established in September 1996. The report issued by the Task Force in September 1997 encouraged the Government to adopt an even stronger policy by working towards a permanent international ban on commercial whaling. The report acknowledged that this would be a long-term goal and advocated the following steps as a process to achieve this goal:

- maintenance of the current IWC moratorium on whaling with the complementary measure of seeking an extension of the moratorium for a further fifty years
- establishment of a global whale sanctuary
- prohibition of permit (scientific) whaling
- voting against any proposal to adopt the Revised Management Scheme (RMS) and Revised Management Procedure (RMP) by the IWC
- opposing the recognition of any additional categories of whaling by the IWC, and seeking to resist any extensions of current aboriginal subsistence whaling provisions
- strengthening the definition of humane killing.

The Government accepted the recommendations of the report in October 1997.

Commercial Whaling

At present, blue whale numbers have been so dramatically affected by commercial whaling that the population may have reached a level too low to recover naturally. As the separation of the two subspecies in the Southern Hemisphere has only been recognised in the last twenty years, estimates of blue whale population sizes from surveys in waters where both subspecies occur, cannot be related to 'true' blue whales with certainty. Information from areas south of 60°S is however likely to refer almost exclusively to 'true' blue whales.

Direct exploitation of great whales began in earnest in the late 19th century with the development of the explosive grenade harpoon and powered catcher boats (Tønnessen & Johnsen, 1982 in Gambell, 1993). Antarctic whaling began in the early 1900s and the first land station was opened on South Georgia in 1904. The first floating factory ships began operating in 1925. Incorporating a stern slipway to haul the whales onto the deck enabled processing to occur on the open seas and dramatically increased the exploitation of pelagic, fast-swimming whale species such as the blue, fin and sei (Gambell, 1993). From then, the rapid decline of Antarctic stocks of blue whales continued, with a short reprieve during World War II, until a ban by the International Whaling Commission on the taking of blue whales was introduced in 1965/66. Although not as favoured a species for oil as right whales (Best, 1988; Klinowska, 1991), blue whales were sought for their size. The governing criterion for regulating catches in the Antarctic was set as a Blue Whale Unit (BWU) in 1944 (Gambell, 1993). This measurement made one blue whale=2 fin=2½ humpback=6 sei. Less effort was certainly involved in catching one blue whale than six sei whales, so the pursuit of blue whales continued until the 1965/66 ban. In 1972, BWU catch limits were replaced by limits set on individual species. Commercial whaling has been responsible for reducing the population of Antarctic 'true' blue whales from 160,000-240,000 (Klinowska, 1991) to perhaps less than 1000 today (Bannister *et al*, 1996).

Recent data on pirate whaling (Best 1992) and unreported catches (Yablokov, 1994; Zemsky *et al*, 1995a) indicate that the IWC ban on blue whale take and the subsequent moratorium on commercial whaling did not fully guarantee protection from whaling for this species. Information that has lately become available from Russian scientists, shows unreported catches extending along the entire length of the western Australian coast continuing south of the continent and into the Tasman Sea (Zemsky *et al*, 1995b). These unreported catches were for the period 1947 to 1972, i.e. ending six years after the IWC ban on the commercial take of blue whales was introduced.

A report by New Zealand scientists to the Scientific Committee of the IWC in 1998 (Lento *et al*, 1998), revealed that genetic analyses of whale meat purchased in Japanese markets identified the meat as coming from protected species such as blue, fin and humpback. It could not be ascertained, when these species had been caught or from what areas, but it seems unlikely that Southern Hemisphere blue whales would be involved.

Entanglements with Fishing Gear

Reported cases of entanglements of blue whales in Australian waters are extremely rare, due mainly to the oceanic distribution of this species. Of the larger cetaceans, coastal whale species such as humpback or southern right whales are more likely to become entangled in fisheries gear or shark control nets in Australian waters. In a recent worldwide review of cetacean interaction with fishing gear (IWC, 1994), a number of large, baleen whales were listed as being incidentally captured in a variety of fishing equipment. These included cases of humpbacks, minkes, right and fin whales becoming entangled in gear such as gillnets, cod traps, herring weirs and driftnets, used in artisanal and commercial fishing operations. In the Southern Hemisphere, humpback, southern right and minke whales have been reported as becoming entangled in areas along the south-eastern Pacific Ocean, southern Indian and Atlantic oceans.

Noise Pollution and Seismic Activities

In water, sound is transmitted very efficiently and this allows noise generated by ships and other human activities to travel long distances (Richardson *et al* 1995). This characteristic also allows cetaceans to use sound to communicate and gather information about the surrounding environment. Human activities that contribute to the noises heard in the marine environment include: seismic surveys, oil and gas drilling, sonars, marine vessels and aircraft. The frequencies and pressures of the sounds from these activities are known but studies on the direct effect of these sounds on cetaceans are not comprehensive or conclusive.

Blue whales produce strong, low frequency moans that have been recorded in the frequency range of 12.5-200Hz (Richardson *et al* 1995). However, higher frequency (up to 524Hz) blue whale sounds, thought to be those of pygmy blue whales, have been recorded off Western Australia (Ljungblad *et al* 1997). Richardson also concludes, on indirect evidence, that most baleen whales are sensitive to frequencies below 1KHz but they can hear sounds above this range. They are likely to hear sounds below the detectable range for humans and many whale calls include sounds at below 50Hz. Fin and blue whale sounds usually include components under 20Hz.

A recent study on the effect of a seismic survey air gun array on humpback whales (McCauley *et al*, 1998) found that although no gross changes in migration paths were observed, behavioural and avoidance reactions to the air gun array were documented. The authors speculated on the possibility that seismic noise effects would be greatest in areas of breeding and calving rather than on migration routes. McDonald *et al* (1993 in Richardson *et al*) reports that blue and fin whales off the Oregon coast continued to vocalize during a mid-ocean ridge airgun experiment. The effects of seismic experiments in areas where animals may be at rest, feeding, feeding calves or mating are not known and need to be determined in order that appropriate guidelines and management can be put in place.

Very little study on the effect of seismic noise on blue whales has been conducted. Ljungblad *et al* (1998) and Ljungblad and Clark (1998), presented the acoustic results obtained from the 96/97 Japan/IWC blue whale cruise off Madagascar and the 1997/98 IWC/SOWER cruise off Chile. Both studies obtained previously unknown vocalizations that were attributed to pygmy blue whales. Pygmy blue whale vocalizations had not previously been recorded and were found to differ from those ascribed to true blues. This new information, by identifying the type and range of sounds used by blue whales, may lead to more effective understanding of how seismic and other man-made noise can affect blue whales. Possible concentrations of blue and pygmy blue whales around the area of Rottnest Island, WA and Portland, Vic may be in areas of future seismic exploration (Encom, 1998).

Impacts from vessels

Reports of collisions of vessels with large whales are mostly anecdotal (R.Pirzl, *pers comm*). A Bryde's whale was found dead on the bow bulb of a cargo vessel in May, 1992 (ANPWS, 1994) but it was unclear if the whale had died before being struck. A report of a collision of a yacht with a large whale was made during the 1995/96 Sydney to Hobart yacht race, however, the species of whale was unknown. No collisions were reported in subsequent races.

Most of the busiest traffic shipping routes into Australia are concentrated along the eastern coast of Australia, where cargo ships arriving and departing from Asia travel to and from the ports of Brisbane, Sydney and Melbourne. The waters off Cape Nelson, Victoria, used for feeding by blue whales, are also a major shipping route between Melbourne, Adelaide and points further west. Fewer vessels use a route off the western coast of Australia. Although no blue whales have been reported as being involved in collisions within Australian waters, such an event cannot be discounted. A blue whale (thought to be a pygmy blue whale) was carried into Auckland Harbour after being struck by a container ship (Donoghue, 1996). If the population of blue whales is not recovering, a small number of mortalities from vessel collisions becomes significant.

A whale watching industry based on blue whales has been established in the Gulf of St Lawrence, Canada. Some concern for disturbance to the blue whales and the increased possibility of impacts with vessels has been raised (NMFS, 1998). This concern would seem to be justified given that Sears *et al* (1990) found 9% of the individuals on photographic file from the Gulf of St Lawrence had ship-induced scars. No blue whale watching industry exists in Australia although opportunistic sightings have been made off Coffs Harbour and Eden, NSW, Portland, Vic, and south-western Western Australia. Whale watching based on blue whales may become a viable industry in some locations, if numbers increase and awareness of their presence is raised.

Competition and Prey Availability

In their review of baleen whale competition, Clapham and Brownell (1996), concluded that there was little evidence to suggest that any interference competition existed among baleen whales. They examined the proposed hypothesis that an increase in the abundance of minke whales in the Southern Hemisphere has inhibited the recovery of blue whales. They concluded that supporting data for this theory was virtually absent. Suggestions for further research were made to be able to exclude or consider competition as a factor affecting recovery of exploited populations.

One of these suggestions, and one that is important to the question of recovery, is the availability of the prey items in the feeding grounds. Krill harvesting has been taking place for a number of years and more data is needed to classify whether this may have significant effects on krill numbers in the Antarctic. Major oceanographic and climatic impacts on euphausiid abundance must also be considered. Horwood (1981) argued that surplus krill exists in the Southern Ocean due to the great reduction of the Antarctic whales. He points out that although this may suggest an argument for

krill harvesting without detriment to the whale stocks, we cannot consider the management of krill fisheries without taking into account the management of the whales and their recovery. Commercial exploitation of the coastal krill *Nyctiphanes australis* has been proposed in Tasmania (Nicol and Endo, 1997) in areas where humpback whales feed on them (Gill *et al* 1998) and in Victorian waters where blue whales feed on them (P Gill, *pers comm*).

Global warming and ozone depletion may also affect cetacean feeding in the Antarctic. Any process that can modify the dispersion or supply of krill, can be expected to impact on the foraging efficiency of whales that include krill as a primary prey item (Tynan and DeMaster, 1997). These authors presented various models of climate change, global warming and ozone depletion and noted that increases in the level of UV-B radiation in the Antarctic ecosystem could affect cetacean foraging strategies. In particular, high latitude residents such as the blue whale could be at greatest risk.

Research on whether krill (*Euphausia superba*) is a limiting resource in the Antarctic is an important component of the recovery of all baleen whale species, especially the blue whale.

Other Potential Threats

Bio-accumulation of toxins is not considered to be a serious threat at this time to Southern Hemisphere blue whales, which feed in high latitudes on a diet that relies heavily on low trophic level organisms such as krill. Other pollution hazards to blue whales include an increase of plastic discarded at sea and carried to the polar feeding grounds by currents and wind action. Plastics may be ingested accidentally while feeding on krill swarms. Large oil spills or chemical contamination in calving, mating and feeding areas are also a concern. These areas, however, have not been well defined for blue whales, again emphasizing the need to outline such areas and the migration routes taken.

The dramatic decrease in blue whale numbers has suggested the possibility of an increase in the probability of interspecific breeding. Hybridization between blue whales and fin whales has been documented in five cases (Bérubé and Aguilar, 1998; Spilliaert *et al*, 1991). The hybrids, three females and two males, were all taken in commercial whaling operations in the Northern Hemisphere and it is unknown whether the hybrids were reproductively viable. In an analysis of the documented cases, Bérubé and Aguilar (1998) concluded that historical records of other possible blue-fin whale hybrids preceded the concentrated blue whale harvest and therefore the hybrids were not a response to mating pressure on blue whales. As noted by the same authors, hybridization between fin and blue whales is assisted by the overlap of feeding habitats and similarity at the molecular level. The small number of documented cases make conclusions difficult. No cases have been documented from the Southern Hemisphere.

Defence force operations may impact on whales, depending on the time and area in which they occur. Regular communication between Environment Australia and the Department of Defence ensures that any operations take into account whale migration timing and routes, and areas of critical habitat. These precautions are better defined for species such as humpback and southern right whales but actions under this plan could introduce similar protective regimes for blue whales.

PART 4. OBJECTIVES AND RECOVERY ACTIONS

Recovery Objectives

Overall Objective

Section 32 of the ESP Act (Appendix 1) specifies the content of a recovery plan. In particular the plan must state an objective, actions to achieve the objective and criteria against which the success of the actions is measured.

The *Recovery Plan Guidelines* (Environment Australia, 1998) indicate the need for an overall recovery objective and specific objectives. Overall recovery objectives are those which may not be achievable within the life of the plan, whereas the specific objectives must be realistically achievable within this time span.

The overall objective for this recovery plan is:

- *To promote the recovery of blue whale numbers in Australian waters (including the AAT), and where appropriate, initiate complementary conservation measures with regional and global partners (given the highly migratory and highly dispersed nature of the species) to a level that will see the species removed from the endangered category in the ESP Act*

Full recovery of blue whale numbers is not achievable within the five-year life of the plan as a consequence of the great decline of numbers of blue whales due to commercial harvesting. It is difficult to determine the size and status of populations, areas of critical habitat, movements and distribution. Because of this, monitoring, conservation and management will be very challenging. Progress towards the overall objective is however possible and quantifiable if the actions listed in the recovery plan are conducted and supported in a timely manner. The aims and objectives of the plan will only be accomplished with a long-term commitment to support the recovery actions listed. Cooperation and collaboration between Commonwealth, State and local agencies, scientists, non-government organisations, industry and the Australian community will be required during the recovery period.

Specific Objectives

1 Determine the abundance, distribution, genetic relationships and seasonal movements of blue and pygmy blue whales in Australian waters.

2 Determine and define calving, mating and feeding areas, and the extent to which physical and biological processes determine distribution, movements and behaviour. Protect critical habitat areas once defined.

3 Design and commence a long-term monitoring program to assess trends in abundance and to monitor recovery of blue whale populations.

4 Determine the extent to which human-induced injuries/mortalities affect the recovery of blue whales and implement measures in consultation with marine based industries to ensure that these impacts are kept to a minimum.

5 Ensure maximum scientific data is collected from any blue whale that may have stranded, by supporting museums, universities and other organisations prepared to collect, archive and display material. Continue to provide support for scientists involved in established cetacean stranding programs around Australia.

6 Implement, expand and support 'platforms of opportunity' studies in Australian and Southern Ocean waters. Implement and maintain sightings and identification databases.

7 Continue to participate in international fora and support programs of cetacean conservation worldwide. Continue to implement the recommendations of the Report of the National Task Force on Whaling[7].

Recovery Actions, Priorities and Success Criteria for Specific Objectives

1 Determine the abundance, distribution, genetic relationships and seasonal movements of blue and pygmy blue whales in Australian waters.

Priority: Very High
Timeframe: First three years of plan
To assess the recovery of blue whale populations, it is necessary to determine their stock structure, abundance, and seasonal movements in Australian waters, both in continental waters and off the AAT. Very little information of this type exists for the Southern Hemisphere 'true' or pygmy blue whales. To accurately estimate the size of the 'true' blue whale population, the question of distinction 'in the field' between the two subspecies of blue whale must be resolved.

Actions:

1.1 conduct surveys to estimate population size of blue whales, including biopsy sampling for genetic analyses of population structure of blue whales in Australian waters

1.2 assess daily and seasonal movements and inter-area exchange of blue whales, using telemetry, acoustic and fine scale studies and surveys

1.3 conduct retrospective analyses using past whaling catch data and historical environmental data to determine possible/likely distributions and environmental linkages, to assist with focussing present studies and assessing rate of recovery

Criteria for Success:
The determination of the population size, stock structure, abundance, and seasonal movements of blue whales in Australian waters. The resolution of the genetic distinction between the 'true' blue and 'pygmy' blue whale.

2 *Determine and define calving, mating and feeding areas, and the extent to which physical and biological processes determine distribution, movements and behaviour. Protect critical habitat areas once defined.*

Priority: Very High
Timeframe: Last three years of plan (builds on data from objective 1)
Threats are more likely to impact heavily on population dynamics when they occur in areas essential for species recovery. Areas such as breeding and feeding sites that are subjected to environmental pollution such as oil spills, increased levels of marine debris, changes in habitat through human induced degradation or large scale environmental changes, will directly affect the species recovery rate. Accurate assessment of present and future

[7] See Appendix 4

requirements for protected areas must incorporate knowledge of significant and critical habitat and knowledge of the level of present and future threats to recovery in such areas.

Actions:

2.1 support and implement habitat based studies on known concentrations of blue whales in Australian waters

2.2 increase multidisciplinary ecosystem studies in areas where blue whales congregate to improve knowledge of their feeding ecology

2.3 as breeding and feeding areas are identified, ensure protection of these habitats by introducing awareness programs and legislation as required to secure adequate protection in these regions (eg declaration as a Marine Protected Area)

Criteria for Success:
Identification and protection of areas of critical habitat. The determination of the effect of physical and biological processes on distribution, movements and behaviour of blue whales in Australian waters.

3 Design and commence long-term monitoring programs to assess trends in abundance and monitor recovery of blue whale populations

Priority: Very High
Timeframe: Years three and five of plan (builds on data from objective 1)
As data about blue whale populations and critical areas are accumulated, a long-term program to monitor recovery and determine any trends in abundance can be designed. Well planned programs based on intervals of two to three years would provide indications of the rate of blue whale recovery and allow calculations of the trends in the population of blue whales that move through Australian waters.

Actions:

3.1 Analyse data from previous studies and studies conducted under Objectives 1 and 2 to design and implement a monitoring program to assess blue whale recovery and determine trends in abundance of blue whale populations

3.2 Continue the program at regular intervals after the life of this plan to ensure long-term assessment of recovery

Criteria for Success:
Provision of regular, scientifically sound data on trends in abundance and recovery of blue whale populations in Australian waters. Reporting of this data in national and international fora.

4 Determine the extent to which human-induced injuries/mortalities affect the recovery of blue whales and implement measures in consultation with marine based industries to ensure that these impacts are kept to a minimum.

Priority: High
Timeframe: Year 3 - 5
When areas of important habitat for blue whales are identified (through action 2.1), it is necessary to target any threatening processes that can impact on blue whales in these areas.

When dealing with a small population, any human-induced mortality can affect the species recovery significantly.

Actions:

4.1 implement programs that identify recurring sources of pollution (including noise pollution) entering defined critical blue whale habitats and ensure adequate pollution reduction programs exist in those areas

4.2 develop and continue dialogue and cooperation with marine based industries to ensure blue whales are protected from adverse effects of commercial and recreational activities in critical habitat areas

4.3 ensure existing whalewatching guidelines are observed in regard to blue whales, especially in critical habitat areas

Criteria for Success:
Identification of threatening processes in areas identified as critical habitat and implementation of programs for reduction of human induced injuries/mortalities. Increased consultation with all marine based industries. Improved education and enforcement measures in all whale watching areas.

5 Ensure maximum scientific data is collected from any blue whale that may have stranded, by supporting museums, universities and other organisations prepared to collect, archive and display skeletal material. Continue to provide support for scientists involved in established cetacean stranding programs around Australia.

Priority: High
Timeframe: Continuous over all five years of plan
Strandings of blue whales provide an opportunity to obtain anatomical, morphometric and physiological data that we usually cannot obtain through non-lethal research. Maximising the amount of information we obtain from stranded animals can greatly increase our knowledge of blue whale biology, particularly given the rare nature of such stranding events around Australia.

Actions:

5.1 establish and maintain a system for reporting stranded whales that ensures sample collection as quickly as possible

5.2 ensure all State and local organisations involved in strandings are familiar with correct sampling and storage techniques for data analysis

5.3 ensure a system of information exchange is established between all State and Commonwealth agencies to facilitate access to stranding studies

5.4 ensure scientific analysis of samples, from previous as well as future strandings, and the reporting and discussion of such analyses

Criteria for Success:
The establishment and maintenance of systems and databases for reporting, sample collection, analysis and information exchange for all blue whale and other cetacean strandings. Reporting such analysis and ensuring their availability to the scientific community in general.

6 *Implement, expand and support 'platforms of opportunity' studies in Australian and Southern Ocean waters. Implement and maintain sightings and identification databases.*

Priority: Medium
Timeframe: Continuous over all five years of plan
Platforms of opportunity studies enable data collection at relatively low cost, on an opportunistic basis. Taking advantage of such opportunities can lead to an increase in our understanding of blue whale ecology. Catalogues and sightings databases, maintained in a central location, enable the collation and analysis of information gathered from varied sources around Australia.

Actions:

6.1 support and fund platforms of opportunity studies, particularly joint initiatives with CSIRO (NW Shelf), industry (eg APPEA), ANARE, other nations, and the IWC

6.2 establish and maintain a blue whale identification catalogue (to be held and maintained at Environment Australia)

6.3 continue to maintain a blue whale component of the national sightings database (held and maintained at Environment Australia)

Criteria for success:
An increase in data provided through joint initiatives and platforms of opportunity studies. An increase in the blue whale component of the national cetacean sightings database and the maintenance of a blue whale identification catalogue.

7 *Continue to participate in international fora and support programs of cetacean conservation worldwide. Continue to implement the recommendations of the Report of the National Task Force on Whaling.*

Priority: Very High
Timeframe: Continuous over all five years of plan
Australia is recognised internationally for our strong advocacy for the protection of whales. Participation in international fora, such as the International Whaling Commission, CITES and CMS, ensures we continue to have an input into decisions that affect cetaceans on a global scale.

Actions:

7.1 continue to support the IWC moratorium on commercial harvest of baleen whales (with special reference to blue whales in the Southern Hemisphere); encourage all nations to support the Southern Ocean Sanctuary, Indian Ocean Sanctuary and any future Southern Hemisphere whale sanctuaries; continue to oppose any scientific whaling programs especially in Southern Hemisphere sanctuaries

7.2 continue to support, by funding the participation of Australian scientists, the IWC/SOWER blue whale and Antarctic cruises, and other IWC programs that are based on non-lethal research

7.3 encourage any nation that is involved with any form of whaling to join the IWC, if not already a member

7.4 continue to work against any actions to downlist whales in CITES appendices, and work to prevent any trade in whale products

7.5 continue to implement the recommendations of the Report of the National Task Force on Whaling and work towards the establishment of a permanent international ban on commercial whaling through the actions listed in that report

Criteria for success:
Australia's continued participation in international fora. Increased international support for whale sanctuaries. Cetacean species remaining at the highest level of CMS and CITES protection. Continued support and funding for cetacean conservation programs across Australia.

ESTIMATED COST OF RECOVERY ACTIONS

OBJECTIVE 1 Determine abundance, distribution, genetic relationships and seasonal movements of blue and pygmy blue whales in Australian waters

Action	Description	Priority	Responsibility	$ Year 1	Year 2	Year 3	Year 4	Year 5	Total
1.1	conduct surveys incl biopsies for population size and structure	1	EA	120,000	120,000	120,000			360,000
1.2	assess daily and seasonal movements with telemetry, acoustic and fine scale studies								
1.3	retrospective analyses of historical whaling and environmental data	2	EA	3,000	2,000				5,000

OBJECTIVE 2 Determine and define critical habitat areas

Action	Description	Priority	Responsibility	$ Year 1	Year 2	Year 3	Year 4	Year 5	Total
2.1	support and implement habitat based studies	1	EA			40,000	60,000	60,000	160,000
2.2	increase multi-disciplinary studies in areas of known blue whale concentrations								
2.3	ensure protection of identified areas of critical habitat	1	EA, State agencies	from Commonwealth and State marine protected areas management budgets					

OBJECTIVE 3 Design and commence long-term monitoring program

Action	Description	Priority	Responsibility	$ Year 1	Year 2	Year 3	Year 4	Year 5	Total
3.1	design and implement monitoring program	1	EA			60,000		60,000	120,000
3.2	continuation of monitoring program at set intervals	1		After this 5 year plan: $60,000 every two to three years					

OBJECTIVE 4 Determine the extent of human induced injuries/mortality on recovery of blue whales

Action	Description	Priority	Responsibility	$ Year 1	Year 2	Year 3	Year 4	Year 5	Total
4.1	identification of pollution entering critical areas and implement pollution reduction programs	1	EA, State agencies, community groups			10,000	5,000	5,000	20,000
4.2	develop dialogue with marine based industries to protect blue whales	3	EA, AMSA, AFMA, shipping and other industry groups eg APPEA	from recurrent budgets					
4.3	ensure whalewatching guidelines are observed for blue whales – increase education and enforcement	3	EA and State agencies	requires an increase in the recurrent budget allocations for education and enforcement, both for Commonwealth and State agencies, of approx $10,000 per annum					

OBJECTIVE 5 Maximise scientific data collection, analysis and information exchange from stranded blue whales

Action	Description	Priority	Responsibility	$ Year 1	Year 2	Year 3	Year 4	Year 5	Total
5.1	establish and maintain system for reporting stranded whales	2	EA and State agencies	requires an increase in the recurrent budget allocations for strandings management and reporting, both for Commonwealth and State agencies, of approx $5,000 per annum					
5.2	ensure agencies aware of correct storage and sampling techniques								
5.3	information exchange between all State and Commonwealth agencies								
5.4	analysis of past and future samples	2	EA	10,000	10,000	10,000	10,000	10,000	50,000

OBJECTIVE 6 Implement, expand and support 'platforms of opportunity' studies, sightings and photo-identification databases

Action	Description	Priority	Responsibility	$ Year 1	Year 2	Year 3	Year 4	Year 5	Total
6.1	support and fund platforms of opportunity studies	2	EA	20,000	20,000	20,000	20,000	20,000	100,000
6.2	blue whale identification catalogue	3	EA- establish and maintain with photo and genetic input from all interested parties	from recurrent budget					
6.3	maintain blue whale component of national sightings database	3	EA						

OBJECTIVE 7 Participate in international fora and support programs of cetacean conservation worldwide

Action	Description	Priority	Responsibility	$ Year 1	Year 2	Year 3	Year 4	Year 5	Total
7.1	support IWC moratorium and whale sanctuaries (for all whale species)	1	EA, DFAT	from recurrent budget					
7.2	support and fund participation in IWC research programs	1	EA	10,000	10,000	10,000	10,000	10,000	50,000
7.3	encourage IWC membership	1	EA, DFAT	from recurrent budgets					
7.4	support CITES listing of whales in Appendix I								
7.5	implement National Task Force on Whaling recommendations	1	EA, DFAT, relevant government departments						

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APPENDIX 1

ENDANGERED SPECIES PROTECTION ACT, *SECTION 32*

The *Endangered Species Protection Act 1992* specifies the content of the recovery plan in Section 32. This part of the Act is reproduced for reference.

Content of recovery plans

32. (1) The recovery plan must provide for the research and management actions necessary to stop the decline of, and support the recovery of, the species or community so that its chances of long-term survival in nature are maximised.

(2) In particular, the recovery plan must:

(a) state an objective to be achieved (for example, removing the species or community from a list, or indefinite protection of existing populations of the species or community); and

(b) state criteria against which achievement of the objective is to be measured (for example, a specified number and distribution of viable populations of the species or community, or the abatement of threats to the species or community); and

(c) specify the actions needed to satisfy the criteria; and

(d) identify and specify the actions needed to protect the habitats that are critical to the survival of the species or community; and

(e) state the estimated duration and cost of the recovery process; and

(f) identify:

(i) interests that will be affected by the plan's implementation; and

(ii) organisations or persons who will be involved in evaluating the performance of the recovery plan; and

(g) specify any major benefits to non-target species or non-target ecological communities that will be affected by the plan's implementation.

(3) In preparing a recovery plan, regard must be had to:

(a) the objects of the Act; and

(b) the most efficient and effective use of the resources that are allocated for conservation of species and ecological communities; and

(c) consistent with the principles of ecologically sustainable development, minimising any significant adverse social and economic impacts.

DEFINITIONS AND SCHEDULES RELATING TO BLUE WHALES : AUSTRALIA

Endangered Species Protection Act 1992

PART 1 - PRELIMINARY

4.(1) "native species" means a species:

(e) members of which periodically or occasionally visit:

(ii) the Australian coastal sea; or

(iii) the Australian fishing zone

6.(1) For the purposes of this Act, a species is endangered if:

(a) it is likely to become extinct unless the circumstances and factors threatening its abundance, survival or evolutionary development cease to operate; or

(b) its numbers have been reduced to such a critical level, or its habitats have been so drastically reduced, that it is in immediate danger of extinction;

PART 2 - LISTING

15.(1) Part 1 of Schedule 1 contains a list of native species that are endangered.

*The Action Plan for Australian Cetaceans (***Bannister *et al,* 1996*)***

Endangered

As defined by IUCN.

Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included are taxa whose numbers have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

No category assigned, (a) because of insufficient information

Where there is no firm basis on which to infer a significant threat, past or present.

Definition of Critical Habitat

In this document, the definition of critical habitat is based on the definition used in the United States Code Title 16 – Conservation, Chapter 35 – Endangered Species[8]

Sec. 1532. Definitions

(5) (A) The term "critical habitat" for a threatened or endangered species means –

(i) the specific areas within the geographical area occupied by the species, ..., on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection;

[8] From the United States Code website 21/5/99: http://www4.law.cornell.edu/uscode/16/1532.html

ARTICLES, DEFINITIONS AND APPENDICES RELATING TO BLUE WHALES : INTERNATIONAL CONVENTIONS

Convention on the Conservation of Migratory Species of Wild Animals (CMS)[9]

Article I

Interpretation

1. For the purpose of this Convention:

   e) "Endangered" in relation to a particular migratory species means that the migratory species is in danger of extinction throughout all or a significant portion of its range;

Article III

Endangered Migratory Species: Appendix I

1. Appendix I shall list migratory species which are endangered.

Article IV

Migratory Species to be the subject of AGREEMENTS: Appendix II

1. Appendix II shall list migratory species which have an unfavourable conservation status and which require international agreements for their conservation and management, as well as those which have a conservation status which would significantly benefit from the international co-operation that could be achieved by an international agreement.

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)[10]

Article II

Fundamental principles

I. Appendix I shall include all species threatened with extinction which are or may be affected by trade. Trade in specimens of this species must be subject to particularly strict regulation in order not to endanger further their survival and must only be authorised in exceptional circumstances.

II. Appendix II shall include:

   A. all species which although not necessarily now threatened with extinction may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with their survival; and

   B. other species which must be subject to regulation in order that trade in specimens of certain species referred to in sub-paragraph (A) of this paragraph may be brought under effective control.

[9] From the CMS website 19/1/99: http://www.wcmc.org.uk/cms/

[10] From the CITES website 19/1/99: http://www.wcmc.org.uk/CITES/

International Union for the Conservation of Nature (IUCN)[11]

Red List Categories

Endangered (EN)
A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future, as defined by any of the following criteria:

A) Population reduction in the form of either of the following:

1) An observed, estimated, inferred or suspected reduction of at least 50% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following:

a) direct observation
b) an index of abundance appropriate to the taxon
d) actual or potential levels of exploitation

Data Deficient (DD)
A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat or Lower Risk. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate.

International Whaling Commission (IWC)[12]

International Convention for the Regulation of Whaling 1946

Article V

1. The Commission may amend from time to time the provisions of the Schedule by adopting regulations with respect to the conservation and utilization of whale resources, fixing ...(c) open and closed waters, including the designation of sanctuary areas

SCHEDULE

III. CAPTURE

7(a) In accordance with Article V(1)(c) of the Convention, commercial whaling, whether by pelagic operations or from land stations, is prohibited in a region designated as the Indian Ocean Sanctuary. This comprises the waters of the Northern Hemisphere from the coast of Africa to 100°E, including the Red and Arabian Seas and the Gulf of Oman; and the waters of the Southern Hemisphere in the sector from 20°E to 130°E, with the Southern boundary set at 55°S. This prohibition applies irrespective of such catch limits for baleen or toothed whales as may from time to time be determined by the Commission. This prohibition shall be reviewed by the Commission at its Annual Meeting in 2002.

[11] From the WCMC website 19/1/99: http://www.wcmc.org.uk/species/animals/
[12] From the IWC website 19/1/99: http://ourworld.compuserve.com/homepages/iwcoffice/

7(b) In accordance with Article V(1)(c) of the Convention, commercial whaling, whether by pelagic operations or from land stations, is prohibited in a region designated as the Southern Ocean Sanctuary. This Sanctuary comprises the waters of the Southern Hemisphere southwards of the following line: starting from 40 degrees S, 50 degrees W; thence due east to 20 degrees E; thence due south to 55 degrees S; thence due east to 130 degrees E; thence due north to 40 degrees S; thence due east to 130 degrees W; thence due south to 60 degrees S; thence due east to 50 degrees W; thence due north to the point of beginning. This prohibition applies irrespective of the conservation status of baleen and toothed whale stocks in this Sanctuary, as may from time to time be determined by the Commission. However, this prohibition shall be reviewed ten years after its initial adoption and at succeeding ten year intervals, and could be revised at such times by the Commission. Nothing in this sub-paragraph is intended to prejudice the special legal and political status of Antarctica.

** The Government of Japan lodged an objection within the prescribed period to paragraph 7(b) to the extent that it applies to the Antarctic minke whale stocks. The Government of the Russian Federation also lodged an objection to paragraph 7(b) within the prescribed period but withdrew it on 26 October 1994. For all Contracting Governments except Japan paragraph 7(b) came into force on 6 December 1994.
+ Paragraph 7(b) contains a provision for review of the Southern Ocean Sanctuary "ten years after its initial adoption". Paragraph 7(b) was adopted at the 46th (1994) Annual Meeting. Therefore, the first review is due in 2004.

10(e) Notwithstanding the other provisions of paragraph 10, catch limits for the killing for commercial purposes of whales from all stocks for the 1986 coastal and the 1985/86 pelagic seasons and thereafter shall be zero. This provision will be kept under review, based upon the best scientific advice, and by 1990 at the latest the Commission will undertake a comprehensive assessment of the effects of this decision on whale stocks and consider modification of this provision and the establishment of other catch limits.

* The Governments of Japan, Norway, Peru and the Union of Soviet Socialist Republics lodged objection to paragraph 10(e) within the prescribed period. For all other Contracting Governments this paragraph came into force on 3 February 1983. Peru withdrew its objection on 22 July 1983. The Government of Japan withdrew its objections with effect from 1 May 1987 with respect to commercial pelagic whaling; from 1 October 1987 with respect to commercial coastal whaling for minke and Bryde's whales; and from 1 April 1988 with respect to commercial coastal sperm whaling. The objections of Norway and the Russian Federation not having been withdrawn, the paragraph is not binding upon these Governments.

APPENDIX 4

RECOMMENDATIONS OF THE NATIONAL TASK FORCE ON WHALING

The National Task Force on Whaling was convened in September 1996 by the Federal Minister for the Environment. The Task Force was given a mandate to advise the Minister on practical measures that would help realise Australia's policy of bringing about a permanent ban on whaling worldwide.

In a report released in September 1997, the Task Force set out its principal conclusion, along with 13 recommendations to achieve that goal. The Commonwealth Government accepted the report and recommendations in October 1997.

It is our primary conclusion and recommendation that the best and most practical way to do this is to work, through the International Whaling Commission (IWC), for either the establishment of a global whale sanctuary or, as a less preferred option, a fifty year moratorium on commercial whaling. This should be done in a way that does nothing to disturb the existing indefinite moratorium provided for in the Schedule to the International Convention for the Regulation of Whaling (ICRW) 1946.

Recommendation 1
The Australian Government should take all reasonable steps to bring about, as expeditiously as possible, a permanent international ban on commercial whaling. The Government should identify and use all possible means to implement this policy.

Recommendation 2
The Australian Government and its representatives should be committed to applying the precautionary principle in pursuing its goals.

Recommendation 3
The primary focus for achieving a permanent international ban on commercial whaling should be the International Whaling Commission (IWC). Australia should continue its membership of and participation in the IWC and its subsidiary bodies, and should support the IWC as the primary international mechanism for the conservation of whales.

Recommendation 4
In addition to this primary focus on the IWC, Australia should take positive steps in other relevant international fora to advance the goal of a permanent international ban on commercial whaling. Australia should also be vigilant in opposing any initiatives in other fora that would have the effect of subverting the goal of a permanent international ban on commercial whaling. This must include, *inter alia,* vigorously resisting any attempts to:

reduce the level of protection given to whale species through the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); and

modify the references in the United Nations Convention on the Law of the Sea (UNCLOS) and Agenda 21, which recognise marine mammals as living resources to which a special regime applies and the responsibilities of the International Whaling Commission for the conservation and management of whales.

Australia's policy positions and actions in other fora must be consistent with its objective of achieving a permanent international ban on commercial whaling.

Recommendation 5

The ultimate objective of the Australian Government should be to have the International Convention on the Regulation of Whaling 1946 amended to bring about an effective, permanent international ban on commercial whaling. However, recognising the significant legal and logistical difficulties to be overcome to achieve this outcome, this must be considered a long-term goal.

In the short term the Australian Government should carry out the following actions within the IWC:

a. (i) Australia should support strongly the maintenance of paragraph 10 (e) of the Schedule to the Convention, as the continuation of this paragraph, without modification, results effectively in an ongoing moratorium.

(ii) Australia should work towards the establishment of a global whale sanctuary in all international waters and Exclusive Economic Zones (EEZs), established under the United Nations Convention on the Law of the Sea, up to the territorial seas of each coastal State (up to twelve nautical miles), through an appropriate amendment to paragraph 7 of the Schedule to the Convention.

(iii) as a complementary measure Australia should also work towards the insertion in the Schedule of a commitment to a fifty year moratorium, using a precedent such as the Madrid Protocol to the Antarctic Treaty (on exploitation of mineral resources).

b. Australia should seek ultimately to have the Convention amended to prohibit permit (scientific) whaling. In the meantime, Australia should seek to minimise the granting of permits, and the number of whales taken under any permit, and encourage countries to forbid any permit whaling within their own EEZs.

c. Australia should resist any extension of the current provisions for aboriginal subsistence whaling. Australia should seek to have the following criteria for aboriginal subsistence whaling clearly set out in the Schedule:

- it must be necessary for both cultural and nutritional needs;
- there must be a continuing history of such whaling; and
- it must be carried out by the aboriginal people in question, not on their behalf.

d. Australia should promote the view that all whaling not classified by the IWC as aboriginal subsistence whaling, as set out in Recommendation 5c., is commercial whaling.

e. Australia should oppose the recognition under the Convention of any additional categories of whaling, in particular any proposal for approval of catches for small-type coastal whaling operations.

f. Consistent with its opposition to commercial whaling and its aim of achieving a permanent international ban on commercial whaling, Australia should oppose and vote against any proposal to adopt the Revised Management Scheme (RMS) by resolution or to incorporate the RMS or Revised Management Procedure (RMP) into the Schedule.

g. Australia should seek to strengthen the 1980 Working Group definition of humane killing to establish the principle that humane killing requires that the death of the animal occurs without pain, stress or distress to the animal through a process that, regardless of the limits of technology, causes instant insensibility that lasts until the death of the animal.

Recommendation 6
Australia should undertake activities in relevant multilateral fora to progress its goals, and should recognise and establish its role as a leader of other nations on whaling issues

Recommendation 7
Australia should engage in a series of bilateral negotiations to progress its goals.

Recommendation 8
The Australian Government should recognise the important role that non-government organisations (NGOs), both in Australia and overseas, will play in this initiative.

The Government should:
- seek to use the networks and expertise of conservation NGOs; and
- promote dialogue with relevant Australian NGOs and work with them to achieve mutually held whale conservation objectives.

Recommendation 9
The Australian Government should commit itself to a domestic and international educative campaign.

Recommendation 10
Australia should pursue its objectives vigorously. The status, and range of expertise, of its representatives at IWC and subsidiary meetings should reflect Australia's particular interests.

Recommendation 11
The Government should demonstrate clearly its commitment to cetacean conservation through continued support and encouragement for non-lethal research to address effectively the threats posed to Australian and Southern Ocean whale populations by marine resource exploitation, habitat degradation and environmental change.

Recommendation 12
The National Task Force on Whaling should be continued:
- to review strategies between IWC 49 and IWC 50; and
- to provide advice on matters the Government wishes to refer to it.

Recommendation 13
The Government must be prepared to commit the necessary resources to these strategies and to place adequate priority on the goals.