Completing the Commonwealth Marine Reserves Network

Regulatory Impact Statement

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<u>**Attachments**</u>

Attachment A   Goals and Principles underpinning the development of the Marine Reserves Network Proposals

1.   Problem definition

1.1   Background to the problem

Australia's oceans, like those around the world, are subject to many pressures arising from direct exploitation as well as the indirect impacts of expanding human activities across the planet. The outcome is a decline in the capacity of the oceans to continue to provide ecosystem services to support human needs. The State of the Environment Report 2011[1] found that the overall condition of Australia's marine environment is good compared with the marine waters of other nations. However the cumulative pressures on marine ecosystems are increasing.[2] The marine areas adjacent to Australia have suffered less from the impacts of human activity than other oceans but the same processes are at work and the responses of ocean ecosystems, in terms of declining productivity and biodiversity are observable and measurable, even in areas subject to low levels of current direct exploitation.

The State of the Environment Report 2011 identified climate change impacts as the greatest risk to the marine environment, noting '...There are likely to be major impacts in the coming decades from increasing sea level, increased severity and incidence of extreme weather events, altered ocean currents and associated changes in productivity, [and] increasing acidity of the oceans...'. Sea surface temperatures are also projected to rise.

Changing sea surface temperatures directly affects the distribution and abundance of many species and habitats. In addition, a rise in carbon dioxide levels changes the chemistry of surface waters, making the ocean more acidic. Ocean acidification poses a risk to marine food chains and may potentially affect the primary production systems in the ocean.[3]

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[1] 2011 State of the Environment Committee (2011) *State of the Environment 2011: Independent report to the Australian Government Minister for Sustainability, Environment, Water, Population and Communities,* viewed 21 May 2012, < http://www.environment.gov.au/soe/2011/report/marine-environment/key-findings.html#key-findings>.

[2] *State of the Environment 2011*, viewed 21 May 2012, <http://www.environment.gov.au/soe/2011/report/marine-environment/key-findings.html#key-findings>.

[3] 2011 State of the Environment Committee (2011) *State of the Environment 2011: Independent report to the Australian Government Minister for Sustainability, Environment, Water, Population and Communities*, viewed 23 May 2012, < http://www.environment.gov.au/soe/2011/report/marine-environment/6-risks.html>.

Declining biodiversity reduces the capacity of ecosystems to withstand perturbations without losing any of their functional properties. Ecosystems may become so disturbed that they pass a threshold and undergo what is termed a 'regime shift' which can produce undesirable and potentially irreversible changes where the existing ecosystem structure collapses. The complex, non-linear dynamics of ecosystems means these thresholds are difficult and in some cases impossible to predict[4]. In the absence of the ability to predict such regime shifts, there is a case for the implementation of precautionary measures that support the resilience of ecosystems through the protection of biodiversity.

Representative networks of marine reserves are a key tool for ecosystem-based spatial management that enhances the effectiveness of conservation over wider geographic scales when used in concert with other sectoral management tools.[5]

Representative marine reserve networks provide an insurance policy for our biodiversity assets by building and supporting the health and resilience of ecosystems. This is particularly important given that the combination of pressures on the marine environment is growing and the impacts are becoming increasingly unpredictable, particularly in the context of the potentially significant disturbances from ocean warming and acidification due to climate change.

1.2   The problem

The State of the Environment Report 2011 noted that the cumulative pressures on our marine ecosystems are rapidly growing and that "...The main risks to the future of the marine environment are from the impacts of climate change".[6]

The protection of biodiversity through a network of marine reserves is intended to support the resilience of marine ecosystems to adapt to impacts, such as those from climate change. Systems that are species-rich are more likely to have many species that perform

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[4] Thom, 1969; Loehle 1989; Walker and Meyers 2004; Holling 1973; May 1977; Scheffer et al. 2001; Folke et al. 2004 in Kumar, P (Ed.) (2010) *The Economics of Ecosystems and Biodiversity: The Ecological and Economic Foundations*, Earthscan, London; OECD Environmental Outlook to 2050: The Consequences of Inaction; OECD 2012.

[5] Agardy 2005; EC, 2008; Fernandes et al., 2005; Gaines et al., 2010; IUCN-WCPA, 2008; Roberts, 1997; Roberts et al., 2003 and Sala et al. 2002 in Katsanevakis et al (2011). Ecosystem-based marine spatial management: Review of concepts, policies, tools and critical issues. *Ocean and Coastal Management* , Volume 54, Issue 11November 2011; 807–820.

[6] 2011 State of the Environment Committee (2011) *State of the Environment 2011: Independent report to the Australian Government Minister for Sustainability, Environment, Water, Population and Communities*, viewed 23 May 2012, < http://www.environment.gov.au/soe/2011/report/marine-environment/6-risks.html>.

similar functions ('functional redundancy') which can generally provide a degree of ecological insurance against uncertainty.[7]

There has been at least two decades of ongoing national and international commitments by successive Australian Governments to create a representative network of marine protected areas within Australia's waters (see Table 1.1). This domestic commitment is also consistent with our international commitments to establish a representative system of marine protected areas within Australia's waters by 2012 — being advanced through the National Representative System of Marine Protected Areas (NRSMPA). Similar commitments have been made by a large number of countries through the *Convention on Biological Diversity*. Australia's network of marine reserves will contribute to a global network of marine reserve networks.

During the 2010 election campaign, the Government committed to establish a comprehensive network of marine parks in Australia's offshore marine areas.[8] Amongst other matters the Australian Government committed to:

- Establish a representative network of marine parks by 2012, protecting key Commonwealth waters around Australia;
- Use a scientifically driven process that determines the location and size of marine parks;
- Provide the highest level of conservation protection for the most sensitive and special areas; and
- Continue to allow sustainable fishing in other areas that will benefit from the healthy fish stocks that the marine park network supports.

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[7] Palumbi et al., Hughes at al in 2011 State of the Environment Committee (2011) *State of the Environment 2011: Independent report to the Australian Government Minister for Sustainability, Environment, Water, Population and Communities,* viewed 23 May 2012, <http://www.environment.gov.au/soe/2011/report/marine-environment/5-1-marine-systems.html>.

[8] Marine parks, marine protected areas and marine reserves have been used interchangeably.

Table 1.1   Overview of international and national policy framework and commitments on marine protected areas by Australian Governments

Year	Key frameworks	Relevant commitment
1991	Ocean Rescue Program	The Australian Government committed to the establishment of a National Representative System of Marine Protected Areas (NRSMPA).
1992	Conference on Environment and Development (RIO Earth Summit)	Objective 10.1 states that states will "establish a comprehensive system of protected areas... ."
1993	Convention on Biological Diversity	Article 8a establishes a legal obligation for all member nations to establish a system of terrestrial and marine protected areas by 2012.
1995	CBD COP-2 (Jakarta, Indonesia)	Identified marine and coastal biodiversity, including "Establishing and maintaining marine and coastal protected areas" as a high priority issue
1996	Strategy for the Conservation of Biological Diversity	"… the establishment of a comprehensive, representative and adequate system of ecologically viable protected areas … ."
1998	National Representative System of Marine Protected Areas	All Australian Governments and the New Zealand government agreed to establish a system of representative marine protected areas.
1998	Australia's Oceans Policy	Commitments and actions for the ongoing establishment of the NRSMPA.
2002	World Summit on Sustainable Development (WSSD) (Johannesburg, South Africa)	"...the establishment of marine protected areas consistent with international law and based on scientific information, including representative networks by 2012…"
2004	CBD COP-7 (Kuala Lumpur)	Commitment to establish a system of protected areas by 2010 for terrestrial reserves and by 2012 for marine reserves.
2006	South-east Commonwealth Marine Reserves Network	First representative network of marine reserves within Commonwealth waters.
2010	CBD Strategic Plan for Biodiversity 2011-2020	"by 2020, at least... 10% of coastal and marine areas... are conserved through... well connected systems of protected areas... ."

Deferral of, or failure to declare, a marine reserves network in Commonwealth waters may increase the risk of further biodiversity loss. Predicting the threshold points for

lasting and potentially irreversible ecosystem change and when they might occur in the absence of the declaration of a marine reserves network is not possible, but there is a growing body of evidence that loss of biodiversity in critical functional groups increases the probability of reaching such thresholds. [9] This is further complicated by the potential for loss of 'keystone species', which have a disproportional influence in ecosystem functioning[10] and the unknown level of additional pressure that is being placed on these natural systems by ocean warming and acidification. Deferral of the declaration of marine reserves networks would also introduce added uncertainty into the investment climate for the marine industries that are directly dependent on access to the living and mineral resources of our oceans.

Biodiversity decline

The rate of biodiversity decline in Australia is among the world's highest, and is the highest in the OECD. [11] Australia is the world's largest island continent and has been isolated from other continents for millions of years. As a result, Australia has a very high proportion (80 per cent) of species that are endemic (i.e. not found anywhere else in the world). An estimated 60 per cent of Australia's temperate marine species are endemic. This means that there are no 'back up' populations elsewhere in the world should these species become extinct. In addition, Australia is the most megadiverse of developed countries—it has almost 10 per cent of the world's known species.

Australia's accelerated rate of biodiversity loss compared to other developed countries can be attributed to this country's high species diversity and the relatively recent exposure to intensive human induced pressures.

As of 2009, Australia had 10 per cent of the world's threatened species. [12] Decline of known and studied species is one important indicator of biodiversity decline. However, the challenge of gaining an accurate understanding of the state and trajectory of Australia's biodiversity is compounded by the fact that at least 75 per cent of our native species are undiscovered or undescribed from a western taxonomic perspective. Only 172,000 of Australia's estimated 680,000 species have been described. Australia's oceans are largely unexplored and there is little information about Australia's marine

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[9] O'Neill and Kahn 2000, Bellwood et al. 2004 in Kumar, P (Ed.) (2010) *The Economics of Ecosystems and Biodiversity: The Ecological and Economic Foundations,* Earthscan, London.

[10] Hooper et al. 2005 in Kumar, P (Ed.) (2010) *The Economics of Ecosystems and Biodiversity: The Ecological and Economic Foundations*, Earthscan, London.

[11] Year Book Australia, 2009-10; Australian Bureau of Statistics, viewed 17 May 2012, <http://www.abs.gov.au/ausstats/abs@.nsf/Latestproducts/1301.0Feature%20Article12009%E2%80%9310?opendocument&tabname=Summary&prodno=1301.0&issue=2009%9610&num=&view=>.

[12] Department of Sustainability, Environment, Water, Population and Communities (2009) *Australia's Fourth National Report to the United Nations Convention on Biological Diversity*, viewed 23 May 2012, <http://www.cbd.int/doc/world/au/au-nr-04-en.pdf> .

biodiversity. This is especially the case for species and ecosystems in more remote, deeper oceanic areas.[13]

Australia's marine environments contain a range of critically endangered, endangered, threatened and vulnerable species. These include a number of species that fulfil apex predator functional roles in marine ecosystems, such as the critically endangered grey nurse shark, and the vulnerable great white shark and Australian sea lion.

Listed and threatened marine species face a range of pressures that have been assessed as being of concern or of potential concern through the marine bioregional planning program. These include extraction of living resources, fisheries bycatch, habitat and hydrological regime modification, marine debris, invasive species, collision with vessels, sea level rise and changes in sea temperature as a result of climate change, as well as a number of other pressures.[14]

The placement of marine reserves within a representative network is not determined on the basis of achieving protection for individual identified threatened species, although protection of such species may be a benefit of the representative network. Allocating resources, such as the placement of marine reserves, solely to protect the most endangered species typically does not minimise the number of extinctions over the long term, as it generally does not provide protection for species that may become at risk of extinction in the future.[15] In addition, such a network is less likely to support the resilience of a broad range of ecosystems than taking a representative approach.

The costs of recovery of endangered species can also be very high compared to preventative actions at the ecosystem and seascape scale such as the establishment of a network of marine reserves. For example, the United States Fish and Wildlife Service spent US$125 million on species recovery in the fiscal years 2000-2003.[16]

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[13] Department of Sustainability, Environment, Water, Population and Communities (2009) *Australia's Fourth National Report to the United Nations Convention on Biological Diversity,* viewed 23 May 2012,< http://www.cbd.int/doc/world/au/au-nr-04-en.pdf>.

[14] Department of Sustainability, Environment, Water, Population and Communities (2010) *Marine Bioregional Plan for the South-west Marine Region: Draft for Consultation; Marine Bioregional Plan for the North-west Marine Region: Draft for Consultation; Marine Bioregional Plan for the North Marine Region: Draft for Consultation; Marine Bioregional Plan for the Temperate East Marine Region: Draft for Consultation*.

[15] Wilson HB, Joseph LN, Moore AL, Possingham HP (2011) When should we save the most endangered species? *Ecol Lett.* Sep,14(9): 886-90.

[16] US Government Accountability Office (2005) *Endangered Species: Fish and Wildlife Service Generally Focuses Recovery Funding on High Priority Species but needs to Periodically Assess Its Funding Decisions*.

Prevention and resilience

Where a pattern of emerging and growing threats to species and ecosystems is reasonably evident, and a broad consensus exists that the current trajectory will lead to a further decline in biodiversity, governments and societies have a choice between preventative and reactive action to address those threats. As a rule it costs less to avoid damage than to restore the functions of ecosystems after damage has occurred. For example, as of July 2011, BP had paid $6.8 billion to fund economic and environmental restoration following the Gulf of Mexico oil spill.[17] Preventative action can generally be considered as the least cost option for biodiversity conservation.

The current proposal, while directly addressing some current threats to iconic places, species and biodiversity generally, is primarily one that is based on taking preventative action – providing an insurance policy (at relatively low cost) for our biodiversity assets. In utilitarian terms, the proposal helps ensure that future Australians have more options available to them to use and enjoy a greater diversity of marine species and more resilient marine ecosystems than would be the case if no such action was taken.

Establishing a comprehensive, adequate and representative network of marine reserves – one that ensures that examples of all the major marine ecosystems under Australian jurisdiction are managed primarily for biodiversity conservation – complements, rather than replaces, many existing measures. This includes improving sectoral management, such as considering ecosystem and food-chain impacts in fisheries management, improving oversight and environmental management in the offshore oil and gas industry, and supporting research and monitoring on ocean processes and biodiversity.

The concept of ecosystem resilience is also relevant to understanding and managing risks to the marine environment. As individual pressures increase, they interact with and compound the impacts of other pressures. This is further complicated by the emergence of ocean warming and acidification due to climate change, for which the only management tools currently available are improving the resilience of marine ecosystems.

Regional Summary

The following is a summary of the particular biodiversity characteristics of each of the marine regions covered by the two marine reserves network options:

The Coral Sea — The generally pristine environment of the Coral Sea may face increasing stress as exploitation in this area increases. The Coral Sea is nationally and

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[17] BP p.l.c. (July 2011) *Group Results Second Quarter and Half Year 2011(a);* BP; London 26 July 2011, viewed 18 May 2012, <http://www.bp.com/liveassets/bp_internet/globalbp/STAGING/global_assets/downloads/B/bp_second_quarter_2011_results.pdf >.

internationally recognised for its unique and near pristine environment. There are few places on the planet where such a large and untouched marine environment is found largely within one nation's jurisdiction. The isolated coral reefs of the Coral Sea play an important part in ecological processes that affect a large proportion of eastern Australia, including the Great Barrier Reef. Without increased protection we are likely to see an increase in a range of pressures in the area – predominantly from the extraction of living marine resources.

The South-west Marine Region — By global standards the waters of the South-west Marine Region have high biodiversity and are home to many species that occur nowhere else in the world (are considered endemic to the region). In the near shore areas of the southern part of the region approximately 85 per cent of the fish specious, 95 per cent of the molluscs and 90 per cent of the echinoderms are thought to be endemic. Currently around 25 per cent of listed species occurring in the area are classified as threatened under the *Environment Protection and Biodiversity Conservation Act* (the EPBC Act). The region includes the Diamantina Fracture Zone, a rugged, deep-water environment of seamounts and numerous closely spaced troughs and ridges. Very little is known about the ecology of this remote, deep-water feature, but marine experts suggest that its size and physical complexity mean that it is likely to support deep-water communities characterised by high species diversity.

The North-west Marine Region — The North-west Marine Region is characterised by shallow-water tropical marine ecosystems with high species richness. Most of the region's species are tropical and are also found in other parts of the Indian and western Pacific oceans. The southern part of the region is a transition zone between tropical and temperate waters and includes the northern extent of the ranges of some temperate species that are more typical of the South-west Marine Region. High diversity is partly driven by the interaction between seafloor features and the currents of the region. The interaction of seafloor features and oceanographic processes also supports unique ecosystems and associated trophic interactions and communities.

The North Marine Region — The region encompasses a range of different ecosystems, including the banks and terrace system of the Van Diemen Rise, the basin of the Gulf of Carpentaria and the tributary canyons of the Arafura Depression which are remnants of a drowned river system that existed from around two million to 12,000 years ago. The region is increasingly recognised as an area of global conservation significance for marine species and is one of the few remaining relatively pristine shallow tropical marine environments left in the world. The waters support a high degree of biodiversity, including six of the world's seven species of marine turtle, sawfish, 28 of the 35 known Australian species of seasnake and a vast array of seahorse and pipefish species.

The Temperate East Marine Region —The region is characterised by a narrow continental shelf, dynamic oceanography, a unique mix of tropical and cold water reef systems, and a significant variation in habitats including deep canyons and trenches, abyssal plains and entire ranges of submerged seamounts. Temperate species dominate

the southern parts of the region, and tropical species become progressively more common towards the north. The region supports high levels of species richness and diversity, particularly among corals, crustaceans, echinoderms, molluscs, sea sponges and fish. The temperate and sub-tropical waters of the region are also home to the pristine coral reefs of Elizabeth and Middleton Reefs and Lord Howe Island which are regarded as the southern-most coral reefs in the World. These unusual communities are mainly supported by the tongue of warm water that is driven southwards by the East Australian Current, extending the range of tropical species.

2 The objective being sought

The objective is the creation of a representative system of marine protected areas consistent with the Goals and Principles for the establishment of the NRSMPA in Commonwealth waters.

2.1 Achieving the objective

In 1998, Ministers of the Australian and New Zealand Environment and Conservation Council (ANZECC) approved guidelines for establishing the NRSMPA, and the principles by which the reserves networks should be established. These are referred to as the CAR principles or Comprehensive, Adequate and Representative:

- **C**omprehensive: the NRSMPA will include the full range of ecosystems recognised at an appropriate scale within and across each bioregion.
- **A**dequate: the NRSMPA will have the required level of reservation to ensure the ecological viability and integrity of populations, species and communities.
- **R**epresentative: those marine areas that are selected for inclusion in reserves should reasonably reflect the biotic diversity of the marine ecosystems from which they derive.

In 2007 the Australian Government released the Goals and principles for the establishment of the NRSMPA in Commonwealth waters (see Attachment A). The purpose of this document was to provide guidance on how to identify regional networks of marine reserves under the CAR principles. An important component of this document was the specification of four primary goals to be sought when undertaking reserve design. The four primary goals are:

Goal 1 — Each bioregion occurring with a region should be represented at least once within a network;

Goal 2 — The network should cover all depth ranges occurring within a region;

Goal 3 — The network should seek to include examples of benthic/demersal biological features; and

Goal 4 — The network should include all types of seafloor features present within a region.

In addition to the four primary goals, 20 design principles are also outlined. These include location, selection, design and zoning principles.

3.   Options for the Reserve Network

The options for marine reserves networks described below will significantly expand the network of marine reserves (marine protected areas) in oceanic waters adjacent to Australia. This is consistent with Australia's national and international commitments to ensure that representative examples of major marine ecosystem types are managed to give priority to conserving biodiversity, including the existing assemblages of species and ecological communities and the physical and biological process that sustain them. The options presented also meet the Australian Government election commitment.

Both of the options presented in this Regulatory Impact Statement (RIS):

- Would add substantially to the existing network of offshore protected areas that includes the Great Barrier Reef Marine Park and 27 other reserves established under Commonwealth law since 1975 (2,398,216 square kilometres for Option 1 and 2,353,326 square kilometres for option 2);
- Are made up of individual reserves with several different 'zones' that will determine what activities may or may not be permitted in each zone;
- Are about the establishment of the reserves under the EPBC Act, not their management. Management Plans for regional network of reserves must be developed after the reserves are created and those plans will have their own approval processes and Regulatory Impact Statements;
- Are not designed to deliver direct fisheries management benefits or to replace fisheries management as the primary mechanism by which fish stocks and species directly impacted by commercial fishing are managed;
- Are not designed to achieve particular arbitrary percentage outcomes in terms of total area of reserves or areas of particular zones within the reserves network;
- Have been developed to meet the Government's conservation objectives while minimising impacts on current marine resource use. They are not predicated on an assumption that any particular current use is unsustainable at current levels or with current technology. Where activities have been identified as compatible with proposed zoning arrangements, this has been done primarily on the basis of an assessment of that activity's limited risks to habitat features in the area. In a limited number of cases, activities that do present some risk to habitat have been permitted in some zones on the basis that to exclude them at this time would represent an unacceptable impact on a user group;
- Do not change the permitted uses in any of the existing 27 Commonwealth marine reserves; and
- Only relate to the establishment of new marine reserves under Commonwealth legislation and in Commonwealth waters – not in marine waters immediately adjacent to the land and islands that are the responsibility of the Australian States and

the Northern Territory (that is, generally the waters out to a distance of three nautical miles from the shore, but further in some areas).

3.1   National Overview

This RIS includes two options for the national marine reserves network. The first option is made up of the regional networks released for public consultation during 2011 in each of the marine regions (except for the South-east where the marine reserves network was proclaimed in 2007). No status quo option is provided as the completion of the Commonwealth waters component of the NRSMPA by 2012 is a 2010 Government election commitment.

Option 1 (draft) networks were released by the Government at the start of the 90 day public consultation period for each region. This option covers a total area of 2,398,216 square kilometres of approximately 44 per cent of the total area of the five marine regions. The National Option 1 network is shown in Figure 3.1.

Figure 3.1   National Option 1 network
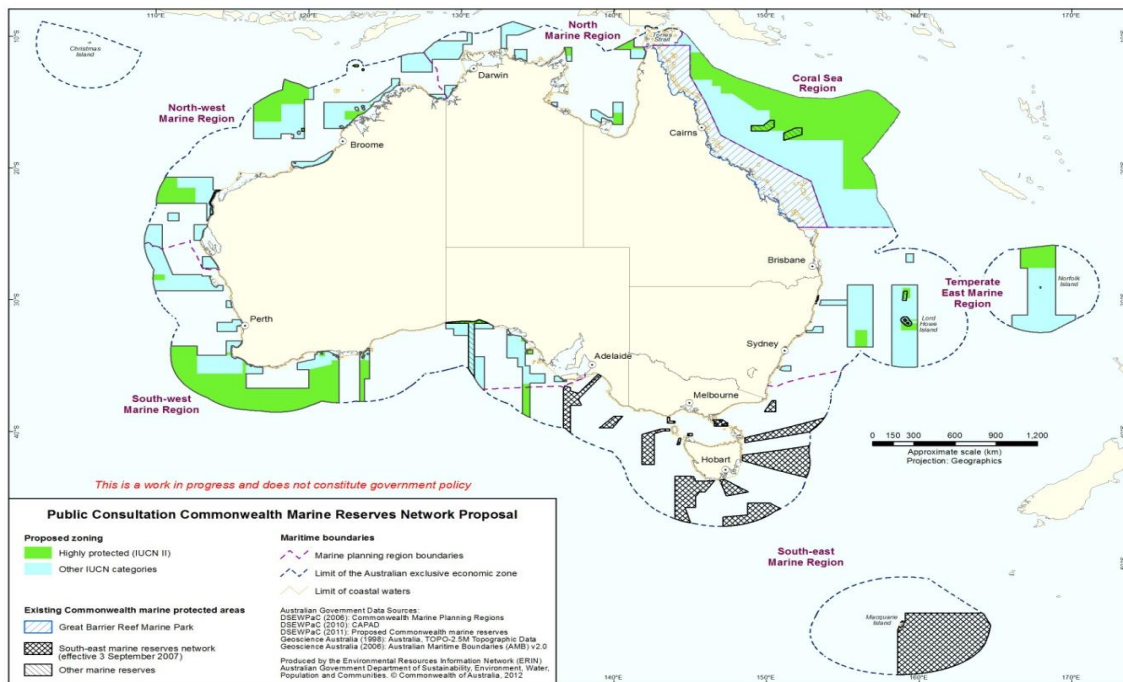
Consideration of public and institutional input received during the public consultation period together with the social and economic assessments of the impacts of both marine reserves network options undertaken by the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), informed the finalisation of the Option 2 networks. Option 2 covers a total area of 2,353,326 square kilometres or approximately 43 per cent of the total area of the five marine regions. The national Option 2 network is shown in Figure 3.2.

Figure 3.2   National Option 2 network
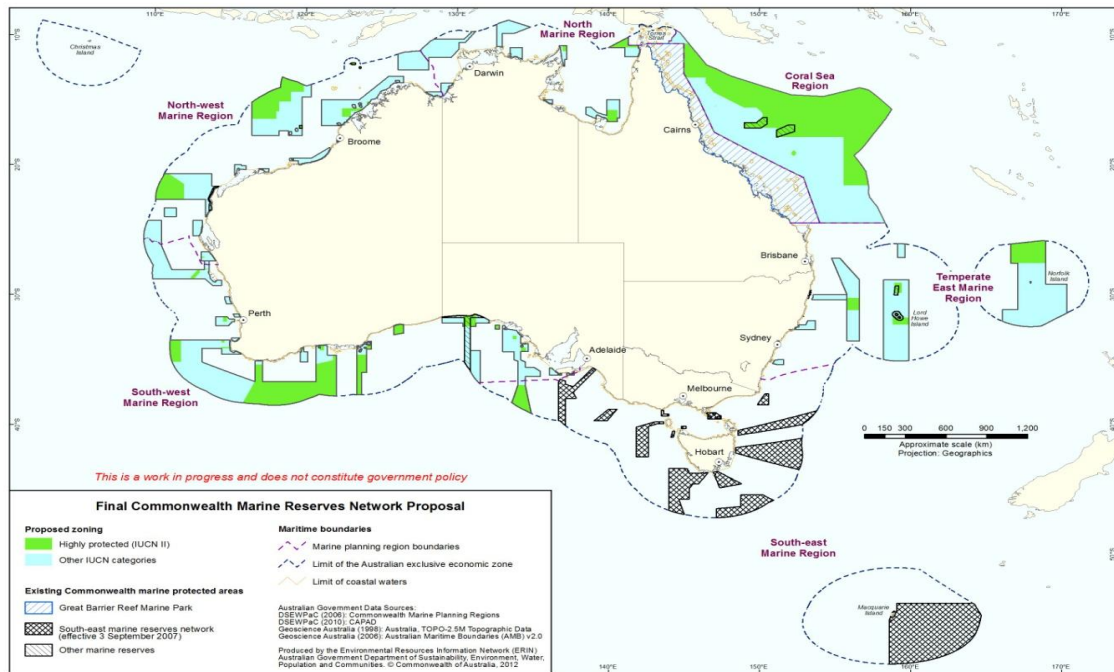
Table 3.1 shows the performance of the Option 1 (draft) and the Option 2 (final proposed) against the four primary goals of the Goals and Principles for the Establishment of the NRSMPA in Commonwealth Waters. The comparison indicates that Option 2 achieves increased representation of primary conservation features in Marine National Park Zones (IUCN II) where all extractive commercial activity would be excluded.

Table 3.1   Comparing Goal outcomes between the Option 1 and 2 marine reserves networks (excluding the South-east Marine Region)

Goal	Primary Conservation Feature	Total No.	Option 1		Option 2	
			Features represented within Network	Features represented in IUCN II	Features represented within Network	Features represented in IUCN II
1	Provincial Bioregions (PB)	35	32	24	32	25
	Meso-scale Bioregions (MB)	37	35	14	25	20
2	Depth by PB	371	331	167	331	197
3	Key ecological features	43	41	21	41	27
	Biologically Informed Seascapes	67	62	31	62	36
4	Seafloor types	83	80	60	80	59
	Total	**636**	**581**	**317**	**571**	**364**
	Proportion		91.4%	49.8%	89.8%	57.2%

Further detail of the national reserves network options is provided in section 3.2 below.

3.2 Marine region reserves network options

The two national marine reserves network options are comprised of an option in each of the five marine regions. The individual performance of these options against the four primary Goals of the establishment of NRSMPA is provided below.

In reading this section it should be noted that in some cases (in the North-west, North and Temperate East) the conservation outcomes, as measured by achievement against the Goals, provided by the Option 2 network represent a slight decrease in performance against the Option 1 network. The main rationale for recommending the Option 2 networks is the consideration of the socio-economic implications of the various network configurations. This is consistent with principles 9, 16 and 20 for the establishment of the NRSMPA which provide guidance about minimising socioeconomic costs in the selection, size, shape and zoning of areas for inclusion in the reserves networks.

South-west Marine Reserves Network options

The two marine reserve options presented below are the outcome of the planning process for the South-west Marine Region which commenced in 2005.

Option 1: Draft South-west Marine Reserve Network

Option 1 is the draft network released on 5 May 2011 at the start of the 90 day public consultation period. The draft proposal covered an area of 538 240 square kilometres, which equates to about 40.8 per cent of the area of the South-west Marine Region. It consisted of eight proposed individual Commonwealth reserves (Figure 3.3). The Option 1 network incorporated three categories of internal zoning – Marine National Park Zone, Special Purpose Zone and Multiple Use Zone.

Figure 3.3 Option 1 South-west Marine Reserves Network

Option 2: Final proposed South-west Marine Reserves Network

Option 2 is the final proposed marine reserves network for the South-west Marine Region. This network covers an area of 465 037 square kilometres, which equates to about 36 per cent of the area of the South-west Marine Region. It consists of thirteen proposed individual Commonwealth reserves (Figure 3.4). The Option 2 network includes two additional internal zoning categories – Habitat Protection Zone and Special Purpose Zone (Oil and Gas Exclusion).

Figure 3.4   Option 2 South-west Marine Reserves Network

Comparison of the Option 1 and Option 2 South-west marine reserves networks

While the total area covered by the Option 2 network has decreased from the Option 1 network, Option 2 has improved conservation outcomes. For instance, the proportion of the continental shelf that is recommended for high protection (Marine National Park Zones) has increased from 3.4 per cent of the shelf to 7.1 per cent of the shelf — over a 100 per cent increase in on-shelf protection. Many of the pressures of immediate concern on the marine environment occur on the shelf.

In regards to achieving the four primary goals under the Goals and Principles for the Establishment of the NRSMPA in Commonwealth Waters, Table 3.2 shows the benefits of the Option 2 network over the Option 1 network released for public comment. The Option 2 network offers improved conservation benefits. In particular the features represented in Marine National Parks Zones which guarantee a high level of ongoing protection, increase from 67 to 103, a 54 per cent increase.

Table 3.2 ***Comparing Goal outcomes between the Option 1 and 2 South-west marine reserves networks***

Goal	Primary Conservation Feature	Total No.	Option 1		Option 2	
			Features represented within Network	Features represented in IUCN II	Features represented within Network	Features represented in IUCN II
1	Provincial Bioregions (PB)	7	7	6	7	7
	Meso-scale Bioregions (MB)	7	7	4	7	7
2	Depth by PB	62	61	28	61	50
3	Key ecological features	13	13	8	13	13
	Biologically Informed Seascapes	18	17	8	17	14
4	Seafloor types	16	15	13	15	12
	Total	**123**	**120**	**67**	**120**	**103**
	Proportion		97.6%	54.5%	97.6%	83.4%

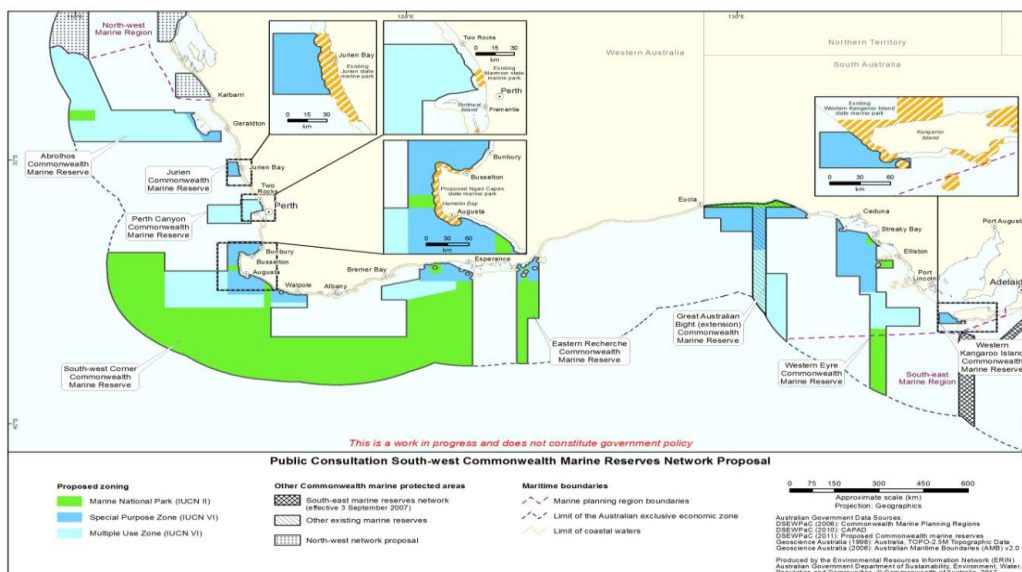## The North-west Marine Region

The two marine reserve options presented below are the outcome of the planning process for the North-west Marine region.

Option 1: Draft North-west Marine Reserves Network

Option 1 is the draft network released at the start of the 90 day public consultation period. The draft network covered an area of 377 297 square kilometres, which equates to about 35 per cent of the area of the North-west Marine Region. It consisted of ten proposed individual Commonwealth reserves (Figure 3.5). The draft network incorporated three categories of internal zoning – Marine National Park Zone, Habitat (Benthic) Protection Zone and Multiple Use Zone.
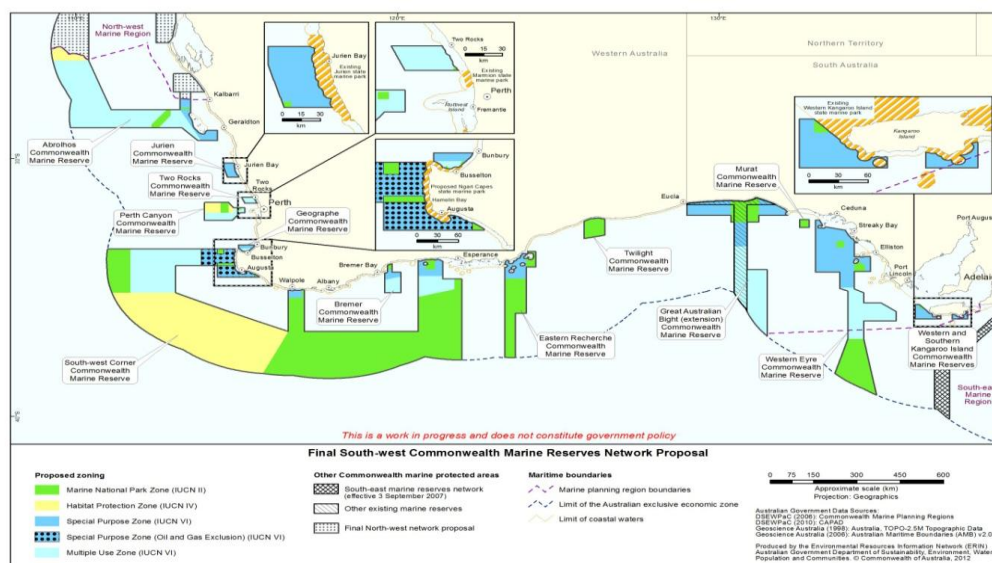
Figure 3.5   Option 1 North-west Marine Reserves Network

Option 2: Final proposed North-west Marine Reserve Network

Option 2 is the final proposed marine reserves network for the North-west Marine Region. This network covers an area of 392 356 square kilometres, which equates to about 37 per cent of the area of the North-west Marine Region. It consists of thirteen proposed individual Commonwealth reserves (Figure 3.6). The zoning arrangements for the Option 2 network are as per the Option 1 network.

Figure 3.6   Option 2 North-west Marine Reserves Network

Comparison of the Option 1 and Option 2 North-west marine reserves networks

The total area covered by the Option 2 network is larger than the Option 1 network. This increase in area has been achieved together with a reduction in estimated impacts on commercial fisheries.

In regards to achieving the four primary goals under the Goals and Principles for the Establishment of the NRSMPA in Commonwealth Waters, Table 3.3 shows how Option 1 and 2 represent primary conservation features. Option 2 proportionally represents slightly less primary conservation features than Option 1 (from 98 per cent to 97.4 per cent), however the proportion of primary conservation features represented in high level of protection zones (IUCN II) in Option 2 (54.9 per cent) is higher than in Option 1 (52.3 per cent).

Table 3.3   Comparing Goal outcomes between the Option 1 and 2 North-west marine reserves networks

Goal	Primary Conservation Feature	Total No.	Option 1		Option 2	
			Features represented within Network	Features represented in IUCN II	Features represented within Network	Features represented in IUCN II
1	Provincial Bioregions (PB)	8	8	6	8	7
	Meso-scale Bioregions (MB)	11	11	3	11	6
2	Depth by PB	82	81	37	81	38
3	Key ecological features	13	11	5	11	4
	Biologically Informed Seascapes	20	20	15	19	15
4	Seafloor types	19	19	14	19	14
	Total	**153**	**150**	**80**	**149**	**84**
	Proportion		98.0%	52.3%	97.4%	54.9%

The North Marine Region

Option 1: Draft North Marine Reserves Network

Option 1 is the draft network released at the start of the 90 day public consultation period. The draft network covered an area of 121 723 square kilometres, which equates to about 19.5 per cent of the area of the North Marine Region. It consisted of eight proposed individual Commonwealth reserves (Figure 3.7). The draft network incorporated three

categories of internal zoning – Marine National Park Zone, Special Purpose Zone and Multiple Use Zone.

Figure 3.7   Option 1 North Marine Reserves Network
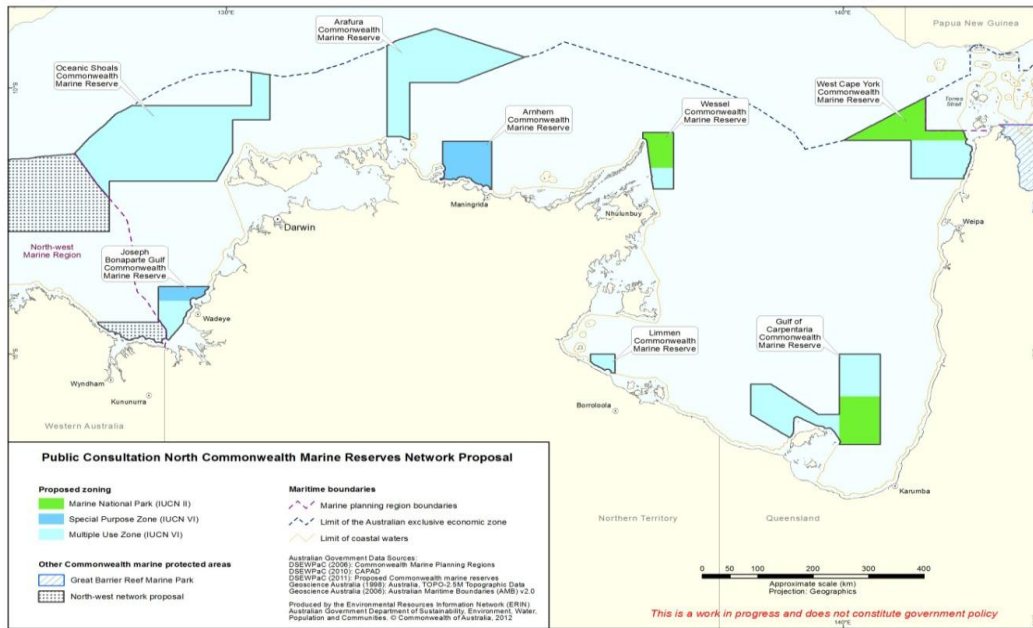
Option 2: Final proposed North Marine Reserves Network

Option 2 is the final proposed marine reserves network for the North Marine Region. This network covers an area of 122 739 square kilometres, which equates to about 19.6 per cent of the area of the Region. It consists of eight proposed individual Commonwealth reserves (Figure 3.8). The zoning arrangement for the Option 2 network for the North Marine Region is consistent with the Option 1 network.

Figure 3.8   Option 2 North Marine Reserves Network

Final North Commonwealth Marine Reserves Network Proposal

Proposed zoning
- Marine National Park Zone (IUCN II)
- Special Purpose Zone (IUCN VI)
- Multiple Use Zone (IUCN VI)

Other Commonwealth marine protected areas
- Great Barrier Reef Marine Park
- Final North-west network proposal

Maritime boundaries
- Marine planning region boundaries
- Limit of the Australian exclusive economic zone
- Limit of coastal waters

Australian Government Data Sources:
DSEWPaC (2008): Commonwealth Marine Planning Regions
DSEWPaC (2010): CAPAD
Geoscience Australia (1998): Australia, TOPO-2.5M Topographic Data
Geoscience Australia (2006): Australian Maritime Boundaries (AMB) v2.0

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Population and Communities. © Commonwealth of Australia, 2012

Approximate scale (km)
0   50   100   200   300   400
Projection: Geographics

This is a work in progress and does not constitute government policy

Comparison of the Option 1 and Option 2 North marine reserves networks

The total area covered by the Option 2 network is slightly larger than the Option 1 network. This increase in area has been achieved with a reduction in estimated impacts on commercial fisheries.

In regards to achieving the four primary goals under the Goals and Principles for the Establishment of the NRSMPA in Commonwealth Waters, Table 3.4 shows how Option 1 and Option 2 represent primary conservation features. Option 2 represents the same proportion of primary conservation features as Option 1 (96.5 per cent), however the proportion of primary conservation features represented in high level of protection zones (IUCN II) by Option 2 at 32.6 per cent is less than Option 1 with 33.7 per cent. Table 3.4 shows the performance of the North Marine Reserves Network under both the Option 1 and Option 2 networks.

Table 3.4 ***Comparing Goal outcomes between the Option 1 and 2 North marine reserves networks***

| Goal	Primary Conservation Feature	Total No.	Option 1		Option 2	
			Features represented within Network	Features represented in IUCN II	Features represented within Network	Features represented in IUCN II
1	Provincial Bioregions (PB)	4	4	2	4	2
	Meso-scale Bioregions (MB)	15	14	6	14	6
2	Depth by PB	24	22	4	22	4
3	Key ecological features	8	8	2	8	3
	Biologically Informed Seascapes	20	20	7	20	6
4	Seafloor types	15	15	8	15	7
	Total	**86**	**83**	**29**	**83**	**28**
	Proportion		96.5%	33.7%	96.5%	32.6%

The Coral Sea Marine Region

Option 1: Draft Coral Sea Marine Reserve

Option 1 is the draft marine reserve released at the start of the 90 day public consultation period. The draft proposal covered an area of 989 842 square kilometres, which equates to 100 per cent of the area of the Coral Sea Region. It consisted of one proposed individual Commonwealth reserves (see Figure 3.9). The draft marine reserve incorporated four

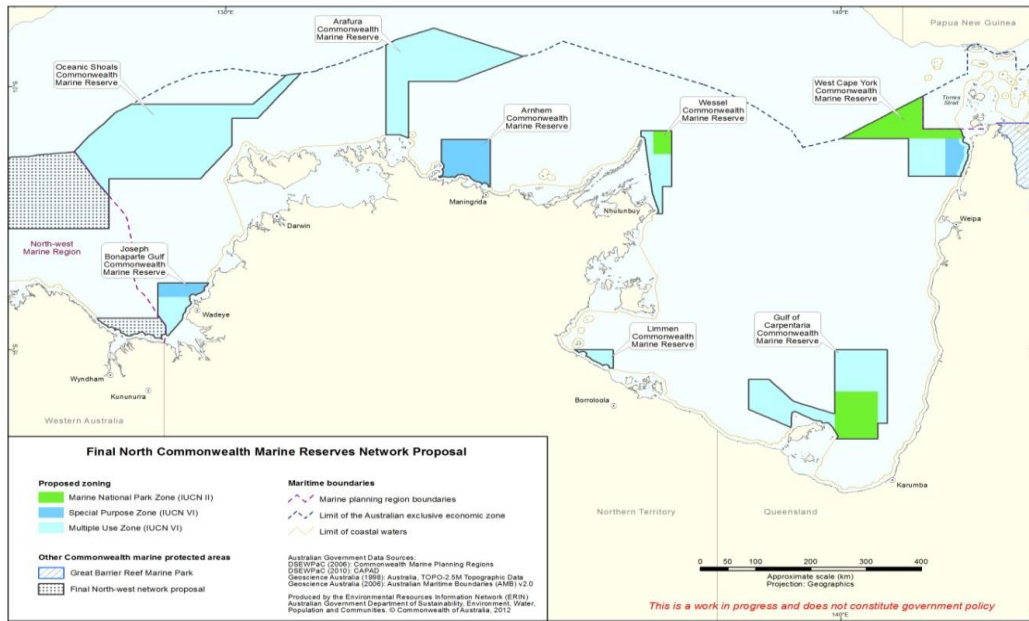categories of internal zoning – Marine National Park Zone, Special Purpose Zone and Multiple Use Zone and Habitat Protection Zone.

Figure 3.9   Option 1 Coral Sea Marine Reserve
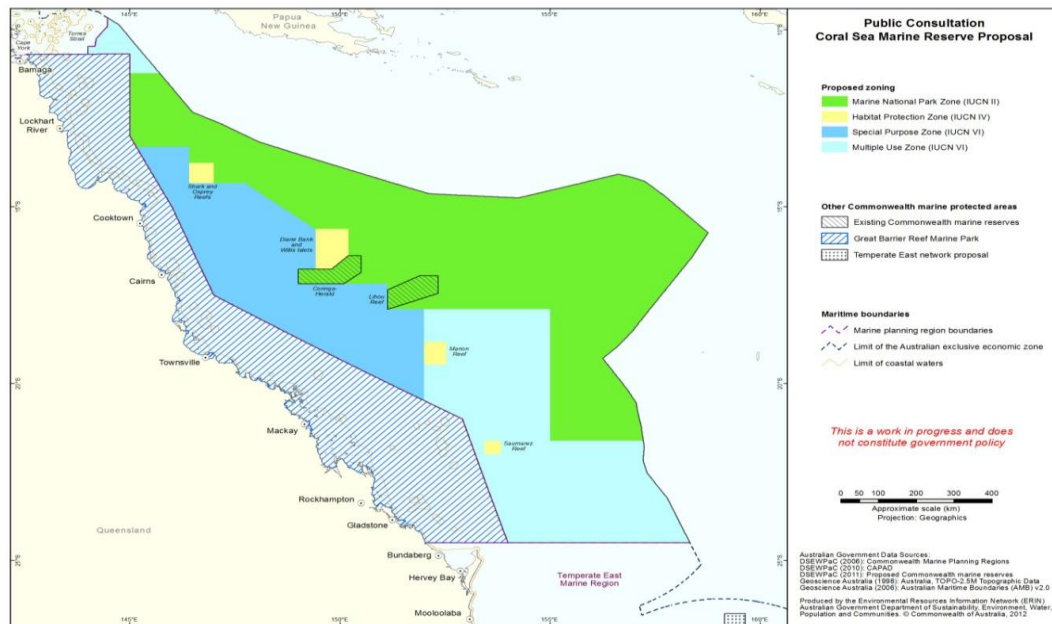
Option 2: Final proposed Coral Sea Marine Reserve

Option 2 is the final proposed marine reserve for the Coral Sea. This reserve covers an area of 989 842 square kilometres, which equates to 100 per cent of the area of the Region. It consists of one proposed reserve (see Figure 3.10). The zoning framework for the Option 2 marine reserve for the Coral Sea includes a Marine National Park Zone, Conservation Park Zone, Habitat Protection Zone (Coral Sea), Habitat Protection Zone (Seamounts), Multiple Use Zone and a General Use Zone.

Figure 3.10   Option 2 Coral Sea Marine Reserve

Final Coral Sea Marine Reserve Proposal

Proposed zoning
- Marine National Park Zone (IUCN II)
- Conservation Park Zone (IUCN IV)
- Habitat Protection Zone (Seamount) (IUCN IV)
- Habitat Protection Zone (Coral Sea) (IUCN IV)
- Multiple Use Zone (IUCN VI)
- General Use Zone (IUCN VI)

Other Commonwealth marine protected areas
- Existing Commonwealth marine reserves
- Great Barrier Reef Marine Park
- Final Temperate East network proposal

Maritime boundaries
- Marine planning region boundaries
- Limit of the Australian exclusive economic zone
- Limit of coastal waters

This is a work in progress and does not constitute government policy

0 50 100 200 300 400
Approximate scale (km)
Projection: Geographics

Australian Government Data Sources:
DSEWPaC (2006): Commonwealth Marine Planning Regions
DSEWPaC (2010): CAPAD
Geoscience Australia (1998): Australia, TOPO-2.5M Topographic Data
Geoscience Australia (2006): Australian Maritime Boundaries (AMB) v2.0

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Papua
New Guinea

Torres Strait
Cape York
Bamaga
Lockhart River
Cooktown
Cairns
Townsville
Mackay
Rockhampton
Gladstone
Bundaberg
Hervey Bay
Mooloolaba

Queensland

Shark and Osprey Reefs
Bougainville Reef
Holmes Reefs
Flinders Reefs
Diane Bank and Willis Islets
Coringa-Herald
Lihou Reef
Marion Reef
Saumarez Reef

Temperate East Marine Region

Comparison of the Option 1 and Option 2 Coral Sea Marine Reserve

The total area covered by the Option 2 and Option 1 marine reserves is the same. Amendments made to the Option 1 marine reserve include new zone types that strengthen the conservation outcome of the final proposed reserve and increase protection of a number of additional reefs. This includes the introduction of a Conservation Park Zone (IUCN IV), Seamount Protection Zone (IUCN IV) and renaming and classification of the Habitat Protection Zone (IUCN IV) [previously named Special Purpose Zone (IUCN VI)]. The amendments improve the final proposed reserve's conservation performance by increasing the proportion of reef area under high level (IUCN II) of protection (from 33 to 40 per cent).

In regards to achieving the four primary goals under the Goals and Principles for the Establishment of the NRSMPA in Commonwealth Waters, Table 3.5 shows how Option 1 and Option 2 represent primary conservation features. Option 2 represents the same proportion of primary conservation features as Option 1 (100 per cent), however the proportion of primary conservation features represented in high level of protection zones (IUCN II) by Option 2 is 16 per cent greater than Option 1.

Table 3.5 *Comparing Goal outcomes between the Option 1 and 2 Coral Sea marine reserves*

| Goal	Primary Conservation Feature	Total No.	Option 1		Option 2	
			Features represented within Reserve	Features represented in IUCN II	Features represented within Reserve	Features represented in IUCN II
1	Provincial Bioregions (PB)	6	6	5	6	5
	Meso-scale Bioregions (MB)	-	-	-	-	-
2	Depth by PB	94	94	58	94	70
3	Key ecological features	3	3	2	3	3
4	Seafloor types	16	16	15	16	15
	Total	**119**	**119**	**80**	**119**	**93**
	Proportion		100%	67.2%	100%	78.2%

The Temperate East Marine Region

Option 1: Draft Temperate East Marine Reserves Network

Option 1 is the draft network released at the start of the 90 day public consultation period. The draft network covered an area of 371 114 square kilometres, which equates to 25.3

per cent of the area of the Temperate East Marine Region. It consisted of nine proposed individual Commonwealth reserves (Figure 3.11). The draft network incorporated six categories of internal zoning – General Use Zone, Multiple Use Zone, Special Purpose Zone, Recreational Use Zone, Habitat Protection Zone, and Marine National Park Zone.
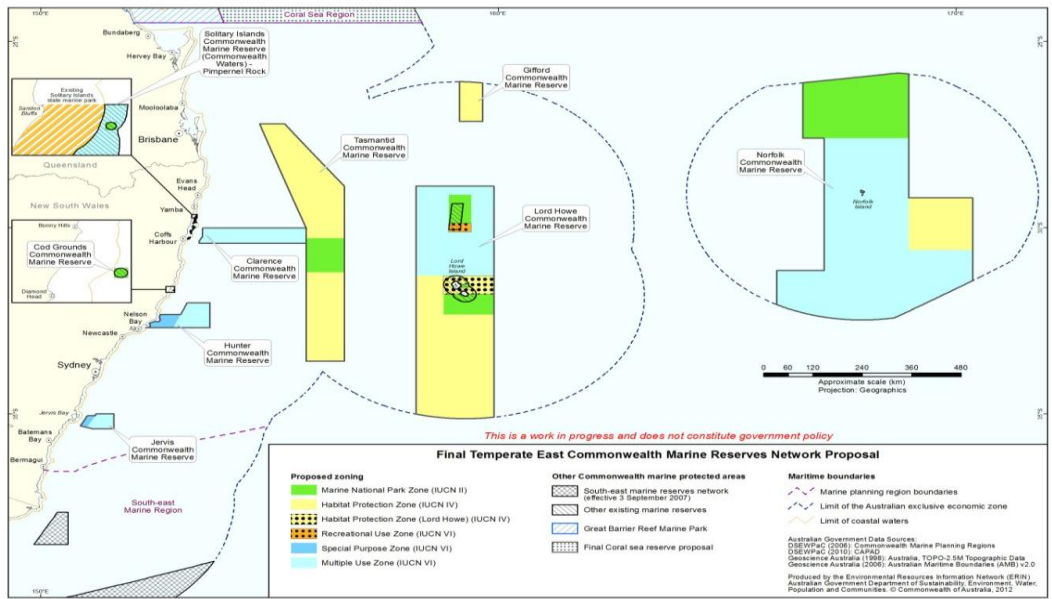
Figure 3.11 Option 1 Temperate East Marine Reserves Network
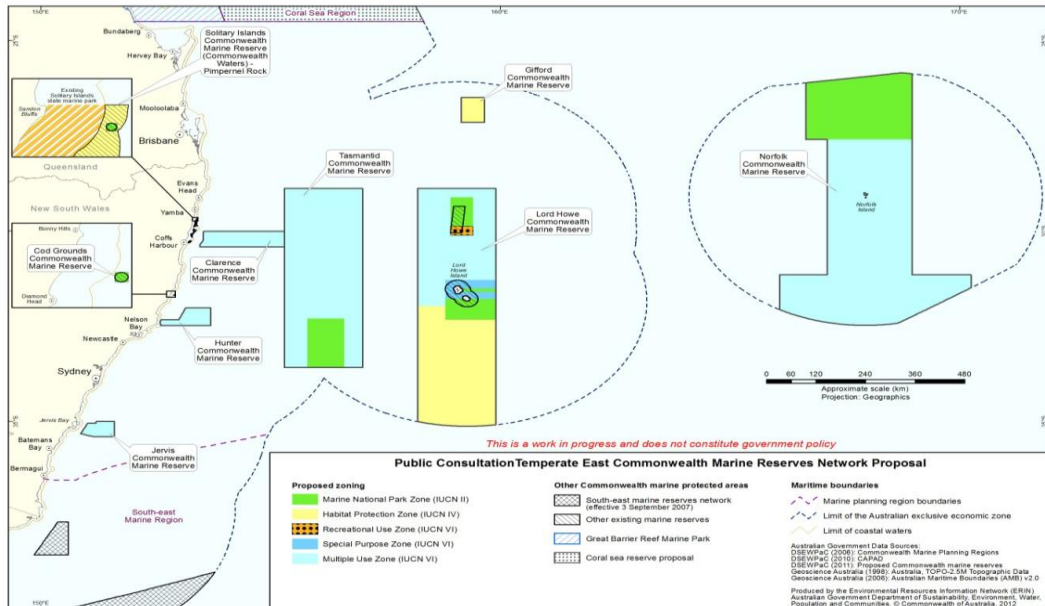
Option 2: Final proposed Temperate East Marine Reserves Network

Option 2 is the final proposed marine reserves network for the Temperate East. This network covers an area of 383 352 square kilometres, which equates to 26.1 per cent of the area of the Temperate East Marine Region. It consists of nine proposed individual Commonwealth reserves (Figure 3.12). The zoning arrangement for the Option 2 network for the Temperate East is consistent with the Option 1 network.

Figure 3.12 Option 2 Temperate East Marine Reserves Network

This is a work in progress and does not constitute government policy

Final Temperate East Commonwealth Marine Reserves Network Proposal

Proposed zoning
- Marine National Park Zone (IUCN II)
- Habitat Protection Zone (IUCN IV)
- Habitat Protection Zone (Lord Howe) (IUCN IV)
- Recreational Use Zone (IUCN VI)
- Special Purpose Zone (IUCN VI)
- Multiple Use Zone (IUCN VI)

Other Commonwealth marine protected areas
- South-east marine reserves network (effective 3 September 2007)
- Other existing marine reserves
- Great Barrier Reef Marine Park
- Final Coral sea reserve proposal

Maritime boundaries
- Marine planning region boundaries
- Limit of the Australian exclusive economic zone
- Limit of coastal waters

Australian Government Data Sources:
DSEWPaC (2006): Commonwealth Marine Planning Regions
DSEWPaC (2010): CAPAD
Geoscience Australia (1998): Australia, TOPO-2.5M Topographic Data
Geoscience Australia (2006): Australian Maritime Boundaries (AMB) v2.0

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Comparison of the Option 1 and Option 2 Temperate East Marine Reserves Network

The total area covered by the Option 2 network is slightly larger than the Option 1 network. This increase in area has been achieved with a reduction in estimated impacts on commercial fisheries.

In regards to achieving the four primary goals under the Goals and Principles for the Establishment of the NRSMPA in Commonwealth Waters, Table 3.6 shows how Option 1 and 2 represent primary conservation features. Option 2 represents a slightly higher proportion of primary conservation features than Option 1 (71 per cent compared to 70.3 per cent), however the proportion of primary conservation features represented in high level of protection zones (IUCN II) by Option 2 is 8 per cent less than Option 1.

Table 3.6 ***Comparing Goal outcomes between the Option 1 and 2 Temperate East Marine Reserves Networks***

Goal	Primary Conservation Feature	Total No.	Option 1		Option 2	
			Features represented within Reserve	Features represented in IUCN II	Features represented within Reserve	Features represented in IUCN II
1	Provincial Bioregions (PB)	10	7	5	7	4
	Meso-scale Bioregions (MB)	4	3	1	3	1
2	Depth by PB	109	73	40	73	35
3	Key ecological features	6	6	4	6	4
	Biologically Informed Seascapes	9	5	1	6	1
4	Seafloor types	17	15	10	15	11
	Total	**155**	**109**	**61**	**110**	**56**
	Proportion		70.3%	39.4%	71.0%	36.1%

4. Impact analysis of marine reserve network options

This RIS presents only the measurable direct and indirect impacts of the new network. Long-term environmental, social and economic costs and benefits of the option 1 and 2 reserves networks, and the ways that the government may, over the medium and longer term, assist the adjustment process, are not covered in detail here. The application of the Government's Fisheries Adjustment Policy and design of any adjustment assistance program is subject to finalisation of the proposal and to consultation with the affected industry and fisheries managers.

Inputs received as public comments on the draft reserves network proposals and the reports of ABARES' social surveys make it clear that some people believe that marine reserves could have a significant negative impact on their lives. Equally, a large number of people responding to the opportunity to comment on the draft marine reserves networks believe that a more extensive and restrictive network of reserves would make a positive impact, albeit indirect and non-financial, on their wellbeing and happiness. This may reflect the high value they place on the "existence" value of biodiversity and concern about the consequences of continuing environmental degradation in areas that are remote from their own lives.

Both the costs and the benefits of new marine reserves networks, particularly those in relatively poorly understood deepwater areas, are difficult to define precisely and the methods to do so are contentious. While the conservation sector and some scientists have made claims of very significant future economic value for marine reserves, these are often based on assumptions that are impossible to test, such as the development of new industries or the projected cost of ecosystem failure. Similarly, those who question the use of marine reserves in conservation policy sometimes speculate about the economic value of resources that would be forgone. These differences of view, and theory, are largely unresolvable in the context of whether or not the government should adopt the current proposal except to note that there are considerable uncertainties about both the cost of action and of inaction.

4.1 Overall benefits

The Australian Government is establishing a marine reserves network to contribute to the national and international system of marine protected areas as committed in policy and under the international agreements. The declaration of the marine reserves network in 2012 would deliver on these commitments.

The recommended marine reserve networks have been designed as a representative system. Section 3.1 outlines how the recommended networks meet the Australian

Government's Goals and Principles for the Establishment of the NRSMPA in Commonwealth Waters (see Attachment A).

Networks of protected areas are considered by the Convention on Biological Diversity as a cornerstone tool for the protection of biological diversity which can potentially generate a range of benefits.[18]

As noted earlier, a key rationale for establishing a representative network of marine reserves is to provide an 'insurance policy' to support the resilience of ecosystems. By protecting a representative set of marine ecosystems, the network is intended to protect a greater range of biological diversity than would otherwise be the case. There is evidence that more biodiverse ecological systems have a greater capacity to self correct in response to perturbations as they have a greater level of redundancy built in through a larger number of species performing similar functions.[19]

This is particularly important as there is broad lack of understanding about marine ecosystem function and composition and a high degree of uncertainty about climate change impacts and the compounding consequences of human interactions with marine ecosystem. In the absence of a full understanding, establishing marine reserves is a precautionary approach to supporting the long-term conservation of marine ecosystems and the protection of marine biodiversity. The Australian and New Zealand Environment Conservation Ministerial Council (ANZECC) stated that:

> The conservation of marine biodiversity and the maintenance of ecological processes are recognised nationally and internationally as being best achieved through strategic regional planning that provides for the establishment and effective management of a representative system of MPAs and the complementary sustainable management of adjoining waters.[20]

There is some evidence that biodiversity is associated with enhanced productivity in marine ecosystems and that increased biodiversity of primary producers and consumers in an ecosystem enhance some ecosystem processes.[21] A review of 112 studies and 80 marine reserves found that fish populations, size and biomass increased within reserves,

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[18] Secretariat of the Convention on Biological Diversity (2008) *Protected Areas in Today's World: Their Values and Benefits for the Welfare of the Planet*, Montreal, Technical Series no. 36, i-vii + 96 pages; *The Economics of Ecosystems and Biodiversity for National and International Policy Makers* (2009), Earthscan, London.

[19] Palumbi et al., Hughes at al in 2011 State of the Environment Committee (2011). *State of the Environment 2011: Independent report to the Australian Government Minister for Sustainability, Environment, Water, Population and Communities*, viewed 23 May 2012, <http://www.environment.gov.au/soe/2011/report/marine-environment/5-1-marine-systems.html>.

[20] ANZECC (1998) 1.

[21] Arenas et al. 2009, Balvanera et al. 2006, Worm et al. 2006 in Kumar P (Ed.) (2012) *The Economics of Ecosystems and Biodiversity: Ecological and Economic Foundations*, Routledge.

which resulted in 'spillover' effects into nearby areas.[22] As fish stocks are generally more studied that other marine species due to their economic significance, this result suggests that networks of marine reserves may support greater levels of productivity within ecosystems. While it is noted that these "spillover" effects of marine reserves in relation to improving the economic performance and resilience of commercial and recreational fisheries have been cited extensively in the literature, there is no data that would allow the actual economic benefits of "spillover" to be included in the economic analysis of the current proposal.

The final proposed marine reserve network is an appropriately precautionary approach to supporting the long-term sustainable use of the Commonwealth marine environment for the Australian community, particularly in the context of impacts of climate change which can only be managed through improving the resilience of ecosystems. This is likely to be more cost effective than significant remediation actions or efforts to recover individual species, as noted in Section 1.2.

While it is not suggested that this be weighted more heavily than those potential benefits outlined above, the public submissions suggest that a significant value is attributed to the draft marine reserves network. Further information on the submissions received during the consultation phases of the planning processes is contained in Section 5 of this assessment. Summary overviews of the submissions received for each region are available at: http://www.environment.gov.au/coasts/mbp/index.html.

4.2   Overall Costs

The commercial fishing sector is the sector most affected by both marine reserve options. It is a result of the direct displacement of commercial fishing effort and resultant indirect impacts on upstream and downstream land based industries. For users other than commercial fishing there is expected to be minimal or no disruption to current activities (see Table 4.1).

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[22] Halpern 2003 in *The Economics of Ecosystems and Biodiversity for National and International Policy Makers* (2009) Earthscan; London.

Table 4.1   Summary of expected socio-economic impacts by activity

Existing activities	Socio-economic impacts	
	Option 1	**Option 2**
Recreational fishing	Minimal impact expected.	
Charter fishing	Minimal impact expected.	
Registered Native Title claims (total 9 claims in SWMR at April 2011)	No impact expected.	
Defence training areas	No impact expected.	
Petroleum leases/ acreage releases	No impact expected.	
Shipping and ports	No impact expected.	
Existing offshore aquaculture leases (total 3 in SWMR in April 2011)	No or minimal impact expected.	
Commercial fishing activities	**46** out of the **62** fisheries operating in Commonwealth waters will experience some level of displacement. **13** fisheries may experience displacement greater than 3% of average annual gross value of production (GVP).	**48** out of the **62** fisheries operating in Commonwealth waters will experience some level of displacement.**12** fisheries may experience displacement greater than 3% of average annual gross value of production (GVP).

The primary basis for the consideration of costs within the context of this assessment is the estimated average annual decrease in the gross value of seafood production (GVP) from the reserve areas if there is no replacement (i.e. that the product cannot be caught elsewhere at the same cost). This is a conservative assumption given that many of the fisheries that would experience displacement are not currently assessed as overfished, have access to alternative fishing grounds outside of the final recommended marine reserves network and/or may have opportunities to fish within the reserves if they change fishing methods.

The analysis here is based on the use of recent historic data on fisheries catch and averaging that value for each proposed reserve and zone across the most recent decade's data. Consistent use of this methodology, across the different versions of the reserves network has provided a means of comparison of the relative potential impact of different reserves network options. It should be emphasised that the displaced value of production is an indicator of impact, not a measure of absolute cost in terms of economic loss or the potential cost of adjustment to either the industry or government. It represents the potential annual decrease in the value of seafood before it enters the supply chain for either export or domestic consumption.

Understanding Australian Fisheries and Marine Reserve Impacts

Under the Offshore Constitutional Settlement (OCS) both the states and the Commonwealth manage fisheries that occur within Commonwealth waters. Commonwealth waters marine reserves options will therefore affect state, Northern Territory and Commonwealth managed fisheries.

The management of commercial fisheries by the Commonwealth, states and the Northern Territory to achieve fishery management objectives varies across fisheries. Some fisheries are managed under output-based management regimes which allow participants to fish a certain number of days per year or catch fish up to a set quota. Others are managed by input-based management arrangements which may involve restrictions on the number of fishing licences available. All fisheries also operate within defined management boundaries which may be large (in the case of some offshore fisheries such as the Great Australian Bight Trawl Fishery) or small in size such as the South Australian managed Northern Zone Rock Lobster Fishery.

Fishing businesses, like other business within the Australian economy are not homogenous. They can vary from small scale businesses employing a single operator operating within a single fishery to vertically integrated companies employing a range of people in catching, processing and wholesaling and operating across a range of fisheries. Given the seasonal nature of some fisheries and the economics of fishing operations many fishers also hold multiple entitlements across fisheries.

The dependence of Australia's regional economies on commercial fishing also varies widely. Some fisheries, though small in size, may be extremely important to the functioning of small regional economies. Other fisheries may not have the same regional economy connections due to their operations out of the larger regional centres.

State agency and ABARES research indicates that the level of profitability across fisheries can vary markedly from highly profitable to marginal. At the national level there are a number of generally highly profitable export based fisheries that generate significant returns to the Australian economy. These include state regulated fisheries, such as the Western and Southern Rock Lobster Fisheries and the Pearl Aquaculture fishery, and Commonwealth managed fisheries such as the Southern Bluefin Tuna fishery off South Australia and the Northern Prawn Fishery that operates in the Gulf of Carpentaria. However, based on state and Commonwealth research, the majority of fisheries serve relatively limited domestic markets are composed of small and medium sized businesses and exhibit low and variable profitability.

There are many economic pressures faced by Australian fishers, particularly the wild catch sectors impacted by the two marine reserves network options. Over the past decade, wild catch has been declining in both absolute dollar terms and as a proportion of total fisheries production as aquaculture emerges as a major sector. Fuel, labour and other operating costs are a major determinant of both where fishing occurs and how profitable any enterprise is.

Surveys and responses to calls for public submissions indicate that there is a very strong personal attachment to fishing as an occupation, particularly in regions offering few other employment opportunities and where there has been long-term family association with the business. Significant financial and personal capital has often been invested in these businesses over many years and generations.

Overview of impacts on fisheries

Based on ABARES' analyses of the networks it is estimated that the Option 1 network would displace fish catch (GVP – Gross Value Production) to the value of approximately $13.7 million per annum with the Option 2 network estimated to displace around $11.1 million (a decrease of 19 per cent in impact on annual fishing income between the Option 1 and the Option 2 networks).

The estimated displacement impact is estimated at approximately 1.4 per cent of the total annual income of commercial fisheries active in the four marine regions and the Coral Sea for the Option 1 network and 1.1 per cent for the Option 2 network. These percentage impact figures, however, are based only on the analysis of those fisheries active in Commonwealth waters of each marine region. There are also a number of active fisheries that only fish within state or territory waters. Based on total wild catch fisheries income across all fisheries (Commonwealth and state/Northern Territory managed) the impact on total Australian annual fisheries income is estimated at 1 per cent for the Option 1 network and 0.8 per cent for the Option 2 network. Including aquaculture production reduces this impact to 0.6 per cent and 0.5 per cent respectively. Table 4.2 shows estimated displacement by jurisdiction for both the Option 1 and Option 2 network proposals.

Table 4.2   *Estimated GVP impact by jurisdiction (Option 1 and Option 2 network proposals).*

Jurisdiction	Estimated GVP displaced (Option 1 network)	% impact	Estimated GVP displaced (Option 2 network)	% impact
Commonwealth	$8,955,700	2.9%	$6,863,220	2.3%
Western Australia	$2,445,500	0.6%	$2,731,820	0.7%
South Australia	$349,100	0.3%	$267,200	0.3%
Northern Territory	$385,200	2.3%	$370,300	2.2%
Queensland	$1,237,200	0.8%	$669,200	0.4%
New South Wales	$303,400	0.9%	$225,250	0.7%
Total	**$13,676,100**	**1.4%**	**$11,126,990**	**1.1%**

While the analysis presented here is based on the expected displacement of activities currently active in Commonwealth waters activities are not static. It is possible that commercial fisheries that are currently not active may evolve to take advantage of existing or emerging opportunities and may be constrained by the network options. For instance, through the public consultation process, some individuals in the fishing industry expressed concern regarding the impact of the marine reserves on prospective fishing opportunity. While no economic analysis has been undertaken (or is possible) on potential opportunity costs for a potential reduction in prospective fishing opportunity, the

recommended option broadly responds to the concerns of the commercial fishing sector where it has been possible. For example, consideration of future opportunities for the pelagic longline fishery (the Western Tuna and Billfish Fishery) off the South-west of Australia resulted in changes to the shape, size and zoning of the proposed South-west Corner Commonwealth Marine Reserve to minimise potential impacts on prospective fishing opportunities.

A further issue to note is that the fishing industry has expressed concern that the marine reserves may present the industry with a "tipping point" such that the impact may be larger than that expected through economic analysis. The fishing industry contend that marine reserves coupled with other changes occurring (such as exchange rate movements, increases in fuel costs and the impact of other regulation, etc.) may mean that many fishers can no longer maintain economic viability or may just leave the industry to take up other opportunities.

Impact on dependent communities/regions at the national scale

A reduction in commercial fish landings into some regional ports will result from both the Option 1 and Option 2 networks. How this potential drop in landings may impact upon dependent communities/regions will depend upon a number of factors including the scale of the potential impact at the port level, the dependence of communities on the fishing activities of a port and how individual fishers respond and adapt to the new reserves. Based on survey and landing data, Table 4.3 below shows the ports estimated to have a fall in fish landings with a value of greater than $100,000 per annum assuming all displacement is removed from the fisheries. Further analysis of the potential future landings foregone by ports, including impact per capita analysis at the port level, is included within the regional analysis in Section 4.3 below.

As well as the analysis of GVP impacts by port, ABARES has undertaken analyses to identify those regions that could be materially impacted by the Option 1 reserves network proposal. ABARES identified the southwest corner of WA (in the vicinity of Augusta), the area between Port Lincoln and Ceduna in SA, Darwin and Karumba, Cairns, Hervey Bay/Bundaberg, Mooloolaba and an area around Ulladulla as the most potentially impacted by the Option 1 network in regards to reduction in landings and the dependence of their communities on the employment generated by commercial fishing.

ABARES economic modelling of the impact of reduced landings found that while some of the employment displaced will transition quickly to other employment there is likely to still be a net loss in employment. The ABARES modelling points to a possible loss in Full Time Equivalent (FTE) positions of up to 125 in the short term (one year after the creation of the marine reserves networks) and 103 FTE positions for the Option 2 network. ABARES also modelled the impact of the network options on economic activity. ABARES results were a loss in economic activity of $23.2 million per annum in the short-term for the Option 2 network and approximately $28.3 million for the Option 1 network.

The ABARES modelling output needs to be compared with the estimates of job losses derived from its detailed surveys of the catching and processing sectors. Survey respondents anticipated that the Option 1 network would result in the loss of 284 FTE positions. No surveys were able to be undertaken for the Option 2 network. In addition through the surveys, 50 fishers indicated that they would leave the industry as a result of the draft marine reserve networks.

It should be noted that the model used by ABARES is highly sensitive to the scale of the impact applied. That is, as the scale of the impact falls relative to the size of the regional, state or national economy the estimates produced by the ABARES model may include an unknown, but likely relatively small, margin of error. For instance, where the impact (for both employment and economic activity) is less than 0.005 per cent of the total regional, state or national employment or economic activity (as is the case for the estimated regional impacts of the proposed reserves in most regions) modelling cannot produce estimates with a high degree of certainty. As a result, the actual employment and economic activity impacts of the proposed reserves may be somewhat higher or lower than that produced by the model.

Table 4.3   ***Potential future landings foregone by port under the marine reserve network options (where impact is estimated to be greater than $100,000 per annum).***

Port	Marine region(s) where impact is derived from	Potential future landings foregone annually ($,000)	
		Option 1 ($,000)	**Option 2 ($,000)**
Cairns	Coral Sea & North	4,168	3,717
Mooloolaba	Coral Sea & Temperate East	1,763	1,231
Karumba	North	1,647	1,052
Darwin	North & North-west	859	793
Esperance	South-west	473	428
Fremantle	North-west & South-west	449	261
Greenwell Point	Temperate East	351	<1
Augusta	South-west	305	69
Hamelin Bay	South-west	288	236
Port Lincoln	South-west	264	213
Hervey Bay	Coral Sea	242	19
Bunbury	South-west	164	127
Geraldton	North-west & South-west	157	311
Ulladulla	Temperate East	154	1
Bundaberg	Coral Sea	153	102
Forster	Temperate East	143	74
Streaky Bay	South-west	137	78
Newcastle	Temperate East	108	41
Brisbane	Temperate East, Coral Sea & North-west	98	287

Broome	North-west	91	103
Eucla	South-west	70	124

Table 4.3 (cont.)   Potential future landings foregone by port under the marine reserve network options (where impact is estimated to be greater than $100,000 per annum).

Port	Marine region(s) where impact is derived from	Potential future landings foregone annually ($,000)	
		Option 1 ($,000)	Option 2 ($,000)
Busselton	South-west	68	134
Kalbarri	North-west & South-west	0	109
Jurien Bay	South-west	0	107

Relationship between adjustment assistance and economic cost

The Government released its Fisheries Adjustment Policy in May 2011. The primary purposes of providing adjustment assistance to impacted businesses are to: a) ensure that fishing effort is adjusted where necessary to account for the displacement impact of the reserves (i.e. displaced fishing effort does not result in other areas being overfished); and b) to ensure that one sector of the Australian community (commercial fishing businesses) does not bear the full financial cost of that adjustment and of the transfer of public assets from production (fishing) to biodiversity conservation.

Adjustment assistance may address the total economic cost of establishing reserves, but only to the extent that it assists fishers adapt to the new reserves by fishing (sustainably) elsewhere and total fisheries production does not decline to the extent that it would have if adjustment assistance was not provided. If adjustment assistance helps operators leave the industry and catch decreases in line with the displacement estimates, the full economic cost of displacement is likely to be realised, at least in the short-term. It is arguable that, based on the ABARES socio-economic analysis, the impacts of the current proposal are not at a scale where detectable impacts on total national fisheries production are likely even if the total estimated displaced catch was lost to the economy. Any decline in national production that does occur because of displacement from the proposed reserves is likely to be well within normal annual catch variability and less than the variability due to other factors such as fish stock dynamics, market movements and changes in input costs. Nonetheless, individual businesses are potentially significantly impacted by both options and this is the basis for providing assistance.

Fisheries adjustment assistance will be provided at a cost to government. There will be consultation with the fishing industry and fisheries management agencies which will inform the design and implementation of an adjustment package.

4.3   Cost analysis by marine region

South-west network options

It is estimated that both the Option 1 and Option 2 networks displace up to 0.5 per cent of the annual GVP of the fisheries active in the South-west Marine Region equal to approximately $2.9 million of displaced GVP (with the Option 2 network expected to have a marginally lower overall impact). The main difference between the networks is changes in relative impacts across some fisheries. For instance, the impact on the Western Australian managed Western Rock Lobster Fishery has increased due predominantly to increased protection around the Abrolhos Islands under the Option 2 network. This increase balances the decrease in impact across a range of other fisheries due either to changes in zoning arrangements within reserves or movement of reserve boundaries (Table 4.4).

Table 4.4   *Fisheries and the South-west marine reserve network options*

Jurisdiction	Fishery	Option 1		Option 2	
		Estimated GVP displaced	%[+]	Estimated GVP displaced	%[+]
C'wlth	SESSF – Great Australian Bight Trawl Sector	$66,800	0.5%	$46,730	0.4%
	SESSF - Gillnet, Hook & Trap	$356,100	1.4%	$192,210	0.8%
	Small Pelagic	*	*	*	*
	Southern Squid Jig	*	*	*	*
	Western Deepwater Trawl	$48,000	4.3%	*	*
	Western Tuna and Billfish	$246,100	3.8%	$114,190	1.5%
SA	Marine Scalefish	$165,000	0.6%	$186,800	0.7%
	Rock Lobster (northern zone)	$184,000	0.8%	$84,430	0.3%
WA	Joint Authority Southern Demersal Gillnet and Demersal Longline	$580,100	6.5%	$516,910	5.8%
	South Coast Crustacean	$373,800*	18.4%	$140,610	6.9%
	Open access and other conditions	$73,700	24.3%	$8,960	3.0%
	South Coast Trawl	*	*	$151,990	8.4%
	South West Trawl Inshore Managed	$113,500	32.4%	$36,950	10.6%
	West Coast Demersal Gillnet and Demersal Longline (Interim) Managed	*	*	*	*
	Mackerel	-	-	$2,843	1.6%
	West Coast Demersal scalefish	$130,800	1.9%	$97,480	1.4%
	West Coast Rock Lobster	$309,000	0.1%	$1,174,200	0.4%
	West Coast Deep Sea Crab	-	-	$49,930	2.3%
	West Coast Purse Seine	-	-	$1,900	0.1%

	Total	$2,855,200[+]	0.5%	$2,855,030[+]	0.5%

* Catch and GVP data is confidential due to the small number of operators.

[+] includes impact not shown above due to confidentiality

\- No displacement recorded

Impact on fishing operations

ABARES surveyed potentially affected fishers to gauge their response to the Option 1 network (no survey was able to be undertaken on the Option 2 network). Of the 281 businesses surveyed (note that not all of these fishers responded to the survey), 13 stated that they would leave the industry as a result of the Option 1 network's impact upon their fishing operations.

Impact on dependent communities/regions

A potential reduction in landings into ports will result from both the Option 1 and Option 2 networks with landings estimated to fall by around $2.9 million (equivalent to the South-west Marine Reserves Network overall displacement figure). How this potential drop in landings impacts upon ports and their associated communities will depend upon a number of factors including the scale of the potential impact at the port level, the dependence of communities on the fishing activities of a port and how individual commercial fishing operations adjust and adapt to the new reserves. Based on survey and landing data, Table 4.5 shows the ports estimated to have a fall in fish landings greater than $50,000 per annum.

Table 4.5 ***Potential future landings foregone by port under the South-west marine reserve network options (impact is greater than $50,000)***

Port	Potential future landings foregone $ per annum		Potential landings foregone per capita ($)
	Option 1	Option 2	Option 2
Esperance	$473,000	$428,000	$33
Fremantle	$327,000	$168,000	$7
Augusta	$305,000	$69,000	$65
Hamelin Bay	$288,000	$236,000	$23
Port Lincoln	$264,000	$213,000	$16
Bunbury	$163,000	$127,000	$4
Streaky Bay	$137,000	$78,000	$74
Albany	$92,000	$91,000	$6
Thevenard	$86,000	$41,000	$11
Eucla	$69,000	$124,000	$116
Busselton	$68,000	$134,000	$5
Windy Harbour	$67,000	<$50,000	$2
Coffin Bay	$51,000	$56,000	$81
Geraldton	$50,000	$234,000	$12
Kalbarri	<$50,000	$101,000	$76
Jurien Bay	<$50,000	$107,000	$37
Cervantes	<$50,000	$84,000	$168

Lancelin	<$50,000	$51,000	$73
North Island (Abrolhos)	<$50,000	$50,000	$3
Green Head	0	$52,000	$18

As well as the analysis of potential future landings foregone by port, ABARES has undertaken analysis to identify communities that could be more impacted by the proposed network relative to others. ABARES has identified the south-west corner of Western Australia (in the vicinity of Augusta) and the area between Port Lincoln and Ceduna in South Australia as perhaps the most potentially impacted by the Option 1 network in regards to reduction in landings and the dependence of the local communities on the employment generated by commercial fishing.

ABARES economic modelling of the southwest corner of Western Australia and the area between Port Lincoln and Ceduna as a result of the Option 1 network has found that while some of the employment displaced will transition quickly to other employment, there is likely to still be a short-term net loss in employment. ABARES research points to a total loss in Full Time Equivalent (FTE) positions of up to 27 for the Option 2 network and 29 for the Option 2 network. For economic activity, ABARES has calculated that the Option 1 and Option 2 networks may lead to a loss in economic activity of $6.1 million in the short-term.

The ABARES modelling output needs to be compared with the estimates of job losses derived from detailed surveys of the catching and processing sectors. Survey respondents anticipated that the Option 1 network would result in the loss of 77 positions across the two sectors — equating to around 37 positions after conversion to FTE positions.

North-west marine reserves network options

It is estimated that the Option 1 network would displace about 0.2 per cent of the annual GVP of the fisheries active in the region with the Option 2 network estimated to displace 0.1 per cent — equal to approximately $0.74 million of GVP for the Option 1 network and approximately $0.62 million for the Option 2 network (see Table 4.6).

Table 4.6   Fisheries and the North-west marine reserve network options

Jurisdiction	Fishery	Option 1		Option 2	
		Estimated GVP displaced	%[+]	Estimated GVP displaced	%[+]
C'wlth	Northern Prawn	$16,600	<0.1%	$32,500	<0.1%
	North-west Slope Trawl	$63,600	6.2%	$71,630	7.0%
	Western Deepwater Trawl	$3,500	0.3%	$3,330	0.3%
	Western Tuna and Billfish	$11,700*	0.2%	$3,450	0.1%
WA	Mackerel	$2,300	1.3%	$12,400	1.4%
	Nickol Bay Prawn	$55,000	1.5%	*	*
	North Coast Shark	*	*	*	*
	Kimberley Prawn	$179,400	5.2%	$259,000*	7.5%

	Northern Demersal Scalefish	*	*	*	*

Table 4.6 (cont.)   Fisheries   and   the   North-west   marine   reserve   network options

Jurisdiction	Fishery	Option 1		Option 2	
		Estimated GVP displaced	%[+]	Estimated GVP displaced	%[+]
WA (cont.)	West Coast Demersal Scalefish	-	-	$11,200	0.2%
	Pilbara demersal finfish	-	-	$18,200	0.5%
	Shark Bay Prawn	$195,500	0.8%	*	*
	West Coast Demersal Gillnet and Demersal Longline	*	*	*	*
	Total	**$739,300[+]**	**0.2%**	**$615,400[+]**	**0.1%**

* Catch and GVP data is confidential due to the small number of operators.

[+] includes impact not shown above due to confidentiality

- No displacement recorded

Impact on fishing operations

ABARES surveyed potentially affected fishers to gauge their response to the Option 1 network (no survey was able to be undertaken on the Option 2 network). Of the 104 businesses surveyed, 3 fishing businesses stated that they would leave the industry as a result of the Option 1 network impact upon their operations.

Impact on dependent communities/regions

A potential reduction in landings into ports will result from both the Option 1 and Option 2 networks with landings estimated to fall by $0.7million and $0.6 million respectively. How this potential drop in landings impacts upon ports and their associated communities will depend upon a number of factors including the scale of the potential impact at the port level, the dependence of communities on the fishing activities of a port and how individual commercial fishing operations adjust and adapt to the new reserves. Based on survey and landing data, Table 4.7 shows the ports estimated to have a fall in fish landings greater than $50,000 per annum.

Table 4.7   Potential future landings foregone by port under the North-west marine reserves network options (impact greater than $50,000)

Town	Potential future landings foregone ($ per annum)		Potential landings foregone per capita ($) Option 2
	Option 1	Option 2	
Darwin	$187,000	$205,000	$3
Geraldton	$157,000	$77,000	$4
Fremantle	$123,000	$93,000	$4
Carnarvon	$98,000	<$1,000	<$1

Broome	$91,000	$10,000	$9
Point Samson	$61,000	$31,000	$113

ABARES has not undertaken any specific economic modelling in the North-west Marine Region due to the fact that most of the impacts fall outside of the ports adjacent to the region. However, based on the economic modelling undertaken in other regions ABARES calculates up to 6 FTE positions may be lost in the short-term under the Option 1 network with an additional position lost under the Option 2 network proposals.. ABARES has also calculated that the Option 1 network may lead to a loss in economic activity of $1.5 million in the short-term with Option 2 leading to a short-term loss in economic activity of $1.2 million per annum.

The ABARES modelling output needs to be compared with the estimates of job losses derived from detailed surveys of the catching and processing sectors. Survey respondents anticipated that the Option 1 network would result in the loss of 5 FTE positions.

North marine reserves network options

It is estimated that the Option 1 network would displace about 3.5 per cent of the annual GVP of the fisheries active in the region with the Option 2 network estimated to displace about 2.4 per cent — equal to approximately $4 million of GVP for the Option 1 network and approximately $3 million for the Option 2 network (see Table 4.8).

Table 4.8   Fisheries and the North marine reserves network options

Jurisdiction	Fishery	Option 1		Option 2	
		Estimated GVP displaced	**%+**	**Estimated GVP displaced**	**%+**
C'wlth	Northern Prawn	$3,061,496	3.5%	$2,086,000	2.4%
QLD	Gulf of Carpentaria Developmental Finfish Trawl	$72,100	2.2%	$73,500	2.2%
	Gulf of Carpentaria Finfish and QFJA Set Mesh Net	$311,400	2.5%	$12,700*	0.1%
	Gulf of Carpentaria Line and QFJA Line	$97,700	4.7%	$70,500	3.4%
NT	Finfish Trawl	*	*	*	*
	Offshore Net and Line	*	*	*	*
	Spanish Mackerel	*	*	*	*
	Total	**$4,215,000+**	**3.5%**	**$2,943,300+**	**2.4%**

* Catch and GVP data is confidential due to the small number of operators.
+ includes impact not shown above due to confidentiality
- No displacement recorded

Impact on fishing operations

ABARES surveyed potentially affected fishers to gauge their response to the Option 1 network. Of the 227 fishing businesses surveyed, 5 stated that they would leave the industry as a result of the Option 1 networks impact upon their operations.

Impact on dependent communities/regions

A potential reduction in landings into ports may result from both the Option 1 and Option 2 networks with landings estimated to fall by $4 million and $3 million respectively. How this potential drop in landings impacts upon ports and their associated communities will depend upon a number of factors including the scale of the potential impact at the port level, the dependence of communities on the fishing activities of a port and how individual commercial fishing operations adjust and adapt to the new reserves. Based on survey and landing data, Table 4.9 shows the ports estimated to have a fall in fish landings greater than $50,000 per annum.

Table 4.9 **Potential future landings foregone by port under the North marine reserve network options (impact greater than $50,000)**

Town	Potential future landings foregone ($ per annum)		Potential landings foregone per capita ($) Option 2
	Option 1	Option 2	
Cairns	$1,818,000	$1,252,000	$10
Karumba	$1,647,000	$1,052,000	$2,027
Darwin	$672,000	$565,000	$9
Weipa	$51,000	<$50,000	$16

Based on estimated potential future landings foregone, ABARES has modelled the possible impact on the regional economies of Darwin and Karumba (and surrounding areas) including the regional and national implications. ABARES estimates that up to 37 FTE positions would be lost in the short term under the Option 1 network. For the Option 2 network, ABARES calculates a in employment in the short-term of up to 25 FTE positions. ABARES has also calculated that the Option 1 network may lead to a loss in economic activity of $8.4 million in the short-term with Option 2 leading to a short-term loss in economic activity of $5.9 million per annum.

The ABARES modelling output needs to be compared with the estimates of job losses derived from detailed surveys of the catching and processing sectors. Survey respondents anticipated that the Option 1 network would result in the loss of 30 FTE positions.

Coral Sea marine reserve options

It is estimated that the Option 1 reserve would displace up to 3.7 per cent of the annual GVP of the fisheries active in the region with the Option 2 network estimated to displace up to 2.3 per cent — equal to approximately $4.7 million of GVP for the Option 1 reserve and approximately $4.2 million for the Option 2 reserve (Table 4.10).

Table 4.10   Fisheries impacted by the Option 1 proposed Coral Sea network

Jurisdiction	Fishery	Option 1 network		Option 2 Network	
		Estimated GVP displaced ($)	**%[+]**	**Estimated GVP displaced ($)**	**%[+]**
C'wlth	Coral Sea Fishery	$334,500*	65%	$332,600*	64.6%
	East Coast Tuna and Billfish	$3,820,900	9.7%	$3,566,100	9.1%
QLD	Otter Trawl	$375,300	0.5%	$78,400	0.1%
	Net	*	*	*	*
	Deepwater finfish	$87,800	6.7%	$98,400	7.5%
	Trap	*	*	*	*
	Harvest	*	*	*	*
	Total	**$4,667,200[+]**	**3.7%**	**$4,154,400[+]**	**2.3%**

* Catch and GVP data is confidential due to the small number of operators.

[+] includes impact not shown above due to confidentiality

- No displacement recorded

Impact on fishing operations

ABARES surveyed potentially affected fishers to gauge their response to the Option 1 reserve. Of the 377 fishing businesses surveyed 8 stated that they would leave the industry as a result of the Option 1 reserve impact upon their operations.

Impact on dependent communities/regions

A potential reduction in landings into ports may result from both the Option 1 and Option 2 reserves with landings estimated to fall by $4.7 and $4.1 million respectively. How this potential drop in landings impacts upon ports and their associated communities will depend upon a number of factors including the scale of the potential impact at the port level, the dependence of communities on the fishing activities of a port and how individual commercial fishing operations adjust and adapt to the new reserves. Based on survey and landing data, Table 4.11 shows the ports estimated to have a fall in fish landings greater than $50,000 per annum.

Table 4.11   Potential future landings foregone by port under the Coral Sea marine reserve options where impact is greater than $50,000

Port	Potential future landings foregone ($ per annum)		Potential landings foregone per capita ($) Option 2
	Option 1	**Option 2**	
Cairns	$2,350,000	$2,462,000	$20
Mooloolaba	$1,549,000	$1,002,000	$33
Hervey Bay	$242,000	$19,000	<$1
Bundaberg	$153,000	$102,000	$2

| Brisbane | $98,000 | $284,000 | <$1 |

Table 4.11(cont.)   ***Potential future landings foregone by port under the Coral Sea marine reserve options where impact is greater than $50,000***

Port	Potential future landings foregone ($ per annum)		Potential landings foregone per capita ($) Option 2
	Option 1	**Option 2**	
Mackay	$64,000	$53,000	<$1
Hobart	$60,000	$59,000	<$1
Gladstone	$59,000	$53,000	$3

Based on potential future landings foregone and consideration of the socio-economic issues at the community level, ABARES has modelled the likely impact on the regional economies of Cairns, Bundaberg/Hervey Bay and Mooloolaba. ABARES estimates that up to approximately 40 FTE positions would be lost in the short term under the Option 1 marine reserve network and 39 FTE jobs for the Option 2 network. ABARES has also calculated that the Option 1 network and Option 2 networks may lead to a short-term loss in economic activity of $9.9 million and $8.8 million per annum respectivley.

The ABARES modelling output needs to be compared with the estimates of job losses derived from detailed surveys of the catching and processing sectors. Survey respondents anticipated that the Option 1 network would result in the loss of 41 FTE positions.

Temperate East marine reserve options

It is estimated that the Option 1 network could displace about 0.7 per cent of the annual GVP of the fisheries active in the region with the Option 2 network displacing about 0.3 per cent — equal to approximately $1.2 million of GVP for the Option 1network and approximately $0.6 million for the Option 2 network (see Table 4.12).

Table 4.12   ***Fisheries impacted by the Option 1 proposed Temperate East network***

Jurisdiction	Fishery	Option 1 network		Option 2 Network	
		Estimated GVP displaced	% GVP total fishery[+]	Estimated GVP displaced	% GVP total fishery[+]
C'wlth	East Coast Tuna & Billfish	$261,700*	0.7%	$248,000	0.6%
	SESSF - East Coast Deepwater Trawl	*	*	*	*
	SESSF - Commonwealth Trawl	$512,000	0.7%	$3,800	<0.1%
	SESSF - Gillnet, Hook & Trap	$67,100	0.3%	$43,300	0.2%
	Small pelagics	*	*	-	-
NSW	Ocean Trawl	$214,590	1.0%	$113,990	0.5%
	Ocean Trap & Line	$4,400	<0.1%	$2,540	<0.1%
	Total	**$1,191,200**	**0.7%**	**$559,250**	**0.3%**

* Catch and GVP data is confidential due to the small number of operators.

Impact on fishing operations

ABARES surveyed potentially affected fishers to gauge their response to the Option 1 network. Of the 526 fishing businesses surveyed, 21 stated that they would leave the industry as a result of the Option 1 networks impact upon their operations.

Impact on dependent communities/regions

A potential reduction in landings into ports may result from both the Option 1 and Option 2 reserves network with landings estimated to fall by $1.2 and $0.6 million respectively. How this potential drop in landings impacts upon ports and their associated communities will depend upon a number of factors including the scale of the potential impact at the port level, the dependence of communities on the fishing activities of a port and how individual commercial fishing operations adjust and adapt to the new reserves network. Based on survey and landing data, Table 4.13 shows the ports estimated to have a fall in fish landings greater than $50,000 per annum.

Table 4.13 ***Potential future landings foregone by port under the Temperate east reserve network options where impact is greater than $50,000***

Port	Potential future landings foregone ($ per annum)		Potential landings foregone per capita ($) Option 2
	Option 1	Option 2	
Greenwell Point	$351,000	<$50,000	<$1
Mooloolaba	$214,000	$223,000	$7
Uludulla	$154,000	<$50,000	<$1
Forster	$143,000	$74,000	$2
Newcastle	$65,000	$41,000	<$1
Sydney	$57,000	$16,000	<$1
Port Stephens	$65,000	$41,000	<$1

Based on potential future landings foregone and consideration of the socio-economic issues at the community level, ABARES has modelled the likely impact on the regional economies of Mooloolaba and an area around Ulladulla including the regional and national implications. ABARES estimates that up to 10 FTE positions would be lost in the short term than would otherwise have been the case in the absence of the Option 1 marine reserve network and 5 FTE jobs for the Option 2 network. ABARES has also calculated that the Option 1 network may lead to a loss in economic activity of $2.4 million in the short-term with Option 2 leading to a short-term loss in economic activity of $1.1 million per annum.

The ABARES modelling output needs to be compared with the estimates of job losses derived from detailed surveys of the catching and processing sectors. Survey respondents anticipated that the Option 1 network would result in the loss of 25.8 FTE positions.

5. Process used to identify marine reserve network options including consultation

5.1 Overview

The marine bioregional planning process commenced in 2006 with the release of publication, *The way ahead for Australia's South-west Oceans*.[23] This document committed the Australian Government to establish a network of marine protected areas in the South-west Marine Region. In 2007, the South-west Marine Bioregional Plan – Bioregional Profile was released. This document reaffirmed the Australian Government's commitment to the establishment of a national network of representative MPAs in Commonwealth waters. Bioregional Profiles for all remaining regions were subsequently released during 2008 and 2009.

In 2009 and 2010, consultation was undertaken on Areas for Further Assessment (AFAs). AFAs were large areas that encompassed examples of the range of biodiversity and ecosystems within which the placement of a reserve was desirable. AFAs were identified to aid further analysis of information at a more detailed scale and assist in the design of the marine reserves network. Consultations on the AFAs assisted in identifying potential social and economic impacts that may occur with the establishment of marine reserves networks in these areas and how those impacts could be minimised.

From 5 May 2011 until November 2011, the Government sequentially released the Draft Marine Bioregional Plans and the Commonwealth Marine Reserve Network proposals for each marine region. This marked the start of the 90 day consultation period for each draft plan and marine reserves network proposal.

5.2 Consultation on the Option 1 marine reserve networks proposal

Between May 2011 and February 2012, public feedback was invited on the draft marine reserve networks proposals and the draft Coral Sea marine reserve. The invitation to provide feedback was advertised in the media, through the department's website and through notices sent to stakeholder organisations, community groups and industry associations.

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[23] Department of Sustainability, Environment, Water, Population and Communities (2006) *The way ahead for Australia's South-west Oceans: Marine Bioregional Planning in Commonwealth Waters*, viewed 25 May 2012, <http://www.environment.gov.au/archive/coasts/mbp/publications/south-west/pubs/sw-brochure.pdf > .

The department made publically available on its website and upon request, a range of supporting publications to provide information and guidance on each draft network and the draft Coral Sea marine reserve. The publications assisted stakeholders to understand the policy basis of what was being proposed and information on how to lodge a submission.

In addition to the supporting publications, the department undertook an extensive range of meetings with stakeholder groups and public events throughout coastal areas of Australia. Meetings included multi-sector information sessions, "open house" public information sessions and targeted meetings for specific stakeholder groups.

566,377 submissions were received on the draft marine reserves networks. The largest proportion of submissions lodged (99.9 per cent) were from organised campaigns. Table 5.1 shows the submissions received both with the inclusion of campaign submissions and without.

Table 5.1   Numbers of submissions received

Source	Including campaign	Excluding campaign
Organisation	392	392
Individual	565,985	1,104
Total	**566,377**	**1,496**

The vast majority of submissions related to the draft Coral Sea Marine Reserve, representing around 86 per cent of all submissions received with the next highest being for the South-west Marine Region draft reserves network (around 7 per cent) followed by the North-west draft marine reserve network (around 4 per cent). The order was the same with campaign submission removed (see Table 5.2).

Table 5.2   Submission by marine region

	Including campaign	Excluding campaign
South-west	39,266	224
North-west	19,702	69
North	12,861	69
Coral Sea	487,435	907
Temperate east	7,113	227
Total	**566,377**	**1,496**

Including campaign submissions, the largest number of submissions received supported marine reserves but with a higher level of protection (99.5 per cent of submissions received). The second largest number of submission were from people concerned with the social and economic impacts of reserves (representing 82.9 per cent of submissions). The majority of submissions supported either the proposed network option or increased protection for the south-west marine environment.

In regards to campaigns, the vast majority (over 99 per cent of total submissions) were run by the conservation sector. These included submissions received on the draft Coral

Sea marine reserve under the AVAAZ (an international campaign organiser) and Protect Our Coral Sea conservation campaign umbrella. This campaign generated over 87 per cent of all Coral Sea related campaign submissions (of which 74 per cent, or 361 829, individual submissions were received from overseas). On the South-west draft marine reserves network 99 per cent of all submissions were campaign submissions with the vast majority (82 per cent) received under the umbrella of the Save Our Marine Life collaboration comprising several Australian and international conservation organisations. For the draft North-west marine reserve network most campaign submissions were generated under the umbrella of the Save Our Tropical Sealife coalition. This was the same for the North where 99.5 per cent of campaign submissions were received under the same campaign umbrella. For the Temperate East the Conservation Society was responsible for most of the campaign submissions (61.9 per cent).

Excluding campaign submissions, the majority of submissions still supported increased protection for the marine environment from its current state. However, significant percentage (37.5 per cent) of submissions were concerned with the social and economic impacts of the draft reserves.

In addition to the work undertaken by the department, ABARES as part of its socio-economic assessment work undertook extensive consultation with industry through workshops, targeted meetings and through surveys sent out to all fishers identified as being potentially impacted.

Formal feedback received on the Option 1 South-west Marine Reserves Network

39,266 submissions were received on the draft South-west marine reserves network. The largest proportion of submissions lodged (99 per cent) were from organised campaigns. Table 5.3 shows the submissions received both with the inclusion of campaign submissions and without. Campaign submissions were often submitted just as a pro forma.

Table 5.3   Number of submission received – South-west Marine Region

	Including campaign	Excluding campaign
Organisation	93	93
Individual	39 173	131
Total	**39 266**	**224**

Including campaign submissions, the largest number of submissions received came from people supporting marine reserves but with a higher level of protection, representing 93 per cent of submissions received when campaign submissions are included in the total. The majority of submissions supported either the proposed network option or increased protection for the south-west marine environment.

Excluding campaign submissions, the majority of submissions still supported increased protection for the marine environment from its current state. However, a large number of

submissions (at 44 per cent or 99 individual submissions) were concerned with the social and economic impacts of the proposed reserves. Table 5.4 shows the formal feedback received by the end of the public consultation period classed into six themes.

Table 5.4   Feedback received via submission – South-west Marine Region

Theme	Proportion of submissions (incl. campaigns)	Proportion of submissions (excl. campaigns)
No support for marine reserves	Less than 0.1%	3.1%
Support for the marine reserves as proposed	2.8%	13.4%
Support for the marine reserves but with a higher level of protection	94.4%	50.0%
Concerned with protection of the marine environment	2.8%	2.7%
Concerned with social and economic impacts of reserves	2.4%	44.0%
Concerned with management of reserves	Less than 0.1%	10.7%

Formal feedback received on the Option 1 North-west Marine Reserve Network

19,702 submissions were received on the draft North-west Commonwealth marine reserves network. The largest proportion of submissions lodged (99.6 per cent) were from organised campaigns. Table 5.5 shows the submissions received both with the inclusion of campaign submissions and without. Campaign submissions were often submitted just as a pro forma.

Table 5.5   Number of submissions received – North-west Marine Region

	Including campaign	Excluding campaign
Organisation	47	47
Individual	19 655	22
Total	**19 702**	**69**

Including campaign submissions, the largest number of submissions received came from people concerned with the conservation of the marine environment, representing 99.4 per cent of submissions received when campaign submissions are included in the total. The majority of submissions supported either the proposed network option or increased protection for the North-west marine environment.

Excluding campaign submissions, the majority of submissions still supported increased protection for the marine environment from its current state. However, a large number of submissions (at 59.4 per cent of individual submissions) were concerned with the social and economic impacts of the draft North-west marine reserves network. Table 5.6 shows the formal feedback received by the end of the public consultation period classed into six themes.

Table 5.6   Feedback received via submission – North-west Marine Region

Theme	Proportion of submissions (incl. campaign)	Proportion of submissions (excl. campaign)
No support for marine reserves	Less than 0.1%	4.3%
Support for the marine reserves as proposed	Less than 0.1%	7.2%
Support for the marine reserves but with a higher level of protection	94.4%	37.7%
Concerned with protection of the marine environment	Less than 0.1%	4.3%
Concerned with social and economic impacts of reserves	0.6%	59.4%
Concerned with management of reserves	0.1%	37.7%

Formal feedback received on the Option 1 North Marine Reserve Network

12,861 submissions were received on the draft North marine reserves network. The largest proportion of submissions lodged (99.5 per cent) were from organised campaigns. Table 5.7 shows the submissions received both with the inclusion of campaign submissions and without. Campaign submissions were often submitted just as a pro forma.

Table 5.7   Number of submissions received – North Marine Region

	Including campaign	Excluding campaign
Organisation	37	37
Individual	12 824	32
Total	**12 861**	**69**

Including campaign submissions, the largest number of submissions received came from people concerned with the conservation of the marine environment, representing 98.7 per cent of submissions received when campaign submissions are included in the total. The majority of submissions supported either the proposed network option or increased protection for the North marine environment.

Excluding campaign submissions, the majority of submissions still supported increased protection for the marine environment from its current state. However, a large number of submissions (at 59.4 per cent of individual submissions) were concerned with the social and economic impacts of the proposed reserves. Table 5.8 shows the formal feedback received by the end of the public consultation period classed into six themes.

Table 5.8   Feedback received via submission

Theme	Proportion of submissions (incl. campaign)	Proportion of submissions (excl. campaign)
No support for marine reserves	Less than 0.1%	7.2%
Support for the marine reserves as proposed	Less than 0.1%	8.7%
Support for the marine reserves but with a higher level of protection	99.7%	47.8%
Concerned with protection of the marine environment	Less than 0.1%	8.7%
Concerned with social and economic impacts of reserves	1.2%	59.4%
Concerned with management of reserves	0.3%	49.3%

Formal feedback received on the Option 1 Coral Sea Marine Reserve

487,435 submissions were received on the draft Coral Sea marine reserve. The largest proportion of submissions lodged, 99.8 per cent, were from organised campaigns. Table 5.9 shows the submissions received both with the inclusion of campaign submissions and without. Campaign submissions were often submitted just as a pro forma.

Table 5.9   Number of submissions received – Coral Sea

	Including campaign	Excluding campaign
Organisation	129	129
Individual	487 306	778
Total	**487 435**	**907**

Including campaign submissions, the largest number of submissions received came from people concerned with the conservation of the marine environment, representing 99.76 per cent of submissions received when campaign submissions are included in the total. The majority of submissions supported either the proposed network option or increased protection for the Coral Sea marine environment.

Excluding campaign submissions, the majority of submissions still supported increased protection for the marine environment from its current state. However, a large number of submissions (at 29.6 per cent of individual submissions) were concerned with the social and economic impacts of the proposed reserves. Table 5.10 shows the formal feedback received by the end of the public consultation period classed into six themes.

Table 5.10   Feedback received via submission

Theme	Proportion of submissions (incl. campaign)	Proportion of submissions (excl. campaign)
No support for marine reserves	Less than 0.1%	6.4%
Support for the marine reserves as proposed	Less than 0.1%	7.8%
Support for the marine reserves but with a higher level of protection	99.9%	77.2%
Concerned with protection of the marine environment	Less than 0.1%	2.7%
Concerned with social and economic impacts of reserves	96.0%	29.6%
Concerned with management of reserves	2.7%	14.2%

Formal feedback received on the Option 1 Temperate East Marine Reserve Network

7,113 submissions were received on the draft Temperate East marine reserves network. The largest proportion of submissions lodged, 96.9 per cent, were from organised campaigns. Table 5.11 shows the submissions received both with the inclusion of campaign submissions and without.

Table 5.11   Number of submissions received – Temperate East Marine Region

	Including campaign	Excluding campaign
Organisation	86	86
Individual	7 027	141
Total	**7 113**	**227**

Including campaign submissions, the largest number of submissions received came from people concerned with the conservation of the marine environment, representing 96.43 per cent of submissions received when campaign submissions are included in the total. The majority of submissions supported either the proposed network option or increased protection for the Temperate East marine environment.

Excluding campaign submissions, the majority of submissions were concerned with the social and economic impacts of the proposed reserves. Table 5.12 shows the formal feedback received by the end of the public consultation period classed into six themes.

Table 5.12   Feedback received via submission – Temperate East Marine Region

Theme	Proportion of submissions (incl. campaign)	Proportion of submissions (excl. campaign)
No support for marine reserves	0.2%	6.1%
Support for the marine reserves as proposed	0.6%	20.7%
Support for the marine reserves but with a higher level of protection	96.8%	48.0%
Concerned with protection of the marine environment	0.3%	3.0%
Concerned with social and economic impacts of reserves	6.5%	48.9%
Concerned with management of reserves	65.9%	46.2%

5.3   Consultation leading to the Option 2 marine reserves networks proposals

Following the period of statutory public consultation and the analysis of submissions, the department conducted targeted meetings with representatives of key sectors to clarify elements of the feedback received and to gather information necessary for the assessment of options for revisions. Based on consideration of submissions received, consideration of the further input and the findings of the socio-economic impact assessments, the department developed revised networks for each of the five marine regions. Prior to finalising network proposals, the Minister for Sustainability, Environment, Water, Population and Communities conducted a final round of consultations in all relevant capital cities and Cairns with a range of stakeholders to discuss and ensure understanding of the views and outstanding issues.

6.   Conclusion and recommended option

Both options presented here would fulfil the Government's policy and national and international commitments.

Both would deliver a substantial conservation outcome in terms of long-term marine biodiversity conservation at low economic cost. At the same time, neither option would meet all the aspirations nor address all the concerns of every stakeholder group.

The process used to develop these options for government has been extensive and consultative, involving the accumulation of scientific, socio-economic and public input over several years and the engagement of key stakeholder groups in developing options and responses to issues as they arose.

Option 2 is the preferred option at the national level — made up of all regional Option 2 networks. These networks provide a well balanced marine reserve network which meets the conservation goals (see Attachment A) while at the same time minimising the impacts on Australia's marine industries and the communities associated with them. Option 2 provides increased protection to 43 per cent of the waters of the five marine regions while impacting up to a maximum of 0.8 per cent of total annual average wild capture fisheries income. Further, while the impacts and benefits of Option 2 are broadly comparable with those of Option 1 at the national level, there are many amendments to the boundaries and zoning of the reserves within the Option 2 networks that seek to either improve long-term conservation benefits or moderate impacts on particular fisheries, communities and other users of the marine environment.

A decision not to establish a network of marine reserves in Australia's waters would mean that:

- Australia would not meet its domestic and international commitments.

- The ability of the Australian Government to protect the ecological integrity of Australia's marine ecosystems would be reduced.

- There would be potential, but unquantifiable, economic and social consequences resulting from biodiversity loss.

Implementing the Government's 2011 Fisheries Adjustment Policy will be a cost to government. The amount of adjustment assistance required will depend on the final reserve network and on the design of an assistance program. While adjustment assistance to impacted fishers may moderate the total economic impact of the new reserves, this will depend on the form of adjustment and how individual fishers respond to both the reserves and the assistance received. For example, if assistance results in fishers leaving the

industry or reducing catch, the displacement impacts identified by ABARES are likely to occur. If fishers adjust by changing fishing methods or moving to new grounds, the economic impacts, including flow-on impacts, will be moderated.

7.   Implementation and Review

The implementation of the final proposed option is a three phase process involving the establishment of the new marine reserves under the EPBC Act; the management of the reserves under Interim Management Arrangements for a period time; followed by the development of statutory management plans for the regional marine reserves networks.

7.1   The process for declaration of a Commonwealth Marine Reserve and the preparation of a management plan

The process to declare a marine reserve network is set out in Box 7.1 below. This process is consistent with section 351 of the EPBC Act.

Box 7.1	The process of declaring a Commonwealth marine reserve
1	The Director of National Parks publishes a notice inviting the public to comment on the proposal to declare a Commonwealth marine reserve over the area, allowing a minimum period of 60 days for comments. This notice includes a statement of the proposed name of the reserve, the proposed boundaries of the reserve and any zones within the reserve, the purpose for which the reserve is to be declared, the IUCN category that the reserve (and any zones) will be assigned to, and the purposes for which it is intended to manage and use the reserve.
2	Any native title holders, registered native title claimants and native title representative bodies for the area are notified of the proposed declaration, and given an opportunity to comment, in accordance with the requirements of the Native Title Act 1993.
3	The Director of National Parks provides the Minister with a report on the Commonwealth reserve proposal. The report must include any comments received and the Director's views on the comments.
4	If necessary a Regulation Impact Statement examining any impacts that declaration of the proposed Commonwealth reserve, would have on business is prepared and provided to the Office of Regulation Review.
5	The Minister considers the report from the Director of National Parks.
6	The Minister decides not to proceed; or
7	The Minister is satisfied the reserve should be established and the Governor-General is advised accordingly
8	The Governor-General makes a Proclamation declaring the area to be a Commonwealth reserve. The Proclamation: names the reserve; states the purposes for which it is declared; states the depth of any seabed included in the reserve; and, assigns the reserve to an IUCN category.
9	The Proclamation comes into effect the day after registration on the Federal Register of Legislative Instruments or at the date set in the Proclamation.

Interim Management Arrangements

When the reserves come into effect, the Director of National Parks will make interim managements arrangement that will apply until statutory Management Plans are made.

Management Plans

The EPBC Act requires that reserve management plans be put in place as soon as practicable to ensure that uses that are allowed under the zoning arrangements can continue where this is consistent with the protection of the conservation values for which the reserves have been established. The process to develop a management plan is at Box 7.2.

Box 7.2 The process to develop a management plan

1. The Director of National Parks publishes a notice inviting the public to comment on the proposal to prepare a draft management plan for the reserve within a minimum period of 30 days.

2. The Director of National Parks prepares the draft management plan.

3. The Director of National Parks publishes a notice inviting the public to comment on the draft management plan within a minimum period of 30 days. Any native title holders, registered native title claimants and native title representative bodies for the area are also notified and given an opportunity to comment, in accordance with the requirements of the Native Title Act 1993. The Director of National Parks considers any comments and may alter the plan accordingly.

4. The Director of National Parks gives the final draft management plan to the Minister with the comments on the draft plan and the views of the Director on those comments.

5. If necessary a Regulation Impact Statement examining any impacts the management plan would have on business is prepared and provided to the Minister for his consideration.

6. The Minister considers the draft management plan, the public comments raised and the Director's views on the comments and when satisfied approves the management plan.

7. The management plan comes into effect the day after registration or at the date specified in the plan.

8. Management plans must be tabled in the Commonwealth Parliament and may be disallowed by either the House of Representatives or the Senate. A notice of motion to disallow a management plan must be introduced within 15 sitting days.

7.2 Reviewing the Arrangements

Once proclaimed, a marine reserve stays in effect until it is revoked or amended. Under the provisions of the EPBC Act, management plans for Commonwealth reserves can be in force for up to ten years unless revoked or amended sooner by another management plan.

Performance assessment will be carried out during the life of a management plan. Results from the performance assessment program will be used to undertake a review of a management plan approximately two years before its expiry.

A review of a management plan will take account of all aspects of management, including internal zoning; management actions, rules, policies and indicators; and research priorities. As part of a review, consideration will be given to how well the objectives and performance indicators outlined in the management plan have been met.

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Goals and Principles underpinning the development of the Marine Reserves Network Proposals

The Australian Government developed a set of Goals and Principles to guide the implementation of the National Representative System of Marine Protected Areas (NRSMPA) in Commonwealth waters. These Goals and Principles are consistent with Guidelines for Establishing the NRSMPA agreed to by all Australian governments in 1998.

The primary aim of the NRSMPA is to establish and effectively manage a comprehensive, adequate and representative system of marine reserves to contribute to the long-term conservation of marine ecosystems and to protect marine biodiversity.

Four goals to maximise conservation outcomes have guided the identification of areas suitable for inclusion in the NRMSPA. These goals apply nationally, and guide identification of representative marine reserves in all the marine regions (except the South-east Marine Region, where the process has been completed).

Goal 1 - Each provincial bioregion occurring in the marine region should be represented at least once in the marine reserve network. Priority will be given to provincial bioregions not already represented in the National Representative System.

Goal 2 - The marine reserve network should cover all depth ranges occurring in the region or other gradients in light penetration in waters over the continental shelf.

Goal 3 - The marine reserve network should seek to include examples of benthic/demersal biological features (for example, habitats, communities, sub-regional ecosystems, particularly those with high biodiversity value, species richness and endemism) known to occur in the marine region at a broad sub provincial (greater than hundreds of kilometres) scale.

Goal 4 - The marine reserve network should include all types of seafloor features. There are 21 seafloor types across the entire Exclusive Economic Zone. Some provincial bioregions will be characterised by the presence of a certain subset of features, such as continental slope or seamounts.

Guiding Principles

Twenty supporting principles have also assisted in determining suitable areas for inclusion in the NRSMPA. These principles have been applied in each Marine Region to guide the location, selection (when more than one option to meet the goals is available), design and zoning of the final Commonwealth marine reserve proposals.

The Goals and Principles also provide guidance for considering potential impacts on people when the location of new Commonwealth marine reserves is being identified. In particular, the Principles require that the selection and design of marine reserve networks is done in a way that minimises potential socio economic impacts on marine users and coastal communities.

Location of MPAs

In developing options that meet the four goals, the following location principles will be applied:

1. MPAs will be located taking into account the occurrence and location of existing spatial management arrangements (e.g. existing protected areas and sectoral measures) that contribute to the goals.
2. The goals should be met with the least number of separate MPAs (i.e. a smaller number of larger MPAs rather than many small MPAs) to maximise conservation outcomes.

Selection

Where different options that meet the goals exist, the following selection principles should be considered in selecting areas suitable for inclusion in the National Representative System of MPAs:

3. The capacity of an MPA to mitigate identified threats to conservation values.
4. The occurrence of spatially defined habitats for and/or aggregations of threatened and/or migratory species.
5. The occurrence of ecologically important pelagic features which have a consistent and definable spatial distribution.
6. The occurrence of known small-scale (tens of kilometres) ecosystems associated with the benthic/demersal environment.
7. Relevant available information about smallscale distribution of sediment types and sizes and other geo-oceanographic variables.
8. Occurrence of listed heritage sites (where inclusion in the MPA network would improve administration of protection regimes).
9. Socio-economic costs should be minimised.

Design

Once the broad location of MPAs has been determined, the following design principles should be applied to further refine the size and shape of individual MPAs:

10. Individual areas should, as far as practicable, include continuous depth transects, (e.g. from the shelf to the abyss).
11. Whole seafloor (geomorphic) features should be included.
12. Features should be replicated wherever possible within the system of MPAs, (i.e. included more than once).

13. Size and shape should be orientated to account for inclusion of connectivity corridors and biological dispersal patterns within and across MPAs.
14. Boundary lines should be simple, as much as possible following straight latitudinal/ longitudinal lines.
15. Boundary lines should be easily identifiable, where possible coinciding with existing regulatory boundaries.
16. The size and shape of each area should be set to minimise socio-economic costs.

Zoning

Because zoning of MPAs (i.e. the allocation of appropriate management regimes to different zones) has the potential to affect the socio-economic costs associated with the establishment of any protected area, the Australian Government recognises the importance of addressing zoning considerations as early as possible in the process. The following zoning principles will be applied in developing the regional systems of MPAs:

17. Zoning will be based on the EPBC Act/World Conservation Union (IUCN) categories of protection (see Box 4.1).
18. The regional MPA network will aim to include some highly protected areas (IUCN Categories I and II) in each bioregion.
19. Zoning will be based on the consideration of the threat that specific activities pose to the conservation objectives of each MPA.
20. Zoning of MPAs will seek to ensure that the conservation objectives of the area are protected, taking into account a precautionary approach to threats as well as the relative costs and benefits (economic, social and environmental) of different zoning arrangements.