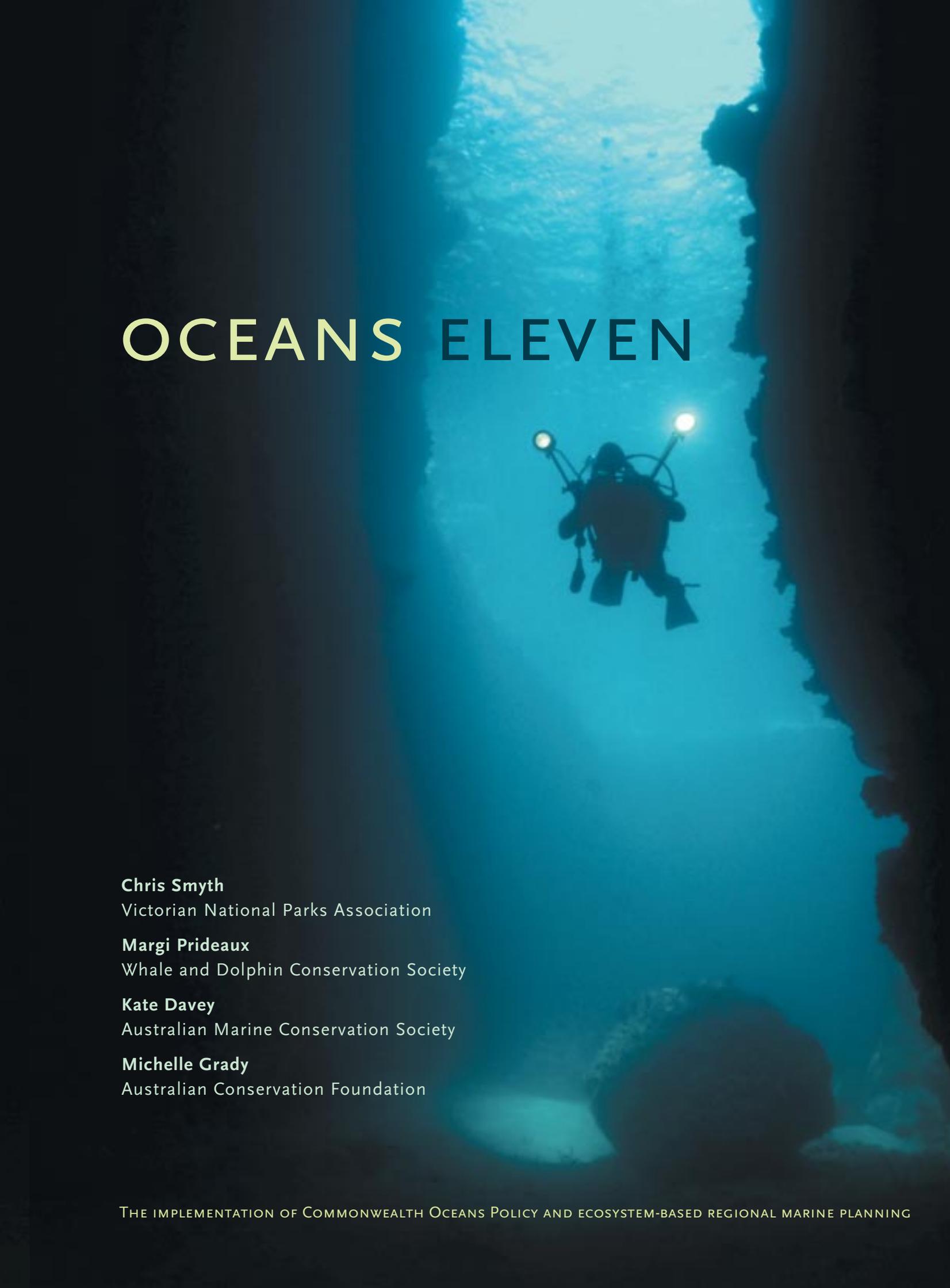


OCEANS ELEVEN

A diver is silhouetted against a bright blue background, swimming upwards. The diver is equipped with a scuba tank and two lights, one on each side of their head. The water is clear and blue, with some darker, rocky shapes visible in the lower right corner.

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THE IMPLEMENTATION OF COMMONWEALTH OCEANS POLICY AND ECOSYSTEM-BASED REGIONAL MARINE PLANNING

MARCH 2003

Oceans eleven

The implementation of Commonwealth Oceans Policy and ecosystem-based regional marine planning

by

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Conservation Council of South Australia

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Dolphin Research Institute

Environment Centre Northern Territory

Greenpeace

Humane Society International

International Fund for Animal Welfare

National Parks Association of New South Wales

Nature Conservation Council of New South Wales

Queensland Conservation Council

Tasmanian Conservation Trust

The Wilderness Society

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Foreword

The big blue country

Australia might be known as a sunburnt country of sweeping plains and ragged mountain ranges, but in fact, it is more water than land.

The biggest island on the planet has the biggest area of ocean, stretching from the tropics to Antarctica, from the Indian Ocean to the Pacific, from Macquarie Island to Heard – all of sixteen million square kilometres.

Beneath the surface of Australia's oceans is a marine world of vibrant colours, remarkable diversity, unusual creatures, enormous canyons – and waters darker and deeper than you can imagine.

Whales travel from the frozen south to the tropical north on an ancient, annual pilgrimage, their wild songs echoing across the oceans.

Orange roughies, some born when Ned Kelly was a boy, gather to spawn around submerged mountain peaks that rise a kilometre from the seabed.

Giant kelp forests, with fronds up to thirty-five metres long, sway with the waves, giving shelter to seadragons, shrimps and sea urchins. Yes, dragons exist, and forests grow under water.

Wandering albatrosses, the tips of their mighty four-metre wingspan barely above the waves, fly more than 15,000 kilometres searching for squid and fish.

These are just a few of the jewels in our vast marine treasure. It is time that Australia's image, so rooted in the land, broadened to embrace its oceans.

But centuries of misuse have taken their toll. News of heavy metal and oil pollution, overfishing, algal blooms, industrial noise pollution and habitat losses comes not only from overseas. Sadly, these catastrophes occur here too.

Australia's premier marine icon, the Great Barrier Reef, one of the natural wonders of the world, is shrinking and dying as water temperatures rise. The wandering albatross, the largest seabird in the world, is close to extinction, drowning on longlines and shot dead for bait.

After centuries of slaughter, whale numbers are dangerously low. Orange roughy populations have plummeted, overfished to twenty per cent of their pre-fished levels. And giant kelp forests now cover a tiny fraction of their original range, possibly lost to water pollution, rises in water temperature due to global warming, and fishing-related changes in species interactions.

We can stop our big blue oceans from going the way of our damaged brown land. We can turn our ignorance of the ocean into knowledge and understanding, and become stewards of the marine environment, ambassadors for its protection. But to do so we must move from rhetoric to action.

In 1998 Australia stated its intention to protect its oceans and ensure ecologically sustainable use through the groundbreaking Oceans Policy. But is it now lost at sea?

Oceans eleven provides the navigational charts for Oceans Policy by setting out how truly integrated management, underpinned by the needs of the ecosystem, can work in practice – in the water – through regional marine planning.

There is a compelling and urgent case for legislative and administrative leadership and reform, expanded research, community education, engagement and capacity building, and a suite of conservation measures, including a network of marine national parks, to support these changes.

It is time that our oceans were valued at their true worth and given the protection they so richly deserve. The policy is there. The skills are there. The people are there. What we now need are the resources and leadership of governments to get on with the job.

Peter Garrett

President

Australian Conservation Foundation

Executive summary

In 1998 the Commonwealth government's Oceans Policy laid down a framework for ecosystem-based regional marine planning, establishing Australia as a world leader in efforts to secure a sustainable future for the oceans.

The Oceans Policy was embraced by Australia's marine-based industries, the scientific community and the conservation movement, who have all been actively participating in its preparation and implementation processes.

Five years on, the movement from policy to action has stalled.

Oceans eleven outlines the actions and measures that will make regional marine planning a success and Oceans Policy the difference in oceans management. These are reflected in the following six core recommendations for the protection of our treasured marine environment.

Recommendation 1

That ecosystem-based management is reinforced as being at the heart of Oceans Policy and regional marine planning.

Recommendation 2

That a National Oceans Act and, a sufficiently empowered National Oceans Authority, be created.

Recommendation 3

That a National Marine Research Council is formed to review and fund an expansion of marine research.

Recommendation 4

That the National Representative System of Marine Protected Areas (NRSMPA) is established with a core network of marine national parks that are of sufficient number and size to protect the range of marine ecosystems in Australia's care.

Recommendation 5

That the Commonwealth and state governments make a commitment to community capacity building, education and engagement in regional marine planning

Recommendation 6

That the 11-step process for ecosystem-based regional marine planning be adopted.

This executive summary now outlines the key points made in each of the seven chapters of *Oceans eleven*.

1 Exploring ecosystem-based management

According to Australia's Oceans Policy, the objective of regional marine planning is to maintain the health and biodiversity of our marine environment, promote diverse, strong, sustainable and increasingly secure marine industries, and establish a representative system of marine protected areas. That's quite a challenge, and one that can only be met by ensuring that ecosystem-based management remains at the heart of regional marine planning.

Ecosystem-based management is a management system that recognises, respects and protects biological diversity and the functions and dynamic processes of natural ecosystems, and aims to reduce human impact on these ecosystem processes. It drives inter-agency cooperation and organisational change, captures improving knowledge of ecosystems, and recognises that while natural ecosystems must be maintained, human values also play a dominant role in establishing ecosystem-based management goals. The analysis of cumulative impacts and the use of system and species indicators are crucial to ecosystem-based management and regional marine planning.

2 Making new laws for the sea (and a pilot for sustainable use of the marine environment)

To manage human interactions with ocean systems, while also ensuring that ocean uses do not compromise one another or the marine environment, requires clear, streamlined and integrated arrangements anchored in

appropriate legislation and supplied with the best-available environmental, economic and social research. This currently does not exist, with a fragmented and sector-based approach continuing to provide a significant barrier to the implementation of Oceans Policy.

To resolve this issue, *Oceans eleven* proposes a National Oceans Act, under the auspices of a proposed National Oceans Authority. The Act would among other things:

- enshrine biodiversity protection, the maintenance of ecological integrity and the practices of ecological sustainability as primary objectives
- provide the legislative foundation for ecosystem-based management and its decision making and planning
- coordinate existing Commonwealth, state and territory legislation and, where appropriate, replace existing legislative mechanisms with more appropriate ones and/or shift responsibilities for management of specific issues between agencies to better reflect ecosystem-based management needs.

Central to the development of national oceans management is the creation of a single, statutory National Oceans Authority to oversee the implementation of the proposed National Oceans Act. Responsibilities of the National Oceans Authority would include the:

- development, management and regulation of ecosystem-based regional marine plans, with clear legislative requirements for ecologically sustainable targets and the obligation to give priority to the protection of biodiversity
- conduct of strategic assessment, periodic review and accreditation of state, territory and Commonwealth agencies that assess proposals and carry out management activities in the marine environment, ensuring that they adhere generally to ecosystem-based management, ecological sustainability and the regional marine plans.

The National Oceans Authority is not intended to be a sprawling new bureaucracy. Rather, it would be a lean and effective pilot for industry and government agencies with strong and clear directive and enforcement powers.

Under these new arrangements existing agencies would continue to manage their sector, or monitor and report on specific factors. But this would be within a coordinated decision-making framework, one that would assess the cumulative impact of each sector and implement a shared vision for the future use and conservation of Australia's oceans.

3 The next age of discovery

Well-targeted, well-funded, independent, integrated, expanding and accessible research is the key to building our knowledge and understanding of Australia's marine waters. A strong policy and increased funding commitment is urgently required from the Commonwealth and state governments, as well as the establishment of a National Marine Research Council assigned the task of reviewing and funding research. Increases in core and untied funding are needed to begin the independent research and monitoring for the establishment of ecosystem baselines and the assessment of ecosystem health. The success of Oceans Policy, and of ecosystem-based management, depends on it.

4 Conserving the oceans

To adequately protect ecological processes, biodiversity and the interconnections of the marine environment, it is vital that a network of marine national parks is established as a core component of the National Representative System of Marine Protected Areas. If the parks in this network are of sufficient number and size, the full range of marine life and habitats can be protected on the regional scale, at different locations and at different stages in life cycles.

Marine national parks are part of a suite of marine conservation management tools now available, including legislative arrangements, conservation agreements, critical habitat protection, recovery and threat abatement plans and industry codes of conduct. It is essential that these become integrated with one another and the objectives of ecosystem-based management.

5 Bringing the community on board

The best protection for the marine environment will come from engaged, well-informed and aware communities working with managers and acting as custodians and ambassadors for the marine environment. The challenge for achieving this will be to develop well-resourced, two-way, contemporary, timely and high-quality:

- primary, secondary, tertiary and community education programs
- communications strategies
- consultation processes that are transparent, accountable and responsive
- participation programs and activities led by local communities where possible
- community capacity-building programs.

Governments must allocate adequate funding, staff and in-kind resources to ensure equity of opportunity for communities to participate in regional marine planning.

6 Eleven steps to ecosystem-based regional marine planning

The new National Oceans Authority, working with the research community, stakeholders and the wider community, would proceed through the following 11 steps to implement ecosystem-based regional marine planning:

- Step 1 Stakeholder engagement and community education
- Step 2 Gathering necessary baseline data
- Step 3 Identifying operational objectives, indicators and targets
- Step 4 Consideration and selection of habitat for protection
- Step 5 Assessing the risks to ecosystem values, operational objectives and system and species indicators
- Step 6 Achieving the operational objectives and indicator targets
- Step 7 Designing research, information and monitoring systems
- Step 8 Designing performance assessment and review
- Step 9 Designing a compliance strategy
- Step 10 Finalising the regional marine plan
- Step 11 Review of the regional marine plan to ensure adaptive management.

7 Stepping into a sustainable future

In five years time, when Australia's first regional marine plan is reviewed, Australia's oceans should be better understood, better protected and better managed. But will they? It all depends on how we act now.

We could establish regional marine plans that bow to sectoral, government and agency pressures and ignore the needs of the marine environment. That would be easy, simply business as usual. But then, Oceans Policy would stand for nothing.

Or we could create innovative, challenging and world-leading regional marine plans that are backed by statute, are enforceable, implement an ecosystem-based management system, recognise the socio-economic needs of communities, and ensure the ecologically sustainable use of Australia's marine environment.

The choice is clear: a choice between status quo or a sustainable future for our oceans. If we make the wrong choice, in five years time Australia's oceans will be worse off, and the imperative more urgent for action that we can take right now.

The impossible triage for saving our dying rivers and devastated landscapes that we now face on land need not be our future at sea.

Charting a new course for marine management

One saw, while crossing, that the sea displays the most wonderful sights.

They were in endless variety.

The scene changed continually, and we were called upon not only

to contemplate the works of the Creator in the midst of the liquid

element, but to penetrate the awful mysteries of the ocean.

Jules Verne¹

When Jules Verne wrote of 'awful mysteries' of the deep in *20,000 leagues under the sea* it was the late 1860s, a time when an expanding shipping industry was charting new horizons and sending back reports of mighty and amazing marine creatures.

Knowledge about the marine environment beyond nearshore waters was growing; several years later the *Challenger* expedition finally exploded the myth that the deep waters of the planet were lifeless. The 1876 expedition returned with specimens of 1500 species discovered at 1000 metres below the surface.

As exploration technology has improved, so too has our knowledge of life on the continental shelf and slope, and the abyssal plains, deep canyons and seamounts. But as we have opened windows to this remarkable underwater world, improvements in exploitation technology have opened doors to new, previously untapped resources.

There are now very few species of ocean fish that can find places to hide. Large ships travel the world's oceans, crossing rough waters with tonnes of toxic, viscous hydrocarbons and often carrying unwanted passengers on their hulls and in their ballast water. The oil, gas and mineral industries continue their search for new fields and new technologies to go ever deeper. And as the ocean frontiers have become industrialised, artificial noise has risen to levels that could force threatened marine species from their homes.

As our knowledge of the natural values of the oceans has increased, so too has the intensity of their use. The two are inextricably linked.

To ensure that these natural values are protected, oceans planning must have at its heart the protection, conservation and restoration of marine ecosystems and ecological processes. To do this we must break free from the shackles of tired and environmentally insensitive administrative, political and bureaucratic decision-making structures and processes.

Breaking down boundaries

As has oft been said but rarely acted upon, nature doesn't recognise artificial boundaries, and this is particularly so in the dynamic marine environment. Nor does nature single out uses and their separate impacts; these all work in combination in affecting animals, plants and ecological processes.

To best protect and manage the marine environment we have to work with it, not against it, and embrace management objectives, policies, structures, programs and actions that reflect and respect the natural boundaries of marine ecosystems and consider all impacts as one. This approach is called ecosystem-based management.

But since Federation, the management of Australia's oceans has been the responsibility of a confusing myriad of state and Commonwealth government agencies, and state and Commonwealth legislation, regulations and management plans. The result has been inconsistent, inefficient and ultimately unsuccessful management of Australia's marine regions.

Given what is at stake in environmental, social and economic terms, the Commonwealth government has recognised the need to better manage our oceans and is urging the coordination of all activities and conservation through the implementation of its 1998 Oceans Policy.

BOX 1 THE AIMS OF ECOSYSTEM-BASED MANAGEMENT

As described in Australia's Oceans Policy, ecosystem-based management 'aims to ensure the maintenance of:

- ecological processes in all ocean areas including, for example, water and nutrient flows, community structures and food webs, and ecosystem links
- marine biological diversity, including the capacity for evolutionary change
- viable populations of all native marine species in functioning biological communities'.

Ecosystem-based management seeks to manage human interactions with ecosystems to ensure that an ecosystem's natural integrity is maintained and biological diversity is sustained, in perpetuity and in accordance with the ecosystem's natural cycles.

Ecosystem-based management is fundamental to the Oceans Policy and why, for effective implementation, the ocean area that Australia is responsible for – the Exclusive Economic Zone – has been divided into eleven planning regions based on environmental features, not political or administrative ones.

The South-east Region is the first of the eleven marine regions to have a regional marine plan in preparation. The region covers more than two million square

kilometres of Australia's southern waters and, although this is only one-eighth the area of Australia's oceans, it is still much larger than the entire marine jurisdictions of many coastal countries.

For Australia's Oceans Policy to give our oceans an ecologically sustainable future, the Commonwealth must ensure that ecosystem-based management drives all decisions on the use of the marine environment.

Staying on course

Australia's oceans contain a variety of marine ecosystems, a very rich collection of marine plants and animals, and dramatic underwater seascapes. And these support a myriad of uses including commercial and recreational fishing, oil, gas and mineral exploration and extraction, fish farming, tourism, shipping and ports, submarine cables and energy transmission lines, marine research and education, waste dumping and defence activities. All of these uses must coexist with each other and within what are dynamic and environmentally significant marine ecosystems.

The setting of boundaries based on natural systems is only a first step in the journey towards ecosystem-based management. *Oceans eleven* is about ensuring that Australia continues to head in the right direction and along the right course. It has been prepared by an alliance of community environment groups closely involved in the planning processes associated with the implementation of the Oceans Policy. They are determined to see Australia's oceans protected and sustainably managed and, in *Oceans eleven*, outline a conservation perspective on the policies and actions necessary to achieve the aims of the Oceans Policy. This will be discussed in later sections of the report and includes:

- protection of marine biodiversity as a fundamental goal of regional marine planning, including the protection of critical species and habitats
- implementation of an ecosystem-based management system that has decision makers and managers weighing the ongoing cumulative impacts of all ocean uses against the conservation objectives for ecosystems
- adoption of the precautionary principle to ensure that wise conservation decisions are not delayed by an absence of comprehensive scientific information. This requires users of the environment to prove that their uses have no impact
- establishment of a National Oceans Act and a National Oceans Authority, an expanded program of marine research, a core network of marine national parks, and effective community engagement.

The genesis of *Oceans eleven*

An eleven-step process for ecosystem-based regional marine planning is outlined in Chapter 6. Eleven planning steps for eleven marine regions in Australia's oceans, here is the genesis of *Oceans eleven*.

By making use of the substantive cross-sectoral work that has characterised Oceans Policy development so far, and the best of emerging science and policy advances, *Oceans eleven* takes the debate on marine management to the next level. It builds on the work of governments, the National Oceans Office, management agencies, marine-based industries, community groups, the science community and others who have been searching for a new way forward in oceans protection. They have now laid the groundwork for the Commonwealth Government to take the most crucial step from policy into action.

A number of the elements called for in *Oceans eleven* are now taking seed within government. These include the tailoring of consultative processes that are delivering the NRSMPA to better facilitate stakeholder input, the consultative structure established by the National Oceans Office (including the National Oceans Advisory Group), and the substantial information provided to the community through the informative *South-east Regional Marine Plan Assessment Reports*. The next step is to nest these and other elements within an oceans conservation framework, ensuring that they are part of the development of new standards and processes across marine-industry departments and driven by conservation imperatives.

Oceans eleven is a timely reminder that Oceans Policy defined and set the goals and standards for the establishment and implementation of ecosystem-based regional marine planning. Without this new and groundbreaking planning and management system, the future of our oceans is bleak.

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BOX 2 AUSTRALIA'S OCEANS POLICY: VISION AND GOALS

Vision

Healthy oceans: cared for, understood and used wisely for the benefit of all, now and in the future

Goals

In seeking to care for, understand and use our oceans wisely, Australia's oceans policy has the following broad goals:

1. To exercise and protect Australia's rights and jurisdiction over offshore areas, including offshore resources
2. To meet Australia's international obligations under the *United Nations Convention on the Law of the Sea* and other international treaties
3. To understand and protect Australia's marine biological diversity, the ocean environment and its resources, and ensure ocean uses are ecologically sustainable
4. To promote ecologically sustainable economic development and job creation
5. To establish integrated oceans planning and management arrangements
6. To accommodate community needs and aspirations
7. To improve our expertise and capabilities in ocean-related management, science, technology and engineering
8. To identify and protect our natural and cultural marine heritage
9. To promote public awareness and understanding

The deep and dark blue ocean will continue to roll – far into the future – but it is increasingly clear that it is unrealistic to take for granted the benefits it provides, the distillation of four and a half billion years of fine tuning, obviously and swiftly altered in the wink of a geologist's eye.

Robert Ballard²

1

Exploring ecosystem-based management

He always thought of the sea as *la mar* which is what people call her in Spanish when they love her. Sometimes those who love her say bad things of her but they are always said as though she were a woman. Some of the younger fishermen, those who used buoys as floats for their lines and had motor-boats, bought when the shark livers had brought much money, spoke of her as *el mar* which is masculine. They spoke of her as a contestant or a place or even an enemy.

Ernest Hemingway³

Hemingway's old man has a very different attitude to the young Turks of the fishing industry. He works with the marine environment, while the younger fishers work against it. Unfortunately, exploitative attitudes such as theirs have for too long prevailed in the use of Australia's oceans. Ecosystem-based management is infused with the old man's way of thinking and is the only means by which we can give our oceans long-term protection.

Managing people, not ecosystems

The concepts of ecologically sustainable development and the precautionary principle came to prominence as fundamental policy shifts in resource management during the United Nations Conference on Environment and Development held in Rio de Janeiro in June 1992.

Ecologically sustainable development has three core objectives: improving individual and community welfare and wellbeing, increasing inter- and intra-generational equity, and maintaining biodiversity and ecological process. The precautionary principle urges caution when consideration is being given to development proposals and other environmental issues, including planning and management, when scientific knowledge is incomplete or uncertain⁴.

In the years since the conference these concepts have been refined, and ecosystem-based management has developed to include them both. However, the pace of management reform has been slow, and many management systems continue to be simple ones based on single species, single sectors and maximum sustainable yields.⁵

Ecosystem-based management is a new approach to looking after the environment. It is a rejection of the old management systems based on sectoral influences, tired management strategies and boundaries drawn from politics, fishing practices or other lines of convenience. In their place it establishes management systems that recognise, respect and protect biological diversity and the functions and dynamic processes of natural ecosystems.

Although this might sound like the aims of existing resource management systems, there are two key differences that set ecosystem-based management apart. The first is that human use is managed to operate within the natural capacity of the ecosystem, not at a level that requires manipulation or control of the ecosystem. The second is recognition that the integrity of natural ecosystems requires protection from human impact, not active management intervention.

Ecosystem-based management is adaptive, with a systems perspective operating across all levels of biological diversity and within ecological boundaries. It maintains ecological integrity – natural genes, species, populations, habitats and ecosystems – and the ecological patterns and processes that support them. Therefore, it should never be confused with management actions that interfere and manipulate ecosystems, such as the culling of higher-order predators in an attempt to increase the abundance of commercially targeted fish species.

The Antarctic management system under the Commission for the Conservation of Antarctic Marine Living Resources has begun the embrace of ecosystem-based management principles. The Convention's Ecosystem Monitoring Program uses selected species and sites as indicators of long-term trends. Two priority areas at this stage are fisheries and climate change.⁶

One of the striking features of the Convention is the obligation to manage fisheries from an ecosystem perspective, requiring the assessment of a full range of ecosystem dynamics such as the flow-on effect to the natural predators of target stock – seabirds, seals and whales.⁷ This has meant a necessary shift from 'descriptive' to 'predictive' planning, and has required a new research thrust to fulfil the Convention's obligations.⁸ Although it is relatively early days for the Convention's adoption of this ecosystem-based management perspective, the signs are positive that it will reap rewards.

The work of the Convention, and the commitment to ecosystem-based management in Australia's Oceans Policy, has given marine management reform a fresh impetus. But to achieve it will require a new view of our interaction with nature, and an explicit examination of our patterns of political and scientific inquiry.⁹

Ecosystem-based management does not stand still. It drives inter-agency cooperation and organisational change, captures improving knowledge of ecosystems, adapts to trends and indicators, and recognises that human values play a dominant role in establishing ecosystem management goals.¹⁰ Governments, managers, stakeholders and the community will have to expect change, accept change, and embrace this new and essential management system.

The goals of ecosystem-based management

In 1998, during the negotiation process for Australia's Oceans Policy, the Ministerial Advisory Group¹¹ recommended that ecosystem-based management

requires the explicit recognition of a number of key goals including the:

- maintenance, throughout the ocean realm, of viable populations of native marine species within functioning biological communities
- maintenance of ecological processes in the marine environment including water and nutrient flows, community and trophic structures, ecosystem linkages and the movement of broad-ranging migratory species
- establishment and maintenance of a comprehensive, adequate and representative system of protected areas covering Australia's biological diversity.

The Ministerial Advisory Group also recognised that ecosystems are dynamic, and that human uses of the oceans and the economic, social and cultural aspirations of people should be accommodated within ecological boundaries. In addition, the group believed that management must take into account the spatial and temporal scales that maintain the evolutionary potential of marine biological diversity.

BOX 3 MARINE BIOLOGICAL DIVERSITY AND MARINE ECOSYSTEMS

The *National Strategy for the Conservation of Australia's Biological Diversity 1996*, states that marine biological diversity is the 'variety of living organisms in the estuaries and oceans, their genes, and the ecosystems of which they form a part'.

The *Convention of Biological Diversity 1992* states that a marine ecosystem is a 'dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit'. For the purposes of regional marine planning, examples of ecosystems are bays, estuaries and the local continental shelf.

The four tenets of ecosystem-based management

As will be discussed later in Chapter 6, ecosystem-based management – and regional marine planning – is a step-by-step process that will move us towards a sustainable future for our oceans (and other natural systems to which it is applied). These steps, and the goals of ecosystem-based management, are based on four tenets.

Holistic, integrated science

This recognises that ecosystems are open, changing and complex, and that the effects of one activity may have an impact on another system or group of species. These impacts have been traditionally left out of conventional management and considered 'externalities', however ecosystem-based management

requires their inclusion and consideration. To achieve this, the best-available science must be used at each stage of the management process, and researchers must view the ecosystem as a whole and assess impacts as cumulative, not isolated.

Adaptive management

Sparse knowledge and the complexity of dynamic ecosystems require flexible management that is adaptive to change. Management decisions and risk assessments are works in progress that must be regularly reviewed and amended to reflect new knowledge and understandings.

Collaborative decision making

With management based on ecosystem features rather than on political boundaries, there must be a range of expertise – ecological, political, generational and cultural – included in the collaborative, decision-making process.

Socially defined goals and objectives

Management should become a reflection of societal values rather than narrow scientific concepts that focus on single issues. However, management goals and objectives must be tempered by an understanding that ecosystem processes must be protected above all other values.¹²

Cumulative impacts

The 'Penguin Parade' at Phillip Island, in Western Port Bay, Victoria, has become an international drawcard, attracting more than 500,000 people each year to watch little penguins scurry up the beach.

At thirty-three centimetres in length, the little penguin is the smallest of the eighteen penguin species, and the only one known to breed in Australia. As well as being a vital component of the marine environment, the little penguin has been given icon status by Victoria's tourism industry, adding up to \$100 million per year to the state's domestic product – about \$50,000 per bird – and directly generating about one hundred jobs. Phillip Island's economy would shrink without them.

During the breeding season males and females share the fishing, going out on alternate days to catch food for their one or two chicks. Their daily search takes them inside Western Port Bay, along the Mornington Peninsula and several kilometres out to sea.

Penguin numbers on Phillip Island have decreased substantially over the last century due to predation by foxes and dogs and the destruction of their coastal habitat. Numbers have also been affected by the loss of food sources, including the dramatic reduction of

pilchards in Victorian waters during the 1990s. Many researchers suspect that the viral disease that caused this decline was linked to imported pilchards used to feed farmed tuna in South Australia. The little penguin population at Phillip Island is now slowly recovering as the birds search for and find replacement food sources.

When considering and resolving the impacts that different uses have on marine ecosystems and marine life, each impact must not be dealt with in isolation from others. Taken alone, each of the impacts on the little penguins – predation, habitat destruction and reduced food sources – would have a lesser effect on them than when combined. Impacts that add to the effects of other impacts on the same ecosystem, species or resource are termed 'cumulative impacts'.

Cumulative impacts most often are those relating to behavioural or other sub-lethal changes in species. Often these changes remain undetected by researchers until the affected animals die and their bodies are washed ashore. Some recent deaths of marine mammals indicate that environmental factors influence the course and outcome of disease outbreaks. In particular, reduced resistance to disease has been linked to increased pollutant burdens, with a likely strong relationship between immuno-suppressive compounds, such as organochlorines, and disease epidemics in cetaceans and other marine mammals.

In 1991 and 1992, large numbers of striped dolphins died along the Spanish, Italian and Greek coasts after succumbing to morbillivirus. Pathology tests indicated higher-than-average levels of organochlorine pollutants in their bodies compared with the animals that survived the virus. The dead dolphins also had depleted stores of body fat and increased numbers of ectoparasites and epizootics, suggesting that they had been in poor health for some time. Researchers speculated that the poor body condition was associated with abnormal water temperatures, and that these had led to a decline in marine biodiversity, food supplies and, eventually, the health of the dolphins.¹³

The decimation of sea otters and kelp forests along the Aleutian Islands in the North Pacific reveals that cumulative impacts can cause fundamental ecosystem shifts. The story begins in the late 1970s when, according to researchers, a sudden warming of water temperatures by 2° C caused plankton at the base of the food chain to disappear. The populations of species that fed on the plankton, such as krill, shrimps, crabs and smelt, declined, and the commercial shrimp and crab fisheries collapsed. Fishing effort shifted dramatically towards the trawling of pollock and cod for sale in the American and Japanese markets. But this

new harvest came from the only alternative food source for the region's sea lions.

The increase in North Pacific water temperatures was having other undesirable effects. Salmon moved into the warmer waters, followed by sharks that quickly added the now-endangered sea lions to their diet. The sea lion population plummeted, removing the main food source of the orca, the highest natural predator in the food chain. Starved of their usual food, the orcas replaced sea lions in their diet with sea otters, whereby the otters quickly disappeared.

Until this cascade of events in the Aleutians, the orcas, otters and sea lions had been living in a finely balanced predator-prey relationship for thousands of years. But the cumulative impacts did not end there. Without predation by sea otters, the sea urchin population exploded and ate its way through the region's kelp forests, the foundation of the region's ecosystems. Local sea birds, including puffins and kittyhawks, are now suffering from the loss of fish that once bred in this kelp environment. Researchers believe the ecosystem has been irrevocably changed.¹⁴

These stories from Phillip Island, the Mediterranean and the Aleutians show why¹⁵ the analysis of cumulative impacts and the use of system and species indicators are crucial to ecosystem-based management and regional marine planning. Even so, cumulative impacts analysis is still an emerging discipline. As yet there are no established thresholds beyond which cumulative impacts significantly degrade an ecosystem or a resource.

The current lack of information makes the assessment of cumulative impacts all the more important, and should be carried out across the ranges of species.¹⁶ New research must develop the system and species indicators, and frameworks for the prediction, risk analysis and assessment of cumulative impacts on marine ecosystems (for an outline of ecological risk assessment see Appendix 1).

In the absence of certainty, adaptive management will be critical to addressing cumulative impacts, and ongoing risk assessments should be adjusted in response to improved knowledge and understandings. Unfortunately, in many Australian marine ecological systems even the most basic baseline information is unavailable. Our knowledge is too often limited to just identifying species. And for most of these, we have little understanding of their full range and habitat requirements. But systems can be established in ecosystem-based management to take these uncertainties into account and to avoid the current situation where a lack of information leads resource managers to conclude that there is no significant impact.

Cumulative impacts also have social dimensions. Were the little penguin population on Phillip Island to collapse, for instance, there would be significant social and economic costs. Ecosystem-based management considers environmental, social and economic values, costs and benefits as information is gathered, and as assessment and performance-based objectives are set. This helps avoid or minimise the negative social and economic pressures associated with often-conflicting uses, environmental change and management responses.

Ecosystem-based management and regional marine planning

For ecosystem-based management to be the foundation of regional marine planning in Australia it will be important to:

- establish baselines for monitoring conditions and system and species indicators
- consult with and actively involve the users and the community in management processes
- conduct ecological risk assessment of all uses and their cumulative impacts on ecosystems
- build the capacity of the community to become involved.

The information gathered in these steps can be used to create a regional marine plan that is evolving, flexible, adaptive to changing circumstances and information, and sensitive to multiple issues. This is a complex, cross-sectoral and cross-jurisdictional task that will often have little or no information available for decision making. Ecosystem-based management is clearly an iterative process measured in decades, not years.

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I think we're challenged as mankind has never been challenged before to prove our maturity and our mastery, not of nature, but of ourselves.

Rachel Carson¹⁷

2

Making new laws for the sea

[Nation] States have the obligation to protect and preserve the marine environment.

United Nations Convention on the Law of the Sea

Laying down the law is one thing, interpreting it is another. With each nation state developing its own set of rules and actions to satisfy this international environmental obligation, what should Australia be doing to ‘protect and preserve the marine environment’?

The Commonwealth government’s 1998 Oceans Policy is where to find the answer. It established Australia as a potential world leader in the implementation of integrated oceans planning and management. But it could remain an opportunity lost if we cannot move from policy to action.

Turning policy into effective action

Managing human interactions with dynamic and largely unknown ocean systems is a complex task. There are no guarantees on the operation of natural ocean processes, but we can provide certainty in the management and regulation of marine-based users.

To do this, while also ensuring that ocean uses do not compromise one another or the marine environment, will require clear, streamlined and integrated arrangements anchored in appropriate legislation and supplied with the best-available environmental, economic and social research.

However, administrative and legal arrangements for marine-based industries are currently sector-based, tailored to meet the needs of particular industries, not those of the marine environment. Ecologically sustainable development is reflected to some degree in each sector’s management, but progress towards sustainability is undermined by the disparate and isolated nature of that management. Management ‘tunnel vision’ such as this makes it impossible to determine collective cumulative impacts or to quantify the relationship of collective operations to the carrying capacity of the marine environment.

Existing environmental laws are generally no better than resource statutes in providing for integrated and pro-active marine management. They are limited in scope and focus, reinforcing existing inefficient, fragmented and often conflicting regimes. They are limited in scope and focus, reinforcing existing inefficient, fragmented and often conflicting regimes. They do not provide for the key goals of Oceans Policy, including:

- integrated oceans planning and management founded upon an ecosystem based approach
- enforceable regional marine plans
- coordination with state jurisdictions
- an overall Oceans Policy framework to which all resource statutes are accountable.

This is particularly true of the EPBC Act, which addresses an important, but limited range of matters regarding environmental protection and biodiversity conservation, not integrated oceans planning. The lack of state government buy-in to regional marine planning is also a major barrier to the effectiveness of Oceans Policy. This must be addressed as a priority to ensure that necessary law reform is all encompassing.

An overall vision anchored with the certainty of legislation is needed. One that is not just about providing checks and balances according to single impacts, but promotes the integration of management, use and conservation of the ocean.

Oceans eleven does not propose that the current environmental laws and administrative arrangements be done away with, although there may well be new agencies and changed responsibilities for others. The principal recommendation here is that Oceans Policy be used to combine these disparate building blocks into a purpose-built structure that ensures ecologically sustainable use and conservation. Ecosystem-based management will provide the foundation upon which the structure is built; integrated legislative and administrative arrangements will bind the blocks together.

Commonwealth powers and Oceans Policy

Does the Commonwealth have the power to implement Oceans Policy? Even though it has no direct or explicit power to enact laws for the environment, the Commonwealth has been able to rely on the broad interpretation given to other heads of power such as trade and commerce, external affairs and corporations' powers contained in section 51 of the Constitution.¹⁸

The external affairs power, for example, enables the codification of Australia's comprehensive set of international obligations that include the *United Nations Convention on the Law of the Sea 1992* and the subsequent *Convention on Biological Diversity 1992*.¹⁹ As a result, the Commonwealth has an expansive set of constitutional powers that it can use to implement Oceans Policy.

Commonwealth waters occupy ninety-seven per cent of the Exclusive Economic Zone. The remainder falls under state jurisdictions. But any notions of state sovereignty cannot hinder the Commonwealth's broad powers. The High Court has found no difficulties with the Commonwealth retaining the role as final arbiter in the management of Australia's marine environment from low-tide. And the states and Commonwealth have agreed that marine management is of national significance.²⁰ However, although the Commonwealth retains ultimate control, it is of vital importance to engage the states in handling land-based sources of

BOX 4 COMMONWEALTH LEGISLATION AND MARINE MANAGEMENT

Aboriginal and Torres Strait Island Heritage Protection Act 1984
 Australian Heritage Commission Act 1975
 Ballast Water Research and Development Funding Collections Levy Act 1998
 Ballast Water Research and Development Funding Levy Act 1998
 Control of Naval Waters Act 1918
 Crimes at Sea Act 2000
 Customs Act 1901
 Environment Protection (Sea Dumping) Act 1981
 Environment Protection and Biodiversity Conservation Act 1999
 Export Control Act 1982
 Fisheries Administration Act 1991
 Fisheries Legislation Amendment Act (No 1) 1999
 Fisheries Management Act 1991
 Foreign Fishing Boats Levy Act 1991
 Foreign Fishing Licences Levy Act 1991
 Hazardous Wastes (Regulation of Exports and Imports) Act 1989
 Historic Shipwrecks Act 1976
 Migration Act 1958
 National Environment Protection Council Act 1994
 Native Title Act 1993
 Navigation Act 1912
 Offshore Minerals Act 1994
 Petroleum (Submerged Lands) Act 1967
 Protection of the Sea (Civil Liability) Act 1981
 Protection of the Sea (Oil Pollution Compensation Fund) Act 1993
 Protection of the Sea (Powers of Intervention) Act 1981
 Protection of the Sea (Prevention of Pollution from Ships) Act 1983
 Quarantine Act 1908
 Sea Installations Act 1987
 Seas and Submerged Lands Act 1973
 Statutory Fishing Rights Charges Act 1991
 Submarine Cables and Pipelines Protection Act 1963

pollution²¹ and other marine environmental issues that derive from catchment and coastal land use.

Current weaknesses in federal arrangements

The scale and nature of the issues for Australia's oceans should encourage the Commonwealth to show leadership by implementing Oceans Policy and ecosystem-based management on a truly national basis. To date, however, it has displayed a reluctance to do so, especially in the reform and integration of the complex web of legislation²² that hinders sound marine management and effective decision making.

Inconsistent and inadequate application of legislative instruments

Like other well-developed democracies, Australia has numerous legislative instruments for marine environmental management, but the many

inconsistencies and problems within and between them undermine the genuine achievement of sustainable resource use and biodiversity conservation.

The oil and gas industry, for instance, must meet inconsistent legislative requirements under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Petroleum (Submerged Lands)(Management of Environment) Regulations 1999* (Petroleum Regulations).

The 'Guidelines on the Application of the EPBC Act to Interactions Between the Offshore Seismic Activities and Large Whales' (Seismic Guidelines) have been issued under the EPBC Act. In addition, the Petroleum Regulations require an environment plan to be prepared that should, through recording, monitoring and reporting on the activities of a seismic survey during its operation, offer details on interactions with cetaceans (Regulation 15).

Although a report-back is a condition of the EPBC Act, meaning that impacts of activities can be monitored and policy changed to suit, there is no requirement to report back on the Seismic Guidelines. Nor are the Guidelines enforceable despite their increasing use for the majority of seismic referrals on a 'manner specified' basis. Further, assessments and decisions under either instrument are not required sufficiently early to ensure that industry is able to modify or amend plans to prevent environmental harm. 'Acreage' – the Commonwealth waters made available for oil and gas exploration – is released in some cases years before activities might take place, yet decisions on the parameters of activities can be made as late as a few weeks or months before they commence.

The overlap between the EPBC Act and the Petroleum Regulations extends to administrative control. Currently the designated state authority has responsibility for the Petroleum Regulations, while the EPBC Act is a matter of Commonwealth responsibility. Arrangements between the Commonwealth government and designated state authorities are urgently needed to encourage open communication and the rationalisation of regulations.

Further, at the time of the acreage release, there is no mechanism for government departments to coordinate their activities and ensure that areas of critical habitat or of conservation importance are excluded. Input that may be provided by the environment agency is not binding on the industry agency releasing the acreage. And industry has little choice but to apply to explore within the acreage blocks, setting it on a collision course with other marine conservation objectives even before the Seismic Guidelines and Petroleum Regulations are considered.

BOX 5 INTERNATIONAL CONVENTIONS AND TREATIES INFLUENCING MARINE MANAGEMENT IN AUSTRALIA

Agreement for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment between the Government of Australia and the Government of Japan
 Agreement for the protection of Migratory Birds and their Environment between the Governments of Australia and the People's Republic of China
 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal 1989
 Convention concerning the Protection of the World Cultural and Natural Heritage 1972
 Convention for the Conservation of Southern Bluefin Tuna 1993
 Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific Region 1989 and Protocols
 Convention on Biological Diversity 1992
 Convention on the Conservation of Antarctic Marine Living Resources 1980
 Convention on the Conservation of Migratory Species of Wild Animals 1979
 Convention on Trade in Endangered Species of Wild Fauna and Flora 1973
 Convention on Wetlands of International Importance Especially as Waterfowl Habitat 1971 (Ramsar Convention)
 International Convention for the Prevention of Pollution from Ships 1973
 International Convention on Oil Pollution Preparedness, Response and Cooperation 1991
 International Convention on Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972
 International Convention on the Regulation of Whaling 1946
 Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships
 United Nations Convention on the Law of the Sea 1982
 USSR-Australia Migratory Bird Agreement

Neither the EPBC Act nor the Petroleum Regulations takes into account the cumulative impacts of the activity they are assessing against existing and forecast activity, either within the sector or from other sectors operating in the same waters. This inconsistency in the assessment of threats sees the oil and gas industry following the Seismic Guidelines, but no such guidelines exist for shipping, defence, fisheries, fish farming and other marine uses that can create intense noise pollution of potential harm to cetaceans and other marine species.

This unsatisfactory situation is symptomatic of a greater problem, the lack of an overall natural resource management and conservation framework in which these sector-based laws can operate. Such a framework should put in place a proactive management regime that facilitates industry development and sustainable use within an integrated regional marine plan. Only when this issue is redressed can we hope to ensure that the cumulative impacts of the proposed activity

are assessed in the context of the profile of industrial activity in the region, and the dynamics of the ecosystems impacted upon.

Divided management and the Offshore Constitutional Settlement

The Commonwealth's reluctance to lead the reform of marine management is in part reflected in the operation of the Offshore Constitutional Settlement reached between the Commonwealth and the states.

While designed to ensure cooperation with state interests, the Offshore Constitutional Settlement has, in the absence of any overarching Commonwealth control, resulted in divided, sector-based and insular management focused on the exploitation of marine resources within jurisdictional boundaries, not ecological or resource boundaries.

The capacity for Oceans Policy to truly deliver an integrated, ecosystem approach is also hampered by the current voluntary 'opt-in' approach for state involvement in Oceans Policy, as shown by the absence of New South Wales, Victoria, Tasmania and South Australia in the development of the South-east Region Marine Plan.

Artificial jurisdictional boundaries fail oceans management by obstructing genuine catchment-coast-ocean management. Australia's many legislative and administrative approaches lack an ecosystem-based focus that acknowledges that land-based pollution sources and state-managed resource uses have significant impacts on the marine environment.²³

As the coastal zone and the offshore zone are inextricably linked, and many areas of critical importance are within state jurisdictions but cross into Commonwealth waters, it is critical to the development of genuinely integrated, ecosystem-based management that their management and administration are within the same legislative framework.

The Offshore Constitutional Settlement has failed to address the need for uniform regulation and consistent management of Australia's maritime resources. To effectively implement the Oceans Policy, legislative reform at Commonwealth level must deal with the multiple layers of Commonwealth management and, in time, state management.

Until an urgently needed review of the Offshore Constitutional Settlement is conducted and acted upon, the current cooperative approach between the Commonwealth and the states does provide a foundation from which Oceans Policy can be implemented. The states have a key role to play, must be included in the preparation and operation of

regional marine plans, and will need guidance in the implementation of nationally consistent ecosystem-based management. This will require active leadership from the Commonwealth government, including the use of effective mechanisms that encourage the states to engage.

Undercutting the proposed regional marine plans

The main mechanism for delivery of Oceans Policy is regional marine planning. The purpose of each regional marine plan is to operationalise the Oceans Policy framework and to tailor its objectives to specific regional needs. But regional marine plans have no standing under existing statutes, and their implementation will hinge upon the ongoing agreement of various ministers and agencies (and ultimately, jurisdictions).

Regional marine plans will establish clearly defined outcomes across all sectors and be relied upon to ensure fair decision making and conflict resolution regarding resource access. They will be the main vehicle for involving resource users and the community in decision making, for engendering stewardship, for ensuring flexible and adaptive management arrangements, and for establishing performance regimes for auditing and review.

Without necessary legal reform, regional marine plans will have to achieve all of these things in the absence of legislative standing and enforceability, an approach that is unlikely to provide any certainty. Without the coordination of national oceans management under a national legal framework operating ultimately at both state and Commonwealth levels, individual agencies will attempt to implement regional marine plans in accordance with their own regulatory objectives. This will lead to duplication of effort, inconsistency in application and performance, conflicting policy and decision making, and no meaningful mechanism to hold agencies accountable for the impact that their decisions have beyond their jurisdictions.

Further, the forcing of marine reform to work within Offshore Constitutional Settlement arrangements will significantly hamper the implementation of Oceans Policy objectives and, in particular, the flagship of ecosystem-based management. The states must engage actively in Oceans Policy arrangements, and their waters included in regional marine plans.

The current reluctance of states to engage, and the passivity of the Commonwealth in encouraging their involvement, lends increasing weight to the argument for a review of the Offshore Constitutional Settlement.

A new way forward

Oceans eleven proposes that a National Oceans Act²⁴ be developed that enables the coordination of existing legislation within a nationally consistent legislative regime, including the identification of matters that need to be reviewed under the Offshore Constitutional Settlement arrangements. The Act would create a National Oceans Authority to oversee the implementation of Oceans Policy and provide certainty, equity and security for all stakeholders.

As previously noted, current Offshore Constitutional Settlement arrangements between the states and the Commonwealth for the management of Australia's oceans provide no bar to creation of the Act or the authority.²⁵ Indeed, it is only through the development of a National Oceans Act and the creation of a National Oceans Authority that the goals of Oceans Policy²⁶ and Australia's international obligations can be truly met.²⁷

Similar national frameworks have been established under Commonwealth legislation for the regulation of corporations (*Corporations Act 2001*), trade practices (*Trade Practices Act 1974*), National Competition Policy (including the National Competition Council) and the prevention of pollution from ships (*Protection of the Sea (Prevention of Pollution from Ships) Act 1983*).²⁸ Further, national approaches can be achieved through agreement by the Commonwealth and the states to legislate in a nationally consistent manner, as was the case with gun control laws.

National Oceans Act

The proposed National Oceans Act, under the auspices of the proposed National Oceans Authority, would:

- enshrine ecological sustainability, biodiversity protection and ecological integrity as primary objectives
- provide the legislative foundation for ecosystem-based management and its decision making and planning
- coordinate existing Commonwealth, state and territory legislation and, where appropriate, replace existing legislative mechanisms with more appropriate ones and/or shift responsibilities for management of specific issues between agencies to better reflect ecosystem-based management needs²⁹
- ensure that the management of the marine environment is accountable and transparent, and has clear environmental quality and performance targets and standards
- provide a mandatory assessment scheme for ecologically sustainable development within the oceans of Australia

- enable a review of all Offshore Constitutional Settlement agreements, and all existing legislative instruments, to ensure that they adhere to the principles of integrated, ecosystem-based management
- provide regional marine plans with the appropriate statutory standing to ensure certainty for industry and the community
- provide mechanisms that prevent actions of threat to the marine environment and its associated natural and cultural values³⁰
- provide for flexibility in the management of decision making. The Minister for the Environment and Heritage and the National Oceans Authority must have the capacity to call in proposals³¹ and, in emergency situations, control actions
- provide for the ability to create a category of 'prohibited actions' within regional marine plans where certain uses are incompatible with the protection and integrity of the marine environment and its values.

National Oceans Authority

Central to the development of national oceans management is the creation of a single, statutory National Oceans Authority to oversee the implementation of the proposed National Oceans Act. The National Oceans Authority is not intended to be a sprawling new bureaucracy. Rather, it would be a lean and effective pilot for industry and government agencies by having strong and clear directive and enforcement powers.

The National Oceans Authority would derive its power from the National Oceans Act and, through an appropriately negotiated Council of Australian Government Agreement, would:

- develop, manage and regulate regional marine plans, with clear legislative requirements for ecologically sustainable targets and the obligation to give priority to the protection of biodiversity
- conduct strategic assessment, periodic review and accreditation of state, territory and Commonwealth agencies that assess proposals and carry out management activities in the marine environment, ensuring that they adhere generally to ecological sustainability and the regional marine plans
- provide ongoing and regular auditing of approval processes to ensure that legislated standards for ecosystem-based management are maintained under each regional marine plan
- provide concurrent approval powers for activities that extend across jurisdictions or agency responsibilities
- provide the ability to undertake independent investigation and report to Parliament or make

recommendations to relevant ministers. Such ministers would be required to provide reasons for decisions made contrary to those recommendations

- monitor agreements between state, territory and Commonwealth agencies to ensure that they adhere to the standards required for marine and coastal management under the National Oceans Act, regional marine plans and relevant international agreements
- report to Parliament when required or requested
- integrate data collection, research, information sharing, communications and education as part of developing the full range of relevant knowledge to be applied to the planning and decision-making processes. This includes scientific, economic and social studies and local and Indigenous knowledge³²
- advise on residual inconsistencies between Acts and, where necessary, provide expert advice on amendments to those Acts to ensure the smooth functioning of the framework National Oceans Act.

The National Oceans Authority would have an expertise-based board with an advisory committee having membership drawn from significant stakeholder groups. Both the Board and the advisory committee would have clearly expressed powers to access information from the Authority.

Regional and technical advisory committees

The use of advisory committees in the formulation of regional marine plans would become an important feature of management and encourage regional relevance, accountability and ownership. The committee membership would comprise the various stakeholder groups within the communities and include industry and community organisations.³³ Technical advisory groups with appropriate government and independent scientific, social and economic expertise would also be a key feature of this structure.

The operations and functions of regional advisory committees would be enshrined in legislation to protect their capacity and integrity. Their role would be to:

- assist in the formulation, implementation and review of regional marine plans
- make formal recommendations and provide a report-back capacity to the National Oceans Authority and the Minister and Parliament concerning the amendment of a regional marine plan or regulations where circumstances have changed
- provide advice from a regional perspective back to the National Oceans Authority on matters

referred to them by the Authority. This could include matters relating to the operation of a regional marine plan, Oceans Policy, the National Oceans Act, public interest or the maintenance of the integrity of integrated ecosystem-based management.

Impact of the proposed changes

The proposed legislative changes would provide significant outcomes for good administration by providing nationally consistent management through a streamlined process that would eliminate cross-jurisdictional and territorial disputes over resource management responsibilities.

Under these new arrangements, existing agencies would continue to manage their sector or monitor and report on specific factors. But this would now be within a coordinated decision-making framework, one that would assess the cumulative impact of each sector and implement a shared vision for the future use and conservation of Australia's oceans. This could have the added benefit of eliminating existing duplication and releasing state and Commonwealth agency resources.

Within such a framework, emergency response procedures for catastrophes such as oil spills or major pollution events could be more easily coordinated, and international obligations better integrated. The streamlining of process and the central coordination of management would more easily ensure resource-access security and genuine community participation in the management and use of marine resources.

At the core of Oceans Policy is the practical application of ecosystem-based management. But without dedicated legislation, Oceans Policy will be no more than a policy-guidance requirement for Commonwealth agencies. Legal impetus will be at best, indirect, and by way of sector-focused legislation that has little or no capacity to accommodate integrated management or provide certainty.

Administrative and legislative reform is a critical step in the development of truly sustainable management practices for our coasts and seas. The success of Oceans Policy will be judged by how well we 'protect and preserve our marine environment' while providing progress and certainty for marine-based industries whose futures depend on integrated and effective management.

References

- 18 Trade and Commerce, s51(i); external affairs s51(xxxvi); foreign corporations and trading or financial corporations s51(xx).
- 19 These international obligations have been codified in Commonwealth Acts including the *Continental Shelf*

(*Living Natural Resources*) Act 1968, *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* and *Environment Protection and Biodiversity Conservation Act 1999*.

- 20 *Seas and Submerged Lands Case (NSW v Commonwealth)* (1975) 135 CLR 337.
- 21 The Council of Australian Government Agreement (COAG) Heads of Agreement on Commonwealth/State Roles and Responsibilities for the Environment, November 1997.
- 22 A useful summation of this legislative framework as it pertains to the Commonwealth is contained in National Ocean Office, 2002, *Ocean management: the South-East Region Marine Plan Assessment Reports*. The reports do not deal with the legislative framework of the relevant States except in so far as where it was necessary to describe the existing management arrangements between the States and the Commonwealth. Bateman, 1999, 'The development of Australia's Oceans Policy: implications for marine environmental law and policy' in Leadbeter, Gunningham and Boer (eds), 1999, *Environmental Outlook No 3: Law and policy*, Federation Press, at 218. This situation is not unique to Australia but is common to countries with a federal system, such as the United States and Canada. On the US see Belsky, 1989, 'The Ecosystem Model Mandate for a Comprehensive United States Ocean Policy and Law of the Sea', *San Diego Law Review*, 26, 417; and Hopkins, Goldberg and Marston, 1997, 'An environmental critique of government regulations and policies for open ocean aquaculture', *Ocean and Coastal Law Journal*, 2,209. On Canada see *Canada's Oceans Strategy: our oceans, our Future*, Fisheries and Oceans Canada, 2002 and *Canada's Oceans Strategy: our oceans, our future – policy and operational framework for integrated management of estuarine, coastal and marine environments in Canada*, Fisheries and Oceans Canada, 2002. Both documents are available on the Oceans Program home page: <http://www.pac.dfo-mpo.gc.ca/oceans/default.htm>
- 23 According to the United Nations Environment Program 70% of impacts on the marine environment are from land based sources (Chapter 17, Part 17.18 of Agenda 21). Others have suggested this figure is conservative and claim 80%, see *Canada's Oceans Strategy: our oceans, our future* at www.pac.dfo-mpo.gc.ca/oceans.
- 24 On the implementation of other oceans legislation see Canada's Oceans Strategy documents listed in 'Further reading'. See also Bateman, 1999, *op cit*.
- 25 The decision of the High Court in the *Seas and Submerged Lands Case (NSW v Commonwealth)* (1975) 135 CLR 337 confirmed that the Commonwealth was responsible for all waters and the seabed beyond the low-water mark. This situation was not changed by the *Offshore Constitutional Settlements* or accompanying legislation: *Offshore Constitutional Settlement: selected statements and documents 1978-79*, AGPS, Canberra 1980; Rothwell and Kaye, 2001, 'A Legal Framework for Integrated Oceans and Coastal Management in Australia', *EPLJ*, 18, 3 (June 2001) at 278.

- 26 Commonwealth of Australia, 1998, *Australia's Oceans Policy*, Part 1, 4; Ensuring that these goals are met is consistent with the recognition by the COAG Heads of Agreement on Commonwealth/State Roles and Responsibilities for the Environment. This states that the 'management and protection of the marine and coastal environment ... is a matter of national environmental significance' and a matter that is appropriate for Commonwealth assessment and approval processes: The COAG Heads of Agreement on Commonwealth/State Roles and Responsibilities for the Environment, November 1997.
- 27 This includes article 192 of the United Nations *Convention on the Law of the Sea*, which imposes an obligation 'to protect and preserve the marine environment', which Australia ratified in 1994; see also National Ocean Office, 2002, *Ocean management: the South-east Regional Marine Plan Assessment Reports*.
- 28 This Act implemented Australia's obligations under the *International Convention for the Prevention of Pollution from Ships 1973 (MARPOL)*.
- 29 This will ensure that regulation of our coasts and seas is consistent both across all internal jurisdictions and with the objectives of the National Oceans Act.
- 30 This would include prohibiting certain actions or uses within certain identified areas of Australian oceans.
- 31 Similar to the power contained in section 88A of the New South Wales *Environmental Planning and Assessment Act 1979*, which covers state governments in relation to local government decisions.
- 32 *Canada's Oceans Strategy: policy and operational framework*, 8.
- 33 This is in keeping with the ethos of the Commonwealth government's sustainable regions program.
- 34 Quoted in Earle S, 2001, *Atlas of the ocean*, National Geographic, Washington.

The real voyage of discovery does not consist of seeking new landscapes, but in having new eyes.

Marcel Proust³⁴

3

The next age of discovery

Fingerbone knew more about things than anyone Storm-Boy had ever known. He could point out fish in the water and birds in the sky when even Hide-Away couldn't see a thing. He knew all the signs of wind and weather in the clouds and the sea. And he could read all the strange writing on the sandhills and beaches – the scribbly stories made by beetles and mice and bandicoots and ant-eaters and crabs and bird's toes and mysterious sliding bellies in the night. Before long Storm-Boy had learnt enough to fill a hundred books.

Colin Thiele³⁵

Information exists that would probably fill more than a hundred books on Australia's oceans but, like Storm-Boy, our knowledge is still growing. There continues to be gaps, very large gaps in what we know of the marine waters under Australia's care. The identification and filling of these gaps will be one of the great challenges for government, science, industry and the community in the implementation of Oceans Policy and ecosystem-based regional marine planning. If we cannot rise to this challenge our oceans will continue to suffer.

The future of research

In 1999 the Commonwealth government released *Australia's marine science and technology plan: an overview* as part of Oceans Policy implementation. The plan identified three long-term priorities for marine science, technology and engineering to be achieved within three programs:

- understanding the marine environment
- using and caring for the marine environment
- infrastructure for understanding and utilising the marine environment.

The plan's responses to a number of national issues included mapping the form and nature of the seabed, developing an integrated southern temperate research program, encouraging integration of institutional research, strengthening and broadening skills bases and coordinating national data sets. But the plan is merely a framework to guide the decision-making of government, institutions, agencies and industries. It makes no recommendations and it offers no funding commitments. That must now change to enable its many fine words to be turned into deeds.

Well-targeted, well-funded, independent, integrated, expanding and accessible research is the key to building our knowledge and understanding of Australia's marine waters. Although to date these qualities have been generally lacking in marine research, there have been many significant outcomes over the years, albeit mostly in tropical waters. However, as Tony Underwood and Gee Chapman state: 'Despite the finances, resources, publicity and acclaim that underpin our national effort in tropical marine biology, the largest marine problems in this part of the world are coastal ones in temperate waters.'³⁶

It is now time to look south as well as north when developing new directions for marine research. But while doing this a number of key elements must be kept top of mind.

The first is to ensure that marine research is independent and accessible. Currently Australia has no funding program for public-good marine research.

Other than intertidal research, marine research is only possible by linking to industry requirements. This has the potential to misdirect and compromise the collection of baseline data, and must change.

Marine research must be in the public interest and the environment's interest, not solely sectoral interest, and be freely available in the public domain. Claims of commercial-in-confidence for research carried out in what are publicly owned waters severely undermines the capacity to build community education and engagement, and to achieve the management aims of Oceans Policy.

Secondly, publicly funded research must be openly tendered to assist in the development of a diverse and broadly skilled research community.

Thirdly, marine research must be integrated with the research, management and planning of the coastal, marine and catchment zones. And this integration process must extend to the efforts of scattered research institutions in universities and state agencies.³⁷ Collaboration, not competition, will be key to the future of marine research, as it will be for the administrative and legal reforms outlined in the previous chapter.

Fourthly, marine research must have strong links with education programs, and not just those of tertiary institutions. Community and school education activities that encourage involvement in the gathering and analysis of data, and in its use in management, will help build the capacity of the community to participate in regional marine planning.

Fifthly, a greater level of dedicated funding and resources is needed, especially in the areas of scientific research, compliance and enforcement.

Finally, the research effort should involve the collection, analysis and reporting of environmental, economic and social data. This approach will help achieve the operational objectives and targets of ecosystem-based management, place a higher value on natural capital, and show the links between natural services and social and economic benefits.

How can marine research be moved in this direction? It will need a strong policy and funding commitment from the Commonwealth and state governments, and the establishment of a National Marine Research Council assigned the task of reviewing and funding research. Such a council would work to progress *Australia's marine science and technology plan*.

Fundamental baseline research is urgently needed and will grow the information base of regional marine

planning and ecosystem-based management. There is currently no basis for environmental monitoring systems, other than for industry sectors, and no marine benchmark reference sites for long-term ecological analysis.

Other research needs include the broadscale mapping and documentation of subtidal communities, the development of comprehensive marine inventories at the bioregional level, expanded baseline mapping of marine biodiversity and the patterns and effects of human use, and temperate water research beyond the current focus on nearshore fisheries.

Investigations into catchment practices, the quality and quantity of freshwater input, reef habitats and their links with non-reef areas, and the linkages between offshore and nearshore waters, and between surface and bottom waters, should be actively pursued. Research should also be undertaken on estimating values of natural capital, and the socio-economic benefits and costs of current and future management arrangements and future structural readjustments to marine-based industries.

Well-grounded marine research and environmental monitoring will build our knowledge base of the marine environment and its use, and help measure and act on environmental change. As well as the general need for its expansion, marine research will need to be ecosystem-based and across jurisdictional boundaries. It must also be adaptable for use in the feedback loops of ecosystem-based management processes and the measuring of ecosystem values and system and species indicators. Indeed, new research must also develop the system and species indicators, and frameworks for the prediction, risk analysis and assessment of cumulative impacts on marine ecosystems.

Indicators of environmental change

In their report on environmental indicators, Trevor Ward, Edward Butler and Burke Hill list five key attributes of marine ecosystems – diversity, stability, yields, productivity and resilience. These can be used 'to guide the development of environmental indicators for the purpose of assessing the condition of ecosystems and their components and processes, and to assess the success of the integrated management framework'.³⁸

Environmental indicators are '...physical, chemical, biological or socio-economic measures that best represent the key elements of a complex ecosystem or environmental issues'.³⁹ They are used to provide data on major trends and impacts within and on ecosystems, and give feedback on ecosystem health.

TABLE 1 KEY MARINE ENVIRONMENTAL INDICATORS

Issue or element	Condition indicator	Description
Cited species/taxa	Protected species populations; and seabird populations	All the species and other identified taxa explicitly protected under legislation
Habitat extent	Algal bed area; beach and dune area; coral reef area; dune vegetation; intertidal reef area; intertidal sand/mudflat area; mangrove area; saltmarsh area; seagrass area	The place or type of sites, where organism/s or population/s occur. Its use as an indicator is primary to ensure that habitat loss does not occur
Habitat quality	High-order predators; algal bed species; beach species; coral reef species; dune species; fish populations; intertidal reefs species; intertidal sand/mudflat species; islands and cays species; mangrove species; saltmarsh species; seamount species; seagrass species; subtidal sand/mudflat species; chlorophyll concentrations	Ensure that the integrity of each identified habitat type/s are assessed in a more detailed manner
Renewable products	Aquaculture production; fish stocks; seafood quality (contamination)	Monitor the health of commercial species as they relate to healthy ecosystems
Ecosystem process	Sea level; sea surface temperature variability	Broad scale and related to important functions or process within ecosystems and can assist with interpreting trends
Issue or element	Pressure indicator	
Habitat quality	Algal blooms; pest numbers; species outbreaks	Provide information about the pressure to each identified habitat type
Renewable products	Aquaculture effort; fishing effort; trawl fishing area; fishing gear	Monitor the numbers of commercial species being removed from the ecosystem
Non-renewable products	Ocean exploration; ocean mining	Document the activities within the marine environment as pressures on ecosystems
Water and sediment quality	Sentinel accumulator program; turbidity; water nutrients (nitrogen); seabird eggs (contamination); sediment quality (contaminants)	Document the level of contaminants within the system and food chains. Can be used to assess the pressure on specific species and systems
Integrated management	Catchment development; coastal discharges; coastal population; coastal tourism; ship visits; shipping accidents	Measure human pressures
Issue or element	Response indicator	
Cited species/taxa	Marine species rare, endangered or threatened	All the species and other identified taxa explicitly protected under legislation
Integrated management	Integration of management; beach stabilisation; catchment management programs; coastal care community groups; management of fishing effects on non-target biodiversity; marine network participation; marine protected areas	Measure human (government) effort to integrate management. Can be used to assess equity and success

Source: Adapted from Ward T, Butler E and Hill B, 1998, *Environmental indicators for national state of the environment reporting: estuaries and the sea*, CSIRO Division of Marine Research, Environment Australia.

They should reflect highly valued aspects and relevant conditions of the environment, provide measures of socio-economic factors, and be robust indicators of environmental change.⁴⁰

According to Ward, Butler and Hill there are three indicator types and these measure the:

- condition of an environmental feature
- pressure on the environment
- management responses to environmental issues.

Examples of these three indicator types are described in Table 1, with a description of each indicator and the issues and elements to which they apply. The indicators listed are adapted from indicators used for the national state of the environment reporting process. The list is not comprehensive and should be used as a guide only.

While stakeholder involvement is appropriate in guiding the direction of monitoring and management objectives, the indicators to help assess the identified ecosystem values, systems and species should be chosen in full consultation with the research community to ensure their credibility.

Oceans Policy and an information shortage

Up-to-date information is critical to management actions such as increases or decreases to fishing quotas, appropriate timeframes for petroleum or gas exploration, and the adaptation of shipping lanes to accommodate migratory species. It can also provide an early warning of dramatic, climate-induced ecosystem change, and system contamination.

With adequate research and data, conservation mechanisms will be much better targeted, calibrated and effective. This is particularly advantageous to industry because there will be less reliance on the precautionary approach as the information base is improved.

At the outset of developing a regional marine plan, the research community and stakeholders will use the improved information base to map ecoregions, ecological processes and critical habitats, and also features such as fishing concentrations, ports and infrastructure.

The maps produced by this collaborative process will be compared with information on known uses and impacts drawn from action plans, recovery plans, system and species indicator assessments, conservation assessments, community knowledge and that of specialist researchers. When combined, the ecological maps and those of human activity will drive the

choice of ecosystem values, system and species indicators, and the monitoring programs that will be used to measure changes and impacts.

By necessity, Australia's Oceans Policy is currently being implemented without much of this important information, accentuating the need for adaptive management. However, without an ongoing commitment to research and monitoring, the feedback processes in ecosystem-based management will fail.

Increases in core and untied funding are immediately required to begin the independent research and monitoring needed to establish ecosystem baselines and to assess ecosystem health. The success of Oceans Policy, and of ecosystem-based management, is relying on it.

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My first swim amongst a kelp forest was magical. I can remember the sun penetrating the surface of water and shooting rays down like those through a rainforest. Fish swirled amongst the golden fronds. That was 15 years ago. It fired my imagination, and it has stayed with me for all those years.

Jeannie Baker⁴¹

4

Conserving the oceans

When I first started diving it was like a huge aquarium, but within 20 years I realised that fish were disappearing at an alarming rate through overfishing.

If we had a series of completely protected marine national parks we would give sealife a break. Sealife populations would then be allowed to replenish. We need big marine national parks where fish can breed and escape humans.

Valerie Taylor⁴²

In just 20 years, during a time when governments and industries began to talk the talk on sustainability, world-renowned film-maker and diver, Valerie Taylor, has witnessed a major decline in the health of Australia's oceans.

Australia needs to reverse the declining trend and make good use of the marine conservation management tools now available. As Valerie Taylor suggests, highly protected marine national parks⁴³ are essential. Multi-zoned marine parks also have their place. But marine protected areas alone cannot fully protect Australia's oceans. Other tools are also needed, firstly to support the objectives of marine protected areas, and secondly, to give protection to the ecosystems and species outside them. To be effective, however, their use must be integrated with those of ecosystem-based regional marine planning.

Marine protected areas

In a recent study⁴⁴ of Tasmanian marine reserves, Graham Edgar and Neville Barrett discovered that when fishing was removed from certain areas, natural productivity within them returned to levels higher than expected, suggesting that the impact of overfishing on Tasmania's rocky reefs was far greater than first thought.

This work, and that of other marine scientists, is giving us fresh insight into the need for marine conservation. And as the health of the world's oceans continues to decline, policy makers, resource management agencies, conservation organisations and other stakeholders are increasingly turning to marine protected areas for help.

The declaration of marine protected areas is a fundamental part of ecosystem-based management. This has been reinforced by the *Convention on Biological Diversity 1992*, which calls for nation states to 'establish marine protected areas for the conservation and sustainable use of threatened species, habitats, living marine resources and ecological processes'.⁴⁵

The Food and Agricultural Organisation has also acknowledged their importance, recently stating that: 'Marine reserves represent an important tool to be used in conjunction with other appropriate management measures, not just for protecting many ecosystems and leaving proportions of them intact, but also for providing a baseline state for monitoring. To be effective, reserves have to cover a relatively large proportion of the ecosystem at the regional level'.⁴⁶

As well as the ecological benefits of protecting marine biodiversity and ecological processes within marine protected areas, there is an increasing acknowledgment that it makes good economic sense. To quantify this, researchers continue to work towards better valuation methods of the fundamental importance that natural systems have in supporting social and economic systems (see Appendix 3).

Marine conservation is an investment in natural capital that will pass on benefits from generation to generation. Getting the accountants to adjust their methods is a fundamental means to ensure that communities value oceans at their true worth.

The National Representative System of Marine Protected Areas

In 1990 the Commonwealth government committed to the establishment of the National Representative System of Marine Protected Areas (NRSMPA), but it was not until 1999 that the *Strategic Plan of Action for the NRSMPA* was released.

The primary goal of the NRSMPA is to 'establish and manage a Comprehensive, Adequate and Representative (CAR) system of MPAs to contribute to the long-term ecological viability of marine and estuarine systems, to maintain ecological processes and systems, and to protect Australia's biological diversity at all levels'.⁴⁷

To date, fifteen marine protected areas have been declared in Commonwealth waters, including the Great Barrier Reef, the Great Australian Bight, Lord Howe Island and Ningaloo Reef, and the subantarctic Macquarie, Heard and McDonald islands. The latter three have substantial areas of high-level protection, with the Heard Island-McDonald Island Marine Park the world's largest (65,000 square kilometres) marine protected area free of extractive uses.

The regional marine planning process under Oceans Policy commits the Commonwealth government to the NRSMPA, but only a fraction has been established. NRSMPA delivery is now part of regional marine planning, underlining the need for the speedy development of regional marine plans around Australia.

Marine parks and marine national parks

Most marine protected areas in Australia are described as 'multiple-use' or 'multi-zoned', are usually referred to as 'marine parks', and employ zones to manage a range of extractive uses including fishing and mining.

While multi-zoned marine protected areas have in the past fifty years contributed to the overall management of our oceans, and can continue to do so, they do not necessarily ensure protection of ecosystem integrity. In Australia, these are dominated by general-use zones, meaning that for many of them there is very little difference in the activities permitted inside and outside their boundaries.

This undermines their conservation value, and reduces their standing in the eyes of the community. The Great Australian Bight Marine Park is one such marine

BOX 6 THE GREAT AUSTRALIAN BIGHT MARINE PARK

The Great Australian Bight Marine Park was one of the first marine parks to be included in the National Representative System of Marine Protected Areas. It was declared in two stages by the South Australian and Commonwealth governments: South Australian waters in 1996 and the Commonwealth waters in 1998.

The Great Australian Bight Marine Park was created to protect southern right whales and the Australian sea lion – the area is critical breeding habitat for both species – and to preserve a representative sample of the unique sediments and benthic fauna and flora (on or near the sea bed).

The park has two separate components – a marine mammal protection zone and a benthic protection zone – each of which should be given a high degree of protection to achieve the management aims of protecting the whales, sea lions and benthos. However, the decision by the Commonwealth government to designate both sections of the park as 'multiple-use' (IUCN Category VI) has probably achieved little management change that could not have been developed through other means.

Rather than achieving strong conservation outcomes, the Great Australian Bight Marine Park process appears to have set some disturbing precedents.

The principle of having a fully conserved area at the core of a large marine park was severely compromised, first by declaring the whole park as multiple-use, and secondly by vertical zoning within the water column.

The primary benefit of the park remains limited to petroleum and gas exclusion and a seasonal fishing closure. Both of these are within the Marine Mammal Protection Zone, with the specific intent of protecting the migrating southern right whales and, it would seem, without consideration for the annual needs of the Australian sea lions. These provisions are also being reviewed in the new management plan and may be amended or removed.

The park includes only one attempt at an extraction-free area. This supposedly provides protection for the benthos, but a range of fisheries are still permitted in the area, including midwater trawling, which has regular and predictable contact with the seabed, as well as petroleum exploration and, presumably, extraction.

park that fails to adequately protect the significant natural features within its boundaries (see Box 6).

Marine protected areas that are free of extractive uses (highly protected) are usually referred to as marine national parks, sanctuaries or reserves (and sometimes no-take areas). Some have called these areas 'single-use' (conservation only) in an attempt to unfavourably compare them with 'multi-zoned' or 'multiple-use' marine parks. But conservation in itself is not a use. Rather, it is a multi-layered function of these highly protected areas that also protect essential natural services such as larval dispersal and transport, pollutant breakdown and nutrient cycling. Highly

protected marine areas also support multiple non-extractive uses, can increase the community's awareness of marine conservation needs, and generate many other environmental, social and economic benefits.

Marine biodiversity, habitats, genetic composition and ecological processes and structures within the boundaries of marine national parks are protected from the impacts of human uses. Species composition and community structure can be restored, egg and larval production increased, the abundance of overfished stocks improved, and high-quality feeding areas for fish and wildlife maintained. By sustaining habitats for commercial and recreational they can also offer opportunities to improve fisheries management and achieve ecologically sustainable fisheries.

And with marine national parks acting as secure, long-term monitoring sites in natural areas, they can increase scientific understanding of marine ecosystems by providing benchmarks for separating the effects of extractive activities from those caused by natural variability. This can be used to build community knowledge and assist managers in the restoration and maintenance of natural systems and biodiversity.

A network of marine national parks

The NRSMPA must include at its core a network of marine national parks of sufficient number and size to protect the full range of marine life and habitats on the regional scale, at different locations and at different stages in life cycles. Endangered species can be conserved, common species will remain common, marine biodiversity maintained, and protection given to the areas where high-order predators aggregate.

The American Association for the Advancement of Science, in its March 2001 Scientific Consensus Statement⁴⁸, concluded that networks of fully protected marine reserves – equivalent to marine national parks – are the most effective way to conserve marine plants and animals, and a key tool in helping reverse widespread overfishing and habitat disturbance.

The Consensus Statement, signed by more than 160 of America's leading marine scientists, also indicated that full protection would return areas to more natural levels of productivity, and lead to larger and greater numbers of marine organisms. Soon after this statement was released, 115 of Australia's leading marine scientists signed a statement endorsing the American Association's consensus statement and backing proposals for a network of marine national parks in Victoria.⁴⁹

The practice of establishing corridors of protection to link major conservation areas is widely accepted on

land. In the ocean it is even more relevant, given that marine environments are interconnected, with eggs, larvae, fish and other marine life moving with the flow of currents, tides, wind and waves.

Callum Roberts and Julie Hawkins⁵⁰ compared single sanctuaries with networks of highly protected marine areas (referred to as reserves) and found that isolated reserves have many benefits but only protect a limited fraction of marine biodiversity. Individual reserves, they concluded, might sustain self-recruiting populations of species that disperse short distances, but networks of closely spaced reserves protect the many species that have long-distance larvae dispersal phases in their life cycle.

Selecting networks of marine national parks

The selection and design of a network of marine national parks for the NRSMPA should be conducted within a bioregional framework and based on a range of ecological and cultural principles. These include Indigenous and non-indigenous values and, together, should be used to determine the level of protection and help achieve the national system's primary goal.

In the Victorian National Parks Association's *Nature conservation review Victoria 2001*⁵¹, Christine Porter outlined ecological, scientific, cultural, pragmatic and economic criteria for the design and selection of a comprehensive, adequate and representative (CAR) network of marine national parks in Victoria's marine waters, the purpose of which is biodiversity conservation. These criteria are outlined in Table 2.

To represent all communities, individuals and species within the CAR principles of the NRSMPA, it is essential to get the scales right. According to ANZECC, 'comprehensiveness and adequacy are understood and applied at the scales of bioregions, ecosystems and habitats. Representativeness is applied at the finer scales of communities and individuals/species'.⁵²

Being provided with environmental data at the right scale will give greater scientific certainty in answering questions on the size, shape and placement of marine national parks and maximise their environmental, social and economic benefits.

But how much of Australia's marine bioregions should be protected within marine national parks? In any discussion of this question, it must be made clear that it is a bioregion, and not simply an area of water, that is to be protected. It would be possible to protect a high percentage of a body of water, but this may give little protection to the bioregions representative of that area.

TABLE 2 SELECTION CRITERIA FOR MARINE NATIONAL PARKS

Criteria	Explanation
Ecological	
Comprehensiveness	The full range of biophysical diversity (habitat types) is included in a system of marine national parks
Adequacy	Ability to maintain conservation objectives of individual marine national parks (eg. each unit large enough) and of marine national park system (eg. units close enough together). The size of each national park based on its status, condition, vulnerability and disturbance
Representative	Representative at the levels of biogeographic region, bioregion, ecosystem, habitat and community types. A minimum amount of each bioregion should be included
Criticalness	Degree to which life stages of valued species (eg. rare, endangered, commercial) and important ecosystem processes are dependent on the habitat or area
Irreplaceability	The degree to which a particular habitat is irreplaceable if lost to development or degradation
Naturalness	Degree of protection from human disturbance (favours remote locations and those adjacent to terrestrial parks)
Important species and communities	Includes key species for maintenance of ecosystem processes (eg. seagrass) and significant habitats that help protect rare, threatened, endemic or migratory species. Also include threatened marine ecological communities and critical habitat of listed threatened species
Rarity, uniqueness	Contains rare, unique, iconic or unusual biogeographic qualities, habitats, geological or biological features. Incorporating all of a biophysical feature or place maximises the ecological benefits gained from managing whole ecological units
Vulnerability	Fragile areas receive higher ranking in selection process
Diversity	Variety of habitats or communities; species richness, species diversity (within habitats). Danger that natural areas that are less diverse but of ecological importance will be ignored in selection process
Redundancy	Degree of replication built into the system
Distribution	The marine national park network should reflect that community types, habitats and ecological processes can cover wide latitudinal and longitudinal ranges. High-level protection should exist throughout the water column in recognition of vertical linkages between habitats and species
Ecological processes	The siting of individual areas in the network should reflect currents, dispersal patterns, migratory routes of fish and whales, upwelling areas, spawning aggregations and congregation sites of high-order predators or other important keystone and indicator species
Productivity	Higher priority given to the more productive areas in the selection process
Scientific, cultural, pragmatic and economic criteria	
Benchmarking	Value to monitoring of ecological effects of protection
International value	Areas covered by international conventions
Research	Scientific value for research
Diversity	People are more impressed by areas with high species diversity, and hence see more value in protecting them
Special species or features	Feel-good value of protecting unique, unusual, rare endangered species (eg. endangered mammals)
Feasibility	Take into account ability to manage, enforce and monitor (favours areas adjacent to existing coastal protected areas). Also the level of conflict generated towards proposal
Educational value	Value to formal and informal marine education programs
Restorability	Potential for restoration to natural state
Cultural value	Indigenous and non-indigenous
Recreational and tourism value	Economic and social values and contribution to community wellbeing
Accessibility	For public education and involvement
Scenic beauty	Value to scenic appreciation of marine and coastal environments

Source: Adapted, with some additions, from Traill B and Porter C, 2001, *Nature Conservation Review Victoria 2001*, Victorian National Parks Association.

The Victorian National Parks Association believes that twenty per cent in high-level protection is a conservative estimate for what is needed to protect Victoria's marine bioregions. At the beginning of the current review of the Representative Areas Program on the Great Barrier Reef, the Scientific Steering Committee recommended that a minimum of twenty-five to thirty per cent of each bioregion be given high level protection. In the 'Townsville Declaration on Coral Reef Research and Management'⁵³, seventeen prominent scientists from the US, Europe and Australia concluded that for the long-term protection of entire reef systems, not just fish, between thirty and fifty per cent of reefs should be highly protected. And a recent scientific review⁵⁴ of the extent of high-level protection required for biodiversity conservation puts estimates somewhere in the range of twenty to fifty per cent.

The establishment of the NRSMPA must ensure that between twenty and fifty per cent of each bioregion, not just of marine waters in general, is protected in marine national parks. The actual percentage of each bioregion to be included is something that must be resolved by the research community. The size, number and spacing of the parks within the network, and the percentage of each marine bioregion protected, will depend upon the status/condition⁵⁵, vulnerability and level of disturbance of the bioregions, and the satisfaction of criteria selected from Table 2.

The percentage of marine bioregions chosen for inclusion in marine national parks should be seen as a minimum, a first step on the road to effective, sustainable protection of the oceans.

Legislation, international agreements, conventions and treaties

The Commonwealth and state governments have a number of legislative instruments that to varying degrees provide for the conservation of marine biological diversity. Box 4 in Chapter 2 listed many of the Commonwealth Acts that influence marine conservation. A significant one is the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), which identifies six matters of national environmental significance: World Heritage properties, Ramsar wetlands, nationally threatened species and ecological communities, listed migratory species, nuclear actions and Commonwealth marine areas.

Several aspects of the Act have the potential to make a valuable contribution to the protection and conservation of the marine environment. For instance, the biodiversity permit process under the EPBC Act regulates actions in Commonwealth marine waters

that harm or injure a cetacean or a member of a listed threatened species, ecological community, migratory species or marine species.

The listing of threatened species, threatened ecological communities and migratory species assists in the formal identification of what is threatened within Australia's biodiversity. To assist the continued survival of these species and communities, recovery plans and wildlife conservation plans can be prepared that set out the necessary research and management actions. They identify the threats to the species or community, identify important habitats and populations, specify actions needed to ensure the protection and conservation of the species or community, provide a timeline for the achievement of the objectives of the plan, and can lead to the provision of government funding. Recovery plans have been prepared for the great white shark, grey nurse shark, albatrosses and giant petrels, while plans for the blue whale, southern right whale, humpback whale, fin whale, sei whale, sub-Antarctic fur seal and elephant seal are pending.

The EPBC Act also allows for the listing of key threatening processes and the development of targeted threat abatement plans. Like recovery and wildlife conservation plans, threat abatement plans are required to outline the research and management measures that are necessary to address the threats posed by the threatening process. The list of key threatening processes currently includes 'incidental catch (bycatch) of sea turtles during coastal otter-trawling operations within Australian waters north of 28 degrees South' and 'incidental catch (or bycatch) of seabirds during oceanic longline fishing operations'. Despite this, the listing of a threatening process no longer requires the preparation of an abatement plan.

The EPBC Act also provides for the strategic assessment of management plans and policies concerning Commonwealth managed fisheries and other fisheries with an export component. The management plans and policies for Commonwealth managed fisheries, including cumulative impact assessment, must be satisfactorily completed by July 2004, otherwise export permits will not be issued. These strategic assessments are, however, sector-based and do not provide a framework for enforceable ecosystem-based management.

The above discussion highlights some key features of the EPBC Act that can aid progress towards marine conservation, but other Acts and regulations, and international actions, can also assist this end.

Australia has ratified and is a signatory to a number of international conventions, treaties and agreements of

relevance to marine management. These include those covering the law of the sea, whales, migratory species, marine pollution and wetlands, and the conservation of high seas fish stocks (some of the conventions are listed in Box 5 of Chapter 2). These instruments have had a significant influence on marine management by encouraging their objectives to be reflected in relevant state and Commonwealth legislation, policies and strategies. Without a coherent framework, however, their application domestically is limited, ad hoc and inconsistent.

The United Nations *Convention on the Law of the Sea* requires nation states to manage and conserve living marine resources, including the sustainable management of fisheries within the Exclusive Economic Zone. Input and output controls, ranging from the type of gear used to the setting of catch quotas, have been used by government resource agencies to encourage better management and protection of fish stocks.

The objective of the *Law of the Sea Convention* also influences the activities of other marine-based industries including oil and gas, minerals and shipping. Proposals of the oil and gas industry must satisfy a number of environmental conditions and processes under the *Petroleum (Submerged Lands) Act 1967*. They can also be assessed under provisions of the EPBC Act in relation to Commonwealth marine areas, threatened species and ecological communities, and migratory birds. (The application of these instruments, the inconsistencies that arise, and the lack of a strategic and coordinated legal framework have been dealt with in Chapter 2.)

The shipping industry is also bound by a number of international regulations that seek to minimise environmental impacts from shipping operations. The Commonwealth has released the *National Plan to Combat Pollution of the Sea by Oil and other Noxious and Hazardous Substances*, and the *National Marine Oil Spill Contingency Plan*, to encourage cooperation, preparedness and effective responses to pollution incidents. The Introduced Marine Pests Program and the National Ballast Water Management Strategy are government initiatives for the prevention and control of exotic marine pests.

The initiatives briefly described above reflect increasing government and community awareness in relation to marine protection. But they have been largely developed in isolation from one another. Oceans Policy via the National Oceans Act and ecosystem-based regional marine planning provides the mechanism by which these disparate instruments can be integrated and maximised in their effect.

Industry-driven codes of conduct and voluntary measures

Industry has also developed tools to assist with marine management. These have ranged from voluntary conservation plans addressing a wide range of sector/species issues to focused codes of conduct. The codes address specific issues such as the dumping of waste at sea, the release of marine mammals from nets, making industry resources available to scientific research, and the collection of extra scientific data. Some commercial fisheries, such as the South-east Trawl and Non-trawl fisheries, have developed codes of conduct to in part encourage environmentally responsible fishing practices.

While these measures are not binding, and cannot be seen as a replacement for such arrangements, they can be valuable for their role in advancing norms and driving better practice from within a sector. Their benefits can include cost effectiveness, greater industry buy-in and understanding, and the ability to target a focused issue without the necessity of legislative reform. But caution is needed here to ensure that these measures do not undermine an appropriate mix of management measures for the marine environment and other ocean users while benefiting just a single sector.

Conservation agreements

Signed agreements between government, industry and the conservation sector that seek to protect threatened species or ecological communities and processes are yet to be developed in Australia's marine waters, but they do offer great flexibility and promise.

A conservation agreement could be used to lay down an agreed framework and set of conditions that minimise user impact on the migratory paths of marine species and the spatial and seasonal variability of ecological processes. This would be especially relevant where the species and processes are not contained within the boundaries of marine national parks and which, in the case of migratory species, need protection throughout their life cycle and across their range.

Conservation agreements should be developed as complements and not alternatives to marine national parks, other conservation tools and legislation. For example, a conservation agreement with legal backing and accountable processes could be developed to protect the blue whale across its range. At the same time a marine protected area could be used to protect the significant biodiversity and ecological processes of the Bonney Upwelling, a prime aggregation site for blue whales in South Australian waters.

Conservation agreements that include communities and nongovernment organisations can make good use of stakeholder knowledge, encourage their 'buy in' and make them accountable to the outcomes and mechanisms of the conservation agreement.

BOX 7 GREAT BARRIER REEF MARINE PARK – TAKING THE NEXT STEP IN BIODIVERSITY PROTECTION⁵⁶

The Great Barrier Reef Marine Park is a multi-zoned (multiple-use) marine park that covers an impressive 347,000 square kilometres, and stretches 2000 kilometres along the Queensland coast. Established in 1975 in response to public outcry over proposed oil drilling on the reef, the park is now an Australian and international icon.

While the accompanying *Great Barrier Reef Marine Park Act* prohibited drilling and mining for minerals in all areas of the marine park, other extractive uses such as fishing and collecting have continued over most of the region. In fact, general-use zones cover ninety per cent of the park's waters, meaning that protection of the Reef's seventy-one bioregions is woefully inadequate. Increasing threats from overfishing, trawling damage, land-based water pollution, coastal development and climate change demanded a new approach.

After almost thirty years of management, the Great Barrier Reef Marine Park Authority acknowledged the current level of protection was insufficient to achieve long-term protection of the Park's biodiversity. It has now begun a process to create a representative network of highly protected 'green zones' (equivalent to marine national parks in their level of protection). This initiative, known as the Representative Area Program aims to help:

- maintain biological diversity
- allow species to evolve and function undisturbed
- provide an ecological safety margin against human-induced errors
- provide a solid ecological base from which threatened species or habitats can recover or repair themselves
- maintain ecological process and systems.

The development of the highly protected network is guided by a set of biophysical operational principles prepared by an independent Scientific Steering Committee. In essence the principles guide the decisions for the number, size and location of the 'green zones'. If these principles are implemented in full, the Committee expects a minimum of twenty-five to thirty per cent of the Great Barrier Reef Marine Park will become highly protected and extraction free. Once established, the network will establish world-best practice for the management of large marine regions for long-term biodiversity protection.

It is essential that the lessons from managing the Great Barrier Reef are heeded when managing the rest of Australia's marine environment. The key lesson is the need for a large and well-placed network of marine national parks. It is essential that the development of the National Representative System of Marine Protected Areas uses similar principles beyond the Reef. Otherwise, Australia could find that in thirty years it has given inadequate protection to marine biodiversity. The result would be the likely broad-scale loss of biodiversity, an increasing number of threatened species and, inevitably, the extinction of some marine species.

Protecting the critical habitat of large or migratory species

Another important aspect of ecosystem-based management is the declaration of protected critical habitat. Critical habitat for a species is that part of its range essential for day-to-day survival, and for establishing and maintaining a healthy population growth rate. This includes areas that are regularly used for feeding, hunting, breeding, courtship and the raising of young, and those areas sometimes used for migration, socialisation and communication. With the bulk of Commonwealth waters being pelagic ocean environments, the protection of the critical habitats of migratory and high-order predators is of special significance for the regional marine planning process.

Unlike those of land-based critical habitat, the boundaries of marine critical habitat are fluid. This is especially so for hunting and feeding areas associated with upwelling and other dynamic oceanographic conditions such as temperature and salinity gradients and currents. Whales, for example, are known to feed in and around upwellings that vary depending on local and large-scale oceanographic conditions, and to some extent during a season and from year to year.

When developing protection measures, larger bioregional areas can include a number of flexible, highly protected 'core areas' that correspond to critical habitat, but have boundaries that can be annually or seasonally adjusted. Such adjustments should be adaptive and be sensitive to signals from the wider environment, be sensitive to the needs of the species, not the users, and maintain overall habitat protection as an aim.

The marine species that should be protected by critical-habitat conservation initiatives include those that:

- are threatened species
- play a central role in ecological communities and may serve as indicators of the condition of habitats or of ecosystem declines
- serve as a conservation 'hook' that allows management to scale up from single-species management to ecosystem-based management, by capturing public attention and providing a mechanism for education.⁵⁷

In many cases each of these criteria apply to marine mammals and, in all cases, at least the last two. Marine mammals are high-order predators whose health reflects the ecosystem in which they live.⁵⁸ Randall Reeves and Stephen Leatherwood have urged greater attention be paid to protecting cetacean habitat⁵⁹ and, like Erich Hoyt,⁶⁰ have stated the importance of protecting critical habitat and restricting human

activity within these areas. They have also called for these protected areas to be 'embedded in broader-based initiatives'.⁶¹ These might include biosphere reserves and, importantly, ecosystem-based management.

The focus of conservation initiatives should be on the protection of the animals and their critical habitats. Protection needs to take into account the long-term maintenance of ecosystem function, and this will lead to restriction on users that have access to these areas. Like the concept of a network of marine national parks, critical habitat areas need to be considered as a network, not single reserves, and surrounded by well-managed buffer zones.⁶²

The EPBC Act provides for the protection of critical habitat⁶³, but there is limited detail of the specific parameters that relate to this protection. For instance, information about the distribution and abundance of cetaceans in Australian waters is very limited, and distribution maps held by Environment Australia cover only a few cetacean species. The Commonwealth government has an existing responsibility under the EPBC Act to prepare, within 10 years of the Act's commencement, surveys that identify the range of cetaceans present in Commonwealth marine areas.⁶⁴ For the good administration and full implementation of the EPBC Act, a greater level of dedicated funding and resources is needed. (To provide for the better protection of marine mammals, there is a need to either amend the EPBC Act, or to establish a Marine Mammal Protection Act. This is discussed in Appendix 2.)

While our information base is less than what is needed for certainty, a precautionary approach to protecting critical habitat is required. Over the next few decades the parameters for critical habitat will need to be defined, located and understood. As this is done we must keep the future options open by conserving sufficiently large marine areas that include known critical habitat and areas of similar conditions.

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- 55 Vulnerability is, in general, the extent to which a living organism, habitat or ecological process is susceptible to disturbance. Status relates to the adverse effects caused by human interactions, in particular habitat destruction, changed sedimentation rates and the mobilisation of contaminants, while condition refers to the current state of the ocean, prevailing trends and the prognosis for improvement or deterioration of its quality. Disturbance is the extent to which the natural environment has been changed by human interactions.
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- 61 Reeves and Leatherwood op.cit.
- 62 Roberts and Hawkins op.cit.
- 63 *Environment Protection and Biodiversity Conservation Act 1999*, Art 207.
- 64 *ibid.* Section 173.
- 65 Winton T, 'Victoria's undersea treasures Wilsons Promontory', *The Sunday Age*, August 2000.

Anything I learned about the sea was learned with an extractive tool in my hand – a spear, a net, a pot, a rod or gaff. Hunting does bring a kind of meditative focus to the mind, but it also funnels your attention in surprisingly narrow ways. It took me years to connect my hunting behaviour with the effects it had on the rocky reef around me. How did I let myself believe it would all go on forever?

Tim Winton⁶⁵

5

Bringing the community on board

'I love you', I whispered to the ear of the ocean. 'Ever since I've known you, I've loved you. I just see all your marvels, know all of your beauty...' And the ocean listened and snuggled still closer to me.

Hans Hass⁶⁶

Adventurer and explorer, Hans Hass, has a deep knowledge of and affection for the oceans. But except for those who dive or snorkel, the world beneath the waves is a mystery to most Australians. This can lead to apprehension and fear of the unknown – and a lack of concern about the marine environment. Such feelings can be overcome by education, as seen in the successful campaign for Victoria's marine national parks network. When people were shown the beauty and diversity of the underwater world and its need of protection, their attitudes changed and they became ardent supporters of marine conservation.

While community knowledge and understanding of the marine environment remains relatively low, programs for community education and engagement will be vital in ensuring its long-term protection.

Communities protecting the marine environment

A survey⁶⁷ of 1300 people living within fifty kilometres of the South-east Region's coast⁶⁸, has indicated a very low level of community awareness about the region – eighty-two per cent said they knew 'basically nothing to a little' – but very high levels of support for marine conservation. In fact, most respondents would prefer to see money spent on caring for the marine environment, scientific research and policing of the region rather than on exploration and the development of fishing and recreation. And at the same time, fifty-nine per cent of respondents said that there was 'not enough money' being spent by the Commonwealth government (only five per cent said enough was being spent).

The potential is there for high levels of involvement in education, consultation and other participatory activities that can lead to effective community engagement and behavioural change. However, the low level of community awareness needs to be reversed through the long-term inclusion of a coordinated and strategic community education program in regional marine planning.

The best protection for the marine environment will come from engaged, well-informed and aware communities working with managers and acting as custodians and ambassadors for the marine environment. The challenge for achieving this will be to develop well-resourced, two-way, contemporary, timely and high-quality:

- primary, secondary, tertiary and community education programs
- communications strategies
- consultation processes that are transparent, accountable and responsive
- participation programs and activities led by local communities wherever possible
- community capacity-building programs.

The Commonwealth government clearly recognised the need to promote public awareness and

understanding of the marine environment by identifying it as an objective of Australia's Oceans Policy. This is a key area where the Commonwealth's leadership role in oceans management through Oceans Policy should manifest.

A long-term commitment to effective education programs will create an aware community with the values, attitudes, behaviours and skills necessary for participation in marine protection activities and for encouraging attitudes and behaviours in others that also help protect the marine environment.

Community engagement

Local communities are not just collections of individuals. They are a reflection of Australia's diverse population and with a mix of associations and linkages represented in marine-based industries, local government, community environment groups, business and welfare organisations, Indigenous communities, ethnic and tourism associations, schools, government agencies and other bodies.

To tap into this human potential, the outcomes of education, consultation and participation must make communities feel that they are playing important roles in the management of the marine environment. In return, those communities will provide knowledge, ideas and active involvement that assist the setting of priorities and directions, the development of policies and programs, and the completion of conservation projects.

Engaged communities will offer quality management advice and help shape outcomes, question management plans and actions where appropriate, act as advocates for improved management, and add value to the operations of management agencies. Their engagement through community partnerships will also strengthen links within the community, enhance individual personal development and increase support for marine protection.

Indigenous involvement

*Aboriginal people's cultural and economic relationship with the [South-east] Region begins before the current coastal ecosystems were established. This relationship includes knowledge and use of lands that now lie beneath the ocean all around the coast, and between mainland Australia and Tasmania.*⁶⁹

For Indigenous communities the sea and the land are inseparable elements of the one environment – what is described collectively as 'Country'. For instance, the estuaries, beaches, dunes, rock platforms, coastal waters and oceans of the South-east Region, along with the coastal heathlands, ranges and forests of the

hinterland, have been used for thousands of years by Indigenous communities for food, clothing, medicines, shelter, cultural ceremonies, spiritual fulfilment and recreation.

Unlike the broader community, Indigenous communities more often than not already have great knowledge and strong senses of ownership and stewardship of coastal and marine regions. However, existing management structures do not allow this uniquely powerful connection to express itself or have any authority in respect of their marine estates.

The challenge for the implementation of Oceans Policy is to rebuild confidence and capacity among Indigenous communities, and ensure that their involvement facilitates their aspirations.

However, Oceans Policy cannot be implemented in isolation to the major issues facing Australia's Indigenous people: cultural dislocation, lack of recognition and self determination, disempowerment, inadequate legal rights and other key social justice issues. Fundamental to Oceans Policy implementation is recognition of their rights, their disenfranchisement from country, the dynamic contemporary nature of their culture and aspirations, and their custodianship of land and sea (not limited to where native title is proven).

Mechanisms for incorporating Indigenous knowledge, perspectives and participation in planning and ongoing management is an important outcome for all natural resource management in Australia, not the least being regional marine planning.

Indigenous communities come to regional marine planning with a great knowledge of their sea country, and pre-existing strategies and initiatives to manage it. They must therefore be allowed and encouraged to take the initiative in planning, management and use of their marine estates. But the issues facing Indigenous communities, and their capacity to engage, will vary from region to region, making it vital that marine planning and management processes facilitate their involvement and build their capacity and willingness to do so.

Government support will be essential to help establish appropriate parameters, resourcing, information provision and visioning to encourage socially, culturally and environmentally sustainable use and management. Only then can Indigenous communities express their vision for sea country and then move to implement it.

Regional marine plans should therefore seek appropriate ways to devolve power to the local

Indigenous community level and facilitate the assumption of decision-making power over time. High priority should be given to properly resourced comanagement arrangements that can be initiated or undertaken by Indigenous communities and can lead to employment opportunities for them.

To further encourage Indigenous community involvement there would need to be

- broad and inclusive consultation and participation processes led by Indigenous communities where they wish to do so
- management boundaries based on negotiation with Indigenous communities to ensure workability and to take into account cultural boundaries
- Indigenous community representation on planning and management committees
- Indigenous involvement in coastal/marine natural resource management currently carried out by other jurisdictions.

And, as stated in the Ministerial Advisory Group on Oceans Policy Report: 'Marine planning and management processes should promote involvement and learning to make the wider Australian community aware of the uniqueness of Indigenous peoples' connections to the marine environment and the nature of their rights and aspirations'.⁷⁰

It is in everyone's interests, and those of Oceans Policy, regional marine planning and marine conservation, that Indigenous communities be able to share their understanding of sea country and management approaches with other sectors and communities.

Marine education and conservation

Community education about the values, diversity and sensitivity of coastal and marine environments, and the benefits of marine protection, will be crucial to public acceptance and ongoing support of the marine management system. It will form the basis of the consultation and participation processes and help develop community custodians and ambassadors for marine conservation.

Community education programs should be based on an understanding of Australians' connections, values, attitudes and knowledge related to the ocean. They should be strategically targeted, and identify and develop communications pathways, messages, themes, images and messengers that engage the public and increase concern for the health and protection of the oceans. Community service announcements, a high-profile web site, and the employment of a journalist to

develop articles for syndicated publication in newspapers and magazines across a region could assist in conveying the right messages to the community.

To be right these messages will need to be relevant, expressed in meaningful and accessible language, and delivered by messengers such as community leaders and other trusted influencers to whom the community relates. Marine scientists, who are viewed by the community as highly credible marine conservation messengers, should play a key role in this process, but they will need guidance on how to communicate more effectively with policymakers, the media and the public.

An expert group would be needed to coordinate the development of marine education programs and resources focused on increasing the profile of each of the regions in school curricula. This group would develop cross-curriculum primary and secondary materials, special training programs for method practitioners and student teachers, and in-service training for practising teachers, as well as provide assistance to education departments in curriculum and policy development.

There is a considerable amount of existing visual materials, such as photographs, video, maps and animated presentations held by government agencies, research institutions and resource companies that could be made available for educational purposes. With guidance from the expert education group, these materials could be made available to a range of organisations including conservation groups, schools, aquariums and museums.

Consultation and participation

Good consultation processes inform, listen and respond by giving positive feedback to those involved. Questionnaires or focus groups might be used to seek out community expectations and aspirations of marine management. Or a workshop might consider specific management issues. The participants might also provide advice on the community membership and role of an advisory committee, or on the nature of formal partnerships between agencies, community groups and other interested participants in management.

Community consultation and participation are two-way processes that share and analyse information and give guidance in the making of decisions. They should not just be seen as 'local' and should also be used within relevant management agencies to ensure that staff members are well-informed and supportive of policies and programs.

**BOX 8 CAPACITY-BUILDING IN COASTAL COMMUNITIES:
THE MARINE AND COASTAL COMMUNITY NETWORK**

Established in 1993, the Marine and Coastal Community Network is a national, nongovernment project that increases community involvement in initiatives aimed at ensuring the ecologically sustainable use of Australia's marine environment.

The Network currently has more than 10,000 participants including conservation interests, commercial and recreational fishing interests, the dive industry, local government, catchment management authorities, marine scientists and government agencies. It provides an accessible link between the community and Commonwealth and other government programs delivering marine and coastal conservation and management initiatives.

The activities of the Network focus on seven key areas:

- contacts and network building
- government policy development and implementation
- information dissemination
- public awareness, communication and education
- media liaison
- community involvement projects
- workshops and training.

Key initiatives and achievements of the Network include:

- creating an active national network of marine and coastal interests
- the development of many high-quality community projects and events eg. Reef Watch
- access to marine information, data, publications and resources via newsletters, email and other material
- extensive media work across Australia linked to key marine and coastal policy initiatives eg. marine protected areas
- numerous high-quality educational products that highlight the values of Australia's temperate and tropical marine and coastal environments
- facilitating community awareness of, and involvement in, the implementation of Australia's Oceans Policy, and other government marine and coastal programs
- promoting understanding of, and support for, marine protected areas around Australia.

Community participation is diverse and will provide benefits to the management agencies and the community groups and individuals touched by this involvement. It can include membership of policy advisory committees, attendance at workshops and involvement in research, monitoring, conservation, education and administrative activities. At all times participation activities must be seen as meaningful to the participants and credible in achieving the objectives of planning and management.

To be truly effective, participation processes must also provide the community with the knowledge, the skills and the capacity to become actively involved in the management of the marine environment, and engender a sense of community ownership of the process. They must be constructed in a way that overcomes ingrained community cynicism about

token processes or programs that use 'on ground participation in management' as a way to make use of voluntary community labour.

Building the capacity of the community to make a difference

Capacity building will be crucial to the successful involvement of groups and individuals in regional marine planning. At the core of capacity building is the removal of all obstacles that prevent individuals and communities making change and becoming meaningfully engaged in issues. The Ottawa Health Charter⁷¹ articulates several of these obstacle levels, including:

- policy and legislation
- social and cultural
- institutional
- economic
- personal constraints including technical, personal confidence and levels of empowerment to act.

Governments must allocate adequate funding, staff and in-kind resources to ensure equity of opportunity for participation from regional communities. They must also seek to engage the broader community in developing active appreciation and stewardship of the marine and coastal environment. In this regard it is worth remembering that many people who feel they have a stake in a region might not reside there year-round – visiting just for holidays – but could have high levels of regional attachment.

Genuine capacity building goes beyond providing technical information, opening up processes to the community and injecting funds to further their involvement. For instance, anti-smoking campaigns with clear technical information about the health effects of smoking have not in themselves been successful. More proactive, supportive and empowering programs, such as the Quit campaign, have been developed following the failure of stark technical information alone to engender change.

A key barrier found in Natural Heritage Trust projects is the burnout experienced by communities burdened with restoration activities but without sufficient capacity beyond general facilitation and materials for onground works. A further limitation on the outcomes of the Natural Heritage Trust has been the absence of policy and law reform to prevent further degradation. This has led to a perception that the causes of degradation are being ignored, resulting in disempowerment and a sense of futility among communities.

Once engaged, the community must be provided with training and ongoing access to data and expertise. Its

role in the process of dealing with problems and delivering solutions has to be made clear, and governments must demonstrate their own commitments to addressing the problems at their source. This is crucial to engendering confidence in one's own ability to affect change – and to make a difference.

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Today, we are coming to better appreciate the extent to which our actions affect an ecosystem – and the people who depend on it – thousands of miles away. The reef fisherman in Fiji is not undone by the local poacher, but by global warming intensified by the driving of a car in downtown Toronto, Canada. Yet these connections are not all bad news. The web of interdependence is built with strands of responsibility and hope. Our ever expanding ability to communicate across borders and oceans is helping to drive a truly global dialogue about the planet's most pressing environmental challenges.

Jean-Michel Cousteau⁷²

6

Eleven steps to ecosystem-based regional marine planning

The goals of marine environmental management are to maintain biodiversity and ecologically sustainable development. The alternatives are continuing environmental degradation and ecological collapse.

Leon Zann⁷³

In these final sentences of his widely acclaimed report on the state of the marine environment, Leon Zann identifies the two futures for our oceans: ecological sustainability or ecological collapse.

Whatever is to be the future will depend on choices made now. There is the status quo, a 'safe' harbour where we continue doing the age-old familiar things. But as Leon Zann indicates, this will not work, and our marine environment will continue its decline.

The best choice for our oceans requires a new tack, a journey beyond the familiar and towards the uncertain challenges of the open seas. Ecosystem-based management can provide the certainty and security required to meet those challenges and to achieve the goals of Oceans Policy, and of Leon Zann.

The 'how to' of ecosystem-based regional marine planning

To produce a good regional marine plan is neither quick nor easy. It is helped if the planning process is anchored in a desire to achieve the best protection for the marine environment and in the long-term security for industries that have a commitment to sustainable practice. This will be vital as governments, agencies, stakeholders and communities travel together on their journey seeking not one but eleven regional marine plans.

The use of ecosystem-based management is the logical progression from single-species, single-sector management to the ecologically sustainable use of the marine environment. Although natural systems and human uses vary across Australia's eleven marine regions, there are many essential elements that should be common to all of their plans.

There are eleven necessary steps in the development of ecosystem-based regional marine plans, and these are outlined in Table 3.

The development of an effective ecosystem-based regional marine plan requires a good understanding of a region's environmental, social and economic values, as well as knowledge of marine ecosystem use and the impacts and threats that derive from that use. However, in the marine environment, there is always a degree of uncertainty for management, underlining the need for adaptive management and a well-resourced marine research program to fill the gaps in knowledge.

Articulation of the region's environmental, social and economic values would be based upon the information gathered by scientific and socio-economic research and through collaborative consultation and negotiation processes between governments, agencies, stakeholders and the general community.

Included in this presentation would be ecological maps of the region that locate ecosystems, ocean currents, upwellings and other key oceanic processes, and areas where key species congregate for breeding, feeding and socialisation. Maps created at this time would also highlight how the region is used, including fishing grounds, areas of Indigenous cultural and resource significance, and major tourism sites. Other activities that could be included are ports and harbours, scenic areas, fish spawning grounds, migration paths of commercial species, popular recreational fishing or diving spots, and areas used for dumping of dredge wastes and defence training.

After identifying operational objectives and system and species indicators and targets for performance-based assessment, the best-available science would be used to select environmental sites for protection in marine national parks. This would be followed by an ecological risk assessment that would identify and analyse the threats to the region's ecosystem values and system and species indicators, and assist the establishment of measures for sectoral management.

As much as regional marine planning is a management process, it is also a resource allocation process. There should be lines on maps, and these should show the locations for marine protected areas, fishing grounds, oil and gas fields and other permitted sectoral uses. The lines will be the result of a negotiation process that has assessed the values of ecosystems and their use, weighed and considered the impacts on these ecosystems, established operational objectives for protecting these ecosystems, and set targets for reaching them. These must be consistent with the plan and also with Oceans Policy, and backed up by commitments to independently assessed compliance and enforcement, expanded research and monitoring, community education and engagement.

Without such negotiations and the allocation and spatial management of resources, the plan will be a reactive approvals process, rather than what is needed, a pro-active and adaptive ecosystem-based management system that provides the support framework for achieving ecologically sustainable development.

The next step would involve the research community, a mix of scientists, economists, sociologists, geographers and other experts considering the research and monitoring needs associated with the operational objectives, indicators and targets. Accompanying these would be a program that identifies research and information needs and priorities, an information and monitoring system, and an independently conducted and audited performance assessment and review process.

The timeline for implementation, assessment and review of the regional marine plan should allow for its legal authorisation, and for agencies to make their management and reporting systems consistent with it. Included would be the frequency and scheduling of reports on indicator and other monitoring, agency compliance with plan provisions, reviews and re-assessments of cumulative impacts, provisions for emergency re-assessments if indicator trends are negative, independent audits of process and review, and renegotiation of the plan.

Where conservation security is gained by a commitment to ecosystem-based management, industry security will be gained through a commitment to demonstrated and documented sustainable practice.

The ecosystem-based management process is iterative. It should be regularly updated and reviewed every five years, ensuring that the management plan adapts and evolves to new information and remains a genuine and relevant commitment to the future.

Community education, capacity building and engagement during the preparation and operation of the plan will be vital to its success. This requires building the capacity of the community to participate in education programs, management activities and consultation and negotiation processes. Community capacity building must be a genuine commitment in the plan and from the governments and agencies responsible for its preparation and operation.

Subregional considerations

Australia's marine regions are very large relative to the areas covered by marine planning processes in other countries. To make the planning process more manageable, smaller subregions could be used to help build the overall regional marine plan by enabling decisions about issues to be made at closer to ecosystem scales, and closer to regional communities.

The subregional analysis would provide information for the development of one, overarching regional marine plan, not create independent subregional plans. It would inform the regional planning process of the most appropriate subregional focus for management choices and the systems and species indicators to be used. It would also provide:

- greater opportunities for regional communities to be more directly involved in the development of the regional marine plan
- better representation of regional community interests in a planning process that will have greater relevance to them

TABLE 3 ELEVEN STEPS TO ECOSYSTEM-BASED REGIONAL MARINE PLANNING

STEP 1 STAKEHOLDER ENGAGEMENT AND COMMUNITY EDUCATION

Step 1 involvement

Identified non-government stakeholders: non-government conservation organisations, industry groups, Indigenous communities, local community groups, associations or cooperatives, tourism bodies

Identified government stakeholders: conservation agencies, industry agencies, Commonwealth and state governments

Identified research community: scientific, social and economic research community

General community: community groups (social and environmental), community networks, education agencies, providers and trainers, primary, secondary and tertiary institutions, local councils

Step 1 outcomes

For stakeholders:

1. A network of interested parties with whom the National Oceans Authority will consult with in the preparation of the management structure.
2. Capacity-building (including funding) of the community to actively participate in the marine management process, particularly including community-based Indigenous, community and environment nongovernment organisations.
3. Transparent, accountable, accessible and responsive community consultation and participation strategies.

For general community:

1. A communications and community education strategy that maximises effective community engagement and ensures increased community awareness, understanding, appreciation and active support for the values and benefits of the marine environment, and the benefits of Oceans Policy and regional marine planning.
2. Education and training strategies that develop support for the marine environment within the community and management agencies.
3. Engaged communities that act as custodians and ambassadors for the marine environment.
4. Programs that promote the benefits of community involvement in the management of the marine environment.

** Community education is an ongoing process and, as such, does not have a set completion date. It must be implemented throughout the preparation and life of the regional marine plan.

STEP 2 GATHERING NECESSARY BASELINE DATA

Step 2 involvement

Research community with regional stakeholders

Step 2 outcomes

1. Identification and documentation of all major natural and ecosystem values throughout the area.
2. An ecosystem map of the region, including ecological processes, benthic primary producer habitats, ocean currents, upwellings and other key oceanographic systems on both a spatial and temporal scale, and areas where the key species (indicator species and commercial target species) congregate either for breeding, feeding or for socialization. This step would include the clear and agreed expression of the natural values that could include:
 - a detailed analysis of ecosystems at a scale consistent with the potential impacts of the marine industries
 - major features documented (eg. highly migratory species, oceanographic currents or features, boundary mismatches between taxa)
 - highly valued habitats
 - existing protected areas
 - protected species critical habitat including feeding, breeding, or resting grounds
 - fish spawning grounds, recruitment areas and migration paths for commercial species
 - highly productive areas such as upwellings.
3. Identification, documentation and mapping of all major human activities throughout the region, including:
 - highly productive fishing areas
 - areas used for ports and harbours
 - areas of high scenic and wilderness amenity
 - high cultural and historic value
 - traditional hunting grounds for Indigenous peoples
 - major areas for oil and gas extraction
 - major shipping lanes
 - areas used for dumping of dredge wastes, defence training etc
 - areas that are the focus of tourism and recreational activities.
4. Identification and documentation of major uncertainties identified and documented as guidance for research and investigation programs

Note: A further two stages of Step 2 would be added here in the case of subregional analysis. For details see 'Subregional considerations' opposite.

STEP 3 IDENTIFYING OPERATIONAL OBJECTIVES, INDICATORS AND TARGETS

Step 3.1 Assessment of ecological processes and human activities of the region

Step 3.1 involvement

Research community

Step 3.1 outcomes

1. Comparison of maps of all major uses and all major natural and ecosystem values throughout the region (as gathered during Step 2).
2. Determination of major factors influencing ecosystem values in the region by assessment of known uses and impacts (including emerging uses and potential impacts) that are land-based and marine-based, drawing on existing information available in action plans, recovery plans, indicator species assessments, conservation assessments and the knowledge of specialist researchers. It would include a detailed identification of threats to marine ecosystems that could include:
 - loss/damage of marine habitats, including impacts of specific fishing gear on benthic habitats
 - pollution from coastal rivers and its impact on inshore habitats
 - risk of marine pest invasion and disruption to critical habitat
 - removal of the biomass of harvested species (in all fisheries) and impact on trophically dependent species
 - impacts of oil and gas exploration and extraction and shipping
 - habitat displacement and its impacts on indicator species.

Step 3.2 Determining operational objectives for uses and values of ecosystems in the region

Step 3.2 involvement

Regional stakeholders

Step 3.2 outcomes

1. Using information gathered during Steps 2 and 3.1, development of a set of operational objectives for protecting the values of ecosystems in the region. These could include:
 - recovering the populations of threatened species
 - protection of critical breeding habitats of rare, threatened and vulnerable species
 - maintenance or recovery of populations of protected species
 - maintenance of the distribution, area, species diversity and trophic structure of important habitats
 - increasing the distribution and diversity of benthic fauna considered to be affected by fishing
 - rehabilitation of marine ecosystems to a past (healthier) condition
 - improvement of water quality.
2. Appropriate operational objectives that drive the performance of each individual sector, and are 'sectorally tailored'. These could include:
 - adjustment of shipping routes to avoid cetacean migration paths
 - reduction or prevention of fishing effort in specific areas to help protect populations of benthic communities
 - prevention of serial depletion of fish populations
 - managing fisheries at an agreed percentage of virgin biomass (as appropriate to the specific species and the advice of the fisheries agencies)
 - reduction of noise pollution from seismic testing, drill sites and vessel noise (measured spatially and temporally)
 - buffer zones around marine national parks
 - bycatch mitigation in longline fisheries
 - removal of ocean outfalls
 - improvement of ambient water quality of waters receiving land-based discharges.

Step 3.3 Identify system and species indicators for the region

Step 3.3 involvement

Research community

Step 3.3 outcomes

1. Drawing on advice on the ecosystems and ecological process (Step 2), the human impacts (Step 3.1) and the identification and choice of operational objectives (Step 3.2), identification and description of appropriate system and species indicators to be monitored. These could include the:
 - volumes and rates of catches for specific commercial fisheries
 - species composition of rocky reefs targeted by specific fisheries
 - size of populations of apex predators
 - number and species of fish catches on charter fishing boats
 - frequency and extent of trawling operations
 - loss or damage to habitats in bays, estuaries and intertidal areas
 - extent of land-based impacts associated with river and urban discharges
 - area and species composition of seagrass beds
 - level of contaminants in the sediments of bays
 - number and extent of algal blooms.

(This acknowledges that high-level indicators such as habitats will be chosen in the interim where more refined indicator data is unavailable.)

2. Assessment of cumulative impacts of threats on major ecosystem values, system and species indicators, and open assessment for formal peer review and stakeholder comment.

3. Determination of indicator targets for the achievement of operational objectives. These would include timelines for the reaching of the targets, with target numbers and percentages for indicators such as those outlined above.

STEP 4 CONSIDERATION AND SELECTION OF HABITAT FOR PROTECTION

Step 4 involvement

Research community and regional stakeholders

Step 4 outcomes

1. Advice on the identification and choice of candidate marine protected areas and other marine conservation measures using information collected at Steps 2 and 3. The level of protection in marine national parks (extraction-free marine protected areas) should be between 25-50% of each of the region's bioregions.
2. Opportunity for peer review by independent authorities and public participation.

STEP 5 ASSESSING THE RISKS TO ECOSYSTEM VALUES, OPERATIONAL OBJECTIVES AND SYSTEM AND SPECIES INDICATORS

Step 5 involvement

Research community with regional stakeholders

Step 5 outcomes

1. Ecological Risk Assessment of threats to the identified ecosystem values, operational objectives and system and species indicators in the region using a broad, multi-disciplinary knowledge base (see Appendix 1 – Ecological Risk Assessment for flow of this part of step 5).
2. Evaluation of high, medium and low risks to the operational objectives, major ecosystem values, system and species indicators – specifically to protected species, and to the ecosystem, critical habitats, species and genetic diversity.
3. Identification of the key areas of uncertainty.
4. Opportunity for peer review by independent authorities and public participation.

STEP 6 ACHIEVING THE OPERATIONAL OBJECTIVES AND INDICATOR TARGETS

Step 6 involvement

Research community and regional stakeholders

Step 6 outcomes

1. Identification of appropriate and workable strategies to achieve operational objectives and indicator targets. These would consider the high and medium priority risks from the Ecological Risk Assessment and important aspects of the ecosystems (including protected species, critical habitat), and would make use of appropriate management and conservation tools.
2. Prioritised strategies that define workable activities and responses to achieve specific objectives and targets. Include:
 - who is responsible
 - what funds and time frames are involved
 - what controls are needed
 - where data/outcomes should be reported and assessed
 - clear decision trees when targets are not met.

If a subregional analysis were to be conducted, here would be the point where the various subregional investigations are collated in consideration of the regional marine plan's development. For details see 'Subregional considerations' in this chapter.

STEP 7 DESIGNING RESEARCH, INFORMATION AND MONITORING SYSTEMS

Step 7 involvement

Research community

Step 7 outcomes

1. Advice on research and information needs and priorities for the region. This could include the development of research to establish cause-effect relationships on major ecosystem values, and system and species indicators.
2. Development of a regional information and monitoring system that provides regular feedback on ecosystem health, and system and species indicators and ecosystem trends within the region.
3. Identification of 'feedback loops' to enable adaptive management systems to be developed.

STEP 8 DESIGNING PERFORMANCE ASSESSMENT AND REVIEW

Step 8 involvement

Research community and regional stakeholders

Step 8 outcomes

1. Integration of operational objectives and indicator targets (Steps 3.2 and 5) and research information and monitoring system advice (Step 6) with regional research performance assessment and review system.
2. Performance and assessment review systems that provide regular data to enable adaptive decisions to be made.

3. A set of decision rules to provide a transparent process for adapting management targets in the light of performance assessments or changing environmental conditions.
4. Performance outcomes peer reviewed by independent authorities.

STEP 9 DESIGNING A COMPLIANCE STRATEGY

Step 9 involvement

Regional stakeholders with agencies and departments having enforcement roles at state and Commonwealth levels

Step 9 outcomes

1. Compliance strategy that is well-resourced and provides encouragement and incentives for compliance, effective penalties for non-compliance, well-coordinated surveillance and response strategies, and consistent treatment of non-compliers.
2. Communications program promoting the benefits of compliance to users and wider community to maximise voluntary compliance and to encourage reporting of non-compliers.

STEP 10 FINALISING THE REGIONAL MARINE PLAN

Step 10.1 Release of draft regional marine plan for public comment

Step 10.1 involvement

Regional stakeholders and wider community

Step 10.1 outcomes

1. Submissions from stakeholders and wider community on the merits of the draft regional marine plan.
2. Assessment of submissions by National Oceans Authority and report-back to stakeholders.
3. Agreed modifications to the regional marine plan.

Step 10.2 Compilation and finalisation of the regional marine plan

Step 10.2 involvement

National Oceans Authority and regional stakeholders

Step 10.2 outcomes

1. Integrated regional marine plan with ecosystem-based management at its core, and clear roles and responsibilities for various new and existing agencies with legal authority given by the National Oceans Act and driven by the National Oceans Authority.

Step 10.3 Creation of regional advisory committee

Step 10.3 involvement

National Oceans Authority with regional stakeholders and government and independent scientific, social and economic expertise

Step 10.3 outcomes

1. Creation of a regional advisory committee that is well resourced, has access to data and information, ensures communication between sectors and provides advice to the National Oceans Authority on the operation, performance and review of the regional marine plan. The advisory committee would:
 - assist in the formulation, implementation and review of regional marine plans
 - make formal recommendations and provide a report-back capacity to the National Oceans Authority and the Minister and Parliament concerning the amendment of a regional marine plan or regulations where circumstances have changed
 - provide advice from a regional perspective back to the National Oceans Authority on matters referred to them by the Authority. This could include matters relating to the operation of a regional marine plan, Oceans Policy, the National Oceans Act, public interest or the maintenance of the integrity of integrated ecosystem-based management.

STEP 11 REVIEW OF THE REGIONAL MARINE PLAN TO ENSURE ADAPTIVE MANAGEMENT

Step 11 involvement

National Oceans Authority with regional stakeholders (and subregional stakeholders) and research community

Step 11 outcomes

1. Regular review of the regional marine plan, to ensure the plan is adaptive to new information, has been subject to an independent peer review, and includes:
 - scheduled report requirement from other agencies on compliance with plan provisions
 - scheduled report on indicators and other monitored aspects, with publication of data for the region as a whole (and subregions if region subdivided)
 - review of data and re-assessment of cumulative impact
 - scheduled formal assessment of the plan's provisions and independent audit of process
 - provisions to call for an emergency re-assessment of the plan if indicator trends are negative
 - appropriate review and possible re-negotiation.

- a more intense and localised analysis of environmental, social and economic issues that makes good use of local knowledge
- a more manageable scale of analysis in what are very large marine regions.

The division into subregions could in part be based on the Interim Marine and Coastal Regionalisation of Australia (IMCRA)⁷⁴ and would be carried out on a case-by-case basis for each of the eleven marine regions. The size of a region, and the homogeneity or otherwise of its bioregions, would be critical factors in determining the need for a subregional analysis.

At the end of Step 2 in Table 3, the National Oceans Authority, the research community and regional stakeholders would determine whether the development of the regional marine plan would benefit from the division of the region into subregions. If so, Step 2.2 and Step 2.3 would be added to the process.

Step 2.2 would identify ecological and political subregions and involve the research community and regional stakeholders. The outcomes (using information collected during Step 2) would be:

- advice on the division of the region into subregions
- consideration of political jurisdictional issues in the final division, with the view to streamlining the involvement of resource-use agency participation etc
- a map of each subregion to be managed
- a detailed analysis of the main attributes of the subregions to be managed
- coherency with other ecosystem classification initiatives (at both larger and smaller scales) such as fisheries regions, etc.

Step 2.3 would have the stakeholder groups of Step 1.1 identify the stakeholder community to be involved in the development of each subregional process. The outcomes of Step 2.3 would be:

- a formal group of subregional stakeholders and specific research community with whom the National Oceans Authority will work to prepare each subregional advice.
- capacity-building funding programs for non-government organisations and other stakeholders.

Once the subregions are defined, and the subregional stakeholders identified and engaged, Steps 3-6 would then be completed at the subregional scale. At the completion of step 6, the draft subregional 'advice' from each subregion would be collated for consideration in the regional marine plan development process.

The outcomes of Step 3 to Step 6 would be to:

1. Develop and negotiate provisional subregional advice, including:
 - negotiated outcomes for reducing the impacts identified in Steps 3.1
 - draft management arrangements borne out of assessments made in Steps 3-6.
2. Additional advice that:
 - bears in mind the development of other subregional plans, and where possible includes whole-of-region values, objectives and outcomes
 - can be integrated with other subregional plans to ensure effective management of uses and species that are found in more than one subregion or the effects or requirements of which extend beyond subregional boundaries
 - proposes marine protected areas and critical habitat and the designation of buffer zones.

Once this work is completed, the planning process would continue at the whole-of-region scale through Steps 7-11.

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From space the planet is blue.
From space the planet is the territory,
not of humans, but of the whale.

Heathcote Williams⁷⁵

7

Stepping into a sustainable future

‘Whither, thou turbid wave?
Whither, with so much haste,
As if a thief wert thou?’
‘I am the Wave of Life,
Stained with my margin’s dust;
From the struggle and the strife
Of the narrow stream I fly
To the sea’s immensity,
To wash from me the slime
Of the muddy banks of Time.’

The wave,
Henry Wadsworth Longfellow⁷⁶,
as translated from the
German poet, Tiedge

If the sea had the ‘immensity’ as Tiedge, Longfellow and their contemporaries thought, then it would be in far better shape. But dilution is not the solution for the ‘Wave of Life’ in our marine environment. The ‘slime’ that comes down the rivers to the sea can be a nasty cocktail of chemicals, nutrients and sediments. Better planning, better management and better use of land and sea must underpin the way forward to an ecologically sustainable future for our oceans.

Choosing the future in the present

Oceans eleven has outlined the fundamentals for effective regional marine planning. These are ecosystem-based management, substantive legal and administrative reform (including a National Oceans Act and a National Oceans Authority), a powerful research base, programs for community education, engagement and capacity building, and a comprehensive, adequate and representative network of marine national parks. Without any one of these elements, a successful outcome for regional marine planning is unlikely.

Planning is about seeing the future and acting upon it. Regional marine planning should be based on the values of natural ecosystems. By using environmental indicators, and not sectoral or political influences, as triggers in the performance assessment of management and marine industry sectors, the responsibility for environmental protection will fall squarely on the user. Although the users pay, they also benefit from a healthy marine environment. This will obviously require adjustments in the allocation of resources, but better management should provide long-term security. In these circumstances it would be hoped, even expected, that industry would act to lessen or remove the impacts of damaging activities.

In five years time, when Australia’s first regional marine plan is reviewed, Australia’s oceans should be better understood, better protected and better managed. But will they? It all depends on how we act now.

We could establish regional marine plans that bow to sectoral, government and agency pressures, and ignore the needs of the marine environment. That would be easy, simply business as usual. But then, Oceans Policy would stand for nothing.

Or we could create innovative, challenging and world-leading regional marine plans that are backed by statute, are enforceable, implement an ecosystem-

based management system, recognise the socio-economic needs of communities, and ensure the ecologically sustainable use of Australia's marine environment.

The choice is clear: a choice between status quo or a sustainable future for our oceans. If we make the wrong choice, in five years time Australia's oceans will be worse off, and the imperative more urgent for action that we can take right now.

The impossible triage for saving our dying rivers and devastated landscapes now facing us on land need not be our future at sea.

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Whales, corals, and deepsea fish
know nothing of how we track time,
but because this is a pivotal point in
history for us, it is pivotal for them,
too. We have the power to choose the
fate of these and thousands of other
creatures. Decisions already made
have set the present course, but what
will we choose for the future?

Sylvia Earle⁷⁷

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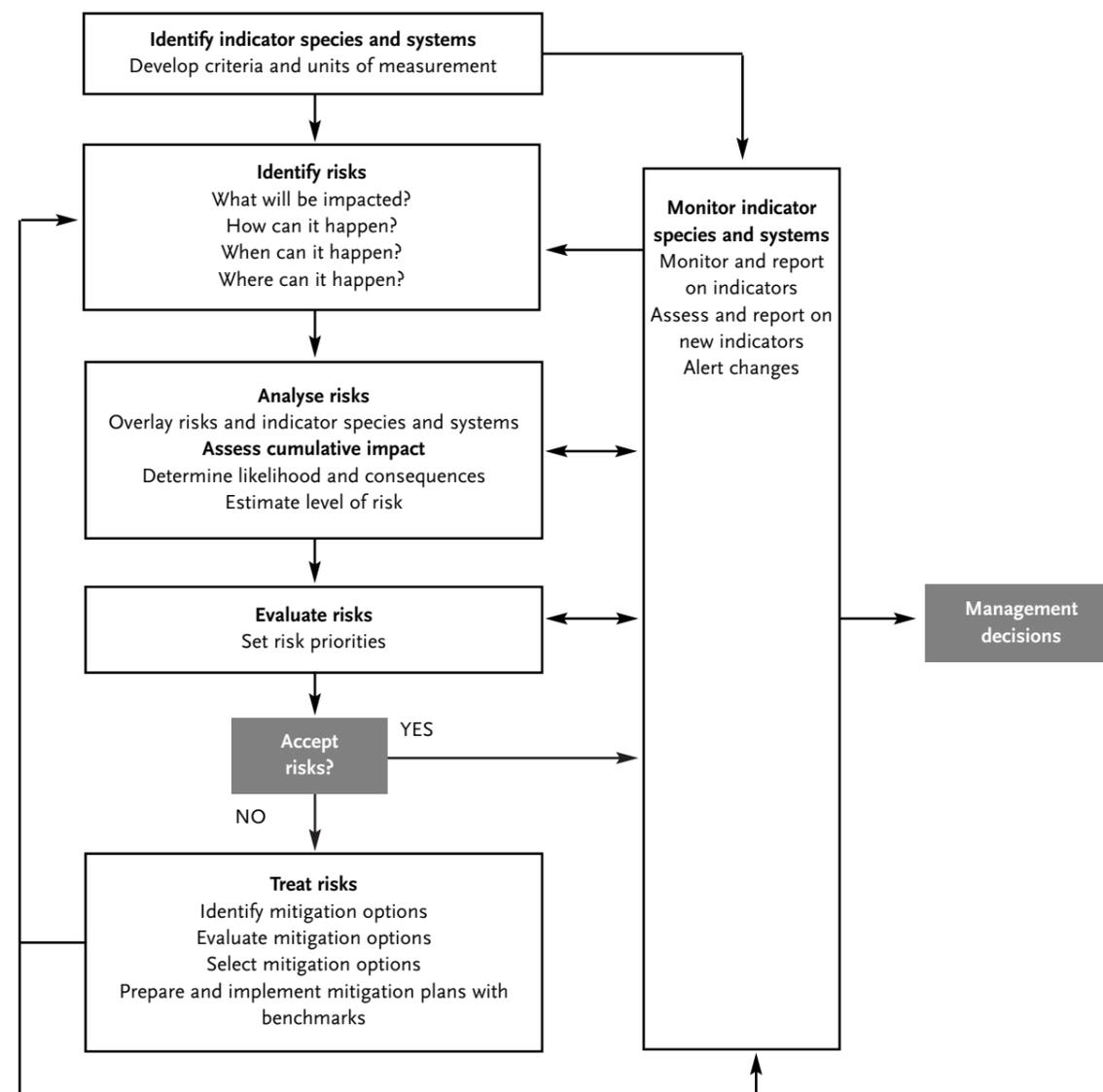
Appendix 1 Ecological risk assessment

Acknowledging that information used for the regional marine planning process will remain incomplete, it is important to conduct appropriate risk assessment of the cumulative impacts on indicator species and systems. Ongoing information from a well-resourced scientific community is critical to carry out ecological risk assessments and to enable:

- the identification of key areas of uncertainty
- full public scrutiny and review
- full peer review by independent authorities
- the evaluation of high, medium and low risks to the identified ecosystem values, operational objectives and system and species indicators.

The risk assessment process would follow on from the selection of marine protected areas. This acknowledges that marine protected areas are established not on the basis of risk, but to first and foremost protect the ecological values of an area.

FIGURE 1 A PROCESS FOR ECOLOGICAL RISK ASSESSMENT



Appendix 2 Marine mammal protection

The current level of protection for marine mammals under the EPBC Act is insufficient and in urgent need of reform. Cetacean provisions within the EPBC Act have been carried forward from the Whale Protection Act 1980, but are inappropriate and unable to deal with the broader range of threats and issues facing these large marine mammals.

Threats to marine mammals do not just come from commercial whaling and also include climate change, ozone depletion, chemical and sound pollution, habitat loss, interaction with commercial fisheries, and harassment from tourism – the same ones that are affecting the marine environment in general.

The protection for cetaceans in the EPBC Act comprises a prohibition on the killing, injuring, taking, capturing or interfering with cetaceans in Australian waters.⁷⁸ But this does not address wider threats that have short-term, long-term and cumulative impacts.

Oceans eleven recommends that the following amendments be made to the EPBC Act:

- include all marine mammals as either vulnerable or conservation-dependent species in recognition of their position within the marine ecosystem under the EPBC Act
- identify and list critical habitat for all marine mammals on the EPBC Act Register.

In addition it is recommended that a Marine Mammal Protection Act be introduced, or appropriate amendments be made to EPBC Act to reflect the following:

- addressing in detail the full range of threats experienced by marine mammals in Australian waters including fisheries interaction and pollution (including noise)
- providing to the Environment and Heritage Minister ('the Minister') increased powers to oversee and regulate the *Petroleum and Submerged Lands Act* over important cetacean (whales, dolphins and porpoises) habitat in both Commonwealth and state marine waters
- addressing and regulating conditions of industry activity and the granting of permits
- providing for the declaration and legal protection of all areas identified as critical habitat, and provide appropriate levels of protection for all such identified areas
- providing for the development and implementation of recovery plans for threatened marine mammals
- providing for the creation of a scientific register of government-accredited cetacean specialists from whom all industry-observer coverage must be sourced
- providing for the creation of a National Cetacean Centre in an appropriate independent institution (such as a University) to manage all industry-observer coverage, cetacean sighting reports, the promotion and supervision of cetacean research and the provision of a public education service.

References

78 Sections 229, 229A, 229B, 229C, 229D of the EPBC Act. There are also a number of other offences that relate to cetaceans. These include the possession of a cetacean or part of a cetacean and unlawfully importing a cetacean: sections 230, 233, 234 and 236 of the EPBC Act.

Appendix 3 The value of conservation

All too often the values of natural capital are ignored in the cost-benefit analyses of resource allocation processes. Unless conservation produces a product that can be bought and sold on the market, it is given little consideration in the analysis of marine industry proposals. In contrast, ecosystem-based management recognises that terrestrial and marine ecosystems in their natural state provide high-value functions and services to the community. Although these can be difficult to quantify in dollar terms, there have been advances in methods designed to achieve this.

To reflect accurately the economic worth and use options of different marine ecosystems an accurate assessment of total economic value is necessary. Total economic value consists of direct and indirect use values, option values and existence values,⁷⁹ as illustrated in Table 4 (which draws on the work of Edward Barbier⁸⁰).

Robert Costanza⁸¹ and others calculated the indirect values of the world ecosystems such as natural capital stocks and critical functioning ecosystems. They estimated that ecosystems annually provide at least \$US33 trillion dollars worth of services that are currently identified only outside the market system (externalised). According to their study, the world's oceans have a total global value of \$US8381 trillion for ecosystem service, including food production, nutrient cycling and regulation of atmospheric chemical composition. Coastal ecosystems, including estuaries, reefs and seagrass beds, were calculated to have a value of \$US12,568 trillion. The comparison between marine and terrestrial ecosystem value is US\$20,949:US\$12,319 trillion respectively (Costanza et al 1997).

With the value of many other environmental services, such as climate regulation, hydrological flow regulation, waste treatment, raw materials and genetic resources yet to be calculated, the dollar values will increase further when the analysis is complete. Ecologically sustainable management of these natural areas makes economic sense.⁸²

Paul Hawken, Amory Lovins and Hunter Lovins, in their book *Natural capitalism*⁸³, have published data that values ecosystems on an acre-by-acre basis. Overall, marine systems were valued at \$US234 per acre, but the continental shelf yielded \$US1640 per acre and estuaries \$US9240 per acre. The authors urged that valuations of ecosystem services must be incorporated within 'planning, policy and public behaviour'. They used the following to illustrate their views:

'When a Philippine fisherman tosses a stick of dynamite into coral reefs, harvesting stunned fish for local markets and broken pieces of coral for the pharmaceutical industry, he pockets cash at market prices. He does not pay for the loss of the coral reef, but it should be obvious that the net present value of the coral reef habitat as a future home for fish far outweighs the few pesos garnered by its destruction. Nevertheless, governments from developed and developing nations still use accounting methods that register the fish and the coral harvest as net gains rather than net losses.'

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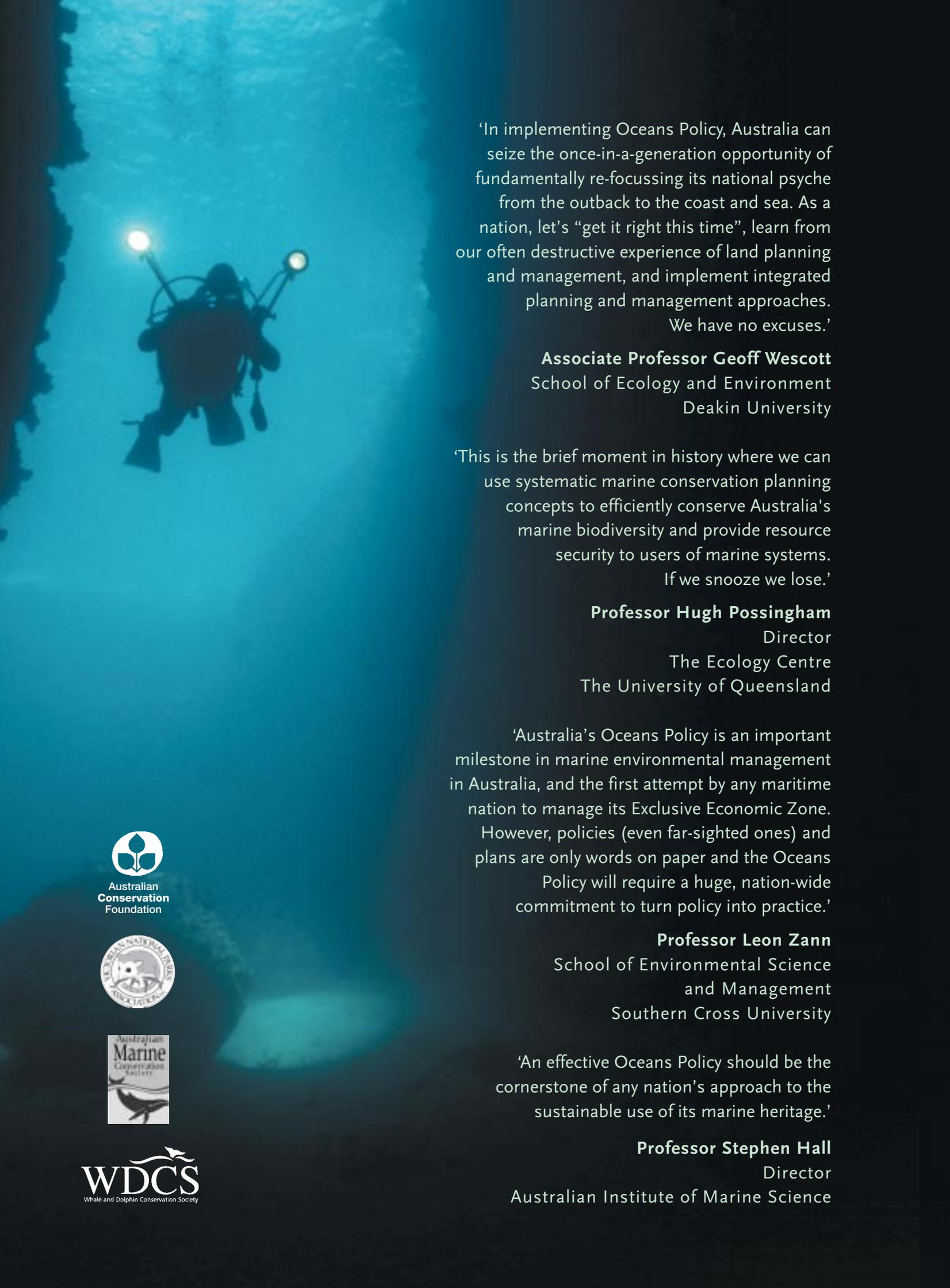
TABLE 4 THE VALUES OF WILDERNESS

Use values			Non-use values
<i>Direct value</i>	<i>Indirect value</i>	<i>Option value</i>	<i>Existence value (Intrinsic value)</i>
The resources and services provided directly by the natural area or by direct harvesting and exploiting wildlife	The indirect functions which support the economic activity which are provided by the natural area	Amount parties are willing to pay to conserve the ecosystem or components of it for future use	Value attributed to the asset with no connection to the use value components. This would include the worth of wildlife species, natural areas and overall biodiversity as having intrinsic value and stewardship value
Sustainably harvested products such as water, meat, fish, timber, plants Tourism/recreation Genetic material Education Human habitat Other services such as water transport	Ecological functions and roles Protection functions Waste assimilation Microclimate functions Macroclimate functions Carbon store	Future use of direct and indirect value columns	Biodiversity Species diversity Cultural heritage

Source: Adapted from Barbier E, 1992, 'Economics for the wilds' in Swanson T and Barbier E (eds) *Economics for the wilds: wildlife, wildlands, diversity and development*, Earthscan Publications Ltd, London; Prideaux, M, 2002, in prep

You waves, though you dance by my feet like children at play,
Though you glow and you glance, though you purr and you dart;
In the Junes that were warmer than these are, the waves were more gay,
When I was a boy with never a crack in my heart.
The herring are not in the tides as they were of old;
My sorrow! for many a creak gave the creel in the cart
That carried the take to Sligo town to be sold,
When I was a boy with never a crack in my heart.

Selected verses from 'The meditation of the old fisherman' by WB Yeats



'In implementing Oceans Policy, Australia can seize the once-in-a-generation opportunity of fundamentally re-focussing its national psyche from the outback to the coast and sea. As a nation, let's "get it right this time", learn from our often destructive experience of land planning and management, and implement integrated planning and management approaches. We have no excuses.'

Associate Professor Geoff Wescott
School of Ecology and Environment
Deakin University

'This is the brief moment in history where we can use systematic marine conservation planning concepts to efficiently conserve Australia's marine biodiversity and provide resource security to users of marine systems. If we snooze we lose.'

Professor Hugh Possingham
Director
The Ecology Centre
The University of Queensland

'Australia's Oceans Policy is an important milestone in marine environmental management in Australia, and the first attempt by any maritime nation to manage its Exclusive Economic Zone. However, policies (even far-sighted ones) and plans are only words on paper and the Oceans Policy will require a huge, nation-wide commitment to turn policy into practice.'

Professor Leon Zann
School of Environmental Science
and Management
Southern Cross University

'An effective Oceans Policy should be the cornerstone of any nation's approach to the sustainable use of its marine heritage.'

Professor Stephen Hall
Director
Australian Institute of Marine Science

