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Sea change

Advancing Australia's ocean interests

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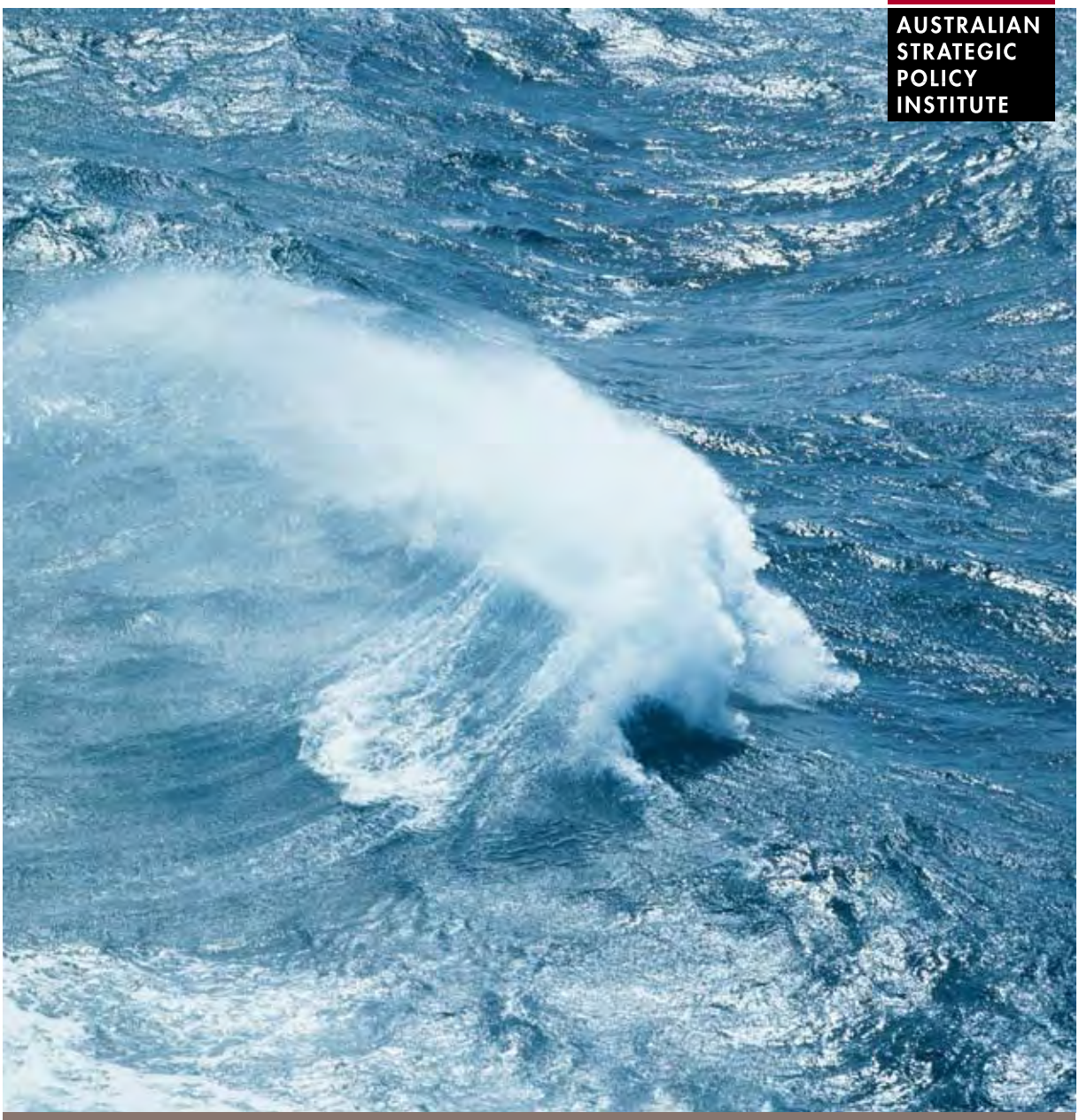

March 2009

Sam Bateman

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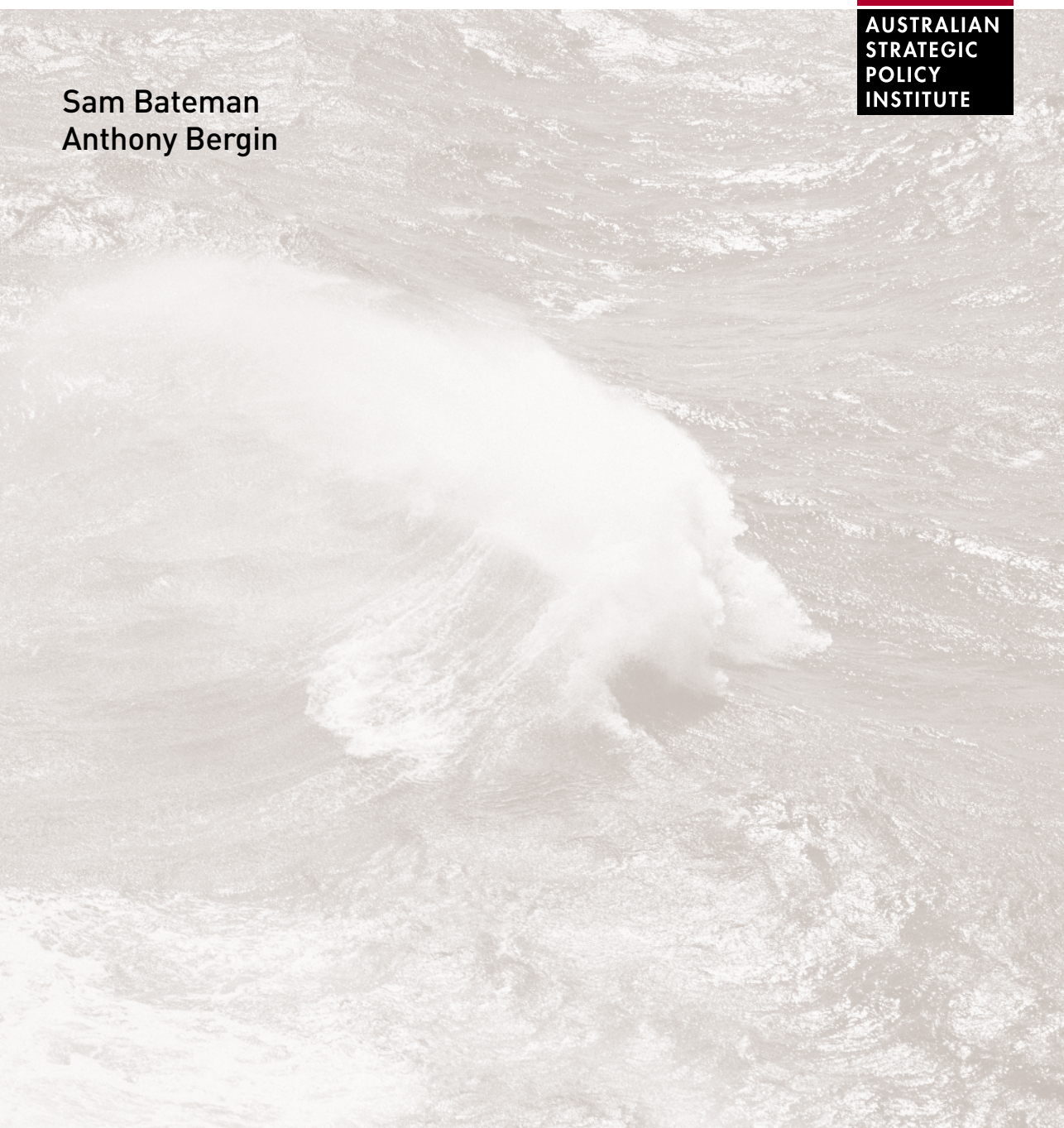

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KEY
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Area of Australia's exclusive economic zone as defined by the UN Convention on the Law of the Sea and certain treaties (not all in force).
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Notes: 1 nautical mile (M) = 1852m
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Executive Director's introduction

As an island continent Australia has significant national interests in the oceans. We have tended, however, not to appreciate the full strategic significance and economic importance of the oceans.

Australia lays claim to the third largest marine jurisdiction of any nation on earth.

Our maritime strategic interests comprise offshore island territories, our Antarctic territory, the sea–air gap and navigational rights and freedoms.

Shipping and seaborne trade are vital maritime interests for Australia.

Our maritime borders require enforcement in the face of unregulated people movement, illegal fishing, and the introduction of marine pests.

Australia's ocean industry sector contributes significantly to the national economy: a recent evaluation of Australia's maritime industries valued the ocean economy at $38 billion in 2006–07. Emerging new marine industries offer great economic potential.

Australia's oceans host some of the most important marine habitats in the world. We have a clear obligation to protect the environment of our marine jurisdiction and conserve its living resources, but at present we lack much of the scientific knowledge required to discharge this obligation effectively.

The oceans surrounding Australia hold the key to Australia's climate. The cycles of droughts and floods are controlled by ocean circulation patterns and their interaction with the atmosphere in the Indian, Pacific and Southern Oceans is critical. Seasonal climate predictions will improve as we gain a greater understanding of ocean processes.

This report examines the opportunities and challenges to advance Australia's security, political, economic and environmental interests by developing a more comprehensive approach to the oceans.

It argues that a more integrated approach will give Australia substantial national strategic benefits from our ocean territory and surrounding oceans and seas.

The authors, both leading experts on maritime policy, engaged in a wide range of stakeholder consultations with government marine agencies, the maritime industries, academia and the marine science research community. I am very grateful to all those individuals and organisations that shared their knowledge and expertise with the authors, and acknowledge in particular the assistance of Geoscience Australia in providing data and figures for this report.

Australia has not yet understood the importance of the oceans to our national wellbeing. This *Strategy* report makes an important contribution in assisting us to grasp the significance of maritime policy as a central issue for Australia's destiny in the twenty-first century.

Peter Abigail
Executive Director

Executive summary

Australia is a three-ocean country with a large stake in the management and security of the Indian, Pacific and Southern oceans, as well as the seas lying to our north—the Timor, Arafura and Coral seas. Geographically, we're potentially an oceanic superpower with one of the largest areas of maritime jurisdiction in the world. This is vitally important to our future prosperity and security. Managing our large maritime domain and ensuring our future maritime security are great challenges for Australia—they are complex, whole-of-government problems that won't be solved through conventional wisdom and traditional approaches.

This report explores the value of the oceans to Australia and the threats they now face. It includes recommendations on protecting and securing Australia's maritime interests, and what we might do regionally to foster cooperation across the Indo–Pacific region. Australia's future largely depends on how we act as a maritime power, but we need to do much more to realise the full potential of the oceans.

Despite Australia's large maritime domain and extensive maritime interests, it isn't yet a great maritime nation or maritime power. Australia has focused much more on continental concerns, particularly farming and mining, and paid scant attention to maritime issues; historically, we've left our maritime industry largely in foreign hands. On the credit side, however, we've put in place effective arrangements for maritime border protection, and have taken positive steps to confirm the limits of our area of maritime jurisdiction. We've also taken a leading role at the International Maritime Organization and in other international and regional forums to provide safer shipping and to protect the marine environment and conserve its living resources.

The development of international management and legal regimes for using the oceans has received much attention in recent years, leading to recognition that the interrelationship of ocean interests requires an integrated approach to oceans management. Climate change is now a major issue for the international community, although the role of the oceans in climate change has been underappreciated.

For the past twenty years or so, Australia has attempted to get its ocean management act together. Australia's Oceans Policy was released in 1998, but it hasn't achieved the high expectations originally set for it. It's now mainly an environmental policy focused on implementing a system of bioregional marine plans, although the necessary biophysical, social and economic knowledge those plans are based on is often deficient.

Responsibility for maritime security and managing our maritime interests is spread across national and state agencies. Marine scientific research is also conducted by several agencies. There's a strong requirement for effective interagency coordination. While much progress has been made in recent years, particularly with the coordination of civil maritime security through the Strategic Maritime Management Committee, our failure to achieve a truly integrated approach to oceans management shows that further measures are still required.

Our maritime interests are strategic, political, economic and environmental. Strategic interests comprise offshore island territories, the Australian Antarctic Territory, the sea–air gap, and navigational rights and freedom. Political interests include effective arrangements with the states and territories for managing our maritime domain and interests, and cooperation with our regional neighbours for oceans management and good order at sea. Economic interests are traditional marine industry, shipping and seaborne trade, and energy, as well as emerging new marine industries, such as wind and tidal energy, desalination, deep seabed mining, carbon capture and storage, and marine biotechnology. Environmental interests include a healthy marine environment, better marine scientific knowledge, more accurate hydrographic data, and oceans governance.

The oceans are a major physical resource for Australia. The exclusive economic zone (EEZ) and continental shelf offer large economic benefits, and so potentially, do the high seas under international regimes. We should give greater priority to exploring our economic opportunities in the oceans.

There are also direct and indirect threats and risks in the oceans, and they're increasing. Direct threats include maritime terrorism, illegal activity at sea, and illegal, unregulated and unreported (IUU) fishing. Indirect ones include food insecurity, energy insecurity, climate change, loss of marine biodiversity, marine pollution, ocean acidification, marine natural hazards, and the impact of the oceans on drought. Direct threats are evident today and are generally receiving attention, but indirect threats tend to be longer term and mightn't be getting the attention they deserve. We need more policy focus on the less immediate threats, including the interrelationship between climate change and the oceans. The potential consequences of the indirect threats and risks are very serious. Dealing with these threats and risks requires greater international cooperation and more concerted political action.

The oceans should figure prominently in Australian strategic thinking, but we've so far failed to fully grasp their strategic significance. In many ways, Australia creates an image of itself as an insecure nation still seeking security *against* rather than *with* the region. The promotion of Australia as a maritime power and a reliable maritime partner involves consideration of 'soft power', as well as 'hard power'. Most strategic thinking in Australia is locked into hard power, but the oceans offer us great potential to apply soft power and creative diplomacy.

Australia has a clear strategic interest in helping to build stability in the oceans and seas that surround it. This is one of the surest ways we can prevent threats to our security arising. We can do it by helping regional countries build their capacity to manage and protect their

maritime interests, but we need to be careful that our actions and statements don't add to regional maritime instability.

The conclusions and recommendations in this report concern what can be achieved at the national level, and possible initiatives to promote Australia's involvement in regional management of maritime issues. There are several priorities:

- First, Australia should do more to promote itself as a confident regional maritime power. We're moving to increase our hard maritime power, but we could also do more to demonstrate soft maritime power.
- Second, we need to develop a higher level of understanding and awareness of the oceans, including by increasing our efforts in marine science and technology.
- Third, we should adopt a more coordinated approach to oceans management and maritime affairs.
- Fourth, we need to work actively with our neighbours to promote a stable regional environment that addresses shared maritime concerns and will prevent the emergence of threats to Australia's future prosperity and security.
- Finally, we need to develop our national capacity for managing and protecting the oceans and our national interests.

Recommendations

Becoming a maritime power

Regional leadership

1. The post of Ambassador for the Oceans should be established to lead Australia's involvement in international and regional cooperation on oceans management.
2. Particular attention should be given to the Indian Ocean, which currently lacks effective forums for oceans management and the exploitation of marine resources. We should work closely with India and South Africa on this.
3. Discussions should be started with France, Papua New Guinea and Solomon Islands on the cooperative management of the Coral Sea to discharge joint responsibilities under the 1982 UN Convention on the Law of the Sea (UNCLOS) Part IX.
4. Australia should actively promote regional adherence to the key international conventions and agreements for providing good order at sea.

Cooperative fisheries management

5. A whole-of-government approach should be developed to deepen and broaden cooperative regional fisheries engagement. The approach should address the limitations of the regional fisheries management organisations, particularly by increasing Australian funding for science in those organisations.

Aid priorities

6. Australian priorities for providing assistance and aid to regional countries should recognise the strategic benefit of building capacity in maritime affairs, including for fisheries management and enforcement.

Maritime understanding and awareness

Marine science and technology

7. A national framework for marine science and research and development, including arrangements for private–public sector cooperation, should be developed through a new National Steering Committee for Marine Research and Innovation established within the Innovation, Industry, Science and Research portfolio.

8. Greater priority should be given to exploring the economic opportunities in the oceans, including support for emerging new marine industries, such as wind and tidal energy, desalination, deep seabed mining, carbon capture and storage, and marine biotechnology.

Marine environmental data

9. An Australian National Ocean Observatory should be established, building on the Integrated Marine Observing System initiative. The observatory would make real-time and virtual data available to researchers, industry and the public, and would help to promote awareness of the oceans and their resources.

Multidisciplinary research

10. Interdisciplinary research in oceans affairs should be encouraged. The review of National Research Priorities in 2009 should consider including one priority specifically related to the maritime domain.

Parliamentary Maritime Group

11. An all-party Maritime Group should be established in the Australian Parliament, comprising interested members of parliament and selected senior industry representatives.

Management arrangements

12. An Office of Oceans and Maritime Affairs (OOMA) should be established in the Department of the Prime Minister and Cabinet to provide central coordination of oceans and maritime policy.

13. The OOMA should be supported by a National Oceans Commission to provide high-level public–private sector advice on marine industry and oceans affairs. As an initial task, the commission might review national oceans policy, including the achievements and shortcomings of the existing policy, and the spectrum of emerging issues in the maritime domain that will affect Australia's national interest.

Regional maritime security

14. Australia should continue to play an active role in promoting regional maritime security, with a renewed focus on maritime confidence and security building measures and preventive diplomacy. Relevant measures might include greater transparency with naval budgets and new naval capabilities, as well as agreed processes for reducing the risks of 'intruder' submarine incidents.

15. Australia should take a leading role in promoting regional cooperation to deal with less immediate security threats, including climate change, rising sea levels, marine pollution and ocean acidification. Measures to deal with such threats should have priority in our international aid programs.

Infrastructure and capacity

National maritime infrastructure

16. The current study of the adequacy of Australia's infrastructure, by Infrastructure Australia, should address Australia's current and future maritime infrastructure needs by identifying significant weaknesses, highlighting commercial opportunities and recognising the importance of enhancing our understanding of our oceans.

Shipping

17. The benefits of coastal shipping, including intermodal aspects, require close attention in our future national infrastructure planning.

A national fleet

18. An independent study should be conducted of Australia's requirements for bluewater capabilities for maritime policing, patrol and scientific research. Naval war-fighting capabilities should not be included, but the study should take into account the Australian Defence Force's contribution to civil maritime tasks. The study should be sponsored by the Associate Secretary (National Security and International Policy) in the Department of Prime Minister and Cabinet, pending the establishment of the Office of Oceans and Maritime Affairs.

Human resources

19. Secondary education in maritime affairs should be promoted by Australian educational authorities and Australian marine industries. Dedicated 'Ocean High Schools' might also be considered.

Chapter 1

THE OCEANS—OUR FUTURE

The oceans are of great and growing importance to Australia. Australia is a three-ocean country with a large stake in the management and security of the Indian, Pacific and Southern oceans and the seas to our North—the Timor, Arafura and Coral seas. Those waters span a wide range of marine environments, from the cold Antarctic to the warm, tropical waters of the north. Eighty-five per cent of Australia's population lives on or near the coast.

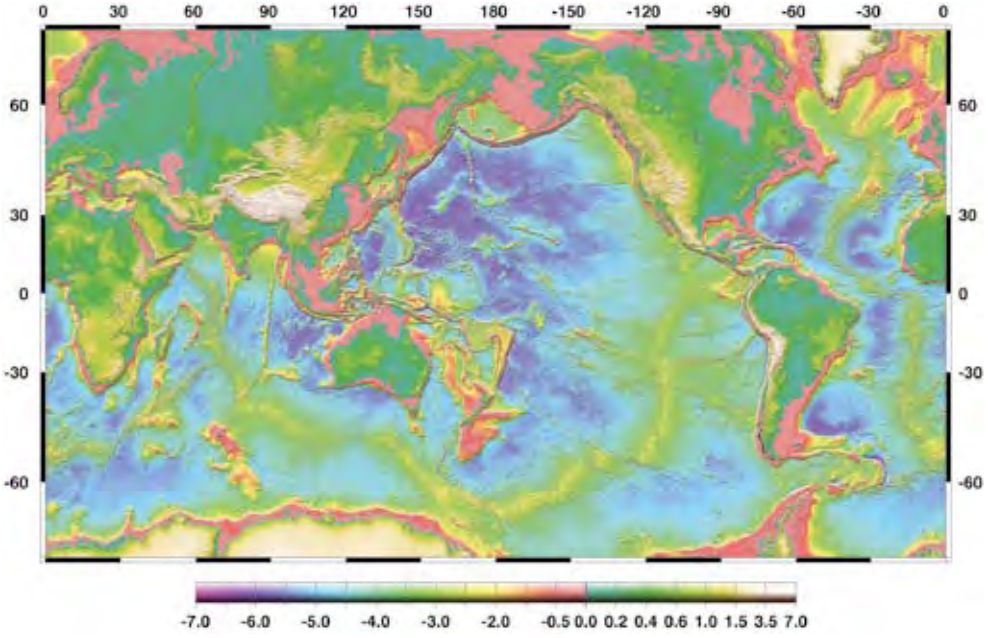
The importance of the oceans and their resources to our future prosperity and security requires greater emphasis at a time when there's increased concern over the health of the oceans, the depletion of fish stocks and global warming.

Australia has one of the largest maritime jurisdictions in the world. In geographical terms, we are an oceanic superpower. The importance of the oceans and their resources to our future prosperity and security requires greater emphasis at a time when there's increased concern over the health of the oceans, the depletion of fish stocks and global warming. Rather surprisingly, the Prime Minister's 2020 Forum in April 2008 gave scant consideration to these issues—the only direct reference to the maritime environment in the report of the Future Security and Prosperity 'stream' at the forum was to the need to 'assess Australia's maritime area to inform long-term management and planning'.

We sit at the heart of the Indo–Pacific region, where maritime problems are particularly acute (see Figure 1). Managing our huge maritime domain and playing a leading role in regional efforts to address the problems of the oceans and seas surrounding Australia are vital tasks. We have a clear responsibility to help regional countries, which are less well-equipped than we are, to deal with ocean issues. Discharging this responsibility is a key way Australia can assist in building a more stable regional security environment and prevent threats to Australia arising.

This report addresses major issues involved in fulfilling these tasks. Using an integrated approach to maritime affairs and a comprehensive concept of maritime security, it explores the value of the oceans to Australia and the threats they face. It includes recommendations on protecting and securing Australia's maritime interests, and what we might do regionally to foster cooperation across the Indo–Pacific region.

Figure 1: Australia's place in the world's oceans



Source: Global sea floor topography from satellite altimetry and ship depth soundings (Smith, Sandwell 1997)

Australia's maritime domain

Australia has declared an exclusive economic zone (EEZ) of 8.15 million square kilometres (km^2) around the continental land mass and island territories (see Figure 1 and Table 1)—the third largest EEZ in the world. The area of the zone increases to 10.19 million km^2 if the EEZ declared around the Australian Antarctic Territory (AAT) is included. The legal continental shelf off the continent and territories has an area of 10.71 million km^2 (or 12.75 million km^2, if the one around the AAT is included). On 9 April 2008, the Commission on the Limits of the Continental Shelf adopted recommendations that confirmed the location of the outer limit of Australia's continental shelf in nine distinct marine regions. This decision gives Australia jurisdiction over an additional 2.56 million km^2 of continental shelf that extends beyond 200 nautical miles from its territorial sea baseline (excluding a possible 0.68 million km^2 of extended continental shelf from the AAT). These figures mean that the maritime domain

Table 1: Australia's global jurisdiction

	Square kilometres (millions)
Territorial sea (12 nm)	
Continent + island territories	0.68
Australian Antarctic Territory	0.17
Total	0.85
Exclusive economic zone	
Continent + island territories	8.15
Australian Antarctic Territory	2.04
Total	10.19
Continental shelf (includes EEZ)	
Continent + island territories	10.71
Australian Antarctic Territory	2.04
Total	12.75
To be compared with:	
Australia's continental landmass	7.69
Australia's Antarctic Territory landmass	5.90
Total landmass	13.59
Australia's total global jurisdiction	27.19

Notes
1. The figures for the EEZ and continental shelf include the contiguous zone.
2. The continental shelf areas are as confirmed by the Commission on the Limits of the Continental Shelf. Australia has requested the commission not to consider the area of continental shelf beyond 200 nm around the Australian Antarctic Territory for the time being.
3. The area of territorial sea does not include internal waters lying inside territorial sea baselines.

Source: Geoscience Australia

over which Australia has some jurisdiction is nearly twice the area of the continental landmass of Australia.

When Australia's claim to the AAT landmass is included, Australia becomes the country with the largest jurisdictional claim to an area of the earth's surface—around 27.2 million km^2, of which about half is over ocean or sea.[1] In other words, Australia has jurisdictional responsibility for over 5% of the earth's surface—and nearly 4% of the planet's ocean areas. The AAT is nearly one-half of our land territory but, even without that area, Australia would still rank second (after Russia) in terms of the area of the earth's surface under some form of national jurisdiction.

This large area of global jurisdiction makes Australia an oceanic and environmental superpower. However, as this report points out, we are not doing enough to protect and manage our large maritime domain and adjacent oceans. Australia, as a nation-state, has continually failed to appreciate the importance of the oceans to its national wellbeing and security.

Australia's coastline is about 60,000 kilometres long—almost as long as the coastline of Europe. With 85% of the nation's population living within 50 kilometres of the coast, our coastal marine environment requires careful stewardship. We gain security from having no land borders with any other country, but we still face an immense problem in preventing illegal entry to our shores, preventing illegal exploitation of our marine resources, and securing the sea–air gap between us and our neighbours. The problem is further accentuated

by the need to provide similar protection for our offshore island territories, the AAT, and the resources in the sea around them.

From a marine scientist's point of view, Australia's maritime domain is extremely complex. It encompasses all five of the world's oceanic temperature zones, from tropical (25–31°C) in the north to polar (–2 to 5°C) in Antarctica. As a result of this range of temperature zones, along with Australia's geographical and evolutionary isolation, our maritime domain has globally unique features, such as the Great Barrier Reef, and extensive biodiversity. Furthermore, the maritime domain includes not just the water column, but also the seabed and the subsoil beneath.

Australia also has obligations in areas of the high seas well beyond our maritime zones of jurisdiction.

Australia also has obligations in areas of the high seas well beyond our maritime zones of jurisdiction. We manage a large search and rescue region in which we have responsibility for the safety of people in distress. This area is equivalent to about one-ninth of the earth's surface and extends well into the Indian Ocean and south to the Antarctic continent (see Figure 2). It is also the area where Australia, under recommendations by the International Maritime Organization (IMO), is the 'Security Forces Authority', which should initiate action in response to an international security incident.

Maritime jurisdiction

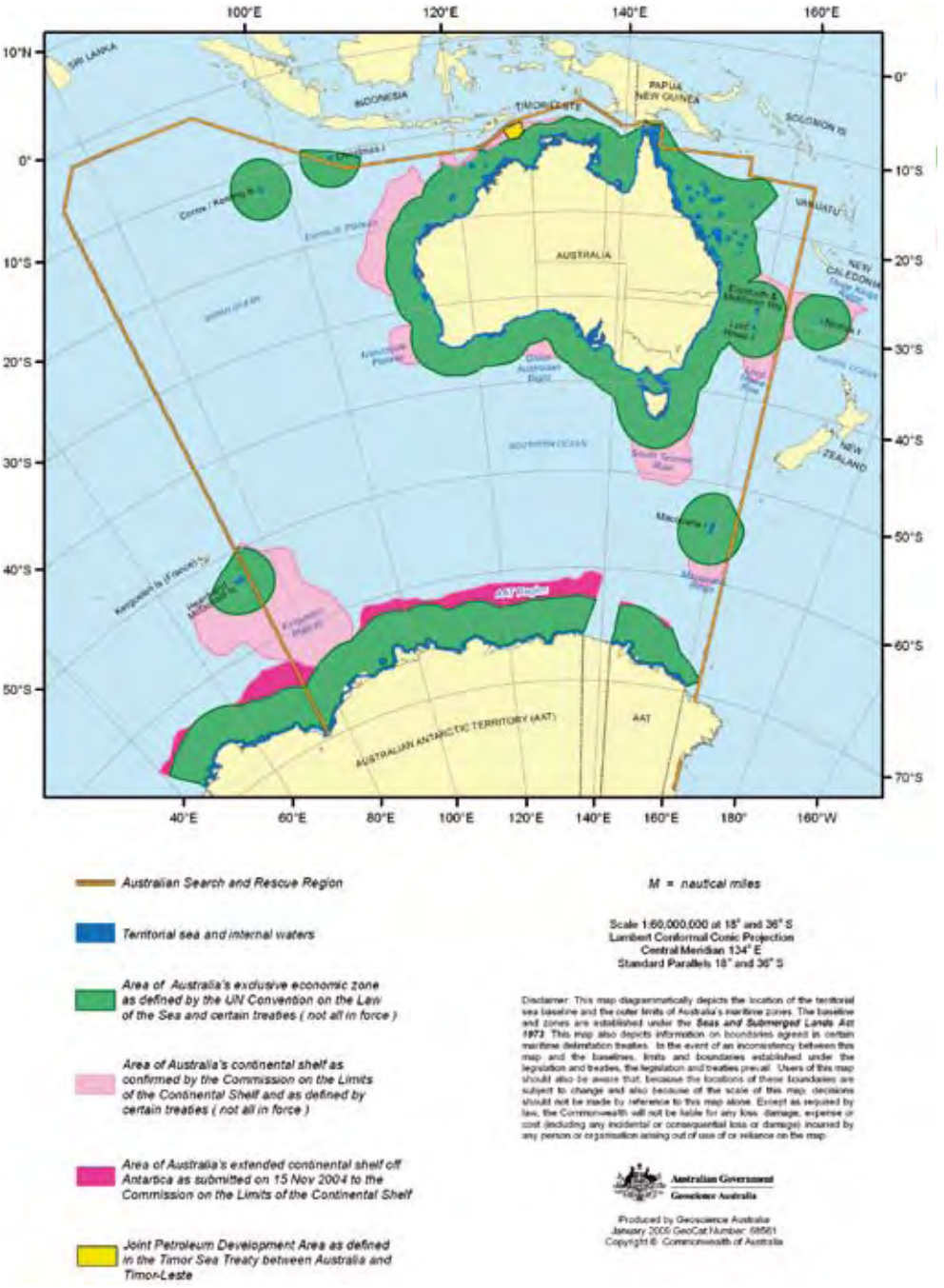
The 1982 UN Convention on the Law of the Sea (UNCLOS) provides the rules and principles for jurisdiction at sea. The separate zones that make up Australia's area of maritime jurisdiction are all measured from territorial sea baselines (see Figure 3 and box). We have full sovereignty over internal waters and the territorial sea, but only limited sovereign rights, as well as obligations, in other zones.

Australia's federal system of government complicates maritime jurisdiction. In the early 1970s, the High Court upheld the Commonwealth's assertion of sovereignty over the (then) three-mile territorial sea against a challenge by the states. Subsequently, however, Canberra and the states came to a series of arrangements in 1982, known as the Offshore Constitutional Settlement (OCS).

Under the OCS, the states and the Northern Territory are given title to 'coastal waters', which consist of all waters landward of the 3 nm limit (see Figure 3). The OCS made clear that when the territorial sea was extended to 12 nm (as subsequently happened in 1990), the OCS arrangements would continue to apply only to the 3 nm limit. The OCS also includes cooperative arrangements for the management of resources offshore and for marine environmental protection, such as managing an oil spill in coastal waters. Over the years, and as we've seen most recently with maritime security arrangements, the Commonwealth has progressively assumed greater powers over activities in the entire maritime domain.

While coastal states have greater rights under UNCLOS in their littoral waters, they also have increased responsibilities. UNCLOS Article 192 establishes the general obligation of countries

Figure 2: Australia's maritime jurisdiction



Source: Geoscience Australia

to protect and preserve the marine environment, while other articles in the convention set out obligations in particular zones, as well as an obligation to cooperate on a global and regional basis on the management of oceans and seas.

The Timor, Arafura and Coral seas are semi-enclosed seas under UNCLOS Part IX, which places an obligation on countries bordering enclosed and semi-enclosed seas to cooperate on resource management, the protection of the marine environment and marine scientific

Maritime zones of jurisdiction

Internal waters—the waters lying on the landward side of territorial sea baselines drawn in accordance with UNCLOS. The coastal state exercises full sovereignty over internal waters.

Territorial sea—the outer limit of the territorial sea may extend no more than 12 nm seaward of the baseline. A state has sovereignty over the territorial sea, with one qualification—it must allow the right of innocent passage to foreign vessels.

Archipelagic waters—These are the waters within archipelagic baselines drawn in accordance with Article 47 of UNCLOS. Archipelagic waters come under the full sovereignty of the archipelagic state with the exceptions of the rights of innocent passage, and that archipelagic sea lanes passage be allowed for foreign ships and aircraft. Fiji, Indonesia, the Maldives, Papua New Guinea, the Philippines, Solomon Islands and Vanuatu are all archipelagic states within Australia's region.

Contiguous zone—a zone contiguous to the territorial sea but not extending more than 24 nm from the territorial sea baseline. Coastal states may exercise controls in this zone to prevent infringements of their customs, fiscal, immigration or sanitary (quarantine) laws and regulations within their territorial sea or to punish infringements of such laws and regulations committed within the territorial sea.

Straits used for international navigation—a special regime applies when a strait used for international navigation is wholly or partly within the territorial sea of one or more states. The regime of 'straits transit passage' allows a right of passage through the strait to all ships and aircraft. This regime applies to Torres and Bass straits.

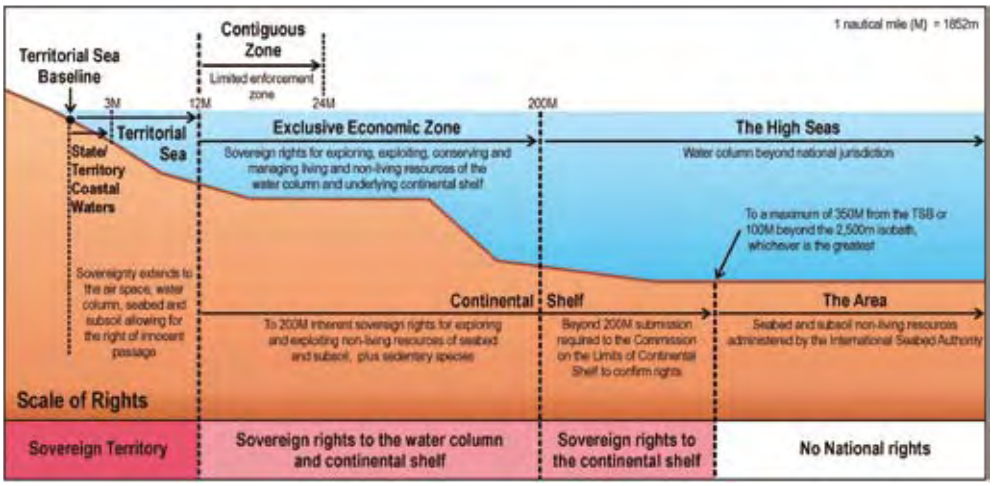
Exclusive economic zone (EEZ)—an area, adjacent to the territorial sea, which cannot extend more than 200 nm from territorial sea baselines. In the EEZ, coastal states have sovereign rights for the purpose of exploiting, conserving and managing living and non-living resources. Coastal states also have jurisdiction in the EEZ in relation to artificial islands, installations and structures; marine scientific research; and the protection and preservation of the marine environment.

Continental shelf—the seabed and subsoil of the submarine areas adjacent to the territorial sea of a coastal state. Ordinarily, the continental shelf cannot extend beyond 200 nm, but where the coastal state has a long continental margin the legal continental shelf may extend up to 350 nm from the territorial sea baseline. The coastal state has sovereign rights over the non-living resources and sedentary living resources on its continental shelf.

High seas—all parts of the sea that are not included within the EEZ, territorial sea, internal waters or archipelagic waters of any state. No state may validly purport to subject any part of the high seas to its sovereignty.

research. However, the opening sentence of UNCLOS Article 123 also sets a more general obligation to cooperate, which might be interpreted as possibly including security and safety. While embryonic arrangements for cooperation in the Timor and Arafura seas are in place through the Arafura and Timor Sea Experts Forum,[2] nothing has yet been done for the Coral Sea. Like most parts of Australia's maritime domain, marine scientific knowledge of these areas is poor.

Figure 3: Australia's maritime zones



Source: © Commonwealth of Australia 2008 (Geoscience Australia)

Maritime power is a country's ability to use the sea to promote its national interests—economic, political, strategic and environmental.

A maritime power?

Maritime power is a country's ability to use the sea to promote its national interests—economic, political, strategic and environmental. It has both 'hard' and 'soft' dimensions. Parameters of maritime power might include the country's seaborne trade, the size of the national merchant marine, domestic shipbuilding output, the economic significance of marine industry, naval power, exploitation of offshore resources, the size of maritime jurisdiction and the length of coastline. Less measurably, it includes the requisite knowledge and expertise to manage surrounding oceans and contribute to regional cooperative efforts.

As well as in physical attributes, power might also be considered in terms of behaviour and influence. Therefore, Australia's maritime power should also encompass our ability to influence maritime events and their outcomes in the oceans and seas surrounding Australia. Not only should we be seen to be a maritime power, but we should also act as one.

Despite being a large island continent, Australia has not been a strong maritime or naval power. Australia has focused much more on continental concerns, particularly farming and mining, and paid scant attention to maritime issues. As an Australian naval historian once noted, the Australian landmass is 'so spacious that its inhabitants are inclined to acquire an outlook deceptively continental; placed on the map in its immense context of ocean, it displays its true insularity' (McGuire 1948).

There are now indications that we might be moving to increase our 'hard' maritime power (Franklin 2008), but the 'soft' power dimension also requires attention. The National Security Statement made by the Prime Minister in December 2008 claimed that Australia's 'soft power' assets are significant (Commonwealth of Australia 2008, p. 28). This might be true generally, but it is not so for the maritime domain where our power and influence are underdeveloped.

Australians use the sea for recreation—swimming, sailing and fishing—and are 'addicted' to the beach, but we don't think of ourselves as a 'maritime' people. A persistently insular outlook has inhibited the development of an understanding of the oceans and the opportunities they hold. We lack a great naval tradition. Historically, we've left our maritime industries, such as shipping (including associated activities, such as stevedoring and towage) and fishing, largely in the hands of foreigners. As a consequence, the maritime infrastructure needed to support our oceans management responsibilities and expanding marine industries is underdeveloped.

The Australian economy was driven by primary industry from the earliest days of colonial settlement, and more recently by mining, another terrestrial industry. Australia is a land-based mining country with relatively little appreciation of the mineral potential of the deep seabed. The mining industry even opposed Australia's ratification of UNCLOS for fear that seabed mining might unfairly compete with terrestrial mining. Australia hasn't conducted significant research into deep seabed mining and couldn't qualify as a pioneer investor under the deep seabed regime in Part XI of UNCLOS. With the long-term depletion of land-based resources, we may yet pay the price for this inaction.

On the credit side, however, Australia takes a leading role at the International Maritime Organization and in other international and regional forums to provide safer shipping, protect the marine environment and conserve its living resources. This is a reflection of our heavy requirement for international shipping, public concern for a healthy marine environment, and our stewardship of a large maritime domain that includes significant marine ecosystems, particularly the Great Barrier Reef, that attract great community interest.

Chapter 2

MANAGING OUR OCEANS

The Independent World Commission on the Oceans in its 1998 report, *The ocean—our future* (the Soares Report, IWCO 1998) described how the oceans are the setting of major problems, including territorial disputes that threaten peace and security, global climate change, illegal fishing, habitat destruction, species extinction, pollution, drug smuggling, substandard ships, illegal migration, piracy and the disruption of coastal communities. These problems are all evident in Australia's region.

The decade since the Soares Report has seen two major developments with the oceans. First, governments have paid more attention to maritime security since the terrorist attacks of 11 September 2001. With the introduction of the International Ship and Port Facility Security Code by the International Maritime Organization, maritime security has taken on a broader and more civilian dimension. New agencies have been established to manage maritime security, placing an additional premium on the need for effective interagency coordination in dealing with maritime affairs.

Second, awareness of the importance of the oceans and their resources and of the risks they face has grown. Climate change is now a major issue for the international community, although the role of the oceans in climate change has been underappreciated. The oceans directly affect climate and, in turn, they're directly affected by climate change.

Integrated oceans management

The development of management and legal regimes for using the oceans has received much attention in recent years. This is a result of the expansion of economic activities at sea, growing concern over the health of the world's oceans, excessive fishing, tensions between different uses of coastal and sea areas (such as for shipping, ports, aquaculture, fishing and tourism), and the emergence of the idea of

ecologically sustainable development, which treats all natural environments as interacting systems. Contemporary issues in international oceans management are covered in the annual reports of the UN Secretary-General to the General Assembly on Oceans and the Law of the Sea,[3] while particular matters are addressed through annual meetings of the UN Open-ended Informal Consultative Process on Oceans and the Law of the Sea.[4] The UN General Assembly has also set up the Ad hoc Open-ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction.[5] Management of the 64% of the world's oceans that lie beyond national jurisdiction is a major issue to be resolved in coming decades

Unfortunately, although the problems are well known, increased attention to international oceans management so far has been largely rhetorical and has produced few specific outcomes. While the Soares Report identified management of the world's oceans as one of the great challenges facing the international community, 9/11 and its aftermath have diverted attention away from that priority. The Soares Report has not had the same impact as previous notable World Commission reports, such as the 1982 Palme report on security (*Common security: a blueprint for survival*) or the 1987 Brundtland report on sustainable development (*Our common future*).

It's now recognised that managing oceans on a sectoral basis (with each industry sector and ocean-user 'doing its own thing') is dysfunctional, with 'a tyranny of small decisions'.

It's now accepted that managing oceans on a sectoral basis (with each industry sector and ocean-user 'doing its own thing') is dysfunctional, with 'a tyranny of small decisions'. This is recognised in the preamble to UNCLOS, which states that the problems of ocean space are closely interrelated and need to be considered as a whole. The sectoral approach doesn't acknowledge the interconnectedness of ocean uses and submerges conflicts of interest that can emerge, particularly basic tensions between wealth-creation interests (or economic uses) and marine environmental protection. Resolution of these problems requires an integrated approach.

Major implications for maritime security result from an integrated approach to oceans management. Measures for dealing with one threat in the maritime environment require consideration of their potential impact on other threats and maritime interests. For example, marine environmental protection can have impacts on other maritime interests, such as freedoms of navigation. The management of Indonesian traditional fishing in northwestern Australia is another example of how oceans management and security concerns intersect.

Increased environmental awareness of the oceans and of the pressure on the stocks of marine living resources, along with greater concern for ship safety and the avoidance of ship-sourced marine pollution, has led to increased regulation of the oceans and marine activities. There are more international conventions designed to promote good order at sea and mitigate threats now than there were twenty years ago. National legislation covering maritime space and uses has increased accordingly. International regulation of activities on the high seas has increased, so that the traditional freedom of the high seas is now a qualified one.

Countries and regions around the world are paying more attention to their ocean interests. The European Union has recently launched *An ocean of opportunity: an integrated maritime policy for the European Union* (European Communities 2008), with the objective of enhancing European capacity to create optimal conditions for the sustainable use of the oceans and sea, and enable the growth of maritime sectors and coastal regions. The policy recognises the fundamental importance of marine science, technology and research, and includes the cooperative Marine Observation and Data Network as an important tool for implementing the policy. In the US, the report of the Commission on the Oceans, *An ocean blueprint for the 21st century*, in December 2004 led to the establishment of the secretarial-level Committee on Ocean Policy within the Executive Office of the President to develop and implement a new national oceans policy. Canada issued the policy paper *Canada's oceans strategy: our oceans, our future* in 2002.

In the Asia–Pacific region, the Seoul Oceans Declaration was agreed by Asia-Pacific Economic Cooperation (APEC) maritime-related ministers in April 2002. The declaration covered recommendations on marine environmental protection and integrated coastal management and set the direction for future work by APEC.[6] The Ocean Policy Research Foundation of Japan has recently launched an initiative to build a network of maritime policy think tanks in East Asia, but no institution in Australia has so far been invited to join that network. ASEAN has recently decided to establish the ASEAN Maritime Forum to promote maritime cooperation within the ASEAN community.

Australia's oceans policy

From the mid-1980s, Australia has attempted to get its ocean act together and adopt a more integrated approach to oceans management. The 1988 *Oceans of wealth?* report provided a comprehensive review of Australia's research activities in marine science and technology and of the industrial and commercial opportunities available (Commonwealth of Australia 1989). The report noted that much of Australia's future is tied up with the sea and that there was a need for a national plan to provide better interaction between marine science and industry and enhanced coordination across government agencies. In 1993, the Minister for Science and Small Business commissioned the Review of Marine Research Organisations, which recommended the establishment of the Australian Marine Industries and Sciences Council, charged with developing an oceans management policy (McKinnon 1993).

Coincident with the entry into force of UNCLOS, the Ocean Outlook Congress was held in Canberra on 16–17 November 1994 to bring together stakeholders in Australia's oceans and draw attention to Australia's rights and obligations under the convention. The congress was followed in 1995 by *Australia's ocean age: science and technology for managing our ocean territory*, a report prepared by an independent working group for the Prime Minister's Science and Engineering Council. The key recommendation from the report was that the overall policy framework for Australia's oceans and seas should be reviewed and that options for providing an overarching policy should be identified. Prime Minister Paul Keating subsequently announced that the Australian Government had agreed to develop a coordinated policy for the management of Australia's marine resources, and that this work would be conducted through the Department of the Prime Minister and Cabinet. However, after a change of government in March 1996, the Howard government assigned responsibility for the policy to the then Department of Environment, Sport and Territories.

After comprehensive public consultation, *Australia's Oceans Policy* was released by Senator Robert Hill, the Minister for the Environment, in December 1998 (Commonwealth of Australia 1998). It was a brave attempt at whole-of-government strategic planning for the oceans. While the main focus was on EEZ management, the policy also addressed Australia's interests in the high seas and maritime aspects of our relations with our neighbours. The policy sought to integrate sectoral and jurisdictional interests with an ecosystem-based management approach and new institutions and implementation methods. It was supported by the *Marine Industry Development Strategy*, developed by the Australian Marine Industries and Sciences Council (Commonwealth of Australia 1997), and *Australia's Marine Science and Technology Plan* (Commonwealth of Australia 1999).

Australia's Oceans Policy was initially hailed as a milestone in oceans management, but unfortunately the high expectations for the policy weren't realised.

Australia's Oceans Policy was initially hailed as a milestone in oceans management, but unfortunately the high expectations for the policy weren't realised. Institutional barriers have prevented integration across jurisdictions and sectors, and some key institutional arrangements introduced to implement the policy have been dismantled. Rather than reflecting an integrated approach to the oceans, Australia's Oceans Policy is now mainly an environmental policy focused on implementing a system of bioregional marine plans, which are being developed often without the necessary biophysical, social and economic knowledge. This process reflects the portfolio perspective of the Department of the Environment, Water, Heritage and the Arts, rather than the original objective of a multiple-use planning and whole-of-government approach.

Bioregional marine plans are being developed in five marine regions—the South-west, North, North-west, East and South-east—under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Each region is divided into bioregions (areas that contain geographically distinct groupings of plants and animals), including a network of 'marine protected areas'. The policy is implemented by first identifying the conservation values and key ecological features of each bioregion, along with related risks and threats, and then establishing the need for particular marine protected areas. Subsequent development proposals for each region can then be tested against the regional plan under the provisions of the EPBC Act.

There are several reasons why Australia's Oceans Policy has not achieved its original objectives, and they are instructive as we look to the future:

- The policy was rather idealistic and possibly beyond what was realistically achievable with the available political will at the national and state levels.
- It encountered institutional barriers within the Australian Government. Departments were given no extra resources to support the Oceans Policy and were reluctant to concede any part of their ocean-related responsibilities to the National Oceans Office, which had been established to implement the oceans policy.
- The states and the Northern Territory were reluctant to support the policy.

- The policy met with some opposition from industry sectors—fishing, ports and shipping, oil and gas—which thought the policy ignored certain commercial realities.
- There was opposition to the National Oceans Office and its activities within the Environment portfolio itself, where there were concerns about the independence of the office.
- As implementation of the policy progressed, it became clear that Australia lacked the capacity to collect, analyse and communicate the biophysical, social and economic data required to achieve the high ideals originally expected of the policy.

The goals for Australia's Oceans Policy (see box) remain valid today, although the policy is now only a guide for marine environmental management. The first goal—'to exercise and protect Australia's rights and jurisdiction over offshore areas, including offshore resources'—reflects the fundamental importance of the maritime security objective to protect Australia's sovereignty and sovereign rights at sea.

Goals for Australia's oceans

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.

Source: Australia's Oceans Policy (Commonwealth of Australia 1998)

Current organisational arrangements

Responsibility for maritime security and managing Australian maritime interests is spread widely between national and state agencies. Currently, twenty-one Australian Government agencies are responsible for some aspect of oceans management and maritime security (see box). The adoption of a broader concept of maritime security has led to more agencies being involved, placing a greater premium on the need for interagency coordination. However, there remains no one department or agency concerned with coordinating a whole-of-government approach to managing the maritime domain.

National agencies involved with oceans affairs

The **Department of the Prime Minister and Cabinet** coordinates government administration, including the work of the Strategic Maritime Management Committee, and manages governmental relations and communications with state and territory governments.

The **Department of Foreign Affairs and Trade** (DFAT) is responsible for policy related to the international law of the sea, regional maritime security cooperation and for treaties with other countries, including maritime boundary agreements. DFAT chairs a Regional Maritime Security Cooperation Inter-departmental Committee providing whole-of-government visibility to Australia's regional maritime security activity.

The **Attorney-General's Department** coordinates national security and crisis management arrangements and provides legal and policy advice on a range of maritime issues.

The **Australian Defence Force** (ADF) is the major supplier of Australian Government resources for maritime security. Efforts to streamline the Defence contribution to offshore security were implemented in July 2006, with the consolidation of several separate operations for countering unauthorised arrivals, illegal fishing and smuggling, and for patrols in southern waters and around offshore installations into one mission—Operation RESOLUTE, directed by the Border Protection Command (BPC).

The **Australian Customs and Border Protection Service** (ACBPS, previously known as the Australian Customs Service) is responsible for maritime border protection. The Customs National Marine Unit has grown over the years in size and responsibilities, and includes a number of chartered vessels manned by civilian crews and Customs officers. Coastwatch, a branch of the ACBPS, is controlled by the Director-General Coastwatch, who is a Royal Australian Navy (RAN) two-star officer who also serves as Commander of the BPC.

The **Border Protection Command** (BPC) was established in 2005 as the Joint Offshore Protection Command. A joint organisation of the ADF and the ACBPS, the BPC coordinates the aerial surveillance program and surface response operations when required by 'client' agencies, develops intelligence systems for maritime surveillance and enforcement, and manages the Australian Maritime Identification System.

The **Office of Transport Security** in the Department of Infrastructure, Transport, Regional Development and Local Government is the principal security regulator for maritime industry, including for the implementation of the International Ship and Port Facility Security Code by Australian ports and shipping, and for the offshore oil and gas industry. Its responsibilities include making security risk assessments of ships sailing towards Australian ports.

The **Australian Federal Police** (AFP) is responsible for Commonwealth law enforcement, often in conjunction with state police forces. The AFP may be involved in the prosecution of offences against Commonwealth law in virtually all areas of maritime jurisdiction, such as fisheries, navigation, marine environmental protection, and illegal importation.

The **Australian Fisheries Management Authority** manages Australian and licensed foreign fishing within the Australian Fishing Zone under policies administered by the **Department of Agriculture, Fisheries and Forestry**. The authority takes enforcement action against illegal fishing by foreigners and nationals.

The Department of Agriculture, Fisheries and Forestry has carriage of Australia's engagement in regional and international fisheries forums.

The **Australian Quarantine and Inspection Service**, a division of the Department of Agriculture, Fisheries and Forestry, is responsible for preventing the spread of exotic diseases through imports of infected insect, animal or vegetable material. Its responsibilities include national arrangements for the management of ballast water and introduced marine pests.

The **Australian Maritime Safety Authority** is responsible for shipping safety and the prevention of ship-sourced pollution in Australian waters. This includes implementation of port state control measures in Australian ports. The authority provides maritime safety services in Australia and Australia's allocated area of search and rescue (SAR) responsibility, including SAR operations for vessels in distress and for aircraft at sea through Australian Search and Rescue (AusSAR).

The **Department of Resources, Energy and Tourism** is responsible for the safety and security of offshore oil and gas installations. The **National Offshore Petroleum Safety Authority**, a statutory agency of the department, administers offshore petroleum safety legislation and includes a national oil spill recovery capability.

The **Department of the Environment, Water, Heritage and the Arts** (DEWHA) is responsible for oceans management and for preserving ecosystems in Australian waters, including the establishment of marine parks and marine protected areas and implementing the EPBC Act in marine areas. This includes portfolio responsibility for the Great Barrier Reef Marine Park Authority, as well as for the Australian Antarctic Division.

The **Department of Infrastructure, Transport, Regional Development and Local Government** develops policy to support and enhance shipping services and ports, including international shipping and liability and compensation for maritime incidents.

The **Department of Immigration and Citizenship** manages entry programs and the entry of individuals into Australia. It takes enforcement action against people smuggling and alleged illegal immigrants, including their removal to appropriate accommodation.

The **Department of Innovation, Industry, Science and Research** has portfolio responsibilities for the Commonwealth-funded marine research institutions and the Cooperative Research Centre (CRC) Program. It is also responsible for enhancing the long-term sustainability and international competitiveness of the Australian marine industries.

The **Australian Antarctic Division** is part of DEWHA with responsibility for managing Australia's interests in the Antarctic, including possible security threats.

The **Bureau of Meteorology** is an executive agency within DEWHA. It provides meteorological and oceanographic services in response to Australia's needs and international obligations.

The **Department of Climate Change** is responsible for managing the potential impacts and costs of climate change on Australia's industries, environment, people and infrastructure, including the ocean impacts.

The **Department of Education, Employment and Workplace Relations** has responsibility for human resource development for oceans management, marine industry and marine science.

A high-level coordinated approach to domestic civil maritime security is provided through the Strategic Maritime Management Committee (SMMC). The Department of the Prime Minister and Cabinet leads the SMMC, which was established in early 2006 and consists of agencies with maritime security interests. The committee provides strategic direction for Australia's civil maritime security, overseeing and guiding the development and implementation of policy on a range of threats, particularly illegal fishing, people smuggling and terrorism. It oversees civil maritime domain awareness and regularly assesses threats to civil maritime security within our EEZ.

The SMMC provides for coordination between Australian Government agencies. However, it is concerned only with border protection and illegal activity that's human initiated, and not with threats that arise from natural processes, including climate change, or with oceans management. There are other possible problems with the approach of the SMMC. There is no simple definition of 'civil maritime security', including the extent to which it might involve maritime safety, search and rescue (SAR) and the mitigation of marine natural hazards. With its heavy emphasis on *civil* maritime security, the committee perpetuates the schism between civil and military dimensions of maritime security, including in the important areas of intelligence, surveillance and patrol.

Good science is fundamental to effective oceans management, but there are currently no arrangements for setting priorities for marine science and research and development.

Good science is fundamental to effective oceans management, but there are currently no arrangements for setting priorities for marine science and research and development (R&D). Responsibility for marine scientific and technological research is spread across several departments and agencies. The Australian Government funds three large research institutions involved in marine scientific and technological research—the Commonwealth Scientific and Industrial Research Organisation (CSIRO), Geoscience Australia and the Australian Institute of Marine Science (AIMS). Some agencies listed in the box also include a marine research capability, either integrally or as a separate entity within the portfolio (for example, the Australian Antarctic Division, the Defence Science and Technology Organisation, and the Bureau of Rural Sciences). There is no one-stop shop for marine science and technology in Australia.

Some coordination of marine R&D in Australia is provided by the Oceans Policy Scientific and Advisory Group as the peak marine science advisory body to the Australian Government. Its role includes the promotion of coordination among marine science agencies and across the broader marine science community.[7] It was established to support the National Oceans Advisory Group to advise the government on the development and implementation of national oceans policy. However, following the scaling back of oceans policy, both groups have to some extent lost their way. Each marine scientific research institution sets its own agenda. There's an urgent need to establish a properly coordinated and agreed framework for marine science, R&D, infrastructure and training in Australia.

The states and the Northern Territory are also involved in maritime security and oceans management. All have in place integrated arrangements for managing their coastal zones, including offshore areas to the limit of their jurisdictions. They all maintain environmental, maritime transport and fisheries agencies as well as water police elements, although the capabilities vary from one jurisdiction to another. Some also maintain a marine scientific and technological research facility.

A significant rationalisation of maritime safety regulation is underway. The nation's transport ministers have agreed to recommend to the Council of Australian Governments that, subject to regulatory impact assessments, a single national system of maritime safety regulation, administered by the Australian Maritime Safety Authority, be established. Currently, Australia has more than fifty pieces of legislation and subordinate legislative instruments pertaining to maritime safety, along with eight independent maritime safety agencies.

All jurisdictions maintain fisheries agencies. Given that total fishery management costs in Australia are around $95–100 million per year, there could be cost and fisheries management advantages if state fisheries agencies were amalgamated under a federal minister, with regional offices. Currently, there are fifty-five current OCS arrangements related to fisheries, involving all states.[8]

An ocean blueprint?

The destiny of Australia is inextricably linked with how we conduct ourselves as a maritime power. Managing our large maritime domain and ensuring our future maritime security pose a great challenge. It's perhaps one of the greatest challenges for public policy in Australia, but it remains seriously underappreciated. It requires a comprehensive approach to maritime security that recognises the interconnectedness of oceanic threats to Australia, both traditional and non-traditional.

Unfortunately, and as these two opening chapters show, our record in providing greater integration and managing a whole-of-government approach to the oceans isn't brilliant. The recent National Security Statement noted that the arrangements inherited by the Rudd government for border management lacked unified control and direction and a single point of accountability (Commonwealth of Australia 2008, p. 22). While this observation related specifically to border management, it is also true of oceans management more generally.

The complex whole-of-government problems involved will not be solved through conventional wisdom and traditional ways of doing business. Relevant issues cut across state and national jurisdictions, are the responsibility of numerous government agencies, and involve the interests of the various sectors of industry that either use the sea or exploit its resources. There's a strong requirement for effective interagency coordination and clear dividing lines of responsibility without duplication or overlap. While a lot of progress has been made in recent years, particularly with the coordination of the civil maritime dimension of national security through the SMMC, the failure to achieve a truly integrated approach to oceans management shows that further hard thinking is required.

Chapter 3

OCEANS OF WEALTH

Australia has extensive maritime interests and opportunities in the oceans to our east, west and south and in the seas to our north. Potentially these are 'oceans of wealth' for Australia, but our ability to exploit their opportunities has been inhibited over the years by an insular outlook, a relatively small population, a small resource base and lack of knowledge.

Our maritime interests can be categorised as strategic, political, economic and environmental:

- Strategic maritime interests are those that are instrumental in providing a degree of security for Australia and our national interests. However, that security might also come at a cost and involve vulnerabilities.
- Political interests are both national and international. They include effective national arrangements for managing our maritime domain, as well as effective regional and international regimes for oceans governance and cooperation in managing the oceans around Australia and their resources.
- Economic interests are ones that bring economic benefit to Australia either now or potentially in the future.
- Environmental interests reflect our stewardship of a large maritime domain and our responsibilities for preserving and protecting the marine environment and conserving its living resources.

Strategic interests

Island territories

Australia possesses a number of mainly remote island territories in the Pacific, Indian and Southern oceans (see Table 2). They differ markedly in size and economic and political significance. Australia's sovereignty over these islands has not been challenged. While some

Table 2: Australia's offshore island territories

Territory	Location	Population	Resources	Strategic factors
Christmas Island	Indian Ocean 1,565 km northwest of Northwest Cape	1,400	Phosphate.	Airfield. Poor harbour. Proximity to Java.
Cocos (Keeling) Islands	Indian Ocean 3,700 km west of Darwin and 900 km southwest of Christmas Island	596	Large EEZ.	Airfield. Good anchorage. No developed port facility.
Ashmore and Cartier Islands	Indian Ocean 840 km west of Darwin	Nil	Nil	Poor anchorage. Proximity to Timor.
Coral Sea Islands Territory	Coral Sea 560 km east of Cairns	3–4	Nil	Includes numerous widespread reef systems
Heard Island and McDonald Islands	Southern Ocean 4,100 m southwest of Perth	Nil	Large EEZ and continental shelf. World Heritage site.	No anchorage. Landing difficult.
Norfolk Island	Tasman Sea 1,500 km east of Brisbane	2,114	Large EEZ.	Airfield. No harbour.
Lord Howe Island	Tasman Sea 600 km east of Port Macquarie	350	World Heritage site.	Airfield. Poor harbour.
Macquarie Island	Southern Ocean 1,500 km south-southeast of Tasmania	20	Large EEZ and continental shelf. World Heritage Site.	No harbour. Poor anchorage.

Note: Lord Howe Island and Macquarie Island are politically parts of New South Wales and Tasmania respectively.

concern has been expressed in Indonesia about our control of Ashmore and Cartier Islands, the Indonesian Government accepted Australian sovereignty when negotiating boundary agreements with Australia in the Timor Sea.

The island territories bring both costs and benefits. They generate large EEZs, as well as continental shelves that extend in some cases beyond 200 nm. Some have significant strategic value, as they are near Australian sea lines of communication and offer airstrips from which Australia can project its maritime surveillance and patrol capabilities. However, Cocos and Christmas islands, the more strategically important of the island territories, could be difficult to resupply and defend in time of conflict.

Antarctica

Australia claims about 42% of the Antarctic continent as the Australian Antarctic Territory (AAT), but this territorial claim is not widely recognised. Most states are silent on the question. The strategic and scientific value of the AAT to Australia is important. Three permanent bases are maintained at Casey, Davis and Mawson and an airstrip allowing direct flights from Australia was opened recently at Casey. An EEZ around the AAT was declared in 1994, and a claim to an extended continental shelf was part of Australia's submission to the Commission on the Limits of the Continental Shelf although the Commission agreed to Australia's request not to consider the Antarctic data for the time being. The AAT is vast—approximately the size of Australia without Queensland.

Australia's claim to sovereignty over the AAT is based mainly on various acts of discovery. However, there are doubts over whether subsequent activities have been sufficient to establish effective occupation, particularly as other nations have established bases in the AAT and Australia hasn't sought to extend Australian law to non-nationals within the territory. While the AAT is not universally recognised, no state actually disputes Australian sovereignty and, unlike some other claimants, we aren't subject to any counterclaims.

Activities in Antarctica and its surrounding seas are governed by the Antarctic Treaty. Australia was one of twelve original parties, including the seven claimant states, to the treaty which entered into force in 1961. The treaty is not well supported by countries in Australia's region: New Zealand is a claimant state, Japan is an original signatory, and China, India and South Korea have become consultative parties.* Under the treaty, military activities are prohibited in the treaty area, although military personnel may be used in a support role.

The Antarctic Treaty system has developed over the years. As well as the Antarctic Treaty itself, it now includes the Convention on the Conservation of Antarctic Seals, the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) and the 1991 Protocol on Environmental Protection to the Antarctic Treaty (the Madrid Protocol). The protocol recognises Antarctica as the last great wilderness on earth. Among regional countries, only China, India, Japan and South Korea are members of CCAMLR and parties to the Madrid Protocol. Vanuatu is a contracting party to CCAMLR.

The resources of the Antarctic and the Southern Ocean have considerable potential value, and Australia should have a significant stake in their commercial exploitation.

The resources of the Antarctic and the Southern Ocean have considerable potential value, and Australia should have a significant stake in their commercial exploitation. While we've moved to protect the living resources in the EEZs off the sub-Antarctic islands, there's been little research and no exploitation of the resources of the EEZ off the AAT. Many believe that these constitute a huge, largely untapped, source of food. Similarly, there's been little research of the mineral resources of Australia's claimed continental shelf in the Antarctic and Southern Ocean, and the ADF appears to have lost interest in an ability to operate there (Bergin and Haward 2007). Australia's Antarctic budget of $100 million per year has been static for some years, and hence reducing in real terms.

Sea–air gap

Australia gains considerable security from the sea–air gap between us and our nearest neighbours. The ability to exercise sea control in the maritime approaches to Australia will always be a strategic priority. Maritime boundaries have been agreed between Australia, our offshore territories and all our neighbours—Indonesia, Papua New Guinea, Solomon Islands, France (in the Coral Sea and in the Southern Ocean) and New Zealand, although the 1997 Perth Treaty with Indonesia is not yet in force. Maritime boundaries are also required in Antarctica with France, New Zealand and Norway, but no attempt has been made to delimit them. The Joint Petroleum Development Area established in 2002 with East Timor in the Timor Sea allows for the rich hydrocarbon resources of the area to be shared 90%–10% in favour of East Timor.

***Correction 13 September 2012:** An earlier version of this paper incorrectly stated that '.... both Koreas and Papua New Guinea have become consultative parties.'

The sea–air gap has effectively quarantined Australia from a wide range of exotic diseases and pests. The absence of land borders with neighbouring countries has rendered control of access to Australia relatively easy, but the long coastline and the distances involved make maritime border protection a demanding task. While northern Australia is the focus of maritime surveillance and patrol operations, illegal incursions have also occurred in southern areas. These waters, as well as those around our island territories, cannot be neglected.

Navigational rights and freedoms

Australia has a strong interest in freedoms of navigation and overflight. Invariably, we have sided with the major maritime powers to oppose any restrictions on navigational rights and freedoms under UNCLOS and customary international law. Increasing concern for the maritime environment has shifted the balance in the international law of the sea against traditional freedoms of navigation.

Australia is ringed by archipelagos from the northwest through to the northeast. The most important shipping routes to and from Australia pass through them, particularly the Indonesian archipelago and Papua New Guinea. It has been estimated that in 2004–05, 39% of Australia's exports by value (50% by weight) and 39% of imports by value (41% by weight) passed through the archipelagic sea lanes designated by Indonesia (BTRE 2007). The UNCLOS regime of archipelagic sea lanes passage guarantees rights of navigation and overflight through and over the archipelagic waters of an archipelagic state. It is extremely important to Australia, both for military mobility and for the free movement of trade.

Political interests

Federal–state relations

Good federal–state relations are a fundamental prerequisite of effective oceans management in Australia. Public policy for the oceans is more complicated in a federal system of government, particularly when, as in Australia, the states have some jurisdiction at sea. The OCS was established to deal with this split jurisdiction, although over time the Commonwealth has assumed greater powers over offshore activities. The problems in implementing Australia's Oceans Policy, as originally conceived, show that federal–state relations can still hamper effective arrangements for oceans management in Australia.

Oceans governance

Australia has a large stake in the management of adjacent oceans and seas. Current arrangements include the following:

- For the seas to our north and northwest, Australia participates in the Coordinating Body on the Seas of East Asia, which is currently focusing on marine and land-based pollution, coastal and marine habitat conservation and management, and response to coastal disasters.
- In the Asia–Pacific region generally, ocean-related matters are addressed through various APEC working groups and APEC's Secure Trade in the Asia–Pacific initiative (STAR).
- The Coral Reef Initiative (CTI), which includes Indonesia, Philippines, PNG, Solomon Islands, East Timor and Malaysia, addresses sustainable development, food security and marine biodiversity concerns in the CTI area (Australia is a 'development partner' in CTI).
- A range of regional fisheries management organisations (RFMOs) in the Indian and Pacific oceans, which establish principles and rules for managing marine living resources and their ecosystems.

- In the South and Central Pacific, including the Coral and Arafura seas, Australia participates in the Pacific Regional Environment Programme (SPREP), which is one of the most active of the United Nations Environment Programme's regional seas programs, reflecting the strong common interest of Pacific island countries in marine environmental protection. It has been reasonably successful in implementing global norms at a regional level.
- In the Southern Ocean, CCAMLR and the Madrid Protocol both establish principles related to oceans management. The Australia–France Southern Ocean Agreement provides for cooperative enforcement activities against IUU fishing.

We need to have cooperative management arrangements in place to provide effective governance for the oceans and seas around Australia. However, no currently established body deals with the Indian Ocean, and the Coral Sea lacks a multilateral process that reflects the responsibilities of bordering countries under UNCLOS Part IX.

Good order at sea

Australia has a clear interest in ensuring that good order prevails in the oceans and seas around Australia. This places a premium on regional cooperation and adherence to the various international regimes that have been established to provide good order at sea.

Good order at sea permits the free flow of seaborne trade and ensures that nations can pursue their maritime interests and develop their marine resources in an ecologically sustainable and peaceful manner in accordance with agreed principles of international law.[9] A breakdown in good order at sea is evident where there is unregulated pollution of the marine environment or IUU fishing, or if other illegal activity occurs at sea. Illegal activity might include piracy; maritime terrorism; maritime theft and fraud; people smuggling; the shipment of drugs, arms, protected animal and plant species, certain toxic materials and nuclear wastes; and the dumping of environmentally harmful and hazardous substances banned under international agreements.

International regimes

All regimes for good order at sea are based on the framework provided by UNCLOS. They include regimes for shipping, fishing, seabed mining, marine environmental protection, sea dumping, the prevention of ship-sourced pollution, search and rescue, and so on. Relevant international law is derived from UNCLOS, other international conventions, soft law and customary international law. Recent decades have seen a proliferation of international instruments related to good order at sea, and Australia has often played a leading role in their development. However, we might not have always matched our rhetoric in promoting new regimes with our actions in ensuring their implementation. Key international conventions that help establish good order at sea are shown in the box.

Table 3 shows the current state of ratification of key conventions by countries in Australia's region. All are parties to UNCLOS except Cambodia and Thailand, but there are still major gaps in the level of ratification of the other important conventions. Only about one-third of regional countries are parties to the SAR Convention. The 1988 SUA Convention has not been ratified by Indonesia, Malaysia, Thailand and some other regional countries. Only four countries, all in Oceania, have ratified SUA 2005. While the UNFSA is relatively well supported in Oceania and the Indian Ocean, it hasn't yet been ratified by any Southeast Asian country. Only the SOLAS and MARPOL conventions have been ratified by most regional countries, although some of their key protocols and annexes have not been.

Key international conventions for good order at sea

UNCLOS. The 1982 UN Convention on the Law of the Sea provides the broad principles for oceans governance and the framework for other international regimes and treaties.

SOLAS Convention. The 1974 Safety of Life at Sea Convention deals with the safety and security of merchant ships, and includes the International Ship and Port Facility Security Code.

MARPOL Convention. The International Convention for the Prevention of Pollution from Ships, 1973, as modified by a 1978 protocol (MARPOL 73/78), has the objective of preventing the pollution of the marine environment by ships.

SAR Convention. The 1979 Convention on Maritime Search and Rescue encourages cooperation between parties and SAR organisations in SAR operations at sea.

SUA Convention. The 1988 Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation, and its protocol covering offshore facilities, extends coastal state enforcement jurisdiction against acts of violence at sea beyond territorial limits.

SUA 2005. The SUA 2005 Convention brings together the 1988 Convention and its 2005 Protocol to create new measures related to maritime terrorism and shipment of weapons of mass destruction.

UNFSA. The 2001 UN Agreement for the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks establishes principles for the management and conservation of fish stocks (such as tuna and Patagonian toothfish) that straddle or migrate across national EEZs and high seas.

There's a need for greater attention to these conventions in regional countries. There might be scope for Australia to play a more active role in promoting the benefits of ratification.

There's a need for greater attention to these conventions in regional countries. There might be scope for Australia to play a more active role in promoting the benefits of ratification. We already assist in this regard in the Pacific island countries through our support for the Regional Maritime Programme of the Secretariat of the Pacific Community. The lack of adherence to the SAR Convention is a particular worry. As well as some lack of legal capacity in the smaller countries, the failure to ratify a particular convention is sometimes due to a concern that ratification could lead to some loss of sovereignty and independence, as well as imposing an additional administrative burden on already overstretched bureaucracies. To overcome this, greater awareness of the benefits of ratification is required, as well as acceptance of the principle that the sum of mutual benefits outweighs any perceived individual costs. There's also a need to strengthen administrative capacity in marine affairs in these countries—something Australia is well placed to offer.

Table 3: Status of key conventions and agreements for good order at sea							
	UNCLOS	SOLAS	MARPOL	SAR	SUA 88	SUA 05	UNFSA
SE ASIA							
Brunei	X	X(a)	X(a)		X		
Cambodia		X	X(a)				
Indonesia	X	X(a)	X(a)				
Malaysia	X	X(a)	X(a)				
Myanmar	X	X(a)	X(a)		X		
Philippines	X	X(a)	X(a)		X		
Singapore	X	X	X	X	X		
Thailand		X(a)	X(a)				
Vietnam	X	X	X(a)	X	X		
OCEANIA							
Australia	X	X	X	X	X		X
Cook Islands	X	X(a)	X(a)	X	X	X	X
Fiji	X	X			X	X	X
Federated States of Micronesia	X				X		
Kiribati	X	X	X	X	X		X
Marshall Is	X	X	X		X	X	X
Nauru	X				X		X
New Zealand	X	X	X(a)	X	X		X
Palau	X				X		X
Papua New Guinea	X	X(a)	X(a)	X			X
Samoa	X	X	X	X	X		X
Solomon Is	X	X(a)	X(a)				X
Tonga	X	X	X	X	X		X
Tuvalu	X	X	X		X		
Vanuatu	X	X	X	X	X	X	
INDIAN OCEAN							
Bangladesh	X	X(a)	X		X		
India	X	X	X(a)	X	X		X
Maldives	X	X(a)	X(a)				X
Mauritius	X	X(a)	X(a)	X	X		X
Seychelles	X	X	X(a)		X		X
Sri Lanka	X	X(a)	X(a)		X		

X = Convention has been ratified.
X(a) = Not all protocols and annexes to the convention have been ratified.

Sources: International Maritime Organization and UN Division for Ocean Affairs and the Law of the Sea web pages

Economic interests

Marine industry

Australia's marine industries make a vital contribution to the Australian economy and society, both directly through production of goods and services and employment, and indirectly by stimulating production and employment in other sectors. They contribute at least

4% of gross domestic product, and the marine sector is growing faster than other sectors. It has grown by 42% since 2000 and was conservatively valued at $38 billion in 2006–07 (see Table 4). From 2001–02 to 2006–07, marine industry output grew by an average of 7.23% per year, largely due to the expansion of the offshore oil and gas industry, which is Australia's largest marine industry and a key source of export earnings. The output of the fishing industry (comprising both wild capture fisheries and marine-based aquaculture, but excluding recreational fishing) fell over the period. In 2006–07 the gross value of production increased by 2% in nominal terms to $2.18 billion, although it fell by 1% in real terms. Since 1999–2000, the real gross value of fisheries production has fallen by 26%.

However, there's potential to further develop the marine aquaculture industry. It now accounts for about one-third of the gross value of Australia's fisheries production; in 2006–07, the value of Australian aquaculture was $823 million, but it's really Australia's 'Cinderella' ocean resource industry (see box).

Table 4: Marine industry value of output, 2001–02 to 2006–07 ($ million)

Industry sector	2001–02	2006–07	Rate of growth p.a.
Fishing	2,805.3	2,095.5	–5.67
Offshore oil and gas	8,629.9	17,215.1	14.81
Boat/ship services	(a)	5,204.8	5.27
Marine tourism and recreation	11,353.6	13,493.6	3.51
Total	**26,814.8**	**38,008.9**	**7.23**

(a) Due to a change in industry classification, 2006–07 data is not compatible with earlier years

Source: Adapted from AIMS Index of Marine Industry*, 2008*

Climate change will increasingly affect Australian fisheries and aquaculture over coming decades. A recent CSIRO review identified likely significant impacts on the biological, economic and social aspects of Australian fisheries, but found that there's little consolidated knowledge of the potential impacts of climate change. Both positive and negative impacts are expected, and they'll vary according to changes in the regional environment. The report also noted the need for fisheries and aquaculture management policies to better integrate the effects of climate variability and climate change in establishing harvest levels and developing future strategies (Hobday et al 2008).

There is potential for the development of emerging new marine industries, such as wind and tidal energy, desalination, deep seabed mining (mineral sands and potentially also mineral ores), carbon capture and storage, and marine biotechnology. With seabed mining, we're being left behind by our neighbours. For example, Papua New Guinea recently announced plans to extract copper, zinc and gold from the floor of the Bismarck Sea. Furthermore, there are opportunities within existing marine industries, such as in coastal and maritime engineering and the offshore oil and gas sector, to develop export opportunities, particularly through the application of Australia's skills and expertise.

Greater priority should be given to exploring the economic opportunities in the oceans. Inadequate attention to our knowledge requirements of the maritime domain has created a Catch-22 situation: in which we don't invest to overcome these knowledge deficiencies because we don't know what we have. The current recession and the need for economic stimulus might provide an opportunity to redress this situation.

Raising fish

Fishery yield is low in Australian waters—we rank fifty-third in the world in fishery landings. Wild fisheries won't meet the demand by Australian consumers, but, despite Australia's enormous oceanic area, we're one of the smallest producers of farmed seafood. Aquaculture has now developed globally to supply nearly 50% of seafood to the human food chain, and has the potential to meet estimated demand for an additional 40 million tonnes of aquatic food by 2030 to maintain the current per capita consumption.

There's an urgent national need to examine our marine environment as a major supplier of food. Massive efficiency gains are possible in aquatic farming. Yield per unit of surface area from aquaculture greatly exceeds that of terrestrial farming, although there are environmental and production problems still to be resolved. The environmental impact of aquaculture is less than the impact of terrestrial farming, although potential negative impacts include the introduction of pests and diseases and damage to natural species from the translocation of farmed fish.

However, there's no lack of seawater in the marine environment, no progressive increase in salinity due to irrigation, no loss of irreplaceable topsoil by erosion, and a limited requirement for fertilisers.

Imports of seafood into Australia will soon be supplying 70% of domestic demand. The increasing production deficit hasn't been addressed by Australian governments. The US Government is expediting the establishment of aquaculture in waters under its jurisdiction, between 3 and 200 nm offshore, to address its current seafood trade deficit of US$8 billion.

Australian governments' support in aquaculture has been too tightly focused on environmental impacts. This has led to near zero growth in Australian aquaculture production. We should open more state and federal maritime leases for sea-cage aquaculture development and coordinate regulatory agencies to streamline permit processing.

There's also a need to rationalise the current fragmented government research effort into a small number of national aquaculture research centres to achieve critical mass.

Shipping and seaborne trade

Shipping and seaborne trade are vital maritime interests for Australia. In 2005–06 Australia's international maritime trade was worth $249 billion. The balance between overseas trade carried by sea and that carried by air (see Table 5) has changed little over the past thirty years since wide-bodied jet aircraft entered service. However, in recent years there has been a marginal increase in the maritime share, by both value and weight (BTRE 2007). This trend might continue if the international aviation industry continues to face difficulties, and further transfer of freight from air to sea occurs.

Australia's seaborne trade stands to increase significantly as part of the general pattern of growth in seaborne trade, and as some domestic trade shifts back to sea as a consequence of environmental concerns with road transport and some foreign trade moves back to

sea. Seaborne trade and the world shipping fleet have generally grown over the years at a significantly higher rate than world output. For example, global shipping volumes doubled between 1985 and 2007, and the container sector is expected to triple from 2000 to 2020. However, international shipping is now in recession, and this projection is likely to be revised downwards.

Although shipping is a source of air pollution and carbon dioxide emissions, it is considerably more energy efficient than road transport; for example, domestic shipping is about six times more energy efficient than trucks (ABARE 2008). Greater use of shipping for interstate freight would help reduce both the number of trucks on our roads and Australia's emissions of greenhouse gases.

However, shipping services have a major disadvantage. They can't provide a door-to-door service for shippers, and road transport has to be used to move cargoes to and from sea terminals, some of which are within suburban areas of our major cities. The development of maritime infrastructure to support shipping, especially port infrastructure, has fallen well behind the pace of economic growth in Australia, particularly the growth in mining industry.

Although the value of Australia's exports by sea is almost equal to the value of imports by sea, there's a marked difference between exports and imports by weight. Table 5 shows that exports by sea are almost nine times the weight of imports by sea. Most exports by weight are coal, iron ore and other minerals, and the bulk carriers to lift those cargoes mostly enter Australia in ballast. This explains Australia's interest in the management of ballast water to prevent the introduction of marine pests.

Table 5: Overseas trade, by mode of transport, 2004–05

	Inwards		Outwards	
By weight	**million tonnes**	**%**	**million tonnes**	**%**
Sea	69.9	99.4	610.6	99.95
Air	0.4	0.6	0.3	0.05
Total	**70.3**	**100.0**	**610.9**	**100.0**
	Inwards		**Outwards**	
By value	**$ billion**	**%**	**$billion**	**%**
Sea	108.9	70.7	106.3	80.8
Air	45.2	29.3	25.2	19.2
Total	**154.1**	**100.0**	**131.5**	**100.0**

Source: Bureau of Transport and Regional Economics, Australian Maritime Trade: 2000–01 to 2004–05, *Table 1.4*

National flag shipping fleet

The vast majority of Australia's seaborne trade is carried in foreign flag ships. According to the UN Conference on Trade and Development, there were 85 vessels in the Australian controlled shipping fleet at 1 January 2007, equivalent to about 0.29% of world shipping tonnage (UNCTAD 2007). By comparison, Australia accounts for about 10% of world seaborne trade (measured by tonne–mile). Of the Australian controlled vessels, 46 were under the Australian flag and 39 were registered overseas. However, it's difficult to get an accurate figure for Australian controlled ships under foreign flags—mainly 'flags of convenience'. Ownership is hard to pin down because Australian entities might own assets, charter vessels, participate in third party management arrangements, or own or charter a vessel for only a relatively short period. This is the multinational nature of the international shipping industry.

Whether a larger national flag shipping fleet would support Australia's security and defence interests has been much debated over the years. Proponents of a larger national fleet argue that having such a fleet would ensure that enough shipping and seafarers would be available for Australia's defence use in time of conflict. However, opponents argue that policies to increase the national fleet ignore the economic realities of international shipping and would lead to higher costs for Australian shippers. There may also be an argument that using foreign flag ships to carry Australia's seaborne trade could reduce the risks to that trade because it spreads the risks across other countries.

Energy

Australia is generally regarded as being self-sufficient in energy, with ample reserves of coal, oil, natural gas and uranium. The previous Prime Minister, John Howard, once described Australia as an 'energy superpower'. However, energy shortages could emerge in the longer term. Emissions trading schemes will affect energy usage, and pressure for energy from renewable sources will increase. Energy security has significant implications for maritime security. We're increasingly dependent on imports by sea of crude oil and refined petroleum products. Our level of self-sufficiency in oil and gas could fall from around the current level of about 60% to less than 20% by as early as 2015 (Richardson 2007), although there is petroleum potential in Australia's extended continental shelf areas. Less than 20% of prospective offshore basins are currently under licence.

As Australia's oil and gas energy security declines, the oceans surrounding Australia offer a wide range of alternative energy options, including renewable energy (such as wind, wave or tidal) and radical new forms of energy (such as algal-based biofuels).

Likely productive continental shelf areas include the Exmouth Plateau (the deepwater extension of Australia's premier hydrocarbon producing province, the Carnarvon Basin), the Wallaby Plateau (to the south of Exmouth Plateau), and the Naturaliste Plateau (a large submarine plateau off the southwestern tip of mainland Australia in depths of 1,700 to 4,000 metres). The area of extended continental shelf in the Great Australian Bight is considered by many as the best chance for a new oil province, and the south Tasman Rise region is a deepwater remote frontier. The closest offshore exploration acreage to the extended continental shelf area is around 500 to 800 kilometres further north in the Sorell Basin, along the western margin of Tasmania.[10]

While Australia is a net importer of crude oil and refined products, we're a net exporter of natural gas. Around 90% of recoverable reserves of natural gas are off the west and northwest coasts of Australia (ABARE 2008). Australia also has considerable gas resources in ocean areas deeper than 300 metres, which is the limit of exploitation with current technology. New subsea technology is needed to develop these fields cost effectively. With most of our offshore production in the northwest, the protection of offshore energy infrastructure (oil and gas rigs, floating storage facilities, pipelines) and onshore terminals is a vital concern for Australia.

As Australia's oil and gas energy security declines, the oceans surrounding Australia offer a wide range of alternative energy options, including renewable energy (such as wind, wave or tidal) and radical new forms of energy (such as algal-based biofuels). Renewable energy in Australia currently accounts for less than 5% of total energy consumption. Limiting factors in generating renewable energy are geography and climate.

Wave power is still under development and is not yet commercially viable. Recent research has also highlighted the potential for seabed-based methane hydrates to provide energy. The oceans are also large solar collectors, and solar arrays could be installed in virtually any coastal area sheltered from excessive wind or seas. Ocean thermal energy technology extracts energy using the temperature difference between the warm surface waters and the cooler deep layers of the ocean. Tidal energy has great potential, particularly in areas of northern Australia, where there are strong tidal streams and a large tidal range.

However, there are also problems with sourcing energy from the oceans:

- There are potential conflicts of interest with other ocean users.
- There are ecological impacts from the construction of facilities, and possible pollution.
- Political will and commitment are required to make the necessary investment in R&D.
- Surveillance and monitoring will be needed to maintain security around the large offshore facilities that will likely be required.
- There might be problems in reducing energy leakage along the chain from generation, through transfer, to end use.

Carbon capture and storage

Capturing carbon dioxide (CO_2) before it is emitted and storing it in the deep subsurface will help reduce the impact of our use of energy. Geological storage (geosequestration) involves capturing CO_2 from industrial processes, such as power generation, and injecting it deep underground for long-term storage in geological formations. This will prevent it entering the atmosphere and adding to the potential for climate change caused by greenhouse gases. Among the options being considered for storage of CO_2 are injecting it into depleted oil and gas fields, including those offshore.

The sub-seabed sequestration of CO_2 will enable countries to secure energy resources while addressing climate change by lowering greenhouse gas emissions from the use of fossil fuels.

On 12 November 2008, the Australian Parliament passed the *Offshore Petroleum Amendment (Greenhouse Gas Storage) Act 2008*, which gained royal assent on 21 November. This legislation amended the Offshore Petroleum Act 2006 to introduce a regulatory regime for the injection and storage of greenhouse gas substances in offshore areas in Commonwealth waters.

While there are a number of carbon capture and storage projects around the world, with this legislation Australia became the first country to establish a specific legislative framework for an offshore title system for the injection and storage of greenhouse gases in sub-seabed geological formations that also allows the continuation of other commercial activities, such as fishing and oil drilling (Senate Economics Committee 2008).

The legislation will allow Australia to offer the first carbon storage blocks for commercial development in early 2009, clearing the way for greenhouse gases collected from coal-fired power stations to be injected through the seabed and captured in geological formations

similar to those in which oil and gas are found. Only captured gases and substances from the emission source will be sequestered (that is, no other wastes will be included). The injected gas stream would be almost entirely CO_2, providing a safe way to allow continued carbon-based power generation with reduced impact on the environment. Geoscience Australia has identified numerous sites where greenhouse gases could be stored.

In Australia, one project is currently storing CO_2 underground. In western Victoria, the Cooperative Research Centre for Greenhouse Gas Technologies is injecting CO_2 into a depleted gas field in the Otway Basin. Other projects in the advanced stages of planning include the Gorgon project in Western Australia and the ZeroGen project in Queensland. The ZeroGen project will capture CO_2 from a power plant near Rockhampton, with subsequent storage in western Queensland.

Marine biodiscovery

Biodiscovery is the examination of biological resources (plants, animals, micro-organisms) for characteristics that might have wider application, commercial value, or both. Targets can be chemical compounds, genes and their products, whole organisms or, in some cases, the physical properties of the material in question. Biodiscovery aims to identify new materials or biologically active molecules that can be developed as drugs, insecticides, herbicides or industrial enzymes. Other products could have applications in bioremediation, sustainable farming and materials science.

Australia stands to gain not just economic benefits, but social, environmental and scientific benefits, from increased investment and legal certainty in biodiscovery. We're well positioned to capture opportunities presented by our vast and unique marine biodiversity, but current impediments make it difficult. The problems relate to legal and regulatory clarity and consistency, the extent and nature of data collections and networks, and taxonomic skill needs.

Australia is in the top echelon of biodiverse nations. We have a bountiful biodiversity—an astonishingly rich hub of terrestrial and marine plant and animal species, and a unique national treasure. Australia is one of only nineteen countries classed as 'mega-biodiverse' and, among those, one of only two in the developed world. Significantly, more than 80% of our species are found nowhere else—an extraordinarily high level of endemism. More species are being discovered and described almost daily, particularly in our marine estate, which remains largely unexplored. Currently, five marine-sourced metabolites are undergoing clinical tests globally; two from Western Australia are on the US Federal Register. This is an indication of the high hit-rate in Australian biodiscovery.

The opportunities are there. For example, biofuels from marine micro-organisms and algae is predicted to be the next major global industry, as the efficiency of growth and energy yield from the product is substantially higher than from crops. As a bonus, this form of production doesn't interfere with food supply.

A discovery program for our ocean domain is needed to take advantage of this new opportunity to build national wealth. We need to provide funding for early phases of marine biodiscovery: biodiversity samples are available for the range of living species, but no funds are accessible to curate them for discovery and carry out initial screening programs.

The Prime Minister's Science, Engineering and Innovation Council has made several useful recommendations on the key needs for biodiscovery in Australia, including improving

conditions for investment, benefit sharing and capacity building, and providing an action plan for harnessing Australia's vast natural resource (PMSEIC 2005). Unfortunately, those recommendations have not yet been acted on.

Marine environmental interests

A healthy marine environment

Australia has a huge interest in the preservation and protection of the rich biodiversity and the social amenity of Australia's coastal and marine environment. While Australia isn't currently a significant maritime power, the Australian public shows a strong community interest in a healthy marine environment. The Australian marine environment is relatively pristine and includes six marine areas on the World and National Heritage lists: the Great Barrier Reef, the Lord Howe Island group, Shark Bay, Fraser Island, Heard and McDonald Islands and Macquarie Island.[11] Several other areas, including Ningaloo Reef and the Kimberley region, are currently being assessed for heritage listing.

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The Australian Government and the state and territory governments are creating a national representative system of marine protected areas for the conservation of marine ecosystems that is scheduled for completion by 2012. There are now over 200 such areas in Australian waters, and it's expected that around 20% of Australia's EEZ will ultimately be protected within the national representative system. Shipping accidents in Australian waters—such as those involving the container ship, *Bunga Teratai Satu*, which ran aground off Cairns in 2000, and the *Pasha Bulker*, a large bulk carrier that grounded on Nobby's Beach near Newcastle in 2007—attract much publicity.

Understanding the marine environment

Oceanographic conditions vary enormously in the oceans around Australia. Much biological and oceanographic research conducted in the northern hemisphere is not relevant to our circumstances. Unique features of Australia's oceanic environment are associated with the Southern Ocean and its currents, which flow unimpeded around the world between Antarctica and Africa, South America and Australasia, and the fact that the Indian Ocean is closed off just north of the equator by the Asian landmass. These features have a large influence on global and regional weather and beg for a higher level of research than is conducted at present.

Several of the original goals identified for Australia's Oceans Policy related to understanding the oceans and ocean processes. This is a key maritime interest for Australia. Despite mounting pressures on the oceans from climate change, resource exploitation and other human impacts, Australia's marine scientific and technological research has languished in recent years after the enthusiasm of the 1990s.

Terrestrial research is the main focus of the CSIRO's activities. It's involved in over thirty joint venture projects with the private sector, but none appears to be associated with the marine environment or with a maritime activity. It is involved in thirty-seven CRCs but only two—the CRC for Coastal Zone, Estuary and Waterway Management and the CRC for Antarctic Climate and Ecosystems—have a direct link with the oceans. There are five CSIRO national research 'flagships', one of which, the Wealth from Oceans Flagship, is focused on marine research. Three new flagships are to be established in the areas of Climate Adaptation, Niche Manufacturing and Minerals Down Under. Despite its title, the last new flagship will be focused on developing technologies to exploit currently unprofitable terrestrial reserves of iron ore, nickel and heavy mineral sands.

On the credit side, AIMS is actively pursuing joint venture projects with the private sector. These include a large joint project with a consortium of liquefied natural gas (LNG) producers in the Browse Basin, with an industry contribution of at least $30 million over four years.

A drop in the ocean: critical gaps in marine science

There are critical gaps in our scientific knowledge and understanding of the marine environment:

- *Climate Change*. Understanding and monitoring the relationship between climate change and the oceans; and the impacts of sea-level rise, increasing sea temperatures, ocean acidification and extreme weather on biological systems and coastal areas.
- *Sustainable use of marine resources*. Discovering and exploring Australia's offshore mineral wealth; developing innovative ways of recovering offshore hydrocarbons and of exploiting sustainable sources of energy at sea; and estimating the magnitude of IUU fishing effort in the oceans around Australia.
- *Preserving marine biodiversity*. Most of Australia's marine environment is still unexplored, and the biological processes that sustain it are poorly understood.
- *Coastal zone development*. Understanding and monitoring the pressures on the marine coastal environment from urban growth, industrial development and land-based marine pollution.
- *Seafloor morphology*. We lack comprehensive knowledge of the seabed and subsoil of our maritime jurisdiction, but reliable bathymetric charts are essential to fulfil other critical gaps in our understanding of the marine environment.
- *Security and safety*. Effective defence, border security and safety of operations at sea require innovations in marine support systems and infrastructure. Comprehensive oceanographic knowledge of the marine environment is essential for many defence operations.
- *Coastal and ocean observing*. Australia lacks coordinated investment and ongoing support for the development and deployment of novel sensors, especially to measure and monitor biodiversity and for the collection and ongoing monitoring of biophysical and environmental marine data. The establishment of Australia's Integrated Marine Observing System (IMOS) addresses this need, but there should be a commitment to continue to invest in the further development of IMOS.

Current systemic weaknesses in the marine science and R&D sector include research vessel capability, long-term biophysical data, an integrated marine observing system, seafloor bathymetry, and high-performance supercomputing to link statistical analyses and modelling of ocean processes. A national framework for marine science and R&D is required to identify challenges in the maritime environment and establish research priorities.

Figure 4 shows Australia's very low research vessel capability, relative both to the size of our maritime domain and to the capabilities of other countries. We have only one vessel engaged full-time in bluewater research, and that vessel is old with substandard facilities and limited continental shelf capability. This is a sad reflection on the priority Australia attaches to researching and managing our maritime environment.

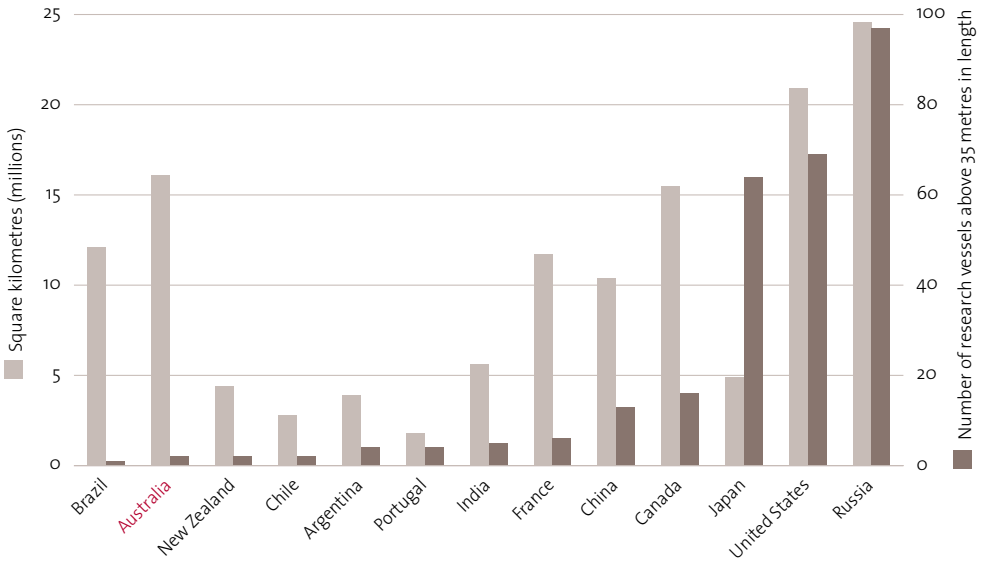
There's also a looming shortage in new marine science and geophysics graduates coming through the university system to satisfy existing and anticipated future demand. To some extent, this shortage is linked to student perceptions of a lack of opportunities in marine science.

Hydrographic data

Good hydrographic charts are essential for safe navigation, but also for planning the exploration and exploitation of marine resources, determining the seaward limits of national jurisdiction, coastal zone management, national development (including new ports and harbours), and the delimitation of maritime boundaries. The area of the earth's surface for which we have charting responsibility is huge, roughly equating to our SAR area of responsibility. Significant parts of Australia's maritime jurisdiction are still not adequately charted.

Requirements for hydrographic data have increased over the years. Deeper draught vessels, greater recognition of the need to protect the marine environment, new patterns

Figure 4: Comparison of research vessel capacity



Source: Compiled by Fred Stein, Marine National Facility, CSIRO Marine and Atmospheric Research. The base data was sourced from the International Research Vessel Operators Meeting website, http://www.researchvessels.org & Wikipedia in 2006.

of maritime trade, the growing importance of seabed resources, increased exploitation of offshore oil and gas, border protection in remote areas, and the new limits of national jurisdiction allowed under UNCLOS are all factors that highlight inadequacies in existing hydrographic knowledge.

Defence requirements

Comprehensive knowledge of the underwater domain is essential for effective submarine operations, antisubmarine warfare, mine warfare and mine countermeasures, amphibious operations and maritime domain awareness. Antisubmarine warfare systems (sensors, weapons and the means of integrating them) are ideally tailored to the specific oceanographic conditions of a particular area. For example, passive fixed and towed arrays that are well suited to the cold, deep and quiet waters of the North Atlantic are less suitable for waters north of Australia where very different oceanographic conditions exist. The need for oceanographic research to support military operations will increase in the future due to increased numbers of submarines in the region, and technological developments in sonar and other underwater systems.

Undersea capabilities are also important for countering the maritime terrorist threat. Relevant capabilities include minehunting, underwater surveillance of ports and port approaches, and harbour defence (sonar and underwater cameras). All these capabilities place a premium on the availability of comprehensive oceanographic data.

The RAN formed a partnership with the CSIRO and the Bureau of Meteorology in 2002 to establish Project *BLUElink*, an ocean forecasting system to provide information on temperature, salinity and currents. It's an important defence facility, but there's still much room for improvement, particularly in northern waters. The quality of the forecasts from *BLUElink* depend on data inputs and high-performance computer modelling, both of which the Oceans Policy Scientific and Advisory Group has identified as areas of deficiency in current capabilities.

See the value

Most attention in this chapter has focused on the sea as a medium for maritime activity and resource exploitation, but we can also look at the oceans around Australia as a resource in their own right—in the same way we tend to look at the terrestrial domain. The oceans are a strategic resource that both separates us from our neighbours and unites us with them through a range of common interests. Rather than seeing the sea–air gap only as a moat around Australia and focusing our efforts on border protection, we should also see the oceans as a key strategic interest that provides important opportunities for cooperation and building a more favourable regional strategic environment for Australia. Our area of strategic interest extends well into the Pacific and Indian oceans, as well as into Southeast Asia.

The oceans are also a major physical resource for Australia, offering large potential economic benefits from the EEZ and continental shelf, and potentially also from the high seas. Unfortunately, Australian industry has shown little interest so far in that potential. The large areas of Australia's maritime jurisdiction within the tropics, including ecosystems such as coral reefs and mangrove coasts, provide opportunities to acquire skills and information of direct utility both to us and to the economies of Southeast Asia, South Asia, and the small island states of the Indian and Pacific oceans. Despite this utility, our previous strong programs of regional collaboration in marine science and technology have withered in recent years.

Chapter 4

THREATS AND RISKS

Australia's maritime interests, including the great potential of the oceans and their importance for Australia's future prosperity and security, have been discussed but it is also necessary to consider threats and risks. Both are likely to increase significantly in the future, along with the value of the oceans to Australia. They're of great concern to Australia because of our large area of maritime jurisdiction and the obligations we've assumed in managing that area.

The threats and risks can be categorised as either direct or indirect. The direct ones, mainly involving illegal activity at sea, are clearly evident today and are generally receiving attention, while indirect ones are mainly environmental, tend to be longer term, and might not be getting the attention they deserve.

In a recent special report on the sea, *The Economist* drew attention to the serious oceanic threats confronting the international community, such as overfishing, ocean acidification and pollution (Grimond 2009). The report concluded that the oceans need much more research, an enhanced management approach that overcomes the 'tragedy of the commons', much greater international cooperation, and concerted political action.

Direct threats and risks

Maritime terrorism

The maritime sector is seen as vulnerable to terrorist attack due to the sector's economic importance and perceptions that it might offer 'soft' targets. Australia has introduced a comprehensive maritime security regime to deal with the threat of maritime terrorism. The main agencies involved are the Border Protection Command (BPC) and the Office of Transport Security.

The Australian Maritime Information System is a primary means for managing information and developing our awareness of activities

in our maritime domain. The aim is to identify all vessels coming towards Australia and to undertake risk assessments of them. However, small vessels, such as cruising yachts and fishing vessels, may escape the attention of the system.

Despite major improvements in recent years, possible weaknesses in current arrangements can still be identified. Most of them aren't applicable just to Australia, but are characteristic of international shipping generally. While international responses to the threat of maritime terrorism have been comprehensive, problems have arisen with the practical implementation of some new measures. New arrangements for seafarer identification and ship security alert systems are two such measures.

New seafarer identification documentation has been introduced through a revised Seafarers' Identity Documents Convention 2003. However, aspects of the convention are problematic; there are about 1.3 million international seafarers, and preventing fraudulent documentation is a huge task. Human rights issues must also be considered to ensure that seafarers have reasonable access to shore leave.

Ship security alert systems were introduced with the International Ship and Port Facility Security Code to provide a ship-to-shore security alert, but this system is largely ineffective because of long delays in an alert reaching a response authority and a large incidence of false alerts. Australia has tightened up visa requirements for foreign seafarers coming to Australia, but the problems with ship security alert systems remain outstanding.

Port security is of particular concern; some port authorities lack the capacity to fully secure the landside and waterside approaches to the port, and state police forces are not well enough resourced to provide adequate waterfront security.

In Australia, any weaknesses in these systems flow largely from our federal system of government and the division of responsibility between the Australian Government and the state governments. Port security is of particular concern; some port authorities lack the capacity to fully secure the landside and waterside approaches to the port, and state police forces are not well enough resourced to provide adequate waterfront security.

Illegal activity at sea

In addition to IUU fishing and environmental offences, which are dealt with separately in this chapter, the main forms of illegal activity at sea are piracy, robbery or violence at sea and trafficking in people, arms, weapons of mass destruction, drugs and other prohibited imports and exports. The sea is the main medium for the illegal movement of people and goods because larger shipments can be carried, covert transhipment may be possible at sea, and maritime borders may be more porous than land and air borders.

The BPC is the lead agency in Australia for responding to security incidents in Australia's maritime domain, including the detection and prevention of all forms of illegal activity at sea. The main focus of maritime border protection in Australia over the years has periodically shifted between drugs, people and illegal fishing. So far, acts of piracy and armed robbery at

sea have not occurred off Australia and are probably unlikely, although vessels bound to and from Australia through the archipelagos to our north may be at risk. An ongoing priority area of concern for Australia is possible compromises of biosecurity by the introduction of pests, diseases and viruses through the sea–air gap.

Cooperation with neighbouring countries is an important part of countering illegal activity at sea. The BPC liaises on operational matters with relevant government agencies in neighbouring countries, as well as with agencies in other regional countries with which we share common maritime security interests. Australia has developed whole-of-government efforts to prevent or disrupt security threats before they emerge. For example, the government has worked with Indonesia to establish the Bali Process to build regional cooperation to combat people smuggling and people trafficking.

IUU fishing has become a serious global problem. It is increasingly seen as one of the main obstacles to the achievement of sustainable world fisheries.

Illegal, unregulated and unreported fishing

IUU fishing has become a serious global problem. It is increasingly seen as one of the main obstacles to the achievement of sustainable world fisheries (High Seas Task Force 2006). Growing demand for seafood, particularly in Asia, and the industrial-scale exploitation of the seas are destroying global fish populations. Projections of the state of the world's oceans and the decline of fish stocks are no longer just environmental fear-mongering. They are real and firmly based in good science. It's not going too far to say that regional stability is threatened by declining fish stocks.

IUU fishing losses are borne particularly by developing countries, many of which are in Australia's region of influence and depend on fisheries for food, livelihoods and revenue. The state of tuna stocks, particularly of southern bluefin tuna, is of particular concern to Australia. We need to ensure that the Pacific island countries gain appropriate benefits from fishing in their waters.

A recent paper has reviewed Australia's fisheries relations with Southeast Asia (Willams 2007). The study identified problems of overcapacity (that is, too many fishers and fishing vessels relative to the sustainable catch); overlapping and weak regional fisheries management organisations (RFMOs); a lack of scientific data on crucial issues such as the status of stocks; and a tendency to give most emphasis to short-term commercial returns.

The problems are not unique to Southeast Asia. Similar difficulties might also be observed with our fisheries links in the Indian and Pacific oceans. Fisheries in the oceans and seas around Australia are served by a plethora of regional bodies and agreements, many of which Australia is party to. However, few deal effectively with IUU fishing and shared stock management. While the Pacific on the whole is better served by its RFMOs, including the Western and Central Pacific Fisheries Commission, the Inter-American Tropical Tuna Commission and the developing South Pacific Regional Fisheries Management Organisation, the situation in the Indian Ocean gives cause for concern: the Indian Ocean Tuna Commission

has been slow to act in dealing with increased pressures on stocks. As the recent report in *The Economist* points out, in most places fisheries policies have failed completely (Grimond 2009).

Australia has been particularly concerned with measures to control IUU fishing and with restrictions on Japanese whaling in the Southern Ocean. We took a leading role in developing the Regional Plan of Action to Promote Responsible Fishing Practices, adopted in May 2007, which follows on from an earlier international plan to prevent, deter and eliminate IUU fishing.

Due largely to increased patrol activity, cooperation between countries with sovereign interests in the Southern Ocean, and port state controls, illegal fishing activity off the sub-Antarctic islands has declined in recent years (ANAO 2008). The focus of protection activities has shifted to northern waters where illegal activity has increased significantly since 2001. However, the illegal entry of Indonesian fishing vessels into northern Australian waters, after increasing significantly in earlier years, declined dramatically in the last two years.

Indirect threats and risks

Food insecurity

Food insecurity is a major threat to international peace and security, and the overexploitation of fishery resources contributes to food insecurity around the world and particularly in our region.

Food insecurity has two connections with the oceans. The first is the direct impact of declining fish stocks and loss of marine habitats on subsistence fishing and access to seafood at a reasonable price. Climate change is projected to accelerate these processes. The second is the indirect impact arising from the consequences of food shortages. This could manifest itself in increased civil disorder and migration flows, which would reinforce flows already occurring as a consequence of climate change.

The management of fish resources is a major security issue in the oceans and seas around Australia. It is also an area of Australian expertise and a strong area for cooperation. Fishing is an important means for Australia to promote economic growth, human development, security and regional cooperation in developing countries in Asia and the Pacific. However, this activity will need to be supported by a higher level of marine scientific research and R&D than is currently undertaken.

Energy insecurity

The need for additional sources of energy at an acceptable price is now recognised as one of the most demanding challenges facing regional leaders. Generally, the quest for energy security is tending to lead to more competition between countries, rather than cooperation: there are risks of resource wars in the future.

There are three main implications of energy insecurity for the maritime environment:

- Regional countries are paying greater attention to the security of shipping routes used by oil tankers and LNG carriers. This concern is evident in new cooperative arrangements for safety, security and environmental protection in the Malacca and Singapore straits.

- The intensity of exploration and exploitation of offshore resources has increased. This has led to a greater focus on overlapping EEZ claims and conflicting claims to sovereignty over offshore islands and reefs. These tensions have been evident in the East and South China seas, and most recently between Bangladesh and Myanmar in the Bay of Bengal.
- The safety and security of the increasing number of offshore oil and gas installations in regional seas has become an important common interest of regional countries. It's another significant issue in which Australia has considerable expertise. The Council for Security Cooperation in the Asia Pacific (CSCAP) has recently formed a study group, co-chaired by CSCAP Australia, to investigate relevant issues.

Climate change

While most policy concern with climate change has focused on controls to reduce greenhouse gas emissions, climate change also poses significant challenges for oceans management and policy. Major uncertainties in how Australia will be affected by global climate change can only be resolved by a better and more in-depth understanding of the ocean system and processes. Oceans have a major influence on Australia's climate: the Pacific and Indian oceans are largely responsible for Australia's high interannual climate variability and cycles of droughts and floods. Understanding the relationship between the oceans and climate change is essential, as is investigating the potential for renewable energy from the oceans. Australia also has a responsibility to work with developing countries in our region, particularly the small island countries, to help them understand their vulnerabilities to climate change.

Not only would this research help improve our understanding of climate change, but it would also have a direct benefit for our understanding of weather patterns in southern Australia, including drought.

Climate change will affect the physical conditions of the oceans, such as temperature, the strength of currents, sea levels and ocean chemistry, and these impacts are becoming increasingly evident (UN 2008:89). As a result of climate change, ocean temperatures will rise, ocean circulation patterns may change and sea levels will rise. Changing ocean conditions as a consequence of global warming could have compounding effects on the rate of climate change. Ocean circulation plays a major role in determining the regional impact of climate change. The impacts on marine, coastal, estuarine and freshwater ecosystems will likely affect many people directly or indirectly through the loss of fish stocks and marine habitats and the increased prevalence of natural disasters, such as flooding and cyclones.

The Great Barrier Reef faces a greater trial of its resilience and ability to survive in the next 100 years than it has ever before, mostly because of global climate change. The costs to Australia's economy and reputation of losing all or a significant part of one of the earth's greatest natural wonders make this an issue of pressing national urgency.

Climate change impacts for Australia's coasts include rising sea levels and changes in coastal currents, resulting in changes to coastal erosion rates and increased saltwater incursions into

estuaries, wetlands and river systems. Rising sea levels might have a disastrous impact on small, low-lying island states in our region, such as Kiribati, Tuvalu and the Maldives.

Australia has a major role to play in monitoring what is happening in the Southern Ocean. Not only would this research help improve our understanding of climate change, but it would also have a direct benefit for our understanding of weather patterns in southern Australia, including drought. While dealing with climate change was identified as a key issue for Australia at the 2020 Summit, the summit gave no attention to the importance of the oceans in understanding climate change processes.

Loss of marine biodiversity

The rate of marine diversity loss is a worry to the international community. Increasingly attention is being given to the conservation and sustainable use of marine biological diversity, including in areas of the high seas. Biodiversity has considerable intrinsic environmental, economic and social values.

The conservation and management of coral reef systems is of great concern to Australia. Major concerns arise from land-based sources of pollution and about the resilience of reefs to other threats, including climate change. Ship-sourced marine pollution is a particular concern in the Great Barrier Reef and Torres Strait. While the end goals of conservation and sustainability are clear, considerable gaps remain in our fundamental knowledge of Australia's marine biodiversity and the ecological processes that generate and maintain it.

Pollution of the marine environment

Illegal pollution of the marine environment can lead to the destruction of marine habitats, loss of biodiversity and the bleaching of coral reefs, with a very serious impact on economic activity and social welfare. Globally, about 80% of pollution arises from land-based activities. International regulation to reduce the risks of ship-sourced marine pollution has increased enormously in recent decades, with significant positive effects. However, there are growing concerns about the human element in ship accidents, and the risks of accidental pollution remain high unless ship crews are well trained and responsible.

Illegal activity in protected areas

Different types of maritime areas are protected under Australian law. These include the Great Barrier Reef Marine Park, other marine protected areas, designated historic wreck sites, safety zones around offshore oil and gas installations, and protected zones around submerged pipelines/cables. Illegal activity in these areas might include fishing, anchoring, diving, or even in some cases, unauthorised entry into prohibited areas.

Ocean acidification

Apart from contributing to global warming, CO_2 emissions are also causing acidification of the oceans. This is a major consequence of increased fossil fuel consumption. The impacts on the sustainability and management of many marine and coastal ecosystems and fisheries are potentially very serious. They're likely to be seen first in the Southern Ocean, but could extend to the southern margins of the Australian continent and Tasmania, and eventually to temperate and tropical seas, including the Great Barrier Reef. A recent study by AIMS shows that reef-building corals on the Great Barrier Reef have slowed their growth by 14% from 1990 to 2005, and systematic analysis suggests that a combination of rising sea surface

temperature and ocean acidification, due to increased CO_2 in the atmosphere, are the likely causes of the dramatically slowed growth.

The seas are believed to be acidifying at a much faster rate than previously believed, with disturbing effects on marine life. The consequences for the Indo–Pacific region are very severe. Australia should become a lead nation in monitoring acidification levels in regional waters, and raise the issue of sustaining our oceans at every opportunity in regional and international bodies concerned with global environmental change (Bergin and Allen 2008).

Drought and the oceans

Although not obvious and not often recognised, ocean predictions are essential to modern approaches to managing drought. The El Nino-related seasonal droughts in eastern Australia, interspersed with flood cycles, are the best known ocean-controlled variations of climate. A similar process works in the Indian Ocean but is less well understood. A variable and irregular cycle of warming and cooling of ocean water dictates whether moisture-bearing winds are carried across southern Australia (*The Australian*, 6 February 2009).

Just as weather predictions have improved steadily over the past fifty years, seasonal climate predictions are improving with advances in observation, understanding of ocean processes and modelling. This information potentially has enormous benefit for primary production and natural hazard mitigation (including of bushfires) in southern Australia.

Marine natural hazards

The oceans and seas around Australia are particularly vulnerable to marine natural hazards. This was demonstrated by the disastrous tsunami in the northeast Indian Ocean on Boxing Day 2004 and the impact of *Cyclone Nargis* in Myanmar in May 2008. The Pacific island countries are similarly exposed to tsunamis and cyclones. In July 1998, a devastating tidal wave swept through the Aitape coastal region of northern Papua New Guinea, killing at least 2,150 people and injuring many more.

Maritime natural hazards include climatic hazards (cyclones, tropical storms, floods and sea-level changes), geological hazards (earthquakes, volcanic eruptions and tsunamis) and biological hazards (marine pest infestations and pollution). Three aspects of such hazards stand out:

- Some, particularly climatic hazards, can be predicted through satellite monitoring, oceanographic research and weather forecasting.
- The occurrence of natural disasters is increasing as a result of higher levels of volcanic activity and changing weather patterns. With the growing populations of developing countries, many of whom live in coastal regions, the large-scale human impacts of maritime natural disasters are likely to become more common.
- They are pervasive in time and space, but the Indian Ocean seems to be particularly vulnerable.

With the roaring forties and the 'furious fifties', sea conditions in the Southern Ocean are among the most severe in the world. The safety implications for Australia are significant, as Australia has accepted responsibility for a disproportionately large SAR area in the Southern Ocean.

Various measures, including tsunami warning buoys, have been introduced to mitigate the risks of marine natural hazards. The Indian and Pacific oceans will soon both be covered by

tsunami early warning systems. Cooperative arrangements for dealing with the aftermath of natural disasters are also receiving attention. While much of this cooperation revolves around the use of military forces and their skills and capabilities, potential sensitivities about that use must be appreciated, particularly where a political agenda is evident or suspected.

Meeting the threats

On the whole, direct threats are being handled effectively, mainly because they are more immediate. For example, arrangements for dealing with maritime terrorism, maritime border protection and illegal activity at sea in Australia's maritime domain have improved markedly in recent years, largely through the establishment of the BPC and the SMMC. However, more policy focus is required on the less immediate threats, not least because the potential consequences are very serious. These are also the ones that are difficult for Australia to deal with alone. They are common interests with our neighbours, and regional cooperation is required to deal with them effectively.

... we need to understand the relationship between climate change and the oceans, including adverse impacts on human welfare and sensitive ecosystems, and the role that the oceans can play as a source of renewable energy.

While climate change is now attracting considerable policy attention, most of the attention is focused on controls to reduce greenhouse gas emissions. However, climate change also poses significant challenges for oceans management—we need to understand the relationship between climate change and the oceans, including adverse impacts on human welfare and sensitive ecosystems, and the role that the oceans can play as a source of renewable energy. Australia also has a responsibility to work with developing countries in our region on climate change issues, including monitoring the impact on weather systems and the potential consequences of rising sea levels.

Chapter 5

THE OCEANS AND MARITIME SECURITY

Regardless of whether we take a traditional or non-traditional view of security, the oceans should figure prominently in Australian strategic thinking. They protect us against military threats while insulating us from most non-traditional security concerns, including disease and some biological threats. However, the oceans also unite us with surrounding regions where countries now have a significant emphasis on maritime security in their own strategic thinking. The oceans offer great potential for working with regional countries to promote regional security and stability, which will help make Australia more secure and protect our future prosperity.

> ... for Australia, almost everything to do with the oceans has a strategic dimension.

Largely because of our lack of a maritime culture, insular attitudes and failure to see Australia as a maritime power, we've so far failed in our defence and foreign policies to fully comprehend the security significance of the oceans: for Australia, almost everything to do with the oceans has a strategic dimension.

Comprehensive maritime security

In the narrowest context, maritime security is traditionally about protection from military threats against a state and its interests from on, over or under the sea. A comprehensive view includes non-traditional threats and national maritime interests. Comprehensive maritime security requires good order at sea; reduced illegal activity

at sea; maritime border protection; protection and preservation of the marine environment; and the conservation of marine living resources.

The concept of maritime security has changed. It has become more multidimensional. Following the introduction of the International Ship and Port Facility Security Code, it has more of a civil dimension. As well as encompassing a range of non-traditional threats, maritime security is now more closely linked with maritime safety than in the past.

Australia's maritime security

Australia's maritime security is governed by a mix of enduring and dynamic factors. Dynamic factors tend to dominate contemporary discussion of defence and foreign policy. This is much the case today, with concern about the implications of globalisation and the rise of Asian powers, particularly China and India. There's likely to be more major power competition in our region than in the past.

A globalist approach sees Australia's security as mainly determined by global events. It argues against geography as a primary strategic determinant. It postulates that our security is about defending values and interests even though that might lead to expeditionary military commitments. It downplays the remarkable impact that the rise and rise of Asian powers will have on Australia's future prosperity and security.

This report argues the importance of the enduring factors of our strategic environment, particularly our dependence on the oceans and their good health, our wide oceanic surrounds, our regional relations, our dependence on shipping and seaborne trade, and our increasing dependence on offshore oil and gas to maintain energy security. These are real factors that should loom large in our strategic thinking; instead of the imprecise values and assessments that condition a globalist and more expeditionary approach, and do not inform priorities in defence spending.

Global trends, such as population growth, terrorism, food shortages, military modernisation, climate change and energy insecurity, certainly affect Australia, but much of the effect is through the impact they have on the oceans, and through them on Australia. Most of the trends have a significant maritime dimension. And while we can't have much influence on them at their source, at least we can try to have an influence, even in some cases a controlling influence, on how they affect Australia via the adjacent oceans and seas.

Similarly, any tension or conflict between our major trading partners, such as India, China, Japan or the US, would largely affect Australia through their maritime implications, including impacts on our seaborne trade. Implications would include threats to shipping and the possible commitment of maritime forces to protect that trade. It's becoming less likely in current and emerging circumstances that Australia would commit land forces to any engagement in East Asia; any commitment to a conflict in Asia would primarily involve sea and air forces.

An insecure nation?

In many ways, Australia presents the image of an insecure nation still seeking security *against* rather than *with* the region. Australia's defence budget is now the thirteenth biggest in the world and the sixth in the Asia–Pacific region after the US, China, Japan, South Korea and India. We spend more than Canada, despite having a smaller population and resource

base. Yet many Australian defence statements paradoxically have the consequence of promoting insecurity in the region. From time to time, there are robust statements from various Australian interest groups that argue the need for strike aircraft that can reach particular Asian capitals, or long-range submarines that reach through Indonesia into the East Asian seas. Such statements don't go unnoticed in the region. They may send mixed signals about our commitment to regional security, and they can also promote a regional arms race that's clearly not in Australia's national interest.

Those attitudes reflect an image of Australia as an insecure nation that lacks appreciation of its own geostrategic environment. The late Frank Broeze, an eminent maritime historian, captured this outlook when he observed:

> Images and perception of national identity have revolved largely around inward-looking and often racist concepts of 'continental' Australia in which the sea was seen as a fence shutting out unwanted intrusions from the surrounding region. It is part of an 'other' world, in which Australia held no stake. (Broeze 1998)

A greater appreciation of the oceans, of their problems and of the security they provide would allow us to be more confident of our security. The promotion of Australia as a maritime power and a reliable maritime partner involves a greater emphasis on *soft power*: the oceans are the great global commons and their management requires cooperation. All countries can gain from cooperative oceans management and security.

Regional maritime stability

The rise and rise of Asian maritime power is the dominant feature of the contemporary regional maritime security environment. This isn't just a matter of China, India and Japan as the leading regional maritime powers, but includes newer maritime powers—South Korea, Indonesia, Malaysia, Singapore and Taiwan, as well as Thailand and Vietnam in the longer term. Only the Philippines is 'dragging the chain'; despite extensive maritime interests, it remains handicapped by internal security problems.

The increased maritime power of Asian nations isn't just a matter of naval power, but includes all the other trappings of maritime power: sizeable merchant shipping fleets, a large involvement in seaborne trade, significant shipbuilding and ship repair activities, and extensive fishing interests. This is the maritime scene in which Australia is challenged to play a part.

The main challenge of regional maritime security is to provide good order and stability at sea.

The main challenge of regional maritime security is to provide good order and stability at sea. To some extent, this is lacking in the regions around Australia. Destabilising factors include sovereignty disputes, naval modernisation that highlights the security dilemma (increasing one's own defence spending can prompt a similar response from one's neighbours, leading to a competitive spiral upwards), competitive rather than cooperative maritime strategies, and a lack of support for key international maritime regimes. Declining fish stocks and the

quest for energy security could lead to resource wars. In a broader sense, regional insecurity is fuelled by natural disasters and rising food and fuel prices.

Defence spending in regional countries over recent years has generally increased in line with rates of economic growth. Thus, most regional defence budgets have grown markedly without any significant change in defence spending as a percentage of gross domestic product or of government spending. In the longer term, some discussion of arms limitation measures might become appropriate. The 2008 annual report from the Stockholm International Peace Research Institute predicts that the next two years will see a broadening consensus around the world that more serious and effective arms control and disarmament measures are required. As we move further into a century of increasing Asian power and influence, it will be important that Asia participates in this dialogue, and Australia should have some part in this.

Much of the additional defence spending in the region has been on maritime capabilities—ships, submarines and aircraft. Elements of a naval arms race are apparent in particular capabilities, such as larger surface warships, submarines and anti-shipping missiles; and, for the major maritime powers, aircraft carriers—although some other term, such as 'large amphibious ship', might be used to describe them.

Increased submarine numbers in the region, particularly in Southeast Asian waters, should be of particular concern to Australia. Regional antisubmarine warfare capabilities are also improving and with more submarines at sea—from a wider range of countries, sometimes in areas of possible tension, such as around the Spratly Islands and off Taiwan—the risks of an 'intruder' submarine incident in the region are increasing. In a worst-case scenario, such an incident might involve an Australian submarine; the operational and political consequences could be very severe.

Australia has a clear strategic interest in helping to build good order and stability in the oceans and seas around Australia.

Building maritime security

The global thinking for maritime security has largely been done and translated into numerous international regimes. The challenge now is to apply those regimes at the regional and national levels. This is difficult in some parts of the world, including Southeast Asia, where countries have conflicting national priorities and some lack the capacity to implement international regimes effectively and provide maritime security in waters under national jurisdiction. As shown, major international conventions are not well supported in the regions around Australia. Growing regional naval forces and the risks of competitive maritime strategies, such as may be emerging between China and India, further threaten maritime stability.

Australia has a clear strategic interest in helping to build good order and stability in the oceans and seas around Australia. It's one of the surest ways we can prevent threats to our security. We can do it by assisting regional countries to build their capacity to manage and protect their maritime interests, but we need to be careful that our actions and statements

don't add to regional maritime instability. The forums in which we can promote our endeavours include the ASEAN Regional Forum and APEC for the seas to our north and the Pacific Ocean. At this stage, there's no effective forum for the Indian Ocean.

Australia has been extremely active in recent years extending cooperation with Indonesia and the Philippines, specifically on maritime security and counter-terrorism. The focus on Indonesia reflects geographical proximity and includes arrangements for border security and to counter illegal fishing. The focus on the Philippines reflects the economic significance of the LNG trade between northwest Australia and China that passes through the Celebes Sea and near the Sulu archipelago—areas where terrorist groups are active and which have been prone to piracy. Measures funded by Australia to enhance maritime security in the southern Philippines include improvements to sea surveillance systems, border controls and port security. Australia has also donated new patrol vessels to the Philippine Coast Guard.

Southeast Asia and the Pacific are well covered by existing organisations, but arrangements for cooperation in the Indian Ocean are deficient. APEC is the most prominent regional organisation concerned with maritime security, but it has a broad agenda and a wide geographical scope that inhibit its effectiveness. Little has come of the 2002 Seoul Oceans Declaration. The ASEAN Regional Forum probably offers a more focused forum relevant to issues discussed in this report, particularly as it has recently agreed to establish an 'Inter-Sessional Meeting on Maritime Security' to meet once a year. Australia should seek a prominent role in that meeting.

Chapter 6

REALISING THE POTENTIAL OF THE OCEANS

Australia has achieved a lot over the past decade in improving arrangements for managing the oceans and promoting our maritime interests. Gaining international acceptance of our claim to an extended continental shelf was a significant recent achievement. Other notable achievements included progress with bioregional marine planning; enhanced interagency coordination of maritime security and border protection; the completion of maritime boundary agreements with our neighbours; the establishment of a tsunami warning system for the Indian Ocean; the establishment of the Integrated Marine Observing System (IMOS); fostering new conventions for marine environmental protection through the International Maritime Organization; and the introduction of a national system for marine safety regulation.

The oceans offer great potential for Australia, but they also face many threats: old ones, such as illegal activity at sea, as well as new ones, such as ocean acidification and other impacts of climate change.

Despite these successful but diverse activities, there's still much more to be done before we realise the full importance of the oceans to our future prosperity and security. The oceans offer great potential for Australia, but they also face many threats: old ones, such as illegal activity at sea, as well as new ones, such as ocean acidification and other impacts of climate change. The full implications of these developments for Australia—including, for example, the impact of oceanic conditions on weather in southern Australia—aren't yet reflected in public policy.

The conclusions and recommendations of this report cover a host of issues. These are concerned with what Australia might do to obtain maximum strategic, economic, scientific and political benefit from the oceans while contributing to more effective management of our adjacent oceans and seas. Several priorities stand out. We must:

1. promote Australia as a leading maritime power in the regions around us
2. promote a higher level of national understanding and awareness of the importance of the oceans to our future prosperity and security
3. make further improvements to our arrangements for understanding and managing the oceans and our maritime interests
4. promote measures to provide regional maritime security
5. develop our national capacity for managing and protecting the oceans and our maritime interests.

Becoming a maritime power

Australia should do more to exert itself as a confident and leading maritime power in the oceans around us. Our efforts should match the size of the ocean space that we claim. We should rely not so much on the trappings of *hard* maritime power, such as the size of our navy or the national merchant shipping fleet, but rather on *soft* maritime power, particularly our knowledge and expertise in ocean affairs, our leadership in dealing with oceanic threats, and our promotion of ourselves as a maritime nation. This would fit well with the National Security Statement's concept of an activist diplomatic strategy aimed at keeping our region peaceful and prosperous (Commonwealth of Australia 2008, p. 12).

Countries can't be good at everything, but we should try to be a smart nation in ocean affairs. As we start the lobbying to win a seat at the UN Security Council in 2013, the oceans offer a potential source of credibility and leadership. While not eschewing hard power, we need to put more focus on the soft power dimension of maritime security to become a leading player in oceans management and maritime security in our surrounding oceans and seas. This would have great benefits for our future prosperity and security.

Regional leadership

Australia is very near to the most rapidly developing and dynamic region in the world. But that region is also a maritime one. It depends heavily on the sea for food, energy security, trade and longer term economic prosperity. Many regional countries have a large involvement in offshore oil and gas exploration and exploitation. The importance of the sea to them is reflected in the size of their national merchant shipping fleets, their expanded navies, and the attention they give to offshore sovereignty. Climate change is also a looming threat of great concern to Australia and our neighbours.

Maritime issues will become even more important in the region in the future. Economic growth means greater interdependencies and a more than commensurate growth in seaborne trade. Concerns about energy and food security mean that countries are paying more attention to their rights over offshore resources and the need for effective management of offshore areas. Longer term environmental threats in the oceans are likely to become particularly acute in the Indo–Pacific region. Against this background, there are great opportunities for Australia to project itself more into this region as a major maritime nation. We've extensive maritime interests of our own and considerable skills and expertise in marine industry, naval operations, and marine science and technology.

An Australian Ambassador for the Oceans would help bring focus to our efforts to provide regional leadership in ocean affairs, including maritime security and adherence to key international regimes for providing good order at sea. This position would support the call by Australia's national security policy for 'diplomatic resources that are more in depth and more diversified than currently exist' (Commonwealth of Australia 2008, p. 14).

Particular attention should be given to the Indian Ocean, where all forms of maritime cooperation, including fisheries management, are currently underdeveloped. Much less is known about oceanic conditions in the Indian Ocean than about those in the Pacific or Atlantic oceans. Rectifying that deficiency would have great benefits for countries in South Asia and East Africa, as well as for the small island countries of the Indian Ocean.

The Coral Sea is another area requiring greater attention. Australia has obligations in the Timor, Arafura and Coral seas under UNCLOS Part IX, but while some arrangements are in place with the Timor and Arafura seas, little attention has so far been paid to the Coral Sea. The Coral Sea has great ecological significance because of its many coral reefs, underwater mountains and abundant populations of large pelagic fish, but our marine scientific knowledge of it is poor. Measures to preserve and protect its marine environment and conserve its biodiversity would best be achieved through consultation and cooperation with the other countries that also have a responsibility in the Coral Sea. This might lead initially to the establishment of a forum for the Coral Sea similar to the Arafura and Timor Sea Experts Forum for the Timor and Arafura seas.

Recommendations

The post of Ambassador for the Oceans should be established to lead Australia's involvement in international and regional cooperation on oceans management.

Particular attention should be given to the Indian Ocean, which currently lacks effective forums for oceans management and the exploitation of marine resources. We should work closely with India and South Africa on this.

Discussions should be started with France, Papua New Guinea and Solomon Islands on the cooperative management of the Coral Sea to discharge joint responsibilities under UNCLOS Part IX.

Australia should actively promote regional adherence to the key international conventions and agreements for providing good order at sea.

Cooperative fisheries engagement

Fisheries are a vital interest in the Indian, Pacific and Southern oceans, and in Southeast Asia. This is a leading area where Australia has key skills and expertise, and can show leadership. We already make a significant contribution to regional and global efforts to address IUU fishing and to manage shared stocks through RFMOs and through APEC, which hosts working groups on fisheries and marine resources. However, some RFMOs are not working well. The Bali Plan of Action agreed at the 2005 APEC Ocean-Related Ministerial Meeting supported greater adherence to international and regional fisheries arrangements. Fishing is part of the 2006 Agreement between the Republic of Indonesia and Australia on the Framework for Security Cooperation.[12]

The strategic benefits of cooperative fisheries engagement should be appreciated. We're at the forefront of modern fisheries management. Our well-managed fisheries no longer focus on maximising catches in the short run, but on using harvest strategies to maintain stocks at higher levels—giving greater biological security and better economic returns. The entire ecosystem of the fishery is now assessed using environmental risk assessment and management. These tools identify where target species, by-catch species and habitats are at greatest risk from fishing, and ensure that measures are in place to eliminate the risks or reduce them to an acceptable level.

Our engagement with various RFMOs gives us opportunities to showcase these advances and, through a consistent, science-based approach, make a substantial contribution to save what have been 'problem' fisheries. Engagement with RFMOs on sustainability targets would benefit from a greater level of coordination and consistency, especially in long-term commitments by Australia to fisheries science in the RFMOs.

A comprehensive strategy is needed to guide our cooperative fisheries engagement with Southeast Asia and in the Pacific, Indian and Southern oceans.

Recommendation

A whole-of-government approach should be developed to deepen and broaden cooperative regional fisheries engagement. The approach should address the limitations of the RFMOs, particularly by increasing Australian funding for science in those organisations.

Aid priorities

While we move to a more prominent role in regional oceans management, we'll need to be prepared to make a greater contribution to help regional countries in their oceans management efforts. Currently, Australia makes no reference to maritime activities in its priorities for international aid. Other countries, including Canada and the US, recognise the special strategic benefits of such aid.

Current themes in Australia's aid program are accelerating economic growth in developing countries; fostering functioning and effective states; investing in people through health and education programs; and promoting regional stability and growth.

All these themes have a significant maritime dimension in Australia's region of influence. For example, our current aid program makes special reference to Africa as a significant new area of engagement. Actions to assist East African countries, in particular, to manage their extensive maritime interests could offer key opportunities for Australia. Somalia is a striking example. The plundering of its rich EEZ by foreign fishing interests was an important factor leading to the current piracy off its coast.

The 2008–09 Australian Federal Budget included plans to increase Australian development assistance significantly over the next seven years. Official development assistance is scheduled to increase to 0.5% of gross national income by 2015. This is part of the Rudd government's plans to become more multilaterally engaged than its predecessor, but we're yet to see how those plans will be affected by the recent severe financial downturn.

Helping to build the capacity of developing countries in our region to manage their maritime interests might be an official development assistance objective. For example, Australia could usefully invest in transferring knowledge and training to neighbouring countries that mostly have large EEZs and extensive fisheries resources, but have a very limited concept of sustainable harvest strategies. Those countries are prey to foreign fishing nations offering short-term increases in revenue, but with substantial underlying long-term biological and economic risks. The risks are magnified where living marine resources offer one of the only avenues to sustainable income.

Many of the small island countries in the Indian and Pacific oceans potentially have extended continental shelves, but they're experiencing great difficulties in making their submissions to the Commission on the Limits of the Continental Shelf. This might be a key area for greater Australian assistance.

Recommendation

Australian priorities for providing assistance and aid to regional countries should recognise the strategic benefit of building capacity in maritime affairs, including for fisheries management and enforcement.

Realising the potential of the oceans requires a higher level of understanding and awareness of the oceans in Australia, including a greater effort in marine science and technology.

Maritime understanding and awareness

Realising the potential of the oceans requires a higher level of understanding and awareness of the oceans in Australia, including a greater effort in marine science and technology. The importance of the oceans and their resources to Australia's future prosperity and security requires even greater emphasis now, when there is growing concern about the health of the oceans, the depletion of fish stocks and global warming. Oceans and maritime issues should be a priority for the current and future governments, but they have generally not been a priority in the past because of a lack of maritime awareness. One explanation for this is that the oceans lack a political champion. In Australia, unlike in some other countries, there are currently no votes in ocean development.

Marine science and technology

Australia has pressing requirements for greater knowledge of its maritime domain. A much greater effort is needed in marine science and technology to allow Australia to manage its extensive maritime interests effectively and to realise the economic opportunities likely to be available. Research priorities include the impacts of climate change, offshore sources of energy, resource exploration and exploitation, and the growing pressures on the oceans from population growth and human impacts. These priorities are not dealt with cohesively in the National Research Priorities (NRPs). The current NRPs don't capture the major responsibilities

and opportunities created by Australia's large maritime domain and on the high seas. The recent review of the national innovation system states that our investment in marine research and industries is 'underweight' and proposes marine industries as one of nine national innovation priorities (Cutler and Company 2008).

Policy, management and research frameworks are currently being developed independently for fisheries, biodiversity, climate change and coastal zone management. All draw heavily on our limited marine science and R&D capability. We need a national marine R&D framework to bring an integrated approach to marine R&D that reflects national priorities and fully supports the government's policy agenda and the interests of all stakeholders, including a balance between wealth generation and sustainability. This would be similar to the Ocean Research Priorities Plan developed in the US by the White House Office of Science and Technology Policy.

In its recent paper, *A marine nation: national framework for marine research and innovation*, the Oceans Policy Scientific and Advisory Group recommended that a national steering committee for marine research and innovation be appointed, with responsibility for further development and implementation of the National Framework for Marine Science and Innovation, and for providing a critical high-level interface with industry and policymakers.

Recommendation

A national framework for marine science and R&D, including arrangements for private–public sector cooperation, should be developed through a new National Steering Committee for Marine Research and Innovation established within the Innovation, Industry, Science and Research portfolio.

Greater priority should be given to exploring the economic opportunities in the oceans, including support for emerging new marine industries, such as wind and tidal energy, desalination, deep seabed mining, carbon capture and storage, and marine biotechnology.

Marine environmental data

Marine environmental sampling and observation, historically dependent on ship-based and often random and infrequent approaches, has advanced rapidly with the availability of new technologies, particularly various forms of remote sensing. New technologies make it possible to view in real time the ocean currents, eddies and pools of warm water that control climate; the flora and fauna, from plankton to whales; and the chemical, biological and physical structure of the oceans. We know very little about the deep seabed and subsoil of our area of maritime jurisdiction.

Existing and emerging technologies for observing the ocean make it possible to create an 'ocean observatory', where researchers, industry and the public can access imagery and data from our regional seas. The observatory would make available data from sustained, regional observing systems around Australia and a fleet of research vessels for coastal and offshore waters. The information would come from many sources, putting a premium on statistical analyses and modelling of ocean processes. Information and communication technology is one of the highest priorities in our innovation system. There would be significant benefits for security and defence in developing such a facility.

Recommendation

An Australian National Ocean Observatory should be established, building on the Integrated Marine Observing System initiative. The observatory would make real-time and virtual data available to researchers, industry and the public, and would help to promote awareness of the oceans and their resources.

Multidisciplinary research

Oceans management is fundamentally an interdisciplinary activity. The main disciplines involved are law, marine science and public policy, but economists, historians and other social scientists all have inputs to make. The two main university centres that currently do this type of work are the Australian National Centre for Ocean Resources and Security at the University of Wollongong and the Institute of Antarctic and Southern Ocean Studies at the University of Tasmania. A new interdisciplinary Oceans Institute is being established at the University of Western Australia.

Government-sponsored research in Australia is conducted under the auspices of either the National Health and Medical Research Council (with an annual research budget of about $500 million), or by the Australian Research Council through the National Competitive Grants Program (with a budget of $571.8 million in 2007–08 and grants approved in accordance with the NRPs). The NRPs highlight areas of particular social, economic and environmental importance to Australia, where a whole-of-government focus has the potential to improve research and broader policy outcomes.

Currently, no priority is given specifically to the maritime area, and none of the current NRPs refers to any marine activity.[13] This is in contrast with the United States Sea Grant program, which provides funding for a network of academic institutions, government agencies and industry bodies to undertake research, education and public outreach or extension activities related to marine and coastal resources and environments in the US, including relevant social science and humanities disciplines.

The NRPs are due to be reviewed in 2009, when it will be determined whether there's any need to finetune or wind down existing priorities or incorporate new ones. It would be appropriate to include a specifically maritime-related priority, such as 'Managing and protecting Australia's oceans'.

Recommendation

Interdisciplinary research in oceans affairs should be encouraged. The review of National Research Priorities in 2009 should consider including one priority specifically related to the maritime domain.

A Parliamentary Maritime Group

Maritime awareness might be helped at the political level by the establishment of a Parliamentary Maritime Group, similar to the Associate Parliamentary Maritime Group in the United Kingdom. The British group is an all-party group of both houses of parliament and British members of the European Parliament, along with representatives of companies and professional organisations involved in maritime activities and affairs. Its objective is to remind parliamentarians of the importance of the sea and maritime activities to the UK and

to provide a forum for the exchange of views between parliament and those engaged in the nation's maritime industries and related ventures. A similar parliamentary group here would promote a stronger maritime culture in Australia.

Recommendation

An all-party Maritime Group should be established in the Australian Parliament, comprising interested members of parliament and selected senior industry representatives.

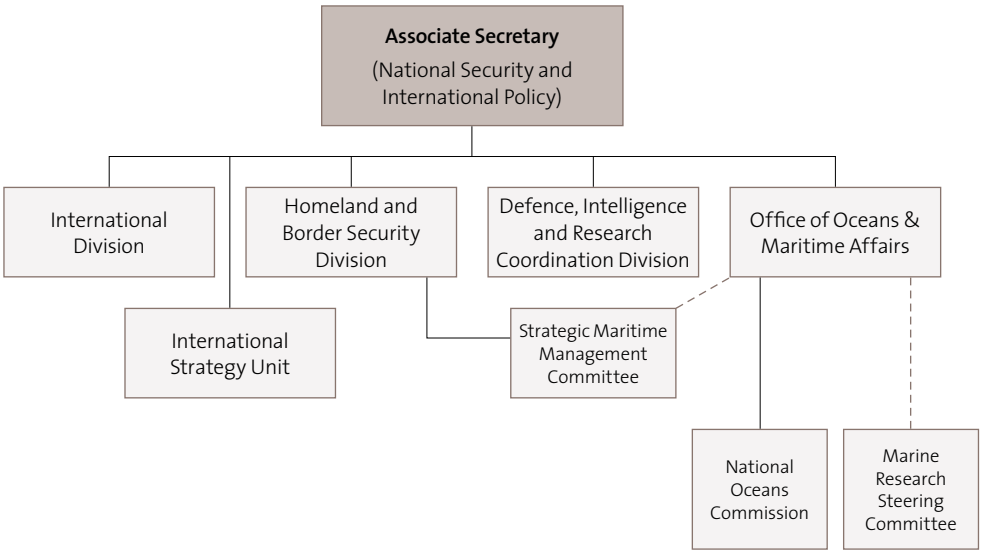
Management arrangements

A stronger and integrated policy focus on Australia's maritime domain, its resources and its maritime interests is needed. This is a great challenge for public policy in Australia. It's now ten years since the original Australia's Oceans Policy was released and, despite its high ideals, not all of its goals and ambitions have survived the test of time. Public policy for the oceans and our maritime interests is still largely determined on a sectoral basis. A re-think of our arrangements for coordinating our approach to managing our maritime domain on a whole-of-government basis would now be appropriate. This should address the links with maritime security; developments in marine science and technology; the use of data and information; the links with industry; the interrelationship between national and international policies; and federal–state issues.

To reflect a truly whole-of-government approach, an Office of Oceans and Maritime Affairs (OOMA) should be established in the Department of the Prime Minister and Cabinet. Its location in that department would properly reflect the importance of the oceans to Australia, including to our security, and the need for powerful interagency coordination and coordination with the states and territories. It should be located under the Associate Secretary (National Security and International Policy), as shown in Figure 5. This central policy coordination of oceans affairs occurs overseas, for example in France, Japan and South Korea.

The OOMA should be supported by a National Oceans Commission with selected senior public and private sector representatives to advise on Australia's oceans management

Figure 5: Office of Oceans and Maritime Affairs



arrangements, including industry issues and public–private sector linkages. The commission would replace the current National Oceans Advisory Group, but would provide policy advice at a higher level. The OOMA should also have a significant policy input to the new National Steering Committee for Marine Research and Innovation. It should also link into the SMMC and Cabinet's National Security Committee.

Recommendations

An Office of Oceans and Maritime Affairs should be established in the Department of the Prime Minister and Cabinet to provide central coordination of oceans and maritime policy.

The office should be supported by a National Oceans Commission to provide high-level public–private sector advice on marine industry and oceans affairs. As an initial task, the commission might review national oceans policy, including the achievements and shortcomings of the existing policy, and the spectrum of emerging issues in the maritime domain that will affect Australia's national interest.

Regional maritime security

A clear strategic objective for Australia should be to assist in building a more stable region and creating a regional security environment that will prevent threats to Australia arising. Our declaratory statements should show that we actively promote regional stability and that we seek security *with* the region rather than *against* it. Maritime security should be a key area in which we can work to achieve that objective. Achieving it will require careful and sensitive diplomacy, including the building of *soft power* and influence rather than more direct military involvement that can sometimes send wrong messages.[14]

Most destabilising factors in the region have a significant maritime dimension, including the worst-case scenarios of conflict between China and India, or between China and a coalition of powers, perhaps including Japan, India and the US. China and India are either already significantly expanding their naval fleets or planning to do so, including by acquiring aircraft carriers and more submarines. The risks of an 'intruder' submarine incident in the region are high unless appropriate maritime confidence and security building measures are introduced. Broader naval arms control measures may also be necessary in the longer term.

Non-traditional threats in the maritime environment are significant and growing. Climate change, energy security and food security are prominent current issues. Regional cooperation is needed to deal with these threats effectively.

Recommendations

Australia should continue to play an active role in promoting regional maritime security, with a renewed focus on maritime confidence and security building measures and preventive diplomacy. Relevant measures might include greater transparency with naval budgets and new naval capabilities, as well as agreed processes for reducing the risks of 'intruder' submarine incidents.

Australia should take a leading role in promoting regional cooperation to deal with less immediate security threats, including climate change, rising sea levels, marine pollution and ocean acidification. Measures to deal with such threats should have priority in our international aid programs.

Infrastructure and capacity

National maritime infrastructure

The development of Australia's national maritime infrastructure hasn't kept pace with either the rate of economic growth or the growth of ocean usage, particularly seaborne trade, offshore oil and gas development, and marine tourism. Bottlenecks are evident in both physical and human resources.

Infrastructure Australia[15] has recently begun a study of the adequacy, capacity and condition of nationally significant water, transport, energy, and communications infrastructure. The focus of the study is the national infrastructure, including roads, rail, ports, airports, pipelines, grids, cables and communication networks, that provides the platform for future growth and prosperity. Because of the growing importance of the marine industry in Australia and rising awareness of the economic potential of our offshore areas, this study should address longstanding needs for specialist maritime infrastructure, including port facilities, offshore support services, facilities for marine tourism, and R&D infrastructure, including research vessels and ocean observing systems.

Recommendation

The current study of the adequacy of Australia's infrastructure, by Infrastructure Australia, should address Australia's current and future maritime infrastructure needs by identifying significant weaknesses, highlighting commercial opportunities and recognising the importance of enhancing our understanding of our oceans.

Shipping

There are sound environmental and energy security grounds for making greater use of shipping for interstate and some intrastate cargo. Shipping is appropriate for longer hauls, such as from southeast Australia to north Queensland, Darwin and Western Australia. Greater investment in shipping would have extra benefits for security and human resource development, but port infrastructure to support such development is currently deficient. The government has recently announced a major review of the Australian coastal shipping industry.

Recommendation

The benefits of coastal shipping, including intermodal aspects, require close attention in our future national infrastructure planning.

A national fleet

Maritime border protection and the management of Australia's very large maritime domain are probably the most challenging and fundamentally important of all security tasks confronting Australia in peacetime. Because of the wide areas involved, resources might always be inadequate to detect and intercept all illegal vessels before they reach the mainland coast. This was again evident during November 2008, when several small vessels with illegal immigrants aboard reached the Western Australian coast without being detected.

Maritime border protection and the management of Australia's very large maritime domain are probably the most challenging and fundamentally important of all security tasks confronting Australia in peacetime.

Rather than each agency 'doing its own thing' with bluewater capabilities, there's scope for a national fleet to meet all requirements other than naval war-fighting. This would ensure that important capability requirements don't fall down a 'hole' between national agencies (see box).

National fleet requirements

- A **naval capability** to defend the nation against threats, primarily of a military nature. This role requires capabilities for combat operations either at sea (surface warfare, anti-air warfare, submarine warfare, maritime strike, mine warfare, protection of shipping, coastal defence) or from the sea (amphibious operations, naval gunfire support, or land strikes using cruise missiles). The ADF provides this capability.
- A **maritime constabulary or policing capability** for border protection and the enforcement of national laws at sea. Specific tasks include maritime surveillance and enforcement, sea patrol, fisheries protection, SAR, monitoring marine pollution, combating drug smuggling and piracy, and controlling illegal immigration. In Australia's case, this requires ideally a capability to visit any part of the EEZ and continental shelf, including waters off island territories and the AAT and adjacent areas of the high seas. This capability is provided by both the RAN and the ACBPS, which uses chartered vessels for Southern Ocean patrols and support in northern waters.
- A **diplomatic capability** involving the use of maritime security forces as instruments of foreign policy, including for civil assistance and humanitarian aid; peacekeeping; regional security cooperation; maritime confidence building (port visits, personnel exchanges, joint patrols, passage exercises etc.). These roles will assume greater importance as Australia moves to exercise greater maritime influence in adjacent oceans and seas. The RAN currently provides this capability, with some small, but possibly increasing, involvement of the ACBPS.
- A **marine scientific research capability** to conduct all forms of bluewater marine scientific research, including hydrography, in all parts of the EEZ and continental shelf, including waters off island territories and the AAT. This is fundamental to the discharge of our responsibilities for the EEZ and continental shelf. Australia currently has only one full-time bluewater research ship, the *Southern Surveyor*, which is supplemented with some involvement of the Antarctic supply vessel, *Aurora Australis*, RAN hydrographic vessels, chartered vessels and ships of opportunity.

A current example of a possible capability gap is the lack of an effective offshore patrol vessel in the national fleet. The ADF isn't likely to recommend such a vessel, which doesn't relate to what Defence views as 'core business', while the ACBPS would regard it as outside its focus on border protection. However, if such a vessel were to be acquired, not only would it fill a gap in our ability to patrol in the further limits of our EEZ, including off our offshore territories and their EEZs, but it could also be given a significant marine scientific research capability. It would thus contribute to overcoming our current lack of research vessel capability. A study of our research vessel requirements would undoubtedly reveal a requirement for more than the one bluewater research vessel currently available.

Recommendation

An independent study should be conducted of Australia's requirements for bluewater capabilities for maritime policing, patrol and scientific research. Naval war-fighting capabilities should not be included, but the study should take into account the ADF's contribution to civil maritime tasks. The study should be sponsored by the Associate Secretary (National Security and International Policy) in the Department of Prime Minister and Cabinet, pending the establishment of the Office of Oceans and Maritime Affairs.

Human resources

It is apparent that there are critical shortages in the skills and expertise Australia needs to manage the maritime domain and our maritime interests. Both marine science and the maritime sector are failing to attract enough people. Australian marine science suffers from serious shortages of technologists, engineers, mathematicians, statisticians, modellers, physicists, chemists, microbiologists, geographers and taxonomists.

The maritime sector is suffering a major skills shortage of people with seafaring skills and experience.[16] They are needed for a range of jobs, including pilotage, marine surveying, terminal and cargo operations, port operations, ship management, maritime education and training, and for maritime administration in state and national agencies such as the Office of Transport Security and the Australian Maritime Safety Authority. There's nothing unique in the Australian situation—there's a growing global shortage of seafarers, with potential risks to security and ship safety if shortages are filled by underskilled personnel. Maritime training needs to be addressed at both the national and the international levels.

One cause of the current situation is the lack of a maritime culture and awareness in Australia. This might be overcome by fostering secondary and tertiary education in maritime affairs, for which some programs are already in place in some states. Industry and other stakeholder involvement should be sought, to identify particular skill and knowledge requirements.

The possibility of creating one or more dedicated Australian Ocean High Schools might also be considered. Such a school would use the marine environment and marine industries as a theme for Year 7 to Year 12 studies, to ensure that students are well positioned to take up careers in our various maritime industries. Industry experts would support teachers through professional learning and mentoring opportunities, so that the curriculum would engage students and reflect current developments in the marine sector. These partnerships would

offer students unique opportunities to access training and industry experience in an array of maritime careers.

Recommendation

Secondary education in maritime affairs should be promoted by Australian educational authorities and Australian marine industries. Dedicated 'Ocean High Schools' might also be considered.

Concluding thoughts

The oceans and seas around Australia are central to our future prosperity and security. The 2008 report of the UN Secretary-General to the UN General Assembly on Oceans and the Law of the Sea noted how all countries share in both the benefits of safer and secure oceans and the responsibility for addressing major threats and challenges to maritime security (UN 2008:14).

Global and regional cooperation is fundamental to the maintenance of maritime security and safety, and Australia should be a leader in this regard in our adjacent oceans and seas. We have some achievements, but more could still be done, and what we do could be better coordinated.

We could achieve much by exploiting the economic and strategic potential of the oceans, and at relatively little cost, but with enormous political benefit.

We need to promote our involvement in the management of regional oceans and seas, as well as our proactive involvement in the full range of maritime issues.

Most importantly, we should do this as a confident maritime power assured of our own oceanic destiny, rather than as an insecure nation, imbued with insular and insecure attitudes, that tends to see the oceans only as a moat providing protection from other powers. Instead, we should see the seas as a bridge that links Australia with the world.

Endnotes

1 Russia is second with a claim to 21.5 million km^2 and the US is third with 20.0 million km^2.

2 Australia, Indonesia and East Timor comprise the membership of the forum. The forum seeks to fulfil the obligations of these countries under UNCLOS Part IX. Particular concerns are the prevention of illegal, unregulated and unreported fishing, and information and data sharing.

3 The latest report, UN document A/63/63 dated 10 March 2008, can be found at http://www.un.org/Depts/los/general_assembly/general_assembly_reports.htm (accessed 13 January 2009).

4 The ninth meeting was held from 23–27 June 2008. The report of the meeting, which focused on maritime security and safety, is at http://www.un.org/Depts/los/consultative_process/consultative_process.htm (accessed 13 January 2009).

5 Australia chaired the first two meetings of this Group in 2006 and 2008. The report of the 2008 meeting is available at: http://www.un.org/Depts/los/biodiversityworkinggroup/biodiversityworkinggroup.htm

6 The Seoul Oceans Declaration is available at: http://www.apecsec.org.sg/virtualib/minismtg/minmtgocean2002.html

7 The Oceans Policy Scientific and Advisory Group has estimated that there are about 1,900 marine scientists in Australia. The Australian Government has about 640 (including 300 in CSIRO and 180 in AIMS), the universities have 627, and about 640 are with state agencies.

8 They have been negotiated under the broad concept that localised fisheries adjacent to a state should be managed by the state, and the Australian Government should manage fisheries off more than one state or where there is involvement of foreign fishing boats.

9 This description of good order at sea and its prerequisites is based on CSCAP (2001).

10 Information supplied by Geoscience Australia. Article 82 of UNCLOS, sets down principles for the sharing of revenues by the international community as a whole from mineral exploitation (including oil and gas) on the outer continental shelf extending beyond the 200 nautical mile limit. This proportion is defined as one percent of the value or volume of production at the site rising by one percent annually until it reaches seven percent, at which level it remains. Responsibility for collecting these revenues and distributing them is given to the International Seabed Authority. The revenues are to be distributed 'on the basis of equitable sharing criteria, taking into account the interests and needs of developing countries, particularly the least developed and the land locked amongst them'.

11 World Heritage List at: http://whc.unesco.org/pg.cfm?cid=31

12 www.dfat.gov.au/geo/Indonesia/ind-aus-sec06.html

13 The current NRPs are: An Environmentally Sustainable Australia; Promoting and Maintaining Good Health; Frontier Technologies for Building and Transforming Australian Industries; and Safeguarding Australia.

14 An example would be Australia's participation in the Indian sponsored *Exercise Malabar* in the Bay of Bengal in September 2007 that provoked concern in China.

15 Infrastructure Australia is a statutory advisory council with twelve members drawn from industry and government, including five from the private sector. It's supported by an Infrastructure Coordinator within the Infrastructure, Transport, Regional Development and Local Government portfolio.

16 The Australian Shipowners Association has recently launched a careers website to attract people to the maritime profession.

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Acronyms and abbreviations

AAT	Australian Antarctic Territory
ACBPS	Australian Customs and Border Protection Service
ADF	Australian Defence Force
AIMS	Australian Institute of Marine Science
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
BPC	Border Protection Command
CCAMLR	Convention for the Conservation of Antarctic Marine Living Resources
CRC	Cooperative Research Centre
CSCAP	Council for Security Cooperation in the Asia Pacific
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DEWHA	Department of the Environment, Water, Heritage and the Arts
EEZ	exclusive economic zone
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
IMOS	Integrated Marine Observing System (Australia)
IUU	illegal, unregulated and unreported (fishing)
nm	nautical mile
NRPs	National Research Priorities (Australia)
OCS	Offshore Constitutional Settlement
OOMA	Office of Oceans and Maritime Affairs
R&D	research and development
RAN	Royal Australian Navy
RFMO	Regional Fisheries Management Organisation
SAR	search and rescue
SMMC	Strategic Maritime Management Committee
SOLAS	International Convention for the Safety of Life at Sea (1974)
SPREP	Pacific Regional Environment Programme
SUA	Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation (1988)
UNCLOS	1982 UN Convention on the Law of the Sea
UNFSA	United Nations Fish Stocks Agreement

About ASPI

The Australian Strategic Policy Institute (ASPI) is an independent, non-partisan policy institute. It was established by the government to provide fresh ideas on Australia's defence and strategic policy choices. ASPI is charged with the task of informing the public on strategic and defence issues, generating new ideas for government, and fostering strategic expertise in Australia. Its aims are to help Australians understand the critical strategic choices which our country will face over the coming years, and to help government make better-informed decisions.

For more information, visit ASPI's web site at www.aspi.org.au.

ASPI's Research Program

Each year ASPI publishes a number of policy reports on key issues facing Australian strategic and defence decision makers. These reports will draw on work by external contributors.

Strategy: ASPI's flagship publications are longer studies on issues of critical importance to Australia and our region.

Strategic Insights: A series of shorter studies on topical subjects that arise in public debate.

Special Reports: Generally written by ASPI experts, SPECIAL REPORTS are intended to deepen understanding on critical questions facing key strategic decision-makers and, where appropriate, provide policy recommendations. In some instances, material of a more technical nature may appear in this series.

Specialist Publications: ASPI also produces valuable reference tools, such as *The Cost of Defence* and the *Australian Defence Almanac*.

Strategic Policy Forums are online roundtable discussions undertaken when a subject of critical importance requires debate. They bring together a range of experts to discuss the main policy alternatives, the results of which provide policy makers and the broader public with accurate and authoritative information about crucial strategic policy choices.

Policy Analysis: Generally written by ASPI experts, POLICY ANALYSIS papers are provided online to give readers timely, insightful opinion pieces on current strategic issues, with clear policy recommendations when appropriate.

Commissioned Work: ASPI undertakes commissioned research for clients including the Australian Government, state governments, foreign governments and industry.

ASPI's Programs and Projects

These produce publications and hold events including lectures, conferences and seminars around Australia, as well as dialogues on strategic issues with key regional countries. They are as follows.

Strategy and International Program: This program covers ASPI's work on Australia's international security environment, the development of our higher strategic policy, our approach to new security challenges, and the management of our international defence relationships.

Operations and Capability Program: This program covers ASPI's work on the operational needs of the Australian Defence Force, the development of our defence capabilities, and the impact of new technology on our armed forces.

Budget and Management Program: This program covers the full range of questions concerning the delivery of capability, from financial issues and personnel management to acquisition and contracting out—issues that are central to the government's policy responsibilities.

Outreach Program: One of the most important roles for ASPI is to involve the broader community in the debate of defence and security issues. The thrust of the activities will be to provide access to the issues and facts through a range of activities and publications.

National Security Project: Starting in January 2008, the Institute commenced a two-year project examining Australia's National Security in the 21st Century. This project is designed to run in parallel with the government's review of national security arrangements and subsequent crafting and implementation of a National Security Strategy.

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Some previous ASPI publications

Sea change
Advancing Australia's ocean interests

Australia is a three-ocean country with a large stake in the management and security of the Indian, Pacific and Southern oceans, as well as the seas lying to our north—the Timor, Arafura and Coral seas. Geographically, we're potentially an oceanic superpower with one of the largest areas of maritime jurisdiction in the world. This is vitally important to our future prosperity and security.

Our maritime interests are strategic, political, economic and environmental. Strategic interests comprise offshore island territories, the Australian Antarctic Territory, the sea–air gap, and navigational rights and freedom. Political interests include effective arrangements with the states and territories for managing our maritime domain and interests, and cooperation with our regional neighbours for oceans management and good order at sea. Economic interests are traditional marine industry, shipping and seaborne trade, and energy, as well as emerging new marine industries, such as wind and tidal energy, desalination, deep seabed mining, carbon capture and storage, and marine biotechnology. Environmental interests include a healthy marine environment, better marine scientific knowledge, more accurate hydrographic data, and oceans governance.

This report explores the value of the oceans to Australia and the threats they now face. It includes recommendations on protecting and securing Australia's maritime interests, and what we might do regionally to foster cooperation across the Indo–Pacific region. Australia's future largely depends on how we act as a maritime power, but we need to do much more to realise the full potential of the oceans.

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