

# **Military activities and high seas biodiversity conservation**

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## Summary

The military forces of the world have a long history of being the principal stakeholders in matters relating to the high seas. Through history, wars have been fought over access to the seas and oceans of the world and the trade that access represents. The need for nations to be able to protect their strategic interests over water has led to the military being responsible for gathering much of the knowledge we now have about the sea. The great voyages of discovery, probing the depth of the ocean's abyss, our knowledge of physical ocean processes and the characteristics of the sea all have their genesis in the activities of the military.

Through history, the military have also been responsible for environmental impacts as a result of their activities. Adverse impacts have generally been unavoidable, resulting from accidents, as an act of war, or through ignorance due to a lack of knowledge. On the high seas the direct contribution of the military forces of western countries to adverse environmental outcomes has been almost immeasurably small. Yet the military (and Coastguard equivalents) remains the major player in terms of practical contributions to positive environmental and social outcomes through fisheries protection, maintenance of quarantine barriers, search and rescue efforts, charting for safe navigation and research. Military activity on the high seas is one of the principal sources of information about the biophysical environment of the high seas, principally through military sponsorship of worldwide, hydrographic, biophysical and acoustic research. Precise navigational charts are essential for all shipping.

In Australia the Australian Defence Force recognises the critical importance of ensuring that people remain confident that the conduct of essential military training activities - are not at the same time compromising the ecological integrity of the world's oceans. The sensitive nature of the marine environment means that serious incidents such as a major oil or chemical spill can lead to serious environmental impacts. Sound environmental stewardship practices are necessary for sustainable management of the world's oceans.

The fleets of modern warships of countries such as Australia, Canada, USA and the UK are now either equipped with systems that minimise environmental impacts or are moving rapidly in that direction. Such systems are designed to minimise pollution, and are complemented by impact and risk assessment procedures that consider all activities, and mitigate identified impacts through revision of operating procedures.

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This paper will describe some of the positive contributions that military forces make to ensure that the biodiversity of the high seas is protected from the risks of adverse environmental impacts associated with military training. It describes the environmental legislative framework applying to military activities and draws on the Australian experiences with risk minimisation, contributions to research and regulatory responses to impact management on the high seas and in territorial waters. It proposes a model for the development of management arrangements for high seas biodiversity conservation building on the existing regionalisation developed for search and rescue on the high seas.

## Introduction

Intuitively, many people would think that their military's combat roles are such that its activities at sea and ashore are totally incompatible with protection of the environment. To the lay person, any discussion of military activity and environmental effects, evokes imagery of the trench war battlefields of World War I – the “Somme effect”. It is inconceivable to most people that the military can conduct itself in peacetime in a way that is environmentally benign or be involved in stewardship initiatives aimed at environmental protection and biodiversity conservation. Such perceptions are reinforced by periodic media attention given to historical episodes of poor environmental management practices. Past examples include sea dumping of munitions, chemical warfare agents, and obsolete equipment, as well as contamination of soil and groundwater and unexploded ordnance in former training range areas. These are not legacies in which the world's military can take pride, but they are symptomatic of less environmentally sensitive standards applying in an earlier era. Thirty, fifty or 100 years ago prevailing community attitudes and the regulatory climate meant that environmental issues were barely recognised as management priorities – let alone priorities for one's military.

Times have changed, and environmentally speaking, for the better. Over the past 40 years environmental awareness and interest has greatly increased. Certainly in Australia there is widespread community understanding and acceptance of the need to manage the environment in a manner that will ensure *sustainable use* and the arrest of any long term degradation. This fundamental shift in community values means that sustainable environmental management, including on the high seas, must also feature as a key interest for defence forces, and navies in particular.

## The Australian Defence Mission

In Australia the Royal Australian Navy's (RAN) mission is described as to "fight and win in the maritime environment as an element of a joint force, to assist in maintaining Australia's sovereignty and to contribute to the security of our region."<sup>3</sup> This involves a wide range of activities at sea and ashore, and ranging across a spectrum of roles from peacetime surveillance patrols to war fighting. In peacetime, the continuous involvement of Navy ships around Australia's coastline and offshore Exclusive Economic Zone (EEZ) remains a key maritime enforcement option

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<sup>3</sup> Australian Department of Defence, White Paper (2003)

available to the Australian Government.

With attention focused primarily on the RAN's role in enforcing Australia's sovereign rights, it is understandable that public attention is not drawn to the environmental management aspects of such activities. Indeed many Navy personnel would be surprised at the extent to which Navy's routine peacetime operations make important contributions to protection of Australia's unique and in some cases fragile environment.

*Military training on the high seas*

The military generally and navies in particular rarely conduct routine training activities on the high seas beyond 200nm from the coast (except for some very specialised functions or during routine transits overseas). This is because most training occurs in close proximity to home ports in order to conserve fuel, and maximise training value through minimising transit times. This pattern of coastal bias is not unique to Australia and is unlikely to change. The majority of the vessels transiting beyond the EEZ are either on maritime patrol of Southern Ocean EEZ boundaries (and thus participating in protection of high seas biodiversity), or are on routine transits posing environmental risks similar to most civilian shipping. Military vessels make up only a tiny fraction of the world's shipping fleet.

## Defence Contributions to Environmental Protection and Biodiversity Conservation

### Border protection

In Australia our Navy continues to play a vital role in support of the Australian Customs Service (ACS), Australian Quarantine and Inspection Service (AQIS), Agriculture, Fisheries and Forestry Australia (AFFA), Environment Australia (EA) and the Department of Immigration and Multicultural and Indigenous Affairs (DIMIA) in border patrols. These patrols are multitasking patrols organised through Australia's Coastwatch organisation. They aim to intercept potential threats to the environment, fisheries, health or agriculture and to detect illegal immigrants. Probably the most directly relevant to the protection of the marine environment are the support roles for AQIS and fisheries.

### Quarantine barrier

RAN assistance to AQIS - primarily in our northern waters - also extends to boarding and control of foreign vessels that could be carrying diseased animals or plants, or harboring pests and vermin. Of particular concern to marine biodiversity is the possibility of introducing invasive marine species on hulls or in ballast water. These have potential to cause enormous environmental or economic damage to Australia and its marine industries. The risk is real as some animal and plant species not found in Australia are common elsewhere. Thus the RAN's role in assisting AQIS to maintain the quarantine barrier is a key element in maintaining the marine environment relatively free from invasive species and is a positive environmental outcome for our oceans as well as the national economy.

### Fisheries patrols

RAN surface vessels, operating in close cooperation with RAAF maritime patrol aircraft, Coastwatch aircraft and Customs response vessels, play a major role in supporting the Department of Agriculture, Fisheries and Forestry Australia (AFFA) in controlling illegal fishing incursions in the Australian Fishing Zone (AFZ). Control of fishing in the AFZ is seen as fundamental to ensuring the sustainability of fish stocks and the viability of the domestic fishing industry. Sustaining high seas biodiversity in any form, will require strong surveillance and enforcement capacity as well as coordination and information sharing between departments within and between countries. It is likely that as pressure on world fisheries grows, and as regional stocks diminish, the prospects of illegal incursions into both the AFZ and any future managed fisheries on the high seas may well increase without some form of military presence charged with enforcement of regulatory compliance.

A high seas fisheries enforcement capability has not yet been identified as a priority for the Australian Defence Force. Generally speaking whilst defence assets may pursue and board vessels suspected of carrying out illegal activities within the EEZ through maintaining "hot pursuit", legal justification for boarding and apprehension of vessels on the high seas remains unresolved. In some countries, such as Canada, the military have divested themselves of any constabulary role and must embark police to conduct boardings and

arrests. The United Nations and the International Maritime Organisation may be required to develop guidelines for authorisation for such activities in support of high seas biodiversity conservation.

Military vessels generally represent the only significant maritime capability for interception and apprehension of vessels and their crews conducting illegal activities. If conservation of high seas biodiversity is to include surveillance, interception, and apprehension capability, then thought must be given to the legal prerogative for these actions. Constraints on capability are most notable in sub-antarctic and antarctic waters, where sea state and weather conditions may severely inhibit response from military vessels which are, at least in Australia's case, largely designed for warmer climates. Whilst surveillance and apprehension are standard operations of current Defence assets, the long lead times for design and delivery of military platforms that would be required to undertake more specialist roles may be a significant issue for consideration by natural resource policy makers.

#### Hydrographic survey

The RAN has responsibility for survey of the waters off the Australian coast outside ports and harbours. The Navy Hydrographer, based at Wollongong, provides marine charts for the Australian coastal, offshore and littoral areas. Provision of high accuracy charts and related navigational products is fundamental to maintaining the safety of all vessels at sea in our region. Correct charting of the coastline greatly reduces the likelihood of commercial and pleasure craft grounding, one of the most common marine accidents which cause both physical and oil spill damage to reefs and coastlines.

High resolution charting is fundamental to development of bioregionalisation in marine ecosystems when such systems are not well understood. This is because the bioregionalisation is frequently based upon whatever bathymetric data are available (often the only data). High resolution charting also facilitates identification of small scale features that may have ecological significance disproportional to their size (eg seamounts, volcanic vents etc.). Accurate charting is also vital to development of environmental plans managing marine activities in marine ecosystems permitting sustainable management..

#### Search and Rescue

Australia, as a signatory to the International Convention for the Safety of Life at Sea, 1974 (SOLAS), the International Convention on Maritime Search and Rescue, 1979, and the Convention on International Civil Aviation is responsible for search and rescue over a vast area of the Indian, Pacific and Southern oceans. The offshore capability for search and rescue is largely the responsibility of Defence. The internationally agreed Australian Search and Rescue (SAR) Region covers 52.8 million square kilometres - over one-tenth of the earth's surface. There would be significant synergistic value in duplicating the SAR area in any proposal for a high seas maritime patrol regionalisation for the worlds oceans.

## Environmental Legislation and Australia's Military

### Commonwealth Legislation

The *Defence Act 1903* contains very little that is relevant to environmental issues apart from the very narrow concept of Defence public areas. Similarly, the *Naval Defence Act 1910* has little bearing on issues of environmental management within Defence. Regulation of Defence impacts on the environment occurs through specific environmental legislation.

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the most powerful environmental legislation yet enacted by an Australian Government. Amongst other things, the Act binds all Commonwealth agencies, including Australia's Defence Forces, to environmental best practice, regardless of operational location in the world. Defence personnel could face legal action under this Act if their activities have a significant impact on the environment.

The EPBC Act promotes the conservation of biodiversity by providing strong protection for listed threatened, migratory and protected species (marine, avian and terrestrial), and protected areas. Defence activities identified as having the potential for significant impact will require approval from the Minister for Environment and Heritage. Strict conditions may be imposed on when and how the activity can be conducted.

The *National Environmental Protection Measures (Implementation) Act 1998* (NEPM[I]) Act provides for accountability and reporting of environmental pollution or activities that may lead to environmental degradation, in accordance with National Environment Protection Measures (NEPMs). As part of a Defence-wide response to this legislation, Navy is participating in the development of a Defence Accountability Framework, and is reporting to the National Pollutant Inventory (NPI).

The *Great Barrier Reef Marine Park Authority Act 1975* (GBRMPA Act) impacts significantly on important RAN operations and training in the coastal areas of North Queensland. RAN activities in the Marine Park include interception of illegal foreign fishing vessels and vessels attempting to enter the country unlawfully; hydrographic charting; research and oceanographic studies, plus ship transits and joint service training exercises in designated areas.

### State/Territory Legislation and Local Government Regulations

In Australia the Department of Defence is committed to working cooperatively with State/Territory and Local government to ensure that Defence activities do not have unintended environmental or other impacts. To the extent that laws are not inconsistent with overarching Commonwealth legislation Defence seeks to comply with legislation in other jurisdictions.

### International Conventions

International agreements such as the International Maritime Organization's (IMO) ship-sourced pollution regulations (MARPOL 73/78) generally include

an exemption for warships. Australia's *Navigation Act 1912* implements MARPOL for ship construction, and reflects the general exemption for warships. This exemption not only recognises the unique attributes of these vessels, compared to merchant ships (eg purpose built, critical weight and space limitations), but also the traditional 'right' of these vessels to use the oceans 'unencumbered' by civil regulation. The weight of public opinion can occasionally erode the value of exemption for warships under international agreements such as MARPOL 73/78. The RAN voluntarily chooses to comply with all extant MARPOL 73/78 regulations pertaining to pollution discharge at sea, despite the exemption clause. In fact, in many instances RAN policy exceeds the requirements laid down by the convention. This also satisfies obligations contained in the Defence Environmental Policy.

There are other examples of the RAN complying with conventions governing international marine environment protection, despite the immunity applying to warships. One example is the London Convention on sea dumping, in force in Australia since 1981. This was only extended to include the Defence Force following amendment in 1996, but RAN has voluntarily complied since inception.

#### Defence Environmental Policy

In December 2001 Defence launched its Environmental Policy committing the organization to legislative compliance, prevention of pollution and continuous improvement of its environmental performance. The Policy recognises the importance of protecting the environment, and the need to ensure that best environmental practices continue to be implemented throughout Defence. Management of activities to minimise environmental impacts, and promotion of environmental sustainability, are key elements of the new policy (discussed separately in this issue).

#### The Australian Navy's response to the challenge of protecting marine biodiversity

In recent years Navy has responded to the challenge of sustainable environmental management with increasing vigour. Navy managers now perceive the need to balance the need to train for war and warlike activities, with the need for sustainable environmental management<sup>4</sup>.

Military activities are rarely conducted on the high seas unless associated with a transit voyage because of the costs involved. Most training occurs near the coastline close to fleet bases. Navy training in peacetime must mirror conditions that may be encountered during genuine hostilities. When preparing to send personnel, ships and aircraft in harm's way, there is no substitute for rigorous and realistic peacetime training. This puts a considerable challenge on exercise planners to meet the need for exercise realism and extract the greatest training benefit, while avoiding adverse environmental outcomes. An example is the training strategies that have been developed for the RAN to ensure that cetaceans and other marine life are not

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<sup>4</sup> Wark, N. J. and Verrier, F. J. (2002). Australian Defence Organisation Environmental Management Initiatives - Shoalwater Bay Training Area. *Federal Facilities Environmental Journal*, Spring 2002: 53-63.

adversely impacted by SONAR transmissions or acoustic impulses generated by underwater explosions.

Sound management of the terrestrial environment at major bases also means that sensitive coastal ecosystems are protected. These coastal environments are in turn a critical part of the life cycle of species found in deeper water offshore and demonstrate the interconnectedness of coastal and ocean marine environments. With regard to protection of coastal environments the RAN can point to a number of examples:

HMAS STIRLING (which includes Fleet Base West and is located on Garden Island near Rockingham, Western Australia) is effectively a port, light industrial and residential area, but operates as the equivalent of a national park, abuts protected marine park and is listed on the Register of the National Estate for both its natural and cultural heritage values;

Navy operations in the Jervis Bay (New South Wales) area are conducted in sympathy with preservation of environmental values in two adjoining National Parks (Jervis Bay Marine Park and Booderee National Park), and on the adjoining Beecroft Peninsula Bombardment Range (also listed on the Register of the National Estate);

Broader environmental initiatives delivering positive outcomes for biodiversity protection have included:

The conduct of rigorous environmental impact assessments for the adoption of new technologies and equipment (such as for the development and operation of new Mine Countermeasure training sites off the New South Wales coast);

funding for research into the distribution and abundance of whale populations off the east and west coasts and for tracking critically endangered blue whales in the Indian Ocean off WA;

development of ship mitigation procedures for use of sonar and explosives to avoid adversely impacting on cetaceans; and

standardisation of ship fuel types, involving removal of heavy bunker fuel oils, and improved fuel efficiency of ships.

Defence is committed to continuous improvement through the adoption of management systems based on the ISO 14001 quality assurance standard. As environmental issues evolve and as scientific knowledge continuously improves, Defence accepts that environmental practices will need to keep pace for it to remain a leader in environmental stewardship.

#### Examples of RAN management of current environment issues

As the environmental knowledge base increases, practises previously sanctioned by the community may become less acceptable, particularly when methods to avoid or minimise potential damage become available. The challenge for Navy policy makers and operators is to ensure that operational and training activities that may pose some environmental risk are managed carefully to preserve Navy operational capability *and* to ensure compliance with environmental legislation.

Protected species and marine protected areas.

Operating in and adjacent to marine protected areas or those periodically populated with whales and other highly protected marine species will require careful management of activities identified as posing some environmental risk. The development of Environmental Management Plans (EMPs) for ships and maritime exercise areas, and adoption of the mitigation measures contained within these EMPs, will provide the management process whereby protection is ensured.

*Minimising impacts on whale populations*

A number of protected species, particularly cetaceans, use sound to navigate, hunt and communicate. Whilst there is always “ambient” sound present in the oceans (and often at high levels<sup>5</sup>), a limited number of Navy activities are capable of producing levels of sound significantly above the background ambient levels<sup>6</sup>.

“Active” sonars (which transmit sound, as opposed to “passive” sonars, which only receive) are used by warships of all nationalities in conducting anti-submarine or sea mine detection operations against threats to themselves or ships they are escorting. Commercial vessels and fishing boats all use forms of SONAR for depth sounding and fish finding. Essentially this technology involves underwater sound transmission from the ship, and its detection after reflection from an object. Active sonar systems are necessary elements of a warship’s fighting role, and fundamental to successful detection, identification and destruction of submarines, mines and torpedoes. The detection of underwater objects using active and passive sonars requires considerable skill and regular training, which can only partially be met in shore simulators. Such activities are therefore a necessary and unavoidable part of Navy operations at sea. The challenge is to ensure that the peacetime training use of equipment capable of impacting on the marine environment is undertaken in a way that minimises the degree of environmental risk.

The destruction of sub-surface threats involves use of a wide range of weapons designed for detonation underwater. While these are rarely used in peacetime, underwater explosions are capable of generating high intensity sound, in addition to the shock-wave caused by the explosion. The shock-wave may affect not only the physical environment, but biota within it. Fortunately the shock-wave may be quite local in effect, frequently only a few tens of metres depending on the size of the charge. In contrast the sound of an explosion, or high power active sonar may propagate for many kilometres. Underwater sound levels and their impact on marine mammals is the subject of ongoing scientific debate <sup>7</sup>, particularly with reference to shipping noise,

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<sup>5</sup> Cato, D. H. (1976). Ambient sea noise in waters near Australia. *J. Acoust. Soc. Am.*, 60, 320-323.

<sup>6</sup> Dotinga, H. M., & Elferink A. G. O. (2000). ‘Acoustic pollution in the oceans: The search for legal standards’. *Ocean Development and International Law* 31 (1): 151 - 182.

<sup>7</sup> Cato, D. H. (1992). The biological contribution to the ambient noise in waters near Australia. *Acoustics Australia*, 20, 76-80.

Richardson, W. J., Greene, C. R., Malm, C. I., and Thompson, D. H. 1995. *Marine mammals and noise*. Academic Press, San Diego California. 576 p.

Cato, D. H. (1998). “Low frequency component of wind dependent noise.” Paper presented at and incorporated into proceedings of U.S. Office of Naval Research Noise Focus Workshop, Keystone, Colorado, August 1998.

seismic survey vessels<sup>8</sup>, and high intensity active sonar and other Defence related activities.

In recent years RAN has become acutely aware that training activities involving sonar or underwater explosive devices require careful management if significant impacts are to be avoided. This is particularly the case noting the extensive use of Australian waters by migratory whale species such as the humpback whale (*Megaptera novaeangliae*). Not only do individuals of this species migrate the length of the east and west coasts, they also use the tropical waters of Queensland and Western Australia for breeding and resting purposes. Other species, including the blue whale (*Balaenoptera musculus*) and the pygmy blue whale (*Balaenoptera musculus breviceauda*), inhabit the west coast, and are known to congregate at certain times of the year in the West Australia Exercise Area (WAXA)<sup>9</sup>. The WAXA is used continually for operational exercises and training by ships and submarines based at the Navy's nearby Fleet Base West at HMAS STIRLING, near Rockingham.

Clearly as populations of whales recover in line with the reduced impact of whaling, interactions between ships and whales will increase. The humpback whale population for example is estimated to be increasing at 10.9% per year<sup>10</sup>. Other species recovery is much slower. It is possible that the humpback whale may in future occupy a broader range of ecological niches due to its speed of recovery, and the comparative lack of recovery in other species. A consequent increase in the humpback population, potentially above that which existed prior to the onset of whaling, would lead to significant congestion issues for seagoing vessels off the Australian coast. Mitigation of activities through application of sound scientific research conclusions is fundamental to sustainable use of such areas, and maintaining the ability of the Navy to train and operate using active acoustic equipment. As stated, current Defence Science and Technology Organisation (DSTO) research projects are aiming to determine rates of sound attenuation, effects of sound on marine ecosystems, and design and operational use of alternative underwater sonar systems.

Recovery of whale populations in Australian waters brings increased threat of whale collision with ships. Whale collision is recognised as a probable major

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Simmons, M. P. and Dolman, S. (1999). A note on the vulnerability of cetaceans to acoustic disturbance. Paper submitted to the Scientific Committee of the IWC: IWC 51/E15: 1-4.

Parsons, E. C. M., Birks, I., Evans, P. G. H., Gordon, J. G., Shrimpton, J. H., and Pooley, S. (2000). Possible impacts of Military Activity on Cetaceans in West Scotland. *European Research on Cetaceans* 13:128-133

<sup>8</sup> McCauley, R. D., Jenner, M-N., Jenner, C., McCabe, K. A., and Murdoch, J. (1998). The response of humpback whales (*Megaptera novaeangliae*) to offshore seismic survey noise: preliminary results of observations about a working seismic vessel and experimental exposures. *APPEA Journal* 38 (1): 692-707.

McCauley, R. D., Jenner, C., Bannister, J. L., Cato, D. H., and Duncan, A. (2000). Blue whale calling in the Rottnest Trench, Western Australia, and low frequency sea noise. *Acoustics* 2000: 1-6.

<sup>9</sup> Bannister, J. L. and Burton, C. L. K. (2000). Investigation of blue whales off Perth, Western Australia: Aerial survey, 1999-2000. Final Report to Environment Australia, by the Western Australian Museum. 10 pp.

Gill, P. C. (2000). A blue whale feeding ground off southern Australia: preliminary findings. SC/52/OS 9:1-9. Paper presented to the 53rd Annual Meeting of the Scientific Committee of the International Whaling Commission, July 2001.

<sup>10</sup> Paterson, R., Paterson, P., and Cato D. H. 2001. Status of humpback whales (*Megaptera novaeangliae*), in east Australia at the end of the 20th century. *Memoirs of the Queensland Museum* 47(2): 579-586. Brisbane.

cause of the lack of recovery of the northern right whale (*Eubalaena glacialis*), a species known for its slow swimming speed and limited response to surface threats. The RAN is concerned about collisions because not only is an equally vulnerable close relative, the southern right whale (*Eubalaena australis*) present in our waters, but such collisions can lead to significant damage to warship hulls and systems. The rapid recovery of the humpback whale population will also add to the risk of collision. It is worth noting that the number of Navy vessels at sea on each day of the year is relatively small compared with the number of merchant vessels trading around the coastline. Naval ships also tend to operate at significantly lower speeds (for reasons of fuel economy) than merchant vessels, and generally have more people keeping visual watch. Correspondingly the risk of whale collisions with merchant vessels is likely to be greater than for Navy ships.

#### IMO Phase Out of Single Hulled Tankers

The total loss of the tanker *Erica* off Brittany, France from hull failure in high seas led to increased impetus for an IMO plan to phase out single hull tankers (Danish Shipowners Association Website). The accelerated phase-out plan has been ratified by Australia, and its impact on the Defence Capability Plan is being reviewed. Despite the warship exclusion clause, Australia plans to replace both its tankers (HMAS WESTRALIA and HMAS SUCCESS) with compliant double hulled vessels when they are due for withdrawal from service at the end of their effective lives. This is in line with decisions made by a number of other major navies.

#### Phase Out of Tributyl Tin (TBT) Antifouling Paints

TBT antifouling paint is to be banned by the international community via a new IMO convention. This ban is due to the paint's toxicity to non-target organisms and its tendency to accumulate in sediments and bio-accumulate in the food chain. The current timetable for the phase-out is a ban on new applications from January 2003 and a total ban on use by January 2008. DSTO has been researching efficacy of replacement paint systems on behalf of the Navy for some years. Subsequently, the Navy has commenced a programme of withdrawal of TBT in line with the IMO convention, notwithstanding the clause exempting warships. One promising replacement finish uses less toxic copper as the active constituent, in line with paint types adopted by commercial shipping operators, and Western Navies.

#### Management of Potential Introduced Marine Pests

Introduced marine pests (IMPs) are recognised as a major threat to marine ecosystems worldwide. Recent examples of incursions include the black striped mussel in Darwin and the green-lipped mussel in Cairns. In both cases Defence personnel assisted in survey, sample collection and clean-up of the harbour areas, as a community service.

Ballast water and hull fouling are recognised as the two most prominent vectors for the transfer of potential marine pest species. A ballast water reporting and management system has been developed and implemented by AQIS. RAN voluntarily complies with the requirements of the system in vessels equipped with dedicated water ballast tanks.

Hull fouling is increasingly being recognised as a potential source of IMPs. Due to the specialised design requirements for high speed and endurance, the hulls of naval vessels are kept clean, and with antifouling coatings in good condition. Hull coatings are renewed on average every five years.

As well as external hull areas, seawater systems are also vulnerable to fouling organisms. Warships require larger cooling systems compared to merchant vessels. They generally use salt water for cooling main engines, gearboxes, airconditioning, fridge/freezers, and to provide water for firefighting systems. Water for these systems enters the ships hull via complex valve and piping systems and sea chests, which can harbour IMPs. Navy directed research by DSTO is seeking improved fouling control technology for these systems.

#### Ship generated waste management

Ship waste management protocols were developed by the IMO via the *International Convention for the Prevention of Pollution from Ships, 1973*, as modified by its Protocol of 1978 (otherwise referred to as MARPOL 73/78). These regulations were developed in response to the significant contribution of waste from shipping and boating to degradation of the marine environment (IMO, 1991). Warships are excluded from MARPOL 73/78, however sovereign states are required to ensure that they act in a manner consistent with the objectives of the Convention, without prejudicing operational capability. Navy voluntarily complies with (and often exceeds) MARPOL 73/78 requirements (ANZECC, 2000).

#### Environmental Management Plans (EMP) for Navy Exercise Areas and Ships.

Navy shore establishments and shore practice ranges have had EMPs for some years. These are currently being updated to ensure compliance with the EPBC Act. In parallel, EMPs are also being developed for maritime exercise areas and ships.

Maritime exercise areas are used for a broad range of activities, and frequently by groups of vessels and aircraft. The EMPs, when in place by late 2003, will greatly enhance Defence ability to avoid environmental damage. The risks of not managing an exercise area in a sustainable manner could result in loss of public confidence, even loss of access and use. The ship EMPs will demonstrate due diligence and provide environmental protection from shipborne activities *anywhere in the world that Navy operates*, in accordance with the requirements of the EPBC Act. However, it should be noted that the environmental impact of naval ships and aircraft conducting normal peacetime operations at sea is insignificant.

#### Scientific research

The RAN undertakes and supports research in environmentally related areas in collaboration with other elements of the Defence organisation, notably the Defence Materiel Organisation (DMO) and DSTO. The range of current research topics includes:

modelling of underwater sound propagation characteristics;

impacts of underwater sound on marine life;  
 observation and reporting of the movements, behaviour and ecology of whales;  
 testing efficacy of replacement antifouling paint systems and reducing the risk of introduced marine pests;  
 participation in management of introduced marine pest incursions;  
 ship waste management and pollution prevention; and  
 use of environmentally benign components in maritime equipment.

Defence also have collaborative research programmes with other scientific institutions including universities. These include a pygmy blue whale population distribution and abundance survey off the coast of Western Australia in collaboration with Curtin University, and a marine mammal acoustic research programme proposed by the University of Queensland for the coastal areas of south-east Queensland.

The RAN has recently flagged environmental issues as a focus area requiring increased scientific research by DSTO. An increase in Defence spending on environmental research will help considerably in providing balanced, scientific solutions to many of the marine environmental issues where knowledge is still limited.

*Role of community engagement, environmental awareness, media and public perception*

For the past 40 years environmental issues have been finding an increasing resonance with the aspirations of the wider Australian community. Awareness and expectations have grown and what was once acceptable may now be unforgivable. As far as Defence in Australia is concerned, Government, regulators and interest groups as well as the Australian community generally are still prepared to draw distinctions between active, unusual or unique military operations, and the more routine operational tasks or training activities which Defence undertakes.

Compliance with environmental legislation now occurs as a matter of policy. Only in the most urgent extraordinary circumstances will activities that have the potential to compromise best practice environmental management outcomes be accepted as necessary; for example, during war or to save human life. As previously mentioned, the RAN has formally introduced mitigation procedures for its operations, to ensure that whales are avoided when conducting activities with the potential to cause harm, such as underwater explosions. Migration, feeding and breeding areas are specifically being avoided. This is the way of the future. It involves some compromises for Defence, but also obliges a degree of acceptance by the community that Defence is environmentally aware in the conduct of its business. Defence plans to do more in future to improve public awareness of its good environmental record.

Defence also takes a leading role in regional environmental fora around Australia, where these are relevant. The RAN for example, has been a key player in programmes such as the Australia and New Zealand strategy to reduce impacts from shipping on the marine environment and in collaborative

projects to study marine habitats. Another example is the multi-party Cockburn Sound Management Council established by the WA Government. Membership of these groups demonstrates the RAN's credentials as an environmentally responsible corporate citizen, while simultaneously permitting public scrutiny of their environmental performance.

### Conclusion

Defence in Australia has taken an approach to management of environmental issues with the potential to impact on biodiversity of the high seas that is not atypical of the approaches taken by other developed countries. Compared to other risks, for example from overfishing, land-based sources of marine pollution or marine transport accidents, the risks arising from military activities in peacetime remain relatively small. Nevertheless, the Australian experience has been to try and minimise even the small risks posed by the activity of its Defence forces.

Management of high seas biodiversity may require development of fishing limits, exclusion zones, and in some cases declaration of marine reserves. If these conservation measures eventuate, a surveillance, interdiction and apprehension capability may be required. In most cases Defence force assets represent the sole capability to undertake these activities on the high seas. Consideration would then be required as to the legal framework under which such activities could be authorised. Further, any development of high seas biodiversity management regions should adopt the existing regionalisation developed for search and rescue, for communication and administrative efficiency reasons.

In Australia the contribution by Defence in leadership of environmental stewardship of the oceans is appropriate and inevitable, given that the RAN is the largest Australian shipowner and our responsibilities for search and rescue exist over such a broad expanse of ocean. Defence activities generally are often the subject of close public, Parliamentary and media scrutiny. The use of SONAR has been a particularly closely scrutinised. Defence has concluded that the community will not tolerate any failures by Defence to conduct its peacetime training activities in a sustainable manner, consistent with the communities expectation that this must be done sustainably. This is particularly important in the case of potential impacts on rare and threatened species such as the great whales, which have acquired an iconic status.

So far the challenge has been met. Defence has delivered significant positive outcomes for environmental conservation in a number of areas. However, Defence needs to continually monitor and evaluate all activities that may be constrained or prevented by changes to Commonwealth legislation and international treaties, or in response to public pressure.

Nevertheless, Defence must keep its young men and women safe. It does so by preparing them to the highest possible standards for the unfortunate possibility that one day they may find themselves in harm's way. For the conservation of high seas biodiversity, the challenge for Defence is to

successfully balance sound environmental stewardship of the oceans with this overriding critical requirement to train our people to provide for our national security.