

SCUTTLING THE EX-HMAS ADELAIDE AS AN ARTIFICIAL REEF AND RECREATIONAL DIVE SITE: A CASE STUDY IN COMPLEXITY

C Cole¹, C Abbs¹

¹Catchments & Lands, Department of Primary Industries, Newcastle, NSW

Introduction

An estimated 18,000 people attended the scuttling of the *Ex-HMAS Adelaide* on 13 April 2011, the culmination of a complex project with economic, environmental and educational benefits for the NSW Central Coast. The former naval frigate is now an artificial reef and dive site located approximately 1.8 kilometres off Avoca Beach near Terrigal, attracting marine life as well as local and international tourists.

Built in the United States, *HMAS Adelaide* was commissioned in November 1980 and was the first of six Adelaide-class guided-missile frigates to be delivered to the Royal Australian Navy. The 138-metre long ship was decommissioned in 2008 and demilitarised by the Department of Defence before being handed over to the NSW Government in 2009.



Figure 1: The Ex-HMAS Adelaide in service

Since 1997, five former naval vessels have been transformed into dive sites in waters off Western Australia, South Australia, Queensland and Victoria. The Adelaide Project was a first for NSW, and also set precedents for the Commonwealth approval process with the permit issued under the *Environment Protection (Sea Dumping) Act 1981* undergoing a comprehensive review by the Federal Administrative Appeals Tribunal.

Operational since May 2011, the Ex-HMAS Adelaide dive site is now delivering multiple benefits for the regional economy, particularly for tourism and hospitality. By creating an artificial reef, the vessel is also enhancing marine biodiversity and providing environmental education and research opportunities.

This case study shares some of the challenges in the project delivery included site selection, ship preparation to meet environmental and diver safety needs, environmental assessment, stakeholder consultation, divergent community interests, legal action, interagency cooperation for the tow and scuttling event, and the commercial management model for the dive site.

Naval ships as artificial reefs

Divers have long enjoyed exploring shipwrecks, but in more recent times decommissioned naval ships have been deliberately scuttled to create an artificial reef that attracts both marine life and divers. Canada and the United States have developed guidelines for best management practices and clean-up standards for preparing ships to create artificial reefs. The Australian authorities use these guidelines in the absence of an Australian standard.

The Ex-HMAS Adelaide was the sixth naval vessel to be scuttled in Australian waters as an artificial reef and dive site, as detailed in Table 1. The locations are illustrated in Figure 2. Compared with similar dive sites around Australia, the location on the Central Coast has the advantage of proximity to the major local and international tourist market emanating from Sydney, with the site being an easy 1½ hours drive from the NSW capital.

Being the sixth project gave the opportunity to learn from the experience of others, but differences in state legislation meant that each project had different planning and regulatory regimes. Approval under Commonwealth legislation (*Environment Protection (Sea Dumping) Act 1981*) is also required unless the site is in enclosed waters of the state.

Table 1: Naval wrecks scuttled as artificial reef dive sites in Australia

Year	Location	Name	Classification
1997	Geographe Bay, Dunsborough, WA	Ex-HMAS Swan	Destroyer escort (Leander)
2001	King George Sound, Albany, WA	Ex-HMAS Perth	Guided missile destroyer (DDG)
2002	Yankalilla Bay, The Fleurieu Peninsula, SA	Ex-HMAS Hobart	Guided missile destroyer (DDG)
2005	Off Mooloolaba, Sunshine Coast, Qld	Ex-HMAS Brisbane	Guided missile destroyer (DDG)
2009	Bass Strait, off Barwon Heads, Vic	Ex-HMAS Canberra	Guided missile frigate (FFG)
2011	Bulbararing Bay, off Avoca Beach, NSW	Ex-HMAS Adelaide	Guided missile frigate (FFG)

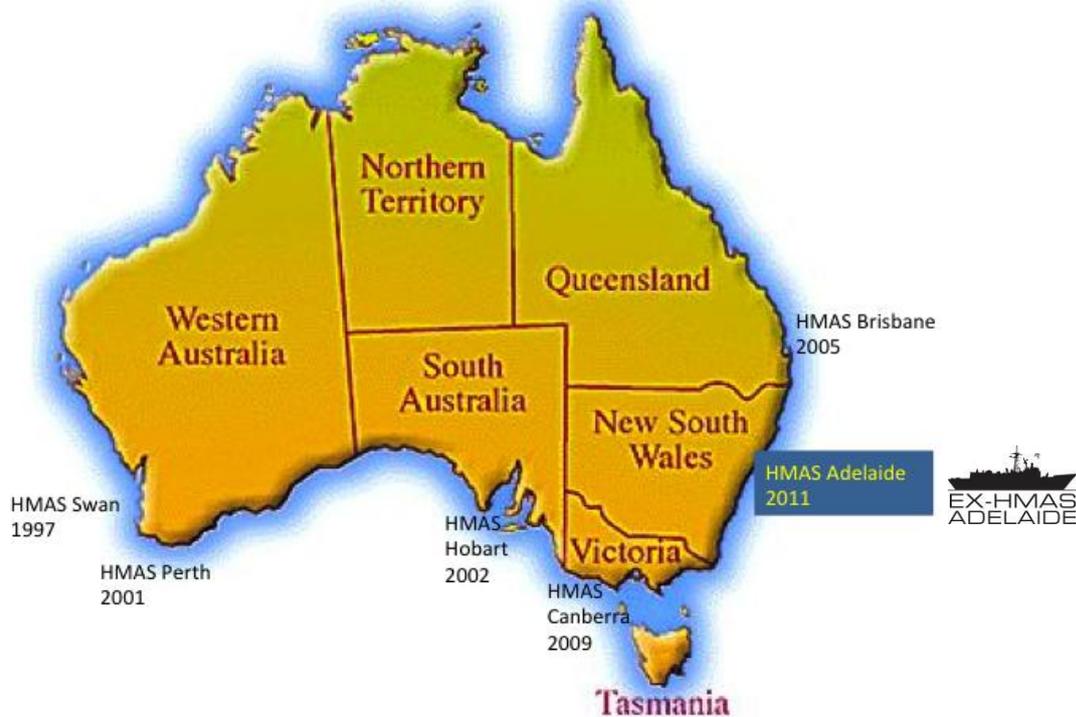


Figure 2: Location of naval wreck dive sites in Australia

A project conceived by the community

The Central Coast Artificial Reef Project (CCARP) is a non-profit organisation formed around 2000 from community representatives from Central Coast dive clubs and dive operators with the sole objective of establishing one or more diveable artificial reefs on the NSW Central Coast.

The group initially lobbied for the *Ex-HMAS Brisbane*, which was gifted to the Queensland Government in 2002. CCARP was again disappointed when the *Ex-HMAS Canberra* was gifted to the Victorian Government in 2006, but by this time the NSW Government was on board in supporting the group's bid due to the anticipated economic and environmental benefits for the Central Coast. Creation of the artificial reef was expected to boost the local economy, enhance marine biodiversity, and provide ongoing educational and research opportunities. The initial business case for the project forecast benefits in the order of 3200 extra visitor nights per year to the Central Coast, with a total direct and flow-on value from diving tourism of approximately \$1M per annum.

The Gifting of the Ship

In February 2007, CCARP finally achieved the first milestone toward their objective when the Commonwealth Government announced that the *Ex-HMAS Adelaide* would be gifted to the State of NSW for the purpose of creating an artificial reef and recreational dive site off the Central Coast. The Deed of Gift identified 'waters adjacent to Terrigal' as the first priority for the dive site.

The Commonwealth provided \$3M to fund the necessary activities to select a site, prepare the ship to meet environmental and diver safety requirements, scuttle the ship and establish the dive site.

After researching the likely project costs, the NSW Government recognised that \$3M was well short of the amount needed. Handover of the ship was delayed while the funding issues were negotiated. After lengthy negotiations, the Commonwealth agreed to fund up to \$5.8M for the project, with the costs eligible for reimbursement being strictly defined in the Deed of Gift. The NSW Government originally committed \$0.25M to the project, as well as in-kind contributions, but had to meet significant additional costs to complete the project.

Site selection studies

CCARP undertook some initial site surveys at the time they were lobbying government for a naval vessel to create a dive site off the Central Coast. They proposed a location between Terrigal Headland (Broken Head) and Avoca Beach.

In 2008, the then Department of Lands engaged The Ecology Lab to assess and map the physical, environmental and operational constraints and recommend a suitable location for more detailed environmental assessment as part of the planning approval process.

Desirable site characteristics include:

- sand at least 2-5 metres deep to enable the ship to settle in the sand and remain stable and upright
- water depth of 30-35 metres
- suitable coastal and oceanographic characteristics (currents, wave characteristics and water clarity)
- no navigational safety hazards
- the ability to attract marine life to colonise the artificial reef
- no impact on threatened species
- minimal impact on commercial fisheries
- proximity to on-shore infrastructure for dive operations.

The site selection study used existing sources of information, results of a single-beam side scan sonar survey and a diving inspection to identify two site options in 30-35m of water, offshore of north Avoca Beach as shown in Figure 3.

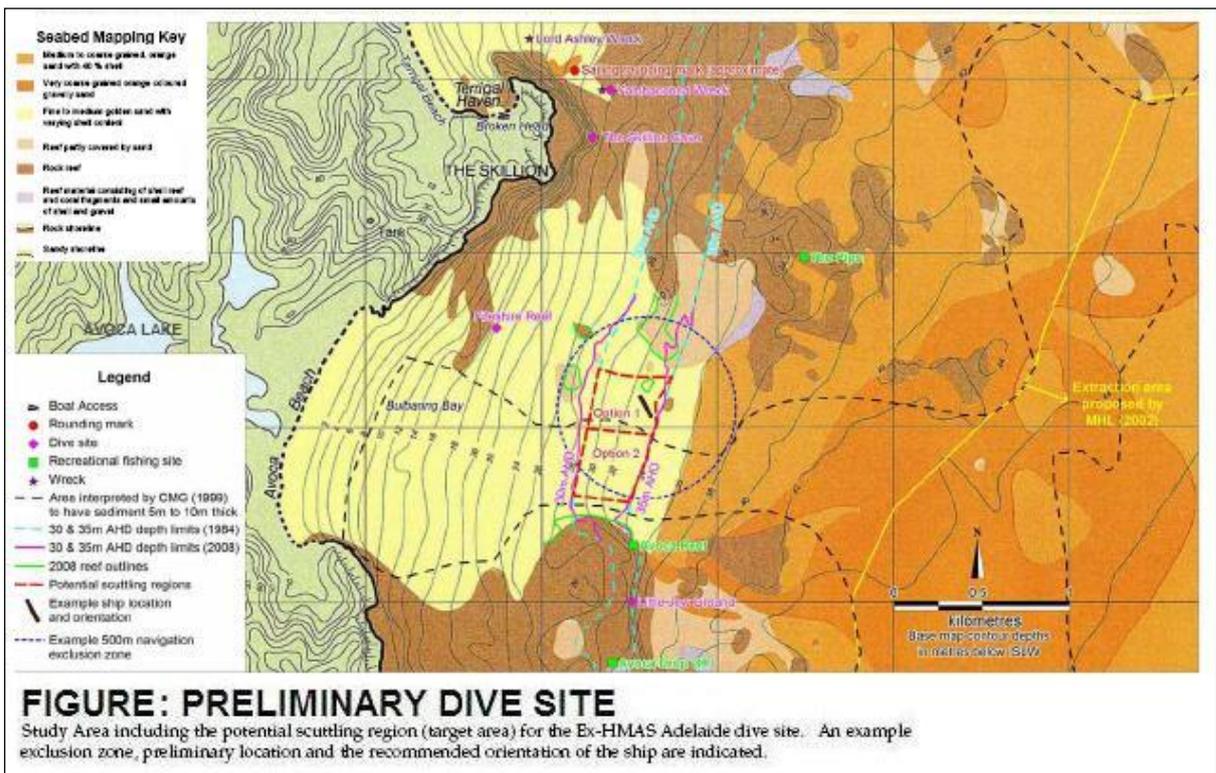


Figure 3: Options identified by the site selection study

The final site selected for the Ex-HMAS Adelaide is approximately 1.4km from The Skillion and 1.8km from Avoca Beach in approximately 32 metres of water. The ship is oriented ESE so that the bow is facing into the general direction of the largest waves which are from the SE, ESE and S.

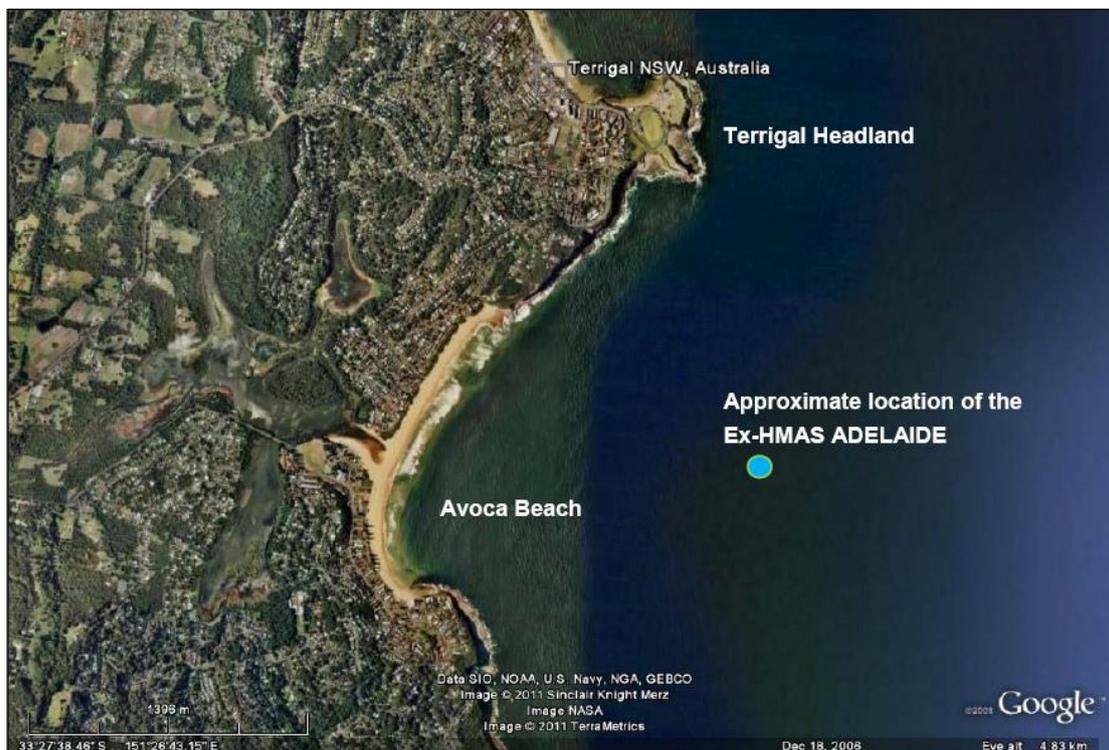


Figure 4: Final location of the Ex-HMAS Adelaide

The planning and regulatory process

A comprehensive environmental assessment was undertaken in accordance with state and federal environmental legislation. This included approval under the NSW *Environmental Planning and Assessment Act 1979* as well as obtaining an Artificial Reef (or Sea Dumping) Permit issued under the Commonwealth *Environment Protection (Sea Dumping) Act 1981*. The final resting place of the ship is on Crown Land within the 3 nautical mile limit, so a Plan of Management for the Ex-HMAS Adelaide Reserve was also prepared in accordance with the *Crown Lands Act 1989*.

Early contact was made with the then Department of Environment Water Heritage and the Arts (DEWHA) to establish requirements for the Artificial Reef (or Sea Dumping) Permit. DEWHA requested all available information and undertook progress inspections over the course of the project, making it clear that the permit would not be issued until the ship was ready to tow and all relevant plans had been approved.

The environmental assessment was undertaken in accordance with Part 5 of the *Environmental Planning and Assessment Act 1979* and considered a variety of environmental and socio-economic issues including:

- characteristics of the seabed
- coastal processes
- flora and fauna
- navigation
- water and air quality
- noise and vibration
- visual and aesthetic
- socio-economic impacts, including recreational and commercial fishing, surfing, boating
- cultural or historical importance
- benefits to the Central Coast regional economy
- operational feasibility, diver safety and amenity.

The environmental assessment was prepared as a Review of Environmental Factors (REF). If the assessment had identified any significant impact on the environment, the legislation requires an Environmental Impact Statement (EIS). The issues considered in the REF were essentially the same as would be addressed in an EIS, but the distinction between an REF and EIS can be complex for stakeholders to understand, particularly if they are opposed to an initiative.

A *Long Term Monitoring and Management Plan* was also prepared in accordance with the requirements for obtaining the Sea Dumping Permit. The monitoring program includes:

- the structural integrity, vessel stability and position of the scuttled ship
- sediment movement
- colonisation of the artificial reef over time by marine biota
- sediment quality and bioaccumulation studies

Preparation of the REF, Plan of Management and Long Term Monitoring and Management Plan was undertaken by under a single consultancy engagement.

Stakeholder and community consultation

The creation of an artificial reef and dive site commenced as a community-driven project, and stakeholder consultation commenced in 2000 when CCARP held an information night attended by around 250 people. CCARP also established a website and consulted with local Members of Parliament and Gosford and Wyong Councils.

NSW Government agencies became involved in the project in 2006, with the Department of Premier and Cabinet (DPC) preparing a business case supporting CCARP's lobbying for the *HMAS Adelaide* to be gifted to NSW. After it was announced that the ship would be gifted to NSW in 2007, DPC became the coordinating agency and the then Department of Lands took on the project management role.

As the project progressed, the consultation process included:

- establishing a project website in April 2008 to disseminate general information and detailed reports such as the site selection study, Plan of Management and REF
- briefing the Central Coast Community Environment Network on the project in May 2008
- publicly advertised community meetings in May, June and November 2008.
- establishing a community reference group to input to the Plan of Management
- a public meeting in September 2009 in conjunction with the exhibition of the Plan of Management
- consultation with the fishing industry
- convening an Environmental Reference Group to facilitate state agency and local stakeholder input to the environmental preparation of the ship
- convening a Dive Reference Group with members of local clubs and dive industry stakeholders to input to the dive design process.

After a decade of positive community involvement, this situation changed in February 2010 when some members of the Avoca community formed the No Ship Action Group (NSAG). This group was incorporated on 11 March 2010, just a few weeks before the original scheduled scuttling date of 27 March 2010, and their vigorous opposition to the project culminated in legal action in the Administrative Appeals Tribunal (discussed later).

The tension and high emotions between community supporters and opponents of the project added to the complexity of the project.

Initial ship preparation by the Department of Defence

The *HMAS Adelaide* was decommissioned by the Australian Navy in January 2008. The Department of Defence undertook initial cleaning and demilitarisation of the vessel at Garden Island, Fleet Base East, between January and September 2008 in a process called 'paying off availability'.

The two stages of the paying off availability process were:

- declassification – removal of classified security items, including communications and signals processing equipment and control consoles from weapons systems; and

- demilitarisation – removal of weaponry, radar systems, rudder, propeller, sonar dome, pumps, motors, cabinets, radio equipment, etc.

The process included the retrieval of spare parts for frigates of the Adelaide class that are still in service. ‘Spare parts’ included the missile launch unit, weaponry, electronic components and engines. The ship’s fuel tanks were also emptied and the fuel filling and transfer lines were flushed with soapy water.

By the time she was handed over to the NSW Government, the *Ex-HMAS Adelaide* was a ‘dead’ ship with no power or means of propulsion. She was towed to Glebe Island wharf for the next stage of preparation in June 2009.

The ship preparation and scuttling contract

Following an Expression of Interest process, four prequalified tenderers were invited to submit a tender for the ship preparation and scuttling contract, which was ultimately awarded to McMahon Services Australia in June 2009.

The scope of the contract included all necessary environmental and other safeguards to create a safe and effective dive site, including:

- removing all fuels, oils and greases
- identifying and removing all hazardous materials, including PCBs, asbestos, heavy metals, batteries, chemicals, plastics etc
- removing items that could break loose during the scuttling process or be a diver hazard
- preparing a safe and interesting dive design to suit different levels of expertise, including cutting diver access holes, removing items that could be a safety hazard (including cabling, non-structural partitions, hatches/doors) and sealing some areas to prevent access for safety reasons
- designing the scuttling process to ensure the vessel would settle to the seabed with its structural integrity maintained, in an upright position in the correct location, depth and orientation
- towing to the scuttling site, undertaking final on-site preparations, and scuttling the ship
- post-scuttling activities, including retrieving debris, clearance dive, and repairing any damage from the scuttling process
- installing navigation markers and mooring buoys for operation as a dive site.



Figure 5: The ship being prepared at Glebe Island Wharf

Where feasible, material stripped from the ship has been recycled or reused, including over 500 tonnes of copper, aluminium, stainless steel, and lead ballast.

The ship preparation was undertaken in close consultation with the then Department of Environment Water Heritage and the Arts (DEWHA), who inspected the ship as the preparation proceeded and ultimately issued the Sea Dumping Permit under the *Environment Protection (Sea Dumping) Act 1981* on 22 March 2010.

One of the challenges for the project was that the lack of an Australian standard for ship preparation meant the contract had to be managed with the flexibility to respond to DEWHA's standards which were specified during the months of preparing the ship.

A further complexity for the project was that DEWHA's practice was to issue the Sea Dumping Permit after they were satisfied that all preparations had been completed, effectively just days before the tow was scheduled.

A significant lead time was required to book the tugs, barge and explosives sub-contractor, and plan the logistics of crowd and traffic management on land and water, the transit of Sydney Harbour under tow, and media liaison. Event management was coordinated through the Department of Premier and Cabinet and multiple state agencies, Gosford City Council and volunteer organisations. The tow and scuttling were also highly weather dependent, as it was critical to have relatively calm weather conditions for the tow from Sydney Harbour to Avoca and for final preparations on site before the scuttling. Hence planning had to include a backup date with all agencies cognisant of the potential for a last-minute change.

As a consequence, considerable planning was undertaken and resource commitments made without the certainty of a permit or suitable weather conditions, with the potential for significant costs if the tow and scuttling had to be rescheduled – as ultimately occurred.

In contrast, "traditional" development approvals provide much greater certainty because they are issued at the planning stage of a project, so the proponent and contractor have greater clarity and lower risk as the consent conditions are defined at the start.

Review by the Administrative Appeals Tribunal

After a comprehensive process of cleaning and preparation, DEWHA issued a permit for the scuttling on 22 March 2010 under the *Environment Protection (Sea Dumping) Act 1981*.

The ship was scheduled to be towed out of Sydney Harbour on 24 March, with scuttling planned for 27 March 2010. On 23 March 2010, on the eve of the tow, a recently-formed community group called the No Ship Action Group Inc (NSAG), represented by the Environmental Defenders Office, lodged an application with the Administrative Appeals Tribunal to review the decision by DEWHA to issue the Sea Dumping Permit. The Tribunal granted a stay, halting the scuttling.

The Administrative Appeals Tribunal has jurisdiction to review a wide range of administrative decisions made by Australian Government ministers and agencies, with its predominant workload being about decisions in areas such as family assistance, taxation, veterans' affairs and worker's compensation. Merits review of an

administrative decision involves the Tribunal considering the facts, law and policy relating to that decision and deciding whether to affirm, vary or set aside the decision. It does not award costs.

This was the first time a permit issued under the *Environment Protection (Sea Dumping) Act 1981* had been reviewed by the Tribunal. The Tribunal's role was to determine whether the decision by DEWHA to issue the Sea Dumping Permit was the 'correct and preferable' decision.

NSAG originally had a long list of concerns, principally claiming that the marine environment would be polluted by the scuttling of *Ex-HMAS Adelaide* due to leaching into the marine environment of polychlorinated biphenyls (PCBs) and heavy metals. Their Amended Statement of Issues in April 2010 raised ten issues for the Tribunal to review, but on the second day of the hearings in July, NSAG abandoned all but four items, dropping their claims regarding PCBs and most of the heavy metals. The case proceeded principally upon their concerns relating to potential harmful effects from lead-based paint and the copper-based anti-fouling system. NSAG also argued that the proposal was contrary to the international convention known as the London Protocol, arguing that the ship should be recycled for scrap metal.

The Tribunal heard evidence from a number of experts on these issues, Australian and American specialists in vessel preparation, environmental monitoring and risk assessment. Evidence was also presented on environmental monitoring from other vessels placed as artificial reefs in Australian and American waters.

The NSW Government presented expert evidence that the risks of harm to the environment from PCBs, copper and lead were low or negligible. The type of lead present – lead tetroxide – is particularly inert and insoluble. The State contended that the proposed scuttling was consistent with the London Protocol as it entailed the deliberate placement of the ship for the purpose of creating an artificial reef that will attract marine life, and hence was a form of reuse.

The Administrative Appeals Tribunal handed down its decision on 15 September 2010, allowing the scuttling of *Ex-HMAS Adelaide* to proceed with some extra conditions relating to the preparation of the ship and environmental monitoring. By this time the project had been delayed 6 months at a cost of \$1M. The Tribunal concluded that:

- '*...all the information available to us points to a conclusion that there is no risk of harm to human health or the environment*' and
- '*The level of pollutants now aboard the ship is low, and those that remain are either in very low quantities of inert and unlikely to cause any environmental problem*'.

The Tribunal also concluded that the purpose of the scuttling – to create an artificial reef – is recognised by the *Environment Protection (Sea Dumping) Act* as a proper purpose and that '*there are benefits to the environment from the resulting marine habitats generated, as well as more general benefits to the community*'.

The parties had 28 days to appeal the Tribunal's decision in the Federal Court, but neither party appealed.

Further ship preparation

The additional conditions imposed by the Tribunal required:

- *'the ship must be cleaned of all remaining wiring, including junction boxes, which might be associated with PCBs'*
- *'the ship must be cleaned of all canvas and insulation'; and*
- *'the ship must be cleaned of all exfoliating and/or exfoliated red lead paint'*

The Tribunal also directed that some additional environmental monitoring for lead be included in the *Long Term Monitoring and Management Plan*.

The wording of the Tribunal's decision added to the complexity of the project as it did not provide for judgment based on a risk assessment and required removal of wiring *'which might be associated with PCBs'*, which was open to interpretation on the meaning of 'might'.

The project team applied the following logic to address this ill-defined requirement:

- Around 75 tonnes of cable had already been removed during the original ship preparation.
- Comprehensive testing found that of the remaining cable, only one sample of large-diameter cable remnant had PCB at detectable levels, but still below the classification of 'scheduled PCB material'.
- That remnant had been located in a compartment which previously housed equipment containing PCBs and was removed prior to the Tribunal hearing, along with approximately 700 kg of similar cable remnants and two other items (some rubber bellows and a small area of insulation) that had detectable levels of PCBs.
- All the other samples (80 out of a total of 83 samples) were below the detection limit for PCBs.
- After the Tribunal's decision, three empty switchboard cabinets located in the compartments where PCBs had been detected were removed as a precaution.
- A further 1300kg of cable remnants (most of which were previously inaccessible) were removed while removing insulation and other linings.

This was considered to satisfy the obligation to assess and remove items 'which might be associated with PCBs'. However, to avoid uncertainty and legal debate, it was decided to remove all junction boxes as well as any small wire remnants in switches, communication systems, electrical boxes and battle lanterns.

The State sought clarification from the Tribunal on the condition regarding removal of canvas and insulation, as the Tribunal's 'Reasons for Decision' could imply that the purpose of removing these materials was to inspect for and remove any exfoliating or exfoliated red lead paint. The State noted that red lead paint was not used on the superstructure, which was constructed of aluminium. The Tribunal confirmed that it intended canvas and insulation to be removed from the entire ship, including the aluminium superstructure.

Hence all canvas and insulation was removed from every compartment of the ship. Over 44 tonnes of canvas and insulation were removed, amounting to 25 truckloads.

The ship had already been cleaned of all visible exfoliating and/or exfoliated paint as required by the permit. Where there was paint behind the insulation, it was generally in good condition as it had been protected by the insulation. There were limited areas where past ship modifications involving hot work such as welding had caused some minor areas of paint damage. The extent of exfoliated or exfoliating red lead paint found in these areas was less than 0.5% of the ship's surface area.

The main areas of exfoliating paint were on exterior surfaces that had been exposed to the elements since the project was interrupted in March 2010.



Figure 6: The underlying surfaces after removal of insulation

The additional work was inspected by the Department of Sustainability, Environment, Water, Population and Communities (DSEWPC, the successor to DEWHA) in March 2011 and DSEWPC verified compliance with the additional Permit conditions imposed by the Tribunal.

The tow and scuttling – a major logistics exercise

The project had been delayed by over 12 months and costs had increased significantly due to the time delays and the additional work required by the Tribunal's conditions. However, the culmination of the project was finally in sight with new dates set for the tow on 10 April 2011 and scuttling on 13 April 2011, provided weather conditions were suitable.



Figure 7: Departing Sydney Harbour on 10 April 2011

The tow and scuttling events were major logistical exercises involving a wide range of government departments coordinated through the Department of Premier and Cabinet's Community Events and Engagement Division (CEED). The scuttling involved NSW Police, NSW Maritime, Sydney Harbour Master, Transport Management Centre, RTA, Busways, Parks and Wildlife Service, Ambulance Service, Gosford City Council, as well as volunteers from the SES, surf life saving and service clubs.

Gosford City Council estimated that over 18,000 people attended the scuttling, with over 600 vessels on the water.

The process of scuttling the ship involved the controlled inflow of seawater to inundate the vessel as follows:

- 16 locations on the hull were prepared for the placement of cutting charges below the water line
- rectangular openings were also cut on the vessel sides above the waterline (these had been prepared at Glebe Island with the final cutting occurring on the morning prior to scuttling). There were 19 openings on each side of the ship.
- Precut openings through decks and bulkheads allowed water to distribute throughout the vessel and provided an exit route for air.
- When detonated, the cutting charges below the waterline formed a jet of liquefied copper that cut through the steel hull, allowing water to enter the vessel.
- As the ship started to sink, water entered through the openings cut above the water line.



Figure 8: Ready for scuttling, showing precut holes above the waterline

The Ex-HMAS Adelaide was scuttled on 13 April 2011 at approximately 11.48am. The plan was to scuttle at 10.30am, but some friendly dolphins came for a look and the scuttling had to be delayed until they had left the area! The ship took about 2 minutes to submerge.



Figure 9: Scuttling pyrotechnics



Figure 10: Down she goes...

Dive design

The dive design was developed to make the ship attractive to divers of all levels of experience. Vertical and horizontal diver access holes were strategically placed throughout the vessel to allow easier access to and from the shipwreck. As far as practical, divers have at least one, but preferably two, access points from all compartments.

For more experienced divers, some areas were prepared with lower ambient light levels (such as the laundry and Auxiliary Machine Room 2) to increase the sense of 'exploring a natural shipwreck'. For safety reasons a number of compartments were sealed or made inaccessible (including fuel, water and ballast tanks; void spaces; and any space considered to be a potential entrapment point), and sharp edges, snag points and items that could break loose over time and block access were removed.

The additional conditions imposed by the Tribunal required removal of many items of interest that were planned to remain on the ship. For example, equipment and fittings in the galley had to be removed to access insulation and remaining wiring and the cold rooms were stripped bare.

Key features that have been retained on various decks of the wreck include the Bridge with the captain's chair, the helicopter hangars, the operations room with the shell of various weapon and sensor consoles, torpedo racks, the crew's cafeteria, sick bay and a limited number of bunks and amenities.



Figure 11: The bridge and captain's chair (Photo courtesy of Robb Westerdyk)

Managing dive operations

A Crown reserve (the Ex-HMAS Adelaide Reserve) has been declared over the final resting place of the ship. Anyone wishing to dive or snorkel at the site must purchase a permit, available through Central Coast Tourism. The fees to access the site support the ongoing management, maintenance and environmental monitoring of the dive site.

Divers can book a tour through commercial dive operators, or make their own booking for a club or private mooring through Central Coast Tourism.

Six moorings have been installed at the dive site. Two moorings have been allocated for exclusive licence to commercial dive operators – these were awarded to Terrigal Dive Shop and Pro-Dive Central Coast following a tender process. The other moorings comprise two for casual hire by commercial dive tour operators, and two for public and club dive bookings.

The NSW Government has engaged Central Coast Tourism to market the dive site to the tourism industry, issue permits to dive the *Ex-HMAS Adelaide* and take bookings for moorings.

A complex project delivering multiple benefits

The proposed artificial reef has many social and economic benefits for recreational divers, local businesses and community groups, surf life saving clubs and ocean swimmers, for biodiversity, fishing enthusiasts, and for tourism. It also presents research and educational opportunities for nearby university campuses in Sydney, Ourimbah and Newcastle.

One of the current research projects is investigating the ship's performance as an artificial reef, including monitoring of fish colonisation and whether fish are recruited from other nearby reefs or if there is a net increase in the number of fish in the area.



Figure 12: Some of the marine life already seen on the Ex-HMAS Adelaide

The latest advice from Central Coast Tourism predicts that the Ex-HMAS Adelaide will provide a significant economic boost for the Central Coast by generating:

- \$4.5M economic expenditure by divers in the region per annum

- approximately 5,000 divers per annum, with 90% coming from outside the region
- \$870 spend in the region per tourist diver, and \$340 spend per local diver

These predictions were based on experience reported for the *Ex-HMAS Brisbane*. The *Ex-HMAS Adelaide* was opened to diving in May 2011. To the end of September, over 2000 permits have been purchased, suggesting numbers may trend better than predicted in the first year as the period to date has had less than ideal weather and sea conditions for diving.

Conclusion

The project team, with wide-ranging prior experience, found this to be the most complex and personally difficult project they had ever managed. The technical, regulatory and logistic issues, the involvement of two community groups with fundamentally different views and the impacts of the legal action which ultimately ensued all added to the complexity in delivering the project. We hope in time the emotion will diminish and the environmental, educational and economic benefits predicted for the Central Coast will be achieved and recognised.

References

1. Administrative Appeals Tribunal (2010). *No Ship Action Group Inc and Minister for Environment, Water, Population and Communities and State of NSW (Joined Party) [2010] AATA 702*. Available from <http://www.austlii.edu.au/au/cases/cth/aat/2010/702.html>
2. Atlantic and Gulf States Marine Fisheries Commissions (2004). *Guidelines for Marine Artificial Reef Materials*, 2nd edition. Available from [http://www.gsmfc.org/pubs/SFRP/Guidelines for Marine Artificial Reef Materials January 2004.pdf](http://www.gsmfc.org/pubs/SFRP/Guidelines%20for%20Marine%20Artificial%20Reef%20Materials%20January%202004.pdf)
3. Environment Canada (2007). *Clean-up Standard for Disposal at Sea of Vessels, Aircraft, Platforms & Other Structures* (Revision 3).
4. The Ecology Lab (2008). *Sinking of Ex-HMAS Adelaide off the Central Coast NSW – Review of Constraints and Site Selection*. Available from <http://www.hmasadelaide.com/publications>
5. US EPA / US Maritime Administration (2006). *National Guidance: Best Management Practices for Preparing Vessels Intended to Create Artificial Reefs*. Available from <http://www.epa.gov/owow/oceans/habitat/artificialreefs/documents/0605finalreefguidance.pdf>
6. Worley Parsons (2009). *Ex-HMAS Adelaide Artificial Reef Review of Environmental Factors*. Available from <http://www.hmasadelaide.com/publications>
7. Worley Parsons (2009). *Ex-HMAS Adelaide Reserve Draft Plan of Management*. Available from <http://www.hmasadelaide.com/publications>
8. Worley Parsons (2011). *Ex-HMAS Adelaide Artificial Dive Reef Long Term Monitoring and Management Plan*.