

Managing Threats to Underwater Cultural Heritage Sites: The Yongala as a Case Study

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SS Yongala (1911) was a luxury passenger steamer which foundered and sank during a cyclonic event approximately 12 nautical miles from Cape Bowling Green and 45 nautical miles south of Townsville, Queensland, Australia, in what is now a part of the Great Barrier Reef Marine Park. The *Yongala* was an early 20th-century interstate coastal steamer which supplies a snapshot of Edwardian life in Australia. The wreck lies structurally intact and is host to an amazing diversity of marine life. The wreck has been listed as a gravesite and a significant historic, archaeological, social, scientific and interpretive site. The degree of significance as determined by the *Guidelines for the Management of Australia's Historic Shipwrecks* is assessed as being both "rare and representative." The shipwreck is also one of Australia's most popular wreck diving experiences.

Management of the *Yongala* shipwreck by the Museum of Tropical Queensland (MTQ) illustrates the holistic approach to cultural heritage preservation epitomised in the general principles of the UNESCO Convention for the protection of underwater cultural heritage.

The Shipwreck Incident

with no desire to indulge in idle speculation, simply find that after becoming lost to view by the light keeper at Dent Island, the fate of the Yongala passes beyond human ken into the realms of conjecture, to add one more to the mysteries of the sea...

The *Yongala* was built in 1903 by Armstrong, Whitworth and Co. in Newcastle-on-Tyne, England. The vessel was powered by a large triple expansion engine driving a single propeller. The vessel was 363 feet in length and of iron, steel and wood construction. The vessel was employed on a Melbourne to Cairns run from 1907 to its sinking in 1911.

On March 23rd 1911 at 1:40 pm the *Yongala* left Mackay for Townsville but sank in or after cyclonic conditions with the loss of all aboard, reportedly 121 people, although an unlisted servant may have also have been aboard.

Location and Site Conditions

The *Yongala* lies in open waters in Cape Bowling Green Bay in the central section of the Great Barrier Reef Marine Park (Latitude 190 18' 16" South, Longitude 1470 37' 19" East). The site is adjacent to a major shipping channel with shipping traffic passing on both the east and west of the site. The site is clearly marked on all nautical charts as an historic shipwreck.

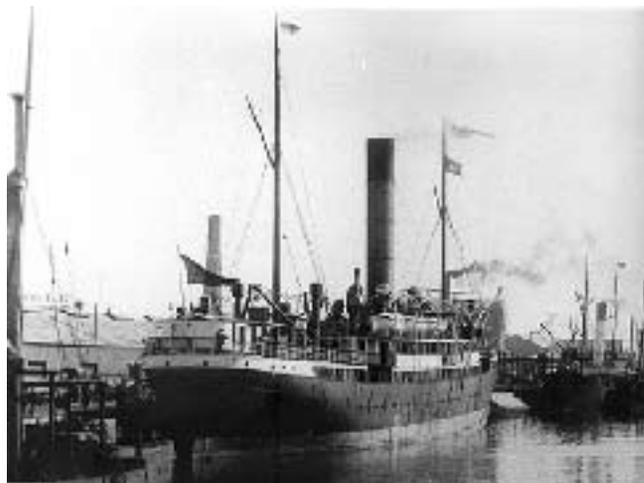


Figure 1: *SS Yongala* (Courtesy of A.D. Edwards Collection in the State Library of South Australia)

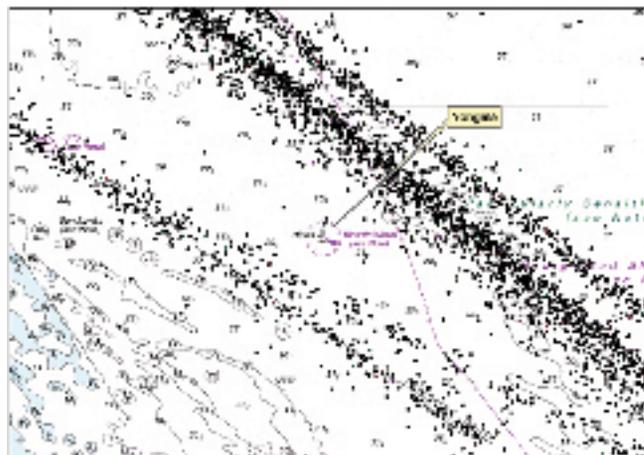


Figure 2: Shipping traffic past *Yongala* wreck site from Australian Maritime Safety Authority

Figure 3: Approximate location of *Yongala* in relation to Queensland coastline and Great Barrier Reef (<http://www.townsvilleholidays.info/>)



The wreck sits intact on the seabed, listing to starboard on an angle of 60-70°. The depth of water to the sea floor is approximately 27-30m, with the upper sections of the wreck approximately 16 meters below the surface. The seafloor surrounding the wreck is sandy. Strong currents scour the area, constantly exposing or covering parts of the hull and starboard side decking.

The site is fully exposed to all weather conditions. The summer period is the cyclone season with a peak around January to March. In winter, south easterlies up to gale force can occur, causing large swells to develop.

Threats to the Site - Environmental and Human

The *Yongala* is subject to its own unique blend of environmental and human threats. Since the *Yongala* is an iron hulled vessel, the predominant threat is corrosion with subsequent loss of structural integrity. Since the wreck sits proud on the seabed, the site is predominantly affected by aerobic corrosion with the rate of oxygen access to the residual metal being the controlling step in the corrosion process.

While storm events may happen regularly with varying degrees of impact on the site, cyclones happen only rarely near the *Yongala*. However, when a cyclone does happen it has major implications for the wreck's condition. This point was proven by Cyclone Aivu in 1989. The force of water movement and associated sandblasting during the cyclone dislodged a memorial plinth cemented to the bow area and scoured a large portion of the wreck clean of concretion.

Human threats to the site are generally less dramatic in their effect than cyclones, but cumulatively are significant. In 1994 under Section 7 of the *Historic Shipwrecks Act*, a provision was added to the permit conditions for divers, making penetration diving illegal. Penetration diving can cause two different types of damage that accelerate corrosion: loss of concretion through mechanical damage and the buildup of oxygen concentration (air pockets) inside the ship wreck's confined spaces.

One of the most significant threats to the site in the years subsequent to its re-discovery was removal of fixtures and fittings from the vessel. This happened primarily through uncontrolled souveniring. Accelerated corrosion is measurable near locations where portholes were removed from the wreck. Ironically the illicit salvage of the *Yongala*'s single bronze propeller circa 1971 has most likely assisted in the preservation of the wreck by removing the largest galvanic couple on the site that would have eventually accelerated the corrosion of the stern area.

More recently dive boats have been the main human threat to the site due to damage associated with anchoring. The site is in open fetch conditions subject to strong currents and wind. Dive boats have been known to drag their anchors over the wreck site, causing significant loss of concretion, as well as to drop their anchor directly onto the wreck causing physical damage.

Since the site is not only a shipwreck but an artificial reef supporting incredible diversity of marine life, mechanical damage to the wreck's corals reduces its aesthetic value. In the last three years an average of 7,774 divers per year have dived the site. Their level of personal skill and buoyancy control varies significantly and sometimes results in damage to the coral. Another threat to the site's marine diversity was fishing. This was a serious threat to the wreck's artificial reef ecosystem up until 1984 when the Great Barrier Reef Marine Park Authority declared the section in which the *Yongala* is situated as a Marine National Park B zone. This zone designation prohibits fishing, aquaculture, bait netting, crabbing, harvest fishing, research without a permit, tourist programs without a permit and shipping without a permit.

Managing Threats

Under the *UNESCO Convention for Protection of Underwater Cultural Heritage* both formal and informal approaches are recommended to manage threats to sites. In the context of the *Yongala*, managing environmental threats is neither cost-effective nor practicable. For example, the theoretical installation of a large number of sacrificial anodes to mitigate against the corrosion cycle would require an enormous amount of human resources and significant ongoing financial commitment beyond the resources of the MTQ.

The management of threats to the *Yongala* site therefore focuses on the management of dive operators and diver interaction with the ship wreck. These interactions are controlled by legislation and enforcement as well as education as recommended in the UNESCO Convention.

Legislative protections for the *Yongala* are:

- 1981 the *Yongala* was gazetted as an historic shipwreck under Section 5 of the Commonwealth Historic Shipwrecks Act 1976
- 1982 the site was listed on the register of the National Estate
- 1983 it was also listed under Section 7 of the *Historic Shipwrecks Act* 1976 which supplies a protected zone of 500 meter radius around the site
- 1984 the site was included in the Central Zone of the Great Barrier Reef Marine Park

Under the *Historic Shipwreck Act* the site is protected for its heritage value while being made available to users for recreational and educational purposes. The Act proscribes activities that detrimentally impact on the site and its associated artefact assemblage. This emphasis on the public's right of access and responsibilities on site reflects the values of the UNESCO convention.

Formal approaches to managing threats include site planning, legislation and regulation combined with policing and prosecution. Informal approaches are communications focussed and targeted at individual divers and dive operators.

Within the framework of the existing legislation the MTQ prepared a Conservation and Management Plan for the *Yongala*



Figure 4: Yongala Moorings Layout

in 2001 to identify and make recommendations on outstanding issues. Following on from a number of recommendations in the report, in 2002 a moorings infrastructure was put into place with funding from the National Moorings Program. The moorings comprise five vessel mooring points, two diver access points and one mooring point with an associated isolated danger mark buoy.

With the moorings infrastructure in place, anchoring within the 500m protected zone was banned and no anchor damage has been subsequently reported.

Not only have the moorings been a success from the point of reduced damage to the shipwreck, but from the operator and diver safety perspectives. Recent consultation with operators has guaranteed ongoing operational funding for the moorings based on a user-pays system. This result has come about through a process of communication and engagement with each operator and other regulatory bodies. Another outcome from this recent meeting is unanimous support from dive operators for each company to present their formal business plan, environmental management plan and signed diver code of behaviour agreement before being issued with a permit. This is being proposed by operators in a bid to improve the quality of dive tourism on the site.

Another strategy put forward by MTQ was engaging diving operators to raise the standards of diving practice by tying in a diving code of behaviour with operator interest. Education of operators in the importance of preserving the site has also resulted in the first successful prosecution in Australia under the no penetration dive restriction incorporated in the Historic Shipwrecks Act. In 2003 an operator supplied an appropriate pre-dive briefing on deck encompassing restrictions to diver activities while on site. This briefing was ignored by a diver, and that person was witnessed entering the wreck. The dive operator called the police and supplied evidence against the diver which resulted in a legal first — the diver was fined \$2,000 for making an illegal dive on the *Yongala*. With the operator's evidence, the prosecutor proved that the diver had "ample opportunity to know that the dive was a no penetration dive" and that the *Yongala* is designated not only as an "historic shipwreck, but as a grave site."

Since eventual collapse of the site is a certainty, MTQ has initiated a planning process to prepare for the event and to

mitigate against it from an archaeological perspective. This process involves communication with the dive industry, local university, user groups, federal and state governments' regulatory authorities, and is placed within the framework of the MTQ's staff and resources. As part of this planning process the first significant conservation assessment of the wreck was initiated. This includes a combination of non-destructive techniques such as video and still photo documentation and a corrosion survey. This work is being carried out in conjunction with operators, divers, the Great Barrier Reef Marine Park Authority as well as the Environmental Protection Agency-National Parks and Wildlife division.

Under the UNESCO convention object recovery for the protection of the underwater cultural heritage is allowed. As part of MTQ's mitigation plan, an assessments of the following are addressed:

- Significance of individual objects
- Potential information loss associated with collapse of the *Yongala*
- Ability of the museum to fund the excavation, conservation and publication of any rescue archaeology is being addressed.

This will be developed as per the project design framework laid out in the Annex of the UNESCO convention.

Since public education is critical to the management of sites and the mitigation of human threats to the site, MTQ is investing its resources in on site and display interpretive material, pamphlets and web based information, while continuing its policy of face to face engagement with operators and divers.

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