

## A Cheap and Effective Method of Protecting Underwater Cultural Heritage

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Australia's underwater cultural heritage is diverse and extensive. The allocation of the limited resources available to protect this heritage is prioritised through balancing competing cultural heritage values of individual sites with an assessment of threat to that site's physical integrity.

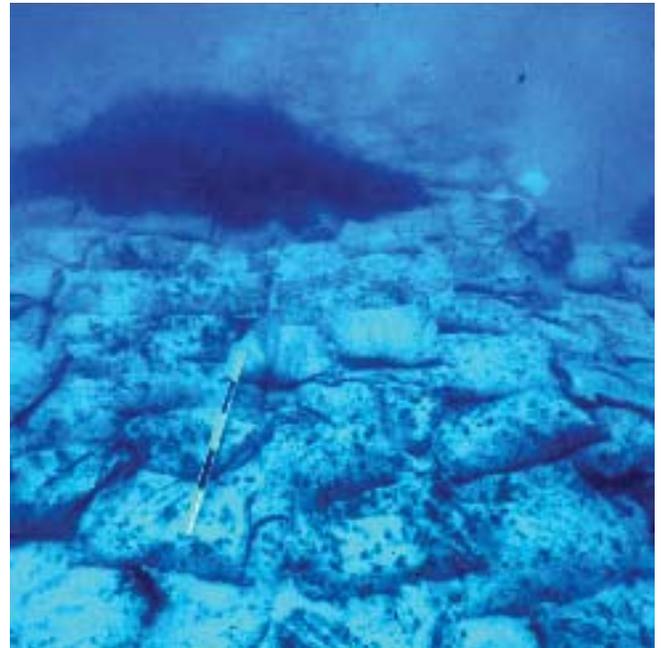
Iconic or well known sites justifiably receive the lion's share of attention as they are usually, by the nature of their popularity, under immediate threat. Mitigation measures commonly involve public programmes and policing as well as elaborate and innovative site stabilisation. Rescue excavations have been undertaken in extreme circumstances when the options of *in situ* preservation have been found, or predicted to be, ineffective.

The UNESCO Convention for the Protection of Underwater Heritage does not discriminate between sites based on cultural heritage value. However, not all sites of underwater cultural heritage are faced with equal threats. The majority of Australia's underwater cultural sites are under low to moderate threat and such sites are understandably given less attention. Nevertheless, the forces of nature and collateral cultural impacts relentlessly erode the cultural values of such sites through a gradual yet irretrievable loss of fabric and context. The preservation of these sites is still an imperative.

This article outlines practical steps which conform to the Convention's Articles and Rules and that were taken for the *in situ* preservation of one such site, the *Solway*, a 337 ton ship, wrecked at Rosetta Harbor, South Australia in 1837. The preservation measures implemented were simple, reversible and of little cost to the State. This relatively small outlay of time and money retarded the deleterious effects of natural agents on this site.

The method used to protect the site involved the placement of bags filled with sand over exposed parts of partially buried timbers. The use of sandbags in this way is not uncommon in Australia and is a much used instrument in the tool kit of the underwater cultural resource manager. Such a method, of course, is not applicable in all circumstances; it is most effective when dealing with low relief sites of which a significant proportion is buried in sediment.

The *Solway* is located approximately 500 metres offshore and in 3 metres of water. The site has been known since the early 1960s. The first inspection of the *Solway* by the State's cultural resource management agency took place in 1982. Its historical significance, being South Australia's second oldest known shipwreck (by two weeks) and the earliest located shipwreck in the State, enhanced by its relatively high state of preservation, led to the site being declared an Historic



**Figure 1: Sandbags on the Solway (C. Coroneos)**

Shipwreck under the South Australian Historic Shipwrecks Act 1981.

In early 1994 the site was inspected as part of a Regional Survey Programme. It was found that considerable structural remains of the hull remained intact. The amount of sand covering, in places, and the extent of the remains suggested that a considerable part of the site, from the turn of bilge to keel, was buried. This also suggested that the site could contain a considerable amount of artefacts, including cargo.

The 1994 inspection of the site noted that some deterioration of the site had occurred since the early 1980s. Deliberations by the State Heritage Branch on the appropriate management response prompted a review of the significance assessment of the *Solway*.

Built at Monkswearmouthshore, Sunderland, England in 1829, the *Solway* was a trading vessel with an unremarkable history. When wrecked in December of 1837 it had been in South Australia for two months under charter to the South Australia Company, having sailed from Hamburg with 52 German migrants and cargo. The vessel was driven onto a reef in storm whilst loading whale oil from the whaling stations established in Encounter Bay. There were no fatalities.

The review found that that the *Solway*'s significance extended beyond the superficial historical association as one of the first ships known to have been lost in South Australia. The wreck of the *Solway* is also of historical significance because it symbolised the economic and logistical follies committed by the initial European settlers to South Australia. The site had enhanced archaeological significance as it possibly contained cultural material evidence of the first German settlers to the State.

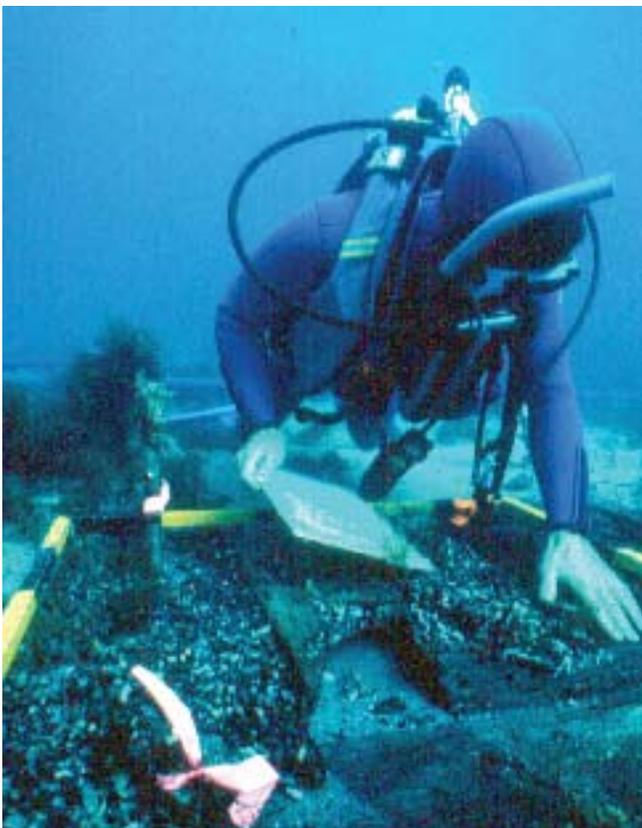
To better ascertain the archaeological significance of the *Solway* a test excavation was conducted in April 1994, with the aim of determining the variety and extent of the remains of cargo and personal possessions on the site.

The test excavation revealed that the site had considerable archaeological and research potential. It was discovered that much more of the vessel's structure had survived than was initially assessed. This was a result of the vessel being situated on a reef composed of relatively soft calcareous limestone. From the time of impact until the breakdown of hull from marine borer infestation and wave action, the keel and bilge of the vessel would have been grinding down the soft reef rock upon which it rested, the weight of the hull given momentum by the constant southerly swells. This would have had the effect of creating a depression in the reef which was filled with sand, thereby preserving the wreck from the turn of the bilge to the keel.

During the test excavation it was also observed that much of the timber that was exposed was "fresh," i.e. not damaged by marine borers. However, only a few centimetres of sand covered the wide expanse of timber floors and planking in the centre of the site, whereas anecdotal information prior to the 1980s indicated that in previous times the site was almost completely covered.

An assessment of the threats to the site indicated that there were no potential, direct, cultural impacts through seabed development, anchoring or looting. However, observations and anecdotal evidence from the site did not reveal whether the recent loss of sand cover was an ongoing, one way process, or a seasonal effect. This posed a management problem.

**Figure 2: Recording the *Solway* (B. Jeffery)**



The *Solway* was one of many archaeological sites under the State Heritage Branch. Other sites had been assessed to be under greater threat and therefore required a greater share of the agency's time and resources. However, to leave the site alone allowed for the likelihood of the continued erosion of sediment resulting in the loss of structural integrity and what remained of the intra-site contexts. In addition, the site would become increasingly vulnerable to looting.

It was decided to take immediate steps to stabilise the site using sandbags, pending the availability of funds to further investigate the site. The application of sandbags on the exposed timbers would protect the site from two prevalent threats, both biological and mechanical. By artificially replacing the sand over the site, the wreck timbers would be reintroduced to anaerobic conditions thereby limiting the ravages of marine borers. The sandbags would also protect the site from mechanical damage in the form of sand abrasion or larger objects being propelled through the water during storms. The placing of sandbags also served as a minor deterrent to inquisitive divers. As the area was not commonly frequented by boats, there was little fear that the sandbags would be disturbed by dragging anchors.

The sandbags would also serve to act as a sediment trap and the surface of the bags were sufficiently rough to attract the colonisation of marine growth, which in turn would accelerate the rate sedimentation. Polyester sandbags were used, as it was feared that Hessian bags would deteriorate before marine growth could take hold.

The initial deployment of sandbags involved three days of work, filling the bags with clean sand, taking them out and placing them over the freshly exposed timbers. Care was taken to lay the sandbags flat so as to maximise the amount of coverage. The costs were limited to the purchasing of 1,000 sandbags, sufficient sand, accommodation, fuel and the wages of one State Heritage Office staff member. Assistance was provided by volunteers.

In conjunction with the deployment of the sandbags, a monitoring programme was initiated. The purpose of the programme was to gauge the condition of the sandbags, possible disturbances by divers, the effects of storms, the rate of sedimentation and marine growth on the bags, the creation and effects of scouring around the sandbags, and the exposure of other parts of the site.

Subjective observations of sand movements were noted on a copy of the site plan attached to an underwater dive slate. Newly exposed remains and previously exposed remains that had become buried were also noted. Quantitative data of sand movement were obtained from taking measurements from established stations – brass rods hammered into the seabed – around the site. Photographs were taken at each inspection from predetermined locations to obtain a "time lapse" record of the site. Records were also kept of the weather patterns in the area for three days prior to each inspection.

Six months into the monitoring programme another 300 sandbags were laid over parts of the site that were consistently exposed prior to 1994 and on timbers that had recently

become exposed. A further 500 sandbags were deposited on the seabed near the site for future use if required.

The regular inspection of the site after the initial deployment of the sandbags was a critical part of the site preservation process. It was observed that the sandbag mound on the most vulnerable parts of the site modified water movement patterns which resulted in scouring around the bags, thereby exposing more timbers. With regular inspections and a “bag depot” available nearby, it was possible to continually cover newly exposed timbers.

Regular inspections also allowed an investigation of the effect of the sand bags on sand movements across the wider site. The collation of measured observations on site made before and during the monitoring programme showed that the greater part of the site became exposed during the summer months. This seasonal exposure of the site revealed timbers damaged by marine borers as well as “fresh” un-infested timbers. The monitoring programme allowed for refinements to be made to the protection and stabilisation of the *Solway* wreck site.

The sandbagging of the *Solway* is not a unique or innovative form of underwater cultural resource management. However, it is often worth being reminded that underwater sites can be physically protected cheaply, quickly and effectively with minimal effort, all the while conforming with the principles and rules of the UNESCO Convention for the Protection of Underwater Cultural Heritage.

## Information Sources

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Figure 3: The Solway in the 1980s  
(B. Jeffery)