

PRIISMH project: A Case Study of Community Involvement and Museum Collaboration on Maritime Cultural Heritage around Rottnest Island (Perth, Western Australia)

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Abstract

The Program for the Rottnest Island Interpretation of Shipwrecks and Maritime Heritage (PRIISMH) project is a community-based initiative conducted under the aegis of the Maritime Archaeology Association of Western Australia (MAAWA), in collaboration with the Western Australian Museum (WAM), the Rottnest Island Authority (RIA), Tempus Archaeology, and Shipwreck Data, with sponsorship provided by the Maritime Museums of Australia Project Support Scheme (MMAPSS 2016-2017) from the Australian National Maritime Museum. The main objective of the PRIISMH project was to enhance the presentation of Rottnest Island maritime cultural heritage through the use of new and innovative forms of interpretation involving terrestrial and underwater 3D Photogrammetry as a key element in for public engagement.

Specifically, the project was initially developed to address issues identified in a recent condition report on the Rottnest Onshore Shipwreck Plaques (MAAWA, 2015), relating to existing interpretive signage on the island. As a consequence, MAAWA and RIA identified as a priority the need to update existing land-based shipwreck signage (currently over thirty years old) in order to address potential health and safety issues, to improve overall visitor experience, and to improve public accessibility to the Rottnest Island underwater shipwreck heritage.

The project represents a new stage in an on-going long-term program of site documentation, management and interpretation within the broad Perth region, initiated by MAAWA in 2014 under the aegis of the Three-Dimensional (3D) Maritime Archaeology Project – Perth Region (3DMAPRR, Edwards et al. 2016). The structure and nature of the project also allowed it to be connected to another MAAWA earlier initiative (2013), namely the ‘Shipwrecks WA’ website and app platform to expand the audience outreach.

Key words: Outreach, Photogrammetry, Heritage, Australia

Introduction

As a geographical reference, Rottnest Island is located 18 kilometres off the coast of Western Australia, and it encompasses an area of approximately 19 square kilometres. The island is administered by the Rottnest Island Authority and mainly used currently as a popular holiday destination. Known as Wadjemup to the local Noongar people, the island has a rich and diverse history including the early Aboriginal presence, and the European exploration and settlement. The coast surrounding Rottnest Island is composed of outlying reefs which have been the resting place of at least 12 vessels since 1842.

Access to, and interpretation of, the maritime cultural and archaeological heritage of Rottnest Island is currently facilitated through a variety of means, among which is the Rottnest Wrecks Heritage Trail (RWHT), which currently encompasses 12 wreck sites, namely *Transit* (1842), *Gem* (1876), *Macedon* (1883), *Janet* (1887), *Lady Elizabeth* (1878), *Raven* (1891), *Shark* (1939), *Uribes* (1942), *Mira Flores* (1886), *City of York* (1899) and *Kyrio Maru I* (1984). Information on each of these wrecks is provided through on-site underwater and terrestrial plaques, links to websites, and information pamphlets. Visitors are also encouraged to view the wrecks using a land trail, snorkel dives, semi-submersible tour, boat trail and dives (Rottnest Island Wrecks Heritage Trail pamphlet, 1981).

The RWHT has been rightly praised for its innovation since being established in 1981 by the Western Australian Museum in conjunction with the Rottnest Island Authority (and with the participation of MAAWA) as the first underwater heritage trail in the Southern Hemisphere (McCarthy 1981; McCarthy et al. 1982). Nevertheless, a number of issues have been identified, both in terms of on-going maintenance of interpretive signage (now almost 30 years old), and the interpretive content itself. These issues are outlined in more detail, below.

Project Background

The Maritime Archaeological Association of Western Australia or MAAWA is a not-for-profit association created in 1974 in order to promote and encourage maritime archaeology in Western Australia. Since the 1990's MAAWA and its members have been very regularly traveling to Rottnest

Island in order to undertake basic maintenance and the cleaning of the underwater plaques. This annual task has put the association in a favourable situation to be able to visually inspect these plaques, but also to visit and inspect the terrestrial plaques at each opportunity. This observer viewpoint led in 2015, some MAAWA members on their own initiative, to conduct a formal and documented visual inspection about the state of the terrestrial plaques. The final observations gathered in a report were subsequently sent to the RIA (MAAWA 2015). The condition report highlighted the poor condition of many interpretive plaques, prompting the RIA to initiate a long-term renovation programme of terrestrial signages as part of a wider Rottnest Island interpretation plan.

Based on the MAAWA long standing past experience as well as these more recent observations, another group of MAAWA members (including the authors) listed a series of inherent as well as structural limitations concerning the various means of interpretation accessible to the public about the maritime cultural heritage of Rottnest Island. As a consequence, this group identified a number of points to address about these pamphlet and plaques (with the aim to update and improve these means), including:

- The lack of accurate and updated visual representation and geographical localization for each of the sites;
- The basic nature of the interpretation format in comparison to the more immersive experience provided by the possibility of diving/snorkelling on those shipwreck sites;
- The level of inconsistencies between the different supportive media proposed to visitors for the various sites, in term of content but also regarding the general layout;
- The degradation of the on-land signage due to the choice of material and the impacts of the natural elements.

In terms of interpretive issues, these observations are consistent with an earlier review of maritime heritage trails in Australia conducted by Cassandra Philippou and Mark Staniforth (2003). Part of the reason behind these observations resides in the lack of consistent professional

archaeological monitoring of these sites during the past 20 to 30 years, and hence the lack of updated information to enhance the interpretive content and means accessible to the RIA to improve the visitor experience.

Nourished by the points listed above, MAAWA embarked in an internal consultation stage, which resulted in the decision to shape the contours of a project in order to address these points, and hence instigated the basis of the PRIISMH (Program for the Rottnest Island Interpretation of Shipwrecks and Maritime Heritage) project. Once agreed on the definition of the objectives, and after consultation with project partners (RIA, MADWAM, Shipwreck Data and Tempus) this initiative became a reality when MAAWA was officially notified of the success of its grant application to the Maritime Museums of Australia Project Support Scheme (MMAPSS) 2016-17 from the Australian National Maritime Museum (becoming as a result one of the project support). The project received strong additional backing with the in-kind support from the MADWAM and RIA. Finally, the fieldwork for the project was conducted in several phases between mid 2016 and mid 2017.

Project Objectives

Beyond the meaning of the acronym PRIISMH, the word 'Prism' has been chosen for its definition of a light refracting device. When applied in the context of this project, this word symbolises the project's aim. Indeed, the idea developed as the basis of this project is to enlarge accessibility to the various components of the local knowledge on Western Australian maritime cultural heritage. Likewise, a prism enlarges the light beam to perceive all its colourful components.

The PRIISMH project is inscribed in a wider strategy based on a continuity of projects established by MAAWA since 2011 in order re-invigorate the association as a crucial link and a central facilitator between the general public and its local maritime cultural heritage. Indeed, in addition to providing support for the RIAs Rottnest interpretation plan, the project aims to build upon several long-terms MAAWA initiatives, including the 'Shipwrecks WA' app and website, as well as the 3DMAPPR initiative.

As a consequence, and in order to fulfil its mission, the overall objectives of the PRIISMH Project can be summarised as follow:

- 1 To enhance the Rottnest Island content of the 'Shipwrecks WA' website and app;
- 2 To record three terrestrial features with maritime heritage values (specifically the anchors of the *Kyrio Maru*, *City of York* and *Mira Flores*);
- 3 To support the renovation of the terrestrial shipwreck trail on Rottnest Island as part of the wider Rottnest Interpretation Plan; and
- 4 To conduct 3D photogrammetric recording of six shipwreck sites around Rottnest Island (specifically the Lady Elisabeth, Miwok II, Uribes, Macedon, Mira Flores, City of York).

Beyond building upon MAAWA's existing skillset and projects, important aims of the PRIISMH project were also to address current documentation, management and interpretation priorities associated with the maritime and underwater cultural heritage in the Perth region and more particularly within and around the Rottnest Island. It was furthermore planned that this project would enhance the visitor experience and awareness (both in reality and virtually), as well as to increase to a wider audience the accessibility to the Rottnest Island shipwreck sites that are typically inaccessible to non-divers and people with reduced mobility. Finally, the project also provided an avenue for skill development among the MAAWA membership, with training being provided in respect of maritime archaeology best practices.

Enhance 'Shipwrecks WA'

The first objective of the PRIISMH project was to conduct a gap analysis in respect to the information content of MAAWA's 'Shipwrecks WA' app and website, specifically as it pertained to Rottnest Island content. The gap analysis was performed in July 2016, by two volunteers from the University of Western Australia (UWA) during their internship at the Maritime Archaeology Department of the Western Australian Museum (MADWAM). Having identified deficiencies in the 'Shipwrecks WA' content, additional research was carried out to identify suitable documentary and/or image-based content from the MADWAM archives. This research was also conducted by the same two volunteers in August

2016, and was focusing particularly in looking at the digital photos, the slides and the paper archives specifically for the Rottnest Island shipwrecks site files.

The results of these first two steps were then combined into a single working document with the purpose to use the content data collected to fill in the gaps identified within the MAAWA's 'Shipwrecks WA' app and website. This task consisted in the migration (with MADWAM authorization and credit) of all content data from the MADWAM archives (text and/or visuals) deemed appropriate to each relevant entry to the MAAWA's 'Shipwrecks WA' app and website. This data was migrated to the various platforms supported by 'Shipwrecks WA' by project partner Shipwrecks Data in September 2016.

This aspect of the project has benefited significantly from the long experience and expertise accumulated by several MAAWA members involved in the development of the MAAWA's 'Shipwrecks WA' app and website, but also from the collaboration with MADWAM as the Western Australian custodian of the archives on the Rottnest Island shipwreck sites.

Record maritime heritage terrestrial features

The second objective was focused on the accurate recording of terrestrial maritime heritage features around Rottnest Island. As part of this component of the project, focus was placed on the recording of three anchors from local three different shipwrecks, namely the *City of York* (British three-masted ship, wrecked in 1899 after striking a reef), the *Mira Flores* (British built but German owned Barque, wrecked in 1886 after running around in poor visibility) and the *Kiryō Maru* (Japanese tuna boat, wrecked in 1984, in rough seas after its propeller shaft broke). These three anchors and their associated commemorative plaques are the only anchors installed terrestrially on Rottnest Island to mark (almost as reminders but also as urban decorations) the proximity of these three shipwreck sites. (Fig.1)



Fig 1: The measuring of the City of York anchor. (Nicolas Bigourdan)

To fulfil this objective, it was decided that both manual and close-range 3D photogrammetric techniques would be employed. Here Photogrammetry was undertaken not only as a recording tool but also to provide additional data assets that could be used for interpretive purposes. The first recording technique used was based on the standards of the manual recording (coupled with detailed descriptions) developed by the Nautical Archaeology Society (NAS) as part of their international 'Big Anchor Project' (BAP) online anchors typology database project. The second one was centred around the use of photogrammetry in order to create an accessible interactive 3D model for each anchor, while following the methodology developed as part of MAAWA's 3DMAPPR initiative. This also allowed various MAAWA members to practice the simple but crucial skills needed to complete the recording of a 3D model (Fig. 2).



Fig 2: 3D Model of the City of York anchor. (Kevin Edwards)

This phase of the project has required three visits on Rottneest Island and involved up to eight different team members during various visits between

December 2016 and July 2017. The task consisted firstly in taking hundreds of digital images for each of the 3D models anchors reconstruction, and secondly to undertake the necessary measurements for each anchor as required by the BAP. In addition, some testing attempts were implemented on nearby maritime cultural heritage features such as the Rottnest Island pilot boat. However, a few problems emerged, involving access difficulties the poor lighting conditions.

As a result in participating in the world-wide maritime cultural BAP initiative coordinated by the NAS, it allowed MAAWA to become the Western Australian representative of this NAS BAP initiative after uploading the three anchors forms with corresponding images, and secondly has also permitted MAAWA to create three interactive 3D models for each of these anchors that were made accessible to the wider public on the MAAWA Sketchfab account.

(<https://sketchfab.com/MAAWA>).

Upgrade the Rottnest Island terrestrial shipwrecks trail

The third objective was focused on upgrading one element of the terrestrial component of the RWHT. This aspect of the project was carried out as part of RIAs longer-term Rottnest Island Interpretation plan. This task was centred on the creation of the signage's design, its manufacturing as well as its installation. This new sign, concerned a site for which no previous sign existed mainly due to its isolated location in a less visited area of Rottnest Island. This site concerned the shipwreck of the *Uribes* (three-masted Schooner, wrecked in 1942, after drifted onto rocks)

The design of the sign followed a recent and consistent new generation of sign template developed by RIA (similar to others on Rottnest Island. Made out of solid metal, the sign was composed of a square pole onto which was fixed an information plate. The content of the sign was composed of a brief text provided by one of the authors and a MAAWA member about the *Uribes* wreck, a few images of the ship sourced and the wreck from MADWAM's and MAAWA's archives; a map showing the location of the shipwreck site relative to the sig, and a QR code. The presence of this QR code make this sign unique in Rottnest Island, and at least in Australia for a maritime cultural heritage site. This QR code is a

link that provides direct and in situ access for any visitor with a mobile phone to the page of the MAAWA Sketchfab account showing an interactive 3D model of the *Uribes* (Fig. 3). Due to unexpected issues encountered at the data acquisition and processing phase of this site as well as at the sign conception stage, this objective was only completed at a much later stage (around December 2017).



Fig. 3: Home page of the 'Shipwrecks WA' app and website. (MAAWA)

The creation of this sign permitted a strong working collaboration between 3 partners (MAAWA for the 3D model and some visuals, MADWAM for the historic information and some visuals, and RIA for the design, manufacturing and installation) of the PRIISMH project. Once finalised and manufactured, the *Uribes* sign was installed, made operational and finally unveiled in February 2018.

Record 3D models of six shipwrecks

The fourth and final objective of the PRIISMH Project was to carry out detailed close-range 3D photogrammetric documentation of six wreck sites. This proved to be the most time consuming, challenging component of the PRIISMH project. The documentation of these sites was completed over the course of three visits between December 2016 and April 2017. Overall, fifteen MAAWA members and two MADWAM staff members have been involved.

Weather and underwater conditions involving strong winds, surge as well as low underwater visibility have created numerous issues in term data acquisition and processing. These constraints forced the team to review the initial list of targeted sites, and replace two of the target sites with

fallback options; specifically, *Denton Holmes* (Irish built Barque, wrecked in 1890, after drifting inshore) and *Shark* (local Hopper Barge, wrecked in 1939, after going aground) were replaced by *Miwok II* (local flat top crane Barge, wreck in 1983, by explosives) and *Lady Elizabeth* (British three-masted Barque, wrecked in 1878, after running aground in a heavy gale) respectively. In addition to these two shipwrecks sites the list consisted in the *Uribes*, the *Mira Flores*, the *City of York* and the *Macedon* (British screw steamer rigged Barque, wrecked in 1883 after running aground on a reef).

Several MAAWA divers recorded each site to ensure an optimal and maximum coverage of the area targeted. (Figs. 4 and 5). Gopro action cameras together with simple scale and orientation rig were used to implement the image recording methodology. In addition to the photogrammetric recording, basic length and width measurements together with surface GPS points were taken between pre-defined points across the site in order to ascertain the scale, orientation and geographic position of each site. Once captured, the images were processed using Agisoft Photoscan 3D Photogrammetry software through the contracted endeavour of the project partner Tempus Archaeology. After the processing phase, each 3D model was uploaded onto the MAAWA Sketchfab account (provided in kind as one of the project support), together with the 3D models of the terrestrial anchors.



Fig. 4 (left): Shannon Reid recording the Macedon (Nicolas Bigourdan)

Fig. 5 (right): Nick Sargeant and Shannon Reid undertaking measurement on the Lady Elisabeth (Nicolas Bigourdan)

Because as a best practice in maritime archology, the collection and management of data should not be seen as an end in itself; it is important to remember as a principle that research becomes most valuable when it is effectively disseminated to a wider audience. This why as a tool to

respond to this principle, the MAAWA Sketchfab account facilitates a wider accessibility to and dissemination of information to the general public (Fig 6). These 3D models will also in due course be linked to the 'Shipwrecks WA' app and website, and as a consequence will become a touristic opportunity for the RIA to be used as promotional material of the underwater and maritime cultural heritage of Rottnest Island (Figs. 7 and 8).

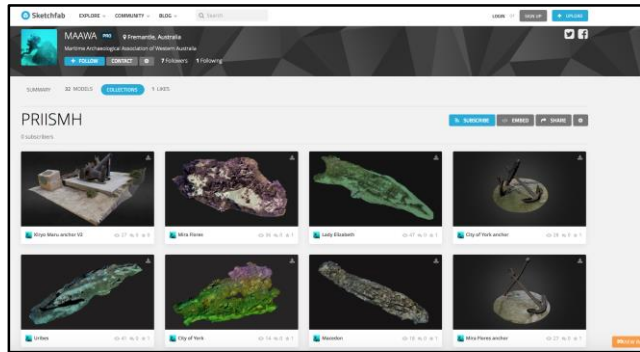


Fig. 6: Home page of the MAAWA Sketchfab account. (MAAWA)

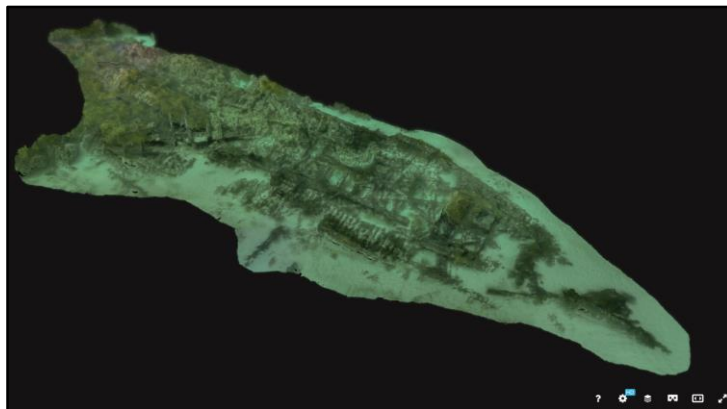


Fig. 7: 3D Model of the Lady Elisabeth (Kevin Edwards)

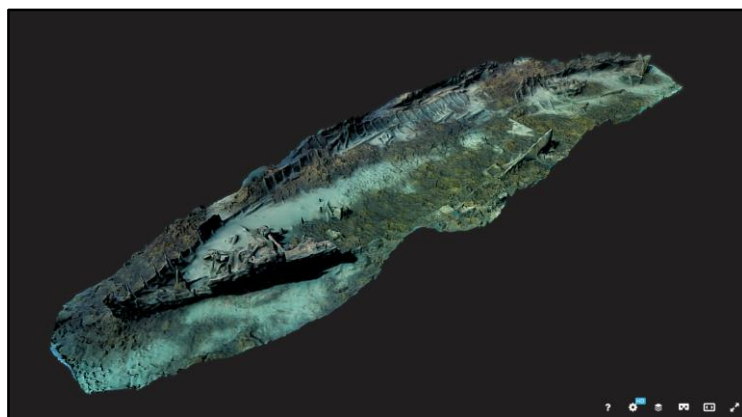


Fig. 8: 3D Model of the Uribes (Kevin Edwards)

The PRIISMH project was also designed as a capacity building exercise from the start, allowing MAAWA members to participate in several workshops (in October 2016) and training sessions on 3D

photogrammetric recording and processing in November 2016 as well as February and April 2017 (Fig. 9). The project also allowed further transmission of knowledge and skills, because it enabled MAAWA members to further engage in community education and outreach through a workshop to recreational divers from Perth Scuba dive club and shop in October 2017. This last action was pursued with the objective to further expand the accessibility for a wider audience to involvement opportunities in the preservation of the Perth region maritime and underwater cultural heritage.



Fig. 9: MAAWA members teaching 3D photogrammetry (Perth Scuba)

Conclusion

The PRIISMH project represents the latest in a long-line of collaborative ventures between an institutional organisation and a community-base avocational group. In the context of ensuring a sustainable future for the local Perth Metropolitan maritime and underwater cultural heritage by actively involving and engaging the public into local, meaningful, useful and innovative projects, the PRIISMH initiative successfully responded in the most encompassing and proactive way to this complex but rewarding challenge.

With the enhancement of the 'Shipwrecks WA' app and website, the recording of three anchors in 3D and in traditionally, the creation and installation of the *Uribes* interactive sign, and the processing of 3D model from 6 shipwreck sites around Rottneet Island, the PRIISMH has entirely fulfilled its 4 main objectives. MAAWA's active role was central in the

PRIISMH project in initiating the condition report, but above all a number of its new assets can be accessed through its 'WA Shipwrecks' app and website or via Sketchfab where the majority of MAAWA 3D content has been made available to the public.

The multiple facets of the PRIISMH project have highlighted the relationship between MAAWA and MADWAM (or in other words between a community group and a governmental institution), and will continue to be in the upcoming and even more inclusive SWAN RIVER project the beacon that will show the direction to follow for the connection between maritime heritage and local public.

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Biography

Nicolas Bigourdan graduated from the Paris-Sorbonne University in 2003 and from James Cook University in 2006 in nautical and maritime archaeology respectively. His research interests include 18th and 19th centuries French scientific sailing expeditions in the Southern Hemisphere, 3D visualisation of underwater maritime cultural heritage, Western Australian maritime Aboriginal rock art, Middle Eastern (Mesopotamia and Persian Gulf) early watercraft depictions, Indian Ocean French illegal slave trade, Citizen scientist's involvement in maritime archaeology, and Ethno-archaeological study of canoes traditions from Irian Jaya (Indonesia). He has an extensive fieldwork experience in multiple countries, and as worked over the last 10 years successively for Wessex Archaeology (UK) and the Western Australian Museum (Australia).



Kevin Edwards graduated from the University of Western Australia in 1991 and is currently a post graduate student in the Maritime Archaeology program at Flinders University. His research interests include the archaeological potential of near and offshore disposals of military material in wartime and post-bellum contexts, the application of social theory to shipwreck survivor camp studies, and the documentation of archaeological collections using a variety of 3D digitization technologies. He hopes to expand his study interests to include the social and material agencies involved in the creation of 19th century museum collections relating to maritime archaeology.