

Bridging the Gap in Maritime Archaeology: Working with Professional and Public Communities

edited by
Katy Bell



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Thanks to CIfA for giving us our first Maritime session as part of their conference for several years in 2014. We were able to run a further session in April 2017 when building Maritime Archaeology on a global scale was discussed. This is only touched on in this volume where consideration is made of the Balkans case study. In April 2019 another session will run in Leeds looking at best practice in wind farm based archaeology.

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Finally, thanks to our publisher who took through part way through this project and enthusiastically embraced the idea of a Maritime Archaeology Volume.

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Foreword

This volume came about as a result of a session run at the (then) IfA conference in Glasgow in 2014 by the Maritime Affairs Group. The focus of the conference was ‘research in practice’, in particular, the challenges that are posed to heritage professionals regarding value, quality, dissemination and accessibility of the archaeological resource. In maritime archaeology this can be a particular issue with the additional practical considerations of allowing access to what is often underwater or inaccessible.

The conference session was divided into two themes ‘Working together’ (looking at how the archaeological community could engage with other professions in order to improve dissemination and accessibility) and ‘Working with the community’ looking at how the maritime resource could give value to the communities around them. During both the conference discussion and subsequently it became clear that there was a third aspect: the impact and use of technology as a tool to provide, value, quality and dissemination.

Many people at the conference kindly volunteered to contribute a paper to this volume. For those who were not able to do this I have tried my best (with their permission) to summarise in my opening paper what they brought to the discussion on the day.

Since this volume was originally proposed there have been a number of changes: the Institute for Archaeology has become the Chartered Institute for Archaeologists; and the Maritime Affairs Group has become the Marine Archaeology Special Interest Group. The first reflects an important move in further professionalising archaeology, and the second shows the wide-ranging interests of the group, from shipwrecks to submerged landscapes and coastal resources. In addition English Heritage has divided into two bodies; English Heritage remaining as the curator of properties and Historic England as the statutory body. Appropriate editorial changes have been made to each article, however these changes may be useful to keep in mind when considering that underwater archaeology, which is still regarded as a somewhat niche discipline, has to compete for ‘space’ on various different social media platforms against very visible, and often much more accessible, parts of our heritage, such as castles.

The processes we discussed in 2014 are still ongoing and evolving. This is an exciting time in maritime archaeology with new developments occurring all the time. This volume starts by considering best practice for maritime archaeology and for new entrants to the profession. It then looks at diver trails – one of the early success stories for maritime archaeology in engaging with the public. Next it looks at community archaeology in the UK and how successful projects are put together and managed, followed by consideration of how research communities can be generated from statutory bodies and the impact of these. Subsequently we look at the ethical side of maritime research communities, with an examination of maritime archaeology within the open access platform. Finally we move away from Britain to the case study of the successful integration of the community during training in three countries in the eastern Adriatic.

If you would like to learn more about the role and purpose of MASIG please refer to our Facebook page and Twitter feed and our page on the CIfA website <http://www.archaeologists.net/groups/maritime>

I would like to thank the authors for their patience, as organisational changes in CIfA and within the MASIG organisation and committee came into place and disrupted the preparation of the publication.

Katy Bell
On behalf of MASIG

Creating Maritime Archaeology Research Communities

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Maritime archaeology is considered to be a newer part of the discipline of archaeology. This has led to much experimentation with how it is conducted, recorded and disseminated. As maritime archaeology comes of age (or even middle age) the Marine Archaeology Special Interest Group (MASIG) wishes to consider how we can make the most of our successes, build on them and foster communication inside and outside the marine community. The marine archaeological resource is vast, and the number of paid professional archaeologists relatively small in comparison. As a result we need to work effectively with all stakeholders, to ensure protection and management of the resource. To do this MASIG wishes to aid the creation of a maritime archaeology research community.

The conference

The theme of the 2014 IfA conference in Glasgow was 'Research in Practice'. As a relative newcomer to the archaeological discipline, maritime archaeology has had the opportunity to experiment with projects free from the constraints of tradition. These are often inclusive of a wide range of stakeholders, from government departments through to members of the public. The latter have ranged from outreach personnel working beyond the normal 'school children range' including prisons and people with conditions such as Alzheimer's disease (MAD about the wreck - see below), through to projects where professionals, government representatives and amateur divers have worked together to ensure best possible practice (*.. between a rock and a hard place ...* - see this volume). Without the constraints of long established practice it has been possible to think outside the box and be creative with project planning combining technology and working with new types of stakeholders to enhance the archaeological record (Project SAMPHIRE). From the conference session it became clear that there were many good projects running with high-quality results being achieved. However, the sharing of good practice and results is not always as good as it should be, highlighting the importance of opportunities to showcase results. This volume is intended to bring together not only the thoughts and processes of those people at the conference, but also others whose good practice have enhanced the profession in recent years.

During the session, good practice points were shared and time to reflect on what had been achieved was central to the discussion. To ensure the future evolution of the profession it was agreed that is necessary for MASIG to act as the reflective practitioner – to identify opportunities to continuously improve in the future. The session at the conference was intended as the first step in raising MASIG's profile and improving communication with members. During the session the importance of members communicating with each other was also made clear. Since the conference, MASIG has identified a clear remit for its work:

The group provides a forum for practising maritime archaeologists and advises CIfA Advisory Council on issues relevant to underwater sites, intertidal and nautical archaeology. MASIG aims to:

- promote the advancement of maritime archaeological practice and individual professional development
- promote greater understanding of maritime archaeology within the wider archaeological community through the publication of technical papers and guidance documents
- organise seminars and conferences to act as a forum for the development and maintenance of good practice in matters relating to maritime archaeology

<http://www.archaeologists.net/groups/maritime>

Since 2014 the group has been busy responding to consultations, also arranging events and reviewing technical practice papers to bring them in line with the current profession.

Where do maritime archaeologists work?

Maritime archaeologists work in a variety of organisations including government-based organisations (represented at the conference by English Heritage and the Ministry of Defence), commercial units (represented by Wessex Archaeology) and universities (represented by Paola Palma, then at Bournemouth University). In addition, for the proceedings of the session, the Nautical Archaeology Society and Peter Campbell, a PhD student from Southampton University, have contributed papers. Many of these organisations interact with avocational/volunteer archaeologists or, as Terence Newman (Assistant Designation Officer (maternity cover), Historic England) reminded us, as ‘unpaid archaeologists’. These form the core of stakeholders with an interest in maritime archaeology.

The tip of the iceberg ...

Using the diagram (Figure 1) as an illustration of maritime archaeology’s diverse stakeholder groups, it is apparent that the public and the media are clearly visible, whilst a variety of other factors that affect the development and practice of maritime archaeology are ‘hidden’. Employing the iceberg analogy, the top groups are very familiar and form what can be called ‘surface’ or ‘folk’ culture. As a profession, we also need to engage with what is ‘lurking beneath’ in order to develop an archaeological research community that is both meaningful and brings a measureable return. What is ‘lurking beneath’ often covers things that we find harder to engage with, however this does not mean we should avoid them.

In maritime archaeology we have been affected by rapidly-changing legislation. In a recent survey of MASIG membership (2014), 40% said this is an area in which they ‘feel’ they need further training. In discussion with colleagues they felt this may represent the number of our membership who are new entrants to the profession. However, when our research was used in conjunction with a Historic England project on the need for training in the profession (Grant et al 2014:22), clear gaps in knowledge and processes were identified. The fact remains that a huge body of statute law has been passed, often without detailed guidance. Until the full impact of changes have been absorbed, project planning of any maritime archaeology in the UK needs careful consideration. This is why a considerable amount of MASIG’s time is taken up in replying to, and becoming involved in, consultations on how legislation and guidance should be put into place.

Funding for projects is a key issue, in developer-led archaeology; ‘the polluter pays’ principle was developed in 1995. This rather stark term is a result of the fact that in the law of England and Wales the only guidance for archaeological work came under the same environmental policies that deal with contaminated land. There has been some discussion as to how maritime archaeology can be embedded within the commercial interests of firms. In terms of creating a research community this causes a problem. Much of the information

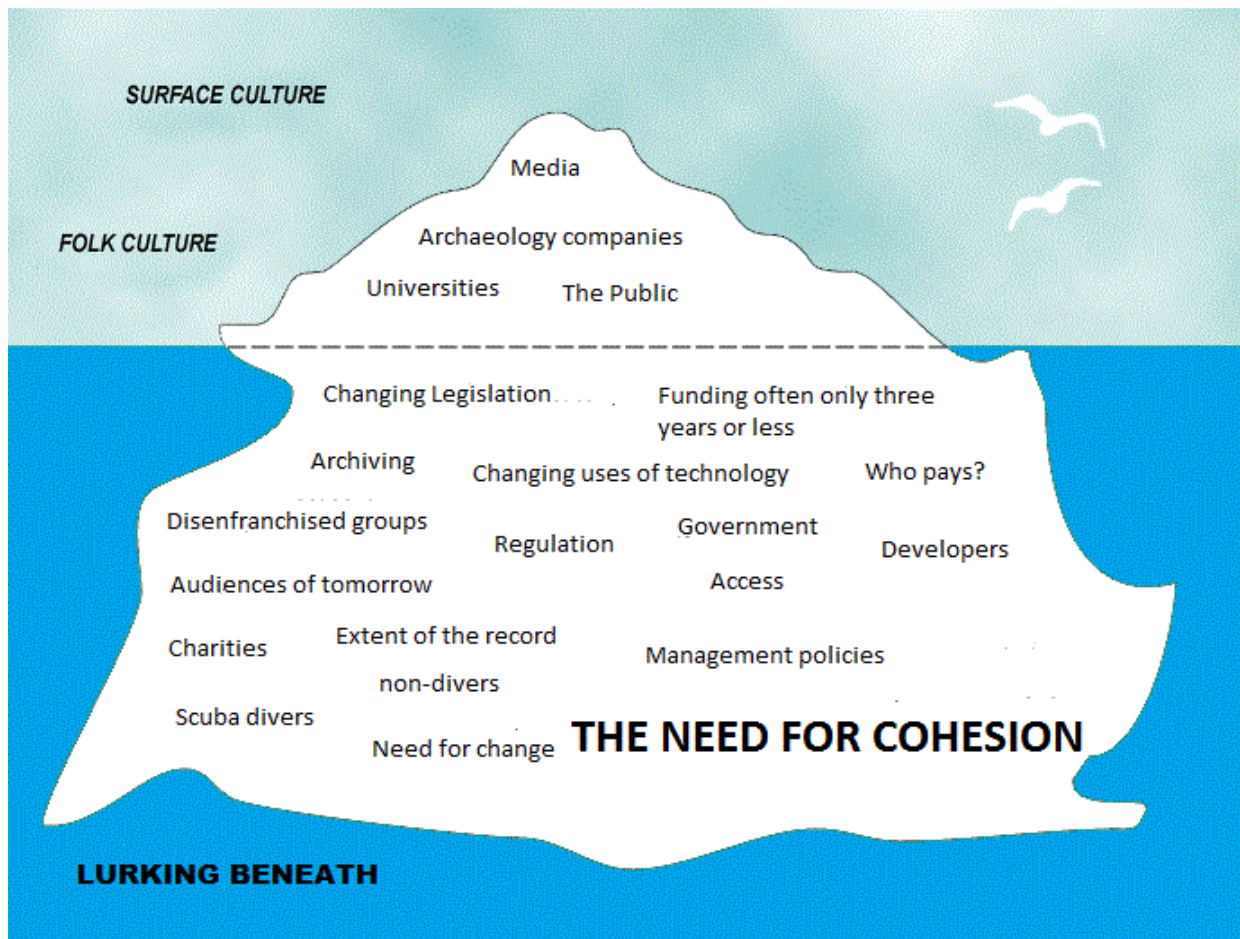


Figure 1. 'The Iceberg'

in the types of projects that generate a need for archaeological intervention is commercially sensitive and cannot be shared or disseminated. Despite this, there are some very well-known success stories where archaeological priorities have corresponded with those of commercial interests. A key example would be the work on Doggerbank where Dr Richard Bates (2012 BBC news) of the University of St Andrews said 'We have speculated for years on the lost land's existence from bones dredged by fishermen all over the North Sea, but it's only since working with oil companies in the last few years that we have been able to re-create what this lost land looked like.' Embedding commercial interests and wider long term research is of benefit to all, and the many corporate bodies recognise this. Isolated archaeological work that gets lost as non-available grey literature does nothing to develop the discipline as a whole and is by its nature uncommunicable.

Specifically there is a problem of funding for public outreach projects. Typically this funding lasts for about three years and this creates a dual problem. Firstly, many projects just do not run beyond their funding period, secondly many projects fail to fully reach completion as the funding has ended. Short-term funding is one of the most difficult challenges we have to deal with in order to create a sustainable research community. If you can only focus a few years ahead at a time it makes it fundamentally difficult to create a long-term research framework.

The sheer extent of the marine archaeological record forms part of the problem. *People and the Sea: A Maritime Archaeological Research Agenda for England* (Ransley et al:2013) fully identified what is probably

extant. Whilst this identification is a necessary part of driving maritime archaeology forward (and a very good read) what is necessary now is to consider how we can do this. In fact, in discussions the MASIG committee agreed that one of the biggest weaknesses in maritime archaeology in England and Wales is that most of the work revolves around identifying the extent of the resource, and failing to come up with comprehensive plans for management and dissemination. Talk is all very well, but while the discourse is taking place, the resource is getting lost. This is very frustrating to all of us who care deeply about it.

In archaeology we have not always made the best use of technology. It is important not only that this is addressed, but that we start thinking about the audience and technologies of tomorrow. In higher education this is a key message enshrined within current staff development. Success involves preparing not just for the current generation, but the generation coming up behind them. In 2015 there was a 233% increase in archaeological Twitter accounts opened. Twitter as a whole went into a period of slow growth and crisis for the first time. A new generation of communication is coming into play: Instagram posts generated 58 times more engagement per follower than their Facebook posts, and 120 times more than their Twitter posts. As a discipline, archaeology often fails to be on trend in its adoption of social media. When considering how to disseminate, we need to stop following what has been and engage fully in the present. We work with an inherently vulnerable resource in maritime archaeology and are often misunderstood by the wider community. A personal observation would be that while many individuals, projects and members of the profession make a very good use of the available technology some of the poorest examples of social media use come from inside the archaeological world e.g. repetitive language, automated tweets and failure to use hashtags. At least one current project has a Twitter account that has not been updated in a year and old projects often do not archive their social media. It is important to keep social media up to date and to keep interacting. If we do not take these steps, less reputable parts of the marine world will.

Divers form an important stakeholder as they are often in the marine environment and may be the first people to discover new information. Information from the Professional Association of Diving Instructors (PADI) (<http://www.padi.com/scuba/about-padi/PADI-statistics/default.aspx>) tells us the average diver is around 30 and two times more likely to be male than female. Statistics from the Pew Research Centre indicate that Twitter users are aged between 18 and 30. Social media, therefore offers an excellent opportunity to engage with large amounts of people with access to and interest in the marine archaeological environment, to share information and to educate. The use of social media is explored far more eloquently in Peter Campbell's contributions to this volume, but it is a point worth emphasising here.

Access is an intrinsic problem in marine archaeology. Many maritime landscapes are only accessible if you dive, which the vast majority of the population does not. Through the Nautical Archaeology Society (NAS) I have worked with many dive clubs offering basic archaeological training in the past five years, however many divers still feel removed from the archaeological process, or that archaeologists want to keep them away from the archaeological heritage. The best anecdotal evidence I can offer of this is when diving *the Iona II* in Lundy with a dive club in June 2013. We were talking to the skipper (and licensee of the protected wreck) and discussing recovering items and when to do it. One member of the dive club piped up 'Be careful of her, she makes you report everything properly'. The licensee explained that was the correct procedure and that although their club house contained many pieces of collected and preserved material all had been properly reported. However, it is always much more effective when the message comes from a peer! Since that date a dive trail on the *Iona II* has opened involving, at various points, Historic England, Wessex Archaeology, The Landmark Trust and the local divers. The *Iona II* is now accessible to many divers and the Landmark Trust also carries full information on the wreck and why she is important

(<https://www.landmarktrust.org.uk/lundyisland/iona-ii-dive-trail/>). While it is not in the nature of this introduction chapter to look in detail at individual shipwrecks, the Iona II was a paddle-ship bought as a blockade runner and was on her way to join the American Civil War when she sank. As such the Iona II illustrates the global nature of marine archaeology, technological innovation in the Victorian era and historic importance.

It has been stated that the disenfranchised diver (much like the hobby metal detectorists operating outside the law) was the norm in the past and is thankfully less of an issue today. However the fact that they exist at all is a worry. Not only do they need to be included because of the amount of material information they can offer, the fact is that while they feel outside the system they can also cause damage. The marine archaeological resource should be accessible by all and in the past I (in a person not a MASIG committee context) have spoken out strongly against the domination of projects by a small unrepresentative segment of society. In many of the case studies presented at the conference, people have worked hard to get beyond this. By involving everyone on a community basis we will gain better protection and more information about the resource as a whole. In addition, much funding is linked to accessing hard-to-reach groups and by automatically including this element in project planning funding it helps to address the ongoing funding issue. In the event that people still refuse to engage, and despite education being more important than legislation, it is important that the consequences are clear. Since the conference there have been a number of prosecutions of divers for removing marine heritage illegally (most recently concerning Scapa Flow wrecks from Orkney, <http://www.bbc.co.uk/news/uk-scotland-north-east-orkney-shetland-38144450>). Fines have ranged between £12,000 and £60,000 and in one case a jail term of two years was given. It has been maintained that such prosecutions are in the public interest, not least because the random collection of artefacts destroys the archaeological context and means research becomes difficult.

A growing phenomenon in the past five years has been the increasing number of non-divers who have developed an interest in maritime archaeology. As an assistant tutor with the NAS from 2007 to 2015, I typically taught on or hosted two to three courses a year. At the end of that period it was common to have a third non-divers working on a practical foreshore-based exercise. This reflects the growing interest in marine archaeology and the fact that people want to get involved. It is a challenge to ensure that not only is this interest capitalised on, but that it is fully used. The Thames Discovery Programme was able to confirm the funding of the CITiZAN project based on their work at the 2015 conference. Now nearly three years old, the programme trains people in archaeological techniques so that they can independently record and monitor the coastal archaeological resources (<http://www.citizen.org.uk/>). As well as involving stakeholders in activity through the use of their artefact recording app and the data that they have generated, they have created a natural database for research.

This is not the only exciting citizen science-based project that has been founded since the conference. The Marine Antiquities Scheme launched in 2016 allows people to record and get identified chance finds from sea (<https://marinefinds.org.uk/>) complementing the CITiZAN app which records coastal finds; this scheme shows the importance of integrating stakeholders. Funding comes from the Crown Estate, the scheme is backed by experts from Wessex Archaeology and depends on the wider public reporting finds. The database is then searchable and, as it based on that of the Portable Antiquities Scheme which records land finds, it will hopefully lead to some interesting in-depth research projects on the marine resources.

The whole of 'what lurks beneath' for marine archaeology can be summed up as the need for cohesion: a plan to move ahead and integrate the best elements of maritime practice as a long-term plan that can improve the management of the resource. Excitingly, since 2014 there is more and more evidence that this is possible.

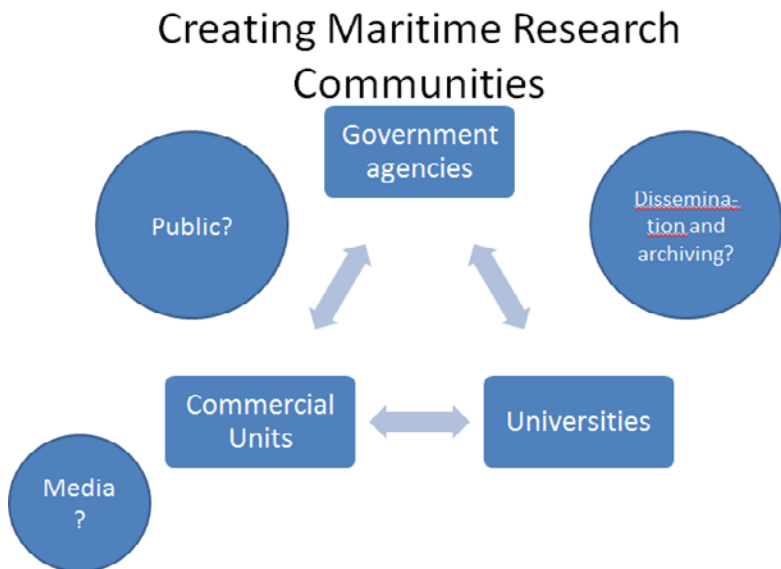


Figure 2. How do we integrate all stakeholders?

Balancing stakeholders

There have been many failures with balancing stakeholders on the way to evolving a successful research community. As noted in my paper at the conference, even when an experiment has not lead to immediate success (such as dive trails), the generation of new ideas has often lead to the development of successful schemes. These ideas therefore can be regarded as 'trailblazers'. Keith Muckelroy (1978:10) noted that maritime archaeology displayed 'a remarkable lack of development or systematization,' constituting an 'academic immaturity' when compared to other

archaeological sub-disciplines. Nearly 40 years later there is still a distinct lack of cohesion in maritime archaeology. The conference called for marine archaeologists to deal with the lack of development in the discipline and create a framework that works not only for maritime archaeology, but that can ultimately act as a template for archaeology as a whole.

Academic marine archaeologists have stated that field practitioners fail to engage with theory due to 'the relative scarcity in this field of scholars who are strongly conversant with prevailing archaeological method and theory' (Gibbons 1990:383). It is important to state this because many student essays or early academic works state that there is no archaeological theory in marine archaeology and clearly this is not the case. In 2009 the Nautical Archaeology Society was commissioned to research and put together a paper called 'Benchmarking competence'. Avocational (unpaid) archaeologists reacted against statements in the paper such as 'the only way competence can ultimately be demonstrated and recognised is by peer review of academic publications' and expressed concern that many of the proposals, such as competency review, would exclude them from the field. This viewpoint is ultimately correct, as a PhD student I appreciate the importance of academic publications, but I am also aware that they appeal to a limited audience. When funding often comes from wider stakeholders, like any other discipline we have to offer value in return for this. The speakers at the conference all added a perspective on this. Although their papers are available in this volume, I would like to consider what they mean collectively. Peta Knott (Archaeologist, Wessex Archaeology) in her paper *Not necessarily between a rock and a hard place* explained how such problems can be dealt with, and how, work can be conducted integrating all stakeholders (Figure 2).

Working closely with Tyneside 114 British Sub Aqua Club, and with funding and support from English Heritage, the Gun Rocks Recording Project integrated a cross-section of stakeholders. Peta explains the problems that could have occurred e.g. the sub aqua club had an active Facebook page and Historic England was concerned that images shown there should be appropriate. With careful planning problems were overcome and all stakeholders were satisfied with both their participation in the project and the quality of the final product produced.

It would seem that although a formal imposed benchmarking system, as suggested in 'Benchmarking Competence' does not work, a system of careful planning and consultation does! Much like an unwritten constitution, everyone is aware of their rights and responsibilities. Good negotiation and a clear emphasis on benefit for all produces positive results. Peta emphasised the fact that many of the people who took part in fieldwork were taking annual leave in order to do so; in addition, they were people often with quite responsible positions elsewhere in society. An authoritarian approach would have produced quite a different outcome.

Best practice in action

The speakers from the conference were a diverse cross-section of the archaeological community. It was good to have people at different stages of their career and with different experience coming together to share best practice, and it was good to see organisations give full credit to their staff where projects have been successful.

Traditionally, marine archaeology has suffered from different stakeholders working separately and not sharing best practice. While commercial confidentiality must be respected, thankfully the number of organisations who totally refuse to share information, or engage in the wider debate, has shrunk dramatically (in fact only one unit refused to take part in the 2014 conference and this the subsequent publication). While some of the case studies overlapped in theme and content, the conference presented a cross-section of action and experience in the maritime archaeological world. Having had the privilege to read submissions I have been struck both by the quality of the work being produced and how interesting it is to read about it in detail.

The issue of maritime archives is an ongoing discussion point. This is one area where the problem and extent of the resource has been fully identified in the past by MASIG in its previous guise as MAG. However there has been no material advancement in practice. For us this creates a dual problem how do interested people access material to enhance research, and how can it be ensured that all archives are maintained?

The Isle of Wight council was very helpful in providing access to their archive material (Figure 3). The Isle of Wight is one of the few HERs in the country that maintain a separate maritime archive. In many cases as there is no legal obligation to accept maritime artefacts, HERs will not even take them on. The archive is well cared for and excellently referenced, however there is no on-line access and no ability to display items.

The Yarmouth Roads Wreck is an excellent case study for the archives issue: part of the archive is displayed seasonally at Yarmouth Castle, the cannon is at Fort Victoria and the majority of rest of the archive is in the store in Ryde. In fact, the HER was under the impression that all the archive was in their possession, although subsequent to the conference it became clear that a small amount of material was retained elsewhere. Split archives of maritime material are not unusual and some are not as well cared for as the items on the Isle of Wight. The ADS (Archaeology Data Service) Grey Literature service does accept maritime reports and MASIG would strongly urge anyone doing work to lodge a copy of it with them. Agreeing where the physical archive should be held and by whom is also essential to any work.

In 2013 the book *Caring for Digital Data in Archaeology: A Guide to Good Practice* was published jointly with the US-based organization the Digital Archaeology Record (TDAR) (www.tdar.org). This proves it is possible to disseminate not just on a national, but also, an international basis to a high standard and involving corporate (including developer) funded archaeology. In marine archaeology we need a set of best practice guidelines for the marine resource. In this respect we need to turn to the work being done on a terrestrial basis.

One solution to managing the archive and information issue may be presented by the maritime archaeology platform run by post-graduate students at the University of Southampton, which was given as an example of how digital archiving can be used to increase accessibility. The platform acts as a source of 'how to' guides as well as holding information. The idea behind the site <http://www.maritimearchaeology.com/> is that any professional can request a log in and add to the information collection.

The use of multi-media to broadcast to a wider audience is also significant. In September 2014 the University of Southampton started broadcasting (mainly on Tuesdays) a range of talks by students and specialists on maritime archaeology. These were open to anyone to watch live and questions could be voiced to the speaker via Twitter using the hashtag #cmarg. Ultimately this type of broadcast depends on speakers who are happy for their information to go out to a wider audience. However in 2014 the university launched their online MOOC Shipwrecks and Submerged Landscapes to an audience of 10,000 learners (<http://www.southampton.ac.uk/iliad/engaging-and-inspiring-moocs/casestudies/casestudyfrasersturt.page>). Alongside the number of learners registered with FutureLearn and directly engaging with the course, study groups have been set up on Facebook. The course has tried to have an interactive element during each presentation of the course ranging from Google hangout, Youtube videos through to Twitter chat. By engaging with different media it has been possible to try out the different ways to create a community approach to the marine resource.

John McCarthy (Project Manager, Wessex Archaeology) reported and reflected on Project SAMPHIRE (Scottish Atlantic Maritime Past: Heritage, Investigation, Research & Education) (Figure 3). This is a model project for us all to follow. Its purpose is bridging the gap between professional maritime archaeologists and the local maritime community. John explained the project as a knowledge exchange between the public and archaeologists with both parties benefiting from it. Some of the best information that the project has gained so far has been from going to harbours and going out in boats. Not only have new sites been discovered, but evidence has been gained of how sites have changed over years. In order to do this it is necessary to make sure that the public is fully integrated into any project design.

John's respect for the individuals that he had met is evident and the results, including some fantastic illustrations drawn by divers, were valuable. John makes it clear if we want truly meaningful results then we need to go out and get a wide range of people involved. As the project has progressed, all participants have received a copy of the disseminated results. The project has also used technology to create visualisations of different material to enable further dissemination of information.

As previously mentioned, many funding sources are time-restricted for periods up to, but not exceeding three years. This creates an issue as the opportunity for longevity of succession is not there. One situation where this problem has been managed into a success has been dive trails.

Dive trails have been set up on the Norman's Bay Wreck and Colossus, and more are being set up with the most recent being the A1 submarine in the Solent in May 2013 and the PS Iona II in Lundy in June 2014. In terms of looking at a community, these trails give access to protected wrecks, but also add information to the archive through initial set-up research, and information fed back from divers diving the wrecks. I have dived both of these dive trails (the A1 being a memorable 100th dive) and they are both fantastic dives with the wildlife being as entertaining as the wrecks. Figures show the number of visitors to the protected wrecks has increased year on year and continues to do so. Divers also eat out in the local community and stay in local hotels. This allows people to see a direct economic benefit from their local wrecks which in turn can only help to improve their profile and protection.

Having been invited to help with the Norman's Bay wreck dive trail in its early stage, setting up a dive trail involves a good plan from the project director and everyone in the team knowing their role. For example,

during the early part of the project I buddied with a marine biologist who recorded the wildlife on the wreck. The NAS acknowledges that not all divers are into wreck diving. Wildlife information not only gives something for divers who are not that interested in wrecks to look at, but gives important monitoring information for the archaeology as well. Working underwater may involve thinking outside normal stakeholder groups in order to get the widest range of involvement and information. Dive trails are an important success story in creating the correct balance between different stakeholders and generating ongoing information.

Another three-year-funded project is the MAD about the wreck project. Recently completed, this project revolved around bringing maritime archaeology to non-typical audiences. Paola Palma (Bournemouth University) in her paper *The Swash Wreck: A maritime archaeological case study*, explained how they were using the focus of the Swash wreck to reach out to a wide section of the community. As well as traditional groups the project has worked with prisoners, people in hospital, the visually-impaired and other groups. Funding today often involves inclusivity in units and impact in the higher education sector and this is a project that truly manages to meet these criteria. As part of this project a maritime archaeology outreach day was held on 11 and 12 June 2014 in Bournemouth and included many agencies working with the project, promoting maritime archaeology to a wider audience.

Matthew Skelhorn (Wreck Research Analyst, Ministry of Defence) presented information about the MOD and the wrecks for which the Ministry is responsible in his paper *RFA Darkdale: A British Wreck in St Helena*. Although the MOD do not have a mandate for archaeology it sometimes does become part of their work. Matthew was keen to emphasise the importance of metal military wrecks, which ultimately come under their remit, and that funding *could be* made available for relevant work on them. Whilst the MOD might not always be an organisation we often think off in Marine Archaeology, it is clear that they should be a part of any developing research community.

Courtney Nimura and Elliott Wragg (Community Archaeologists, The Thames Discovery Programme) in *Community Archaeology in the Coastal and Intertidal Zone*, gave an insight into how we get beyond the three year funding problem. The Thames Discovery programme was initially set up for three years with support from the Heritage Lottery Fund. Local volunteers were trained in recording and working on the Thames foreshore in a responsible and safe fashion. Once confident in what they were doing they were able to manage project work for themselves. After three years the funding finished, but such was the success of the project that it was adopted by the Museum of London. A few of the finds were shown to us and there can be no doubt this project has added considerably to the archaeological record. The success of the project can also be measured by the fact that many community members can continue the work themselves with minimal professional support due to the training and support they received during the project.

The Marine Archaeology Special Interest Group

In the MAG 2014 members' survey, it was revealed that even amongst our membership people were not clear what MAG actually did! Although existing to support members in their continuing professional development and to cascade good practice, members felt neither of these roles were evidenced by the group. Cascading good practice is a broad remit and ranges from attending meetings and giving input to a range of organisations that impact on marine issues through to arranging conference sessions and CPD for members. Changing the group name from MAG to MASIG was a conscious branding decision to raise awareness of the group and its remit. We currently have 365 members, ranging from senior practitioners through to students.

Unsurprisingly, many of the membership have maritime archaeology as the main focus of their job or study, however for others it is a smaller part of their work, or an interest or hobby. The latter is

particularly interesting as when trying to identify who are the stakeholders in maritime archaeology, it appears our diverse membership within CIfA reflects the range of external stakeholders. The fact that 25% of our membership view marine archaeology as an outside interest suggests that, although our membership may be trained archaeologists, a lot of the time they are unpaid when carrying out maritime work. As an interest group MASIG owes a duty of care to all our stakeholders. So, from company director through to student, it is necessary to provide support and training necessary to develop our part of the profession and provide an interface where all stakeholders can interact.

The papers at the 2014 IfA conference were the first step in feeding back to our membership and working towards sharing and developing best practice.

Where do we go from here?

Developmental issues for the group remain focused on using technology effectively, and embedding the main issues facing our discipline in our long-term planning. As part of that we have launched a new name and branding. When googling Maritime Affairs Group the range of returns was interesting and not always archaeologically relevant. In addition at meetings with other groups it seemed the wider archaeological profession regarded us as ‘those people who dive on shipwrecks’, a somewhat narrower view than we wished the rest of the profession to hold. Changing the name to Marine Archaeology Special Interest Group has allowed us to flag up our remit of shipwrecks, submerged landscapes and coastal resources and removed the google issue. The only other use for MASIG is a coral and clay island, part of an archipelago off the Queensland coast, and even that seems appropriate!

Recognising that the profession has often failed to consolidate its ideas is one thing, but MASIG has on occasion failed to do this as a group. Additionally criticism has been levelled at us unfairly, and as a group we have aimed to improve our communication with our membership to help avoid this. Like our membership the committee contains a wide range of people, from early-years researchers through to senior marine archaeologists. We intend to use our wide range of experiences to help the membership at all levels. Through our various contact points at conferences, and through social media, we wish to encourage debate on all the points raised in this volume. We are going to work towards a vibrant Maritime Archaeology Research Community and we hope you will make the journey with us.

Thanks and further information

I would like to thank the CIfA for their financial support which enabled me to attend the conference in 2014, the Isle of Wight County Unit for their help, the committee members of MASIG and Sarah Holland for taking the time out of final PhD write-up to write extensive and honest feedback on this paper. In addition I would like to thank Victoria Cooper for taking over the sometimes difficult position of MASIG chair and giving me the time to finally finish this volume.

MASIG would like to thank all those who contributed to Creating Maritime Research Communities and made the conference session and this article possible. The achievement of marine archaeologists both paid and unpaid is manifold, and it has only been possible to touch on a few here. As many of the papers have shown working together we produce much more than working separately. In the coming year MASIG intends to focus on communicating with its membership, encouraging all stakeholders to communicate with each other, recruiting more people, responding to new consultations on marine heritage issues and using the research generated to create targeted CPD opportunities. After all, we are all archaeologists ...

To keep up to date with MASIG activities please join us on facebook www.facebook.com/IfAMAG and Twitter at @IfAmaritime. A copy of responses from MASIG to recent consultation and articles can be found on our website

<http://www.cifamarinearchaeologysig.co.uk> Membership of MAG is free as part of CIfA membership or costs £10 per year separately.

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Archaeological Skills in a Commercial Marine Environment: What marine archaeologists need to succeed in a development-led context

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Not all that long ago, commercial marine archaeological contracts were relatively uncommon compared to terrestrial work. However, in the last fifteen years or so, the numbers of contracts have been growing due to development pressure to build offshore wind farms, extract aggregates, install cable routes and increase port capacity.

In order to meet this growing demand, the number of archaeological contractors able to undertake commercial marine archaeology has increased. However, finding team members that have a sufficient level of archaeological competence, knowledge, aptitude and experience for commercial work is challenging.

While universities teach a wide range of subject matter on courses dedicated to marine archaeology, they do not always insist that individuals attain good quality experience in the field and in post-excavation processes and tasks. This can result in a skills gap that becomes apparent when individuals then apply to work in a commercial marine archaeological environment.

This article aims to draw attention to the skill requirements for those who aspire to work in the competitive and challenging environment of commercially funded archaeology.

Archaeology in the marine environment

There is a range of published material (see for example: Muckelroy 1978; Bowens 2009) that describes the complexities of successfully undertaking archaeological fieldwork in the marine environment in comparison to equivalent terrestrial work.

Additionally, the environmental conditions experienced by diving archaeologists are seldom as idyllic as those presented on television. This is the case particularly in the UK and elsewhere with difficult tidal regimes and unpredictable environments. Restrictive factors include depth and time, as well as distance from shore, tidal regime, meteorological conditions, temperature, turbidity and limited visibility.

These difficulties are faced by anyone attempting to undertake marine archaeological fieldwork, from volunteer organisations to universities; from academic researchers to the commercial sector. However, those working in the commercial sector face additional pressures.

Commercial archaeology

Commercial archaeology is where archaeological techniques are put into practice by professional archaeologists who are funded by a commercial client, usually a developer. In the last 15 years or so, there has been a considerable increase in commercial marine archaeological contracts, largely due to development pressure to build offshore renewable energy projects, such as wind farms, install cable routes, renew licence areas for aggregate dredging, and the dredging and development of ports and harbours.

As a result of the increased demand, a growing number of marine archaeological contractors able to undertake the work have been established. However, for these organisations it can be difficult to recruit staff with a sufficient level of archaeological competence, knowledge, aptitude and experience for commercial work.

Standards are set by local and national curatorial bodies that sit within the planning system and are guided by the professional standards laid out by a professional body such as the Chartered Institute for Archaeologists (CIfA). The government body responsible for ensuring those standards are maintained (The Regulator) is the Department for Culture, Media and Sport (DCMS), advised by Historic England.

Commercial archaeology contracts, whether in the terrestrial or marine environment, are likely to have been competitively tendered by a client and therefore there will be budget limitations. Tenders are routinely won at rates lower than the contractor would ideally want, which requires contractors to operate as efficiently as possible to avoid projects going into deficit.

The commercial archaeological contract will have been tendered on an estimate of how many days a member of staff or team will take to do the work. If the team or member of staff cannot complete the project within the specified financial tolerances then the project will make a loss. For practically any organisation, too many of these losses will ultimately spell financial disaster.

Additionally, commercial archaeologists are often working to very tight deadlines. Projects must be completed within the time scale set by the client. A late report could delay the development project, causing considerable financial implications for the client; and therefore archaeological contractors unable to meet set deadlines are unlikely to be considered for future work.

Commercial marine archaeological projects have additional pressures, including the difficulties in working underwater discussed previously. Any diving undertaken while at work must comply with HSE diving at work regulations (www.hse.gov.uk/diving), and there are a host of legal obstacles



Figure 3. Wind farm under construction (Wessex Archaeology).

that must be carefully negotiated; the effect of which is a hugely increased cost over an equivalent terrestrial job.

Taking on a member of staff without proven experience is a risk, and therefore it is essential for potential employees to be able to demonstrate relevant previous experience that will enable them to dive right in.

For those who aspire to work in the competitive and challenging environment of commercially funded archaeology, this article aims to provide advice for what is realistically required to work in a commercial marine archaeological unit.

Higher education and experience

It will generally be expected that all archaeologists working commercially will have a degree in archaeology or a related discipline.

There are a number of universities around the world that teach undergraduate and post-graduate courses dedicated to marine archaeology. These courses cover a wide range of subject matter related to marine archaeology. However, they are not necessarily designed to prepare individuals for work in the commercial sector, rather they provide a broad academic introduction to the subject or focus on particular specialisations. This can result in a considerable skills gap between what individuals have learned while at university and what is required in a commercial context. As a result, employers will expect to see relevant experience as well.

At some universities, it may be possible for individuals to take initiative to bridge this gap, for example attending courses in different archaeological subjects, such as lectures and computer lab sessions in archaeological computing in order to develop skills with commercially used GIS software such as ArcGIS.

Additionally, it may be possible to develop marine archaeological skills through links with marine archaeological organisations with strong volunteer and education programs, such as the Nautical Archaeology Society (NAS). The NAS runs regular training sessions in a variety of topics from basic fieldwork techniques to early boatbuilding techniques, and provides fieldwork opportunities on a range of sites.

The aims of archaeologists are the same whether on land or underwater. The detailed and complex recording of archaeological information is best honed in a terrestrial setting where it can be practised and refined. Once the practitioner is competent it is then an easier step to apply it to the impracticalities and logistical constraints of an underwater site. In short, it may well be easier to teach an archaeologist to dive, than to teach a diver to be an archaeologist.

In rare cases, it may also be possible for experienced practitioners without a degree, having worked extensively on commercial archaeological projects, to be taken on by commercial archaeological organisations as their practical experience outweighs the traditional academic background.

The development process

It is important for marine archaeologists working in the commercial sector to develop an understanding of the industries that provide contracts for commercial marine archaeologists, and to understand the development process in the marine environment. Comprehending the needs of the client, and how commissioned work fits into the larger framework, ensures that marine archaeologists can deliver the most appropriate advice and products.

Fortunately, there is guidance available that examines the role of marine archaeology and the historic environment in the development process.

The marine aggregate industry has been at the forefront of working with marine archaeologists to minimise archaeological impact on the historic environment. A Guidance Note for Marine Aggregate Dredging and the Historic Environment (BMAPA and English Heritage 2003) provides details about assessing, evaluating, mitigating and monitoring the archaeological effects of marine aggregate dredging.

The offshore renewables industry has also produced guidance. The Historic Environment Guidance for the Offshore Renewable Energy Sector (COWRIE 2007) outlines the role of marine archaeologists within the offshore renewable energy development process in the UK. It provides notes on survey methods, appraisal, and monitoring of the historic environment, promoting best practice. The guidance is also intended to promote an understanding of the conservation issues arising from the impacts of offshore renewable energy projects, and therefore develop capacity amongst marine archaeologists, consultants, developers and contractors.

Similar guidance for ports and harbours is currently in production (English Heritage, forthcoming).

Specialist vs. ‘jack-of-all-trades’

When many people think of marine archaeology, they often picture divers working on underwater shipwreck excavations. However, not all marine archaeologists need to be able to dive – there are numerous opportunities to undertake other fieldwork activities such as walk-over surveys or watching briefs; to research and write reports; to archaeologically interpret geophysical and/or geotechnical data; participate in post-excavation activities or outreach opportunities.

In marine archaeological organisations, as in many other organisations, there is the need for people who are specialists at what they do and for people who are more general ‘jacks-of-all-trades’.

Some marine archaeologists specialise in niche areas, for example as experts in submerged prehistory, timber recording or geophysics. These experts provide important, authoritative advice on their subjects. This not only supports the credibility of commercial marine archaeological units, it feeds into the development and planning process by providing expert professional opinion and sometimes driving best practice.

There are also opportunities for more general marine archaeologists who have a working knowledge of a range of specialties and are able to work in many different areas. In fact, marine archaeologists with a variety of skill sets may be more easily deployed and therefore provide added value to commercial employers. This can be particularly important for diving archaeologists, as diving operations may be limited to seasons when diving conditions are more favourable, and therefore the ability to write reports and undertake other types of archaeological assessment would increase employment opportunities.



*Figure 4. Aggregate dredger at work
(Mineral Products Association (MPA))*

Research, assessment and reporting

Research, assessment and reporting are three areas where university students are likely to have been well prepared. However, commercial marine archaeological reporting may differ considerably from university writing in a number of ways, such as subject matter and form of analysis.

Research in the commercial marine archaeological sector can range from a detailed account of a single wreck site to an archaeological assessment of the entire archaeological resource for a wide area, for example the Thames Estuary.

Strong research skills are needed and provide the opportunity to continue to develop expertise and knowledge. Commercial marine archaeologists should be familiar with the principle sources of both terrestrial and marine archaeological data, with their constraints and with their interpretation.

Marine archaeologists gather data from a wide variety of sources, including:

- The United Kingdom Hydrographic Office (UKHO);
- The National Record for the Historic Environment (NRHE);
- Local Historic Environment Records (HERs);
- Geophysical and geotechnical surveys;
- Charts and maps – both historic and modern;
- Previous archaeological reports and various secondary sources.

Data from these sources can provide information about known wrecks on the seabed, recorded losses of ships and aircraft in the area, navigational hazards, the history of seafaring in the area, submerged prehistory, and so forth.

Once the data has been collected, it needs to be collated for further assessment and analysis. Records with spatial data can be compiled using GIS software. As with terrestrial archaeology, there are a number of technical skills that marine archaeologists should be proficient with, and of these, the ability to work with GIS software is probably one of the most important, as it is widely used and is not confined to marine archaeological use. GIS software enables spatial data from a wide range of sources (such as those identified above) to be compiled, visualised and analysed. It enables marine archaeologists to present the locations of known wrecks, geophysical anomalies, and other archaeological features, superimposed over charts, maps, bathymetry data or other datasets, in order to examine the known archaeological resource in detail. This in turn provides a basis for assessment of potential impacts from development activities.

Records without spatial data, such as archaeological reports or other secondary sources, or records with poor positional data, such as recorded losses (reports of vessel losses for which there is no known associated material on the seabed), are consulted to provide a broad baseline for the archaeological resource.

Having thoroughly researched a subject and/or completed a marine archaeological survey, it is essential to be able to communicate the results with the client, curators (such as English Heritage, Cadw or Historic Scotland) and in many cases the wider archaeological community and the public. Experience writing archaeological reports is definitely an asset, as are strong word-processing skills, in order to ensure reports are produced in a timely manner.

In order for a development to gain planning consent, reports may be required at various stages. Although not all developments go through the same stages or require the same types of reports, possible types of reports that marine archaeologists may be commissioned to prepare include:

- Strategic Environmental Assessments (SEAs);
- Scoping Reports;
- Desk-Based Assessments (DBAs);
- Environmental Impact Assessments (EIAs);
- Environmental Statements (ES); and
- Written Schemes of Investigation (WSIs).

During development, further reports may be required, such as:

- Watching Brief reports;
- Clearance Mitigation Statements;
- Wreck Reports; and
- Unexpected archaeological discoveries may lead to further reporting, for example through Protocols for Archaeological Discoveries.

Each of the reports listed above requires a different level of detail and a different focus.

SEAs, Scoping Reports, DBAs and EIAs all require data collection, collation, assessment and analysis of data, often including a large amount of data from disparate datasets. The use of GIS software facilitates the assessment and analysis of spatial data, but other secondary sources are also incorporated in the report. These reports provide developers with a historic environment baseline which presents the archaeological resource in the development area in context and highlights any gaps in archaeological knowledge. The reports identify ‘show stoppers’ such as wrecks protected by legislation, including the Protection of Wrecks Act 1973 and the Protection of Military Remains Act 1986 as well as other nationally or internationally important sites, but also provide an assessment of other archaeological assets (or receptors) in the area.

Archaeological receptors are the archaeological sites and material that could be impacted through a development. Key receptors can include:

- Shipwrecks;
- Aircraft crash sites; and
- Seabed prehistory.

Other archaeological receptors that can be impacted include:

- Historic Seascape Characterisation; and
- Setting of archaeological sites with views of the proposed development.

The results of archaeological assessment of geophysical and geotechnical data may be integrated into these reports, or they may form stand-alone reports.

When writing an EIA, it is essential not only to prepare a thorough baseline for the historic environment, including known and potential archaeological receptors, but details about the development must also be included. From this information, marine archaeologists assess the importance of the receptors, their value, sensitivity, recoverability and other factors in order to determine the significance of impact. The ability to interpret and make valued judgement on the importance and significance of archaeological data, based on professional judgement and experience, is particularly important for preparing these reports. Additionally, EIAs can present mitigation measures in order to lessen the level of impact, for example recommending the establishment of Archaeological Exclusion Zones (AEZs), the identification of receptors for further assessment and the implementation of Protocols for Archaeological Discoveries.

Writing an ES chapter is the next stage of the EIA process. For this work, marine archaeologists must be able to condense previous EIA results, combine them with the results of any archaeological assessments that have been undertaken since the EIA report was finalised, and present the final product in a format provided by the client.

For the creation of a WSI, a detailed understanding of the historic environment baseline, project design and potential impacts is required in order to develop and present appropriate mitigation measures. This work may draw on recommendations presented in the EIA.

Watching Brief reports provide an overview of the development and assessment and analysis of any archaeological material discovered during the development work.

Clearance Mitigation Statements focus on a single archaeological site and provide a detailed account of the information available about the site as well as the recommended mitigation for clearance. These reports can be produced when it is impossible to prevent damage to, or the destruction of, known archaeological sites, for example shipwrecks identified in areas that will require additional dredging for a port development.

Written reports for material reported through Protocols for Archaeological Discoveries can vary from a single page report on the artefact to a much more in depth study. For these reports, marine archaeologists must either have specialist knowledge of finds, interpreting and analysing artefacts, or must collaborate with specialists and other experts. Material recovered through the Protocols can be as wide ranging as cannon balls, Palaeolithic flint, material from aircraft crash sites and shipwreck timbers.

In conclusion, almost every type of archaeological investigation is likely to require some level of written reporting. While this section has not intended to discuss each type of report in detail, it has illustrated the importance of research and writing skills and their application in a commercial marine environment. Employers will want to be sure that potential employees can write clearly and with academic integrity within often tight deadlines.

Geophysical and geotechnical assessments

These assessments are generally undertaken by specialists, however it is important to understand how the archaeological interpretation of geophysical and geotechnical data feeds into the development process.

Because the historic environment underwater is relatively poorly understood compared to the historic environment on land, geophysical and geotechnical data provide an essential way to expand what is presently known about an area. For example, records of shipwrecks created by the UKHO have often been developed in order to identify navigational hazards. Because of the geophysical survey methodologies utilised, existing records are predominantly for wrecks of post-medieval or modern steel hulled vessels that lay proud of the seabed, as these are more likely to constitute a hazard than the broken up wrecks of wooden vessels that lay flush with the seabed. While marine archaeologists are interested in post-medieval and modern steel hulled wrecks, it is also important to prospect for archaeologically interesting material that does not constitute a navigational hazard, such as debris trails around shipwrecks or wreck material scattered across the seabed.

Geophysical survey methods, including sidescan sonar and multibeam bathymetry, are used for assessing archaeological material on the seabed, such as shipwrecks, aircraft crash sites and associated material. These methods can provide details about the size, height, distribution of material and other features of a wreck site.



Figure 5: Sidescan sonar image of the Talis
(Wessex Archaeology)



Figure 6: Geoarchaeologist recording a vibrocore
(Wessex Archaeology)

In conjunction with magnetometer data, which reveals the presence of ferrous material on or under the seabed, marine archaeologists can further interpret these sites, or identify previously unknown sites beneath the seabed.

Data from sub-bottom profiler surveys are used to assess archaeological potential beneath the seabed. Although this method can provide information about buried wreck sites, it is also used to interpret submerged prehistory, by identifying palaeolandscape features such as ancient riverbeds from periods during the Palaeolithic and/or Mesolithic, when much of the now submerged seascape was dry land and suitable for human occupation.

Geotechnical surveys provide further information about palaeolandscapes and can be used to verify geophysical interpretations of sub-bottom profiler data. Geoarchaeologists use vertically cored seabed sediments, such as boreholes or vibrocores, to assess geotechnical and palaeoenvironmental evidence in order to interpret palaeolandscapes and submerged prehistory.

Marine archaeological geophysicists and geoarchaeologists not only interpret existing datasets, they advise clients regarding the parameters for the acquisition of survey data throughout the development process.

Marine geophysicists and geoarchaeologists clearly need specialist, expert knowledge, training and experience in their subject areas. For marine archaeologists who are not specialists, general knowledge

in each area sufficient to be able to integrate geophysical and geoarchaeological results into the wider commercial marine archaeological project and deliverables would be an asset, as would understanding the basic survey types, what they are used for and methodologies that produce the best results for archaeological data. With regards to submerged prehistory, it would also be useful to have a general understanding of the Palaeolithic and Mesolithic periods (including glaciations and sea-level rise); the local geology; and the types of material that could be recovered through geoarchaeological surveys.

Diving at work

Marine archaeologists who undertake commercial underwater surveys, investigations and excavations need to be appropriately qualified.

For avocational archaeologists engaged in their own activities or volunteering, a recreational diving qualification and a suitable level of experience will be sufficient. For anyone engaging in diving at work, the requirements will be more stringent. In order to meet the requirements of the Diving at Work Regulations 1997, the minimum level of CMAS 3* equivalency or Professional Scuba will be mandatory. Equivalency tables for diving qualifications can be found on the HSE website:

<http://www.hse.gov.uk/diving/qualifications/approved-list.pdf>.

In the UK, some archaeological contractors go further than this, and some jobs will require the use of Surface Supplied Diving equipment (SSD). SSD has a number of advantages over traditional scuba equipment and can be safer to use under certain environmental conditions. Those archaeologists with a commercial SSD diving qualification (HSE III/Surface Supply) may find that they are more employable depending on which organisations they would like to work for and what roles they want to undertake.



Figure 7. Diver at work using SSD
(Wessex Archaeology)

In addition, employers will be looking for proven experience of having dived at work, particularly in challenging environments or conditions.

Other technical skills or experience relevant to diving at work would also be an asset, such as recognised experience or training in the use and/or maintenance of diving equipment including SSD, full face masks, through water communications, and diver tracking/positioning systems. Oxygen administration qualifications would also be an asset.

In addition, archaeological divers must be able to demonstrate technical skills relevant to underwater archaeological recording. These may include digital photography, photogrammetry, 3D measured survey, timber recording, sediment sampling and identification, and so forth.

Development-led projects that may require divers include assessing potential wrecks and seabed anomalies that have been identified through geophysical survey.

Although preservation *in situ* is recognised as the best means of protecting archaeological material on the sea

bed (UNESCO 2001), in some cases excavation may be the only available option. If avoidance is not possible and impact will occur during development or dredging, then sites should be surveyed and excavated (termed preservation by record). Therefore, knowledge of underwater excavation techniques can be beneficial.

The following paragraphs provide examples of recent projects involving marine archaeological divers at work, shipwreck material recovery and underwater excavations.

The wreck of the Thames Princes Channel Wreck (or Gresham Ship) was first discovered in 2003 when the Port of London Authority (PLA) was undertaking survey work in advance of dredging to deepen the Princes Channel. Archaeological investigations, including detailed surveys, were undertaken by Wessex Archaeology and consultations with the PLA and English Heritage resulted in the 2004 recovery of a variety of ship's timbers (Firth *et al* 2012; <http://www.wessexarch.co.uk/system/files/Wreck%20in%20the%20Thames.pdf>).

In recent years, there have been some large scale underwater excavations on shipwrecks that were initially identified through pre-development surveys.

The Swash Channel wreck was discovered by Wessex Archaeology through survey work undertaken as part of the Poole Harbour Commissioners and Poole Borough Council Pool Harbour Channel Deepening and Beneficial Use Scheme. In 2004 the site was designated as a Historic Wreck under the Protection of Wrecks Act 1973. Monitoring of the wreck indicated that it was under serious threat from exposure due to erosion, and in 2010 English Heritage granted Bournemouth University a license to excavate (<http://research.bournemouth.ac.uk/2014/02/swash-channel-wreck/>). Artefacts recovered from the wreck include not only the intricately carved rudder, but also iron cannons, wooden barrels, rigging elements, copper, pewter, bones, ceramic and domestic material, leather shoes, musket balls and apothecary jars.

In 2005, the wreck of the *London* was discovered during work in advance of the London Gateway Development. In 2008, the wreck was designated under the Protection of Wrecks Act 1973. Investigations into the wreck were begun by Wessex Archaeology, and the work was continued from 2010 by a group



Figure 8. Diver using an airlift for excavation
(Wessex Archaeology)



Figure 9. Diver surveying the Swash Channel Wreck
(Wessex Archaeology)

of local volunteers under the direction of site Licensee Steve Ellis. Monitoring activities indicated that the wreck of the *London* was under serious threat from unstable sediments which led to exposure of the wreck structure and loss of artefacts, and English Heritage granted Cotswold Archaeology a license to excavate in 2014 (<http://www.cotswoldarchaeology.co.uk/the-london-wreck-1665/>).

Traditional archaeological skills

Whether working in a marine environment or not, there are certain skills that will be invaluable to an archaeologist. Experience of archaeological recording, the interpretation of archaeological remains, and the ability to process records and finds post-fieldwork would be beneficial in many archaeological fieldwork situations. Knowledge of common types and modes of archaeological investigation, recording systems, research and their limitations would also be advantageous.

Many of the basic skills, such as filling out a context sheet or object register, drawing a measured plan of the site, and taking archaeological photographs should be second nature to archaeologists. The best place to acquire these skills is during terrestrial fieldwork; once understood and practiced, they can be transposed to a marine context. It is more difficult to acquire these skills in a marine context due to the many other factors on submerged sites, such as limited visibility, currents, and time limitations.

Marine archaeological expertise

In addition to traditional archaeological skills, it would be expected that marine archaeologists working in a commercial environment would have further expertise in marine archaeological subjects, and a broad and/or specialist knowledge of marine archaeological periods, theory and practice.

Solid background knowledge contributes to understanding marine archaeological sites and finds. For example, many of the known and recorded shipwrecks around the coast of the UK date to the post-medieval or modern period, and therefore knowledge of vessels of these periods would be an asset.

Other areas of expertise could include in-depth knowledge about seabed prehistory, the identification of maritime finds, the recording of preserved historic vessels and timber recording.

It is also essential for marine archaeologists to keep current with discoveries, research, and applicable legislation and guidance.

Other fieldwork and desk-based assessment

There are a wide range of other fieldwork and desk-based opportunities in commercial marine archaeology, and experience in any one of them would be an asset.

Walkover Surveys are similar to those undertaken by terrestrial archaeologists, but may focus on a particular area of the coast. Archaeologists require basic knowledge of the known sites in the area, in order to assess the survival and extent of sites and to identify previously unrecorded ones. Additionally, archaeologists should be familiar with the use of GPS and the use of historic and modern maps and charts.

Intertidal Surveys may be similar to walkover surveys, but as they take place in the intertidal zone there are additional hazards and health and safety concerns, and a solid understanding of local conditions and tidal regimes is a must. Intertidal surveys are likely to focus on intertidal structures and remains such as hulks, so knowledge of these, and other materials that could be encountered in the intertidal zone would be beneficial.

Other surveys may focus on a particular archaeological feature and provide far more detailed recording and assessment. For example, a marine archaeologist might undertake a detailed survey of a hulk that could be impacted by a foreshore development. Types of skills that would be advantageous for hulk surveys include previous ship or wreck recording experience, basic knowledge about boatbuilding techniques, timber recording skills, and research skills to discover more information about the vessel. Further work might include liaising with locals, curators, shipbuilders and ship owners.

Watching Briefs, similar to those undertaken on terrestrial sites, may be required, for example marine archaeologists may observe foreshore development such as the digging of trenches for cable routes through the intertidal area. Marine archaeologists undertaking Watching Briefs need to have a broad and/or specialist knowledge of archaeological periods and the types of finds that could be recovered in the area.

Additionally, Watching Briefs may occur with marine archaeologists installed on dredgers to monitor the recovery of dredged material. Dredgers have the potential not only to expose and retrieve previously buried archaeological material such as shipwrecks and aircraft crash sites, but also material related to seabed prehistory. Therefore a broad understanding of marine archaeological periods and potential archaeological receptors is vital.

Watching Briefs may also occur during Clearance Mitigation work, where marine archaeologists are present on the clearance vessel while removal work is taking place. Clearance mitigation work would be undertaken if archaeological material on the seabed, for example a shipwreck, cannot be avoided by development, and therefore must be removed. The archaeological assessment of recovered material is greatly enhanced by previous knowledge of the site, including any previous geophysical survey data and/or the results of any diver surveys. Skills that could be advantageous for this type of work include knowledge of a range of vessel types, ship building techniques, timber recording skills, and so forth.

In some cases, diving may not be the most efficient way of gathering data about a site, or the site may be too deep for divers to access. In these cases, a Remotely Operated Vehicle (ROV) with full video capabilities may be deployed. It may be possible for marine archaeologists to assist with the ROV Survey while it is being undertaken or the video footage can be forwarded to desk-based marine archaeologists for review and assessment.

Marine archaeologists interested in assessing known and potential archaeological sites along the coast could also consult aerial photographs, photogrammetry data and LiDAR data. A basic knowledge of these data sources, their uses and limitations, combined with experience in interpreting, recording and digitising archaeological features would be beneficial for archaeological assessments of this nature. Capability in rectifying aerial photographs and/or processing photogrammetric data may also be of use.

There is also potential for marine archaeologists to undertake projects in inland waterways, such as rivers, lakes, or submerged quarries.

Post-excavation

Any finds that are recovered during watching briefs, diver surveys, excavations, through dredging or development works, need to be treated in line with the Institute for Archaeologist's *Standard Guidance for Archaeological Field Evaluations* (IfA 2001b) and *Standard and Guidance for the Collection, Documentation Conservation and Research of Archaeological Materials* (IfA 2005) and in accordance with *First Aid for Underwater Finds* (Robinson 1998).

Detailed records that relate to the site, its finds, objects, and contexts will need to be kept, checked and possibly digitised. Records may include information about recording methods used, photographic registers, drawing registers, and so forth.

Most marine archaeologists should be familiar with general post-excavation techniques, but there are also opportunities for marine archaeologists with specialist knowledge regarding the identification, interpretation and conservation of marine archaeological material.

Outreach

There is often considerable public interest in marine archaeological investigations, so it is not surprising that some commercial projects have an outreach component. Additionally, outreach programmes provide an ideal opportunity for developers to demonstrate their high levels of corporate social responsibility and environmental stewardship. Outreach may involve working with the general public, volunteers, dive clubs, special interest groups, or other stakeholders, but it can also include educating industry developers and contractors.

Within the aggregate industry, as part of the Implementation Service in relation to the Mineral Products Association's (MPA's) Marine Aggregates Protocol for Reporting Finds of Archaeological Interest, marine archaeologists visit wharves and dredgers to provide information about the types of archaeological materials that could be recovered through dredging.

Although not directly related to development-led marine archaeological work, other commercial marine archaeology outreach projects have included the development of dive trails (<http://www.landmarktrust.org.uk/lundyisland/iona-ii-dive-trail/>) and walkover and diving surveys as part of the New Forest Rapid Coastal Zone Assessment Survey (Wessex Archaeology 2011a). With these projects, marine archaeologists worked closely with volunteers, both divers and those undertaking walkover surveys, and therefore experience working in community archaeology projects and/or with volunteers establishes useful transferable skills and capabilities.

Case Study: the Area 240 handaxes

This case study illustrates just how interwoven the skills of marine archaeologists can be – as it involved considerable research, find identification and assessment, geophysical and geotechnical assessment, watching briefs, post-excavation work and outreach.

In 2008, 88 flint tools and associated faunal remains were recovered amongst aggregate from dredging licence Area 240 (Wessex Archaeology 2011b). The material dates to the Lower or Middle Palaeolithic and represents one of the most significant discoveries of Palaeolithic material from the North Sea.

Between 2008 and 2011, a major study of Area 240 was undertaken which aimed to improve the future management of the effects of aggregate dredging on the historic environment: by refining practical techniques to establish the possible presence of prehistoric archaeological material; by developing further understanding of the area to provide greater insight into the historic environment of the region as a whole; and by passing on the knowledge to public and professional audiences. Investigations included detailed examination of geophysical and geotechnical data from industry surveys, further intensive geophysical survey of the area from which the artefacts were recovered, seabed sampling, coring to obtain samples of the sedimentary sequence and accompanying palaeoenvironmental assessment.

In 2011, Wessex Archaeology was commissioned by Hanson Aggregate Marine to undertake a further programme of archaeological monitoring of aggregate dredging activity on board a dredging vessel and at the receiving wharf at SBV Flushing. The recovered archaeological material provided further details about the distribution and character of Palaeolithic artefacts in Area 240.

The results of the project were disseminated through archaeological reports, included in a range of publications (for example: Bicket *et al.* 2014), and an outreach project called Time Travelling by Water (<http://www.wessexarch.co.uk/cm/projects/time-travelling-by-water>).



Figure 10. Marine archaeologists wet sieving dredged aggregate material (Wessex Archaeology).

Health and safety

One of the biggest differences between the volunteer/avocational sector and the commercial sector comes from the scope of health and safety legislation and how it affects the way project work is undertaken. As soon as individuals are ‘at work’ they are subject to strict regulations whether in the office, carrying out coastal fieldwork or diving.

By far the biggest impact is when individuals are considered to be ‘diving at work’. The HSE considers diving to be a high hazard activity, and therefore has developed regulations and recommends the establishment of good practice in order to reduce the risks (<http://www.hse.gov.uk/diving>).

It is advantageous for anyone interested in working in the commercial marine archaeology sector to understand the types and sources of information available on safe working practices, legislation and regulations and experience of their practical application.

For anyone working onboard a vessel, for example if undertaking Watching Briefs on a dredger or cable laying vessel, Personal Survival Training (PST) is likely to be required. As would in-date medicals – anyone working offshore would need an ENG-1 medical and divers would require an HSE dive medical.

Conclusions

Marine archaeology in the commercial environment can be an exceptionally challenging but rewarding career option. It involves working with tight deadlines and budget limitations, but it can also involve working on the cutting edge of research techniques and archaeological discoveries.

There are a wide range of opportunities for marine archaeologists to work within the environment of commercially funded archaeology. This article has demonstrated the wide variety of training, skills, knowledge and expertise that contribute to successfully working in this sector.

Although it may be possible for students at university to gain experience of these marine archaeological skills, developing abilities further and gaining experience through voluntary work or terrestrial archaeological work will provide an even more solid background for employment.

Marine archaeology is a relatively competitive career to embark on, and therefore, either developing strong expertise in a particular area or having a wide skill base, backed up with substantial practical experience, greatly increases the chances for landing a job.

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Experience is Everything: England's Protected Wreck Diver Trails

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In April 2014 there were 49 wreck sites designated under the Protection of Wrecks Act (1973) in England. These wrecks are protected for being the most important historical and archaeological wrecks in UK territorial waters with a known location. Many of these wreck sites are buried, and therefore rather uninspiring to the public perception of the shipwreck and underwater archaeology. Some of them are fragmented and therefore difficult to understand, whilst others are fragile and like any delicate archaeological assemblage cannot withstand large numbers of visitors on a regular basis. However some designated wrecks lend themselves to licenced public access.

Since 2005 the Nautical Archaeology Society (NAS) has worked to not only facilitate access to these heritage assets but to also contribute to the research aims of the volunteer custodians. This paper will highlight the opportunity that diver trails on protected wrecks in England offer to the UK heritage sector in facilitating the engagement of the recreational diver.

The paper looks at several diver trails in England, including on the Norman's Bay Wreck and on HMS m/A1 submarine and highlights the role that guided access can play in both education provision and public experience and interaction with underwater heritage.

The paper argues that whilst the Protection of Wrecks Act (1973) remains the principle legislation used to protect and manage historic material on England's seabed, licensed public access must remain a cornerstone of any associated heritage management strategy, a strategy that must receive long-term commitment from both the trail organisers and the heritage agencies.

The Protection of Wrecks Act 1973

The designation of significant historic wreck sites in England occurs under Section 1 of the Protection of Wrecks Act 1973. The Act enables the Government to control investigations of wreck sites and on the seabed surrounding them. Designated sites under Section 1 of the Act are identified as being those likely to contain the remains of a vessel, or its contents, which are of historical, artistic or archaeological importance.

It must be stressed that the Protection of Wrecks Act 1973 does not prohibit access to designated wrecks; but instead, it controls activities so that designated wrecks are not put at risk from undisciplined investigations or actions (English Heritage 2010).

English Heritage's responsibilities to underwater wreck sites derive from the National Heritage Act 2002, which modified functions to include firstly securing the preservation of ancient monuments in, on or under the seabed; and secondly promoting the public's enjoyment of (and their knowledge of) monuments in, on or under the seabed. The National Heritage Act 2002 Act also enabled the Secretary

of State for Culture, Media and Sport to transfer administrative functions relating to the Protection of Wrecks Act 1973 to English Heritage.

Access to England's protected wreck sites is facilitated through a licensing scheme administered by English Heritage on behalf of the Department of Culture Media and Sport (DCMS). In England, licences enabling access are subject to the authorisation of the Secretary of State for Culture, Media and Sport.

Individuals or groups wishing to visit or undertake archaeological activities on a protected wreck may only do so with an appropriate licence, but anyone may apply to access a protected wreck. There are four types of licence: Visit, Survey, Surface Recovery and Excavation and one licence can cover multiple activities without the need for additional licences. All licences issued include conditions such as the full names of individual divers, duration of the licence and the requirement for reporting to English Heritage. They may also have specific conditions attached to them, so that each licence can be tailored to the particular site, the skills and experience of the applicant as well as the proposed activity.

Applications requesting access to protected wreck sites are each evaluated on their merit and applicants are invited to contact English Heritage to discuss proposed projects before submitting a formal application. The English Heritage website hosts application forms to access a protected wreck site that can be downloaded or completed online.

In the UK there has been a strong tradition of avocational groups working alongside professional archaeologists to actively investigate protected wrecks. Proactive groups like the South West Maritime Archaeology Group clearly show that the advantages of involvement far outweigh any disadvantages, so long as assistance is provided in the form of guidance, support, conservation and training (Parham and Williams 2012).

Encouraging access to England's Designated Wrecks

Back in 2002 English Heritage's Initial Policy for The Management of Maritime Archaeology in England, Taking to the Water identified the need 'to engage with the recreational diving community and the non-diving public to instil an enthusiasm for the maritime environment and its conservation' (Roberts and Trow, 2002). Building on this initial policy the philosophy of English Heritage in 2014 is to encourage the

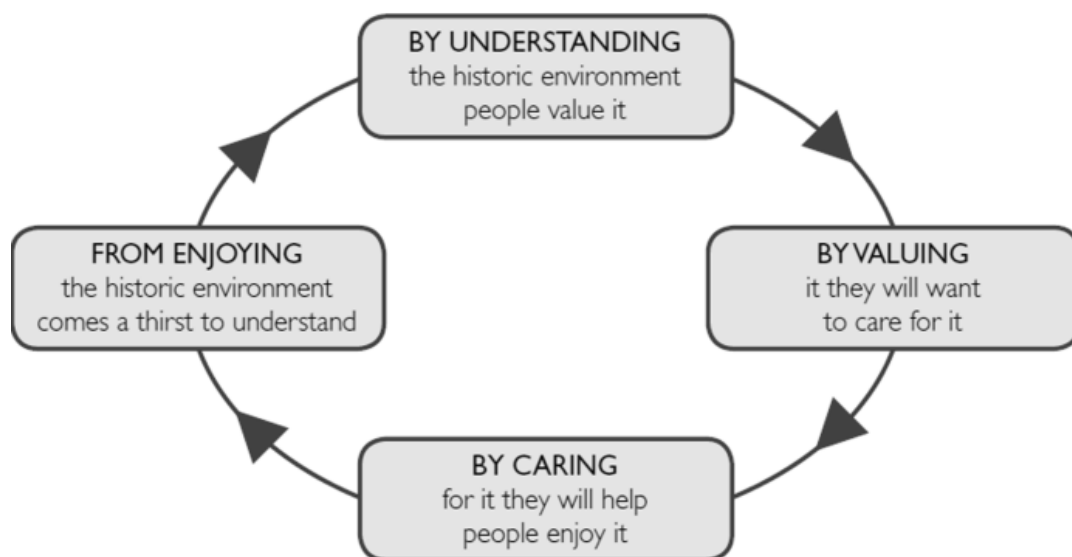


Figure 11. The Heritage Cycle. English Heritage

participation of avocational volunteers in the management and understanding of their heritage and to encourage them to care for it, through a heritage cycle of understanding, valuing, caring and enjoying the historic environment (Figure 11) (James 2012).

Development of diver visitor trails

The concept of managed visitor access via an underwater trail is not a recent phenomenon. The Hampshire and Wight Trust for Maritime Archaeology (HTWMA), now the Maritime Archaeology Trust (MAT) installed a diver underwater navigation line on the Needles protected wreck in the late 1990's. The concept was developed further in West Sussex and resulted in the creation of an underwater dive trail on the protected wreck of the warship *Hazardous* in collaboration with the *Hazardous* project team and with the support of English Heritage. The trail experience included a presentation, a guided tour around the wreck trail as well as a visit to an artefact collection and display (HWTMA 2005:5).

In 2009 English Heritage supported the installation of a dive trail on the protected wreck of HMS *Colossus*, in the Scilly Isles, Cornwall (Camidge 2009 and 2012). At the time, one of the motivations for supporting the visitor trail on HMS *Colossus* was the opportunity to generate local social and economic benefits. The HMS *Colossus* trail was developed by volunteers from the Cornwall and Isles of Scilly Maritime Archaeology Society (CISMAS) and funded by English Heritage. The underwater trail used numbered observation diver stations at particular places on the seabed around the site and a waterproof information booklet to guide visiting divers around the wreck and to explain the exposed remains visible on the seabed. The dive trail on HMS *Colossus* has been a huge success; since it opened in 2009, with over 1,000 divers having visited the protected wreck (see Table 1).

The Norman's Bay Designated Wreck Diver Trail

The creation of the Norman's Bay Designated Wreck Diver Trail was commissioned by English Heritage in the summer of 2010 (Project Number 5946). The aim of the project undertaken by the NAS was to develop, install and test a diver visitor trail around the Norman's Bay Wreck (designated under the Protection of Wrecks Act (1973) on 14th June 2006). The dive trail was designed and installed by the NAS in 2010 and launched in the spring of 2011.

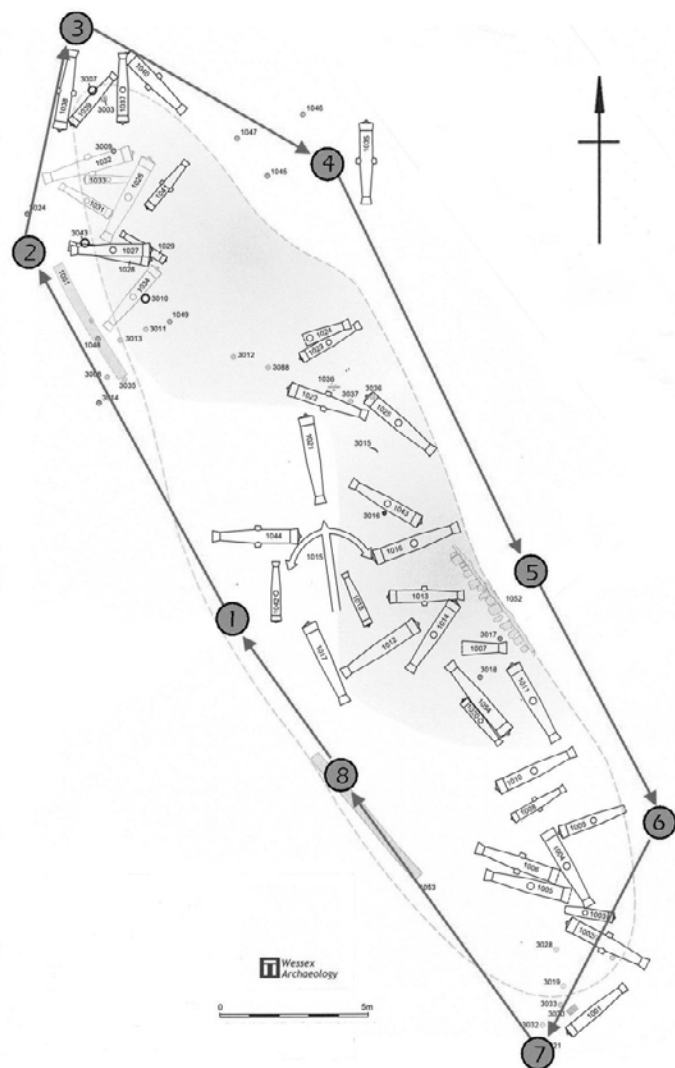


Figure 12. The location of eight diver stations surrounding the outer perimeter of the Norman's Bay Wreck.
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Since it launched, the Norman's Bay Wreck trail has been promoted and managed by the NAS as a mechanism to provide divers with an opportunity to both visit and help survey a protected wreck. As with HMS *Colossus*, an underwater information booklet guides divers around the site and eight diver stations were established around the wreck to aid diver navigation (Figure 12).

Additional information in the waterproof booklet is also included to assist visitors in navigating around the site and to help divers recognise features on the wreck site which often suffers from poor visibility of less than one meter. The waterproof booklet also explains the background of the exposed remains and the problems and issues in identifying the wreck (Figure 13).



Figure 13. A diver preparing to visit the Norman's Bay Wreck with the NAS. © NAS.

The waterproof booklet made from 250 micron laminating plastic is strong enough to be taken on a dive by the visitor. It consists of five double sided laminated pages of information. These pages are bound together using cable ties which also serve as a lanyard attachment point for the diver, to prevent losing the guides during their dive.

The underwater guides can be either downloaded (and then printed and laminated) from the project webpage or can be loaned from the NAS for a £5.00 refundable deposit. The information provided on the underwater booklet includes:

- Overall site map or plan
- A photographic scale
- Sponsors and supporters logos
- Background information on the wreck
- How to find the site including GPS coordinates
- What to see at the eight diver stations
- Additional areas of interest to visit
- Where to send photos and video clips
- How to help record the wreck

Each of the eight diver stations that are on the seabed around the perimeter of the wreck are numbered with a small ball float. As visitors reach each diver station they are encouraged to read the text on the appropriate page of the underwater booklet. For example at Station No.3 visitors can see a 'stunning view of four large cast iron guns....which formed part of the ship's forward defences' (Figure 14). Divers are also given information to guide them to the next station and provided with a photograph and name of a marine species to look out for on the wreck.

The NAS created supporting project web-pages with an online Google calendar. The calendar is not designed to show the best dates to visit the wreck, but simply shows dates that have already been

booked by a visiting group. The webpage also contains a Frequently Answered Questions section which aims to pick up on the questions that potential visitors may have prior to their visit.

After their visit the divers are asked to complete a feedback form about their experience, including whether they would recommend the visit to their friends, and if they would consider visiting another diver trail. The feedback form also encourages visitors to supply copies of their photographs and video to the NAS to add to the wreck archive, currently held at the NAS office in Portsmouth.

The HMS *m/A1* submarine Designated Wreck Diver Trail

In February 2013 the NAS were commissioned by English Heritage (Project Number 6750) to develop a visitor diver trail on the designated wreck of the HMS *m/A1* submarine (designated under the Protection of Wrecks Act (1973) in 1998 (Statutory Instrument number 1998/2708), with an amendment in 2004 (Statutory Instrument number 2004/2395). The dive trail would be developed and managed by the Nautical Archaeology Society (NAS) in partnership with the Southsea branch of the British Sub-Aqua Club (SSAC) and the wreck licensee, Martin Davies

An underwater information guide for divers visiting the site was designed that aids navigation and assists visitors in recognising features on the wreck. This guide also provides some additional factual information on the wreck and asked visitors to help in recording and managing the wreck. An online interactive visualisation was created by 3deep Media Ltd and supporting webpages and a Flickr photograph album are hosted by the NAS so that photographs from visiting divers can be posted.

For Historic England, as the commissioning body, one of the key objectives of the project was to highlight the important historic value of the site to the general public, to the SCUBA diving community and the fishing community to reduce criminal impact on the site such as trawling, fishing and illegal diving. The NAS is a member of the Alliance to Reduce Crime against Heritage (ARCH) and believes that educational and awareness initiatives like this project can help reduce crime against monuments including wrecks (NAS 2014a).

The creation of the diver trail on the HMS *m/A1* submarine worked on the premise that as a complete (single context) submarine wreck, every visiting diver would be able to navigate and orientate themselves easily, even in poor underwater visibility. Compared to other protected wreck diver trails, such as on the *Coronation* and the Norman's Bay Wreck, the features are not dispersed over a large area of seabed. The most appropriate method for the creation of the diver trail on the HMS *m/A1* submarine was felt to be through the use of multibeam sonar survey combined with an accurate artist's visualisation of the site which would be available online.

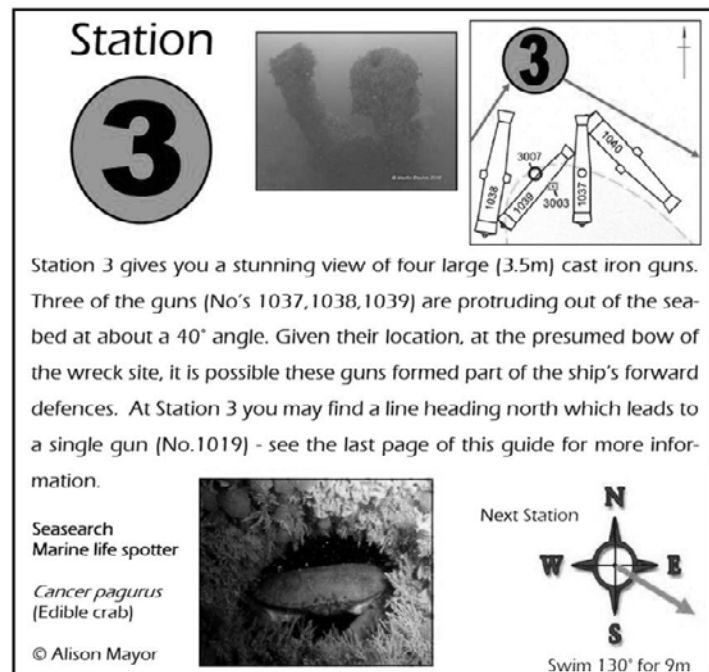


Figure 14. The design of the waterproof guide used by divers during their visit to the Norman's Bay Wreck. © NAS.

No deposits of navigation aids/signage on the seabed were needed to establish the trail on the HMS *m/A1* submarine. Visiting divers would only need a waterproof underwater guide which can be used as a reminder; as an aid to navigation; as a way for divers to record observations, and as a photographic and measuring scale. As with the Norman’s Bay visitor trail, the underwater guides can be either downloaded (and then printed and laminated) from the project webpage or can be loaned from the NAS for a £5.00 refundable deposit.

The underwater guides serve many purposes and are divided up to cover different aspects of the site and assist any visitor to the wreck. The information includes:

- Finding the site – including GPS co-ordinates for the bow, the stern and the best location for deploying a diver access shot weight on the site. It asks visitors to not deploy their shot directly on the wreck as this risks damaging the historic wreck.
- A north arrow – to aid navigation and orientation.
- A labelled multibeam sonar image of the wreck (kindly provided by Mark James from MSDS Marine and Swathe Services) – to facilitate observation and aid visitor understanding and navigation.
- A 20cm photographic scale (divided by 5cm colour bars) – to be used by underwater photographers when photographing particular features.
- General information – about the builder, launching and loss dates, length of vessel, the owner and the date the wreck was protected by the Protection of Wrecks Act (1973).
- Space for any notes and observations.
- A 15cm scale (divided by 1cm colour bars and numbers) for taking small measurements of particular features such as holes or cracks in the hull of the wreck.
- Four images of marine life found on the wreck.
- How to find out more about the HMS *m/A1* submarine and the NAS – including a Quick Reader (QR) code.
- Text which suggests that visitors could record marine life for the Marine Conservation Society Seasearch Project.
- Text which suggests that visitors take photographs and videos of the wreck and supply these to the NAS or directly to the wreck’s licensee.
- Text (and a supporting image) which suggests visitors measure and photograph the width of the crack that runs up the leading edge of the conning tower.
- Text requesting that visitors complete a feedback form and contact the NAS if they are interested in visiting other protected wreck diver trails such as the *Coronation* or the Norman’s Bay Wreck.

The information on the underwater guides was developed following two visits by diving groups in the summer of 2013. These visits involved divers from the Nautical Archaeology Sub-Aqua Club and Southsea Sub-Aqua Club, with a mixture of divers who had visited before and some who had not visited the wreck before. The biggest issue from these test visits was the group’s ability to find the wreck and deploy their shot line in a safe location so as to avoid damaging the wreck but also close enough to actually find the wreck (NAS 2014a).

As already stated one of the objectives of the project was to create an online visualisation of the HMS *m/A1* submarine. This had already been done for the protected wreck of the Holland No.5 submarine by the NAS and 3deep Media in 2012. The HMS *m/A1* submarine visualisation was created by providing 3deep Media with the engineer’s general arrangement drawings, with multibeam sonar imagery, as well as up-to-date photographs and videos of the condition of the wreck provided by the NAS and by Martin Davies. The project was fortunate to be offered the use of a new multibeam sonar survey undertaken by MSDS and Swathe-Services during the summer of 2013. This survey data allowed the graphic artist at 3deep Media Ltd to build the seabed environment surrounding the wreck.



Figure 15. The online interactive visualisation of the HMS m/A1 submarine, developed by 3deep Media Ltd and hosted by the NAS. © NAS.

The wreck visualisation allows the online viewer to spin the image around a horizontal axis by 360 degrees to view the site from every angle. Embedded in the wreck visualisation are four short video clips (the bow, torpedo loading hatch, conning tower and exposed exhaust pipes). There are also five embedded photographs that show details of the wreck along with descriptive text (Figure 15).

During visits to the wreck of HMS m/A1 submarine in 2013 the NAS dive team were joined by a professional marine biologist. The marine life surveys were undertaken to provide a baseline of marine life species

abundance. Data was supplied to the Marine Conservation Society (MCS) via the SeaSearch Project. It is hoped that these marine life surveys can be repeated by trained SeaSearch divers who will be able to visit the wreck diver trail. The opportunity for visitors to contribute to our understanding of the marine life on the wreck is also emphasised on the waterproof diver guides (NAS 2014a).

As with the Norman's Bay wreck trail the HMS m/A1 submarine trail is supported by project web-pages with an online Google calendar and a Frequently Answered Questions section which aims to pick up on the questions that potential visitors may have prior to their visit.

Terry Newman, Assistant Maritime Designation Adviser for Historic England, said of the HMS m/A1 submarine diver trail: 'We are diving into history with the launch of our first submarine trail. Protected wreck sites are as much part of our national heritage as castles and country houses, although they are not as widely accessible unfortunately. By giving licensed divers access to these historically and archaeologically important wrecks, we are encouraging greater understanding and recognition of England's underwater heritage' (English Heritage 2014).

Creating a diver trail – lessons learnt

Naturally many lessons are learnt during the creation and management of a protected wreck diver trail. Some lessons are positive (what does work) and some are negative (what does not work). It is worth stressing that many lessons are specific for each particular site, in the particular location and with the resources available to the project and as such they are not rules, but 'more like guidelines' (to mis-quote *Pirates of the Caribbean*).

In the project development stage the main lesson learnt has been in the design of a trail. It is vital to have a comprehensive understanding of your site and an accurate site plan. During some projects the author and the team from the NAS have discovered differences between the published site plans and what is actually on the seabed which could very easily result in confusion by visiting groups as well as the team establishing the trail.

Secondly it is vital that a site hosting a diver trail has a marker buoy to allow visiting divers to find and access the trail from the preferred starting point (Fig 16). Buoying the wreck would also serve

to reduce the risk of potential damage caused by visiting diver shot weights and lines impacting on the wreck or the seabed around the wreck. If a wreck site is not buoyed then every visiting dive boat (whether carrying recreational divers or archaeologists) will need to deposit a large weight on the seabed near to the wreck. This weight is attached to a rope (or even a chain) to facilitate diver access directly to the wreck, rather than to a position on the seabed hopefully near to the wreck.

Every time this procedure is carried out there is a risk that the weight (weighing possibly up to 50KG or even more) will impact directly on the protected wreck. This type of damage would not be acceptable or legally allowed on a protected monument on land and there would be an outcry by interested members of the public as well as the heritage community. Yet when a monument that is protected for its archaeological and historical importance is at sea, it is deemed an acceptable risk to damaging it just by visiting it (NAS 2014c).

It is essential to have dialogue with other groups that are undertaking similar projects in the UK and overseas in order to learn from their experiences. It has also proved very beneficial to involve the local dive clubs who can then act as local custodians of the wreck. In the case of the HMS *m/A1* submarine trail working collaboratively with Southsea Sub-Aqua Club and the licensee Martin Davies proved invaluable.

Local diving infrastructure is also crucial factor to consider when establishing a diver trail. Compared to the very successful dive trail on the *Coronation* wreck in Plymouth it become clear that diving from Eastbourne on the Norman's Bay Wreck does not come without its logistical complications. There is very limited diving infrastructure in or around Eastbourne, with perhaps the largest issue being the lack of a nearby public slipway for launching diving boats. The nearest public slip is in Newhaven some 33 kilometres from the wreck site. Launching boats at Sovereign Harbour, Eastbourne can only be achieved by crane which is expensive (over £60.00) and there are only a couple of charter boats operating out of Sovereign Harbour. In this situation it is vital to build good relationships with all the diving charter boats who could offer dives on the designated wreck trail as part of their offering to their clients.

It is recommended that online visualisations of protected wrecks should be created for every site that has a diver trail. These visualisations not only allow visiting divers to better understand the wreck they are visiting, but also allow non-divers to witness and appreciate what the site looks like. Online visualisations like the one on the HMS *m/A1* submarine, along with their additional information, photographs and videos highlight the important historic value of the site to the general public, to the SCUBA diving community and the fishing community to reduce criminal impact on the site such as trawling, fishing and illegal diving.

Finally it is recommended by the author that any group wishing to create a diver trail should be allowed a minimum of 2 years for the design, creation and administration of a diver trail. Inevitably, in England it is necessary to build in a contingency for days lost due to bad weather.

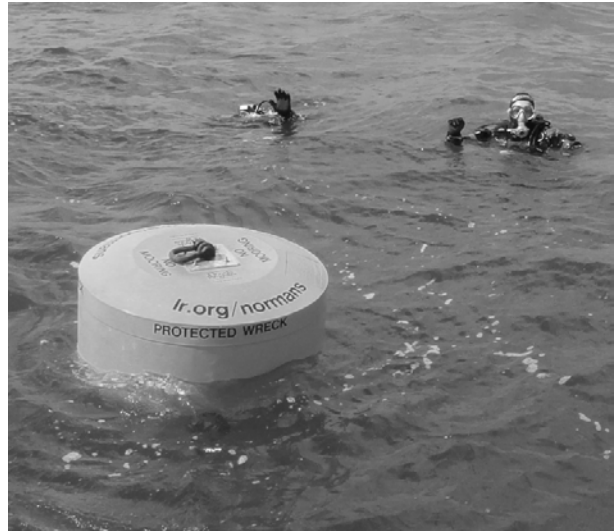


Figure 16. Divers on the marker buoy on the Norman's Bay Wreck Diver Trail, funded by Lloyds Register LR250 Project. © NAS

The local economic benefit of a Protected Wreck

The *Coronation* was a 90-gun second-rate ship of the Royal Navy. She was launched in 1685, and wrecked off Penlee Point, the entrance to Plymouth Sound from the Cornwall side, in 1691. Her wreck, which consists of iron cannon and anchors, was discovered in 1977 and designated for protection the following year. In 2011, with the support of English Heritage local divers and archaeologists began operating a diver trail for visitors to the site.

During 2012 and 2013 the Nautical Archaeology Society, with funding from English Heritage (Project Number 6608) undertook a study into the economic impact of the *Coronation* diver trail (Figure 17). The study aimed to determine the number of visitors to the site, and how much each visitor had spent money while in the Plymouth area. The aim was to determine the value of the protected wreck to the local economy (NAS 2013 and 2014b).

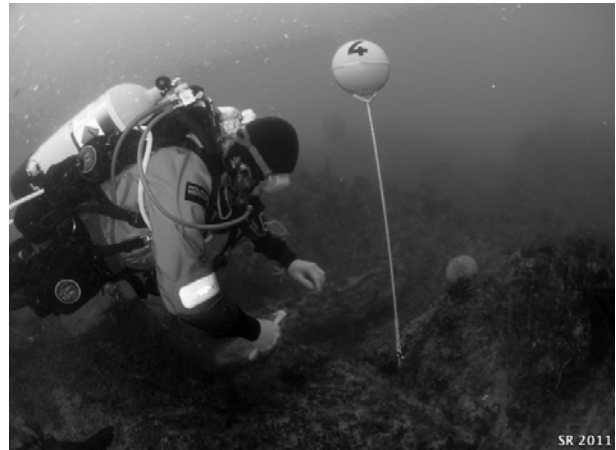


Figure 17. A diver visiting the *Coronation* Wreck Diver Trail.
© *Coronation* Wreck Project.

The impetus for the study came in April 2012 after the author attended a meeting in Paris of the Scientific and Technical Advisory Body to UNESCO's Convention on the Protection of the Underwater Cultural Heritage. Here the development of 'models for managing underwater cultural heritage in a way that brings benefits for the sustainable economic development of regions' was proposed, in order to 'increase the positive image of underwater archaeology and the involvement of the public in the awareness, the protection and enjoyment of the underwater cultural heritage.' Recent studies by the Heritage Lottery Fund (for example, Oxford Economics 2010: 3) have aimed to make comparable quantitative assessments of the economic benefits of heritage-related tourism, so that comparisons could be made to other sectors of the UK economy.

The study was funded by English Heritage, which, under its National Heritage Protection Plan, recommends 'Ensuring that the public understand and agree that looking after our heritage is important both in terms of the economy of the country and the well-being of its people' (English Heritage 2013: 7). English Heritage has had responsibility for the management of the 47 designated historic wreck sites since 2002, and it is a criminal offence for a person to dive on or interfere with these sites without a licence.

Alison James, English Heritage Project Assurance Officer for the study said that 'the *Coronation* diver trail is an outstanding example of how heritage can really contribute to the local economy and it is thanks to the passing of the Protection of Wrecks Act forty years ago that we are able to protect it along with 46 other important wreck sites that bear witness to the country's remarkable maritime heritage. It is fantastic to be able to demonstrate that underwater heritage and tourism is a contributory factor to the growth agenda – a fact recognised by all of the UK Governments in the UK Marine Policy Statement' (NAS 2014b).

The research data was obtained through an online survey (via *Survey Monkey*) of people who had visited the *Coronation* wreck in 2011 and 2012. The questions chosen aimed not only to understand visitors' economic spend, but also to assess the success factors of a diver trail of this nature. Due to

Year	Coronation (opened 2011)	HMS Colossus (opened 2009)	Norman’s Bay Wreck (opened 2011)	Total
2008	0	166	0	166
2009	22	257	20	299
2010	197	204	0	401
2011	672	218	65	955
2012	264	320	81	665
Total	1155	999	166	2320

Table 1. Number of named divers on licences issues for three designated wrecks in England from 2008 to 2012.

current licensing procedures, both the numbers of individual visitors and the number of overall visits undertaken were difficult to calculate. Despite this, by comparing the figures for the three diver trails currently running on the *Coronation*, the Norman’s Bay Wreck and on HMS *Colossus*, it was possible to demonstrate that the opening of a visitor trail had an immediate impact on the numbers of people interested in diving the sites (Table 1). In the case of HMS *Colossus* site the number of named visitors rose from 166 to 257 (154% increase); on the Norman’s Bay Wreck named visitors rose from zero to 65 and on the *Coronation*, the named visitors rose from 197 to 672 (341% increase).

Seventy-four respondents took part in the online survey. Of these, 69 people undertook 105 visits to the *Coronation* as part of the diver trail in 2012. These 69 individuals spent a total of £8,085, an average spend of £117 per person and of £77 per visit. In addition to the visits to the diver trail undertaken in 2012, the 69 respondents undertook a total of 49 visits to the site as part of the *Coronation* Wreck Project, which is researching the site, and which maintains the visitor scheme. Such respondents spent a total of £1,388, or an average of £28.32 per visit. In summary, the study found that in 2012 alone over 700 visits were made to the wreck, generating £42,000 worth of benefits to Plymouth: over £60 per visitor to the city. The study demonstrates that underwater historic wrecks do not have to be a burden on the taxpayer and insists that with proper visitor access they can actually be a great benefit to local economies (NAS 2014b).

The future for Designated Wreck Diver Trails in England

Launched in April 2014, the HMS *m/A1* submarine dive trial is the fourth underwater tourist trail for protected wrecks to open since 2009 and is part of an English Heritage project to create up to a dozen trails by 2018 for historic protected wreck sites dating from the 17th to the mid-20th centuries.

In the summer of 2014 the fifth designated wreck diver trail will open on the wreck of the *Iona II* which lies on the seabed off Lundy Island, Devon. The *Iona II* was a paddle steamer which foundered off Lundy after taking on water in heavy weather, having left the River Clyde for her first transatlantic voyage in 1864. At the time of her loss there was speculation that the *Iona II* was acting as a gunrunner for the Confederates in the American Civil War. Originally built as a ferry for the Clyde, she was constructed of iron with paddle wheels and a state-of-the-art twin cylinder oscillating engine.

The diver trail being designed by Wessex Archaeology is contributing to English Heritage’s programme of interpretation of protected wreck sites. It is hoped that the dive trail will encourage responsible (and licensed) access enabling visiting divers to enjoy their experience whilst encouraging the feedback of information about the wreck as part of a heritage management strategy.

Peta Knott from Wessex Archaeology has stated that ‘the local dive clubs have been incredibly helpful in developing this dive trail with us. They are very happy that through the dive trail, the diving

community will be able to learn more about the diverse history of the *Iona II* as well as participate in the ongoing preservation of the wreck through the monitoring scheme. There is already a great sense of custodianship of the *Iona II* which can only grow stronger through this dive trail.'

The success of any designated wreck diver trail can only be evaluated in the long term. The NAS intend to continue to develop and administer the trails on the Norman's Bay Wreck and the HMS *m/A1* submarine and will continue to look for new mechanisms to promote the experience of diving on an underwater cultural heritage asset. The NAS believes that visiting, seeing and touching a real archaeological monument like a wreck site can be a wholly positive experience that can change people's perception of the value of the in-situ preservation of our underwater cultural heritage (NAS 2011). Licensed public access must remain a cornerstone of any underwater cultural heritage management strategy, a strategy that must receive long-term commitment from both the trail organisers and the heritage agencies.

Acknowledgements

The author and the Nautical Archaeology Society would like to thank Historic England (especially Mark Dunkley, Alison James, Terry Newman and Ian Oxley); Wessex Archaeology (especially Toby Gane and Peta Knott); Martin Davies from Amberley Photographic; Mark Pearce and Roger 'Ginge' Crook from the Coronation Wreck Project; Mike Postons from 3deep Media Ltd; Mark James from MSDS Marine; Vince Jenkins from Lloyds Register; Katy Bell from the Chartered Institute for Archaeologists Maritime Affairs Group.

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Not Necessarily between a Rock and a Hard Place: English Heritage, Tyneside BSAC and Wessex Archaeology working together at the Gun Rocks wreck

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Since the 18th century, local stories have perpetuated the knowledge that a ship with many cannons had fallen foul of the Gun Rocks in the Farne Islands. These stories had been fuelled by cannons being raised from the seabed, divers regularly visiting the site and surveys being completed in 1970 and 2010 by the Tyneside BSAC 114.

In summer 2013, on behalf of Historic England, and with the assistance of Tyneside BSAC 114, Wessex Archaeology investigated the early 18th century Gun Rocks wreck site as part of the Heritage at Risk programme. This three way partnership threw up challenges to all parties, particularly Wessex Archaeology as the conduit for the fieldwork, that required a delicate balancing act between the measured research and confidentiality required by the client against the social media savvy dive club and their preference to immediately disseminate images and information. While official reports and BBC releases characterised the Historic England to Wessex Archaeology relationship, website and Facebook updates characterised the Wessex Archaeology to Tyneside 114 relationship. However, effective communication between all parties led to a successful project that not only encouraged ongoing Tyneside BSAC custodianship of the site but ensured fruitful research with a diversity of dissemination outlets for the results.

Gun Rocks site assessment

In the summer of 2013, Wessex Archaeology was commissioned by Historic England to undertake an Undesignated Site Assessment of the Gun Rocks wreck site in the Farne Islands. One of the objectives of this project was to liaise with the local British Sub-Aqua Club, Tyneside 114.

As the statutory body responsible for the management of marine heritage in the UK, Historic England administers the protection of cultural heritage on behalf of the Department of Culture, Media and Sport. A logical development of this role is to involve the local communities in this work, to foster a sense of custodianship between people and their local shipwrecks. However, Historic England must also research and manage the marine heritage under its care and that is where professional archaeological contractors such as Wessex Archaeology are involved.

This article will outline how, over the course of the Gun Rocks wreck project, a three way partnership was developed between the managing body Historic England, the commercial archaeology company Wessex Archaeology and the recreational dive club Tyneside 114. While certain challenges were thrown up from time to time, this proved to be a fruitful three way partnership that benefitted maritime heritage.

Geographical background

The wreck is off the south western side of Gun Rocks, after which it is named, to the west of Staple Island in the Outer Farne Islands. This is an area notorious for shipwrecks which is an ideal setting for developing this partnership; numerous local and visiting divers in the area and numerous shipwrecks for Historic England to potentially manage.

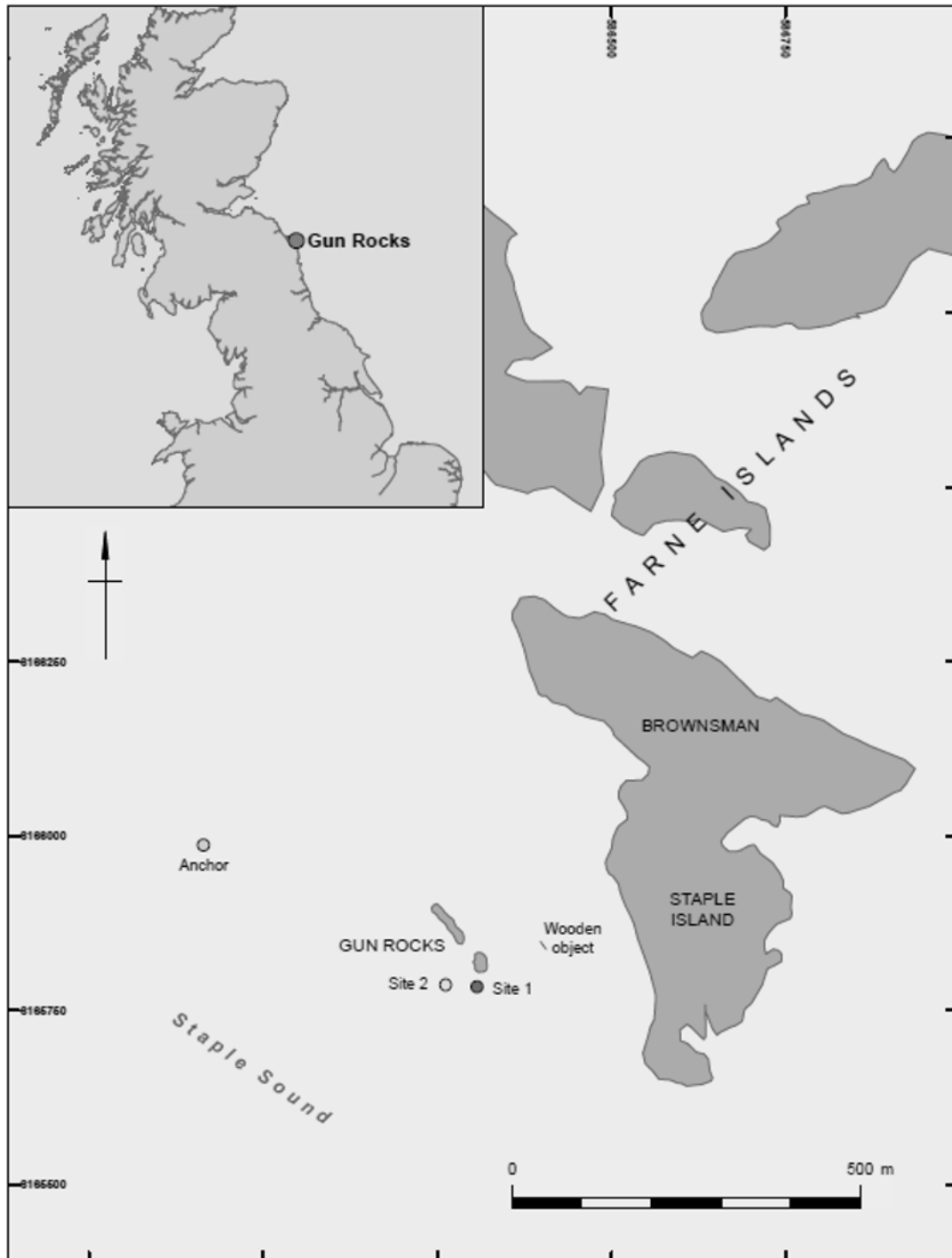


Figure 18. Map of Gun Rocks area. Contains Ordnance Survey data © Crown copyright 2013.

Historical background

The Gun Rocks wreck has been known as the site of a shipwreck almost since the shipwreck event itself in the early 18th century. The first charting of the wreck site was in 1778 on a map created of the local area as part of the developing shipwreck rescue service (Sutherland 1778). Even then, it seemed common knowledge that a ship with many cannons had fallen foul of the rocks. Local knowledge has perpetuated the memory of the wreck though not always with accurate details. Almost immediately after the wrecking event, it was reported that a Dutch merchant vessel had run onto the rocks with loss of all life. Thomas Pennant reported this in 1769 in his travel book (Pennant 1769) as did John Sharp in around 1778-91 in his notes as trustee for Bamburgh Castle (Sharp 1778-91). But for some reason, by the late 19th century, the identity of the wreck was being erroneously associated with the Spanish Armada (Bates 1894).

Although the wreck was well known, it was not until the advent of SCUBA equipment in the 1950s and 1960s that the site became popular and underwater investigations into the nature and nationality of the site were begun, in particular, by Tyneside 114.

Initial investigation by Tyneside 114

In June and July 1970, the Tyneside 114 BSAC carried out a reasonably comprehensive survey of the Gun Rocks site. The typical dive team consisted of around twelve divers each weekend over the summer of 1970. To complete a proper measured survey of the site, three pitons were embedded in the rock along the south face. Each cannon was marked with a numbered, floating buoy. In that way, 20 cannons were located although only 15 were marked on the site plan (Smith 1970). Each cannon was then triangulated to the baseline along the rock face. Numerous small artefacts were raised, recorded and drawn to scale before being reported to the Receiver of Wreck and some handed over.

The local TV station Tyne Tees filmed the daily activities of the divers including the raising of a single cannon. Unfortunately this footage has since been lost and so has the cannon which was reportedly given to a museum in Newcastle.

Considering that they were avocational archaeologists, the Tyneside 114 divers produced a convincingly detailed report.

Anniversary investigation by Tyneside 114

To commemorate 40 years since the first survey of Gun Rocks, Tyneside 114 completed a brief investigation of the area in June 2010. The primary aim was to survey the cannons and compare their numbers and condition to those of the 1970 survey. Although a measured survey was never achieved, great quantities of kelp were cleared and a visual search and rough sketch for the whole area was created locating all 13 cannons. The divers also found a previously unknown cannon to the north of Gun Rocks (Hunt 2010). A secondary objective was to identify the name of the wreck but this was not achieved either.

Site investigation by Wessex Archaeology

As part of the Heritage At Risk diving contract, Historic England commissioned Wessex Archaeology to complete a non-intrusive photographic, acoustic and measured survey of this wreck to confirm the nature and extent of *in situ* artefacts at Gun Rocks. The statutory body expected the commercial archaeological contractor to complete a certain amount of fieldwork, and to write both a confidential management report and a non-confidential archaeological report.

By incorporating the Tyneside dive club, English Heritage also benefitted from an increased workforce and cultivated a relationship with a group that could and will provide on the ground local support and preservation of the wreck site.

The incentive for Wessex Archaeology was: employment for its dive team and the opportunity to investigate another wreck. On this occasion, Wessex Archaeology also took the opportunity to develop the relatively new technique of photogrammetry. Working with Tyneside provided Wessex Archaeology with a source of more recent site history as this club had investigated the wreck on two occasions. Also, the additional recreational divers allowed more work to be completed in the same space of time.

Tyneside benefitted from working with the statutory body by gaining increased media coverage for their club, experience of working with professional archaeologists, learning new survey and recording techniques and accessing anomalies that can be investigated in the future.

Preparing for fieldwork

As is typical for most marine archaeological projects, a geophysical survey of the area around Gun Rocks was completed. This identified numerous anomalies which were prioritised into those most likely to be archaeological remains. Unfortunately, the Gun Rocks themselves have a very high magnetic output which did negatively affect the magnetometer results.

This was followed up with historical research which included reviewing the reports written by Tyneside in 1970 and 2010 along with contacting other relevant sources of information.

The two weeks of fieldwork were conducted between the 26th August and 6th of September 2013 and the assembled team was an apt reflection of the three way partnership. In addition to the five Wessex Archaeology divers, there was Mark Dunkley from Historic England and a changing rota of divers from Tyneside.

It is not common for Historic England staff to participate in their commissioned fieldwork but it was a welcome opportunity for this organisation to see their work being done rather than just reading about it in the final report. Mark Dunkley is a commercially qualified diver and so was easily absorbed into the Wessex Archaeology team.

As part of the dive team, Mark assisted in examining anomalies and was one member of the buddy pair that measured a cannon and a wooden beam with copper pins. As

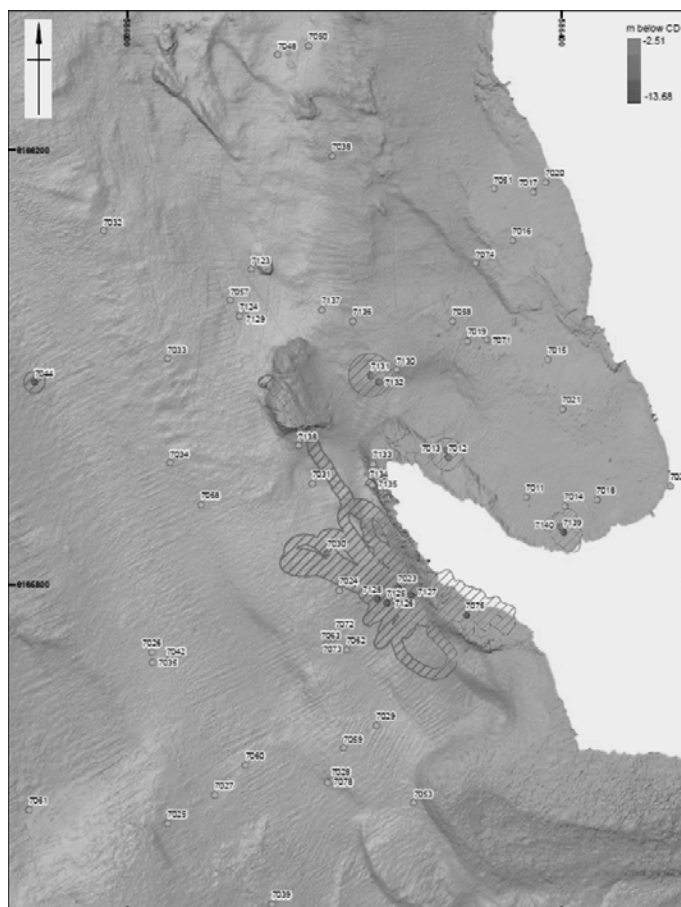


Figure 19. Gun Rocks area showing numbered sidescan sonar anomalies and striped areas of diver searches

well as being an additional diver, it was beneficial to have him on hand to make quick on-the-spot amendments to the work plan when the archaeological remains or weather made this a necessity.

Health and safety at sea

One of the first challenges of this three way relationship was how to run safe diving operations with both commercial and recreational divers on the same boat.

This was overcome by Wessex running their operations according to Health and Safety Executive (HSE) commercial diving standards while Tyneside ran their own operations under British Sub Aqua Club (BSAC) regulations. Of course, Wessex directed where the Tyneside divers should go and dropped them in and retrieved them from the appropriate locations, however Tyneside were entirely responsible for their own safety checks. Considering that the rota of Tyneside divers working with Wessex Archaeology changed daily, they were very well organised and worked efficiently in constantly changing buddy pairs.

Working together in the field

The second challenge was maximising efficiency of fieldwork operations between the two sets of divers. Wessex staff are skilled archaeologists and divers but have minimal physical experience or knowledge of the Gun Rocks site, while Tyneside divers are quite familiar with the site but not with survey or investigation methods.

The solution was that the Wessex Archaeology divers were guided by the Tyneside divers to the known areas of cannons. These cannons were located in a very rocky and magnetic area making geophysical survey results unreliable and they were also under a canopy of kelp. The Tyneside divers started the process of cutting back the kelp to allow the Wessex divers easier access for surveying.

Once the Tyneside divers had located the area of known cannons, they were dropped off on various anomalies of high archaeological potential to see if any of these hits lived up to expectations. On several occasions they found only natural features, but on others they found archaeological remains such as the anchor shown below. Upon encountering this anchor, the divers did not have any measuring equipment. However, they improvised and used a fellow diver as a scale bar. Once back on deck, he was measured and the relevant dimensions were transferred to anchor drawing. From then on, Tyneside divers borrowed tape measures and slates from Wessex as and where necessary.

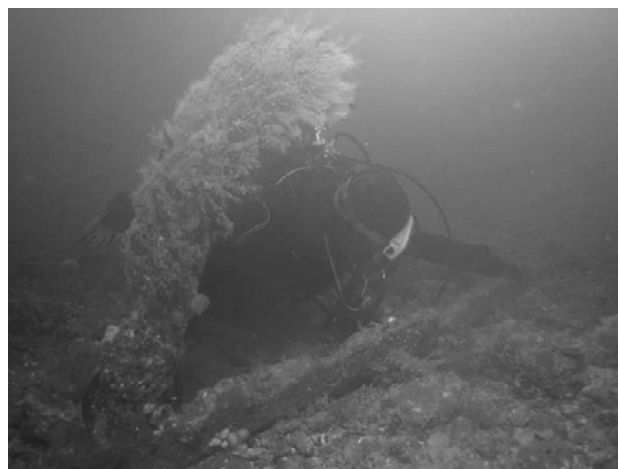


Figure 20. Tyneside diver with anchor (A. Hunt).

With the Tyneside divers scouting out potential anomalies while the Wessex divers were surveying the archaeological remains, a lot of ground was covered and a great deal was achieved each day. The three way partnership worked to each groups' strengths and overall met everyone's expectations.

Investigation results

To the south west of Gun Rocks, thirteen concreted iron cannons were uncovered lying in a scattered formation. This area was fairly well known from previous investigations and was labelled Site 1.

Through investigation of the anomalies identified by the geophysical survey, a second previously undiscovered area of cannons was located 30m to the west of Gun Rocks and Site 1. Named Site 2, it consisted of six cannons also in a scattered formation.

All archaeological remains were recorded through standard photographs, measurements and the diver tracking system. However, Wessex also used two other survey techniques of photomosaic and photogrammetry to record various features of the Gun Rocks site.

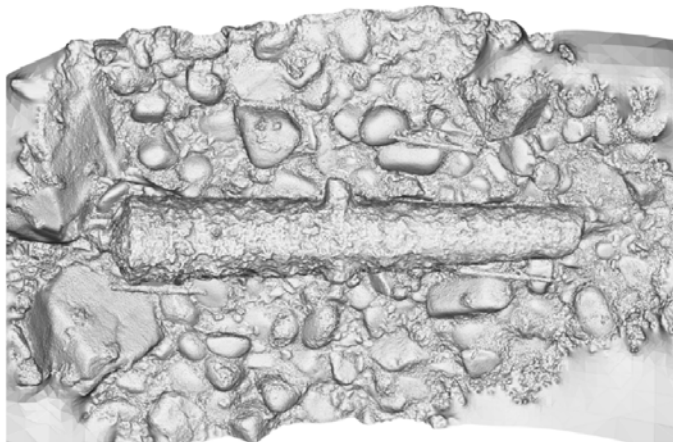


Figure 21. photogrammetry rendering of a cannon.

During the Gun Rocks fieldwork, Wessex took the opportunity to hone the technique of photogrammetry. Three cannons were selected to be recorded with photogrammetry with scores of overlapping photos taken of each cannon with multiple scale bars included in each shot. Computer software was then used to collate the images into a detailed 3D rendering of the cannons that can be moved and manipulated.

The Tyneside divers were very interested in this technique and after witnessing it in action, and discussing the process with the Wessex divers, they are keen to attempt photogrammetry themselves.

Drawing up the wreck

As is usual on archaeological investigations, a site plan of the two areas of cannons was created to show the dimensions of each cannon and their relationship to each other and the surrounding environment.

While recording of the seabed remains is an important part of the archaeological process, it did not assist in discovering the identity and origin of this wreck. After initial post fieldwork processing of the collected data, measurements of the cannons were sent off to experts Charles Trollope and Nico Brink who suggested that due to the varied sizes of cannons the vessel may have been carrying a cargo of damaged cannon and shot from Sweden to the Netherlands before being blown off course.

Added evidence for this argument came from the Tyneside divers of the 1970s. Due to Historic England's non-intrusive site investigation requirements, Wessex divers were unable to remove any of the concretions to locate markings on the cannons. Fortunately, in 1970, before this rule was put in place, the Tyneside divers had chipped off some areas of concretion to reveal the markings on the trunnions, and had also photographed them. Wessex were able to draw on this historical wreck investigation record to confirm that the cannons were Swedish and from the early 18th century.

Further investigations revealed that the cannons were associated with the production centre at Finspong, Ostergotland in Sweden (Kennard 1986). Cannon founding was a major industry in Sweden and was first established by the Dutch de Greer family and went on to supply most of the Dutch requirements for iron guns from the 1620s onwards (Martin 2005). Other examples of Dutch wrecks in UK waters with Finspong artillery include the *Kennemerland* (1664) and *Adelaar* (1727).

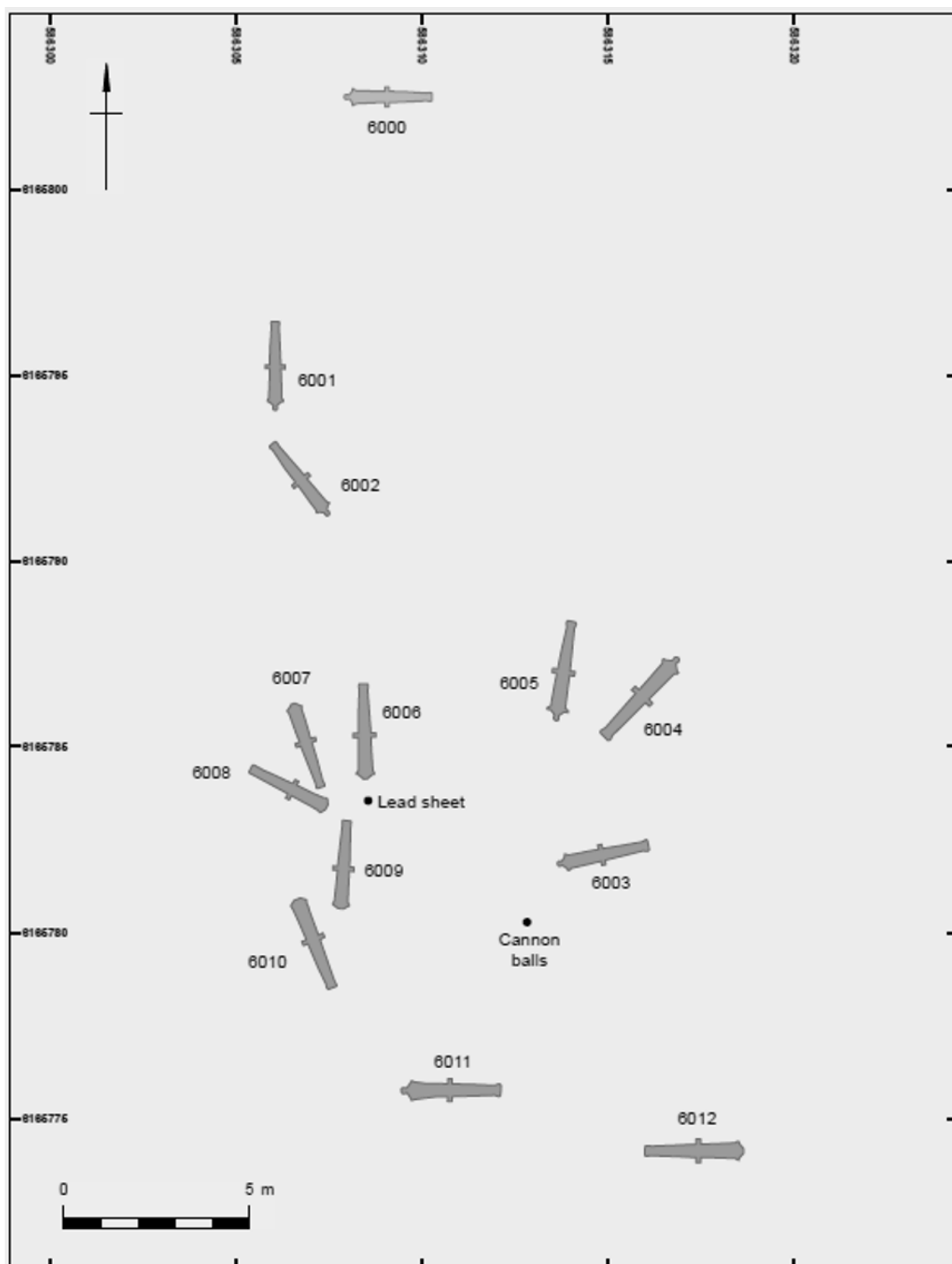


Figure 22. Site 1 plan.

One of these Swedish cannons was raised from the wreck in the mid-18th century and was donated to the nearby Bamburgh Castle where it remains on display to this day. This demonstrates what the Gun Rocks cannons look like when not covered in concretion.



Figure 23. Cannon from Gun Rocks at Bamburgh Castle.

While the origin and destination of the armaments are known, it is hard to predict how many cannons were originally on the vessel. From local stories in the 18th century and reported anecdotes in the 20th and 21st centuries it can be concluded that there used to be more than the current 20 cannons in the Gun Rocks area (19 underwater and one at Bamburgh Castle). A document written within two or three generations of the wrecking event reported that it was thought to be a 40 gun merchant vessel that sank in the 18th century (Pennant 1769). In 2013, a member of the initial Tyneside survey crew recalled that there were 40 or 42 cannon on site in 1970 (pers. comm. Selby Brown 05.09.13) however only 25 cannons are mentioned in the original report and only 15 actually appear on the site plan (Smith 1970). A popular dive guide also reports that there used to be 25 cannons onsite (Young 2000).

Further investigations

While Wessex Archaeology has produced a report for Historic England on this wreck site, the work has by no means finished. Several recommendations for continued work on the site have been made and many of these involve the Tyneside divers.

Wessex has provided Tyneside 114 with a gazetteer of anomalies that could potentially be archaeological remains. While the divers have been enthusiastic to examine these anomalies, the weather has not permitted this to date.

Tyneside has been given confidential high quality geophysical data that would not normally be accessible recreational divers but offers them an out of the ordinary diving experience with the potential to learn more about their local wreck. The continued work means that Wessex is able to gather more data without the expense of sending a dive team to the wreck and English Heritage is able to obtain more information about its wreck with the added bonus of having guardian divers preventing any interference with the wreck.

Other survey work that still needs to be undertaken is an additional baseline survey of Site 1 and searches to the east of Gun Rocks where another cannon has been reported by the Tyneside divers. The outskirts of both Sites 1 and 2 should also be searched to define their full extent.

With Tyneside's ability to acquire the basic measurements and photographic data of the site, combined with Wessex's specialist capabilities in this area, this has the potential to provide English Heritage with another effective, low cost model for an avocational-professional partnership.

Further recommendations for the site include ongoing informal monitoring of the site by the Tyneside divers. This site has also been recommended as an excellent site for a dive trail. The Farne Islands are one of the most popular dive attractions in the UK and there appears to be an

opportunity for English Heritage to actively promote the value and understanding of marine heritage there through establishing a dive trail. The wreck remains are interesting to look at and are also durable enough to withstand higher numbers of visiting divers. While the site is relatively compact and located close to the natural feature of the Gun Rocks, the original cannon site can be hard to locate under the prevalent kelp and so an underwater guidebook would be useful to help divers locate the site.

Communication strategies

Perhaps the greatest challenge of this three way partnership related to intellectual property rights and the sharing of information. As three very diverse organisations, the communication strategies of each partner group, whether laid down in policy or not, were very different.

While Historic England does have strict clauses in its contract about ownership and confidentiality of its intellectual property, it is very diligent in making its research publicly available after thorough proofing and quality assurance checking.

Similarly, Wessex must maintain the confidentiality of its research either for commercial interests or client requirements. However the charitable company does its best to release as much of its research for public viewing as possible, however this does usually take some time after the requisite proofing has taken place.

These communication strategies in relation to intellectual property for Historic England and Wessex Archaeology are in stark contrast to the attitude of the recreational dive club Tyneside 114. While the dive club are suitably concerned about the appropriate attribution of their images and information, their overall goal is to spread knowledge of their activities as widely and quickly as possible to remain relevant to their supporters and to attract new members.

Contrasting communication strategies

This vast difference in the modes of communicating information was highlighted in the Gun Rocks project. From the outset, Tyneside stated that one of their objectives of participating in this project was promotion of their dive club. They are a very media aware organisation while this could have caused problems throughout the project, effective communication between the three members of this partnership prevented this from occurring. While Historic England and Wessex Archaeology also have an underlying objective to share new historical information, they do so at a more reserved pace, making sure that all facts are checked, texts proofed and images attributed.

For the two weeks that Tyneside participated in this project, they posted daily on Facebook about their wreck diving activities. This is not unusual in this day and age of social media and it is certainly a very effective and economical way of promoting the activities of the club. Facebook was used as both a promotional and recruiting tool as posts reported on the day's achievements, including underwater photographs taken by club members, as well as advertising for more members to join the project. The coordinating club member Andy Hunt stated that it had been quite difficult to arrange divers to participate throughout the two weeks due to divers' work commitments. However, due to their enthusiasm and organisational skills, they were able to coordinate a regular stream of divers, often using Facebook as an organisational tool. Neither Historic England or Wessex Archaeology even considered Tyneside's use of Facebook as a threat to their intellectual property rights as the posts were always done under the club's auspices, only included positive and supportive comments and only used the divers' own images.

Tyneside's prevalent Facebook posts had an unexpected benefit at the conclusion of the final day's diving. One of the members from the original 1970 expedition was waiting at the wharf to share his memories and show Wessex a sword handle that had been raised during the initial expedition adding further depth to the research of the wreck site.

While Historic England does have a Facebook page, it also has a very large remit managing hundreds of properties as well as undertaking dozens of archaeological and heritage projects. An image from the Gun Rocks site was used to promote maritime heritage on the Historic England Facebook page but it was up there vying for attention amongst castles, photographic exhibitions and open house that also needed to be promoted through this medium.

Historic England's mode of communication is more structured and controlled with many layers of proof reading and checking before releasing to the public either through formal reports, media releases or carefully worded Facebook posts.

Wessex's attitude to public sharing of information is in between those of Historic England's and Tyneside's in that they must abide by the terms of their contracts in regards to intellectual property but it is also in their best interest to keep clients, potential clients and the general public apprised of their activities to both support their activities in general and also to potentially gain business. For this reason, Wessex has a regular blog which covers a range of topics. This is heavily proofed and checked before release and is then dispersed to the wider world through Twitter, Facebook, Linked In and Google Plus (Wessex Blog 2014).

Communication challenges

A slight issue arose when the Tyneside divers requested some of photographs from the Gun Rocks project to include in the club Facebook page and newsletter. As this was going to be an online use of the images and there were copyright issues involved, it took a little longer to provide the photos to the divers than would normally be expected.

After Tyneside made the request, Wessex emailed Historic England to ask permission to release the photos to the recreational dive club. Historic England holds crown copyright for any images taken on Heritage At Risk projects and therefore permission must always be sought before public use of those images. Once Historic England had responded in the affirmative and given details of the attribution, the relevant photo was sent to the Wessex Drawing Office to be watermarked with these details.

Due to clear communication and efficient cooperation from all partners, the watermarked image was sent to Tyneside within a few hours of the request being made. While Tyneside was understanding of the process that needed to be followed, it was in contrast to their usual procedure of taking a photo and immediately uploading it online.

Another communication challenge occurred in regards to an article written for the BBC online news. In late September, a brief article was written about the Gun Rocks site by Wessex Archaeology which was duly sent to English Heritage for approval and then submitted to the BBC for their online news page. No communication was received from the BBC until two weeks later when they informed Wessex that the article was now live on the Tyne and Wear site (BBC News Tyne and Wear 2014).

While Tyneside had been notified that an article was imminent, they found out about the online publication through a third party and were a little perturbed that Wessex Archaeology or Historic England had not communicated the news to them. The dive club was also somewhat annoyed by the fact

that their name was incorrect in the news article. While neither of these issues had been directly caused by members of the three way partnership, it did strain relations between these groups. However some quick corrections to the website and clear communication between the three organisations managed to clear up any misunderstandings.

Promotion and publication of investigation

Tyneside were true to their word in promoting their dive club and involvement with the Gun Rocks project and released a number of publications about this work.

A short article appeared in late October in the BSAC online news section talking about Tyneside's involvement with the project. Shortly afterward, the dive club created a separate page on their website including details and images from the 1970 survey as well as their recent work on the wreck (BSAC News 2014 and Tyneside BSAC 114 2014).

In April 2014, an article written by Andy Hunt was published in the printed BSAC magazine. The dive club made Historic England and Wessex aware that this article was going to be published well in advance and only used their own images. The end result was a very professional story that promoted the dive club and their successful working relationship with Historic England and Wessex Archaeology.

While Tyneside was busy sharing knowledge and promoting the Gun Reports site investigation through dive media, Wessex was busy producing an archaeological report on behalf of English Heritage. While this is a technical report, after it has been approved by English Heritage, it will be made publicly available through the Wessex website as are most other reports by this company. This will provide a detailed account of the fieldwork and an analysis of the finds with recommendations for the future.

Tyneside was frequent in their sharing of information while Wessex and English Heritage were much more cautious and regulated in their release of information to the public. This could have been a major sticking point for the relationship, but through regular and clear communication, this challenge was met and the difference in methods and expectations were moderated accordingly.

Conclusion

In conclusion, the three way partnership that ensured a successful site investigation into the Gun Rocks wreck worked as follows:

Historic England provided a contract for work and benefited from the skills and experience of a professional archaeological contractor, receiving a detailed site investigation and report from Wessex.

Wessex provided professional guidance, equipment and directions for Tyneside to continue investigating the site while in return they received additional divers and important local knowledge from the dive club. Working with the local dive club also allowed Wessex to fulfil one of its company aims as a charitable organisation.

The Tyneside divers learnt more about their clubs' past activities, had an out of the ordinary diving experience, learnt new techniques, obtained a list of anomalies for future work and increased publicity for the club and the project in general.

Finally, Historic England received excellent value for money with an increased diver workforce who also actively promoted the wreck investigations. The statutory organisation also developed a group of wreck custodians and created a model for best practice in professional-avocational wreck investigations.

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A Maritime Archaeological Case Study on the Understanding and Appreciation of Heritage: Integrating and merging different parties

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Maritime archaeology is a vital part of many nations' national heritage. The Swash Channel Wreck, excavated by Bournemouth University archaeologists, one of the most important shipwrecks excavated in the UK since the Mary Rose, has been at the centre of traditional and innovative research for the last seven years. Since its discovery, the research conducted on the wreck has attracted the support of a variety of funding bodies, a large number of collaborators at national and international level, fuelled a number of different research topics and resulted in a highly innovative approach to dissemination and appreciation of its importance.

This paper considers how research on the wreck has brought a number of different parties, from academia to museums, from local government to volunteers and including the integration of minorities, together in a creative and innovative fashion and how it has inspired diverse and unusual subprojects. Amongst these, attention will be particularly dedicated to two projects M.A.D About the Wreck and Tales from the Sea to demonstrate how heritage can be the cohesive factor between different partners for the benefit of all.

Introduction

Poole in Dorset is home to a uniquely rich maritime archaeological heritage, including an Iron Age log boat and the 16th century Studland Bay Wreck site. Whilst there is a strong interest in maritime themed events such as the annual Harry Paye Day (based on renowned local pirate and Privateer Harry Paye), a review of current provision suggests that there is a lack of awareness and engagement with the underwater archaeology of the Poole area. Poole Museum Services is home to an extensive collection of maritime archaeology and provides an education and outreach service to schools, colleges and community groups, as well as volunteering opportunities.

The Swash Channel Wreck, discovered in 1990, is that of an early seventeenth century armed merchant ship, lying in 7-9m of water in the approach to Poole Harbour on the South coast of the United Kingdom. It was initially investigated by Wessex Archaeology on behalf of Poole Harbour Commissioners and Poole Borough Council in 2004 as part of the Poole Harbour Channel Deepening and Beneficial Use Scheme. The site was designated as a Historic Wreck under the Protection of Wrecks Act 1973 on Friday 10 December 2004. Since designation, the archaeological licence has been held by the Poole Harbour Commissioners Harbour Engineers, with Bournemouth University undertaking fieldwork and providing archaeological advice for the site since late 2005.

In 2008 Historic England published its first register of Heritage at Risk – a region-by-region list, including protected wreck sites in England known to be 'at risk'. A year later, this second updated regional edition of the Heritage at Risk register was enlarged to include details of all scheduled monuments



Figure 24. Iron Age Logboat

(archaeological sites), as well as conservation areas designated by local authorities that are also reported to be at certain or potential risk. The density of shipwreck remains in the English territorial sea is amongst the highest in the world. This is due to the combined effects of historically high volumes of shipping traffic, a long history of seafaring and an often hazardous coastline. Wreck sites provide tangible evidence of our ancestors' use of the sea and may contain the remains of vessels, their fittings, armaments, cargo and other associated objects or deposits. If historic wrecks contribute significantly to our understanding of our maritime past they may merit legal protection under the Protection of Wrecks Act 1973.

All wreck sites, whether or not they are protected by the 1973 Act, are vulnerable to both environmental and human impacts. Due to their often remote locations, their management can also be challenging – and changes to their condition are characteristically difficult to anticipate and monitor. Survey has shown that 19 (40%) of England's 47 protected wreck sites are at high or medium risk from damage, decay or loss, unless action is taken to further protect them. Nine of them were considered to be at high risk and the Swash Channel Wreck site was recorded as being at the highest risk of all these sites (Mark



Figure 25. Harry Paye Day



Figure 26. Swash Channel Wreck

Dunkley pers. comm.). While the sediment transport regime that operates in the vicinity of Hook Sand and Poole Harbour entrance is extremely complex, fieldwork undertaken in autumn 2005 reinforced pre-existing evidence for instability across the whole of the wreck site (Wessex Archaeology 2006a). Despite temporary stabilisation of remains in 2005, two comparative topographic surveys across the site, undertaken by Poole Harbour Commissioners in May and September 2006, recorded a general depositional trend - though some areas to the north of the restricted area had been subject to a loss of sediment (Palma & Parham 2006, Parham and Palma 2010) hence the preservation of the wreck remains was being compromised.

Preservation at the site is excellent, and remains consist of the lower stern, mid-ships and the almost complete port bow to the top rail of the upper bow castle and a carved rudder. Rudders are only in place on a small number of protected wrecks in the Great Britain, including the incomplete rudder of the Mary Rose (1545), which is missing the upper portion. Carvings on rudders are even rarer, meaning this one is extremely significant (D. Parham pers. comm.). Other rare survivals include elements of the ships galley, upper gun ports and other carved features. The ornately carved items found on the site represent some of the earliest ships' carving from the United Kingdom and in fact are amongst the earliest in the world, which reinforces the importance of this site. The Swash Channel wreck is an internationally significant site containing information about international trade and exchange, science and engineering and social relations in the early 17th century.

Finds from the site to date include majolica, copper domestic ware, a copper bell, seven iron cannons, a gun carriage, ships pump, damaged and complete barrels, navigational equipment and personal items including shoes. There are also extensive elements of ships rigging including the main block for the foremast. The wreck site has also become a haven for marine wildlife including rays, lobsters, pipe fish; even seahorses and the semi tropical trigger fish species.

The site and its archaeological, research and public significance, locally, nationally and internationally

Historic England is the Government's advisor on all aspects of the historic environment in England and since July 2002, this has included England's seabed. Their responsibilities now include securing the preservation of ancient monuments in, on, or under the seabed, and promoting the public's enjoyment of, and advancing their knowledge of ancient monuments, in, on, or under the seabed. Duties include the management of sites designated under the Protection of Wrecks Act 1973 and the administration of the contract for archaeological services in support of the Act. Currently there are 61 designated wreck sites in the UK, one of which is the Swash Channel Wreck. Given the importance of this site, Historic England prepared a Conservation Statement and Management Plan with the assistance of Paola Palma (Bournemouth University) and Graham Scott (Wessex Archaeology). The Conservation Statement and Management Plan have been produced to enable local and regional stakeholder involvement in our aspirations for the conservation management of the Swash Channel Wreck so as to balance protection with economic and social needs. The principle aim of the Plan is to identify a shared vision of how the values and features of the Swash Channel Wreck can be conserved, maintained and enhanced.

The site is managed by Historic England and was assessed by the Government's Archaeological Contractor for Services in Relation to the Protection of Wrecks Act (1973) and authorisation by the Secretary of State for Culture, Media and Sport is needed to access the shipwreck. The Licence for field investigation of the monument following designation in 2004 has been held by Poole Harbour Commissioners' Harbour Engineer Mr Andrew Ramsbottom. Site specific archaeological advice to Poole Harbour Commissioners is provided by Bournemouth University who carry out research projects and student training on the site.

Since 2005 extensive research on the wreck has been conducted by BU with the support of the Poole Harbour Commissioners, who are the licensees of the wreck and in 2010, with funding of English Heritage. In 2010, because of the site's archaeological importance combined with the risk of its disappearance due to environmental conditions, English Heritage funded an archaeological excavation on the site, led by Bournemouth University maritime archaeologist David Parham, with a team of internal and external experts. One of the aims of the excavation was to raise the rudder of the ship, which was standing proud of the seabed leaving it vulnerable to destruction. The rudder could then be conserved and ultimately be displayed in Poole Museum. The huge size of the rudder (c.9m) will provide the community with the visual scale of the type of ships that were trading with Poole and the area during this period and therefore the recognised maritime importance on an international level.

There are several factors which contribute to the importance of the site. The 17th century saw the beginning of globalization and this ship played a part in this phenomenon. Andrew McIntosh, Heritage Minister said when the wreck was designated: *'This is an important wreck ... it is likely to be well preserved and rare in terms of its quality and the quantity of the surviving structure ...'*. The site was principally designated due to the rare survival and excellent condition of the vessel. The wreck potentially holds information about international trade and exchange, science, engineering and social relations in the early 17th century. The wreck is a unique and finite resource that offers unique insights into ship construction, life on board ship, and trade. This early trade and exchange also included the trafficking of slaves, a story of huge importance not only to ethnic minorities but to all of western societies. It is both a huge asset to Poole Harbour's maritime archaeological landscape and an important link with the early European colonisation and exploitation of newly discovered lands.

As well as being internationally important, the area's maritime heritage holds a real significance for local people and the seafaring community. Poole Harbour has naturally helped to shape the town's development and identity; it has also influenced local arts, inspired maritime, local history and other stakeholder groups as well as being important to the local residents. The harbour attracts visitors from around the world both by land and sea. The ship wreck represents Poole's prosperous maritime past and the trade links that Poole held internationally. To date the only parallel with the carved rudder found on the Swash Wreck is with the highly decorated and expensively constructed Swedish warship *Vasa*, which sank on her maiden voyage just outside Stockholm Harbour. The suggestion therefore is that the Swash Channel wreck forms the remains of a large high status vessel of its period.

The site was and still is inaccessible to the general public as it is located underwater. Access is also restricted to the diving community, unless holding a Historic England licence. However the public can engage with the wreck and its artefacts through Poole Museum Service, the recipients of the Swash Channel Wreck collection. As Poole Museum Services do not have an in house maritime archaeologist, collaboration with Bournemouth University was not only natural but also advisable and the combination of academic and local museum expertise with hands-on activities for students and the general public can provide a unique experience. Despite the success of the more traditional approach to public engagement it was noted that the outreach talks were not really suitable for mixed age and ability groups.

It has been demonstrated that by using a theme, such as Maritime Archaeology and a case study, such as the Swash Channel Wreck, it is possible to generate a diverse range of outputs which can benefit academic, students and the public alike. There is opportunity for training, research, education and creativity for students, volunteers, academics, groups and societies, older and very young participants to get involved with the discovery, recording, conservation and dissemination of information. Volunteers were trained to be able to deliver aspects of outreach and specialists had the opportunity to undertake professional development.

The diving and recording element of the project initially took place between 2005 and 2006 and gave students and volunteers the opportunity to be involved in the hands on aspects of maritime archaeology. Since 2006, Mr Parham (Bournemouth University) has researched the archaeological importance of the site and Ms Palma (the author) has conducted scientific research on the environmental threats degrading the archaeology of the wreck at a fast pace. The collaboration with Poole Museum has always been fundamental towards the research conducted on the site.

In situ protection research pilot project, funded by Historic England to Ms Palma was initiated in 2007 in order to investigate preservation methods from the scientific and financial point of view (Palma, 2009). In addition a photo mosaic of the wreck site project was also funded by English Heritage and created in 2008 as part of a student research project. By being involved in such a project the students and volunteers have developed a host of transferrable skills, including diving, recording, analysis, research techniques and experience in delivering outreach activities, presentation, leadership, web design and administration. The hands-on experience was incredibly valuable to the participants and the study of the wreck has made possible, up until 2010, 1461 dives done largely by students with 1470 hours underwater. From 2010-13 829 dives have been undertaken, by professionals and students with 1656 hours underwater.

A number of student dissertations have been drawn from the study of the wreck, including; Metal Degradation on Shipwrecks, Wood Degradation on Shipwrecks, Artefacts on Shipwrecks, Shipwreck Distribution, East India Company Shipwrecks, Sheeting on Shipwrecks And Photomosaic. The breadth of subjects that can be studied within a maritime archaeology context is extensive and includes; Hull Remains, Environmental Conditions, Faunal Remains, Dendrochronology, Geology and Ordnance, to name but a few.

From 2008 onwards increased media attention brought the project to a national and international audience and in order to build on public interest the outreach events began in 2009. Further excavation was undertaken in 2010 and research into the condition of the submerged material continued. From 2012 onwards more volunteer engagement and co-ordination has taken place and the Project team have continued to deliver talks, seminars and conference presentations. Activities were developed and run in collaboration between with BU's Programme Leader of the MA Maritime Archaeology, Ms Paola Palma and Poole Museum staff in their area of specialisation (including outreach, curation etc.). The idea for the project came from working with the Masters students on the site and realising that only a small

group of people, two staff, the students and few others had the opportunity to enjoy this incredible heritage. The realisation was how important is that not just students were involved, but the wider community.



Figure 27. Rudder of Swash Channel Wreck

Professional development opportunities for specialists such as, archaeological conservators and maritime archaeologists were met by offering a unique resource (the wreck and its artefacts) for study, the recording and conservation of the carved rudder being a case in point. The process involved concretion removal and archaeological recording, followed by a degradation assessment and desalination followed by a stabilisation phase. Work was

also undertaken to record the carved wooden artefacts retrieved from the wreck using a laser scanner and rendering the measurements as a 3D replica.

In recent years, the public interest for archaeology has increased dramatically. TV programmes and popular publications have had a great impact on awareness and interest in archaeology. Increasingly outreach and engagement activities taking place, which allow the public to get closer to the past and really interact with aspects of their heritage. To keep up the momentum of public interest the site had been made known to the general public soon after its discovery, utilising a fruitful collaboration with Poole Museum who would be curating and displaying shipwreck's artefacts. Several events were organised and delivered, including seminars and open days. Bournemouth University staff also delivered talks to members of local groups and societies, which were very well attended. This was a very important approach in engaging the public and making the local heritage known.

The wreck site has received major media coverage since July 2008 when significant finds were brought to light and the presence of the destructive shipworm (*Lyrodus pedicellatus*) was recorded, by the author, in both the carving and in those timbers of the wreck that remain underwater. Further research on wood degradation by woodborers was funded by the British Council to Ms Palma for a research project done in conjunction with the National Council for Research (Italy) (Palma, 2009). The find was reported by the national papers but also reached international publications such as *Archaeology* (publication of the Archaeological Institute of America). The find really captured public attention. The wreck itself was also chosen to be included in the BBC 'A History of the World Project'

<http://www.bbc.co.uk/ahistoryoftheworld/objects/D-VcJdp3RwCQtpYsPx7Lbg> and has featured in the BBC2 series *Britain's Secret Seas* <http://www.bbc.co.uk/programmes/p00h2ftx>. All this publicity brought the wreck and the project to the attention of a much wider audience. The significance of the M.A.D project was recognised when it was nominated and was runner-up at the Dorset Archaeological Awards. Comments from the committee included; '...combining and archaeology magnificently...', '...providing outstanding presentations...' and 'The judges thought this project was breaking new audience ground in presentation', (Maureen Putnam, chair of the judging panel).

The first special open day was hosted by Bournemouth University (BU) in 2009, organised by the author, with the collaboration of colleagues and students. The unique Maritime Archaeological Day M.A.D. about the Wreck provided the University experts and students in marine and maritime archaeology with the opportunity to share their findings from the 17th century ship. Artefacts raised from the Wreck were put on display, prior to undergoing conservation. Replicas allowed visitors a hands-on, tactile, experience. The event was open to all and of course anyone interested in heritage, archaeology, diving and maritime history was particularly welcome to attend. BU's leading maritime archaeology experts spoke on their experiences of working on the Wreck site as well as undergraduate and postgraduate students, Poole Museum Service, English Heritage who has both supported the site and share in the belief that it represents a significant and important discovery.

The site is by definition prohibited to most due to its location and physical access is restricted to a very few. Also intellectual barriers exist allowing cultural access only to those who have a good understanding of the cultural heritage. It was felt as time went on that the traditional approach was not entirely suitable for all potential groups who could be included in outreach and engagement activities. It was felt that people of all ages and capabilities, such as families, people at both ends of the age spectrum and those with learning disabilities or sensory impairments should all have the opportunity to engage with maritime archaeology and the exciting discoveries from the Swash Channel Wreck.

The location of such activities can also be an issue for certain members of the public and it was realised that the Museum or the University may not be the most beneficial environment for some people to experience maritime archaeology, whether through perception or access (being easily able to attend rather than available facilities). The project looked at taking the heritage material out of the museum and interacting with people who wouldn't usually be exposed to it. It is hoped the public will have the opportunity to enjoy their heritage and contribute to an expansion in the level of heritage appreciation within the community, this solicited participation it is hoped, will encourage other people to talk and raise interest in the project which will eventually self-fuel with local and wider interest. By focusing on providing greater opportunities for people of all ages, backgrounds and abilities to learn about and become involved with their maritime archaeological heritage, using the Swash Channel wreck as a vehicle, the project makes the local heritage available and accessible to those who wouldn't have access otherwise. It was therefore acknowledged that there was a need to demolish these barriers in order to allow anyone an equal opportunity to enjoy and engage with maritime archaeology.

'M.A.D. about the Wreck' aimed to involve young people, the non-diving community and the wider general public with activities such as events, volunteering opportunities for all ages and the chance to become join the new Friends and Young Friends of the wreck groups. It is hoped such approaches will inspire the public to learn about their Underwater Cultural Heritage. Conservation, outreach and preservation for future generations are at the core of the project.

The synergy between BU and Poole Museum is a winning combination to unite academia with the public, providing a unique experience and hands-on project for the students and the general public. Heritage Lottery Funding for the project has made this opportunity to widen participation possible. In addition to all the activities offered to engage with the wreck above all is the passage of the ownership to the future generations. One of the HLF aims is to conserve the diverse heritage for present and future generations to experience and enjoy.

Public engagement case study 1: M.A.D about the Wreck

Maritime Archaeology Days (M.A.D) about the Wreck, in the second developed phase became a Heritage Lottery Funded project, and it expanded into more than just a series of events. The consultation carried out so far began in 2009 and was aimed at investigating how the local and national community perceived the archaeological, historical and cultural value of the site. In May 2009 the first 'M.A.D about the Wreck Day' was organised. This was a successful Maritime Archaeological Open Day many of the 250 attendees registered their interest in the site and offered to get involved in any related activities by signing up to a mailing list. Other consultations include discussions held at Poole and Bournemouth Cultural Hub meeting (December 2009) Poole Museum Teachers Steering Group, Poole Heritage Forum and a specially arranged a consultation evening open to the local community in 2010.

M.A.D about the Wreck aims to make maritime archaeology accessible to all, without exclusion. Through the project the team have developed and provided a learning, professional development, outreach and volunteering programme aiming to reach all members of the community and attempting to break down the barriers that currently prevent them enjoying their shared heritage. The archaeological site and its finds offered, and continue to develop many exciting opportunities to participate that benefit both the public at large and specific stakeholder groups.

M.A.D about the Wreck also went out into the community visiting a number of children's day care facilities, to introduce the themes of maritime archaeology through stories, discovery, play and craft activities. A puppet of a merman was commissioned by the project and made by a student at the Arts University Bournemouth as part of their final year project. It was used in initial talks with the children

to engage and inspire them to talk about ‘underwater archaeology’. Other replica artefacts were made by another student, to enable the public the opportunity to see and handle the type of artefact being recovered from the site, without compromising their fragile condition.

The team also took sand and artefact filled fish tanks for the children to experience discovering buried items and identifying what they had found. There was also an activity to build a ‘fun foam’ sailing boat to introduce some of the terminology (mast, stern, hull, etc.) to the children. One of the visits also incorporated a pirate themed treasure hunt around the nursery garden, complete with treasure map and filled treasure chest!

In the spirit of inclusivity the project tried to reach as many of the elements of society that for reasons of circumstance or opportunity may be excluded from learning about maritime archaeology as possible. To augment the open day events sessions were organised and run (by project volunteers and staff including Gordon Le Pard, Mark Watson, Bronwen Russell, Tom Cousins, Susanne Saleh, Tom Harrison, Bournemouth University students, Dave Parham and Paola Palma) with secondary school geography students, Age UK in Dorchester, Autism Wessex and Dorset Blind Association, tailoring each of the events to suit the particular needs of the group. It was possible to utilize handling collections, tell stories about local historical events, inspire discussions and take part in hands-on recording and surveying activities. A particularly strong collaboration was between Bournemouth University, the Devizes Writers Group and prisoners at HMP Erlestoke. Who, with the support of the writers group, produced scripts for an audio play, recorded dialogue bringing the sinking of the ship to life, and a piece in the voice of the captain watching his vessel go down before he drowns. The prisoners have also made two models of 17th century ships from matchsticks, produced two paintings and made a replica of a board game of the period.

The contributors to the project included volunteers, Friends of the Swash Channel Wreck, Young Friends of the Swash Channel Wreck, Students (from Bournemouth University) Hampshire & Wight Trust for Maritime Archaeology, York Archaeological Trust, Wessex Archaeology, SeaSearch, Dorset Wild Life Trust, The Nautical Archaeology Society, The Young Archaeologist Club (YAC), English Heritage, Poole Museum Society, Teachers Group, Poole Maritime Trust and the Poole Harbour Heritage Project.

Following the M.A.D about the Wreck activities there is a real sense of wellbeing and enjoyment. The Age UK visit was particularly successful and the participants really enjoyed using the handling collection and hearing about the maritime recollections. They were a very vocal group and were very keen to share their own experiences. The nursery children found the merman puppet intriguing and loved the thrill of discovery excavating the fish tanks. They also enjoyed making the boats and were delighted to have something to take home and talk to their parents about.

Public engagement case study 2: Tales from the Sea

Another project to have been developed is ‘Tales from the Sea’. Britain is a rapidly aging society with the prevalence of dementia predicted to increase (Brookmeyer et al 2007, Ferri et al 2006). For those already living with dementia the importance of maintaining and enhancing well-being by sustaining involvement and interaction with physical, social and mental activity is well documented (Hall et al 2009, Hill et al 2010, Wang et al 2011, Swan 2012). Despite such actions reducing the risks of early dependency and social exclusion it is a reality that the lives of people with dementia can change dramatically upon receipt of a diagnosis of the condition, often resulting in the withdrawal from everyday leisure activities. For those with dementia still living within the community, day centres may often be the only opportunity for social interaction. The ‘Tales from the Sea’ pilot project delivered a maritime archaeological experience for people with dementia and engaged a societal group often excluded from such activities.



Figure 28. Working with people with dementia

The aim of the project was to evaluate the impact of the interactive maritime archaeological sessions to people with dementia. The sessions replicated the archaeological processes undertaken by field archaeologists (the excavation, the findings and what the findings tell us) and included activities such as a mini maritime archaeological excavation and sensory activities through food, sound, smell, videos and music. A treasure chest containing objects and replicas of archaeological artefacts represented a time capsule of life at sea in the past. The objects contained within it ranged from replicas of personal possessions of crew on board of ships, to navigational devices and equipment. The

activities were designed to be stimulating and encourage interaction and sensory participation for those with dementia.

The Tales from the Sea project was delivered between February and May 2013 within the Bournemouth and Poole conurbation. Five venues hosted three sessions (one a week) each lasting one hour and facilitated by at least two people (a maritime archaeologist and a Clare Cutler, member of the BU Dementia Institute (along with student interns, specifically employed for this project)).

The sessions were evaluated following a broadly ethnographic approach and included ethnographic field notes, evaluation sheets (for participants, carers and staff), video diaries (of carers and staff) and evaluation discussions with participants at the end of the sessions.

People with dementia will benefit from this project in a number of ways, it particularly provided an opportunity for social interaction, reminiscence, mental stimulation and opportunity for learning in an inclusive, fun and interactive environment. In addition, the project also highlighted a valuable educational opportunity for both the PI and CO-I (ERC) who are also engaged with PhD activities. A fused experience was also provided for two recruited student interns. This project showcases BU's commitment to research, BUDI's commitment to dementia research with societal impact and commitments to the dissemination local maritime archaeological research. This project is the epitome of what can be achieved and created through the opportunity of fusion. It demonstrates what is possible through collaborative working and an innovative approach.

Festival of Maritime Archaeology 2013 & 2014

A project of this kind whilst creating greater access to the public also promotes the work of underwater archaeologists in general and raises awareness of this relatively undiscovered aspect of our cultural heritage. Helping people to understand the finite and fragile resource of underwater archaeological sites can also be used to encourage responsible diving and a respect for the underwater archaeology of the area in general. With this in mind two events were held as part of the Bournemouth University Festival of Learning (in 2013 and 2014).

The Festival of Maritime Archaeology was an opportunity to bring together organisations involved with maritime heritage and showcase the varied aspects of the work they undertake. Events like these

give the public a chance to learn about the latest research in maritime archaeology and the new discoveries that are being made. It also provides them with a better understanding of the methods involved in maritime archaeology, a field which still remains shrouded in mystery for many, from a number of different event participants. In this case, people will have the opportunity to learn about maritime archaeological excavation, conservation, experimental archaeology, and human remains associated with shipwrecks and maritime contexts.

Professionals and volunteers were on hand to answer questions, a story teller captured the visitors' imaginations with tall tales from the sea and there were craft activities for all ages, on a maritime theme, available to join in with. Other activities for visitors to try out included, maritime archaeology surveying, excavations in fish tanks, operating remote operated vehicles (ROVs) and rope making. An exhibition of maritime and nautical photography, taken by students worldwide was hosted and the winner voted for by the public attending the event.

The festival also provided participants and visitors with a greater appreciation of the maritime archaeological environment and its associated ecology. By increasing awareness of the fragility of shipwreck sites such as this one, it is hoped that people will have an increased sense of respect for the maritime archaeological environment. Public interest is caught by exciting discoveries such as the Mary Rose and the Vasa, they demonstrate how such shipwrecks can inspire public audiences. Poole Tourism Manager, Graham Richardson has previously commented that 'a featured vessel along the lines of the Mary Rose and or HMS Victory would greatly benefit the town' (Bournemouth Echo 17th January 2008). The opportunity to educate, engage and discover exists with a find such as the Swash Channel Wreck.

The events were very successful and the 2014 festival saw over 500 visitors who came to learn about maritime archaeology in all its forms. The festival saw the collaboration of a number of organisations and provided a fantastic showcase for Maritime Archaeology. The participants included, Bournemouth University (M.A.D about the wreck



Figure 29. Festival of Maritime Archaeology

and ShipWrEx project), the Nautical Archaeology Society, Poole Maritime Trust, the Bio-beach project, Wessex Archaeology, Artwork and poetry from the Erlestoke prisoners, and the Maritime Archaeology Trust along with their Discovery Bus.

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Bamburgh Wreck: Opportunity in the intertidal zone

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The Bamburgh Castle Wreck site reappeared in June 2013 in the sands after more than a decade of absence and was discovered by Steve Brown, a local historian and avocational archaeologist known to the Maritime Archaeology Sea Trust (MAST). Following a visit the next day MAST raised funding from the Northumberland Area of Outstanding Natural Beauty (AONB) to conduct an archaeological and dendrochronological survey. The results were unexpected and show the vessel's terminus post quem to be 1768. The rare survival of deck features including a mast, windlass and pump in conjunction with this early date combine to make the Bamburgh Wreck Site of huge significance designated by English Heritage in March 2014 as a Scheduled Monument under the Ancient Monuments and Archaeological Areas Act 1979. None of this work would have been possible without the combined team of volunteers and experienced professionals working together. The site lies in the intertidal zone and is currently revealed at low tide. It consists of the exposed remains of an unknown wooden sailing vessel 22.5m long. The survival and position of some of the features within the site would suggest that the buried structure could be mostly intact as the position of hull structure, deck beams, masts and even deck fittings are all as would be expected from a mostly intact buried vessel. Should the starboard side survive under the sand it would potentially offer an unparalleled opportunity to study a wreck with this level of survival within the intertidal zone, there being very few comparable examples currently discovered anywhere beyond the low water line within the UK.

Wreck sites the world over spanning centuries of our global maritime past are occasionally discovered by divers and beach combers. In still many cases, these sightings are almost as quickly forgotten or just plundered as 'lumps of metal on the seabed' or 'rotten bits of sodden wood', signifying nothing. This reckless attitude, however, has shown marked change in recent years in the UK with the growth in the availability of specialist diver education and training programmes, reflecting a demand for knowledge and a move away from considering marine life as the only underwater entertainment.

This paper presents a case study for the crucial role played by recreational sports divers, avocationalists interested in exploring and appreciating their past, and the challenge presented to professional practitioners and governments in both fostering this community and in advancing access to speciality training to as wide a community of recreational divers as possible. The promotion of best practice and the availability of such training to a broad field is the best way of ensuring and developing a change in community attitudes and ethics (Edney 2011).

The current number of recreational divers just at entry level in the PADI system, the world's largest diver training and licensing organisation, stands at 550,000 and is growing (Bill Hamm, PADI, pers. comm. 2013). The British Sub Aqua Club (BSAC) estimates the world's total active recreational diver population at about 9 million (BSAC 2012). Of these there are approximately 3.2 million active European divers (RSTC 2014) and 200,000 active UK divers (BSAC 2012).

In the UK, where the coastal waters have the greatest density of shipwrecks in the world and where state funding of heritage, maritime in particular, is limited, maritime fieldwork, ranging from discovery to survey and sometimes excavation, is conducted in the main by avocationalists (McElvogue and Parham

2003:9-11; Parham and Williams 2003:469; James 2008; Satchell 2008, House of Commons 2011:172). In 2013, of the 66 licences issued by English Heritage, only 21 were held by professional archaeologists, 37, were held by avocationals and 8 by other. Indeed, English Heritage stated in policy advice in 2002 that: 'maritime archaeology in England is predominated by work carried out by the voluntary sector. This high level of amateur (in the sense of non-vocational) involvement should be regarded as an asset to the discipline, as there is demonstrably a greater requirement for survey and recording than can possibly be accomplished by professional archaeologists' (Roberts and Trow 2002:8). The authors go on to state the importance of not alienating this vast resource: 'English Heritage believes that a fundamental requirement in seeking to prevent damaging disturbance of important historic wrecks, while protecting the legitimate interests of recreational divers, will be gaining the understanding and support of the responsible majority of divers. We also believe that our stewardship of the historic resource, in its widest sense, will be far more effective if it commands the respect and enthusiasm of this constituency'. With government funding dwindling – 'Unlike other DCMS-funded bodies, English Heritage has received grant settlements below inflation since 1997, resulting in a real term reduction of £130 million' (House of Commons 2011:142) – the importance of the availability of training for recreational divers is increasingly paramount for those interested in our understanding of the past.

There are both disadvantages and advantages to this high proportion of avocationals. The drawbacks, some argue, are that the avocationals have less developed skills, due to a lack of breadth of experience, particularly in 'interpreting or evaluating the significance of what is being revealed by excavation' (Parham and Williams 2008:471). The authors point out, however, that this imbalance of competence is potentially less significant than before due to a lack of maritime excavations in the UK. Avocationals, too, though highly motivated in the main, also lack the time to devote to their hobby by the constraints of funding and their own professions. There is another concern. English Heritage has relied heavily on the volunteer role of the avocationals, 'their support, commitment and enthusiasm for these nationally important sites, enabling stewardship and under-pinning effective management of them into the future' (James 2008:447). However, as James argues this group is rapidly ageing, to wit 63% of licensees are over 50, 19% over 65 and there are no licensees under 25.

The advantages are considerable. Avocational teams armed with local knowledge and access to infrastructure working under the guidance of experienced professionals, provides not only a cost-effective model but this model also encourages a sense of community ownership of a site and one of social inclusion, bonding not only the team but also linking the community to its past (McElvogue and Parham 2003; Parham and Williams 2008; James 2008). This civic pride is fostered by English Heritage with awards such as the annual 'Heritage Angels' event, and aware of its own lack of funds to assist projects, English Heritage is keen to promote local communities' educational outreach. To an extent this approach is working towards increasing awareness and understanding of our past. English Heritage receives approximately 3-5 notifications annually of potential archaeological site discoveries. The Nautical Archaeology Society (NAS), which conducts training courses for avocationals, receives on average 5-10 calls a year about unidentified sites (Beattie-Edwards, *pers. comm.* 2014). MAST, too, receives a number of unsolicited calls and emails from divers and beach walkers alike. In 2013 MAST received five such notifications.

The discovery and subsequent funded survey of the Bamburgh Castle Wreck in the summer and autumn of 2013 occurred thanks to a local historian known to the Maritime Archaeology Sea Trust (MAST) in 2012. Steve Brown, who had previously taken MAST's speciality recreational diver course, a PADI Distinctive Specialty (sic) called Basic Archaeological Diver (BAD). The two-day, three-dive BAD course teaches the rudiments of the discipline and the relevant legislation and was designed to encourage an increasing number of divers to become 'the eyes and ears' of our underwater cultural heritage, recording and reporting discoveries.

MAST, a charity established in 2011 to conduct work in the field of maritime archaeology, established a training scheme for the broad market of UK and international recreational divers. The BAD course graduate notified MAST within hours of the Bamburgh Beach Wreck making its first appearance in over a decade during extreme low tide in June 2013. It is thanks to him and his students (he is now teaching the course in the north east of England) that MAST was able to conduct a preliminary survey within hours of the sighting.

MAST archaeologists, Kevin Stratford and Jessica Berry, would have been very limited in what they could have achieved in that short time without the help of Bournemouth University staff who volunteered their valuable time, of local volunteers and a BAD diver, all of whom were interested to learn more.

The Bamburgh wrecksite

The wreck, now added to the Schedule of Monuments, lies on a Northumberland beach 615 metres ENE of the imposing former seat of the Northumbria Kings, Bamburgh Castle, in the intertidal zone. The beach is made up of fine sand that is well compacted, potentially providing a good level of preservation. The wreck appears only roughly one hour either side of low water slack giving the team a maximum of three hours to work during each tide. The site itself sits within its own scour which, along with the tidal conditions, means that it never completely dried out.

The survey was conducted during a spring low tide allowing for maximum time on the exposed timbers. An RTK survey was conducted using an Leica Viva GS10 GPS plotter to accurately map the exposed timbers and the surrounding site environment (see Figure 30). The site consists of the exposed timber

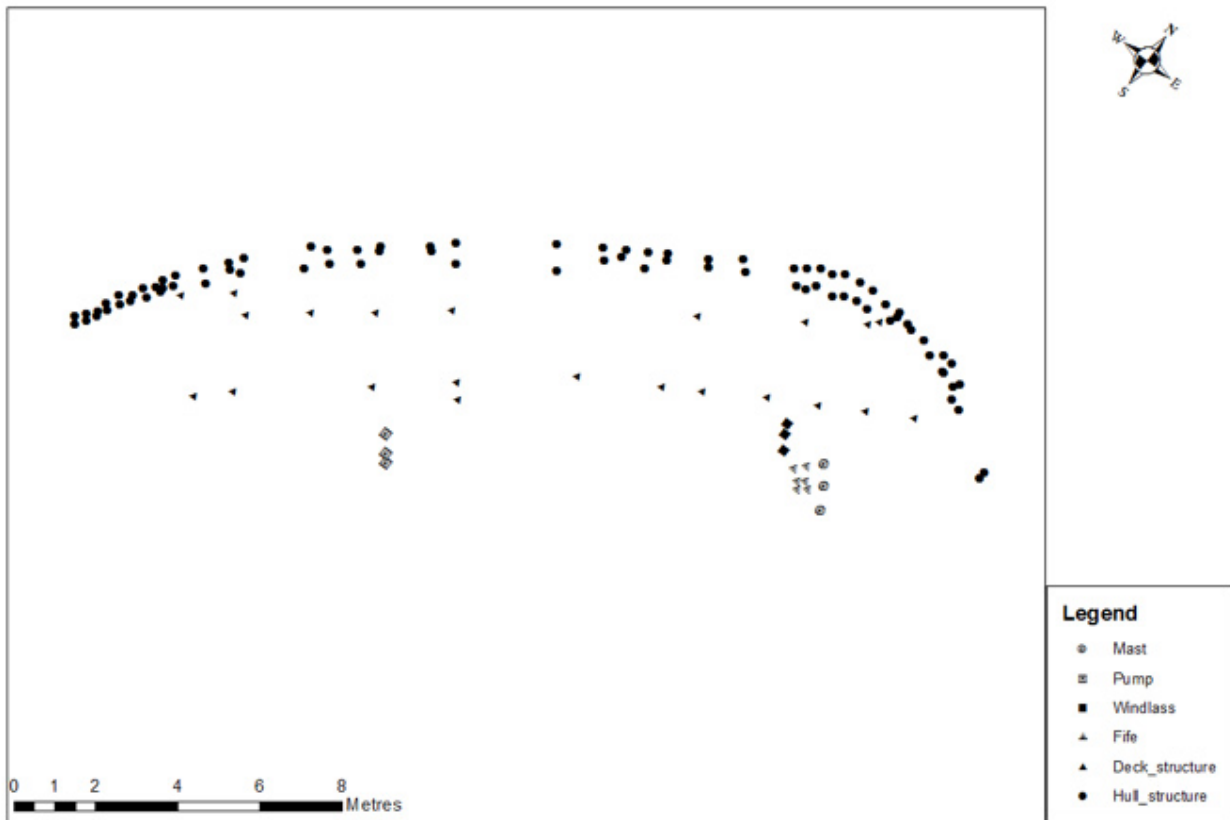


Figure 30. RTK site plan

remains of an unknown wooden sailing vessel 22.5 metres long by 5 metres wide, with considerable evidence for buried material on site which could greatly increase the site dimensions. The orientation of the wreck from stern to the bow is approximately 80 degrees. The site appears to be stern inshore and lying on its starboard side which is buried with only the eroded port side still showing. There are several rare features for sites within this environment and it is even rarer within the UK archaeological record.

Consequently a dendrochronology survey by Dr Roderick Bale of University of Wales, Trinity Saint David was conducted. This revealed a *terminus post quem* of AD1768 for which this element of the ship could have been built (Bale 2013). Further, the survey revealed that the ship's construction is characterised by the use of fast grown, low quality (ie. often knotty) oak trees suggesting the timber used was local, most likely east of England. The use of different species for specific functions is indicated through the use of Larch (*Larix* spp.) for the mast and Elm (*Ulmus* spp.) for the pump structure. Should further timbers become exposed, sampling for tree ring analysis could add to the limited information obtained from the 'single dated timber' (Bale 2013:4). This timber was from the lower deck beam line towards the bow of the stern of the wreck.

The survival and position of some of the features would suggest that the buried structure is mostly intact as the position of hull structure, deck beams, mast and even deck fittings are all as would be expected from a mostly intact buried vessel. An air probe survey conducted along three baselines indicated some possible buried material within the first metre of sand at 21 locations along the survey lines. Due to the nature of the sediment it is likely that some of the material is natural. The shallowest material was within the stern section (further inshore) and the amount of contacts reduced towards the bow of the wreck.

Should the starboard side survive under the sand it would offer an unparalleled opportunity to study a wreck with this level of survival within the intertidal zone, there being very few comparable examples currently discovered beyond the low water line within the UK. The exposed section of the wreck that appears to have been eroded consisted of the hull structure of the starboard side of the wreck. The exposed deck beams suggest the possible survival of deck planking below the sand (potentially a large portion of the port side) which would also be extremely rare within the UK.

The visible remains of the wreck consist of the surviving port side of the vessel. It is likely that the starboard hull from the turn of the bilge down towards the keel still survives mostly intact, buried in the sand. The survey of the wreck was undertaken on the exposed timber only. The hull (ceiling planking, frames - possible first futtocks - and outer hull planking) has eroded. The surviving starboard side appears to consist of the hull from just below the turn of the bilge, the lower deck beams and the upper deck beams inside the ship's hull. The hull construction is of carvel design with predominantly wooden treenails and iron strengthening around the locations of the knees. The surviving structure from amidships to the stern consists of eroded frames (possibly first futtocks). The measurements for the frames at the stern and amidships



Figure 31. Outer hull planking 11.5cm thick 16cm wide and length unknown

were therefore estimated from the exposed timber and as such a sample of one from amidships and one from the stern section were recorded. There was no exposed planking from amidships along to the stern section of the wreck. The exposed amidships frame is 0.14m moulded 0.22m sided and length unknown.

Along with the hull several other structural remains were exposed. The starboard ends, or closest surviving sections of the starboard ends, of two layers of deck beams were protruding from the sand. A total of seven lower deck beams were showing with flat ends suggesting that they were close to their original length. The fastenings of this section were found to be a mixture of wooden treenails and iron fastenings. This feature shows the fastening for hanging or lodging knees that would have braced the deck beams. It is likely that the knees would have been salvaged for reuse as they are sought after pieces of structure suitable for use in buildings and other boats. The survival of the coherent structure suggests that the vessel was quickly buried after wrecking and that exposed key components appear to have been salvaged after this (see Figure 33 below). The removal of the knees would have weakened the exposed starboard side and would explain the subsequent collapse and removal of the weakened sections of outer hull by natural processes.

A second layer of deck beams (main deck) were also exposed on the site. A total of 12 main deck beams are exposed to varying degrees. The most exposed located at the bow (the first four main deck beams). A sample of the main deck beams was recorded.

The amidships section contained the remains of four main deck beams, two



Figure 32. Frames (first futtocks) 16cm moulded 11.5cm sided and length unknown.



Figure 33. Image showing longitudinally aligned circular holes running through the lower deck beams



Figure 34. Mast with fife rail in front

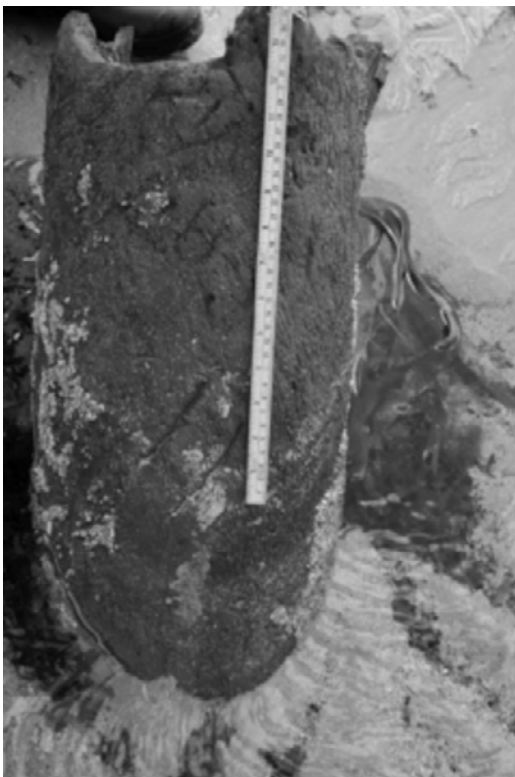


Figure 35. Possible pump tube in the stern

of which were exposed timbers along with the tips of two partially exposed main deck beams where the end of the exposed section lies flush with the sand. The stern section contains a further four main deck beam timbers. The most exposed of these being 0.30m above the sand. All of the exposed faces of the timber were heavily eroded making any dimensions measured an estimate.

Of the rarer features that survived were the broken stump of a mast. It has been broken off roughly 1-2 metres above the main deck beams, the point where the mast is weakest. This suggests survival down to the mast step, something very special for an intertidal site within the UK. The mast in the bow lies approximately four metres aft from what could be the remains of the stem. It is cylindrical and 0.38 metres in diameter. The mast is clearly broken down rather than cut and therefore most likely broke during the wrecking event. Adjacent to the stern face of the mast a small, squared off timber survived which is a fife rail used to tie off rigging ropes to (see foreground of Figure 34 below). The original level of the deck may not be more than one metre below the current sand level, as suggested by the air probe survey.

The cylindrical tube in the stern lies approximately 16 metres aft of the possible stem. It has a diameter of 0.29 metres and has a hollowed core; this could be a product of erosion or more likely the remains of a pump tube. The fact that the timber is Elm suggests the latter to be the case (see Figure 35 below).

Within the exposed bow section of the wreck there is a timber running transversely above the main deck beams. It lies just aft of the mast and is cut with an octagonal cross section with square notches carved into the flattened faces. The diameter of the timber is 0.31m and the exposed length is 1.1 metres. The square notches are between 0.10m - 0.12m square and penetrate through the width of the timber. A total of 10 notches are showing making five complete holes running through the timber. The location and design of the timber would suggest that this is the remains of the starboard side of the windlass with the centre and port side possibly still *in situ* but buried (see Figure 36 below).

No small finds were exposed on the site. However there is a chance that some may survive within the

buried structure. This is supported by evidence from the air probe survey that shows evidence for buried structure at numerous locations. Due to its position within the intertidal zone it is also likely that the wreck underwent some level of contemporary salvage as was and remains the norm in UK coastal communities. It is also possible that sections of the structure were salvaged for reuse. This is evidenced by the removal of the knees and the cutting of the upper deck beams.

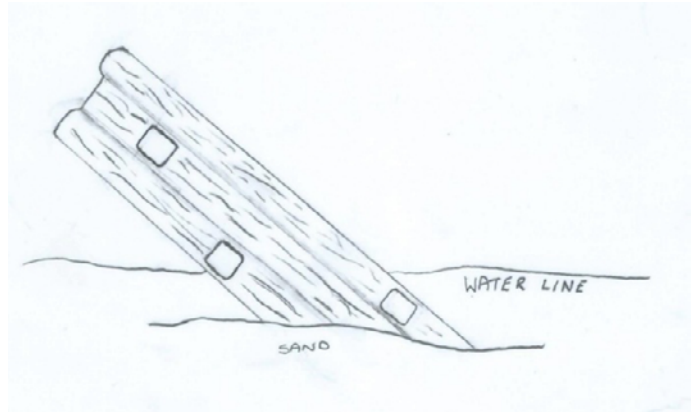


Figure 36. Sketch of windlass showing locations of the notches (viewed from the aft side)

It is thanks to Brown's knowledge then, gained in part from his speciality diver training, that research and survey of this significant wreck site has begun. What at first glance would have appeared to be little more than a series of timber frames, is now revealed as a significant site, currently being considered for designation, due to the rare survivals of deck features and the potentially early date from the dendrochronology survey. These factors are matched by the noteworthy historic maritime association of Bamburgh Castle itself which, since 1771, acted as a coastguard to mariners, firing its signal gun during storms to alert sailors and providing a safe haven to both the wrecked and their cargo. On occasion the sheer number of sailors was too much for the castle's housekeeper, Mrs Graham, to bear. In 1784 Mrs Graham was reported in a letter to Dr Sharp, a trustee, as 'being fed up with so many shipwrecked sailors' (NRO 1784:00452/C/3/2/14/10).

Conclusion

This case study shows how archaeologists and the local community can work together in a socially inclusive and cost effective way. Public funding for such projects being at its lowest in years, this combination of local knowledge and infrastructure and experienced archaeological practitioners could be seen as the last resort, despite detractors concerned at the perceived level of competence. Indeed lack of experience amongst avocationalists is arguably one of the key concerns, as the authors, Roberts and Trow argued – 'Rather than concentrating on professional or amateur status, the discipline should now focus on competence, on the need to enhance it for both groups and on the need to define pragmatic and attainable standards towards which all practitioners can aspire,' (Robert and Trow 2003), and it is experience and training that are most in demand.

With the current number of recreational divers worldwide at about 9 million (BSAC 2012), of which about 200,000 are in the UK, the challenge for heritage managers is to harness this vast resource and to encourage speciality training schemes for as broad and representative a group as possible: as James acknowledges, 'Young people are the sports divers, policy makers and archaeologists of the future and engaging them is vital for the future of the discipline' (James 2008:447). The schemes must not only be inclusive for all recreational divers in order to help facilitate increasing partnerships with experienced maritime archaeologists but must also be sustainable to ensure that training can be passed on to future generations.

It is already thanks to such schemes that the vast majority of work on UK designated wreck sites has occurred as divers have applied what they have learnt. MAST's experience with the PADI BAD Distinctive Specialty course and the discovery of the Bamburgh Castle wreck exists as a case study. This unique and historically significant site's existence was alerted to MAST by a graduate of the MAST PADI BAD

recreational diver training course and not through official government channels. This marks a promising growth in the development of the network of heritage eyes and ears being developed by MAST which in this case produced a shipwreck of national importance. Importantly the project was part funded and therefore made possible not only by the use of trained amateurs but also by the funds generated by the MAST PADI BAD training course.

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Scottish Island Dwellings: Combining research, fieldwork and local knowledge

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For many, underwater archaeology is largely regarded as the realm of shipwrecks and sunken cities, yet from the Neolithic to the Post-Medieval Period, people lived on small islets in the numerous freshwater lochs throughout Scotland. Many of these islets are artificial in nature and are referred to as 'crannogs'. Today, we know of over 500 examples in Scotland, yet the majority appear simply as unassuming (and unoccupied) natural islets, while a number are now entirely submerged. To better understand the rationale behind their construction and often lengthy occupation, it is essential to examine their place in local memory and legend by engaging communities. PhD research carried out in the Scottish Highlands and Islands from 2009 to 2012 combined extensive underwater inspection in conjunction with informal interviews and discussions involving members of the local community. The resulting communication was useful not only in locating 'missing' sites, but also in forming a better understanding of the meaning behind their use and current legacy. This interaction also fostered local pride and an increased awareness of this unique cultural heritage. This fieldwork is ongoing and I welcome any questions or e-mails to robert.lenfert@gmail.com.

Introduction

The study of our submerged human past in Scotland –encapsulated within the superimposed disciplines of maritime, nautical and underwater archaeology – presents a vast range of opportunities not only for the researcher, vocational and avocational archaeologist, but equally for a wide-ranging section of the public to exchange knowledge and information, whether they are avid consumers of local history and folklore, local sport or commercial divers, fishermen, or simply walkers who chance upon exposed artefacts or features along the foreshore.

This fortunate situation exists in Scotland not only due to outward geographical factors such as a maritime location with extensive shoreline, numerous islands and archipelagos, large sea lochs and wide firths - but also due to the vast abundance of freshwater lochs found inland. Indeed, beyond Scotland's rich and complex maritime past, there exists an equally deep and complex relationship between land-based settlement and what might be simply termed 'watery places' – coastal, intertidal and especially, loch-based island settlements including crannogs and island dwellings.

Scottish lochs and island settlements: A brief overview

It may be surprising to learn that Scotland is home to some 31,000 lochs distributed throughout the country from Dumfries and Galloway in the south-west to Caithness and the Northern Isles (Smith & Lyle 1979). Simply quantifying the freshwater resource in Scotland has proven to be a monumental task. Credit for producing the first comprehensive bathymetric survey of Scottish lochs rests squarely on the well-developed shoulders of John Murray and Laurence Pullar, who, from a small rowboat, recorded over 60,000 soundings with a lead weight from 562 lochs between 1897 and 1906 (Murray & Pullar 1910). The data produced from this astounding achievement is still regarded as highly accurate today, as modern soundings have indicated (Young & Shine 1993).



Figure 37. Dun Torcuill, an enhanced natural inlet in the Western Isles which supports an Atlantic roundhouse or dun (photo: author)

Island settlements in Scotland take on many different forms revolving around the common denominator of ‘living on lochs’ (Lenfert 2013:128). This theme centres upon the *crannog* – a largely or completely man-made artificial islet, usually comprised of varying amounts of brush, timbers, stone or turf, typically encircled by a retaining ring of timber piles which supported a single timber roundhouse. Yet this is admittedly the neat, almost idealistic, definition of a crannog – in reality variation abounds in regards to materials, location and degree of artificiality *versus* natural composition. In areas such as the north and west of Scotland, this ‘timber recipe’ veers more

towards the opportunistic use of stone due to the lack of available timber and brush. Despite this general ambiguity in definition, two closely-linked physical constants tend to remain for artificial islets – first, the overall basal diameters for completely artificial islets average less than 30m (Lenfert 2012: 347). This no doubt is a reflection of the massive amount of labour involved in constructing a crannog. Second, loch depth is a naturally occurring factor, with most surviving crannogs today situated on shelves or reefs in less than 5m of water, unless loch levels increased post-abandonment due to silting or blockage of the loch outlet. This stands to reason as building an island in deeper water requires exponentially more material to produce a platform capable of supporting a structure – again a reflection of labour limitations. Beyond the use of these labour-intensive artificial islets, the pragmatic use of arguably less-monumental natural islets – often enhanced or expanded to provide a suitably dry living area – is also well represented in the archaeological record, particularly in the Western Isles or Outer Hebrides where both lochs and small rocky islets abound (fig. 1).

Crannogs and other forms of islet-based settlement experienced a lengthy and complex cycle of construction, occupation, abandonment and re-use from the Neolithic to the Post-Medieval Period, peaking in popularity during the Iron Age (Henderson 1998: 228) and to a lesser extent, during the Early Historic Period. Island dwellings were still widely utilised from the 13th through 17th centuries, often occupying sites which were initially constructed in later prehistory. This raises interesting questions regarding local memory and the reuse of ancient sites with an existing legacy, likely supported through oral traditions over the centuries. We are fortunate that in several instances, oral legacies survive which shed light on the motives behind the reuse and reoccupation of these sites.

This vast chronology of islet use extends over five millennia, and based upon the current state of knowledge, is only punctuated by apparent absences in islet use during much of the Bronze Age and later, the initial stages of the Norse Period in Scotland (c.800-1266AD). Meanwhile, distributions tend to favour the west of Scotland and Highland lochs, while the sheer density of island dwellings on North Uist in the Western Isles stands clear above all other areas, with a density of one site per 3.75km² (Lenfert 2012: 290; Lenfert 2013: 129). The number of island dwellings in Scotland currently stands at 571, including some 347 sites referred to as crannogs. (Lenfert 2013: 135). Out of the non-crannog numbers, 177 exist in the Western Isles alone.

Therefore, rather than island dwellings forming a peculiar niche element of the settlement record in Scotland, it becomes clear that loch-based settlements form a substantial and influential element of the build environment, especially in regards to the later prehistory of Scotland. It should also

be stressed here that crannogs are hardly unique to Scotland, though their distribution ultimately remains discreet, if not asymmetrical. In Ireland, there are some 1200 crannogs (O'Sullivan 2000:12) while a solitary example can be found in Wales at Llangorse Lake (Campbell & Lane 1989). Currently, no examples are known from England or the Continent, though wetland or lake-side habitations certainly exist.

Previous work in the Western Isles

Out of this total of 177 island dwellings in the Western Isles (Lenfert 2012: 212), only 13 islets (0.073%) have been subject to organised excavations. Dun Ban, Grimsay was the first recorded island dwelling excavation by Captain F.W.L Thomas (1890). The prolific Erskine Beveridge excavated six sites: Rudh an Duin, Vallay (1911) Dun a Ghallain (1911), Eilean Maleit (re-excavated by Armit – below; 1911), Eilean a Ghallain (1911), Eileann an Tighe (partial) and Dun Thomaidh (1930) all of which are on North Uist. Seven island dwelling excavations in the Western Isles can be considered modern: Dun Bharabhat, Cnip, Lewis (Harding and Dixon 2000) Berigh, Riof, Lewis (Harding and Gilmour 2000), Eilean Domhnuill, North Uist (Armit 2003), Eilean Olabhat (Armit *et al.* 2008), Eilean Maleit (re-excavated; Armit 1998), Dun Vulcan, South Uist (Parker-Pearson *et al.* 1999) and finally, test trenching on Upper Loch Bornish (Marshall & Parker Pearson 1998). Notably, all of the islets above are classified as 'duns' or 'settlements' and not as any recognisable type of island dwelling. By 1985 the University of Edinburgh commenced plans for an intensive programme termed the Callanish Archaeological Research Project (CARP) which resulted in the excavations (both underwater and terrestrial) at Loch Bharabhat, Cnip (Harding and Dixon 2000) and also at Berigh-Riof, Lewis (Harding and Gilmour 2000). Loch Olabhat, North Uist became the focus of work by Ian Armit in 1985 producing, rather surprisingly, evidence of Neolithic occupation on Eilean Domhnuill.

Underwater survey and investigation in the Western Isles

Only three underwater surveys or investigations have been carried out in the Western Isles. The first was carried out by T.N. Dixon and P.G. Topping (1986). This was followed by Raven and Shelley who examined several sites in South Uist (2004) and finally, fieldwork conducted for this research on South Uist, Benbecula, North Uist, Grimsay, Berneray and Lewis (Lenfert 2009; 2010, 2011, 2012, 2013). The Dixon and Topping survey marked an important step forward in island dun research as this was the first serious attempt at examining these sites below the waterline. This survey also revealed sherds of later-prehistoric and medieval pottery from two islands in Loch Baravat, Crowlista (NB 039 349), one of which produced evidence for a boat noost (Dixon & Topping 1986: 191). Dixon and Topping concluded that the work previously published in the 1928 RCAHMS survey was insufficient and contained errors when viewed from the perspective of contemporary archaeology (*ibid*: 189). Dun Bharabhat, Cnip was one of the surveyed sites; it was from this initial survey the decision was made to excavate the site as part of the CARP project owing to good site visibility and the presence of several courses of stone walling with pottery sherds scattered about the base of the revetment. Not all the Dixon and Topping survey sites revealed the presence of artificial foundations; rather several indicated they were completely natural without indication of human activity or occupation. While this may not be an exciting revelation for archaeologists, it does highlight the challenges facing those who design field work strategies on often limited budgets while refining the overall known distribution. In this respect initial underwater survey is integral to the crucial decision of where to focus future resources. The Dixon and Topping survey is now some 25 years old; there are still over one hundred islets remaining from North Uist to Barra that have not been examined underwater. This is an area that certainly deserves more consideration and will undoubtedly generate substantial data in the future. It will undoubtedly generate a substantial amount of new and exciting data in the future, based upon this fieldwork, and from upcoming projects the author has planned on Lewis.

Aims and Nature of the Research

Elements of the research summarised below cover a large geographical remit which, amongst other aims, set out to a.) produce the first comprehensive gazetteer of island dwellings throughout Scotland, b.) investigate the underwater element of islet sites in Argyll, Sutherland and the Western Isles and c.) assess the potential in the Hebrides for additional Neolithic crannog sites – an area which undoubtedly possesses an additional number of these particularly enigmatic and important sites. In addition to underwater investigation, walkover survey was also conducted in order to assess whether a suspected crannog was in fact artificially constructed or modified, or simply a natural islet with or without visible features such as walling or causeways. As many suspected crannogs have not been physically examined by archaeologists, particularly below the waterline, these efforts were critical in verifying the nature of a particular islet. Research of this nature, particularly in the Western Isles, was quite limited prior to fieldwork, within only a handful of previous dives in Outer Hebridean lochs (discussed below). Prior to field visits during the desk-based portion of the initial research, it quickly became clear that local knowledge would be critical in maximising the effectiveness of time spent in the field. Information from individuals, including crofters, estate managers, local historians, divers, guides and fishermen amongst other helpful individuals, would play an equally vital role in informing fieldwork as would data available from government agencies, commissions and the handful of researchers and academics that currently specialise in crannogs and island dwellings.

Geographically, investigations in the Western Isles presented the greatest theoretical challenges, given the remote location of many of the lochs and predominance of Gaelic place-names which are admittedly difficult for this non-Gaelic speaker to properly pronounce, thus creating occasional communication issues. Another challenge when dealing with hundreds of sites was the prolific reuse of common Gaelic place-names such as Dun Beg (29 sites), Dun Mor (38 sites) and Dun Ban, with 25 archaeological sites located throughout the Highlands and Islands, with six on North Uist alone, further adding to potential confusion. Additionally, a site may have multiple spelling variations on the same name. Thus it was apparent that local knowledge would play a key role in many aspects of the research and field work.

It should also be mentioned that both the initial financial backing and inspirational community support neatly fits here with underlying themes of community, memory and awareness of a shared cultural heritage. I was fortunate to receive the GAMA Award which supports publication of material relating to the culture and history of the Western Isles. Not only did this award introduce me to several people involved in local heritage and culture studies, but it also served as a source of much-needed funding necessary to develop the programme. This work culminated with exciting finds of largely intact prehistoric



Figure 38. Notable examples of prehistoric pottery recovered from the lochbed surrounding a Hebridean crannogs.

pottery (Figure 38) discovered lying on the lochbed surrounding a number of Hebridean crannogs during the fieldwork (Lenfert 2011: Lenfert *forthcoming*)

Modern perceptions of ancient places

Given that island dwellings have persisted in Atlantic Scotland for five millennia it is argued here that they are as much a part of a collective memory and identity of those who lived on or near lochs over time as they are part of the physical landscape. Today, local inhabitants who realise that the unassuming islets or seasonally submerged cairns in their local lochs are the remains of artificial islands or 'ancient dwellings' may view them as somewhat puzzling, perhaps mysterious entities. Crannogs can be easily overlooked when walkers pass by, often unaware that many of the small islets found throughout the Scottish landscape were once bustling centres of activity closely connected to the surrounding landscape. Island dwellings today may also appear as inconsequential and overly laborious locations where one would decide to construct not only a house, but literally the ground upon which it rests - an island in this instance. A sense of ephemerality is balanced by the recognition that the 'place' still exists, even if dilapidated and overgrown or only sporadically visible below the surface. This view tends to foster a feeling of detachment that contradicts a natural instinct to view an 'ancient place' as part of an inherited individual and national identity, while systematically retaining an aspect that remains alien in that the use and meaning of the crannog or island dwelling can perhaps never be fully reconciled or understood. The symbolic view of island dwellings as remnants of the past is easily applicable to places of antiquity that are in disuse or decaying.

The symbolism of a particular object need not remain static, and it is argued that the *meaning* of island dwellings has recognisably changed over time, as island dwellings have interchangeably served as localised refuges and homesteads, or larger, highly elaborate monuments conspicuous in the landscape, centres of political power or resistance, workshops of skilled artisans or as abandoned, overgrown islets visible today. This interpretation of the meaning of island dwellings closely follows a 'structured system of functional inter-relationships' which broadly implies more tangible aspects such as environment, deposition, organisation and economy while a second meaning, 'the structured content of ideas and symbols' (Hodder 1999: 124) expands upon the former to attempt an understanding of an implied symbolic function. While contemporary drawings or sketches of islet use in Scotland are non-existent, the Bartlett maps of Ireland made sometime between 1600 and 1603 provide empirical depictions of crannogs under siege, while another Bartlett image can be interpreted to represent the determination of native Irish to repel invaders. While this post-medieval analogy appears far-removed from a prehistoric context, it serves as a unique example of a contemporary illustration which clearly conveys changing symbolism and meaning which appears throughout the trajectory of islet use.

One need not look more than three or four centuries into the past to see island dwellings as 'living and breathing' sites, a relatively recent event on an archaeological scale. The entire suite of island dwellings were not only homes, farmsteads, workshops, council meeting areas or defended 'places of strength', but outright symbols of persistence and continuity that spoke for themselves in the same manner imparted by any monumental dwelling, whether it be a prehistoric broch such as Mousa in the Shetlands, or a Medieval site such as Stryker Castle in Argyll. Despite recent advancements in island dwelling studies regarding both their lengthy chronology and implications of power, more visible in the archaeological record from the Early Historic Period onwards, island dwellings remain understudied and therefore largely unincorporated in the current record in comparison to terrestrial sites such as Atlantic roundhouses, promontory forts, roundhouses, hillforts and hut circles. As a result, they can be overlooked when performing research - a point noted in more recent studies of settlement archaeology in prehistoric Scotland (Harding 2000:301; Poller 2005:140-143; Cavers

2006:17; Henderson 1998:231). Therefore it becomes increasingly clear that island dwellings were an intrinsic part of daily life for many inhabitants throughout Atlantic Scotland and Ireland.

The human element: Raising community awareness by employing local knowledge

The following section acts as an acknowledgement to the many individuals and community groups who selflessly provided information and logistical support in regard to their community heritage and archaeology. It also acts as a testimony to simply asking (and perhaps most importantly) listening to local knowledge and tradition when it presents itself. In return, I hoped to raise the profile and awareness of these enigmatic islet settlements amongst the local communities I visited in Scotland. The process also allowed a chance to examine the construction of local memory and tradition through folklore and stories passed down through the generations, not only for islet-based sites, but also nearby ruins and key inhabitants.

While many of the islet sites in question exist in RCAHMS records with approximate locations, or are conspicuous in the landscape due to their monumental architecture (fig. 39), finding the best route for access through often treacherous approaches atop bog and blanket peats was undoubtedly a matter of local knowledge. Community participation and assistance manifested itself both directly and indirectly throughout the three-year project. Initially, the GAMA Award provided the critical funding needed to overcome the initial inertia, and move from a desk-based analysis to much-needed field work. As I was based in Nottingham at the time, moving all the diving, survey and camping equipment first to Oban, then via ferry to the Western Isles, proved to be a laborious and particularly costly task for a research student.

First and foremost, through the Gatliff Trust, the Ravenspoint Centre, and the Islands Book Trust, a large proportion of travel and ferry expenses were covered in addition to accommodation for 30 days. Rather than simply offering financial support, the practical benefits of this arrangement extended much deeper. In contrast to typical funding situations, the GAMA Award provided an immediate level of support and encouragement via direct personal contact with members of the local communities in which I was to perform fieldwork. In particular, John Humphries, editor of the *Scottish Islands Explorer*, a bi-monthly publication which focusses upon heritage, culture and environment on Scotland's islands, gave me enthusiastic assistance and support, while John Randall local resident and director of the Ravenspoint Centre in Kershader, south of Stornoway on Lewis, introduced me to the Angus MacLeod Archives and shared his knowledge of local lochs. From an ethnographic perspective, the archives are a particularly



Figure 39. A diver stands on the impressive submerged causeway connecting Dun Ban, Grimsay to the shore (photo:author)

informative source of local Hebridean history, knowledge and traditions which were painstakingly gathered throughout his life. These archives contained a number of references to islet use, particularly as crofts and sites on which to keep lambs and young livestock safe. Though by the time of Angus Macleod's writings living on an islet was no longer in vogue, they remained active centres in local memory and traditions.

One of the first community contacts was with George MacDonald, the factor of North Uist Estates. A

conversation with Mr. MacDonald, a keen walker and avocational archaeologist with an intimate knowledge of the area, indicated the presence of geometrically-incised pottery of probable Neolithic origin around the margins of the loch which have not yet been recorded. In particular, George directed me towards remote, watery areas of North Uist which were only accessible by a lengthy walk-in of an hour or more. Given the complex and maze-like topography of watery North Uist, any help in reducing the search area was exceedingly beneficial. The public land use laws in Scotland are ideal for being able to access numerous locations across a wide rural area, and to this end, no instances of being denied access were encountered. During the course of logistical matters, such as finding air fills for dive cylinders, I was directed to Clachan Stores on North Uist, where keen local diver Leigh provided both information on potential undocumented island dwellings and practical assistance with equipment matters.

Chance contacts in the field also led to some rather interesting discussions on local folklore and islet use. One memorable chat was with a crofter on South Uist whom I met walking on a remote, windswept track. This individual, who wished to remain anonymous, provided an impromptu session of local folklore regarding a nearby islet-based shieling – a temporary refuge for crofters, fishermen or walkers typically made of rudimentary drystone construction. Tradition has it that the shieling was ‘occupied for one night during a storm, by a young girl who fled from an ‘auld hag’ who arrived also seeking shelter, who then tried to drain her blood while sleeping’. The terrified girl finally made it to a neighbouring croft where she collapsed but survived. After this colourful narrative on Hebridean vampirism, he effortlessly shifted to the possible means and motives behind stone islet construction: ‘In the Hebrides you have two things in abundance – stone and water. Prior to modern machinery, the easiest way to move stone on soft, boggy ground was with water, even when using horses or other livestock’. After this he went on to mention Archimedes’ principle, water displacement, and how it was common practise to pour water around large stones and boulders when prising them from the ground during field clearance or construction. Simply listening to local knowledge, however unexpected, provided additional insight into local lore and the construction of memory. In this unusual case, the insight was combined with a practical lesson on heavy moving which was of particular relevance to island building.

Happenstance in Loch Hope, Sutherland

Before travelling to the Western Isles, I was hoping to dive in several remote mainland lochs in Sutherland to prospect for sites. This particular search below centred upon two undocumented submerged crannogs in the aptly named Loch Hope (NC45SE2 & NC45NE22) some 25km from Cape Wrath in the far north-west of Sutherland. Here, tradition states that two submerged stone crannogs were believed to exist, though unseen by archaeologists or RCAHMS monument inspectors. As Loch Hope is a substantial Highland loch some 9.7km long, and Ordnance Survey locations for one crannog were unknown, while the other was only vaguely located within a 2,000m² area, the chances of finding anything in this dark loch by a single diver was incredibly remote at best. Therefore a reluctant decision was made to abort the dive and save the remaining air cylinders for the known sites in Hebridean lochs. While packing kit away into the vehicle, once again a local crofter passed by with his flock and a conversation was quickly struck up. Within minutes, the crofter pointed out the exact location some 120m offshore and north of our position. He recalled that as a young boy, he was able to swim to the crannog, which became temporarily exposed, during a particularly severe drought, but that it had not been exposed since. Naturally, due to this stroke of luck I was able to then relocate the site after a lengthy surface swim from the shore. The crannog’s location was aligned with the margins of a much-later drystone field boundary which contained the only areas of good grazing and level ground in the vicinity – a strikingly similar situation to Morrison’s observations that crannog locations in Loch Awe were primarily adjacent to arable land (1985: 65).

The crannog mound itself is 30m in diameter, completely artificial, comprising relatively small sub-angular stones under approximately 40cm across. No causeway was visible, and none appears to have been used as the loch bed is composed of fine yellow sand and is completely smooth and void of stones. The mound itself is well delineated and neatly arranged, without scattered stone randomly distributed around the site. No trace of any discernible structure atop the mound was noted, which suggests the site is more akin to mainland crannogs further south than any Hebridean counterparts. The small nature of the stones which comprise the mound further suggest that it could not support the weight of drystone architecture, regardless of robustness. No timber piles were noted, although any timber protruding from the mound would have been conspicuous unless erosion has hidden them within the mound - a similar situation to Oakbank, initially visible as a sterile capping of stone overlying timbers (Dixon 2004). The top portion of the mound was 1.5m below the loch level at the time of visit and there were no indications that this was an unusually high loch level. Therefore, either considerable subsidence or loch level fluctuation has occurred since the crannog was constructed and subsequently abandoned. It appears the loch level can easily be altered at its steep northern outflow which leads directly into the sea. A partially breached dam, or equally plausible, a relict crossing, is visible in aerial photos which closely follows the modern roadway. As the loch itself and the southern inlet extend inland from the sea for some 17km, undoubtedly this crossing would have been a major nodal point in the landscape for many centuries. Therefore the crannog would pre-date the construction of the old crossing, and may well indicate prehistoric origins.

In regards to the second crannog in Loch Hope, the crofter I spoke with was unaware of it. Based upon the location of the known site next to good areas for both grazing and settlement, it would be logical to look for the second crannog in a similar setting, of which only two others exist along the loch, greatly reducing the search area. A return trip is planned to survey the known crannog in 2017.

In total, 30 suspected or confirmed island dwellings were investigated underwater using a drysuit due to the frigid water temperatures with either SCUBA or simply mask and snorkel, while an additional 19 were subject to a walkover inspection or survey with total station. The primary fieldwork took place over two summers in 2009 and 2010 (Lenfert 2012: 265) while follow-up trips were made in March 2011 and June 2012.

The research and fieldwork culminated in a public speaking event and book release by the Islands Book Trust at *Comann Eachdraidh Uibhist a Tuath* (the North Uist Historical Society) in Lochmaddy, North Uist in March of 2011, and later at the Gatliff Trust AGM. This was an ideal opportunity to share information about the sites I visited, as many of the local audience were broadly aware of the presence of island dwellings, but were not familiar with their chronology, use, artefacts or construction and prolific reoccupation. Local historians and avocational archaeologists in attendance also shared useful insights into this fascinating tradition of living on lochs, while additional local finds of artefact along the margins of lochs and coastline were discussed. It is also hoped that in the near future, the largely intact pottery recovered during fieldwork from island dwellings, now held in the National Museum of Scotland, can be put on permanent display at *Taigh Chearsabhaigh* Museum & Arts Centre in Lochmaddy. A project website <http://crannogs.weebly.com/> with an interactive map download also details the archaeology and history behind Scottish crannogs and island dwellings, in addition to key sites and pottery finds. Finally, a comprehensive bibliography is also included on the website.

For the future

Although the initial thrust of the above research did not intend to focus on a community-based perspective, it quickly became clear during fieldwork that engaging the local community allowed for a reciprocal exchange of ideas and information to the benefit of all.

In particular, the high probability of finding additional Neolithic crannogs will form the basis of future research on North Uist and Lewis. Overall, sharing local community information and insights in the occupied islets of the Highlands and Islands provided a human element which was lacking in most existing research and related publications on crannogs and island dwellings. In addition, I felt being able to share information and findings with the local community was as important as the academic results, especially on a project of this nature set within numerous small, remote settlements. I also discovered that when dealing with unverified sites, especially submerged ones, local knowledge was often the difference between locating a site and going away empty-handed. Most of the community members I spoke with have spent the majority of their lives in and around the lochs in questions, as did their ancestors. This kind of intimate knowledge is a resource that cannot be excluded, and recognition is due to everyone who assisted in what may have understandably appeared to them as curiously odd and unusual forays into lochs which had never been dived and inspected underwater before. In the next round of field-work, community involvement is considered essential in the research design from the outset, both for the continued success of the project, and as a way of promoting pride and knowledge in a local heritage that is unequalled in many respects. It is hoped to share this information with all ages, from schools to local historical societies, in hopes of building a long-lasting and mutually beneficial rapport.

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Deriving Archaeological Information from Potentially-Polluting Wrecks

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The assertion that little could be gained from the archaeological study of the wrecks of the 20th century was prevalent until comparatively recently. The argument against such work was twofold. Firstly that surviving historical documentation relating to these craft was so extensive as to render archaeological investigation of limited value (Muckelroy 1978). Secondly, the limited resources available for maritime archaeology in general meant that these were better channelled to earlier periods

The first argument has now been countered. A number of studies have shown that the archaeological study of recent wrecks yields results that contradicts the historical record and challenges established beliefs. There is a growing, and important tendency, to examine the wrecks of particular battles or, much more challengingly, distinct campaigns. Such work has the potential to provide a far greater degree of understanding of the conduct of the maritime war than the isolated study of individual wrecks. McCartney's study of a number of wrecks from the Battle of Jutland, for example, has provided valuable new insights on how the Royal Navy came to lose so many of its larger warships during the engagement (McCartney 2012: 60; McCartney 2014: 171).

The process can be viewed as part of the wider acceptance that the archaeological study of 20th century remains is a legitimate discipline. This is most apparent in the field of terrestrial archaeology where work, particularly in relation to the battlefields and training areas of World War I, has revealed much new information (see for example Robertshaw and Kenyon 2008: 17 and Saunders 2007: 21).

This process is likely to continue apace given the interest following the anniversary of the start of World War I and is now manifesting itself with regards the underwater cultural heritage of the conflict, see for example Duncan (2011) and Wessex Archaeology (2006). Numerous plans are in place to better understand the maritime archaeological legacy of the war (see for example Maritime Archaeology Trust 2014) while a number of important international gatherings, such as UNESCO's 2014 Scientific Conference and Commemorative Event on the Occasion of the Centenary of World War I, seek to raise awareness of this rich, and largely untapped, resource for understanding the war.

The second point is more difficult to counter. The resources for carrying out maritime archaeology are scarce and the arguments for devoting those that are available to the wrecks of older, more poorly documented periods are undoubtedly powerful. If we acknowledge that this, perhaps rightly, is the case are the resources that are available for studying 20th century wrecks being properly channelled? Are we always making most effective use of them to ask the 'right' questions of the more recent archaeological record and what are these 'right' questions?

Neyland has noted that much of the work on the wrecks of the World Wars has consisted of putting 'pins on the map' (2010: 711). By this he means that work has often concentrated on finding certain

wrecks, usually those of large famous vessels that were lost in equally famous encounters. There are, undoubtedly, many positive outcomes of such work. Expeditions to the *Bismarck*, the *Hood* and other high profile wrecks excite public imagination, encourage interest and participation in maritime archaeology and drive technological developments (Ballard 1991, Mearns and White 2001). What is questionable, however, is whether the expenditure of scarce resources on famous military wrecks is always justified. Does it tell us much beyond the stories of a select few vessels at the expense of a greater number of less documented vessels that, collectively, played a far greater role in the World Wars?

The problem is now beginning to be recognised with at least some attention being given to the wrecks of the numerous merchant and auxiliary vessels which played a vital role and which were lost during both conflicts (see for example NOAA 2011). Such work is to be encouraged but is always likely to suffer because of the temptations to investigate military wrecks. Furthermore beyond examining individual wrecks can much be usefully said about the part played by such vessels in the World Wars given that the sheer number of their wrecks dwarfs the resources available to study them? The contribution of these vessels to the outcome of both World Wars stems from their collective rather than individual importance. This is in contrast to large warships where the loss of a handful of vessels of a certain type could determine not only the course of a battle but that of the wider conflict (as the loss of aircraft carriers to the Japanese at Midway attests). The loss of one, two or even a dozen merchant vessels, however, often had little impact. It was only when such vessels were sunk in their hundreds over vast geographical areas that their critical importance and their ability to determine the fate of nations became apparent. How can archaeology illuminate the study of these conflicts given the vast areas and the numbers of wrecks involved? One possible solution is to do with the fact that the wrecks of the 20th century are not solely the concern of historians and archaeologists.

Environmental concerns

It is probably fair to say that not a great deal of thought was given by contemporaries to the environmental impacts of the World Wars. The bombings of Coventry and Dresden for example, besides the horrendous loss of life, were noted for the destruction of old and historic centres but rarely does this concern extend to what the war might be doing to the natural environment. The maritime wars, particularly that fought in World War II, are a case in point. Many first-hand accounts of ship losses mention the volumes of oil released into the ocean but nowhere, as far as these authors are aware, have attempts been made to quantify this or to examine the effect it might have been having. Times change sensibilities however and there is now a growing awareness of the potential environmental hazards posed by wrecks, particularly where these are suspected to still harbour oil or ammunition. This is not simply alarmist as significant leaks from a number of vessels attest to the growing risks posed by increasingly fragile wrecks. Such concerns have, in several countries, attracted new initiatives and new resources to address the problem. It is a by-product of such concerns that presents perhaps the best opportunity for studying the largely neglected categories of wrecks noted above as it is these that often pose the greatest environmental risk. The challenge is to kill two birds with one stone, to make the resources allocated to the environmental remediation of such wrecks also address the archaeological concerns.

While the hazards posed by certain wrecks have drawn attention for considerable amounts of time, for example that of the SS *Richard Montgomery* in the Thames Estuary, (Department for Transport 2014) it is only in the last two decades that these concerns have become more widespread as a result of several high profile incidents. Certain examples stand out, in the UK the wreck of the battleship HMS *Royal Oak* (Scapa Flow Historic Wreck Site 2014) began leaking significant quantities of oil in the mid-1990's, while the wrecks of the SS *Jacob Luckenbach* (NOAA 2014) and the USS *Mississinewa* (Naval Sea Systems Command 2004) have caused similar problems for the US authorities. Elsewhere, the Norwegian government has

been attempting to deal with the wreck of the mercury carrying submarine *U-864* for over ten years (Kystverket 2014). All of these high profile cases required intervention to deal with the problems which, in several cases, is ongoing. Furthermore they have drawn attention to the fact that as the wrecks of the 20th century decay there is an increasing likelihood of similar incidents occurring. Much of the work therefore has been to understand the extent of the inventory and to identify high risk wrecks ahead of problems occurring.

Assuming a wreck is carrying quantities of oil and ammunition that may lead to environmental problems the factors determining the rate at which it decays and the point at which it may release these materials is determined by the following:

1. Type of wreck – the type of vessel (warship or merchantman) and the material from which it was constructed will play a significant part in the decay process.
2. Nature of the sinking event – the condition of a wreck at the present day will largely be determined by the condition in which it sank. A ship sinking as a result of a fire or a catastrophic explosion may yield a much more fragile wreck than a vessel that sank relatively intact. The speed at which a vessel sank also plays a part with the potential for hydrostatic forces to severely damage a rapidly sinking ship compared to a slower sinking one.
3. Natural factors – The rate of decay will be influenced by the time the wreck has been submerged, the depth at which it lies, the chemical make-up and temperature of the surrounding water and the effect of currents etc.
4. Anthropogenic factors – The rate of decay will be influenced by such activities as trawling and legal/illegal salvage.

What can one expect from the surveys that seek to address the environmental problems associated with wrecks and what data are they likely to yield? Firstly, it is worth noting that a key aim of such work is to determine the material condition of a wreck as it is this that is critical in deciding whether potential pollutants are still present and if they are likely to pose problems. The techniques to achieve this vary and are determined by the conditions, such as depth and visibility, prevailing at individual sites. Typical techniques include diver, sidescan, Remote Operated Vehicle (ROV) and multibeam survey amongst others. As a result of the cost and time considerations the primary aim must always be to address the environmental concerns that drive the work. Nonetheless such surveys yield information with multiple applications beyond the environmental confines of the surveys. The value of such data for the archaeological assessment of individual wrecks is further enhanced if consideration is given to this possibility at the planning stage of a survey.

Another point to consider is that while many countries have heritage agencies that play an important role in managing and protecting wreck sites the remit for such work usually stops at the boundary of their territorial waters, twelve nautical miles out from the coastline. Beyond this, such agencies often play only an advisory role. Conversely, a country's responsibility for the potential environmental risks associated with its wrecks is global (though, admittedly, this is not always exercised). High risk wrecks need to be targeted wherever they lie in the world and this has an important side-effect. It means that large numbers of wrecks falling outside of territorial waters and which would not otherwise be examined may become liable to investigation at state expense. Once again, the driver is environmental concerns but the work can yield important archaeological results. We shall come onto how such work is carried out in the UK but it is worth examining what is going on elsewhere.

In the US the National Oceanic and Atmospheric Administration (NOAA) has completed a programme of research into potentially hazardous wrecks. Based on extensive archival investigations this work has many potential applications besides the environmental issues it seeks to address (NOAA, 2013).

Not least of these is that it forms a systematic body of research into a large number of wrecks which might otherwise have remained largely unnoticed. In time, as certain of these wrecks are subjected to on-site survey, the desk based research will be complemented by the analysis of their material remains. The possibilities for utilising this information for other purposes are obvious. The work should yield important archaeological insights that would not otherwise have been attained without the environmental imperatives that drive the work.

The Norwegian government has undertaken perhaps the most single minded campaign of legacy wreck remediation. In the last few years oil has been removed from a significant number of wrecks lying within their territorial waters, many of which date from World War II (Kystverket 2011). In this case environmental concerns have been the overwhelming focus of the operations resulting in a rapid rate of clean-up. Nonetheless, the background research and wreck survey work demanded by these operations forms a valuable pool of as yet untapped archaeological information. The potential for this material to impact the study of, for example, the maritime aspects of the Norwegian Campaign of 1940 are significant.

Elsewhere in the world the degree of responsibility assumed by individual governments for legacy wrecks is variable. It is likely, however, that the steady decay of these vessels, and in particular those carrying oil, will demand more work on the problem.

The UK approach

The UK government has one of the largest inventories of state owned wrecks in the world reflecting both its position as an island nation with a strong maritime history and its role in the World Wars. The UK also has a policy of non-abandonment; that is to say that the UK government maintains its claim of ownership of a vessel even after its loss regardless of where in the world it sank. This is especially the case for military vessels where the loss of the vessel also resulted in the loss of a significant number of military personnel. Within UK territorial waters these military losses can be protected by legislation but in international waters or the territorial waters of other nations, little more can be done other than stating the principle.

Within the UK government, there is a divide splitting the wrecks of the circa 4500 merchant ships the government became the majority owner in via the war reinsurance schemes (operated during both World Wars and which are the responsibility of the Department for Transport) and the more than 54000 military vessels that are the responsibility of the Ministry of Defence (MOD).

Within the wrecks owned by the MOD there is a further split. The purely heritage concerns associated with these wrecks are managed by Navy Command Headquarters while the environmental and safety concerns peculiar to post-1870 wrecks are managed by the Salvage and Marine Operations (SALMO) division of Defence Equipment and Support (DE&S). The authors both work within SALMO and their experience is with UK owned military wrecks.

SALMO have been responsible for the environmental and safety aspects of the full inventory of post-1870 MOD wrecks since 2008. Pre-dating this, however, SALMO carried out periodic operations to remove oil from the wreck of HMS *Royal Oak* which, as noted above, was occasioned by a series of leaks from the vessel into the environmentally sensitive waters of Scapa Flow in the Orkneys. The efforts to remove the oil have continued at intervals since the mid-1990's with each campaign tailored to achieve this aim with as little disturbance to the wreck as possible.

The work on HMS *Royal Oak* and the rising concern over environmental protection led to questions about the management of the wider inventory. Following a period of review and study, it was

decided that rather than waiting to react to a wreck leaking, which can be difficult and extremely costly to deal with, the MOD would move to a proactive policy of risk management. The current situation is that all MOD owned wrecks are subject to the same policy of study, investigation and risk management.

Before any meaningful progress could be made, the scale and nature of the problem first had to be understood, and the majority of the work to date has been to catalogue and gain a basic understanding of the nature of the problem. The inventory is significant and currently amounts to approximately 54000 vessels lost between 1870 and the present day. The date of 1870 is somewhat arbitrary but forms a convenient start point with the assumption that vessels post-dating this year may well be of iron and subsequently steel construction (and so are likely to make for robust, durable wrecks more capable of harbouring hazardous materials than their wooden predecessors). In addition, changes in means of propulsion from sail to coal and then oil from the early 20th century results in wrecks that become, potentially, more environmentally problematic as the period progresses. Similarly, the types of ammunition used in the weapons carried on ships changes rapidly from this date onwards with essentially benign solid shot, powder weapons giving way to types of ammunition which may still pose hazards at the present day.

The range of vessels is significant, encompassing the very largest aircraft carriers and battleships down to the smallest harbour craft. It includes a significant number of merchant vessels requisitioned for military service in both world wars, such as the liners that became troopships and Armed Merchant Cruisers (AMC) and the numerous oil tankers that joined the Royal Fleet Auxiliary (RFA). It includes the U-Boats that were surrendered and subsequently sunk at the end of both wars and such oddities as one or two of the German High Seas Fleet that were scuttled at Scapa Flow in 1919 and which were not, as most were, either salvaged or latterly sold to Orkney Island Council. As will be obvious the vast majority of wrecks come from World War I and II but there are a significant number falling outside these conflicts that were either lost to accidents, deliberately scuttled or, as in the case of the wrecks from the Falklands War, lost in the only other conflict to witness significant losses to the Royal Navy during the period. The list continues to grow with the exact status of certain wrecks, and hence MOD responsibility for them, being something of a grey area.

The geographic spread of these wrecks is also considerable. Whilst the majority are clustered around the war time shipping routes in to and out of the UK there are a large number distributed globally with significant concentrations in the Mediterranean and Far Eastern waters.

Work on the 54000 wrecks comprises three stages. The wrecks are all catalogued on a Geographic Information System (GIS) which allows a basic assessment of location, water depth, proximity to environmentally sensitive features and a number of other factors. This system is used to give a very coarse risk assessment of the wrecks and allows wrecks to be selected for the first stage of the process; a Historical Desk Based Assessment (H-DBA). This comprises an appraisal of the archival material relating to each ship to determine what it was, what it was carrying at the time of its loss, the circumstances of its sinking and the subsequent history of the wreck. Over time all wrecks will be subject to a H-DBA but given the scale of the task, this will take several years. While its main function is to allow for an informed decision as to whether a wreck needs to be surveyed it is analogous to an archaeological desk based assessment. By drawing upon near identical resources to build up a picture of what is known of a wreck at the present day it forms an important historical and archaeological resource in its own right which, eventually, will build into a comprehensive study of many of the 5000 wrecks.

The second stage of the work comprises an on-site survey of a wreck and is reserved for those vessels which the preceding stage indicates may pose potential environmental problems. It is at this stage that

the varied suite of survey resources noted above are deployed to build up a picture of each site that has potentially multiple applications.

Only a small number of wrecks deemed to pose particular risks will be subject to the third stage of the process. This involves removing oil from the wreck and possibly, though this has not yet been required, the remaining ammunition. This stage is likely to yield less directly relevant archaeological information though there is the potential that some of the wreck modelling work required when planning an intervention may be of value.

What is significant from the point of view of illuminating the study of the less ‘attractive’ wrecks of the World Wars is that it is not the purpose built warships of the two conflicts that necessarily attract the greatest environmental concerns. In the case of MOD owned wrecks it is the tankers of the Royal Fleet Auxiliary (RFA), either purpose built for the Fleet or requisitioned during hostilities, that are the focus of work. As a result the vital part played by the RFA in both World Wars has the potential to be better understood through the study of the wrecks of its fleet, an important point given that the wrecks of this service have attracted even less attention than those of the Merchant Navy.

Case study – RFA *Darkdale*

In the case of the tanker RFA *Darkdale*, SALMO were first alerted to the environmental problems posed by the wreck in 2010 (Salvage and Marine Operations 2013). The *Darkdale* had been sunk by a U-boat in 1941 while stationed at St Helena as a refuelling tanker for Royal Navy warships engaged in convoy escort work and anti-surface raider patrols in the South Atlantic. The wreck, lying in shallow waters just offshore from the main settlement on the island, had been disturbed by a storm in the spring of 2010 and had leaked a considerable quantity of oil. The potential impact to the island’s fishing and tourism industries required intervention and in 2012 SALMO deployed to the island to conduct a survey of the wreck (Fig. 40).

Prior to this, however, a considerable amount of work was undertaken to determine the history of the ship, the cargo it was carrying and the circumstances in which it was lost. This desk based assessment now provides a detailed historical analysis of a wreck which, in other circumstances, would probably have attracted little attention. Besides doing much to highlight the role played by the island of St Helena in World War II, it shed light on the earliest forays of German U-boats into southern Atlantic waters and the crucial role played by the RFA in supporting Royal Navy operations.

The eventual survey of the well preserved wreck was geared to determine condition, the likely quantities of oil remaining onboard and the



Figure 40. Sidescan of the wreck of RFA *Darkdale* –the ship is broken in two with the bow section at right inverted and the after end at left lying on its port side. Such surveys are routinely undertaken during environmental assessments of wrecks. © Crown copyright 2014



Figure 41. The inverted bow of RFA *Darkdale* l- excellent visibility allowed for a comprehensive video and stills record to be compiled. The results informed both the environmental and archaeological aspects of the final report. © Crown copyright 2014

potential environmental impacts of further leaks (Fig. 41). However, the techniques used, including side-scan survey, ROV survey and hull thickness measurements facilitated an archaeological appraisal of the wreck which now forms a significant annex of the final report (Fig. 39). This work was further enhanced by a subsequent multibeam survey of the site and by a detailed naval architect study of the ship. While the particular hazards posed by the *Darkdale* determined this comprehensive approach SALMO intend to use this methodology for future work on wrecks with a number of others belonging to the RFA prioritised for investigation.

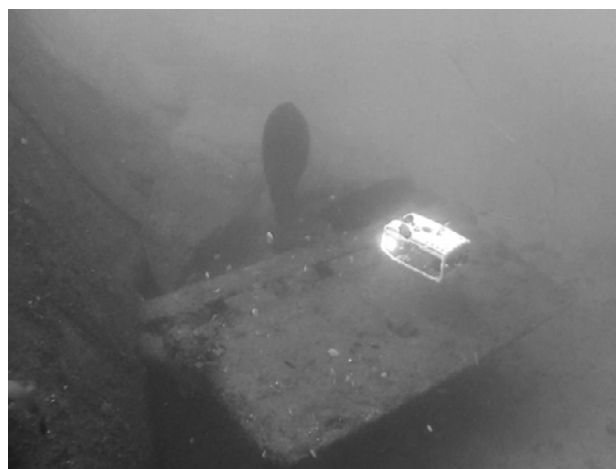


Figure 42. The primary survey ROV over the rudder and propeller of RFA *Darkdale*. © Crown copyright 2014

20th century wrecks: worthy of study?

The view that little can be gained by study of 20th century wrecks did not hold in the case of the *Darkdale* as much was discovered about her role and the impact of this loss on the wider war effort. The study was heavily biased toward the environmental impacts but in order to understand this, the construction, trading pattern and even the chemical composition of the fuel she was carrying added to the understanding. The gaps in the historical record became very apparent during this study and whilst it is assumed that these gaps exist for earlier wrecks, the extent of the missing information for a relatively recent wreck was surprising.

Steel and iron wrecks, by virtue of the materials from which they are constructed, will not survive in salt water indefinitely; corrosion is an inexorable process. The gaps in the historic record combined with the loss of these wreck sites to corrosion mean that study is essential if we are to understand these ships before they are lost.

Other avenues of investigation

It should be noted that the work being undertaken on potentially polluting wrecks both in the UK and elsewhere is not restricted to examining them sequentially in order of risk. For example, studies are underway to develop cost-effective methodologies to measure the decay rates of the wider inventory. From an environmental perspective such work is critical because it allows a more informed assessment of when a wreck may release any pollutants contained within it. It is also of value to the archaeological community where rates of wreck decay may be of importance for determining effective heritage management strategies. A good deal of additional work is required to understand the variations in decay rates between, and within, individual wrecks. Nonetheless, important work has been undertaken. In the US, for example, on the development of the Weins Number methodology for predicting long term marine corrosion in variable environmental seawater conditions, notably in relation to the wreck of the USS *Arizona* sunk at Pearl Harbour in 1941 (Johnson *et al* 2011: 125005-1) and the tanker S.S. *Montebello*, also sunk in 1941 (Medlin *et al* 2014: 74).

Limitations

It is worth noting that the use of environmentally driven studies for archaeological purposes has certain drawbacks. The work is at an early stage so that the data generated will be of future rather

than immediate value as the number of wrecks studied steadily increases. As noted the primary aim of such work must always be to address environmental concerns. Thus while the H-DBA's discussed above provide information of immediate value for the archaeological assessment of wrecks it will largely fall to the archaeological community to take the data produced during the environmental surveys conducted by various countries and utilise it for their purposes. Similarly, while the work will produce much new information on previously largely unstudied wrecks it will not be without its own biases. For example, larger tankers known to be carrying oil will be selectively examined over smaller vessels and those believed to have been in ballast at the time of their loss. Vessels carrying non-hazardous cargoes will receive little attention while on-site studies will focus on more intact wrecks in shallower, more sensitive waters.

The possibility of a temporal bias is less clear cut. Theoretically the greater numbers of larger tankers carrying oil during the World War II should receive greater attention.

However, this has to be balanced against the fact that the less numerous, and usually smaller, tankers of World War I have been underwater for longer and are likely to merit more urgent investigation. None of these issues is insurmountable but will require consideration by those using such data.

Archiving the work and making it accessible

A particular challenge facing the producers of such work is how best to make the results available to others. The MOD, for example, has no suitable public portal through which completed studies can be accessed and so the obvious solution is to store them in archaeological repositories such as that available through the Archaeological Data Service (ADS). Amongst all producers it is clear that this aspect of the work needs further consideration with thought being given not only to where the completed reports are stored but also where the data on which they are based are kept.

Conclusion

The steady decay of wrecks by natural means or otherwise is likely to demand intervention on the part of governments which own significant inventories but which have not, as yet, taken steps to address the issue. The wreck remediation efforts of the US, UK and Norway have been discussed in this paper but these countries are not alone in owing large numbers of wrecks. As more countries adopt a proactive stance to dealing with the problems it is to be hoped that they will give consideration to both the environmental and archaeological aspects of their wrecks and tailor their strategies accordingly.

The work offers considerable potential for furthering the study of wrecks which would likely receive little attention were it not for the harmful materials remaining aboard them. Crucially, the problems posed by these wrecks means that considerable numbers of them will need to be studied over the coming years. The resources made available to achieve this will in time provide considerable insights into these wrecks and the part they played in the conflicts that shaped the 20th century. The potential for this will only be fully realised, however, if archaeologists choose to make use of the results as they steadily accumulate.

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Protected Wrecks – Community Archaeology in Action

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The management and protection of England's historically important wreck sites, within the framework of the Protection of Wrecks Act 1973, permits anyone to become the custodian of these valuable heritage assets, subject to the approval of the Secretary of State, at the Department of Culture, Media and Sport. The process of designation and management relies upon a multi-agency approach that involves Historic England, the Marine Management Organisation, the Local Planning Authority, the Owner, and the applicant for the licence to access the site. The licensing system forms an integral part of the management of these assets and the licensees are drawn from across a broad spectrum of professional archaeologists and enthusiastic volunteers.

The projects undertaken by the licensees are a classic example of Community archaeology in action. This paper will consider two case studies: HMS Invincible, an Eighteenth Century warship, wrecked in 1758 and found 1979. This project is under the direction of a professional archaeologist, staffed by professionals and volunteers. The second case study, the London, sank in the River Thames, following an explosion in 1665. The London licensee is unpaid, working with a nominated practitioner, volunteers and others with Heritage and Conservation experience. The two case studies will illustrate how these licensees have tackled the problems of research, investigation, publication, training and methods of engaging the wider audience to increase public awareness of this underwater cultural heritage.

The 37,500 identified wrecks and recorded casualties scattered around this island prove testimony to our Nation's maritime history and their remains represent a tangible link to the past. Many of these sites are visited by members of the diving community and others for a variety of reasons but it is only through research, the systematic recording of these sites and disseminating the results of this work into the public arena that our understanding of our maritime history can be enhanced.

Despite this huge data set being available for investigation only a small percentage of these wreck sites have thus far, been deemed important enough to be provided with a degree of protection from interference. There are currently forty-nine wrecks that have been.

For example, *HMS Association* (21st March 2014), wrecked in October 1707 on the Gilstone Ledges, Isles of Scilly en route to Portsmouth from the Mediterranean. This vessel foundered with two others and 2000 souls were lost. It was a tragedy unparalleled in British Naval history and brought about the *Longitude Act 1714* that helped make seafaring safer. There are other options available to provide protection to a site, such as *Listing* and *Scheduling* but they will not be the focus of this paper.

These protected wrecks and the sites themselves should be considered research projects in their own right. The custodians of these sites have, in many cases, spent years researching and investigating their wreck and this paper will look briefly at how the sites are selected, how to gain access to these sites and using two case studies, *HMS Invincible* and *London*, illustrate how paid and unpaid

practitioners can conduct effective research projects that fill the gaps of our knowledge in our maritime past.

How a Designated Wreck Site is selected.

A Designated site is defined as *'being likely to contain remains of a vessel, or its contents, which are of historic, artistic or archaeological importance.'* (English Heritage, 2012). There are a number of factors that assist with measuring this significance of such a site and provide the evidence to support candidacy for protection under the 1973 Act.

Period: The variety of vessels that have been used through history provide a narrative

to the evolution of construction methods and materials, commerce and industry. The vessels that best reflect these developments are likely to be Nationally important.

Rarity: Surviving examples of vessels built prior to 1840 are rare and consequently the sites containing these remains clearly warrant protection. English Heritage has undertaken a strategic programme during which eighty-eight sites have been identified that might benefit from further investigation to assess their potential to further our knowledge of pre-1840 vessels and be added to the list of designated sites.

Documentation: Primary sources relating to a particular vessel or employment assist hugely with our understanding seafaring. Secondary sources are also of use in assessing significance if they can corroborate historical claims.

Group value: The site of a battle at sea, maritime catastrophe or significant event such as the Spanish Armada, Goodwin Sands or Scapa Flow, can increase importance through group association.

Survival and condition: What has survived from a vessel and the condition of those remains, in terms of structure and/or contents, must be considered when trying to establish National importance.

Potential: What role, if any, did the candidate vessel play in England's maritime history? In addition to the six factors above there are two more areas that need to be considered when considering a site for designation:

Fragility & vulnerability: Environmental threats, uncontrolled salvage and removal of material can all be factors in establishing vulnerability and materials used in construction can also produce various degrees of fragility for different vessels and place the heritage asset at higher risk.

Diversity: The surviving remains of vessels can be a measure of importance by physically showing the skill of the designer, the art of the individuals that put the craft together, the changes in technology and human innovation. The various forms a particular type of craft or the survival of constituent parts of those vessels should be taken into account when considering importance. Some of these survivors may chart



Figure 43. Known Shipwrecks www.heritagegateway.org.uk designated for such protection under the Protection of Wrecks Act 1973;

the evolution of a particular type of craft or be representative of a particular region or culture; ideally our protected sites should display this variety. It may be that a vessel is considered to be a classic example of a particular type or historic period or it may have an association with a particular historic event.

If a site is considered to be a candidate for designation then a consultation process is undertaken. The parties involved include Department for Culture, Media and Sport, who are the final arbiters, the owner of the wreck, if one exists; the Ministry of Defence is a prime example, where the wreck is an historic warship, the Marine Management Organisation (MMO), who administer the Marine and Coastal Access Act 2009 and manage activities on the seabed through a licensing system, the appropriate local authority and Inshore Fisheries and Conservation Authorities (IFCAs) and English Heritage. Where the recommendation for designation is accepted then a *Statutory Instrument* is laid before Parliament and once enacted confers protection to the site.

Is designation a barrier to accessing a site?

The *National Heritage Act 2002* gave Historic England new responsibilities regarding the preservation of our underwater cultural heritage and this included the administration of the *Protection of Wrecks Act 1973*; importantly these new responsibilities included a duty to promote ‘*the public’s enjoyment of, and advancing their knowledge of ancient monuments in, on or under the seabed.*’ (English Heritage, 2010)

How then are these responsibilities reconciled? On the one hand a site is considered so important to the Nation’s maritime history that it warrants special protection and on the other the public are to be encouraged to visit, enjoy and learn more about these heritage assets. It would be helpful at this stage to look first at what the Act conferring protection actually says and secondly at the system that is in place to facilitate access to the asset.

Protection of Wrecks Act 1973 s.1(3)

(3) Subject to section 3(3) below, a person commits an offence if, in a restricted area, he does any of the following things otherwise than under the authority of a license granted by the Secretary of State-

(a) he tampers with, damages or removes any part of a vessel lying wrecked on or in the seabed, or any object formerly contained in such a vessel; or

(b) he carries out diving or salvage operations directed to the exploration of any wreck or to removing objects from it or from the seabed, or uses equipment constructed or adapted for any purpose of diving or salvage operations; or

(c) he deposits, so as to fall and lie abandoned on the seabed, anything which, if it were to fall on the site of a wreck (whether it so falls or not), would wholly or partly obliterate the site or obstruct access to it, or damage any part of the wreck; and also commits an offence if he causes or permits any of those things to be done by others in a restricted area, otherwise than under the authority of such a license. (www.legislation.gov.uk)

The Act provides statutory protection for our nationally important assets but it also created a framework in which the sites may be managed and access to the sites actively encouraged. This management system is administered by English Heritage on behalf of the Secretary of State and involves the issuing of licenses to individuals, by DCMS, commensurate with the level of interference proposed:

Visit – Access is basically permitted on ‘a look but do not touch’ approach. No active investigation of the site may be undertaken, visual monitoring or administering a dive trail are the limits to what may

be done under this licence. The latter is an effective method of bringing underwater cultural heritage to the public's attention and research conducted by the Nautical Archaeology Society has shown that the wider community can benefit economically from diver trails. There are currently five in operation, *HMS Colossus* (Isles of Scilly), *Coronation* (Plymouth) and *Norman's Bay* (Sussex), *HMS/m A1* (Solent) and *Iona II* (Lundy).

Survey – This type of license permits non-intrusive investigations of a site and may involve remote sensing or measured survey, drawing up of site plans, recording site topography or ecological survey.

The following categories of licenses reflect the higher level of interference that the site is expected to experience and consequently a greater degree of expertise and supervision is required. Any prospective licensee is expected to submit a project design outlining the nature of the intended activity and methodology. The project design would be written in line with Historic England Heritage guidelines, *Management of Research Projects in the Historic Environment* (English Heritage, 2009)

Surface recovery – Where it is the intention to remove archaeological material exposed on the seabed but with limited disturbance to any underlying archaeology or sediments.

Excavation - This licence covers the most intrusive activities and includes such activities as fixing objects into the seabed or structures lying on, in or under the seabed, to full archaeological investigation of the site.

The sheer scale of the data set that comprises the known wreck sites and recorded losses around our coast make it highly unlikely that they could all be systematically and scientifically investigated. Even the current designated sites would not experience the same level of attention if left solely to the efforts of those in the professional sector and our understanding of these sites would therefore be much reduced.

The role of the licensee is essential to the effective management of England's protected wreck sites.

Licensees

The system is open to anyone and possession of formal qualifications in Maritime Archaeology is not a prerequisite in obtaining a licence. There is a caveat however, that the individual must be competent to complete the tasks that they have proposed and this includes reporting and dealing properly with the archive.

There are currently fifty-three individuals who hold a licence that permit access to the forty-nine protected wreck sites in England. A licensee may hold a number of licenses that permit the holder to carry out different activities on each of the sites or different sites as applicable, depending on the type of licence issued. The licensees are drawn from a broad base; some are full-time professional archaeologists working within the sector, others have obtained formal qualifications in Maritime Archaeology, often to a high standard but are employed elsewhere, however the majority of our licensees are non-vocational or as they prefer to be called, unpaid. The list of licensees is made up of twenty individuals that can be classed as professional and thirty-three who are unpaid. The level of commitment from the unpaid volunteers was recognized in a Historic England review of the maritime archaeological resource in England and its management,

'The high level of non-vocational involvement should be regarded as an asset to the discipline, as there is demonstrably a greater requirement for survey and recording than can possibly be accomplished by professional archaeologists.' (Roberts & Trow, 2002:8).

It must be borne in mind that all licence holders, regardless of qualification, have volunteered to be custodians of these precious assets.

Historic England has in place an 'Affiliated Volunteer Scheme' to recognize the contribution made by our licensees. The system, based on a criteria of hours worked in research, planning, time on site and outreach, rewards the individuals with a number of benefits including free entry to sites in the National Collection and discounts on English Heritage products and books. These criteria are currently under review to better reflect the effort and nature of the work of its members.

By obtaining a licence to access a protected wreck site, the licensee enters into an agreement with Department for Culture, Media and Sport (DCMS) and the system administrator, English Heritage. The agreement is that the holder will abide by the terms and conditions of the licence, conduct any works in line with archaeological principles (including UNESCO 2001), maintain close contact with their nominated archaeologist (usually a professional practitioner advising the unpaid licensee and named by him on the licence application) and Historic England, the licensed activity will be conducted safely and by competent people and to produce a report on their work at the end of the licensing period; this runs from 1st December to 30th November and are available on the Historic England web site.

The range of activities conducted by the licensees continually adds to our understanding of the site and our knowledge of our maritime past, whether this is confined to the visual monitoring of the wreck, systematic recording of the structure or more detailed investigation involving excavation. Some examples of the type of projects currently being undertaken or planned include the visual monitoring of the recently designated site of an almost complete assemblage of a mid-to-late 19th century merchant sailing ship at *Thorness Bay, Isle of Wight*; the licensee is an enthusiastic recreational diver with a certificate in Foreshore and Underwater Archaeology from the Nautical Archaeology Society (NAS Pt.1); the measured survey of the inter-tidal wreck of the *Anne*, a 17th century English warship. The licensee comes from a business background but now works in the Heritage sector. Acting under the direction of the nominated archaeologist, this individual has undertaken diver training and entered into the NAS training programme to add to their skills-base and to work more effectively on site. The intention is to continue with the measured survey but also utilize innovative 3D survey techniques to produce a better model of the ship's surviving structures which, it is hoped will lead to a better understanding of the techniques employed in the construction of vessels of this period. The establishment of dive trails is an important element in exposing our country's maritime past to a much wider audience. Work is currently being undertaken by the licensees to improve the visitor experience on a number of the sites, not only for those entering the water, and by reaching out to others within the Heritage sector working in partnership to create museum exhibits that bring the story of the wreck to the attention of divers and non-divers alike. Historic England has commissioned research projects, within the framework of the National Heritage Protection Plan, looking at the effects climate change on terrestrial heritage assets; how climate change effects underwater cultural heritage is little understood. The effects of climate change on wooden shipwrecks underwater wooden structures and metal wrecks, specifically the effects in the change of the oceans pH levels, needs to be investigated and understood so that effective management strategies can be formulated. The diversity of the wreck sites, within the marine environment and visited on a regular basis by the licensees, would provide a perfect group setting from which valuable data could be obtained. The licensees and their teams are ideally placed to gather information from their sites to produce baseline data that would provide a starting point for this investigation. This site monitoring could effectively continue over a period of years thus providing excellent evidence with regard to changes over time.

The licensees and their teams are passionate about the work they undertake; they are often very protective of the site and actively participate in the policing of it to prevent unauthorized intrusions. This passion and the enthusiasm can sometimes cause a degree of frustration when an activity is proposed that cannot be supported. The system administrator must manage the situation sympathetically and it is often the case of reminding the individual of their responsibilities of upholding archaeological principles and best practice, whilst still providing support and encouragement.

The sites worked by the licensees and their teams are varied and often complex, and present their own specific problems and challenges. These problems can involve considerations relating to accessibility and visibility for example. Despite these hurdles a huge amount is known about each of these sites that would not have been discovered had it not been for the dedication of these individuals. Their aspiration is to discover more and consequently this leads to a desire to interfere more with the site.

Where an activity is likely to lead to disturbance of the archaeology at the site, removal of artefacts and/or archaeological excavation then the proposed work must be explained through the submission of a project design in accordance with the guidelines set out in *Management of Research Projects in the Historic Environment* (MoRPHE).

The nominated archaeologist, if one has been appointed, will work with the licensee to help formulate the strategy and set out, in detail, the plan and explanation of the task proposed and most importantly, what will happen to the archive and how the information obtained during the term of the project will be disseminated to the public domain. If the project is agreed then it is the nominated



Figure 44. Salt glazed pot recovered from the site of the London.
(Courtesy of Steve Ellis)



Figure 45. Volunteer on the site of HMS Invincible.
(Courtesy of Pascoe Archaeology Services)

archaeologist who has the responsibility to see that the strategy is implemented, to assist with analysis and interpretation of any items recovered.

The final reporting and deposition of the project archive are fundamentally important to the success or failure of a project. The findings and conclusions reached by the research team need to be subject of scrutiny in order to be validated; information sharing is vital in order that the volunteer's efforts are properly valued. The 'end of year' licensee reports have already been mentioned but there are other forums that have been and are being utilized, by our volunteers, to publicize the work they have undertaken. Some of our licensees are regularly updating local communities through regional news media on the works they are conducting or speaking at local history or archaeological society meetings, others have created their own websites, contributed to academic journals, presented at conference proceedings such as the Nautical Archaeology Society and International Shipwreck Conference and several of our volunteers have published books about their activities in Maritime Archaeology.

It would be appropriate to look at a couple of examples that illustrate the excellent work being conducted by our licensees and how the system is able to utilize the wealth of experience, talent and enthusiasm of these individuals and create a research community dedicated to furthering our understanding of England's maritime past.

Case study 1: HMS *Invincible*, Horse Tail Sand, Eastern Solent

This is a Historic England commissioned project to 'assess, monitor and record a designated wreck for vulnerability.' The project is supervised and managed by the licensee, Dan Pascoe, Pascoe Archaeology Services. An experienced Maritime Archaeologist, Trustee and Assistant Tutor with the Nautical Archaeology Society, he has enlisted the aid of a mixed team of fellow professionals and unpaid volunteers, drawn mainly from Nautical Archaeology Society members with varying degrees of expertise and experience, to carry out the work. The Nautical Archaeology Society was a logical port of call in the search for willing hands being an existing resource of enthusiastic people with an interest in maritime history. The project was an ideal opportunity not only to complete the task at hand but also to supplement the training provided by the NAS with practical experience of an underwater survey in a relatively safe environment. The selection of team members from this source also meant that pressures on the budget for the project were somewhat reduced.

The ship

In 1737 a Frenchman, Francois Coulomb, produced a design for a new type of vessel, a 74 gun ship that was fast, maneuverable and powerful. This new longer hulled vessel would be able to carry more, heavier ordinance and be a match for all but the largest of her enemies fleet, in this case the Royal Navy three deck ships. The longer hull and lower displacement provided for improved sailing abilities.

This vessel started life as *L'Invincible*, launched in 1744, she was the second ship of this type, *Terrible* (1739) was the first and latterly, *Magnanime*. The design of this type of vessel with a 'fuller bow and much finer lines to the ship's stern with a near vertical stern post and rudder' (English Heritage, 2014:3) not only made her design revolutionary but her construction incorporated technologies not previously employed; the experimental use of iron for certain elements of the build for example.

The first Battle of Finisterre, May 1747, found *L'Invincible* taken as a Royal Navy prize, in possession of Admiral Anson, who soon saw the potential of the ship's design and pushed for the Royal Navy to adopt it for their future warships. Despite a degree of resistance the Admiral's recommendations were accepted in the mid-1750s.

On 19th February 1758 the *Invincible*, as she now known, lay at anchor in Portsmouth awaiting orders to sail to Canada. The order was duly received but as she weighed anchor she encountered difficulties and ran aground on Horse Tail Sand, where she capsized and remains on the sandy bottom, some 7-9m below the surface; the best preserved example of a mid-18th Century ship of the line.

The project

The work currently being progressed by Dan Pascoe and his team builds on the investigations of the site conducted by the original licensee from 1980, Commander John Bingeman over a period of some thirty years, and who published his findings in his publication, *'The First HMS Invincible (1747 -58) Her Excavations (1980-1991)'*

By comparing the findings of Bingeman, other information supplied by the Archaeological Diving Unit and Pascoe's own observations it was clear that there had been significant changes to the site resulting



Figure 46. Volunteer surveying plankton
(Courtesy of Pascoe Archaeology Services)



Figure 47. Photogrammetry survey (Courtesy of Pascoe Archaeology Services)

in more of the vessel's structure being exposed and changes in sediment levels. It was noted that areas of newly exposed structure and artefacts would need recording and were now vulnerable to the dynamics of the site and biological processes; the site was placed on the Heritage at Risk register. This level of monitoring is another illustration of the value of having licensees for each of the protected sites.

The primary aims of this project were to identify the areas at most risk, conduct a measured survey of areas not fully recorded and trial photogrammetry as a survey method. Sediment monitoring was to continue so that a better understanding of the wreck site dynamics could be better understood.

The secondary objectives were directed towards recovering exposed and vulnerable artefacts, gaining an understanding of the structure and construction methods and identifying areas that had been altered or repaired.

In addition to the usual measured survey techniques, *'photographic and video survey was employed to record constructional features and exposed artefacts'* (English Heritage, 2014:10). Photogrammetry was trialed during the project and some very useful results were obtained.

Outcomes

The investigation was carried out over a nine days between April and July 2013. Seventeen divers completed 130 dives for a total bottom time of 7292 minutes (English Heritage, 2014:p11).

The project was able to continue the survey of the site and record areas that had not recently been exposed or recorded. Artefacts were recorded and recovered that will enable further studies to be made to gain an insight into 18th Century shipboard life. Ship structure was surveyed, construction methods noted and fixtures recorded, the details of which will prove vitally important in understanding how such structures were put together as existing plans and other reports regarding maintenance of such vessels are rare.

Dan Pascoe reported *'A combination of professional archaeologists working alongside volunteers demonstrated that a lot of work could be achieved in a relatively short period of time, to a very high standard.'* (English Heritage, 2014:25)

The trialing of photogrammetry as a survey technique appeared to be highly successful, *'The technique of photogrammetry to record areas of the site has been a revelation. It has enabled accurate and rapid recording in 3D of a large section of.... The margin of errors in traditional techniques caused by flexibility in tapes or simply diver error, are almost totally eliminated with photogrammetry.'* (ibid)

The licensee intends to continue this season in line with the project aims above. As well as a report on the Historic England site there is a Facebook page for the site where the work can be seen by the wider public.

Case study 2: The London-Kings, off Southend-on-Sea, Thames Estuary

The current licensee, Steve Ellis, has been in place for some four years. He is a keen recreational diver, who has spent much of his time, away from his day job, exploring the River Thames in and around the estuary. He has always had a fascination for the maritime history of this part of Essex and his inspiration to further this interest came about through a casual conversation on an aeroplane with a fellow holiday-maker, who happened to be a Maritime Archaeologist. This meeting led to the licensee applying for a visit licence for the designated site and has gathered an enthusiastic team about him, including his wife, to find out more about this significant piece of our maritime past. The licensee has obtained training through the Nautical Archaeology Society and is currently working towards his Certificate in Foreshore and Underwater Archaeology (NAS Pt II). In addition he has successfully completed HSE Scuba training

that will allow him to accompany the diving contractor when they visit the site and undertaken bespoke training with the NAS, in underwater photography, that will provide evidence for eventually obtaining an Advanced Certificate in Foreshore and Underwater Archaeology (NAS Pt. III).

The ship

The *London* was a 2nd rate warship built in Chatham in the mid-17th Century and was in service with the navy of the Commonwealth. At the time of the Restoration, she formed part of the convoy that conveyed King Charles II back to his realm and was host to the Duke of York and his entourage for this voyage. The *London* was lost to an explosion whilst being mobilized for service and sank in 1665.



Figure 48. The licensee and members of his team 2013
(Courtesy of Steve Ellis)

The wreck is a rare example of a ship from this period and together with the connection to such a significant moment in the Nation's history makes her especially important.

The project

The licensee has spent some three years actively investigating the site and the information provided here has been gleaned from his latest licensee's report, submitted to Historic England at the end of the licensing period in 2013.

The licensee has stated his aim is quite simply to find out as much as he can about the wreck and the events leading up to her loss and put this information into the public domain. He has three main objectives, 1) produce a site plan, 2) record and document recovered artefacts and 3) publish.

The site of the wreck is close to a very busy shipping channel in the Thames Estuary; known as the *Thames Gateway*, and lies in two parts close to Sea Reach Buoy N. 4. The two parts have been assigned the labels site 1 and site 2 for identification purposes:

Site 1 consists of highly vulnerable archaeological material including well preserved hull and other ship's structures and small finds; it may also contain evidence that support other archaeological and documentary sources that suggest late 16th Century and early 17th Century iron cannon were used as ballast.

Site 2 contains the remains of two vessels, a post-1832 wooden sailing boat and sections of the *London*. This site is closer to the shipping channel and there may be other buried deposits extending beyond what is visible. A number of finds have included human remains, both male and female.

The original designation came into force in October 2008 but due to the protected area being extended by some 25m a new designation was implemented in July 2012.

The licensee has worked closely with the nominated archaeologist, the current incumbent being Dan Pascoe, and the project itself has been the focus of a Historic England commissioned report, *Supporting*

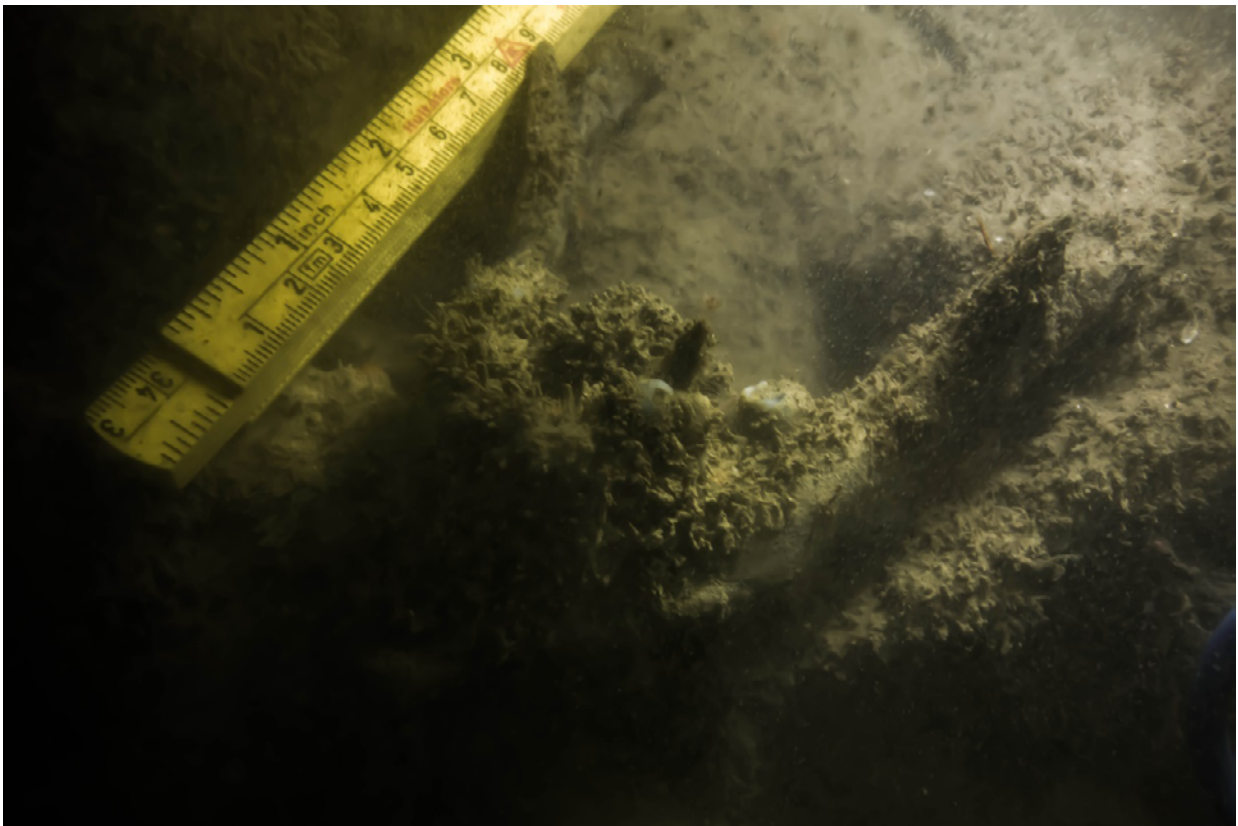


Figure 49. Female mandible (Courtesy of Steve Ellis)

community-based recording: The 'London' project, (2013) produced by Wessex Archaeology. The project supports an activity within the framework of the National Heritage Protection Plan namely, (5A4) 'Supporting local communities in protecting significant heritage assets.' The report described the site as containing 'a rich, potentially unique assemblage of finds' (English Heritage, 2013). The site does present significant challenges



Figure 50. Visibility is an issue that confronts the team. (Courtesy of Steve Ellis)

including environmental threats, poor visibility in the extreme, complicated site dynamics and vulnerability to uncontrolled salvage. The poor visibility has effectively meant that much of the investigation has literally been done by fingertip, as the licensee and his team have had to work in conditions of virtually zero visibility, and it is testament to their dedication that they have attained the high level of success they have. The licensee has reported that some thirty bronze cannon are missing from the protected site; it should be noted that a number of individuals are currently subject of criminal proceeding linked directly to offences connected to the illegal recovery of artefacts from this site.

The project has, as part of the Historic England management strategy, created a partnership between the licensee, Southend Borough Museum Services and Historic England. This partnership has produced a number of benefits including the creation of a site recording system or protocol, in liaison with the diving contractor, that was successfully trialed on the site and which is hoped may become the model for sites of a similar nature. The system enabled 'Affiliated volunteers with relatively little training to achieve high quality archaeological recording and monitoring.' (English Heritage, 2013:2). The finds and data archive from this and previous investigations is being curated by Southend Museum; a post for a Project Curator created as a result of the project and clearly represents an economic benefit. Historic England is able to offer technical assistance; this has allowed the licensee to visit and meet with experts who are helping conserve historic artefacts recovered from the site and with analysis and interpretation.



Figure 51. Leather shoe recovered from site of the *London*.
(Courtesy of Steve Ellis)

Outcomes

The London Wreck Project is ongoing and the licensee is keen to continue his investigations during the next dive season. A variety of artefacts have been recovered including a leather shoe, two anchor rings, cannon balls, various lead shot, cordage and galley bricks. These items will hopefully shed light on the lives of the individuals aboard the *London*.

A website, www.the.londonwreckproject.co.uk, has been created to inform a wider audience about this Nationally important site, two outreach presentations have been given by the licensee and Southend Borough Museum Service is continuing to provide support with the curation of the archive and looking to create a more permanent display to bring the story of the *London* to their visitors' attention.

The licensee has been able to develop as a practitioner through training provided by the Nautical Archaeology Society, practically by working with the diving contractor, Wessex Archaeology and add to his diving experience by undertaking the relevant Health and Safety Executive course.

A major outcome that will benefit all projects of this kind was that through the partnership with the diving contractor and Historic England solutions were found to some of the challenges presented to the licensee. It was recognized that the difficulties created by the environment in obtaining good survey results was exacerbated by the lack of suitable equipment. Historic England was able to arrange for the loan of the right equipment to complete the task at hand. Lack of specialist training limited the quality of vital *in situ* photographic recording; bespoke training was sourced through the Nautical Archaeology Society.

Training was identified as a central pillar in any project but any training must be carefully designed to meet site-specific requirements.

On the downside, funding issues were identified as threatening the long-term future of the project and the quality of the data produced. This problem is not unknown to practitioners and regrettably, easy solutions are difficult to find.

The presence of human remains on this site generated a consultation between the Ministry of Justice and Historic England to try and address a situation not currently catered for by statute. The *Burials Act 1857* does include reference to burial at sea but these must be ‘deliberate’ as defined within the Act; clearly the loss of life caused by a catastrophic event at sea would not be ‘deliberate’ within the definition. The discussions were time consuming and long in duration; suffice it to say during this period all human remains uncovered during the course of an investigation were dealt with respectfully; it is hoped that some guidance of what to do in this situation will be forthcoming that addresses this omission.

What is achieved through all this effort?

The contribution made by the licensees in recording, measuring and deciphering our maritime story cannot be underestimated. The sheer scale of the task, with reference to the number of known wrecks and recorded losses, in attempting to gain an understanding of the vessels involved, the lives of the people and the role they played in the broader scheme of commerce, politics and our maritime past would be impossible to tackle if it were not for these dedicated individuals.

The framework provided by *Protection of Wrecks Act 1973* allows for sites to be subject of intensive investigation by individuals who gain an intimate knowledge of their site. The licensee can, in some instances, be active on a site for years, something that, in the professional sector, would be rare.

The system brings together different strands within communities, through a common interest, to share experience and expertise, gain additional training and find practical solutions to problems presented by the diversity of sites they access.

The licensees’ activities bring economic benefits to the wider community, as illustrated by diver trails, and creation of employment opportunities in some instances.

The most important aspect of the licensees’ work is the contribution to research, as illustrated by the work currently being undertaken on HMS *Invincible* and *London*. The hours spent searching for information, working on the site, recording, measuring and monitoring, can only make a positive contribution to our understanding of our shared maritime story and through publicizing their work, by giving presentations, administering dive trails, writing articles for academic journals, online or through social media they can promote the enjoyment of these assets to a much wider audience.

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Building a Community-Based Platform for Underwater Archaeology: MaritimeArchaeology.com and a Web 2.0 solution for public outreach and research collaborations

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Introduction

The Internet has become the ubiquitous tool of our age and it plays a significant role in maritime archaeology. It is the primary tool for public outreach today and an integral part of developing research collaborations. Google search lists over 5 million results for ‘underwater archaeology’; however, many highly ranked websites are non-professionals that do not follow accepted ethical standards, such as treasure hunters. These websites turn up alongside professional websites in search engine results, making it difficult for laypersons to locate reliable archaeological information. Since the Internet is ‘the most direct and effective means archaeologists, managers, and educators have in reaching the public’ (Keith and Carrell 2009: 128), it is critical for a focused and ethical message to reach the billions of Internet users. One approach is to have a single mouthpiece that presents accurate information about maritime archaeology, which is managed by a community of professionals.

Professional maritime archaeology websites at the moment generally suffer from competing search rankings, a wide range of websites of varying quality, and poor discoverability. ‘Discoverability’ is an information technology (IT) term meaning information’s capacity to be found. It is currently a buzzword for search engine optimization and social media, as web designers strive to make it easier to connect users to information.

Professional archaeology’s poor discoverability can have a significantly negative impact on cultural heritage. The proliferation of poor quality, incorrect, and outright misinformation can affect funding, legislation, and preservation (e.g. Mullins 2013; LaBarre 2013). Though inaccurate websites are created by a small number of people, the sites are available to any search engine user seeking information about the past. Scrolling through search results for ‘underwater archaeology’ reads like a ‘who’s who’ of treasure hunters and academic programs with little to distinguish between them. Treasure hunters are striving to make their web presence and publications appear as legitimate archaeology, meaning it can be difficult for a layperson to evaluate the difference between scientific research and unethical salvage. These questionable yet seemingly professional websites complicate professional archaeology’s already poor discoverability.

The content on professional websites is also problematic. Most provide brief overviews of the history of the field and other groups' contributions, then discuss their own projects in great detail. While this is effective for communicating personal goals to the public it fails to effectively communicate research, methods, and views.

As a field with a small professional population but considerable visibility, there is a need for a web resource that acts as a central hub for the community. It would need to be independent from existing organizations to best serve the entire field and avoid becoming monopolized by a specific group. Moreover, it needs to use the latest web design and social media to maximize discoverability and reach Internet users on different scales of information and also increase the discoverability of contributors' websites.

MaritimeArchaeology.com is a community-based search tool and web resource. It is search engine optimized and designed to draw Internet traffic that is searching for keywords related to underwater research. The website is not designed to be content heavy, but instead easily redirects users to professional websites such as universities, contract firms, or museums also pointing to general information and research material. The result is a web tool that captures the bulk of search engine traffic and shepherds them to ethical websites, increasing the discoverability for all websites linked from MaritimeArchaeology.com. Besides engaging with the public, the website serves as a hub for intersecting research communities where academic and contract archaeologists, as well as museum, non-profit, and government workers can share information.

This chapter argues that there is a pressing need for a planned and deliberate Web 2.0 approach to public engagement and research for maritime archaeology. As treasure hunters work hard to appear as legitimate archaeologists, the Internet is quickly becoming a battleground that archaeology is losing. Further, the field is generally neglecting the latest digital trends and the result is a failure to reach millions of people. Working as an organized community, not every archaeologist needs to use Twitter or Instagram; together the field can have a far broader reach than non-professionals through pooling resources in a shared framework.

In the first section, this chapter discusses the nature of information today and aspects of web design, such as scales of information, cognitive fluency, and how to write effectively for the web. It then explores how to learn from the past failures of other community-based websites. MaritimeArchaeology.com is then introduced as a potential solution to these issues and its design is explored. Finally, the chapter concludes with a discussion on improving communication and increasing collaboration, as well as future directions for archaeological web design.

Information today

Readers do not need to be told that information today is very different from the past. However, there are common misconceptions about how people consume the vast amounts of information available on the Internet. These misconceptions are in large part due to the fact that contemporary culture continues to judge information by a pre-Internet paradigm, in spite of the great changes introduced by digital media. In order to design effective websites it is necessary to understand these differences.

In 1800, Harvard University library contained 12,000 books and the university was composed of 248 faculty and students (Drake 2003: 1198). Boston contained a population of 24,937 at this time, meaning this information was available to 0.9% of the citizens. There were few other information resources available to people at this time. Public libraries would not become popular until the late 19th century

and the United States National Archives were not founded until after World War II (Drake 2003: 1198). This means that a finite amount of information, though carefully catalogued and easily located, was limited to a small population.

Today, 2.4 billion people out of a world population of 7 billion, or 34.2%, have access to over 940,424,927 websites (InternetLiveStatistics 2014). Each website has the potential to contain the equivalent of thousands of books. For example, Archive.org has over a million books online, while GoogleBooks has 20 million. There are an estimated 129.8 million published books worldwide and GoogleBooks has the stated goal of digitizing them all (Skipworth 2010). This means at some point in the future an Internet user may be able to access the full extent of published human knowledge.

Compared to Boston in 1800, this is an incredible increase in both access and amount of information. This information is not arranged in a straightforward manner, such as Harvard's catalogue, but instead found through search engine algorithms. Each person is therefore sifting through information to find material relevant to him or her, looking for the 'maximum benefit for minimum effort' (Nielsen 2003).

This is a significant shift in information accessibility; the rapid growth in both information and its availability are the reason Internet users are using shorter bits of information. Many social commentators are critical of sound bites, headline tickers, and social media sites like Twitter, but

these commentators fail to realize that Internet users have so much information available that these mechanisms are necessary to sort through and find the longer pieces that interest the users. For this reason it is necessary to present information on different scales.

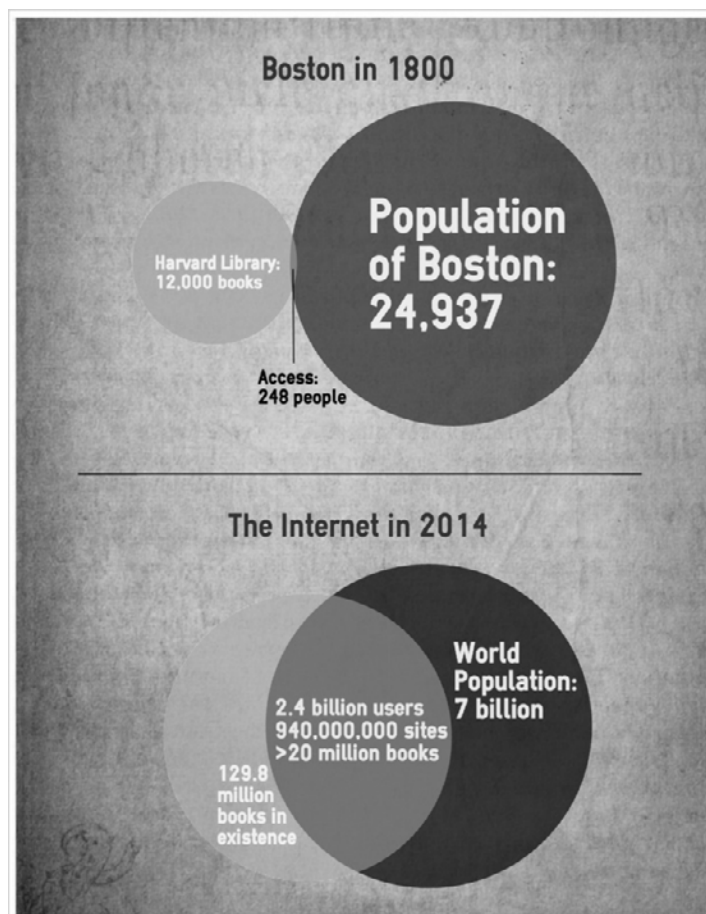


Figure 52. The relative amounts of information and its availability to the public in 1800 versus 2014 (Author).

Successful Internet communication is best understood through scales of information. People have limitless space to write on the Internet; however, micro-blogging websites like Twitter are immensely successful. Twitter posts are limited to 140 characters, resulting in short yet rapid bursts of information. Even non-Twitter users must now acknowledge the power of the site, as it has become pervasive in modern society. Micro-blogging is an effective form of communication, but it hardly exists in a vacuum. The co-founder of Twitter created Medium, a website that publishes posts longer than Twitter and shorter than full articles. Meanwhile, the number of online academic journals has increased significantly with about one thousand open access journals being added

per year (Bohannon 2013). These different scales of information, from Twitter to Medium to full webpages or journal articles, are successful because people consume information in different amounts depending on their interests.

In order to educate people today, it is necessary to share information on different scales. None of these methods are perfect or completely effective. Instead, the same information should be shared across platforms of different scales. Rather than choose between social media platforms like Twitter, Medium, Facebook, Instagram, Tumblr, YouTube, podcasts, and academic articles, all of these should be integrated and treated as essential means of communicating with the public. Fortunately the Internet is becoming highly integrated and the latest web design makes it simple to share information across platforms.

Web design

Web design is a complex topic, but this section attempts to condense it into a few key points for archaeologists. The most important lesson is that credibility and effective communication are achieved through the user's experience, not by content or the author's reputation. In general, maritime archaeology websites are cluttered and poorly organized, full of collaborators' logos with far too many categories of information, and other non-essential items that should not be on a website's front page.

Simple designs are favoured due to 'cognitive fluency,' the ability to navigate a website easily and quickly without having visited it before. 'Fluency guides our thinking in situations where we have no idea that it is at work, and it affects us in any situation where we weigh information' (Walker 2014). We have all experienced websites that have low, or no, cognitive fluency and are over-cluttered and frustrating to navigate. One key lesson is that too many messages is equivalent to no message. Websites that have high cognitive fluency are rated by users as highly credible, since users believe a website that is conversant in digital communication is likewise competent in the subject matter (Walker 2014). Credibility is conveyed through the web user's experience, rather than the recognition of prestige, affiliations, degrees, or notable authors.

Simple design with cognitive fluency is key, but so is consistent use of style and quality. Websites should always use high quality graphics, maintain good grammar and writing, and cite their claims through linking. A quality experience is the equivalent of a quality source, so credibility on the Internet can be summed up by the saying, 'show it, don't tell it' (Duistermaat 2013).

When writing for 2.4 billion Internet users we know the audience will not have technical understanding, but what needs recognition is that we should not even write full content anymore because people are scan reading. Only 16% of Internet users read word for word (Nielsen 1997). The eye fixates on the centre of a word for 200-250 milliseconds and then jumps between one to twenty characters over 20-40 milliseconds, called a saccade, during which time no information is recorded (Sereno and Rayner 2003: 490). The longer the jump, the more fixations returning to previous characters is needed, which are called regressions. Fast readers have quicker fixations and few regressions, but researchers have found that most reading on the Internet is conducted through fast fixations and greater saccades, which we call scanning text (Sereno and Rayner 2003).

Websites should be designed for scan reading. As nice as it would be for people to read more in depth and understand the nuances of ship construction, archaeologists are not going to change the way people use the Internet. To effectively communicate with the public, websites need to maximize information for scanning readers. How is this done? Less text, more bullet points, and one idea per paragraph (Nielsen 1997). Invert the structure of the text, so that it begins with the conclusion (Walker 2014). Highlight

keywords and include links to related content. Sentences should be no longer than 45-90 characters, while paragraphs should be short, approximately three to five sentences, and have clear topic sentences (Boland 2013).

Typography is one of those important means of communicating that academic and scientific, including archaeological, websites generally ignore. At its most basic, it is the ability to make readers continue from the top to the bottom of the pages and then turn that page; and then make them do that 200 times in the course of any book' (John Curran quoted in Boland 2013). Typography includes font, as well as size, kerning or the space between letters, leading, capitalization, colour, and readability (Chamberlain 2009). Typographer David Carson famously declared, 'Don't mistake legibility for communication' (2009).

Ineffective typography can be boring, resulting in less reading and poor comprehension. Websites with ineffective typography are viewed as less credible, whether rightly or wrongly and users spend less time on them. Archaeological websites generally use the same font for headers and text, simply increasing the size of header similar to academic or report writing. Effective typography is not a process of adding flair to a page; it is a premeditated design meant to lead the eye to important sections, increasing comprehension and aiding the reader to find key information.

Colour selection is critical to successful communication on the Internet. Much like overall design and typography, colour should be minimalist and used as an accent. Well chosen colour schemes blend, supporting the other features of the website. Colours should not be loud or stand out on their own, which is why web designers often use a lot of white space. There has been extensive market research on colour choices. Blue and green are the only colours men and women both prefer (Smith 2014). Blues generally cultivate trust, so they are used by websites like Facebook and PayPal. White creates a sense of ease and spaciousness. It is favoured as it projects a feeling of an uncluttered website, where life is simpler inside the computer than outside (Smith 2014).

Sites are evaluated on their appearance and communication style more than content itself, as speakers are often evaluated on their composure, gestures, and clothing. To these ends, websites should strive for cognitive fluency and simple designs. Writing should be geared toward scan reading with links to allow users to read further, as well as lend credibility. These guidelines are rarely considered by archaeological websites since academic and technical writing is not readily transferrable to the Internet without significant changes.

Learning from past failures

New community-based websites can learn important lessons from Wikipedia, the sixth most visited website in the world (Simonite 2013). Wikipedia is an open encyclopaedia that ostensibly allows contributions from everyone; however, the website has experienced a disturbing decline in recent years in both contributors and editors (Kostakis 2010). Six major flaws in Wikipedia's community-based design have been identified: difficulty finding and maintaining editors, abrasive contributors and editors, inconsistent quality, vandalism, manipulation of articles, burdensome bureaucracy when attempting to correct errors, and general lack of oversight or authority (Kostakis 2010).

Researching similar open forums, a series of studies have discovered the 'nasty effect' of antagonistic commentators on science websites (Brossard and Scheufele 2013; LaBarre 2013). Like the vandalism and hoaxes posted in Wikipedia articles that influence content, antagonistic commentators actually change people's views on an article. 'Uncivil comments not only polarized readers, but they often changed a participant's interpretation of the news story itself. Popular Science closed its public comments,

reasoning that allowing comments adversely affected not just the site and the experience of the users, but public understanding of science. While engagement with the public is important, Popular Science has chosen to do so through social media rather than allow uncivil comments posted on articles themselves.

MaritimeArchaeology.com: design and specifications

The challenge is to create a community-based maritime archaeology website that combines these aspects of web design and the lessons learned from other community-based websites. The domain name MaritimeArchaeology.com was purchased to house the project. A professional designer was hired to conduct branding for the website, creating a website logo and colour scheme. A style guide for contributors was then drafted in accordance with the branding, as well as to maintain a high standard and avoid the quality issues experienced by Wikipedia. The next big issue to address is, ‘Who is allowed to contribute?’

Administration

Learning from Wikipedia, the most effective community projects have effective leadership where, ‘Everyone is free...to propose a contribution, but the people who run the project are equally free to reject the contribution outright...The core task of managing a Commons is to ensure not just the production of resources, but also to prevent its degradation from the addition of low quality material’ (Stadler 2008). To achieve this, MaritimeArchaeology.com is built and maintained by professional archaeologists who follow the site’s ethical guidelines.

Rather than operating as a wiki open to everyone, such as Wikipedia, the website is built by professionals. Any professional maritime archaeologist can be a contributor, provided they follow the ethical guidelines.

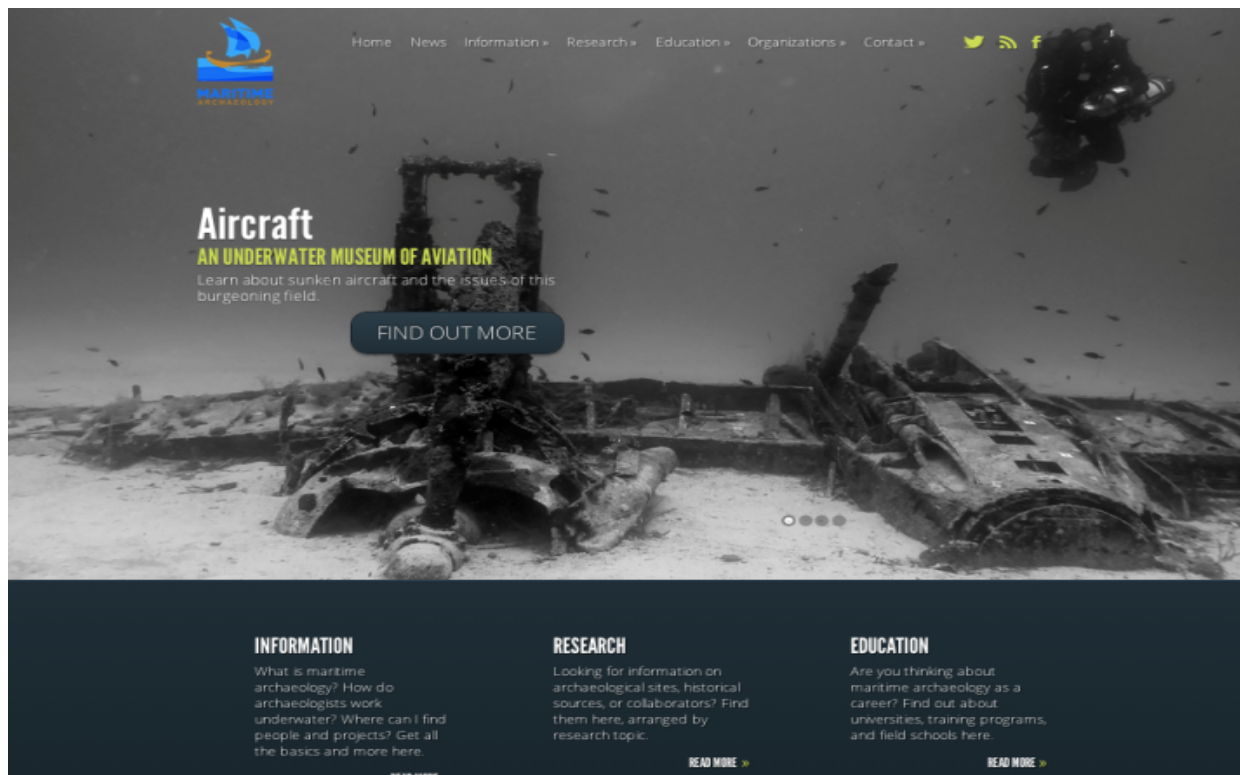


Figure 53. MaritimeArchaeology.com features a simple but striking design for high cognitive fluency and credibility (Author).

Content must meet several requirements. Contributors and content must follow the Society for American Archaeology's Principles of Archaeological Ethics. Contributors are given comments to help with writing for the public and are told to keep content scientific and ethical, avoiding discussions of treasure hunting or looting. Much like the National Geographic website model, MaritimeArchaeology.com fosters a positive atmosphere about research and users can operate under the assumption that if content is not found on the website then it did not meet the ethical requirements. Attacks on treasure hunters or non-professionals divide the public and can make archaeology appear exclusive. The best approach to engaging the public is to provide a positive message. It is the role of administration to approve content and ensure that these requirements are met while maintaining a series of checks.

Several levels of management provide administrative oversight. At the ground level, any member of the public may become a subscriber receiving updates from the website as new content is added. The next level is contributor; any professional maritime archaeologist that follows the website's ethical conduct requirements may be a contributor. Potential contributors fill out a questionnaire that provides information on their education, affiliation, and potential ethical issues. If an applicant meets the guidelines, then they are granted a username and password. Applicants with questionable responses are referred to the advisory board for review. Members of the public can submit a contribution, but it must go through an editor for vetting. This system of professionally generated and maintained content addresses the two major issues Wikipedia experienced, content quality and effective administration

Contributors generate and submit content to the next level, editors. The editors are the primary workforce of the website. Editors oversee specific outreach or research sections. They add content, approve or disapprove of contributor content, The editors are the primary workforce of the website. Editors oversee specific outreach or research sections. They add content, approve or disapprove of contributor content, and maintain pages. They have near autonomy over their sections, provided they maintain the ethical guidelines and treat contributors fairly and politely. This also includes the social media team, who update the website's Facebook, Twitter, YouTube, and other social media accounts.

If there are any issues, the editors consult with the administrators, of which there are currently three. The administrators process contributor applications, recruit editors, check for hacking and malware attacks, and conduct website maintenance, such as upgrading applications and plugins. They also check that editors' sections continue to meet the website's ethical and quality standards.

Finally, there is the advisory board, which also acts as a steering committee to advise on the direction of the website. It is composed of maritime archaeologists that are well respected by the field. The board also reviews disputes arising from content and applications, providing comments on the ethical issues in question.

MaritimeArchaeology.com is currently a private entity. This offers limited liability for any contributors or administrators, meaning in the event of any legal issues the website would fold without liability being passed to any individuals. While it is not a profit seeking enterprise, there are benefits to being private rather than a non-profit or trust. Status as a 501(c)(3) means information held by the organization must be made available if requested. Since the website could potentially contain sensitive data in the form of archaeological site coordinates or descriptions that identify locations, non-profit status is inadvisable. Furthermore, as a private entity it is far easier to refuse contributors of questionable ethics. As a non-profit or trust, these guidelines would be set by the organizations charter and difficult to adapt, meaning loopholes could be found. The website seeks to avoid the loopholes found in well known archaeological organizations that allow for treasure hunters and archaeologists of questionable ethics.

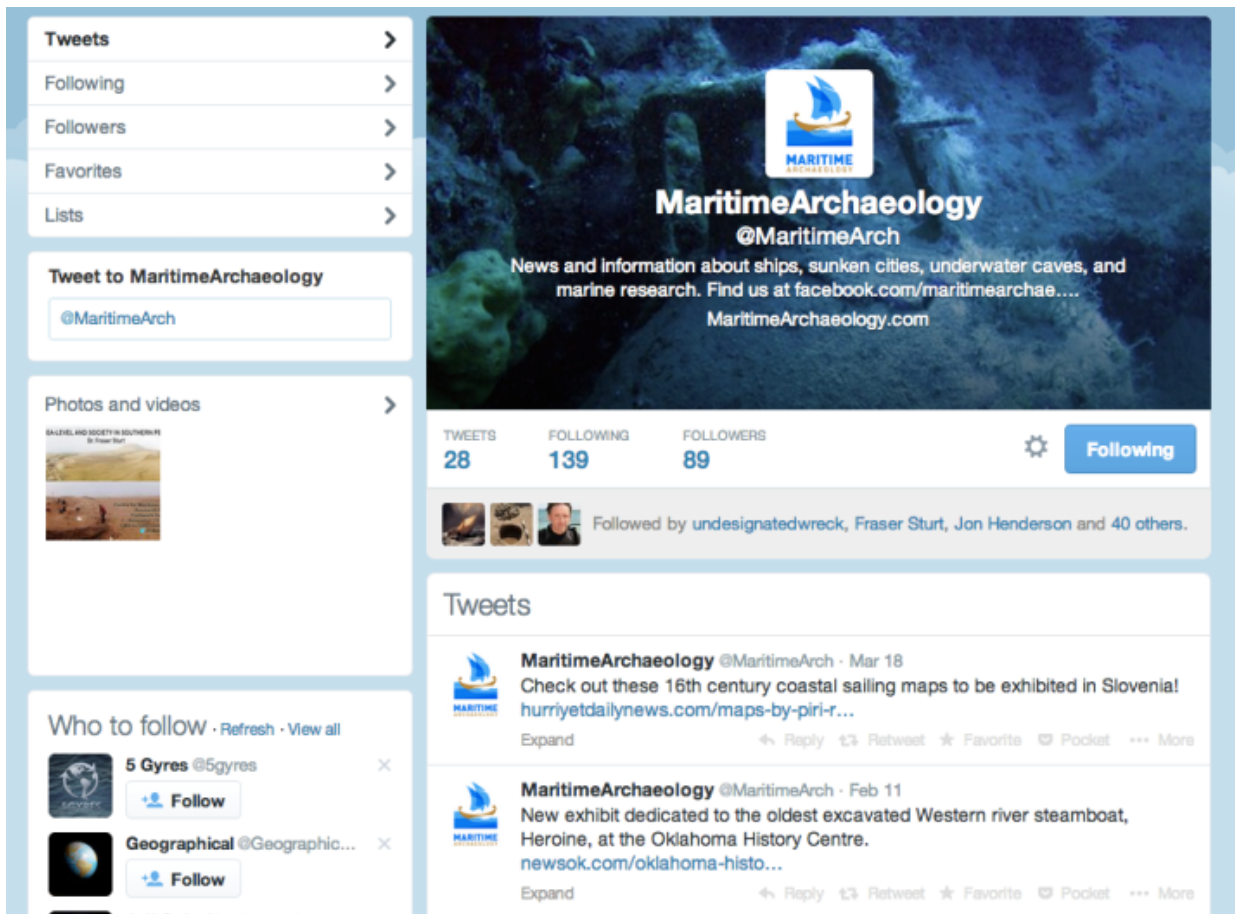


Figure 54. MaritimeArchaeology.com's integrated social media includes Facebook and Twitter (Author).

The advisory board therefore plays an important role, as it reviews the website's annual finances to ensure the website is being well run. In order to maintain parity in disputes, the advisory board makes the final decision on flagged contributor applications. The board is therefore the liaison between the field and website in the event of any concerns.

Web design

Since contributors have a wide range of computer literacy, it is necessary to have a simple interface along with a high quality design. The right combination of cognitive fluency, typography, and colour are needed to create a visually appealing website, while also being simple to use and create consistent pages. A WordPress-based template was chosen to achieve these goals, as it is one of the most popular platforms and many users are already familiar with it.

WordPress templates can create impressive websites. ElegantThemes, a template maker, also has an easy drag-and-drop graphical interface for building and customizing pages. Even someone without any previous website building experience or knowledge of coding can create a high quality webpage with professional design, typography, and cognitive fluency.

The WordPress platform has benefits beyond familiarity with users. The platform has access to a number of useful plugins, including language translation, mobile platforms, and security. Only a few years ago these were external applications that had ran individually, but WordPress makes it easy to run and

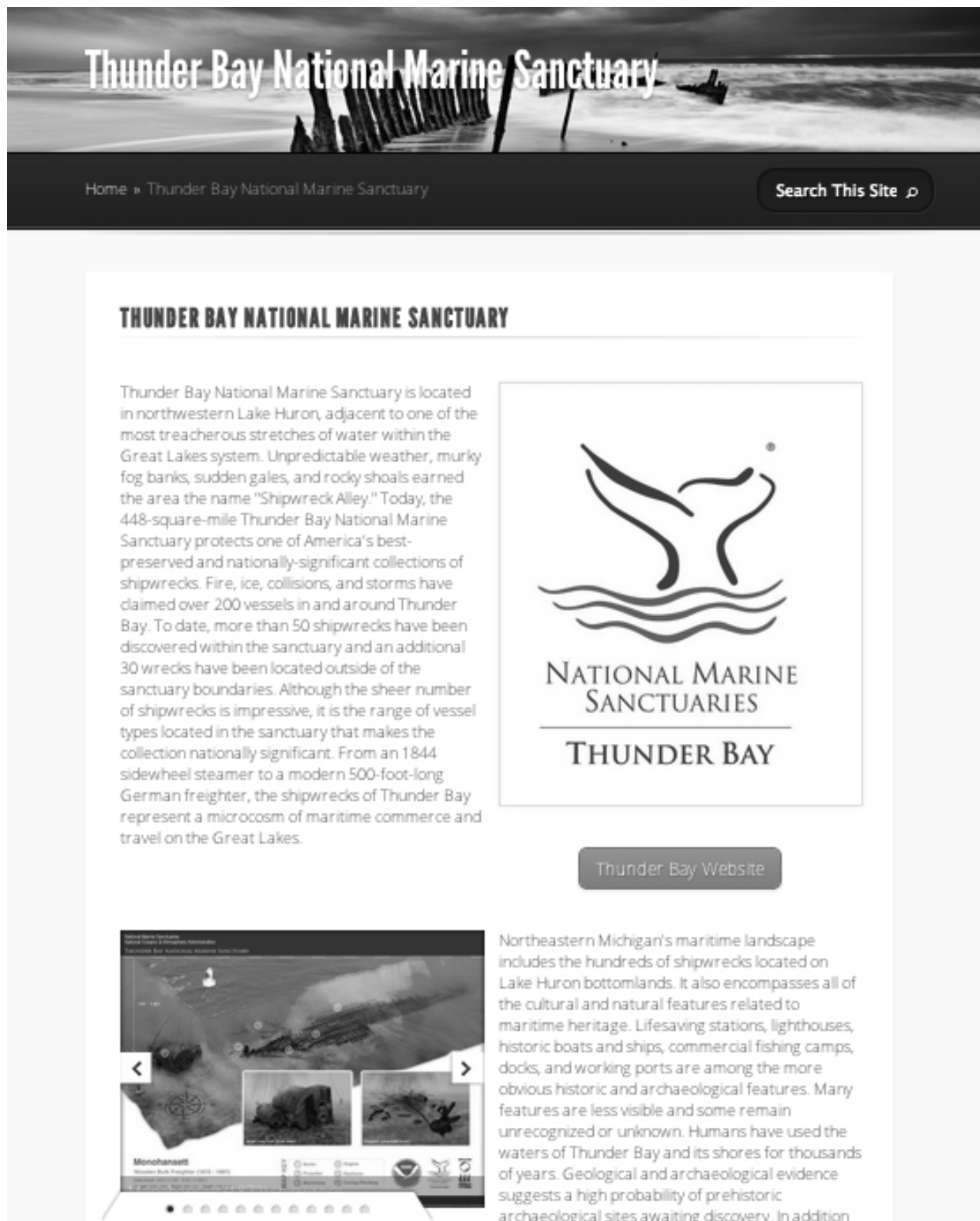


Figure 55: An example of an organizational webpage created by Thunder Bay National Marine Sanctuary (Author).

maintain these applications. For example, MaritimeArchaeology.com experienced three months of daily brute force hacking attacks which attempted to find security weaknesses; however, a security plugin thwarted these attacks.

The plugins also allow the website to be fully integrated across social media sites such as Facebook, Twitter, and Google+. Items posted or updated on the website are automatically posted on these outlets. Social media integration saves time while maximizing reach. The website administrators and the social media team also use a custom suite of outside applications, including Pocket, HootSuite, and others, to manage the site and communicate with Internet users.

The WordPress platforms provides MaritimeArchaeology.com with the following features:

- Translated in 80 languages
- Functions on any web browser
- Mobile and iPad/tablet compatible
- Intuitive, graphical webpage building program, suitable for building pages by those without any coding experience

Using the WordPress theme with a graphical interface, MaritimeArchaeology.com strikes a balance between high quality design and ease of use for contributors building pages. The website's design is functional, but embraces minimalism. It has excellent cognitive fluency and strips the website down to essentials. The design omits needless items and avoids being cluttered while still containing a great deal of information. The average Internet user can quickly find the information they are seeking. Most importantly, the website is search engine optimized to rank higher in searches than non-professional websites.

Search Engine Optimization (SEO)

Search Engine Optimization (SEO) is a complex, but highly important, aspect of the Internet today. SEO uses keywords and registrations to make webpage content rank highly on search engines, helping users find more specific information through complex algorithms. Successful SEO requires keeping the website's software and registrations up to date and constantly monitoring search data.

SEO works by preparing the website for the items that search engines look for. The hierarchy of search items are keywords in the domain name and subdomains, then search engine tags, and finally content and photograph labels. Preparing the website requires submitting page information to search engines, index mapping, and using short codes, as well as other tricks like publishing to social media sites like Google+.

SEO changed recently so that one of the major criteria for search engine ranking is hyperlink priority. This means that data contained in the address of the webpage is searchable. This is a critical aspect of MaritimeArchaeology.com, as the name contains keywords that will increase its SEO. Readers who are interested in examples of hyperlink priority should look through the links in this chapter's bibliography. Search is designed using words; the hyperlinks readers can understand are optimized (e.g. InternetLiveStatistics 2014) and those with an incomprehensible string of letters and numbers are not (e.g. Kostakis 2010). MaritimeArchaeology.com is therefore primed for SEO at its most basic level, which gives it an advantage over non-professional websites.

Structure

The website has a simple layout, which guides users from general to increasingly specific areas. The main pages are the homepage, news, information, research, education, organizations, and contact information.

The Homepage includes a basic overview of the website and the field of maritime archaeology. It is designed to be visually appealing with a high level of cognitive fluency. It has several scrolling articles for users to learn about new research. The Information section builds on this general introduction and is the primary section for public outreach.

The Research and Education sections are primarily for professionals and prospective students, respectively. They contain research areas, which are maintained by individual editors, and degree programs, which can be maintained by the university themselves.

The Organizations section covers the different branches of maritime archaeology. Any professional organization can create and maintain its own page. The contact page includes the contributor application and contact information for the administration and advisory board. It also has a media contact section where journalists can locate ethical archaeologists for interviews and news stories.

Discussion

In a 2009 article Donald Keith and Toni Carrell discuss the proliferation of maritime archaeology websites. A Google search in 2007 returned nearly one million websites for the term ‘underwater archaeology’ (Keith and Carrell 2009: 128); the same search returns over 5 million results in 2014. While the impact of the Internet is significant to every field and enterprise, Keith and Carrell point out that it is especially important to underwater archaeology which has lacked direct public engagement on the scale of other fields and must compete with treasure hunters. ‘Not all web pages are created equal, and to be sure treasure salvors are widely represented—the first link on the list is to a treasure-hunting organization—however, more than ever before, the public can find reasonably accurate, reliable information about the subject. The Internet has quickly become the most direct and effective means archaeologists, managers, and educators have in reaching the public and encouraging the protection and wise use of this declining resource’ (2009: 128). While it is important for every organization to maintain a web presence, arguably the most effective means to reach the public is as a community that pools resources and search ranking in the form of an aggregate website.

Smart Search

Search is currently the most important feature on the Internet (Zaragoza and Najork 2009). All websites and applications seek integration to increase discoverability in search. The primary function of MaritimeArchaeology.com is to act as a ‘smart search.’ This is achieved through using the website’s SEO to draw in users and, once on site, redirect them to the professional websites listed within. The format allows users to easily navigate to more specific information once on site. In this way the website is an aggregate; it contains the links to professional websites rather than building and hosting original content.

Controlling search allows maritime archaeology to shape public perception of cultural heritage; it places information on underwater research in the field’s hands. The benefit is increasing the collective profile of the field while decreasing the visibility of unethical websites. It also raises the visibility of smaller institutions and contract firms, which are traditionally SEO ‘have-nots.’

SEO: Internet haves and have nots

SEO ranking is maritime archaeology's greatest tool against unethical websites. While archaeology's advantage in real life is legitimacy through best practice, on the Internet the advantage is numbers. However, this advantage is lost if the field continues to spread thin across many sites.

At the moment academic programs and government agencies rank at the top of search engine results because they are hosted on university or government webpages that draw millions of users. Meanwhile, non-academic maritime archaeologists including contract or commercial firms, museums, non-profits, and education programs are ranked much lower, despite representing the bulk of the workforce in the field. Therefore, these current SEO 'haves' are disproportionately represented. While there does not need to be a clear distinction between the branches of the field, there is not currently an equal voice. The egalitarian nature of a community-based website presents each of these areas equally, allowing contributions from all the branches.

Are academic websites the best public face for maritime archaeology? Studies have noted individuals with graduate degrees prefer less colourful web designs (Reinecke 2013). Not coincidentally, academic websites rank low with web users, suggesting that perhaps those of us with advanced degrees should not be the ones designing sites for interfacing with the public. Academic websites fulfil their purpose of informing potential students, but considering that university websites have the highest SEO ranking and lowest user ranking, perhaps it is not good for the field that academic websites have the highest discoverability in the field.

However, even these SEO 'haves' may soon face a crisis. SEO is most effective when linking to social media. Also, 30% of Internet traffic is from mobile devices, a figure that is increasingly annually. Despite their high SEO ranking, most university and governmental websites do not have a mobile platform and lack focused social media for specific fields. A community-based website therefore benefits both the SEO haves and have-nots through providing a functional responsive website resource that works on multiple platforms including computers, mobile devices, and all web browsers, as well as being integrated across social media.

Communication with the public

Improving communication begins with changing how and why we engage with the public. For the former, archaeologists need to change how they communicate through shifting from a technical or academic writing style to a popular style fitting current Internet users. Contrary to popular belief within academia, this does not mean simplifying writing or avoiding specialist terminology. In fact, writing for the public can be just as difficult as academic writing. For the latter, archaeology needs to reframe why we communicate with the public in light of continual failures by the media to accurately present information or work with archaeologists in a meaningful way.

Technical and academic writing prides itself on accuracy and nuance, but studies have shown that in reality these speech patterns have increased incoherence as writers strive to protect their arguments by including clauses (Elbow 2013). The result is an argument that is 'fully shielded, immune from refutation,' but it is a form of communication that is rarely elegant (McGinn 2003: 70). Instead of being concerned with a bulletproof argument, archaeologists need to communicate on the Internet to add clarity on topics. Further evidence or caveats can be provided silently through links to academic papers for readers who need more proof of an argument.

While professionals may feel uncomfortable speaking so directly, a higher premium needs to be placed on online public communication. This is especially important considering much of science funding is

public and under attack in many countries due to austerity measures or conservative budgets. There is a general sense that peer reviewed articles are more important than other communications due to university assessments and the Research Excellence Framework (De Lauri 2013), an idea that must be challenged. Tim Ingold argues that without better communication with non-professionals, financial cutbacks and limited enrolment will ensue (quoted in De Lauri 2013).

Direct communication with the public has become increasingly necessary as the media fails to take into account the concerns of the field. Media groups that traditionally consulted or worked with archaeologists are partaking in sensationalism and reality television that promotes fringe theories and unethical behaviour.

Discovery Channel produced the television series *Treasure Quest*, which followed treasure hunting company Odyssey Marine Exploration despite protests by the major archaeological societies. The National Geographic Channel expresses interest in dialogue with archaeology, but continually produces unethical content. At the Society for American Archaeology's 2012 conference, the Presidents Forum addressed concerns about content with several of the channel's directors. The jointly organized discussion stated, 'the relationship between the media and archaeology is often fraught with miscommunication and lost opportunities' (SAA 2012). Despite the discussion, National Geographic went on to produce *Diggers* and *Nazi War Diggers*, consulting archaeologist only after production and addressing concerns retroactively. Archaeology is constantly reacting to content produced by these media organizations even though they attend our conferences and are in regular communication with the heads of the major societies, suggesting these media companies know during pre-production that the content would not gain the approval of archaeologists.

Archaeology must take action to reduce dependency on these media outlets. Digital media makes it easier than ever to communicate directly with the public. Archaeologists can ensure that accurate and ethical information is disseminated to the public by producing media themselves. Options include posting media to outlets like YouTube or Vimeo, or to more specialized sites like the Museum of Underwater Archaeology or the Archaeology Channel, as well as MaritimeArchaeology.com. To encourage journalists to speak with established archaeologists, MaritimeArchaeology.com includes a media contact area where the press can request a specialist and administrators will connect them to the right professional.

Following in the footsteps of *Popular Science*, MaritimeArchaeology.com does not have public commentary. Maritime archaeology already has its own public forum, the Sub-Arch Listserv. The heated debates on Sub-Arch have never led to a consensus, but they have instead resulted in entrenched views and drive commentators to apparent extremes. There are plenty of websites, as well as listservs, for people to engage in conversation about maritime archaeology. MaritimeArchaeology.com instead serves as a vehicle for presenting ethical, scientifically sound research in a visually appealing way. Following *Popular Science*'s lead, there are numerous social media outlets that users can discuss MaritimeArchaeology.com, such as Twitter, Facebook, Instagram, Pinterest, YouTube, and Google+.

Future directions: fostering a community

A community-based search aggregate can immediately impact the visibility of the field, but such a website could also foster an online community in the long term. It has the potential to increase networking and share sources, as well as make authors' publications easier to locate by fellow researchers. A community-based website also offers two types of resources, specialist information and collaborative databases.

MaritimeArchaeology.com is designed so content can be added to specific research areas and each contains a running bibliography. Contributors to the website are able to post conferences, news, and link

to research opportunities on their own website, all of which increase potential collaboration. Several of the website's editors are creating grey literature databases for their research areas to facilitate the sharing of hard to find or unpublished material.

Studies have found that scientists that share information publically are cited more often (Piwowar and Vision 2013). MaritimeArchaeology.com offers a cutting edge platform to share news and data through its network of social media outlets and the website itself. Beyond sharing information through the website, contributors to MaritimeArchaeology.com are encouraged to create an Academia.edu page, which provides a brief biography and copies of publications for easy access by other researchers.

As a community project, the website can host information specific to the field, such as the history of maritime archaeology and lists of journals and institutions, or develop collaborative research forums. For the former, the website can offer a more comprehensive account than similar information on organizational websites and allow academic, contract, or museum websites to focus on their areas of expertise, rather than have to provide general background information.

MaritimeArchaeology.com's Ordnance Depot is an example of specialist information for maritime archaeology and the exciting potential of a professional community-based website. Ordnance expert and maritime archaeologist Bill Utley created a searchable guide to explosives that archaeologists may encounter underwater. This concise guide lists all the necessary information with photographs and diagrams, as well as safety precautions. It is an invaluable resource for many archaeologists.

For an example of developing research communities, several editors are currently recording graduation and hiring rates in maritime archaeology, and information on the job market and pay levels to gauge the health of the field. Others are working to create subject matter databases or integrate the community with exciting platforms, such as crowd sourcing archaeological research through the University College London and the British Museum's new website MicroPasts.org.

Community cooperation is a big part of MaritimeArchaeology.com and it will need to be in the future in order to be successful. Currently, the website works closely with the Nautical Archaeology Society and the Museum of Underwater Archaeology. Directed by Kurt Knoerl and hosted by University of Rhode Island, the MUA is an excellent resource that offers more expansive information on specific projects and archaeological sites than MaritimeArchaeology.com. A close partnership allows both sites to grow their areas of speciality and serve the wider field. Similar partnerships between other maritime web resources can link research communities for information sharing.

Conclusion

Archaeology has been lacking an innovative Web 2.0 approach to public outreach as a community. Often, treasure hunters and amateurs with fringe archaeological theories have better designed and more visually appealing websites. Arguably, archaeology is losing the media battle, as unethical groups receive television programs and documentaries, while in other instances archaeologists split airtime with non-professionals. Creating a focused public voice for the field can create a new narrative for underwater research, both online and in the media.

Web communication is difficult. This chapter is not meant to be critical of archaeological websites, since many of the administrators have limited web design training and their organizational website is only one of many duties in their job description. Instead, this chapter argues that pooling expertise and resources as a community creates a better product.

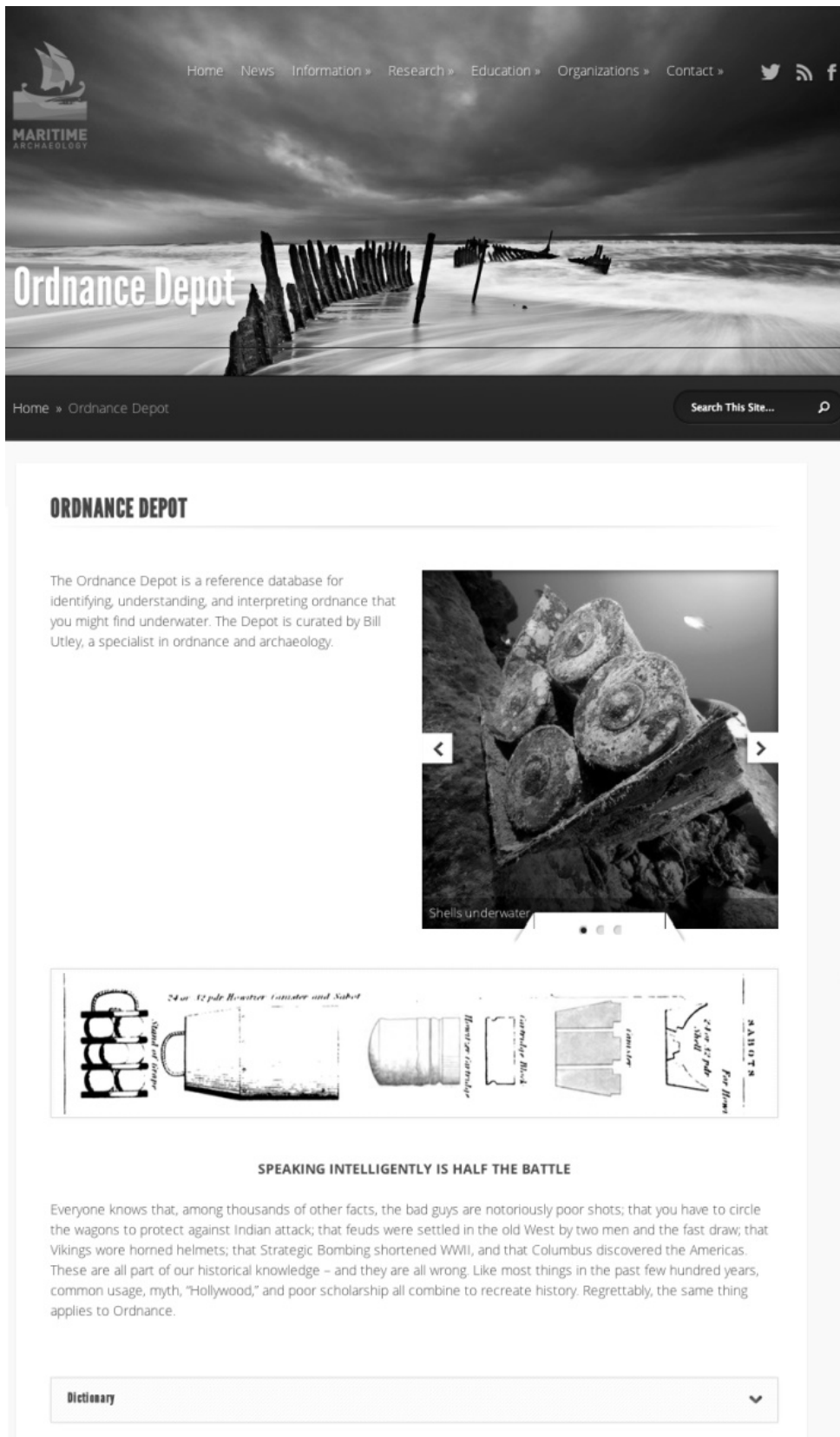


Figure 56. The Ordnance Depot provides a basic guide to explosives potentially found underwater (Author).

MaritimeArchaeology.com is designed to make use of current social media integration and share information on different scales. It is also built to be adaptable, allowing it to change and integrate as new applications become available. Like a tide that lifts all boats, the website increases hits to all the professional websites it links to.

Rather than competing, professionals should work together to create an independent community-based web resource that draws users to their own websites, while acting as a consensus public face for the field. Importantly, this promotes quality research over the questionable content that is found throughout the Internet, ensuring the public can easily find accurate and reliable information. It is hoped that in the process a connected community forms and leads to increased information sharing and quality research.

This chapter has discussed much of the thought process that has gone into the creation of MaritimeArchaeology.com, from SEO to typography to private versus non-profit organization. An intellectual strategy to reach the widest possible audience and combat unethical or inaccurate information is long overdue. The message is not that the approach outlined here is absolute or necessarily the best way forward; instead, this chapter has hopefully communicated that a discourse is needed as a field and digital fluency is critical for communicating archaeology to the public and each other.

A versatile and adaptable approach to digital communication is crucial in the ever-changing Internet Age. MaritimeArchaeology.com will undoubtedly change significantly from year to year. It may fail. However, a central voice is needed for the field, MaritimeArchaeology.com or otherwise. It is the willingness to learn and test new means of communication that will create a successful voice for archaeology over the multitudes of websites vying for attention on the Internet. As a field we must recognize that it is neither expected nor necessary for individual archaeologists, contract firms, or institutions to learn every digital tool or social media outlet; it is impractical and redundant for us to continue to build web resources alone. Our shared professional interests mean we can pool resources, time, and expertise to build our collective public voice.

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Developing Maritime Archaeology Education and Outreach in the Balkans: The Illyrian Coastal Exploration Program's Field Schools in Albania, Croatia, and Montenegro

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This chapter examines the challenges associated with building research communities in a dynamic region with historic political, cultural, and ethnic tensions. It details the creation of research initiatives and cross-border collaborations in Albania, Croatia, and Montenegro. It argues that 'capacity building' should be considered a dirty word and archaeological growth is best realized through a framework of equal partnerships on high-impact research projects. Furthermore, public interest both locally and abroad is necessary to sustain multiyear maritime archaeology projects and raise awareness about protecting underwater cultural heritage.

Specifically, we discuss the Illyrian Coastal Exploration Program (ICEP). Since 2007, RPM Nautical Foundation (RPMNF) has been conducting deep water remote sensing and diver surveys along the eastern Adriatic Sea coastline, formerly the homeland of the Illyrian tribes and the Roman province of Illyricum. In 2008, RPMNF Director Dr Jeff Royal formed the ICEP as a group connecting research across modern political boundaries. ICEP has formed collaborations with several regional centres to offer workshops, field schools, and facilitate research.

While the western coast of the Adriatic has over sixty years of research in maritime archaeology, the eastern Adriatic is relatively undocumented. Composed of Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, and Albania, maritime archaeology is in its infancy in several of these countries. Croatia has led the way with many large-scale and innovative projects, but only a handful of projects have been undertaken in the other countries.

Introduction

The Illyrian Coastal Exploration Program (ICEP) is a collaborative community founded by Dr Jeff Royal in 2008 to integrate research in the region. This research community spans modern day cultural and political boundaries, acting as an umbrella initiative to foster collaboration and pool resources in an area historically known as Illyria or as the Roman provinces of Illyricum and Epirus.

Purely academic or contract archaeology approaches have provided an incomplete view of the Adriatic's eastern coast, so ICEP acts as a bridge to connect academia, education, government, industry, and the public. As a result, the community is composed of individuals from diverse backgrounds including ecology, geology, and history, in addition to archaeology.

Keeping with this volume's goal of discussing different approaches to undertaking research, collaborative efforts, and disseminating results, this chapter begins by discussing the context of ICEP, its current research programs, collaborators, and how results have been published for local and international communities. Finally, the discussion examines successes and how to foster collaborative maritime archaeology research in regions with historical divisions and limited resources.

RPM Nautical Foundation (RPMNF) initiated concurrent coastal surveys in Albania, Croatia, and Montenegro, which served as the initial links between the countries. The coastal surveys were later supplemented with educational programs beginning in 2012. Research and education are carried out under the strictest international ethical guidelines for archaeology, ecology, and scientific diving. ICEP includes a wide range of organizations including governmental bodies, non-profit and non-governmental organizations, universities, museums, and businesses and industry. The research group is composed of the International Centre for Underwater Archaeology in Zadar (ICUA, Croatia), the Center for Conservation and Archaeology at Cetinje (Montenegro), the Regional Center for Underwater Demining in Bijela (RCUD, Montenegro), the Albanian Center for Marine Research, Transylvania University (United States), and RPM Nautical Foundation (United States and Malta), as well as other short-term partners.

This linking framework allows scholars, universities and institutes, and individual research projects in each country to engage in dialogue and establish substantial collaborations. These associations include cross-border research visits, student exchange, sharing of fieldwork results, and cooperative arrangements for sharing expertise and equipment. Croatia has largely led the way in developing maritime archaeology in the Balkans through the regional UNESCO centre, the ICUA, while RPM Nautical Foundation has provided much of the research links between countries.

The importance of linking the eastern Adriatic coastline has become clear from a research perspective as well as bringing the different states of maritime archaeology in each country in line. ICEP has documented 20 ancient, 36 modern, one medieval, and two post-medieval shipwrecks, as well as recorded remains of harbour structures, indicators of sea level change, and a Roman aqueduct and bridge (Royal 2012). From 2012 to 2014, ICEP has offered seven field schools. The archaeological finds are reported in a series of publications by Royal (2009a, 2009b, 2010, 2012, 2013, 2014, 2015; James and Royal 2015), while this chapter is the account of the educational and outreach programs.

Background

The eastern Adriatic was first inhabited during the Palaeolithic (Karavanić and Patou-Mathis 2009) and submerged evidence has been found (Gaspari *et al.* 2011). Lake and coastal settlements from the Neolithic indicate use of watercraft (Sherratt 2004) and movement of material culture suggests trans-Adriatic travel (Robb and Farr 2005). Settlements show large scale maritime commerce developed during the

Bronze Age. The first direct evidence of seafaring is a sewn vessel recently discovered at Zambratija, Croatia, reportedly dating to the 12th century BC, though results have not been published yet (Constans 2014). Otherwise, direct maritime evidence is sparse until approximately the 6th century BC.

Today, the tribes that inhabited the area are grouped under the name 'Illyrian.' This is in large part due to the fact that the only historical texts which discuss these inhabitants come from Greek and Roman writers. Greek colonization began in the 7th century BC (Jurišić 2000: 3). Corinth and Corcyra spearheaded the colonies, focusing on coastal sites and islands as far north as southern Croatia. From the 6th to 4th centuries BC, Illyrian and Greek cities flourished in the region. Rome entered the Balkans in the 3rd century BC. A dynamic shift in settlements and economy is seen, such as construction of large villa estates. Rome incorporated the region into the state through the creation of provinces, though names of these political territories changed frequently. The term 'Illyria' was only used for a portion of the region's history; it remains a politically complex term today. For the purposes of this research community it refers to the entire eastern Adriatic littoral zone (Royal 2012).

At 2390 km, the eastern Adriatic is nearly twice as long as the western 1249-km Italian coast, or five times longer when including 4001 km of island coastlines (Kirigin *et al.* 2009: 137). The west is a dangerous coast with few natural harbours, while the east is full of safe anchorages. In the brief period that maritime archaeology has operated along the eastern coast, researchers have identified more ancient shipwrecks than along the western coastline, 99 to 28 or 78% of Adriatic shipwrecks, despite decades of Italian research (Royal 2012: 442).



Figure 57. Map of the Adriatic Sea with current political boundaries and major Classical Period settlements (Author).

The archaeological evidence demonstrates the importance of this coastline for the study of ancient trade and navigation. The shipwreck concentrations suggest ancient mariners preferred navigating the eastern coast due to the availability of harbours and anchorages, rather than the low lying and harbour-less west coast, much like 19th century pilotage accounts (Dunsterville 1864). Therefore, to understand central Mediterranean trade it is necessary to investigate the Adriatic's eastern coast.

The east coast is composed of former Yugoslavia and Albania. During the communist era, these two countries had very different experiences with maritime archaeology. Yugoslav archaeologists documented underwater finds and identified several key sites; however, there was widespread looting, often by military divers (Royal 2012: 409). In Albania, the communist government under Enver Hoxha outlawed diving and inadvertently preserved sites below free diving depths. Maritime projects were limited to documenting the submerged structures around Durrës (Ceka and Zeqo 1984). The result of these two approaches is the former Yugoslav countries have publications spanning several decades (e.g. Vrsalović 1979; Radić-Rossi 1993; Bekić 2009), but sites are heavily looted. Albania has very few publications (Ceka and Zeqo 1984; Volpe *et al.* 2008; Royal 2012), but even shallow sites are in good condition.

In his review of the region's maritime archaeology, Mario Juršić states, 'The Montenegrin and Albanian coasts (Roman Epirus and Macedonia) are almost entirely unknown in this context because of a total lack of underwater research, at least as far as is known' (2000: 50). In many ways the current state of maritime archaeology reflects the recent past as Hoxha and Tito's policies are still felt today. Albanians have been slow to take to the sea and there is currently limited sailing and diving taking place, though it is increasing annually. In contrast, Croatia and Montenegro are maritime cultures where the general populace spends a great deal of time sailing and diving.

Maritime archaeology is advanced in Croatia, which is a world leader in the field. Several Yugoslav publications identify key sites in Montenegro and since independence in 2006 maritime archaeology has been steadily developing. Albania still lags behind as engagement with the sea continues to be problematic.

Croatia

The Croatian coastline is 1,777 km long, or 4,058 km including islands. It is a maritime nation with many recreational and professional sailors, as well as an active diving community.

Maritime archaeology is fully developed in Croatia and the country is among the world leaders in terms of number of projects and employed maritime archaeologists. Croatian maritime archaeologists have led the way with innovative approaches, such as caging shipwrecks to protect them from looting while still allowing diver access (Bekić and Miholjek 2009). Major institutions conducting maritime archaeology in the country are the regional UNESCO centre, Međunarodni Centar za Podvodnu Arheologiju u Zadar (International Centre for Underwater Archaeology in Zadar), University of Zadar, and University of Zagreb. There are numerous on-going projects within the country, covering shipwrecks and submerged landscapes dating to various periods. There is a record dating back decades, as Yugoslav publications on underwater finds typically feature Croatian collections. There are national laws protecting underwater cultural heritage and Croatia has ratified the 2001 UNESCO Convention on the Protection of the Underwater Cultural Heritage.

Montenegro

The length of the Montenegrin coastline is 293 km. In comparison, Montenegrins are not as maritime-oriented as Croatians; however, boating and diving are popular recreational activities.

Maritime archaeology is still in its infancy, in large part due to the country gaining independence only a few years ago. There was a submerged cultural resource plan designed for the coastline during the 1990s by Gordana Karović; however, the war and lack of funding prevented its implementation. The government has worked quickly to adopt regulations on diving and underwater cultural heritage, including ratifying the 2001 UNESCO Convention. However, implementing the Convention has proven difficult.

The major institutions involved in maritime archaeology in Montenegro are the Center for Conservation and Archaeology in Cetinje and the Regional Center for Underwater Demining in Bijela. Along with RPMNF's coastal survey, the other large-scale maritime archaeology initiative is the Montenegrin Maritime Archaeological Research Project (Blue *et al.* 2015). A cultural resource management plan for the Montenegrin coast was created in the 1990s as many of the significant sites had already been identified during the Yugoslav period and some communist era publications exist.

Albania

Albania's coastline is 611 km in length. Like Croatia and Montenegro, Albania ratified the 2001 UNESCO Convention. However, implementing the Convention and protecting underwater cultural heritage has proved difficult. Few national laws extend into the sea and there is little governing underwater cultural heritage. Due to Albania's communist era restrictions, its intact underwater resources are unique in the Mediterranean and are among the most pristine in the world. The impact of the diving ban is evident in the great disparity between the denuded underwater resources of Greece's Corfu, two kilometres off the Albanian coast, compared to the rich deposits on the Albanian side of the Corfu Channel. Archaeological sites remain intact in large part due to Albanians remaining disconnected with sailing and diving compared to their northern and southern neighbours.

To this day there is an absence of diving facilities in the country such as hyperbaric chambers and medical facilities to treat divers. Only a handful of projects have been attempted in Albania and results have been mixed; fewer than ten scientific publications exist on Albania's underwater cultural heritage. Dr Neritan Ceka surveyed the submerged ruins of Durrës, Roman Dyrrachium, in the 1980s (Ceka and Zeqo 1984). In 2000, a Texas A&M team under the direction of Elizabeth Greene conducted surveys around Lake Butrint, its entrance to the sea, and the Sarandë area (Greene 2001). Dr Giuliano Volpe's Progetto Liburnia surveyed Porto Palermo, Greek Panormus, beginning in 2006 (Volpe *et al.* 2008). In 2007, RPM Nautical Foundation (RPMNF) partnered with the Albanian Institute of Archaeology and the Ministry of Defence to survey the coast (Royal 2012). Archaeologist Adrian Anastasi, based at the Durrës Archaeological Museum, worked with Progetto Liburnia and the Albanian Coastal Survey, and conducted surveys around Durrës.

Though Albania has arguably the best preserved underwater cultural heritage in the Mediterranean, it has garnered less scientific research than countries with smaller coastlines. Unfortunately this heritage will not last. Private industry is conducting large-scale coastal development and diving is on the rise, meaning the status quo of underwater heritage preservation can no longer be maintained. Threats to Albania's underwater cultural heritage have become clear following years of monitoring initiated by the RPMNF and the Albanian Center for Marine Research (ACMR). Increased boating, drag net fishing, and diving have shown a marked increase in looting of underwater archaeological sites over the last several years.

Qendra Shqiptare e Kerkimeve Detare (Albanian Center for Marine Research)

While Croatia and Montenegro had marine or maritime research facilities to partner with, Albania did not and the government was not forthcoming with funds to create one. Therefore, the ACMR

was founded as a non-governmental organization on 30 June 2010 by George Robb, Dr Neritan Ceka, and Auron Tare. Oversight is provided by a Board of Directors composed of Robb, Ceka, and Dr James Delgado, then President of the Institute of Nautical Archaeology (INA) and current Director of Maritime Heritage at the National Oceanic and Atmospheric Association (NOAA). The ACMR was a registered non-governmental organization, but it was without research facilities or operating funds beyond annual costs paid by RPMNF for maintaining an office in Sarandë. In July 2011 Derek Smith and Peter Campbell were hired as directors of coastal ecology and archaeology, respectively.

Smith and Campbell established ethical and operating guidelines for the ACMR based on accepted international guidelines, such as AAUS dive standards and SAA ethical standards. The directors formed the ACMR's goals of professional training in conjunction with on-going research to include field schools and outreach.

In the ACMR's second year, the first with research directors, it had 750% operational budget growth and its third year experienced an additional 167% growth. The Center added visiting faculty such as Dr Chris Begley, Dr Derek Irwin, Petra Zdravković, and Howard Phoenix to aid research, education, and operations. RPMNF matched the Center's funds by providing boats, fuel, and diving equipment. In its first two years the Center operated under RPMNF's Albanian Coastal Survey permit, but in 2013 Dr Luan Perzhita, the head of Albanian Institute of Archaeology, issued the Center its own remit to conduct research in Albania's waterways.

The ACMR has successfully logged close to 600 scientific dives. The number of international researchers working in Albania continues to grow as the ACMR builds its resources. This represents the largest coordinated underwater survey in the eastern Adriatic south of Croatia. During its short life, the Center quickly established itself as the primary marine research organization in Albania and as an international research institution.

In this brief period, the ACMR's research avenues increased significantly while also expanding its educational programs. As a collaborative partner with RPMNF and the Albanian Institute of Archaeology in 2012, the ACMR coordinated one research project, the Fishermen's Amphora Project, and aided with the Albanian Coastal Survey. In 2013, with a permit from the Ministry of Culture, the ACMR fulfilled three new research programs while continuing to collaborate on the Coastal Survey. Answering to increased responsibility, the Center and its staff demonstrated the ability to carry high level research to its conclusion.

Governmental elections in 2013 selected Edi Rama as Prime Minister. Rama, the former Minister of Culture, founded a new governing body for the country's coastline in September 2013. Rama chose the Center's executive director Tare to head the National Coastal Authority. This new period offers increased opportunities to develop the underwater sciences in Albania.

Within Albania, the Center is a high profile institution and many non-traditional issues are brought to their attention. For example, in August 2011 Tare was contacted about a terrestrial cave located in northern Albania containing a scatter of artefacts. Upon visiting the cave, Tare noted several pieces of pottery and photographed them. He consulted Dr Ceka, who concluded the pottery dates from the Early Neolithic (circa 7000-4500 BCE) through the Bronze Age (circa 3200-600 BCE). The Early Neolithic pottery is a southern Italian type, demonstrating trans-Adriatic trade and possible Neolithic seafaring, as the site is located between two Adriatic sailing routes, the northern island hopping route from the Gargano Peninsula (Farr 2006) and the southern route across the narrowest section of the Adriatic. Tare contacted Dr Lorenc Bejko at University of Tirana to report the find and produce a documentary about the site.

The ACMR staff does its best to respond to non-traditional issues and support ethical efforts. The Center has offered expertise and support for ecotourism in Ksamil Bay, grassroots marine clean-up efforts, motorboat and jet-ski regulation, waste dumping regulation, joining the Blue Water Alliance to facilitate docking of sailing vessels, and creation of a lifeguard training program for Albania.

Slovenia and Bosnia-Herzegovina

Slovenia and Bosnia-Herzegovina complete the eastern Adriatic coastline; however, so far these countries have not been included in the ICEP community. Excellent research is being conducted on submerged landscapes along Slovenia's 43 km coastline (Benjamin and Bonsall 2009; Gaspari *et al.* 2011; Benjamin *et al.* 2011). Maritime archaeology is likewise developing in Bosnia-Herzegovina, which contains 20 km of coastline and numerous inland rivers and lakes (Vogt 2008).

Workshop

The Balkan Maritime Archaeology Workshop was the first pan-Balkan workshop, held in June 2012. Delegates from Greece, Montenegro, Serbia, and Albania, as well as foreign universities were hosted by the ACMR at the Grand Europa Hotel in Shkodër, Albania. Organized by Peter Campbell and Auron Tare, the workshop was funded by USAID and received widespread media coverage in Albania.

Presentations included Dr Katerina Dellaporta on the history and current status of underwater archaeology in Greece, Peter Campbell presented the Illyrian Coastal Exploration Program on behalf of Dr Jeffrey Royal who was offshore on the research vessel *Hercules*, Nemanje Cavlovic presented on maritime archaeology in Montenegro as the government's representative, Auron Tare presented on Albanian maritime archaeology, and Dr Athena Trakadas, Dr Lucy Blue, and Petra Zdravković provided details on the Montenegrin Maritime Archaeological Research Project (MMARP).

Following the presentations, a discussion was conducted on underwater cultural heritage in the region. Several participants provided lessons and examples on potential pitfalls and issues that crop up when developing regulations for cultural heritage. Current frameworks within each country were then discussed. All the Balkan states have ratified the 2001 UNESCO Convention; however, means of enacting the treaty and on-the-ground practices differ considerably between the countries.

Discussants suggested that since the region is relatively small, nations could maximize resources through collaboration and resource sharing. Cross-border and IPA funding, as well as other funding bodies like USAID, offer excellent opportunities to build and share resources. Working together, additional international institutions should bring in additional opportunities. It was agreed a second workshop should be organized to draw on a wider group of invitees. Overall, the Albanian workshop was a positive



Figure 58. The 2012 workshop hosted by the ACMR in Shkodër, Albania (Author).

experience with an atmosphere of cooperation and shared goals that carried over into research collaborations.

ICEP proceeded to enact many of the suggestions of the workshop and now acts as a facilitator. Among the many suggestions were equipment sharing and laboratory analysis. Sharing has included cooperation between MMARP and RPMNF, joint field schools in Croatia, Montenegro, and Albania, and plans for cross-border collaboration between Greece and Albania, as well as Albania and Montenegro.

ICEP research

Education and outreach are facets of on-going ICEP research. The research is extensively published in a series of articles by Royal (2009a, 2009b, 2012, 2013, 2014, 2015; James and Royal 2015) and partners (Smith 2009; Delgado 2014; Campbell 2012b, 2013, 2014; Stratton 2014). Readers can find methodologies and a complete description of findings in these articles; this section provides a general overview to show the various scales of research undertaken by the ICEP partnerships as context for the education and outreach programs.

Research and education has been funded through numerous grants including two from the Waitt Foundation, Explorers Club, Southampton Marine and Maritime Institute, Historical Metallurgy Society, American Archaeology Abroad, Coca-Cola sponsorship, and travel funding has been provided by Transylvania University, East Carolina University, and University of Southampton.

The lack of availability of equipment and technology is a major obstacle to the development of high quality research in the eastern Adriatic. Albania, for instance, lacks almost all diving facilities including a hyperbaric chamber. Injured divers must travel to Greece over the mountains, to northern Montenegro, or across the Adriatic to Italy. RPMNF has supplied a mobile hyperbaric chamber as well as diving equipment such as an enriched air nitrox station. Partners in industry provide key diving and scientific equipment, including Atomic, BARE, Titan Dive Gear, and Labsphere. Multibeam and remote sensing technology and technicians are available through a partnership with Highland Geo Solutions.

RPMNF has been conducting a coastal survey of the eastern Adriatic since 2007 (Royal 2012). The primary method for surveying is a hull-mounted multibeam echo-sounder on RPMNF's research vessel *Hercules*. Anomalies are ground-truthed using a Remotely Operated Vehicle (ROV) as well as diver surveys. The multibeam survey produces three-dimensional models of the seafloor and is recorded with the ROV using differential GPS.

In Albania, divers visually survey from -35 m to the surface, covering 25 km of coastline, while diving operations in Montenegro focus on previously identified sites such as the ancient port of Risan. Several shipwreck sites warrant excavation or annual monitoring. These are recorded using triangulation software taking measurements from fixed datums around the site and photogrammetry, as well as traditional photographs and drawings. In Croatia, the field school aids the ICUA's Zadar County Survey. Over the years, the Centre has compiled a database from reports by divers, fisherman, and archaeologists. The survey systematically investigates these reports to create a comprehensive cultural resource map of the important maritime region around Zadar.

ICEP has discovered or confirmed dozens of shipwrecks from the 6th century BC through modern times. Many are significant archaeologically and historically.

- The 4th century AD Joni shipwreck is an important indicator of Central Mediterranean trade during the Late Roman Period, as it was carrying North African Keay 25 amphoras and Late Roman 1 and 2 amphoras (Royal 2012).

- Multiple Corinthian amphora wrecks are reframing trade during the period of Greek colonization (James and Royal 2015).
- A 30 m Roman Period merchant vessel was found off Sazan Island carrying Lamboglia 2 amphoras (Royal 2015).
- *Regina Margherita*, launched in 1901, was the flagship of Italy's Mediterranean Squadron and participated in the Italo-Turkish War from 1911-1912. By World War I *Regina Margherita* was obsolete, but served off the Albanian coast when in 1916 it struck two German mines and sank off Vlorë.
- The World War II Italian hospital ship *Probitas* was carrying hundreds of injured soldiers when Germany bombed it at anchor in Sarandë Bay as punishment for Italy's surrender.

One of the most significant shipwreck discoveries was the result of an international controversy at the start of the Cold War. In 2009 RPMNF and Delgado investigated steel wreckage near Sarandë Bay, determining it was the bow of HMS *Volage* (Delgado 2014).

As the post-war world was reshaped, the Royal Navy tried to send a message to Hoxha and the new communist Albanian government. Four battleships sailed up the narrow Corfu Channel's international waters in October 1946 for what the Royal Navy argued was 'innocent passage' (Delgado 2014). The plan backfired when two vessels, including *Volage*, struck mines. The UK claimed the Albanians had mined international waters, while Albania claimed the vessels had come close to Sarandë in an act of intimidation. International courts ruled in favour of the Royal Navy. It was a landmark case that allowed the UK to freeze Albanian gold reserves in London and resulted in a brief that is still used to argue for 'innocent passage' (Delgado 2014). Archaeological evidence found in 2009 supports the Albanian story; *Volage* was clearly in Albanian territorial waters. The Corfu Channel Incident demonstrates how maritime archaeology can rewrite popular history.

Artefact conservation and scientific analysis are also aspects of research. Ceramic artefacts saturated with saltwater often have compromised structural integrity, requiring extensive conservation time and expense. While Croatia has excellent conservation facilities, Albania and Montenegro are still developing conservation labs specialised for wet finds. As a result, artefacts are left *in situ* as a first option and only raised to answer specific research questions or for protection where looting or damage has been documented. When conservation facilities are not available, raised artefacts are re-deposited on the seafloor after study and petrology or residue analysis samples have been taken. Amphora fragments from several shipwrecks have been tested using petrographic analysis, as well as residue analysis using mass spectrometry and experimental DNA analysis.

Under the direction of Adrian Anastasi, four lead anchor stocks were recovered for the Durrës Archaeological Museum. Lead stocks are often found by fishermen, who have been caught by officials melting them down for fishing weights (Adrian Anastasi, pers. comm.). The four anchors were conserved following the accepted methodology outlined in Hamilton (1999) and Rodgers (2004). The museum was provided with a conservation report along with recommendations of storage and display (Campbell 2012a).

Research by Dr Chris Begley related to underwater 3D imaging is being conducted in the coastal surveys. This work focuses on the development of inexpensive, high-resolution 3D imaging using structured light technology (Crane *et al.* 2010). This research has produced a functional prototype underwater imaging system that is inexpensive to manufacture, with most of the cost associated with processing the images. For archaeologists, this allows great flexibility in costs, allowing modestly funded projects to utilize this technology. A low initial investment and the ability to adjust the amount invested in imaging by controlling the number of images processed should allow this technology to be widely utilized by researchers and institutions, regardless of the level of funding.

The UNESCO World Heritage Site of Butrint has been the focus of excellent scholarship over the years, but little has been done in the surrounding Lake Butrint. In 2013, the ACMR used sidescan sonar, sub-bottom profiler, and diver surveys to locate the 1st century remains of the aqueduct and bridge that once spanned the lake. Archaeological and ecological documentation of these submerged structures are planned for upcoming field seasons.

Since 2011, the ACMR team has annually surveyed and monitored the Blue Eye Spring, a large fresh water system that provides water for southern Albania. The spring is significant for both ecology and archaeology. There is a local oral history tradition about the spring and archaeological evidence of ritual use inside the spring (Tare *et al.* 2011). The ecology of the region is rich and diverse, likely the driver being the settlement of the area and the development of the oral history tradition. For this reason, the authors are planning a joint ecology and archaeology publication on the natural and social history of the spring system.

Models of sea level change are becoming more refined throughout the Mediterranean; however, data is lacking from Albania. Using multibeam data to locate paleolandscapes and diver surveys to identify indicators of sea level change, an ACMR and RPMNF project led by University of Southampton masters student Loren Clark determined the magnitude of sea level changes since the Pliocene in Albania. The study reveals how coastal change has affected archaeological sites and provides better information for the southern Adriatic for Relative Sea Level (RSL) models.

One of ICEP's long term projects is working with local citizens to record previous finds for an initiative called the Fishermen's Amphora Project, a project similar to collaborations with fishermen elsewhere (Price 2013). It has acted as an early warning system for identifying the underwater archaeology of certain regions. Fishermen are actively losing nets through snagging on archaeological sites, damaging both cultural heritage and their livelihood. A mutually beneficial solution may come in the form of collaborative fishing regions, known as marine protected areas (MPAs), delineated by government based on information from this project. The research allows the students to gain experience in artefact photograph, illustration, and identification, while also documenting the ceramics found in fishing nets. Coupled with underwater survey data, it is possible to assess the types of damage caused to archaeological sites by different fishing methods as well as identify high-risk sites. Over one hundred amphoras have been documented and twenty-three ethnographic interviews completed, offering a large database to inform archaeologists about the underwater cultural heritage in the region.

Unfortunately, looting occurs on many sites in the Balkans. Illicit trafficking of amphoras has been documented in Montenegro (Royal 2012: 431) and Albania (Campbell 2013: 138). Disturbance by looters has also been noted during fieldwork together with the ICUA at sites in Croatia. While ICEP partners liaise with law enforcement when looting occurs, the only course of action for archaeologists is to document site changes annually through site monitoring.

A large facet of ICEP is interdisciplinary, especially for the long term monitoring of shipwrecks. The ACMR and University of North Carolina Chapel Hill were awarded a Waitt Foundation Rapid Ocean Conservation Grant for the creation of marine protected areas and carrying out baseline ecological data around Ksamil Bay, the country's first underwater park. The project is a significant step for coastal ecology in Albania and the beginnings of a systematic approach to underwater sciences in the region. It is also an excellent demonstration of how ecology and archaeology can work hand-in-hand to answer the same questions through mutually beneficial scientific methods.

An unexpected but important result of research is the discovery of unexploded ordnance. ICEP has identified and reported numerous bombs and ordnance left from World War II through the 1990s conflict. De-mining departments quickly and effectively detonate or remove the ordnance.

Remote sensing data collected by RPMNF will soon be made available for multidisciplinary researchers through the Organization for Mediterranean Ecology, Geology, and Archaeology (OMEGA). OMEGA provides terabytes of multibeam data from eight Mediterranean countries, including the ICEP countries, through a secure online server hosted by Memorial University of Newfoundland. The research scheme is currently in development and hopes to have an interface for partnering institutions in the near future.

ICEP Scientific Diving Course and field schools

Scientific diving in the United States was developed during the 1950s at the Scripps Institution of Oceanography. Scientific diving programs through the late 1970s enjoyed a community standard and an incident rate far lower than recreational and commercial diving sectors. In 1977, The American Academy of Underwater Sciences (AAUS) was formed to petition the US Occupational Safety and Health Administration for an exemption from commercial diving standards for scientists using diving as a tool to conduct underwater research. The exemption was granted in 1982 and AAUS has since been recognized as the standard setting body for scientific diving in the United States. Scientific divers that are authorized to dive in a program adhering to AAUS standards can enjoy reciprocity with other organizations following the same standard, allowing for recognition of prior training and ease of collaboration between organizations.

In 2012 and 2013, ACMR in collaboration with ICEP conducted the first scientific diving training adhering to AAUS standards in the Balkan region. The Scientific Diving Course is offered as a two-week intensive course teaching scuba rescue techniques, emergency dive accident management, search and light salvage, quantitative sampling methods, experimental design, diving equipment and technology, and scientific ethics. Students completing all requirements become authorized scientific divers in the program and are prepared to lead projects using diving as a tool to conduct underwater research.

In 2014, ICEP conducted a Scientific Diving Course hosted by the ICUA facility in Zadar, Croatia. The course was a first-ever international scientific diving training adhering to AAUS and European Scientific Diving Panel (ESDP) standards. Faculty, staff, and students of the course included representatives of 10 countries, the current Presidents of AAUS and ESDP and the Training and Assessment Coordinator from the Australasian Diver Accreditation Scheme (ADAS). Divers completing all requirements for the course achieved recognition as Scientific Divers across three continents with certifications from AAUS and ESDP as well as authorization to dive in programs adhering to ADAS standards.

ICEP underwater sciences field schools are university courses accredited through Transylvania University. The course is designed based on recommendations by the Register of Professional Archaeologists (RPA) and the Nautical Archaeology Society's guidelines for underwater field schools, though it is not an accredited RPA field school due to its short length of two to three weeks. The field school adopts the Society for American Archaeology (SAA) Principles of Archaeological



Figure 59. Students watch a rescue scenario during the AAUS Scientific Diving course (Jeff Bozanic).



Figure 60. Students watch a demonstration on underwater artefact recording (Elaine Ferritto).

Ethics and Transylvania University's code of conduct policy. All field school divers must be current Scientific Divers authorized by an organization adhering to AAUS, ESDP, or ADAS standards with a minimum 20m depth rating, nitrox certification, and current emergency response certifications to meet ICEP regulations. Students are evaluated based on participation, practical work, and by written examinations.

The course is structured as 2-3 weeks of underwater sciences training. It is a combination of formal lectures and in-the-field training. The staff emphasizes student participation through hands-on methods like experimental archaeology, active artefact recording, 3D modelling, and field trips as supplements to fieldwork.

The aim of the field school is to provide students with a well-rounded and interdisciplinary introduction to the wide range of ideas and technology they will be expected to be knowledgeable about upon becoming professionals in the field. The course exposes students to interdisciplinary research on a number of different site types and teaches analytical methods, conservation, and sustainable site development. It balances lectures by experts with daily dives and practical field experience. Organised field trips to terrestrial archaeological sites and other important cultural sites add to the pedagogical value of the field schools.

Thirty-two students have attended the seven field schools from 2012-2014. Students come from the Balkans and countries from all over the world including Albania, Austria, Australia, Canada, Cyprus, Estonia, Germany, Israel, Italy, Mexico, Montenegro, Portugal, United Kingdom, and the United States. Students are either advanced undergraduates or graduate students in good standing with their home institutions.

The field school staff is composed of specialists from institutions such as RPMNF and the ACMR, as well as East Carolina University, University of Washington, University of Belgrade, and University of Southampton. The course is accredited by Transylvania University, offering transferrable credit to universities worldwide. Specialists are also brought into the field school via Skype to teach students remotely about their areas of expertise. The fourteen staff members come from Albania, Croatia, Denmark, Ireland, Montenegro, Serbia, and United States. The strength of the field school is the ability to draw on a wide knowledge base for education and research.

The underwater sciences field school consists of fieldwork, formal lectures, and practical exercises. Students are introduced to working on an active field project with professional scientists. They are expected to behave professionally and are incorporated into active research conducting surveys and monitoring archaeological sites. Coastal survey extends into unexplored areas; it consists of dives from 35m to 5m in a variety of environments including cliffs, open water, high current, and low visibility conditions. Annual monitoring records known sites, including the 4th century BC Butrint I and II Corinthian shipwrecks, a 4th century AD North African shipwreck, a Byzantine marble transport, Roman bridge and aqueduct ruins, anchorage remains at the Illyrian and Roman city of Risan, several Cold War era torpedo boats, and the World War II Italian hospital ship *Probitas*.

Professional archaeologists and ecologists present the field school's formal lectures. The course begins with an introduction to maritime archaeology and the history of the Balkans. The next day students are presented with a general overview of archaeological theory and ethics. The Nautical Archaeology Society (NAS) course is then taught to familiarise students with recording methods. Following these orientation lectures, students receive daily lectures lasting 1-3 hours on specialist topics.

- Site Types and Cultural Landscapes
- Site Formation Processes
- Remote Sensing and ROV
- Maritime Archaeology in Albania, Croatia, and Montenegro
- Conservation of Wet Finds
- Building a Career and Professional Development
- Archaeological Sites as Ecosystems
- Excavation Techniques
- Coastal Ecology
- Shipboard Life
- Ship Construction
- Site and Museum Development
- Adobe Photoshop for Archaeologists
- Digital and 3D Methods in Archaeology

Beyond formal lectures and fieldwork, the students are given practical in-the-field training activities to acclimate them to working underwater. Since students might encounter other types of archaeological sites than shipwrecks upon becoming professionals in the field, the field school includes visits to every potential site type including underwater caves, lake and river environments, submerged buildings and structures, and intertidal sites to provide a well-rounded experience. Practical experiences include:

- Low Visibility and Night Diving
- Underwater Photography
- Field Methods for Maritime Archaeology
- Eco-Psychology for Divers
- Field Methods for Coastal Ecology

- Site Prospection through Understanding Landscapes
- Ethnoarchaeology
- Remote Sensing
- Excavation Methods
- Fishermen's Amphora Project
- Submerged Structure Recording
- Experimental Archaeology: Fish Sauce (*Garum*), Oil Lamps, and Ancient Anchors

There is also a weekly field trip to show students how underwater finds fit into the wider relationship between land and sea. These include the ancient city of Panormus, modern Porto Palermo, and its Ottoman Period castle, the Blue Eye spring system, Budva's old city, Stari Bar, Nin, Biograd na Moru, Kotor's Venetian castle, local museums, the research vessel *Hercules*, and UNESCO World Heritage Sites Butrint, Gjirokastra, Boka Kotorska, the Palace of Diocletian in Split, and Dubrovnik's Old City. Many of the sites are natural harbours, anchorages, or fresh water sources, which places the underwater cultural heritage offshore into context.

The results of the field schools have been impressive. Over 1050 scientific dives have been undertaken by 49 international researchers without incident. ICEP student alumni have done well upon leaving the field school. Other than two individuals still completing their undergraduate degrees, 95% of the alumni have found either a professional research job (60%) or entered a graduate program following the field school (55%), with four students having done both. Two students, Lee Pape and Nick Bartos, were invited back to subsequent field schools as staff members. Five Masters and five PhDs are being written using data from ICEP fieldwork by graduate students at East Carolina University, University of Oxford, University of Belgrade, Tirana University, University of Southern Denmark, University of Washington, University of Southampton, and University of North Carolina at Chapel Hill. Forthcoming academic publications using data collected during the field schools cover topics including ancient trade, fishermen's finds, Adriatic ecology, and the archaeology of Lake Butrint.

Local impact is a critical component of the program. The field schools demonstrate the value of research to the local economy and tourism industry. The foundation has been laid for sustainable tourism and use of the sea, a process that will aid businesses, fishermen, tour operators, and local citizens while also preserving local ecosystems, archaeological sites, and natural areas. The research has the potential to play a significant role in the future development of the southern Adriatic coastline.

Beyond the sciences, ICEP field schools have stimulated local economies through housing, feeding, and transporting the dozens of researchers and their support personnel at a cost in excess of \$120,000. Tourism in the region benefited through visits to local sites and there has been increased visibility for the region through photographs, video, Internet outreach including RPMNF and the ACMR websites, Facebook pages, and webcasts, as well as word of mouth. The field schools have been an unequivocal success for Balkan underwater sciences with the Albanian programs representing the first scientific diver and underwater sciences training in the country.

Local outreach

Local outreach is one of the most significant goals of ICEP. Communicating the importance of underwater cultural heritage to a public where the majority will never dive is a challenge. ICEP uses a variety of approaches to communicate findings.

Local media has been interested and willing to produce annual pieces on ICEP research. Communicating findings in local languages is critical. Each year there is a media day for local TV stations to film divers.

ICEP provides underwater footage to go with above water shots. There are also independent filmmakers, such as Milorad Djuknic, who joins ICEP to create documentary films.

ICEP also publishes in local or national newspapers. Glossy magazines have proven an excellent medium for sharing high-resolution underwater images. The ACMR published articles on an underwater spring system in Albania titled 'Zbulimet e Syrit të Kaltër,' or Discoveries in the Blue Eye, and an article on the coastal ecology of Albania titled 'Bota Shqiptare e Nënujit,' or Albanian Underwater World (Tare 2011; Tare *et al.* 2011). ICEP also publishes in the ICUA's Submerged Heritage magazine, an annual review of maritime archaeology projects in the Mediterranean and published by UNESCO in both Croatian and English (Smith *et al.* 2013; Campbell *et al.* 2013).

ICEP also meets and works with local archaeology students, as well as maritime-related industry. The ACMR's efforts to create marine protected areas is a large part of this initiative.

There are also a wide range of non-traditional methods of communicating with local communities. As an example of large scale outreach, the Albanian government used RPMNF photographs for national postage stamps, showcasing the country's underwater cultural heritage to millions. On the other end of the spectrum, RPMNF has signage in various languages that it places on the research vessel *Hercules* when in port, so that curious passersby can learn about maritime archaeology.

International outreach

Reaching international audiences is also important. As maritime archaeologists it is vital to demonstrate why underwater cultural heritage needs to be protected by showing the public what is beneath the sea. International outreach consists of transmitting information on different scales and through various mediums. Fieldwork findings have been widely distributed through media outlets including BBC, CBS, ABC, NPR, MSNBC, Fox News, USA Today, Discovery Channel, Daily Mail, Telegraph, Washington Post, Boston Globe, Los Angeles Times, and many more. ICEP has also been published in more specialist media, such as *Archaeology Magazine* (Hvistendahl 2011).

Professionally, ICEP researchers regularly attend academic conferences such as the American Institute of America (AIA), Society for Historical Archaeology (SHA), Society for American Archaeology (SAA), Western Society of Naturalists (WSN), and Ecological Society of America (ESA) as well as speak at universities. Royal recently completed an Archaeological Institute of America lecture tour, while Tare spoke at the Explorers Club in New York.

Beyond these traditional communication methods, ICEP also makes use of the Internet and social media. Interactive shipwreck maps were created for the ACMR and RPMNF websites. These maps allow users to explore the underwater cultural heritage of the Illyrian coast from home without the need for diving equipment. ICEP uses Facebook and Twitter to share information and answer questions. The ACMR YouTube channel allows Internet users to watch videos of archaeologists in the field.

Smith organizes an annual Skype chat with summer school students at the Seattle Aquarium to discuss underwater research, an interaction that is educational for both the students and researchers. The 2014 field school at the ICUA participated in a video conference call to the world's only underwater habitat,



Figure 61. Albanian national stamps featuring maritime archaeology (Author).

Aquarius, where Fabien Cousteau was residing for 31 days as part of a scientific and outreach program named Mission 31. Finally, ICEP has provided photographs and video for a Massive Open Online Course (MOOC) on maritime archaeology created by the University of Southampton's Centre for Maritime Archaeology. These traditional and online communications share Balkan underwater cultural heritage with those in the region and around the world.

Discussion

When summarizing ICEP's findings, Royal concludes that the potential of the eastern Adriatic for maritime archaeology is linked to education and outreach in the region, saying, 'The growing corpus of maritime data will facilitate site protection in these countries and provide decades of work for archaeologists. A major task remains: the training of local maritime archaeologists in analysis, conservation, and methodology. This task can only be achieved by multi-institutional involvement and broadened connections with university departments' (2012: 452). The challenges are great, but, as the previous sections have shown, are worth the effort and a framework is in place.

An engaged and informed public is created through a population of trained local archaeologists; an informed public leads to engaged politicians and the protection of cultural heritage. Three areas are required for success: local engagement, education, and maintaining research communities. This discussion explores the complexity of Balkan archaeology and how success in these three areas can be achieved.

Collaborative research in regions with historic conflict

The Balkan Peninsula is a region of historic ethnic conflict and tensions are a potential hindrance to cross-border research communities. The ethnic, cultural, and political landscapes are incredibly complex and often subtly expressed; understanding these nuances is difficult for outsiders. One scholar from the region contextualizes the history of Balkan archaeology by stating, 'Awareness about the extreme complexity of history of this region, which requires extensive knowledge and mastering of a number of linguistic, cultural, religious, and political intricacies to understand historical and cultural trajectories and contingencies in this area, demands great caution and critical reflection to avoid simplifications and superficial conclusions' (Novaković 2011: 339). The following sections touch on this complexity to provide a sense of working in the region; however, this general account should not be taken further than to underscore the importance of working with regional collaborators.

The region is composed of ethnic Albanians, Croatians, Greeks, Montenegrins, Serbs, and Slovenes, among others, as shown in Table 1. Prior to the 1990s, the region was composed of Yugoslavia, Albania, and Greece. Today, the former Yugoslavia has segmented into Bosnia-Herzegovina, Croatia, Macedonia (FYROM), Serbia, Slovenia and, most recently, Montenegro in 2006. Each country has religious divisions, including populations of Catholic and Orthodox Christians and Muslims, as well as linguistic differences. While past tensions have subsided, there are still highly contested regions, such as Kosovo, a point of contention between ethnic Serbians and Albanians.

Geographical and political boundaries are reshaped along ethnic and religious lines to reflect the cultural landscape. The southern Montenegrin city of Bar is an example of the complex histories involved. The Rikavac River runs through the city with a large mosque on the southern bank, indicating the idealized extent of greater Albania during the formative years of Albanian identity following World War II. On the northern bank is an Orthodox church, while the largest Orthodox church in Montenegro is currently being built in the centre of Bar as an imposing landmark. The mosque is on the outskirts of town, while the church is in the centre of the modern town along the new main road.

Nationality (Declared)	<i>Albania</i>	<i>Montenegro</i>	<i>Croatia</i>
Albanian	82.58%	4.90%	0.41%
Aromanian	0.30%	N/A	N/A
Bosniak	N/A	8.60%	0.73%
Croat	N/A	0.90%	90.42%
Greek	0.87%	N/A	N/A
Macedonia	0.20%	0.10%	0.10%
Montenegrin	0.01%	45.00%	0.11%
Muslim	N/A	3.30%	0.17%
Not Relevant	1.60%	N/A	N/A
Other/Undeclared	15.10%	4.90%	1.98%
Romani	0.30%	0.80%	0.40%
Serbs	N/A	28.70%	4.36%
Yugoslav	N/A	0.20%	0.00%
Religion			
<i>Muslim</i>	58.79%	17.74%	1.47%
Sunni	56.70%	N/A	N/A
Bektashi	2.09%	N/A	N/A
<i>Christian</i>	16.99%	77.84%	91.36%
Catholic	10.03%	3.54%	86.28%
Orthodox	6.75%	74.24%	4.44%
Protestant	0.14%	0.06%	0.34%
Other	0.07%	N/A	0.30%
<i>Atheist</i>	2.50%	0.97%	3.81%
<i>No Response</i>	16.22%	0.80%	2.46%
<i>No Denomination</i>	5.49%	2.24%	0.76%

Table 1. Balkan demographics from 2011 census data (INSTAT 2011; Croatian Bureau of Statistics 2011; Monstat 2011).

Montenegro is majority Orthodox, while Croatia to the north is Catholic; lines from the 1054 East-West Christian Schism are still evident today. The Željeznica River that also runs through Bar was the first boundary of the original Kingdom of Montenegro set by the Austro-Hungarian Empire in 1878. The Balkans show a clear relationship between the construction of identity and the (re)formation of landscape to meet these complex historical, ethnic, and religious aspects of identity, which is found in ‘racialized’ or culturally-delineated constructed landscapes elsewhere (Alderman and Modlin 2014: 277).

The rich history of the Bar region therefore plays out in the cultural landscape through the construction of religious and civic buildings. It is little surprise that identities are tied to archaeology. The populace is primarily interested in medieval history, as Montenegrin identity has traditionally been associated with Slavic archaeology though nationalists are currently adopting a pre-Slavic narrative for increased historical legitimacy. Ottoman archaeology is associated with Albania and though the centre of the Illyrian tribes was based around Kotor Bay in northern Montenegro, Illyria is a politically charged word associated with ethnic Albanians.

This history, as well as memories of the 1990s conflict, remains part of the current public consciousness. The roles of the different ethnic groups during the conflict, as well as the United States' bombing campaign and political intervention, colours public perception of neighbouring countries and outsiders. Governments and researchers are interested in developing cross-border collaboration, but bridging the gap for the public requires education and public outreach.

Complex identities tied to archaeology

Scientists are able to set Balkan ethnic differences aside; however, identity poses a complex problem for outreach and communication with the public. Archaeology is closely tied to ethnic and religious identity in the region, often used in arguments of legitimacy. As Quetzil Castañeda notes, 'Once the archaeologist produces an interpretation of the past, that knowledge has a political life of its own' (1996: 24). Outreach must navigate these waters where divisions are very much rooted in historical events and archaeology provides important evidence for these ethnic and national narratives.

John Wilkes' book *The Illyrians* begins with a comprehensive look at the evolution of the region's politics before exploring the archaeological evidence of Illyria (1996). In brief summary, the term Illyria was not used significantly from Late Antiquity until the Treaty of Schönbrunn in 1809, which awarded the northern Dalmatian coast to Napoleonic Italy under the name 'Illyrian Provinces' (Wilkes 1996: 4). Slav nationalism coalesced by the 1815 Congress of Vienna when Croats in Agram, modern Zagreb, adopted Illyria as their common identity (Wilkes 1996: 5). These self-proclaimed 'Illyrian Slavs' were composed of Croats, Slovenes, and Serbs, leading to the 'Illyrian Movement.' This pan-Slavic movement formed bonds through invoking this culture from the deep past, easily joining all the current inhabitants while distinguishing them from Austro-Hungary. It is in this period that archaeology begins in the Balkans and from the beginning it is tied to proving cultural legitimacy.

The archaeological projects were tied to the earliest museums, founded in Split (1818), Zadar (1830), and Zagreb (1846) (Wilkes 1996: 5). Arthur Evans similarly placed contemporary politics into his account of Balkan archaeology (Evans 1883), juxtaposing ancient Illyrian culture with Ottoman rule, while he was vocal about the poor treatment of Slavs under the Austro-Hungarian Empire in the press (Wilkes 1996: 8). Following the formation of Yugoslavia in 1918, archaeology of Illyrian sites continued at a high level (Wilkes 1996: 9).

A turning point in Balkan identity came in 1854 with the publication of J.G. von Hahn's hypothesis that Albanians were the descendants of Illyrians. Systematic archaeology did not begin in Albania until 1904. The country achieved independence in 1912, but was soon occupied by Italy and Germany during World War II. Liberation in 1944 led to a communist government under Enver Hoxha. When Hoxha came to power it became state policy to prove Hahn's hypothesis of Albanians being the descendants of Illyrians (Wilkes 1996: 10). Hoxha reshaped Albanian identity and closely tied it to the Illyrians, using archaeology as evidence. Today, archaeology is said to demonstrate an Illyrian culture formed in the Bronze Age, which remained distinct through Greek colonization and Roman occupation to the first historic mention of Albanians in the 11th century AD (Wilkes 1996: 11).

This politically charged archaeology includes the contested region of Kosovo. Wilkes sums this up by saying, 'It is no novelty that the debates over the ethnic affinities of ancient people in southeast Europe should be bound up with the antipathies of Serbs, Bulgars, Greeks, and Albanians but the question of Kosovo has become more serious than at any time since it was first posed at the break-up of the Ottoman Empire' (Wilkes 1996: 11). The Dardanians inhabited Kosovo in Antiquity, but Albanian nationalists claim Dardanians to be Illyrian, while Serb nationalists claim they are a mix of Illyrian and Thracian. The first mention of Slavs is in the 6th century AD, while the Albanians are the 11th century AD, and both seek ownership through pre-medieval ties and major medieval events.

The unfortunate result is politicized archaeology, creating ‘house of cards’ reconstructions based on tenuous connections meant to serve political ends rather than accurately portray the past (Wilkes 1996: 12). In fact, it is unlikely that the tribes inhabiting the area currently termed ‘Illyria’ identified themselves as Illyrian (Wilkes 1996: 3). Historical accounts of Illyria all come from other cultures, such as the Greeks and Romans, meaning secondary sources that disparage the Illyrians are the only sources on the culture. Nineteenth century cultural groups picked from a number of ancient tribes such as the Delmatae, Japodes, Liburni or others, and could have come to the same conclusions as they have with the Illyrians. The choice of Illyrian is likely due to it being in the public consciousness after the Treaty of Schönbrunn in 1809 and the need for a pan-Balkan identity to unite against the Austro-Hungarian Empire.

Ignoring or denying the politicisation of archaeology can be dangerous (McGuire 2008: 17). The result of politicised archaeology is all too clear from the conflicts in the 1990s and early 2000s, as well as the current dispute over Kosovo. Each group claims historical legitimacy and uses archaeology as a tool to prove it. As adopted symbols of group identity, archaeological sites became targets, the most famous examples being the shelling of Dubrovnik’s Old City and Mostar Bridge (Petrovic 2013). It is this complex cultural landscape that archaeologists, both from within the region and outside it, must navigate.

Local engagement

The long-term development of maritime archaeology, as well as the protection of archaeological sites, begins with engaging local citizens of all ages. Engagement and education are often different. As researchers this can be confusing and at times frustrating, as engagement does not always equate to accurate portrayals of the past (Secci 2014: 79).

As landscape features, archaeological sites are often part of people’s day to day life and integrated into their worldview (Nardi 2014: 18); challenging these narratives is an affront to their identities. It turns people off archaeology and leads them to engage with the past in other ways (Secci 2014: 74, 79).

While archaeologists may search for facts and strive for accuracy, local interpretation is an important part of engagement that can potentially be inaccurate when tied to identity and historical narratives. However, narratives composed of multiple voices are recreating culture in the physical landscape by embedding meaning and attaching hereeness and otherness (Nardi 2014: 18). Rather than challenge these narratives with academic lectures, engagement with material culture allows local communities to arrive at the same conclusions themselves and rewrite narratives from within. For underwater sites, this often means bringing the sites to the local community through multimedia since many cannot dive. In the long term this generates interest in the archaeological record, which protects sites and educates. In the end, the local community is the custodian of sites and the ‘intellectual owners of the past’ (Secci 2014: 81).

It has taken many years of outreach for locals to understand that ICEP is a scientific mission and not a foreign for-profit venture, though some still think it is. In Albania locals thought archaeologists were searching for a legendary aircraft full of gold that crashed after the fall of the communist government. The local Montenegrins believed the survey was trying to locate a solid gold statue of Aphrodite, whose origins are as obscure as the inventor of this theory’s knowledge of Greek statuary. It is not direct discussion that changes minds; explaining that the value of this imaginary gold would hardly cover operating costs for a field season does little to assuage suspicions. Instead, the change occurred through a continued presence and communication of findings through television and popular media, social media, and person-to-person talks over many years.

Education

Educating students is a critical obligation in archaeology (Mytum 2012; Knox and Smith 2012); it has become a central component of 21st century maritime archaeology projects in areas without a developed field. Education is a method for foreign and local institutions to benefit mutually in equal terms (Harris 2014). Field schools attempt skills transfer and the creation of professionals that can be hired, or create their own jobs where none exist. Therefore, students are not simply learning archaeological best practice, but also experiencing the socio-cultural landscape in each country to understand the entire process of archaeology from permits through publication and outreach.



Figure 62. ICUA archaeologist Mladen Pešić speaks to students about the amphora types found locally (Author).

Archaeology is not a profession that can be taught solely in a classroom. In fact, it is not one that can be learned by a course in the field either. Archaeology takes the sum of knowledge from years of seeing, feeling, and using artefacts to understand and interpret what the objects are today, what they used to be in the past, and how modern and ancient people perceive them. A field school lasting a few weeks cannot possibly convey this knowledge to students. Instead, a field school is a success if it engages the students in the subject, teaching them how to comport themselves professionally on a research team, teaches critical examination of methodology and interpretation, and imparts how to fill the gaps in their knowledge through proper research and self-education. The ICEP field schools are designed around these four tenets, with fieldwork and lectures focused on conveying these lessons.

Accreditation by Transylvania University helps to fulfil the four tenets while both fieldwork and lectures focus on conveying these lessons. Transylvania's Begley has positioned the institution as one of the few liberal arts colleges with a presence in maritime archaeology, and over a dozen students have received university credit for the field schools.

The biggest question when running a field school is whether research or education are aligned, or is one sacrificed for the other (Knox and Smith 2012: 166). Without a doubt education is predominant during a field school and research is secondary. While students on ICEP field schools are active participants in the on-going research, data collection becomes secondary to teaching the skills that students must learn. ICEP is fortunate to have a field season that lasts many months, so research is not disrupted by a few weeks of educational programs. This means students to receive the full attention of the staff and focus on skills transfer. Nevertheless, ICEP has done an exceptional job integrating survey and monitoring of archaeological sites into the field school, allowing research and education to benefit and inform each other.

Building and maintaining research communities

There were originally three rationales for the creation of ICEP as a research community, though more have presented themselves over the years. The rationales are skills development, integrated research, and improved management of cultural heritage. There are unique sets of expertise, sites, and resources in Albania, Montenegro, and Croatia, placing them in a position to achieve more through collaboration than alone.

An integrated approach to the eastern Adriatic coast is obvious in retrospect. The modern state boundaries bear little resemblance to the socio-economic landscape of almost any era under investigation. Data limited to a single country is inherently insufficient for an overarching understanding of the Adriatic. Examples are readily apparent in ICEP publications. The growing dataset of Corinthian colonization and trade in the Adriatic from the Archaic to Hellenistic periods demonstrates the necessity of considering the coastline as a cohesive unit rather than fragmented by modern political boundaries (James and Royal 2015). Several shipwrecks found in Montenegro and Albania carried cargoes of Lamboglia 2 amphoras, which were produced on the Croatian islands of Vis, Lastovo, and Hvar from the 2nd to 1st centuries BC (Royal 2012: 429).

Operating within a regional context allows each country sharing the Illyrian coast to have a better ability to manage their submerged cultural heritage. Identification of major sites has been established to varying degrees in each country. Legal and administrative frameworks for protecting maritime cultural resources can be coordinated across borders, as well as increased communication concerning illegal site looting and artefact trafficking.

ICEP is already coordinating equipment sharing, such as that between RPMNF, MMARP, the ACMR, and the JP Kulturi Centar Bar (Cultural Centre of Bar). The same is true for coordinating multidisciplinary research, as archaeologists are able to connect with marine biologists and geologists through the research group. The result is more meaningful interpretation, as multidisciplinary groups are self-informing.

Three steps are required to coordinate these protection efforts. Sites must be (1) identified (2) monitored and (3) protected through education of law enforcement and the public. ICEP creates a framework for these steps. RPMNF's large-scale deep water coastal survey and Croatia's developed maritime archaeology community can begin to provide the information for steps one and two.

However, the third step requires public engagement and education to increase awareness of underwater cultural heritage, which is why ICEP's education programs are critical. Submerged archaeological sites need to be in the public consciousness, either through bringing them to sites by creating marine protected areas that snorkelers and divers can visit, or through use of digital media. The shipwreck trails on the ACMR and RPMNF websites allow non-divers to view sites, while YouTube, Twitter, Facebook, and other outlets share photographs, videos, and publications.

Protection of the eastern Adriatic coastline is important not just for researchers and local citizens, but for all nations as there are shipwrecks in Balkan waters from Italy, England, Spain, France, Greece, Turkey, Tunisia, Libya, Cyprus, China, and the Near East, often predating modern nations and identities. It is a region of rich cultural history, but also important ecologically and economically. It is important to place archaeology in the context of current society and each of these countries stands to benefit from the protection of cultural heritage and the development of sustainable tourism.

The Noto Statement on the Future of Underwater Cultural Heritage Protection and Preservation in the Mediterranean outlines the latest recommendations for research and outreach for maritime archaeology (Euploia 2013). While ICEP partners were not present at the Euploia meeting that drafted the Noto Statement, many of the recommendations have been aspects of ICEP projects for several years. This includes the creation of marine protected areas, conducting site-specific assessments, evaluation of *in situ* preservation in different environments and conditions, interdisciplinary research, creation of forums for collaboration, outreach with the goal of effective protection of archaeological sites, respect and engagement of stakeholders, and the creation of national laws to fit international guidelines (Euploia 2013). ICEP's implementation of these prior to the drafting of the Noto Statement speaks to both the progressive nature of ICEP and the timeliness of the statement.

‘Capacity building’ and moving toward postcolonial archaeology

Capacity building is the stated goal of many projects working in the Balkans and other regions. It has developed into a buzzword for grant organizations and governmental missions. However, this term has a negative connotation to those ‘receiving’ capacity. Personal communications between the authors and resident archaeologists show that for many the term reflects aspects of colonial archaeology, where an uneven relationship exists between local archaeologists and foreign institutions. While ‘capacity building’ may be used with the best intentions, it conveys a colonial mind set of outsiders knowing better which largely explains why it is considered a dirty term by the resident population.

The movement toward post-colonial archaeology is hardly complete. ‘Nautical archaeology has not sufficiently problematised the concept of empire; it has not critically engaged European colonialism, its own colonial legacy, nor situated itself, in terms of power, in relation to the human subjects it studies’ (McGhee 1998). Maritime archaeology as a field has addressed a few of the issues that McGhee raised in 1998; however, foreign missions continue to face the paradox of being in the country ostensibly for ‘capacity building’ while at the same time being absent for the majority of the year. Can capacity be built, to a level of long-term professions and site preservation, in the space of several weeks?

Capacity building language comes dangerously close to the top down approach used by colonial archaeology in the past. A horizontal approach of equal partnerships has eluded many foreign missions worldwide, as maritime archaeology ‘has not capitalized on the insights that can be gained from collaborative approaches between communities and practitioners’ (Roberts *et al.* 2013: 78). There are many examples of foreign missions practising equal partnerships (Royal 2012; Harris 2014; McKinnon 2014; Blue *et al.* 2015). However, a paradigm shift is needed for the wider field, whereby these local partnerships become standard in research designs. Equal partnerships are needed not simply for compliance, but in acknowledgement that it is best practice for both the gathering of knowledge and the protection of cultural heritage.

Considering that resident archaeologists know the location of sites and have their own methods for dealing with underwater archaeology, foreign missions are not so much capacity building as attempting to create long-term collaborations, encourage research, and enable the host archaeologists to meet international standards. Partnership, or ‘confidence building’ as is used by international training programs, more accurately describes this process. The foreign team facilitates international standards by demonstrating the practices that have succeeded or failed elsewhere (Greene *et al.* 2011: 315) and training to meet those standards, while the resident team provides the local knowledge and context.

ICEP functions as a research community of equal partnerships rather than as a capacity building organization. Education and training is a two-way street benefiting student and teacher; the same can be said for collaboration, where foreign and local institutions educate each other. Rather, the focus is on research, during which deficiencies on both sides are removed through fieldwork experience. High-impact research is a great equalizer.

Conclusion

Though ICEP was formed to foster collaboration in the Balkan region, after three years its education program is driving innovation for the rest of the world, as demonstrated by the scientific diving course. Moving forward, it is hoped that ICEP’s reach will be recognized as broader than simply research. Research and education are not ends, but means to benefit resident stakeholders and governments, researchers, and interested parties internationally. It is hoped the research engages the broader public as well as generates income for the local economies through sustainable tourism.

Developing a maritime archaeology research community in the Balkans has proven fruitful in light of the complexities of the region. Croatia leads the way, while Montenegro and Albania attempt to train archaeologists and build facilities. As with research communities in any country or field, the difficulty lies in maintaining multi-year relationships in ever-changing social, cultural, and political environments.

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Conclusion

Katy Bell on behalf of MASIG

The variety of successful maritime projects run in the UK is a credit to the many people involved, from heritage professionals through to avocational archaeologists and interested members of the public. Clearly there is much that we can learn from projects run further afield, especially when we consider how to introduce ethical and robust guidelines for all to follow. The Illyrian Coastal Exploration Program's Field Schools, for example, should be considered as an example of good practice that could be followed when putting research projects together.

Training and education naturally remain a cornerstone in building relationships with and among communities. This comes in many forms, from the formal training for new entrants into the field of commercial maritime archaeology, through to the courses on offer for avocationalists. However, to build a research community, not everyone has to be active in research and/or fieldwork. Dissemination is an important part of validating research. Therefore an 'armchair archaeologist' joining 'Shipwrecks and Submerged Landscapes' or a member of the public reached through 'MAD about the wreck', it is important that we include and reach out to as many people as possible who can contribute to, and learn from, marine archaeology.

What this volume has proved is that marine archaeology goes beyond just shipwrecks and divers. Crannogs in Scotland continue to yield research opportunities and information whilst involving the local community. As someone who lives on an island that boasts considerable maritime heritage, it is amazing how often I have observed archaeological work being undertaken by teams brought in from elsewhere, who have not wished, or had the opportunity, to integrate with the community. Using the inclusion and engagement of the local community as a starting point for designing the framework of future research is a must.

A careful consideration of who the stakeholders are in marine heritage and how to involve them is important in advancing research and education. Having a community, including people with Avocational Licences through to the volunteers on the CITiZAN programme, that know what to do and how to do it enables research to be conducted on a far wider basis than the small amount of professional archaeologists could ever achieve.

By collecting papers from various stakeholders in marine archaeology it is possible to view how a research agenda and project works from the differing perspectives of statutory bodies, contractors and the avocational people involved. This also demonstrates how current project frameworks are understood by all parties who are active within the marine heritage environment. In collating this information it is hoped that this volume will stand as a starting point of reference for future projects.

At the same time research has to be conducted ethically. This allows for valid data to be generated and for the archaeological resource to be managed. From putting together a proper project plan, through to integrating local people, ethics need to be considered at every level of research. Education can allow for this framework to be communicated to the wider world, especially when that education is completed on a local basis and then disseminated. However, when education fails, legislation needs to intervene to ensure that we protect the resource for future generations.

Although MASIG primarily exists to promote the interest of archaeological professionals, the committee recognizes the importance of all elements that contribute to marine archaeology including the different organizations that enable this work to be completed. In many cases the people directing the projects are the professionals that make up our membership. For us, including academics with fieldworkers and statutory bodies is the only way to ensure that a valid maritime archaeology research community is built.