





Articles

Project SAMPHIRE: Crowd Sourcing Maritime Archaeology data off Scotland's West Coast

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ABSTRACT

Perhaps the greatest barrier to effective management of underwater cultural heritage is the lack of data on the nature and location of offshore archaeological resources. This is a problem shared with terrestrial archaeology, but is particularly acute due to the limitations of survey techniques in the underwater environment. In Scotland <15% of known ship losses from the last 200 years have been located and the record is far less comprehensive for earlier periods, verging on a near total data gap. Most known archaeological sites in Scottish waters have been discovered through large-scale sonar survey of relatively low resolution and a considerable bias has been introduced in the archaeological record; this has favored the discovery and documentation of larger and more recent, often upstanding, metal shipwrecks. This article presents the methods and results from a three-year project designed to reduce this bias by demonstrating large-scale prospecting for maritime archaeology through a community-based crowd-sourcing approach. Project SAMPHIRE (the Scottish Atlantic Maritime Past: Heritage, Investigation, Research and Education Project) was geographically focused on the west coast of the Scottish mainland and was undertaken between 2013 and 2015, resulting

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in a large number of new archaeological discoveries, including shipwrecks, aircraft, and other material of a much more varied nature than what is typically found through large-scale hydrographic surveys.

Keywords Underwater Archaeology, Community Archaeology, historic shipwrecks, archaeological prospection

INTRODUCTION

This article presents the rationale, methods, and results of Project SAMPHIRE (the Scottish Atlantic Maritime Past: Heritage, Investigation, Research and Education), a community engagement and archaeological research project that ran from 2012 to 2016, with the core of project fieldwork during the 2013–2015 summer field seasons. Project SAMPHIRE aimed to enhance the national record and address questions of research and management bias through engagement with the various communities of maritime user groups and local communities. Professional archaeological expertise was combined with local knowledge, to record marine and maritime cultural heritage sites off the entire length of the west coast of the Scottish mainland. Specific focus was given to the discovery and documentation of previously unrecorded archaeological sites in the maritime environment.

The project's objectives were to: 1) address the bias in existing records by developing a methodology for capturing cultural heritage data from maritime communities, focusing on defined study areas and communities located on the west coast of the Scottish mainland (between Kinlochbervie and the border); 2) ground-truth (or visibly observe) selected sites with a team of professional maritime archaeological divers; 3) archive the data obtained with the National Inventory, in order to facilitate future management of the marine environment for the purposes of sustainable development; and 4) share results with local communities, in order to foster the relationship between them and archaeology and heritage professionals. The project design also prioritized intertidal and underwater heritage rather than terrestrial and coastally eroding terrestrial archaeological sites as this has

been the ongoing focus of the SCAPE (Scottish Coastal Archaeology and the Problem of Coastal Erosion) Trust, a Scottish heritage charity founded in 2001. The study area was chosen for the first year of the project in the North-West mainland building on previous work carried out in the Hebrides (Benjamin et al. 2014), and was later expanded to cover the whole west coast of the mainland once further funding was secured.

BACKGROUND: MARITIME ARCHAEOLOGICAL RECORDS IN SCOTLAND

In reviewing best practice for underwater cultural heritage (UCH), we refer to Article 21 of the 2001 *UNESCO Convention on the Protection of the Underwater Cultural Heritage*, which highlights the importance of national inventories. Even among non-signatories, many nations including Scotland, now maintain extensive national databases for this purpose. Such records are essential to monitor impacts on heritage within the widely used framework of Marine Spatial Planning (Ehler and Douvère 2009) where coastal and marine heritage can be weighed in the planning balance and protected. In the years immediately prior to the initiation of Project SAMPHIRE, significant legislative measures were enacted to facilitate Marine Spatial Planning in Scotland, mainly through the *Marine Scotland Act 2010* and the introduction of Historic Marine Protected Areas in Scotland. At the same time, there was a growing awareness of a significant bias in the records of maritime archaeology resulting from a series of studies carried out between 2009 and 2013, mostly commissioned by the Scottish

Government. The first of these studies comprised a brief overview of the major issues related to maritime archaeology (Historic Scotland and the Built Environment Forum 2009) while subsequent studies were designed either to enhance the National Inventory (the Scottish national geospatial database of cultural heritage sites)¹ or were more strategic in nature. The National Inventory enhancement projects included region-specific studies for the Shetland islands (Scott 2011), the Orkney islands (McCarthy and Dresch 2012), the islands of the Outer Hebrides (Benjamin et al. 2014; Bicket et al. 2012; Bicket and Davidson 2013) and most recently, for the Clyde Estuary (Evans 2015) and many of these studies included an element of community engagement. Another major database enhancement project (Geddes 2012, 2013) focused on merging of key existing datasets into the National Inventory, including divergent locational data in the UK Admiralty Wrecks Database (a non-heritage sector database of navigational hazards); 18,500 records from a private database of Scottish wrecks (Ian Whittaker's *Off Scotland* database), and archiving of several major shipwreck investigations from the 1970s and 1980s. Strategic studies included a data audit (McCarthy 2011), which collated metadata (descriptive information) on the wide range of data sources of all types that could be exploited to enhance the maritime heritage component of the Scottish National Inventory. Alongside large-scale remote sensing datasets such as acoustic surveys (undertaken for non-archaeological purposes), this study highlighted a major potential for crowd-sourcing of data among maritime communities. A complementary study by Lancaster (2012) comprised an analytical review of the known maritime heritage resource and quantified for the first time the recognized bias within the existing national inventory towards larger, metal, and more modern shipwrecks, and against smaller, older and wooden watercraft, aircraft wrecks, and submerged prehistoric sites (Lancaster et al. 2012:40).

GAPS IN THE NATIONAL INVENTORY: MARITIME DATA

The bias within the National Inventory is one of the greatest limiting factors reducing the effectiveness of marine cultural heritage management. Finding new ways to address this bias was a key aim of Project SAMPHIRE. The existence of the bias reflects the fact that the vast majority of known (located) sites have ultimately been derived from the UK Admiralty Wrecks Database.² This database in turn has been populated mainly through large-scale and low-resolution sonar surveys, designed to provide bathymetric mapping for navigational safety,³ rather than locating heritage sites. Although these surveys have resulted in identification of many larger metal wrecks and have improved in resolution over time, the data still tends to be too coarse to identify small-scale and low-relief archaeological sites of a more ephemeral nature; a reminder that site scale and archaeological signature are important factors that introduce bias into the maritime historic record (Benjamin and Hale 2012). Bathymetric survey has also prioritized the use of larger vessels which do not easily obtain data in shallow, nearshore waters. This has produced a significant limitation—quite literally a gap—between the modern coastlines and deeper waters which are more accessible to survey vessels.

The potential value of community-generated historic environment research is increasingly recognized in the UK (Hedge and Nash 2016). In particular, there is an enormous untapped potential for programs dedicated to marine heritage data gathering, particularly with respect to the scuba diving community (Martin 1998:117; McCarthy 2011:35–37; Lancaster et al. 2012:42). Such a program could return archaeological sites of a more varied and potentially more significant nature than the current overreliance on sonar data. By way of illustration, of the eight wrecks designated as Historic Marine Protected Areas (HMPAs), the Scottish Government's

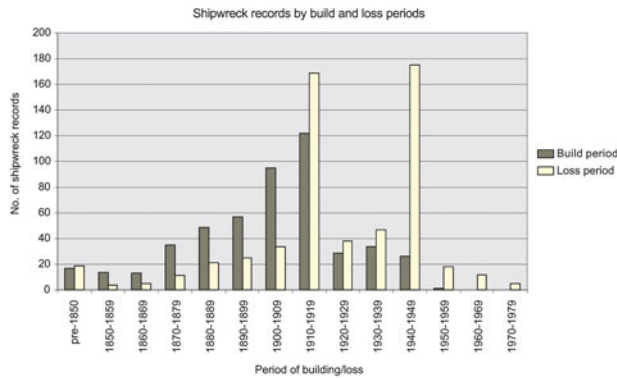


Figure 1. A graph of located wreck sites in Scottish waters (just after Lancaster et al. 2012).

principal mechanism for statutory protection of maritime heritage sites, only the *Campania*, a WWI 18,000 ton aircraft carrier, was *not* discovered by avocational divers. The other seven wreck sites (the Drumbeg wreck, the Mingary Castle wreck, the Kinlochbervie wreck, the *Kennemerland*, the *Wrangels Palais*, the *Dartmouth*, and the *Swan*) are all fifteenth- to eighteenth-century wooden shipwrecks and all were found directly adjacent to the coast, within the depth limits of recreational diving (full bibliographies for each wreck are included in their HMPA designation documents).⁴ In particular, work on the Drumbeg wreck by the authors in partnership with community members provided further inspiration for the Project SAMPHIRE (McCarthy 2012a; McCarthy et al. 2015b).

Figures for historical losses demonstrate that there are many more post-medieval wrecks to locate. Less than 20 shipwrecks from pre-1850 are known from Scotland (Figure 1). Comprehensive records of vessel losses only began in the nineteenth century but despite this there are 20,736 unlocated losses recorded in the National Inventory in Scottish waters and only 2,638 located wrecks (as of December 6, 2016). Losses of smaller vernacular vessels may not have been recorded even during the nineteenth and twentieth

centuries and records are increasingly poor further back in time with almost no records predating the eighteenth century.

Beginning with prehistoric periods, there are only a handful of isolated prehistoric artefacts from marine contexts despite extensive scientific evidence for large areas of submerged prehistoric landscapes in Scotland (summarized in Bicket and Tizzard 2015:659). Although numerous prehistoric vessels have been found in freshwater or estuarine environments (Mowat 1996; Strachan 2010), physical remains of prehistoric seagoing vessels are also lacking, despite extensive evidence for links to other parts of Europe (e.g., Anderson-Whymark et al. 2015). Moving forward in time, there should also be evidence in the sea for vessels of all periods up to and including the medieval. Only a handful of isolated timbers for medieval and pre-medieval vessels have been recorded, mainly from terrestrial contexts (ADU 1995; Grieg 1940; Logan 1951; MacPherson 1878; Martin 2009; Martin and Bogdan 2012). Lastly there is a general lack of located aircraft wrecks in marine contexts with only 27 sites known nationally (Lancaster 2012:11). This lack of data and bias within the located resource is by no means confined to Scotland, and all coastal nations face the same challenge. Examples of discussions of these issues can be found in publications on submerged

prehistory (Missiaen et al. 2017) and for maritime heritage in general for specific countries such as the USA (US Congress Office of Technology Assessment 1987:17) and Ireland (Kelleher 2007).

ADDRESSING THE GAP: TOWARDS A SOLUTION

The aim of Project SAMPHIRE was to develop a model for gathering data on both known and previously unrecorded maritime archaeological sites through engagement with maritime communities in Scotland, by targeting precisely those sources which had previously provided the most significant discoveries. Although some of the previous studies mentioned above had included elements of community engagement, this project focused on the technique's potential as a national-scale prospecting tool in the marine environment, where the vast areas involved and difficulty of access rule out comprehensive visual or high-resolution sonar surveys by professional archaeologists (Scotland's seas cover an area of 468,994 kms² out to the 200-mile fishery limit). To maintain this focus and maximize available resources, a conscious decision was made to exclude a formal teaching program of maritime archaeological skills to non-archaeologists.

Although this can be a valuable exercise, as exemplified by the courses run by the Nautical Archaeology Society (Bowens 2011) and others (e.g., Satchell 2008) it is best suited to detailed recording of single sites or geographically constrained areas (e.g., the SHIPS Project in Plymouth Sound⁵). It was felt that this approach was less suited for large-scale data gathering, as channeling of project resources into training of a relatively small number of participants would simply increase the number of skilled researchers who would not then have the resources to survey large areas. Instead a decision was taken to try to reach out to a much larger section of the public in a less resource-intensive way, essentially capturing existing knowledge only. This could be described as 'crowd-sourcing', a phrase which has begun to appear in the archaeological discipline in recent years but generally in relation to community digitization projects (e.g., Fleet et al. 2012; Vincent et al. 2015). This approach allowed the SAMPHIRE team to acknowledge local participants as the experts of their local historic environment. These local experts could then work with technical specialists and experienced researchers who could offer broader contextualization of sites through research resources and technical skills and scientific process (Figure 2). However, it was also recognized that the quality

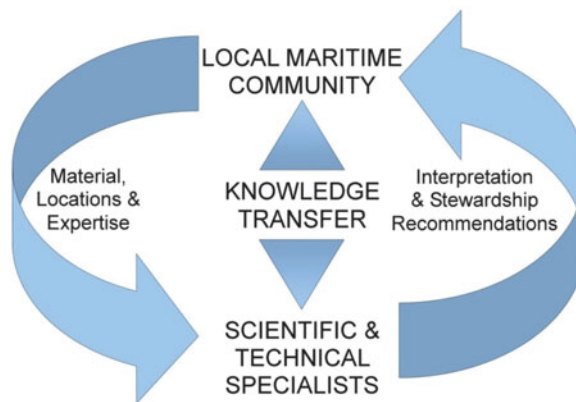


Figure 2. The key concepts of Project SAMPHIRE.

of data would be variable and that establishing the reliability of the reported sites would be a key component of the project.

METHODOLOGY

Project methodology was defined at the outset in consultation with the curators of the Scottish National Inventory. Project phases were devised as: 1) Preparation and promotion (lasting throughout the year but concentrated over two to three months in the Spring); 2) Community engagement fieldwork (approximately two weeks in late Spring); 3) Site-investigation fieldwork (approximately two weeks during optimal diving weather in the Summer); and 4) Analysis and dissemination (over two to three months over Autumn/Winter).

Each year of fieldwork covered approximately one third of the coast, working from north to south. Preparation and promotion for each year involved the creation of project resources with an emphasis on those that would facilitate site reporting and communication between communities and archaeologists, including flyers, site reporting forms and a website with a blog and download section. Promotion also included articles on the project in dive magazines, updates to the website, and extensive use of social media. All local community sources were considered but key groups within these communities were prioritized, namely: recreational divers and dive clubs, dive charter operators, commercial divers; fishermen and harbor masters; and local historical societies, avocational historians, and maritime history enthusiasts.

Project fieldwork for each year consisted of two main field excursions; the first involved community engagement by a pair of maritime archaeologists working along the coast through that year's defined study area. Locations for community engagement fieldwork were published in advance and face-to-face meetings with key individuals, such as dive charter operators and harbor masters, were pre-arranged as far as possible. Although the project exploited electronic and web-based communication,

personal interaction was prioritized. Experience from projects such as the Fisheries Protocol Project (a community reporting trial run in the Sussex Inshore Fisheries Conservation Area) had demonstrated the limitations of reliance on remote communication such as websites, e-mails, and phone calls when trying to engage with a busy maritime community (Davidson 2013:20–22⁶) and the SAMPHIRE project design attempted to minimize the time and effort required for community members to share their knowledge. This was achieved by traveling to meet maritime community members and undertaking introductory conversations and informal interviews in their own villages, harbors, and often in their homes (see also Benjamin et al. 2014) and this was found to be far more effective in gaining interest and in building trust than remote communication. Public lectures and seminars also provided an easy way to reach larger numbers of community members and led directly to several reports of previously unknown sites (including previously unknown intertidal wrecks SID 148, SID 153, and SID154). Such events were presented to local and national dive groups, local communities, history societies and amateur groups, and to international conferences. The map of the location of project blogs provides an overview of community engagement locations undertaken during SAMPHIRE (Figure 3).

This initial data gathering was built upon through further remote communication as necessary and eventually by a second field excursion to survey selected reported sites with a team of qualified maritime archaeologists through both diver and intertidal survey (Figure 4).

PROJECT RESULTS

Over the three years of Project SAMPHIRE, huge variations in landscape, community sizes, and the nature of archaeological sites reported were encountered and it was necessary for the team to adapt and be flexible, adopting techniques such as the use of live-aboard charter vessels in more remote

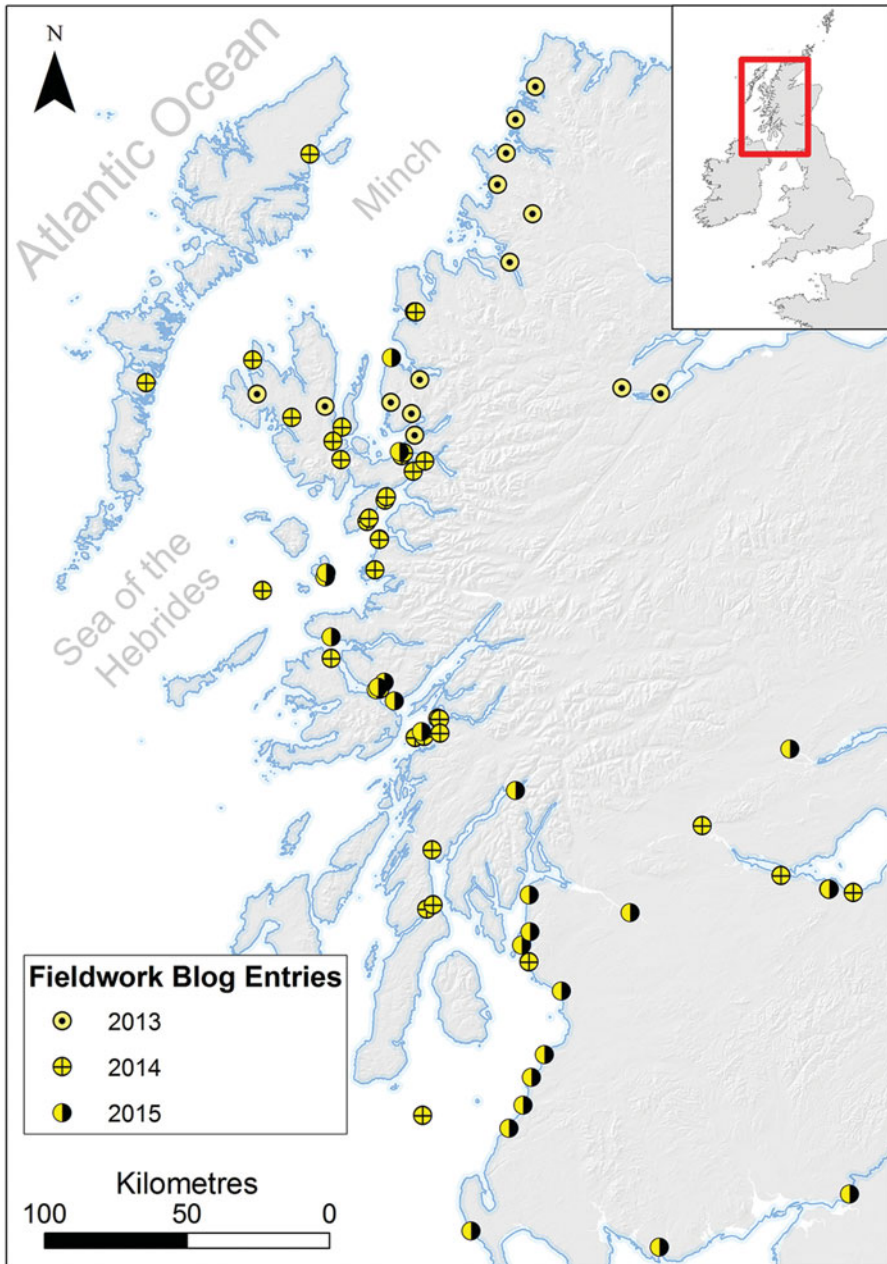


Figure 3. A map of blog locations published during the three years of the project illustrating the geographical spread of community engagement fieldwork and public lectures and seminars.

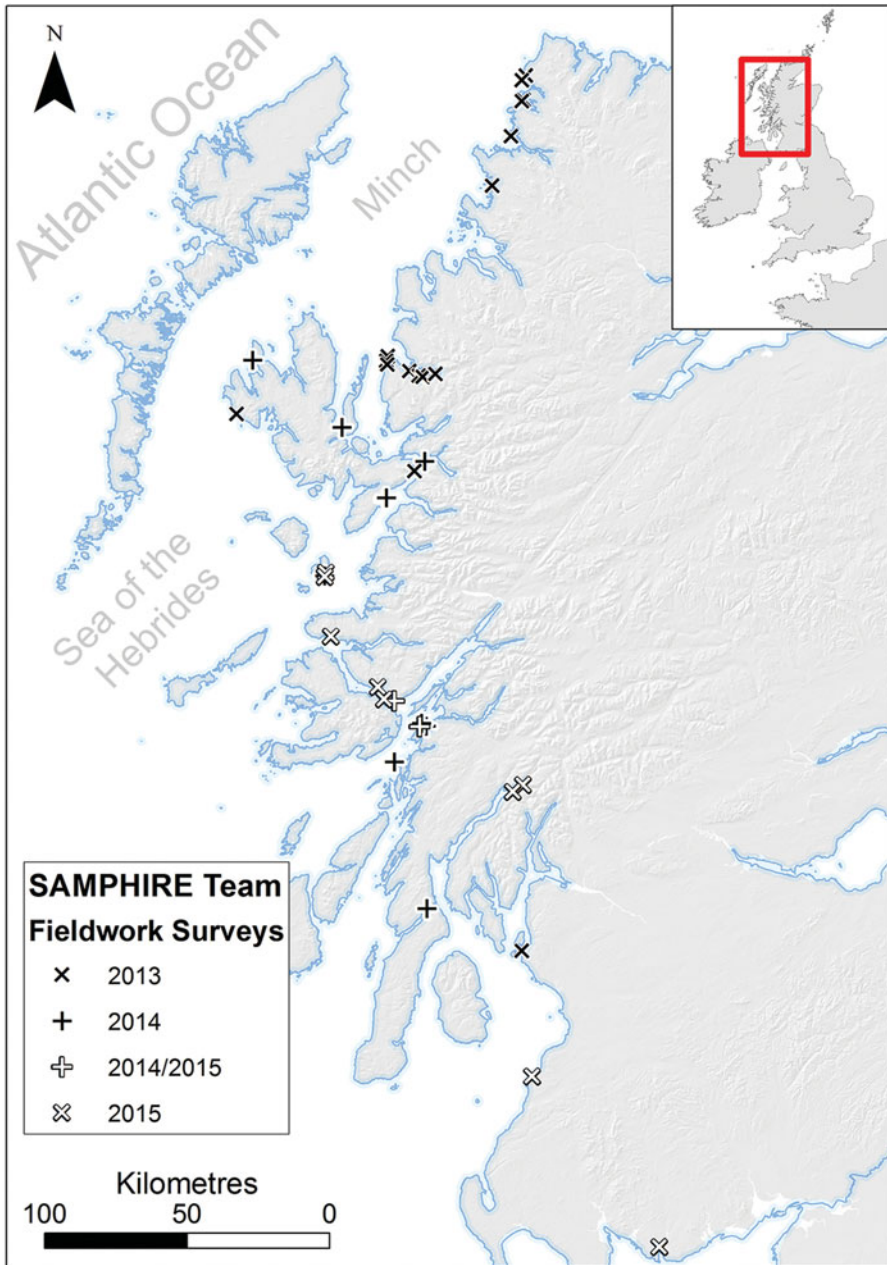


Figure 4. A map of all locations of fieldwork surveys during the three years of the SAMPHIRE Project.

locations and to take advantage of unexpected and short notice opportunities for face-to-face meetings. Nevertheless, the phased approach and the emphasis on applying the project's methods were adhered to throughout the project.

In all, Project SAMPHIRE identified 157 locations of archaeological interest (Figure 5) and while there is insufficient space here to provide a comprehensive account of every new discovery reported to the project team, the full technical details are available in the annual technical reports (McCarthy and Benjamin 2013; McCarthy et al. 2015a; and Roberts et al. 2014). The remainder of this section will consist of a synopsis of the archaeological discoveries, sub-divided by major theme and discussed with reference to the community groups that provided the data (such as fishermen, divers) which have a significant bearing on the nature of the information recovered. Key discoveries are outlined in greater detail and are used to illustrate the more intangible results and lessons learned.

PRE-NINETEENTH-CENTURY SITES

Several pre-nineteenth-century sites were reported during the project. Shipwrecks and related material such as anchors are listed under separate heading below but a small number of other material was also reported and is shown in Table 1.

SHIPWRECKS

Most sites reported to the SAMPHIRE Project were shipwrecks, mainly of the eighteenth to twentieth centuries but the earliest dated wreck investigated for Project SAMPHIRE was a wooden clinker-built vessel on the island of Eigg. This shallow site was previously surveyed but a monitoring survey was carried out during the July 2015 diving fieldwork at the request of local residents and recorded recent storm damage to the 12-metre clinker-built vessel. Timbers washed up on the beach were also recorded. Ongoing contact between the

SAMPHIRE team and Eigg residents, after the survey, eventually led to further work on the site funded by Historic Environment Scotland, including recovery and dating of a total of 18 timbers, which were dated to the late eighteenth century (Vico Sommer and McCarthy 2016). Numerous shipwrecks were reported by fishermen including SID 12-16, SID26, SID29, SID31-34, SID36, SID37, SID57-58, SID63, SID65-66, SID125, SID126-128 and SID129. These sites are generally post-WWII fishing vessels, relatively modern but with a high degree of local significance, many having connections to local fishing families. Scallop divers also demonstrated a wide knowledge of wreck sites (Table 2) and compared to those reported by fishermen these tended to be older but also less precisely located. Recreational divers provided the greatest number of previously unrecorded shipwrecks (Table 3) and often provided images, drawings and video (see Figures 6-7 and further examples provided as online supplemental material).

As an outcome of the engagement with recreational divers, it became clear that several dive clubs had downloaded recently published Civil Hydrography multi-beam data and were identifying and diving on sonar anomalies in their local areas. In some (but not all) cases, dive clubs were willing to report the details of their discoveries. The discovery of the wreck of the *Falcon* (SID155), a steamship lost in 1867 was one such site, reported to the SAMPHIRE project in 2015 by divers who were able to provide a location and photographs of the recovered ship's bell and builder's plate. Several flying boat sites discussed below were also found in a similar fashion.

A summary of non-wreck finds by recreational and scallop divers is provided below, divided by categories of artefact or feature.

ANCHORS

A wide variety of anchors, cannons, and cannonballs were reported to project SAMPHIRE. In many cases scallop divers and recreational divers discovered these, often decades prior to reporting the finds. As a

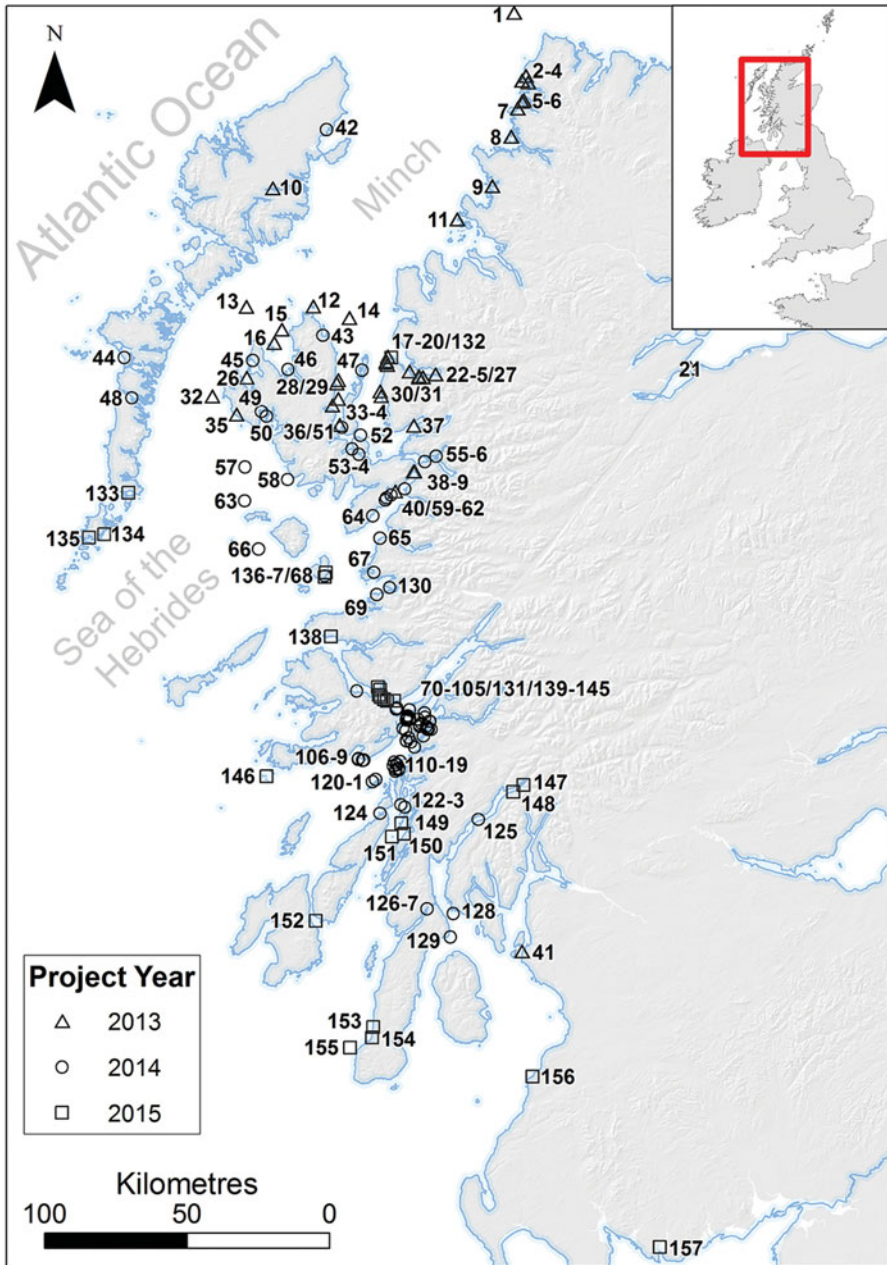


Figure 5. A map of all locations of cultural heritage interest recorded during the SAMPHIRE Project.

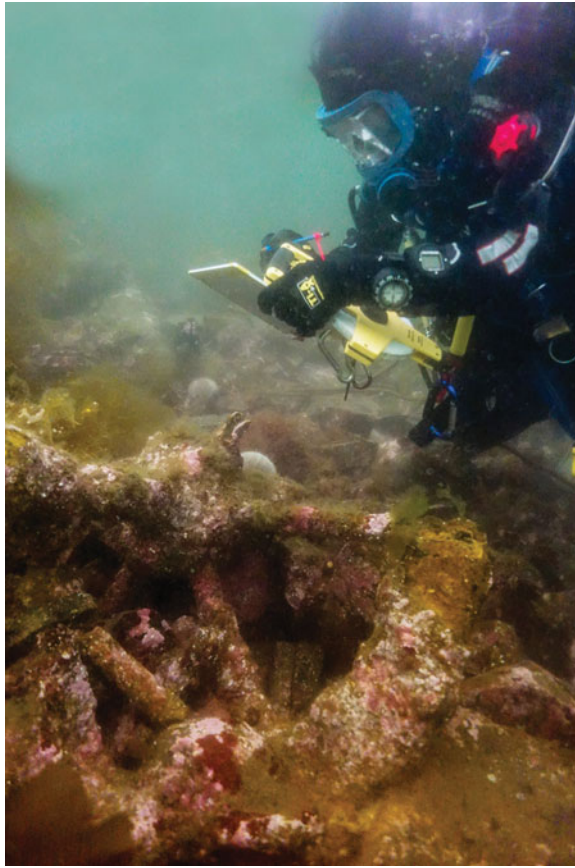


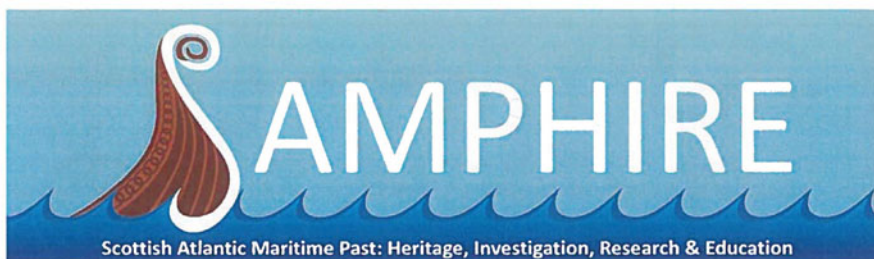
Figure 6. The SAMPHIRE team recording the remains of the newly reported *Iris* (SID45), a nineteenth-century brig (Photo: J. McCarthy).

result, only approximate locations for many of these reports were made available, though all possible attempts have been made to gather as much detail as possible.

Prior to this project the National Inventory included 15 offshore anchor find locations (Lancaster 2012:10) and this project has increased that number by around 50% with several significant finds (Table 4). For example, in early 2014, following on from the Outer Hebrides Coastal Community Marine Archaeology Pilot Project (OHCCMAPP) study (Benjamin et al. 2014), a resident from the Isle of Lewis (Outer Hebrides), James Crawford contacted the SAMPHIRE team to report a

stone anchor discovered in 1993, but which had never been reported or documented in the National Inventory. Made of Lewisian gneiss and weighing approximately 35 kg, this find represents the second recorded location of a stone anchor in Scotland (see McCarthy 2012b). These stone anchors are rare and poorly understood in the context of the British Isles, although similar Mediterranean artefacts can date back to the Bronze Age (e.g., Wachsmann 2008:255).

An iron anchor (SID62) possibly of late-medieval, or earlier, date was discovered near the beach under a peat formation by a local resident digging a trench for a water pipe. Local media had initially reported this



SITE REPORTING SHEET

Correspondent Name: <i>John Beaton</i>	Date: <i>10/6/14</i>	WA Ref: 88901
Description of Find (how it was discovered/description/artefacts/date of discovery/any records or photographs of the site): <i>Dived after information received from Gordon Mackay of 'Dive and Co on the Hebrides'. 10/09/2000</i>		
Visible parts: <i>timbers copper sheathing coal iron knees pump chain pipes bronze rudder gudgeon wreck known as 'Iris'</i>		
Location/Coordinates of Site? <u>WGS1984/British National Grid</u> (underline) <i>57° 32.697'N 06 37.810'W</i> Estimate based on <u>chart/verbal description/GPS/proximity to landmark/Sonar/other</u> (underline) Estimated accuracy in metres (radius)? <i>15m</i>		
When was the site last visited/dived? <i>10/04/09 10/07/09</i>		
What are the conditions on the site? Depth (metres/feet/fathoms etc)/ Seabed/ Currents/ Visibility/ Kelp/ Hazards <i>10-13m, boulder slope to sand around 10m, no current, no hazards</i>		
If this record was made with a SAMPHIRE team member during a Community Engagement event then include: SAMPHIRE team member initials _____ Location of event _____		
Contact Details Address: _____ Postcode: _____ Phone: _____ Email: _____		
We understand that the project team may be taking photographs and recordings for recording/publicity purposes that may include us and we consent to the use of such photographs for these purposes. We agree that any material (photographs/sketches etc) provided to the team may be published with appropriate credit given. Signature <i>John Beaton</i> Date <i>10/6/14</i>		

Figure 7. A report of a previously unknown wreck off the Isle of Skye reported to the SAMPHIRE Project. The wreck was subsequently dived and recorded by the SAMPHIRE team.

Table 1. Pre-nineteenth-century sites recorded during the project.

SID	Type	Date	Source	Description
30	Amphora	Roman period (possible)	Local resident	A large amphora fragment found by a diver was reported to the project team during a community engagement trip to the village of Applecross in May 2013. No such find has previously been encountered in a marine context in Scotland.
41	Intertidal complex	Medieval	Local resident	A standalone survey of a complex of intertidal features at Hunterston Sands in Ayrshire was undertaken with the assistance of local community members. A follow-up project was separately funded by Historic Environment Scotland and included dendrochronological dating of several large intertidal timbers, revealing that they had originally formed part of a massive oak lap-jointed structure dating to the reign of King Alexander II (AD 1214–1249). Possible interpretations include a coastal signal tower. This is a highly significant discovery archaeologically but also provides data on a major gap in the Scottish dendrochronological record (Bicket 2014).
51	Intertidal deposits	Mesolithic	Academic	Intertidal organic samples taken for radiocarbon dating from an intertidal Mesolithic site during 2014 SAMPHIRE fieldwork in Raasay by project partner Prof Karen Hardy of ICREA.
68	Lithic scatter	Mesolithic	Academic	Mesolithic lithic scatter recorded during 2014 SAMPHIRE fieldwork in Eigg (documented by project partner Prof Karen Hardy of ICREA).

as a ‘Viking anchor’ (BBC News, December 3, 2009).⁷ Despite media interest, the site was never investigated further or entered in the National Inventory. The SAMPHIRE team inspected the find spot in Skye and recorded the full details of the discovery as well as scanning the anchor in 3D and working with conservators and the MacDonald Museum to have the anchor X-rayed. Although the date of the artefact remains uncertain, the location under peat suggests it may be several hundred years old. An ongoing typological and metallurgical study has commenced to further evaluate the significance and age of this rare find.

CANNON AND CANNONBALLS

Prior to this project the National Inventory included records of six marine find spots of ship’s armaments (Lancaster 2012:10) and,

discounting the terrestrial material listed above, this number has also been increased significantly (Table 5).

INTERTIDAL VESSELS

Although the project focused mainly on subtidal material, it was inevitable that local communities also reported numerous intertidal wrecks. Where these were previously unknown they were recorded for entry into the National Inventory (Table 6).

The intertidal vessel at Ardno (SID148) illustrates the type of work undertaken for intertidal wrecks during the project. This previously unknown wreck was reported by an archaeologist who passed it while working on a nearby site on the shores of Loch Fyne at Ardno. Only the lower part of the hull of this wooden carvel vessel remained, obscured under intertidal seaweed.

Table 2. Shipwreck locations recorded by scallop divers during the project.

SID	Type	Date	Source	Description
7	Vessel (possible)	Unknown	Scallop diver	Ballast mounds in the shape of a boat at Sgeir nan Airbhe.
9	Vessel (possible)	Unknown	Scallop diver	Ballast mounds in the shape of a boat at Eilean Bad nam Bán (location confirmed through fieldwork).
11	Steam trawler	Circa 1900	Scallop diver	A steam trawler at Glas-leac Mór.
40	Vessel	Nineteenth century	Scallop diver	A probable nineteenth-century wreck from which a bell is reported to have been recovered in the Sound of Sleat.
46	Schooner	1864 (wrecked)	Scallop diver	A wreck at Greshornish consisting of copper clad rudder, copper sheets, and some ceramic plates. It is thought to be a schooner named the Lady Middleton lost in 1868.
49	Wooden ship	1859 (wrecked)	Scallop diver	A wreck near Orbst thought to be an American cargo ship named Yemassee.
53	Sloop (possible)	1860 (possible wrecking date)	Scallop diver	An unidentified wooden wreck of probable nineteenth-century date at Loch na Cairidh.
54	Vessel (possible)	Unknown	Scallop diver	A ballast pile visible at low spring tides at Loch na Cairidh.
60	Vessel	Unknown	Scallop diver	A large section of ship's hull off the Isle of Ornsay.
64	Vessel	Unknown	Scallop diver	A section of carvel-built ship's hull at Ostaig Bay.
143	Vessel	Post-medieval	Scallop diver	A 'debris field' in Scallastle Bay consisting of a stretch of coal, several Dutch smoking pipes, and a compass and binnacle box.

After a full manual and photogrammetric survey of the site, further research unearthed a probable identification of the vessel and early photographs dating to around 1910 showing it in a much more intact condition and allowed an identification as a steam-powered fishing vessel.

SUNKEN AIRCRAFT

In 2013 the project recorded a group of previously unrecorded WWII Flying Boats on the seabed of the Firth of Lorn. These sites were reported to the project by a group of recreational divers who had been investigating small sonar anomalies found in

data captured during the 2012 INIS Hydro Firth of Lorn hydrographic survey (HI1354). Collaborative research between the SAMPHIRE researchers, the dive club, and the Scottish Association of Marine Science identified a Saro Lerwick, two Short Sunderland flying boats, a Consolidated Catalina flying boat, and a probable Catalina wing, all of which lie close to the nearby WWII flying boat base on the island of Kerrera. Many of these wrecks remain in almost pristine condition. Other possible aircraft sites have been reported to the SAMPHIRE Project including other flying boat locations (SID39, SID56, SID70, SID142) as well as isolated artefacts (SID50). With a minimum of five confirmed marine aircraft wrecks the

Table 3. Shipwreck locations recorded by recreational divers during the project.

SID	Type	Date	Source	Description
3	Vessel	Post-medieval	Recreational divers	Scattered ships pins from a large wooden wreck found at a small island Eilean an Ròin.
5	Wooden cargo ship	1842 (possible wrecking date)	Recreational divers	Reported in 2013 a wooden wreck in Loch Laxford consisting of a mass of timbers and large pre-1815 anchor with associated fragments of machinery and artefacts. The dive team were unable to reach the site but were subsequently provided with extensive videos and stills and were able to give a nineteenth-century date for the site based on the artefacts and a possible identification as the Phoenix, sunk in 1842 (Figure 6).
17	Steamship	1892 (built) 1924 (wrecked)	Recreational divers	Initially reported by local residents and fishermen and was the subject of an unfruitful confirmation survey by the SAMPHIRE dive team; this wreck was later confirmed after contacting recreational divers who were able to provide geographical coordinates, photographs and sketches, and is now thought to be the previously unlocated SS Viscount built in 1892 and stranded on the rock in 1924.
18	Naval yacht	1895 (built) 1916 (wrecked)	Recreational divers	Recreational divers provided a location and photographs of a second wreck at Chuaig Island. Further research by the SAMPHIRE team with local input has tentatively identified this site as the Hersilla, an armed iron naval yacht.
19 and 20	Ferry and salvage vessel	Ferry—1904 (built), 1927 (wrecked) Salvage vessel (wrecked 1927)	Recreational divers	Recreational divers discovered and initially identified a wreck as the Sheila, a regionally significant MacBrayne ferry built in 1904 and sunk in 1927. Subsequent collaboration between the SAMPHIRE team and local residents identified the probable wreck of the Sheila at another location (SID19) nearby and confirmed that salvaged material held in a local museum related to yet another nearby wreck (SID20) thought to be the Mafeking, a salvage vessel lost in attempts to recover the Sheila.
38	Schooner	1860 (wrecked)	Recreational divers	A previously unrecorded wreck at Glenelg Bay was reported by a recreational diver and subsequently confirmed by scallop divers and local residents. A diving fieldwork visit to the site confirmed the presence of a large Scotch boiler. Based on of the location and design of this boiler, a tentative identification has been assigned as the schooner Medora, lost in 1860.
45	Brig	1857 (built) 1874 (wrecked)	Recreational divers	Recreational divers completed a Project SAMPHIRE wreck reporting forms for a previously unrecorded wreck thought to be the Iris, a brig lost with a cargo of coal off Skye. The location of the wreck site was

(Continue on next page)

Table 3. (Continued)

SID	Type	Date	Source	Description
				subsequently confirmed by the SAMPHIRE dive team in the summer of 2014 and extensive video and photographic surveys were made of the wreckage which includes copper sheathed hull remains, a bronze rudder gudgeon, coal, iron knees, a pump, and chain pipes as well as auxiliary steam machinery (Figures 7 and 8).
55	Smack (possible)	1876 (possible wrecking date)	Recreational divers	The previously unknown remains of a small unidentified wooden wreck reported in Loch Alsh.
73	Steam trawler	1913 (built) 1927 (wrecked)	Recreational divers	The probable wreck of the SS George A. West, a wooden steam trawler. This wreck was found through recreational diver investigation of anomalies in published navigational multibeam surveys.
74	Steam yacht	1904 (built) 1942 (wrecked)	Recreational divers	The probable wreck of the Thalia, a steam yacht. This wreck was found through recreational diver investigation of anomalies in published navigational multibeam surveys.
133	Unknown	Nineteenth century	Recreational divers	A previously unknown and apparently large wreck of probable nineteenth-century date in the Sound of Eriskay (Figure 9). This wreck was found through recreational diver investigation of anomalies in published navigational multibeam surveys.
146	Steamship	1896 (built) 1912 (wrecked)	Recreational divers	A previously unknown wreck thought to be nineteenth century in date from analysis of recreational diver photographs. It is likely to be the Cathcartpark, a steamship built in 1896 and lost in 1912 near Iona.
150	Wooden ship	1848 (built) 1894 (wrecked)	Recreational divers	A previously unknown wreck reported by recreational divers consisting of girders and metal objects. Based on position it may be the Lord Bangor, a wooden ship built in 1848 and stranded in 1894.
151	Steam drifter	1933 (wrecked)	Recreational divers	A previously unknown wreck reported by recreational divers consisting of girders and metal objects. Based on position it may be the Carrigart, a steam drifter lost in 1933.
155	Paddle steamer	1860 (built) 1867 (wrecked)	Recreational divers	The confirmed wreck site of the Falcon, a previously unlocated paddle steamer built in 1860 and lost in 1867 with great loss of life. This wreck was found through recreational diver investigation of anomalies in published navigational multibeam surveys.

Table 4. Anchor locations recorded during the project.

SID	Type	Date	Source	Description
1/2	Metal anchor	Possible eighteenth century	Fisherman/local resident	An anchor recovered in trawling gear off Cape Wrath and now held by a local resident in Balchrack, Sutherland.
4	Metal anchor	Possible eighteenth century	Dive charter operator/recreational divers	An anchor reported by a dive charter operator, seen by recreational divers on the seabed near Kinlochbervie.
23	Metal anchor	Modern	Local resident	An anchor reported on the seabed at Rubha na Craobh but subsequently verified by the SAMPHIRE dive team as modern.
42	Stone anchor	Possible prehistoric	Local resident	A stone anchor found on a beach on the island of Lewis by a local resident (Figure 10).
47	Metal anchor	Post-medieval	Local resident	A metal anchor of unknown type recovered from the Rona Harbour, reported by a local amateur historian.
52	Metal anchor	Post-medieval	Scallop diver	A very large ringed anchor seen on the seabed north of Scalpay by a scallop diver.
61	Metal anchor	Post-medieval	Local resident	An unusual anchor of apparent antiquity discovered by a local resident on a beach on Skye, currently in care of the MacDonald Museum, Skye.
62	Metal anchor	Possible medieval	Local resident	An anchor found by a resident of Skye under a foot of peat in a coastal croft. The anchor and find spot were surveyed by the SAMPHIRE team in 2014.
145	Metal anchor	Post-medieval	Scallop diver	A large anchor of unknown type on the seabed, the location of which was reported to the SAMPHIRE Project by a scallop diver in 2015.
149	Metal anchor	Post-medieval	Recreational diver	A large anchor of unknown type on the seabed, the location of which was reported to the SAMPHIRE Project in 2015.

contribution of the project to the previous national total of 27 (Lancaster 2012:42), has been considerable.

DISCUSSION

Many of the sites recorded by SAMPHIRE are based on descriptions, photographs, and information held for many years by local communities. Up to around 2012, the Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS—now merged into the government’s heritage agency Historic Environment Scotland) was

very active in collating published data on maritime archaeological sites from dive magazines and other freely available sources and this captured a great deal of data, albeit in a passive way. Since then, enhancement of the National Inventory has been undertaken through a series of projects (see above) which have successfully added a great number of historical losses. However, input of data from dive books and magazines and similar published sources data has been much more sporadic. In addition to the need for passive data capture from groups such as divers, the SAMPHIRE

Table 5. Cannon and cannonball locations recorded during the project.

SID	Type	Date	Source	Description
8	Group of cannons	Unknown	Scallop diver	Several cannons were reported at the base of Ox Rock, near Loch Laxford. Attempts by recreational divers and by the SAMPHIRE team to dive and locate this site proved unsuccessful but in each case only a small area of seabed was covered.
21	Pair of cannons	Possible nineteenth century	Scallop diver	A pair of cannon (the only Scottish east coast site reported during the project) found on the seabed off Fort George by working/scallop divers and may be related to the loss of the <i>Lively</i> , an unlocated cargo sloop lost in the vicinity in 1827.
22-findspot; 27-current location	Carronade	Early nineteenth century	Fisherman	A cannon recovered from a beach and mounted on a carriage on the main street of the village of Shieldaig with a plaque describing it as an 'Armada cannon'. Recording and analysis carried out by independent ordnance expert Charles Trollope for the SAMPHIRE project demonstrated that this was in fact a carronade dating to around 1812.
24	Carronade signal gun	Early nineteenth century	Local resident	A cannon, also recorded in the village of Shieldaig was reported by locals to have been dredged out of the Congo river in Kinshasa. Subsequent analysis established this to be a carronade signal gun of the early nineteenth century.
35	Carronade	1750-1820	Holidaymaker	A Scottish carronade recovered in a rock pool in Skye in 1979 and subsequently placed in a local school. No record of this discovery had been entered in the National Inventory. Extensive records of the discovery were sourced from local archives.
152	Cannonball	Unknown	Recreational diver	A recreational diver reported the location of a cannonball and dead-eye rigging block found in the Sound of Jura in 1995. The SAMPHIRE team recorded and measured the cannonball in 2015 which has been interpreted as a 4 lb shot.

Project has demonstrated a model for *active* data capture. The project has also demonstrated the necessity of traveling into communities and actively building and maintaining links with key groups and individuals.

The links established during project SAMPHIRE have been strengthened through continued dialogue and communication of specialist analysis through direct communication with local communities, as well by

Table 6. Previously unrecorded intertidal wrecks recorded during the project.

SID	Type	Date	Source	Description
10	Steam trawler	1903 (built) 1947 (beached)	Former local resident	Muirneag, a much decayed steam trawler beached at Loch Erisort and described as ‘the last British herring drifter to fish under sail power alone’ (Smylie 2013:43).
43	Clyde puffer	1844 (built) 1919 (wrecked)	Scallop diver	Tom Telford, a previously unlocated wreck buried on Staffin Beach in Skye.
44	Wooden ship	1868 (built) 1877 (wrecked)	Local resident	James A Wright, an American ship, the wreck of which is occasionally visible on the beach at Baleshare on North Uist.
132 and 133	Fishing boats	Early nineteenth century	Academic/ local resident	The wreckage of Queen and Elizabeth, two adjacent largely collapsed early nineteenth-century fishing vessels at Fearnmore, first discovered by Prof. Karen Hardy of ICREA and subsequently investigated by the SAMPHIRE team and local residents.
148	Coastal trader	Circa 1900	Archaeologist	A wooden shipwreck recorded at Ardno, at the head of Loch Fyne (Figure 12).
153 and 154	Unknown	Unknown	Archaeologist	Two intertidal wrecks were reported at Machrihanish beach on the Tarbet peninsula, one of which was an 11 m wooden wreck exposed by storms and the other being a substantial wooden shipwreck eroded from sand dunes and subsequently lost to the sea. In both cases the project has collected photographic evidence of the sites.
156	Wooden vessel	Circa 1900 (possible)	Archaeologist	A previously unrecorded intertidal shipwreck comprising of a large fragment of exposed timbers emerging from beach sand at Maidens in SW Scotland.

providing them with digital and printed reports. Results are recorded in a Geospatial database (in Access and ArcGIS formats) which will be archived with Historic Environment Scotland along with a complete set of associated paper and digital records, including photographs. All locations in this database have been recorded in both British National Grid and WGS1984. All of the archaeological site data has also been placed online on the project website in an interactive digital map, in order to facilitate public use of this data.

This project highlights that more resources need to be targeted towards both passive and active models of maritime archaeological data gathering on a national scale. This requires proactive and integrated methods that communicate data (including community knowledge and ‘tips’), and results between researchers, heritage managers, and local communities. Whether this is undertaken under the auspices of Historic Environment Scotland or a dedicated organization (the SCAPE Trust which focusses on archaeological sites threatened by

coastal erosion may provide a model) it is clear from the strength of links built up over the course of the SAMPHIRE Project that a permanent infrastructure will benefit from a momentum that cannot be maintained through occasional projects. Diving by archaeologists is also essential, and while there are issues around logistics, safety and compliance (Benjamin and MacKintosh 2016), there is a need for national, sustained capacity of diving archaeologists in Scotland. Where archaeologists can work safely in partnership with suitably trained and experienced local community members under water, this should be encouraged.

The potential for recreational divers to contribute to discovery and stewardship of marine archaeological sites in Scotland was recognized by several authors including Oxley (2001:423) and Martin (1998:117) who said of sport divers, that 'groups might adopt their local "patches" and, with guidance, would be well-placed to explore and monitor specific parts of the coastline'. Other examples of projects around the world where local community knowledge has provided coastal and marine archaeological data on a relatively broad scale include the Marianas Islands project (McKinnon et al. 2014) and Australia (Anderson et al. 2006:149-150) but in most cases, gathering of local knowledge has been undertaken as a minor part of a program more focused on other methods of data gathering through remote sensing or professional prospection, and often on a site-specific or relatively local scale rather than regional or national. This project highlights the value of large-scale programs centered on crowdsourcing of maritime archaeology data. Such programs have a major potential, as illustrated by the discovery of several internationally significant submerged prehistoric sites in the Baltic through engagement with the recreational diving community in the 1950s (Andersen 2013:11).

A key outcome of the SAMPHIRE Project has been to highlight that a significant amount of avocational research and wreck diving is taking place in Scotland, in some cases driven by the publicly available Civil Hydrography Programme multibeam survey data. Unfortunately, not

all such activity is undertaken responsibly, with several examples of artefact removal documented by the project. Among the more responsible majority, most divers, fishermen, and other maritime community members proved very willing to share their knowledge, though in many cases are simply unaware of the benefits of reporting material to the primary National Inventory or even of its existence. Instead, many underwater discoveries lead to a minimum compliance with reporting through the Receiver of Wreck (legally required under UK law), which may never filter through to the permanent archaeological record, a disappointing reality that was reported to the project team on multiple occasions. This project has highlighted a disconnect between the Receiver of Wreck and the national heritage branches within the UK; this is an area that should be investigated further for practicality and implementation of governance and heritage management. In other cases, many community members actively seek to share their knowledge but assume that this is achieved through publication in a dive magazine, through submission of details to non-permanent online forums and club/wreck websites, or even through social media. In many cases this cultural information would be subsequently lost. This is particularly critical in the case of sites which appear to be under immediate threat of destruction by natural mechanisms or human interference.

CONCLUSION

The SAMPHIRE Project has demonstrated the value of the proactive gathering of maritime cultural heritage data from community sources across large areas, reaching out and traveling to maritime communities, and shown how valuable this can be compared to the passive approach generally in use. The project has also shown how accurate and detailed the information captured through this type of engagement can be, particularly once rapport and trust has been established through demonstrations of good will and building of personal relationships between archaeologists and maritime

communities over multiple years. Much of the data recorded by project SAMPHIRE is significant in both archaeological research terms and with respect to local heritage, and in many cases, would otherwise have remained unreported and undocumented. Significantly, most of the data recorded represents sites which would not be identified through large-scale sonar survey and will make an important initial contribution to the balancing of existing biases in the National Inventory. Valuable lessons have also been learned about the nature and potential value of data held by different maritime communities and these results will be of benefit to heritage professionals facing similar biases in the coastal and marine environments worldwide.

The success of the approach adopted in this project and the potential value of adopting a similar approach elsewhere has been recognized through the award of a 2017 European Heritage prize.⁸ Despite the overall success of the project, it is best considered as a proof of concept for a more permanent approach. The scale of the problem for maritime nations is far greater than can be addressed by a three-year regional effort. Momentum is critical for the building of networks of relationships within the key communities of recreational and commercial divers, fishermen, and related occupations, and a long-term national infrastructure for proactive and sustained data gathering and community engagement would be far more effective. Crowd-sourcing of maritime heritage data has been shown to be achievable, practical, cost-effective, and appropriate in order to address the current biases, and state heritage agencies should consider dedicating resources on a permanent basis to these active methods of data gathering.

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END NOTES

1. See Canmore, the National Inventory of recorded sites managed by Historic Environment Scotland at <http://www.canmore.org.uk> (accessed Jan. 16, 2017).
2. <http://www.ukho.gov.uk/Pages/home.aspx> (accessed April 9, 2015).
3. <https://data.gov.uk/dataset/wrecks-database> (accessed April 9, 2015).
4. <http://www.historic-scotland.gov.uk/index/heritage/wrecksites/scotlands-historic-wrecks.htm> (accessed April 9, 2015).
5. <http://www.promare.co.uk/ships/> (accessed Dec. 6, 2016).
6. <http://fipad.org> (accessed Dec. 5, 2016).
7. <http://news.bbc.co.uk/1/hi/scotland/8393952.stm> (accessed Dec. 5, 2016).
8. <http://www.europeanheritageawards.eu/winners/samphire-maritime-heritage-project-western-scotland/> (accessed May 24, 2017).

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