Acknowledgements

The first monitoring period has benefited from the diving, technical and scientific expertise of the authors of this report and other members of staff at Bournemouth University, namely Nigel Bryant and Elizabeth Rundle and former students of the BSc Marine Archaeology programme, now professional archaeologists, who returned to the project to work as supervisors during the season.

A key role has been played by some of the students of the BSc Marine Archaeology programme, to whom training in diving and environmental strategies has been given. In particular is valued the work of Thomas Cousins, Danni Seliger, James Pilson-Wood, Tom Burnett and Laura French.

The help of Paul Farrell and Bob Fletcher (Portsmouth University), Stuart Churchley and Ben (Newport Ship), Malcolm Darch, Duncan Brown, David Gamester and especially Frank Eliston (Dorset Work Boats) is also acknowledged

Thanks are also due Mark Dunkley, Angela Karsten and Carla Graham of English Heritage, and staff at Poole Harbour Commissioners, Andy Ramsbottom, Dick Appleton, Steve Pearce and Margi Dillon, without whom the project would not have occurred.

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Introduction

Discovery
The Swash Channel Wreck (the ‘site’) lies in approximately 7m of water on flat sand and shingle immediately adjacent to the eastern edge of the dredged section of the Swash Channel in the approaches to Poole Harbour in Dorset. The site was discovered as a sidescan sonar anomaly as a result of a geophysical survey conducted by Wessex Archaeology (WA) on behalf of Poole Harbour Commissioners (PHC) and Poole Borough Council as part of the Poole Harbour Channel Deepening and Beneficial Use Scheme (Wessex Archaeology 2006).

Designation
The site was designated as a Historic Wreck under the Protection of Wrecks Act 1973 on Friday 10 December 2004 under order 2004 No.3243. The protected site lies within a polygon measuring 100m by 200m whose corners lie at four points Northwest (50°39.8971’N, 001°55.5905’W), Northeast (50°39.9201’N, 001°55.5137’W), Southeast (50°39.8225’N, 001°55.4414W) and Southwest (50°39.7994’N, 001°55.5182’W).

The current site archaeological licence is held by Mr Andrew Ramsbottom, Harbour Engineer for Poole Harbour Commissioners. The archaeological advisors for the site are Bournemouth University.

Previous Work

2004/2005 Work Summary
WA undertook initial diving operations on the site in October 2004 (for identification), for 26 days between 23rd May and 27th June 2005 (to undertake a Designated Site Assessment) and for nine days between 17th October and 15th November 2005 (to undertake mitigation works). During these works a total of 300 sandbags were laid on the site. The distribution of these is shown in previous reports (Wessex Archaeology 2005).

WA concluded that the site consists of a wooden structure and other debris within an area measuring approximately 40m x 12m with a least two cannons lying to the north of this area. Within this area lie two large wooden fragments of hull structure, one 20-24m long (Area 1) and one 10m x 4m (Area 2). Within Area 1 lie two 2 cast iron cannons and outlying to this area are at least a further 2 cast iron cannons. All measure between 2.5 and 2.75m in overall length.

Bournemouth University’s Involvement 2006 - 08

With the completion of the mitigation work and the Designated Site Assessment there was a need for long term monitoring of the site. With limited funds with which this could be undertaken, EH arranged a meeting between PHC and Bournemouth University to discuss a proposal that would allow for this monitoring to take place as part of a research/teaching project connected with the university’s BSc Marine Archaeology programme. Bournemouth University prepared a Project Design to this effect, however whilst the Project Design was being prepared, the specification for the site monitoring was increased with the significant addition of further scientific work.
As PHC had already agreed funding levels, further funding could not be made available and Bournemouth University agreed to include this work within the approved budget.

Bournemouth University Project Design aimed

to complete the survey of and establish a strategy for the future management of the Swash Channel Wreck, which may be implemented by the staff and students of Bournemouth University as an ongoing project to be run over the next five years. This approach combines the application of the staff's archaeological, scientific and diving expertise with the education of students in archaeological skills through the undertaking of research and monitoring on the site.

The combination of academic research with student training provides a comparatively low cost long term solution to the management of a site which will require frequent monitoring due to the unstable nature of the environment it lies in and for which considerable further work is required to gain a basic understanding of the site.

These aims were to be achieved by completion of the following objectives

(a) Collating the current archive held on the site.
(b) Undertaking an assessment of the extent of the site across areas 3, 4 and 6
(c) Establishing a stratigraphy for the site.
(d) Undertaking a monitoring strategy based on the approach developed during the Monitoring, Safeguarding and Visualizing Shipwrecks (MoSS) Project (which includes an assessment of sediment dynamics, the burial environment, and the stability of materials on the site.
(e) Developing a long term strategy for the management of the site based on the results of the monitoring process and proposing mitigative measures to manage the site's stability where necessary
(f) Continuing to develop the site plan produced by WA, undertaking a survey of the debris in areas 3, 4 and 6 and incorporating newly eroded areas.
(g) As far as is possible setting the site in its local and regional archaeological context.
(h) Providing a plan detailing how the archaeological research and management of the site should proceed in the long term.

Objectives (a), (b) and (c) have already been achieved and reported on in previous reports Palma & Parham 2006, Palma & Parham 2007 and Parham 2007. Objectives (d), (e), (g) and (h) are still on going and (f) is at a standstill for the reasons detailed below.

In 2007 English Heritage commissioned Bournemouth University to undertake an in situ reburial and preservation trial of sections of the hull structure. This work was undertaken in 2007 with samples from this being recovered in 2008. The results of this work will form a separate report to English Heritage during 2008.
Bournemouth University began work on site in May 2006. Their initial work quickly demonstrated that the extent of the articulated hull structure on site was not as it had been initially believed (20-24m) but almost 40m in length and up to 15m wide in places with extensive areas of debris extending beyond this, and that the areas protected in 2005 were now exposed again. Since this point (May/June 2006) Bournemouth University’s work has shown that over much of the site the level of sediment has suffered a net reduction of 250mm in many areas, revealing much more wooden structure and organic and other finds than was initially expected.

Bournemouth University’s work has demonstrated the physical and biological damage that the site, particularly the organic structure, is exposed to and the rapid degradation that occurs once it is freshly exposed. Over 2006 and 2007 they undertook steps to attempt to mitigate this damage, including a BU & EH funded preservation in situ trial and recording area of areas of hull structure considered to be under threat. However at the end of the 2007 season it became evident that with the resources available to Bournemouth University the recording required to preserve this exposed material by record (i.e. recording areas of the site prior to their natural destruction) could not be achieved.

The 2008 Season

Diving
In accordance with regulation 7(1) of The United Kingdom’s Diving at Work Regulations 1997 (S.I. 2776) Bournemouth University is registered to act as a diving contractor. All diving operations undertaken on the Swash Channel Wreck were in line with the Poole Harbour Control – Operating Procedures & Guidance (Diving Operations) and Scientific Diving: Code of Conduct (Parham, 2006), which has been agreed by the Health and Safety Executive (HSE). The document is designed specifically for the inclusion of university students within scientific diving research. The dates and number of dives conducted on the site during 2008 is listed below.

Table 1Diving Time

<table>
<thead>
<tr>
<th>Date</th>
<th>BU Staff</th>
<th>BU Students</th>
<th>Non BU Divers</th>
<th>Day Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dives</td>
<td>Minutes</td>
<td>Dives</td>
<td>Minutes</td>
</tr>
<tr>
<td>12/05/2008</td>
<td>4</td>
<td>244</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>13/05/2008</td>
<td>4</td>
<td>250</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>14/05/2008</td>
<td>1</td>
<td>20</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>09/06/2008</td>
<td>5</td>
<td>169</td>
<td>4</td>
<td>172</td>
</tr>
<tr>
<td>10/06/2008</td>
<td>3</td>
<td>134</td>
<td>10</td>
<td>416</td>
</tr>
<tr>
<td>11/06/2008</td>
<td>3</td>
<td>90</td>
<td>16</td>
<td>662</td>
</tr>
<tr>
<td>12/06/2008</td>
<td>5</td>
<td>95</td>
<td>12</td>
<td>706</td>
</tr>
<tr>
<td>13/06/2008</td>
<td>3</td>
<td>120</td>
<td>12</td>
<td>675</td>
</tr>
<tr>
<td>14/06/2008</td>
<td>2</td>
<td>165</td>
<td>13</td>
<td>677</td>
</tr>
<tr>
<td>15/06/2008</td>
<td>3</td>
<td>156</td>
<td>11</td>
<td>702</td>
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<tr>
<td>14/07/2008</td>
<td>2</td>
<td>58</td>
<td>8</td>
<td>756</td>
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<tr>
<td>15/07/2008</td>
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<td>210</td>
<td>8</td>
<td>686</td>
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<tr>
<td>28/07/2008</td>
<td>1</td>
<td>48</td>
<td>12</td>
<td>709</td>
</tr>
</tbody>
</table>
Results

Sediment Monitoring

In agreement with the project specification, sediment measurements were taken during each period on which the site was visited. This has resulted in a considerable volume of data being collected over the 3 years that this work has taken place. The data shown below matches the original sediment as recorded in August 2006 (the black line) adjusted to set level, plotted against the sediment levels record in late July 2008. Readings 1 to 12 inclusive are for the sediment rods positioned on the north-eastern perimeter of the site (Profile 1) and those numbered 12 to 27 inclusive on the south-western perimeter (Profile 2). Sediment loss is occurring over the entire site, with the greater loss occurring across the centre of the site and, as in 2007, the south-western perimeter with sediment reductions of up to 350mm at the maximum extent, 100mm greater than the maximum of 250mm noted by autumn 2007. Again, as was noted in 2007, no research work has been undertaken on this data to date. However it is suggested that the sediment movement in the area of the site is from the east to the west and that the wreck is acting like a groyne, stopping sediment movement and thus denuding the western areas of the site.

It is noticeable that when the profile rods were installed in the summer of 2006 no archaeology was visible along the lines on which they were installed. However whilst that is still the case for Profile 1, timbers and other material are now clearly visible in the area of Profile 2.
During the 2008 season it was noted that a number of the monitoring rods were being bent (through between 30 & 90°). No explanation has been established as to why this is taking place.

**Poole Harbour Commissioners Survey**

The results of monitoring bathometric survey undertaken by PHC across the Protected area (defined in the illustration above by four circles marked NE, SE, SW & NW) shown above. This shows no net increase or loss across the protected area and
would appear in contrast to the results shown by the sediment monitoring rods. Discussion has yet to take place as to why this is so but is suggested that the area may well be stable and that the presence of the wreck is creating a scouring micro environment and is in effect eroding itself.

Environmental Scoping Study

The aim of the Environmental Scoping Study commissioned by English Heritage to Palma in 2007 was to undertake an experimental project to provide useful data for the best stabilisation method to achieve in situ preservation of the Protected Wreck Site of the Swash Channel Wreck.

Specifically, the project set a trial of different strategies for in situ stabilisation, to be deployed for a twelve month period and to establish the efficacy versus financial viability of each method.

Three different protective methods were deployed on site: Grade 4000 of the Geotextile mesh, Polypropylene Net (also known as scaffolding mesh), and lastly an artificial sea grass (a matt made of polypropylene fronds). These three methods were deployed on the archaeological structure and aimed to instate anaerobic conditions on the section of wreck they were laid upon, by gathering a considerable layer of sediment on the archaeology.

Visual Observations:

Geotextile: Preliminary results have shown that colonisation of the area was developing after only one month of deployment of the Geotextile and that a stratum of sediment was already deposited in the grooves between sandbags.

Polypropylene Net: Preliminary results have shown that the net gathers a limited amount of sediment but is eventually weighed down by the algae and coarser sediment which gets trapped in the mesh, resulting in its collapse on the seabed.

Sea Grass Mat: Preliminary results have shown that a considerable amount of sediment was deposited on the mat after three months. Many of the fronds were weighed down by the sediment itself, failing therefore in the aim of continuing the build up of the preservative status.

Sacrificial Samples

Sacrificial samples, in triplicates and different wood types pertinent to the wood utilized for the ship’s construction, were utilized under every trial as well as a control system.

During the diving operations in 2008, the samples under each trial were retrieved and are currently being analysed in the laboratory.

Data logger
The deployment of a data logger, kindly lent by English Heritage, collected environmental parameters in the water at different intervals. The analysis of the data will provide a picture of how the environmental parameters are suitable for the \textit{in situ} preservation of the site and its stability.

This data will be analysed as a student’s project during the Academic Year 2008-09

\textbf{Survey}

As stated in the above, Bournemouth University’s plan for the continuation of the site survey was \textit{Continuing to develop the site plan produced by WA, undertaking a survey of the debris in areas 3, 4 and 6 and incorporating newly eroded areas, not to undertake the primary survey of previously unrecorded hull structure. Work undertaken by Bournemouth University during 2006 & 2007 showed that much of the site was unrecorded and with this in mind a project variation was submitted to English Heritage to meet the costs of a site survey, to be undertaken over a discrete period of time within Bournemouth University’s AH322 Applied Marine Archaeology Unit.}

\textit{Survey Method Statement}

As part of the environmental monitoring work on the site, a series of sediment monitoring rods are situated in two lines that run parallel to the centre line of the wreck and 12 m out on either side. Each rod is positioned along these lines at 5 m intervals. Prior to 2008 the exact position of these rods was not known. However, in May and June measured survey of these rods, plotted via the Web for Windows software package and geo-referenced by the position of 4 key points on this grid by means of a vertical buoy line and a differential GPS fix, established their known positions.

A grid of rope corridors was established between the site’s sediment monitoring rods, and a plastic 3m x 3m frame subdivided into 1m squares will be laid along the line with each 1m square of the frame photographed by digital camera utilising a wide angle lens and taken with overlap provided by the ‘surplus’ photograph surrounding the 1m square. Work on the site was undertaken during the periods shown below.

<table>
<thead>
<tr>
<th>Date</th>
<th>Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 – 14th May 2008</td>
<td>Initial Survey Work</td>
</tr>
<tr>
<td>9th – 15th June 2008</td>
<td>Photographic Survey &amp; Sample Recovery</td>
</tr>
<tr>
<td>14th &amp; 15th July 2008</td>
<td>Survey Work</td>
</tr>
<tr>
<td>28th July – 3rd August 2008</td>
<td>Photographic Survey</td>
</tr>
</tbody>
</table>

Work progressed well during June but adverse weather conditions in July / August limited the work severely resulting in 28% of the available boat time being cancelled due to bad weather, and causing bad visibility that limited work on photographic survey that could not be undertaken in visibility of less than 2 metres. In total to date 84% of the site has been resurveyed and it is hoped that, weather permitting, the work will be completed in November 2008.

A low resolution image of the results is shown in Figure 1
Archaeology

6 finds were recovered from the site in 2008.

<table>
<thead>
<tr>
<th>Object</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maiolica Alborello Jar</td>
<td>SCW 17</td>
</tr>
<tr>
<td>Carving</td>
<td>SCW 18</td>
</tr>
<tr>
<td>Concretion</td>
<td>SCW 19</td>
</tr>
<tr>
<td>Pulley sheave</td>
<td>SCW 20</td>
</tr>
<tr>
<td>Fragment of Silver Laurel bark</td>
<td>SCW 21</td>
</tr>
<tr>
<td>Fragment of hull planking</td>
<td>SCW 22</td>
</tr>
</tbody>
</table>

The carving (see Figures 2 & 3) was observed in May, as a small section uncovering from the seabed in the centre of the site. English Heritage was contacted and in line with agreements made over similar finds from the site it was agreed that the object was at risk from rapid biological and mechanical decay (see Figure 7) and should be excavated, recorded in situ, recovered and conserved. This work was undertaken in June when the object was excavated from within soft silts formed within two of the wreck’s floor timbers where it had become trapped after being broken from the vessel’s upper works. The carving was drawn and photographed by Bournemouth University, and electronically scanned by staff at Newport Ship prior to transportation to York Archaeological Trust for conservation.

The carving is made from slow grown Baltic Oak, traded extensively for detailed work of this kind (Nayling pers com). It was secured to the ship’s hull by the use of iron fastenings (see Figures 6 & 7) and is recessed on the back with two large mortises, (see Figure 5) one of which appears to terminate on the edge of the carving suggesting fastening to a rail, or similar, in the ship’s upper works. Preliminary study of the object suggests that it is manufactured in the early Baroque style typical of the early 17th century. Matching the shape and style of the carving against Admiralty ship models of the period suggests that it may have been originally located in the port bow or forward of the port quarter deck (see Figure 4). As far as can be established this is the earliest known example of a ship’s carving in the United Kingdom.

In July a complete pottery vessel was observed exposed alongside the sediment monitoring rods for Profile 2. This was recovered and is currently in passive storage at Bournemouth University. It has been identified as a Maiolica Alborello Jar of late 16th / early 17th century date (Brown per com) (see Figure 8).

In addition, a complete gun carriage cheek (SCW 34) and possible straw dunage were observed, and after discussion with English Heritage it was decided to raise this item. Unfortunately limitations caused by poor weather conditions have prevented this.

Early in 2008 advice was sought from David Gamester of the Society of Antiquities as to the potential origin and date of the finds assemblage from the site. Parallels for three of the items within the assemblage were found: the pewter spoon (SCW 07), copper alloy bell (SCW 13) and German stoneware shards (SCW 03), all of which are dated to the first third of the 17th century, circa 1620 with north west European origins. The particular rarity of the copper alloy skillet (SCW 23) was noted (Gamester pers com).
Conclusions

Each season since Bournemouth University’s involvement in the site sediment levels have visibly reduced, exposing increasingly larger volumes of archaeological material. In 2006 and 2007 this proved manageable with the resources that Bournemouth University had to hand, however the vastly increased volumes of material seen exposed and actively eroding during 2008 have brought on a position where Bournemouth University staff can observe the site eroding at an increasingly high speed but do not have the resources to manage this. In conjunction with English Heritage, Bournemouth University has approached the National Trust about the establishment of a wet storage facility in the Poole area to allow the recovery and short term storage of endangered material prior to recording and either discard or conservation, and it is considered that, with the exception of obvious extremely important items, no decisions are made about the ultimate fate of recovery material until work on the site has finished.

In the medium term it is recommended that consideration is given to the excavation of endangered areas of the site to mitigate their natural destruction, and that long term reburial then be considered for those areas of the site that can be stabilised once the fieldwork stage of the project is completed.

Education

The monitoring programme was initiated in 2006 as part of a research/teaching project connected with the university’s BSc Marine Archaeology programme. During the course of the project seven students have been involved in its management and execution. During their time on site they have been supported by a full HSE scuba team who have managed their safety and diving practises.

Specific scientific and monitoring training phases have been designed and put in place for the students to learn best practice for in situ site management, photographic survey, measured survey and recording. During 2008 all the students involved performed to the highest of standards and without their input very little work on the site would have occurred.

Archive Location

All of the project archive, with the exception of that held by English Heritage, is stored by Bournemouth University.
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Wessex Archaeology 2006 Poole Harbour Channel Deepening and Beneficial Use Scheme Swash Channel, Designated Wreck: Mitigation Works (Ref: 61340.02) May 2006

Bournemouth University
30th October 2008
Figures

Figure 1. Preliminary Photomosaic, bow to top of image.
Figure 2, Face of Carving (SCW18) whilst being excavated

Figure 3 - Carving (SCW18)

Figure 4 – Possible original locations for Carving (SCW18)
<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Showing mortise on underside of carving</td>
</tr>
<tr>
<td>6</td>
<td>Showing iron fastenings in neck of carving</td>
</tr>
<tr>
<td>7</td>
<td>Showing iron fastening in tail of carving and biological decay</td>
</tr>
</tbody>
</table>
Figure 8 - Maiolica Alborello Jar (SCW 17)