



## SALT WORKING IN CHICHESTER HARBOUR

Counties of Hampshire and West Sussex

March 2016



Chichester  
Harbour  
Conservancy



# Salt working in Chichester Harbour Hampshire/West Sussex

NGR 476329 104432  
OASIS reference molas1-245151  
CITIZAN region: South West

Report on a CITIZAN site survey

## Sign-off History:

Issue No.	Date:	Prepared by:	Checked/ Approved by:	Reason for Issue:
1	25/02/2016	Alex Bellisario and Lauren Tidbury	Stephanie Ostrich	First Issue
2	18/03/2016	Alex Bellisario and Lauren Tidbury	Gustav Milne/ Stephanie Ostrich	Final

© CITIZAN

MOLA, Mortimer Wheeler House, 46 Eagle Wharf Road, London N1 7ED tel 0207 410 2235  
email [citizen@mola.org.uk](mailto:citizen@mola.org.uk)



Chichester  
Harbour  
Conservancy



# Summary

The production of salt in Chichester Harbour has been a long established industry which dates back to at least the Iron Age, with several sites demonstrating continuous occupation from the Iron Age to the Roman period. Further evidence of salt working can be found in the Domesday Book for the late 11th century and on cartographic sources and maritime charts for the post medieval period.

Many of the earlier sites were recorded on what was then dry land in the 1960's to the 1980's (Bedwin, 1980 and Bradley, 1992) but have since been largely destroyed by coastal erosion. The aim of this project was to establish whether any remains of these sites exist in the intertidal zone and whether further sites could be discovered as the coastline has changed.

Salt working is just one of many coastal industries which took place in Chichester Harbour. This now relatively quiet harbour was once bustling with industrial activity including oyster farming, boat building and brick making. This project therefore also sought to increase our understanding and raise local awareness of the history of salt working and other industries in the harbour.

This report outlines the results of this project and recommendations for further work. A heritage trail has been created which focusses not only on salt production sites and how to identify them but also encompasses several other sites which bear testament to this harbour's industrial past.

# Acknowledgements

The report and associated works was funded by the Chichester Harbour AONB (Area of Outstanding Natural Beauty) through the Sustainable Development Fund with match funding provided by CITiZAN, the Coastal and Intertidal Zone Archaeological Network, through the Heritage Lottery Fund.

The finds report was written by Lorraine Mepham and Matt Leivers (Wessex Archaeology).

The work of CITiZAN would not be possible without the support of our volunteers, sponsors and project partners. CITiZAN would like to thank Chichester Harbour (AONB) Sustainable Development Fund, especially Judith Meagher and Richard Austin. The project would also like to thank James Kenny and Alan Whitney for the provision of the Historic Environment Record Data and The Novium Museum for the supply of imagery used in the Heritage Trail. CITiZAN would also like to thank all members of the Chichester Heritage and Archaeology Partnership (CHAPS), especially David Hopkins, James Kenny and Rob Symmons. Thanks also to members of the Chichester and District Archaeology Society (CDAS) Peter Murphy, Anne de Poitier, Steve Cleverly and Ann Davies whose local knowledge of the coastline was extremely valuable to the project.

CITiZAN is funded by a generous grant of £1.4 million from the Heritage Lottery Fund, with match funding from the Crown Estate and National Trust and additional support from Historic England. CITiZAN is hosted by MOLA (Museum of London Archaeology); our regional teams are based with MOLA in London and with our partners the Council for British Archaeology in York and Nautical Archaeology Society in Fort Cumberland, Portsmouth.

# Contents

Summary	1
Acknowledgements	2
Contents	3
1 Introduction	1
2 Background research	3
3 Methodology	8
4 Results	11
5 Conclusions and recommendations	40
6 Dissemination	44
7 Bibliography	45
8 OASIS form	46
Appendix 1 Finds report, Paynes Boatyard	50
Appendix 2 Heritage trail leaflet	54

## *List of illustrations*

Front Cover: Fishbourne Salt Mill, Courtesy of Chichester Record Office

Figure 1 Site Location	4
Figure 2 methods of exploiting and producing salt, Hathaway 2013:22	5
Figure 3 Fieldwalking in Chichester Harbour with members of the Chichester and District Archaeology Society	9
Figure 4 Auger Survey with members of the Chichester and District Archaeology Society	10
Figure 5 Location of salt working sites in Chichester Harbour	12
Figure 6 Taylor Map of 1759 depicting the salterns in the north and south of Hayling Island (geog.port.ac.uk)	13
Figure 7 Milne map of 1791 depicting the location of salterns on Hayling Island (www.geog.port.ac.uk).	14
Figure 8 The Ordnance Survey old series of map of 1810 depicting the salterns on Hayling Island. (www.geog.port.ac.uk).	15
Figure 9 The Greenwood map of 1826 illustrating the salterns on Hayling Island (www.geog.port.ac.uk).	16

Figure 10 The extent of the excavation at Bradley's Site A (Bradley, 1992:30)	21
Figure 11 1794 estate map illustrating the salterns which today, have been replaced by a marina Sussex (Record Office MP 810)	23
Figure 12 the remains of Little Saltern extending into Chichester Harbour and the later additions of the sea defences	25
Figure 13 Linear alignment of posts which are likely to have been associated with previous sea defences rather than the preceding saltern	25
Figure 14 illustrating the large square depression which is visible on aerial imagery which was related to Great Saltern	26
Figure 15 illustrating the probable location of the Iron Age/Roman salt production at Thornham Point	27
Figure 16 illustrating the remains of the salt pans at Paynes Boatyard	28
Figure 17 illustrating the compacted area of reddened clay in which the artefacts recovered are considered to be associated with	29
Figure 18 demonstrating the area of supposed Iron Age/Roman salt working and its possible associations with the growth of Spartina	29
Figure 19 illustrating the landscape of Richard Bradleys 'Site A', with the depressions of salt pans clearly visible today	30
Figure 20 a selection of pottery identified during condition assessment at Richard Bradleys 'Site A'.	30
Figure 21 demonstrating the areas of depressions at Site 18/19 on the west coast of Chidham	31
Figure 22 illustrating the palaeolandscape around sites 18/19	31
Figure 23 flint and pottery identified by CDAS during a field visit to Thorney Island, possible briquetage identified in the bottom left corner (pers comm P. Murphy, copyright CDAS).	42

# 1 Introduction

## 1.1 Site background

---

A targeted archaeological investigation was carried out by CITiZAN, the Coastal and Intertidal Zone Archaeological Network, in Chichester Harbour (the site) as a part of an investigation into how salt has been produced over the past two millennia in the harbour. Chichester Harbour is one of England's 33 Areas of Outstanding Natural Beauty (AONB) and is located on the south coast of England straddling the borders of Hampshire and West Sussex (see figure 1). Covering an area of 74sq km, the Harbour is bounded to the west by Hayling Island and Itchenor and West Wittering to the East and encompasses, Thorney Island, Chidham and Bosham. The AONB is bounded to the north by the A259 and to the west by the A286 and B2179. As such the AONB incorporates the villages of Emsworth, Prinsted, Nutborne, Chidham, Bosham, Dell Quay, Itchenor, West Itchenor and part of West Wittering. This document reports on the fieldwork undertaken on eight survey days between November 2015 and February 2016, alongside detailed desk based and documentary investigations.

A Rapid Coastal Zone Assessment (RCZA) was previously prepared by Museum of London Archaeology Service (now MOLA) (MOLAS 2004) which covers the area of Chichester Harbour. This document should be referred to for information on the natural geology, archaeological and historical background of the site (and the initial assessment of its archaeological potential).

Chichester Harbour is classified as an Area of Outstanding Natural Beauty (AONB) with the entirety of the harbour area and much of the foreshore being listed as the 'Chichester Harbour Site of Special Scientific Interest'. The defined area of the AONB also contains four Scheduled Ancient Monuments (Fishbourne Roman Site; Tournebury Hillfort; Warblington Castle and Black Barn, Warblington) (Magic February 19 2016).

A method statement was subsequently prepared by CITiZAN taking into account health and safety issues, tidal windows, staffing and methodologies. The fieldwork was carried out as part of a detailed investigation of Chichester Harbour funded by the AONB Sustainable Development Fund.

## 1.2 Research frameworks

---

All work has been undertaken within the research priorities established in 'Chichester Harbour: An Archaeological Research Framework' (2004). The project also fits in with the wider regional objectives outlined in the Solent Thames Archaeological Research Framework (2014) for Hampshire and the South East Research Framework (*unpublished*).

## 1.3 Aims and objectives

---

The main objectives of the project were to understand salt production in Chichester Harbour and attempt to identify new areas which were likely to have been used for this purpose. It was also an aim to disseminate this information to the visitors of the Chichester Harbour AONB. The project was broken down into the following specific objectives:

- Desk-based assessment to identify salt production sites dating to the Medieval periods and later
- Condition assessment survey on all known salt production sites
- Identification of new sites and a condition assessment on these
- Establish a heritage trail in the harbour.

## 1.4 Scope of the survey

---

A CITiZAN survey is not a full excavation. It is designed to locate, identify and record significant archaeological features currently exposed on the coast or foreshore and highlight those that are under threat from erosive forces. These surface surveys provide a baseline dataset so that the changing condition of the exposed features can be more effectively monitored in the future.

## 1.5 Related outreach events

---

This report accompanies a programme of works associated with the grant-funded project entitled 'Salt Working in Chichester Harbour: understanding the history of salt working in Chichester Harbour in the Counties of Hampshire and West Sussex'. CITiZAN was accompanied by the Chichester and District Archaeology Society (CDAS) in many of the site visits associated with this project.

One of the most notable outreach accomplishments of this project is the production of the Heritage Trail leaflet which is presented below in Section 6 (see also Appendix 2).



## 2 Background research

### 2.1 An overview of Chichester Harbour

---

Chichester Harbour is an Area of Outstanding Natural Beauty (AONB), recognised for both its natural and historic environment. It contains a wealth of evidence which demonstrates its importance to past societies both in terms of exploiting its natural resources and its sheltered position on the south coast. Between 2003 and 2007 funding was received through the Heritage Lottery Fund for several archaeological projects within the harbour. The *Rhythms of the Tide* project included an assessment of known sites, fieldwalking to identify new sites, geophysical survey, augering, excavation and environmental analysis to improve understanding of how the harbour developed over time (Francis 2007).

Some of the earliest evidence of industry in the harbour is of Mesolithic flint working. During this period the harbour would have looked markedly different from today. Comparable studies in neighbouring Langstone Harbour (Allen and Gardiner 2000 and MAT Ltd 2014) would suggest that Chichester Harbour in the Mesolithic would have consisted of deep valleys initially surrounded by open grassland which later gave way to pine forest making it an attractive place for hunting, fishing and foraging. Although there is very little evidence from the Mesolithic in the harbour itself the continued threat from erosion has the potential to expose further in situ features from this period on the foreshore.

Rising sea levels and clearing of woodland altered the landscape during the Neolithic period, although associated archaeological evidence is sparse with just a few scatters of flints which have been recorded in Chichester HER.

During the Bronze Age (-2200 - -801) the Harbour began to look like something we would recognise today, with Hayling Island probably being separated from the mainland. Evidence for this comes from a wooden structure interpreted as a wharf or causeway which has been identified on the north coast of the Island (Hampshire HER). Finds from this period include scatters of flint tools, hoards of palstaves and funerary urns containing human remains. No evidence for any associated settlements have been identified as yet.

Iron Age sites have also been recorded in the Harbour, most significantly the hillfort situated on Hayling Island; to date this site is relatively unexplored and the primary function has yet to be established. It is within the Iron Age period that we start to see evidence of the coastal zone being exploited, with salt working becoming an important industry within the harbour. Many of these sites are now threatened by coastal erosion, including those on the west coast of Chidham, Hayling Island and the Thorney Channel.

The harbour played an important role during the Roman period in the transportation of goods and materials needed to build Fishbourne Palace. Within the harbour, particularly around Bosham, Roman material has been recorded eroding from the banks. Salt working activity is also thought to have continued with remains of this activity discovered around Chidham and Thornham Boatyard.

Medieval structures and artefacts have been recorded from the harbour. The Wadeway, which is still visible, was built to link the mainland with Hayling Island. By the post-medieval period archaeological evidence demonstrates the importance of the salt and brick industries, oyster farming and fishing to the local economy. Evidence includes roads, canals, mills, causeways and oyster beds, such as Fisherman's Walk in Emsworth, Prinsted oyster beds and Fowley Island.

Many of these sites are being affected by erosion, changing sediment levels and anthropogenic threats.

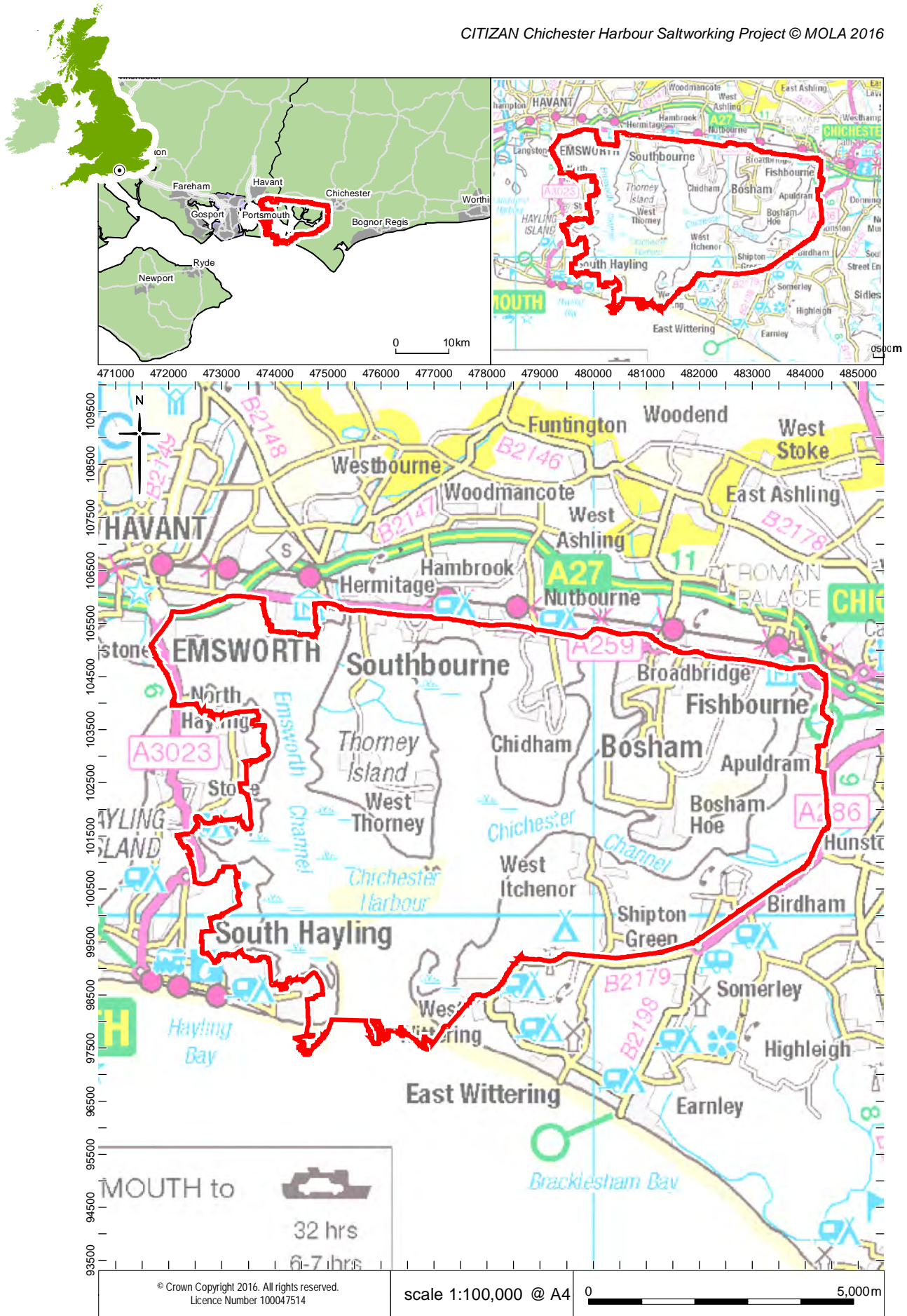


Fig 1 Site location

## 2.2 Salt production

Salt was mainly produced through the evaporation of sea water. Sea water was extracted and heated in salt pans; more sea water was gradually added during the heating process until the salt pans held a concentrated brine. This brine was then decanted into ceramic containers and boiled and dried slowly to remove all water leaving only pure sea salt. This was then used in a variety of ways including flavouring and the preserving of food stuffs such as fish and meat.

There are several methods for the production of salt, and the archaeological trace is often limited. What are often found are the remains of the ceramic equipment used in the heating process (or *briquetage*) and the remains of hearths and ovens. The methods of production and their physical evidence are outlined in the table by Hathaway (2013), in Figure 2.

Source	Method of retrieval or extraction		Physical Remains
Seawater	Open Pan	Condensing and evaporating salt from seawater, salt lakes, or springs using <i>natural sunlight only</i>	Settling/Evaporation Tanks/Ponds/Pans
	Open Pan and Artificial Heating	Condensing and evaporating salt from seawater, salt lakes, or springs <i>using natural sunlight and artificial heat</i>	Open Pans/Hearths/Clay or Metal Vessels/Debris Mounds, Debris Layers or Pits
Peat/Plants	Leaching/Washing/Burning/Evaporation	Process involving the burning of saltmarsh plants, soils, silts and peats, and then filtering/washing the ash with saltwater to produce a concentrated brine which is then artificially heated	Hearths/Clay or Metal Vessels/Debris Mounds, Layers or Pits. Burnt organic matter
Soil/Silt Plants		Process involving washing of soil formed in the beds of dried salt lakes, producing a brine which is then artificially heated	Hearths/Clay or Metal Vessels/Debris Mounds/Silt Mounds or Layers

Figure 2 Methods of exploiting and producing salt, Hathaway 2013:22

The industrial process of sea-salt production is known to have been used in Britain as early as the Bronze Age, with some of the earliest evidence being present at Billingborough, Lincolnshire (Darvill 2010, 232; Harding 2013, 56). The industry became a relatively constant process on the coastal plains of England until the 14th century when the Black Death and the Hundred years war had a devastating affect on the industry with it declining rapidly and England becoming increasingly reliant on imports of continental salt. This reliance on the continent continued into the late 16th century where changing political allegiances forced England to renew the industry (Greenwood 2011, 7). This coastal industry prevailed until the late post medieval period when quarried rock salt from Cheshire became the predominant supply.

## 2.3 Topography

---

Chichester Harbour contains a variety of habitats including residentially developed areas, areas subject to agriculture, salt marshes and mud flats; the harbour is also known for its diversity of wildlife (Francis 2007, 1).

Chichester Harbour lies on four bedrock groups:

- Bracklesham and Barton Group (sand/Silt and Clay)
- Thames Group (clay, silt, sand and gravel)
- Lambeth Group (clay, silt, sand and gravel)
- White Chalk

On the coastal edge the bedrock groups are overlain by alluvium with small exposures of Brickearth, the predominant deposit inland ([mapapps.bgs.ac.uk](http://mapapps.bgs.ac.uk)).

## 2.4 Archaeology and documentary evidence of salt production

---

The natural salinity of sea water varies but it is considered that estuaries are one of the most productive locations for salt production from sea water (Hathaway 2013, 21). Langstone Harbour, directly to the west of Chichester Harbour (see Figure 1), provides comparable evidence of salt working on an industrial level in the area from the Iron Age through to the post medieval period. Further work has been undertaken in Langstone and the results of over 20 years of investigation have been published in Allen and Gardiner (2000).

Below is a summary of salt production in Chichester Harbour from the Bronze Age to the post medieval period; further information on the specific sites can be found in Section 4.1.

### *Iron Age*

Tournebury Hillfort, situated on Hayling Island has not been fully investigated. Whilst early excavations were limited, they do suggest the hillfort does have origins in the Iron Age. The pottery identified during these investigations is noted as being comparable with Iron Age salt production sites around Langstone and Chichester Harbours which may suggest that Tournebury has affiliations with this industry (Hampshire HER 23329). It has also been discussed that the hillfort's prominent position at the entrance to the Harbour gave it a potential influence to control part of the entrance to Chichester Harbour (Francis 2007, 5).

Investigations to look at the salt industry in the harbour began in the 1960's and were carried out by Richard Bradley. As a result several Iron Age and Roman salt working sites were discovered, including the sites at Chidham which contained briquetage, burnt flint and pottery (Bradley 1992). A later excavation at Chidham was carried out by Owen Bedwin in 1978, however, there was a notable lack of Iron Age material discovered at this time which was thought to be a result of coastal erosion (Bedwin 1980). Bradley returned to the area in 1989 and although the original site identified in the 1960's had been lost, a further two sites in the vicinity were found and contained Iron Age and Roman pottery (Bradley 1992).

The first site, recorded as Site A, consisted of a compact layer of pottery and briquetage as well as a small pit measuring 75cm across and 17cm deep. The second site, Site B contained Iron Age and Roman briquetage as well as remains of Mesolithic flints. A large trench was also recorded and was up to 50cm deep which may have been a source of salt water. A probable Roman inhumation was also found at the site (Bradley, 1992).

### *Roman*

Contemporary documentary evidence by St Augustine of Hippo states that the salt production at Hayling Island is of a superior standard to salt production in other places of the British coastline (Allen and Gardiner 2000, 83-84). This evidence points towards a substantial salt production industry on Hayling Island during the Roman period as well as continued production at sites around Chidham. Artefactual evidence has shown that these sites continued in production into the Roman period. Further evidence of salt production in the Roman period have also been discovered at Paynes Boatyard; like Chidham this site contains evidence of continuity of salt production from the Iron Age (Francis, 2007:7).

### *Early medieval*

Much of the evidence for salt working during the early medieval (Anglo Saxon) period can be found in the Domesday Book. This 11th-century account records a single salt house in each of the following villages: Hayling Island (North and South), West Thorney and Bosham ([openDomesday.org](http://openDomesday.org)).

### *Post medieval*

During the post medieval period Chichester Harbour was an important industrial centre involved in the production of salt, brick, fish and oysters for the surrounding towns and villages. Evidence of industrial activity has predominantly come from cartographic sources and maritime charts, with both salt production and brick working shown on late 18th century Mackenzie charts (Francis 2007,7-8). This demonstrates the salt production in this area was now focused on Hayling Island.

## 3 Methodology

### 3.1 Desk based assessment

---

An initial desk based assessment was conducted in order to establish areas of known salt working within Chichester Harbour. Two significant volumes were identified as part of this initial assessment:

- Uncovering the Past. Archaeological discoveries in Chichester Harbour AONB 2004-2007 by MoLAS (now MOLA).
- Chichester Harbour Survey of Foreshore Structures by MA Ltd

These reports were developed as part of the 2007 Heritage Lottery Funded *Rhythms of the Tide* project.

Reports from earlier work in the harbour carried out by Richard Bradley and Owen Bedwin were also consulted and contained information on the survey and excavation of several Iron Age and Roman salt working sites, particularly around the Chidham area. Although many of these sites are now thought to have been lost due to coastal erosion the reports contained useful information on the history of salt working in the harbour during this period, as well as the archaeological evidence such activities leave behind (Bradley, 1992 and Bedwin 1980).

The Hampshire and Chichester Historic Environment Records (HERs) were consulted to identify all known salt working sites within Chichester Harbour and a map of known salt working sites was produced (see Figure 5). Tithe maps and historic maps of Chichester Harbour were consulted at the Hampshire and West Sussex Record Offices.

### 3.2 Fieldwork

---

Fieldwork on sites identified through the desk based assessment was undertaken with the help of volunteers from the Chichester and District Archaeology Society (CDAS). The fieldwork involved a walkover survey, an auger survey and condition assessments of known sites.

#### *Fieldwalking*

A fieldwalking survey of all known salt working sites was carried out over several sessions in the winter of 2015/2016 at low tide. This was conducted in order to establish whether any remains or artefacts could be identified which may suggest the remains of the salt industry had not all been destroyed by coastal erosion. This focussed on the coastline from Thornham Point to Chidham where the majority of Iron Age and Roman salt working sites have already been recorded.

#### *Condition Assessment*

A condition assessment of all the salt working sites identified through both Hampshire and Chichester Historic Environment Records, see section 4.2, was also carried out. This entailed photographic recording of remains of salt working sites, where located.

#### *Auger survey*

On initial assessment of the salt production sites in Chichester Harbour it was noted that there was a possible correlation between salt production sites and the presence of *Spartina* which grows in particularly saline environments. *Spartina* was identified at the following locations:

- Thornham Point
- Paynes Boatyard
- Nutbourne
- West of Chidham

It was hypothesised that if these are indeed correlated, then *Spartina* growth could be used as an environmental indicator for the location of former salt production sites in the Harbour.

An auger survey was undertaken at Paynes Boatyard, where the relationship appeared to be the most distinct. A total of six auger holes were recorded. This was carried out using a hand gouge auger with the CITIZAN south west project team and three members of CDAS: P. Murphy, S. Cleverly and A. de Poitier.



*Figure 3 Fieldwalking in Chichester Harbour with members of CDAS*



*Figure 4 Auger Survey with members of CDAS*

### 3.3 Recording methodology

---

A written and photographic record of features was carried out using the CITIZAN app and proformas where applicable. All artefacts recovered as part of this project were subject to analysis (see Appendix 1).



## 4 Results

A surprisingly small amount of the records consulted (see section 3.1) were associated with the salt working industry; as such only a limited amount of evidence is presented below, mainly based on cartographic depictions. The results are outlined by site location below.

### 4.1 Results of the desk based assessment

---

#### *Hayling Island*

Allegedly during the Roman period the production of salt on Hayling Island was of the finest quality (See Section 2.4). Unfortunately it is unlikely that remnants of early (pre-medieval) salt working sites will remain in a terrestrial environment on Hayling Island. The landscape has much changed since the Mesolithic period with the contemporary prehistoric coastline being as far as 40km seaward of its current location (Hampshire Integrated Character Assessment 2012).

From the medieval period onwards it is recorded on numerous occasions that the principle industry on the island was the production of salt (Scott 1826, 33). Five salterns are recorded on the east of Hayling Island using the resources of Chichester Harbour (the salt production of the west of the Island is discussed separately, Allen and Gardiner, 2000). The cartographic sources (see Figs 6-9) depict the rise and decline of the salt industry during the later post medieval period, where by the middle of the 19th century the salt industry on Hayling Island was considered a tourist attraction rather than a prosperous industry with it being mentioned in a *Guide to Hayling Island* 1836 (Chapman 2007).

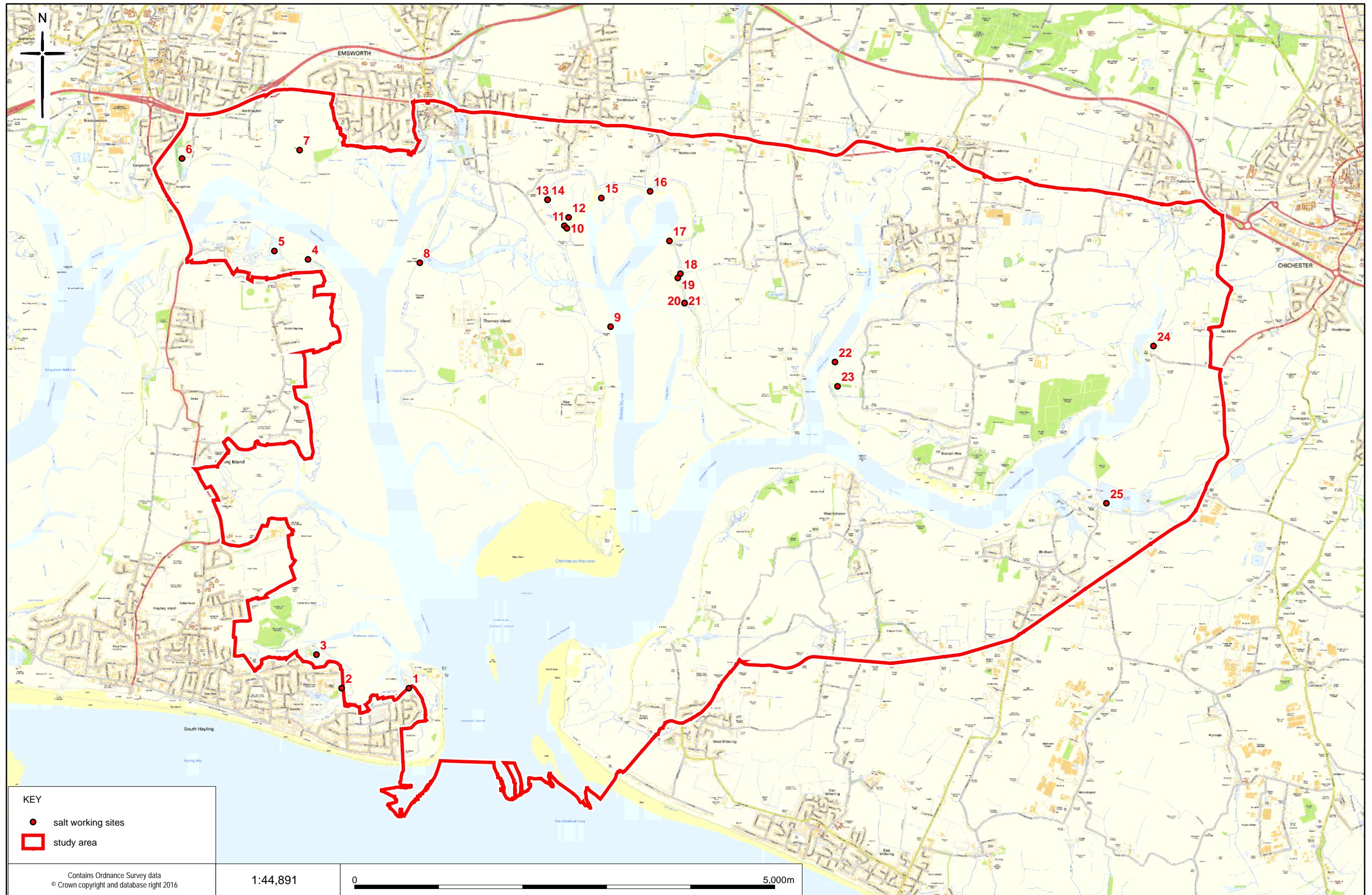


Fig 5 Location of salt working sites in Chichester Harbour

Cartographic evidence for Hayling Island



Figure 6 Taylor Map of 1759 depicting the salterns in the north and south of Hayling Island (geog.port.ac.uk)



Figure 7 Milne map of 1791 depicting the location of salterns on Hayling Island ([www.geog.port.ac.uk](http://www.geog.port.ac.uk)).



Figure 8 The Ordnance Survey old series of map of 1810 depicting the salterns on Hayling Island. ([www.geog.port.ac.uk](http://www.geog.port.ac.uk)).



Figure 9 The Greenwood map of 1826 illustrating the salterns on Hayling Island ([www.geog.port.ac.uk](http://www.geog.port.ac.uk)).

## *Southern Hayling*

Sites 1-3 are considered to have a historic relationship and are the remnants of a salt industry on the south east tip of Hayling Island at the entrance to Chichester Harbour. It is one of two areas of established medieval and post medieval salt production on the island, the other being on the northeast corner.

### **Site 1: Eaststoke Saltern**

Hampshire HER No 23334  
NGR 474700 98900

The site known as Eaststoke saltern is suggested to have post medieval origins with its termination in the production of salt prior to the 1870s (Hampshire HER 23334). Eaststoke saltern would appear to be one of the earlier salterns on Hayling Island with it first appearing on the 1759 cartographic depiction by Taylor (see Figure 6). It is again visible on the Milne map of 1791 (see Figure 7) and on the OS old series map of 1810 (see Figure 8) but the salterns here are not depicted on any map from then onwards. Thus the origins of Eaststoke saltern are unclear but the suggested termination in production lies between 1810 and 1826.

### **Site 2: Jenmans Saltern/Norths Saltern**

Hampshire HER No 23333  
NGR 473900 98900

The site known as Jenmans saltern has post medieval origins with the site going out of use in the 1870s (Hampshire HER 23333). The site of Jenmans or Norths saltern would appear to be one of the most established salt production sites on Hayling Island, as the other four seem to go in and out of use, with it being referred to or depicted on the Taylor map of 1759 (see Figure 6), the Milne map of 1791, the OS old series mapping of 1810 (see Figure 8), the Greenwood map of 1826 (see Figure 9) and is depicted as 'Norths Saltern' on the first edition OS map dated 1871-79 where the saltern has three visible buildings associated with it and a feeding pond to the west.

### **Site 3: Mengham Saltern**

Hampshire HER 23332  
NGR 473600 99300

The site known as Mengham saltern has medieval origins (Hampshire HER 23332). Mengham saltern is recorded in the Domesday Book where the 'Lord of Hayling had a saltpan on the Island' (Page 1908, 130).

Mengham saltern is the larger of the two salterns in south Hayling depicted on the first edition OS map with five associated buildings and a feeding pond to the south. The area would appear to be an industrial one, with oyster beds and a brick field with associated kilns to the North West. The area of Norths/Jenmans and Mengham saltern is referred to on the 1759 Taylor map as 'Salterns' however giving that Mengham saltern is not depicted on the Milne 1791 map it could be assumed that Mengham saltern was a possible replacement for the loss of Eaststoke saltern as Mengham appear on the mapping from 1810 onwards.

## *Northern Hayling*

### **Site 4: Little Salterns**

Hampshire HER 23628  
NGR 473500 10400

The site known as Little salterns went out of use in the 19th century (Hampshire HER 23628). It is first depicted on the OS old series of 1810 (see Figure 8) but is not depicted on the Greenwood map of 1836

(see Figure 9). Only landscape evidence of Little salterns is visible on the first edition OS map of 1871-79 where a square promontory can be seen. The salterns however are not depicted on current aerial imagery and maps and there are no associated buildings remaining (Chapman 2007).

#### **Site 5: Great Saltern**

Hampshire HER 23627  
NGR 473100 104100

The site known as Great saltern went out of use in the 19th century, and is considered to have probable origins in the medieval period (Hampshire HER 23627). Great Salterns are depicted on the Taylor map of 1759 (see Figure 6); they are not depicted on the Mine map of 1791 (Figure 7), but reappear on the OS old series of 1810 (Figure 8) and the Greenwood map of 1826 (Figure 9). Again, evidence of Great saltern is provided on the 1834 map but by 1871-79 there is no landscape evidence depicted on the first edition OS mapping for Great saltern (Chapman 2007).

The salt production process on Hayling Island seems to have been a constant industry since at least the medieval period, where the industry was referred to in the Domesday Book. The cartographic evidence would suggest a maximum industrial output at the beginning of the 1800s where all of the above mentioned salterns were in industrial use, followed by a decline in the middle of the 1800s, perhaps when rock salt proved a more economic method of salt extraction.

### *Hampshire Plain*

#### **Site 6: Langstone/Wade Farm**

Hampshire HER 23496  
NGR 472000 105200

Medieval (11<sup>th</sup>-century) salterns are recorded at Wade Court Farm (Hampshire HER 23496; Page 1903, 122). They are also discussed in a conveyance release of 1794 which states:

*'And also all that piece parcel of freehold ground lying between Lymbourne Lake in the said parish of Havant and Wade farm in the parish of Warblington aforesaid being part and parcel of the Saltern called Langstone Saltern now in the tenure of occupation of Richard Ayles his undertennants of afsigns containing by measure of one or two roods and eighteen perch or thereabouts be the same more or less therefore part and parcel of a certain farm, there called wade farm'(Hampshire Record Office 102M86/358/1,2 – Attested copy made may 1840 of conveyance and leave and release 1 and 2, Oct 1754 of Rowlands Hill coppice (50a), Part of Loangstone Saltern (1a), a close (6a) and coppice land (3 and 5a) in Leigh, Havant.)*

The saltern does not appear in any record or any cartographic depiction after the above date. It could therefore be assumed that the production of salt at Langstone was not continued after the sale of the land in 1740.

#### **Site 7: East of Warblington Church**

Hampshire HER 23495  
NGR 473400 105300

This is recorded as a saltern mound identified in 1994 with circular depression and mound adjacent (Hampshire HER 23495). No further evidence in regard to a saltern in this area has been identified.



### *Thorney Island*

#### **Site 8: Wikor Point *nee* Vicar Point.**

Chichester SMR 168  
NGR 474830 103960

The site at Wikor point is referred to by Bedwin (1980, 170) as an area of salt production as evidenced by calcined flint and charcoal.

#### **Site 9: Stanbury Point (Thorney Island)**

Chichester SMR 195  
NGR 477100 103200

Chichester HER (171) refers to Stanbury Point as being the location of the medieval salt working on Thorney Island. One salthouse and 43.5 households were described here in the Domesday Book. It is likely that the production of salt on Thorney Island would have been located close to the village of West Thorney and not at Stanbury Point, however the exact location is unknown (*pers comm James Kenny*).

### *Thornham*

Several sites from Thornham Marina to Thornham Point were recorded in the HER and are listed in Bedwin (1980). Some of these were later recorded as part of the Chichester Harbour Survey of Foreshore Structures (MA Ltd, 2007). Further east along the coastline are a number of records of Iron Age surface finds which may relate to salt working. On the west coast of Chidham two sites excavated by Bradley date from the Iron Age and Roman periods (Bradley, 1992).

### *Thornham Point*

Two sites of a probable Iron Age or Roman date were identified during sea defence works around Thornham point. It is likely that these sites were both destroyed during these works.

#### **Site 10**

Chichester SMR 178  
NGR 476580 104370

This site was recorded as two clusters of Iron Age pottery and flints found in a modern drainage ditch on the landward side of the sea wall.

#### **Site 11**

Chichester SMR 177  
NGR 476550 104400

Recorded, as above, the site was identified during work to the sea defences, the site contained Iron Age pottery and pot boilers.

#### **Site 12**

Chichester HER 179  
NGR 476600 104500

This site is likely to be the only remaining site at Thornham point, it is recorded as "*Pot boilers in nuclei and scattered up to 20 yards off present shore. A site of undetermined origin but salt working is recorded in the vicinity*". Later survey work of the site by MA Ltd (2007) revealed burnt flints, post medieval building material and a compacted surface eroding from the salt marsh. The site was noted as being vulnerable to erosion.

*Paynes Boatyard (Thornham Boatyard)*

**Site 13 and Site 14**

Chichester SMR 244/245  
NGR 476350 104710

Evidence of Late Iron Age and Roman occupation was identified and recorded by Bedwin in 1980, Chichester HER records the following "*Occupation of uncertain nature, possibly connected with salt boiling overlaid by a large Roman saltern of predominantly C1 AD date. Briquetage, coin of Ant Pius and many sherds recovered from the yacht basin. At least one hearth in section*". The remains of the salterns were also recorded in the survey work undertaken by MA Ltd (2007) where they were considered to be under threat from continuing erosion.

*Prinsted*

**Site 15**

Chichester SMR 253  
NGR 476990 104730

This site had been identified as a salt working site by Bedwin (1980). No further information is available. This area is well known for large scale oyster farming in the post medieval period with a large sea wall constructed to protect the oyster beds.

*Nutbourne*

**Site 16**

Chichester SMR 250  
NGR 477500 104810

Recorded as Bradley's Site 17 where coarse Iron Age sherds and calcined flint were identified during surveys. The site lay beneath the high-water mark during assessment and accurate dating was not possible. (1980).

*West coast of Chidham*

The coast of Chidham was subject to more intensive survey and excavation work by Richard Bradley (1992) and Owen Bedwin (1980). In the 1960's several Iron Age and Roman sites were reported by the former; these were later destroyed by coastal erosion. However, in 1989 the area was re-visited and two further sites in the same vicinity were discovered and a rescue excavation carried out. Prior to this another site in Chidham identified through pottery and burnt flint eroding from the coastline was excavated by Owen Bedwin in 1978. Both Bedwin and Bradley note that the sites were constantly changing and at immediate threat of erosion during the time of excavation. It was therefore assumed likely that little of these sites survives today.

**Site 17**

Chichester SMR 239  
NGR 477800 104220

This site was excavated by Bradley in 1989 (Bradley 1992) and is recorded as Bradley Site A. Much of the site was sealed beneath a low cliff; this area was left undisturbed and the seaward extent of the site which was at immediate risk of erosion was excavated (see Figure 10). The site consisted of a compact layer of Roman pottery and briquetage as well as a small pit measuring 0.75m across and 0.17m in depth (Bradley 1992, 29).

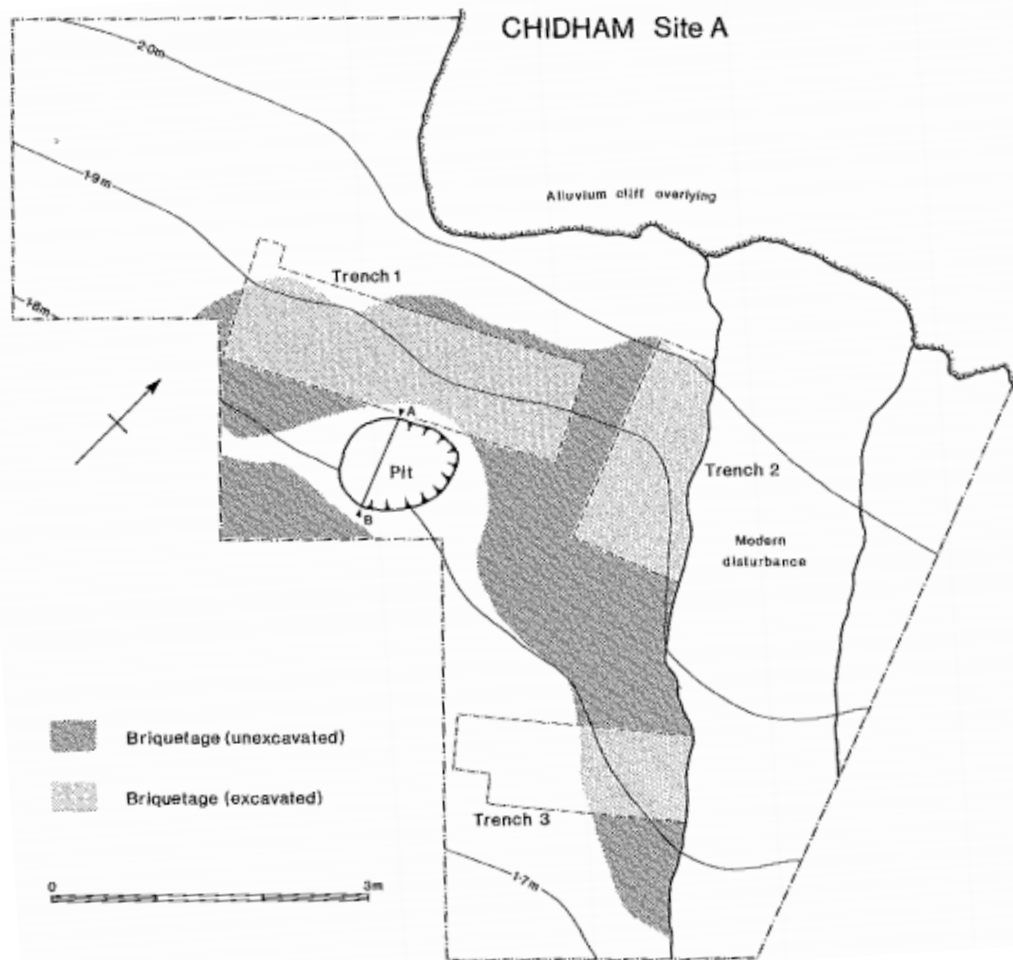


Figure 10 The extent of the excavation at Bradley's Site A (Bradley 1992, 30)

**Site 18/19**

Chichester SMR 205/251

NGR 477930 103830/ 477900 103780

First identified by Bradley in the 1960's (as Bradley site 18) this site was revisited in 1978 by Owen Bedwin and the Sussex Archaeological Field unit due to the rapid rate of erosion which was thought would destroy the site completely. Only one of the three features Bradley identified was visible at this time and quantities of Late Iron Age pottery were identified. It may therefore be assumed that this site in part was used throughout the Iron Age period for the production of salt (Bedwin 1980, 165). Although there was a notable lack of salt working evidence compared with what had been seen in the 1960's, the site did yield over 600 worked Neolithic flints.

**Site 20/21**

Chichester SMR 240/241

NGR 477980 103480

This site lies to the south of Site 18/19 and was excavated by Bradley who recorded it as Site B; the work carried out by Bradley covered an area of 140 m<sup>2</sup> and ran to the edge of the mudflats. Iron Age and Roman briquetage was found as well as Mesolithic flints. Several significant features were recorded, including a large trench up to 50cm deep which may have been a salt water feeder channel to a possible pond (Bradley 1992, 33). A probable Roman inhumation was also found at the site.

None of the above sites were re-visited during the 2007 survey of foreshore structures. The sites were recorded during the 1989 excavations as being affected by erosion and it was therefore considered likely that very little would remain today.

### *South of Bosham*

Bosham is mentioned in the Domesday Book as having '1 Salt house, 150 Households'. It is unclear whether there is a relation to either of the sites below.

#### **Site 22**

Chichester SMR 254  
NGR 479770 102780

It is recorded (as Bradley's site 20) by Bedwin (1980) as having "*five struck cores plus flake and a scatter of calcined flint on the shore*". No further evidence could be identified as to why this is classified as a salt production site.

#### **Site 23**

Chichester SMR 255  
NGR 479800 102490

The site is recorded (as Bradley's No. 21) by Bedwin (1980) as "*Fired clay fragments; probably not briquetage.*" The evidence presented by Bedwin would not point towards this area being used for salt production. No further evidence could be identified as to why this is classified as a salt production site.

### *Dell Quay*

#### **Site 24**

Chichester SMR 2443  
NGR 483560 102970

The HER records that the swimming pool of Dell Quay House marks the site of an old salt panning pond which became disused c. 1840. No cartographic evidence of these salt works could be identified during the documentary research.

### *Chichester Marina*

#### **Site 25**

Chichester SMR 2368  
NGR 483000 101100

OS maps indicate there are 'salterns' in the area with Salterns Copse, Salterns Lock and a house called 'Salterns'. The salterns are clearly identifiable on a 1784 estate map of the area (see Figure 11), and detail that they are owned by James Bayles (Sussex Record Office MP 810). It is noted also in Sussex Archaeological Collection (1981, 145) that the salterns in this area covered a large distance between Appledram and Birdham. However no further evidence of the salterns was identified during the documentary research.

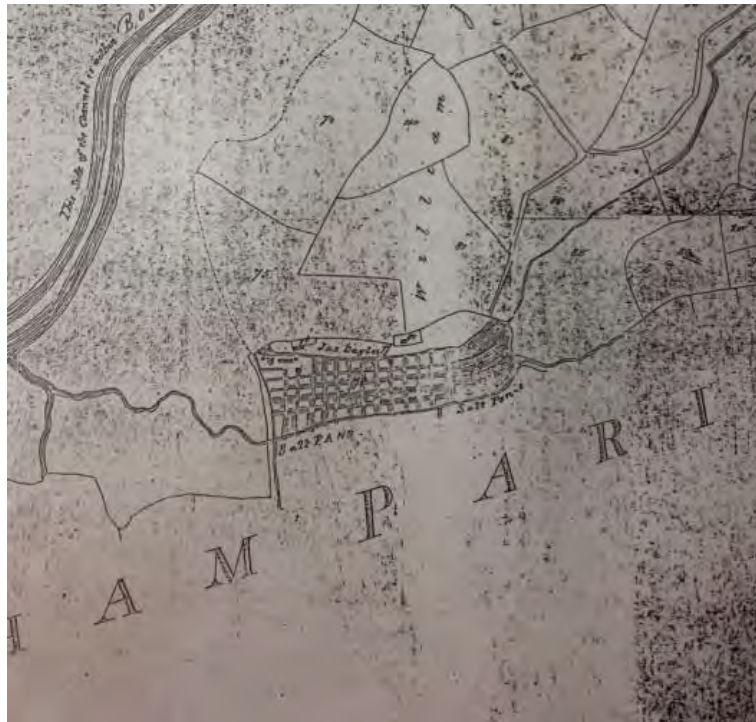


Figure 11 1794 estate map illustrating the salterns which today, have been replaced by a marina Sussex (Record Office MP 810)

## 4.2 Results of fieldwork and condition assessments

---

Not all of the sites listed above in Section 4.1 were subject to the condition assessment below, due to re-development or unknown location of the site. The following sites were omitted from the condition assessment:

- **Site 1 Eaststoke Saltern** due to the site now being occupied by Sparkes Marina.
- **Site 2 Jenmans or Norths Saltern** is now occupied by Fishers Caravan Park and is used as a golf course.
- **Site 3 Mengham Saltern** is now occupied by Mengham Rithe sailing club.
- **Site 6 Wade Farm** as the identification of the exact location of this saltern could not be established.
- **Site 7 east of Warblington Church** was originally identified during an excavation, therefore it is unlikely that any aspect of this is currently visible on the surface and excavation will have altered the natural undulations of the land.
- **Site 9 Stanbury Point**, as discussed above, the exact site of the early medieval/medieval salt production on Thorney Island is unknown.
- **Site 22 South of Bosham** was not investigated as part of this project as the evidence presented above is not adequate to suggest a salt production site.
- **Site 23** was not investigated as part of this project as the evidence presented above is not adequate to suggest a salt production site.
- **Site 24 Dell Quay** was identified through excavation and it is unlikely that any remains will still be identifiable.
- **Site 25 Chichester Marina** has been redeveloped into the Marina.

The results of fieldwalking and condition assessments of the remaining sites outlined in Section 4.1 are presented below.

### Hayling Island

#### Site 4 Little Saltern

A site visit was conducted on 28 January 2016 where Little Saltern is clearly visible on aerial imagery as a square promontory. The out banks have been reinforced by modern concrete and brick to protect the coastal path in Hayling Island (Figure 12). A linear alignment of wooden posts was observed on assessment of Little Saltern (Figure 13), however it is probable that these were associated with the later sea defences of the area rather than the saltern.



*Figure 12 The remains of Little Saltern extending into Chichester Harbour and the later additions of the sea defences*



*Figure 13 Linear alignment of posts which are likely to have been associated with previous sea defences rather than the preceding saltern*

### **Site 5 Great Saltern**

A site visit was conducted on 28 January 2016 where the area of Great Saltern is now occupied by Marina Developments; as such much of the evidence of the saltern has been destroyed. However, on aerial imagery a large depression bounded by artificial banks is visible (see Figure 14); it is considered that this area was associated with Great Saltern.



*Figure 14 The large square depression which is visible on aerial imagery is related to Great Saltern*

### **Thorney Island**

#### **Site 8 Wickor Point**

A walkover survey was conducted on 21 February 2016 in order to establish whether there were any visible remains of occupation of salt production on Wickor Point. None were observed.

#### **Site 10,11 and 12 – Thornham Point**

A survey of structures carried out by MA Ltd (2007) identified evidence of burnt flints which may have been associated with the production of salt in this area. A field walking survey carried out by CITIZAN on 20 November 2015 did not identify any archaeological material. The survey of 2007 noted that active erosion of the site was being undertaken, so all material may have long since disappeared. The growth of the *Spartina* plant was also visible on the probable location of the salt production site.

A possible layer of red burnt material could be seen at the time of the fieldwalking survey in association with a compact layer of gravel (see Figure 15). This was unable to be investigated further due to the soft mud.





*Figure 15 The probable location of the Iron Age/Roman salt production at Thornham Point*

### **Site 13 and Site 14 Paynes Boatyard (Thornham Boatyard)**

Paynes Boatyard is the site of an Iron Age and Roman salt production centre. The site was surveyed in 2007 by MA Ltd (2007) where ‘three small raised areas, consisting of small sandy gravels of medium compaction were visible in the mudflats’ were identified. The raised areas of compacted gravel were visible at the time of CITIZAN survey in November 2015, clearly identifiable by the distinct growth of *Spartina*.

A systematic field walking survey was undertaken by CITIZAN and members of CDAS on 7 December 2015. A total of 50 surface artefacts of worked flint and pottery were collected on site. A large area of compact red clay and gravel was observed during the fieldwalking of the site; it was in this layer that the artefacts originated.

This area has previously been identified as a Late Iron Age - Roman salt working site through artefact analysis. However, the pottery identified through field walking as part of this project was indicative of Bronze Age occupation of the site. A full assessment of the pottery and flint identified can be found in Appendix 1. The identification of previously unrecorded Bronze Age occupation site at this location is a significant outcome of this project. Within the pottery assemblage no evidence was found of briquetage to indicate salt production was present, and so it is impossible to determine the nature of this site and whether it bore any relation to the Iron Age and Roman salt production at this location.



*Figure 16 The remains of the salt pans at Paynes Boatyard*



Figure 17 The compacted area of reddened clay from which the flint artefacts were recovered

## Prinsted

### Site 15 Prinsted

A walkover was conducted on 21 February 2016 in order to establish whether there were any visible remains of occupation of salt production at Prinsted. No evidence was observed and it is probable that remains identified by Bedwin (1980) have been eroded away due to the exposed nature of the site.

## Nutbourne

### Site 16 Nutbourne

Evidence of salt production at Nutbourne was not observed during a walkover survey undertaken on 20 November 2015 and 21 February 2016. A small area of *Spartina* growth was observed, discussed in Section 5.1.



Figure 18 The area of supposed Iron Age/Roman salt working and its possible associations with the growth of *Spartina*

## West Coast of Chidham

### Site 17

A walkover survey was conducted on 20 November 2015 and 21 February 2016. Roman salt production in this location was originally identified and excavated by Richard Bradley, as 'Site A'. Possible landscape features associated with the saltern were identified on assessment. The remains of possible salt pans of a similar scale and nature to those identified by Bradley were visible (see Figure 19). Remains of the salt production site were evidenced by a surface scatter of Roman pottery (see Figure 20). The site demonstrated evidence of erosion, and as such is under threat.



*Figure 19 The landscape of Richard Bradleys 'Site A', with the depressions of salt pans still clearly visible*



*Figure 20 A selection of pottery identified during condition assessment at Richard Bradleys 'Site A'.*

### Site 18/19

A walkover survey was conducted on 21 February 2016 to establish whether any remains of Site 18/19 still remained. A covering of silt hampered pottery and flint identification and thus no artefacts were recovered. However, architectural remains associated with the salt production in this area were clearly visible, identifiable by a series of depressions in areas which are currently only exposed at very low tide (see Figure 21). It was also notable that in the area of the salt works exposed palaeo- land surfaces were also present which were markedly different from the surrounding area (see Figure 22).



*Figure 21 The areas of depressions at Site 18/19 on the west coast of Chidham*



*Figure 22 The palaeolandscape around sites 18/19*

### Site 20/21

A walkover survey was conducted on February 21st 2016 in order to establish whether any evidence of the Iron Age/Roman salt working in this area remained, no visible evidence or artefacts were identifiable.

### 4.3 Results of the auger survey

A total of six auger holes were recorded at Paynes Boatyard in order to test the hypothesis that *Spartina* could be used as a surface environmental indicator of salt production sites.

*BH 1 Paynes Boatyard – 3m*

476411 104755

Description	Interpretation	Depth of unit	Colour	Finds
<b>Intertidal deposits</b>	Three parts clay with one part silt +roots	0.6m		Inclusions of red ceramic
	Clay + decomposed organic material	0.06m – 0.14m	Grey Brown	Inclusions of red ceramic
	Clay + gravel inclusions	0.14m – 0.19m	Brown	



*BH 1.1 Paynes Boatyard (redo for deeper stratigraphy) 3m*

476411 104755

---

<b>Description</b>	<b>Interpretation</b>	<b>Depth of unit</b>	<b>Colour</b>	<b>Finds</b>
<b>Intertidal deposits</b>	Three parts clay with one part silt +charcoal and vegetation deposits	0.1m		
	Clay	0.1m – 0.12m	Red	Ceramic inclusions
	Clay + decomposed plant materials	0.12m – 0.19m	Grey	
	Stiff clay with moderate stone inclusions (>1cm)	0.19m – 0.25m	Orange Brown	

---





BH2 Paynes Boatyard – 8m

476417 104754

---

Description	Interpretation	Depth of unit	Colour	Finds
	Homogenous decomposed organic matter	0.04m	Black	
	Stiff clay (with stone inclusions >1cm)	0.04m – 0.2m	Orange Brown	

---



*BH 3 Paynes Boatyard – 10m*

476419 104752

---

<b>Description</b>	<b>Interpretation</b>	<b>Depth of unit</b>	<b>Colour</b>	<b>Finds</b>
	Homogenous decomposed plant material	0.06m	Black	
	Three parts clay, one part silt + roots (occasional small stone >0.5cm)	0.06m – 0.15	Black	
	Stiff clay	0.15m – 0.17m	Brown	
	Stiff clay + roots (occasional stone inclusions >0.3cm)	0.17m – 0.25m	Red-Brown	

---



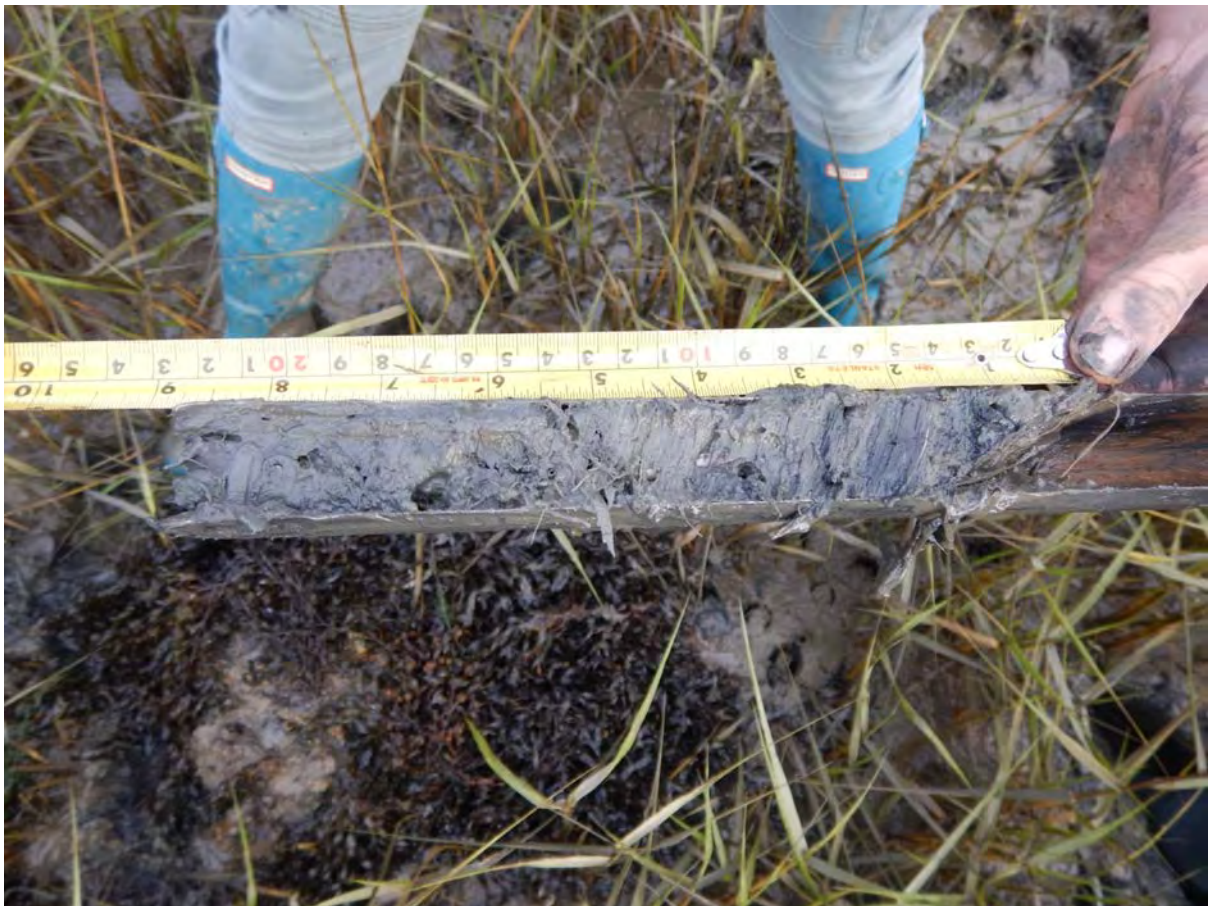
*BH 4 Paynes Boatyard 12m*

476420 104751

---

Description	Interpretation	Depth of unit	Colour	Finds
	Homogenous decomposed plant material	0.07m	Black	
	Homogenous deposits including living plant material (roots of Spartina)	0.07m – 0.22m	Grey	

---



BH 5 Paynes Boatyard – 14m

476423 104750

Description	Interpretation	Depth of unit	Colour	Finds
	Homogenous decomposed plant material	0.12m	Black	
	Two parts clay, two parts homogenous decomposed plant material (deposit layer of hydrobia at 0.19m-0.20m)	0.12m – 0.28m	Grey	Hydrobia



## 5 Conclusions and recommendations

### 5.1 General discussion of the survey

It is clear that Chichester Harbour was used in the production of salt from the Iron Age through to the post medieval period. However since the Iron Age, coastal processes including erosion, anthropogenic development and relative sea level change has meant that many of these sites have been destroyed or are no longer visible. The archaeological traces left by the production of salt also vary and are sometimes difficult to determine.

#### *Salt working in Chichester Harbour*

The condition assessment revealed that most of the salt working sites which had been identified by previous surveys were destroyed by erosion or redevelopment or were otherwise unseen. We are however able to create a picture of the salt industry within the harbour over the past two millennia.

It would appear that salt working in the Iron Age and beginning of the Roman periods was conducted on a small scale in multiple locations around the harbour. With many known sites being destroyed or otherwise unseen (*pers comm* D.Goodburn) producing an accurate picture of the scale of the industry in this period lies outside of the scope of this work. As the Roman writer Augustine noted Hayling Island as one of the best salt producing areas in England, it is therefore likely that the industry would have focused on this area. Thus a synthesising and centralisation of production centres would have taken place, a practise which was common in the Roman period. This was most likely bolstered by small production sites around the harbour to serve the local community.

During the early medieval period leading into the medieval period we have a movement back to the dispersion of production sites. This is documented in the Domesday Book where sites were associated with villages and accounts of this can be seen above in Section 4.1. It is noted that the Black Death and hundred years war had a significant impact on salt production and the industry in England declined in favour of importation to only be re-established with vigour in the beginnings of the post medieval period.

Production peaked at the turn of the 19th century where multiple sites, mainly on Hayling Island, were in use. It would appear that Hayling Island has a long established relationship with the production of salt and was often favoured, as evidenced in cartographic depictions of the harbour where as many as five salterns were in use on the east side of the Island (the west is dealt with as part of a Langstone Harbour study). Only one other significant site can be seen, which is now the location of Chichester Marina.

#### *Paynes Boatyard: Bronze Age occupation of the Harbour*

A salt production site at Paynes Boatyard (Sites 13 and 14) had previously been identified as dating to the Iron Age and Roman period through artefact analysis (pottery and coinage) by Bedwin (1980). The earlier investigations of this site identified evidence of occupation by the presence of a hearth observed in section, however the nature and extent of this Iron Age/Roman site has not been determined during the condition assessment carried out as part of this project. No remains of these features were observed and it has been assumed that these remains have been lost due to erosion.

Pottery remains identified at this site during the condition assessment have returned a probable Late Bronze Age date (whilst a Neolithic date cannot be discounted, the flint analysis would also suggest a Late Bronze Age date, see Appendix 1). To date, evidence of Bronze Age occupation of Chichester harbour has been restricted to individual artefacts and funerary urns, with traces of pottery, briquetage and burnt material having been noted in several areas of the harbour in past investigations, particularly by Bradley in

the 1970s and Bedwin (1980). This, in addition to the Iron Age and Roman material found in previous assessments suggest, at the very least, that there was occupation at the site from the Bronze Age through to the Roman period.

There was no evidence of briquetage within the pottery assemblage. Whilst evidence of salt working dating to the Bronze Age has been identified in England there are no comparable sites on the Hampshire and West Sussex plains (Hampshire, Chichester and West Sussex HER consulted) and detailed investigations of Langstone Harbour did not produce evidence of salt working during this period either.

This project hoped to identify and increase awareness of this material however on assessment no briquetage was identified as part of this project.

### *Identifying a relationship between *Spartina* growth and salt working sites*

It was hoped that a distinctive sequence could be identified at a known salt working site Paynes Boatyard which could then be compared with a sequence from a potential salt production site identified through *Spartina* growth alone.

A distinct red/orange layer identified in boreholes BH1, BH1.1, BH2 and BH3 is considered to indicate an occupation layer, this was substantiated by a single sherd of pottery (<3mm) recovered within the borehole sample which was of the same fabric of the pottery identified on the foreshore during fieldwalking at Paynes Boatyard.

To further test whether the *Spartina* could be used as an environmental indicator attempts were made to auger three further sites at Thornham Point. However, only a hand auger was available for use and the nature of the sediment did not allow the auger to penetrate more than <20mm in some places below the surface.

Within the remit of this project further fieldwork was not possible. It is therefore recommended that further testing be carried out in Chichester Harbour to establish whether a relationship between previous salt pans and *Spartina* growth can be identified and established.

## 5.2 Answering original research aims

---

- What salt production sites dating to the medieval periods and later are already known?

It was noted as part of this project that documentary evidence of what was a large and prosperous industry in the harbour is limited. This limited documentary evidence is also apparent in other salt processing areas such as those at Pennington (*pers comm* F. Green). However all documentary evidence that could be identified has been included in this report.

- Can any new sites be identified?

As part of this project no new salt working sites were identified, however during the time of this project the Chichester and District Archaeology Society (CDAS) were carrying out a survey on the west of Thorney Island. During this survey a series of artefacts were recovered which have been interpreted as possible briquetage (*pers comm* P. Murphy) (see Figure 23). The identification of this site came too late for the project to send the pottery for analysis, however it is highly recommended that this is carried out to determine the nature of the fabrics.



Figure 23 Flint and pottery identified by CDAS during a field visit to Thorney Island, possible briquetage identified in the bottom left corner (pers comm P. Murphy, copyright CDAS).

- What condition are these salt production sites in?

A condition assessment was carried out on all previously identified salt working sites where it was possible or worthwhile, though some were omitted due to access restrictions and redevelopment.

- Establish a heritage trail in the harbour.

A heritage trail was created and is available as a leaflet in hard copy or to download from the CITIZAN website [www.citizen.org.uk](http://www.citizen.org.uk). The trail encompasses several of the Iron Age and Roman sites outlined above, along with other remains of coastal industries including the oyster beds at Prinsted, the old mill at Nutbourne and areas where Neolithic flint has been found.

### 5.3 New research aims

The following are recommended research aims for beyond the life of this project:

- Reassessment of the artefacts recovered in the 1970s and 1980s by Bradley and Bedwin to determine whether briquetage was positively identified.
- Further auger surveys to establish whether there is a relationship between *Spartina* growth in the Harbour and past salt working.



- Further analysis on Paynes Boatyard to establish the nature and extent of the Bronze Age occupation site.
- Establish further larger heritage trails with more detailed information on how to identify, record and monitor coastal industry sites in the harbour as they are threatened by natural processes.

## 6 Dissemination

The results of the survey will be made publicly available on the CITiZAN website: <http://www.citizan.org.uk/>. The feature data will be uploaded to the CITiZAN interactive database, to allow ease of future long-term monitoring of the site via the CITiZAN online interactive map and smart phone app and to permit inclusion of the data in any future academic researches into coastal and intertidal archaeology. This can be found at <http://www.citizan.org.uk/interactive-coastal-map/>.

Records created by this survey will be deposited with the Archaeology Data Service (ADS) where it will make up a part of the archive of all data and materials created by CITiZAN. It will be deposited with appropriate local repositories via the ADS.

Artefacts will be deposited with the appropriate museum service (Hampshire or Chichester depending on location of sites). This report will be submitted to Hampshire and Chichester Historic Environment Records.

A short note on the results of the survey will be submitted to the appropriate journals to be included in annual county and period fieldwork round-ups.

The project developed a heritage trail and leaflet (see Appendix 2) to increase understanding of the industrial history of the harbour. This will also improve understanding of how to identify a potential salt working site, primarily through the identification of briquetage. The trail focusses on the area from Thornham to Chidham, where the majority of Iron Age and Roman salt working sites exist. This route also encompasses evidence of other coastal industries, including the oyster beds at Prinsted and the old mill at Nutbourne. Neolithic flints have also been found in large quantities along this stretch of coast. The information contained in this leaflet will allow harbour users to be more aware of what to look for on the coast and may lead to the discovery of further industrial sites in and around the harbour. The leaflet is available to download from: <http://www.citizan.org.uk/resources/key-zones/south-west/chichester-harbour/salt-working-chichester-harbour/>.

## 7 Bibliography

- Allen, M.J. and Gardiner, J. 2000. *Our Changing Coast: A survey of the intertidal archaeology of Langstone Harbour, Hampshire*. Council for British Archaeology: York
- Bedwin 1980. *Sussex Archaeological Collections* 118, 163-70 *Sussex Archaeological Collections* 122, 23-7.
- Bradley, R. 1992. Roman Salt Production in Chichester Harbour: Rescue excavations at Chidham, West Sussex. *Britannia* XXIII 27-44
- Chapman, M. 2007. The Salt Industry on Hayling Island. Hayling Island U3A <http://haylingu3a.org.uk/the-salt-industry-on-hayling-island/>
- Chartered Institute for Archaeologists, (CIFA), 2014 By-Laws, Standards and Policy Statements of the Chartered Institute for Archaeologists, Standard and guidance: the creation, compilation deposition and transfer of archaeological archives
- Darvill, T. 2010. *Prehistoric Britain*. Routledge: Abingdon
- Francis, A. 2007. *Uncovering the Past. Archaeological discoveries in Chichester Harbour AONB 2004-2007*. Unpublished report: Museum of London Archaeology
- Francis, A. 2004. *Chichester Harbour Area of Outstanding Natural Beauty : An Archaeological Research Framework*. Unpublished report: MOLAS
- Greenwood, J. 2011. The changing technology of post medieval sea salt production in England. Heritage, uses and representations of the sea. Centro de Investigação Transdisciplinar Cultura, Espaço e Memória (CITCEM).
- Porto, Faculdade de Letras da Universidade do Porto, 20-22 October 2011
- Hampshire County Council. 2012. *Hampshire County Integrated Character Assessment (Hayling Island Coastal Plain)*. Unpublished Report: Hampshire County Council
- Hampshire HER back up file. 2015. Unpublished notes
- Hampshire Historic Rural Settlement publication, South Hayling
- Hathaway, S-J. 2013. *Making the Invisible, Visible. Iron Age and Roman Salt-Production in Southern Britain*. Unpublished PHD Thesis: Bournemouth University
- Harding, A. 2013. *Salt in Prehistoric Europe*. Sidestone Press: Leiden
- 'Hayling Island', in *A History of the County of Hampshire: Volume 3*, ed. William Page (London, 1908), pp. 129-134 <http://www.british-history.ac.uk/vch/hants/vol3/pp129-134> [accessed 5 January 2016].
- Magic <http://www.magic.gov.uk/home.htm> February 19th 2016.
- Scott, R. 1826. *A topographical and historical account of Hayling Island, Hants*. Skelton: Havant

## 8 OASIS form

OASIS ID: molas1-245151

---

### Project details

**Project name** Salt working in Chichester Harbour: Understanding the history of salt working in Chichester Harbour in the Counties of

**Short description of the project** The production of salt in Chichester Harbour has been a long established industry which dates back to at least the Iron Age, with several sites demonstrating continuous occupation from the Iron Age to the Roman period or the Medieval to Post Medieval periods. After this further evidence of salt working can be found in the Domesday book for the early Medieval period and on cartographic sources and maritime charts for the post Medieval period. Many of the earlier sites were recorded back in the 1960's to the 1980's (Bedwin, 1980 and Bradley, 1992) and have since been largely destroyed by coastal erosion. The aim of this project was to establish whether any remains of these sites exist in the intertidal zone and whether further sites could be discovered as the coastline has been constantly changing. Salt working is just one of many coastal industries which took place in Chichester Harbour. This now relatively quiet harbour was once bustling with industrial activity including oyster farming, boat building, brick making and of course the production of salt. This project therefore also sought to increase our understanding and raise local awareness of the history of salt working and other industries in the harbour. This report outlines the results of this project and recommendations for further work , alongside this heritage trail has been created which focuses on not only on salt production sites and how to identify them but also encompasses several other sites which bear testament to this harbour's industrial past.

**Project dates** Start: 01-11-2015 End: 28-02-2016

**Previous/future work** Yes / Not known

**Type of project** Research project

**Site status** Area of Outstanding Natural Beauty (AONB)

**Site status** Site of Special Scientific Importance (SSSI)

Site status Scheduled Monument (SM)

Current Land use Coastland 2 - Inter-tidal

Monument type SALT WORKING Iron Age

Monument type OCCUPATION SITE Late Bronze Age

Monument type SALT WORKING Roman

Significant Finds VESSEL Late Bronze Age

Investigation type "Field observation","Part Survey","Recorded Observation","Salvage Record","Systematic Field Walking"

Prompt Research

---

### **Project location**

Country England

Site location WEST SUSSEX CHICHESTER CHIDHAM Chichester Harbour

Study area 7400 Square metres

Site coordinates SU 76329 04432 50.833819089876 -0.915971466625 50 50 01 N 000 54 57 W Point

---

### **Project creators**

Name of Organisation CITIZAN

Project brief originator Chichester AONB

Project design originator CITIZAN

Project director/manager Stephanie Ostrich

Project supervisor Alex Bellisario

Type of sponsor/funding body AONB

Name of sponsor/funding body Chichester Harbour

---

### **Project archives**

Physical Archive recipient The Novium

Physical Contents "Ceramics"

Digital Archive recipient ADS

Digital Contents "other"

Digital Media available "GIS","Images raster / digital photography","Text"

Paper Archive recipient ADS

Paper Contents "other"

Paper Media  
available "Report"

---

Entered by Alex Bellisario (ABellisario@mola.org.uk)

Entered on 9 March 2016

## Appendix 1 Finds report, Paynes Boatyard





## **Paynes Boatyard, Chichester Harbour**

### **Finds Report**

**Prepared for:**

MOLA

Mortimer Wheeler House

46 Eagle Wharf Road

London

N1 7ED

**Prepared by:**

Wessex Archaeology

Portway House,

Old Sarum Park,

Salisbury,

Wiltshire

SP4 6EB

[www.wessexarch.co.uk](http://www.wessexarch.co.uk)

**February 2016**

**Report No. 104071.11**

# Paynes Boatyard, Chichester Harbour

## Finds Report

by Lorraine Mepham, with comments on the flint by Matt Leivers

### POTTERY

The small pottery assemblage amounts to 39 sherds (432 grammes). All sherds are prehistoric, and are in flint-tempered fabrics. Condition is fair to poor; most sherds are at least slightly abraded, and some have lost surfaces. Mean sherd weight is 11.1 g, but this is skewed by the presence of one large sherd (136 g); when this is removed, mean sherd weight drops to 7.8 g.

There is some variation in the range of coarseness and frequency of inclusions, and four separate fabric types have been defined:

Fabric 1: contains sparse, very poorly sorted, subangular flint <4mm, with some clay pellets, in a fine, silty clay matrix (2 sherds; 28 g).

Fabric 2: contains sparse to moderate, poorly sorted, subangular flint <3mm, and rare subrounded quartz, in a moderately coarse matrix (16 sherds; 236 g).

Fabric 3: contains sparse to moderate, poorly sorted, subangular flint <2mm, in a sandy matrix (moderate subrounded quartz <0.5mm) (19 sherds; 157 g).

Fabric 4: sparse, fairly well sorted, subangular flint <1mm (mainly <0.5mm), in a moderately coarse matrix; surfaces well finished (2 sherds; 11 g).

All these fabrics could be accommodated within the known range for Late Bronze Age post-Deverel-Rimbury ceramics in the region, particularly the plainware phase (Seager Thomas 2008, 41, plate 2), although it should be noted that very coarse flint-tempered fabrics, comparable to fabric 1, are also used for Neolithic ceramics across central southern England. Given the lack of stratigraphic provenance for this group of pottery, the possibility that there is a small early prehistoric element within this assemblage must remain open, although there are no diagnostic features to support dating for these two coarsely tempered sherds in either chronological range.

The only 'featured' sherds here are two rim sherds, one in fabric 3 and one in fabric 4. Neither is sufficiently large to determine vessel form; both appear to be slightly everted. These would certainly not be out of place in a post-Deverel-Rimbury assemblage (*ibid.*, figs. 8-9), but are not sufficiently diagnostic to be exclusive to this ceramic tradition.

Despite the lack of clearly diagnostic forms, this small group of pottery can be dated with some degree of confidence to the Late Bronze Age; radiocarbon dating suggests a date range for the post-Deverel-Rimbury plainware ceramic tradition from the late 12th to the 9th centuries BC, and dates from sites in Sussex conform to this range (*ibid.*, 38). Despite the coastal location, and the widespread evidence for saltworking around Langstone and Chichester Harbours (e.g. Bradley 1975),

there are no sherds here of saltworking briquetage, but this is not surprising given the suggested date range, as briquetage is not generally found prior to the middle Iron Age.

### **WORKED FLINT**

Thirteen pieces of worked flint were recovered. Raw material was almost certainly gravel flint from nodules washed up on the shoreline. Several pieces exhibit edge damage that may have resulted from use; however, it could equally well have resulted from redeposition, and this is perhaps the more likely interpretation of this small, unstratified group.

There is only one tool in the assemblage, a denticulate scraper of Late Bronze Age type. All the other pieces are waste flakes which exhibit characteristics of Bronze Age technology – broad, squat flakes produced using hard hammer technique.

### **REFERENCES**

Bradley, R., 1975. Salt and settlement in the Hampshire-Sussex borderland, in K.W. de Brisay and K.J. E. Evans (eds), *Salt: the study of an ancient industry*, Colchester: Colchester Archaeol. Group, 20–5

Seager Thomas, M., 2008. From potsherds to people: Sussex prehistoric pottery, *Sussex Archaeol. Collect.* 146, 19–51

## Appendix 2 Heritage trail leaflet

GET INVOLVED!

# IDENTIFYING EVIDENCE OF SALTWORKING

Chichester Harbour contains evidence of saltworking from the Iron Age through to the post-medieval period. Salt was mainly produced through the evaporation of sea water.

Sea water was extracted and heated in salt pans; more sea water was gradually added during the heating process until the salt pans held a concentrated brine. This brine was then decanted into ceramic containers and boiled and dried slowly to remove all water leaving only pure sea salt. This was then used in a variety of ways including flavouring and the preserving of food stuffs.



Salt Mill at Fishbourne c.1910 © Chichester Record Office

The archaeological traces of salt production are varied. What are often found are the remains of the ceramic equipment used in the heating process and the remains of hearths and ovens.

These ceramic remains are often referred to as *briquetage*. Below are some examples of briquetage found in the region, made of very coarse clay and often quite fragmented. If you see briquetage it is very likely a salt working site is nearby!



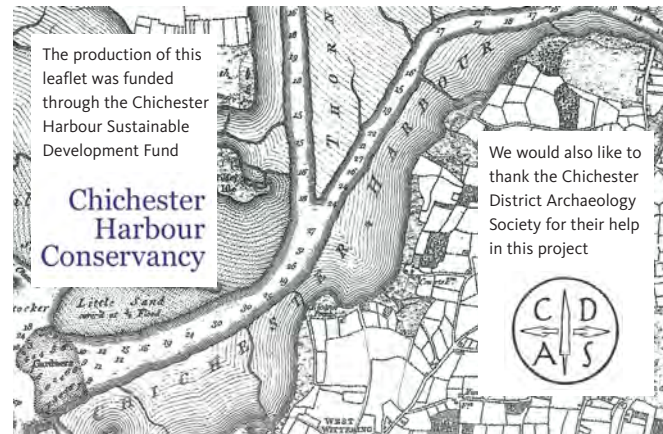
The Nautical Museum

The coast of England is under constant threat from wind, waves and winter storms. These threats wreak havoc on England's varied coastal and intertidal heritage, not only exposing these sites but washing them away before they are ever seen.

Chichester Harbour contains a wealth of archaeological evidence from a time when the harbour was bustling with coastal industries, including saltworking, boat building, oyster farming and fishing. This evidence is now being threatened and new sites are being exposed as our coastlines are constantly changing.

The Coastal and Intertidal Zone Archaeological Network (CITiZAN) has been set up in response to these dynamic threats to our island heritage. We are a community archaeology project working in the areas of England exposed at low tide but covered at high tide. We are actively promoting site recording and long-term monitoring programmes led by our active volunteers. To get involved please visit our website

[www.citizan.org.uk](http://www.citizan.org.uk)



# Heritage Trail – THORNHAM POINT TO CHIDHAM

**3** Follow the foreshore north past the marina and boat yards. Here more evidence of Iron Age and possible Roman saltworking has been found, and it is still possible to see pottery and burnt material on the foreshore.



**2** Just offshore from the Iron Age saltworking site are the remains of the old harbour wall thought to have been built to protect the nearby oyster beds (5)



**1** Start at Thornham Point. There is a footpath by Thornham Marina which takes you to the harbour. In this area is evidence of Iron Age saltworking. Look out for pottery and burnt material on the foreshore.



Approximate distance: from site 1 – 8 = 2.5 miles (5 mile return)

Parking: street parking is available outside Thornham Marina and at Prinsted

**4** Continue along the foreshore towards Prinsted. Numerous worked flints have been found in this region, including Neolithic scrapers, waste flakes and a core.



High Winfield

**5** Continue around the harbour eastwards. Here are the remains of extensive oyster beds. It is possible to make out the gravel linear which bordered the rectangular beds and in some areas the remains of timber elements. The sluice which allowed the control of water into and out of the oyster beds, is also visible. The complex was one of the largest in the harbour and would have been a very important local industry.



Image courtesy of Channel Coastal Observatory

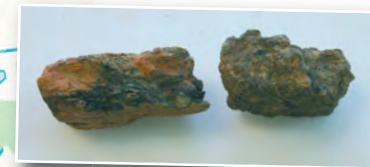
**6** Just back from the old sea wall are the remains of an old mill. The site is now largely destroyed and overgrown but is one of many examples of how the harbour was once thriving with coastal industries.



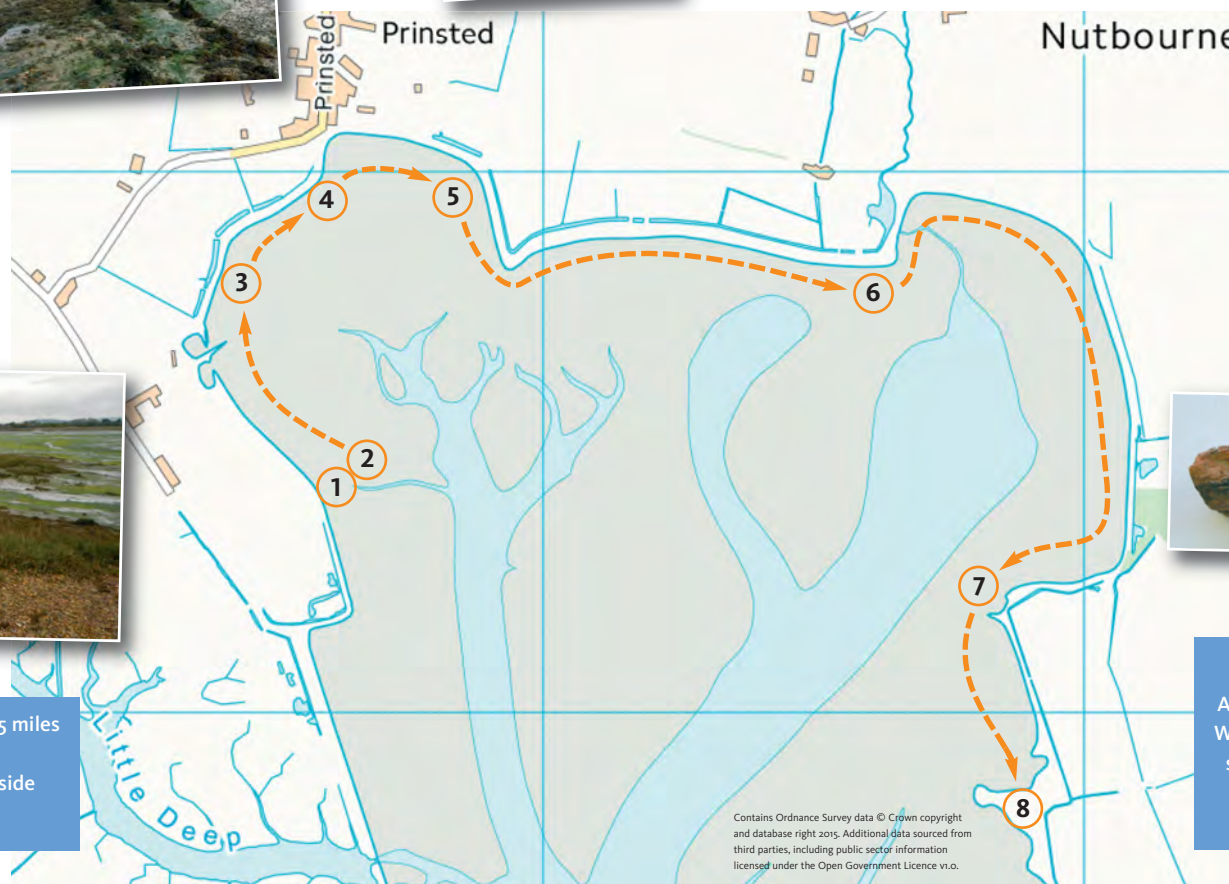
**7** This area was excavated in 1989 and contains the remains of a large Iron Age/Roman saltworking site. Large amounts of pottery and briquetage were discovered and although the site may have been damaged by erosion it is likely that some artefacts may still be visible on the foreshore.

**8** This site was also excavated in 1989 and contains the remains of another Iron Age/Roman saltworking site.

Briquetage and ceramics were found across a large area with a probable Roman burial.



The Norium Museum



## SAFETY FIRST

Always check the tide times before visiting the foreshore. Wear appropriate footwear as the foreshore is uneven and slippery, and take a mobile phone in case of emergency.

For more information visit [citzan.org.uk/health-and-safety](http://citzan.org.uk/health-and-safety)