

# POOLE HARBOUR: CURRENT UNDERSTANDING OF THE LATER PREHISTORIC TO MEDIEVAL ARCHAEOLOGY AND FUTURE DIRECTIONS FOR RESEARCH

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*Poole Harbour and its hinterland comprises a significant area of Dorset both spatially and in terms of influence. It contains numerous archaeological sites of various dates and types. Whilst the area has attracted a considerable amount of research in the last 50 years, information regarding the archaeology of the Poole Harbour basin occurs in disparate locations. This paper summarises and provides a synthesis of the current state of knowledge of the later prehistoric, Romano-British and medieval period. It then identifies threats to the archaeological resource of the area, identifies further research potential which can address local regional and national questions, and suggests future research priorities.*

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## INTRODUCTION

Poole Harbour and its hinterland comprises a significant proportion of the south-eastern part of the current County of Dorset. It contains numerous archaeological sites of various dates and types, which builds a picture of settlement, production and exchange from at least the earlier Iron Age to the present day. The Harbour environs have attracted considerable research, leading to important publications, and been identified as one of the most important areas for coastal archaeology in England (Guthrie 2011). However, the examination of the intertidal and sub-tidal archaeology has been more limited and information regarding the archaeology of the Poole Harbour basin is contained in disparate publications and sources. Previous attempts at synthesising the available data have been constrained by period or research theme.

Broader and more integrated studies would be desirable. This paper summarises current knowledge, focussing on the later prehistoric, Romano-British and medieval periods. It then identifies threats to, and the potential of the resource, and suggests future research potential and priorities.

## THE PHYSICAL LANDSCAPE

Poole Harbour lies on the north-eastern side of Purbeck; the Harbour itself comprises approximately 3500 hectares of lowland estuary (Fig. 1) which drains much of central and southern Dorset. The coastline within the Harbour measures c. 160 kilometres (May 2010). It forms the largest natural harbour in the UK, having broadly assumed its present form around 6000 years ago (May and A'Court 2010, 19).

## Geology, topography and environment

The geology of Poole Harbour is complex. Most of the Harbour is occupied by Tertiary Eocene deposits belonging to the Poole Formation, laid down around 48 million years ago (BGS 2019). The formation comprises gravels, sands, clays, lignites and brickearths along with fine kaolinitic clays commonly termed ‘ball clay’ or ‘pipeclay’. The basin was formed as part of the lower reaches of the ancient Solent River, and much of its area is below 20m aOD. In the more recent past, alluvium and tidal mudflat deposits have accumulated along the fringes of the estuaries and channels. On land, these buried geologies are overlain generally by naturally wet sandy and loamy soils that are relatively nutrient-poor and acidic, in places developing a peaty surface (CSAIS 2020). To the south, the basin is adjoined by the Purbeck ridge which comprises bands of chalk and greensand, which divide the basin from the Isle of Purbeck where the geology is composed of Wealden group mudstones and Purbeck group limestones and mudstones; this is broken to the south-west by the gap at Corfe Castle. To the west lie the valleys of the Rivers Frome and Piddle, and

to the north the land opens out into the undulating terrain of chalk and the Stour catchment, with clay lowlands and heaths to the north-east. On its eastern side the Harbour mouth opens into Poole Bay.

The Harbour possesses a complex hydrological system comprising two main channels connected to several estuarine and river tributaries (Wilkes 2019). These channels comprise the northernmost (Wareham) channel, adjoining the Rivers Piddle, Frome and Sherford and a southern channel, termed the South Deep, which connects to the Corfe River along with several smaller streams (Fig. 1). Within the bay, which is enclosed by Studland on the south side and Sandbanks on the north, lie several small islands that from west to east comprise, Long Island, Round Island, Green Island and Furzey Island, with the eastern-most, Brownsea Island, being the largest. The meandering coastline also forms a number of promontories, notably Newton, Ower and Arne on the south side of the harbour and Hamworthy and Poole on the north. The interior of the Harbour is relatively shallow, with extensive areas of intertidal salt marsh and mudflats, which grade into poorly drained wet grassland; heathland lies further inland.

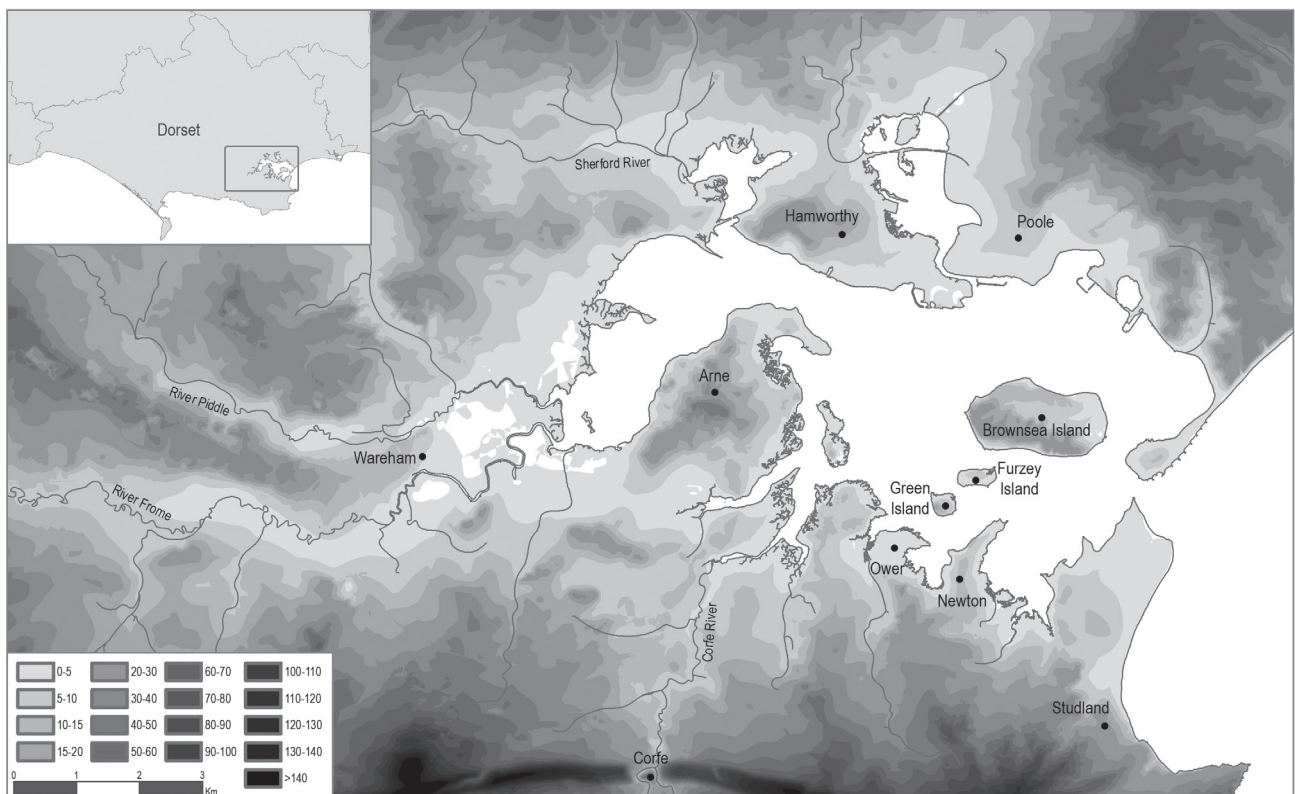


Figure 1 Location and topography of Poole Harbour.

Currently, the north-east of the Harbour is dominated by the conurbation of Poole and Bournemouth. This contrasts to the west and south, which comprises sparsely populated heathland with a largely pastoral agricultural economy; located within this lies the Wytch Farm Oilfield. The historic town of Wareham (with more recent development around Sandford) lies to the north-west, located strategically at, what was at the time of its establishment the lowest bridging point at the mouth of Frome and Piddle rivers which drain central Dorset. The castle and substantial village at Corfe is located on the major routeway south into the Isle of Purbeck at a break in the Purbeck Ridge.

The area is of both national and international importance with respect to its environmental value, forming part of the Dorset Area of Outstanding Natural Beauty (AONB). The entire area of the Harbour is designated as a Site of Special Scientific Interest (SSSI), comprising a wetland of international significance under the Ramsar Convention, and a European Special Protection Area (SPA). Areas within the Harbour fall under additional land designations such as Special Areas of Conservation (SACs) and National Nature Reserves (DEFRA 2019). Cumulatively, these highlight the importance of the numerous flora and fauna within this unique mixed wetland and heathland habitat.

## A CHANGING RESOURCE

By its nature, Poole Harbour is a dynamic environment. It sees regular diurnal and seasonal changes relating to the tides, weather and run-off from the river valleys, as well as being subject to longer-term climate change and, in recent centuries, large scale anthropogenic intervention.

### Environmental change

Present-day Poole Harbour is a product of postglacial sea-level change. While the pre-glacial topography of limestone and chalk ridges and river valleys are identifiable, the current form of the landscape is also due to modifications via sediment accretion and coastal erosion. The area has of course been subject to changing vegetation over time (Long *et al.* 2009),

whilst sea levels have altered dramatically at times (Sutherland 1984).

Sea Level changes have been considered utilising foraminiferal data from multiple cores from Arne and Newton (Edwards 2001). During the last 5000 years there have been four broad phases:

1. A rising relative sea level between 4700BP and 2400BP (e.g. Later Neolithic- Middle Iron Age);
2. Stable to falling level from 2400BP until 1200BP (e.g. Middle Iron Age-Early Medieval);
3. A brief rise in from 1200BP to 900BP, followed by a period of stability (e.g. Early medieval-medieval). The mean tide level (MTL) was calculated to be c. -1.0 mOD;
4. A recent increase in the rate of rise from 400–200BP until the present day (e.g. Post-medieval) (after Edwards 2001).

It has been suggested that by the late Iron Age/Romano-British period the highest astronomical tide (HAT) was 1m lower than that currently experienced (Jarvis 1992; Wilkes 2004). Further localised changes have been postulated from the middle Iron Age into the Romano-British periods. For example, Furzey Island and Green Island were separated, having previously formed a single 'South Island' (Wilkes 2004, 214; Trim 2018, 62–3); Round Island and Long Island adjoin at low tide suggesting that they were once one land mass, whilst Brownsea Island may always have been separate (Wilkes 2019, 5). Shoreline change and coastal erosion is an extensive phenomenon within Poole Harbour, and is of considerable current concern. May (1969, 147) showed that the coastal erosion rate measured between 1886 and 1952 could be averaged at 0.28m per annum for Hamworthy, and 0.35m at Arne. By 1980, 66% of the extent of salt marsh and coast which had been measured in 1952 had been lost from the southern shore of the Harbour between Fitzworth Point and a point south of Brownsea Island, while only 16% had been lost from the central part of the harbour (Long and Scaife 2009, 16). Coastal erosion has been most significant on the southern shore. However rapid sediment deposition is taking place on Sandbanks and Studland on the north and south sides of the harbour mouth (SCOPAC 2012). The colonisation of the mud flats with *Spartina* cord-grass

in the 19th century trapped more silt, although the affected area is now much reduced compared with the 1920s (May and A'Court 2010). Several studies of saltmarsh and coastal erosion have shown that the causes are often unclear and potentially result from diverse actors. Accretion rates particularly in areas of salt marsh and are not uniform, and the extent of salt marsh may expand or see a net reduction (Wolters *et al.* 2005, 845–6).

### Post-medieval industry and anthropogenic change

The greatest impact to the north-east has been urban and suburban development of the historic settlements of Poole and Hamworthy. This now covers a considerable portion of the northern shore, and there is continual pressure for development for housing, business and infrastructure. The impact of the expansion of Poole-Bournemouth from the 19th century was two-fold. The footprint of settlement expanded and also created increased clay extraction for bricks and other architectural ceramics, affecting the northern arc of the Harbour and Brownsea Island (Sheldrick 2010). Substantial residential development has also occurred around Wareham, particularly in the Sandford area. Large scale gravel extraction in the later 20th century enabled the extensive excavation at Bestwall Quarry (Ladle and Woodward 2009; Ladle 2012) but has created a re-configured landscape including new lakes. On the south side of the Harbour, extensive open cast ball clay mining from the end of the 18th century has radically altered the form of the land itself in areas around Norden and Newton (Buxton 2010). Consequently, considerable areas have been either removed or put beyond reach beneath spoil dumps, and this needs to be taken into account in any consideration of archaeological site distribution.

## THE ARCHAEOLOGY

Occupation within the Poole Harbour basin appears to have shifted location several times in the last three and a half millennia. There is a growing body of data suggesting that these relocations may be linked to a combination of changing climatic and environmental (e.g. Wilkes 2004; Long and Scaife

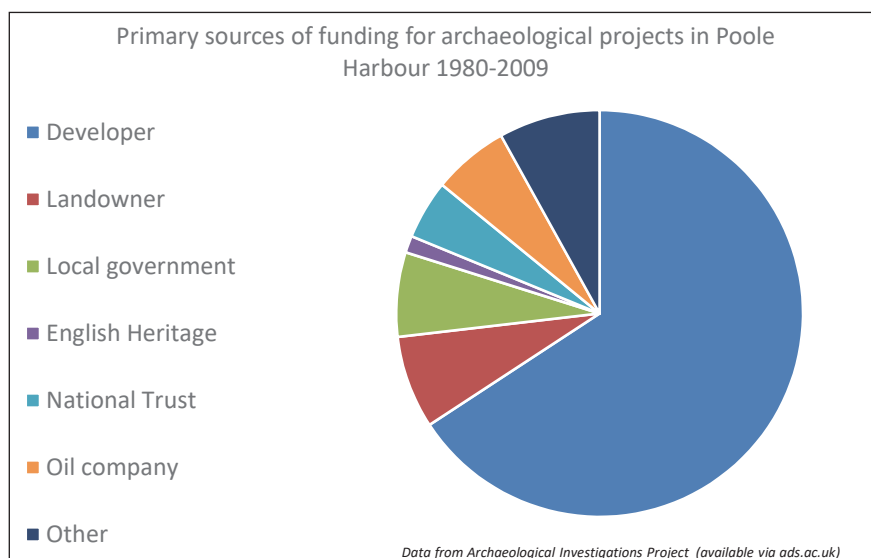
2009), commercial (Hinton 2002, 94; 2018; Forrest 2017) and political factors (Jarvis and Bellamy 2010). There is extensive evidence for the use of the area of the Harbour from the Mesolithic onwards (e.g. Bellamy 2009; RCHME 1970, 511), with notable Neolithic monuments over-looking the basin from the south (e.g. Ailwood Down, RCHME 1970, 432), and within it at Bestwall Quarry (Bellamy 2009). There are numerous round barrows on Godlingston Heath, along the flanks of the Purbeck ridge, at Arne and the Frome valley (RCHME 1970, 443–4, 452–3). Extensive and important Middle and Late Bronze Age settlement and field systems occur at Bestwall Quarry (Ladle and Woodward 2009) with the most easterly Dorset stone circle at Rempstone (Gale 2003, 76). However, it is from the Iron Age onwards that various strands of settlement, production and use of the place as a location for connectivity coalesce. A larger nodal network focussed on the harbour with extensive communication links from at least the Middle Iron Age onwards (Wilkes 2004; Forrest 2017; Hinton 2018; Trim 2018).

Conversely, the Poole Harbour basin also contains important evidence of post-medieval industry ranging from attempts to produce alum and copperas (Bellamy *et al.* 2014a), through the inception and burgeoning of the ball clay industry from the 16th century, to the establishment of the Cordite Factory at Sandford in the earlier 20th century (Street and Sheldrick 2010). The evidence from these post-medieval activities are however so extensive that they require separate consideration. This review therefore focuses on the period between the beginning of the Iron Age (c. 800BC) to the production of the Treswell map of the harbour in 1586 (Forrest *et al.* 2017), a convenient beginning to the post-medieval/modern period.

### Datasets and reviews

Numerous sources record archaeological finds, site and investigations, including the Dorset Historic Environment Record. Detailed surveys were undertaken by the Royal Commission on the Historical Monuments of England (1970) and airborne laser scanning data has more recently been collated as part of the National Mapping Project (Royall 2014; 2016). Various research frameworks and policy documents





**Figure 2** Primary funding sources for archaeological projects carried out in the Poole Harbour basin 1980–2009.

reference the archaeology (Champion *et al.* 2001; Webster 2008; Le Pard *et al.* 2011; Guthrie 2011; Johns *et al.* 2015). A substantial overview of the history of the Harbour has been provided in the *Book of Poole Harbour* (Dyer and Darvill 2010).

From the late 1980s onwards archaeological field investigations have largely been commercially driven (Fig. 2). This has included substantial and important work related to oil exploration and extraction at Wytch Farm (Sunter and Woodward 1987; Cox and Hearne 1991). The extensive and long-running examination of the landscape at Bestwall Quarry, Wareham (Ladle and Woodward 2009; Ladle 2012) related to large scale gravel extraction. Excavation, historic building survey and documentary research has been carried out partly as a research project but given impetus by the need to conserve the structures at Corfe Castle (Papworth in prep). On the north-eastern side of the basin, the ever-expanding Poole/Bournemouth conurbation has led to both significant and numerous small investigations within the old town of Poole (Horsey 1992; and Watkins 1994) and on the Hamworthy peninsula (e.g. Jarvis and Bellamy 2010).

Several reviews of the archaeological evidence have been focussed on a particular period or activity (e.g. Wilkes 2004; Trim 2018; Jones 2017; Hathaway 2013). Attention has been paid to craft activities such as Kimmeridge Shale working and particularly the Romano-British pottery industry (South East Dorset Black Burnished Ware 1 pottery hereafter termed

BB1 – e.g. Calkin 1949; 1953; 1954; 1960; 1967; and Farrar 1969; 1976; 1981; 1982; 1983; 1984; Lyne 2002; 2012). This has led inevitably to some spatial bias towards the south and west sides of the Harbour where the archaeological resource has been located and is accessible. The principal archaeological investigations undertaken within the study area have been collated in Table 1 and are presented thematically.

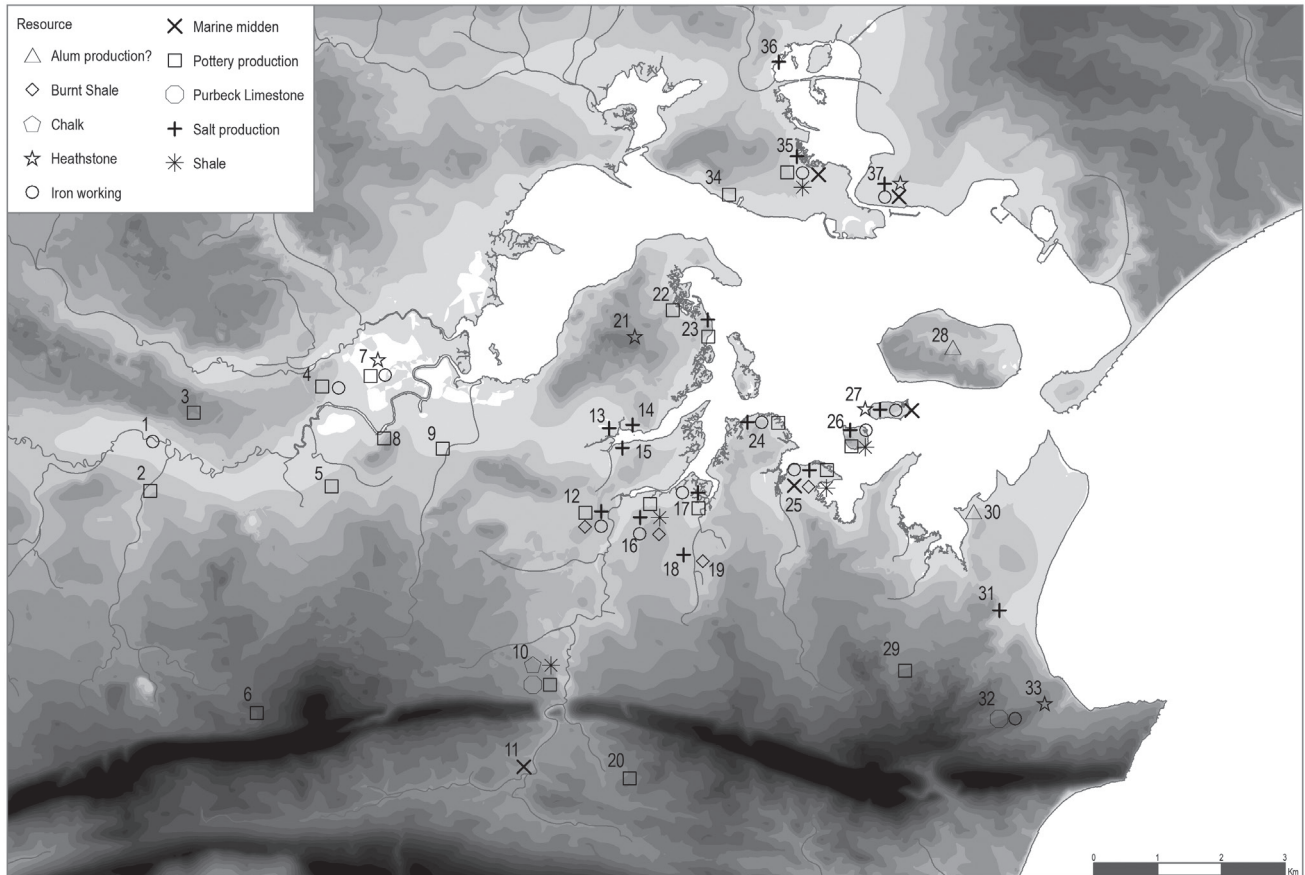
This review of the archaeological evidence from the Poole Harbour basin will be in two strands. The first strand focuses on the available resources that have been exploited during the study time frame, with the second focusing on the chronology of the different archaeological sites identified. This dual stranded approach provides a far greater synopsis of the available data whilst providing an insight into possible research themes for the future.

### The resources of the harbour and its hinterland

Apart from its physical and topographical characteristics which offer abundant beaching locations sheltered from the prevailing weather, the Poole Harbour basin also contains, or has access to a wide range of raw materials (Fig. 3).

#### *Stone (Heathstone, Limestone, Chalk, Shale)*

Poole Harbour and Purbeck provide access to a variety of bedrock geologies with a long history of extraction and product creation. The differing



**Figure 3** Principal sites of resource exploitation and production mentioned in the text. 1: River Frome at Worgret; 2: East Holme; 3: Worgret; 4: Pound Lane; 5: Stoborough; 6: Creech Grange; 7: Bestwall; 8: Redciffe Farm; 9: Bank Gate Cottages; 10: Norden; 11: Bucknowle Farm; 12: West of Corfe River; 13: Salters Copse; 14: Salters; 15: Middlebere; 16: East of Corfe River; 17: Point Ground; 18: Wytch Moor; 19: East of Wytch Moor; 20: Sandyhill Copse; 21: Arne; 22: Big Wood; 23: Shipstal Point; 24: Fitzworth Point; 25: Ower; 26: Green Island; 27: Furzy Island; 28: Brownsea Island; 29: Godslington Heath; 30: Studland Circles; 31: Studland Heath; 32: Woodhouse Hill; 33: Studland; 34: Lake; 35: Hamworthy; 36: Boat House Clump; 37: Poole.

nature, quality and potential uses of each stone coupled with changing tastes and distribution opportunities has influenced their use through time.

Heathstone is the only generally available stone within the basin itself. It is a highly ferruginous sandstone and derives from discrete pockets within local tertiary sand and clay formations across Purbeck and known colloquially as Carstone or Ironstone. The use of this material is known from the Neolithic period onwards (Mercer and Healey 2008, 633). The stone was used in the Romano-British period to make rotary querns (e.g. Furzey Island (Cox and Hearne 1991, 176), and Bestwall (Ladle 2012)), as well as for three stele (marker stones) at Studland (Cox 2012) and one from Bestwall Quarry (Ladle 2012, 174). Heathstone was used in the main construction of local buildings rather than decorative elements, such as the medieval Town

Cellars of Poole, churches at Arne, Canford Magna and Corfe Mullen (Dorset Materials Survey 1992–4), Wimborne Minster (RCHME 1975, 82) and Wareham Castle (Renn 1960; RCHME 1970, 325). It was also commonly utilised locally for vernacular buildings. There are currently no known dedicated extraction sites, and due to the isolated nature of outcrops, such sites may be difficult to define. Thomas (2016, 129) hypothesises that heathstone was recovered from isolated clay and sand pits. However, the large volume used in the past implies a more focussed exploitation. Lytchett Matravers on the northern fringe of Poole Harbour may have provided one potential extraction site dating to the 15th century (Thomas 2016, 131).

The Purbeck Limestone beds run east to west from Swanage to Worbarrow Bay. They comprise various qualities of fossiliferous limestones of Cretaceous

**Table 1** Site investigations in and around Poole Harbour.

	Site	Reference	Settlement	Funerary	Pottery	Salt	Stone	Shale	Metal Production / working	Other
Iron Age	Bestwall	Ladle 2012	X							
	East of Corfe	Cox and Hearne 1991	X		X	X		X	Iron	
	Furzey Island	Cox 1989; Cox and Hearne 1991; Wilkes 2004; Hathaway 2013	X			X		X	Iron	
	Green Island	Calkin 1955; Wilkes 2004, Wessex Arch 2003	X					X	Iron	
	Hamworthy	Smith 1931; Jarvis 1994	X		X	X		X	Iron	
	Ower	Sunter and Woodward 1987; Cox and Hearne 1991	X			X		X	Iron and Bronze	
	Rope Lake Hole	Sunter and Woodward 1987	X	X				X		
	Slepe	Cox and Hearne 1991	X							
	West of Corfe River	Cox and Hearne 1991	X		X	X		X	Iron	
	West Creech	Cox and Hearne 1991	X							
Romano-British	Arne (Shipstal Point and Redcliffe)	Smith 1934; Farrar 1952; 1963; 1978; 1981 Lyne 2002	X		X	X				
	Bestwall	Ladle 2014	X	X	X			X		
	Boathouse Clump, Upton	Jarvis 1986b								
	Brownsea Island	Jarvis 1993			X	X		X		
	East of Corfe River	Cox and Hearne 1991	X		X	X		X	Iron	
	Fitzworth	Calkin 1949	X		X?	X?				
	The Foundry, Poole; West Quay Road, Poole	Watkins 1994	X			X				
	Hamworthy	Smith 1931; Jarvis 1994; Terrain Archaeology 2001; 2003	X		X	X		X	Iron	
	Middlebere	Papworth 1992				X				
	Norden	Sunter and Woodward 1987; Cox and Hearne 1991	X				X			
	Ower	Sunter and Woodward 1987; Cox and Hearne 1991	X	X	X	X		X		
	Rope Lake Hole	Sunter and Woodward 1987	X			X		X		
	Stoborough	Hearne and Smith 1991; Field 1992; Lyne 2002	X		X					
	Woodhouse Hill, Studland	Field 1966; Beavis 1971	X				X			
	Worgret	Hearne and Smith 1991	X		X					
	Point Ground, Wytch	Pitman <i>et al.</i> forthcoming			X					

	Site	Reference	Settlement	Funerary	Pottery	Salt	Stone	Shale	Metal Production / working	Other
Early Medieval	Bestwall	Ladle 2012							Iron	Numerous charcoal pits possibly associated with metalworking
	Ulwell	Cox 1988		X						
	Worgret, Frome River	Maynard 1988; Hinton 1992a							Iron	Timber lined pit – evidence for watermill /with metalworking
Medieval	Arne	Numerous historic documentary sources	X							
	Bestwall	Ladle 2012	X							
	East Holton	Hewitt forthcoming	X							
	Newton	Cox and Hearne 1991	X							
	Ower and Ower Farm	Cox and Hearne 1991; Dodd 1994	X							X – Clay extraction for unknown purpose
	Salterns	Cox and Hearne 1991	X							X–Waste Only
	Wytch	Pitman et al. forthcoming; Cox et al. 2009								X

origin (Clements 1993). Purbeck limestone (or ‘marble’) was used from the Bronze Age onwards (Palmer, 2019), but most archaeological evidence relates to the Romano-British period (Beavis 1971) when it was worked on sites within the Harbour basin. The initial lack of suitable stone sources in southern Britain necessitated importation from the Mediterranean, incurring cost and suggesting wealth and power. Its occurrence at high-status sites across Britain (e.g. Fishbourne) indicates that Purbeck Limestone was on a par with Mediterranean imports (Williams 2002, 127–9). In time it came to be extensively used as a roofing material on several Dorset villas. Unworked stone awaiting use for building materials or to be turned into stone products was identified at Woodhouse Hill (Beavis 1971, 192). In addition, distinctive limestone mortars were produced at Norden (Sunter and Woodward 1987), and like heathstone it was also used to create stele or markerstones which were recycled in buildings at Ower (Woodward 1987, 105) and Worgret (Mills and Hearne 1991, 97). As expected the evidence for workshops and extraction sites increases nearer

to the source, but limestone appears to have been a status symbol associated with authority, probably due to restricted availability.

This is echoed in the medieval period, when Purbeck marble occurred across southern Britain in monastic and parish church architecture (Leach 1978), including high profile buildings such as Salisbury Cathedral (Tatton-Brown 1991) and Wimborne Minster where it was used extensively in decorative elements (RCHME 1975). The occurrence and use of Purbeck marble during the medieval period has been charted by Drury (1949), with an overview of extraction for both the Romano-British and medieval periods provided by Williams (2002); a gazetteer has been compiled by Palmer (2019). Purbeck limestone was a highly sought-after material, prized for the creation of buildings, architectural details and mortars (Palmer 2014). Limestone was exported from Ower quay during the medieval period (Jarvis 2014), prior to the development of Swanage as the primary transshipment location for the industry in the 18th century (RCHME 1970, 290).



Chalk occurs across the southern part of Purbeck, forming the western end of a remnant which originally extended the Purbeck Ridge to the Isle of Wight (May and A'Court 2010). Chalk was also worked at Norden, where tesserae were being produced in the Romano-British period (Sunter and Woodward 1987). During the post-medieval period chalk was burned in limekilns scattered across the Purbeck hills; an early 18th century example was excavated on Wytch Heath (Cox and Hearne 1991, 104–5). More significant, at least in earlier periods, was the utilisation of shale. Kimmeridge Shales occur within the Jurassic deposits of Kimmeridge Clay. The beds lie between Chapman's Pool and Brandy Bay, roughly east to west across Purbeck. Deposits outcrop in a band less than 1km in width. Accessible near-surface exposures are likely to have existed at Horbarrow Bay and Clavel's Hard (Cox and Mills 1991, 170). This finely laminate argillaceous rock is soft, which facilitates splitting and working. It has a high mineral oil content, which contributes to its sheen but also enabling its use as a readily combustible fuel source.

Kimmeridge Shale first enters the archaeological record in the form of worked beads in the Mesolithic period (Denford 2000). However, industrial scale exploitation of the material does not appear to have been undertaken until the Iron Age, when it was worked by hand into armllets and rings, as evidenced at Rope Lake Hole (Sunter and Woodward 1987), Eldon's Seat (Cunliffe and Philipson 1968) and Football Field, Worth Matravers (Cullinane 2018). Waste shale quantities can be voluminous, as at Rope Lake Hole (Sunter and Woodward 1987, 165). Here, five shale working dumps were identified with random samples of c. 1% being taken from three of these. It was noted by Cox and Mills (1991, 170) that the 'evidence for shale working, in the form of waste core material has come from virtually every Iron Age site in Purbeck'; in the past such waste cores were referred to colloquially as 'coal money' (Calkin 1955).

A major innovation in the Late Iron Age, probably in the 1st century BC, was the introduction of the lathe. The typology of waste cores demonstrates changes in technology over time (Calkin 1955). Working tools were still flint, supporting a limited but significant flint-working tradition. Pre-Roman lathe turned shale objects, trimmed using flint tools, occur within

the Harbour on Green Island, as well as Gallows Gore, and sites at Worth Matravers (Calkin 1955; Cullinane 2018). The hand working of shale objects continued alongside those worked on the lathe (Cox and Mills 1991, 173), and this is evidenced at sites such as that East of Corfe River, West Creech and at Ower. These sites also speak to a change in focus of production in the later Iron Age from locations close to source, to locations within the Poole Harbour basin. The evidence for burnt shale is mixed. Cox and Hearne (1991) noted that it could relate to either domestic or industrial processes, with occurrences at East and West of Corfe River, at Ower and East of Wytch Moor, likely deriving from accidental burning (Cox and Mills 1991, 174). In contrast, where shale occurs on medieval sites across Dorset, it is burnt rather than worked (e.g. Shaftesbury, (Richards *et al.* in prep)), suggesting a conscious shift from its use for manufactured products to use purely as a fuel.

The intensity and specialisation of the Romano-British shale industry is notable. Examination of the incidence of over 3000 artefacts from nearly 700 British sites showed that armllets, spindlewhorls and waste cores all dramatically increased in number from the late Iron Age into the Romano-British period (Denford 2000). The number of lathes per workshop identified at Gallows Gore, Worth Matravers, could be inferred where a shale working floor produced debris patterns and stone settings showing the locations of lathes (RCHME 1970, 621). Diversity of products increased over time but vessels and other items were a more specialised product than armllets (Cox and Hearne 1991, 174). Furniture elements and vessels were made at Norden from the 2nd century onwards, and bead and tray fragments were identified at 3rd–4th century Ower (Sunter and Woodward 1987). Ower, followed by Hamworthy, had the most occurrences of shale objects within Poole Harbour (Denford 2000).

#### *Aggregates*

The entire Poole Harbour basin is a complex series of beds of stones, clays, sands and gravels. Having been used from the Bronze Age onward in a variety of fabrics (Woodward (2009) sands were used extensively from the late Iron Age as a temper in ceramics (Jones 2017, 10–17), and were most likely obtained from the same area as the clays within

which lenses of sand occur (see below). In recent centuries, sand and gravel have been extracted deliberately as aggregates for the construction industry, and this remains a potential area for impact on the archaeological resource.

### *Clay*

Poole Harbour possesses a wealth of clays suitable for potting. These have been utilised since at least the earlier Bronze Age (Jones 2017, 73), with firing features and dumps of clay identified at Bestwall Quarry (Ladle and Woodward 2009, 66,68). However, more abundant evidence of pottery production dates to the Late Iron Age with clay filled pits and burnishers found at Bestwall (Ladle 2012), along with a probable Late Iron Age trench kiln (kiln 2914), identified at the site East of Corfe River (Cox and Hearne 1991, 38–9). A further probable kiln of similar date was identified West of the Corfe River (feature 3040; Cox and Hearne 1991, 69). A defined range of styles in sandy or quartz tempered reduced and/or oxidised wares, often termed Durotrigian ware after the supposed tribal area in which they occur (and which somewhat problematically, they have also been used to define), spread across Dorset and into Somerset during the 1st century BC. These included jars with everted rims, bowls and jars with bead rims and less common forms such as tankards and lids. These were first defined as a limited suite of styles (Brailsford 1958), but the picture has subsequently been recognised to be more complex (Brown 1997; Jones 2017). The standardisation in forms and fabric seems consistent with organisation of production and apparent commercialisation (Williams 1977, 168).

The term 'Black-burnished ware' (BB1) was first coined by Gillam (1963, 126). The pottery forms drew upon the Iron Age tradition and the vessels are arguably Dorset's most prolific ceramic product. The industry has an extended history of study (Farrar 1969; Williams 1977; Grant 1982; Coulson 1989). During the early Romano-British period, BB1 was distributed across the south west, but during the 2nd–4th centuries AD it spread across the entire province of Britain. The potential Roman Army supply base at Hamworthy may have influenced the survival and development of the industry (Williams 1977, 170). The BB1 industry is characterised by a wide range of vessels, handmade in a quartz-rich

fabric, burnished and fired in reducing conditions to a black colour. However, 84% of the 1st/2nd century AD BB1 assemblage from Hamworthy was oxidised which rarely occurs in quantity anywhere other than kiln sites (Jarvis 1994). A similar percentage occurred at Bestwall Quarry (Lyne 2012), where BB1 was produced in huge quantities (Ladle 2012). Recent finds at Point Ground, Wytch also contained oxidised pottery of an orange hue (Pitman in prep). It appears therefore that this is a common phenomenon for Roman Poole Harbour, and it has been linked to salt production (Farrar 1963, 140). Jones (2017, 39–41) has shown that there are numerous potential production sites known (Table 2) with 13 sites of this type lying within the immediate confines of Poole Harbour, and others further afield.

South East Dorset Orange Wiped Ware (SEDOWW) was a late derivative of the BB1 industry (Gerrard 2010; 2012). This comprises a fabric very similar to that of BB1, oxidised rather than reduced with a striking range of forms. These include peculiar large jars with pie-crust rims, small perforations at numerous heights up the body and around the neck and often, a very large pre-firing hole in the base. Their function remains obscure (Gerrard 2010; Ladle 2012, fig. 154.8). The dateable contexts in which these occur indicate that they were produced (alongside some other late forms of Black Burnished Ware) from the mid-4th to mid-5th centuries AD (Gerrard 2010; 2012) and when found on sites across Dorset are potentially an important marker of activity continuing into the 5th century (Randall 2020).

The earlier medieval period has been regarded as largely aceramic. However locally produced pottery occurred at Bestwall Quarry with vessels dated to the 6th through to the 10th century (Brown 2012, 258). Whilst pottery was being produced in the area of the Harbour during the medieval period, the location for this is unclear. The recent find of a 13th–14th century pottery kiln at Pound Lane, Wareham (Milward 2017) is helpful. This kiln was producing both glazed fineware jugs alongside more utilitarian coarsewares. Further kilns were probably situated around Poole (Spoery and Hart 1988). A group of kiln waste dating to the early post-medieval period was identified at East Holme, west of Wareham (Terry 1987), although no kiln structure

**Table 2** Late Iron Age and BB1 pottery production sites, suspected and confirmed (After Jones 2017, Table 3.1).

Location	Date Range	Reference
Shipstal Point	AD C1–2nd	RCHME 1970, 593, no. 54; Swan 1984, 261
N. of Bank Gate Cottages	ERB–LRB	Farrar 1963, 140; RCHME 1970, 593, no. 52; Swan 1984, 260
Nutcrack Lane and Stickland's Gardens, Stoborough	LIA–RB	Lyne 2003; RCHME 1970, 592, no. 50; Swan 1984, 259
Worgret, west of The Purbeck School	LIA–LRB	Farrar 1953; Hearne and Smith 1992; RCHME 1970, 592, no. 49; Swan 1984, 259
Redcliff Farm, Ridge	AD C1–4th	Lyne 2003; Swan 1984, 260
Big Wood, near Shipstal	AD C1–2nd	RCHME 1970, 593, no. 53; Swan 1984, 261
Fitzworth Point	AD C1–4th	Calkin 1949; RCHME 1970, 597, no. 226; Swan 1984, 262–3
Cleavel Point, Ower	LIA to RB (C3rd–4th)	Farrar 1952; Farrar 1962b; RCHME Dorset 1970, 597–8, 227; Sunter and Woodward 1978; Swan 1984, 261–2
Old Landing Stage, Green Island	LIA	RCHME 1970, 597, no. 224; Wessex Archaeology 2003; Swan 1984, 262
Lake, Hamworthy	LIA	Smith 1931, 126–7; RCHME 1970, 603
Hamworthy	RB	Smith 1931; RCHME 1970, 603, no. 402; Lyne 1994
Bestwall Quarry	LIA and AD C3–5th	Ladle 2012
Point Ground, Wytch	RB	Montieth, Milward and Pitman in prep.
West of Corfe River	LIA	Cox and Hearne 1991
East of Corfe River	LIA	Cox and Hearne 1991
Norden	RB	Farrar 1952; RCHME 1970, 598, no. 230; Sunter and Woodward 1987; Cox and Hearne 1991; Swan 1984, 263
Sandyhill Copse	LIA/ERB	Farrar 1962b; RCHME 1970, 599, no. 233
East Holme	AD C2nd	Beavis 1972
Creech Grange	AD C2–3rd	Unknown
Godlingston Heath, Studland	AD C2–3rd	Farrar 1962b, 141–142; RCHME 1970, 609, no. 45; Swan 1984, 264

was identified. Further waste pottery was recovered in the Stoborough area (Ladle pers comm.) and the fabric relates directly to redwares that commonly occur in Corfe Castle and its environs.

### Salt

Salt was an essential element in food preservation before the advent of refrigeration in the post-medieval period. In Poole Harbour, salt was produced by the evaporation of seawater (Hathaway 2005; 2013) as opposed to extraction from the extensive Triassic saltfields that underlie much of south-east Dorset. The topography of the Harbour and direct access to salt water makes it an ideal location. Seawater is c. 3.5% salt (Hathaway 2013, 106), so whilst excess water can be evaporated naturally, in the British climate this is more effectively achieved via the application of heat. For the Iron Age and Romano-British periods, salt production is therefore indicated by the presence of briquetage, a term

which includes ceramic evaporation containers and associated hearth furniture.

Late Iron Age briquetage has been identified from Green Island (Wilkes 2004) and Furzey Island (Cox 1989; Cleal 1991), mainland sites such as Ower (Sunter and Woodward 1987; Cox and Hearne 1991), and East of the Corfe River (Cleal 1991). The Foundry, Poole (Watkins 1994) and West of Corfe River (Cox and Hearne 1991) provided evidence indicating continuation of salt production into the early Romano-British period. Production evidence is more extensive, including at Ower in the 3rd–4th century AD, Middlebere (Papworth 1992), Fitzworth (Calkin 1949), and at two sites on the Arne peninsula, Shipstal Point (Smith 1933; Farrar 1952) and Salterns Copse (Farrar 1963). On the north-eastern side of the Harbour briquetage has been identified at Boathouse Clump (Jarvis 1986b) and Hamworthy (Smith 1931; Jarvis 1994).

During the late Romano-British period there was a distinct decrease in the amount of briquetage, which has been attributed to the adoption of lead vats (Hathaway 2013, 475). This seems to presage the methods used in the medieval period. At Point Ground, Wytch, workshops of Saxo-Norman date with boiling hearths also yielded numerous vesicular droplets of lead (Pitman in prep). Thick deposits of burnt sand and fuel ash slag were identified across the site at Point Ground, which is similar to deposits at Salterns on the adjacent Arne peninsula and Wytch Moor (Cox and Hearne 1991, 93–95, 97–100). Thirteen salt workers were listed in Domesday at Ower (Thorn and Thorn 1983). Documentary sources (Keen 1988) indicate that salt production was widespread across Poole Harbour during the medieval period. It was largely a monastic undertaking, with rents often being paid in salt. Locations including Middlebere, are indicated on Treswell's Survey in AD 1586 as being further potential production locations (Forrest *et al.* 2017; Keen 1988). Place name evidence (*Salterns*), supports this with places including this on the Arne peninsula, between Canford and Poole and at Studland.

#### *Iron and other minerals*

Ironworking took place within the Harbour area. Local outcrops of ironstone at Studland, Woodhouse Hill, and Godlingston Heath may be potential extraction locations (Thomas 2016, 132), providing the raw material for early iron production. In comparison, ironstone was extracted at Hengistbury Head for iron production during the late post-medieval period. Between 1848 and 1872 the Hengistbury Mining Company extracted ironstone boulders (Cross 1963). During the Late Iron Age, ironworking waste was deposited at Ower (Cox and Hearne 1991, 159), Fitzworth Point (Calkin 1949, 42) and West Creech (Cox and Hearne 1991, 159). Further evidence for iron working within the Harbour basin was identified on Green Island during test pitting (Wilkes 2004, 201). Two hearth bottoms were identified in excavations at Furzey Island (Cox and Hearne 1991, 159). Romano-British ironworking evidence has been identified on the north side of the Harbour at Hamworthy (Smith 1931), and at 'Cottage B' at Woodhouse Hill, Studland with a probable forge attached to domestic rooms. This was dated to the 4th century AD (Field 1966, 159). Remnants of non-diagnostic hearth lining at

East and West of the Corfe River (Cox and Hearne 1991, 159) also indicate iron working.

Two sites present evidence of ironworking during the early medieval period. At Bestwall, two phases of iron working were evident, one spanning the late 5th to early 6th century and the second from the 8th to early 10th century (Ladle 2012, 319). At Worgret on the banks of the River Frome, a timber lined pit was identified. Originally a quenching tank or tanning trough it had been later backfilled with large amounts of iron slag and abraded Romano-British pottery sherds (Maynard 1988, 96–7). One of the timbers provided a radiocarbon date of the late 5th to mid-7th century. Subsequently, the timber lining was dendrochronologically dated to the 7th century (Hinton 1992b), after which the ironworking waste must have been dumped. Evidence of ironworking also occurred in Wareham in the 11th century (Hinton and Hodges 1977, 58), whilst metalworking waste was identified within the backfill of salt boiling workshops at Point Ground, Wytch, dating from at least the 11th century (Pitman in prep). Iron smithing evidence of the 14th century was also identified at Thames Street Poole (Horsey 1992, 28–9).

During the 16th century Poole Harbour became the location for activity which potentially represents England's earliest chemical industry, serving increasing demand from the textile industry. Aluminium silicate and pyrites could be found in local clays and manufactured into soluble aluminium sulphate. Ammonium alum could then be produced by the addition of urine, and potash alum by adding burnt seaweed or wood. Alum was utilised as a fixative in cloth dyeing, as well as a softener for leather. Copperas, ferrous sulphate, was used as a black dye or ink colourant and also possessed fixative qualities. It was derived either from its naturally occurring mineral form, melanterite or weathered pyrites which both occur in the local clays (Broadbent and Hawkins 2010, 109–110). Extraction locations were identified on Treswell's Survey as '*the mynes*' (Forrest *et al.* 2017). Demand increased during the 16th century as the supply from the main source in Papal controlled Italy was disrupted. Suggested production locations on Brownsea Island (Broadbent and Hawkins 2010, 111) have proved inconclusive (Bellamy *et al.* 2014a), as has exploration



of the Studland Circles, complexes of low circular earthworks with dish-like interiors (Bellamy *et al.* 2014b).

Agricultural, wild and woodland products (arable, livestock husbandry, fish, shellfish, and timber)

From the Neolithic onwards woodland in the Harbour area consisted of lime oak and hazel, with elements of beech and ash (Haskins 1978). The earliest woodland around Bestwall Quarry appears to have been oak dominated deciduous woodland. Clearance of woodland initially commenced during the Bronze Age, continuing throughout the Iron Age (Gale 2009, 334; 2012, 287), and occurred similarly at other sites in the Harbour (Scaife 1991, 197). Pollen indicates that heathland expanded during the earlier Bronze Age, whilst alder carr vegetation developed in wet valleys. Pine stands remained on some islands into the Iron Age (Allen and Scaife 1991, 217). Development of heaths are of course indicative of degraded soils, but this does not mean that areas were rendered agriculturally unusable. Heathland has to be grazed, cut and otherwise utilised to prevent woodland succession, so persistence of heaths throughout the later prehistoric and historic period indicates constant use for grazing and fuel cutting (Allen and Scaife 1991, 217). The lack of fields on the heaths is therefore not an indication of lack of use but of extensive grazing activities, rather than enclosed agricultural practices.

Woodland exploitation would have occurred from the earliest times, and a common factor in many of the other industrial processes seen within the Poole Harbour basin is that they required fuel, particularly for potting, salt production and ironworking. Iron Age evidence at Bestwall included the use of oak, alder and hazel, but also hawthorn, blackthorn, gorse and heather (Gale 2012, 285) reflecting use of more shrubs and heathland species than the present of woodland *per se*. Oak, gorse and heathers remained important in Romano-British pottery kilns at Bestwall (Gale 2012, 285). Specific exploitation of the woodland in the later 1st millennium AD has been seen at Bestwall, with numerous pits dated to c.600–900 AD containing large amounts of oak with a small element of holly charcoal, suggesting not only charcoal production but also reflecting the

composition of the woodlands from which it came (Gale 2012, 286). Whilst building in timber is implicit in many of the structures of all periods, in some cases wood has been preserved and the species identified. At Worgret, an oak lined tank or tanning trough was dated by dendrochronology to the 7th century AD (Hinton 1992b).

Arable agriculture was apparently confined to inland areas, especially during the Iron Age and Romano-British periods. There is limited evidence of Late Iron Age crops from Bestwall Quarry, being restricted to a few barley and spelt wheat parts (Carruthers 2012, 290). Chaff however was used as a fuel in the Bestwall kilns. Bread wheat, spelt, emmer, hulled barley, possibly oats and flax were all represented. Bread wheat, hulled barley oats and rye all occurred in post-Roman and early medieval features (Carruthers 2012, 299). Rye was also more abundantly present at Wytch Farm. As it tolerates poor conditions this may reflect soil degradation and podzification (Allen and Scaife 1991, 219). Plant macrofossils from Bucknowle Villa included a wide range of weeds of arable production. These reflected local habitats including wet and potentially saline environments, heathland as well as limestone areas (Green 2009, 171), so it seems possible that some crops were sourced from north of the ridge. A single fragment of fig and two olive stones (Green 2009, 168) were evidently not local products. The Romano-British pollen evidence from Bestwall, from a single buried soil and a Late Roman kiln, showed a localised lack of tree cover (excepting low levels of ash and lime) and a preponderance of grass pollen. The arable element had reduced from previous Iron Age samples, although it was still present (Scaife 2012, 274–5). This mirrors other contemporary sites in the Harbour (Scaife 1991, 197). As industrial activity increased, pastoral production may have provided a better fit with land use and seasonal labour demands.

Animal bone has only been recovered from a few sites due to poor preservation on the acid soils (Higbee 2012, 270; Hamilton-Dyer 1991). Where present they typically comprise the main livestock species. However, there are important assemblages from later Iron Age Ower, where, pig is far more abundant than expected (Coy 1987; Hamilton-Dyer 1991). This has been linked to salt production and the suitability of



pig meat for preserving (Maltby 2006). Other nearby sites have produced assemblages which provide an impression of the broader animal economy of the region. At Football Field, Worth Matravers there was a more typical Iron Age emphasis on sheep/goat in the Early and later Iron Age assemblages (Randall 2018b). At Bucknowle villa the modest Iron Age assemblage was dominated by domestic species. This was similar in the Romano-British assemblage, although deer increased, and chicken was added (Rixson and Rixson 2009). Field systems can relate to both arable agriculture and livestock husbandry. The best understood land boundaries were at Bestwall Quarry, where Middle and Late Bronze Age systems (the former including stock handling features such as sorting gates (Ladle and Woodward 2009, 85, 106–108) were superseded by those of later Iron Age, Romano-British and medieval period (Ladle 2012, 101–110). These have features associated with livestock husbandry (cf. Randall in press). Later prehistoric fields survive as earthworks at Creech and Povington Hill, to the south around Corfe, and on Ballard Down (RCHME 1970, 629–32).

Fishing and use of other marine resources were limited until the Romano-British period. In keeping with almost all Iron Age sites, including those coastally located, there is limited evidence of marine species exploitation. However, the Middle Iron Age midden on Furzey Island produced bones of eel, flatfish and garfish which would have been locally available. Late Iron Age deposits on the Ower peninsula also produced eel and flatfish vertebrae (Hamilton-Dyer 1991, 210). Small amounts of marine molluscs were recovered from both sites (Winder 1991). At Football Field, Worth Matravers very small amounts of fish bone were present from Iron Age and Romano-British contexts, mainly seabream, whilst there was some exploitation of shellfish particularly limpets throughout the later prehistoric and Romano-British periods (Randall 2018c; Ladle and Ladle 2018). At Bucknowle villa a range of species was recovered. These included ling, bass, wrasse and scad, which prefer rocky shores (Hamilton-Dyer 2009, 164), and therefore may have been procured from the southern Purbeck coast. However, eels and salmonids could have come from the Corfe River, whilst flatfish and mullet as estuarine species, along

with conger eel, are common in Poole Harbour (Hamilton-Dyer 2009, 164). Fishing became an increasingly important part of medieval subsistence within Poole Harbour and the wider Purbeck area (Hinton 2002, 93–95). There were extensive oyster shell middens of 9th–12th century AD date on the foreshore at both Hamworthy and Poole and which represent deliberate large scale exploitation (Winder 1992, 199).

At Ower Farm a substantial midden of marine mollusc shells accumulated, dating to the 12th–13th centuries. The structure of this midden, of which only a small part was sampled, indicated targeted acquisition of particular species (Winder 1991). It also contained bones of eel, bass, gurnard and ray, all of which would be available in the Harbour (Hamilton-Dyer 1991, 211). It was suggested that the scale of exploitation may have related to the manor being in the possession of Milton Abbey and seafood being particularly appropriate to the monastic diet (Winder 1991, 212–3). Later medieval fish bones from Poole include both local coastal species and those such as cod, ling, haddock and hake which are deep water fish (Coy 1992), and attest to the development of the fishing industry.

#### *Boat Building*

The Poole Harbour logboat was identified during dredging works in the Harbour in 1964. The ten-metre-long vessel radiocarbon dated to 397–176 cal BC was carved from a single locally sourced oak trunk (Wilkes 2019, 8–9). No evidence for Roman boat production has been identified, although extensive oyster exploitation (Winder 1991; 1992) suggests the building of fishing boats was likely to be undertaken, if not larger vessels. Evidence for 14th century boat production was identified at The Foundry (Watkins 1994). Here, 53 timbers including support ‘knees’ and clinker planking were identified. They were situated on the medieval western shoreline adjacent to St James’ Church (Sutton 2010, 147).

#### *Distribution of activity over time*

From the inception of the Iron Age onwards, locations of settlement, agriculture and industrial and other activities shifted throughout the Poole Harbour basin (Fig. 4).

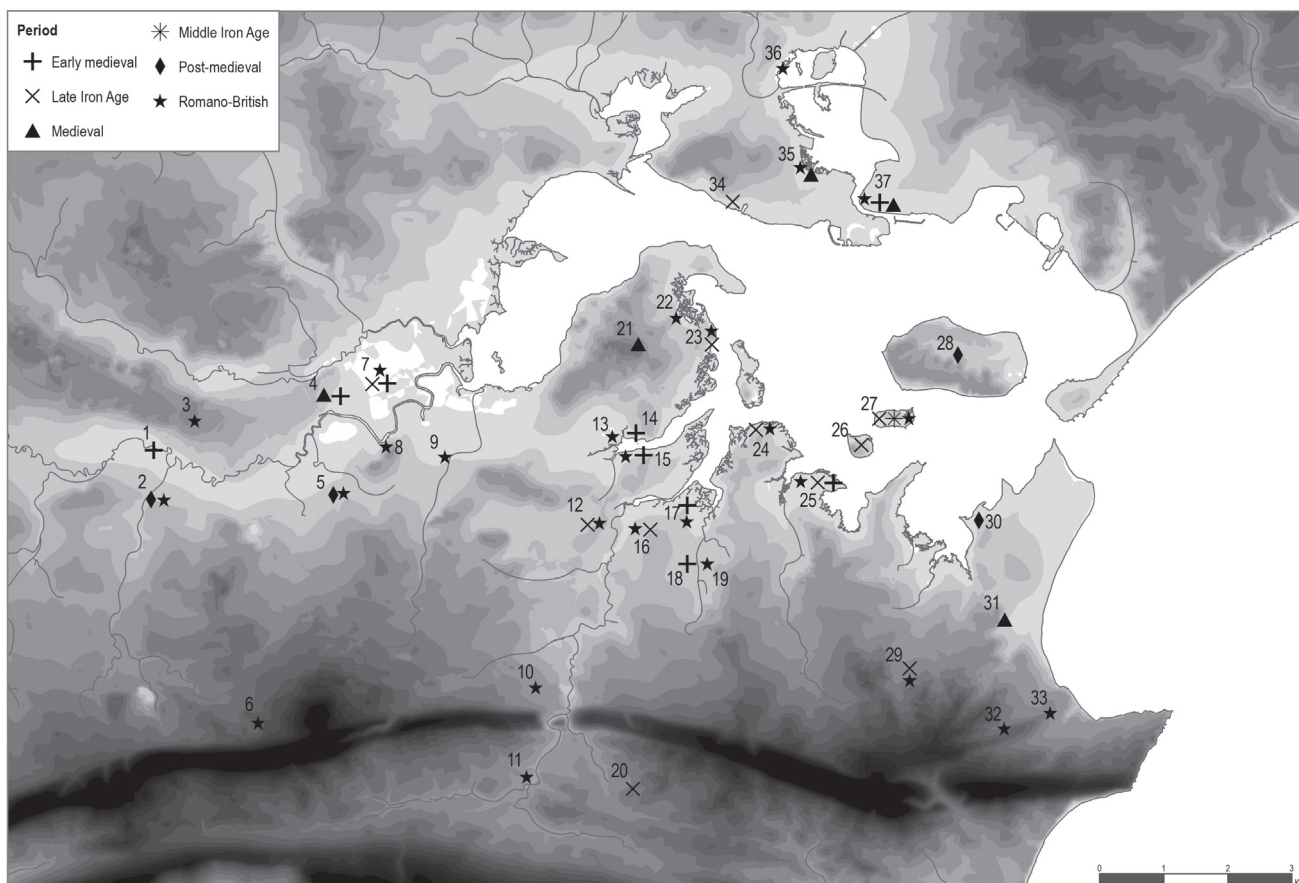


Figure 4 Principal sites mentioned in the text by period, numbers as Figure 3.

### The Iron Age

Evidence for the Early Iron Age use of the immediate harbour area is hard to come by, contrasting with that on the southern Purbeck coast (cf. Cunliffe 1984, fig. 2.3). Cunliffe noted the potential for bias resulting from researchers such as J.B. Calkin (Cunliffe 1987, 338), who focussed his efforts on the Isle of Purbeck. However, there was even a hiatus at Bestwall Quarry between the Late Bronze Age (Ladle and Woodward 2009) and the later Iron Age (Ladle 2012). Nevertheless, Wilkes (2019, 9) suggests that Green Island was occupied from the Early Iron Age. Early Iron Age pottery was also recovered at West Creech (Cox and Hearne 1991, 135). The evidence is therefore currently ambiguous as to whether there was a significant use of the Poole Harbour basin in the Early Iron Age. However, if there were, a reorientation of activity from the middle of the 1st millennium BC onward, creating greater focus on the Harbour basin, it needs to be considered whether changing climatic conditions may have played a role in this. Middle to Late Iron Age activity is known from both Furzey Island and Green Island, Fitzworth,

Shipstal point, and Slepe, on the southern littoral, with further sites at the base of the Purbeck ridge at West and East Creech (Cox and Hearne 1991, 7–8).

The earliest evidence for substantial activity are two opposing stone and timber jetties facing each other from Ower Peninsula and Green Island dated to the Middle Iron Age (Bugler 1964; Markey 2003; Wilkes 2004, 187). These substantial structures demonstrate contemporaneous occupation on Green Island and the mainland from at least the Middle Iron Age (Markey 2003; Wilkes 2004; 2007). Ower, Hamworthy and Green Island may have acted as potential connecting trade points to export items via Hengistbury Head (Woodward 1987, 6). However, Wilkes (2004, 205–6) has pointed out that similar quantities of imported pottery occurred at Ower, Green Island and Furzey Island. The port may have been an amalgam of locations in Poole Harbour forming a coastal node for exchange (Wilkes 2004). Occupation has also been identified along various river valleys, exemplified by sites at East and West of the Corfe River (Cox and Hearne 1991) and Worgret

and Stoborough on the River Frome (Hearne and Smith 1991). Iron Age activity on the Bestwall peninsula (Ladle 2012), at the confluence of the Rivers Piddle and Frome, highlights the importance of access to fresh water. Nodes have previously been shown to act as gateway exchange points in a larger communication network (Burghardt 1971; Hirth 1978) and probably acted similarly along inland waterways whilst at Poole Harbour the sea provided external links to an extensive network of coastal nodes along the south coast (Wilkes 2004; 2007).

Activity on Furzey Island ceased c. AD 20 and there was apparent decline on the sites either side of the Corfe River (Cox 1989; Cox and Hearne 1991). This has been attributed to a rise in sea levels which is evidenced by the separation of 'South Island' into Furzey and Green Islands (Wilkes 2004, 214). At the same time there were changes in activity and formal planning at Ower, with activities previously undertaken on Furzey Island being located here (Cox and Hearne 1991, 79). There was a marked increase in imported pottery at Ower from this time (Cox and Hearne 1991, 78). The role of Ower as a port can be attested via the amount of both regional and continental pottery that has been recovered. The proportion of imported wares to local products within Poole Harbour including Furzey Island and Ower (Cox 1985) are comparable to that recovered from Hengistbury Head for the Later Iron Age (Wilkes 2004, 381) despite the limited nature of the investigations at Ower (Sunter and Woodward 1987; Cox and Hearne 1991) versus the extensive investigations at Hengistbury Head (Cunliffe 1987).

Dressel 1 amphora from Italy were used principally as wine containers. Dressel 1A date to before 50 BC, and 1B appear before the middle of the 1st century BC. The distribution of Dressel 1 Amphora in Britain currently comprises two main clusters, to the east, around Colchester, and at Hamworthy, Green Island and Hengistbury Head. A similar distribution is mirrored in the locations of Pascual 1 amphorae, which came from eastern Spain and southern France (Tyers 1996). Amphora fragments have been recovered from Ower, Cleavel Point and Worgret. This distribution of pre-invasion amphora has suggested a lack of hostility to Rome (Williams 1981). Alongside this there is evidence of several

craft activities including shale working, pottery and salt production. Poole Harbour as a port might be considered in parallel with Hengistbury Head, a renowned centre for inter-continental trade (Cunliffe 1987).

### The Romano-British period

Following the Roman invasion, the apparent focus of maritime infrastructure shifted to the northern side of the Harbour and to the Hamworthy peninsula. The Roman road from Hamworthy to Badbury Rings provided a link to the legionary fortress at Lake Farm, Wimborne (RCHME 1970, 528–531; Russell and Cheetham this volume), some 6km to the north. Evidence from Hamworthy indicates it may have been a military supply base (Smith 1931; RCHM 1970, 603–4; Jarvis and Bellamy 2010). The evolution of Hamworthy into a civilian port is suggested by longevity of use of the peninsula including a 4th century cemetery (Jarvis 1993; Jarvis and Bellamy 2010, 73). Complete BB1 pots have been recovered from the tidal mudflats adjacent to Hamworthy, and may derive from the loading or unloading of vessels. A significant proportion of imported pottery was recovered including *terra rubra* and *terra nigra* (Smith 1934, 14–15), indicating early 1st century activity. *Terra sigillata* of Claudian date was also recovered from Hamworthy (Jarvis 1993). Local copies in BB1 fabric of imported forms of pottery were also present (Smith 1934), presumably meeting a demand for imported styles. In addition, salt manufacture in the area may have been for export (Jarvis 1994).

BB1 was eventually distributed throughout England and northwards beyond the Antonine Wall (Tyers 2014) and produced in such quantity (Ladle 2012) that substantial transshipment facilities within and beyond the Harbour were necessary. BB1 pottery was also exported to the continent, evidenced by occurrences in Belgium at Liberchies, Northern France at Boulogne-sur-Mer and Dieppe, plus further west in Brittany at both Kervennec and Quimper; Aardenburg in the Netherlands, may also be included (Fulford 1977). BB1 was distributed via a three-tier system of inland, coastal, and intercontinental trade, placing the Harbour at the heart of an extensive network of communication links (Allen and Fulford 1996, Fig. 13). Hamworthy, may have played a key role.

Elsewhere around the Harbour, much of the Romano-British evidence has related to the various industrial products discussed above. This is particularly the case for BB1 with one of the most extensively explored sites at Bestwall Quarry (Ladle 2012). Wareham itself may have been a site of Roman occupation (Buxton 2010, 86; Bellows 1892; Hinton and Hodges 1977, 81; Keen 1984, 205; Penn 1980, 106), although the evidence is somewhat scant. On the south side of the Harbour there was some continuity of the later Iron Age sites and activity around the Corfe River. Norden became a particular focus for manufacture. The Isle of Purbeck also has plenty of settlement evidence, with excavated habitation sites at Worth Matravers (Graham *et al.* 2002); Ladle 2018), and Rope Lake Hole (Woodward 1986b). The Woodhouse Hill rural settlement with its important stone built and apsidal ended buildings was situated on the south side of the Harbour basin (Field 1966).

A few villas were located in this area. It has been suggested that, because of this low density, Purbeck was an Imperial estate (Woodward 1987, 69). However, this is now in doubt due to the presence of Bucknowle Villa, Corfe Castle and two villas located at the base of the Purbeck ridge. The Brenscombe villa c. 1.5km to the east of the Corfe gap has been identified only by the presence of a mosaic floor (Farrar 1962, 113–114; Farrar 1963, 103), whilst that at East Creech, c. 2km to the west of the Corfe gap is only known from a selection of architectural fragments (Farrar 1962, 113–4). Further Romano-British remains have been noted c. 2km to the east of Brenscombe and at Corfe itself (Farrar 1963, 103–4). The Bucknowle Villa to the south of the Purbeck ridge is better understood having been extensively excavated. It was occupied from the 1st to the 4th century AD (Light and Ellis 2009). The presence of these villas suggests that east Purbeck was divided into several estates, but we do not currently have distribution or chronological data to understand how this was articulated.

### The earlier medieval period

In keeping with elsewhere in Dorset, there is much reduced evidence for activity in the immediate post-Roman centuries. However, the apparent survival of an element of the Black Burnished

Ware industry into the 5th century (Gerrard 2010) is particularly interesting. Excavation at Bestwall Quarry demonstrated that pottery production continued into the post-Roman period, with a single organic tempered vessel dated by radiocarbon to the 6th century (Brown 2012, 258). At Bestwall one phase of ironworking was of 5th–6th century date (Ladle 2012, 319). Furthermore, the presence of inscribed stones at Wareham now in Lady St Mary church (RCHME 1970, 308, 310–2) is significant. These have been subject to much discussion as to their origin and date but are now thought to range between the 5th and 7th centuries (Cramp 2006, 31, 116–18; Charles-Edwards 2013; Hinton 1992c; Hinton 2019). As these stones have an exclusively western British distribution, with the Wareham inscriptions representing extreme eastern outliers (Hinton 1998, 25), they potentially attest to a lingering Christian presence into the 7th century and may also suggest continued maritime links to the west.

Burial evidence from the Isle of Purbeck, particularly from Ulwell, Swanage (Cox 1988) and Football Field, Worth Matravers (Ladle 2018) indicates populations in the 7th–8th centuries who were burying their dead in manner akin to late Roman practice and referencing Roman buildings in the reuse of building materials in graves. The practices place them firmly in a western British tradition which is seen elsewhere in Dorset and beyond (Randall 2018a). This accords with the stalling of Germanic cultural influence spreading into the area until the formation of the Kingdom of Wessex around this time (Eagles 2001).

Settlement at Wareham was established during this period (Keen 1984, 213; RCHME 1970, 304). Wareham is mentioned in the Anglo-Saxon Chronicle (Ingram 1912) in the early 9th century as the place of burial of King Brihtric, which suggests it was a minster site (Hall 2000, 14–15; Hinton 2012, 123), which appears to have had a profound effect on the development of the estate boundaries in the entire area in the later Saxon period. Wareham was clearly a fortified *burh* by c.AD 876 when it was occupied by the Great Army led by Guthrum (Hinton 1998, 54), the location both enabling penetration inland (a route up the Frome Valley and through south Dorset to Exeter), but access by sea. Its origins however appear to be earlier. The distribution of coinage of the 7th and 8th century



along the Frome valley suggests that Wareham retained an international trading function (Costen and Costen 2016, 11). A sherd of 8th century pottery found in Lady St Mary's churchyard was probably manufactured in or around Hamwih (Southampton) (Hodges 1977). The *burh* was re-fortified by AD 914 and its role in the system of burhs underlines its strategic importance to Wessex. Corfe was a royal estate from the 9th century and by AD 978/9 the connection was strong enough for King Edward to be murdered there (Hinton 1994, 11; 2002, 87). This strategic role of Wareham and the Frome Valley was reinforced over the centuries with Wareham being the location of Canute's invasion of Wessex in 1015, and a landing point of Matilda's Angevin forces during the Anarchy in 1139 (Davis 1977). A number of large, north-south aligned long rectangular land units which in some cases incorporated land both south and north of the Purbeck Ridge apparently preserve the arrangement of late Saxon estates (Taylor 1970, 62).

Elsewhere in the Harbour area, direct evidence of the later first millennium AD has been scant. Iron working evidence from the Frome River site was of 7th century date (Maynard 1988). At Bestwall (Ladle 2012), a second episode of charcoal burning returned a radiocarbon date of 8th to early 10th century. Locally produced pottery from Bestwall spanned the 7th to 10th centuries (Brown 2012, 258). At Point Ground, Wytch, salt production evidence has returned dates of the 9th–11th century AD (Pitman in prep). Substantial marine shell middens at Poole and Hamworthy dating from the 9th century onwards attest to a fishery which may be indicative of settlement (Horsey and Winder 1992; Winder 1992, 194). Other settlement within the Poole Old Town area is attested by a 10th century sherd (Jarvis 1992, 62) and an imported pottery sherd from The Foundry site (Watkins 1994).

### The later medieval period

The Domesday survey of 1086 included the Harbour-side settlements of Wareham, Corfe, Stoborough and Studland as well as East Holton and Ower. Of particular interest are the thirteen salt workers listed at Ower (Thorn and Thorn, 1983). Wareham Castle may have been originally constructed around

this time, although there is confusion in records with Corfe Castle. Both defences had a role to play in the wars of Stephen and Matilda in the early 12th century (RCHME 1970, 304,325). Purbeck was demonstrably an area of dispersed settlement rather than nucleated organisation (Hinton 2012, 126). Dispersed settlement was a general feature of the east and central Dorset heaths where several holdings are likely to have been referred to together. Expansion into these areas is known to have increased in the 13th century (Taylor 1970). However, place-name evidence indicates a lack of newly enclosed areas around the Harbour during the later medieval period (Hinton 2002, 93). Settlement evidence at Ower Farm dating to the 12–14th centuries indicates continuity from Domesday (Cox and Hearne 1991; Dodd 1995). Salt working continued at Point Ground, Wytch into the 12th–13th centuries (Pitman in prep). At East Holton buildings of 12th century date were identified during trial trenching on land at Holton Lee (Hewitt in prep). Some associations and patterns of land holding apparently persisted from the late Saxon period (Taylor 1970). Swanage, although mentioned in Domesday, only developed as the main port for export of Purbeck marble from the 18th century (RCHME 1970, 290). One element of its associated land block was Godlingston, situated to the south of the Purbeck Ridge, but with a connection to the Harbour via Godlingston Heath (which remained part of Swanage parish into the 19th century). The Manor was constructed in around AD 1300. The main building was built on a rectangular plan, but with the addition of a round tower at one end, presumably for defensive purposes (RCHME 1970, 294–295). Part of the large Langton manor also stretched to the shores of the Harbour. During the mid 14th century this included two salterns at Middlebere (Calendar of Inquisitions Post Mortem Vol 15, 1 Richard II).

In contrast, the north eastern coast of the Harbour had limited settlement excepting the manor of Canford. By 1252 a charter was granted for the town of Poole (Sydenham 1986, 22), which was likely a small community by the 12th century (Penn 1980, 78). The growth of the town is charted in detail elsewhere and is outside of the scope of this paper (RCHME 1970, 189; Hinton 1992, 4–5). Late first millennium evidence of exploitation as an oyster fishery (Winder 1992) suggests an origin as a fishing port. However



cross channel trade was an important factor. Norman wine importation was significant (Hodges 1981, 251) and associated French fineware pottery appeared across England (e.g. Fox and Radford 1933, 118). In Poole these imports include 13th century Rouen wares, 13th and 14th century Saintonge, Normandy gritty wares and stonewares datable to the 14th and 15th centuries, with continuity into the early post-medieval with Beauvais pottery (Horsey 1992, 116–8).

Poole grew rapidly from the 13th century onwards (Horsey 1992), which may in part have related to silting of the western extent of the Harbour, around Wareham (Smith 1931, 125; RCHME 1970, 189), where Normandy gritty ware sherds occurred in the 12th century (Renn 1960; Hinton and Hodges 1977). Wareham was still in use as a port in the late Medieval period (Hinton 2002, 94; Forrest 2017, 25), although it may not have been practical for deeper draught shipping. There was a marked decline in Wareham's maritime trade following the Black Death (Forrest 2017, 19–22) and into the 16th century (Hinton 2018, 71). From this point on Poole was engaged in international trade. It was a key transit point in the important pilgrim route to Santiago de Compostela, signified to this day in the town's arms with symbolic scallop shells. From at least the 15th century onwards, trade with Iberia is evidenced by finds of olive jars, dishes and tin-glazed wares of Spanish origin (Barton *et al.* 1992, 126). Poole was the busiest port in Dorset, and serviced the largest ships (Hinton 2018, 70–1); larger sea-going vessels appeared from the 14th century onwards, preferring the deeper water port. Wareham only harboured ships up to 7 tonnes (medievalandtudorships.org). Whilst 87% of the ships leaving Poole in the 15th–16th centuries were engaged in English coastal journeys, 9% of all listed journey destinations were to France, with both Spain and Portugal comprising 1% each (Jarvis 1992b). A possible attempt to cash in on established trade routes occurred with the attempted foundation in 1286 of the planned settlement of *Gotowre super mare*, in the area now known as Newton, on the south side of the Harbour. This had apparently failed by 1288 (Beresford and Hurst 1971; Viner 2002; Le Pard *et al.* 2011). Attempts to locate any physical remains have not been successful (Cox and Hearne 1991, 91–2; Dodd 1995). However, the re-establishment of coastal and cross channel links

provided a ready market for new products which could be won from the Harbour's resources, leading to the appearance in the 16th century of the alum and copperas industries and the commencement of ball clay extraction.

## THE POTENTIAL OF THE RESOURCE, THREATS, QUESTIONS AND FUTURE DIRECTIONS

Whilst the archaeological resource afforded by Poole Harbour is as rich as its natural resources, there are various lacunae in the evidence. We are not in a position to determine at this point whether some of these are genuine absences or an accident of the history of investigation. The archaeology of the area has the potential to offer much in future with respect to understanding settlement, production and connectivity locally, regionally and internationally stretching from the later prehistoric period through to recent centuries. However, there are also a number of on-going threats both from climate change (IPCC 2013) and direct human action (e.g. Monteith and Craig-Atkins 2012).

A number of actions could be taken to address these issues. Detailed mapping of the intertidal and sub-tidal zone would benchmark the current position, potentially recording previously unknown archaeological assets and providing condition information to assess and prioritise projects in the intertidal zone before such information is permanently lost. Enhancing the content of the Historic Environment Record in this regard would be valuable. The non-terrestrial zones of Poole Harbour offer considerable potential for better understanding the use of the harbour as a resource for seafood, shellfish, and salt production. Furthermore, the use of the intertidal zone as a focal point for trading resources should also be explored. Quays and jetties enabled the loading and unloading of goods and people, but also acted as portals to the wider world. Understanding the development of these in relation to social interaction and cultural exchange will shift the focus from them being seen in purely functional terms of transport or logistics. However, we need to better understand the chronology and distribution of such intertidal and sub-tidal features before they are lost.

Coastal erosion rates are concerning, and coupled with potential sea level rise, highlights the need for recording schemes such as the CITiZAN initiative (<https://www.citizen.org.uk>). Wilkes (2019, 8) notes that prehistoric artefacts regularly erode from cliff faces at Ower. Erosion on the southern side of the Harbour around locations which contain valuable archaeological deposits may need proactive examination. The current coastal management approach is one of *No Active Intervention* (Guthrie and Ridgewell 2011), meaning these areas will be allowed to continue to erode, with the potential for valuable archaeological deposits being lost unless they are recorded. Given the 1.8m of cliff per year being lost in the more residential areas around Canford Cliffs, the policy of holding the existing line is understandable (Guthrie and Ridgewell 2011, 4.4.16) where it threatens people's homes and livelihoods, in contrast to uninhabited areas. However, we should start to think in a more pro-active fashion about how to manage the process of change in relation to the historic and archaeological resource.

In addition, because the Poole Harbour basin is so rich in aggregates and the particularly valuable ball clay, the area of the Harbour and its archaeologically related riverine hinterland will inevitably be affected by future aggregate extraction. Locations have been identified as possible extraction sites within the local authority Minerals Strategy (Dorset County Council 2014). This includes areas for potential future open cast sand and gravel extraction through the Frome and Piddle Valleys. A number of them will involve impact on the archaeological resource. Ball clay extraction, given its international importance and scarcity, will also continue to affect the southern Poole Harbour basin, and there may in the future be increased pressure on this resource. Other pressures also exist from settlement expansion, commercial repurposing of some areas and traffic – vehicular and on foot – which potentially impact the condition and setting of a wide range of heritage assets. However, in many of these cases, better understanding of the archaeological resource and the stories it can tell could prove valuable for local people and visitors alike in management and interpretation initiatives.

In considering gaps in our knowledge, there has been limited evidence identified of activity in the Poole

Harbour basin during the earlier Iron Age. This is particularly intriguing given the extensive evidence, often coastally located, on the Purbeck peninsula (e.g. Cunliffe and Phillipson 1968; Woodward 1986b; Ladle 2018). There is also currently no physical archaeological evidence for either Early or Middle Iron Age pottery production. It would be helpful to establish whether this is a genuine lack of potting activity in this period or an artefact of the sites examined thus far or limitations in dating. More could be learned about individual sites, for example clarifying the full extent of activity at Ower and the relationship of the later Iron Age pottery (and shale) industry to sites in the inland hinterland. Given the increased volume and reach of Late Iron Age wares, to say nothing of BB1 during the Romano-British period, there is still plenty we do not know about the distribution of production throughout the Harbour area, how that was managed, articulated and the products transhipped. The Iron Age settlement pattern is particularly poorly understood on the northern side of Poole Harbour, for example along the River Sherford.

Considering the wider use of the landscape in the Romano-British period, we are very far from understanding patterns of land use, tenure and settlement. The two villas north of the Purbeck ridge are only known from minimal finds. Ideas of an imperial estate have been challenged but it is only by considering the role of villa estates and other non-industrial settlement, in conjunction with a more rounded understanding of areas of production of salt, shale, pottery and stone objects, that this can be demonstrated or rejected. In addition, each of these industrial processes still has areas in which increased clarity would not only aid understanding of the locale, but of artefactual studies and thereby more broadly applicable chronology. Making use of remotely sensed data (for example LiDAR data) and processing it appropriately at a landscape scale may provide further insights into land use, which can be combined with information from environmental proxies, as well as identifying hitherto “lost” sites.

Particular attention to very late Romano-British pottery production would be of significant benefit. With the potential for pottery production having continued into the 5th century AD (Gerrard 2010),

the identification of this material has not only implications for understanding continuity of activity within in the Harbour basin into the post-Roman period, but for understanding contemporary occupation and connectivity throughout Dorset. The tantalising indications of pottery production in a new tradition from the 6th century onward at Bestwall Quarry suggest that we should be mindful of the likely existence of other production locations within the Poole Harbour basin in the post-Roman and early medieval period, given the increasing number of sites in the Harbour area which have been yielding evidence of the latter half of the first millennium AD. This has considerable potential to feed into thinking around the ‘frontier’ of Germanic influence as evidenced increasingly by metal detected finds (Eagles 2018), and which have Poole Harbour as the southern point of the zone of contact with incoming influences to the east. Notably, some of the chronological gaps have been filled in recent years by what may have appeared unprepossessing features but provided opportunities for radiocarbon dating (e.g. Worgret; Bestwall). Further use of scientific dating should be a priority.

Moving into the medieval period, there are similar lacunae. Consideration has been given to the late Saxon development of estates on Purbeck, which also involves the southern side of the harbour. It is clear that multiple land holdings, and probably farms and small settlements were associated with named units of land attested by charters and Domesday, but it is far from clear where the subdivisions lay and where the loci of agricultural and settlement activity were. There is much to learn about the role the southern Harbour area played in the agricultural structure of the wider hinterland and the way in which different areas within named land units provided different productive components to the economy of the whole.

We are beginning to have glimpses of the later prehistoric, Romano-British, medieval and later industrial use of Poole Harbour and the way in which contact and shipping was managed. However, viewing the Harbour basin as a series of overlapping resources and tracing their exploitation in a spatio-temporal framework may provide a different understanding of how the area was utilised from the Iron Age onwards. Moving away from a site

specific micro analysis to a wider landscape-based and ecologically integrated approach could provide fresh insights. For example, it would be possible to understand what differing affordances were offered in the various zones within the Harbour basin (e.g. intertidal, heathland, clay with flints etc.) and how these were, or were not, utilised at different times. Other important issues which could and should be explored lie in how and why ecological change occurred, and how the contemporary archaeological evidence changed, or did not, within these zones. Aside from further exploration of salt, iron and pottery production sites, the confirmation of the location of *Gotowre* and understanding the reasons for its failure would be of use. If this was related to the silting up of the Harbour it has wider implications for further understanding the development of Wareham, Poole and Swanage. Within Poole town in particular, there may still be opportunities to examine the remnants of earlier foreshores where boat building locations are likely. The Foundry site highlights the importance of these former intertidal zones both within the built-up area and outside of it, whilst understanding the boat building industry may provide insights as to the balance of deep water, coastal and riverine interactions. Meanwhile there has been limited investigation of the earliest origins of the ball clay industry in the later 16th century, and awareness of early post-medieval chemical industries should also be raised.

Whilst some areas of the Poole Harbour basin have proved better than others in preservational terms for animal bone and shell, there are opportunities to invest more attention in the residues of agriculture (both arable and pastoral), woodland management and fisheries. Where sites are excavated, some weight should be given to prioritising sampling strategies which address these concerns. Additionally, the topographical and environmental nature of the Harbour affords both considerable opportunity. For a wetland environment, there has been in the past limited exploration of waterlogged deposits which could provide valuable environmental proxies over the last several thousand years. These delicate potential resources however are substantially threatened. Peat accumulations in the Harbour remain to be mapped in detail (Wilkes 2019), but have potential to provide more sample locations for

pollen, diatoms, foraminifera and other materials. The low-lying topography with a high water table as well as open water offers further opportunity for wood and other organic materials to be preserved. These proxies have the potential to tell us about both the immediate locale and broader vegetation change in south-eastern Dorset. This deserves to be considered in some detail in relation to past climate change and the response of people living within the Poole Harbour basin to the new challenges and opportunities which those alterations would have produced.

## CONCLUSION

Poole Harbour and its hinterland is a rich, diverse archaeological resource. It not only occupies an important part of Dorset, but its raw materials and industries, coupled with its inland and maritime connectivity, means that it has both local interest and has wider regional and indeed international importance. It is an ideal study area where a broad archaeological dataset can be reviewed and assessed, allowing the consequences of environmental, political and commercial change to be examined, alongside exploring how past communities occupying the fragile liminal littoral zone have responded. It has provided much, but with appropriate attention, has considerably more to offer.

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