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## **Introduction: Poole Harbour in Context**

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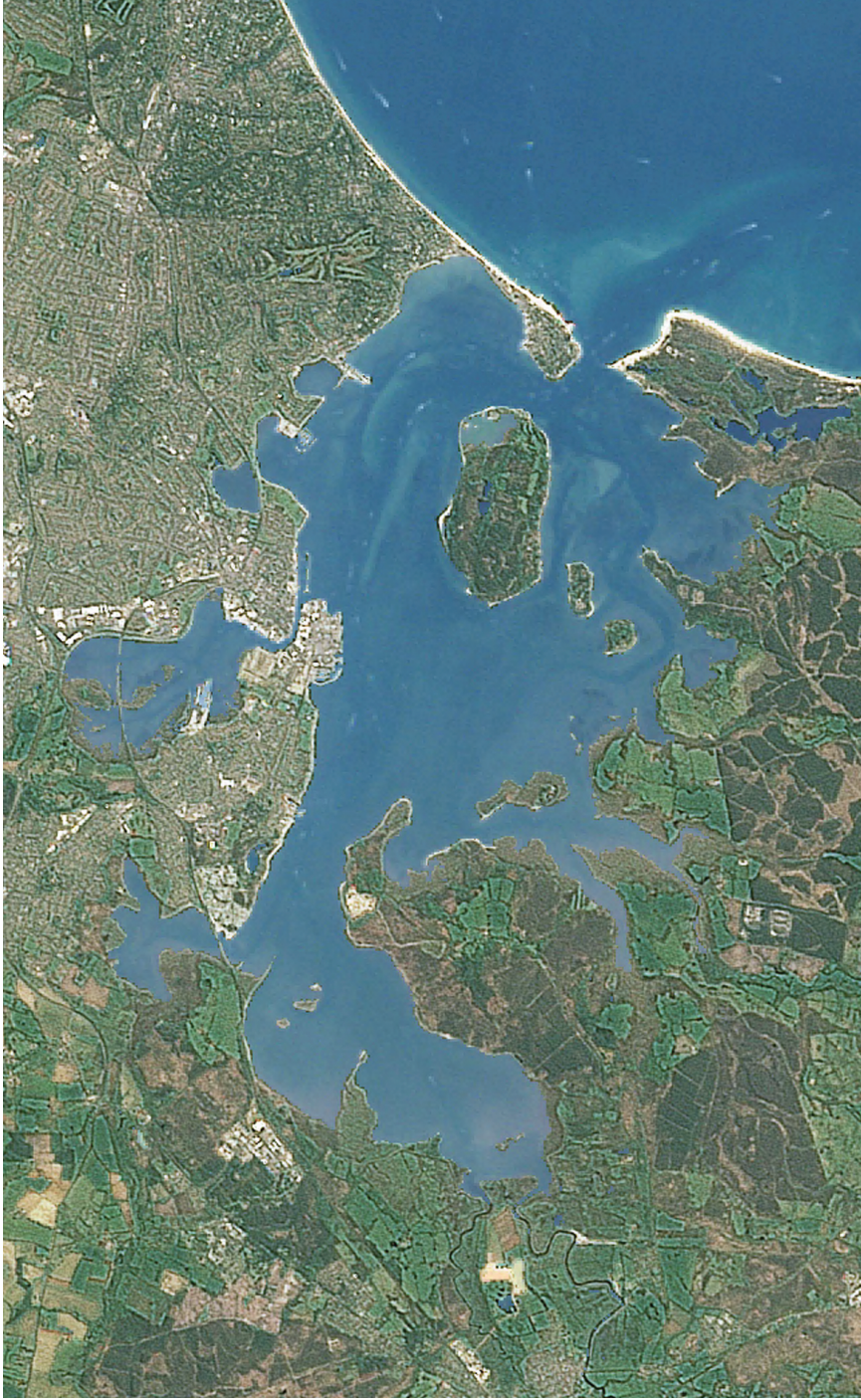
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Throughout the world, coastal ecosystems are at risk. Over half of the world's coastlines suffer from severe development pressure predicated on the growth of human populations and the increasing propensity of those populations to congregate in coastal areas. With coastal urbanization has come rapid industrial and commercial development which has put increasing pressure on coastal wetland habitats including estuaries, mudflats and saltmarshes (World Resources Institute, 1995).

Although accurate figures do not exist, it is possible that half the earth's natural coastal wetlands have gone. In any event it is known that since the Second World War many millions of hectares have succumbed to urban expansion, land reclamation and drainage for agriculture among other things (Hinrichsen, 1998). Furthermore, many of those coastal ecosystems that remain suffer reduced vitality and viability as a consequence of pressures derived directly from human activity, for example, serving as ports, recreation centres, fishing grounds or receivers of effluent. Yet such coastal environments are ecologically and economically significant assets. Estuaries and saltmarshes are important in terms both of biodiversity and as highly productive natural ecosystems whose significance ranges well beyond their immediate locality. They are spawning and nursery areas for commercially harvested species of fish and provide essential seasonal feeding grounds for bird populations whose migrations range across continents. As such it is important that coastal ecosystems are well understood and sustainably managed.

All of the above generalizations apply in the particular case of Poole Harbour (Figure 1). Indeed Poole Harbour is arguably unusual in the extent to which it represents in microcosm coastal zone issues in the developed world. The contrasting and conflicting pressures on Poole Harbour are sometimes startling. For instance, the harbour entrance – no more than 370 m wide – separates on the south-west side an unspoilt protected natural environment of considerable importance (Studland) from, on the north-east side, a residential centre where property competes with Manhattan and Hong Kong island in the world-wide table of real estate values (Sandbanks), see Figures 1 and 2 (Concoran, 2000).



**Figure 1** Satellite photograph of Poole Harbour and surrounding areas. Note the contrast of urban development to the north and west with natural and rural environments to the south and east. (Image courtesy of Infoterra.)

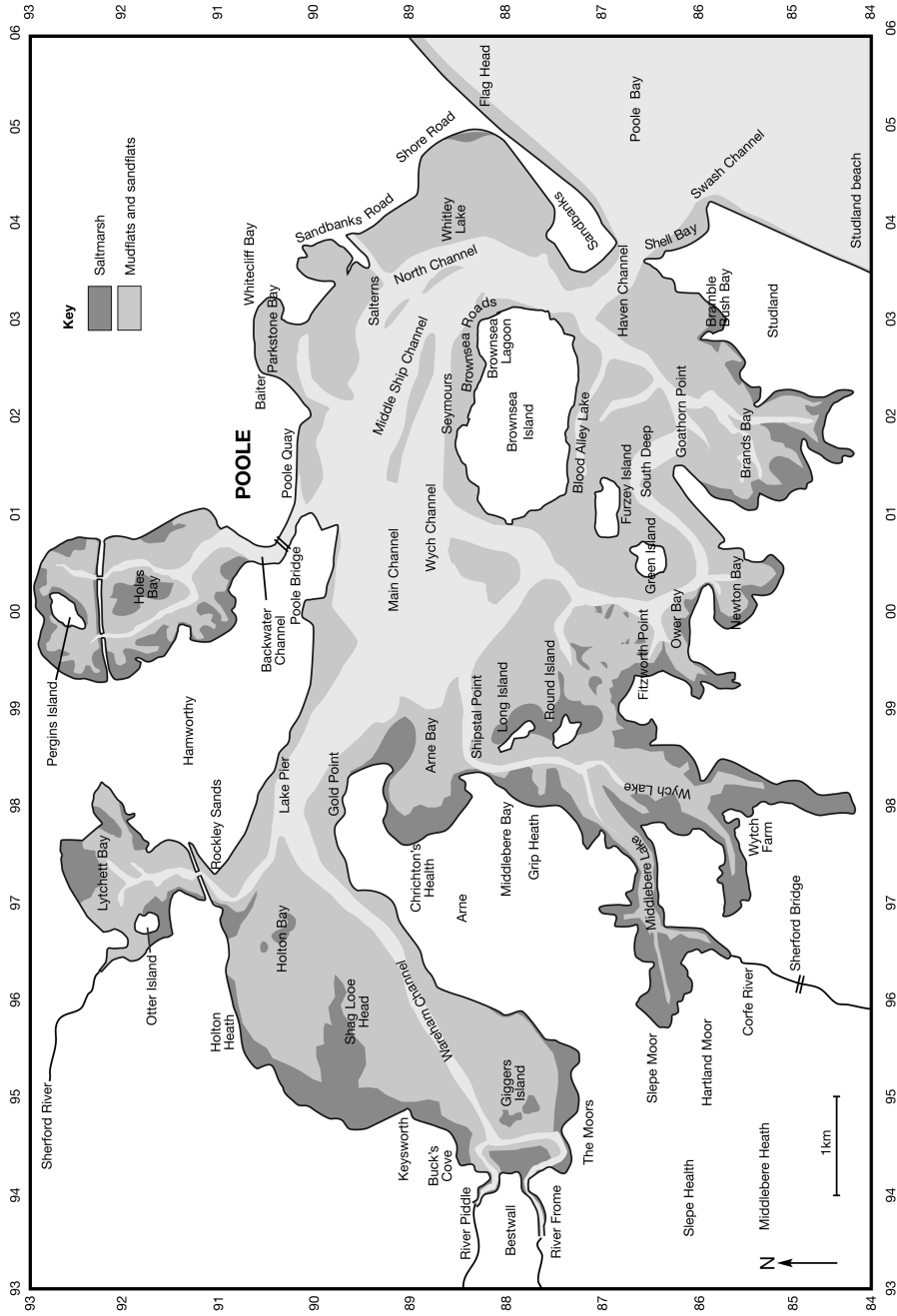


Figure 2 Poole Harbour showing the approximate locations of the main features referred to in this book.

## General description

Poole Harbour is one of several estuaries on the south coast of England which are enclosed by spits and bars at their mouth, formed as a result of the drowning of river valleys by the post-glacial rise in sea level (Figure 3). At High Water Spring Tides, the area of water is about 3600 ha, making Poole Harbour one of Europe's largest lowland estuaries. However, it is not, as is often claimed, the world's second largest natural harbour. There are many other estuaries and lagoons which have narrow restricted mouths and serve as harbours, although they may not be so-named. They include, for example, Grays Harbor (Washington, USA), which is almost six times the area of Poole Harbour.

The harbour has a long indented shoreline which exceeds 100 km and there are five main islands (Brownsea, Furzy, Green, Round and Long) and a single entrance (Figure 2). There are three main channel networks. South Deep drains the southern lowland heaths, and the Wych Channel drains the Corfe River whose catchment is mainly on the Wealden sands and clays of the Isle of Purbeck. The northern harbour forms the estuary of the Rivers Frome and Piddle (with a combined catchment of over 770 km<sup>2</sup>) and two smaller embayments with restricted mouths, Lytchett Bay (the Sherford River estuary) and Holes Bay (draining the heathlands around Creekmoor). Much of the natural shoreline is marked by a low bluff (commonly less than 5 m in height) and eroding cliffs, but the northern shoreline is mainly artificial with walls, embankments, marinas and wharves. The harbour has a small tidal range (1.8 m at spring tides, 0.6 m at neaps) and a double high water which means that water levels are often above mean tide level for 16 out of 24 hours. Mean monthly maximum temperatures range from 8 °C (January) to 27 °C (August) and mean monthly minimum temperatures from 3 °C (February) to 16 °C (August). Ground temperatures can fall below freezing on the intertidal flats and rise to over 30 °C in summer, but there have been few local studies of the estuary's microclimate. Although winds are mainly from the west or south-west, they can be modified in summer by sea breezes from the south or south-east.

## History of human activity

Poole Harbour has been used for trade and fisheries since the Iron Age, and its history reflects its role as a port and the exploitation of the natural resources both within the harbour and around its shores. Late Iron Age and Romano-British pottery, salt-working, iron smelting and shale working took place on the southern shore and on Green Island. Imported goods (pottery and amphorae) found here and the structures of a late Iron Age port make Poole one of the earliest cross-channel trading ports (Markey *et al.*, 2002). Upstream there was extensive medieval reclamation of the Frome and Piddle floodplains and the upper estuary.

By the thirteenth century, Poole was a prosperous commercial port. From the late seventeenth century to the early nineteenth century, Poole thrived on its Newfoundland

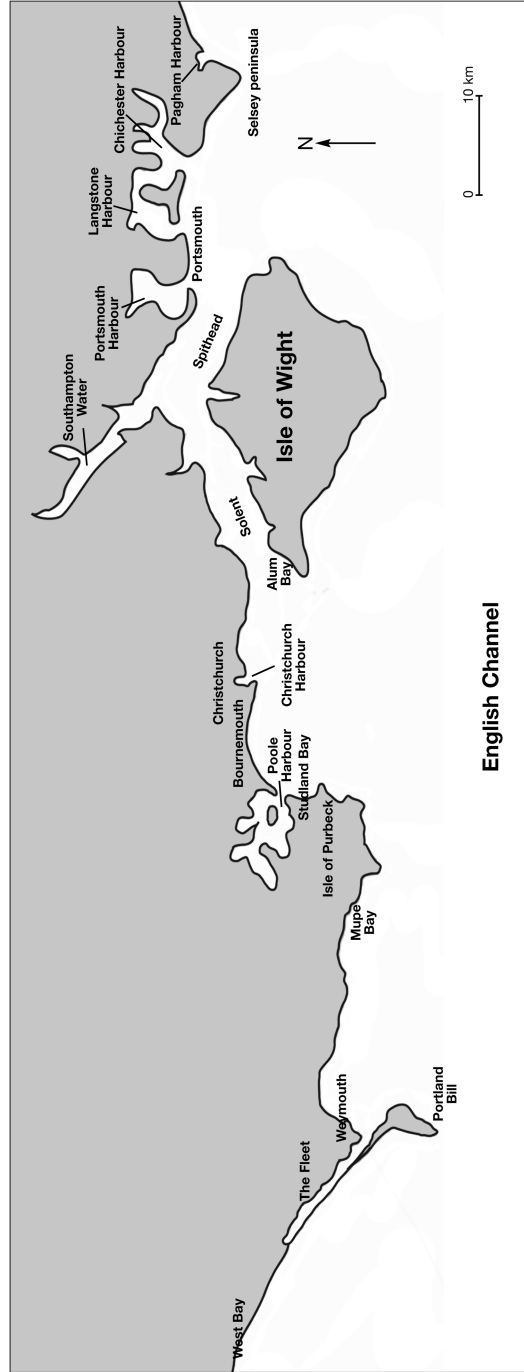


Figure 3 Map showing the position of Poole Harbour in relation to the adjacent coast of southern England.

trade and reached the peak of its prosperity. In 1802, the Newfoundland trade employed over 350 ships with 2000 men and there were at least twelve boatyards. However, with Napoleon's defeat, blockades ended, and Poole's fish trade collapsed. Although demand for clay for potteries and the coastal grain trade expanded, the port declined. The Poole oyster fishery also collapsed.

The Second World War saw the harbour used intensively. International flying boat services (both by Imperial Airways and the RAF) were moved from Southampton. The harbour was an important base for preparations for the D-Day landings in 1944. From the mid-1950s, development of the shore continued with a power station at Hamworthy (now demolished), reclamation and waterfront building for recreation, roads and marinas. There are currently eight yacht clubs and ten boatyards as well as marinas associated with residential developments. Europe's largest onshore oilfield lies beneath the harbour with wells on Furzy Island and Goathorn and the port has been enlarged to provide for roll-on-roll-off freight and larger cross-channel ferries.

Throughout its history, the harbour has been recognized as a resource to be exploited and altered to enhance the prosperity of the town. Any study of the ecological history of the harbour thus needs to acknowledge the human impacts over 2000 years on the harbour ecosystem.

## **Ecological character**

Poole Harbour contains a wide variety of habitats not least due to its size, estuarine gradients and the fact that most of the harbour bed falls within the intertidal zone. As Gray (1985) observed, the harbour and its adjacent shores contain most types of British coastal habitat within an area which is relatively small in relation to this diversity. The intertidal area includes extensive mud and sandflats mostly fringed by reedbeds or saltmarshes (Figure 2). Much of the saltmarsh area is dominated by Cord Grass *Spartina anglica* and the harbour has been the site of classic studies on the development and decline of this species since its first occurrence. Eelgrass (*Zostera* sp.) beds are known to occur in the sub-littoral. Cobbles, stones and gravel occur in channels subject to scour, and sub-tidal bedrock occurs in the Haven Channel to the east of Brownsea Island. Much additional hard substrate, however, has been introduced into the harbour by human activity. This includes boulders introduced as part of a causeway to the south-west of Green Island and increasingly concrete and stone habitats associated with quay, marina and other construction, especially along the urban north-west perimeter.

Since 1999, Poole Harbour has been classified as a Special Protection Area (SPA) under the European Union Birds Directive on the basis of its internationally important population of birds. The harbour and its adjacent landscape hold a number of other European and national statutory designations which serve to protect the natural environment, including that of a designated European Marine Site. Despite its high conservation value, the harbour has a history of problems of contamination and hyper-

nutrification, which appears to have affected species abundance and distribution while also reducing biodiversity in some habitats (Langstone *et al.*, 2003).

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