

The Solent: an estuarine system in flux

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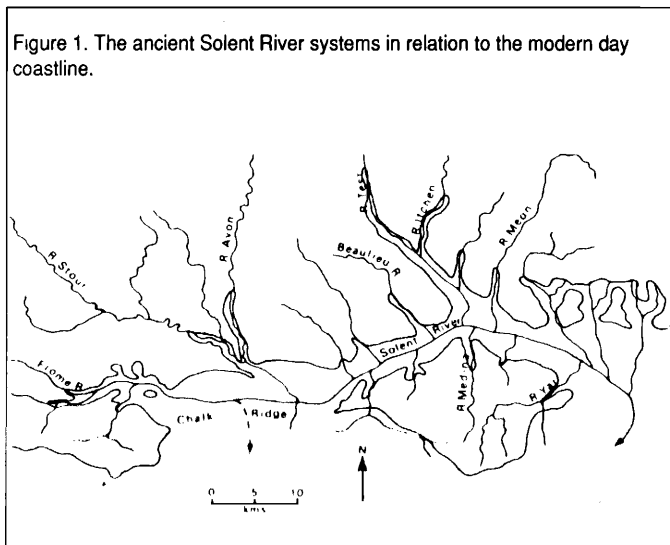
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The modern Solent on the south-coast of England arose from the invasion of an ancient river system by the sea following the end of the last Ice Age. The main stream formerly flowed eastwards through what is now Poole Harbour, across the bed of Bournemouth Bay and along the bed of the present Solent waterway, before turning south to an ancient coastline south of the Isle of Wight (Figure 1). Rising sea level drowned this river and the lower parts of its tributaries, giving rise to the numerous estuaries and harbours of today along the south coast of Hampshire (extending just into West Sussex) and the north shore of the Isle of Wight (Figure 2).

SALTMARSH AND SEDIMENTS

The largest of the harbours, those of Portsmouth, Langstone and Chichester, derive from the drowning of a dense network of streams followed by a lateral expansion through wave attack at high water which in places has produced cliffs 2m or more high, cut into a glacial terrace. The three harbours of the northeast Solent are essentially a single biological system, comprising connected and extensive intertidal basins drained at low water by systems of channels and creeks which probably reflect the early postglacial drainage pattern.

Figure 1. The ancient Solent River systems in relation to the modern day coastline.



The sediments accumulated in the estuaries and harbours mainly comprise fine silts and organic matter - the muds in the harbours are among the softest I have encountered and are mostly only negotiable with mud pattens. Saltmarshes, probably of medieval or possibly earlier date, occur locally, though they are now receding through erosion at the terminal cliffs. From the 1870s the invasive cord grass *Spartina* spread widely on mid-level mudflats, but these *Spartina* marshes are now in a degenerate phase and over large areas the platforms of accreted mud are currently slumping back to something thought to approximate to the pre- *Spartina* profile.

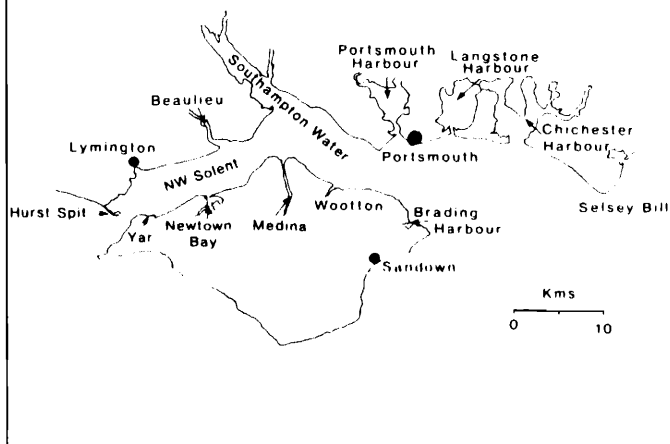
RISING SEA LEVELS

The processes involved are beyond my scope here, but an implication for shorebirds is that the potential feeding area has increased. This increase, however, is in part balanced by a progressive narrowing of the intertidal zone during this century through processes which probably derive from sea level rise. We need to remind ourselves that sea level has been rising relatively rapidly since around the mid-19th Century irrespective of any 20th Century greenhouse effect. Today, of 9,060 ha of intertidal sediment in the Solent, 6,191 ha are mudflats, 729 ha are sandflats, 430 ha are ancient saltmarshes and 1,710 ha are *Spartina* marshes, of which 650 ha are in an advanced state of degeneration. There are extensive beds of the sea grass *Zostera* and there is abundant green algae, mainly associated with sewage effluent discharges into estuaries. The Solent is a warm, nutrient-rich muddy system in which there is abundant organic debris and very high densities of mud-flat invertebrates.

The biological wealth of the system is reflected in the large numbers and high densities of waders and wildfowl which feed in the intertidal zone. Over the five year period 1983-84 to 1987-88, the average winter peak populations of waders



Figure 2. The main estuaries within the modern day Solent complex.



and wildfowl were respectively 103,000 and 40,000, representing about 20 birds per ha of mud and sandflat. This density would appear to be higher than in other major UK estuarine systems. Among the Solent's component estuaries, Chichester and Langstone Harbours support the highest numbers of wintering birds, each ranking among the top 15 UK estuaries for their total wader populations (Table 1). Individual Solent estuaries support internationally important concentrations of Ringed Plover, Grey Plover, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Redshank, Brent Geese, Wigeon, Teal and Shelduck, and nationally important numbers of Sanderling, Curlew and Turnstone. Langstone and Chichester Harbours are already designated for conservation under the Ramsar Convention and as a Special Protection Area under the EEC Birds Directive. The remainder of the Solent also qualifies for both designations, and the Nature Conservancy Council propose to seek designation by the Secretary of State once the necessary preliminary consultations have been carried out.

International designations deter but do not preclude threats. About 1.1 million people live within 15 km of the Solent. It has 32,000 yacht berths and moorings - the largest recreational fleet in the world - and it has two major ports and the massive Esso refinery at Fawley on Southampton Water. It shares in the biological malaise of south-east England - over abundant capital available for investment in up-market waterside housing, marinas, leisure centres and the claim of new land from the tide. As I write, the catalogue of threats to the shoreline and intertidal of the Solent includes 11 proposed marinas, one large scale land-claim and part flooding of a 103 acres tidal inlet, the canalisation of the Lyminster estuary to accommodate larger ferries to the Isle of Wight, and a multiplicity of demands for pontoons, slipways, and shore facilities for the amazing array of recreational pursuits which we seem to have invented to mop up the abundance of

leisure time and disposable income.

This all represents a snapshot in time. A year ago, and doubtless a year hence, there was, and will be, a different catalogue of threats of equal length. Between 1930 and 1980, 11.5% of the intertidal area of the Solent was destroyed by land-claim and development. Were all the present threats to achieve fruition, I guess they would remove another 1% - not, you may say, disastrous, but nonetheless another step in the process of attrition. Interestingly, we have now reached the stage where the first applications are being made to fill in marinas in order to build houses, because houses pay better than boats - the marinas in the first place having received planning permission mainly on the grounds of an over-riding demand for berths in the Solent! If this trend continues, then, presumably, it will in turn exacerbate the demand for more boat berths and hence add another turn in the spiral demands made on the Solent.

Probably the most far-reaching recent threat to the Solent was the CEGB's proposal to build a 2500 kv coal-fired power station next to the existing oil fired station on the shore between Fawley and Calshot Spit. Coal, and the limestone for a flue-gas desulphurisation plant, would arrive by sea at a port constructed over the saltmarshes and mudflats. Huge quantities of wastes would be exported the same way or via a new rail link. We - the consortium of opposition, led by the County and District Councils - were still grappling with the ecological consequences of marine and atmospheric pollution and with the multitude of effects deriving from the sheer scale of the mega-station, when the Board withdrew in the shadow of privatisation early in 1989. Yet, I am not optimistic enough to assume that the threat has been disposed of for ever.

Table 1. Average peak winter totals for waders wintering on Solent estuaries, 1983-84 - 1987-88.

Estuary	Waders
Chichester Harbour	39,487
Langstone Harbour	38,811
Southampton Water	10,858
Portsmouth Harbour	9,018
NW Solent	6,509
Beaulieu	4,316
Newtown	2,154
Brading Harbour	1,185
Medina	782
Yar	553
Wootton	538



MORE COUNTS NEEDED

I do not mean this article to be a catalogue of woes. We - I use the term to embrace the Nature Conservancy Council, Hampshire and Isle of Wight Naturalists' Trust, RSPB and community conservation bodies - have not lost a public inquiry where the conservation of the intertidal or shoreline was at stake since the 1960s. It was not only that different attitudes prevailed in the 1960s and before. More importantly, we simply did not have the data - nor to be brutal, the expertise of presentation - that we now possess. Much of that data derives from the British Trust for Ornithology based Birds of Estuaries Enquiry and the Wildfowl and Wetlands Trust based National Wildfowl Counts. Much else besides has contributed to the cases we have presented at successive public inquiries, but without the counts I suspect we would have been lost many times. I doubt if I need labour the point except to say do please keep counting and we will continue to fight.

