Winterton Ness, Norfolk

[TG 489 216]–[TG 506 181]

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Introduction

The term 'ness' (an Old Norse word) is commonly used, particularly in south-east England, to describe either a headland, for example White Ness (Thanet), or a low-lying foreland or promontory, for example Dungeness. Derived local terms include 'nothe' (Dorset) and 'naze' (Essex). Technically it has been applied most usually where a narrow cuspate foreland occurs with a high obtuse angle between its two shorelines. Such features occur on the East Anglian coast at Winterton Ness, Benacre Ness and Orfordness. Winterton Ness is unusual because of its modern dynamism, its predominantly sandy beach and its migration, often in an opposite direction to that of the longshore drift.

Description

Winterton Ness (see (Figure 8.2) for general location) is significant both for the well-formed dunes, which are its most characteristic landform, and for the processes that affect its continuing development. At Winterton Ness, there appears to be a slight sediment budget surplus and some growth in the volume of sediment retained in the ness. There is both erosion and deposition within the site and an important aspect of the interest of the site is its dynamism, a feature that has been the focus of much of the research here (Cambers, 1975; Craig-Smith, 1971a,b, 1973; Green *et* ed., 1953; McCave, 1978b; Onyett and Simmons, 1983; Robinson, 1966; 1980a; Steers, 1927, 1939a, 1964a; Steers and Jensen, 1953; Ward, 1922; Williams, 1956). It is one of a small number of such features cited in the wider coastal literature (Bird, 1984, 1985; Bird and Schwartz, 1985).

The site extends from [TG 489 216] in the north to [TG 506 181] in the south. From a narrow dune ridge at its northern end, the ness widens to over 500 m in its central section around the ness itself before narrowing again southwards. North-east of the village of Winterton-on-Sea, the site is formed of linear dunes and slacks. Much of the dune landscape was greatly altered during the 1953 floods, and many of the blowthroughs and other features that existed before 1953 were modified or eliminated (Steers, 1964a). Ridges of shingle also occur, albeit occasionally. Towards the ness, low dunes rest upon parallel sand and shingle ridges about 1.0 to 1.3 m in height. South of the village, the old cliffline (which is up to 15 m in height) is separated from a line of dunes by a valley, the origins of which remain obscure.

Cambers (1975) reported that there was some slight accretion around the Ness. Onyett and Simmons (1983) indicated that accretion at Winterton had passed its peak with the area of positive growth moving north to the Horsey area. Halcrow (1988) described the coast as retreating at rates up to 2 m a^{-1} on both sides of the ness, whereas at the ness the coast had advanced at about 0.5 m a^{-1} (Figure 8.15). The foreshore was steepening. They confirmed that the ness was migrating towards the north. The Shoreline Management Plan (North Norfolk District Council *et al.,* 1996) reports beach retreat on the northern side of Winterton Ness of up to 1 m a^{-1}, In contrast to general accretion on its southern side. Sediment transport is towards the south. This suggests a return to the patterns described by the earliest descriptions of the Ness. It also accords with Cambers' view that the Ness results from a change in the rate of littoral drift resulting from the change in beach alignment. The northern edge of the site lies just south of a point where there have been breaches of the dune line (Steers, 1964b), as in 1938 and 1953, but the main dune area remains unscathed. There are several ebb-flood channels offshore from the Ness.

Interpretation

The development of nesses along the East Anglian coast has been the subject of some debate, but it is difficult to develop a general hypothesis for their formation as a group because their individual sedimentary characteristics are not

similar. The beach at Winterton Ness, for example, is mixed sand and shingle, whereas Benacre Ness to the south is usually veneered by shingle. Both the movements of sand and shingle and the forms associated with them differ. Benacre Ness shows a strong tendency to migrate northwards, but the movements and history of Winterton Ness are less certain. Robinson (1966) demonstrated that ness features are associated with offshore ebb–flood channel systems and suggested that material reaches the nesses via these systems. The process thus involves a complex interaction of offshore tidal streams and wave action. Cambers (1975), however, suggested an alternative hypothesis. His sediment transport calculations show that in the vicinity of Happisburgh 1 000 000 m^3 of sediment could move annually towards Winterton. To the south of Winterton at Hemsby 390 000 m^3 could move southwards. Cambers interpreted this to mean that Winterton Ness could be an area where part of the balance is added to the ness, whereas the remainder moves offshore via the ebb-flood channel system. This is completely the reverse of Robinson's hypothesis. Despite some conflicting and inconclusive evidence from the analysis of drifter releases between Winterton Ness and Benacre Ness (Craig-Smith, 1973), Cambers proposed a simple hypothetical model for the sediment budget of Winterton Ness. Allowing for an accretion rate of 1 m^3 per metre length of coastline per year, 2000 m^3 would accumulate annually at the Ness. In practice such rates are unlikely to be achieved today with much of the cliffed coast now artificially protected to the north.

Ward (1922) linked the changes in the offshore banks to the intermittent pattern of erosion along the East Anglian coast. This view had been expressed earlier by the Royal Commission on Coastal Erosion and Afforestation (1907–1911), which attributed periods of increased erosion to the lowering of offshore banks. The relationship between the offshore banks and ness maintenance may therefore be a very complex one. Steers (1964b) put forward the possibility that the contrast between the northern and southern parts of Winterton Ness might result from the presence of a sandy spit or bank, or even a shingle bank, on which the dunes south of Winterton could form. If this were the case, the ness would form at a point where following the trend of the coastline would cause the beach to extend into deeper water and for refraction around it to assist the rate of transport of sediment southwards. What is of particular interest at Winterton is that, unlike other nesses, it does not appear to have been a gradually growing feature, but may be more akin to features such as Orfordness, Suffolk, where a ness is accompanied by a spit at its down-drift end.

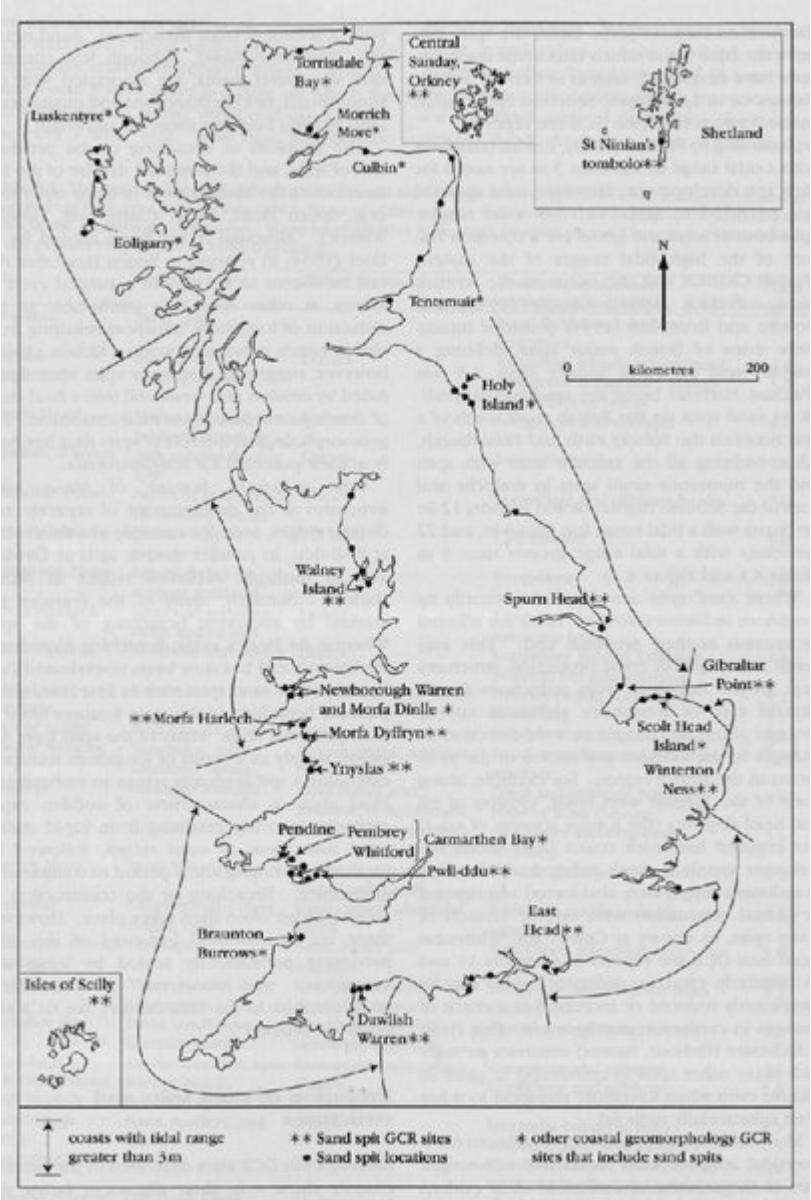
The significance of this site lies in the contrast between its northern (erosional) and southern (aggrading) parts and the processes that affect its continuing growth. It has been suggested that Winterton Ness, like other similar forms, marks a location where there is net offshore transport of sediment. As far as the longshore sediment budget is concerned, it is a sediment sink. However, the role played by offshore banks may be such that sediment returns elsewhere to the shore via ebb-flood channels.

The dynamism of the feature and its place within a continuum of longshore sediment transport makes the definition of its northern and southern extremities difficult. They have, however, been set, for GCR purposes, so as to include the processes maintaining the ness as well as the form itself The offshore limit of the site should be related to the processes in the ebb-flood channels and on the offshore banks, but since the evidence of their precise role is conflicting they have not been included in the site. If sediment reaches the ness from offshore, as in Robinson's (1966) hypothesis, then it is essential that the offshore is offered the same protection as the ness itself for without the former the latter will remain at risk. If, however, Cambers' (1975) hypothesis is correct, designation of the offshore zone is not critical for the Ness. In the early 1980s the evidence seemed to favour the latter position, but Halcrow (1988) suggest that the ness is the result of littoral sediment supply from the north-west associated with converging tidal residual currents. There is a need for further investigation to determine not only the relationship of the Ness and the offshore area, but also the relationship of the probable offshore transfer of sediment to the sediment budget farther south.

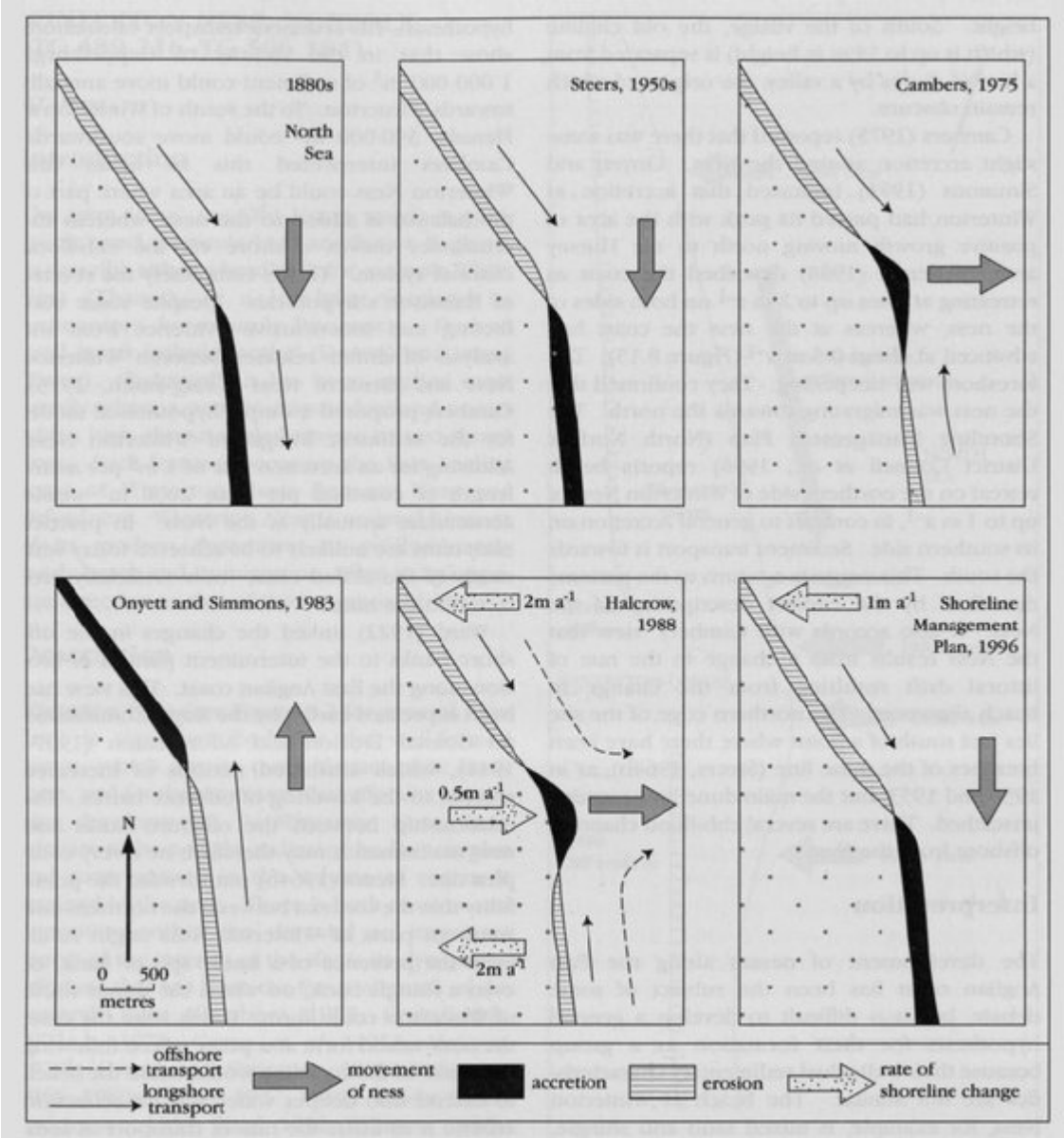
Conclusions

Winterton Ness is a narrow cuspate foreland dominated by well-developed dunes and a sandy beach. It has been identified as an area with a sediment budget surplus and of considerable sediment transfer offshore. Winterton Ness differs from the other similar features of the East Anglian coast in being predominantly sandy and in having a slight sediment budget surplus. It also differs from other nesses because it has not had a consistent pattern of growth. Although there has been an historical pattern of movement towards the south, this has not been maintained in recent decades.

The shoreline dunes are very geomorphologically active at the site, since they migrate inland on shorelines undergoing erosion or build seawards where accretion takes place. Winterton Ness has been cited by a number of writers (e.g. Ranwell, 1972; Goudie, 1990) as a key example of a prograding ness dune system. Behind the linear coastal dunes, the dunes of the central part of the ness are of considerable ecological importance because of their relative stability and alkalinity, and much of the GCR site coincides with the Winterton Dunes National Nature Reserve. It is an important member of a group of narrow cuspate forelands that play an important role in the long-shore sediment transport of the East Anglian coast.



(Figure 8.2) The location of sand spits in Great Britain, also indicating other coastal geomorphology GCR sites that contain sand spits in the assemblage. (Modified after Pethick, 1984).



(Figure 8.15) Different interpretations of the sediment transfers at Winterton Ness. In the 1880s, according to Steers (1964a) and the Shoreline Management Plan (North Norfolk District Council et al., 1996), net sediment transport was southwards and the ness moved in the same direction. Others have suggested that transport is from the south, and Cambers (1975) and Halcrow (1988) agree on transport from both south and north with a transfer offshore and the ness extending seawards.