
Dungeness and Rye Harbour, Kent and East Sussex

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Introduction

The large shingle cusped foreland of Dungeness and the associated beaches at Rye (see (Figure 6.2) for general location and (Figure 6.46)) provide a record of the development, partial destruction and reconstruction of a very large shingle barrier beach and spit system. Former shorelines, which are thought to have formed during approximately the last 5500 years, include both exposed shingle ridges and a large number of buried ridges, Dungeness itself being especially noteworthy for its sequence of some 500 progressively younger, but increasingly cusped eastwards, ridges. Bare shingle occurs at Rye Harbour and Camber, Dungeness and Hythe. At Rye Harbour lies the westernmost group of shingle beaches, which extend across the former Romney Marsh embayment between the Fairlight Hills east of Hastings and the former sea cliffs at Hythe. Unlike the beaches of Dungeness and Hythe, the development of the beach ridges at Rye Harbour has taken place mainly since the 16th century. At Camber Castle, the exposed shingle ridges generally post-date the mid-16th century (Lovegrove, 1953), whereas at the western end of the Lydd Ranges, they may be over 3500 years old (Eddison, 1983a,b). Between New Romney and Hythe (see (Figure 6.46)), a large number of ridges at high angles to the present-day shoreline were described by Elliott (1847) and have been detected in the distribution of the Beach Bank soil series and in the exposed shingle ridges west of Hythe. Both dunes and beach ridges are found at the foot of former sea-cliffs at west of Hythe, where there is considerable archaeological interest in the relationship between the Roman and Saxon forts at Lympne and the nature of a navigable inlet behind the shingle ridges (Shackley, 1981). Much of the human history of the marshlands has involved land-claim and drainage. The development of the marshes, land-claim and drainage within Romney Marsh (*sensu lato*) are discussed in Eddison (1995), Eddison and Green (1988) and Eddison *et al.* (1998).

Although the development of the features at Rye, Camber, Dungeness, Romney and Hythe are interrelated, they form separate physiographic units. Eddison (1983a,b) summarized the main phases of the evolution of the barrier beaches, expanding upon the detailed surveys carried out during the 1930s by Lewis (1932, 1937), by Lewis and Balchin (1940), and by Lovegrove (1953) for Camber, and the Soil Survey of England and Wales (Green, 1968) for Romney Marsh during the 1950s and 1960s. This wider view is necessary for an understanding of the development of Dungeness and Rye Harbour.

The idea that there had been a former continuous beach from Fairlight to Hythe was suggested during the early 19th century by Elliott (1847), but later Gulliver (1897) and then Lewis (1932, 1937) attempted to explain the gradual development of the barrier beach into the cusped foreland of today. Longshore transport processes brought flint from the west where very large volumes may have been deposited during the Pleistocene Epoch on the floor of the English Channel to be carried towards the present-day shoreline by the waves of the rising Holocene sea (Eddison, 1983a). Some of this shingle was trapped in the Pevensy embayment, but much of it accumulated to the east of Hastings. As the western part of the barrier beach weakened, shingle was re-distributed to more eastern beaches. The beach is thought to have gradually changed its alignment towards the predominantly south-westerly up-Channel waves (Lewis, 1931).

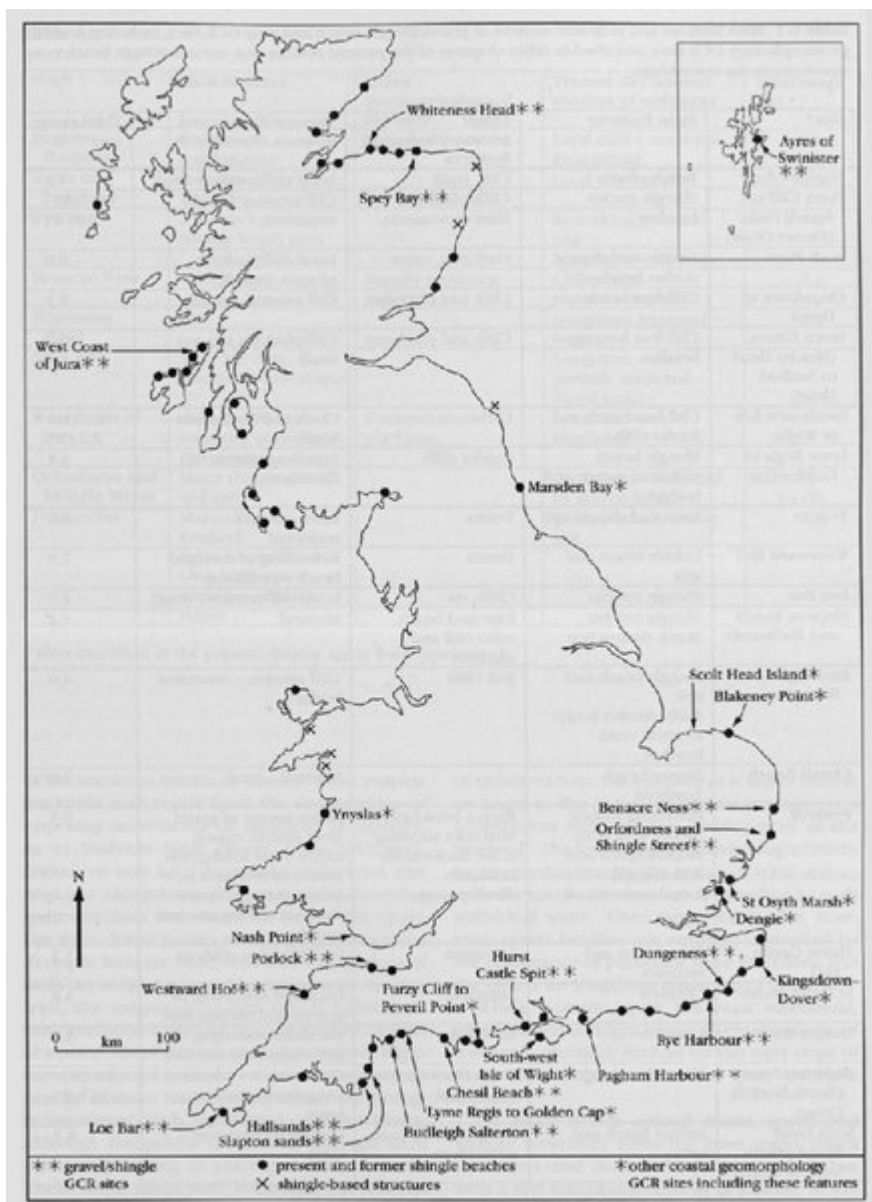
Eddison (1983a,b) suggested that the earliest features, a submerged forest at Cliff End and the low-lying shingle deposits at Broomhill and Sandylands, represent an early barrier beach, probably dating from between 5500 and 4000 years BP. The barrier progressively extended towards Hythe by a series of recurves, identified by Elliott (1847). Thus with the shingle emplaced close to the present-day sea level, longshore transport gradually moved much of the shingle into the Romney embayment. The eastern end of the barrier beach extended towards, but never joined, the former cliffs around Lympne, so providing shelter for both Roman and Saxon vessels approaching the fort at Lympne, a site now about 3 km from the coastline.

Between Jury's Gap [TQ 993 180] and Dungeness itself, there are about 500 individual ridges in four main groups: their alignment changes by about 10° between each group. Eastwards from Galloway's Lookout [TR 045 172], the ridges are characterized by increasing curvature and the preservation of a ness form. Some of the western exposed shingle (for example, Jury's Beach, The Forelands and Holmstone) probably represents recurred sections of the early ness form. Near the power stations (Figure 6.46), gravels and sands were deposited for about 1900 years beginning at least 3270 years BP (Greensmith and Gutmanis, 1990). These deposits suggest that there was already a spit or ness feature here by the end of the British Roman period.

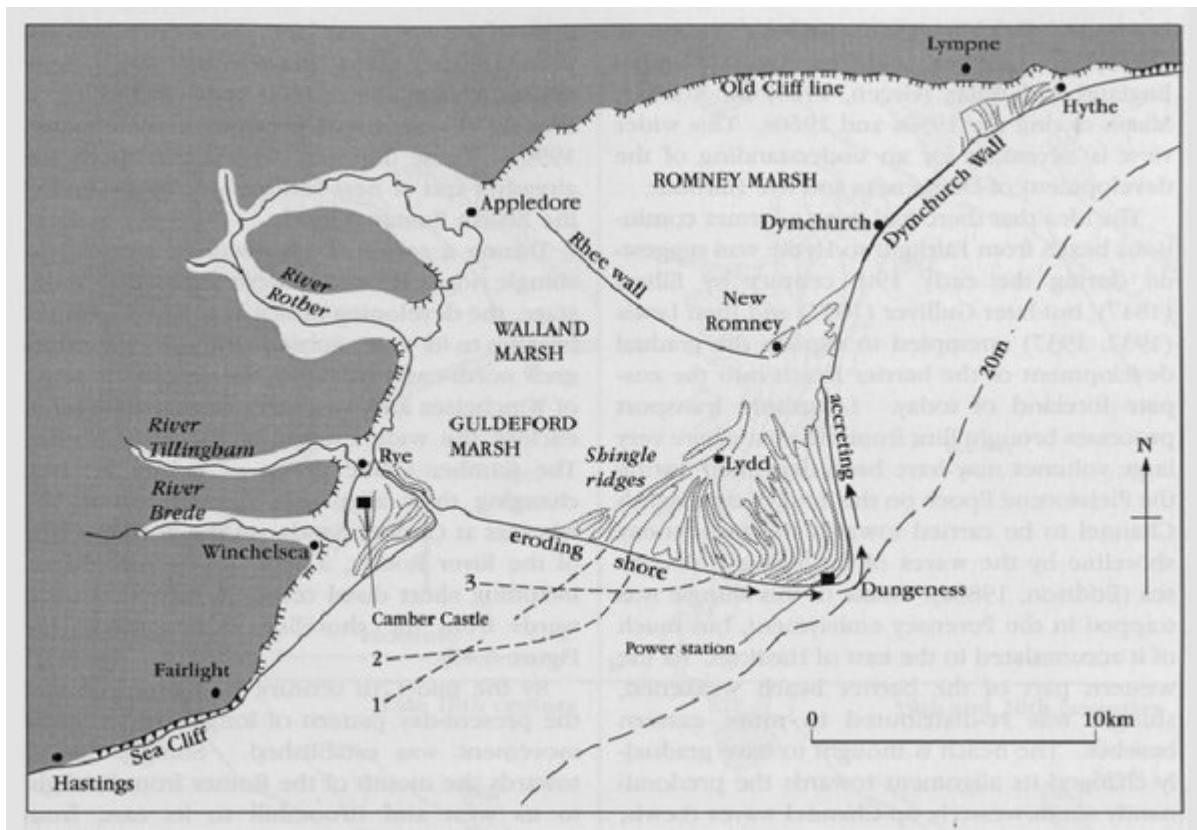
During a series of 13th century storms, the shingle ridges at Camber were destroyed. At this stage, the developing ness was isolated from the beaches to its west. Subsequently, shingle ridges grew north-eastwards from the area to the south of Winchelsea and westwards from Broomhill to enclose the wide estuary of the River Rother. The Camber Castle group of ridges fan out, changing their alignment through about 50°, whereas at Camber Sands, on the northern side of the River Rother, a series of narrow ridges, including short distal recurves, extended westwards from the shoreline at Broomhill (see (Figure 6.47)).

By the mid-17th century, it is probable that the present-day pattern of longshore sediment movement was established. Shingle moved towards the mouth of the Rother from Fairlight to its west and Broomhill to its east, from Broomhill along the southern shoreline of Dungeness to the ness itself and thence northwards to Greatstone, and from St Mary's Bay southwards towards Littlestone. At Hythe, shingle moved eastwards towards the Lympne inlet, as appears always to have been the case. Much of the barrier beach at Romney has been built upon and the ridges at Hythe retain little of their original form. The modern shoreline is reinforced by sea-walls at Winchelsea Beach, Broomhill, Littlestone and Dymchurch, with artificial beach feeding at Cliff End, Jury's Gap, the Dungeness power station and St Mary's Bay, with over 110 000 m³ of material being added in 1979 (Eddison, 1983a), mostly by re-distribution from within the site. Nevertheless the southern shoreline continues to be eroded and shingle added to the eastern shoreline, the landward movement of the southern shoreline often taking place in stormy periods when it may move several tens of metres inland.

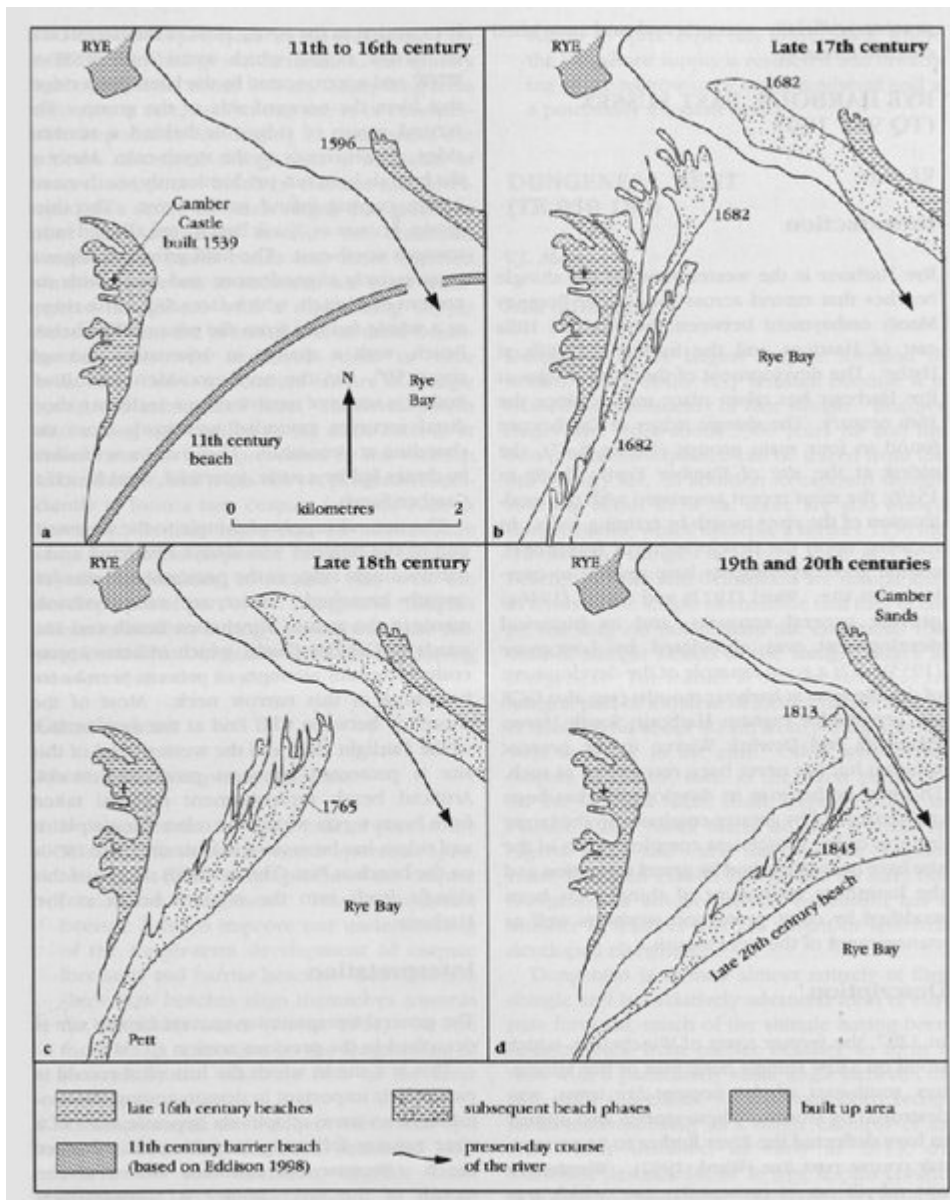
The present-day features of Dungeness and the associated beaches at Rye, Romney and Hythe thus result from changing sediment transport rates and deposition over some 5000 years, the different alignments of the shingle ridges and the buried beach ridges demonstrating gradual development from a barrier beach to the present artificially strengthened and nourished cusped foreland.



(Figure 6.2) Coastal shingle and gravel structures around Britain, showing the location of the sites selected for the GCR specifically for gravel/shingle coast features, and some of the other larger gravel structures.



(Figure 6.46) The cusped foreland, Dungeness, Kent. The dashed lines 1 to 3 indicate former positions of the original spit over time, showing the down-drift extension of the spit across the bay. Saltmarsh has formed behind the outer shingle barrier. Over time, up-drift erosion and down-drift deposition led to rotation of the feature from position 1 to 3. Land-claim of the marsh occurred in two phases — in the north it was drained in the Roman period, and in the 13th century diversion of the River Rother from its course north of Lydd to its new exit at Camber Castle led to the draining of the southern marshes. (After Bird, 1984, p. 159.)



(Figure 6.47) The historical evolution of Rye Bay. Dates indicate shoreline and beach area from contemporary maps and charts. (After Lovegrove, 1953; and Eddison, 1998.)