



LONGSHORE DRIFT  
INFORMATION SHEET

# THE BEACHES ARE ON THE MOVE!



**NRA**  
*National Rivers Authority*  
*Southern Region*  
Guardians of  
the Water Environment

Shingle beaches are an important part of our sea defences in Southern Region, they act as a cushion against the pounding waves

... BUT THEY ARE ON THE MOVE!



### SINGLE TICKET, CHRISTCHURCH TO DOVER

The sand and broken stones for our beaches came from the continental shelf when the last ice-age finished. Ground up sea shells and flints from croded chalk cliffs have added more beach material since.

Over the centuries, because the wind and waves usually come from the South-West, the shingle has moved along the coast towards the East. It does not take many days of watching to see that the stones are still on the move. At Dungeness, for example, the shoreline westward of the point is eroding at a rate of about 2 metres per year, while to the North the beach tends to accrete or build towards France.

### THE ZIG-ZAG ROUTE

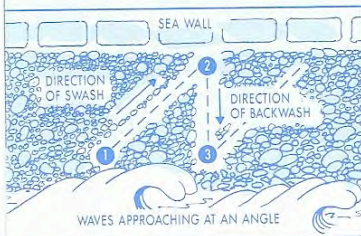
The reason for all the movement is called longshore drift.

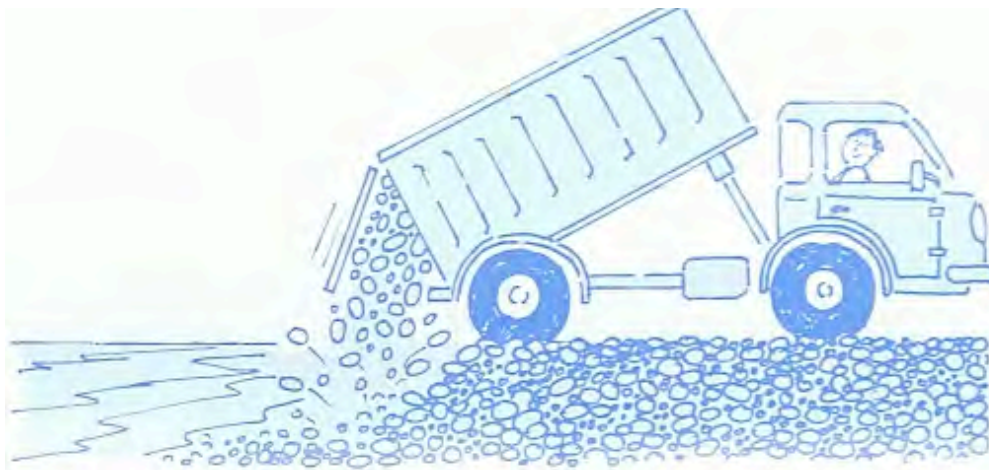
Let us follow the course of one pebble. A wave under the influence of the winds, approaches the coast at an angle. As the wave breaks, it carries the pebble up the beach with its forward movement or 'swash' (1). The 'backwash' of the wave trickles straight down the beach and the pebble rolls with it (2).

The pebble is now at position 3 and ready to be moved forward again by another wave.

And so with all the other pebbles.

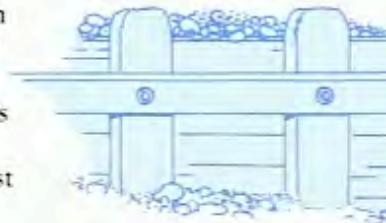
There are several things that affect longshore drift — especially the number of days in a year that winds come from one direction; the strength of the winds, and the 'fetch' or distance that the waves have had to travel in which to build up their height and power.





This gives three benefits — sea defences are protected, the river can discharge freely and the entrance is left open for shipping. Each year costly replacement and maintenance is undertaken to preserve a timber groyne system to trap sand and shingle. A cushion of shingle must be preserved and in some cases reinstated, to dissipate the energy of the storm waves.

West of Dungeness and in other vulnerable areas, protection has been achieved by reseeded the beach with transported shingle — a continuous picking up of shingle from beyond the point and transporting it back to the West to continue its function as part of the longshore drift along the foreshore. In a major civil engineering operation, which was the largest of its kind in this country, an artificial beach nourishment and groyne scheme was recently completed at Seaford at a cost of £13 million.



## WORKING WITH THE SEA

The National Rivers Authority knows that our beaches need as much attention as our countryside. By working with the sea, it will ensure that the protective shingle is spread evenly along the Channel coast to protect people and property from flooding.

## LOST HARBOURS

**SANDWICH** — once a major port and naval base, now 2 km inland, embalmed in sand. Longshore drift created a spit running northward from Deal which forced the Stour River into a hairpin bend. The last straw was the wrecking of a large ship belonging to the Pope in the entrance to the Stour in the mid sixteenth century. She trapped the sand and created a dangerous bar.

**HYTHE.** Around the year 1,000, the River Rother entered the sea near Hythe which was another of the Cinque Ports. But within 300 years the shingle drifted along the shore of the Romney Marsh and extinguished the entrance.

**ROMNEY** was the next exit to the sea that the River Rother adopted. A succession of storms and floods savaged northwestern Europe during the thirteenth century. A great storm in 1287 captured the Rother and drew it westward to Rye.

**RYE's** battle to keep open is still going on. To reach the town now, boats have to go 4 km up the Rother. A castle built in 1539 beside the approaches to Rye is now more than a kilometre inland.

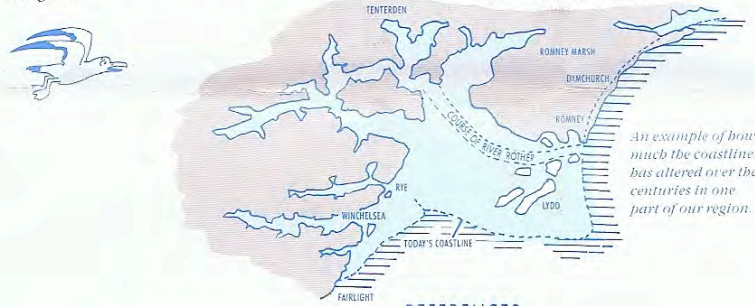
**OLD WINCHELSEA** stood on the shingle to the West of the mouth of the Rother. In 1250 a storm, combined with high tides, breached the sea defences. The great storm of 1287 destroyed the town and its rubble rolled away to join the rest of the shingle on Dungeness.

**PEVENSEY HARBOUR** was once situated on a lagoon behind the shingle spits of the coastline and Pevensey Castle could be reached by ships at high tide. The eastward drift choked the mouths of the streams and the lagoon silted up, encouraging man to recover the marshland for farming.

**SEAFORD AND LEWES.** The Ouse's losing battle against the shingle and silt resulted in the downfall of both ports. In Roman times the river came out roughly where it does now. Then the longshore drift threw a shingle spit across the river and moved it 4 km. The haven of Scaford grew up there but the new river mouth was threatened by the drifting shingle. A man-made cut was made to save the river and took it by a direct route to the sea where a New Haven was founded.

**PEN-HOUSE IN LANCING.** Until the latter half of the fifteenth century the Adur and the Arun shared a common entrance to the sea just East of Lancing Church. Shingle pushed the Adur towards Hove and the Arun was thrust back westwards. Fresh exits formed at Worthing, Goring and Ferring. Around 1500-1530 it broke through near Littlehampton. Shoreham Beach is a spit of shingle created by longshore drift which turned the mouth of the Adur eastwards.

**SELSEY** was formerly an island. The gap was closed by longshore drift leaving only the vanishing harbour of Pagham on the eastern side. Once a major Roman Port, Selsey, together with its cathedral was washed away by the sea.



*An example of how much the coastline has altered over the centuries in one part of our region.*



### REFERENCES

- Murray, J.C. (1953). Romney Marsh. Robert Hale Ltd.
- Calder, N. (1986). The English Channel. Chatto & Windus Ltd.
- \* Robinson, G.W. (1972). Land Drainage and Sea Defence of Romney Marsh. Cantium.
- \* Roper, A. (1972). Romney Marsh — The Fifth Quarter. Cantium.
- \* Smyth, C. and Jennings, S. (1988). Coastal Changes and Land Management in East Sussex, Southern England. Ocean and

- Shoreline Management II, 375-394.
- \* Robinson, G. (1984). Land Drainage and Sea Defence of Romney Marsh. Gazette of the Association of Drainage Authorities, 65-74.
- \* Holmes, A.E. (1988). The Scaford Sea Defence Scheme. IWEM Conference, 16.1-16.13.

*\* Available on request from NRA Southern Region.*



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