The coastal environment

Protecting our beaches

Offshore sources of sediment for recharge schemes

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Beach recharge or nourishment is the practise of replacing sand or gravel on beaches which has been removed by erosion or longshore drift. The principal aims of beach recharge are to combat coastal erosion and the loss of public amenity. The latter is an important criterion in tourist resorts where the beach is a major attraction. Ecological as well as economic values can be affected, with loss of habitats for sea birds and benthic fauna.

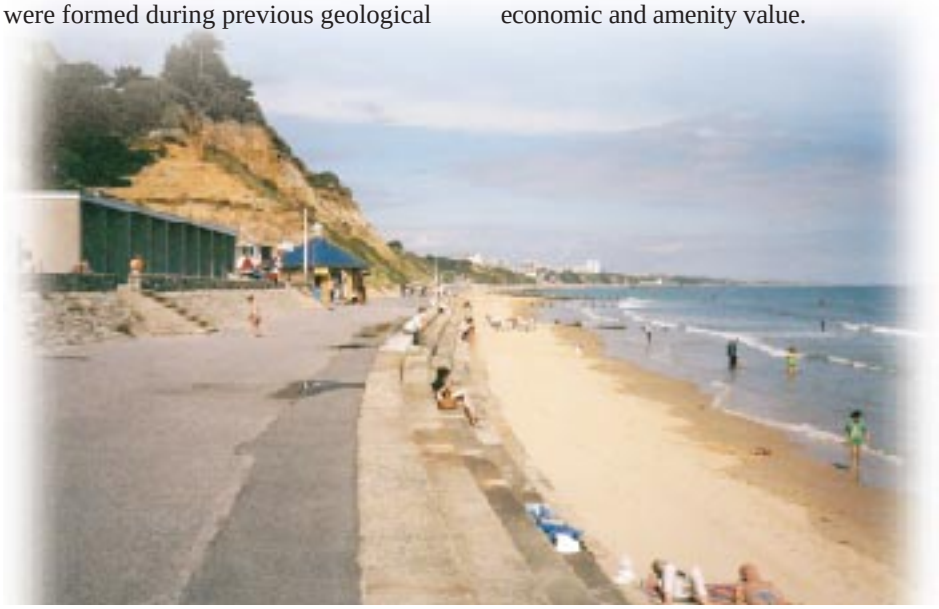
In terms of combating coastal erosion, beach recharge widens the beach between the high and low water mark and forms an effective barrier which absorbs wave energy. Experience in Holland indicates that beach recharge is cheaper than building and maintaining dykes and embankments, and may also reduce the cost of coastal defence in matters such as the maintenance of groynes. However, the cost effectiveness of beach recharge is very much a function of the length of time recharged sediment remains on the beach. The natural forces which originally denuded the beach of sediment will continue to attack the recharged beach and remove sediment. Hence, in the long term, there may be a need to maintain beaches with further recharge.

The growth of beach recharge in recent decades has gone hand in hand with the growth of coastal defences. These defences have generally taken two forms. Firstly, sea walls and revetments to protect cliffs from erosion and secondly, groynes to contain sand on beaches. These two measures have led to the disruption of long term natural systems which have normally sustained and maintained beaches. Sediment from cliff erosion, which forms one of the primary sources for beach sediment, is generally no longer available once cliffs are protected. Groynes impede and, in some cases, virtually stop the longshore drift of sediment which feeds sediment to beaches down drift.

Beach recharge is therefore a measure for redressing the natural balance by returning material to beaches from offshore sources. These offshore sources are not always the resting place of sediment lost from beaches, therefore a virtuous circle of lost sediment returned to a specific beach is not generally established. Many sources of sediment for recharge are sand banks or gravel bars which are relict features, i.e. they were formed during previous geological conditions, such as lower sea levels during and after glacial periods. However, there are some examples of linked sediment pathways between beaches and offshore sources. A recent recharge scheme at Hurst Spit in Hampshire used gravel dredged from The Shingles, a gravel bank offshore of the spit in Christchurch Bay.

Beach recharge has been common in Europe and the USA since the 1950s and with the increasing efficiency of the techniques employed, is now being practised in many other parts of the world. In the UK beach recharge schemes have grown in number since the 1960s and the demand for sand and gravel for beach recharge will continue in the future. It has been estimated that for England and Wales, demand for recharge sediment over the next 20 years will vary from about 60 to 130 million cubic metres.

Most of the material used for beach recharge in the UK comes from marine dredged sediment. Alternatives, include land based sources and secondary aggregates such as colliery spoil, china clay waste and power station ash, as well as sediment from navigation dredging at ports and harbours. These alternatives have to be assessed for environmental and aesthetic suitability. Most recharge schemes are likely to demand sediment which mirrors the original beach sediment. Hence marine dredged sand and gravel will continue as the primary source based on consideration of economic and amenity value.



Poole Bay, Bournemouth , a resort with recharged beach sand.