

Investigation Title(s):

What is the evidence of longshore drift at Porlock Bay?

Location:

Porlock Bay, North Somerset



<https://www.exmoor-nationalpark.gov.uk/learning/coastal-management-in-porlock-bay>

Target Audience:

Ideal as a GCSE investigation but could work as a more in-depth study (possibly focusing on the managed retreat management strategy) for an A level NEA.

Logistics (access, parking, toilets etc):

Public parking (pay meter) is available at Porlock Weir. There is a NT car park (charges apply) at Bossington, where a choice of footpath leads to the east and west sides of Porlock Bay. There are public toilets at both car parks and a convenience shop at Porlock Weir. Access to the beach is (east) involves part of the coastal path and steps down to the beach; to the west the footpath is flat.

Geographical Concepts Underpinning Investigation):

Longshore drift is an important process of coastal transportation. In the south west, it is predominantly responsible for moving sediment from west to east in response to the prevailing south westerly winds (and approaching waves). Under normal circumstances, it would be expected to cause a build-up of sediment (beach) at the eastern end of Porlock Bay. With increased exposure to abrasion and attrition, pebbles might be expected to become more rounded, smaller and better sorted as they are transported from west to east.

Coastal management strategies (such as groynes) deliberately interrupt longshore drift to encourage the formation of a wide beach. This acts as a buffer to the waves and helps protect the coast from erosion.

References & Web Sites:

Bishop, V and Prosser, R (2001) Landform Systems (Collins) p91

Coastal management at Porlock Bay (Exmoor National Park) (<https://www.exmoor-nationalpark.gov.uk/learning/coastal-management-in-porlock-bay>)

Reviewer:

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Data Collection Opportunities:

At Porlock Weir, the harbour breakwater provides an excellent opportunity to investigate the difference in height between the western (updrift) beach and the eastern (downdrift) beach. This can be measured using a systematic survey technique, say every 2m. Rocks embedded in the breakwater provide good evidence of the direction of longshore drift.

At Porlock Bay, there are several wooden groynes providing plenty of opportunities to make beach height comparisons. It's interesting to investigate variations in beach height along each groyne to compare the effectiveness of longshore drift at low and high tides. Measurements of beach sediment can be made at a selection of sites (ideally about 3-5 sites across the bay). This can be done using a systematic survey; measuring sediment size and angularity at 1m intervals along a 30m transect (30 pebble sample). Beach profiles can be carried out at each of the sites, using a tape measure and clinometer. Student photos should be encouraged to provide additional evidence (groynes, pebbles, beach); these can be annotated.



Safety: in common with all coastal investigations, students should not approach the sea; fieldwork should ideally be conducted on a falling tide. Students should also keep well away from the foot of cliffs (landslip hazards). Pebbles should not be thrown.

Data Presentation, Analysis, Statistical Applications:

There are many appropriate data presentation techniques. Cross profiles can be drawn to represent the beach profile data (approximate cross-sectional areas can be calculated). Sediment data can be represented using histograms (grouped data for pebble size) and pie charts or divided bar graphs (pebble angularity). Profiles can be used to show differences in beach height either side of a groyne or breakwater; the data could be represented in the form of a dispersion diagram providing opportunities for statistical analysis (median, range, etc). Consider geo-locating data sets onto a base (satellite) map of Porlock Bay.

Evaluative Issues:

Longshore drift does not always operate from west to east. During a period of strong north easterly winds, material can be moved back along the coast in a westerly direction. Storms may cause significant changes to beach profiles, disrupting the usual pattern. The accuracy of results and reliability of conclusions will be greatly affected by the quality of the data collection, for example, the sample size and the accuracy of the measurements/use of equipment.

However, most of the time, this investigation does work well, providing clear evidence of longshore drift operating from west to east at Porlock Bay.