

Coastal processes at Hook Head

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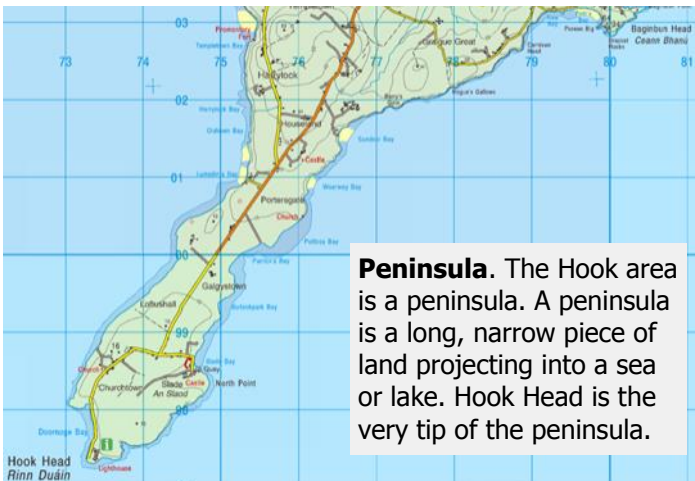
Coast. The coast is defined as the place where the land meets the sea. The **coastal zone** comprises the coast and its immediately adjoining area of land and sea.

Coastal processes. Coastal processes are all the actions and changes that take place in the coastal zone. For example, at Hook Head, the sea weathers the rocks and transports sediment, waves erode the coastline creating new landforms and changing the shape of the county.

Weathering. Weathering is the natural breakdown of the rocks that form the crust of our planet, Earth. Waves are the main agents of weathering at Hook Head.

Waves. Waves are movements in sea water. Waves get their energy from the Sun via wind. At Hook Head, waves use their energy to break up the rocks.

Refraction. The prevailing weather at Hook Head is from the south-west. The headland faces into that weather. When sea waves hit the tip of the headland, the land causes the waves to refract or bend around the headland. This change of direction focuses wave energy on the sides of the peninsula, weathering it, and making the landform long and skinny.



Fetch. Fetch is the distance that waves travel at sea before they reach the land. Waves from the south have a long fetch at Hook Head. The longer the fetch, the more energy the waves have.

Destructive waves. Destructive waves are waves that damage the coastline by causing weathering and erosion. On the other hand, constructive waves build beaches.

Fissures. Fissures are long, narrow cracks found in the rocks at Hook Head. Fissures are points of weakness in the rocks. The waves use their energy to weather the sides of the fissures and to open larger cracks in the rocks. The waves do this in four main ways.

- **hydraulic action** (the power of the water hitting the rock),
- **compressed air** (squeezing air trapped between the water and the rock),
- **abrasion** (stones bashed against the rock by the waves), and
- **solution** (seawater dissolved parts of the rock).

Caves. A cave is a large hole opened in coastal cliffs by severe weathering of a fissure. See (right) the cave attempting to open under the lighthouse at sea level.

Blow hole. A blow hole is a hole in the roof of a sea cave. When the sea rushes into the cave air compressed at the back of the cave is blown out through the blow hole often accompanied by some spray. Blow holes start small (photo) but grow in size over time.

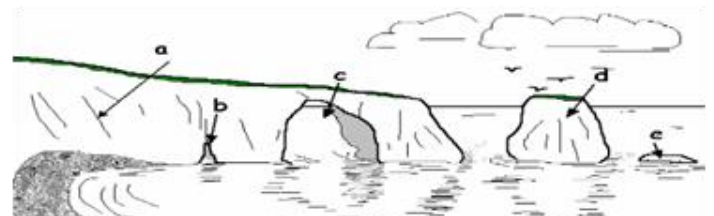


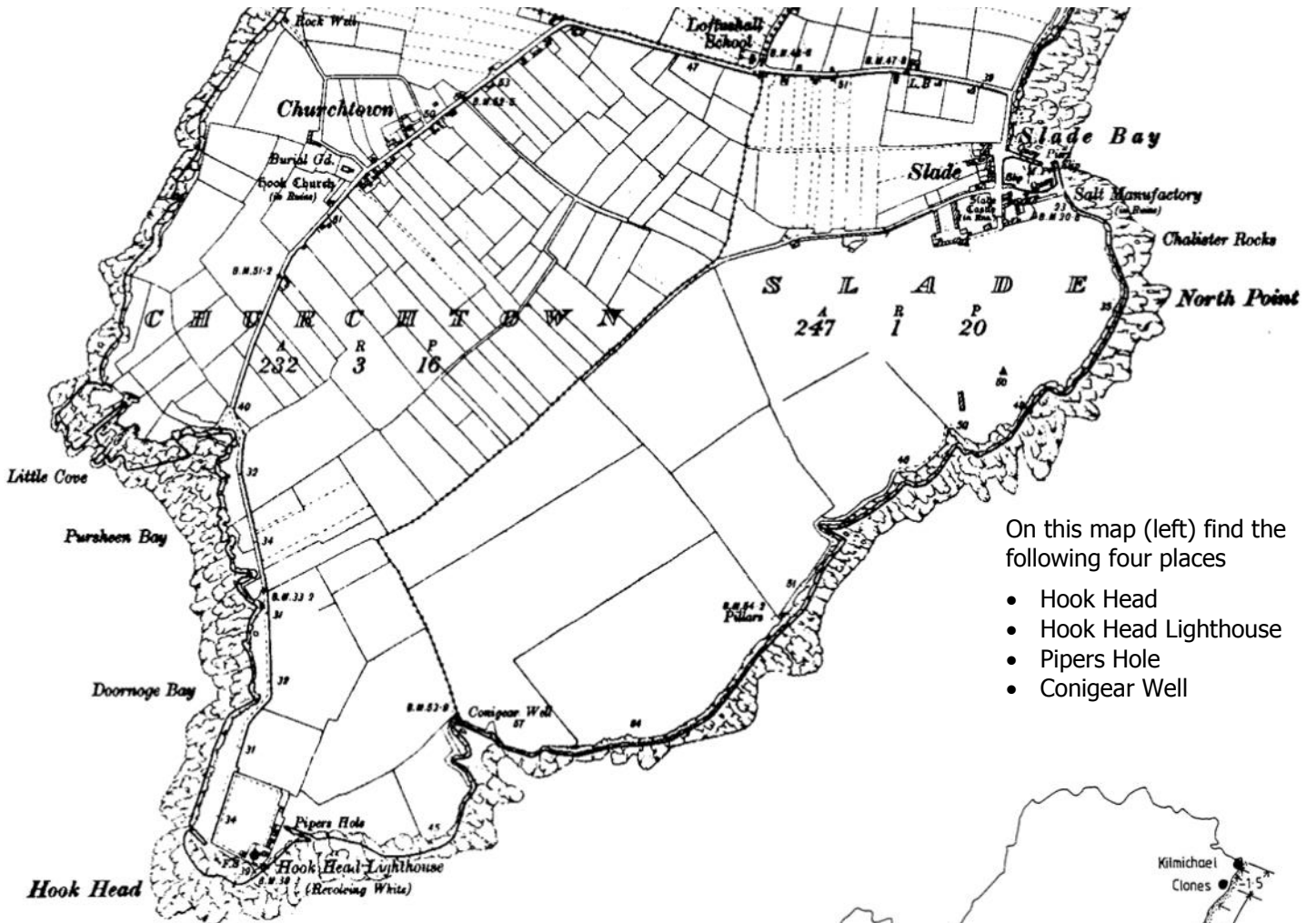
Sea arch. A sea arch is part of the roof of a sea cave that is intact. The arch is located between the sea and a blow hole and acts as a bridge of rock across the underlying sea cave.

Channels. Channels are the very deep grooves formed at Hook Head when the entire roofs of sea caves collapse. These channels are known locally as 'chans', 'guts', 'cuts' and 'holes' and many of them have names, for example, The Tower Hole, Piper's Hole (see map overleaf), Jim's Cut, Black Chan, etc. For further information and a map showing these landforms and coastal placenames see the poster compiled by Dr Billy Colfer at http://www.heritagecouncil.ie/fileadmin/user_upload/Publications/Marine/Hook_Head_Poster.pdf.

Sea stack. A sea stack is a tiny rocky island at the tip of a weathering peninsula. The stack is one stage in the following series of five events.

- a. A fissure opens in the sea cliff. The sea starts to erode the fissure and to widen it.
- b. A small cave opens as waves erode the fissure at sea level. Over time, the cave deepens and widens.
- c. The cave punches through the peninsula, or joins up with a similar cave eroding from the far side. The roof of the cave thins and may be punctured by a blow hole leaving a sea arch.
- d. As weathering continues, the roof of the cave collapses leaving the tip of the peninsula isolated as a tiny rocky island called a sea stack. There is a good example of a sea stack, a fissure and a blow hole at Conigear Well (see map overleaf).
- e. Weathering by the sea breaks down the sea stack over time eroding it to a rounded **stump** followed by a flat **wave-cut platform**.





On this map (left) find the following four places

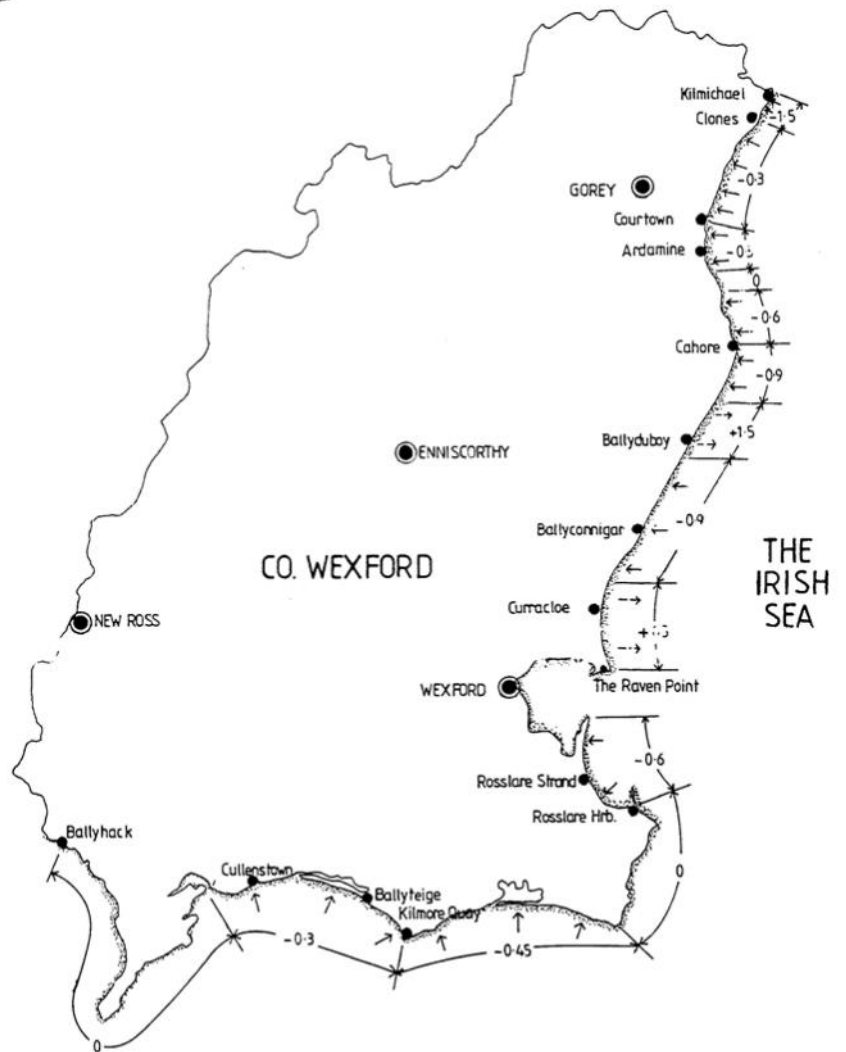
- Hook Head
- Hook Head Lighthouse
- Pipers Hole
- Conigear Well

Erosion. Erosion at Hook Head is the gradual wearing away of the rocks by the action of the sea. The material that is eroded is washed away from the cliffs and is transported offshore by the sea. Erosion differs from weathering in that erosion always involves transport of the eroded material away from the site whereas weathering does not.

Sediment. Sediment consists of particles of weathered rock. Sediments are given different names depending on the size of the particles in it, for example, mud, silt, sand, gravel, stones.

Rate of erosion. The rate of erosion is the average loss of land to the sea measured in metres per year. Since Hook Head is made of rock, the rate of erosion is so low it is rated as nil: zero metres per year (0m/y). However, much of County Wexford has a soft coastline and the rate of erosion is high.

The coastline of County Wexford is 264km in length; 211km (80%) of it is 'soft coast', and 100km of that is considered to be 'at risk' (Source: ECOPRO, 1996 based on Carter, 1988). Note that the map (right) shows that the rate of erosion in the very north of the county (Kilmichael and Clones) to be -1.5m/y , that is, the average loss of land to the sea is 1.5m of coastline each year. However, erosion seldom happens at a steady annual rate; instead, it happens in quantum leaps, major losses during significant storm events.



DYNAMICS OF THE CO. WEXFORD SHORELINE Fig.1

↑ EROSION ↓ ACCRETION (AVERAGE M/YEAR)