

Erosion of Emerging Coastlines

- In this lesson you will:
 - 1.5.1 Define the term spit. (k)
 - 1.5.2 Define the terms sea cave, sea arch, and stack. (k)
 - 1.5.3 Explain how sea caves, sea arches and stacks are formed. (a)
 - 1.5.4 Analyze the processes that result in the “straightening out” of an irregular coastline. (a)



Erosion of Submerging Coastlines

- Terms Related to Water/ Wave Erosion...
 - Hydraulic pressure: The pounding force of water/waves
 - Corrosion: Minerals such as calcium carbonate and limestone dissolve in the water
 - Abrasion: rock and sand particles suspended in the water bump, grind, scrape and gouge surfaces the water hits.

Long-shore drift terms

- Headlands
- Long-shore drift
- Wave Refraction
- Spit
- Bay Bar
- Bay Beach



Headlands

- the protrusions of land that extend the farthest out into wave action.
- The Headland of the Eastport Peninsula at Salvage



Long-shore drift

- refers to the fact that dominant waves have enough energy to carry silt/sand from headlands along the shore where it is later deposited.

Wave Refraction

- waves bending around headlands as they hit the shallow water by shore



Spit

- A ridge of sand running away from the coast, usually with a curved seaward end.
- The spit grows in the prevailing direction of long-shore drift. Ends are curved by the action of waves

Bay Bar/Bay Beach

- A **bay bar** occurs once a spit extends long enough to reach solid land further along the shoreline and cut off a section of water behind it.
- A **bay beach** is basically a bay bar that has been pushed right back to the shore.

Spit

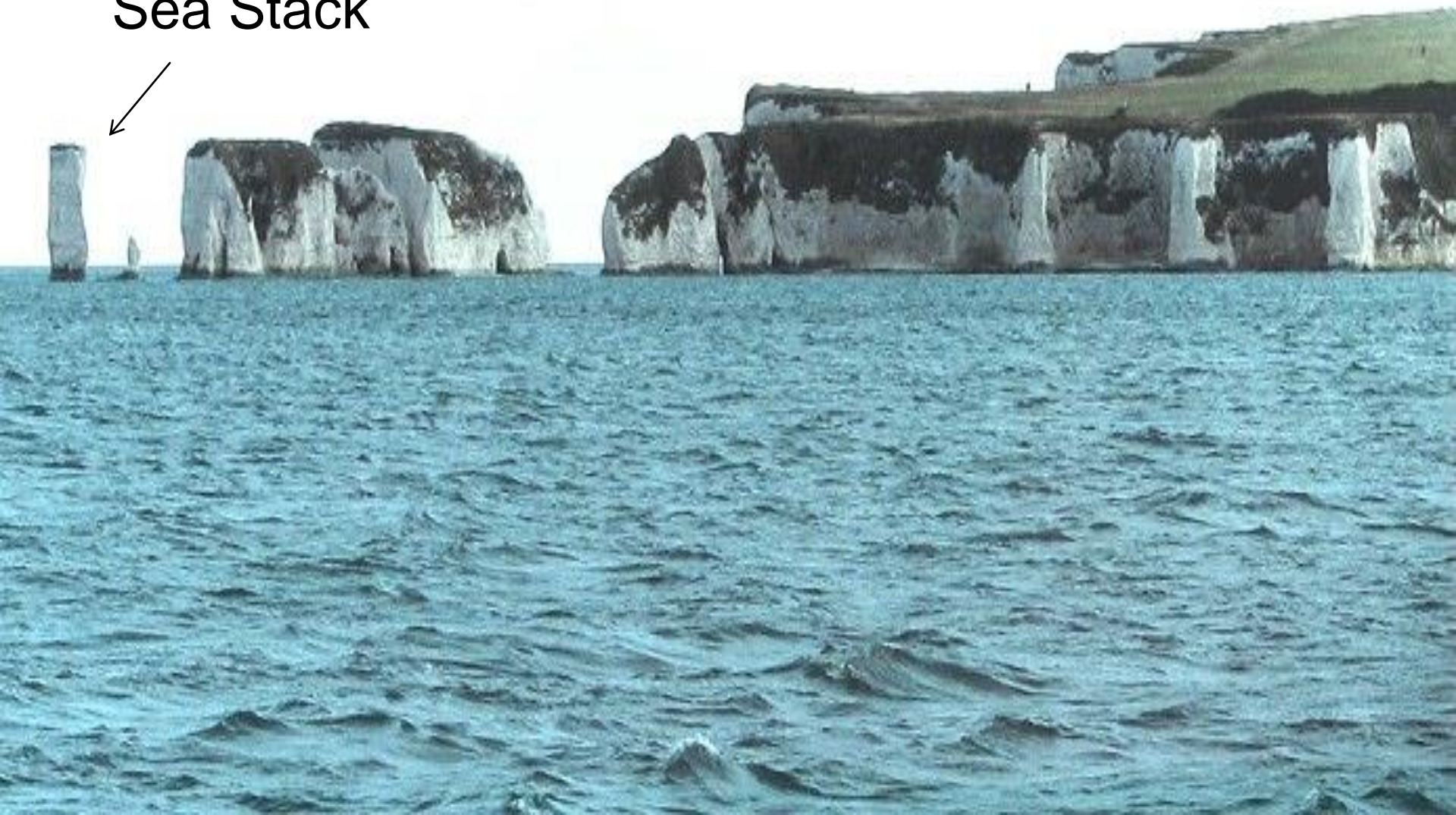




The Evolution of Sea Stacks

- **Sea stacks** are columns of land standing in the ocean just off shore.
- They are created over a long period of time after a series of other land structures have eroded away.

Sea Stack



The Evolution of Sea Stacks

- First, **sea caves** are formed in a headland.
- Continued erosion turns sea caves in to the second land feature, **sea arches**.
- Erosion and eventual collapse of the arch top leaves a **sea stack** standing

Sea Cave Formation

- 1) waves strike the headland first
- 2) waves refract around the headland and put hydraulic pressure on both sides of the headland
- 3) erosion of the weak portions create caves and blow holes in the sides of the headland.

Sea Cave





Sea Arch

Sea Arch Formation

- Eventually sea caves, on opposite sides of the headland, get eroded deeper until they connect inside the headland forming a complete passage way/tunnel or “arch” through the head land.

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Sandstone cliffs near Cavendish, Prince Edward Island. Photographer: Grant, Douglas. Reproduced with the permission of the Minister of Public Works and Government Services Canada, 2002 and Courtesy of Natural Resources Canada, Geological Survey of Canada, photo #2002-182 - <http://www.nrcan.gc.ca/ess/esic/>

Sea Arches



Sea Stack Formation

- Continuous erosion, of sea arches, causes the collapse of the ground over the arch;
- This leaves a pillar or column or stack of land standing alone where the headland was.











Straightening of Emerging Coastlines

- **emerging coastlines (those that rise up from below sea level, such as cliffs or headlands)** straighten in much the same fashion as submerging coastlines
- erosion of headlands creates sea caves, sea arches and sea stacks instead of bay beaches, spits and bay bars;
- however the result is similar in that headlands are reduced in size which straightens the coastline.
Compare the headland length in figure 3.11 before and after erosion.