

WHAT ARE COASTS USED FOR?

Coasts are important for many different reasons and for different groups of people. They provide:

- places to live
- places to work, e.g. fishing, ports and power stations
- places to relax - leisure and tourism industries
- wildlife habitats
- beautiful scenery
- educational value, e.g. geology and natural history



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Coasts

DEFINITION

The coast is the zone between land and sea. The action of the waves and the sea constantly changes the shape and form of the coast, and people manage these changes in different ways.

TYPES OF EROSION

- **Hydraulic action** - this is the sheer power of the waves as they smash against the cliff.
- **Abrasion** - this is when pebbles grind along a rock platform, much like sandpaper.
- **Attrition** - this is when rocks that the sea is carrying knock against each other.
- **Solution** - this is when sea water dissolves certain types of rocks.



HEADLAND EROSION

Headlands can be vulnerable to erosion because they stand out from the rest of the coast. Over time, other features may develop on a headland:

CAVE, ARCH, STACK AND STUMP



1. Waves cause weaknesses to form cracks at the base of the headland



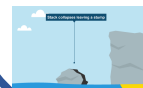
2. Over time the cracks become larger to form a cave



3. The cave gets bigger and cracks appear above the cave to the top of the headland



4. The arch grows larger and eventually collapses leaving a stack separated from the mainland



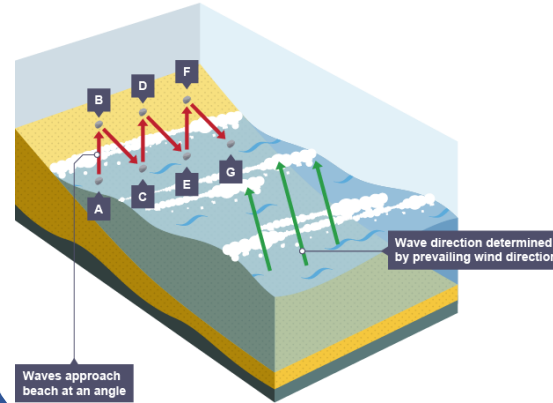
5. The stack erodes and becomes a stump

WAVE CUT PLATFORMS

1. Waves attack the bottom of the cliff, particularly during storms and at high tide.
2. Eventually a wave-cut notch is formed.
3. At the same time weathering attacks and weakens the top of the cliff.
4. The weakened cliff is left unsupported and eventually collapses.
5. Once the sea has removed the fallen rocks it can start the process again.
6. The cliff will move back and leave a rocky platform at the base called a wave-cut platform.

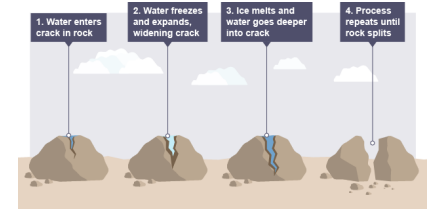
LONGSHORE DRIFT

Sediment is carried by the waves along the coastline. The movement of the material is known as longshore drift. Waves approach the coast at an angle because of the direction of prevailing wind. The swash will carry the material towards the beach at an angle. The backwash then flows back to the sea, down the slope of the beach. The process repeats itself along the coast in the zigzag movement.

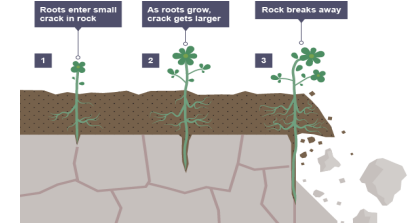


WEATHERING

FREEZE-THAW WEATHERING



BIOLOGICAL WEATHERING



CHEMICAL WEATHERING

Rainwater and seawater can be a weak acid. If a coastline is made up of rocks such as limestone or chalk, over time they can become dissolved by the acid in the water.

KEYWORDS

MANAGING COASTS

It is not possible to completely stop the power of natural forces from changing the coast. People try to protect some areas from erosion but this can have negative impacts as well as positive.




The way the coast is managed can cause conflict. There are two types of coastal management:

- **HARD ENGINEERING** - this involves building structures to protect the coast.
- **SOFT ENGINEERING** - this involves working with nature by using natural materials or allowing nature to take back areas.



HARD ENGINEERING



Defence type	Advantages	Disadvantages
 Sea wall	<ul style="list-style-type: none"> • Protects the area behind the wall • Helps prevent flooding 	<ul style="list-style-type: none"> • Very expensive • Waves bounce off the wall and scour the beach, removing material • Can look ugly
 Groynes	<ul style="list-style-type: none"> • Helps to stop longshore drift moving material along the coast • Traps sediment and builds up beaches 	<ul style="list-style-type: none"> • May create problems elsewhere because they starve other beaches of sediment
 Rip rap or rock armour	<ul style="list-style-type: none"> • Large boulders absorb wave energy and reduce the power of the waves 	<ul style="list-style-type: none"> • Strong waves can move or undermine the boulders • Can look ugly

SOFT ENGINEERING



Management type	Advantages	Disadvantages
 Beach nourishment	<ul style="list-style-type: none"> • Adding more sand or shingle widens the beach and waves lose power travelling across it • Looks natural 	<ul style="list-style-type: none"> • Doesn't last very long
 Managed retreat	<ul style="list-style-type: none"> • Land becomes marsh, slowing waves and reducing erosion • Creates new habitats 	<ul style="list-style-type: none"> • Land is lost

HOLDERNESS COAST

The Holderness coastline is located on the east coast of England. It is the fastest eroding coastline in Europe.

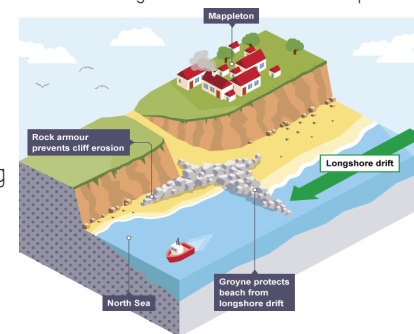
REASONS FOR MANAGEMENT

The coastline is rapidly eroding at an average of 1.8 metres a year. There are several reasons why the coast at Holderness is eroding so quickly:

- **ROCK TYPE** - the cliffs are made from less-resistant boulder clay (made from sands and clays) which slumps when wet.
- **NATURALLY NARROW BEACHES** - these beaches give less protection to the coast as it doesn't reduce the power of the waves.
- **MAN-MADE STRUCTURES** - groynes have been installed to stop long-shore drift. This narrows unprotected beaches elsewhere even more.
- **POWERFUL WAVES** - waves at Holderness travel long distances over the North Sea (so have a long fetch) which means they will increase in energy.

MANAGEMENT STRATEGIES

- Bridlington is protected by a 4.7 km long sea wall.
- Hornsea is protected by a sea wall, groynes and rock armour.
- Coastal management at Withersea has tried to make the beach wider by using groynes, and also uses a seawall to protect the coast.
- Mableton is protected by rock groynes.
- Spurn Head is protected with groynes and rock armour.



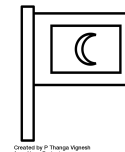
CONFLICTS

- There has been an increase in erosion at Great Cowden because of the groynes used in Mableton. This has led to farms being destroyed by the erosion and the loss of 100 chalets at the Golden Sands Holiday Park.
- Some people disagree with where the sea defences are located, especially if it means the land in their community is not protected.
- Some sea defences negatively impact tourism and reduce the amount of money coming in to the area.

MALDIVES

Rising sea levels pose a huge risk for many communities all over the world. Some are fighting a losing battle. The Maldives is a country made up of over 1,000 low-lying islands, and land below sea level totals 80 per cent. The people of the Maldives are very concerned about coastal erosion and flooding. They believe that this is being made worse by rising sea levels caused by climate change.

- Problems caused by coastal flooding in the Maldives:
- houses destroyed
- land lost
- fishing industry affected
- tourism affected
- fresh water supplies polluted



Coastal defences can be very expensive for some places to build and maintain. They may also look ugly and deter tourists from visiting.