**COASTAL PROTECTION**

**BY**

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**TO**

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1. What strategies can be used to reduce the effects of coastal erosion.

**Answer**

Strategies used to reduce the effect of coastal erosion include:

1. **Hard structural/engineering** options use structures constructed on the beach (seawalls, groins, breakwaters/artificial headlands) or further offshore (offshore breakwaters). These options influence coastal processes to stop or reduce the rate of coastal erosion.

**Groins:** These are long, wall-like structures that are built on beaches and extend into the ocean perpendicular to the shoreline. The idea behind groins is that they act as a barrier to longshore currents. This allows them to control and modify the movement of sand. As the longshore current hits the groin, it loses velocity and dumps sand and sediment on the up current side of the wall. While this catches sand on the up current side of the wall, it leads to more erosion on the down current side of the wall, where the waves once again pick up sand and sediment.

**Breakwaters:** These are barriers that are constructed offshore parallel to or at an angle to the shoreline. Breakwaters act as a wave barrier, allowing the beach to grow while preventing harmful erosion. As waves hit the breakwater, they deposit their load of sediment along it. However, any part of the coast not protected by the breakwater continues to experience erosion.

**Jetties:** This solution involves constructing a line (2 or more depending on the number of channels) of long structures perpendicular to the coast that reach into the ocean. These are usually made from stone, concrete, steel, or timber, and are designed to keep sand from entering a ship channel. As sand builds up on against the up current side of the jetties, it can be redistributed along the beach to further reduce erosion.

 **Seawalls:** Seawalls are one particularly effective way to prevent erosion. These are structures that are built along the coastline to stop waves from ever coming into contact with the sand/shore on the opposite side. While seawalls tend to be quite effective at preventing erosion, they are only able to protect the coast that they are installed along.

1. **Nonstructural methods include**

**Beach Nourishment:** This is a soft solution (one that does not require a hard structure) that involves depositing sand on the beach in order to artificially widen it. Although this solution can be effective, it is costly and temporary.

**Vegetation:** Strategic planting of vegetation can be used to help control erosion. the roots of coastal plants help to anchor the sand and ensure that it is not carried off in erosion. This is why many areas plant seagrass and build marshes along coasts to prevent erosion. However, this solution means that the beach may not be as functional as it once was, particularly if it is a tourist area.

1. Describe how coastlines can be protected from coastal erosion.

**Answer**

**Hard-erosion control methods** provide a more permanent solution than soft-erosion control methods. [Seawalls](https://en.wikipedia.org/wiki/Seawall) and [groins](https://en.wikipedia.org/wiki/Groynes) serve as semi-permanent infrastructure. These structures are not immune from normal wear-and-tear and will have to be refurbished or rebuilt. It is estimated the average life span of a seawall is 50–100 years and the average for a groin is 30–40 years. Because of their relative permanence, it is assumed that these structures can be a final solution to erosion. Seawalls can also deprive public access to the beach and drastically alter the natural state of the beach. Groins also drastically alter the natural state of the beach. Some claim that groins could reduce the interval between beach nourishment projects though they are not seen as a solution to beach nourishment. Other criticisms of seawalls are that they can be expensive, difficult to maintain, and can sometimes cause further damage to the beach if built improperly.

Natural forms of hard-erosion control include planting or maintaining native vegetation, such as [mangrove](https://en.wikipedia.org/wiki/Mangrove) forests and [coral](https://en.wikipedia.org/wiki/Coral) reefs.

**Soft erosion strategies** refer to temporary options of slowing the effects of erosion. These options, including [Sandbag](https://en.wikipedia.org/wiki/Sandbags) and [beach nourishment](https://en.wikipedia.org/wiki/Beach_nourishment), are not intended to be long term solutions or permanent solutions. Another method, beach scraping or beach bulldozing allows for the creation of an artificial dune in front of a building or as means of preserving a building foundation.

**Relocation:** Relocation of infrastructure any housing farther away from the coast is also an option. The natural processes of both absolute and relative sea level rise and erosion are considered in rebuilding. Depending on factors such as the severity of the erosion, as well as the natural landscape of the property, relocation could simply mean moving inland by a short distance or relocation can be to completely remove improvements from an area. Typically, there has been low public support for “retreating.

1. Suggest why some coastal areas need protecting from the impacts of coastal erosion.

**Answer**

Coastal zones occupy less than 15% of the Earth's land area, while they host more than 45% of the world population. Nearly 1.4 billion people live within 100 km of a shoreline and 100 m of sea level, with an average density 3 times higher than the global average for population.  Coastal zones contain rich resources to produce goods and services and are home to most commercial and industrial activities.

The reason for coastal management is obvious, to protect homes and businesses from being damaged and even destroyed by coastal erosion or flooding. Failure to do so can have severe economic and social effects, especially along coastlines which are used for tourism and industry.