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CHAPTER: BEACH AND SHORELINE

MEAK1063: Water Quality Assessment and Management

Master Eng. (Environmental Management)

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TOPIC: BEACH AND SHORELINE

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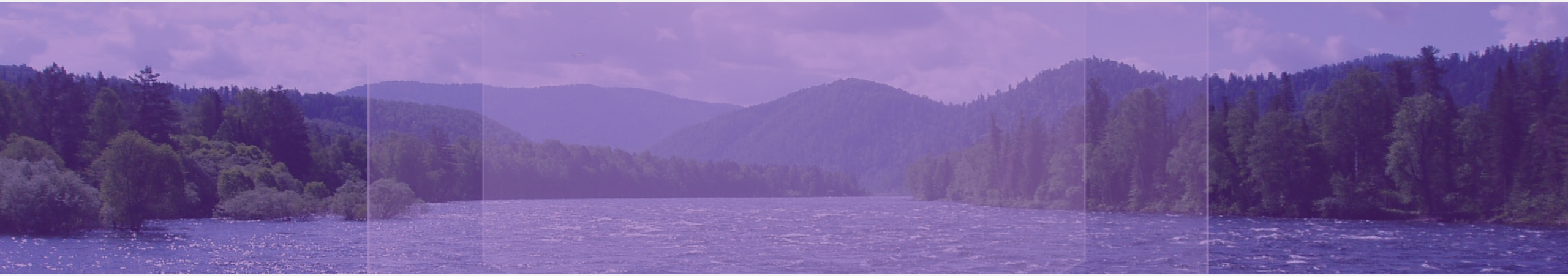

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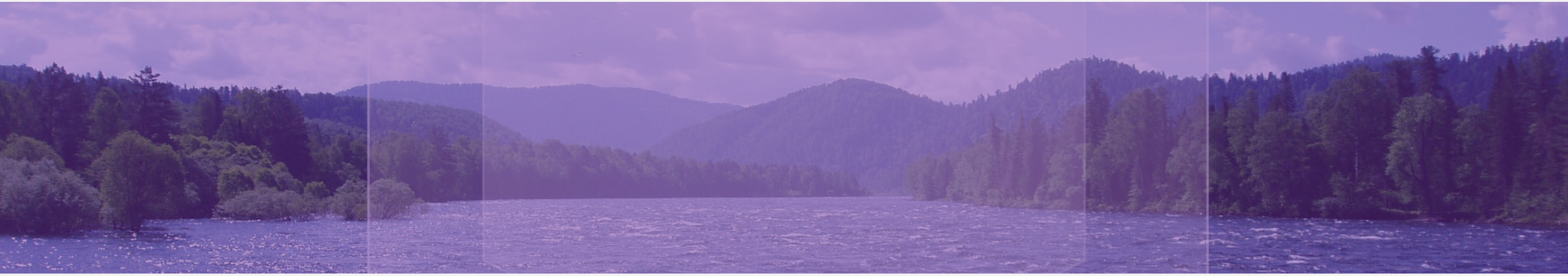

INTRODUCTION

- BEACHES are deposition of landforms, and are the result of wave action by which waves or currents move sand or other loose sediments of which the beach is made as these particles are held in suspension.
- Alternatively, sand may be moved by siltation (a bouncing movement of large particles).
- Beach materials come from erosion of rocks offshore, headland erosion and slumping producing deposits of scree (broken rock that appears at the bottom of crags, mountain cliffs or valley shoulders).
- The shape of a beach depends on whether the waves are constructive or destructive. Constructive waves move material up the beach while destructive waves move the material down the beach.

Refer Youtube video

https://www.youtube.com/watch?v=4RiHd4c1F8c

Farewell Spit is a spectacular coastal feature that extends for 25 kilometres into the sea at the northern tip of the South Island. This image shows clearly the power of the ocean currents that have washed sediment north and eastwards from the West Coast. Image: GNS Science, Lloyd Homer.

SHORELINES

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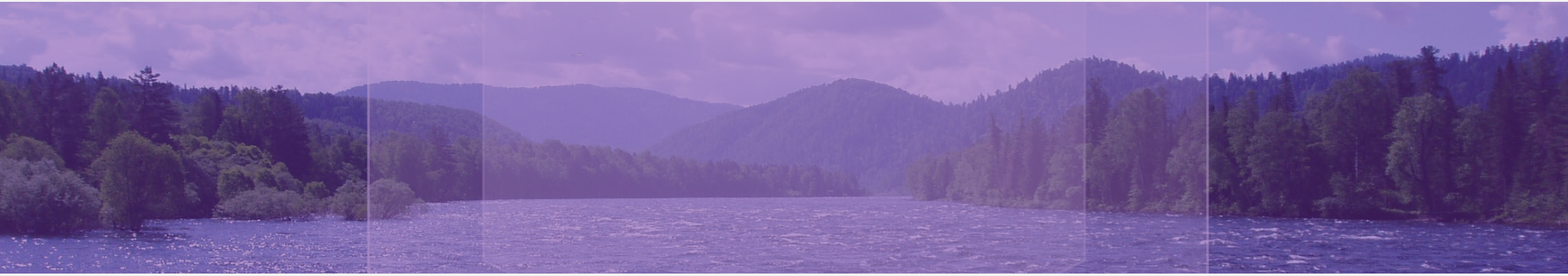

SAND MOVEMENT

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SAND MOVEMENT

Waves and wind are constantly altering beaches and shorelines. The action of tidal currents and waves striking a shoreline at an angle slowly moves sand and other materials along the shore.

This littoral drift as it is called, resupplies eroding beaches with sand transported from offshore or other points along the coasts.

Erosion and movement of sand above the shoreline is reduced by vegetation, which traps and anchors the sand against natural forces.

Manmade erosion results from sand extraction from river mouths and beaches, removal of mangrove, and infrastructure construction.

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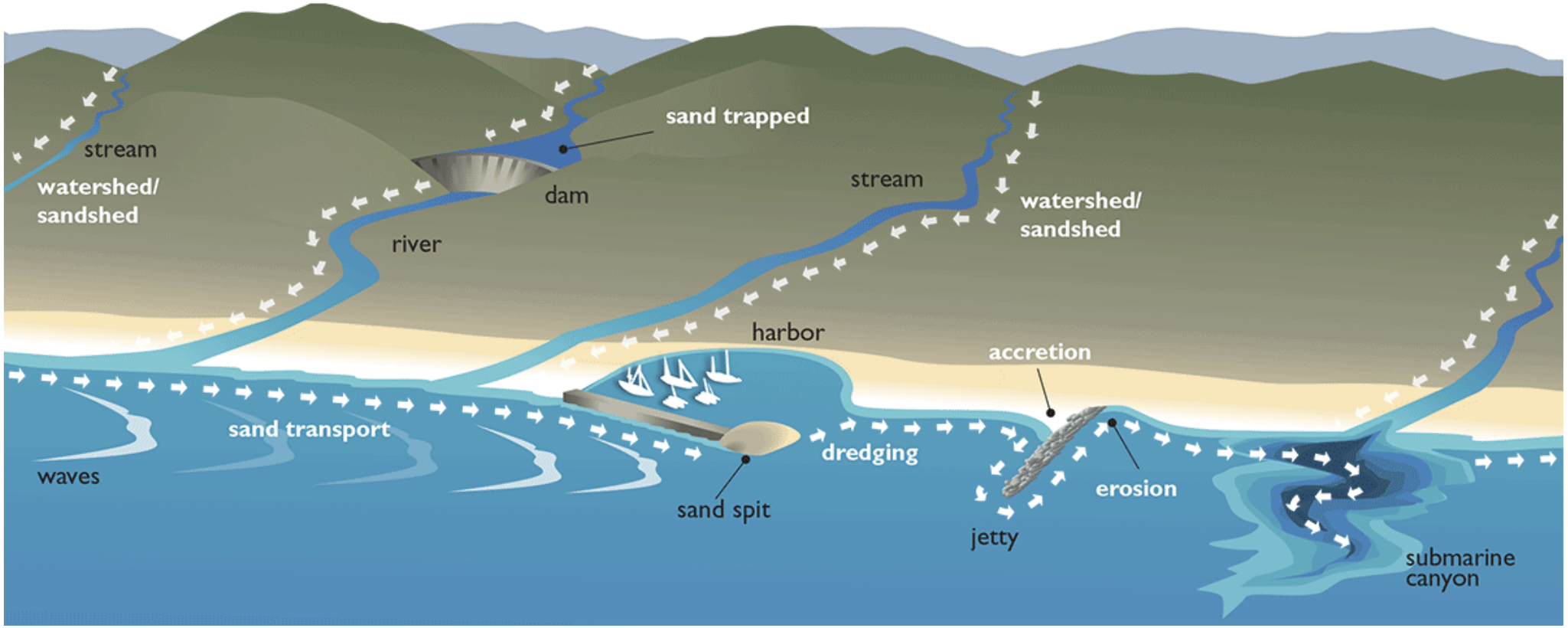
SAND MOVEMENT



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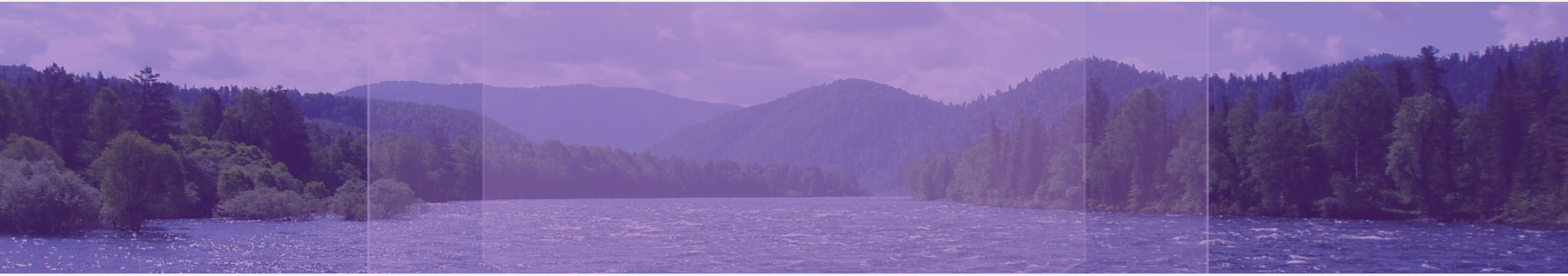

SALINITY AND WATER QUALITY

SALINITY AND WATER QUALITY

- Shore lands exert an important influence on the natural systems of the coastline.
- The amount and quality of fresh water draining from shore lands into estuaries determines the salinity and water quality of all coastal waters.
- The salinity in turn helps determine the animal and plant species in the estuaries.
- Many animals need the lowered salinity in estuaries for breeding, as nursery areas and for protection from predators.

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SALINITY AND WATER QUALITY

- The influx of nutrients from inland areas to the coast makes estuaries highly productive areas for fisheries.
- Nutrients can accumulate in waters naturally and increase aquatic plant growth. However, human activities can accelerate this process, and create excessive nutrient loads (eutrophication) in lakes, rivers, harbours and estuaries.
- Nutrients from human activities include sewage effluent, urban stormwater, artificial fertiliser run off, sediment, stock (manure, nutrients leached from soil and aquaculture.
- An increase in nutrients (nitrogen and phosphorus) results in an increase in the growth of algae.

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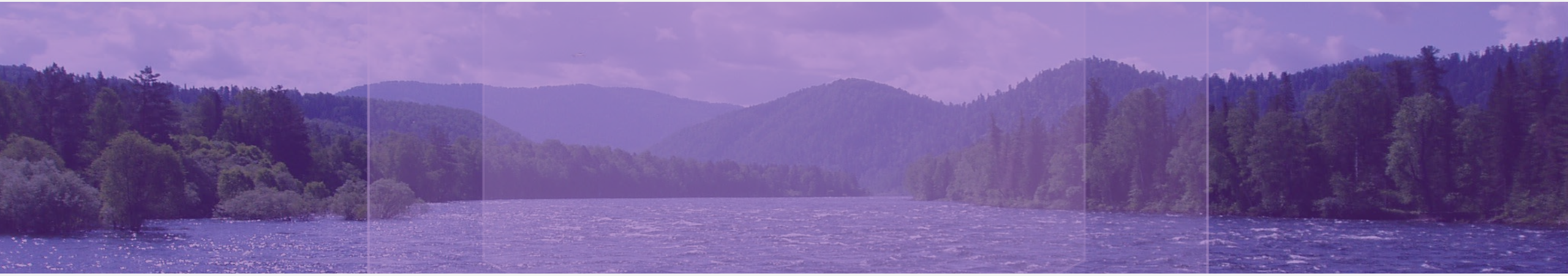

EFFECT FROM HUMAN ACTIVITIES

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EFFECT FROM HUMAN ACTIVITIES

Shores are influenced by the topography of the surrounding landscape, as well as by water induced erosion, such as waves.

Loss of vegetation will increase erosion. Sandy shoreline is an unstable environment which exposes plants and animals to harsh conditions.

Sea turtles also lay their eggs on ocean beaches. Seagrasses and other beach plants grow on **undisturbed areas** of the beach and dunes.

Development of such areas should be approached with great care.

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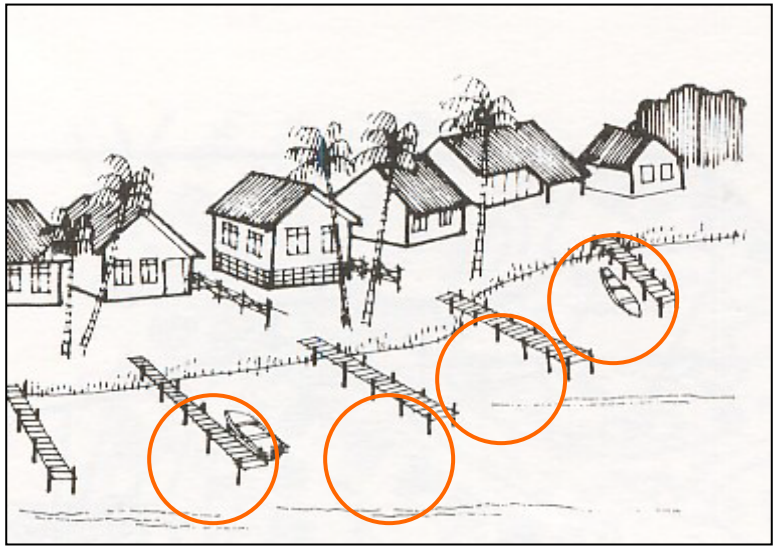
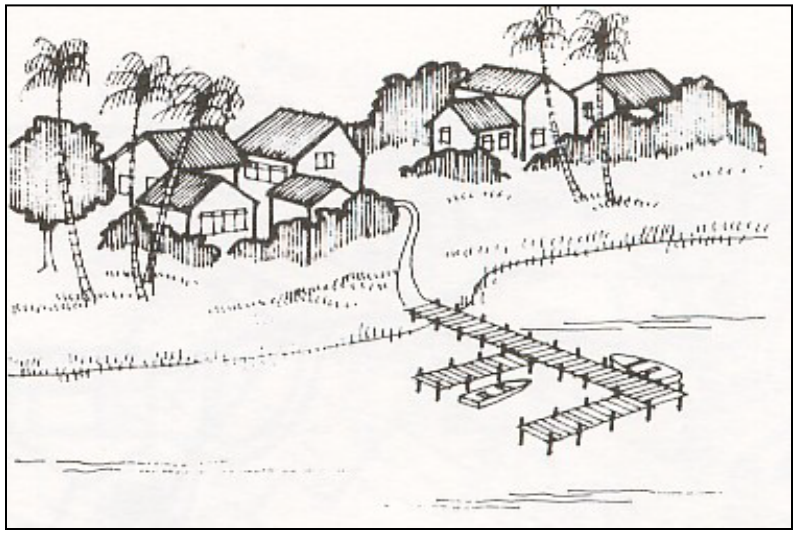
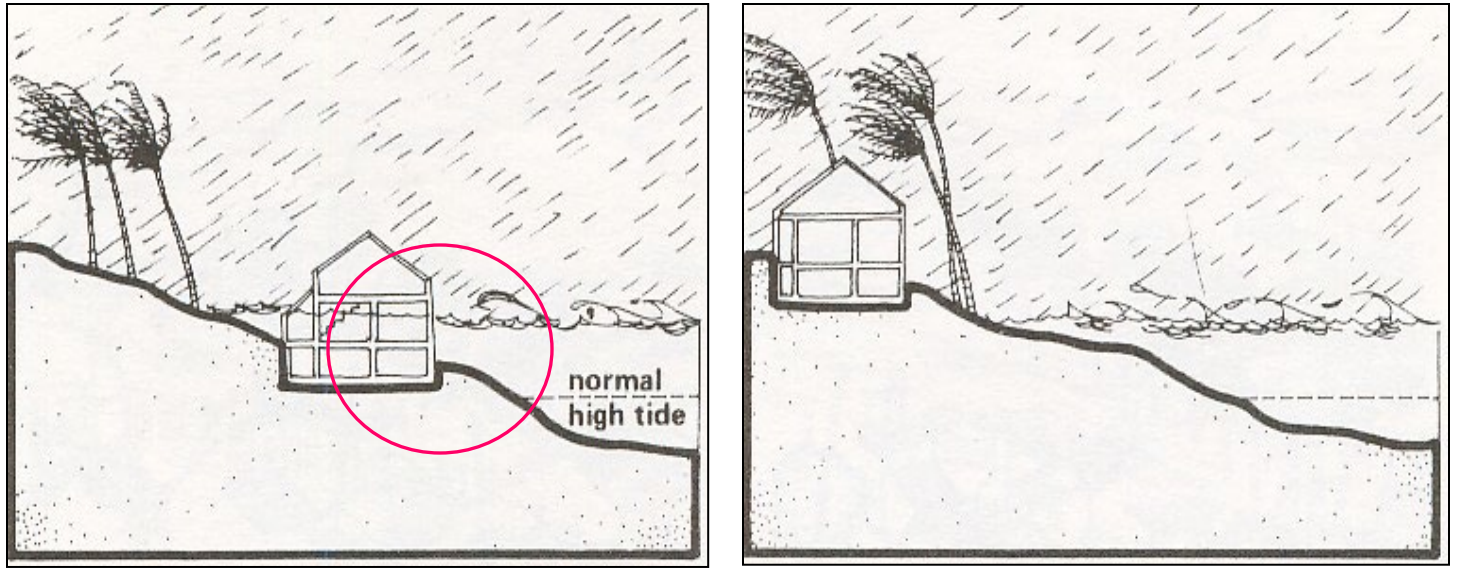




EFFECT FROM HUMAN ACTIVITIES

- Coasts are popular destinations because of recreational activities such as swimming, fishing, surfing, boating, and sunbathing. The natural **quality and attractiveness** of a lakefront or coastline can be destroyed by improper development.
- Heavy development of the immediate waterfront causes **loss to most vegetation and increases danger of pollution** from septic systems.
- Houses should be **set back and clustered**, with common docks and access points instead of unsightly piers.

Low Lying Areas Bordering Estuaries and Coastlines



Low-lying areas bordering estuaries and the coastline may be prone to periodic flooding and storm damage. Development of these areas should be limited to water-related activities such as recreation; other development should be carefully planned and regulated.

Low Lying Areas Bordering Estuaries and Coastlines

- Tides cause changes in the depth of the sea, producing oscillating currents (tidal streams) making prediction of tides important for coastal navigation.
- The strip of seashore that is submerged at high tide and exposed at low tide (intertidal zone-an important ecological product of ocean tides).
- Coastal erosion - result in coastal accretion at other nearby locations (coastal sediment returning to the visible portion of a beach or foreshore following a submersion event.
- A sustainable beach or foreshore often goes through a cycle of submersion during rough weather then accretion during calmer periods.

Assignment 1: Group Assignment Total Marks: 20

Topic: Sensitive Areas in Malaysia based on your lectures

Each group: Choose one area (cannot be the same)

Report: 10 pages (with references)

Slides: Powerpoint Minimum 20 slides

Submit via : elearning (only one group member need to submit)

Assignment 2: Individual
Total marks: 5

Question:

Are beaches and shorelines in peril because of human activities that include development in the areas?

Discuss your findings in a report and include a case study (area affected).

Format: 3 pages report including pictures and reference

Submit via email: elearning

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