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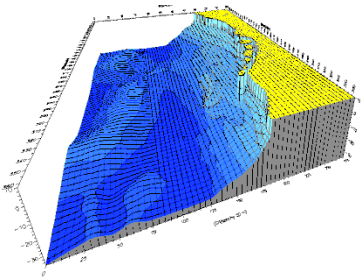
Coastal Classification, Hydrodynamics & Erosion

Course Learning Outcomes



CLO1 **Assess the influencing environmental factors and related coastal processes, and analyze causes of coastal erosion/sedimentation**

CLO2 Develop skills and knowledge for the planning and management of coastal zone in respecting the principles of sustainability

CLO3 Evaluate application of different coastal stabilization schemes and the governing factors for their selection and impacts

PO1 Acquire and apply engineering fundamentals to complex civil engineering problems

PO2 Identify, formulate and solve complex civil engineering problems using creativity and innovativeness

Lesson Outcomes

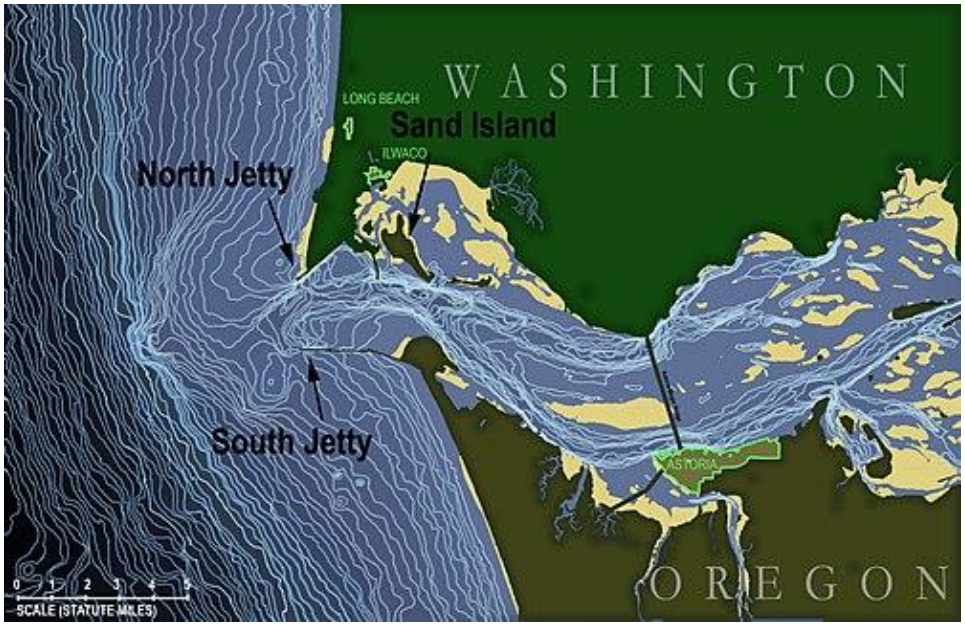
At the end of this session, students will be able to

- explain the coastal features
- predict the change of landform near the coastal features under the influence of various nearshore hydrodynamic regimes

Coastal Feature Classification

- River mouth
- Estuary
- Headlands
- Spit
- Barrier island
- Bathymetry high
- Hook-shape bay
- Tombolo

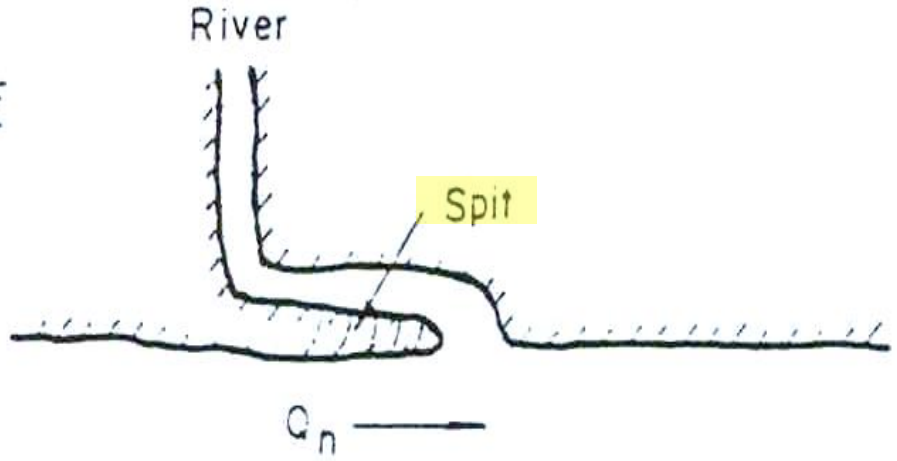
River Mouth



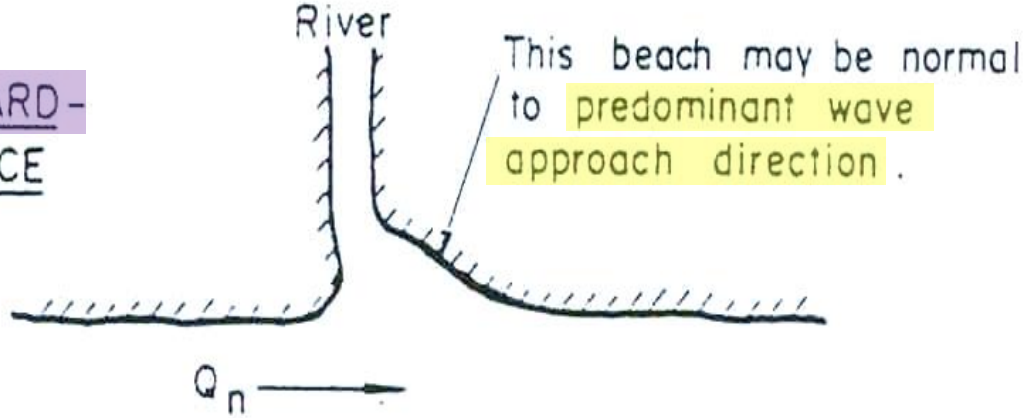
A **river mouth** is the part of a river where the river debounces into another river, a lake, a reservoir or an ocean.

River Mouth

(a) DOWNDRIFT OFF SET OF RIVER ENTRANCE



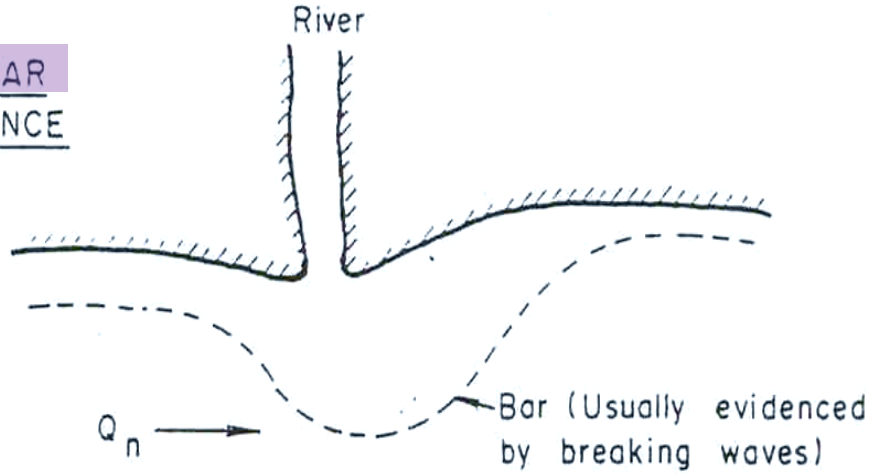
(b) ASYMMETRY OF LANDWARD-FLARED RIVER ENTRANCE



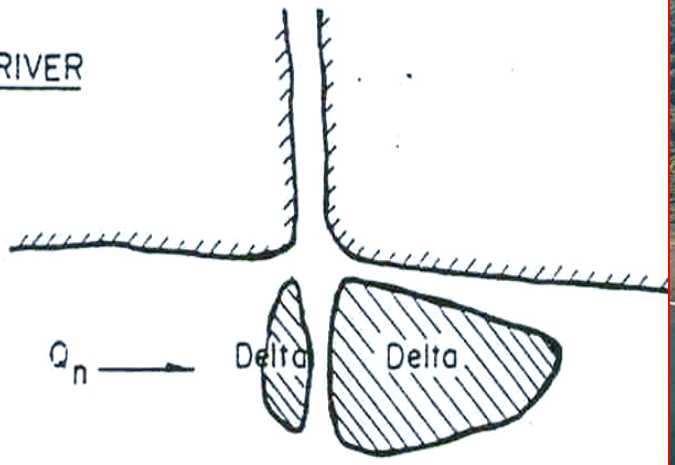
Evidences that may be used to infer NET Longshore Sediment Transport

River Mouth

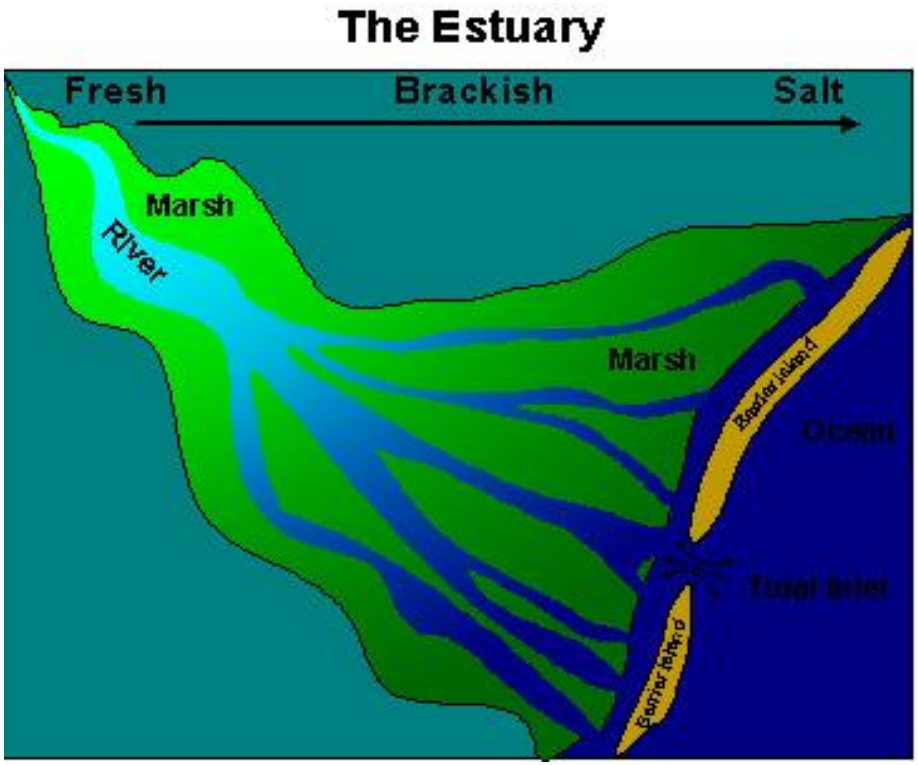
(c) ASYMMETRY OF BAR AT RIVER ENTRANCE



(d) ASYMMETRICAL RIVER DELTA



Estuary



An estuary is an area where a freshwater river or stream meets the ocean. When freshwater and seawater combine, the water becomes brackish, or slightly salty.

Sand Spit & Barrier Island

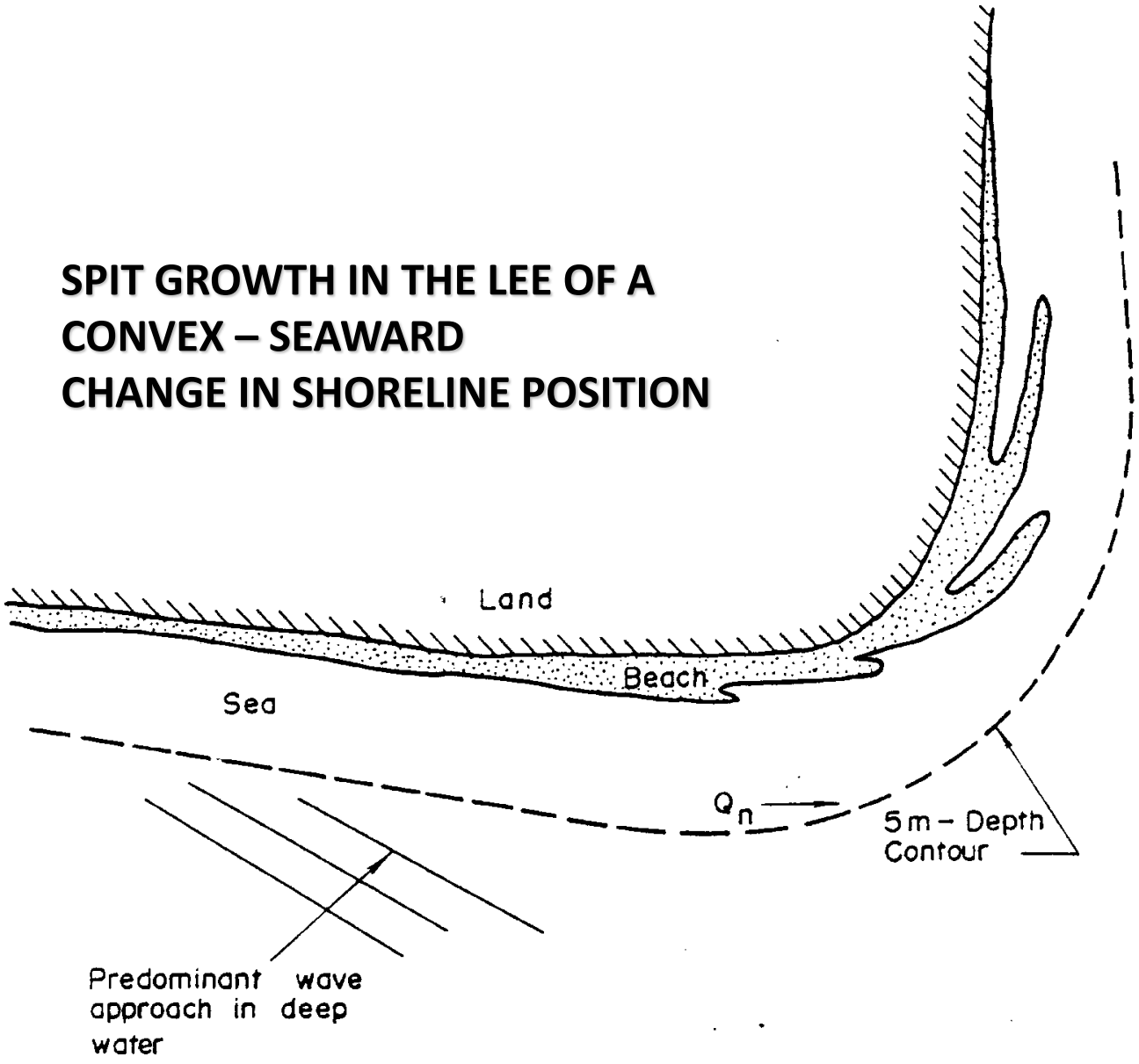
Sand spits often have a curved or hooked end. The **spit** creates an area of calmer water, sheltered by the **spit**.

Sand Spit & Barrier Island

Barrier islands are coastal landforms and a type of dune system that are exceptionally flat or lumpy areas of sand that form by wave and tidal action parallel to the mainland coast.

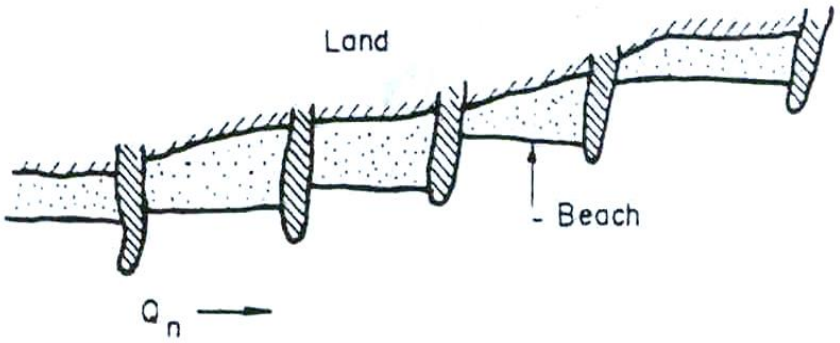
Spit Growth

SPIT GROWTH IN THE LEE OF A CONVEX – SEAWARD CHANGE IN SHORELINE POSITION

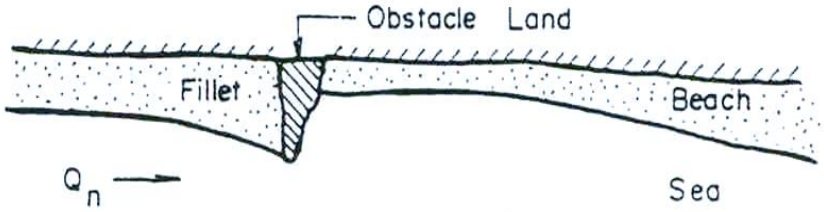


Headland & Groynes

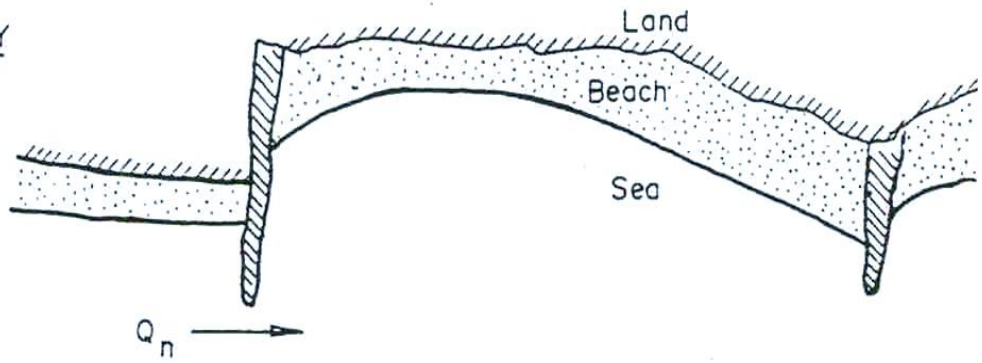
(a) UPDRIFT OFFSETS



(b) FILLET AGAINST OBSTACLE

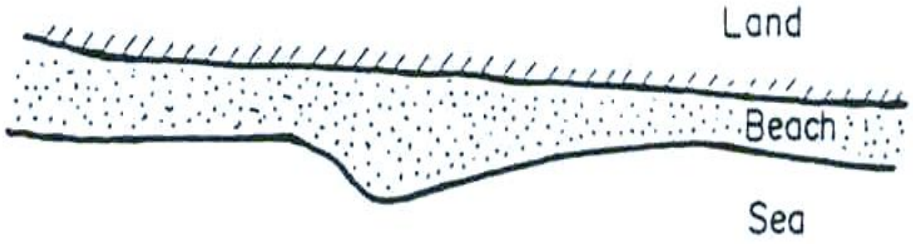


(c) HOOK - SHAPED BAY

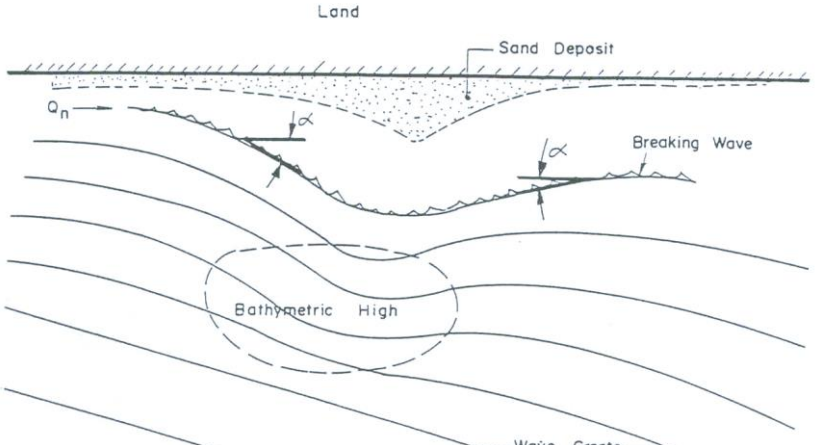


Bathymetric High

(d) ASYMMETRICAL AND OFFSET PROTRUSION LANDWARD OF BATHYMETRIC HIGH



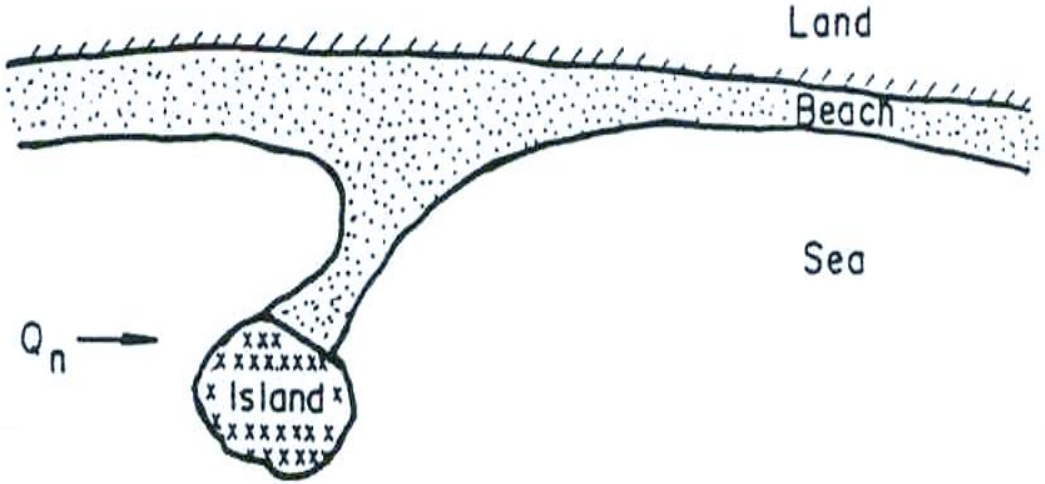
An area on the ocean floor that has locally **higher** topography than the surrounding region

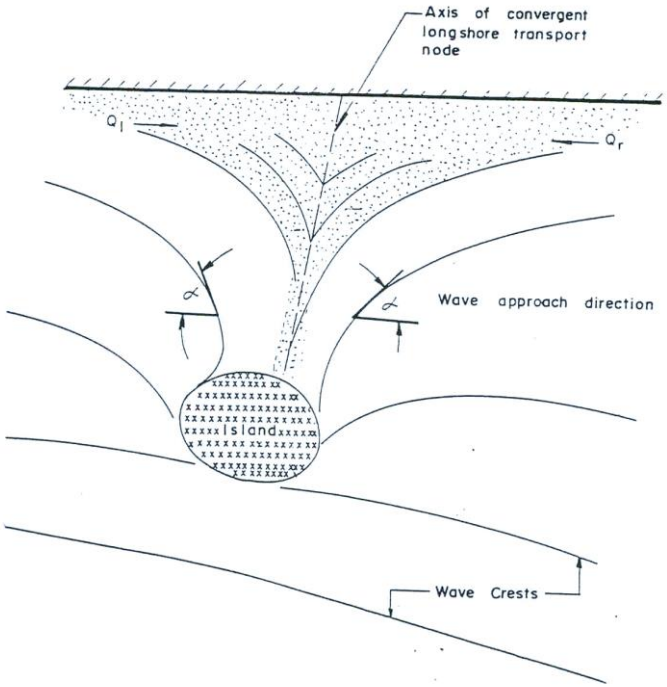


Sand Deposition Landward of a Bathymetry High

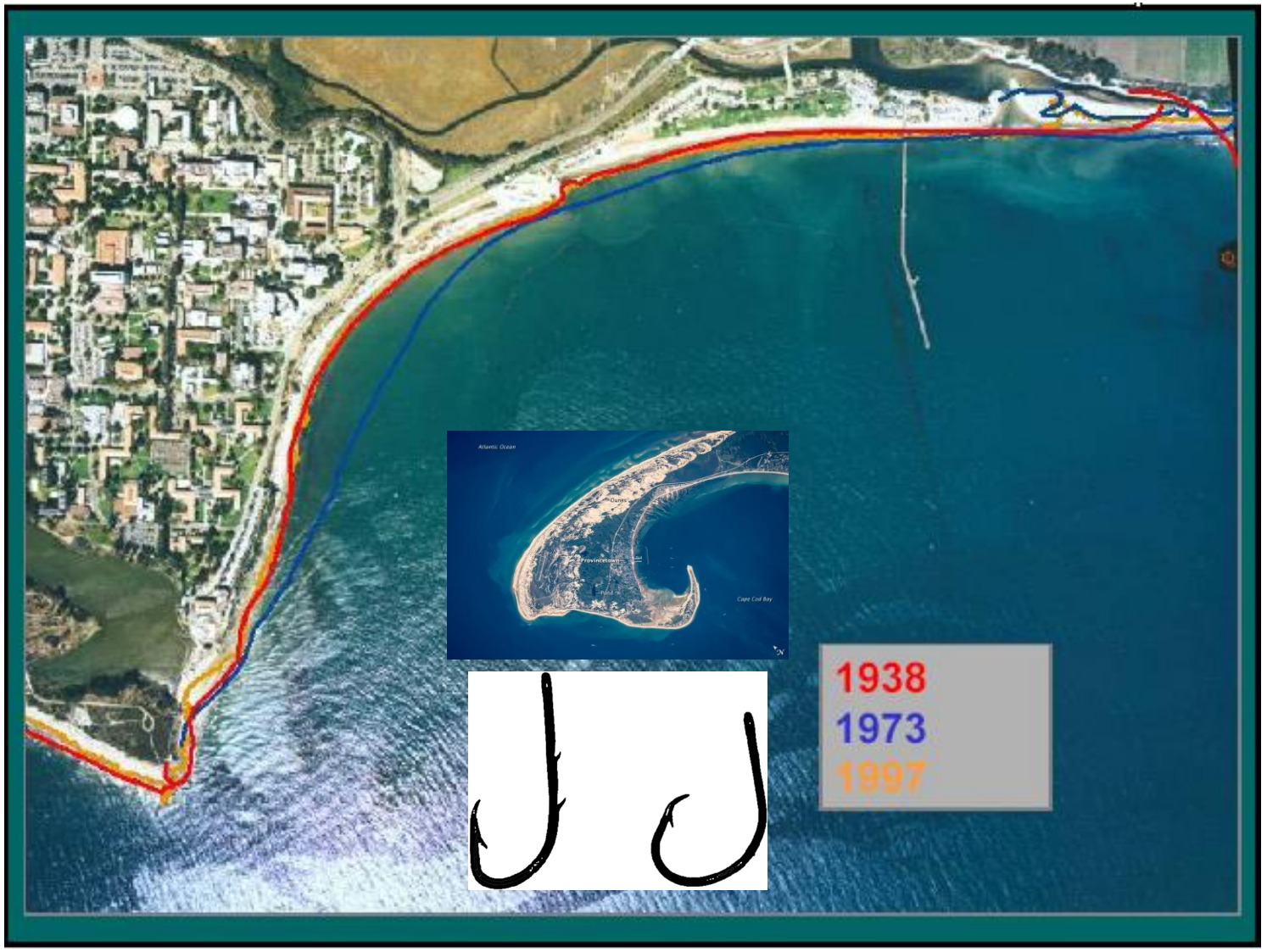
Tombolo

(e) ASYMMETRICAL TOMBOLO





Hook-Shape Bay

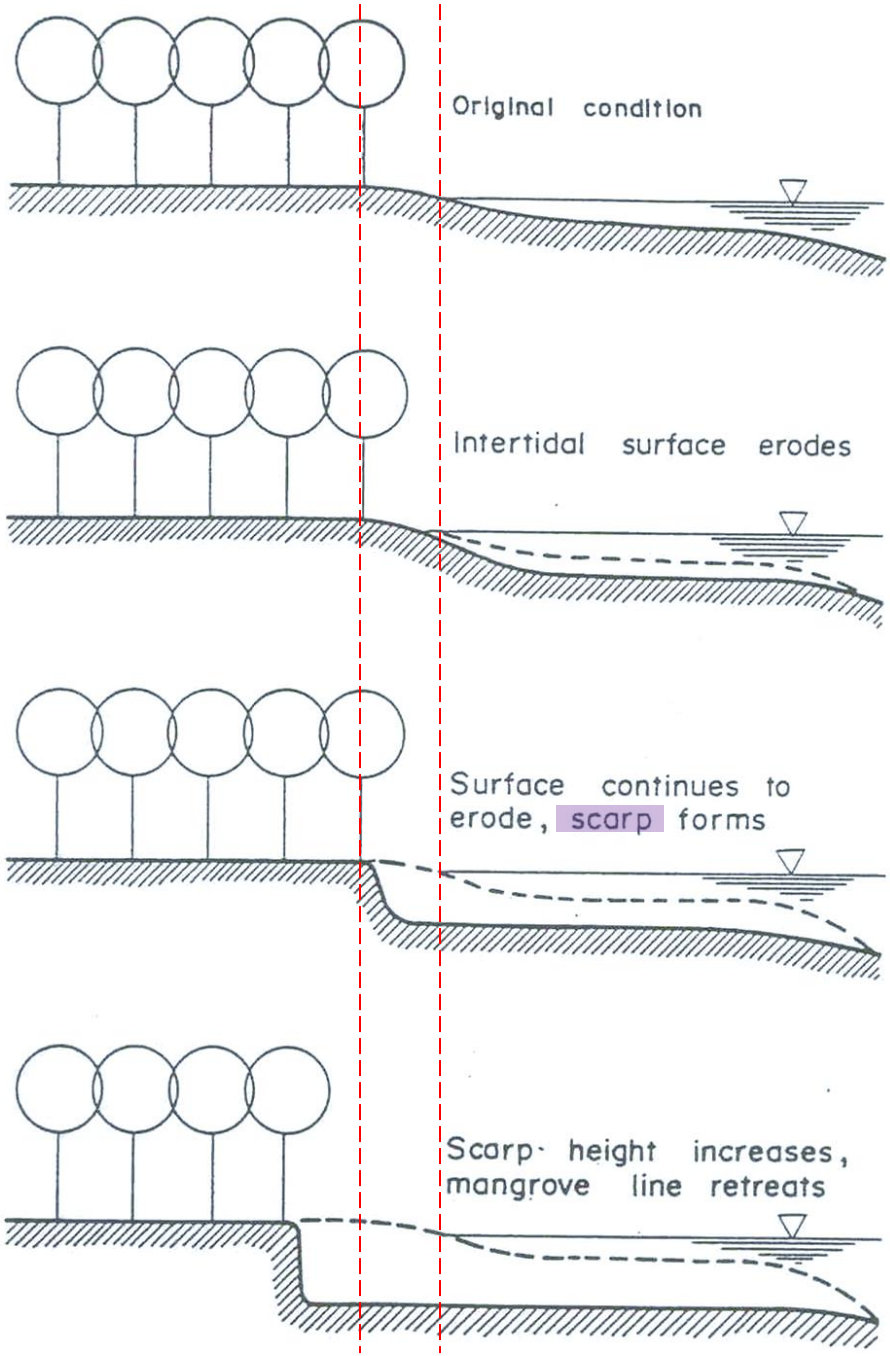


Reshaping of a Hook-shaped Bay

Exercise 1

Identify the coastal features in Pangkor Island.

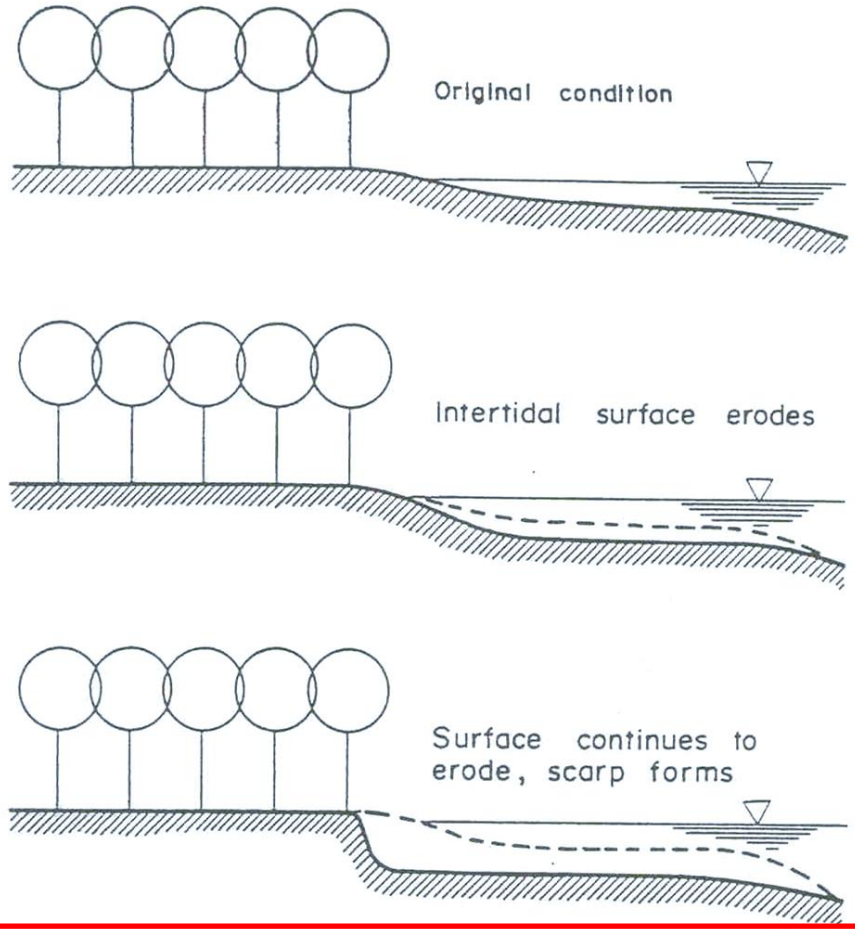
Mangroves



Sequence of Mangrove Line Retreat

Exercise 2

Discuss your observation.


Original condition
Intertidal surface erodes
Surface continues to erode, scarp forms
Scarp height increases, mangrove line retreats

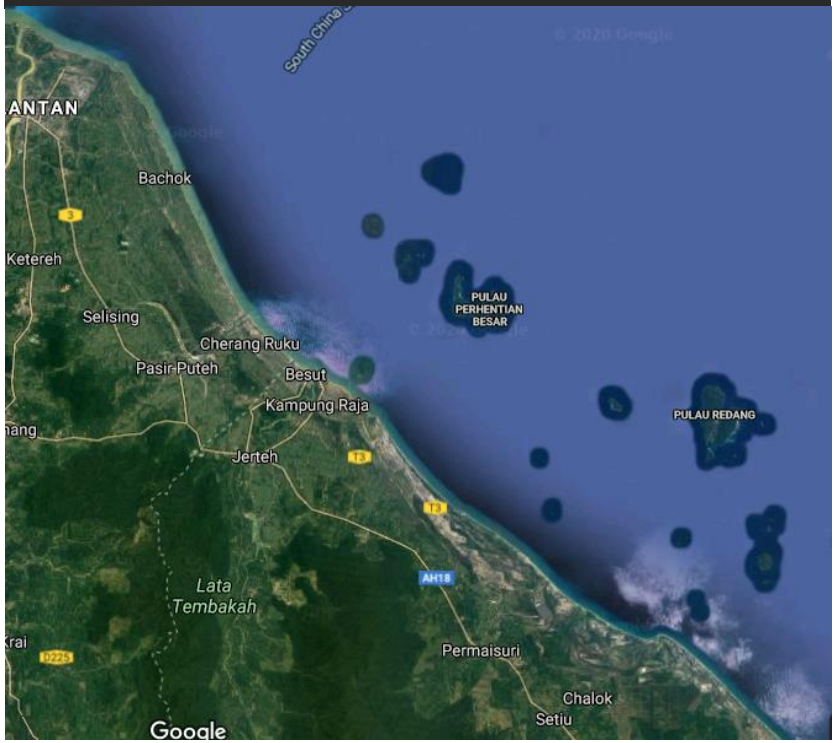

Kelantan Coast
THAILAND
Sungai Golok
Sungai Kelantan
Tumpat
Pantai Cahaya Bulan
Sungai Pengkalan Datu
Pengkalan Chepa
KELANTAN
WAKAF CHE YEH
KUBANG KERIAN
Pasir Mas
Bachok
Kadok
Melor
Ketereh
Kem Desa Pahlawan
Selising
Sungai Semerak
Pulai Chondong
Cherang Ruku
Pasir Puteh
Besut
Tanah Merah
Kampung Raja
South China Sea

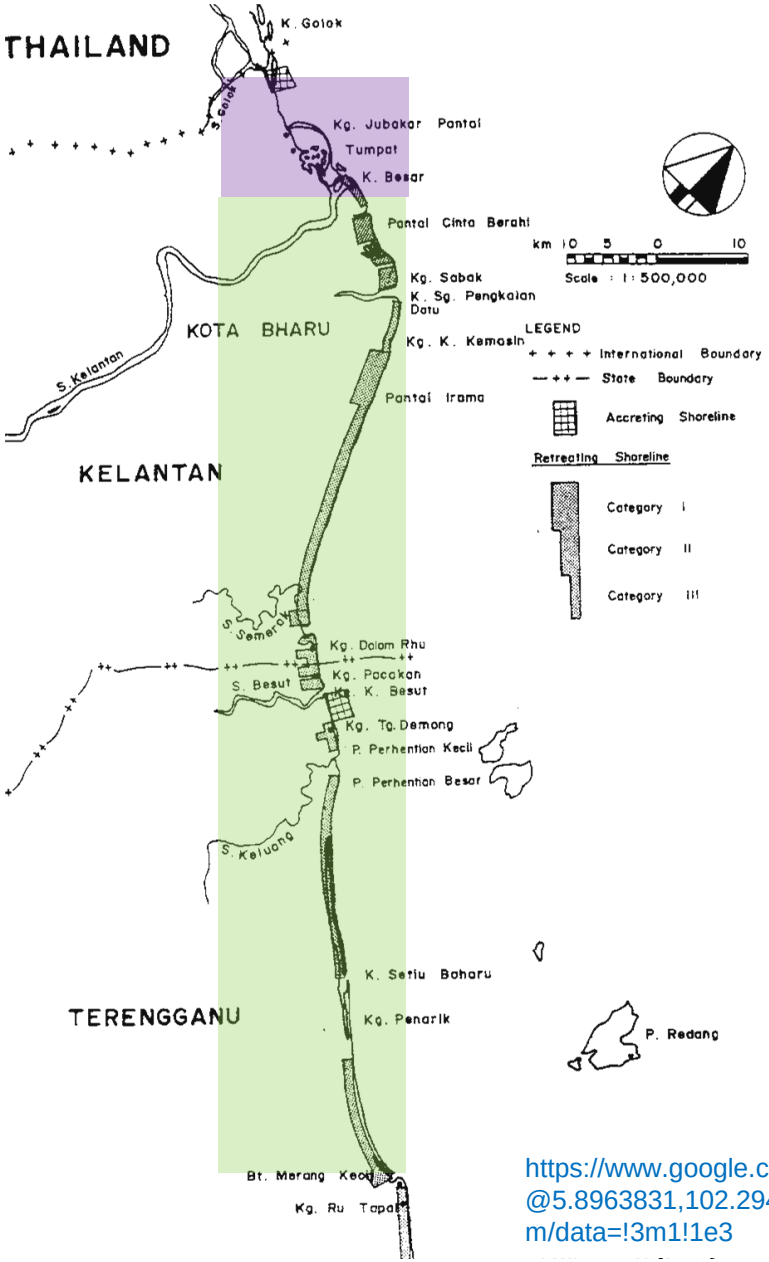

Terengganu Coast
Sungai Besut
Besut
Kampung Raja
Jerteh
PULAU REDANG
Setiu
Lata
mbakah
Permaisuri
Chalok
Setiu
Sungai Tong
TERENGGANU
Kedai Buluh
Bukit Payong
Marang

Erosion & Accretion

Reach 1 – Border of Thailand to Sg. Pengkalan Datu

Reach 2 – Sg. Pengkalan Datu to Bukit Merang Kecil





https://www.google.com.my/maps/@5.8963831,102.2948017,125734m/data=!3m1!1e3

Erosion & Accretion

SHORELINE CONDITION

Border of Thailand to Kuala Muda

CASE STUDIES

Site Observation Using Google Map

- Coastal features, landscape and existing coastal structures
- Orientation of the shoreline
- Signs of accretion & erosion

Make judgements based on your observations.

CASE STUDY 1

Sungai Golok, Kelantan

CASE STUDY 1


2006
Tak Bai
Tak Bai Lagoon
ตากใบ ลากูน
4084
Tak Bai
Tak Bai
4084
Tak Bai
4084
hlong School
นบ้านหัวคลอง
Susco
หจก.ปทานิโตรเลียม
(ปั๊มชัสโก้)
ตากใบ
4084
4084
Tak Bai
Thailand
Malaysia

CASE STUDY 1


2006
Thailand
4084
4084
4084
4084
Tak Bai
Tak Bai
4057
Bang Nara
Bang Nara

CASE STUDY 1

Sungai Golok, Kelantan

CASE STUDY 2


Sungai Pengkalan Datu, Kelantan
2006
Pantai Sabak
Sg. Pengkalan Datu
Image © 2006 DigitalGlobe
© 2005 Google
Pointer 6°10'44.79" N 102°19'18.18" E
Streaming 100%
Eye alt 7.12 km

CASE STUDY 2

Sungai Pengkalan Datu, Kelantan

CASE STUDY 3

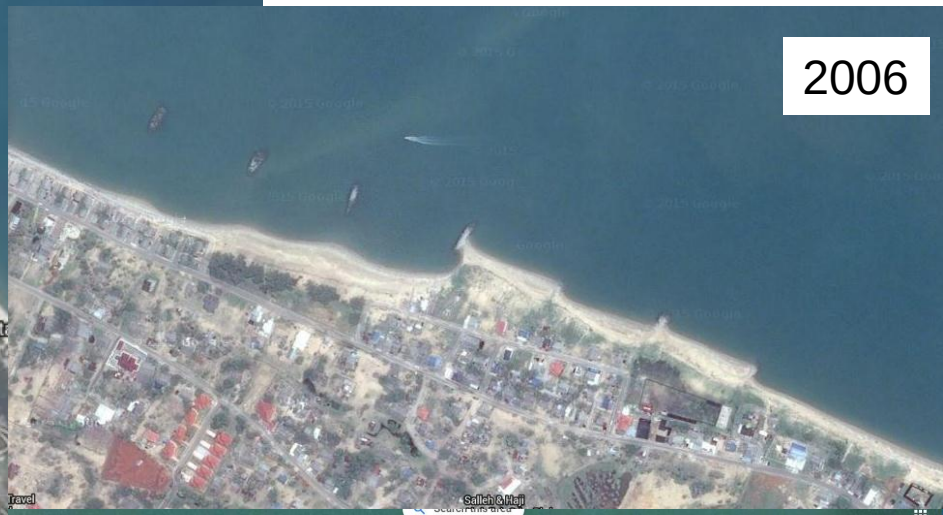
Sungai Besut, Terengganu

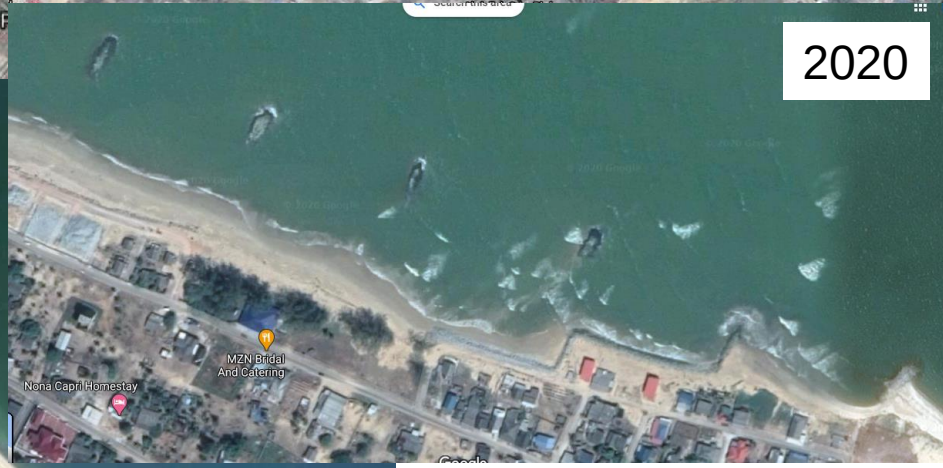
2006

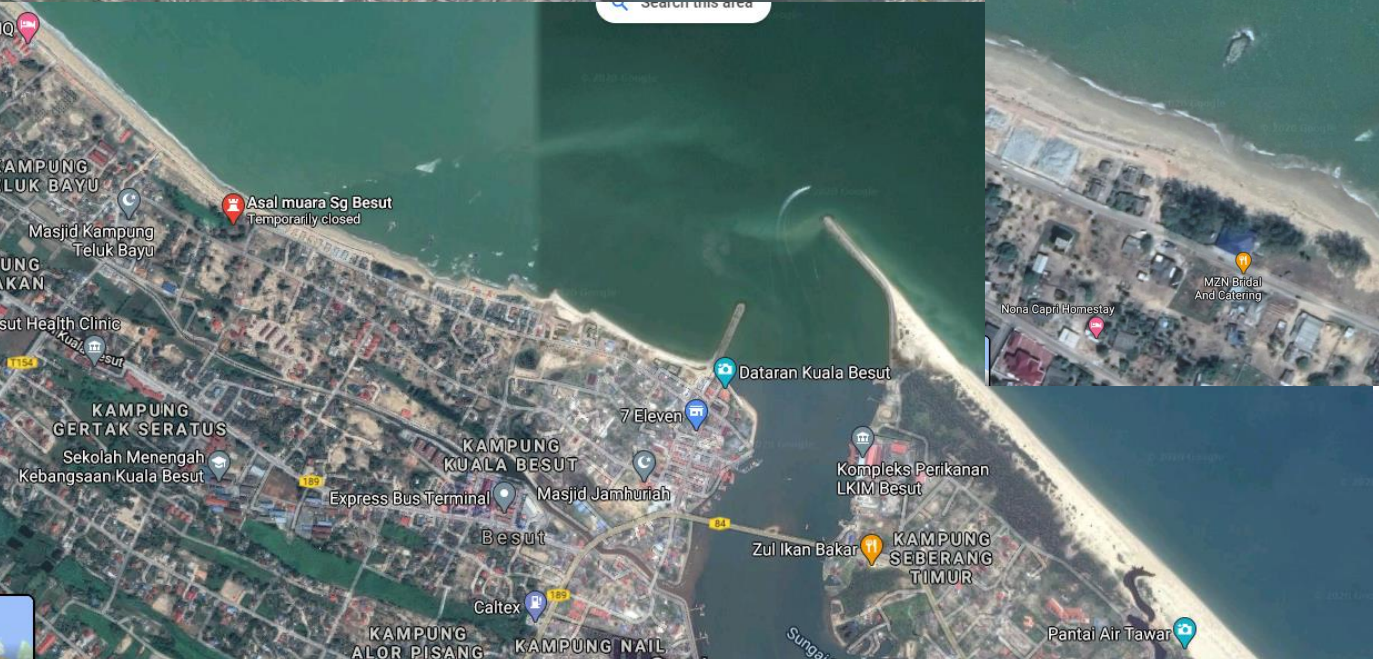
CASE STUDY 3

Sungai Besut, Terengganu

Downcoast Erosion







CASE STUDY 4

Kertih Port, Terengganu

CASE STUDY 4

Kertih Port, Terengganu

Exercise 3

Assess the shoreline condition of the given sites.

CASE STUDY 5

Kemasin, Kelantan

2006

CASE STUDY 6

Setiu, Terengganu

2006

CASE STUDY 7

Sungai Pahang

2006

CASE STUDY 8

Marang, Terengganu

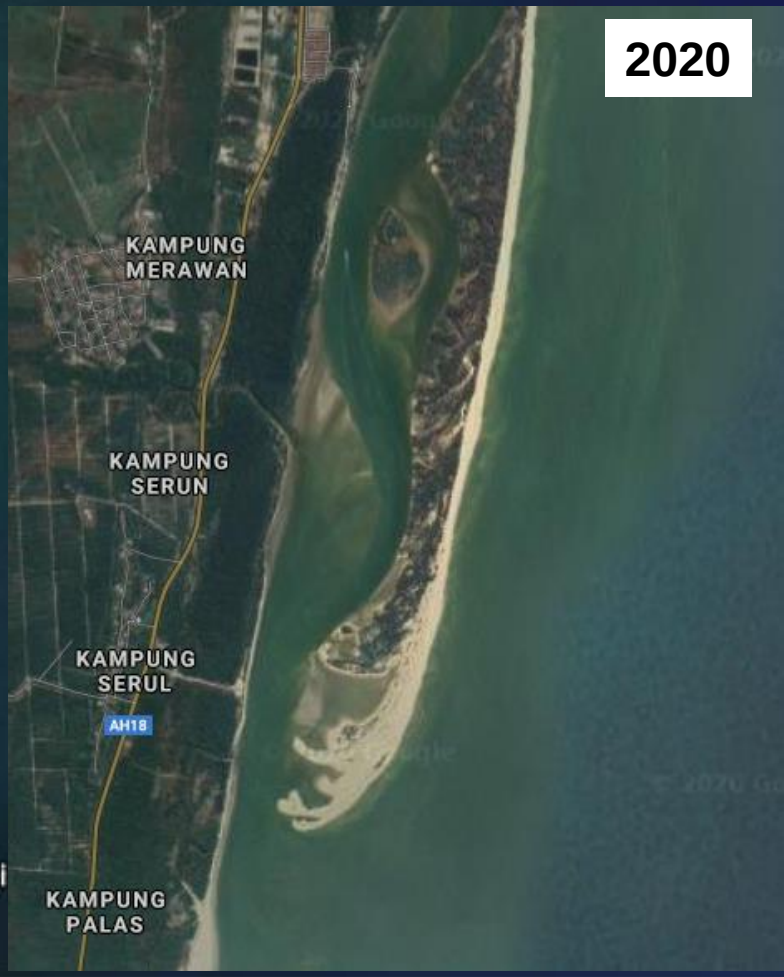
2006

CASE STUDY 9

Sg Bebar, Pahang

2006

Sg. Bebar



2020

CASE STUDY 10

Marang, Terengganu

CASE STUDY 11

Cendering Port, Terengganu

Microsoft
PowerApps

Learning Satisfaction Poll

How satisfied are you with the teaching and learning that took place today?

1- Not satisfied

2- Satisfied

3- Very Satisfied

OPEN