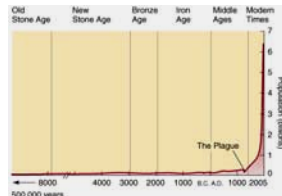


The Coast

- Coastal zone comprises .05% of the area of the world's landmasses
- Over 50% (~ 3.6 billion) of the human population lives within 100 km of the coastline
- It is estimated by 2030, over 75% (~6 billion) of the human population will live within 100 km of the coastline



- Over 66% of Americans live within 100 km of the coast. ~15 million people in the U.S. move to the coast each decade
- Thus the coast is likely the most critical part of Earth's surface in terms of management needs.
- Today, Earth's coasts and their ecosystems are more threatened than ever before in Earth's history. This is due to a variety of **natural causes** and **human activity**.

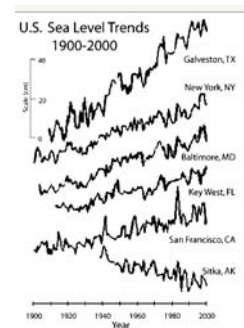
Human Activity: Anthropogenic Change



In the last two decades 85% of U.S. wetland losses have been in the Southeast

Natural or Antropogenic: Sea Level Change

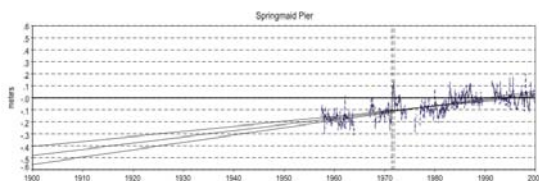
- Most recent forecast: Global sea level during 2000 – 2100 will rise 3x the rate during 1900 – 2000.



Assessing sea level rise, in combination, for selected U.S. cities from 1900 to 2000. Rises in sea levels can increase erosion and inundation, making areas more vulnerable to severe weather. (Data from NOAA, graph available from the US EPA)

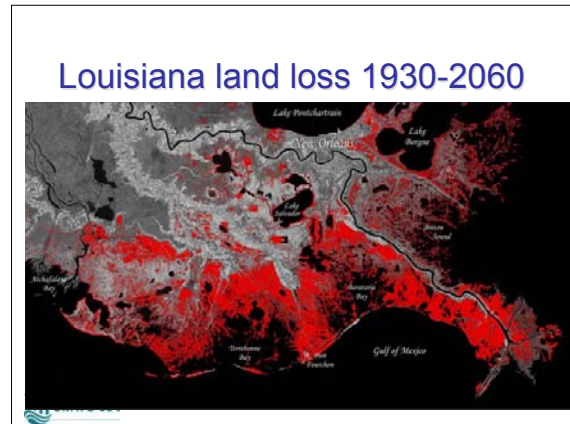
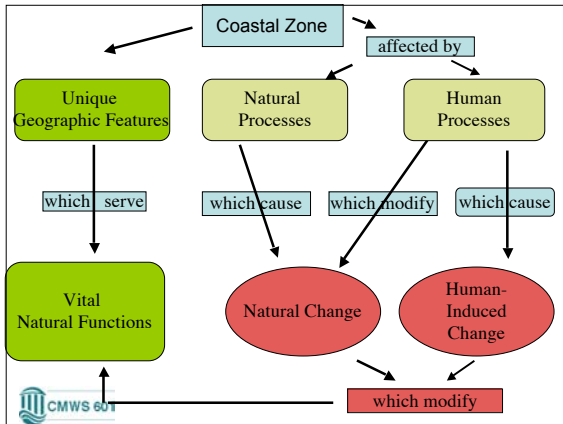
Sea Level Change

Spring Maid Pier, S.C.
5.2 mm/year (52 cm/century)



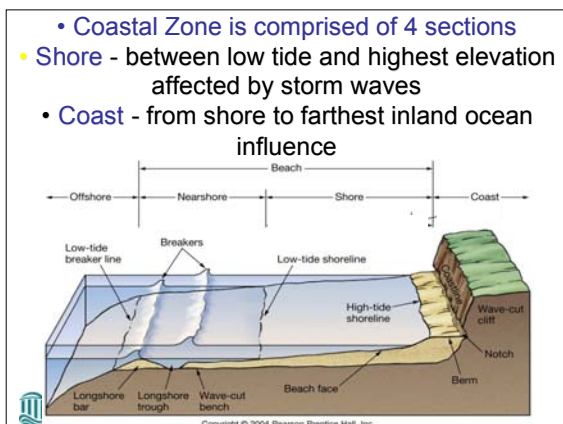
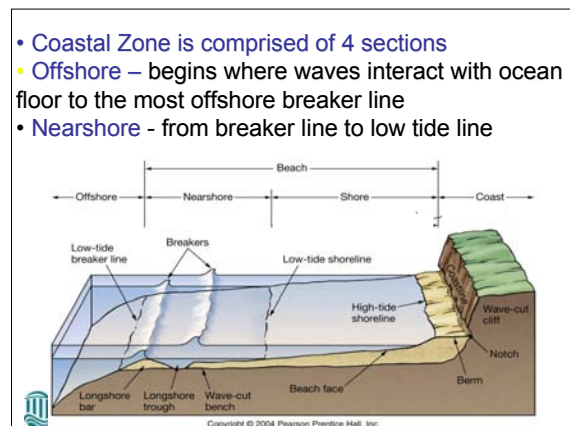
All coasts are constantly changing

- Change can be natural, human caused, or both
- Today, change is **rapidly** occurring to the to the physical, biological, geological & chemical environments. The biology is controlled by the physical, chemical & geologic processes.
- Must **understand the natural processes** before you can determine if human processes are affecting the coast. Must have a basic knowledge of physical & geological processes to understand the natural processes.



The Coastal Zone:

- Are you currently at the coast?
- In the coastal zone?
- At the shore?
- At the beach?



Coastal Processes-

constantly changing the coastal zone

Processes can be grouped by scale

- 1st order processes act on a global scale causing eustatic changes
 - Sea level change
 - Climate change
 - Plate tectonics

Coastal Processes-

constantly changing the coastal zone

- 2nd order processes act on a regional scale ~100-1000 km
 - Hurricanes, glaciers, winds, reefs
- 3rd order processes act on a local scale <100km
 - Waves, winds, currents



Coastal Processes- Time Scales



- Time scales of coastal processes and responses range from seconds to millennia

Coastal Classification

- Coasts are highly varied depending on how they form and the processes that influence them
- Many different classification schemes have been developed



Coastal Classification

- Submergent & Emergent Coasts
- Depositional & Erosional Coasts
- Advancing & Receding Coasts
- Classification based on plate tectonics*:
- Leading Edge, Trailing edge, Marginal Seas
- * Know this!!



Coastal Classification

- In this course we will use the **primary/secondary** classification scheme. This scheme is based on the **natural process** that formed the coast and most influences the physical properties of the coast



Primary Coasts

formed by processes on land

- Erosion by wind, water, ice
- Sediment deposition by wind, rivers, ice
- Volcanism
- Tectonics - Uplift, subsidence



Drowned River Valleys



V-shaped channels cut by rivers during glacial periods



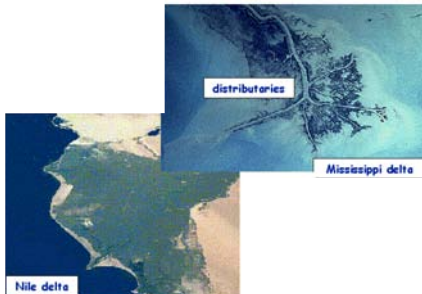
Drowned Glacier Valleys (Fjords)



- U-shaped valley cut by glaciers during Glacial Periods. Sill formed where glacier met the sea



River Deposition (Deltas)



Glacier Deposition

- Moraine – layer of glacial deposits



Volcanic Coasts



Tectonic Coasts



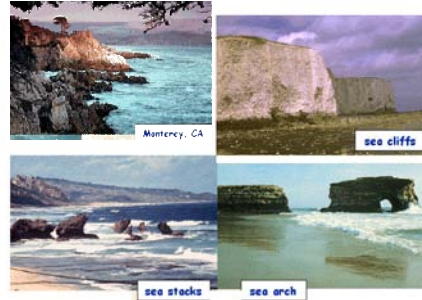
Secondary Coasts

formed by oceanic processes

- Wave, tidal, current erosion
- Sediment deposition by waves, currents
- Alteration by marine plants, animals



Wave Erosion Coasts



Depositional Coasts



Depositional Coasts



Huntington Beach, S.C.



Coral Reefs



Mangroves



mangroves



From *Coastal Environment* Reading:

Coastal Formations: Define

● Watersheds, Marine Terraces, Coastal Bluffs, Headlands

Sand Dunes

- How formed?
- Functions?
- Human impact – significant?



Beaches

- Define: Swash, backwash
- Main function of beaches?
- Coastal Barriers
- How are the 3 types different from each other?
- Main two values of barriers?
- Human impacts – significant?



Coastal Inlets

- How are the 3 types different from each other?
- Wetlands
- What are the 3 components of a coast needed to be a wetland?
- What are the main 3 types?
- Main functions of wetlands?

