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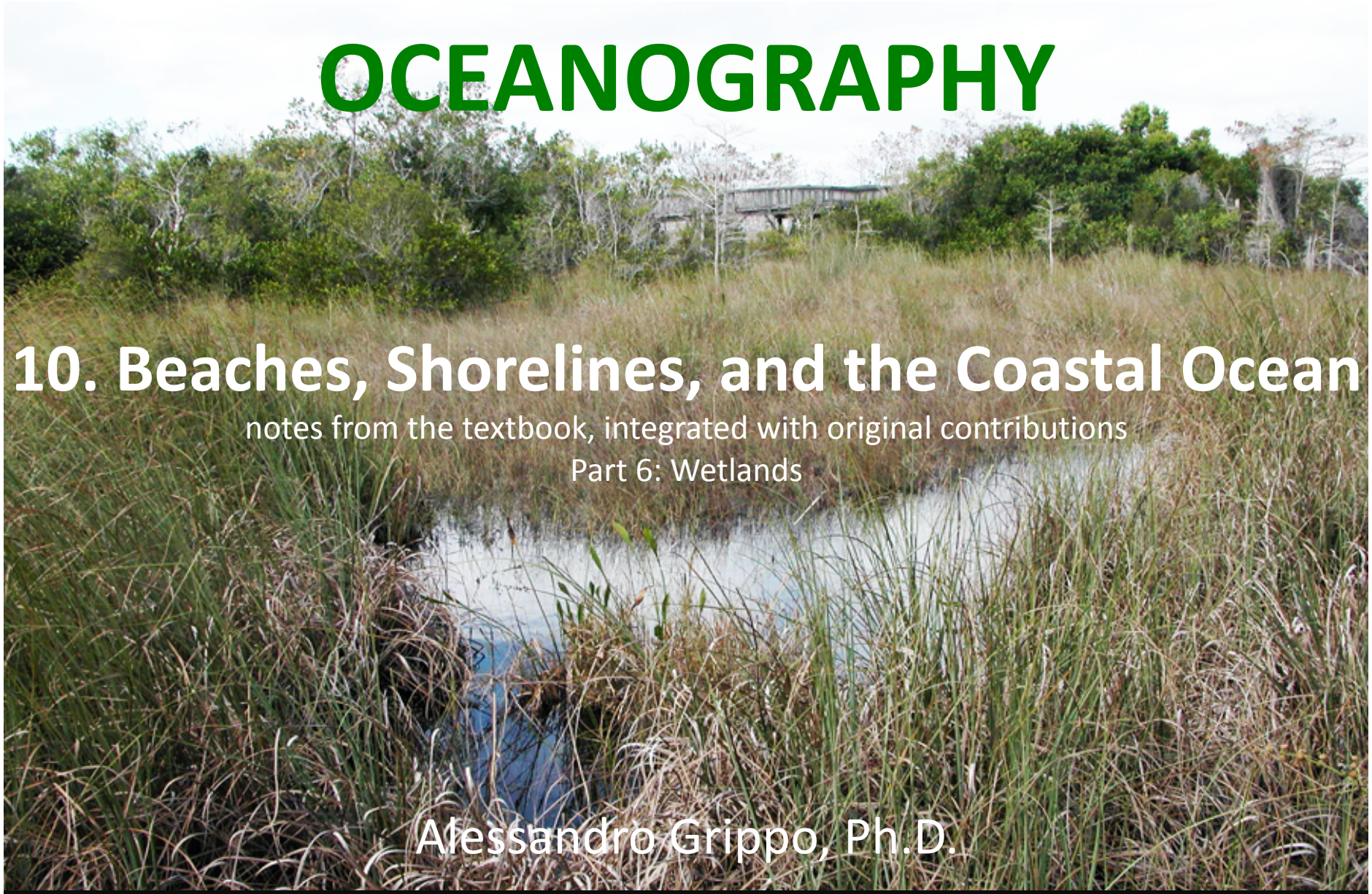


10. Beaches, Shorelines, and the Coastal Ocean

notes from the textbook, integrated with original contributions

Part 6: Wetlands

Alessandro Grippo, Ph.D.

Four different kinds of wetlands can be identified in the Everglades of Florida, arranged in a general progression from north to south, including freshwater marsh, deepwater swamp, tidal salt marsh, and coastal mangrove.

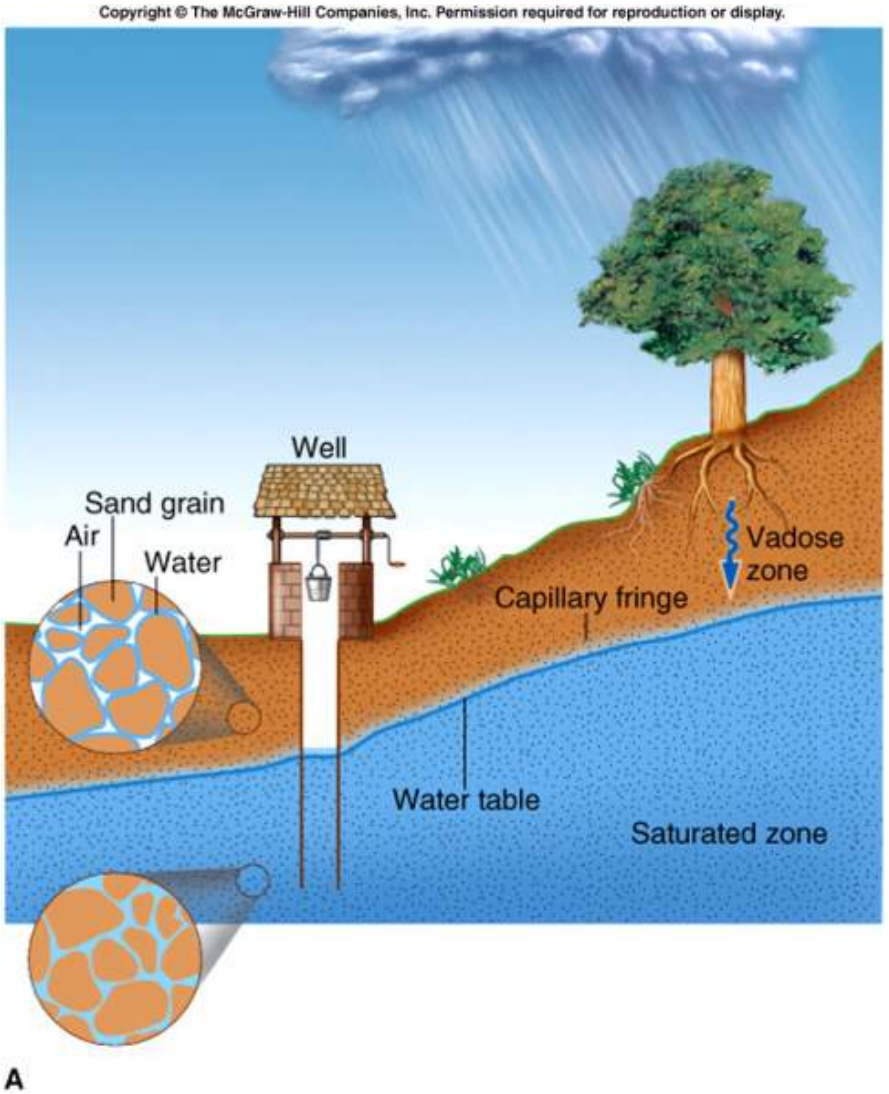
Everglades National Park, Dade county, Florida

Wetlands

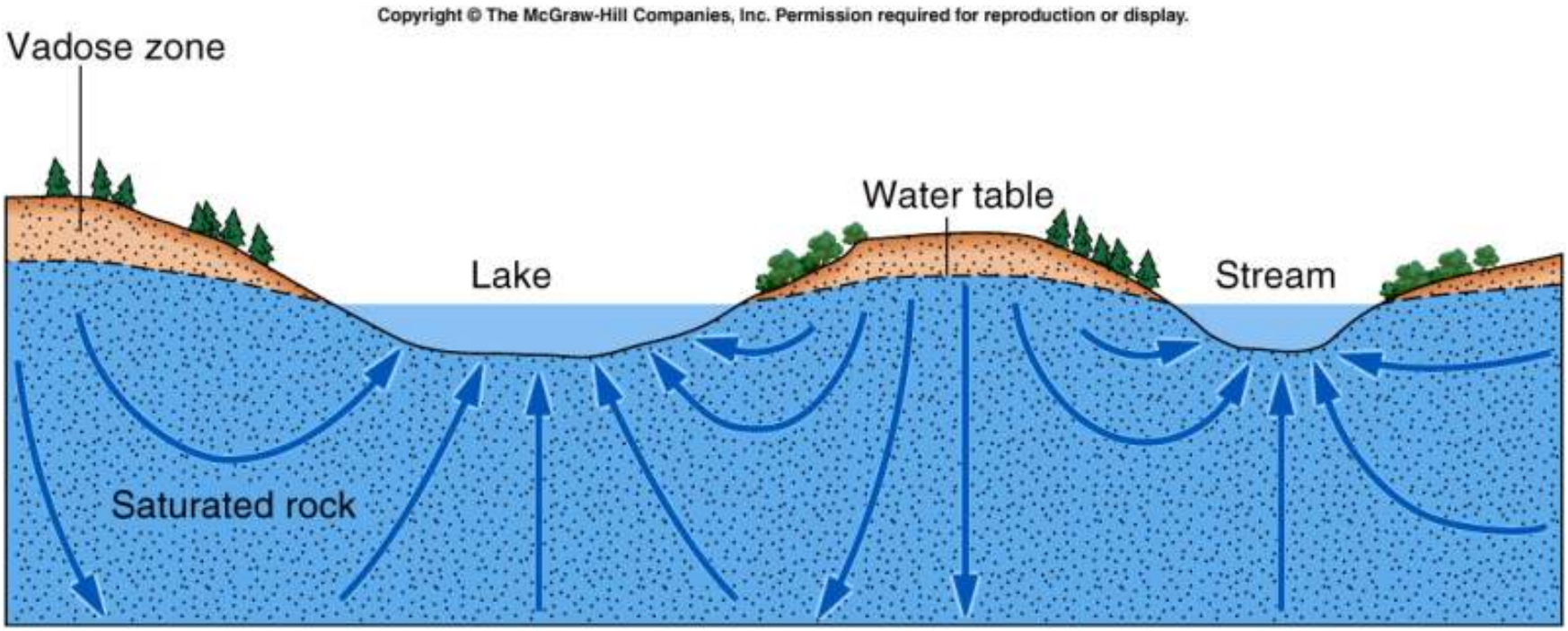
- Wetlands are ecosystems in which the water table is close to the surface, so that they are typically saturated most of the time
- Wetlands can border either freshwater or coastal (seawater) environments
- Coastal wetlands occur along the margins of coastal waters, such as estuaries, lagoons, and marginal seas
- They include:
  - swamps, tidal flats, coastal marshes, and bayous

What is the water table?

- The water table is the top of the saturated zone
- The saturated zone is a subsurface zone where all openings are filled with water
- Water level at surface of most lakes and rivers corresponds to the water table



relationship between the water table
and rivers, lakes, swamps, wetlands, etc.



Types of Coastal Wetlands

- The two most important types of wetlands are Salt Marshes and Mangrove Swamps

  - Salt Marshes
    - found between 30 and 65 degrees latitude
    - Well developed salt marsh habitats are found along most coast of the U.S., Europe, Japan. Eastern South America
    - Support a variety of salt-tolerant grasses (halophytic)
      - *Spartina* (cordgrass) gets rid of excess salt by producing exterior salt crystals
      - *Salicornia* (pickleweed) accumulates salt in its tissues, and breaks them off when too much salt is accumulating

Salt Crystals on *Spartina alterniflora*

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Salicornia Virginica

This succulent plant, which is commonly found in salt marshes, stores excess salt in its tissues. People have been known to break the stalk into small pieces and sprinkle them on salads for a bit of a salty crunch, earning this plant the common name of Pickleweed.

© https://ochsocean.weebly.com/oceanography-picture-of-the-day/salicornia-virginica

– Mangrove Swamps

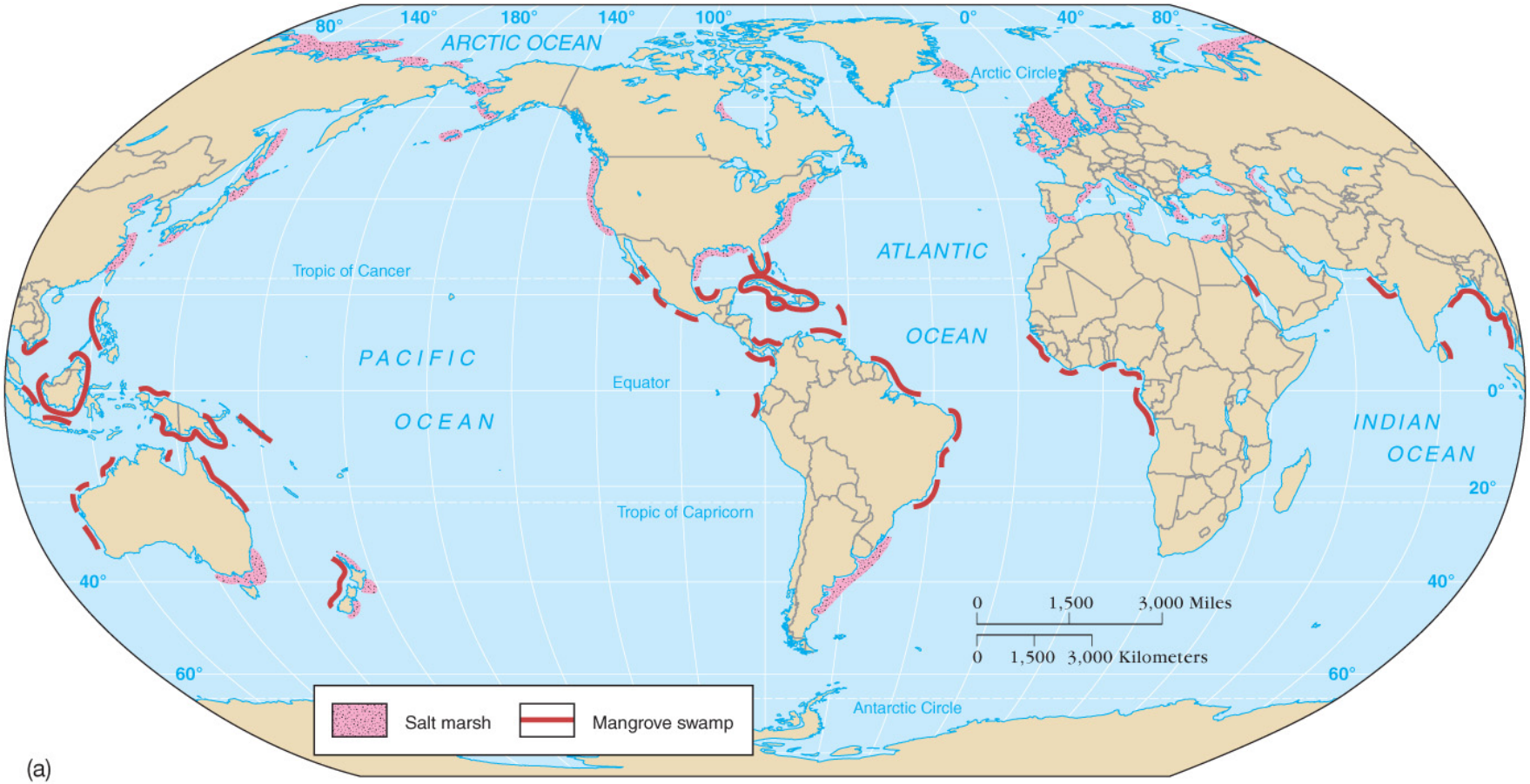
- Restricted to tropical regions
- Support various species of salt-tolerant mangrove trees, shrubs, and palms
- Mangrove swamps occur throughout the Caribbean and Florida, but the most extensive mangroves in the world are found throughout Southeast Asia

- To survive in very salty environments, some mangroves produce tall tripod-0like systems to stay above the salty water; others crystallize excess salt on their leaves

A mangrove swamp: Merritt Island National Wildlife Refuge

Cape Canaveral, Florida

Location of
Salt Marshes and Mangrove Swamps



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Characteristics of Coastal Wetlands

- Wetlands are home to a diverse assortment of plants and animals
- Some of the most highly productive ecosystems on Earth
- When left undisturbed, wetlands provide enormous economic benefits

Characteristics of Coastal Wetlands

- Biologically important:
  - Fish nurseries
  - Feeding grounds for commercially important marine animals
    - Flounder, bluefish, oysters, scallops, clams, eels, smelt, shrimps, prawns, etc.
  - Important stopover for many species of waterfowl and migrating birds

Above: Calico scallop in Harrington Sound, Bermuda
© https://environment.bm/calico-scallop/

Below: Australian Smelt, Australia
© https://www.pinterest.com/pin/419468152774248300/

Characteristics of Coastal Wetlands

- Efficiently cleanse polluted water
  - Wetlands remove inorganic nitrogen compounds (from sewage and fertilizers) and metals (from polluted groundwater) that stick to clay minerals
  - Bacteria break down nitrates
  - Some are used as a source of food by grasses
  - Upon death, those plants that are not recycled can accumulate as peat deposits

Characteristics of Coastal Wetlands

- Wetlands can absorb water from coastal flooding
  - Rising seas levels caused by storms
- Wetlands can protect shores from wave erosion
- Wetlands can serve as a first line of defense against hurricanes and tsunamis
  - by dissipating wave energy
  - by absorbing excess water

Loss of Coastal Wetlands

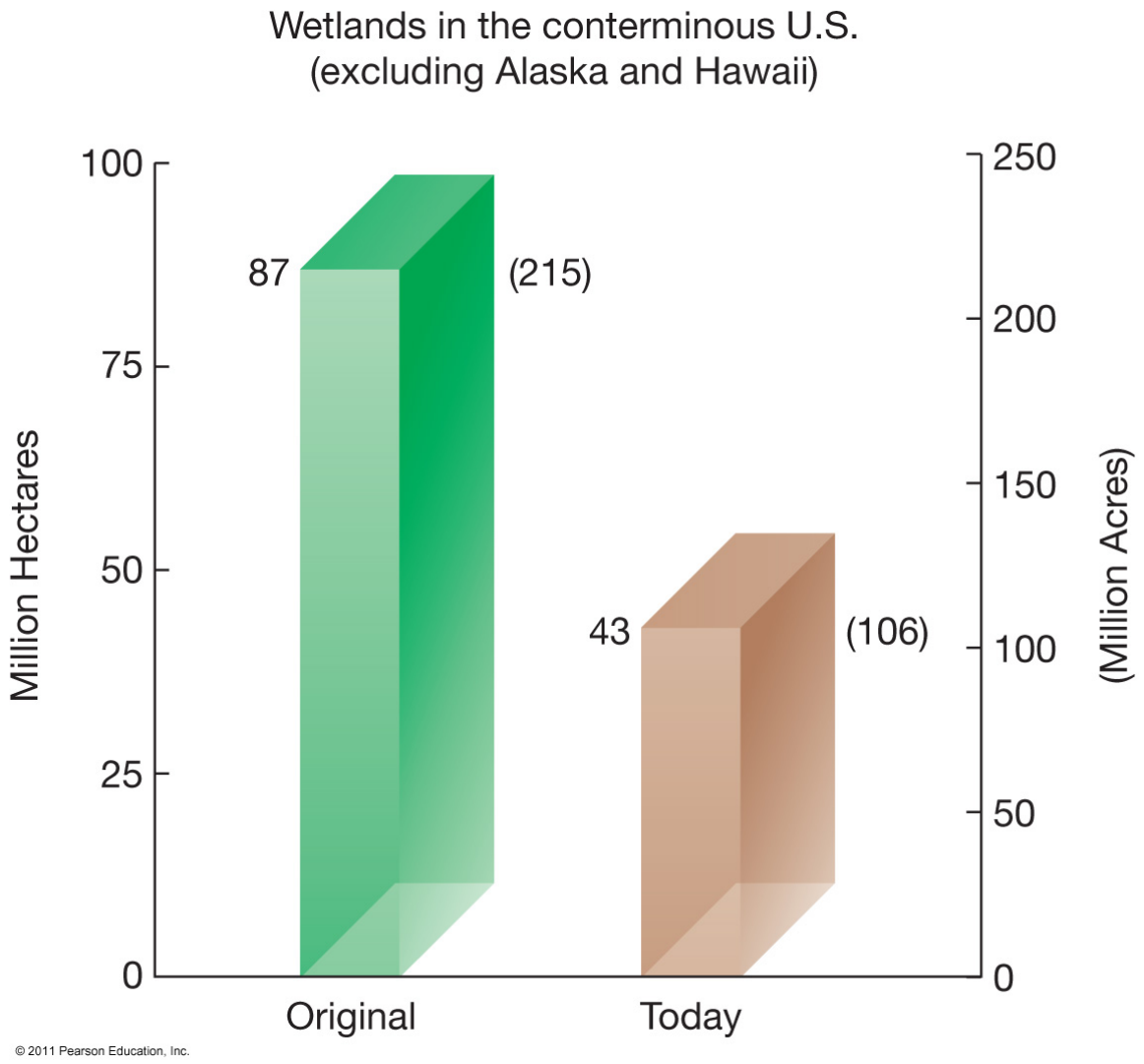
- Despite all the benefits wetlands provide, half of U.S. coastal wetlands has been lost to development (housing, industry, agriculture)

- Wetlands are subject to natural subsidence, which is usually compensated by plant growth and infill from river sediment

- Loss of wetlands in the Mississippi Delta region will cause the disappearance (under rising sea levels) of at least 10% of the state of Louisiana

- Similar scenarios occur around the world, where mangroves are critically endangered or approaching extinction (for instance, in Indonesia and the Philippines)

Loss of Coastal Wetlands



Loss of Coastal Wetlands

- To minimize wetland loss, the U.S. EPA established the Office of Wetland Protection in 1986 with the goals of:
  - Minimizing the loss of wetlands
  - Protecting or restoring wetlands

- The predicted rise in sea level over next few decades will either destroy or shift wetlands inland
  - Under ideal circumstances, not all lost wetlands would be replaced

End of Chapter 10, part 6

Beaches, Shoreline Processes, and the Coastal Ocean: Wetlands