

Coastal Habitats:

Coastal Habitat include: tidal salt marshes, freshwater salt marshes, mangroves

-2 dominant stress factors:

1) salt content extremely high: limited plants in these areas (20 families, 1000 species). This is somewhat misleading because in a typical marsh less than 20 spp. are found

2) anaerobic soils: most productive ecosystems on earth (40 tons/acre of dry matter)

-Eugene and Howard Odum

- theory of "tidal energy subsidy": higher tide production, higher productivity

Tidal Marshes

-temperate, mid to high latitudes

-mostly dominated by grasses

Arctic: *Puccinellia*, (short and wiry)

East Coast: *Spartina alterniflora*, (tall cordgrass, very productive)

Gulf of Mexico, West Coast: *Spartina foliosa*

-development of these marshes usually takes place in a river going into a bay where silt sediment builds up or where silt sediment builds up on a spit of land going out to sea

1) Succession stage: development in low intertidal zones, dominated by *Spartina*

2) High marsh produced, dominated by lower-growing forms

-stability over time depends on local conditions

-build up of marsh due to accretion by: -sediments

-peat

Opposite process-subsidence: oxidation of peat drops the level of the marsh, also through erosion

-Gulf of Mexico: degrading due to subsidence, diversion of silt from Mississippi to Lake Ponchartrain or to Grand Isle (end of Mississippi River)

-East Coast: stable for thousands of years

-Arctic: build up, land rising about 1cm/yr, marshes growing here

-West Coast: becoming subdivisions and shopping malls

-Gulf of California: "negative estuary" buildup

- no freshwater

- not very productive

- grass, *Distichlis palmeri*, (short, wiry, potential food)

- endemic

Problems:

1) Development of these areas

a) - leaking sewage

b) - process of selling land to development

- 2) Aquaculture development
- 3) Off -road vehicles

Hydrology: factors for placement of marshes

- Chemistry
- creeks: build up of silt closes off riverway to sea, branches all over, very productive area
- dams: capture silt, stops floods, reduces productive areas
- salt pans - low productivity, support reduced list of species

Salinity:

- comes in with the ocean waters
- #1 factor in plant growth (reduced salinity equals more plant growth, even for halophytes)
- pans have a high salt content, they are continually flushed by water from the sea, rainwater, etc.
- distribution of mosaic of plants in random, complex pattern in high zone
- low zone has monotypic plants

Study on Red Tide Outbreaks

- 1992, JoAnn Burkholder has studied *Pfisteria piscicida*, meaning "fish killer"
 - unicellular algae, known as a dinoflagellate
 - non-photosynthetic and carnivorous
- First outbreak in Chesapeake Bay, and then all the way down the east coast
 - usually around river mouths dumping pollution from chicken and hog farms
- Called a "toxic ambush predator"
- It feeds on algae cells until it senses a fish presence (usually from fish feces). This triggers a chemical response within the dinoflagellate, in which it follows the fish and produces a narcotizing toxin. The toxin creates sores and skin loss on the fish. The algae then eat bits of the fish's flesh and blood cells. The dinoflagellate sexually reproduces fused gametes. The gametes then feed on the dead fish.
- The dinoflagellates form cysts and wait dormant in the mud until another school of fish comes by, or they stay active by eating other algae