

- 1 Salt Marshes
- 2 Describe salt marshes.
 - Communities of EMERGENT herbs, grasses or low shrubs rooted in soils that are alternately inundated and drained by tidal actions.
 - Found mostly at higher tidal levels in area of protected water and in association with estuaries.
- 3 Salt Marshes
- 4 Define tidal cycle.
 - One full cycle of tides: high to low to high or low to high to low.
 - Tidal cycle: here about 12 hours, 40 minutes (depends on geography)
- 5 What are conditions like in a salt marsh?
 - Fluctuating salinity
 - Temperature fluctuations
 - Nutrient fluctuations
 - Tidal effects: daily, seasonal, and storm events
- 6 Describe the substrate in a marsh.
 - Substrate is typically mud, similar to estuarine sediments w high salt content
 - perfusion of salt water coupled w high rate of evaporation
 - anaerobic
 - within marsh rate of sedimentation height in lower part of marsh than in upper
 - purple sulfur bacteria
- 7 Describe the composition and distribution of plants in a marsh.
 - dominant plants are halophytes-emergent flowering plants grow in soil w high salt content
 - upper portions of plants are above water even during periods of high tide, so both terrestrial and aquatic components “wet feet”
 - very few species able to adapt to these conditions-low diversity
 - tolerant organisms show a high degree of taxonomic similarity over a wide geographic area
 - dominant plants worldwide are grasses of genus *Spartina* and species of *Juncus* and *Salicornia*
- 8 Describe the composition and distribution of animals in the marsh.
 - Residents
 - crabs-*Uca*, *Hemigrapsus*, *Sesarma*
 - mussels *Modiolus* or *Demissus*
 - snails *Littorina cerithidea*, *Melampus*
 - amphipods-*Grillus* and insects from terrestrial
 - Transient species: other animals enter only for feeding-raccoons, birds, etc
 - high tide-marine and estuarine animals
 - low tide-terrestrial species forage
- 9 Microhabitats

- 10 Salt Marsh Food Web
- 11 Explain the relationship between the two types of salt marshes found in North America and topography.
- East and gulf salt marshes
 - Pacific coast
- 12 East and gulf salt marshes
- more extensive occupy large areas of gently sloping coastline which surrounds the numerous broad estuaries and shallow bays associated w extensive shallow offshore continental shelf
 - Spartina succeed each other in elevation and geographically
- 13 Pacific coast
- has few rivers and bays, steep coastal mountains lead directly to narrow continental shelf river mouths narrow and extent of both estuaries and salt marshes restricted
 - Salicornia-poorly dev marshes
- 14 Explain physiognomy and zonation of the marsh in relation to environmental characteristics and composition of the marsh.
- East Coast: broad, flat expanse of low herbaceous grassy or shrubby plants all of similar form
 - cut by dendritic arrangement of channels leading to larger tidal creeks
 - go out to mud flats devoid of macrophytes or to the open waters of estuary
 - open areas-pans
 - shallow pools
- 15 Cross Section of East Coast Marsh
- 1. tidal mudflats(creek bank and bottom)-no macrophytic vegetation-mudflats
 - Contains mainly infaunal estuarine and marine animals and mud snails
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 - rocky intertidal origin of plants marine-salt marshes plants are mainly terrestrial in origin
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 - 2. low marsh- littoral zone 2 divisions lower tall Spartine
 - Upper zone-short Spartina sea lavender (limonium sea blite Suaeda and spearscale Atriplex Salicornia
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- 16 Cross Section (cont.)
- 3. high marsh-salt spray supralittoral zone salt marsh hay
 - Black grass zone-Juncus
 - Phragmites, Panicum, Agrostis red top grass, Eleo charis spikerush Eleocharis and Typha in freshwater
 - Drier sandy substrate-older inundated only during high spring tides and storms
 - 4. Scrub shrub-marsh elder -Iva frutescens, groundsel Baccharis halimifolia
 - Bayberry Myrica heterophylla wax myrtle Myrica cerifera goldenrod Solidago Hibiscus- sea hollyhock

- 17 Typical Salt Marsh Zonation
- 18 Salt Marsh Zonation
- 19 Higher Energy Zonation
- 20 Limiting Factors in Marsh Zones
- in middle and high marsh, competition among the plant species tends to be the limiting factor and governs zonal boundaries
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 - lower marsh limiting factors are physiological tolerances for submersion in salt water
- 21 Compare development of a marsh with pond or lake succession.
- physical dev of marsh constant process resulting from accretion of sediment-no evidence that predictable or directional succession with follow
- 22 Identify sources of primary production in salt marshes.
- primary productivity within the marsh is carried out by the marsh plants and various microalgae that occur on the surface of the marsh plants and the mud
 - prod high in marshes, especially for rooted plants
- 23 Discuss the diversity and abundance of herbivores in the salt marsh.
- major primary prod is Spartina
 - in the South (GA) 1600 g C/m²/yr g of Carbon
 - NJ 325 g C/m²/yr
 - Gulf Coast 300-3000 g
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 - Pacific NW 100-1000
 - San Fran 50-1500
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 - algae Atl 20-25% of vascular
 - Pacific S. CA 40-60% of vascular
- 24 Identify the effect of grazing on marsh biomass.
- herbivores: few possibly due to high salt content and low nutritional value-unpalatable, difficult to break down, or both
 - ducks and geese feed on marsh grasses
 - 90% of grasses are channeled in to detritus and is either decomposed or washed out of the marsh.
 - Algal mats are heavily grazed by snails, etc probably because algae is more digestible than Spartina
- 25 Compare the nature of the salt marsh ecotone with the fauna found in the ecotone.
- ecotone-neither aquatic or terrestrial
 - nearest to water - aquatic
 - terrestrial at upper edge

- in the middle very few indigenous species

26 Describe some of the interactions which occur between animals and between plants and animals.

- minimize environmental changes in a variety of ways: crabs burrowing into the mud-keeps them from desiccating
- Littorina and melampus and some insects migrate up and down stalks-escape tides and predation
- migrate in and out of marsh with the tides-aquatic in and terrestrial out and then vice versa
- marsh plants provide cover that reduces predation
- (Most predatory birds use mudflats, fish use open waters and sediments in water between grasses)

27 Explain the commercial, ecological, and aesthetic value of salt marshes.

- Nursery grounds for more than half the species of commercially important fishes in the SE US
- Other fishes use as overwintering and feeding: bluefish, flounder
- Fisheries of oyster, scallops, clams and eels and smelt located in marshes
- Remove inorganic N cmpds and heavy metals from groundwater polluted by land sources
Plants use cmpds N death of plants feed bacteria, fungi, shellfish, and fin fish
- Aesthetics: protection against hurricanes, generally attractive

28 **Wetland Future**

- to date: more than ½ of the nation's wetlands have been lost due to systematic filling and development for housing, industry, and agriculture
- 215 million acres in US now we have 90 million acres
- in 1986 OWP office of wetlands protections was established
- loss of 300,000 acres a year at that time
- job is to identify wetlands, enforce regulations against wetlands pollution