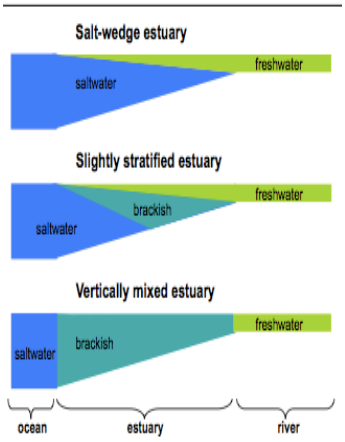
SF Bay Estuary Notes

Questions/Pictures/ Key Words



SF Bay Estuary

• What:

•**_____ and _____ Water Mixing** (Abiotic Factor)

–Partially enclosed bodies of water where rivers meet oceans

•**Interface between the land and the sea**

•Mix How: (Abiotic Factor)

1.**Salt-wedge:** freshwater rides over dense saltwater wedge at mouth; the *most stratified type of estuary*

–requires high freshwater input (e.g., Mississippi River delta)

2._____ ***stratified:*** *like salt-wedge but with more mixing; stratification not as complete*

–Less freshwater input or more tidal influence (e.g. San Francisco Bay)

3.***Vertically mixed:*** *no vertical stratification*

–Low river flow and strong tidal currents; prevalent in shallow estuaries (e.g., most So. Cal estuaries)

•Characterized by: _____

•Mixing of fresh and seawater

•Physical Configuration

•_____ Fluctuations

•Adaptations to Abiotic Conditions

•Resulting _____ Variation

–Salinity

–Oxygen (low oxygen in flooded soils)

–Submergence

–Temperature

•Mixing of Fresh & Seawater (brackish water)

–**_____ gradients** form from mouth (ocean) to back (river)

•Species have a limited range of salinities they can tolerate

•Salinity gradients change over time: depending on weather (rainfall) and tidal flushing

– ⇓_____**:** wet season increases fresh water with rainfall

–⇑_____**:** high tide pushes saltwater in

–Requires _____ to _____ _____ (*euryhaline species)*

- *Limits diversity of organisms in estuaries*
- *Sets patterns of distribution within estuaries*

•Q: Why do Estuaries require species that show flexibility?

Summary:

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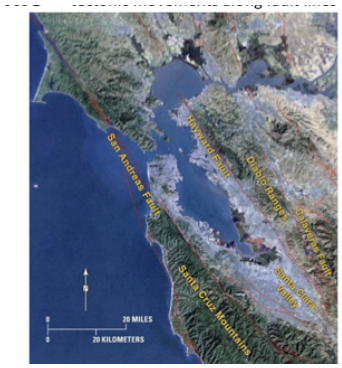

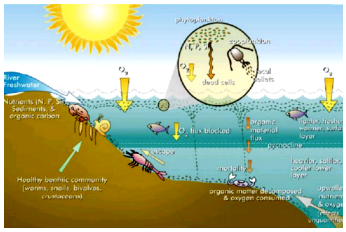

•Types

- **•Coastal Plain – flooded river valley**
  - –(Chesapeake Bay, Narragansett Bay, RI)
- **•Bar-Built – sand bar builds in front of river mouth**
  - –(Tijuana River Estuary, Carpinteria Salt Marsh)
- **•Delta – sediments deposited at mouth by river**
  - –(Mississippi River delta)
- **•_____– tectonic movements along fault lines form estuary**
  - –(San Francisco Bay)
- **•Fjords – dug out by advancing glaciers, form when glacier retreats**
  - –(Glacier Bay Alaska)

• Functions

Chemical Functions	Physical Functions
Filter for nutrients and _____ –Outflowing groundwater and rivers pass through estuaries on the way to the ocean –Plants, animals, and sediments _____ nutrients and toxins **•PRO**: _____ of ocean • **CON**: _____ estuaries	_____ •High levels of _____ •Shallow and tidal ➔ lots of solar radiation for **primary** _____ •_____ than surrounding ocean during summer _____ **Areas**: •High productivity ➔ lots of food ➔ high growth •Reduced predation ➔ low mortality _____ & _____ Areas • Long distance _____ species (birds) –Pacific Flyway (Alaska to Patagonia) –Examples: ducks & geese

•Increased Production in the surface waters results in oxygen depletion at depth

Where does O2 Come from	What happens to It	Result
1. 2. 3.		

Species

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Plant Species (Biotic)

Species	_____ _____	_____
Adaptation	**Salt tolerance in vascular Tissue:** •_____: water in tissues dilutes salts	**Excrete** •_____by pushing through leave •Introduced and _____species :(•Hybridized with native cordgrass •*Colonizing and eliminating mudflat habitat* •230+ species in San Francisco Bay

Animal Species (Biotic)

Species	_____	Northern _____ ____
Adaptation	**_____shell:** •When salinity drops **_____Use** • switch to anaerobic metabolism	**_____:** •When it gets too salty **Keep _____of water**: •Stay above water, spit water out •Lamellae like baleen

Debbie Downer

•Since the Gold Rush, _____% of the Bay's wetlands have been destroyed for development and agriculture. Scientists agree that the Bay needs 100,000 acres of tidal wetlands to be healthy, but as of today less than half that number exist.
•Ref: http://www.savesfbay.org/wetland-restoration

What people are doing to help:

There are currently 45,000 acres of healthy tidal wetlands throughout the Bay, the result of significant restoration efforts over the past half-century.
•Since the 1960's, conservationists have worked with state and federal agencies to secure an additional 31,000 acres of former wetlands.
•Although these lands are now protected forever from development, a small fraction of the funding necessary to restore them to healthy Bay marsh is currently available.
Save The Bay is committed to meeting the goal of 100,000 acres of restored Bay habitat. Since 2007, we have been working to identify new sources of funding for Bay restoration, staring with the release of a groundbreaking report, Greening The Bay.

Summary: