

Water Resources

Major limiting factors in aquatic systems: temp, access to sunlight, DO, avail of nutrients

Saltwater Life Zones

- Coastal Zones

- Estuaries (where salt and fresh water meet)
- Wetlands*BIG on AP Exam... know ecological services provided by wetlands
- Mangrove Swamps
- Intertidal zone
- Barrier Islands
- Coral Reefs

-Open Ocean

- Euphotic Zone (Upper zone; lots of sunlight and DO... lots of life!)
- Bathyl Zone
- Abyssal Zone (Deepest)

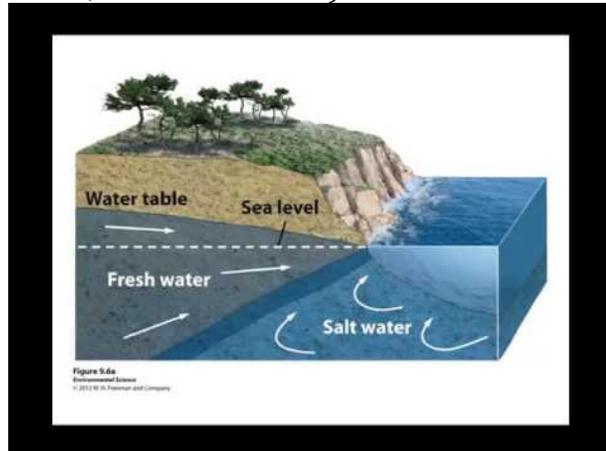
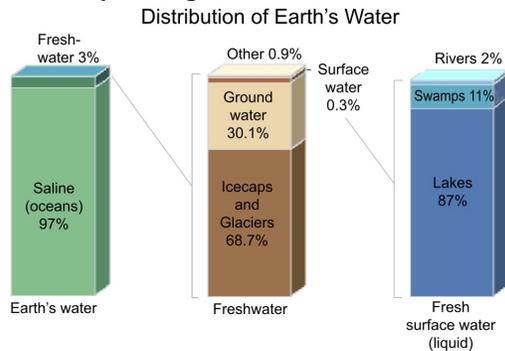
Freshwater Life Zones

-Lakes

- Lake overturns during spring & fall (brings oxygen to the bottom and nutrients to the top)
- Zones:
 - Littoral (near the coast... full of life!)
 - Limnetic (middle of lake at top... photosynthesis!)
 - Profundal
 - Benthic (bottom)

Groundwater: found under ground in spaces between soil and rock due to infiltration (not runoff into lakes/rivers/oceans). Important Source of freshwater!

(70% agriculture use, 20% industrial use, 10% domestic use)



-Zone of Saturation: marks the depth where ground is saturated with water

-Water Table: Uppermost level of Zone of Saturation

-Zone of Aeration: above water table; ground contains both air and water

Aquifer: Natural area where groundwater is found (Ogalalla Aquifer is largest!)

-overuse causes: sinkhole formation (subsidence), and saltwater intrusion

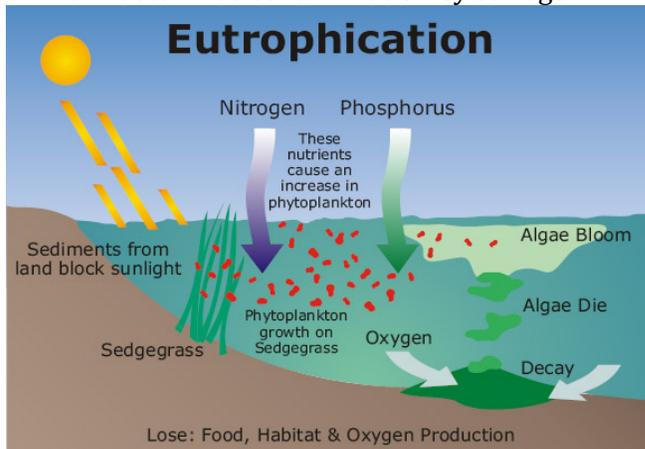
-recharge areas (where water enters) and discharge areas (water exits)

Water Quality

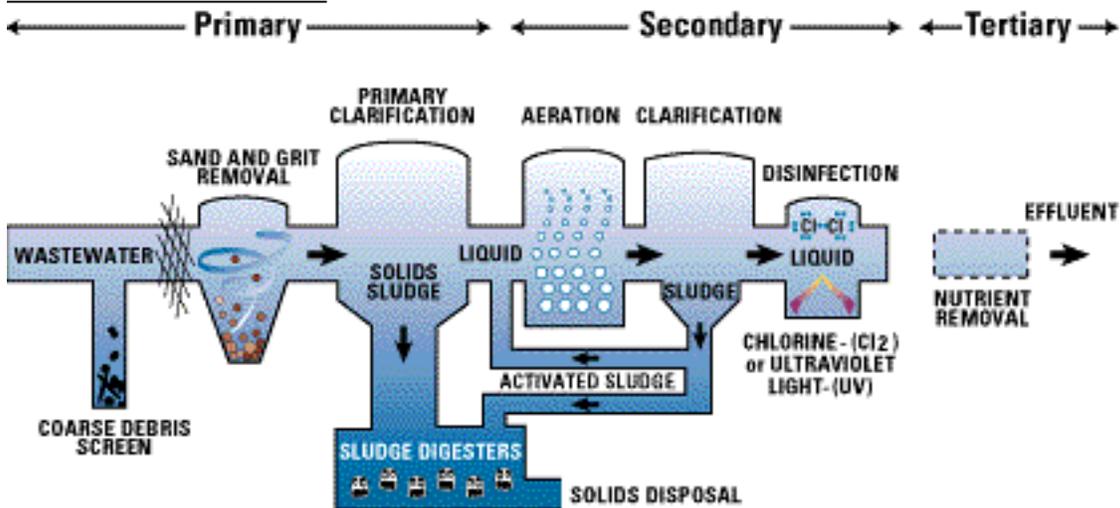
-measured by temp, turbidity, pH, DO, Nitrates/Phosphates, Hardness (Ca/Mg) fecal coliform bacteria (from animal waste), Salinity, CO₂

Water Pollution

- Point-Source (from one location) vs Non-Point-Source (from many locations)
- Common Pollutants: bacteria, lead, arsenic, aluminum (from acid deposition leached from soil), nutrients (N&P), Oil, organic material (sewage), radioactive waste, sediment (erosion)
- Chemicals in water can be bioaccumulated and then biomagnified.
- Eutrophication: when a lake or body of water has too many nutrients (N & P). Causes the excessive growth of algae (High BOD), which takes over lakes, uses up all of DO/nutrients, and then creates a dead zone. Most common cause is runoff of agricultural fertilizer and animal waste. Also contamination by sewage.



Wastewater Treatment:



Primary Treatment (physical process)

- Bar Screens/Floating object removal
- 1st Settling Tank: larger object removal

Secondary Treatment (biological process... uses bacteria to decompose organic waste)

- Aeration tank w/aerobic bacteria
- 2nd settling tank
- chlorine/ozone/UV removal of living organisms

Tertiary Treatment (chemical and physical process to remove specific chemicals (N,P))