FRESHWATER ECOSYSTEMS

1A. LAKES

lakes - also ponds if smaller
- inland depression of freshwater
- outlet into stream, wave action if large
- originate from glacial melt, volcanic crater, oxbow river, beaver dam

temperature - vary by season & depth
- winter surface colder, may freeze
- summer surface warms up, limited O2
- deeper less O2 & temp. more constant, thermocline between temp. zones
- spring/fall uniform, no thermocline, overturning mixes nutrients + O2

1B. ZONATION

stratification - diff depths
- epilimnion - upper, variable temp.
- metalimnion - middle, cool
- hypolimnion - lower, cold, overturn

littoral - shallow water near shore
- max light-O2, most productive-diverse
- plants rooted, emergent or submerged

limnetic - surface layer of open water
- also max light-O2

profundal - lower layer of open water
- less productive-diverse
- too dark for photosynthesis

benthic - bottom mud, mainly decompose
- low O2, productive if close to shore

1C. ECOLOGY

diversity - highest at surface (plankton)
- highest productivity in littoral
- decompose in benthic (also from land)

oligotrophy - if low nutrients/product.
- small-deep lake, rocky, clear blue water

eutrophy - greenish if excess nutrients
- esp. large-shallow, sediment/silt, agric.
- initially lots of plants/photosynthesis
- bacteria decompose, exhaust O2, death

2. RIVERS

rivers - collect freshwater from lakes
- flowing freshwater empty into seas
- stream if smaller & empty into lakes
- waterfall if vertical drop
- collect water from many streams

water gradient
- if steep - rapid, cutting, less sediment
- if flatter - slower, winding, wide area

zones - upstream (cold, fast, rocky, detrital)
- downstream (warmer, slower, plants)
- outlet (slowest, widest, more sediment)

diversity - algae-mosses attach to rocks
- inverts flat & cling beneath rocks
- fish streamlined to resist current flow

productivity - ext. nutrients (runoff, rain)
- high in riffles (turbulent, max CO2/O2)
- decompose in pools

3. WETLANDS

wetlands - once 3% land, mostly gone
- permanently or periodically flooded
- also soils saturated during spring

water - recharges underground water table
- reservoir to control flooding
- varies in duration, freq, season, depth
  source, direction, speed, chem

sources - riverine (flooded riverbanks)
- prairie potholes (collects rainfall)
- coastal shorelines (from tidal flow)

plants - adapt to water + low oxygen
- marsh (flooded grasslands)
- swamp/bayou (~flooded shrub-trees)
- riparian woodlands (seasonal)
- bogs/moors (lots decaying matter)

diversity - very high, nursery for larvae

productivity - very high
- nutrients from both land and sea

4. HUMANS

fishing & boating

siltation - agriculture, logging, mining

pollution
- oil, pesticides, toxins, acid, sewage, solid waste, thermal (warm water)
- hypertrophy (excess nutrients)

diversions - dams, drainage, landfill

urbanization