Aquatic Biodiversity

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1. Saltwater — 71% of Earth's surface
    - Oceans and estuaries
    - Coastlands and shorelines
    - Coral reefs
    - Mangrove forests
2. Freshwater — 2.2% of Earth's surfaces
    - Lakes, rivers, and streams
    - Ice, glaciers
3. Phytoplankton
    - Tiny, photosynthetic organisms. Primary producers for most aquatic food webs
4. Ultraplankton
    - Tiny photosynthetic bacteria
5. Zooplankton
    - Secondary consumers
    - Can be single-celled and up to large invertebrates like jellyfish
6. Nekton — Strong swimmers (fish, turtles, whales)
7. Benthos — Bottom dwellers (oysters, sea starts, clams, lobsters, clams)
8. Decomposers — Mostly bacteria
9. Distribution of organisms and biodiversity depends on:

- Temperature
- Dissolved oxygen content
- Availability of food
- Availability of light and nutrients needed for photosynthesis
- Turbidity — Degree of cloudiness in water; inhibits photosynthesis

10. Zones: Euphotic → Bathyal → Abyssal
11. Water temperature drops rapidly between the euphotic zone and the abyssal zone in an area called the thermocline
12. Estuaries — Where rivers meet the sea
13. Coastal Wetlands — Coastal land covered with water all or part of the year
14. Brackish Water — Seawater mixes with freshwater
15. These ecosystems are all very productive with high nutrient levels
16. Highly Productive Areas:
    - River mouths
    - Inlets
    - Bays
    - Sounds
    - Salt marshes
    - Mangrove forests
17. Intertidal zone
    - Area of shore between high and low tides
    - Rocky shore
    - Sandy shore, barrier beach
18. Organism adaptations necessary to deal with daily salinity and moisture changes
19. Coral reefs are the marine equivalent of tropical rainforests
20. Reefs are being destroyed and damaged worldwide
21. Ocean Acidification
    - Ocean absorbs CO_2
    - CO_2 reacts with ocean water to form a weak acid that decreases levels of carbonate ions (CO_3^{2-}) needed to form coral

22. Major threats to marine systems include:
    - Coastal development
    - Overfishing; use of fishing trawlers
    - Runoff of nonpoint source pollution
    - Habitat destruction
    - Introduction of invasive species
23. Standing (lentic) bodies of freshwater
    - Lakes
    - Ponds
    - Inland wetlands
24. Flowing (lotic) systems of fresh water
    - Streams
    - Rivers
25. Lakes have four zones based on depth and distance from shore
    - Littoral zone
        - Near shore where rooted plants grow; high biodiversity
        - Turtles, frogs, crayfish, some fish
    - Limnetic zone
        - Open, sunlight area away from shore; main photosynthetic zone
        - Some larger fish
    - Profundal zone
        - Deep water too dark for photsynthesis
        - Low oxygen levels
        - Some fish
    - Benthic zone
        - Decomposers
        - Detritus feeders
        - Some fish
        - Nourished primarily by dead matter
26. Oligotrophic lakes
    - Low levels of nutrients and low Net Primary Productivity

- Very clear water

27. Eutrophic lakes

    - High levels of nutrients and high NPP
    - Murky water with high turbidity

28. Cultural eutrophication of lakes from human input of nutrients

29. Inland wetlands

    - Lands located away from coats that are covered with freshwater all or part of the time
    - Includes: Marshes, swamps, prairie potholes, floodplains, and arctic tundra