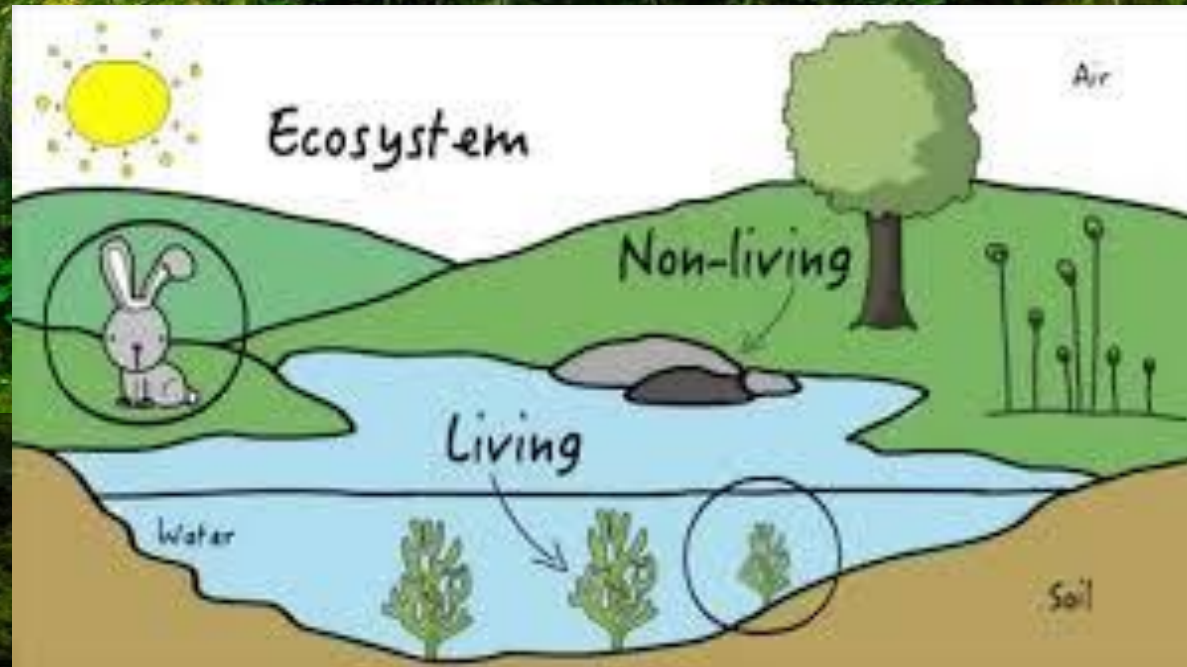


ECOLOGY



Dr. Vijay K. Khorwal

CHE 110: Environmental Studies

Unit - 2

Ecosystems

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Process / Stages of Ecological Succession

Nudation- Succession begins with the development of a bare site, called Nudation (disturbance).

Invasion

- **Migration**- It refers to arrival of propagules (seeds), dispersion.
- **Ecesis**- It involves establishment and initial growth of vegetation.
- **Aggregation**- It involves increase in number of species.

Competition- As vegetation became well established, grew, and spread, various species began to compete for space, light and nutrients. This phase is called competition.

Reaction: Mechanism of the modification of the environment through the influence of living organisms on it.

Stabilization- Reaction phase leads to development of a climax community.

Process of ecological succession

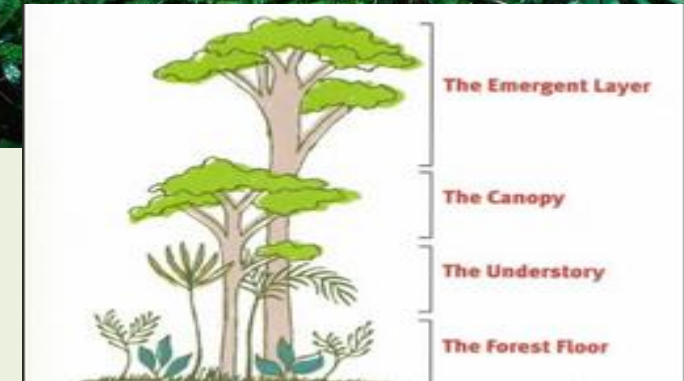
- Nudation
- Invasion
 - Migration (dispersal)
 - Ecesis (establishment)
 - Aggregation
- Competition
- Reaction
- Stabilization

Forest ecosystem

- **Abiotic Components**
 - Inorganic and organic substances found in soil
 - Temperature, humidity, rainfall, light
 - Biogenic gases (CO_2 , O_2)
- **Biotic components**
 - Producers: Large trees, herbs, lianas (climbers), Orchids
 - Primary consumer: Deer, Elephant, moles etc.
 - Secondary consumer: Snake, Lizards etc.
 - Tertiary consumers: Tiger, Lion etc.
 - Decomposers

Tropical rain forest

- Notable features:
 - Found in tropical region (near the equator).
 - High rainfall, humidity and temperature
 - Large leaves
 - Rich in biodiversity
 - Fauna of these rainforests includes the jaguar, tapir, okapi, boa constrictor, African grey parrot, keel-billed toucan, crowned eagle, three-toed sloth, spider monkey, large flying fox and more.
- Example: Amazon Rainforest, Congo Rainforest, Southeast Asian Rainforest etc.



Tropical deciduous forest

- Notable features:
 - Tropical deciduous forests form a natural cover almost all over India.
 - They are of two types-moist and dry. Moist forests are found on the eastern slopes of Western Ghats, North eastern parts of the Peninsular Chhota Nagpur plateau and along the Shiwaliks.
 - They shed there leaves for a particular period of time.
 - They are economically very important because of timber like sal and teak.
 - The animals found here are tiger, wolves, rabbit etc.



Jorge Novoa | avianreport.com

Sub-tropical forest

- **Notable features:**
 - Subtropical forests are within or bordering the tropical zone.
 - temperatures may vary only slightly over a year
 - Subtropical rainforests occur in Central America, the West Indies, India, Madagascar, mainland Southeast Asia, and the Philippines.
 - Small deciduous trees and shrubs are found.



Temperate rain forest

- Notable features:
 - The world's largest temperate rain forests are found on the Pacific coast of North America.
 - Temperate rain forests are also found in coastal Chile, Norway, the United Kingdom, Japan, Australia and New Zealand.
 - The mild weather conditions
 - Adequate rainfall
 - Coniferous trees dominate the forest
 - tall evergreen trees are also found
 - Animals: black bears, lynx, wolves etc.



Temperate deciduous forest

- Notable features:
 - Located in the mid-latitude areas (between the polar regions and the tropics).
 - The temperature varies widely from season to season with cold winters and hot, wet summers.
 - During the fall, trees change color and then lose their leaves.
 - Most of the trees are broadleaf trees such as oak, maple, beech, hickory and chestnut.
 - Animals: toad, chipmunk, gray squirrel, Yellow-breasted chat etc.



Evergreen coniferous forest

- Notable features:
 - They are found just in south of arctic tundra
 - Winters are long, cold and dry
 - Sunlight is available for few hours only
 - Soil has less nutrient and acidic
 - Major trees are Pine, Fir, Cedar etc.
 - Animals: moose, deer, reindeer, squirrels, wolves, bears, foxes, owls, woodpeckers hawks etc.



Grassland ecosystem

- **Abiotic components:**
 - Inorganic elements (C, H, O, N, P, S)
 - Temperature, humidity, rainfall, light
- **Biotic components:**
 - Producers: Some scattered trees, Grass
 - Primary consumers: Grazing animals,

Tropical grassland

- Notable features:
 - Located near the equator, between the Tropic of Cancer and the Tropic of Capricorn.
 - Although these areas are overall very dry, they do have a season of heavy rain.
 - Dominated by grasses
 - May have some drought-resistant, fire-resistant trees
 - Animals: giraffes, zebras, buffaloes, kangaroos, mice, moles, gophers, ground squirrels, snakes, worms, termites, beetles, lions, leopards, hyenas, and elephants.
- Examples:
 - Savannas



Temperate grassland

- Notable features:
 - Trees and shrubs are completely absent or rare.
 - cold winters (-40°C) and hot summers (38°C)
 - Gentle slope
 - Animals: Rodents, bison, wolves, hawks, owls etc.
- Examples:
 - Prairies (South America)
 - Pampas (Africa)
 - Velds (Central Europe)
 - Steppes (Asia)



Polar grassland

- Notable features:
 - Severe cold and strong wind
 - Arctic wolf, arctic fox, reindeer, migratory birds and insects are found.
- Examples:
 - Arctic Tundra
 - Permafrost: Permafrost is soil, rock or sediment that is frozen for more than two consecutive years. In areas not overlain by ice, it exists beneath a layer of soil, rock or sediment.



Desert ecosystem

- About 1/3rd of the worlds' land area is covered with desert
- Tropical desert
 - Notable features:
 - It is the driest and hottest place on earth.
 - Rainfall is sporadic and in some years no measurable precipitation falls at all.
 - Examples: Sahara, Kalahari, Thar, Mexican deserts, Great Australian desert.
- Temperate desert
 - Notable features:
 - Temperate deserts can be much colder than tropical deserts
 - The floor of the temperate desert is often covered by rocks and small pebbles
 - Examples: Mojave, Sonoran Deserts
- Cold desert
 - Notable features:
 - cold deserts occur in temperate regions at higher latitudes
 - hot summers but extremely cold winters.
 - Examples: Atacama,
 - Gobi, Great Basin, Namib, Iranian, Takla Makan, and Turkestan



Pond ecosystem

- Notable features:
 - Small freshwater ecosystem
 - Water is stagnant
 - Can be seasonal
 - Exposed to anthropogenic activities



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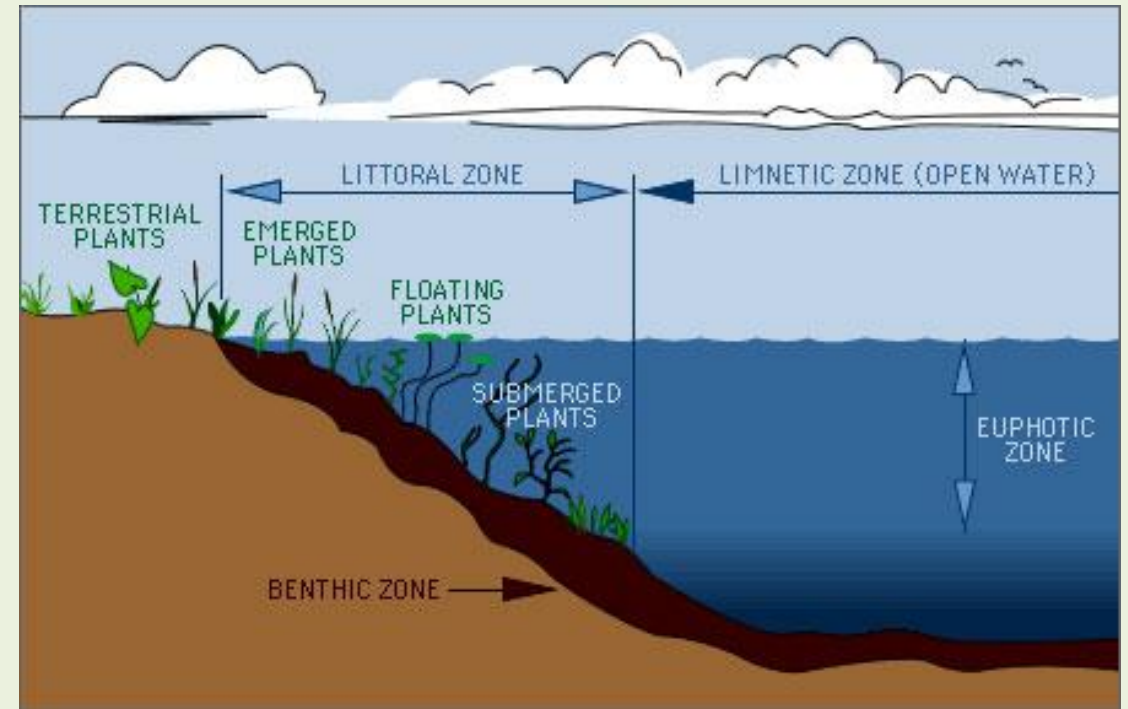
Lake ecosystem

■ Organisms of aquatic ecosystem

- Planktons (Algae, rotifers)
- Nektons (Fishes)
- Neustons (Water flea)
- Benthos (Snail)
- Periphytons (Crustaceans)

■ Zonation (Stratification)

- Epilimnion (Warm, lighter, circulating surface layer)
- Hypolimnion (Cold, viscous, non-circulating bottom layer)

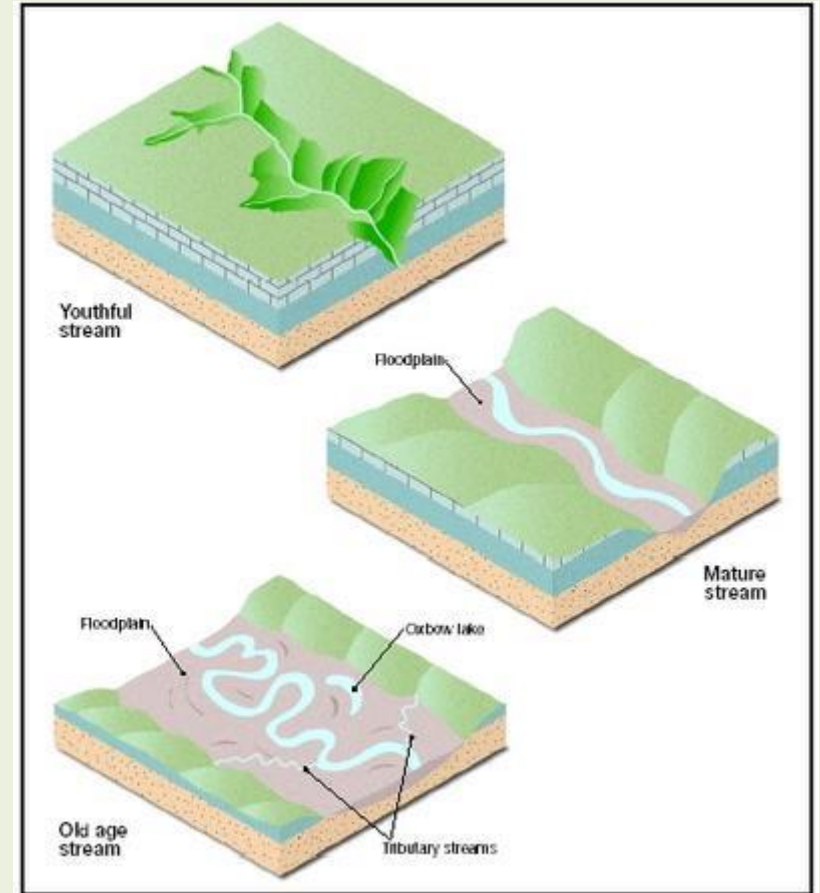


Types of lakes

- Oligotrophic lakes (Low nutrient content)
- Eutrophic lake (High nutrient content)
- Dystrophic lake (Low pH)
- Endemic lakes (Ancient, deep, having endemic fauna)
- Desert salt lakes (High salt content)
- Volcanic lakes
- Mermictic lakes (Permanently stratified)
- Artificial lakes

Streams

- Notable features:
 - Stages
 - Mountain highland (Young River)
 - Second phase (Middle Aged River)
 - Third phase (Old River)



Oceans

- **Notable features:**
 - Marine ecosystems support a great diversity of life and variety of habitats.
 - The ocean is a major influence on weather and climate.
 - Plants: seaweeds, or marine algae (brown, green, red), sea grasses, phytoplankton
 - Animals: protozoans, marine invertebrates (echinoderms, mollusks, segmented and non-segmented worms, jellies, coral, sea anemones, hydroids) marine vertebrates (fishes, birds, mammals), and zooplankton.
- **Zones**
 - Coastal zone
 - Open sea
 - Euphotic zone (Abundant sunlight, high photosynthetic activity)
 - Bathyal zone (Dim light)
 - Abyssal zone (Dark zone)