# Chapter 8: Biomes

## Biotic Provinces

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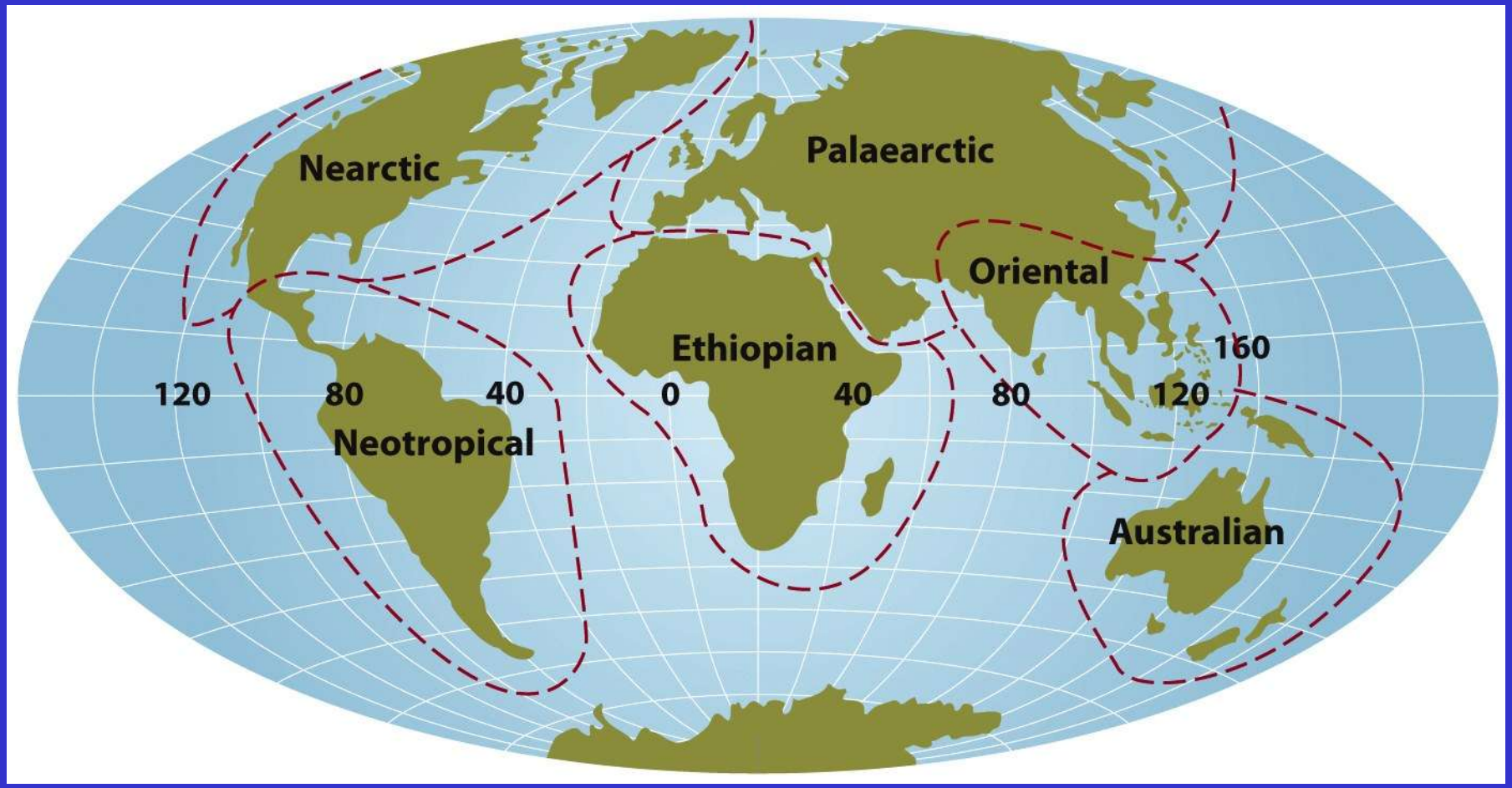
**In 1876 Wallace suggested that the world could be divided into six biogeographic regions Referred to as realms Neartic, Neotropical, Palaeartic, Ethiopian, Oriental, and Australian**


Nearctic
Palaearctic
Oriental
Ethiopian
Neotropical
Australian
120
80
40
0
40
80
120
160

# Biotic Provinces

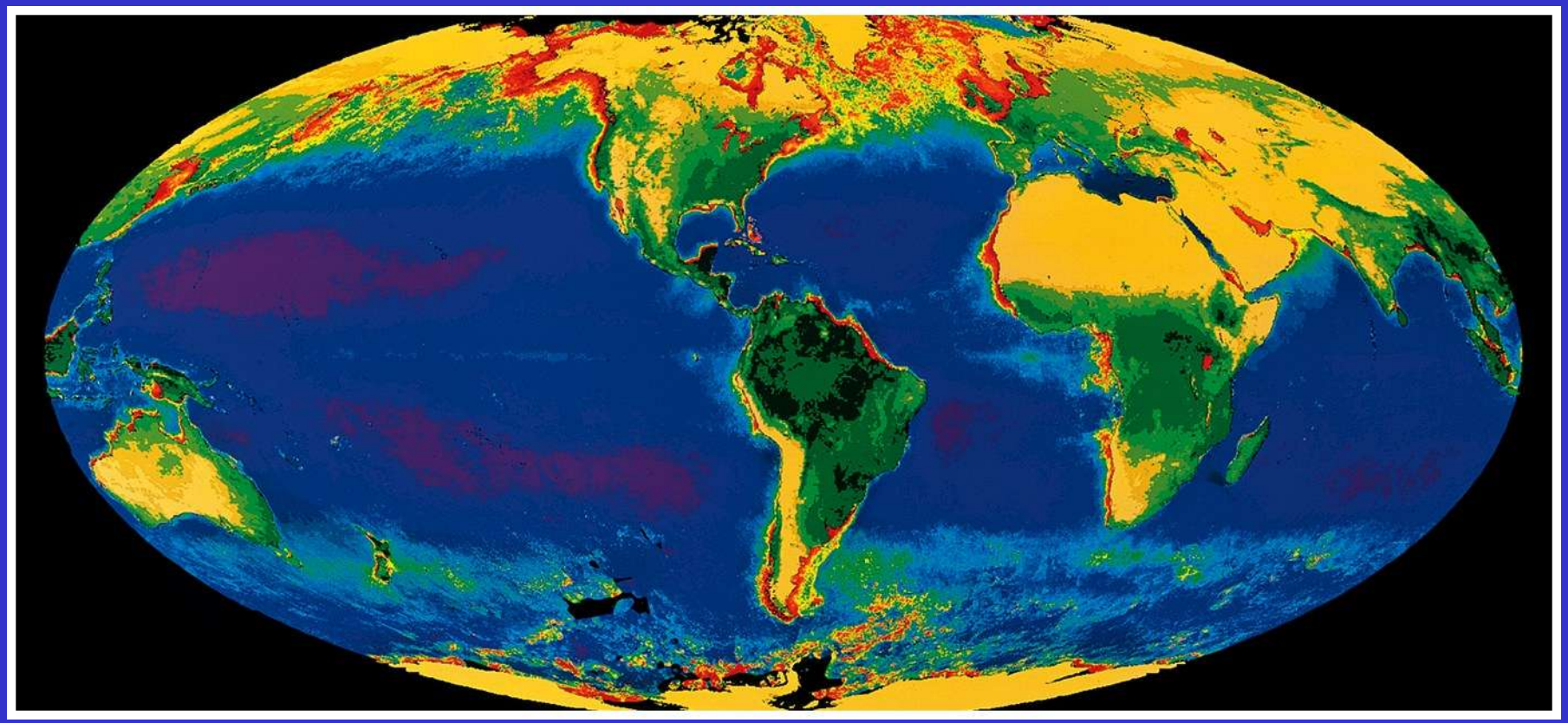
- All living organisms classified into groups called taxa
  - Based on evolutionary similarities
  - Largest group- domain or kingdom
    - Divisions/phyla
    - Classes
    - Orders
    - Families
    - Genera
    - Species

# Biogeography and People

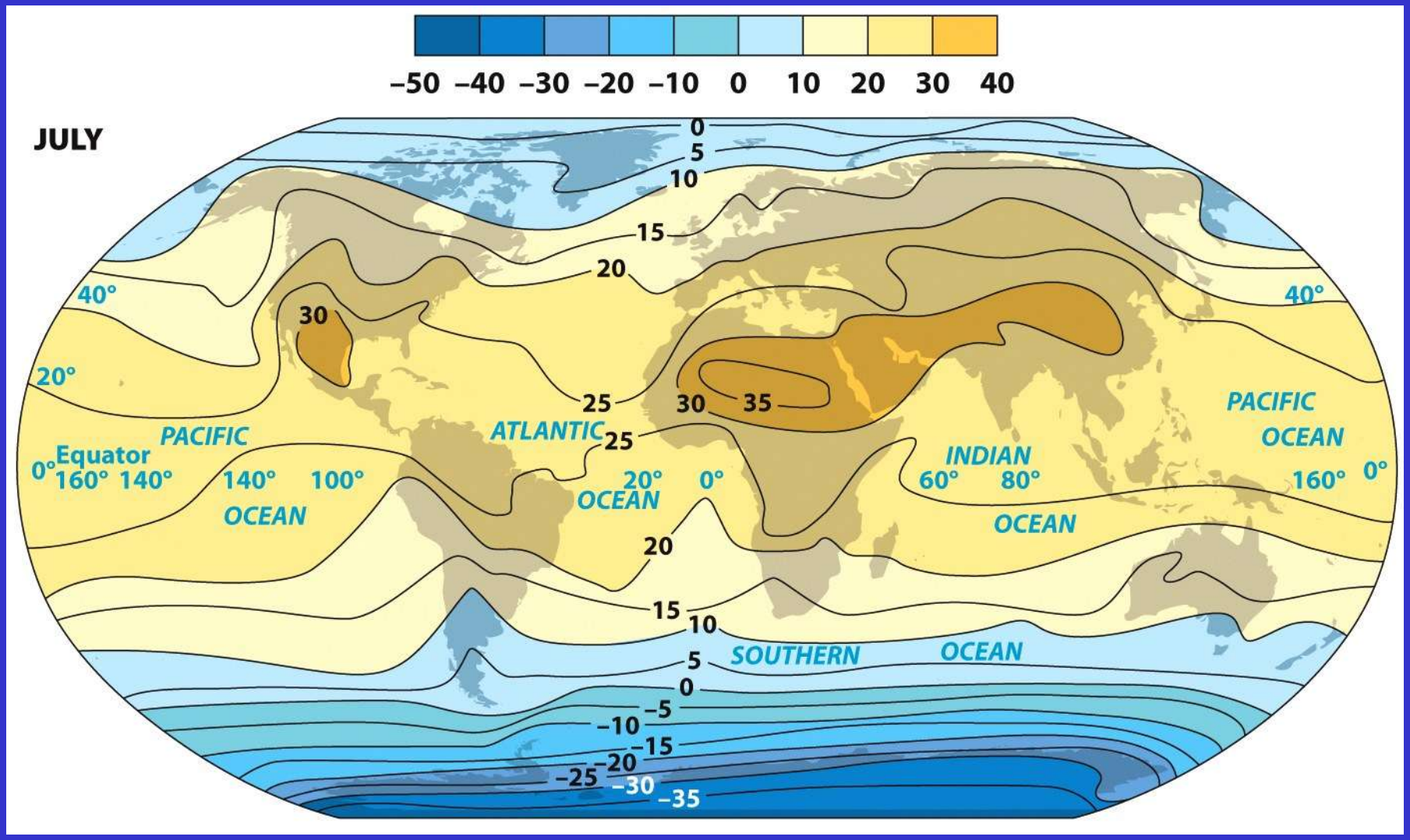
- People alter biodiversity by
  - Direct hunting
  - Directly disturbing habitats
  - Introducing exotic species into new habitats
- Introductions have mixed results
  - Food sources, landscaping, pets
  - Disastrous ecological consequences

# Earth's Biomes

- 17 major biomes
- Usually named for the
  - dominant vegetation type
  - dominant shape or form of the dominant organisms
  - dominant climatic conditions



Biomes show up on Earth satellite image.




Biome patterns correspond to average summer temperature.

# Earth's Biomes

- Biological diversity varies among biomes
  - Generally declines with increasing latitude
- Two theories
  - The more favorable the temperature and precipitation for life the more diversity.
  - Greater the variability of climate, the lower the diversity

# The World's Biomes

Biomes are defined as "the world's major communities, classified according to the predominant vegetation and characterized by adaptations of organisms to that particular environment (Campbell)

- **Biomes are classified in various ways. One classification group biomes into five major types:**

**Aquatic**

**Deserts**

**Forests**

**Grass lands**

**Tundra**

# Tundra

- Treeless plains that occur in harsh climates of low rainfall and low average temperature.
- Dominant vegetation
  - Grasses, sedges, mosses, lichens, dwarf shrubs and mat-forming plants
- Permafrost- permanently frozen ground
  - Extremely fragile, long recovery time

# Forests

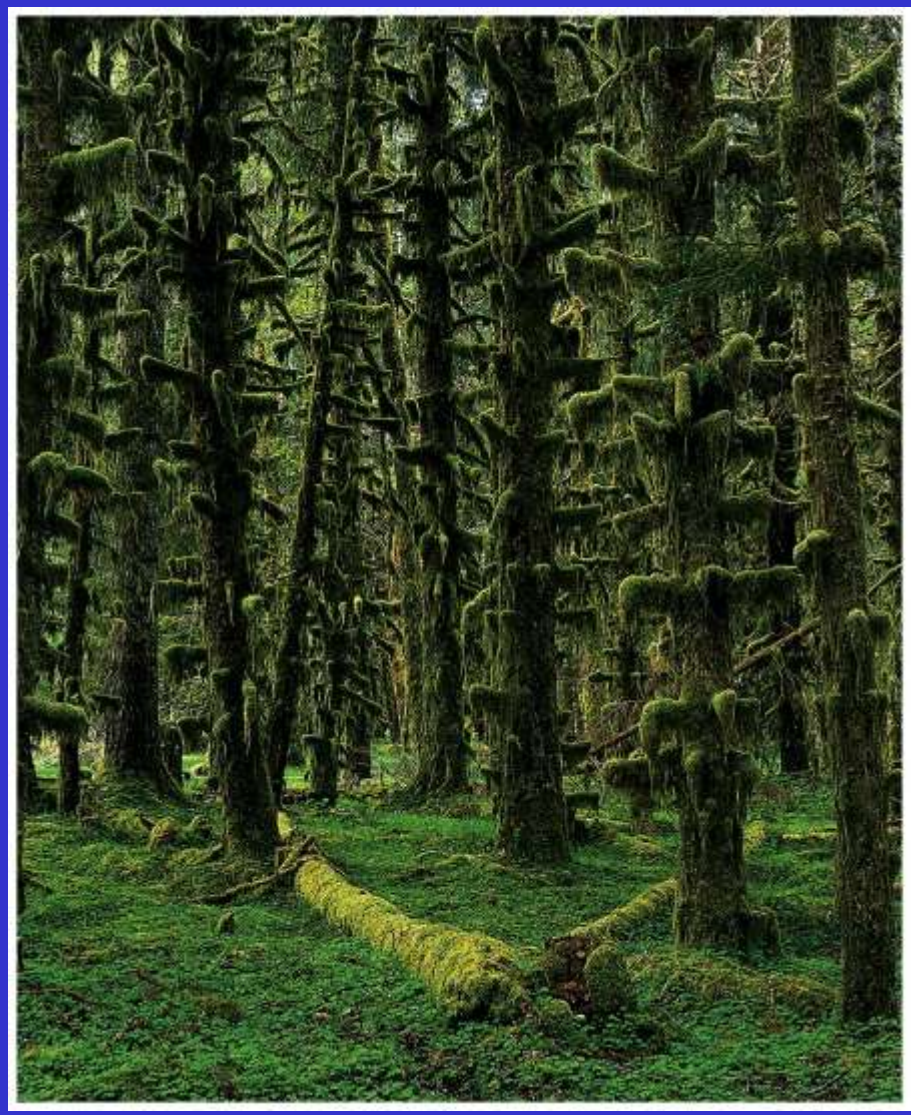
**Taiga or Boreal Forest**

- Includes forests of the cold climates of high latitudes and high altitudes
- Dominant vegetation
  - Conifers, especially spruces, firs, larches and some pines
  - Biodiversity is low (20 major species)
- Dominant animals
  - Few lg mammals, sm carnivores, sm rodents
  - Many insects and migratory birds

Moose in taiga biom

# Temperate Rain Forest

- Occur where temperatures are moderate and precipitation exceeds 250 cm/year.
- Dominant vegetation
  - Evergreen conifers (some of the tallest trees in the world)
- Low diversity of plants and animals
- Important economically and culturally



Temperate Rain Forest

# Tropical Rain Forests

- Occur where the average temperature and rainfall are high and relatively constant throughout the year.
- Famous for their diversity of vegetation
  - 2/3 of known flowering plants
  - Many species of animals as well
- Soils low in nutrients

Tropical Rain Forest

# Grasslands

- **Temperate Grasslands**
- Occur in regions too dry for forests and too moist for deserts.
- Dominant vegetation
  - Grasses and flowering plants
- Many converted to agriculture
  - deep, rich soils
- Highest abundance and greatest diversity of large mammals
  - Grasses and grazers evolved together

Fire is important for the maintenance of Temperate Grasslands

# Deserts

- Occur in the driest regions where rainfall is less then 50 cm/year.
- Specialized vegetation, vertebrates and invertebrates.
  - Water conservers
- Soils has low organic matter but abundant nutrients
  - Need only water to become productive

Desert Biome

# Aquatic

**Wetlands**

- Include freshwater swamp, marshes and bogs and saltwater marshes.
  - All have standing water
- Dominant vegetation
  - Small tress (mangroves) to shrubs, sedges and mosses

# Freshwaters

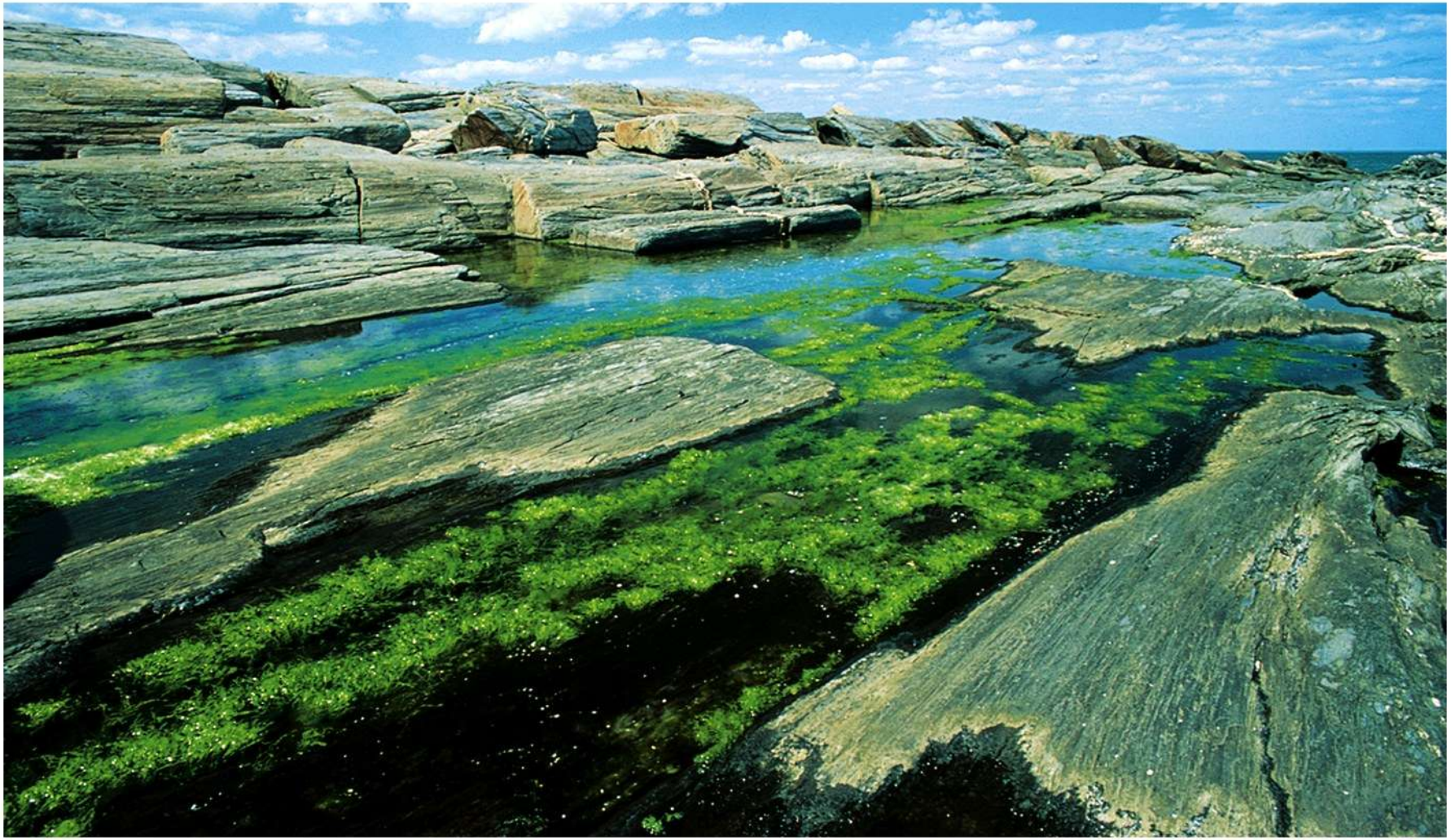
- Freshwater lakes, ponds, rivers, and streams
  - Make up a very small portion of Earth's surface
  - Critical for water supply, material transport
- Dominants
  - Floating algae, phytoplankton
  - Abundant animal life

# Freshwater

- Estuaries- areas at the mouths of rivers
  - Rich in nutrients
  - Abundance of fish and important breeding sites for fish
- Freshwater among the most important biomes for life's diversity.

# Intertidal Areas

- Areas exposed alternately to air during low tide and ocean waters during high tide.
- Constant flow of nutrients into and out of area.
  - Rich in life
- Susceptible to pollution
- Adaptation to disturbances is essential to survival in this biome.



# Open Ocean

- Pelagic region- includes waters in all of the oceans
- Vast areas low in nitrogen and phosphorus
  - Many species but at low density
- Benthos
  - The bottom portion of oceans
  - Primary input of food is dead organic matter
  - Not enough light for plant growth

# Open Ocean

- Upwelling
  - Upward flow of deep ocean waters brings nutrients to the surface
  - Abundant growth of algae occurs and forms base to food chain
- Hydrothermal Vents
  - Occur in deep ocean where hot water w/ high concentration of sulfur compounds released
  - Chemosynthetic bacteria base of food chain