

The Earth's Biomes II

Life's pervasiveness on Earth

Dr. Brian M. Napoletano

University of Detroit Mercy
Department of Biology
Biology 1030

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Top ten side effects of climate change

<http://goo.gl/ou1wr>

1. Forest wildfires
2. Loss of historic ruins
3. Mountain rebound
4. Less drag on satellites
5. Reproduction in migratory species
6. Thawing permafrost (and diseases)
7. Draining arctic lakes
8. Arctic phytoplankton blooms
9. Altitudinal shifts
10. Longer and more severe allergy seasons

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New Office (and Hours)

- ▶ Ford Life Sciences, 212
- ▶ 1:00–4:00 pm MWF

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Tropical seasonal (dry) forest



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Tropical seasonal (dry) forest

Range:	Tropical latitudes (10–30° latitude)
Seasons:	Highly seasonal precipitation
Precipitation:	Dry most of the year, brief periods of abundant rainfall, esp. monsoon forests
Temperature:	25–27°C
Soil:	Low nutrient content
Vegetation:	Drought-resistant deciduous trees, epiphytes, lianas
SR:	High
Productivity:	11%
Threats:	Agriculture, logging, rangeland

See also Brown and Lomolino (1998) and Cunningham and Cunningham (2008)

Tropical seasonal (dry) forest

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Tropical seasonal (dry) forest



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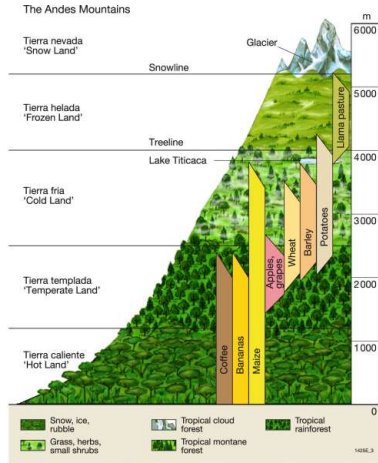
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Mixed montane biomes



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Determinants of community composition in aquatic ecosystems

- ▶ Salinity
- ▶ Light penetration
- ▶ Dissolved oxygen
- ▶ Nutrients
- ▶ Temperature
- ▶ pH
- ▶ Flow

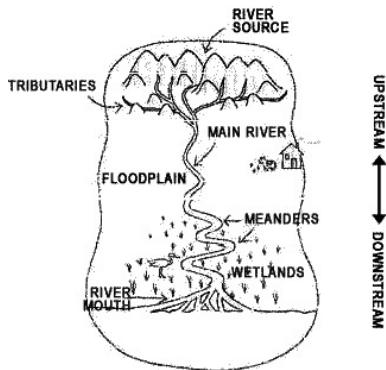
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Types of marine organisms

- ▶ Plankton
 - ▶ Phytoplankton
 - ▶ Zooplankton
- ▶ Nekton
- ▶ Benthos

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Rivers



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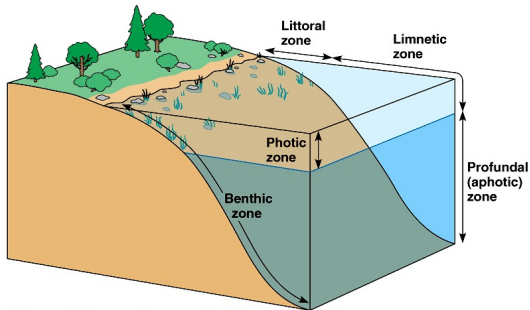
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Threats to rivers

- ▶ Non-point-source pollution
- ▶ Siltation
- ▶ Dam

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Freshwater lakes



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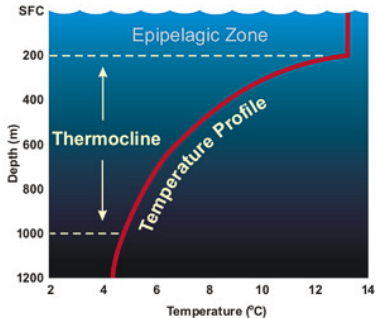
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Thermal stratification



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Threats to lakes

- ▶ Rivers tend to flow into lakes
- ▶ Water withdrawals

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Wetlands

- ▶ “[S]hallow ecosystems in which the land surface is saturated or submerged at least part of the year”
- ▶ Contain vegetation adapted to grow in these saturated environments
- ▶ Legal definition is critical due to disproportionate importance of wetlands

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Types of wetlands

- Swamp** (Forested wetland) Wetlands dominated by trees; high biological productivity; high nutrient levels
- Marsh** Wetland dominated by grasses and other vegetation; high biological productivity; high nutrient levels
- Bog** Area of water-saturated ground, fed by precipitation; containing layers of undecayed vegetation (peat); low biological productivity; low nutrient levels
- Fen** Area similar to bog, but fed by groundwater

Forested wetland



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Marsh



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Bog



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Threats to wetlands

- ▶ Urban sprawl
- ▶ Development
- ▶ Agriculture
- ▶ Pollution
- ▶ Pest eradication

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Estuaries

- ▶ Combination of factors place them among the most fertile ecosystems:
 1. Rivers carry terrestrial nutrients into the estuary
 2. Tidal action promotes rapid nutrient cycling and waste removal
 3. Significant light penetration into shallow water
 4. Numerous plants act as primary producers and trap detritus
- ▶ Critical habitats for fish and other organisms

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Salt marsh



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Mangrove forest



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Threats to estuaries

- ▶ Coastal development
- ▶ Pollution
- ▶ Aquaculture

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Marine life zones

- ▶ Intertidal environment
 - ▶ Supratidal zone
 - ▶ Intertidal zone
 - ▶ Subtidal zone
- ▶ Pelagic environment
 - ▶ Neritic province
 - ▶ Oceanic province
- ▶ Benthic environment

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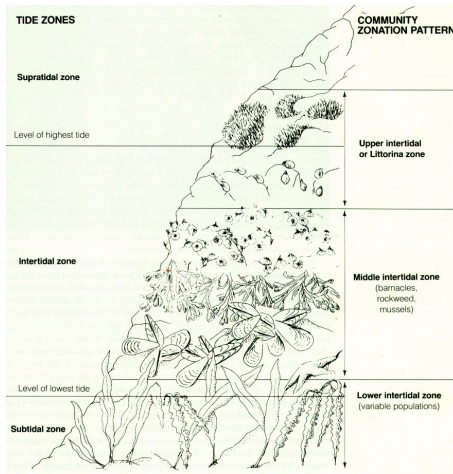
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Intertidal environment



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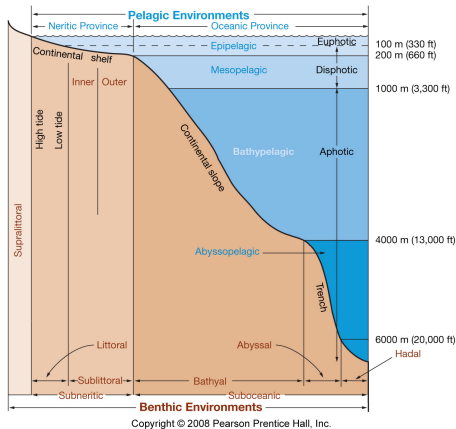
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Pelagic environment



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Benthic environment

- ▶ Seagrass bed — less than 10 m, high primary productivity, food and habitat source
- ▶ Kelp forest — approximately 25 m along rocky shorelines, habitat and indirect food source (through decomposition)
- ▶ Coral reef — warm, shallow water with year-round sunlight (cold-water reefs also exist), water may be nutrient poor
 - ▶ Fringing reef
 - ▶ Atoll
 - ▶ Barrier reef

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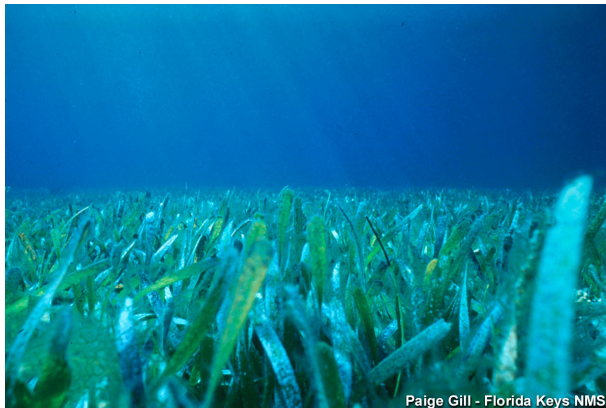
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Seagrass bed



Paige Gill - Florida Keys NMS

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Kelp forest



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Coral reef



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Barrier reef



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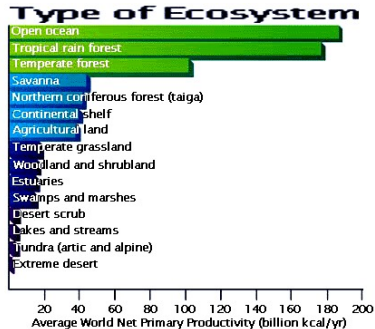
References

Threats to the ocean

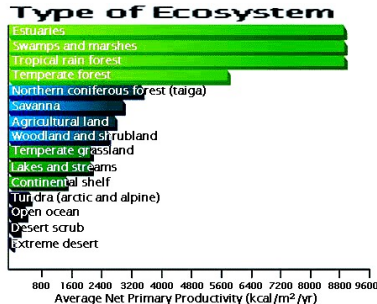
- ▶ Non-point-source pollution
- ▶ Point-source pollution
- ▶ Invasive-alien species
- ▶ Overharvesting
- ▶ Bycatch
- ▶ Aquaculture
- ▶ Coastal development
- ▶ Habitat destruction
- ▶ Climate change

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Net Primary Productivity by Ecosystem, World Average


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Net Primary Productivity by Ecosystem, Per Unit Area


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Cunningham, W. and M. A. Cunningham (2008, January). *Principles of Environmental Science: Inquiry & Applications* (Fourth ed.). Boston, Massachusetts, United States: McGraw-Hill.