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What is Biodiversity?



What is Biodiversity?

- ...the organization of life at all levels of biological organization
- ...the relative diversity among organisms in different ecosystems
- ...totality of genes, species, and ecosystems of a region
- ...the variability among living organisms from all sources, and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems" - 1992 United Nations Earth Summit

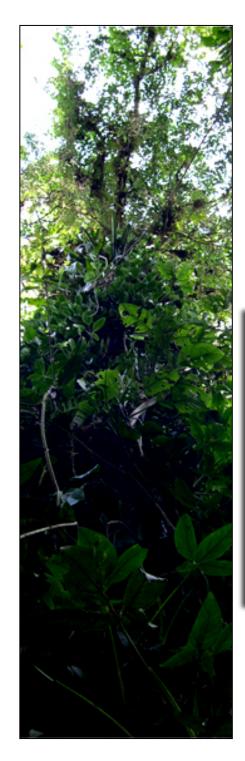


What is Biodiversity?

 www.thewildclassroom.com/ home/ecogeeksvideos/ biodiversity.html



- Why do we care about biodiversity?
- What are the positive impacts of biodiversity?
 - For humans?
 - For ecosystems?



 Food - humans use at least 40,000 different species of animals and plants for food every day







- Pharmaceuticals about 40% of pharmaceuticals produced in the U.S. are manufactured using compounds derived from plants and animals
- the vast majority of organisms on the planet have not been assessed for their pharmaceutical potential
- www.inbio.ac.cr/en/default.html





 Industrial/Building Materials - a wide variety of materials materials are gathered from biological sources





• **Ecosystem Services** - water filtration, atmosphere chemistry, pollination, decomposition, nutrient cycling, resistance to invasion





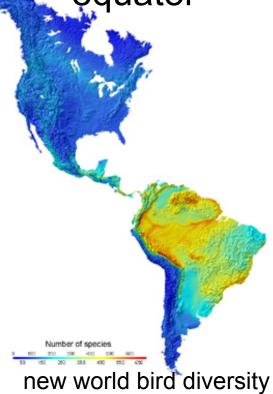
Leisure, cultural, and aesthetic
 value - hardest to quantify

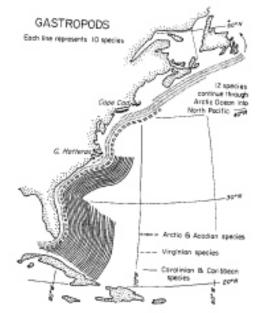




Patterns of Biodiversity

 Latitudinal Gradient - tendency for taxonomic diversity to increase as you approach the equator



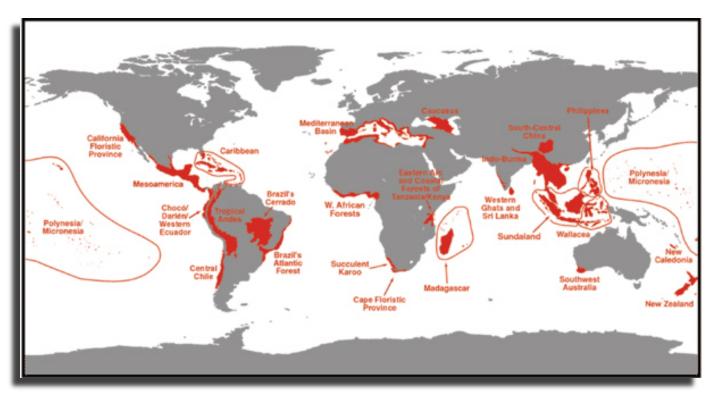


atlantic coast gastropod diversity - from Fischer 1960



Patterns of Biodiversity

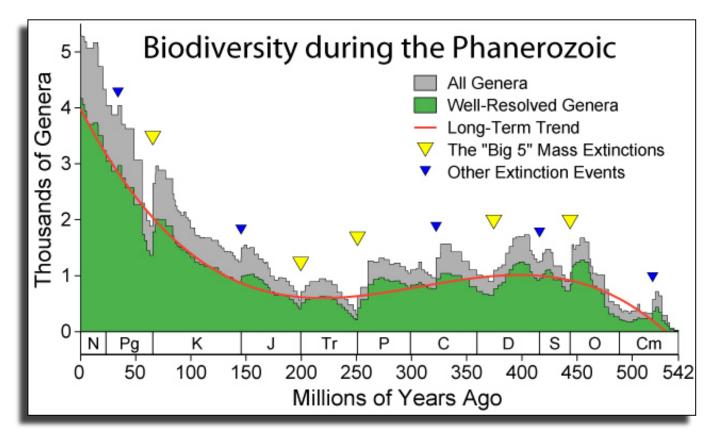
• **Biodiversity Hot Spots** - areas of locally high species richness





Patterns of Biodiversity

Biodiversity through time

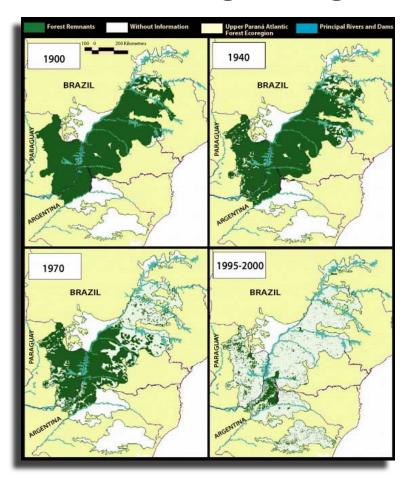




- What are some of the ways humans have impacted biodiversity?
 - globally
 - locally



 Conversion of rain forest to agriculture and grazing



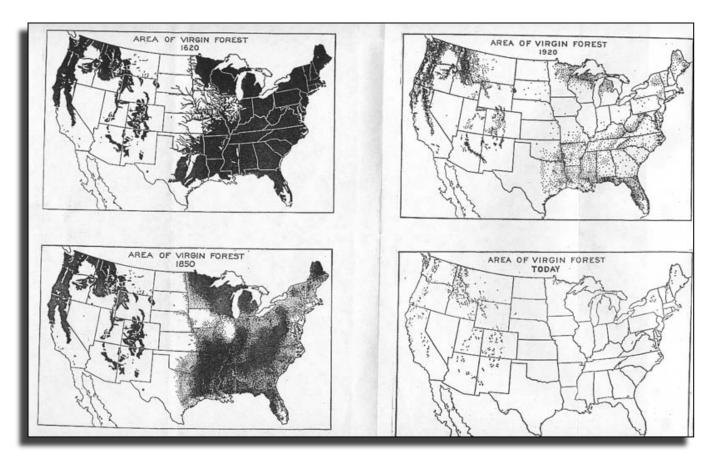


 Conversion of rain forest to agriculture and grazing





Changes in Forest Cover in U.S.



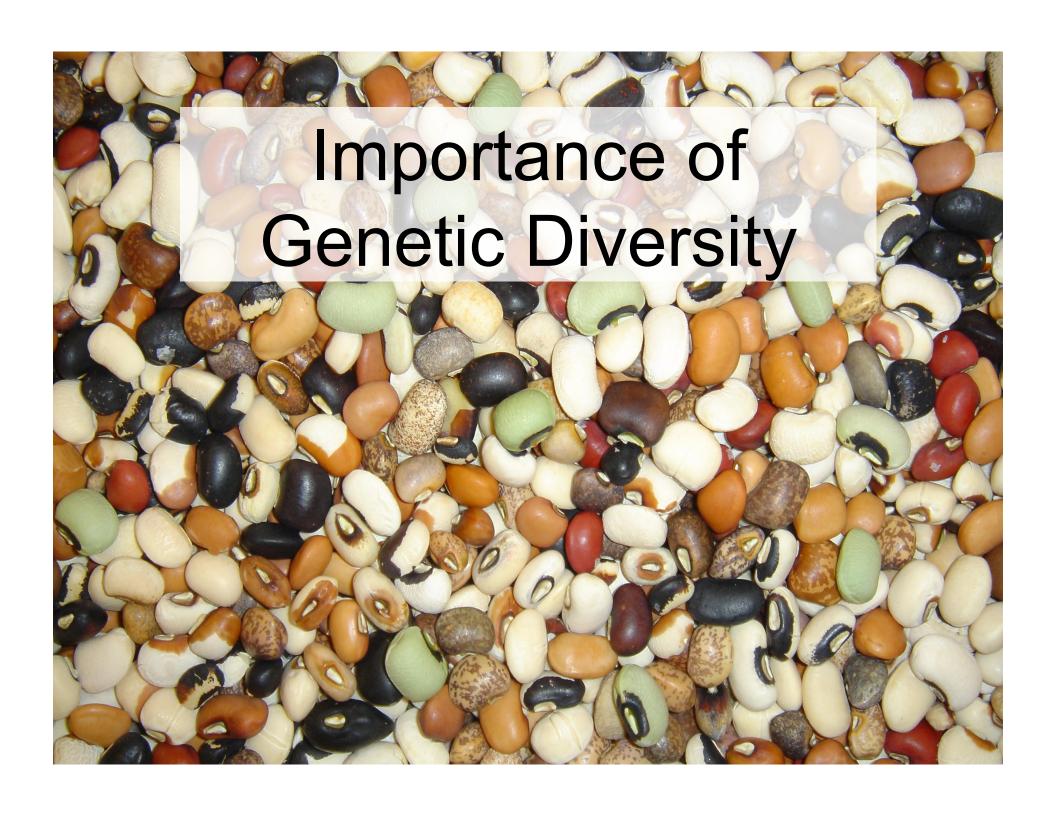


- Invasive Species can displace, outcompete, or directly prey upon native biodiversity
- www.actionbioscience.org/ biodiversity/simberloff.html



Biodiversity Sampling Exercise





Food Agency Calls for Banana Diversity





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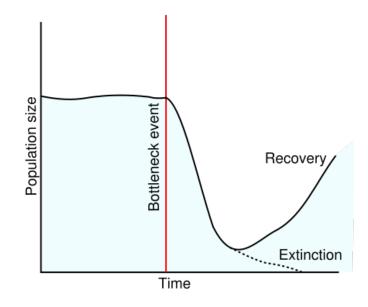


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Risks for species with low levels of genetic diversity

- Disease susceptibility
- Inability to adapt
- Inbreeding
- Bottleneck effect





Benefits of genetic diversity

Evolutionary potential

Genetic repository for disease

resistance

Competitive advantage

Optimize niche availability

Maintains species diversity

Influences colonization success



Human Induced Declines

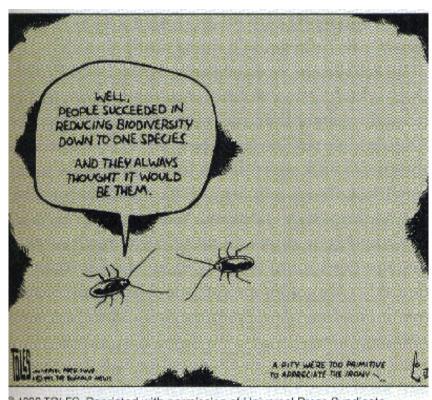
- Fragmentation of habitat
 - Limits gene flow
- Selective Breeding
 - Dogs and other domesticated animals
- Agricultural Production
- Overharvesting/ excessive hunting

Other Genetically Depauperate Species



Preservation of genetic diversity

- Genebanks
- Planting locally native genotypes
- Encouraging diversity in food types
- Avoiding excessive harvesting



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