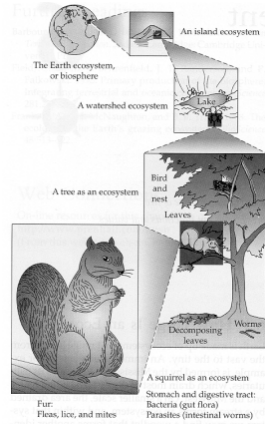


Announcements

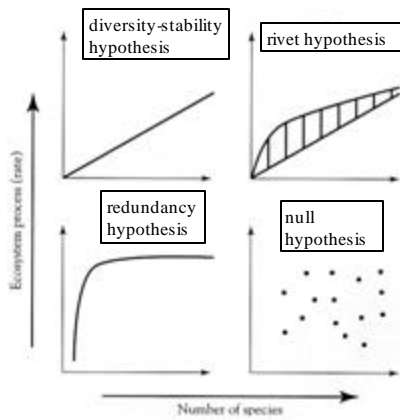
- Exam on Thursday. Same format and covering material since Exam 3
- If you are happy with 1st 3 midterm grades, you do not have to take exam 4
- Cumulative Final is Dec. 14, 2:30-4:30 in Plaza Building 138
 - Use midterms as study guides
 - Review session Dec. 7
- Still reading field trip reports.



Nested Ecosystems

Viewing ecosystems at different scales
hierarchically organized communities ?

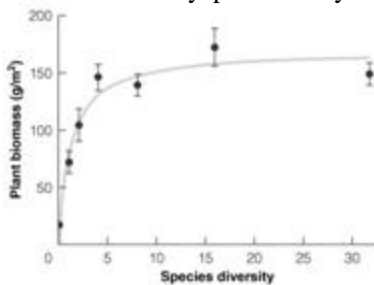
Relationship of diversity and ecosystem function



Biodiversity and Ecosystem Function

- Controversial
- Usually enough microbial diversity is present for ecosystem to function at same rate regardless of diversity
- Important in low diversity systems (e.g if only one species of shredder, then its absence will substantially alter the ecosystem)
- Benthic invertebrate diversity may alter nutrient flux across sediment/water interface

Diversity-productivity



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Flood Pulse Concept

- The traditional idea was that floods were disturbances
- More recent realization that flooding is an integral part of ecosystem
- Moves materials to and from riparian flood zone
- Increases connectivity between oxbows and wetlands in riparian areas and river
- Resets communities
- Encourages reproduction of some species

River Continuum Concept

• The river continuum concept (RCC) is an attempt to describe the function of lotic systems along the longitudinal axis, from source to mouth.
 • It is based upon the following 1980 paper, but has been debated, updated, and even berated.
 • Vannote, RL, GW Minshall, KW Cummins, JR Sedell, and CE Cushing (1980) The river continuum concept. *Can. J. Fish. Aquat. Sci.* 37:130-137.
 • It brings together several of the topics discussed throughout the semester, such as...



STREAM "ORDER" NUMBER

Macroinvertebrate Functional Feeding Groups

- Shredders
 - Feeding mechanisms
 - Herbivores - Chew and mine live macrophytes
 - Detritivores - Chew on CPOM
- Collectors
 - Dominant food
 - Decompose fine particulate organic matter (FPOM)
 - Filterers: feed on suspended particles
 - Gatherers: feed on deposited particles
- Scrapers
 - Dominant food
 - Periphyton (attached algae)
 - Material associated with periphyton
- Predators
 - Dominant food
 - Living animal tissue
 - Feeding mechanisms
 - Engulfers - Attack prey and ingest whole animals
 - Piercers - Pierce tissues and cells and suck fluids

Autochthonous versus Allochthonous Production

- When light reaches system, more primary production can occur within the system (autochthonous)
- Forested areas have large amounts of leaf input (allochthonous)
- Metabolic measurements suggest almost all streams are net heterotrophic, some just more so than others

River Continuum Concept

Summary

- The physical basis of the RCC is
 - Size of the river or stream (stream order)
 - Location along the stream gradient
- Stream order and the RCC
- Low order streams
 - Shaded headwater streams
 - Coarse particulate matter (CPOM) provides resource base for consumer community
- Mid-order streams
 - Energy inputs change as stream broadens
 - Shading and contribution of CPOM decreases
 - Sunlight supports significant periphyton production
 - Upstream processing of CPOM results in input of fine particulate matter (FPOM)
- High order streams
 - As streams widen even more and flows drop, macrophytes become more abundant
 - In the largest rivers, macrophytes are limited to the river margins because mid-channel conditions are typically too turbid
 - Bottom substrate becomes smaller

Streams: River Continuum Concept

