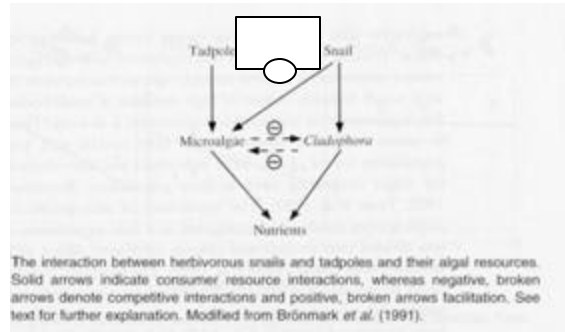


Competition

- Difficult to establish in the field
- Primary producers compete for nutrients and light, benthic for space
- Can structure wetland plant communities
- Leads to evolutionary specialization (niche partitioning) over time



How a competitor can become an ally



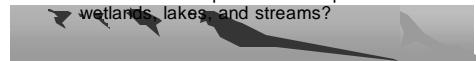
Mutualism and Facilitation

- Mutualism usually approached on a case-by-case basis
- Cichlid fish will brood in multi-species groups to protect eggs from predators
- Groups of wetland plants may facilitate each other in harsh environments
- Invertebrates may facilitate others in feeding relationships



Disturbance

- Response to disturbance dependent upon characteristics of disturbance and organisms
- Disturbance
 - intensity
 - areal extent
 - frequency
- Organisms
 - colonization ability
 - resistance (e.g. diapause)
 - distance to refugia
 - growth rate
- What are some potential examples of disturbance in wetlands, lakes, and streams?



F.E. Clements: Balance of nature view of communities

- All the species living together in an organized, systematic manner to form a super organism.
- Communities even “evolved” in a way analogous to species over millions of years.
- Succession was like organismic development (oak forests became oak forests just as a puppy becomes a dog)
 - In equilibrium
 - Saturated with species
 - Strong biotic interactions
 - Resource limited
 - Optimal performance
 - Deterministic



H. A. Gleason view of communities

- history, chance, and randomness are important in community structure.
 - A community is a fortuitous association of organisms whose adaptations allowed them to live together under the particular physical and biological conditions that characterize a particular place.
 - Non-equilibrium
 - Many open niches
 - Abiotic stresses important
 - Opportunism
 - Stochastic effects



Succession

- **community:** a group of populations of plants and animals in a given place and time
- **succession:** the developmental process that a community goes through; disturbances tend to “reset” succession
- **primary succession:** succession from an area that has not been previously occupied. (no seed bank, no soil, lichens, N-fixers)
- **secondary succession:** the re-establishment of a community following a disturbance that does not remove everything to bare rock (seed bank, trunk regeneration, mature soils)



Succession

- **facilitation:** when a species makes it more likely that another species will colonize the community
- **inhibition:** when a species makes it less likely that another species will colonize the community
- **pioneer community:** an early sere (stage) of succession with a high degree of r-selected species
- **climax/mature community:** the final sere of succession with a high degree of K-selected species. this stage changes little once it is reached, until a disturbance resets the succession
- **mixed community:** intermediate seres characterized by r- and K- selected species, or species with intermediate traits along the r-K continuum

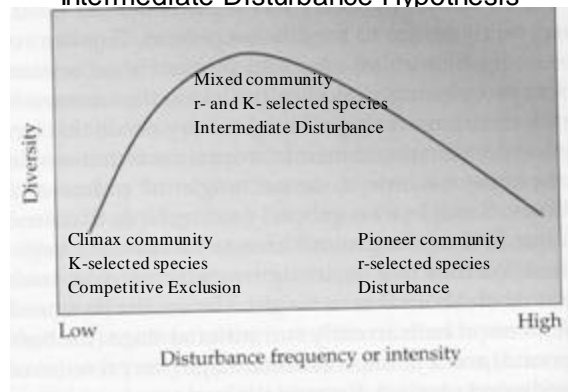


Intermediate Disturbance Hypothesis

- proposed to explain high biodiversity in rainforests and coral reefs
 - stability was old, niche-diversification, competition Clementian explanation
 - intermediate disturbance is newer, Gleasonian interpretation
- **Disturbance:** anything that kills or damages members of a community, such as storms, landslides, lightning strikes, plagues, waves...
- **At low levels** (frequency, intensity, and size) of disturbance, you find low diversity because only species that (1) are competitively dominant (2) those most resistant to damage or death due to physical extremes or natural enemies. “Climax” communities are low diversity.
- **At high levels** of disturbance, everything gets wiped out and you only find pioneering species that are able to colonize new space. “Pioneer” or “colonizing” communities are low diversity.
- **At intermediate levels,** you find mixed communities



Intermediate Disturbance Hypothesis



Succession Following Reservoir Construction

- Macrophytes become established, community becomes more diverse over decade or so
- Productivity initially high because of nutrients released from flooded vegetation
- Fish and invertebrate communities shift from riverine to lacustrine and pelagic lake species



Succession and Wetland Restoration

- Two approaches
 - let natural processes restore natural community (e.g. from seed bank or come in on waterfowl etc.)
 - re-introduce native species
- Often difficult to introduce species and get them all to take
- Some species will take a long time to come back, if ever, so reintroduction needs to occur
- A blend of the approaches should be taken

