

Think Like an Ecologist

- Extra Credit: 10 points possible
- Given a scenario of biodiversity loss discuss the potential consequences
- Due Monday, April 6 (next week)

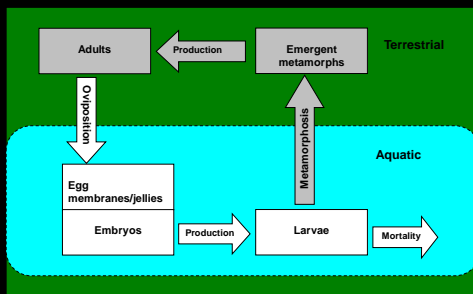
Amphibians in general

- Abundance and diversity peaks in Neotropics
- Young et al. (2004)
 - 5,743 known species
 - 53% of amphibians in NW
 - Brazil (731 spp.) and Colombia (698 spp.)
- Complex Life Cycles
- Energetic link:
 - aquatic and terrestrial habitats



Scott Connelly

Typical amphibian life cycle: energy and material transfer



Register et al. 2006

Amphibians: Functional Roles

- Terrestrial (adult)
 - Feed on emerging insects from adjacent water bodies
 - Resource base for larger vertebrate predators (snakes, birds, bats, etc.)
 - Deposit energy rich eggs in adjacent water bodies
- Aquatic (larval)
 - Primarily herbivores (algal production/periphyton)
 - Eggs as food source for aquatic consumers
 - Resource base for larger predators (fish, some invertebrates)

Amphibian declines

- Stuart et al. 2004; Young et al. 2004:
 - 43% decreasing; 32% globally threatened
 - > 122 species possibly extinct
 - Nearly 1,187 NW species threatened (337 critically endangered)
 - 39% of NW amphibian species threatened > than birds (10%) or mammals (16%)
- Causes
 - UVB radiation
 - Exotic predators
 - Habitat loss
 - Chemical contaminants
 - Overexploitation
 - Disease (i.e. *Batrachochytrium dendrobatidis*)

Amphibian declines




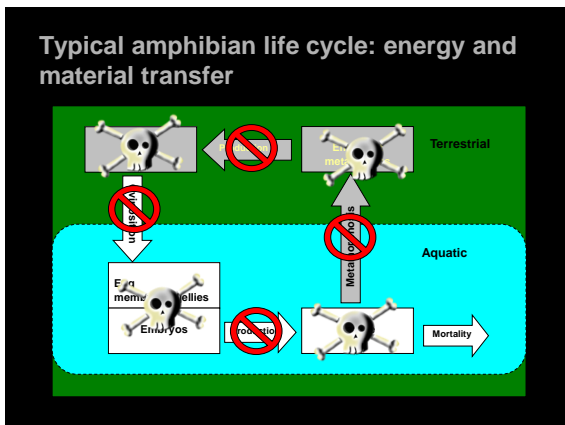
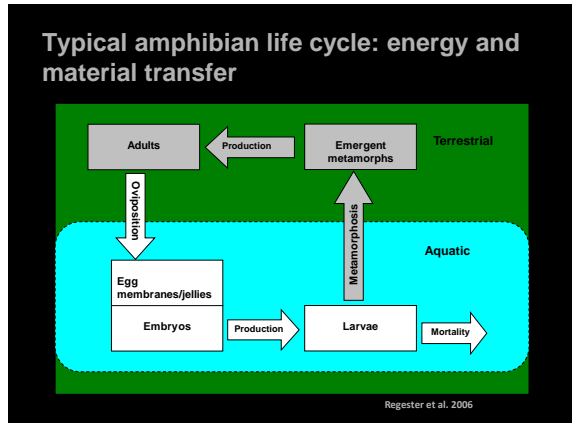
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B. dendrobatidis

Chytrid fungus infection
 Chytridiomycosis
 Emerging infectious disease

Thrives in cool, humid conditions; montane communities vulnerable

Kills rapidly; riparian species most vulnerable

Extra Credit: Think Like an Ecologist

- What will be the potential ecological consequences of the loss of amphibians?
 - How will terrestrial and aquatic ecosystems be affected?
 - How will food webs be affected?
 - Top down vs. bottom up
 - Trophic cascades
 - What groups will benefit (if any) and what groups will experience negative impacts?

Extra Credit: Think Like an Ecologist

- Draw (diagram) a conceptual model of the expected food web before and after declines occur
- Terrestrial:
 - 3 snakes sp. (all predators: two that selectively feed on amphibians only, the third is a generalist predator)
 - Several species of spiders and larger invertebrates that feed on emerging insects from adjacent aquatic habitats
 - Several birds and bats sp. (all generalist predators)

Extra Credit: Think Like an Ecologist

- Draw (diagram) a conceptual model of the expected food web before and after declines occur
- Aquatic
 - Invertebrates (three trophic groups: primary consumers, detritivores, predators)
 - 3 fish sp. (two trophic groups: two sp. are predators - one top carnivore, one insectivore/generalist; the third sp. is a primary consumer)