Anthropogenic environmental changes

- Habitat loss
- Overexploitation
- Introduction of nonnative species
- Chemical pollution
- Climate change
- Pathogen pollution

What is pathogen pollution?

“The anthropogenic movement of parasites outside their natural geographic or host species range.”

--Cunningham, et al.
How does a pathogen transfer between species?

“When parasites are co-introduced with co-evolved hosts and encounter closely related host species that evolved without the parasite... It follows that extinction of the latter is a possible outcome.”

--Cunningham, et al.

Malaria and avian pox in birds

Rinderpest in ungulates

Sylvatic plague in prairie dogs and ferrets

White-nose syndrome in cave bats

Captive Breeding in Zoos

- Animals from different parts of the world are kept in close vicinities
- Ingestion of contaminated food
- Impacts:
  - Geographically or taxonomically
  - Obvious or insidious
  - Severe or subtle
  - Short-lived or long lasting
- Should species that are known to be infected be reintroduced into the wild?
Chytridiomycosis
- Batrachochytrium dendrobatidis (Bd)
- Found in Central America, North America, South America, New Zealand, Australia, and Europe

Expansion of Chytrid Fungus

Ranavirus
- Rana temporaria
- Rana catesbeiana
Bait Trade

- Tiger salamanders used to catch prized fish
  - largemouth bass and channel catfish
  - “waterdogs”
- Anglers returned leftovers to the water

Transfer of Tiger Salamanders

- Salamanders moving southwest
- All collected from wild
- “waterdogs” returned into the wild after being housed in infected shop

Tiger Salamanders in Bait Trade

- Percentage of bait shops in Arizona infected with ranavirus
  - 85% of shops sold at least 1 infected salamander
"I am trying to determine if there is an interest out there to ship live waterdogs for Bass bait. I have access to the Waterdogs, and we also run a FedEx ship center as part of our business, so I have the means to get them to your home.

For anyone not familiar with a Waterdog, they are considered by many to be the best Bass bait on the planet. Waterdogs are immature Tiger Salamanders, living underwater and breathing through gills. They are generally 5 to 7 inches in length and have been known to catch big Bass.

We could ship them in lots of 2 to 4 dozen, with a price around 2.50-3.50 per Waterdog, 2nd Day Air shipping included. Please reply if this is something that interests you. I could use some input in making a decision whether or not to take the time and energy required to make this a viable business."

--Guy from bass fishing thread

**Chytridiomycosis Victim**

- Gastric brooding frog
- Believed to have been driven to extinction by chytrid

**Chytridiomycosis Victim**

- Dominican Mountain chicken (Leptodactylus fallax)
- Critically endangered; declined 80% in one decade
- Declined by 70% within 1.5 years
References


Food for Thought

- 25 million live amphibians imported to U.S.
- Over 70% are caught in the wild
- 6 million bullfrogs imported from farms in South African countries for U.S. restaurant trade
- Poor disease surveillance
- Guidelines for surveillance and quarantine controls by IUCN

- It’s a frog-eat-frog world…
- But not soon enough