

# Pathogen Pollution

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## What is pathogen pollution?

- “Anthropogenic movement and introduction of invasive, nonnative amphibian, fish and reptile species that may act as ranavirus carriers<sup>1</sup>.”
- Primarily through the amphibian trade



1 - Miller D, Gray M, Storfer A. Ecopathology of Ranaviruses Infecting Amphibians. *Viruses*. 2011; 3(11):2351-2373.

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## Chestnut Blight



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### How does pathogen pollution kill amphibians?

- Through the transmission of several diseases including BD, Ranavirus, and ATV



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### ATV (*Ambystoma tigrinum virus*)

- Salamanders as Bait
- Wild caught
- Co-evolution
- Regulation?



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### Ranavirus

- Fish transmission in ponds via water
- Direct Contact



- 28 million amphibian imports to the US from 2000-2005 where 8.5% of these were infected.<sup>1</sup>



<sup>1</sup> - Schloegel, Lisa M., et al. "Magnitude of the US trade in amphibians and presence of Batrachochytrium dendrobatidis and ranavirus infection in imported North American bullfrogs (*Rana catesbeiana*)."*Biological Conservation* 142.7 (2009): 1420-1426.

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### BD (*Batrachochytrium dendrobatidis*)

- Chytrid fungus – first seen in 1938
- Bait trade



From the 28 million amphibian imports from 2000-2005 62% were infected.<sup>1</sup>

1 - Schloegel, Lisa M., et al. "Magnitude of the US trade in amphibians and presence of *Batrachochytrium dendrobatidis* and ranavirus infection in imported North American bullfrogs (*Rana catesbeiana*)." *Biological Conservation* 142.7 (2009): 1420-1426.

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### Incriminating evidence

- The dispersal of localized diseases

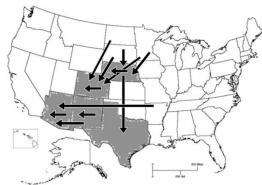


Figure 4. Movement of tiger salamanders in the bait trade in 2006. Arrows indicate movement of salamanders from the state in which they were collected to the state in which the bait shops were surveyed. In many of the shops, the origin of salamanders was unknown; these shops are not indicated on the map.

Picco, A. M., & Collins, J. P. (2008). Amphibian commerce as a likely source of pathogen pollution. *Conservation Biology*, 22(6), 1582-1589

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### Why does pathogen pollution matter?

- Rapidly spreads deadly diseases around the globe and it is largely preventable by the use of proper sanitation practices.
- World Organization for Animal Health (OIE) Aquatic Animal Health Code
- Regulation?




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## References

- Miller D, Gray M, Storfer A. Ecopathology of Ranaviruses Infecting Amphibians. *Viruses*. 2011; 3(11): 2351-2373.
- Picco, A. M., & Collins, J. P. (2008). Amphibian commerce as a likely source of pathogen pollution. *Conservation Biology*, 22(6), 1582-1589
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## Picture Credits

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