Emerging Fungal Pathogens Threaten Vital Wild Salamanders

Ensatina salamander, by Natalie McNear

Salamanders are Key Indicators of Forest Health

Did you know North America is home to 50% of the world's species of salamanders? "Salamander" is the name for a scientific order of amphibians that have tails as larvae and adults. The Pacific Northwest is rich in many salamander species adapted to specific environments, including giant salamanders, unique to the Pacific Northwest, and torrent salamanders, entirely suited for life in fast-moving, cold water.

Salamanders are crucial as well in the process of forest carbon cycling! Researcher Michael Best's work has illuminated how Ensatina salamanders significantly help retain leaf litter on the forest floor reducing the amount of carbon released into the atmosphere. View Little Critter with a Big Influence.[i]

Fungal Pathogens; a New Threat to Salamanders

Salamanders are at risk from a number of threats, including habitat loss, wildlife trade, invasive species, and, most recently, fungal pathogens.

In 2013, a chytrid fungus, *Batrachochytrium salamandrivorans*, or "Bsal," wiped out populations of wild fire salamanders (*Salamandra salamandra*) in Europe. View Deadly Fungal Threat.

Long-toed salamander, by Jasmine Budrow

Though Bsal is not known to occur in the wild in North America at this time, initial studies (called "challenge experiments") show that it is rapidly fatal to some North American salamanders. The Pacific Northwest's rough-skinned newt (*Taricha granulosa*), a salamander found in water and on land, was tested in the challenge experiments with fatal results.

With no effective means to control the spread of Bsal, if it becomes established in wild host populations, it could lead to rapid declines and possible extinctions in the world's richest and most diverse salamander populations.[ii]

How can we prevent Bsal Introduction to North American Salamanders?

Multiple agencies, organizations and citizens are working together to minimize the risk of the spread of Bsal. By law, the Forest Service must not contribute to loss of viability of any native species or a trends toward federal listing of any species. A key responsibility of a Forest Service land manager is to protect wildlife and their habitats.

The Bsal fungus is native to Asia. Asian salamanders carry the disease but don't appear to be affected by it. Because the main path for the global spread of Bsal is the international trade in salamanders, the US Fish & Wildlife Service recently declared 201 salamander species as "injurious wildlife" under the Lacey Act. Under the interim rule, effective January 28, 2016, it is illegal to transport salamanders and/or their parts across state lines or into the United States. The purpose of this listing is to help prevent accidental or intentional introduction of salamanders into the United States that are expected to serve as carriers of Bsal.[iii]

for the greatest good

What can you do to help?

Rough-skinned newt By Betsy Howell

- Discourage the trade in exotic salamanders by not purchasing them and explaining to others the risks they undertake having such animals.
- If you do keep exotic salamanders, don't release them into the wild, including into your backyard! If you have a salamander that you are no longer able to care for, try contacting your local herpetological society, humane society, or zoo.
- Test your pet salamander for Bsal. A list of laboratories can be found here. Before you collect your samples, please directly contact the laboratory that will be screening your samples for further information on sampling biosecurity, diagnostic methods, and more.
- Before disposing of any wastewater from aquariums or terrariums, add bleach to it (ratio of 1 part bleach to 10 parts water for a minimum of 10 minutes OR 1 part bleach to 3 parts water for one 1 minute).
- Do not transport and release any salamanders from one area to another.
- Report any sick or dead salamanders you see in the wild. Bsal infects the skin of salamanders; symptoms include abnormal body posture and behavior, excessive skin shedding, skin ulcerations, lethargy, and anorexia.

Questions?

Contact Betsy Howell, blhowell@fs.fed.us.

More Information:

- http://www.parcplace.org/parcplace/images/stories/pdf/BsalBrief.pdf
- www.salamanderfungus.org
- http://updates.amphibiandisease.org/
- https://www.federalregister.gov/articles/2016/01/13/2016-00452/injurious-wildlife-species-listing-salamanders-due-to-risk-of-salamander-chytrid-fungus#h-22

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i Howell, Betsy, 2014. Little Critter with Big Influence: How one tiny salamander affects an entire forest's carbon cycle. AmericanForests.org.

Best, M. L., and H. H. Welsh, Jr. 2014. The trophic role of a forest salamander: impacts on invertebrates, leaf litter retention, and the humification process. Ecosphere 5(2):16. http://dx.doi.org/10.1890/ES13-00302.1

ii Averting a North American biodiversity crisis: A newly described pathogen poses a major threat to salamanders via trade. 31 JULY 2015, Sciencemag.org, VOL 349 ISSUE 6247, By Tiffany A. Yap, Michelle S. Koo, Richard F. Ambrose, David B. Wake, Vance T. Vredenburg

iii 81 FR 1534. Injurious Wildlife Species; Listing Salamanders Due to Risk of Salamander Chytrid Fungus. A Rule by the Fish and Wildlife Service on 01/13/2016.