

Effects of Global Warming and Climate Change on Amphibians



By: Travis Hutchins

Outline

- ▶ What is Global Warming and Climate Change
- ▶ How is are they affecting amphibian species
- ▶ What species are being affected
- ▶ Future Outlook



SAVE THE FROGS!
Go solar

Global Warming Vs Climate Change

- ▶ According to NASA
 - ▶ Climate change: a long-term change in the Earth's climate, or of a region on Earth.
 - ▶ Global warming: the increase in Earth's average surface temperature due to rising levels of greenhouse gases
- ▶ Global warming video
 - ▶ [://www.youtube.com/watch?v=m94epehpm4](http://www.youtube.com/watch?v=m94epehpm4)
- ▶ Climate change is a major threat to biodiversity since it prompts species' range shifts and alters patterns of species diversity and distribution (Loyola)
- ▶ "Disease is the bullet killing frogs, but climate change is pulling the trigger," (Pounds)

Effects on Amphibians

- ▶ Amphibian life histories are extremely sensitive to temperature and precipitation
- ▶ According to Wells, Temperature change can influence changes in Metabolic rate, feeding, digestion, development, reproduction, movement, and disease resistance.
- ▶ Climate change are forcing increased competition due to increasing ranges in some species
- ▶ Climate change has already resulted in a shift to breeding earlier in the year for some species
 - ▶ Increased risk of exposure to extreme temperature variability in early spring weather (Corn)
 - ▶ Common Frogs (*Rana temporaria*), Common Toads (*B. bufo*), Smooth Newt (*T. vulgaris*),



Effects on Amphibians

- ▶ Decline of anurans in the cloud forest of Costa Rica of a reported 50 species have disappeared believed to be caused in some way by climate change. (Corn)
- ▶ In Loyola's study Climate change had a negative impact on both species richness and diversity in Africa and should see a huge decline in species by 2080.
- ▶ Tropical amphibians will suffer reduced reproductive success, food supply, and a disruption in breeding behavior (Corn).
- ▶ The effects will be greatest on endemic species, restricted to a specific location and which usually have specialized ecological requirements (Donnelly & Crump)
 - ▶ If lost Costa Rica, Panama, and Honduras, amphibian diversity in those countries would decrease by 17 to 26%

What species are being Effectuated

- ▶ <http://www.youtube.com/watch?v=dQpHqkAvNnc>
- ▶ Natterjack toad
- ▶ Boreal Chorus Frog
- ▶ Edible frog
- ▶ Palmate Newt
- ▶ Gray Treefrog
- ▶ American Bullfrog
- ▶ Spring Peeper
- ▶ Tropic species are at a higher risk than most
- ▶ Many Species in Europe have been reported
 - ▶ England and Scotland



Future Outlook

- ▶ According to Amy J. Lind a biologist with the United States Forest Service
 - ▶ Global and regional climate models predict climate warming and increased variability in the timing and type of precipitation.
- ▶ Management options
 - ▶ Reduce the effects of other factors that have negative influences
- ▶ Many groups are advocating and working on helping decrease the decline and help protect amphibian species
 - ▶ Partners in Amphibian and Reptile Conservation (Parc)
 - ▶ <http://www.parcplace.org/>
 - ▶ Southeast Partners in Amphibian and Reptile Conservation (SEPARC)
 - ▶ <http://www.separc.org/>
 - ▶ Amphibian Survival Alliance
 - ▶ <http://www.amphibians.org/>

References

- ▶ MoneySee. "What Is Global Warming?" YouTube. YouTube, 22 Feb. 2013. Web. 13 Apr. 2014. <<http://www.youtube.com/watch?v=n94lephpm4>>.
- ▶ Center for Biological Diversity. "Dying for Protection: Amphibians and Reptiles." YouTube. YouTube, 18 Sept. 2013. Web. 13 Apr. 2014. <<http://www.youtube.com/watch?v=dQpHgkAVNnc>>.
- ▶ Corn, P. S., 2005. Climate change and amphibians. *Animal Biodiversity and Conservation*, 28:1: 59-67.
- ▶ Wells, Kentwood David. *Ecology and Behavior of Amphibians*. Chicago, IL, USA: University of Chicago Press, 2010. p 136. <http://site.ebrary.com/lib/utenk/Doc?id=10366819&pg=136> Copyright © 2010, University of Chicago Press. All rights reserved.
- ▶ Loyola, Rafael D., Priscila Lemes, and Fernanda T. Brum. "Clade-specific C Consequences of Climate Change to Amphibians in." *Ecography* 3.1 (2014): 65-72. Wiley Online Library. Web. 13 Apr. 2014. <<http://onlinelibrary.wiley.com/doi/10.1111/j.1600-0587.2013.00396.x/pdf>>.

References

- ▶ Crump, Martha L. "Potential Effects of Climate Change on Two Neotropical Amphibian Assemblages." - *Potential Impacts of Climate Change on Tropical Forest Ecosystems*. By Maureen A. Donnelly. Houten, Netherlands: Springer Media, 1998. 401-21. Print.
- ▶ Pounds, J. Alan, Martín R. Bustamante, Luis A. Coloma, Jamie A. Consuegra, Michael P. L. Fogden, Pru N. Foster, Enrique La Marca, Karen L. Masters, Andrés Merino-Viteri, Robert Puschendorf, Santiago R. Ron, G. Arturo Sánchez-Azofeifa, Christopher J. Still, and Bruce E. Young. "Widespread Amphibian Extinctions from Epidemic Disease Driven by Global Warming." *Nature* 439.7073 (2006): 161-67. Print.
