The decline of frog populations world-wide has stirred dispute in the media. Like other environmental problems beset with uncertainties, the simultaneous disappearance of frog populations from every continent offers the media a vehicle for venting philosophical views, environmental and anti-environmental. (Just as the anti-environmentalists now have their own funders, they also have their own favorite media and writers.)

The NEW YORK TIMES pins frog loss on ozone depletion and resultant increases in ultraviolet sunlight striking the Earth.[1] At the other end of the philosophical spectrum, Boyce Rensberger, an anti-environmentalists' favorite with the WASHINGTON POST, suggests that environmentalists caused the frog loss when they forced government to ban a pesticide that formerly controlled a fungus that is now running rampant worldwide, killing off frog populations.[2]

The ozone layer in the stratosphere--6 to 30 miles above the earth's surface--filters out deadly ultraviolet radiation from the sun. Many chemicals, but chiefly DuPont's chlorofluorocarbons, diminish Earth's ozone shield, allowing increased ultraviolet light to strike the Earth. The TIMES reported studies showing that ultraviolet light is increasing on parts of the Earth and that reproduction of some frogs and toads is diminished by exposure to ultraviolet light. Rensberger responded with a theory of his own.

For some time now, Rensberger and the WASHINGTON POST have been selling the idea that ozone depletion, although real, has never harmed anyone or anything and is getting better all the time. Rensberger puts his name on stories carrying headlines such as "After 2000, Outlook for the Ozone Layer Looks Good" and "Decline of Ozone-Harming Chemicals Suggests Atmosphere May Heal Itself."[3] And he writes things like, "In fact, researchers say, the problem [of ozone loss] appears to be heading toward solution before they can find any solid evidence that serious harm was or is being done."

Rensberger's theory that the ozone layer will fix itself before anyone or anything is hurt is more wishful thinking than science reporting. Rensberger himself says that the ozone "holes" over the North and South poles will not go away until the year 2050 at the earliest. Even this prediction is optimistic because it assumes worldwide compliance with the Montreal Protocol, a 1987 international agreement to stop using DuPont's ozone-destroying chlorofluorocarbons in cooling systems. A few countries, such as China, India, Indonesia, and those of the former Soviet Union--representing 47% of the world's population--have said they can't afford to comply with the Protocols. Whether they will or not remains to be seen.

Even if everyone phases out chlorofluorocarbons right on schedule, U.S. Environmental Protection Agency (EPA) is sticking with its April, 1991, estimate of the skin cancers that ozone loss will cause. During the next 50 years, EPA says, ozone loss will cause 12 million skin cancers in the U.S. and 200,000 deaths. Worldwide, a billion (a thousand million) skin cancers are expected to result from ozone loss, including 17 million deaths, over the next 50 years.

Rensberger's new theory on frog loss seems philosophically consistent with the anti-environmental perspective, but more than a little implausible all the same. HOMO SAPIENS --modern humans--have been on Earth for at least 200 million years.[4] Most chemical pesticides have been around for 50 years or less. Frogs have successfully inhabited the Earth for at least 200 million years.[5] Rensberger's theory, that during the past two decades frogs somehow became dependent on human pesticides for their survival, is--to put it politely--pretty silly.

The scientific concern about frog disappearances emerged during the First World Congress of Herpetology at Cambridge, England in 1989. Herpetology is the study of reptiles (snakes, lizards, turtles) and amphibians (salamanders, toads and frogs).

At the Congress, in the hallways and during coffee breaks, scientists compared notes and realized that in Colorado and Costa Rica, in Australia and Africa, frogs are disappearing. Whole species being studied in the '60s and '70s simply disappeared during the '80s.

The International Union for the Conservation of Nature (IUCN) by 1991 organized a Declining Amphibian Populations Task Force (DAPTF), located at Oregon State University in Corvallis. Late last year the Task Force published, THE STATUS OF AMPHIBIAN POPULATIONS: A COMPILATION AND ANALYSIS. This authoritative report leaves little doubt that amphibians--particularly frogs--are disappearing from locations all over the globe, though the full dimensions of the problem of course remain sketchy.

What's responsible for the declines? Journalists like simple answers and perhaps scientists do too. But there seem to be multiple complex causes for the loss of amphibians worldwide. The DAPTF lists the following:

1) "The overwhelmingly reported cause of declines is habitat destruction, disturbance and fragmentation," says the DAPTF status report. In other words, condominiums, parking lots, and shopping malls are the culprit reported most often. Humans are wrecking wildlife habitat in a frenzy of what the anti-environmental movement calls "development."

2) A close second is pollution --pesticides, acid rain, and other chemical contamination.

3) Third is the introduction of non-native species of predatory fish, which disturb the ecological balance of lakes and streams.

4) Drought and flood --both of which seem to be increasing, worldwide, perhaps in response to global warming (see RHWN #300 AND #301)--are taking their toll on amphibian populations.

5) Eutrophication of ponds (excessive growth of plants, which depletes oxygen in the water) caused by the modern farming practice of over-fertilizing, contributes.

In the last three years, two new causes, perhaps related, have been suggested.

6) The immune systems of some populations of frogs and toads have somehow been damaged, perhaps by chemical contaminants, perhaps in combination with extremes of weather and temperature.[6] Animals with damaged immune systems may fall prey to bacteria and viruses that they might otherwise withstand.

7) And most recently Robert Stebbins, emeritus professor of zoology at University of California at Berkeley, has suggested that amphibian population declines may be caused by environmental pollutants that mimic estrogens and disrupt the endocrine and immune systems of amphibians. Stebbins presented his views in a paper at the Second World Congress of Herpetology in Adelaide, Australia in January and they will appear again in this month's issue of FROGLOG, the journal of the DAPTF in Corvallis.[7] Stebbins will examine his hypothesis further in a chapter of his new book, A NATURAL HISTORY OF AMPHIBIANS, to be published this year by Princeton University Press, he said in an interview. He wonders aloud whether frogs aren't particularly susceptible to damage by hormone-mimicking chemicals, endocrine-disrupting chemicals for some or all of the following reasons:

1) Most or all hormone-mimicking chemicals are soluble in fat;

2) Frogs absorb environmental chemicals through their highly permeable skin, as well as via digestion;

3) The change from tadpole to frog may release toxins that have
been stored in fat;

4) When emerging from hibernation to breed, amphibians draw heavily on fat reserves, which may release fat-stored toxins;

5) Females draw upon fat reserves to create the yolk of their eggs, perhaps again releasing fat-stored toxins into their systems.

6) The dramatic physical change from tadpole to frog is hormone-driven and thus could be susceptible to interference by environmental pollutants (xenoestrogens, or xenobiotics) that mimic hormones.

7) During the change from tadpole to frog, the creature stops eating, stressing its whole system.

Of course no one knows what's really going on in nature. Scientists produce fragments of information, then try to see patterns among the fragments. What patterns a reporter sees depends upon where he or she stands on one basic question that separates environmentalists from anti-environmentalists: can humans continue to rearrange and contaminate ecosystems everywhere without ultimately destroying the ability of the Earth to support human life? Those with an abiding faith might answer, "Humans are not threatening anything serious. Even if frogs ARE disappearing, we'll simply learn to live without them. All is well."

Environmentalists, on the other hand, are likely to stand with biologist Rachel Carson who in SILENT SPRING (1962) wrote,

"...[T]he new chemicals come from laboratories in an endless stream; almost 500 annually find their way into actual use in the United States alone. The figure is staggering and its implications are not easily grasped --500 new chemicals to which the bodies of men and animals are required somehow to adapt each year, chemicals totally outside the limits of biologic experience.

"These sprays, dusts, and aerosols are now applied almost universally to farms, gardens, forests and homes. Can anyone believe it is possible to lay down such a barrage of poisons on the surface of the earth without making it unfit for all life?"

--Peter Montague


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