

'STAR WARS' AND
ITS CRITICS
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AMPHIBIAN WARFARE

by Brian Doherty

YOU CAN UNDERSTAND WHY THEY created an environmental panic, those deformed frogs that have starred in media scare stories since 1995, when a group of them were first discovered in a Minnesota pond by schoolchildren on a field trip. They looked bizarre. Extra limbs and missing limbs were the most common defects, and there was the rare monster with eyes grotesquely misplaced inside the mouth.

Of course, something must be to blame. And in the modern tradition of environmental scare stories, which tend to double as morality plays, both government and the media went hunting for their favorite culprit—Man. Surely, industrial civilization was somehow responsible for the alarming amphibians. Ultraviolet radiation (because profligate use of spray-

on deodorants and other aerosols had depleted atmospheric ozone) was the first suspect. But despite the trouble it can cause to tadpoles in labs, no

one managed to prove that frogs in the wild had been unduly radiated.

So pesticides became the favored explanation, particularly those of the retinoid class—a class including Vitamin A, and one used in many popular medicines and cosmetics. (Like many chemicals, retinoids can cause birth defects in high concentrations.) To prove the frog-pesticide link, a sizable federal research project was launched, and a small army of federally funded researchers, investigative journalists, and volunteer environmentalists have subsequently descended on the frog ponds of America.

A pair of reports that appeared earlier this month in *Science* magazine should put the brakes on this growth industry in frog deformities. The new studies indicate that natural, not man-made, causes are to

blame. Flatworm parasites known as trematodes, present almost everywhere snails are present, can attack tadpoles and cause almost all the observed natural deformities in frogs. One of the *Science* studies not only showed that the parasites could cause the deformities in labs, but found them living alongside deformed frogs in California.

Stanley Sessions, author of one of the *Science* papers and a developmental biologist at Hartwick College in upstate New York, is feeling a measure of vindication. Sessions first reported the parasite-deformity link in a 1990 paper he thinks was unjustly ignored in the media's rush to make frogs into mankind's victims. "I'm not even 100 percent certain there's any increase in deformities," he says. "There's certainly an increase in reports of deformities, but whether that's because of an increase in time spent looking or a true increase in incidence we don't know."

"As far as frogs and salamanders with extra limbs, it's safe to conclude that we know parasites are causing it," he says. "All the natural history falls into place. The biology of the frogs and the parasites, everything we know about the development of amphibian limbs—it all forms a consistent, comprehensive story." Parasite damage to tadpoles can even cause the adult frog's eyes to develop somewhere they aren't supposed to; since frogs have no palate, it's fairly simple for the developing eyes to get moved into the mouth. What's more, most frog deformities are in the back legs, which parasites can readily attack. A frog's front legs form in gill sacs, protected from parasites but bathed in the water that man-made chemicals supposedly contaminate.

The parasite findings haven't completely solved the mystery of frog deformities. Missing limbs are still not well explained. "It's almost embarrassing and alarming if we can't figure this out," Sessions says. He speculates that natural predators may play a role: fish, and sometimes fellow frogs, bite at tadpoles, often clipping off developing limbs. Unfortunately, he sees research taking a backseat to hype and hysteria, spread by the media and on the Internet, by alarmists unwilling to accept natural explanations like parasites and predators for seemingly weird missing limbs. Not to mention, a lot of people now have a financial and professional stake in the hype.

There is nothing intrinsically alarming about a malformed frog. The reason the frogs have become an obsession of environmentalists and the subject of millions of dollars of government funded research is an often stated notion that frogs are uniquely sensitive to environmental harm—"canaries in the coal mine," in the popular phrase. This point is usually simply asserted and is not necessarily scientifically valid. But whether or not they are useful leading indicators of



AP/Wide World Photos



Deformed leopard frogs (top); Dept. of the Interior's Capt. Ribbitt

environmental disaster, frogs are undeniably photogenic, and make good poster creatures for a crusade.

In this case, the crusade comes in the form of a multi-agency federal task force led by the Department of the Interior (with representatives from the Departments of Justice, State, and Defense—they are ready for anything) and cutely acronymed TADD, the Taskforce on Amphibian Declines and Deformities. As the name indicates, the government's efforts are also aimed at the separate, though sometimes conflated, phenomenon of frog die-offs—frogs not appearing in some typical habitats in expected numbers. (A natural explanation—a fungus called chytrid—has recently come to the fore in that field as well.)

Like all good modern crusades, this one has a Web site, www.frogweb.gov, where you can find a cartoon mascot called Capt. Ribbitt, who purports to be the "Ambassador from Planet Amphibian," exhorting the children of Earth to "get involved in finding the cause, and become a friend to frogs everywhere." Some herpetologists, immune to the appeal of animated amphibians, privately complain about splashing amateurs rampaging through the habitats of possibly endangered frogs. But hey, who wants to complain when the federal government is passing out research money? And more and more of it, too. Interior Secretary Bruce Babbitt has already requested an extra \$8.1 million, for a total of \$9 million, for fiscal 2000 frog research.

Don't expect the scientific controversy created by those *Science* articles to slow the government's search for a man-made cause. Babbitt's science adviser William Brown, who in February informed *BNA Daily Environment* that "there are a whole set of regulatory initiatives" planned to respond to the frog crisis, hasn't been deterred by the parasite studies. Brown told the *Los Angeles Times*, "I don't think there's any single answer. . . . It looks like parasites are important in the deformations in the ponds in Santa Clara County," (where one of the researchers concentrated). The implication: Let's not abandon the more alarming scenarios until we have to. One suspects he would not blithely suggest, if retinoid pesticides were found causing deformities in a Santa Clara County pond, that maybe this was just a local phenomenon.

And don't expect Congress, either, to cut the legs out from under Capt. Ribbitt. It's a small appropriation, relatively speaking. Herpetologists are mostly so delighted to get on the government gravy train that the hunt for the killer chemical is apt to continue. The humble frog suddenly stands for a whole new kind of green for researchers willing to focus on the right answers—answers that condemn industrial civilization for deformities that in all likelihood are just Mother Nature's own freak show.

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