



Investigation of Minnesota's Deformed Frogs

1997 LEGISLATIVE UPDATE

Background

In August 1995 students from the Minnesota New Country School in LeSueur, Minn. found large numbers of grossly deformed frogs in a restored wetland on a farm in LeSueur County near the Minnesota River. Many of the frogs had contorted, shortened or missing limbs; others had multiple extra legs. The school reported this unusual occurrence to staff of the Minnesota Pollution Control Agency, who confirmed their findings. Media coverage of these events resulted in several other sites being reported to MPCA in 1995, including one site in Meeker County where 91 of 93 frogs collected were abnormal. All told, abnormal frogs were reported from 12 locations in 1995.

In 1996, the number of sightings increased dramatically. By December, the MPCA had received a total of 172 reports of deformed frogs, from 54 of Minnesota's 87 counties. Twenty sites were confirmed in 14 counties, with MPCA staff and others spending a great deal of time in the field to try to ascertain the scope of the problem. While most of the deformities observed in 1995 involved extra limbs, in 1996 we saw mainly missing or contorted legs. Also, in 1995 the abnormal frogs were all Leopard Frogs, but in 1996 abnormalities were found in six different species of frogs and toads.

Because the numbers and distribution of abnormal frogs were so much greater in 1996, the MPCA became the center for new reports, inquiries from media and citizens, and

numerous TV and radio interviews and speaker requests. The public and professionals alike have expressed a great deal of curiosity and concern about what this expanding situation means for the frogs and humans.

State-funded investigations

In 1995, MPCA staff were able to collect a few samples of frogs, water and sediments using the small remainder of some funds the U.S. Environmental Protection Agency had provided to follow up on a report of some abnormal frogs near Granite Falls in 1993.

But as the 1995 season advanced, so did the pressure on MPCA staff to come up with the cause of the problem. In 1996, the Legislative Commission on Minnesota Resources recommended that \$123,000 be appropriated to the Agency to investigate the cause of the deformities. The MPCA is using the 1996 LCMR funds carefully. Of the total amount, \$66,540 was contracted to the University of Minnesota for population studies and genetic and histological analysis. The MPCA is also using the money for frog tissue analysis and to evaluate sediment and water chemistry at frog sites. The final report on this project is due Dec. 31, 1997.

Research work in 1996

In 1996, MPCA staff carried out intensive field work; responded to a wide outpouring of interest and concern from citizens, scientists and media; and collected and mapped reports from many citizens and other agency staff.

We established four “focal areas” of the state, each area having at least one affected and one normal or “reference” frog population.

Population surveys in affected sites were carried out through the summer and into early fall. In these surveys, very high frequencies of abnormalities were recorded through the season at several locations, ranging as high as 67 percent abnormal frogs. The collections from late summer and early fall confirm that this is a new phenomenon in Minnesota. (University of Minnesota professor Dr. David Hoppe and Dr. Robert McKinnell have surveyed Minnesota frog populations for decades and have rarely encountered abnormal frogs.)

Both normal and abnormal frogs were collected for several kinds of analysis, including histopathology, DNA and chromosomes, tissue contaminants, and parasites. Wetland sediments and frog tissues are being analyzed for heavy metals such as arsenic, mercury, selenium and cadmium, and organic compounds including PCBs, herbicides and pesticides. Water samples in 1996 were analyzed for agricultural compounds in cooperation with the Minnesota Department of Agriculture.

Some analysis has also been done voluntarily by other interested research partners. Preliminary work by staff of the U.S. Geological Survey/Biological Resources Division National Wildlife Health Center Laboratory (NWHC) in Madison, Wisconsin has shown abnormalities in the skeletons of the frogs, not just in the rear legs where the majority of deformities have been observed. A parasitologist in California has found both normal and abnormal frogs with and without parasite cysts, suggesting parasites may not explain the abnormalities. NWHC staff have found only normal bacteria, viruses and parasites in the frogs, and none of the expected lesions or signs that the abnormalities might be caused by infections.

1997 and beyond

The MPCA provided much-needed leadership in 1996 for what quickly began to appear like an environmental emergency. But as the deformed frogs began to appear in other states and several countries, staff realized the agency’s resources were being outstripped and began to contact other agencies for help. Among agencies which have responded favorably are the NWHC; the National Institute of Environmental Health Sciences in Research Park Triangle, North Carolina; and the U.S. Environmental Protection Agency’s Region 5 office in Chicago.

At this point, rather than attempt to build a frog research program, the MPCA is focusing on developing partnerships with these agencies, which have the resources available to do this kind of critical work. We are also discussing internally what part we will play in these partnerships. As we evaluate our role, we’ll look at how we can fulfill it using existing, Agency-wide resources. If it is determined that more funding is needed for this role, we will seek additional federal or state funding.

MPCA staff will be in the field again in 1997, collecting samples and tracking down investigative leads, and we’ll have more staff working on the problem. We will play a pivotal role in coordinating and planning the overall efforts of all agencies involved.

As the scope of this investigation expands from Minnesota to the U.S. and beyond, the frogs remain a high priority for the MPCA. The Agency intends to continue playing a vital part in the investigation. This phenomenon cannot be solved easily or quickly. A wide range of scientific expertise will be needed to solve the mystery, and it may be quite some time, perhaps even several years, until definitive answers begin to emerge.

For more information on the investigation into the deformed frogs, contact Duane Anderson at the MPCA, (612) 297-1831 or (800) 657-3864.