By Ronald W. Russell and Stephen J. Hecnar

Habitat loss is a major cause of amphibian population declines in the Great Lakes basin of North America. However, specific locations around the Great Lakes are also contaminated by anthropogenic chemicals which pose an additional threat. Many of these industrial and agricultural chemicals have demonstrated physiological, developmental and behavioural effects on amphibians. For example, recent concerns have been expressed regarding the role of organochlorine contaminants acting as endocrine disrupters. Although organochlorine pesticide use in North America has decreased since the 1970s, they may still pose a threat to biota because of their toxicity, environmental persistence and tendency to bioaccumulate in food chains. We surveyed a number of parks and wildlife reserves along the north shore of Lake Erie and found a relationship between local extinctions of amphibians and the degree of site contamination with chlorinated pesticides.

At Point Pelee National Park, Canada, DDT was frequently applied until 1967 for mosquito control. Since the mid-1960s, improvement of terrestrial habitat in the park has proceeded by eliminating campgrounds, private dwellings and agriculture, as well as limiting access to natural areas. No wetland habitat has been lost in the park in the past century. However, since 1972, *Acris crepitans* (Blanchard’s cricket frog), *Hyla versicolor* (Eastern gray treefrog), and *Rana catesbeiana* (bullfrog) have become extirpated at Point Pelee. The last observation of *Bufo woodhousii fowleri* (Fowler’s toad) in the park coincides closely with the inception of DDT application for mosquito control. Currently, only 5 amphibian species remain at Point Pelee National Park.

We measured DDE, the primary breakdown product of DDT, in Point Pelee amphibians. Even though over 25 years have passed since DDT use has stopped, mean DDE concentrations were 5000 µg/kg lipid in *Rana clamitans* (green frog) and 47000 µg/kg lipid in *Pseudacris crucifer* (spring peeper). In contrast, the mean DDE concentration in green frogs at Hillman Marsh, which was connected to the Point Pelee marsh before 1900, was 300 µg/kg lipid. DDE concentrations in green frogs at Holiday Beach Conservation Area, approximately 40 km east of Point Pelee National Park, were 6 µg/kg lipid.

Long Point and Rondeau Provincial Parks are similar areas to Point Pelee National Park and are also located on the north shore of Lake Erie. Both of these parks have essentially complete amphibian faunas (10 and 12 species respectively), and have not experienced recent local extinctions of amphibians as have occurred at Point Pelee. DDE concentrations in Long Point and Rondeau green frogs were measured at 250 and 100 µg/kg lipid respectively. Historic differences in past land-use among these 3 sites are factors affecting amphibian species diversity.

Amphibian declines are a complex and multifaceted problem which defy simple explanations. Although our evidence implicating contaminants in amphibian decline is correlational, the role of such contaminants should not be overlooked. Because of long environmental persistence, continued toxicity and the potential for long distance atmospheric transport, the effects of organochlorine contaminants can be remote in both space and time. Our research to determine contaminant levels in other amphibian species in the Great Lakes area continues.


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