

## **EFFECTS OF AGRICULTURAL, INDUSTRIAL, AND MUNICIPAL POLLUTANTS ON WETLANDS AND WILDLIFE HEALTH**

**Kathryn A. Converse, PhD**

*National Biological Service, National Wildlife Health Center, 6006 Schroeder Road, Madison, WI 53711, USA*

Wetlands accumulate pollutants from adjacent areas through intentional discharge of sewage or industrial wastes, runoff of agricultural fertilizers and pesticides, and discharge from municipal storm drains. Coastal wetlands receive more pollutants indirectly as the endpoint for upland drainage systems and directly through petroleum spills and insect abatement. Wetlands that serve as evaporation basins during seasonally high water, especially in more arid climates, concentrate natural compounds and as well as pollutants. The ability of wetlands to be effective filtration systems for wastewater nutrients through microbial transformations, uptake by plants, and deposition of particulate matter, and the shortage of water in arid climates has resulted in revision of wetland regulations. Wetlands can now be developed for wastewater treatment and natural wetlands can be restored or converted to wastewater treatment systems. The effect of these accumulating pollutants on wetland ecology and wildlife health needs to be recognized.

Inadequate understanding of wetland processes can lead to alteration of the hydroperiod and hydrology by conversion to constant rather than naturally fluctuating water levels. The changes in wetland hydrology along with the addition of pollutants can alter aerobic and anaerobic processes in the sediment, convert plant growth, and change food web structure. Modifications in the vegetation community may affect the attractiveness of the wetland to wildlife. Incoming and accumulated pollutants provide a source of pathogens and toxic chemicals that pose a threat to wildlife health.

Inadequate understanding of the risks to wildlife using polluted wetlands can result in their exposure to bacterial, viral and parasitic pathogens, organic chemical compounds, heavy metals and pesticides. Bacteria, viruses and parasites, primarily from animal feces, can cause disease directly. Because microbial transformations are unpredictable, pollutants may be transformed to more toxic forms, the breakdown of natural compounds may be inhibited and compounds may accumulate in detritus. Wildlife ingest detritus feeding organisms that accumulate contaminants at levels higher than the level in the water. In addition to direct toxic effects, concern exists that contaminants may affect immune function, increasing susceptibility of wildlife to infectious disease.

Greater understanding of the dynamics of wetland ecology and risks to wildlife health is needed to promote wise and effective use of wetlands as natural treatment systems. Recognition of the pollutants present in wetlands needs to be supplemented by research to determine their impact on wildlife.