Mercury Toxicosis

College of Veterinary Medicine

BASICS

Mercury is a naturally occurring heavy metal that is toxic to all animals. It is released into the air or deposited in bodies of water by natural and human activities, such as volcanic eruptions, forest fires, gold mining, coal combustion, and waste incineration.

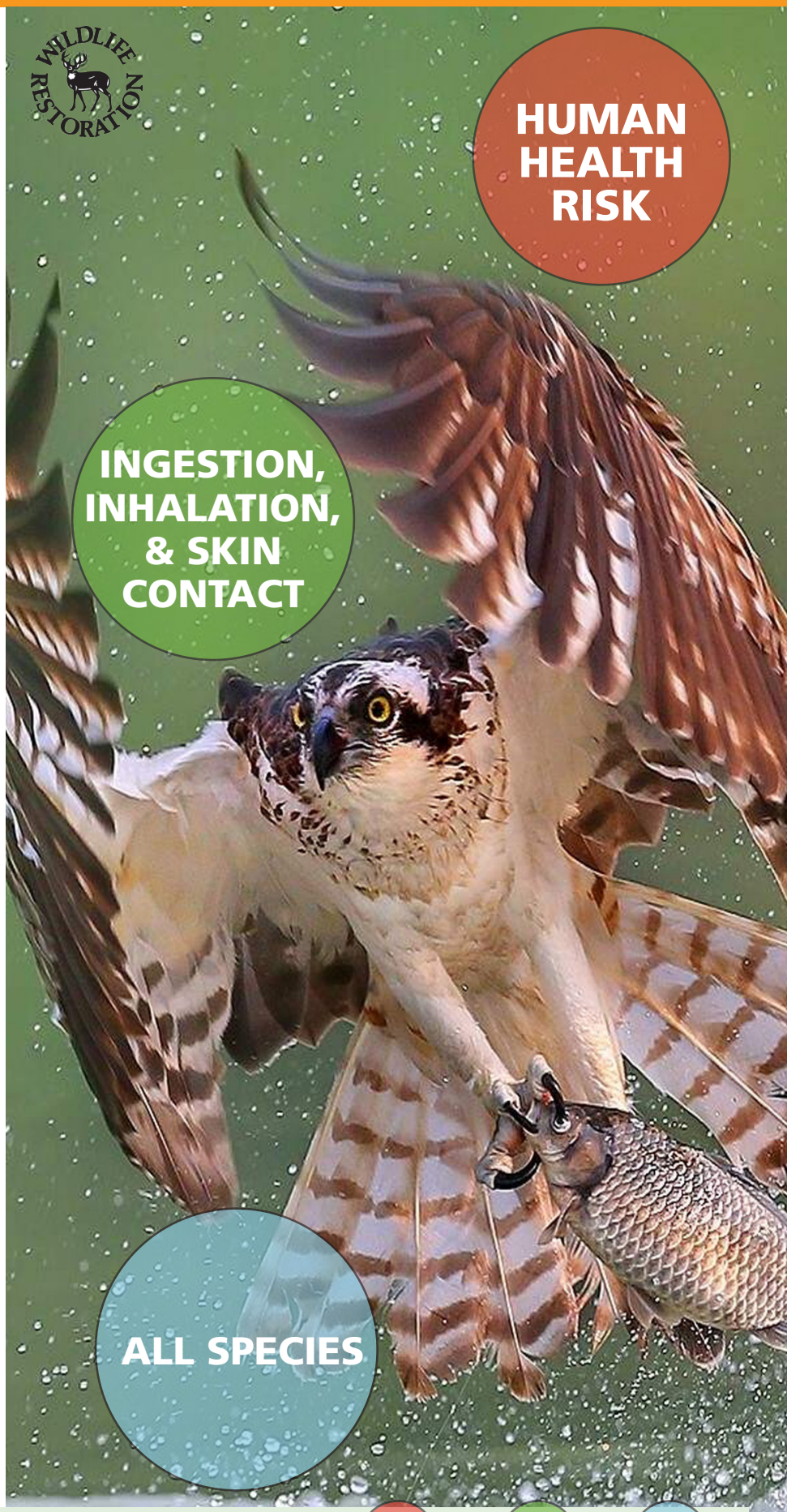
Metallic and inorganic mercury are converted into organic methylmercury, the most common and toxic form, by bacteria in wet environments. The most common route of exposure to methylmercury is through **FOOD CONSUMPTION**. Ingested methylmercury is rapidly absorbed in the intestines and is stored in kidneys, liver, and muscle. Like many contaminants, mercury **BIOMAGNIFIES** and becomes more concentrated at higher levels of the food chain.

Mercury exposure is a health concern for all animals, largely related to diet and habitat preference. **FISH-EATING ANIMALS**, such as marine mammals, loons, ospreys, mink, and otters, are most likely to accumulate high levels of mercury.

Mercury is a **NEUROTOXIN**, and **CLINICAL SIGNS** include lethargy, incoordination, weakness, behavioral alterations, and other sensory and motor deficits. **CHRONIC** exposure may interfere with immune, gastrointestinal, reproductive, kidney, liver, and cardiovascular functions, leading to emaciation. Sensitivity to mercury varies according to species, health status, age, and sex.

DIAGNOSIS of mercury poisoning is made by measurement of mercury levels in blood or tissues coupled with assessment of clinical signs and history of exposure.

TREATMENT of wildlife exposed to mercury is typically impractical, but use of chelating agents may help to limit mercury absorption and/or reduce mercury loads.



DETAILS

The toxic effects of mercury have been known for over a century. Mercury has been replaced in many commercial products, and efforts have been made to reduce or eliminate mercury emissions. However, mercury persists in the environment and remains a threat to human and animal health, including wildlife.

Mercury emitted by natural and human activities can move through the air across long distances and travel in runoff, eventually finding its way into water bodies. Bacteria that thrive in wet areas convert metallic or inorganic mercury into organic methylmercury which binds to sediment and leaf litter and is taken up by small fish and invertebrates. When bigger fish or other animals eat these smaller organisms, they accumulate higher levels of mercury through biomagnification. In turn, larger animals or humans that eat fish or fish-eating animals may ingest large quantities of mercury.

TRANSMISSION All animals, including humans and wildlife, can take up mercury through ingestion, inhalation, or skin contact, although ingestion of organic methylmercury is considered the most common route of exposure. Mercury toxicosis can also impact species that eat plants and/or invertebrates or spend time in wetland habitats. Mercury may be toxic to reptiles and amphibians, but its effects are relatively unknown.

CLINICAL SIGNS In waterfowl such as loons, methylmercury poisoning can contribute to weight loss, progressive weakening, and incoordination. Mercury can also be transferred to eggs, leading to decreased clutch size and hatching success, eggshell thinning, developmental deformities, reduced fledging, and changes in egg morphology.

Songbirds, bats, and other animals may suffer from reproductive or behavioral impairments as a result of mercury exposure through eating invertebrates, such as insects, spiders, and worms, that ingest mercury in leaf litter.

High levels of mercury in marine mammals, particularly those at the top of the food chain, can contribute to behavioral changes, including increased likelihood of stranding, and decreases in reproductive success. Large predatory fish may also suffer from impaired reproduction and development due to mercury toxicosis.

DIAGNOSIS Thresholds for mercury toxicosis for some species are available in the scientific literature, while estimates are required for other species.

PRECAUTIONS AND PREVENTION Regulations such as the 1997 Great Lakes Binational Toxics Strategy and the Minamata Convention on Mercury have helped to reduce mercury emissions. To limit future mercury pollution, contact your local waste management agency for more information on safely disposing of mercury-containing products.

State and federal agencies regulate mercury levels in food and water, and many states test fish and other game species for mercury. To reduce exposure through food, people who eat wild fish and game should consult local, state, and federal guidelines for consumption advisories, avoid consuming liver from wild game, limit consumption of fish, and choose game species with diets that are low in fish.

Below: Fish-eating mammals like mink can accumulate high levels of mercury.