



Standing Position

Wildlife Disease

Disease is defined as any change in the normal function or structure of any part, organ, or system of a living body. It is also defined as a pathological condition occurring in a susceptible population. Diseases often demonstrate characteristic clinical signs, but it may be unclear how disease-causing agents are introduced and transmitted, pathology these agents create, and their predicted outcomes. Pathogens are natural components of ecosystems that may also be limited by environmental conditions or distribution and behavior of their hosts and vectors. Many pathogens are an intrinsic part of biological diversity and ecological complexity of natural, healthy ecosystems. Ecology (or epidemiology) of wildlife disease is the study of interactions between hosts and pathogens as they relate to behavior, biology, the environment, disease transmission, susceptibility, evolution, climate and impacts of diseases on wildlife populations and communities. This discipline works at the interface between ecology and veterinary medicine and thus recognizes importance of a multidisciplinary approach to understand the complexity of disease in wild animals.

Although occurrence of disease in wildlife can be a natural phenomenon or anthropogenically driven, there is an increasing trend toward appearance of novel or introduced diseases with severe consequences for wildlife populations. Chytrid fungus (*Batrachochytrium dendrobatidis*) has impacted amphibian species globally, white-nose syndrome (caused by the fungus *Geomyces destructans*) is threatening cave-roosting bats in North America, diclofenac acid has caused dramatic population declines of Asian vultures, sylvatic plague in black-tailed prairie dog (*Cynomys ludovicianus*) colonies continues to be a major impediment to recovery of black-footed ferrets (*Mustela nigripes*), and a transmissible cancer is causing declines of Tasmanian devils (*Sarcophilus harrisii*). Disease in wildlife populations is not a natural regulatory process when novel causative agents are introduced into native ecosystems. When combined with other stressors on habitats and populations, particularly fragmented populations, disease in wildlife may present serious conservation and management consequences and concerns for wildlife managers and scientists.

Diseases in wildlife can influence reproduction, survival, fitness, and abundance of wildlife populations and can affect biodiversity within ecosystems and present an additional threat to many populations, especially those with limited abundance (i.e. threatened and endangered species). Some pathogens can also be transmitted among conspecifics, other wildlife species, domestic animals, and humans, posing risks to human and animal health and resulting in significant economic impacts. A few examples of important diseases occurring in North American wildlife that may have significant ecological, economic, and health impacts include: chronic wasting disease of North American cervids, rabies and bovine tuberculosis in wild terrestrial mammals, declines of Hawaiian forest birds from introduced avian malaria and pox, and multi-species ecological impacts of avian influenza, West Nile encephalitis, avian cholera, and avian botulism. In addition, many exotic diseases have emerged or re-emerged in wildlife

populations as threats throughout the world including foot and mouth disease, Rift Valley fever, and Ebola hemorrhagic fever. Emerging zoonotic (transmitted between animals and humans) diseases (e.g., AIDS, SARS, rabies, Ebola) have increased concern for public health and stimulated importance of collaborative approaches that integrate human, domestic animal, and wildlife health.

Some of the factors driving disease emergence include increasing host populations, invasive species, environmental changes, rapid long-distance transport of pathogens, pathogen evolution, changes in land-use, increased interaction among humans, domestic animals and wildlife, trade in wildlife meat and products, privatization of wildlife, baiting and feeding, and other highly artificial management activities that greatly enhance risks for disease introduction and establishment. Of primary concern to wildlife ecologists and managers is how to respond to these increasing disease threats. In general, there are 4 main reasons to consider management actions to control wildlife diseases: 1) some wildlife pathogens infect humans, 2) some pathogens may affect the health of domestic animals, 3) pathogens may have important effects on wildlife populations, and 4) wildlife diseases may have important effects on ecosystems and their functions. Prior to initiating wildlife disease management actions, it may be valuable to conduct a risk assessment to evaluate likely human health risks, identify specific management objectives, determine likelihood of success, evaluate uncertainty, and consider alternative strategies.

Understanding transmission, pathophysiology, epidemiology, and ecology of pathogens and how they interact with wildlife hosts is essential for developing effective strategies to prevent or manage disease in wildlife. Better understanding of these concepts will enable wildlife managers and scientists to address disease challenges. In most situations, management involving veterinary treatment, such as wildlife rehabilitation, is limited due to difficulties associated with accessing free-ranging wildlife, inability to adequately monitor elusive individuals and species, inadequate funding to support large-scale treatment programs, and ethical concerns related to invasive veterinary intervention. Moreover, rehabilitation and palliative care that allows unapparent disease carriers to survive may jeopardize health of entire populations. Medical treatment centers may also inadvertently function as transmission sites where disease spread is exacerbated.

Preventing introduction of disease into susceptible populations is a paramount responsibility of wildlife professionals as stewards of the resource, and is the most effective method of disease management. Measures designed to prevent disease occurrence including, but not limited to, appropriate planning, import and transport restrictions, decontamination and sanitation measures, and formation of physical or immunological barriers (e.g., fences to separate wildlife from domestic animals, vaccines), have been the tools most commonly used by wildlife managers. When determining appropriate disease management strategies, managers should consider no management action, some level of disease control, or attempted eradication of the pathogen.

The Wildlife Society recognizes the important role of wildlife diseases in natural ecosystems, their potential adverse effects on populations and ecosystems, and their implications for human and domestic animal health.

The policy of The Wildlife Society regarding wildlife disease is to:

1. Recognize the need for interaction and collaboration among different professional societies, such as The Wildlife Society, Wildlife Disease Association, American Veterinary Medical Association, American Association of Wildlife Veterinarians, and American Medical Association, in solving disease-related problems.
2. Encourage investment and support in collaborative prevention, surveillance, management, monitoring and research of wildlife diseases, using multi-disciplinary approaches to better understand both anthropogenic and natural causes of disease. Encourage natural resource agencies to invest in capacities, including human capital, to address wildlife diseases.
3. Recognize that anthropogenic influences including introduction of exotic diseases, climate change, biodiversity loss, captive wildlife, and managing for or tolerating species overabundance interact to affect transmission of wildlife and zoonotic pathogens and their effects on wildlife populations. Outcomes of these interactions are often complex, synergistic, and difficult to predict.
4. Share knowledge to help educate managers, researchers, policymakers, students, wildlife resource interest groups, and the public about importance and consequences of wildlife diseases and disease management through professional journals (including The Wildlife Society journals), lay articles, and the media.