Naturally Occurring Fish and Wildlife Diseases

Just like people, fish and wildlife can get sick. Diseases caused by viruses, bacteria, fungi, and protozoans can cause illness or death. Usually only a few animals are affected. However, some conditions can cause large numbers of animals to be susceptible, affecting populations. For example, disease spreads quickly when large numbers of animals are concentrated naturally during migration or artificially due to unnatural food sources. People can prevent unnatural disease outbreaks by not feeding wildlife, vaccinating pets, and, in some cases, managing habitat.

Listed below are the diseases of greatest management concern in Oregon. This table focuses on fish and wildlife diseases that occur naturally within Oregon. However, some of the greatest disease concerns center around non-native diseases. Non-native diseases can have devastating effects on wildlife, human health and local economies. Recent reported cases of West Nile virus in Oregon underscore the state's vulnerability to invasive disease-causing organisms. Non-native diseases will be addressed in a implementation tool that evaluates ecological impact and management approaches for invasives.

Disease or Disease-Causing Organism	Vulnerable Fish or Wildlife Species	Conditions that Promote Disease Issues	Management Approaches
Wildlife			
egg-destroying pathogen (*Saprolegnia ferax,* a watermold)	All amphibians, although some species may be more vulnerable	Conditions that weaken immune response (e.g., UV-B light, pesticides)	Maintain high water quality; investigate role of introduced fish in spread between water bodies
Chytrid skin fungus (*Batrachochytrium dendrobatidis*)	All amphibians, although some species may be more vulnerable	Conditions that weaken immune response (e.g., UV-B light, pesticides)	Maintain high water quality, investigate the natural distribution of Chytrid to determine if it is spreading to new areas
Amphibian deformities (multiple legs and other deformities caused by a trematode, *Ribeiroia* sp.)	All amphibians, but seen most often in some frog species	High nutrient levels that increase densities of intermediate hosts (snails)	Maintain high water quality; monitor incidence of amphibian deformities
Avian cholera (caused by a bacterium, *Pasturella multicoda*)	Waterfowl especially, but can also impact gulls, terns, coots, and crows	Concentration of waterfowl during migration. Waterfowl concentrations increase when the amount of open water is reduced (e.g., during drought, freezing temperatures, or due to habitat loss). Freezing temperatures also increase vulnerability by weakening immune systems	Maintain and restore wetland habitats important for migratory waterfowl; manage major die-offs to minimize impacts to populations
Avian Influenza	Many wild bird species are hosts	Waterfowl and other wild bird species may serve as hosts to non-pathogenic strains of the virus; Mutated or pathogenic strains can have devastating impacts to poultry industry and human health	Monitor and conduct surveillance in captured or translocated birds such as mountain quail, turkeys and farmed game birds.
Botulism (caused by a nerve toxin produced by bacterium, *Clostridium botulinum*)	Waterfowl and shorebirds	Associated with shallow wetland habitats during warm weather; can be made worse by fluctuating water levels; sometimes associated with carcasses (e.g., fish kills)	Manage water levels at important migration areas to prevent botulism; manage major die-offs to minimize impacts to populations
Mycoses (diseases caused by fungi, including toxins produced by mold): Aspergillosis, Aflatoxins	Many bird species; waterfowl and shore birds are very susceptible	Transmitted from moldy corn or acquired from soil or damp organic materials; stressed or diseased animals may have increased susceptibility	Monitoring and surveillance; manage major die-offs to minimize impacts to populations

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Avian Influenza	Many wild bird species are hosts	Waterfowl and other wild bird species may serve as hosts to non-pathogenic strains of the virus. Mutated or pathogenic strains can have severe impacts to the poultry industry and human health.	Monitor and conduct surveillance in captured or translocated birds such as mountain quail, turkeys and farmed game birds.
Canine distemper	Raccoons, foxes, skunks, coyotes; note: can infect unvaccinated dogs	Occurs in raccoon populations when densities are high or raccoons are concentrated; less of an issue for other wildlife	Continue to promote prevention (e.g., by not feeding raccoons); use caution when moving nuisance raccoons; promote vaccination programs in domestic pets
Rabies	Raccoons, skunks, bats, foxes; note: can infect unvaccinated dogs and domestic cats; public health issue	Exposure to unvaccinated domestic pets; occurs naturally at low levels in wildlife populations	Continue to promote vaccination programs in domestic pets; outreach regarding avoiding sick animals or those behaving unusually
Parvovirus (includes several closely-related viruses such as feline panleucopenia)	Bobcat and cougar; note: can infect unvaccinated domestic cats	Exposure to domestic cats (e.g., abandoned cats and feral cat colonies)	Promote pet vaccination programs. Promote benefits to cats, wildlife and people when cats are kept indoors.
Leptospirosis	Marine mammals (seals and sea lions)	A bacterial disease transmitted from contaminated urine and infected animals	Outreach regarding the importance of avoiding contact with sea lions and sea lion carcasses Oregon's beaches
Salmonellosis and Mycoplasma conjunctivitis	Songbirds, primarily finch species	Concentration of birds at bird feeders; contaminated feeder surfaces and fecal contaminated bird food	Outreach regarding prevention methods
Fish			
Infectious Hematopoietic Necrosis virus	Most salmonid stocks	Stress situations such as spawning or adverse environmental conditions	Reduce movements of infected fish and track different isolates of the virus
Erythrocytic Inclusion Body Syndrome	Several salmonid stocks	Unknown, but condition depresses immune system and other diseases become patent	Nutrition may affect severity of infection
Viral Hemorrhagic Septicemia virus	North American strain causes little mortality in salmonids but can cause high losses in marine species like herring, sardines, and mackerel	Young immuno-incompetent fish and spawning adults. Fish spread the virus horizontally. May be passed on to progeny	Avoidance by limiting exposure. Monitor for the presence of the European strain which is much more virulent
Infectious Pancreatic Necrosis virus	Most salmonid stocks and few other marine species	Fish to fish transmission and vertically transmitted from parent to progeny	Avoidance by limiting exposure. Screen spawning adults for virus and cull eggs from positive parental groups
White Sturgeon Iridovirus White Sturgeon Herpesvirus	White sturgeon and possibly other related species	Likely vertically transmitted from parents to progeny. High stress environmental conditions may lead to outbreaks	Limit transfer of known carriers. Examine fish and stock history
Bacterial Kidney Disease caused by *Renibacterium salmoninarum*	Salmonid stocks	Exposure to infected fish and transferred within the egg from infected females	In hatcheries reduce the pathogen by culling eggs from infected females and using antibiotic injections and feedings
Columnaris Disease caused by the bacterium *Flavobacterium columnare*	All fish	Warm water conditions, exposure to other infected individuals	Where possible, augment water flows to increase quantity and decrease temperature
Furunculosis caused by the bacterium *Aeromonas salmonicida*	Salmonid stocks, Some other species	Exposure to infected fish.	Antibiotic treatments where possible.
External fungal infections caused by multiple species of fungi	All fish	Stress situations such as spawning, low water, high temperature, body injuries	Fungal spores ubiquitous and no possible control of environmental conditions. Educate about condition
Tapioca disease, caused by myxosporean *Henneguya salmincola*	Several species but most noted in Chinook and coho salmon	Unknown, rarely detrimental to fish but a concern for anglers due to cysts in flesh	Educate about the parasite and the safety of consuming flesh
Ceratomyxosis caused by the myxosporean *Ceratomyxa shasta*	Salmonid stocks	Exposure to infectious stage of parasite that originates in a worm. Warm, slow water and low flows can increase contact with agent	Where possible, augment water flows to increase quantity and decrease temperature
White Spot caused by the protozoan *Ichthyophthirius multifillis*	All fish	Exposure to infected individuals, warm water conditions	Where possible, augment water flows to increase quantity and decrease temperature
Black Spot caused by Strigeid trematodes (Neascus)	All fish	Exposure to infected snails. Complex life cycle involving birds, increased snail populations	Education on the source of the parasite and that it does not affect humans.
Yellow Grub caused *by Clinostomum marginatum*	All fish	Exposure to infected snails Complex life cycle involving birds, increased snail populations	Education on the source of the parasite and that it does not affect humans.
White Grub caused by *Posthodiplostomum minimum*	All fish	Exposure to infected snails Complex life cycle involving birds, increased snail populations	Education on the source of the parasite and that it does not affect humans.

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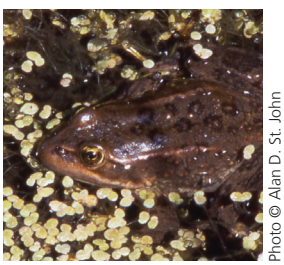
Salmon Poisoning Disease. The disease in canids is caused by a rickettsial organism which is present in the worm *Nanophyetus salmincola*	All fish are susceptible to the worm. Only canids and some bears are susceptible to the rickettsia	Normal exposure of fish to the infective stage of the worm life cycle. All worms and their progeny are infected with the rickettsia. Increased snail populations	Education on the possible effects of dogs eating parasitized fish, getting infected with the rickettsia and the availability of antibiotic treatments
Tapeworms caused by *Proteocephalus* sp., *Diphyllobothrium* sp.	All fish	Ingestion of intermediate host carrying infectious stage of the parasite.	Education on the source of the parasites and the proper handling of fish for consumption
Copepods, Fish Lice and Anchor Worms caused by *Salmincola* sp., Argulus sp., *Lernea* sp.	All fish	Exposure to infected individuals, low water conditions or overpopulation.	Where possible, augment water flows to increase quantity and decrease temperature



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The Importance of Species Monitoring: the Example of Declining Amphibian Populations

Amphibian Declines: A Global Concern

Interest in global amphibian (frogs, toads, and salamanders) conservation has greatly increased since 1989, when herpetologists began to notice that populations of amphibians in several separate locations across the globe were dwindling without explanation. However, not all species or populations of amphibians were thought to be declining, adding to the mystery. A recent study (2005) synthesized data from around the world and concluded that many amphibian populations are indeed declining in significant numbers: globally, 32% of amphibian species are threatened, compared to about 12% of bird species and 23% of mammal species. Of particular concern are declines noted in areas with no detectable changes in habitats, such as remote wilderness areas (for example, the "cloud forest" in Monteverde, South America). The causes are still poorly understood and currently being researched and debated. Potential causes that are being investigated include contaminants, invasive species, diseases, habitat loss, climate change, ultraviolet radiation, acid rain and other atmospheric deposition, or the interaction of multiple causes.

Why might these animals be so sensitive to changes in the environment? All amphibians have several unique characteristics that could make them particularly susceptible to environmental impacts: they have very thin, moist and sensitive skin; their eggs and larvae develop in water, where many pollutants concentrate; and, they also have a terrestrial component of their life cycle, making them vulnerable to environmental change in multiple habitats. Amphibians have been called modern-day "canaries in the coalmine," possibly presenting us with early warning signals of environmental damage that could affect other fish and wildlife, as well as people.

Amphibians in Oregon and Importance of Monitoring

With its diverse habitats and relatively mild climate, Oregon is home to many native amphibians. Some species are common and widespread, with healthy populations. These include the Pacific tree frog and rough-skinned newt. However, others such as the Oregon spotted frog and foothill yellow-legged frog have declined. Although many of these species are monitored, there is still little known about their behavior and habitat use. For example, where they spend the winter months is poorly understood for many amphibians. This basic information is needed to better maintain, manage and restore Oregon's amphibian habitats. Taking up the challenge of long-term monitoring also will be essential to determine amphibians' status and trends over time. Both nationally and in Oregon, the U.S. Geological Survey's Amphibian Research and Monitoring Program is working to increase understanding of amphibian biology (http://armi.usgs.gov). Also, the USGS's FrogWatch USA program offers an opportunity for citizens volunteers to gather information on frogs and toads (www.frogwatch.org). For many reasons, Oregon's amphibians are worth watching.

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