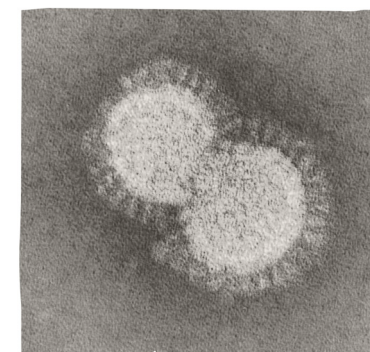




Interconnected

More and more wildlife diseases are being detected in Montana. Keeping tabs on them helps protect domestic animals and people, too.

BY JULIE LUE. ILLUSTRATIONS BY BLAKE CALE



The H5N1 avian influenza virus under high magnification.

A particle of the highly pathogenic avian influenza (HPAI) virus is just a bit of genetic material coated in protein, enveloped in a fatty membrane, and shaped like a pretzel rod or a spiky sphere that might, if you magnified it 670,000 times, resemble a rubber toy your dog would chase across the backyard. It can't even move on its own. But there's no question that the avian flu virus has a powerful reach.

Montana's relative remoteness has provided little protection from a pathogen that can migrate with birds, particularly waterfowl. The H5N1 strain arrived here in early 2022 after spreading across the world and eventually to North America. Especially destructive to domestic poultry and some species of wild birds, the virus has also infected some 1,000 U.S. dairy herds and a wide range of other mammals—including humans.

HPAI is one of several emerging diseases to hit the Treasure State recently. Rabbit hemorrhagic disease virus, sometimes called "bunny Ebola," was detected in 2021. The fungus that causes white nose syndrome (WNS), which has killed millions of hibernating bats in North America, was first detected here in 2020, as was the virus that causes COVID-19, which has proved capable of infecting both humans and wildlife. Chronic wasting disease (CWD) was detected in the state's wild deer populations by 2017. And pigeon paramyxovirus had

arrived on the scene by 2010.

These newcomers join a long list of existing diseases: bighorn sheep pneumonia, brucellosis, rabies, epizootic hemorrhagic disease (EHD), tularemia, plague, chytrid amphibian fungus, and a host of others, including some that sicken or kill fish.

Clearly, wildlife managers have a challenge on their hands. "I call it a growth industry," says Ken McDonald, chief of FWP's Wildlife Division in Helena. "It seems like we just keep adding more issues, like CWD, which has gone from almost nothing in the last five years to a huge program of surveillance and testing and monitoring."

But as diseases have increased, FWP has ramped up its ability to respond via its Wildlife Health Program (WHP), led by wildlife veterinarian Dr. Jennifer Ramsey in Bozeman. The WHP doesn't make wildlife management decisions; instead, it supplies answers to wildlife managers as they weigh decisions related to health, disease, and wildlife population management.

"With the Wildlife Health Program and the wildlife health expertise we have on board," McDonald says, "we're a lot better prepared now than we were 20 years ago."

The big question, given the rapid increase of diseases across the state, is whether that preparation can protect Montana's wildlife populations and livestock—not to mention hunters, ranchers, and others who come into contact with animals.

A frequent contributor, Julie Lue writes from Florence in the Bitterroot Valley.



DON'T GOOGLE BEFORE BREAKFAST

The WHP addresses a range of issues that affect wildlife health, including disease and parasites, environmental toxins (like lead, pesticides, or herbicides), nutrition, genetics, and animal welfare. Staff spend time in the field conducting mortality investigations, collecting samples, and helping capture and radio-collar wildlife. Home base for the program is the Wildlife Health Lab in Bozeman, where Ramsey and veterinary technician Matt Becker conduct necropsies—animal autopsies—to investigate what is sickening or killing animals.

On a frosty fall morning, the lab's steel workbench holds the head of a cow moose found dead near Mill Creek, east of Sheridan. It's not always possible to transport an entire moose to the lab, but this head will provide a sample for CWD testing and another for a U.S. Department of Agriculture (USDA) study about the COVID virus in wildlife (it has been found in white-tailed deer). Ramsey will also dissect the head in search of a parasite you might not want to Google before breakfast: arterial worm.

The adult worms coil tightly in the arteries of the head and neck, restricting blood flow to the head and brain of its host. Mule

deer have a natural resistance to the worm, but moose, elk, whitetails, and bighorns can develop blindness, neurological problems, or ear, muzzle, or antler/horn deformities. Then again, they may show few outward signs. "We commonly find arterial worms in moose that are simply found dead. Often they don't look that unhealthy," Ramsey says. This moose, which has a stubbed-off ear tip, is infected, though it's uncertain whether arterial worms are what killed her.

FWP can't necropsy every dead wild animal found in Montana. But when there's an unexplained mortality, a die-off of multiple critters, or a potential exposure of people or domestic animals, the case is likely to get the agency's attention. Say a landowner finds dozens of dead doves on their property. Or a deer dies in a field used by cattle. Or a skunk is seen staggering around a horse corral in daytime. Determining what's responsible can give people peace of mind or help them decide what precautions to take. The necropsy may also uncover a new pathogen or outbreak, possibly even allowing it to be stamped out before it spreads.

As for a wobbly skunk, most of us probably think of rabies. But Ramsey says that many mammals showing neurological signs

are tested post-mortem for distemper and avian influenza as well. "We've had bears, foxes, skunks, raccoons, mountain lions, and black and grizzly bears with HPAI, and their symptoms are indistinguishable from the rabies virus," she says.

Depending on the disease or parasite, necropsy results may be relevant not just for FWP but also the Montana Department of Livestock (DOL), the Department of Public Health and Human Services (DPHHS), or the federal counterparts of these agencies.

"We look at it these days through a perspective of what's called 'One Health,'" Ramsey says. "Instead of wildlife folks being in their own little bubble over here, worrying only about wildlife, and the livestock folks only worrying about livestock, and public health just thinking about people, we are constantly communicating and sharing information. Because what we now realize is all this stuff is connected."

When Ramsey and other FWP officials are identifying priority diseases that will receive the most time and attention, she says, "we're also thinking about whether there are any things we need to be concerned about affecting our human population or our agriculture industry."

SUSCEPTIBLE POPULATIONS

Are more wildlife diseases reaching Montana these days, or are scientists just paying more attention, detecting some that have been here all along?

"It's a bit of both, but we're definitely seeing an uptick in disease emergence," says Dr. Emily Almberg, an FWP disease ecologist with the Wildlife Health Program in Bozeman. This is partly due to how people move pathogens and animals around, change the landscape in ways that push animals into new contacts with other species, and raise large numbers of domestic animals for agriculture. All this provides greater opportunity for pathogens to spread and change.

Though diseases are a natural part of wildlife ecology, Almberg says, "We start to worry when we get newer pathogens for which a population has no previous exposure, so they're much more susceptible. Often that's where we see conservation-level impacts to a species and big declines."

To pick a few examples: White nose syndrome has pushed some bat species, like the

northern long-eared bat, onto the federal endangered species list. CWD has thinned deer numbers in areas with high prevalence, causing some Colorado mule deer herds to decline by 45 percent over 20 years. Sylvatic plague has put the brakes on endangered black-footed ferret recovery, both by driving down numbers of prairie dogs, their main prey, and sickening the weasel-like predators themselves.

Disease transmission from domestic species to wildlife is also a major concern. For instance, bacteria carried by domestic sheep and goats can "spill over" to infect bighorn sheep, leading to a deadly form of pneumonia. Infected bighorns can then transmit the disease to other wild populations. Since 1979, Montana's once-spectacular bighorn herds have experienced over two dozen die-offs from this devastating illness, which recently decimated a wild sheep herd in the Missouri River Breaks and caused some sheep to die in the Skalkaho area east of Hamilton. Even a healthy herd can be one contact away from disaster.



Keeping bird feeders from spreading bird flu

Songbirds don't often contract highly pathogenic avian influenza (HPAI), but spilled seed underneath feeders can attract pheasants and wild turkeys, which are more susceptible to the disease and consequently more likely to transmit it to backyard poultry flocks or other animals. Because HPAI can be spread through droppings, bird feeders should not be placed near chicken coops or where domestic birds will be walking around. Experts also recommend using disposable gloves when touching bird feeders and birdbaths, which should be disinfected regularly to reduce risk of spreading diseases like salmonella and conjunctivitis.

WILLIAM MOESSNER





Fish get sick, too

Ever since whirling disease arrived in the mid-1990s, FWP’s fish health program has tested fish raised in hatcheries or moved from one waterbody to another to help ensure they are free of certain pathogens.

“The heart and soul of our program is prevention,” says FWP fish health coordinator Ken Staigmiller, based in Great Falls. “But we’re getting pulled more and more into disease management.”

Yet determining what is making a fish sick gets complex. Pathogens are always present in the water, and it’s widely thought that stress plays a role in how susceptible fish are to disease, whether from high water temperatures, low flows, poor water quality, or angling pressure.

Fish health is getting added attention recently because of near-historic lows in trout numbers and reports of fish with fungal infections and head necrosis in the upper Jefferson River basin. FWP is working with Montana State University and other partners to study how environmental stressors, fishing, and other recreational uses affect trout in the Big Hole, Beaverhead, Ruby, and Madison rivers. Some trout numbers increased in 2024, and fewer than 1 percent of those captured for study showed signs of the fungal disease. Staigmiller also noted that, so far, no new disease has been identified.

To help keep fish healthy, he recommends anglers follow the same “Clean, Drain, Dry” practices recommended for aquatic invasive species (clean boots, waders, and other items), and to minimize handling and keep fish in the water as much as possible when catch-and-release fishing. Report sick fish (preferably with photos) at sickfish.mt.gov, or tagged fish at mtcfru.org/msutag.

Diseases that spill over into wildlife can spill back.

And diseases that spill over into wildlife can spill back. Bovine brucellosis was originally transmitted from cattle to bison and elk, which now serve as a reservoir for the disease. Brucellosis has been mostly eliminated in cattle thanks to an aggressive testing and culling program by USDA and a helpful if not perfectly effective vaccine. “But there is now a significant effort to protect livestock from infected wildlife,” McDonald says. “Management of wildlife populations to minimize threats to livestock then becomes a major driver of what we do.”

Concerns about spillover and reservoirs also explain why FWP staff watch out for bovine tuberculosis (bTB); in parts of Michigan, white-tailed deer serve as a reservoir for bTB.

“If it shows up, we need to take some pretty immediate actions to prevent the spread in wildlife to then prevent the spread to Montana livestock,” says McDonald. “Otherwise, there’s going to be more pressure on us to drastically reduce deer numbers.”

THE HUMAN CONNECTION

As we’ve seen with COVID-19, spillover can be a problem in people, too. Montana’s list of zoonotic diseases (transmitted between animals and humans) includes some fearsome names: rabies, plague, and tularemia (which is caused by a bacterium so infectious it’s considered a potential bioterrorism agent).

HPAI is zoonotic as well, though the current strain doesn’t spread readily among people. That could change. “It’s up to us to make sure HPAI doesn’t become a problem,” says Devon Cozart, an epidemiologist with DPHHS in Helena. “The more contact

we have with HPAI and animals that are sick with it, the more likely it is to adapt to humans and then start spreading from human to human.”

From a wildlife management perspective, McDonald is concerned that if this occurs, people might demand eliminating entire populations of waterfowl and other migratory birds.

He also cautions that, “Even if a disease might not make you sick, it can still cause problems.” And he’s not just talking about the price of eggs. Endangered species designations can affect land use and how wildlife agencies allocate their time and resources. Fish die-offs can cause river closures (like on the Yellowstone River in 2016), and declines in big game can result in reduced hunting opportunity. “We saw that a few years back when we eliminated all deer B tags in a season as a result of a significant EHD outbreak,” McDonald says. There also can be economic implications for communities that rely on animal agriculture or wildlife-related tourism, including hunting, fishing, and wildlife watching.

Sometimes consequences can be much harder to predict. One University of Chicago researcher has even linked the decline of insect-eating bats from WNS to higher infant mortality as a result of increased pesticide use for farming.

IMPERFECT TOOLS

Once a disease becomes endemic in free-ranging wildlife, it can be difficult or impossible to eradicate. Usually there’s no vaccine or treatment, even if you could find a way to deliver it. “You can’t very easily run



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“Most wildlife are healthy, and most game meat is wholesome. But there is reason to be paying attention.”

deer or ducks through a cattle chute,” says Ramsey, a former private-practice vet who treated animals from tiny kittens to giant bulls.

But there’s often something wildlife managers can do to reduce effects on wildlife, livestock, or people. For wildlife, that might involve protecting habitat, reducing other sources of stress or mortality, or adjusting hunting seasons or quotas. But any action is likely to involve some trade-offs.

With CWD, testing can help track the infection, showing spikes in prevalence like that in northeastern Montana. And hunting can be used strategically to help reduce the prevalence of the disease over time, both by thinning deer herds where they are highly concentrated and by reducing buck-to-doe ratios, as bucks are more likely to be infected. But harvesting more bucks can be unpopular with trophy hunters who ask FWP to allow them to live longer to grow bigger antlers.

Brucellosis requires a different game plan. “Our tools to limit the spread in elk are limited,” Almborg says. So instead of trying to manage spread in elk, FWP is actively monitoring for the disease and trying to reduce the risk of spillover to cattle. Landowners can request FWP’s help with hazing elk away from livestock, stockyard fencing and fence modification, special management hunts to trim local elk herds, and kill permits.

Each winter, in coordination with the Montana Department of Livestock, FWP staff capture elk outside a designated brucellosis surveillance area in south-

western Montana, test for the disease, and radio-collar some of the animals. “If results are negative, it’s good news,” says Dr. Tahnee Szymanski, state veterinarian with DOL in Helena. “But we still utilize movement data from those elk to inform future decisions.”

NO FREE RIDES FOR PATHOGENS

Though these efforts may not necessarily eliminate an infection, they can help manage it. And Montanans can all make a difference, too—for better or worse. Because the health of people, domestic animals, wildlife, and the environment are all linked, “our actions can directly affect both the health of other species and our own health,” Almborg says.

One of the best ways to help is to avoid providing pathogens with a free ride to a new location or host. That means disposing of deer, elk, and moose carcasses in a Class II landfill, not picking up sick birds and bringing them home, not letting pets scavenge on dead wildlife, and practicing good biosecurity with poultry flocks and other domestic animals. People can also have FWP test their harvested deer, elk, and moose for CWD to try to reduce exposure (the Centers for Disease Control and Prevention recommends not eating the meat of CWD-positive animals).

Ramsey says that basic precautions can reduce much of the risk. Recommendations include wearing disposable gloves and practicing good hygiene when handling animals or carcasses or scrubbing birdbaths and bird feeders, not harvesting or eating meat from obviously

sick animals, and cooking game meat to at least 165 degrees (although unfortunately that doesn’t work for CWD). And if hunters find something strange when processing their animal and wonder if the meat is safe to eat, they should call their local FWP office or the WHP.

Ramsey also asks that people report their own observations of sick or diseased wildlife. “For both bighorn sheep and mountain goats, because they’re so hard for us to see, if folks are out and about and see something that looks suspicious or unhealthy, just giving us a phone call is really helpful,” she says. She notes that a hunter in northern Montana reported seeing something strange in bighorn sheep that may be contagious ecthyma, a viral disease that causes skin lesions. “We may have never known about this if that hunter hadn’t called,” Ramsey says.

And while the variety of diseases circulating in wildlife may seem overwhelming, the FWP veterinarian offers this perspective: “Most wildlife are healthy, and most game meat is wholesome. But there is reason to be paying attention.”

People should all be aware of what they may be exposed to and take common-sense precautions, but they don’t necessarily need to fret, Ramsey says. “We’re here so you don’t have to worry as much.” 🐾



Editor’s note: For information about wildlife diseases and public health issues, go to fwp.mt.gov/conservation/diseases



What you can do to help

Whether you’re a hunter, hiker, or just someone who loves nature, simple actions—like reporting sick animals, testing game, and avoiding direct contact with wildlife—can make a difference.

CHRONIC WASTING DISEASE

Test harvested deer, elk, and moose for CWD—even in areas with no known cases.

- It’s critical for FWP to know as early as possible when CWD has made it to a new area while the percentage of infected animals is still low. That requires a large number of samples, so do your part by having every animal tested, a free service provided by FWP.
- For instructions on how and where to submit a sample, visit fwp.mt.gov/cwd

Report sick animals.

- It’s vital that FWP know as early as possible when CWD has spread to a new area. Use the contact information in the box at lower right to report any deer, elk, or moose that are emaciated, drooling, pacing, circling, have drooping ears, loss of coordination, or tremors.

Properly dispose of carcass parts you bring out of the field at a Class II landfill.

- These facilities bury garbage deep in the soil to shield it from contact with deer, elk, or moose that might contract CWD. Do not dump your leftovers after butchering, which can spread this disease to new areas.

Don’t use food or salt blocks to attract animals.

- Feeding deer, elk, and moose is illegal in Montana, in part because any attractant that congregates animals increases the likelihood of CWD transmission.



WHITE-NOSE SYNDROME IN BATS

When visiting a cave or any structure with bats:

- Clean and disinfect your clothes and gear *before* you enter and *after* you leave to prevent spreading the fungus. The spores that cause white-nose syndrome cling to clothes, shoes, and gear, and can stay viable for years.
- Do not enter caves from October through the end of May to minimize disturbance during hibernation.
- Do not enter closed or gated caves or mines.

Report unusual behavior.

- Examples would be bats flying during the day December through March or roosting in sunlight on the outside of structures. Call FWP bat biologist Shannon Hilty at 406-590-3426 or FWP’s Wildlife Health Lab.

Never touch a bat, living or dead.

- While most bats are not rabid, they can be infected with the rabies virus.



AVIAN INFLUENZA

Report sick wild birds.

- Report sick birds or birds found dead with no apparent cause to FWP’s Wildlife Health Lab.

Avoid contact with wild birds.

- Even if a bird is not sick, always wear gloves if it must be handled or while cleaning bird feeders.
- People and equipment that come into contact with wild game birds should avoid backyard poultry flocks until cleaned and disinfected.

Precautions for bird hunters:

- Prevent dogs from consuming sick or dead birds. Do not harvest or handle wild birds that are clearly sick.
- Clean birds outdoors or in a well-ventilated area wearing disposable latex or rubber gloves.
- Wash hands with soap and water or with alcohol wipes immediately after you finish.
- Wash tools and work surfaces with soap and water, then disinfect with a 10 percent solution of chlorine bleach (one part bleach to 10 parts water).
- Dispose of scraps in a Class II landfill, and never feed scraps to pets or poultry.
- Keep raw meat away from cooked or ready-to-eat foods.
- Cook meat to an internal temperature of at least 165°F.



PNEUMONIA IN BIGHORN SHEEP

Pneumonia can be devastating to wild sheep herds. Immediately report to your regional FWP office if you see:

- Bighorn sheep coughing, with nasal discharge, or otherwise appearing sick.
- Bighorn sheep close to (or in contact with) domestic sheep or goats.
- Deceased bighorns in the wild.

RABBIT HEMORRHAGIC DISEASE



Report groups of sick or dead feral or wild rabbits.

- FWP staff will mark the location and determine whether the animals should be collected for RHDV-2 testing.
- Though RHDV-2 does not infect humans, rabbits can carry other diseases such as tularemia and plague that can pose a risk to human health, so avoid any direct contact.

To report diseases in wildlife, contact your regional FWP office (fwp.mt.gov/aboutfwp/contact-us) or call FWP’s Wildlife Health Lab at 406-577-7880.