

Many Texans rely upon the weather for a variety of reasons. From crops to cattle, Texans are often at the mercy of Mother Nature. Although droughts can have a dire impact on animal health, floods can contribute to widespread issues among animal owners. Excessive rainfall can contribute to mosquito-borne diseases, toxic plants, dermatologic conditions, and many other diseases. The Texas A&M Veterinary Medical Diagnostic Laboratory (TVMDL) offers testing and diagnostic consultations to assist animal owners and practitioners with many issues contributed to flooding.

Here is a list of potential health concerns animal owners and practitioners should be aware of during periods of flood or excessive rainfall.

Animal Diseases

Leptospirosis

Transmission of the spirochetes causing leptospirosis increases when environmental conditions favor their survival. Wet conditions increase the potential for leptospirosis exposure. Leptospirosis affects a wide range of animals from livestock, horses, and dogs to wildlife. Once infected, the animal will shed spirochetes in urine for various periods of time and therefore, contaminate the environment and provide a source of infection for other animals.

The clinical signs of leptospirosis vary and are nonspecific, according to the Centers for Disease Control and Prevention (CDC). Some clinical signs in canines include: fever, vomiting, abdominal pain, diarrhea, refusal to eat, severe weakness and depression, stiffness, severe muscle pain and, infertility in breeding dogs. Generally, younger animals are more seriously affected than older animals.

Various species of wildlife (rodents, skunks, raccoons and other small mammals) serve as maintenance hosts for leptospirosis. Therefore, even "city dogs" that are allowed access to parks, nature trails, and even the backyard, where wet areas can exist, are at risk of being exposed to leptospirosis.

Leptospirosis can be the cause of reproductive problems, as well as other medical conditions in livestock and horses. Veterinarians can work with TVMDL to perform tests to determine if leptospirosis is the cause of an animal's illness.

TVMDL performs a microscopic agglutination test (MAT) and a real-time polymerase chain reaction (rtPCR) test for leptospirosis. The MAT can provide titers that indicate infection in the presence of compatible clinical signs. The rtPCR test can detect the presence of the organism in clinical specimens, which helps differentiate an infected animal from one that may be showing vaccine titers.

Clostridial Diseases

Herds can be vaccinated to protect against clostridial diseases such as Blackleg, Malignant Edema, Red Water disease and other clostridial infections. Spores from the bacteria that cause these diseases can reside in the soil for a few months or even years. Disturbance of the soil can expose the spores and make them more accessible to grazing animals. There can be an increase in clostridial infections in years of high rainfall and flooding. The spores can be spread to new pastures by flood water and run-off.

Blackleg

TVMDL's bacteriology sections can perform a *Clostridium* fluorescent antibody (FA) assay on bovine, ovine, and cervid samples. This acute, highly fatal disease of cattle and sheep is caused by the *Clostridium chauvoei* bacteria and is one of the more common clostridial infections. The bacterial spores may be found on farms after flooding where it was not previously known to exist. This is also true for the other clostridial

diseases. Signs of infection include emphysematous swelling, commonly affecting heavy muscles (clostridial myositis).

Commonly contracted by beef breeds, cattle 6-24 months old are the most susceptible, but disease may occur in cattle as young as 6-week-old and as old as 10-12 years old. In sheep, Blackleg often follows a wound infection following procedures such as shearing, docking or castration. Onset can be sudden, with large, hot and painful lesions; death can occur within 12-48 hours.

Anthrax

Anthrax is endemic in some areas of Texas and is caused by the spore forming bacterium *Bacillus anthracis*. Anthrax cases are often associated with periods of weather extremes. Cases may increase in years of high rainfall and flooding, especially when preceded by a drought; floodwaters may carry spores to new areas.

Anthrax should be considered in cases of sudden death in livestock, especially when dark or tar-like blood exudes from all orifices. If there is good reason to suspect Anthrax, the carcass should not be opened. A cotton or Dacron tipped swab can be soaked in the bloody discharge, placed in a red top tube and submitted to the diagnostic laboratory. TVMDL is equipped with capabilities for properly, and safely, testing the sample for anthrax.

Confirmed cases of Anthrax are reported to the Texas Animal Health Commission. Livestock owners should work with their veterinarian and the commission concerning vaccination protocols and proper disposal of infected carcasses. Laboratory testing is needed to confirm a suspected case of Anthrax.

Mastitis

An inflammation of the mammary gland, mastitis is usually due to infection by bacterial pathogens. Mastitis outbreaks are an issue in flooded areas and areas that have been very wet for prolonged periods. The wet, muddy conditions contaminate the teats and predispose the udder to mastitis.

Preparing animals for milking is important to preventing mastitis. Clean and dry the teats; signs of flakes, clots, watery milk, or hard and swollen quarters at milking are signs of mastitis.

Proper diagnosis and treatment of mastitis is important in an attempt to preserve as much functional mammary tissue as possible. Bacteriology culture and sensitivity results are used to select the proper antibiotic for the treatment of mastitis.

Insect-Borne Diseases

Eastern and Western Equine Encephalitis and West Nile Virus

Biting insect populations increase significantly following excessive rainfall and thrive in flooded and previously flooded areas. Mosquitoes and biting flies spread a number of viral diseases, such as Eastern Equine Encephalitis (EEE), Western Equine Encephalitis (WEE) and West Nile virus (WNV). Although predominantly associated with disease in horses, these viruses can infect and cause disease in birds, dogs, cats, and humans. The natural disease cycle is a bird/mosquito transmission cycle. When the virus becomes more prevalent in nature, it may "spill over" into horses, other animals and humans.

Typically, these diseases manifest through neurologic symptoms caused by inflammation of the brain and spinal cord. Vaccines for EEE, WEE and WNV are available to prevent disease in horses.

TVMDL offers serologic assays to determine whether an animal is infected with EEE, WEE, or WNV. TVMDL also offers a molecular assay (rtPCR) for the detection of WNV. In addition, necropsy and histopathology can assist in the diagnosis of neurologic disease.

Heartworm Disease

Heartworm disease is caused by a parasitic filarial worm *Dirofilaria immitis*. This parasite is transmitted by

mosquitoes. Dogs are primarily infected but this disease is also seen to a lesser extent in cats. As a result of extensive rainfall, there is an uptick in mosquito populations, which increases the risk of heartworm infection for dogs and cats.

Consult a veterinarian concerning heartworm prevention, testing and treatment. TVMDL offers serologic testing for heartworm disease diagnosis in canine and feline specimens.

Skin and Foot Problems

The prolonged wet weather increases the risk of skin and feet infections in both companion animals and livestock.

Dermatophilosis

(Rain rot, rain scald, scratches, mud fever)

This is a common bacterial dermatitis caused by *Dermatophilus congolensis*. The most important factors in the initiation of dermatophilosis are skin damage and moisture. The exudative, crusted lesions are found over the rump and topline, face and neck, and pasterns, coronets and heels in horses. Wet, poorly drained pastures and paddocks are commonly associated with the distal limb dermatitis. This skin infection can also be seen in cattle and sheep/goats. TVMDL can perform diagnostic testing for this skin infection. A definitive diagnosis is based on cytology, skin biopsy and culture. Consult a veterinarian for treatment options.

Foot Abscesses/Foot Rot

Wet muddy conditions can predispose livestock and horses to foot infections. Horses who are in wet, muddy pastures or paddocks are at an increased risk of developing a sub-solar abscess. The horse will present with lameness and should be examined by a veterinarian to determine the extent of the infection and foot structures involved.

Cattle, sheep, and goats that are in wet/muddy conditions are more likely to develop foot rot which is a bacterial infection involving structures of the foot. The infection involves the skin in the interdigital space (between the toes) and swelling of this area is often present. The animal will be lame and usually only in one leg. While spontaneous recovery is not uncommon, if left untreated the infection may progress to involve the joints and tendon sheaths of the foot and lower leg. If this occurs, the lameness will become more severe and swelling may extend up the leg. The treatment will depend on how extensive the infection is and it is recommended a veterinarian is consulted for options.

Veterinarians are the best source of information for potential health threats relating to specific regions in Texas. TVMDL offers an extensive array of assays to help practitioners diagnose a range of animal health diseases.

For a full list of services or specific test information, visit TVMDL's website or contact one of the full service laboratories.