

## Mexican Wolves and Infectious Diseases

Mexican wolves are susceptible to many of the same diseases that can affect domestic dogs, coyotes, foxes and other wildlife. In general, very little infectious disease has been found in captive or wild Mexican wolves. Disease in wild wolves is most likely an indicator of what diseases are circulating in the environment. Many diseases can be density dependent. For example, coyotes, feral dogs and foxes are more numerous in the environment and likely play a larger role in disease cycles than do Mexican wolves. Health protocols are in place for captive Mexican wolves, wolves released to the wild from pre-release facilities, and captured wild Mexican wolves. The Mexican Wolf Recovery Program administers vaccinations and dewormers to all captured wild Mexican wolves and to wolves housed at the U.S. Fish and Wildlife Service's Seville Wolf Management Facility, and the Ladder Ranch Wolf Management Facility (pre-release facilities). Active disease surveillance programs are in place for wild and captive Mexican wolves. Vaccination, deworming and disease surveillance programs are in place for public health, the health of individual Mexican wolves, and for the health of general Mexican wolf population.

### **Captive Mexican wolves:**

*The Mexican Gray Wolf Species Survival Plan Husbandry Manual* is referenced for health protocols. This manual is the reference for health guidelines for all Mexican wolves held in captive facilities through the Mexican Gray Wolf Species Survival Plan. Prior to transfer to a pre-release facility, Mexican wolves are given a general health exam (including laboratory blood and fecal evaluations), vaccinations as appropriate, and antiparasitics, effective for a wide range of external and internal parasites.

### **Captive Mexican wolves at Pre-release Facilities (Seville Wolf Management Facility, Ladder Ranch Wolf Management Facility):**

- Receive comprehensive vaccination with canine distemper, parvo, adeno 2, parainfluenza viruses (DA2PP) vaccine. Killed rabies vaccine is also administered, with yearly boosters
- Are preventively dewormed with products appropriate for a wide range of intestinal and external parasites
- Are handled by a veterinarian and evaluated for disease at least once a year (physical exam, laboratory evaluations etc.)
- Receive laboratory fecal evaluation (fecal floatation) at least twice a year to screen for intestinal parasitism

### **Prior to release from Pre-release Facility to the wild (Blue Range Wolf Recovery Area), Mexican wolves are:**

- Screened with laboratory evaluations of feces and blood, boosted as appropriate with vaccines, and given preventive antiparasitics and deworming (against external parasites and intestinal parasites, including anti-tapeworm dewormer)

**Mexican wolves captured in the wild as part of the Reintroduction Project management activities are handled under specific protocols that result in each wolf receiving:**

- A physical examination
- Vaccination (DA2PP and Rabies)
- Deworming and external parasite treatments
- Blood drawn for surveillance of canine distemper virus, canine parvovirus, plague, tularemia and leptospirosis (multiple types), and obtaining feces (if available) for fecal floatation

These treatments and tests are done each time a wild animal is captured. It is not possible to capture and treat every wild Mexican wolf, but the Project is very active in trapping and will take advantage of annual aerial darting operations to identify and treat as many wild Mexican wolves as possible.

In the event of any (captive or wild) Mexican wolf mortality, recovered carcasses undergo extensive necropsy (animal autopsy) procedures to inform managers about the cause of death and acquire medical data. In general, captive and wild Mexican wolves are very healthy.

**Select diseases relative to Mexican wolves, humans and livestock:**

Human safety and health is of utmost importance to the Mexican Wolf Program. Many viruses, bacteria and external and internal parasites are common in the environment and some can affect humans, as well as livestock and wildlife. Diseases that can be transmitted from animals to humans are called zoonotic diseases. General health and safety precautions relative to wildlife include: wearing gloves, thorough hand washing practices, wearing insect repellent, cooking meat thoroughly, not handling feces or carcasses, and avoiding any animals acting sick or behaving abnormally. The following links for detailed information are available from the American Veterinary Medical Association:

<https://www.avma.org/public/Health/Pages/Outdoor-Enthusiasts-Quick-Tips.aspx>

<https://www.avma.org/public/Health/Pages/Outdoor-Enthusiasts-Precautions.aspx>

<https://www.avma.org/public/Health/Pages/Hunters-and-Disease-Risks.aspx>

- Echinococcus granulosus:

*Echinococcus granulosus* is a type of tapeworm parasite with canines as the host for the adult stage of the worm. Herbivores play a role as the hosts for the immature stages of the worm. It is zoonotic (can be contagious from animals to humans). Mexican wolves are administered praziquantel (an anti-tapeworm medicine) upon release, and any tapeworm positive samples found in the pre-release facility or the wild are tested further for *Echinococcus* species (there are many types of common non-zoonotic tapeworms). No positive *Echinococcus granulosus* samples have been found in pre-release facilities or wild Mexican wolves. To prevent *Echinococcus* and many other diseases in humans, it is important to

wash hands and wear gloves. Humans should not handle canine feces, eat under-cooked meats, or handle any wild animals or parts without gloves.

<http://www.cdc.gov/parasites/echinococcosis/>

- External and Internal Parasites:

General parasitic infections with external and internal parasites can occur in Mexican wolves. Many of these parasites are common in domestic dogs and other wild canines such as coyotes. External parasites such as fleas, ticks and mange can occur in wolves. Topical antiparasitics are applied to all Mexican wolves when handled. Intestinal parasites such as roundworms and tapeworms are also possible and are treated with common deworming protocols in captivity and given to wild wolves when captured. These common parasites have been found infrequently in wild and captive Mexican wolves. Routine laboratory fecal screenings assists with surveillance for these parasites.

- Rabies:

Rabies is a very important worldwide zoonotic viral disease and is present in Arizona and New Mexico. All Mexican wolves captured and handled are routinely administered killed rabies vaccine. To date, no rabies has been documented in Mexican wolves. Nevertheless, the potential does exist for Mexican wolves, as with any canine, to contract rabies and any wolves or wildlife behaving in an abnormal or aggressive manner should be avoided and reported immediately. Domestic animals should be vaccinated appropriately against rabies.

<http://www.cdc.gov/rabies/>

<http://www.azdhs.gov/phs/oids/vector/rabies/>

<http://nmhealth.org/ERD/HealthData/rabies.shtml>

- Plague:

Plague is a bacterial disease commonly found in rodents. It can be transmitted by rodent fleas (not the fleas commonly found on canines). Canines are fairly resistant to becoming actively ill with plague. Wolves will occasionally consume smaller prey such as rodents, and it is common to find titers indicating exposure to plague, though this does not necessarily indicate severe contagious illness in the wolf.

<http://www.cdc.gov/plague/>

<http://www.azdhs.gov/phs/oids/vector/plague/>

<http://nmhealth.org/ERD/HealthData/plague.shtml>

- Tularemia:

Tularemia is a bacterial disease especially associated with rabbits. Mexican wolves can occasionally show exposure titers, but all canines are fairly resistant to becoming actively ill from tularemia.

<http://emergency.cdc.gov/agent/tularemia/facts.asp>

- Leptospirosis:

Leptospirosis is a worldwide bacterial disease. There are many types (serovars) represented in domestic animals, wildlife, and humans. Leptospirosis is zoonotic and can also cause livestock abortions. Serological testing (blood sampling for exposure) in Mexican wolves to multiple serovars has not produced any positives (including testing for the serovar that commonly produces livestock abortion). Contaminated water sources are the most common way leptospirosis is transmitted.

<http://www.cdc.gov/leptospirosis/>

<https://www.avma.org/public/Health/Pages/Disease-Precautions-for-Hunters.aspx#leptospirosis>

- Neospora:

*Neospora* is a protozoal disease with canines as definitive hosts. It can cause abortion in cattle. The role of wildlife is unknown, but domestic dogs are most commonly implicated in transmission, as well as contaminated feed sources. To date, no Mexican wolves have been documented with *Neospora*.

<http://www.ars.usda.gov/Main/docs.htm?docid=11007>

- Chronic Wasting Disease:

Chronic Wasting Disease (CWD) is a disease thought to be caused by proteins called prions. CWD is primarily associated in wildlife with deer and elk. CWD has been detected in New Mexico, but not Arizona. It is possible that wolf predation upon deer and elk populations may serve to decrease incidence of CWD, where it exists, but wolves are not known to become sickened by CWD, or to transmit it.

[http://www.aphis.usda.gov/animal\\_health/animal\\_diseases/cwd/](http://www.aphis.usda.gov/animal_health/animal_diseases/cwd/)

Wild, M. A., N. T. Hobbs, M. S. Graham, M. W. Miller. 2011. The role of predation in disease control: a comparison of selective and nonselective removal on prion disease dynamics in deer. *Journal of Wildlife Disease* 47:78-93

Miller, M. W., H. M. Swanson, L. L. Wolfe, F. G. Quartarone, S. L. Huwer, C. H. Southwick, and P. M. Lukacs. 2008. Lions and prions and deer demise. *Plos One* 3(12): e4019.

- Anthrax:

Anthrax is a worldwide bacterial disease often associated with tropical or temperate regions with alkaline soils, rich in organic matter and nitrogen (these soil types are not commonly found in the Mexican Wolf Blue Range Wolf Recovery Area. Carnivores are fairly resistant, and anthrax has not been

documented in Mexican wolves. Livestock are most commonly infected by grazing or eating feed contaminated with anthrax spores.

<https://www.avma.org/KB/Resources/FAQs/Pages/Anthrax-FAQs.aspx>

- Listeria:

Listeria is a bacterial disease commonly isolated from soils, water, sewage and contaminated foodstuffs. Disease is usually associated with ingestion of contaminated feed by livestock or ingestion of contaminated meat and dairy products by humans. No known listeria cases have been documented in Mexican wolves.

<http://www.cdc.gov/listeria/index.html>

Foot and Mouth Disease, Brucellosis and Tuberculosis are all very important livestock diseases. There are no data relative to Mexican wolves and these diseases. These diseases are not likely to cause active disease in Mexican wolves and it is possible, but unlikely that wolves could potentially spread them. However, if any concern about these diseases arose in an area with Mexican wolves, the Program would work with all appropriate authorities to identify and mitigate any role connected to Mexican wolves.

- Foot and Mouth Disease:

Foot and Mouth Disease is a viral disease of cloven-hooved animals (wolves do not become infected or sickened by it). It has been eradicated in the US since 1929 and in Mexico since 1954. Though almost any animal or object could spread Foot and Mouth Disease, it is most commonly transmitted by contaminated feed or infected livestock.

[http://www.aphis.usda.gov/publications/animal\\_health/2013/fs\\_fmd\\_general.pdf](http://www.aphis.usda.gov/publications/animal_health/2013/fs_fmd_general.pdf)

- Brucellosis:

Brucellosis is a worldwide bacterial disease. Specific types infect carnivores and herbivores. New Mexico and Arizona livestock are certified Brucellosis-free, and no known Brucellosis has been detected in Mexican wolves.

[http://www.aphis.usda.gov/animal\\_health/animal\\_diseases/brucellosis/](http://www.aphis.usda.gov/animal_health/animal_diseases/brucellosis/)

[http://www.aphis.usda.gov/animal\\_health/animal\\_diseases/brucellosis/downloads/bruc-facts.pdf](http://www.aphis.usda.gov/animal_health/animal_diseases/brucellosis/downloads/bruc-facts.pdf)

- Tuberculosis:

Tuberculosis is a worldwide bacterial disease. Bovine tuberculosis is present in limited areas in the U.S. Canines are fairly resistant to tuberculosis. Livestock in Arizona and New Mexico are certified free of bovine tuberculosis, and no known tuberculosis has been detected in Mexican wolves.

[http://www.aphis.usda.gov/wildlife\\_damage/nwdp/tb.shtml](http://www.aphis.usda.gov/wildlife_damage/nwdp/tb.shtml)

[http://www.aphis.usda.gov/animal\\_health/animal\\_diseases/tuberculosis/](http://www.aphis.usda.gov/animal_health/animal_diseases/tuberculosis/)

A helpful general animal and zoonotic disease reference is from the Center for Food Security and Public Health:

<http://www.cfsph.iastate.edu/>

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