

# Caribou Health and Disease: A Pocket Guide



Alaska Department of Fish and Game  
Division of Wildlife Conservation, 2021

# Using this Guide



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Alaska Department of Fish and Game  
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**Cover photo:** ©Jim Dau, ADF&G



The goals of this guide are to provide anyone spending time outdoors with basic information about caribou health conditions that may be observed during wildlife viewing, hunting, or meat processing; and to request help with surveillance for diseases of concern pertaining to caribou, human, or environmental health.

### Information for each condition

**Description:** Basic description of each condition or disease.

**Signs:** Observable indicators of a condition or disease.

**Safety:** Transmission risk and meat safety, pet safety, and wildlife safety information.

**Prevention:** Actions you can take to prevent disease transmission and meat contamination.

**How to report/sample:** Procedures for when and how to report conditions or collect samples.

### Color-coded sections

-  General information
-  External conditions
-  Internal conditions
-  Conditions not easily visible
-  Conditions of concern: not yet detected in Alaska

# General information

**If you harvest an animal that appears to be sick or diseased, you are still required by Alaska Statute to salvage the meat.** You must transport all required meat from the field to fulfill salvage requirements, even if you think the meat is not fit for consumption or you do not intend to eat it.

**Never eat raw game meat. Always cook game meat thoroughly to prevent disease.** Freezing, drying and smoking do not kill all potential disease agents or parasites present in game meat that cannot be seen with the bare eye. Minimum cooking temperatures: 165°F for birds, 160°F for ground meat, and 145°F for steaks or roasts.

**Cook any game scraps you may feed your dogs.** Dogs can be infected by diseases and parasites that spread between game and predators/scavengers, such as wolves and foxes. Some diseases do not infect people directly, but indirectly through pets (e.g. *Echinococcus*, *Tularemia*). Prevent these infections by cooking scraps that can be legally fed to dogs (guts, skin, bones) to a minimum temperature of 160°F.

**Freezing meat will ONLY kill tapeworms.** Many Alaska game parasites have adapted to survive freezing. Universally, cooking your game meat thoroughly is the best solution to protect yourself from internal parasites and diseases.

## HELP US MONITOR CARIBOU:

**If you suspect that a caribou you encounter is exhibiting signs of one of the diseases under surveillance,** please report observations to the Wildlife Health Program. Reports from the public help ADF&G better understand and monitor wildlife health in Alaska.

# How to report

*we appreciate your help in monitoring caribou*

1) If you encounter a caribou that has been hit by a vehicle, has broken limbs or other physical injuries, call your local ADF&G office during business hours. On nights and weekends, contact the Alaska Wildlife Troopers in your area:

**[dps.alaska.gov/AWT/Contact](https://dps.alaska.gov/AWT/Contact)**

2) To submit any physical sample from an animal or carcass for disease identification or monitoring, contact your local ADF&G office. ADF&G can only accept samples submitted with a "Wildlife Samples for Disease/Parasite Investigation" form. Ask for one from an ADF&G office, or print one from our website:

**[wildlifediseasereporting.adfg.alaska.gov](https://wildlifediseasereporting.adfg.alaska.gov)**

3) To submit a wildlife health report to us by email (include photos, GPS locations, and detailed descriptions):

**[dfg.dwc.vet@alaska.gov](mailto:dfg.dwc.vet@alaska.gov)**

4) If you observe a condition of concern and you do not have reliable access to the internet, leave a message for the Wildlife Health & Disease Surveillance Program:

**Wildlife Health Program Office: (907) 459-7257**  
**Wildlife Health Program Mobile: (907) 328-8354**

5) For more detailed information, search "parasites and diseases" on our website:

**[www.adfg.alaska.gov](https://www.adfg.alaska.gov)**



## Brucellosis (*Brucella suis*)



**Description:** Brucellosis is a highly contagious disease caused by the bacteria *Brucella suis* biovar 4, which occurs naturally in caribou and reindeer herds in North America. It spreads through the afterbirth and body fluids during calving or breeding, respectively. Predators and scavengers can be exposed from feeding on infected caribou.

**Signs:** Caribou may appear normal with no outward signs of disease. Brucellosis mainly affects the reproductive organs and leg joints. Caribou may have swollen leg joints that cause limping/lameness, or a swollen udder or scrotum. In people, brucellosis can cause flu-like symptoms with a fever that comes and goes. It is rarely serious enough to warrant medical attention, and thus likely under-diagnosed. However, brucellosis can cause heart damage or even rare fatalities if left untreated.

**Safety:** Brucellosis is a zoonotic disease, meaning it can be transmitted from animals to people. Bacteria can enter through cuts/scratches in skin or through the eyes, nose or mouth, or by ingesting contaminated meat that is not fully cooked.

**Prevention:** Wear gloves while butchering or processing raw meat. Wash your hands, knives, and cutting boards with hot soapy water after butchering or handling meat. Do not cut into diseased parts/swellings, and do not spill fluids from the womb or swellings onto the meat. Freezing preserves the bacteria in the meat for years so it is crucial to cook meat thoroughly. Do not consume raw bone marrow. Do not feed diseased or raw game parts to dogs.

**Impact on caribou populations:** The bacteria can remain dormant in tissues such as bone marrow in some caribou allowing periodic outbreaks of disease to occur in individual caribou or herds when there are additional stressors. Stressors might include a first pregnancy, going into the rut, challenges during migration, or foraging conditions. Bulls can spread the bacteria during the rut, or young cows that have miscarriages can also contaminate calving grounds. Outbreaks can lead to fewer caribou calves growing up to breed and lower fertility rates within herds. As this can lower the population size or depress recovery of a declining herd, ADF&G closely monitors caribou herds for this disease and the resulting impacts.

### How to report/sample:

Before you hunt, check with ADF&G for a list of the requested or required biological samples for any specific caribou hunt(s) you plan to participate in (see pg. 27).

Report caribou with a swollen leg joint or scrotum. Email photos and a relative location or the name of the caribou herd. If you harvest a caribou you suspect may have Brucellosis, please save the whole limb or swelling without cutting into the affected part. Submit infected area along with a leg bone and lower jaw. These samples may be frozen until delivery to an ADF&G office.

## Papillomas



**Description:** Papillomas, also called warts, are benign growths on the skin or antlers that are caused by viruses.

**Signs:** Papillomas may be smooth or lumpy, raised, often round growths on the antlers and skin. They may be on stalks, or can hang down off the skin. They may become red and ulcerated. Papillomas in caribou primarily occur on the head, especially around the antlers. Most eventually fall off and heal.

**Safety:** Warts occur only on caribou skin or velvet, and the meat is safe for consumption. Papilloma viruses are species-specific so there is no known risk to humans. The virus spreads between caribou via direct contact or contaminated surfaces when caribou rub or scratch.

**Prevention:** None needed, but it is always recommended to wear gloves while butchering or processing raw meat.

**How to report/sample:** Email photos and a GPS location if known (or a general area if not), see pg. 5. Cut off one small wart including some of the normal skin around the edges. Keep sample cool until submitted unfrozen to the closest ADF&G office.

## Hoof rot (*Spherophorus necrophorus*)



**Description:** Hoof rot (or foot rot) is caused by the bacteria *Spherophorus necrophorus*, present in the gut and feces/soil. It invades through an injury to the foot and leads to an infection.

**Signs:** Thick foul smelling pus accumulates in the foot and can spread up the leg or through the bloodstream to internal organs. Abscesses (see pg. 18) may drain pus out through the skin, and lower leg/foot swellings.

**Safety:** People can theoretically be infected, but there have been no reported cases in humans. Do not cut into swellings and avoid contaminating meat with pus. Discard any infected legs or other meat. Uncontaminated meat will be otherwise suitable for consumption.

**Prevention:** Avoid direct contact with pus-filled abscesses. It is always recommended to wear gloves while butchering, especially when abscesses or swellings are present. Wash hands and knives, and cook meat thoroughly.

**How to report/sample:** Remove the lower leg at the joint above and place in a plastic bag; keep cool. Bring leg and submission form to your local ADF&G office.

## Lumpy jaw



*View of the underside of caribou jaws after skinning.*

**Description:** Lumpy jaw is a generic term for a bacterial infection in the jawbones. It starts from broken teeth, gum infections, or damage to the gums or tooth roots.

**Signs:** Hard swelling or enlargement of the lower or upper jaw. Molars are often broken, missing, or the roots may be exposed. Yellow or green pus and a foul odor may be present.

**Safety:** There is no risk to humans or other animals, but consuming an infected head is not recommended. Uncontaminated meat is suitable for consumption.

**Prevention:** Do not cut into or consume swellings or suspected infected parts. Liberally trim away any meat that had contact with pus using clean knives. It is always recommended to wear gloves while butchering.

**How to report/sample:** Email photos and a general location, see pg. 5. No sampling requested.

## Warbles



**Description:** Warbles are a parasitic fly larvae (maggots). Female flies lay eggs on the hair of the lower legs. Hatched larvae penetrate the skin. Larvae migrate and end up in the hide of the back. During winter they grow and breathe through a hole in the skin. In spring, they emerge from the hole, go through a pupal stage, and later drop off as adults.

**Signs:** Common especially in the Arctic herds. Warbles are yellowish-white then brown, oval-shaped, and up to 1" in length in pockets under the skin of the back. Warbles take nutrition and energy from the caribou, making them thin and weak. Caribou may leave favorable foraging habitat to escape flies.

**Safety:** Humans cannot be infected by warble larvae in the caribou, but the flies have rarely bitten and infected children. Meat is suitable for human consumption.

**Prevention:** None needed. It is always recommended to wear gloves while butchering.

**How to report/sample:** No reports or samples requested.

## Nasal bots



**Description:** Nasal bots are fly larvae (maggots). Adult female bot flies deposit eggs in the nostrils of caribou. Larvae hatch and crawl to the back of the nose and grow in pouches at the back of the throat. Larvae are sneezed out in the spring, go through a pupal stage, then hatch into adult flies.

**Signs:** Caribou are severely irritated by bot flies trying to lay eggs. Caribou may run and leave good foraging areas to avoid fly harassment. Nasal bots are found during butchering when the head is cut off and the tongue is removed. Larvae are white when they hatch, then turn yellowish-brown over the winter and can reach 1.5" in length.

**Safety:** Humans cannot be infected by nasal bot larvae. Meat is suitable for consumption.

**Prevention:** None needed. It is always recommended to wear gloves while butchering.

**How to report/sample:** No reports or samples requested.

## Besnoitiosis (sandpaper or cornmeal disease)



**Description:** Besnoitiosis is caused by a tiny parasite, *Besnoitia tarandi*. It is transmitted to caribou via plants they eat that have been contaminated by scat from a wolf that had consumed an infected caribou.

**Signs:** Animals usually appear healthy, but heavily infected animals may lose hair on their lower legs and face or have thickened skin. Cysts are hard, round bumps that feel rough like sandpaper on the underside of skin or over the lower leg bones. Cysts are clear to white in color.

**Safety:** Humans cannot be infected by besnoitiosis from infected caribou, and the meat is suitable for consumption.

**Prevention:** Cook meat thoroughly, do not feed infected meat to dogs. Wearing gloves is always recommended.

**How to report/sample:** Common in Arctic caribou herds. Email photos and a general location if found south of the Brooks range, see pg. 5.

## Skin diseases (hair loss, contagious ecthyma, lice)

There are many different causes of hair loss or skin lesions in caribou that can rarely be identified from descriptions alone. Photos and samples are needed. Report with photos, cut widely around skin irregularities, and submit to ADF&G if feasible.



*Left: Yeast infection in a very sickly caribou.*

*Right: Hair loss and scars on a caribou skin from an unknown cause.*

**Contagious ecthyma:** A virus that causes ulcers and proliferations on the lips, above the hoof, between hooves, and under tail/genitals. It is very rare in caribou but can cause lesions on human skin. There is no treatment, so avoid cutting into or touching lesions.

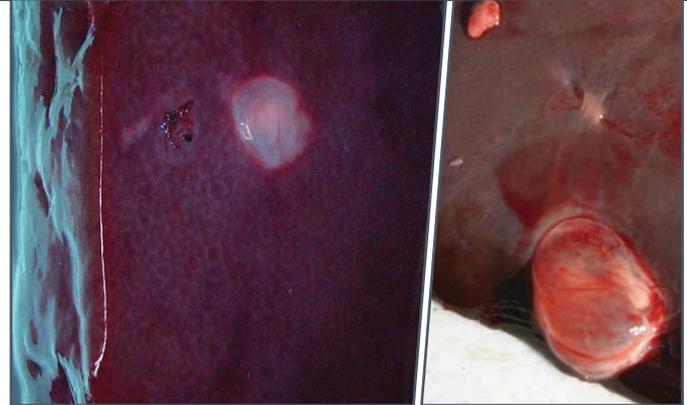


*Caribou with contagious ecthyma.*

**Ectoparasites:** Caribou can carry Moose Winter Tick, but there have been no reports as of July 2021 in Alaska. Lice were reported once many decades ago, but without hair loss. Collect any ticks or lice found and submit in an unbreakable container with a moistened paper towel. Freezing is okay.

## Tapeworm cysts in liver

*(Taenia hydatigena)*



**Description:** Cysts in the liver are made by larval tapeworms. When canines (e.g. wolves and coyotes) consume a caribou liver with larval tapeworms, worms will develop into adults in the canine intestines. Tapeworm eggs are then shed in their scat. Caribou eat vegetation contaminated with the eggs from scat.

**Signs:** Several or many small blister-like fluid-filled cysts in the liver often appear like a small circular “window” on the surface and contain a white tapeworm. Eventually they become white, star-like scars on the surface of the liver.

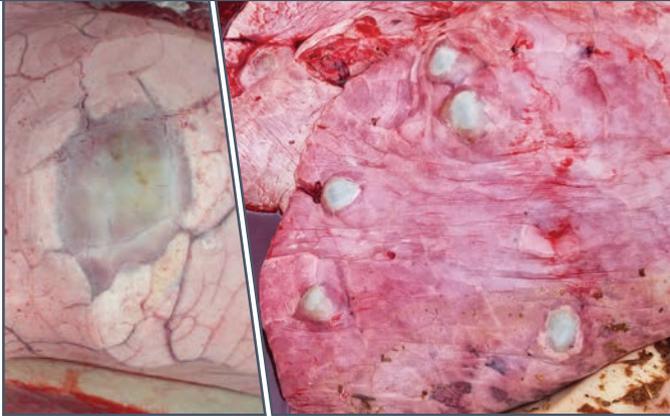
**Safety:** Meat is suitable for human consumption. No direct risk of infection to humans, but there is theoretical risk of indirect infection of humans from exposure to dog or wolf scat when these canines have scavenged or consumed uncooked liver.

**Prevention:** Do not feed raw, infected organs to dogs as tapeworms can infect dogs. Hard freeze or cook any scraps or organs you feed to dogs. Wear gloves when handling potentially contaminated dog scat or wolf hides. De-worm dogs that have scavenged on game with praziquantel.

**How to report/sample:** Liver cysts are common. No reports or samples requested.

## Tapeworm cysts in lungs

Cystic hydatid disease (*Echinococcus canadensis*)



**Description:** Cysts in the lungs are made by larval tapeworms with a similar life cycle to liver tapeworms.

**Signs:** Multiple cysts, ½ - 3" in diameter, are found deep in the lungs but may be visible on the lung surface. Cysts have thick walls that can burst, expelling clear, watery fluid and tiny circular larvae.

**Safety:** Meat is suitable for human consumption. No direct risk of infection to humans, but there is a risk of indirect infection from exposure to dog or wolf scat when these canines have scavenged or consumed uncooked lungs.

**Prevention:** Do not feed raw infected organs to dogs as tapeworms can infect dogs. Hard freeze or cook any scraps or organs you feed to dogs. Wear gloves when handling potentially contaminated dog scat or wolf hides. De-worm dogs that have scavenged on game with praziquantal.

**How to report/sample:** Lung cysts are common. No reports or samples requested.

## Tapeworm cysts in muscle/heart

(*Taenia krabbei* and *Taenia arctos*)



**Description:** Cysts in the heart, muscles, or tongue are made by larval tapeworms with a similar life cycle to lung and liver tapeworms. Caribou get muscle/heart cysts from ingesting eggs shed in wolf scat (moose get a similar tapeworm from eggs in bear scat).

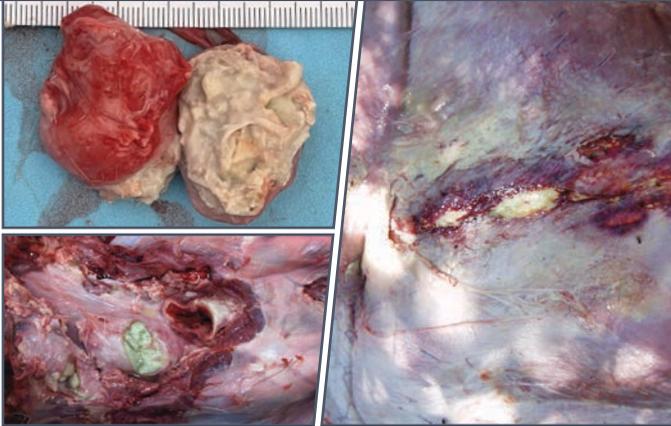
**Signs:** Cysts are a bit larger than a rice grain. They are semi-opaque, fluid-filled bubbles with a white spot, which is the larvae inside. Cysts are usually in the muscles, especially of the legs, the heart, or rarely the tongue.

**Safety:** Meat is suitable for human consumption, and humans are not at risk of infection. Moderate risk to dogs if fed uncooked caribou parts.

**Prevention:** Do not feed raw infected organs to dogs as tapeworms can infect dogs. Hard freeze or cook any scraps or organs you feed to dogs. Wear gloves when handling potentially contaminated dog scat or wolf hides. De-worm dogs that have scavenged on game with praziquantal.

**How to report/sample:** Muscle and heart cysts are common. No reports or samples requested.

## Abscesses (infections, injuries and wounds)



**Description:** Abscesses are pockets of pus - an accumulation of white blood cells working to contain an infection. When under the skin, abscesses rupture and drain like a boil. Abscesses form due to a wound, foreign object, or from an internal infection.

**Signs:** Abscesses are soft swellings that may have a white capsule containing thick yellow to greenish material. As an abscess resolves, it becomes dry, crumbly, then firm; first greenish, then eventually white fibrous scar tissue. They may be anywhere, but especially under the skin, between muscles, or associated with lymph nodes.

**Safety:** There is low risk to humans, but localized infection from pus entering a skin break is possible. If otherwise normal, uncontaminated meat is suitable for consumption if fully cooked.

**Prevention:** Trim liberally around swellings and do not cut into abscesses to avoid contaminating meat. Portions of meat or organs containing abscesses or contaminated by a ruptured abscess should not be eaten. Wear gloves while butchering. Wash and disinfect any knives that have come into contact with pus.

**How to report/sample:** Abscesses are common. No reports or samples requested.

## Serous atrophy (and body condition indicators)



**Description:** A condition typical among bulls resulting from metabolic changes occurring late in the rut. This condition is common and normal, and bulls will generally recover, unless they are badly injured or the winter is severe. Also seen during starvation or when caribou are unable to find or ingest forage.

**Signs:** Caribou will have visibly prominent hip bones, spines and ribs; sunken muscle over shoulders, rump, and between ribs. Watery, jelly-like texture and color changes to the fat under the skin, around the heart, kidneys, and over the guts (red, yellow, green, or iridescent). The odor is acrid, like urine. The bone marrow may be reddish to watery pink in color. The liver may be tan, soft, and mushy in texture (called "fatty liver").

**Safety:** Meat is suitable for consumption if free of abscesses (see previous page) and other diseases.

**Prevention:** Avoid hunting during peak or post-rut for large bulls. If the hip bones and sunken muscle are noticeable, consider harvesting a different bull.

**How to report/sample:** If seen outside of the rut, or if other injuries are noted, report to the closest ADF&G office. To verify, submit fresh, never frozen liver samples and photos, see pg.5.

## Exertional myopathy (odors, meat color)



**Description:** Exertional myopathy is a muscle disease that can occur when wild animals are chased, handled, or stressed, most commonly seen in ungulates (e.g., Dall sheep, caribou) but reported across a wide variety of wild animals and birds.

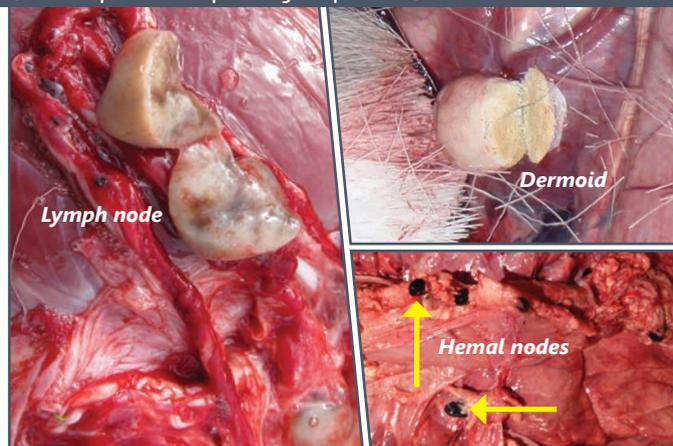
**Signs:** Caribou may appear lethargic, weak, or stiff. The muscles, heart and kidney can be affected but signs may be difficult to see. Muscles may look wet and have small bruises early on, but later may become pale, dry and soft. In severe cases, muscles may be torn; the heart may have pale areas or streaks. Lungs usually look dark and wet. Bladder may contain red-brown urine and kidneys may be swollen and dark brown.

**Safety:** Meat from affected animals is safe for consumption, but the quality may decrease if the animal has exertional myopathy.

**Prevention:** Avoid chasing or stressing caribou.

**How to report/sample:** Cut small portions of muscle from several different areas of the body, as well as sections of the heart and kidney; samples should be chilled but unfrozen.

## Normal/benign structures (no samples or reporting requested)



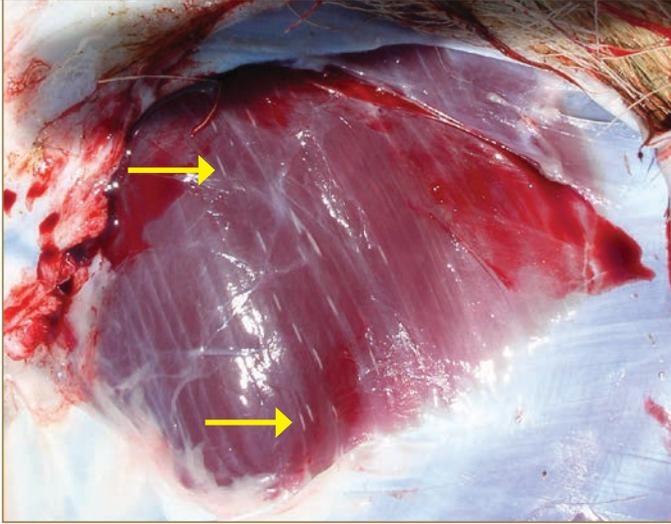
**Dermoids:** These are cysts filled with white to yellow hair found under the skin of the neck or throat area in about 1% of caribou. They are not harmful - just skin and hair cells that get trapped in abnormal locations during fetal development.

**Lymph nodes:** Lymph nodes are normal parts of the immune system. They are usually light tan in color, almond-shaped, and of a similar size or larger, and are found throughout the body. Typically noticed under the skin, between muscle groups, around joints and organs when they have become inflamed or enlarged. Lymph nodes filter the lymph fluid and help clear infections. They can become abscessed and filled with pus.

**Hemal nodes:** These are normal parts of the immune system like lymph nodes. Black, pea-sized and found in lines or clusters, especially under the spine.

**Scar tissue:** The end stage of the healing process, scar tissue is white, firm and may be any size depending on size of the original wound or parasite. Similar to 'silver skin' on the inside of the ribs, it is fibrous tissue that can be trimmed away.

## Sarcocystis



**Description:** *Sarcocystis* is a single-celled parasite in the muscle of caribou and other big game. These parasites are spread when caribou ingest plants contaminated by scat from infected wolves, coyotes, dogs, or other canids.

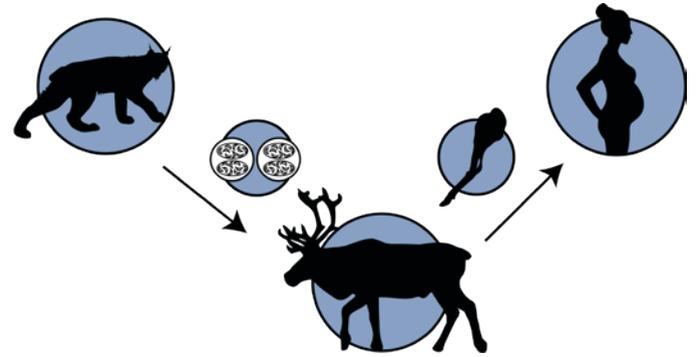
**Signs:** Barely noticeable, tiny, white streaks common in the muscles or heart. May look like grains of rice.

**Safety:** No known risk to humans, moderate risk to dogs if fed uncooked game.

**Prevention:** Cook meat thoroughly and cook any scraps fed to dogs. It is always recommended to wear gloves while butchering.

**How to report/sample:** Sarcocystis is common. No reports or samples requested.

## Toxoplasmosis



**Description:** Toxoplasmosis is caused by a microscopic, single-celled parasite in the muscles and brain. Cats (lynx) are the only hosts that can shed infected eggs (oocysts) into the environment where caribou or other intermediate hosts can be infected. Humans and animals may swallow eggs from contaminated soil, water, or raw meat; a fetus can be infected via the placenta. Symptoms in people range from unnoticeable to flu-like symptoms, seizures, eye or coordination problems, or death of infants.

**Signs:** Most infected animals will not show signs of illness, and toxoplasmosis is not visible in the meat. However, caribou may be dull, depressed, or have trouble walking or seizures.

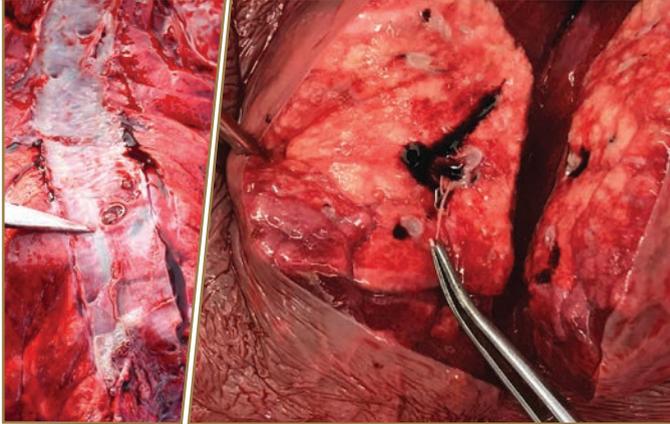
**Safety:** This condition is extremely rare in caribou, but can be potentially hazardous to pregnant women and extremely hazardous to fetuses if infected caribou is consumed raw.

**Prevention:** Wear gloves, wash hands and butchering instruments after handling raw meat. Cook all meat thoroughly. Pregnant women should not handle or eat uncooked meat.

**How to report/sample:** If a person is diagnosed, contact the AK Dept. of Public Health: (907) 269-8000. Reporting a diagnosis by email to ADF&G is appreciated, see pg. 5.

## Lungworms

(*Dictyocaulus eckerti*)



**Description:** The most common lungworm (*D. eckerti*) lays eggs in caribou lungs. The eggs reside in the airways and are coughed up, swallowed, the larvae hatch in the intestines, then are passed in scat. Larvae are taken up by snails/slugs and develop into an infective stage and are then swallowed by caribou that eat contaminated plants.

**Signs:** Caribou often appear healthy, but caribou with severe infection may cough or have difficulty breathing, appear weak or thin, or have a harsh, dull coat. Adult worms or small round gray lumps of dead tissue up to one inch in diameter may be found when butchering. Worms are white and threadlike.

**Safety:** Humans cannot become infected by lungworms. Meat from infected animals is suitable for consumption.

**Prevention:** None needed. It is always recommended to wear gloves while butchering.

**How to report/sample:** Report and bring a large sample of the affected lung, chilled but unfrozen, to the closest ADF&G office. Caribou scat can also be tested.

## Stomach worms

(*Ostertagia gruehneri*)



**Description:** The most common stomach roundworm (*O. gruehneri*) overwinters in soil or in the abomasum, the fourth stomach chamber, or gastric stomach of caribou. The larvae encyst in the lining and create tiny bumps (see arrow above).

**Signs:** When the larvae burst out of the stomach lining in Feb-March, it damages the glands in the stomach, making it less acidic. As a result, caribou will have indigestion and poorer body condition. Larvae shed in the feces that survive freezing can infect the caribou that migrate back to the areas for spring/summer grazing. Another stage of larvae penetrates the caribou stomach again and can spend the winter there - worms have two ways to survive in winter. A warming climate allows larvae in soil to survive at higher rates, and thus may increase infection rates. The parasite also decreases the ability of infected caribou to absorb nutrients, including vital minerals.

**Safety:** Stomach worms have no impacts on humans.

**Prevention:** None needed. Wearing gloves is always advised.

**How to report/sample:** Report emaciated caribou to the closest ADF&G office.

# Chronic Wasting Disease (CWD)



**Description:** CWD is fatal degeneration of the brain of deer, reindeer, elk, moose, and caribou (members of the deer family), all of which are likely to be susceptible.

**Signs:** Emaciation, listlessness, lowering of the head, droopy ears, blank expression, unusual walking patterns, drooling, teeth grinding, increased drinking, or frequent urination.

**Safety:** No known cases of transmission to humans. There have not been any cases of CWD detected in Alaska as of 2021. Do not consume meat from infected animals.

**Prevention:** Do not bring unprocessed carcasses, heads, or materials from reindeer, deer, elk, or moose to Alaska from out of state. Properly dispose of sick/butchered farmed elk/reindeer parts and never use for bear baiting or trapping. Do not spread urine lures from deer family members, as it is illegal in Alaska.

**How to report/sample:** Email photos and GPS locations for dead or infected animals (any deer family species suspected of showing signs of CWD), see pg. 5. Check regulations and permit conditions annually for current hunter/harvest sampling requirements or requests.

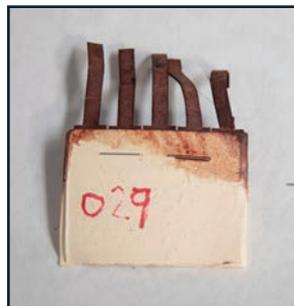
# Hunter sampling

In some caribou hunts ADF&G might request or require hunters to collect samples from harvested animals. There are many reasons why biologists may ask for samples:

- herd health assessment
- disease and parasite monitoring
- determining age of harvested animals
- collecting tissue for genetics research
- pathogen discovery and surveillance

**Required** samples are a condition of your hunt permit — read your permit carefully. **Requested** samples are voluntarily collected by the hunter and are announced prior to the hunt. You can also check with the local ADF&G office in your hunt area and inquire if they are requesting any samples.

Examples of potential hunter sample collections include:



## Blood sampling strips

ADF&G has been collecting wildlife serum samples since the 1970's. Filter papers used to collect blood samples can be used to monitor many health indicators. This is an economical and practical field collection technique that hunters can use to help ADF&G monitor caribou herd health.



## Jaw collection

Jaws are a commonly requested or required sample by ADF&G. Jaws are used to determine the age of harvested animals which can provide insight into the age structure of a population. Jaws are also used to collect tissue samples for genetic analysis and to measure marrow-fat content.

**Detailed instructions are provided with sample requests or requirements.**

For information about wildlife disease, or to learn more about caribou and caribou hunting, go to:

[www.adfg.alaska.gov](http://www.adfg.alaska.gov) or [www.hunt.alaska.gov](http://www.hunt.alaska.gov).



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Hunters are important founders of the modern wildlife conservation movement. They, along with trappers and sport shooters, provided funding for this publication through payment of federal taxes on firearms, ammunition, and archery equipment, and through state hunting license and tag fees.

