

TB

Bovine TB Discovery a Concern for Both Wildlife and Agriculture

Story and Photos by Craig Bibrle

As its name implies, bovine tuberculosis – TB for short – is primarily a cattle disease.

And yet, when a cow from a southwestern North Dakota cattle herd tested positive for the disease in December 2008, the concern level among State Game and Fish Department biologists rose considerably because of what this discovery might mean for wildlife, especially big game animals.

The worst-case scenario is that several hundred deer, plus elk and other big game in the immediate area, would have to be killed and tested to determine if the bovine TB was passed on to local wildlife. As of late January, the factors that would have set such a time-consuming and costly plan into motion had not materialized. However, another month or two remains before all necessary testing procedures are finalized. If no more positive cases are found, Game and Fish and North Dakota Department of Agriculture staff, as well as the state's cattle industry can breathe a little easier, though bovine TB remains an ongoing threat.

Bovine TB is such a concern in the wildlife profession because just about any mammal, under the right conditions, can get the disease from cattle or other infected wildlife. Deer or elk are often the most likely recipients because they are sometimes attracted to live-stock feeding areas where they could come in direct contact with infected cattle, or eat feed contaminated by infected cattle.

The concern is not so much that bovine TB would quickly spread through and wipe out a local deer population, but rather that deer (or elk) would become

an uncontrolled reservoir for the disease that at any time or place could spread TB among themselves, or to a previously unexposed cattle herd. "You might see some deer die off," according to Dr. Dan Grove, the Game and Fish Department's wildlife veterinarian, "but it's not going to be 60 or 70 in the same field."

The greater concern, Grove said, is "once you get a disease in a wildlife population, it's really hard to eliminate."

The only real way to eliminate it, he added, is to prevent close contact between animals, "and one way to do that is thin out the numbers."

Just such a scenario has played out in northwestern Minnesota over the past three years, necessitating the destruction of nearly a dozen cattle herds and a couple of thousand deer so far – with the tab reaching more than \$20 million – in an effort to eliminate the disease.

This current situation is just the latest in a century-long nationwide effort to eliminate bovine TB in U. S. cattle.

A Long TB History

Tuberculosis is a debilitating and eventually fatal disease that can affect various body parts in humans and is typically found in the respiratory tract and lymph nodes in cattle. Three strains have been identified: *Mycobacterium tuberculosis* is the human strain, *M. bovis* is the cattle strain, and *M. avium* is the avian or bird strain.

The human strain largely infects only people. The avian strain is predominately dangerous to the poultry

industry, though other birds and animals can become infected with the avian bacteria but do not normally develop symptoms.

Under the right conditions, bovine TB can spread to humans, and lead to symptoms similar to those of human TB. That link, plus the fatal nature of bovine TB in cattle, has been the basis for the long-term effort to eliminate bovine TB in the United States.

In 1917, when the effort began, approximately one cow in every 20 in this country had bovine TB. By the early 1940s that rate was reduced to one in 200. Today, bovine TB is rare, but not yet eradicated. Consider that in North Dakota, the previous positive TB finding was a single herd in 1999.

The U.S. Department of Agriculture currently lists 46 states as free of bovine tuberculosis. North Dakota is one of those TB-free states, and if the continuing slate of tests does not find any other positive animals, that status will not change. It would take a positive animal from two different herds within two years to warrant a downgrade in status, which would mean significant hardship and financial burdens on cattle producers because of increased testing requirements.

The four states that currently are not classified as TB free are California, New Mexico, Michigan and Minnesota. Michigan and Minnesota also have bovine TB in wild deer in the same areas where TB has been found in cattle, which complicates the desired return to TB-free status because deer can move the disease to new cattle herds.

Where Did It Come From?

The North Dakota cow identified with TB came from a cattle herd in the southwestern part of the

state. It was among a group of cull cows sent to a packing plant in Long Prairie, Minnesota. Cull cows are typically older and not as productive, and are often marketed in October and November.

A U.S. Department of Agriculture Food Safety and Inspection Service inspector at the plant discovered a suspect lesion in a lymph node during processing, which prompted followup testing, according to Dr. Susan Keller, State Veterinarian for the North Dakota Board of Animal Health. The lesion was confirmed positive for *M. bovis* in early December.

Further investigation confirmed that the cow had been on the ranch in North Dakota, and was directly shipped to the packing plant with a group of cull cows. Keller said the cow did not have enough identification for tracing its genealogy history.

While the investigation to try to determine where the cow was exposed to TB continues, laboratory analysis will continue to help eliminate potential sources. Assistant State Veterinarian Dr. Jesse Vollmer said the TB does not match the type present in Minnesota.

The Minnesota strain, which was first confirmed in a cattle herd in 2005, "is consistent with bovine TB found in cattle in the southwestern U.S. and Mexico," according to the Minnesota Department of Natural Resources' website.

Analysis has matched the North Dakota cow with a different strain that appears to be from Mexico, Keller said.

"Since 2005 when Minnesota had its first case, we've been holding our breath," Keller said, although the TB outbreak 60 miles from the state's northeastern border is not the only important risk to North



Bovine TB can spread from cattle to deer, then deer can pass it on to other deer and back to cattle in another location. One of the ways to reduce the risk of transmission is to eliminate feeding situations where deer can mix with cattle, or that promote deer feeding in close proximity to each other.

Dakota. “There are two ways a cow can get TB. One, it could be wildlife movement. The other is, when cattle potentially carrying TB are moved interstate. Many animal health officials believe Mexican roping cattle are one of our biggest risk factors, so I’m not surprised that it (the TB discovery) wasn’t in the northeast and that it wasn’t the Minnesota strain.”

Even if no further positives are identified, the book on this case is not entirely closed. “It still leaves a huge question mark in everybody’s mind,” Keller stated. “Where did this case originate from?”

Once a cow is identified with bovine TB, it sets in motion a complex followup testing process to determine if other animals in the source herd are infected, or if the initial animal is a “singleton” case that picked up the disease somewhere else and had not yet passed it on to other herd members.

(While bovine TB is contagious and is spread through bacteria coughed through the air or in contaminated feed, it does not usually spread rapidly through a herd. Therefore, just because one animal has it, it’s not a given that another will get it. However, the longer an infected animal is part of a herd, the more likely that other animals will be exposed. When that occurs, TB also develops slowly, so it might be months before any visible signs of the disease are evident.)

Once an animal is positively identified with TB, the first step is to test the rest of the herd to find

out if any other animals are infected. Called a caudal fold test, each animal is injected under the tail with a small amount of *M. bovis* antigen, and if they have any response, they are designated for further testing, though a response doesn’t mean the animal has TB. Exposure to avian TB can also cause a caudal fold test response.

Suspect animals – those that had a positive response – in the North Dakota herd were then necropsied and their lymph nodes and other internal organs visually inspected for granulomatous or any abnormal lesions. None of the organs showed any visual signs, and further tests designed to identify *M. bovis* bacteria also came back negative.

To make sure that no TB is present, the lymph nodes from each animal were sent to the National Veterinary Services lab in Ames, Iowa for final culturing, a process that takes about eight weeks. Those results should be back by late February.

If those samples are all negative, then the entire remaining herd will be TB tested again to double check for any new developments.

The Wildlife Connection

Throughout this entire testing process, if one more animal from the suspect herd was (or eventually is) confirmed positive, the Game and Fish Department is prepared to move ahead with its plan to test wildlife, particularly deer but also other big game animals

North Dakota has been free of bovine TB discoveries since 1999. Within the current or any future situation, if TB is detected in more than one cattle herd in an area, or more than one cow in a herd, the State Game and Fish Department will begin testing local wildlife to try to find out if the disease has spread. This could mean taking out hundreds of deer in an area to get a thorough sampling.



and mammals, to see if the disease had migrated to, or potentially came from, local wildlife.

In addition, one more positive test would require remaining animals in the suspect herd to be destroyed, and the state veterinarian would expand testing to neighboring cattle herds as well.

“You can round up the neighboring cattle and administer that caudal fold test,” says Greg Link, the Game and Fish Department’s assistant wildlife division chief, “but you can’t go around and do that with wildlife. So, what we end up having to do is destroy a certain number of deer to do surveillance and see if we’ve got anything.”

Just finding out if bovine TB exists in the deer population in an area will require a major population reduction. For instance, if 1,000 deer might live within five miles in any direction of the infected cattle herd, Link said Game and Fish would arrange for 458 deer to be killed and tested within that area to be 99 percent sure that TB did not exist in the wild. If the disease was found, further population reduction would be necessary over several years, not only in deer, but also elk, pronghorn and even bighorn sheep.

“It would be unpleasant but necessary business,” Link said. “It’s not like the end of the world if we would have to do this, but certainly it would be expensive, put a heavy drain on our resources, and would be a noticeable impact to the deer and deer hunters in that area. We know that animals will eventually filter back into an area, and if conditions allow, they can respond pretty fast.”

To date, except for staff time devoted to finalizing the response plan and coordinating with the Department of Agriculture/Board of Animal Health, Game and Fish has not been financially involved in the current TB situation. The costs associated with destroying and testing the cattle are paid mostly by the U.S. Department of Agriculture, and NDDA/BOAH.

The Department has, however, invested significantly in TB testing of hunter-harvested deer (in conjunction with chronic wasting disease testing) in the last three years, particularly in the northeast because of the proximity of the Minnesota outbreak. No positive tests for TB have come back from any deer in the state.

If the Game and Fish Department response plan does become necessary, it could mean hundreds of thousands of dollars spent from the Department’s budget. And even if no additional TB is found, the staff time invested so far has not been wasted.

“Basically, this has caused us to prepare for a worst-case scenario in a short amount of time,” Link said. “So far, it hasn’t turned out to be the worst case scenario.”

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Game and Fish has dealt with deer population reduction before, when wild deer have gotten inside fences and mingled with farmed deer or elk. If sampling a wild population would become necessary, the effort and expense would be many times greater.

Game and Fish Department Response Plan Details

If any bovine tuberculosis situation requires the Game and Fish Department to sample wild deer or elk populations, it will likely involve personnel from several state and federal agencies, as well as landowners, and depending on the time of year, licensed hunters.

“We found out about this case right after hunting seasons,” recalled Greg Link, Game and Fish assistant wildlife division chief. “If this was something we found out during summer we’d probably work with hunters to try to get as many samples as we could, and then follow up with additional direct sampling ourselves, if needed.”

But in winter, Link said, the Department’s goal would be to get as many samples as possible from the target area in a short amount of time, since it would be a disease control issue and not population management. This might involve sharpshooters and even aerial shooting, but likely not any type of special hunting season.

Initially, Link said the Minnesota Department of Natural Resources tried using hunters within special seasons, but participation and success wasn’t nearly high enough to get the number of animals needed.

“Right away you start thinking about Minnesota,” Link said, “what went on over there, and knowing what they’ve gone through as far as money and manpower, just the huge financial drain it’s been for everyone. It takes center stage to everything else you’re doing.”