

Bovine TB Surveillance in Alberta

Summary 2016-2019

Background

Bovine tuberculosis (bTB) is bacterial disease associated with infections of *Mycobacterium bovis* (*M. bovis*), a species in the *M. tuberculosis* complex. The disease generally affects cattle but can become established in other species. In some countries, specific wildlife species can maintain infections and pose risk of re-infecting cattle.

Canada has maintained a surveillance and eradication program for bTB since 1923. Ongoing surveillance of domestic herds is focused primarily on protecting livestock and international markets, as well as human health. The disease is rare in the domestic livestock population in Canada; however, cases occasionally are detected in cattle. The Canadian Food Inspection Agency (CFIA) investigates any case of bTB in Canada regardless of species or location.

Alberta Environment and Parks (AEP) has the authority to conserve, protect, and manage wildlife species within the province. The department has an embedded Wildlife Disease Unit that develops and delivers surveillance programs for various diseases that pose potential risk to wildlife or livestock health.

In October 2016, *M. bovis* was detected in a beef cow from southeastern Alberta. CFIA initiated an immediate livestock investigation and also requested that the province consider looking for bTB in wildlife. With fall hunting seasons already underway, as an interim measure Alberta Environment and Parks, Fish and Wildlife Branch, expanded the ongoing passive bTB surveillance of hunter-harvested deer, elk, and moose.

During summer 2017, the province worked with CFIA to develop a formal program of active surveillance for bTB in wildlife that met international standards. The program built on ongoing wildlife disease monitoring efforts and focused on Canadian Forces Base (CFB) Suffield and hunter-harvested elk, the area and wildlife species directly linked to the CFIA bTB livestock investigation.



A formal Memorandum of Understanding was signed between CFIA and Minister of Environment and Parks (as represented by AEP) in September 2017. The MOU governed collaborative sampling and testing of wildlife samples to assess the potential risk of bTB infection. AEP was responsible for collecting required elk tissue samples and CFIA was responsible for testing the samples.

The goal of the surveillance program was to test enough samples to either find bTB or demonstrate 95 per cent confidence of disease freedom at the 1 per cent level. With guidance and input from CFIA, AEP determined this required testing 369 elk over three years (2017-2019). The target each year was ~120 elk from Wildlife Management Unit 732 (=CFB Suffield). Annual tissue samples collected by the province were provided to CFIA for testing in their national lab in Ottawa.

Methods:

In conjunction with the CFIA cattle investigation, we incorporated two major components into the wildlife bTB surveillance:

Passive Surveillance is a systematic assessment of suitable tissues or situations that are not directly collected for a specific disease tracking program. This surveillance

builds on other programs or situations that also provide an opportunity to look for bTB.

Passive programs also include a component of communication and education to inform various audiences about a disease problem, the surveillance program, and particularly to tell those who handle dead wildlife what to look for and any potential risk if potentially-infected carcasses were handled.

Active Surveillance involves collecting and assessing appropriate tissues that are used to specifically look for evidence of bTB. Collection and testing methods must meet national and international standards.

In consultation with CFIA, an enhanced version of our ongoing passive wildlife surveillance for bTB was conducted in the fall 2016. During the hunting seasons of 2017-2019 inclusive, both passive and active surveillance were undertaken. Individual annual surveillance reports are available on the AEP [wildlife disease web pages](#).

The current document provides a cumulative summary of the wildlife surveillance associated with the finding of bTB in cattle in southeastern Alberta in 2016.

Methods: Passive Surveillance

Public Education

In 2004 AEP posted online a general factsheet about bovine tuberculosis, from a wildlife perspective. The information was updated in [September 2017](#) to ensure it was current and relevant.

In 2017 we added a general [Wildlife Information Bulletin](#) that provided more details specifically about the wildlife concerns associated with the occurrence of bTB in cattle in southeastern Alberta.

As mentioned, annual surveillance summaries were provided to the public on the AEP web pages <https://open.alberta.ca/publications/bovine-tb-surveillance-in-alberta-wildlife-information-bulletin>

Additional public information was provided directly to hunters during each annual elk hunt on CFB Suffield. All hunting at Suffield is preceded by daily briefings provided to hunters before they begin their hunt. All briefings from 2017-2019 included information about bTB, precautions to take when handling dead wildlife, what to look for in harvested elk, and how to report any unusual tissues or lesions.

General Diagnostic Response to Individual Hunter Concerns

Every year, the Wildlife Disease Unit of AEP responds to a wide range of hunter concerns associated with harvested animals. Hunters who see something 'unusual' in their harvested game often contact government biological or enforcement staff to gain more information and specifically to ask if there is any concern in regards to the 'unusual' tissues.

Abscesses are cardinal indicators of bacterial infections and are key visible lesions that can suggest possible bTB infection. Abscesses in lungs, inside the chest, or in lymph nodes of the head and thoracic cavity are particularly high on the list of possible bTB lesions.

Such abscesses are easy to see and readily recognized by hunters as something abnormal.

Each year, any abscesses that are consistent with possible bTB infection are addressed with the hunter and, if appropriate, the carcass or tissue samples are provided to the Wildlife Disease Unit for further lab evaluation, in conjunction with government pathologists in Alberta Agriculture and Forestry (AF). The presence of acid-fast bacteria is indicative of bTB infection and is grounds for more in-depth examination.

In addition, the Unit receives dead wildlife for a variety of reasons, including post mortem for diagnostic assessment of why an animal was sick or died. All appropriate diagnostic cases examined by the Wildlife Disease Unit consider the possibility of bTB infection.

Lymph Node Assessment

Each year AEP conducts surveillance for chronic wasting disease (CWD). The program receives heads of hunter-harvested deer, moose, and elk. Lymph nodes collected for CWD testing also are examined for visible abscesses as part of the passive bTB surveillance program.

When enlarged (2x normal) or abscessed lymph nodes are found, they are forwarded to Alberta AF for assessment by a veterinary pathologist. If appropriate, the nodes are sent for further bTB evaluation by CFIA. A standardized protocol developed between AEP and AF is used to guide these procedures.

Methods: Active Surveillance

In September 2017 AEP finalized a Wildlife Surveillance Plan to guide active sampling of wildlife.

To reiterate here, the plan identified a target goal of assessing appropriate lymph nodes and tonsils from

369¹ elk heads from WMU 732, sufficient to demonstrate 95% confidence in disease freedom at the 1% level. Sampling would be cumulative up to a maximum of 3 years² in order to provide a manageable stream through the testing labs.

Heads of elk harvested at CFB Suffield and submitted for CWD testing were sampled for bTB. CFIA provided training to AEP wage staff who collected the bTB tissues. Tonsils and a suite of lymph nodes from the head were collected, labelled, frozen, and provided to CFIA in Lethbridge. Local AF staff provided support and assistance. The samples were then forwarded to the CFIA national lab in Ottawa for mycobacterium testing.

RESULTS from 2016-2019

(summarized in Table 1)

Passive Surveillance

Education

Cumulatively, daily briefings were provided to over 4000 recreational and First Nation hunters at CFB Suffield over the three years.

Lymph nodes

Over 29,600 heads were examined as part of the CWD surveillance program. A total of 6 lymph nodes contained abscesses. The six nodes were further assessed for possible bTB infection but there was no evidence of acid-fast bacteria in any of the tissues. Thus *M. bovis* infection was ruled out.



Diagnostics

A total of four diagnostic cases involving lesions consistent with bTB in hunter-harvested animals were further assessed. These cases involved a moose, two elk, and a pronghorn that each had visible masses or abscesses in various tissues of the neck or thoracic cavity. However, there were no acid-fast bacteria present in any of these animals.

Active Surveillance

Over the three-year surveillance period, a total of 381 elk harvested at CFB Suffield were sampled and tested for evidence of bTB.

As determined by the CFIA lab in Ottawa, the great majority of samples (93% of 381) did not reveal evidence of any *Mycobacterium* species. Of the remaining 27 samples, 10 were negative for *Mycobacterium tuberculosis* complex, 14 were in the *M. avium* complex [avian TB], and 3 were mixed minor mycobacterium species none of which were in the *M. tuberculosis* complex.

The data thus preclude the presence of *M. bovis* in any of the elk sampled from CFB Suffield (summarized in the following figure).

¹ As determined by CFIA June 2017

² As determined by CFIA, June 2017

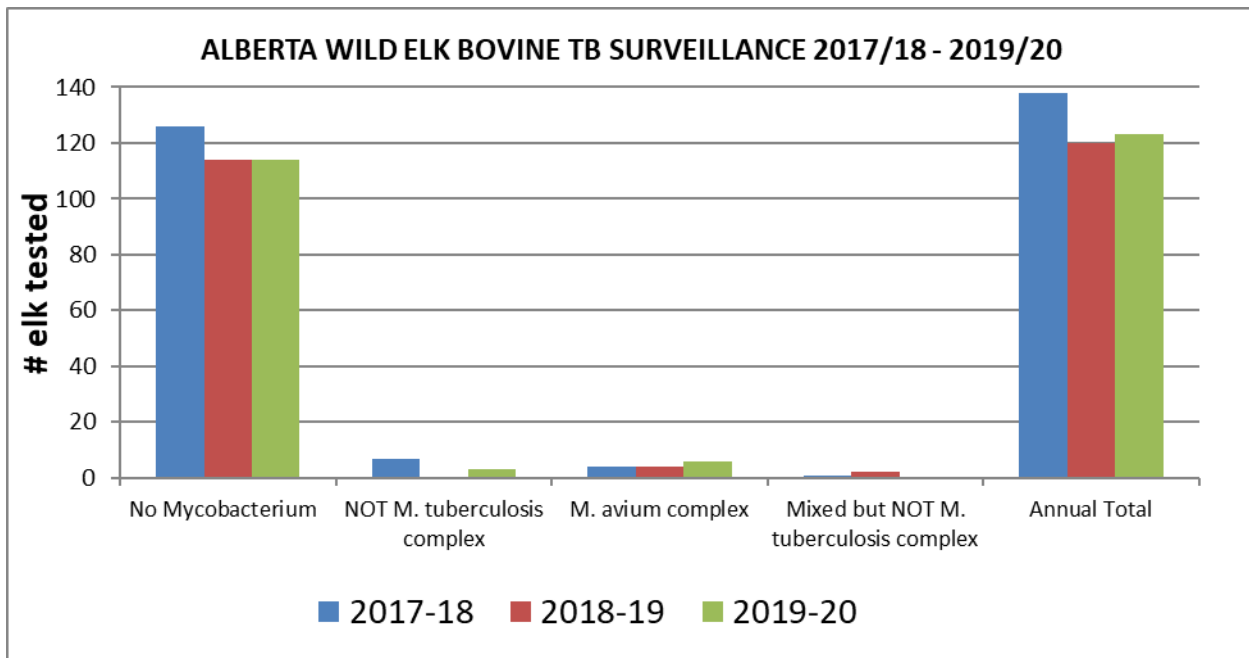


Table 1. Cumulative combined bovine TB wildlife surveillance at CFB Suffield, 2016 to 2019.

Year	PASSIVE				ACTIVE
	hunters briefed	CWD heads assessed for abscesses	# abscessed nodes	diagnostic hunter concerns	# elk sampled
2016	enhanced passive surveillance				
	~ 1500	4934	2	2	
2017	passive + active surveillance				
	~ 1200	6422	0	0	138
2018	passive + active surveillance				
	~ 900	7857	1	1	120
2019	passive + active surveillance				
	~ 400	10390	3	1	123
TOTAL	~4000	29603	6	4	381