

**Managing Disease Risk in  
Northern Alberta Wood Bison -  
Outside of Wood Buffalo National Park**



**2014 - 2015  
Progress Report**

**July 2015**



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## Introduction

Alberta has long recognized that the key issue regarding the management of wild bison is the threat of tuberculosis and brucellosis spreading from infected animals in and around Wood Buffalo National Park to livestock (cattle and domestic bison) and to healthy wild bison.

These introduced cattle diseases represent an ongoing threat to Alberta's livestock industry since they could result in trade restrictions and significant economic losses. In addition, wood bison are listed nationally as "threatened" and by Alberta as "endangered." It will be impossible to fully restore healthy, wild bison populations until these livestock diseases are eradicated, since recovery herds will need to be kept small and relatively confined to reduce their risk of becoming infected. There is also a risk of disease transmission to humans and to wildlife species. In 1990 a federal Environment Assessment Panel recommended completely eradicating all bison from Wood Buffalo National Park (WBNP), followed by restocking with disease-free animals. This recommendation was not implemented by the federal government.

Alberta's long-term goal is to eliminate the disease risk. This would remove the risk to Alberta's livestock industry and would allow the restoration of wild populations of wood bison across northern Canada. The restoration of wood bison populations would fill a key ecological role and provide substantial cultural and economic benefits to Alberta. Until this long-term goal can be achieved, the interim approach is to prevent the spread of tuberculosis and brucellosis from diseased wild bison to domestic livestock and disease-free wild bison.

Alberta's approach for managing the disease risk to both domestic livestock and free-ranging wood bison is detailed in "Managing Disease Risk in Northern Alberta Wood Bison – Outside

of Wood Buffalo National Park." This approach implemented by Alberta Environment and Parks and Agriculture and Forestry with assistance from Mackenzie County and the Alberta and Canadian cattle and bison industry organizations was focused on the area to the west of the park. In 2012/13, the Ronald Lake bison herd, near the south east corner of the park, was added to the program to ensure bison management objectives in Alberta are consistent and within the scope of the National Recovery Strategy for Wood Bison in Canada.

The approach has three broad components:

- Hay-Zama wild bison herd management;
- Disease surveillance and risk reduction east of Highway 35; and
- Monitoring populations of wild bison east of Highway 35 and in the Ronald Lake area.

The objectives for monitoring the Ronald Lake herd are to determine:

- Population size and range distribution.
- Disease status of the herd.
- Movements of the herd relative to bison within Wood Buffalo National Park; and,
- Genetic relatedness of the herd to other provincial herds.

The following is the fifth progress report on this approach and includes work undertaken during 2014 and the winter of 2015. The June 2011, May 2012, June 2013 and September 2014 Progress Reports are available at; <http://aep.alberta.ca/fish-wildlife/wildlife-diseases/wood-bison-disease-management.aspx>

# 1.0 Hay-Zama Wild Bison Management

**Objective** - To maintain the wild Hay-Zama wood bison herd free of bovine tuberculosis and brucellosis by limiting their numbers and distribution, particularly east toward Highway 35, thereby reducing the opportunity for exposure to diseased bison from the vicinity of WBNP.

The Hay-Zama wood bison reintroduction program was started in 1983 to re-establish a healthy population of wood bison in northwestern Alberta. This was a significant element in the national wood bison management plan, which

called for at least one self-sustaining herd in each of Alberta, BC, Yukon, Northwest Territories and WBNP. The Hay-Zama bison herd has grown rapidly in numbers and distribution since 1994. A goal of the 2008 draft recovery strategy for wood bison in Canada was to protect “clean” recovery herds from contact with diseased animals. Hay-Zama bison are disease-free, while bison populations in and around WBNP are known or assumed to be infected.

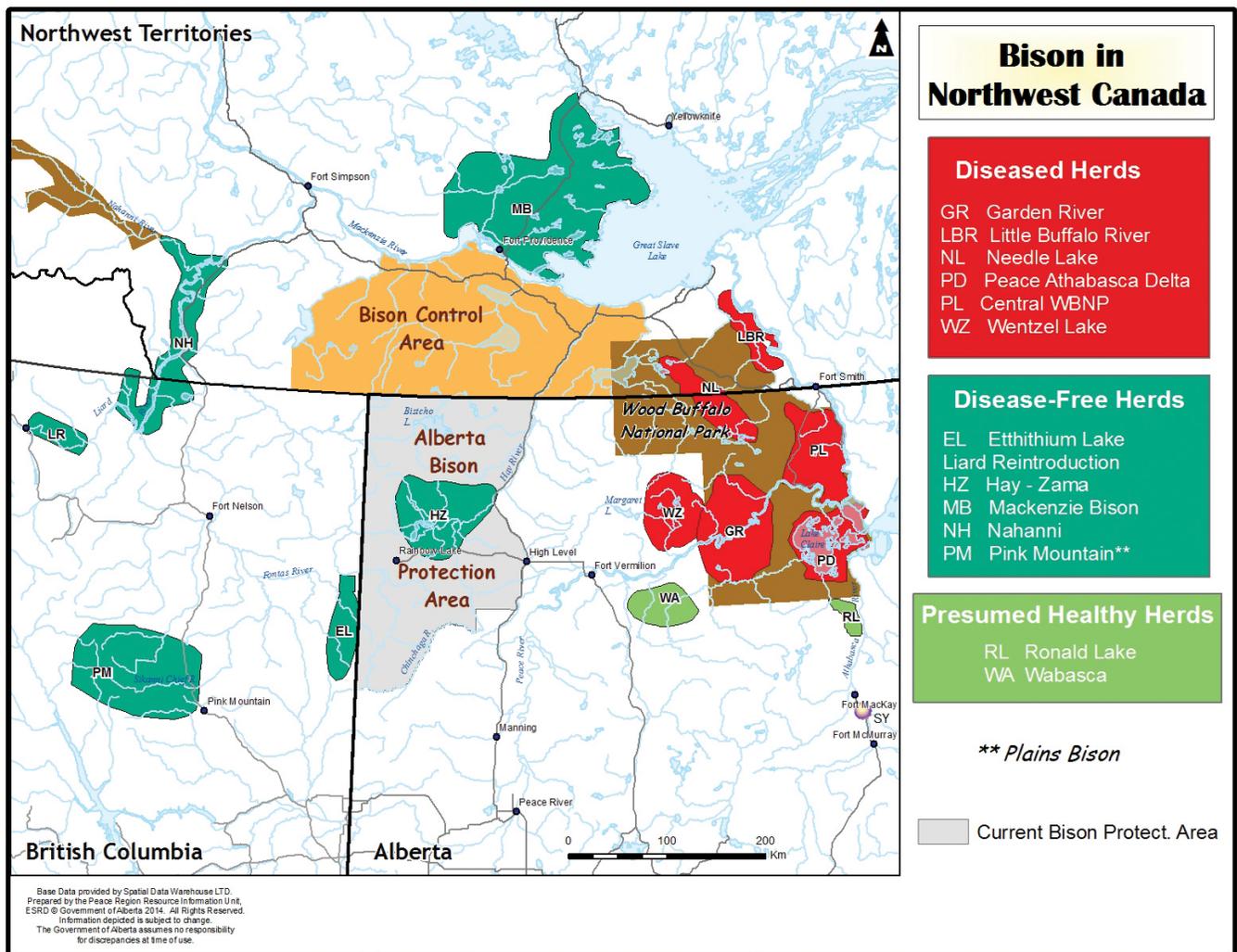


Figure 1. Bison Herds Currently Classified as Diseased or Disease-Free

The Hay-Zama bison herd has been monitored since the original release. The total number of bison peaked in the winter of 2008 when 652 animals were seen in 63 different groups. Observed range expansion raised concerns over bison moving east toward diseased bison from WBNP. In particular, there was specific concern over several instances of bison moving east along the Zama road to and beyond Highway 35. In the spring of 2008, it was determined that a highly regulated hunting season would be instituted and scheduled annually to stop the Hay-Zama herd from continuing to increase in numbers and distribution. The hunt serves two objectives relevant to this strategy:

- It protects the Hay-Zama herd from the near-inevitability of becoming infected as their numbers and distribution increase. **If this happens, there is a strong probability that the whole herd would have to be culled.**
- It allows for a significant amount of disease testing.

### **Update**

From 2008/09 to the end of the 2012/13 bison hunting season, a total of 521 bison were harvested. A total of 279 samples were collected for disease surveillance of bovine tuberculosis and brucellosis, and has been reported on in previous progress reports. The hunting season was suspended for 2013/14 due to bison mortality from severe winter weather of 2012/13. The hunt resumed in 2014/15 with 70 Aboriginal and 35 non-Aboriginal licences and a total of 54 bison harvested.

### **Hay-Zama Bison Population Status**

A population survey of the Hay-Zama herd was conducted from February 23 to 27, 2015. A total of 590 bison including 94 calves (16 per cent) in 28 groups was found (Figure 2). With the new population survey information and the new calf crop in spring/summer (long-term annual recruitment of 11 per cent) the pre-season population estimate is 644 bison. The Hay-Zama bison hunt will be continued in 2015/16 with 300 licences (200 Aboriginal and 100 non-Aboriginal). More information is available at: <http://mywildalberta.com/Hunting/GameSpecies/WoodBisonHuntHayZama.aspx>.

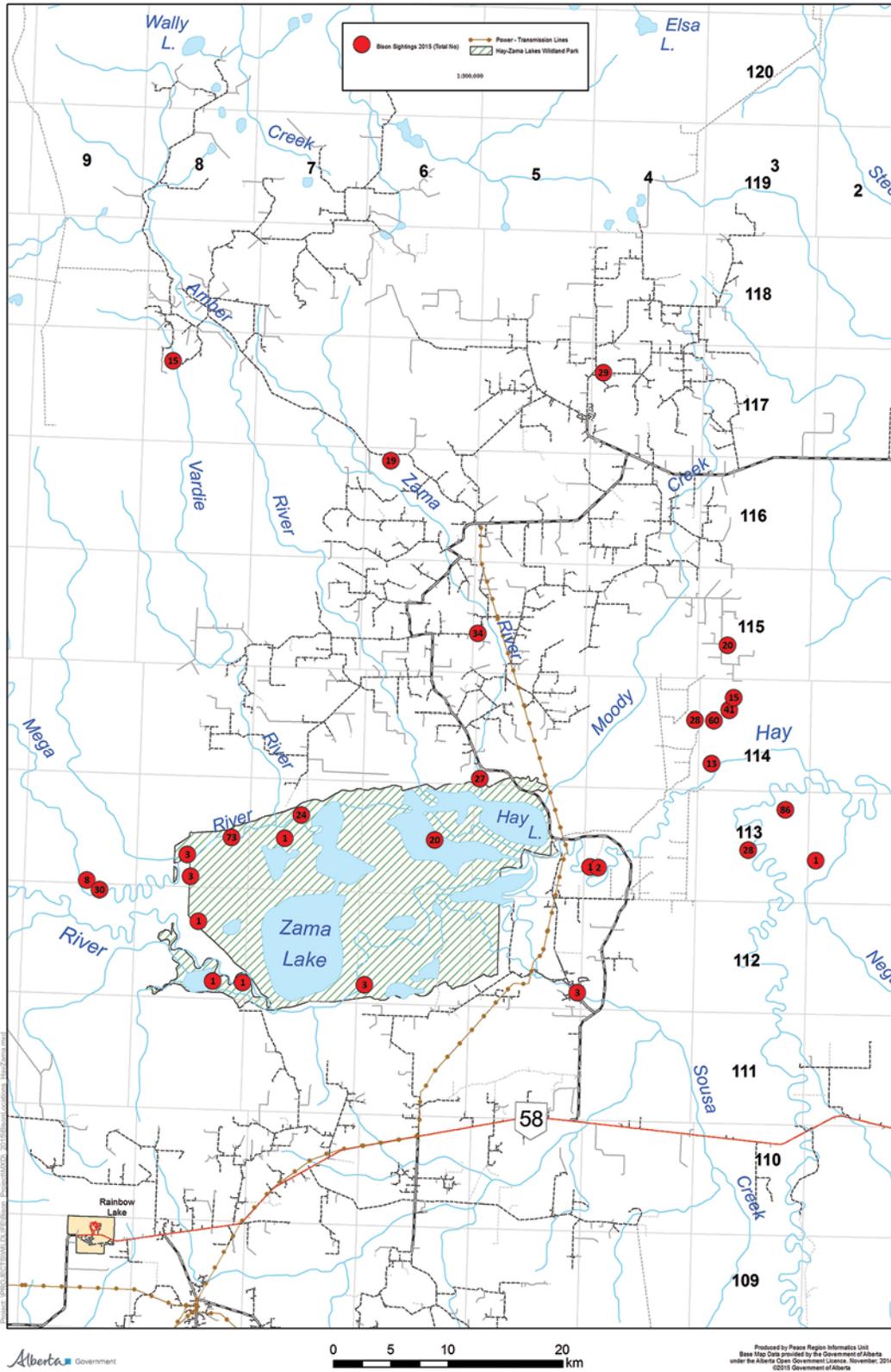


Figure 2. Locations of Hay-Zama Bison observed during survey February 24-27, 2015

## 2.0 Disease Surveillance and Risk Reduction East of Highway 35

The probability of bison moving west from the Wentzel herd or from the populations in the Wabasca-Mikkwa area is high. Gates et al. (2001) identified several routes that bison would likely use to move west. As well, bison from the Hay-Zama herd would most likely move east along these same routes. Most of the favourable travel routes pass through the agriculture zones in and around Ft. Vermilion and La Crete, and therefore pose the greatest threat to domestic livestock.

### 2.1 Detection Approach

**Objective** - To detect any wild bison on private agriculture lands near Ft. Vermilion and La Crete, and the Agricultural and Highway 35 Surveillance Zones.

Surveillance areas have been identified along Highway 35 and around the Agricultural Area Zone. The Highway 35 Surveillance Zone stretches 10 km on both sides of Highway 35 from the High Level airport north to the Alberta – N.W.T. boundary. The Agricultural Area Zone contains farmland along Highway 58 from High Level to Fort Vermilion and farmland in the La Crete – Fort Vermilion area. Ongoing surveillance flights also explore associated areas that are potential movement corridors. The purpose of the Highway 35 surveillance zone is to detect animals that:

- (i) may be moving from the east (high risk of being infected) toward the Hay-Zama herd, or
- (ii) Hay-Zama animals moving from the west toward the high risk area. The purpose of the Agricultural Area Surveillance Zone is to detect bison (presumed infected) that may be moving from known population areas in WBNP, Wabasca-Mikkwa and Wentzel Lake

areas. Currently, the closest known wild bison herd is some 58 kilometres from agricultural lands in the Harper Creek drainage.

#### 2.1.1 Update on Aerial Surveillance Flights

##### Highway 35 Surveillance Zone

Surveillance flights were flown by Environment and Parks staff in the Highway 35 Surveillance Zone on December 4, January 6, and March 24. No flights were undertaken in February due to winter weather and scheduling challenges. No bison or bison sign was detected during these flights.

##### Agricultural Area Surveillance Zone

Surveillance flights were flown by Environment and Parks staff in the Agricultural Surveillance Zone on December 4, January 12, and March 10, 2015. No flights were flown in February due to winter weather and scheduling challenges. No bison or bison sign was detected during these flights.

#### 2.1.2. Public Reporting

**Objective** - To encourage client groups associated with government, as well as the general public, to report wood bison sightings in the surveillance zones.

##### Update

Public communication through the “Bison Watch” program continued throughout 2014/15 reporting period. The Government of Alberta, “Managing Disease Risk in Northern Alberta Wood Bison – Outside of Wood Buffalo National Park” September 2014 Progress Report was sent to

First Nation, Métis, agricultural, local municipal, hunting and outfitting stakeholders in October 2014. Posters and advertisements to encourage agriculture producers to report bison sightings were developed by the Alberta Beef Producers and placed in local newspapers and agriculture notice boards. Additional posters and public contacts were used to ask the public to report bison sightings east of Highway 35.

Public reporting of bison or bison sign during 2014/15 was limited to one occurrence on January 15, 2015: two bison tracks were located within Twp.112 Rge. 3 W5M on a logging road.

## 2.2 Response Plan

**Objective** - To remove all wild bison detected on private agricultural lands near Ft. Vermilion and La Crete, and in any of the Agricultural and Highway 35 Surveillance Zones. Wherever possible, meat should be salvaged and tissue samples for disease detection should be collected.

Response efforts will involve active removal by shooting and killing of any bison detected through surveillance activities. Tissue sampling and disease testing will be an integral component of these efforts.

Government of Alberta staff from High Level and Ft. Vermilion Districts will action bison reports. Reports outside normal office hours will be investigated through 1-800-642-3200 RAP line. Government will engage aboriginal and non-aboriginal hunters, outfitters, landowners, etc. to facilitate removal and salvage of meat where feasible, and to ensure blood and tissue samples, are collected and tested. Remote access by helicopter may be required in some instances.

### **Update**

No response actions were undertaken during 2014/15 as no bison were reported.

### 3.0 Population Monitoring East of Highway 35

The number of bison east of Highway 35, their movements and distribution over time is unknown and remains a significant factor in our assessment of disease risk. To our knowledge, most bison reside in two herds, referred to as the Wentzel and Wabasca-Mikkwa herds. This program initiated a survey to estimate the entire bison population in Alberta outside WBNP, and will subsequently survey every three years to assess population changes over time.

As noted earlier with respect to the Hay-Zama population, herd size is an important risk factor. In addition, a program confirming the disease status of these herds will be needed before establishing long term goals and strategies for them. Currently, bison east of Highway 35 and outside WBNP are offered no conservation protection with the exception of bison found within Caribou Mountains Wildland Provincial Park (CMWPP).

#### 3.1 Population Estimate and Distribution

Objective - To determine with some precision, the numbers and distribution of wild bison in northern Alberta, in areas surrounding Wood Buffalo National Park.

##### 3.1.1 Aerial Survey

The area outside of WBNP has been divided into three areas to facilitate and prioritize bison surveys (Figure 3). It is proposed to survey all areas over a three-year period in order of priority, and then conduct monitoring surveys of each herd on a three-year cycle to evaluate size and distribution changes over time.

There are no confirmed sightings of bison in Area 1, and it is assumed there is no resident population of bison in Area 1.

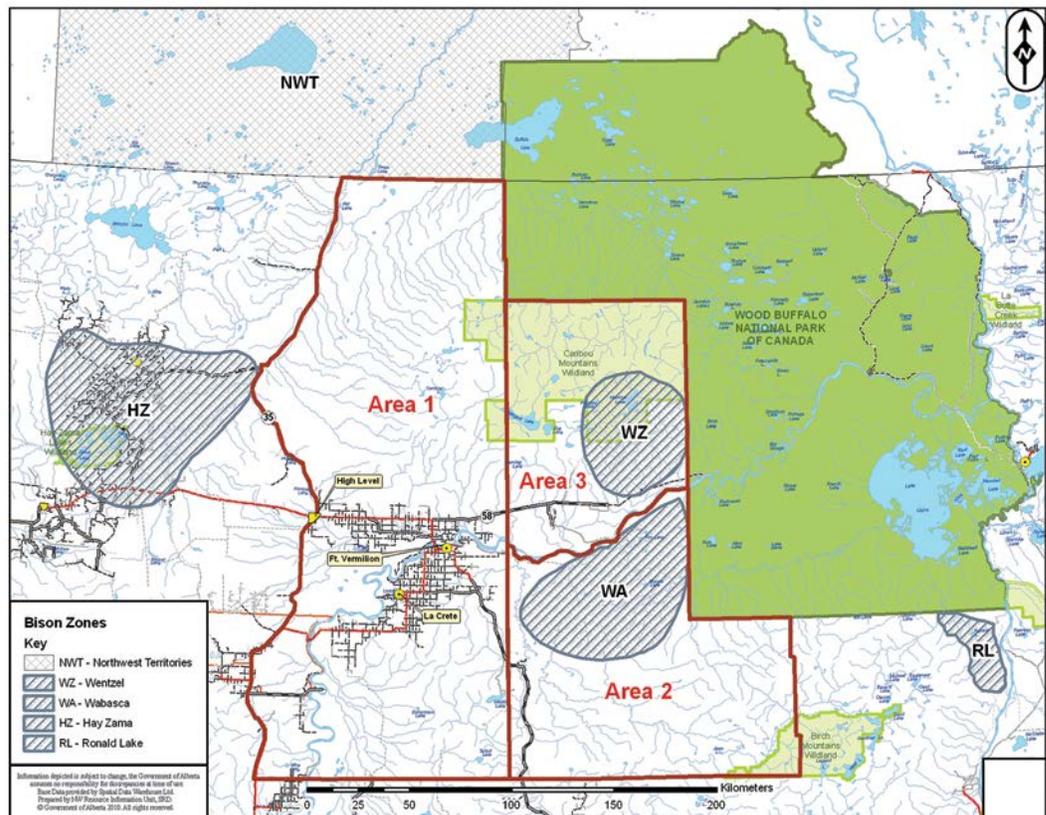


Figure 3. Aerial Survey Areas for Bison Population Estimates

## Update

Surveys for bison in each of the three Areas have been reported in previous Progress Reports. A survey of Area 3 (Wentzel herd) was conducted February 18-22, 2015. A total of 199 bison and two hunter-killed bison were found in the survey area (Figure 4). The severe winter conditions of 2012/13 may have only marginally affected bison in this area compared to bison in the Hay-Zama area.

Only one live bison bull and two kill sites were located within the “boundary area” immediately adjacent to WBNP north of Hwy 58. In previous surveys up to 100 bison have been located in this boundary area, considered part of the Garden River herd, that move in and out of WBNP seasonally.

A significant finding was 100 more bison than previous surveys north of Wentzel Lake. This would indicate movement of bison from WBNP into the survey area, or that these additional bison were not located during previous surveys. Surveying the northern portion of Area 3 is difficult due to

weather, the distance from fuel caches and the lack of communication for safety during winter flying in remote areas. Future surveys will require the location of additional fuel in the northern 20 km of the survey area and the use of satellite telephones or SPOT devices (personal trackers) for safety check in procedures. Other wildlife including 227 caribou and 33 moose were seen on the survey.

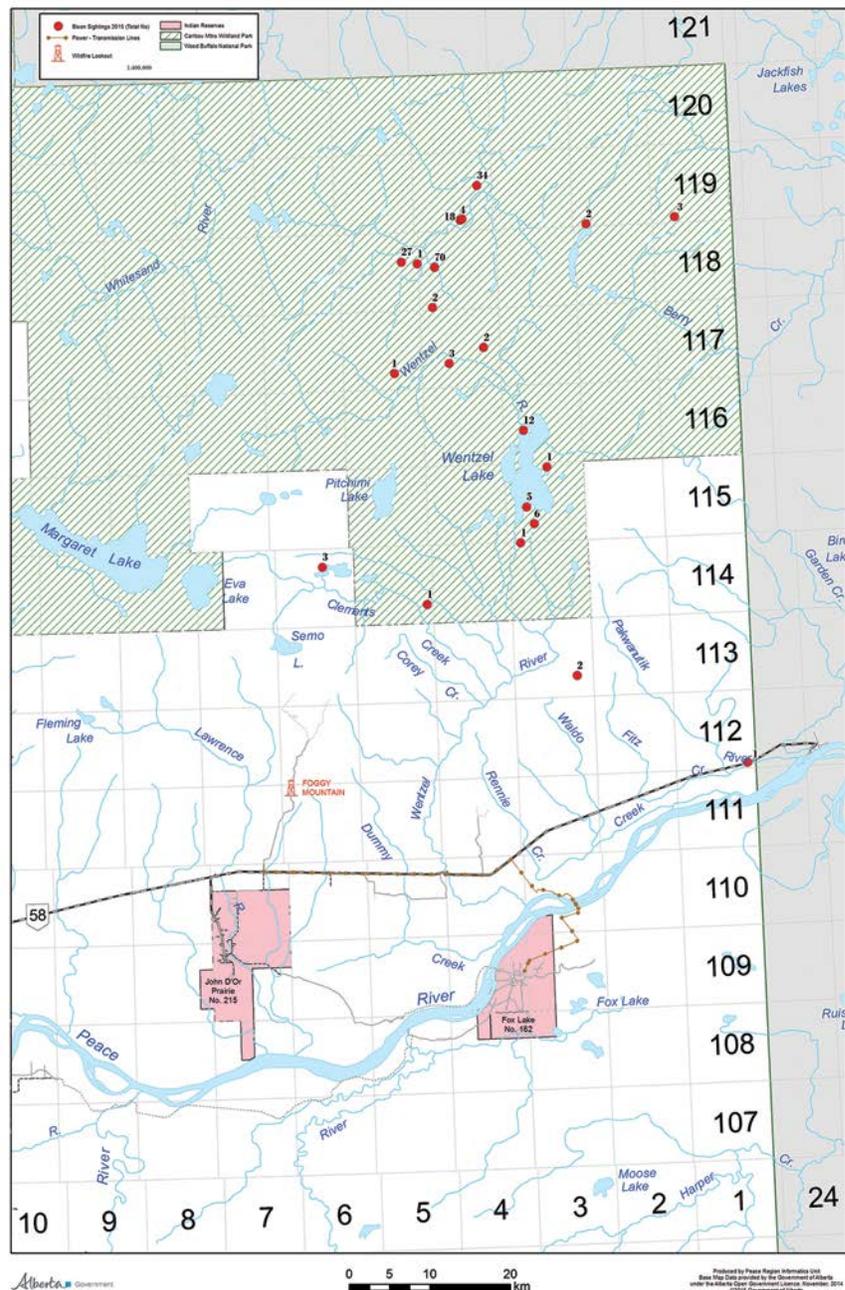


Figure 4. Locations of Bison Area 3 Survey February 18 to 22, 2015.

## 3.2 Disease Status of Bison Outside of Wood Buffalo National Park

**Objective** - To determine the disease status of bison in northern Alberta to the west and southeast of Wood Buffalo National Park.

Data on the prevalence of brucellosis and tuberculosis in the outlier herds (Wentzel and Wabasca-Mikkwa) are incomplete and inconclusive. However, outlier herds have been assumed to be associated with bison from the park, which are known to harbour these diseases. Bison east of Highway 35 are assumed diseased and are classified as non-wildlife under The *Wildlife Act*. As a result, they are not protected and can be hunted year-round except in the Caribou Mountains Wildland Provincial Park. Alberta Health issued a public advisory for the area in 1992, urging anyone handling, processing and consuming potentially diseased bison to take precautions. Regardless of current status, the proximity to the parent WBNP disease reservoir puts all outlier herds at a high risk of infection.

To ultimately assess the risk of disease transmission to livestock and disease-free wild bison, and to plan surveillance and containment programs in the future, efforts will be made to determine the disease status for each outlier herd. Sampling will generally be conducted by government staff, but if the opportunity presents itself through the ongoing harvest of bison by hunters in the area, the samples collected voluntarily may be tested. Hunters may be supplied with a limited number of sampling kits and with information on the two diseases suspected to be in the bison so that the risks can be assessed and the proper precautions can be taken.

### 3.2.1 Disease Sampling

The proposed disease sampling is a phased approach, with each progressive phase increasing in cost, statistical precision and sample size. Bison will be salvaged opportunistically where interested individuals and ground access are available. The disease-testing program for a given herd will be terminated as soon as one of the two diseases (bovine tuberculosis or brucellosis) is detected. The herd will be ranked as diseased. The disease sampling is based on the following assumptions:

- that outlier herds have similar prevalence of bovine tuberculosis or brucellosis to that occurring in WBNP (40 to 50 per cent);
- that it may take small sample numbers to detect disease presence if it is at high prevalence;
- that detection of either disease is enough evidence to classify a bison herd as diseased.

#### 2011-2014

Phase one will use Government or contract collection of two to four animals from each herd for each year of the program, or until the presence of disease is detected. All collection efforts will focus on sampling older bulls wherever possible. With potentially high prevalence, we may be able to establish disease status in one or two years. This phase will run no more than three years.

If there are no diseased bison detected during 2011 – 2014 sampling, Government will evaluate the option of implementing higher precision sampling phases.

The number of disease samples for Area 2 (Wabasca/Mikkwa) herd, Area 3 (Wentzel) herd and Ronald Lake herd is summarized in Table 1. Positive disease samples were detected from the Wentzel herd and the herd is now classified as diseased. To date, all samples from the Wabasca/Mikkwa herd and Ronald Lake herds have been negative for disease.

Year	Area 2	Area 3	Ronald Lake
2010/11	0	0	1
2011/12	4	10*	0
2012/13	8	0	24
2013/14	12	0	49
<b>Total</b>	<b>24</b>	<b>10</b>	<b>73</b>

\* Includes five positive samples for brucellosis

### **Update**

No disease sampling was undertaken during 2014/15.

### **Disease Sampling Summary**

The disease status of free-ranging bison, as with any wild population, cannot be determined definitively as almost every animal would have to be tested. In wild populations we estimate the disease status by rigorously sampling enough animals to reach a confidence level well below the expected rate of disease prevalence. Testing within Wood Buffalo National Park indicates that these diseases typically occur at a 30 - 40 per cent prevalence in similar herds. Disease testing of bison in Area 3 documented the presence of brucellosis. Testing of bison from Area 2 and Ronald Lake did not reveal evidence of brucellosis and the sample sizes allow interpretation with 95 per cent confidence that the disease (if it exists at all in the herd) is below five per cent prevalence. We cannot say definitively that brucellosis does not occur in these populations, but we can say if it does occur, it is at very low levels. Additional testing is necessary to improve confidence in our assessment of the current disease status of

these herds and to determine whether future infection occurs. We will therefore manage both the Ronald Lake herd and Wabasca/Mikkwa herds as disease free until we receive information from ongoing passive disease surveillance that indicates the herd is infected.

### **Northern Alberta Bison Genetics**

As reported in the September 2014 Progress Report, the bison genetic program is concluded. Population genetics were assessed using tissue samples from a total of 253 bison representing wild bison groups in the province. Results from comparative analyses indicated seven bison groups, which include Elk Island National Park (EINP) wood bison, EINP Plains Bison, Wabasca/Mikkwa, Ronald Lake, Mackenzie Bison Sanctuary, Hay Zama/Rainbow Lake and WBNP. Wabasca/Mikkwa bison were the most genetically differentiated bison group and are genetically isolated from all other groups. This group also showed more genetic similarities to the EINP Plains bison than to any other group. Ronald Lake was genetically similar to WBNP bison; however, the level of differentiation between these two groups was strong, suggesting negligible genetic exchange. Additionally, there was no indication that any of the peripheral bison populations maintained genetic integrity of a "pure" wood bison as differing degrees of hybridization with plains bison were identified.

### **Update on 2012-13 Recommendations**

During the 2012/13 year it was recommended that two new strategies be incorporated into the approach "Managing Disease Risk in Alberta's Wood Bison With Special Focus on Bison Outside of Wood Buffalo National Park."

1. The Government of Alberta will amend regulations to facilitate hunting bison in the Caribou Mountains Wildland Park as a mechanism to restrict range distribution and numbers of animals in the Wentzel Lake wood bison herd.

Discussions regarding facilitating a bison hunt in the Caribou Mountains Wildland Provincial Park have been initiated and will continue.

2. Include the Ronald Lake bison herd southeast of WBNP as part of the disease management program. This would include bringing local stakeholders and aboriginal groups up to date on the disease management program, establishing good estimates for herd size and distribution, and determining the herd's disease status. Note: Although this herd does not pose any risk to domestic animals nor disease-free bison herds, the status of all herds is required for any long-term solution to eliminate disease sources.

The Ronald Lake bison herd was added to the Disease Management Program as of 2013. Local stakeholders and aboriginal groups were included in the general stakeholder list and provided information and opportunity to comment or consult. In addition, a Ronald Lake Technical Team was formed to share knowledge and direct further study of that herd.

### Literature cited:

Cannon, R.M., and Roe, R.T. 1982. Livestock disease surveys. A field manual for veterinarians. Bureau of Range Science, Department of Primary Industry. Australian Government Publishing Service, Canberra.

Gates, C. C., J. Mitchell, J. Wierzchowski and L. Giles. 2001. A landscape evaluation of bison movements and distribution in northern Canada. AXYS Environmental Consulting Ltd. 115 pp.

To find more information on bison disease management, go to:

<http://aep.alberta.ca/fish-wildlife/wildlife-diseases/wood-bison-disease-management.aspx>

