

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



**2012 - 2013
Progress Report**

June 2013

Table of Contents

Introduction	1
1.0 Hay-Zama Wild Bison Management	2
2.0 Disease Surveillance and Risk Reduction East of Highway 35	5
2.1 Detection Approach	5
2.1.1 Update on Aerial Surveillance Flights	5
2.1.2 Public Reporting.....	6
2.2 Response Plan	6
3.0 Population Monitoring plan east of Highway 35	7
3.1 Population Estimate and Distribution	7
3.1.1 Aerial Survey	7
3.1.2 Public Reporting.....	10
3.2 Disease Status of Bison Outside of Wood Buffalo National Park	10
3.2.1 Disease Sampling and Herd Genetics	10

List of Tables

Table 1. Hay-Zama Bison Harvest and Samples from all Seasons	3
Table 2. Number of tissue samples collected from wild and protected bison for genetic analyses	14

List of Figures

Figure 1. Bison Herds Currently Classified as Diseased or Disease-Free.....	2
Figure 2. Hay-Zama 2013 Bison Survey Herd Locations and Winter Mortality.....	4
Figure 3. Aerial Survey Areas for Bison Population Estimates	7
Figure 4. Area 1 Surveys 2012 and 2013, and Areas 2 (2010) and 3 (2011)	8
Figure 5. Ronald Lake Bison Survey December 13-14, 2012, March 18, 2013	9
Figure 6. Locations of Wabasca/Mikkwa Bison Sampled December 11-16, 2012.....	12
Figure 7. Locations of Ronald Lake Bison Sampled December 17-19, 2012 and.....	13
March 26 and 27, 2013	



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 (WBNP) to livestock (cattle and domestic bison) and to healthy wild bison.

These introduced 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 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 other 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 Alberta's Wood Bison with Special Focus on Bison to the West of Wood Buffalo National Park." This approach was implemented by Environment and Sustainable Resource Development (ESRD)

and Agriculture and Rural Development (ARD) with assistance from Mackenzie County and the Alberta and Canadian cattle and bison industry organizations. 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 third progress report on this approach and includes work undertaken during 2012 and the winter of 2013. The June 2011, and May 2012, Progress Reports are available at: www.esrd.alberta.ca and search bison disease management.

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.

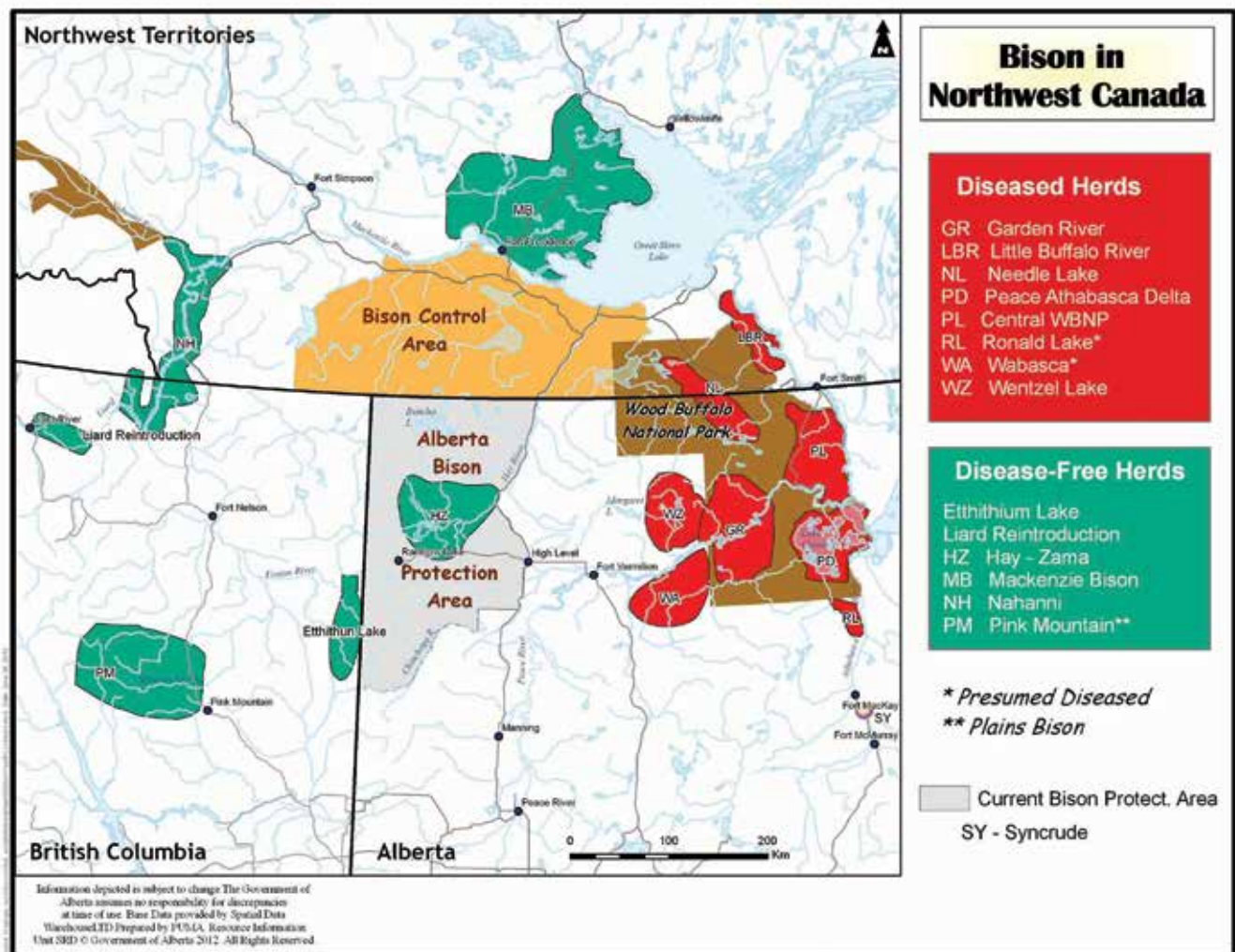


Figure 1. Bison Herds Currently Classified as Diseased or Disease-Free

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 increased. If this happened, there is a strong probability that the whole herd would have to be culled.
- It allowed 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 and 279 samples were collected for disease surveillance of bovine tuberculosis and brucellosis (Table 1). All samples were negative for both diseases and sampling was discontinued for the 2012/13 season. Monitoring the disease free status of the Hay-Zama herd will resume with some routine in the future. Table 1. Hay-Zama Bison Harvest and Samples from all Seasons

Table 1.
Hay-Zama Bison Harvest and Samples from all Seasons

Season	Hunters	Harvest	Tested Samples
2008/09	Aboriginal	74	58
	Non-Aboriginal	54	39
2009/10	Aboriginal	98	81
	Non-Aboriginal	57	43
2010/11	Aboriginal	34	8
	Non-Aboriginal	21	13
2011/12	Aboriginal	47	19
	Non-Aboriginal	38	18
2012/13	Aboriginal	42	0
	Non-Aboriginal	57	0
Total		521	279

Environment and Sustainable Resource Development (ESRD) continues to direct hunting efforts toward bison moving along the eastern edge of the Hay-Zama range, as well as those that pose safety risks to humans along roads or in communities.

Hay-Zama Bison Population Status

A population survey of the Hay-Zama herd was conducted from February 27 to March 5, 2013. A total of 529 bison in 49 groups was found. In addition a number of dead bison found were considered mortality due to relatively harsh winter conditions. Subsequent surveys specifically assessed winter mortality (Figure 2) and revealed estimates of 5 % calf and 90% adult survival; reducing the population to 410 bison. Thus the Hay-Zama herd is at the lower range of the population objective of 400 to 600 bison. It was decided to suspend the 2013/14 Hay-Zama bison hunting season to allow for recovery of the population. More information is available at <http://mywildalberta.com/Hunting/GameSpecies/WoodBisonHuntHayZama.aspx>.

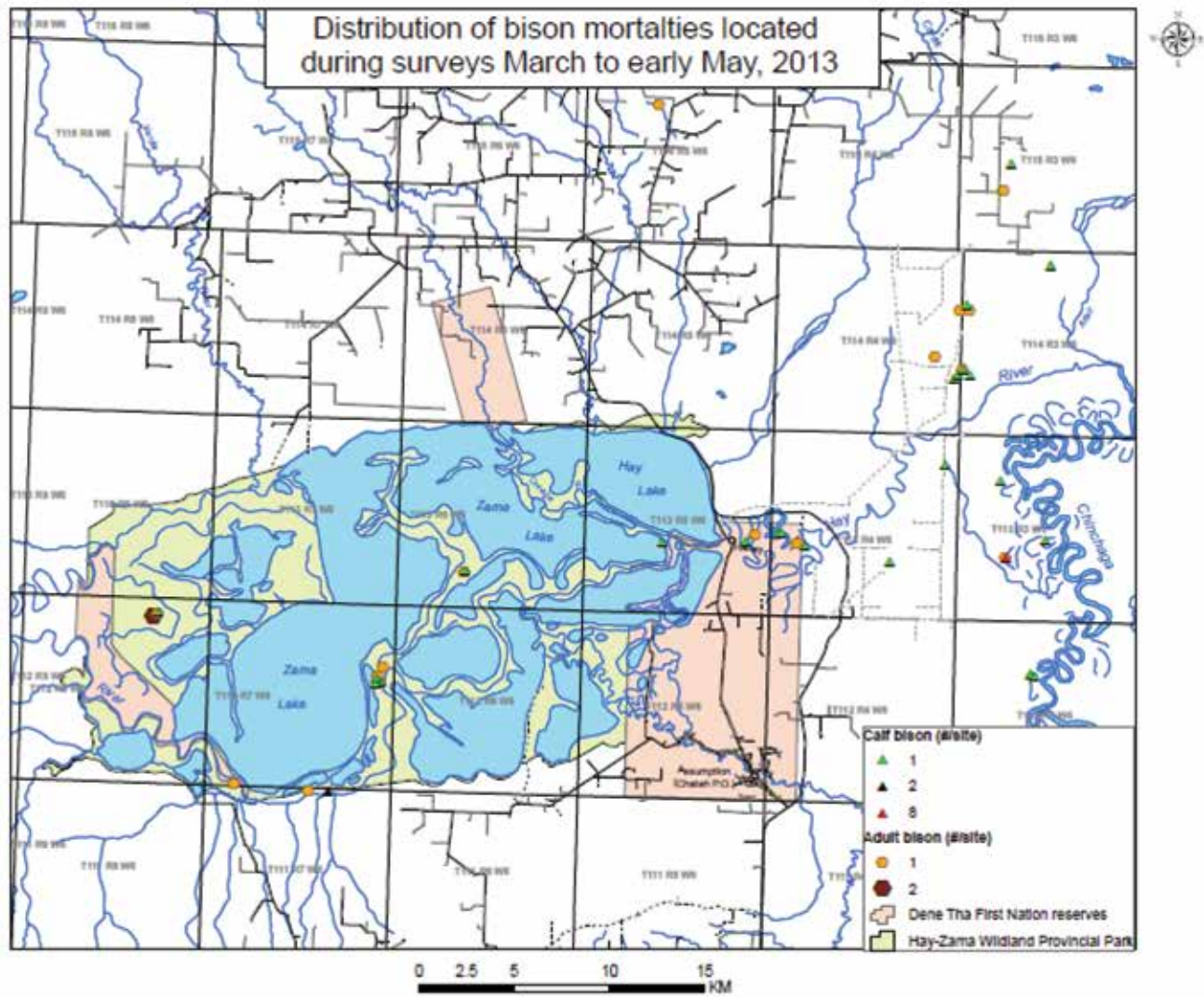


Figure 2. Hay-Zama 2013 Bison Winter Mortality

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.

2.1.1 Aerial Survey

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 – NWT boundary. The Agricultural Area Zone contains farmland along Highway 58 from High Level to Ft. Vermilion and farmland in the La Crete – Ft. 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 infection) 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.

Update

Highway 35 Surveillance Zone

Surveillance flights were flown by ESRD staff in the Highway 35 Surveillance Zone on December 7, 2012, and January 22, February 11, and March 6 2013. No bison or bison sign was detected during these flights. Fish and Wildlife Enforcement, Parks Conservation Enforcement and a representative of the Alberta Beef Producers provided observer assistance on these flights.

Agricultural Area Surveillance Zone

Surveillance flights were flown by ESRD staff in the Agricultural Surveillance Zone on December 8, 2012, and January 22, February 9, and March 6, 2013. No bison or bison sign was detected within the Agricultural Area Surveillance Zone. Parks Conservation Enforcement and a representative of the Alberta Beef Producers provided observer assistance on these flights.

The closest known bison to this zone was 58 kilometres away in the Harper Creek drainage of the Wabasca/Mikkwa herd area (as reported earlier).

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 2012/13 reporting period.

In November 2012, annual Fish and Wildlife District public meetings in High Level and LaCrete were used to encourage stakeholders and the public to report sightings of bison within a 10-kilometre strip along either side of Highway 35.

The Government of Alberta (ARD/ESRD), "Managing Disease Risk in Alberta's Wood Bison with Special Focus on Bison to the West of Wood Buffalo National Park" May 2012 Progress Report was sent to First Nation, Métis, agricultural, local municipal, hunting and outfitting stakeholders in June 2012.

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.

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.

2.2.1

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

2.2.2

Sustainable Resource Development 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

Public reporting of bison or bison sign included :

1. July 30, 2012, report of 2 cow and 1 calf bison just north of Hwy 58 3.2 kms east of the Ponton River.
2. August 15, 2012 report of 1 adult bison east side of Hwy 35 2 km north of Zama Hwy.
3. September 12, 2012, bison sign reported in a cut block in Twp 112 Rng 18 approximately 19.2 kms north east of High Level.
4. January 23, 2013, report of a bison track on Hwy 35 south of the Steen River.
5. January 23, 2013, report of a cow and calf bison within 16 kms west of High Level on the south side of Hwy 58.

All reports were investigated and no bison or bison sign located. A systematic grid search was conducted north of Highway 58 and east of Highway 35, east of High Level, to try and locate bison from reports of July 30, and September 12, 2012. Survey crews flew approximately 3100 kilometres of lines in the search area and did not locate any bison or bison sign.

There appears to be significant errors in the reporting of bison and bison sign, the time of sighting and/ or location. The public has been encouraged to report sightings as soon as possible to ensure a timely investigation and response.

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 are offered no conservation protection with the exception of bison found within Caribou Mountains Wildland Provincial Park.

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 6). 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.

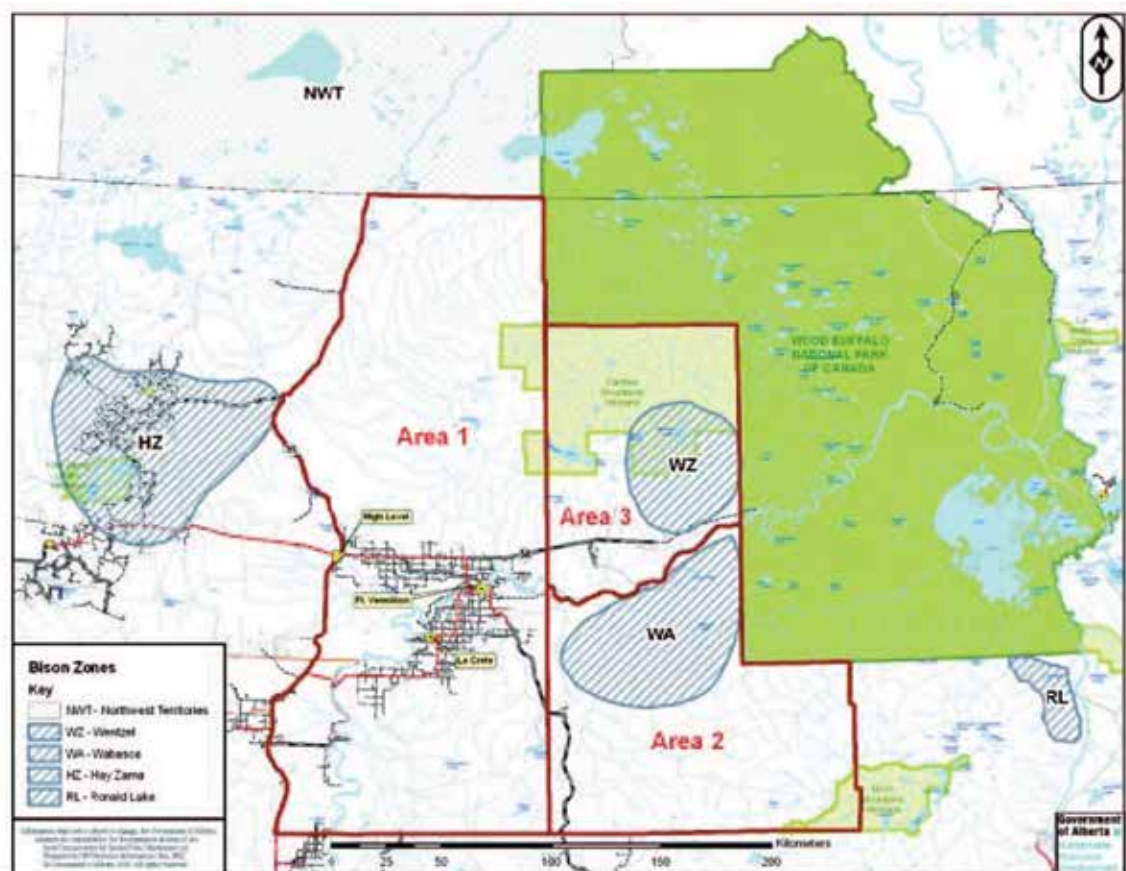


Figure 3.
Aerial Survey
Areas for Bison
Population
Estimates

Update

A complete bison survey of Area 1 planned for the winter of 2011/12 was not undertaken due to a lack of adequate snow; however in December 2012 a portion of Area 1, north of Hwy 58 east of Hwy 35 to longitude 116°00' and north to latitude 58°49'30" seconds was surveyed. No bison or bison sign was found. In January 2013, a moose survey was conducted in Wildlife Management Unit (WMU) 528 which comprises the southern portion of Area 1 south of the agricultural lands in the Fort Vermilion and LaCrete areas. In January 2013, an elk survey was conducted in WMU 535 which includes lands south of Hwy 58 between High Level and the Caribou River south to the boundary with WMU 528. The survey crews searched for bison or bison sign and none was located. These surveys, combined with a survey

along Highway 35 from the NWT border south to Meander River in February and March of 2012, in Area 1 show that a considerable portion of this Area has been surveyed (Figure 4).

Surveys of Areas 2 (2010) and 3 (2011) were reported in an earlier progress report (June 2011).

In preparation for disease sampling and collaring programs in the Ronald Lake area, ESRD Wildlife Management staff conducted scouting flights for bison in December 2012 and March 2013. Approximately 169 and 186 bison, respectively, were observed (Figure 5). These numbers were higher than the last mark-recapture survey conducted in 2010 which estimated the population to be between 74 and 159 bison.

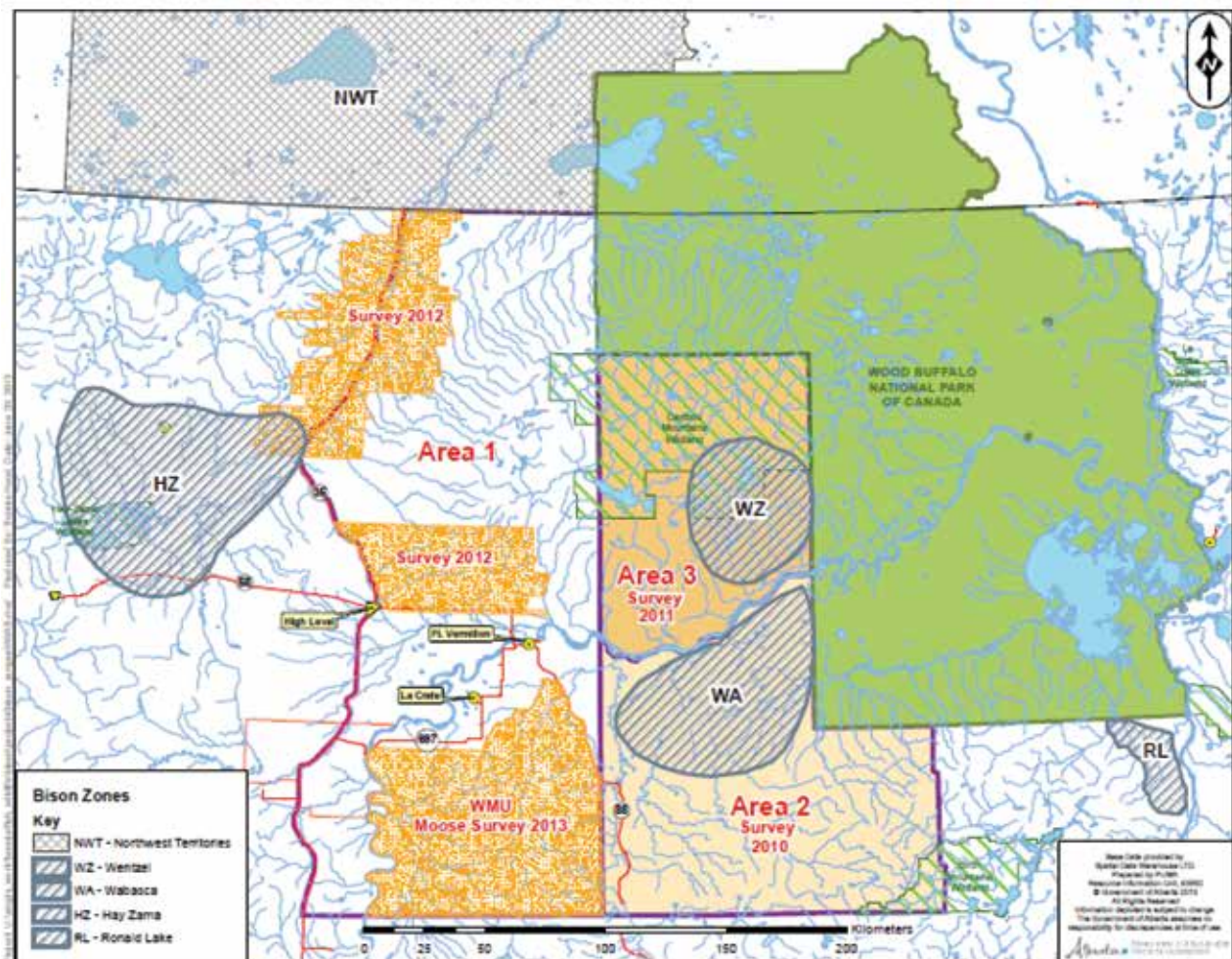


Figure 4. Area 1 Surveys 2012 and 2013, and Areas 2 (2010) and 3 (2011).

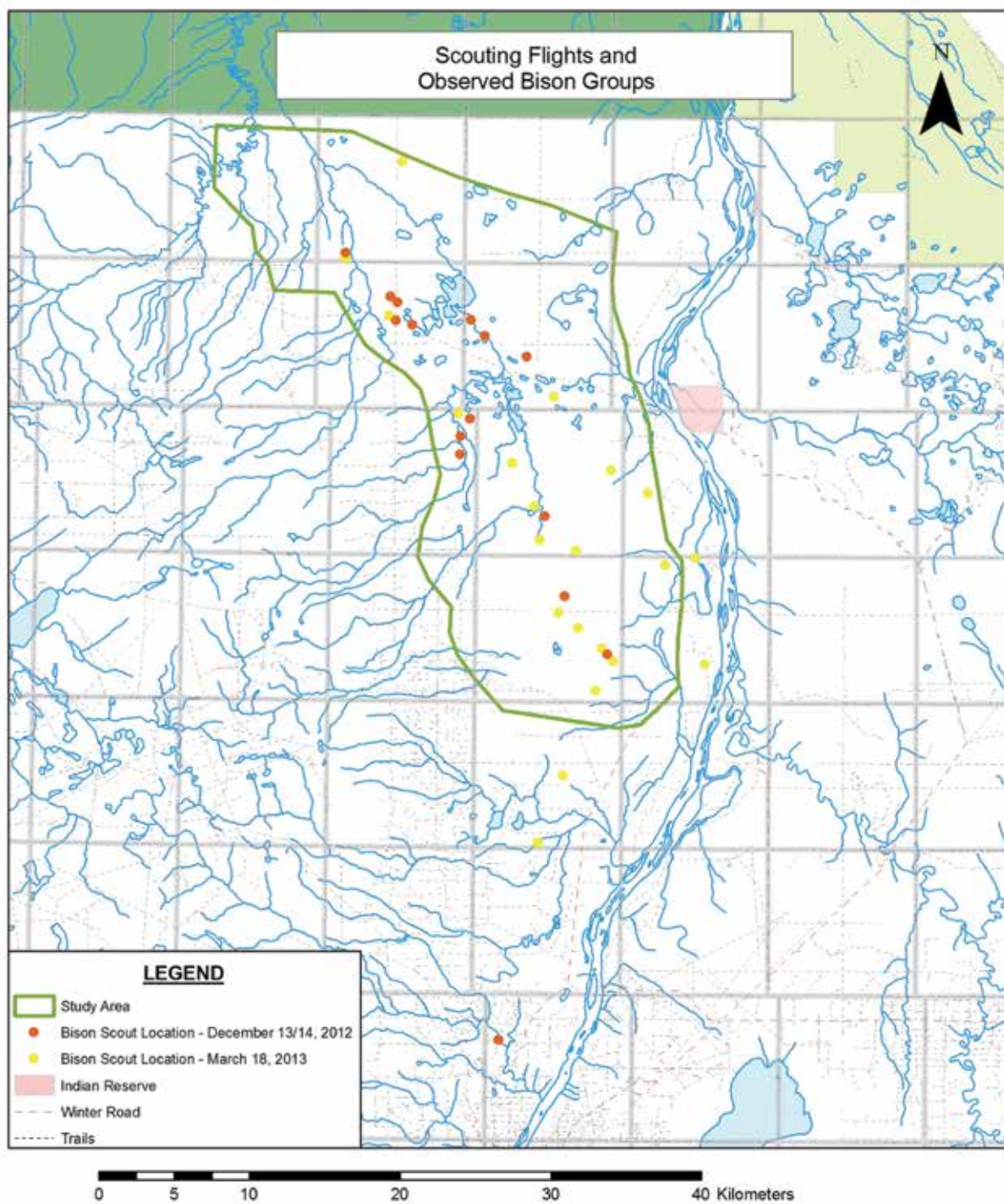


Figure 5. Ronald Lake Bison Search December 13-14, 2012, March 18, 2013

3.1.2 Public Reporting

Encourage the public, bison hunters, trappers and outfitters, First Nation and aboriginal harvesters to report bison sightings and local knowledge regarding preferred habitat use and seasonal movements in each of the three areas.

Update

As with public reporting in the surveillance zones, posters and information were provided to the public.

During the summer of 2012, there were two reports of bison within 16 kms of Wood Buffalo National Park (WBNP) along Hwy 58. Throughout the winter of 2012/13, there were three reports of people hunting bison in Twp 112/113 Rng 1 along the boundary of WBNP and a total harvest of nine bison.

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) is incomplete and inconclusive. There is also no data concerning the rates of infection in the Ronald Lake herd to the southeast of WBNP, which anecdotally may be growing and ranging further south. However, outlier herds are assumed to be associated with bison from the park, which are known to harbour these diseases. Bison east of Highway 35 are presumed to be 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 of Alberta staff, but if the opportunity presents itself through the ongoing harvest of bison by hunters in the area, the samples collected voluntarily may still be tested. Hunters may be supplied with a limited number of sampling kits and be provided 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 sizes 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.

Phase One

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, it may be possible establish disease status in one or two years. This phase will run no more than three years.

If there are no diseased bison detected in phase one, Government will evaluate the option of implementing higher precision sampling phases.

To date disease sampling has included:

1. Three separate blood samples and one lung sample were submitted to the High Level Fish and Wildlife office by an outfitter successfully hunting bison in Area 3 in 2011. Serology tests conducted by the Canadian Food Inspection Agency (CFIA) revealed that two adult female bison tested positive for exposure to brucellosis. These results were provided to the public in an Information Bulletin July 28, 2011.
2. A disease sampling program was conducted in December 2011 to confirm disease status in bison in Areas 2 and 3. A total of four bison from the Wabasca/Mikkwa and seven bison from the Wentzel herds were sampled. Laboratory tests conducted on the four samples from the Wabasca/Mikkwa herd were negative for both tuberculosis and brucellosis. These results do not mean that the Wabasca/Mikkwa herd is not infected with either of these diseases as the number tested did not provide a large enough sample to indicate the herd is disease-free. Laboratory tests were conducted on seven samples from the Wentzel herd, all were negative for tuberculosis and three samples had evidence of exposure to brucellosis. The results were provided to the public in an Information Bulletin June 29, 2012.
3. One blood and lung sample had been submitted to the Fort McMurray Fish and Wildlife office by a hunter in 2011.
4. Genetic material has been archived for each bison sample to support investigations into the origin of these populations.

Update

In December 2012, an additional eight bison were sampled in the Wabasca/Mikkwa herd to increase the sample size (Figure 6). The additional samples were negative for both diseases.

A disease sampling program was conducted on the Ronald Lake herd in December of 2012. A total of eleven bison were sampled (Figure 7). Test results were negative for both diseases. In March 2013, 13 additional blood samples were collected when animals were captured for a collaring program.

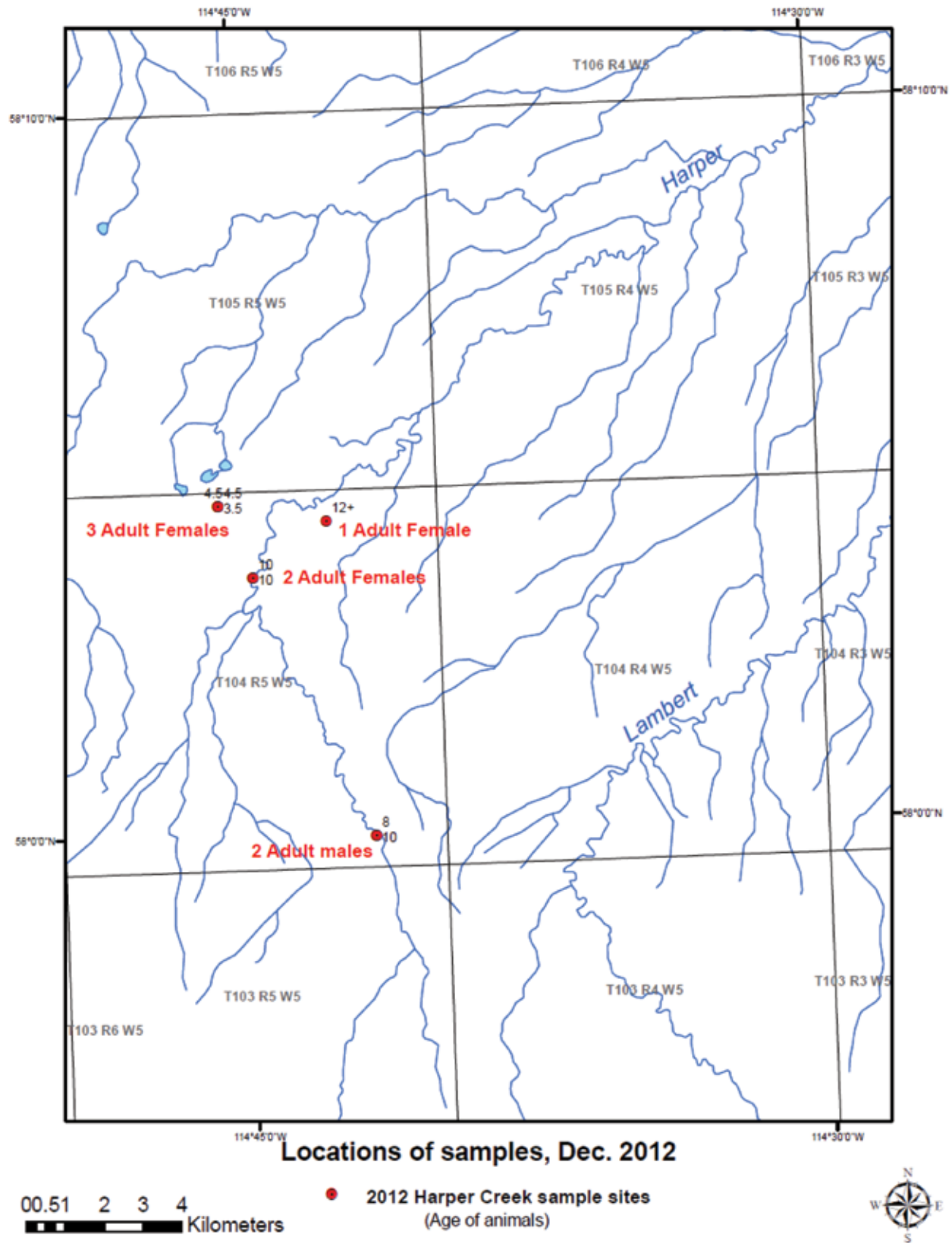


Figure 6. Locations of Wabasca/Mikkwa Bison Sampled Dec. 11-16, 2012

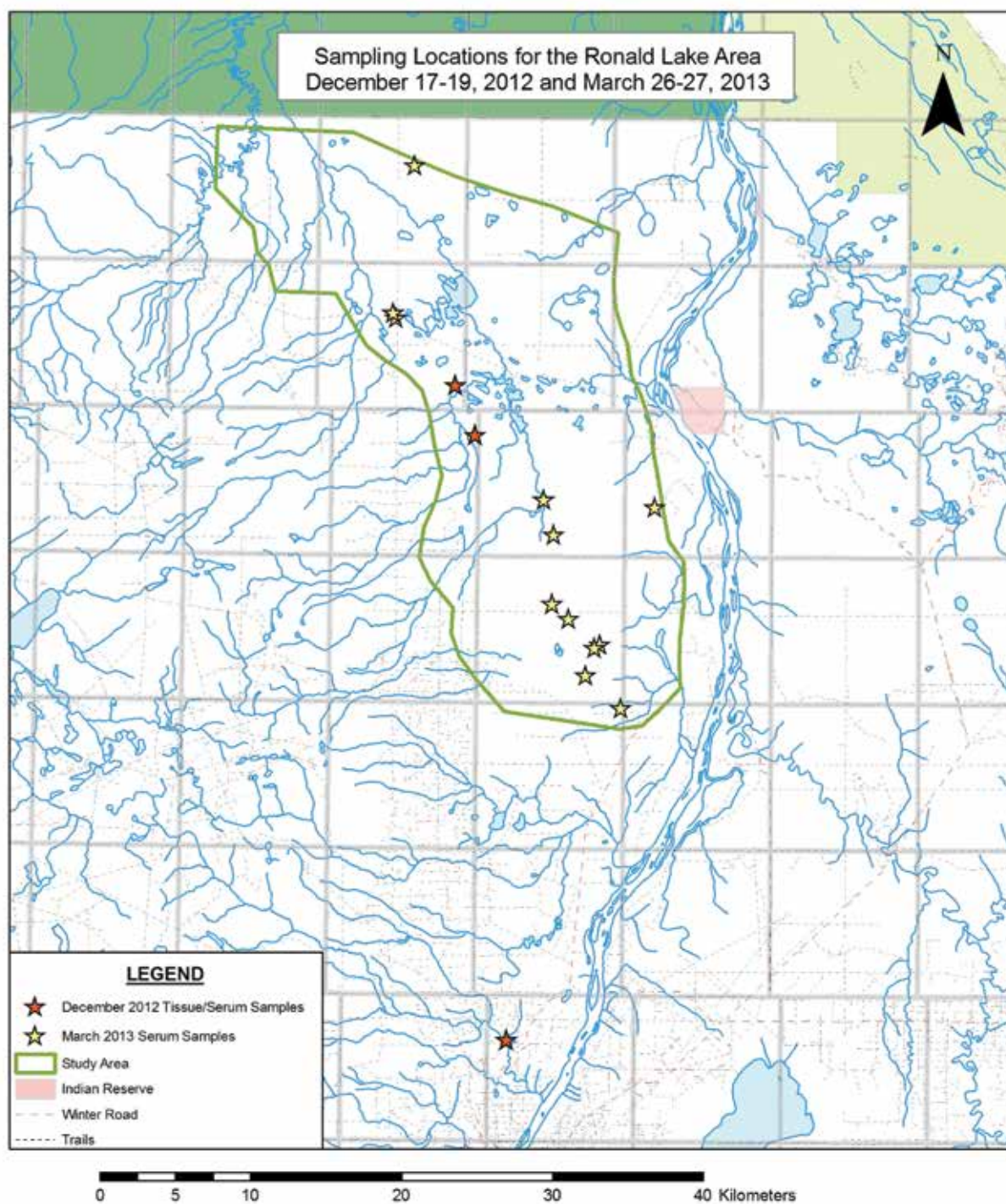


Figure 7. Locations of Ronald Lake Bison Sampled Dec. 17 – 19, 2012 and March 26, 27, 2013

Update on Genetic Program

Genetic material was obtained from each bison sampled for disease and was archived in cold storage to establish a provincial database for each herd.

The bison genetic program was implemented in 2012/13 to assist in understanding bison movements and dispersal which has the potential to shape how local populations are interconnected and subsequently determine how diseases are spread.

Understanding dispersal patterns of Alberta's free ranging bison also is important to identify the natural history of particular bison groups. For example, there is uncertainty in the origin of a group of approximately 200 bison inhabiting an area west of the Athabasca River, east of the Birch Mountains, and south of Wood Buffalo National park, known as the Ronald Lake Bison herd. Currently, ESRD assumes these bison are migrants from Wood Buffalo National Park.

To determine both the fine-scale genetic population structure and inter-population movement, ESRD will analyse genetic markers (microsatellites) specific to the bison genome. The analysis will build on previous efforts (Wilson and Strobeck 1999 a,b), to delineate and characterize bison populations in northern Alberta including Wood Buffalo National Park.

Tissue collection for DNA analysis has been ongoing since 2008 using samples collected from hunter harvested bison during the Hay-Zama disease surveillance program (Table 2). Additional samples were collected from Wentzel Lake, Harper Creek and Ronald Lake during disease surveillance programs in 2011 and 2012. Samples also were obtained from Wood Buffalo and Elk Island National Parks through collaborations with Parks Canada and the Canadian Food Inspection Agency.

Table 2.

Tissue samples collected from wild and protected bison for genetic analyses.

Area	Number of samples
Elk Island National Park	100
Hay Zama	80
Wentzel Lake	7
Wabaskwa/Mikkwa	12
Ronald lake	30
Wood Buffalo National Park	30
Chinchaga	5

The University of Alberta has been contracted by ESRD to process all tissue samples, extract DNA and perform genotyping. Samples were submitted to the University of Alberta in May 2013, with an estimated completion date of July 31, 2013.

All microsatellite profiles will be scored and subsequent analyses undertaken by ESRD (Dr. Mark Ball).

Update on 2011-12 Recommendations

It is recommended that two new strategies be incorporated into the approach "Managing Disease Risk in Alberta's Wood Bison With Special Focus on Bison to the West of Wood Buffalo National Park."

1. ESRD will work with Tourism, Parks and Recreation (TPR) to 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.

Initial discussions between TPR and ESRD regarding facilitating a bison hunt in the Caribou Mountains Wildland Park occurred and will continue based on the need for this potential activity as a risk management tool.

2. Include the Ronald Lake bison herd south and east 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 eliminating disease sources.

The Ronald Lake bison herd has been added as part of this disease management program. Local stakeholders and aboriginal groups have been provided information and opportunity to comment or consult on the program.

With the addition of Ronald Lake to the disease management program in 2012-13, the name of the program changed from "Managing Disease Risk in Alberta's Wood Bison with Special Focus on Bison to the West of Wood Buffalo National Park" to "Managing Disease Risk in Northern Alberta Wood Bison - Outside of Wood Buffalo National Park".

Literature cited:

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.

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Wilson GA and C Strobeck. 1999b. Genetic variation within and relatedness among wood and plains bison populations. *Genome* 42: 483-496.

