

**Toolbox**

# **Tracking Wildlife Health in Alberta**

**Lessons for Treaty 8 First Nations of Alberta**







**Brenda Parlee and Kevin Ahkimmachie © 2018**  
**University of Alberta**

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## Executive Summary

The health of wildlife and the health of Aboriginal peoples are strongly interconnected. Many Aboriginal peoples in Alberta depend on deer, elk, and moose for food and as part of their livelihood and culture. For this reason, we know that wildlife diseases including Chronic Wasting Disease (CWD), have the potential to negatively affect traditional diets and also the health and wellbeing of Aboriginal communities. Although Aboriginal harvesters are vulnerable, many are also very knowledgeable about their local and regional environments.

This toolbox is intended to help harvesters and land users document their observations of changes in wildlife health in their region. It includes background information about Chronic Wasting Disease and ideas about ways in which communities can get involved in monitoring the spread of the disease. Attached are additional resources as well as a draft survey tool that can be printed and shared.

For more information about the this guide or to receive additional copies, contact Kevin Ahkimmachie from Treaty 8 First Nations of Alberta at [kahkimmachie@treaty8.org](mailto:kahkimmachie@treaty8.org) or Brenda Parlee at [bparlee@ualberta.ca](mailto:bparlee@ualberta.ca)

An online version of the guide can be found at [www.brendaparlee.ca](http://www.brendaparlee.ca)

# Treaty Areas of Alberta

## Treaty 8 Communities Located in Areas where Wildlife Health Monitoring is Needed

- (1) Athabasca Chipewyan First Nation
- (3) Bigstone Cree Nation
- (4) Chipewyan Prairie First Nation
- (6) Driftpile First Nation
- (9) Fort McMurray First Nation
- (11) Kapaweno First Nation
- (15) Mikisew Cree First Nation
- (17) Sawridge Band
- (18) Smith's Landing First Nation
- (20) Sucker Creek First Nation
- (21) Swan River Band
- (32) Heart Lake First Nation

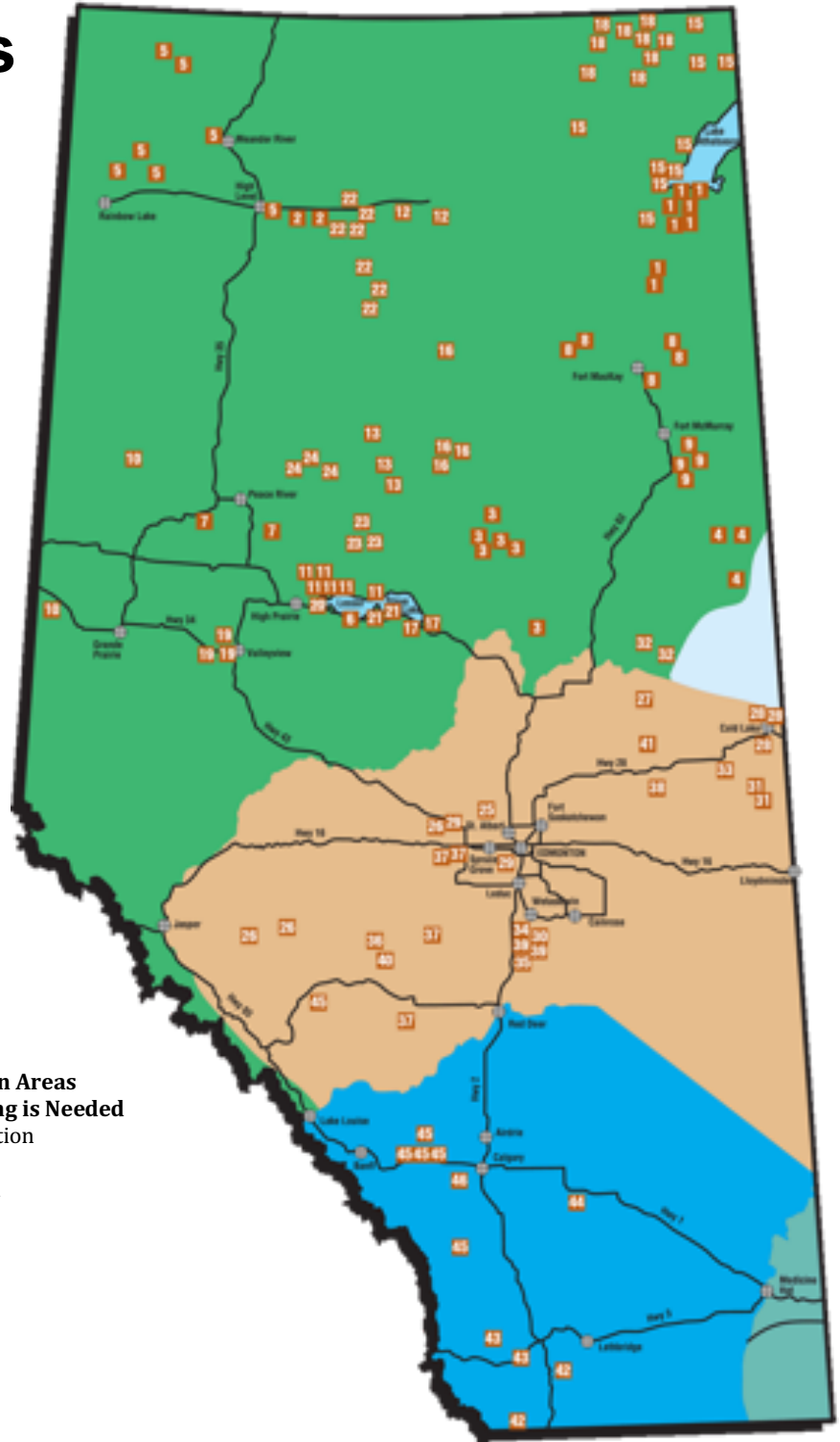


Figure 1 – Treaty Areas of Alberta

## 1. Background

### 1.1 Objectives of this Toolbox

The health of wildlife and the health of Aboriginal peoples are strongly interconnected. Many Aboriginal peoples in Alberta depend on deer, elk, and moose for food and as part of their livelihood and culture. For this reason, we know that wildlife diseases including Chronic Wasting Disease (CWD), have the potential to negatively affect traditional diets and also the health and wellbeing of Aboriginal communities. Although Aboriginal harvesters are vulnerable, many are also very knowledgeable about their local and regional environments. Previous research has emphasized that numerous hunters in the Treaty 8 region are willing and hopeful of participating in wildlife monitoring to ensure the long-term health of both the animals and their communities.

For generations hunters have systematically tracked indicators of animal condition (e.g., skinny/fat liver) to make decisions about where, when and how to hunt. Research between the University of Alberta and Treaty 8 First Nations of Alberta involved interviews and focus groups with communities and harvesters to understand more about traditional systems of monitoring and how they might be important to addressing the spread and effects of Chronic Disease in Alberta. Oral histories about ups and downs (variation) in the health, distribution and population of moose, deer, elk and caribou in four communities were documented. The research resulted in a summary (plain language report) as well as this toolbox. This document includes background information about Chronic Wasting Disease, ideas for monitoring, other resource material as well as a survey document that could be used by communities to keep track of their community's harvest and consumption information, observations of the health of animals and the risk perceptions of hunters and others about the spread of the disease.



## 1.2 Definitions and Key Concepts

### *Indigenous Rights to Wildlife*

Surveillance of Chronic Wasting Disease, including processes of community-based monitoring, can be highly technical. Many scientists are involved in research about the origins of the disease, how it is spread, and potential solutions.

Monitoring is not only technical; it is also social and political. For many Indigenous communities, the capacity to build knowledge and inform decision-making about their lands and resources is important for affirming their Indigenous rights.

Indigenous rights to lands and resources are defined in the Canadian constitution, in historic treaties, contemporary land claim agreements, Supreme Court decisions, as well as in other kinds of legal agreements and processes. Rights are also implicit and explicitly articulated in social relationships, relationships to the land, oral histories and social cultural practices such as hunting or the visiting of sacred sites (Napoleon, 2013).

The rights of Indigenous communities to a healthy land and resource base is not only well defined in Canada but is also recognized in global protocols such as the *United Nations Declaration on the Rights of Indigenous Peoples*. Within this context, there are emerging opportunities to strengthen the existing network of community-based monitoring programs in ways that respect these rights.

### *New Paradigms of Education, Truth and Reconciliation*

A toolbox that aims to improve capacity of Aboriginal communities to meaningful participate in monitoring their lands and resources is offered here in the hopes of developing new relationships and bridges between Traditional Knowledge and science as recommended through the *Truth and Reconciliation Commission* in Canada. The impacts of residential schools in Canada had significant impacts on Indigenous societies, cultures and economies as well as relations between Indigenous and non-Indigenous peoples across the country. As a result, formal education achievement levels and representation of Indigenous youth in post-secondary education are very low. New approaches to engaging Indigenous youth in sciences and alternative kinds of education are needed to address this gap such that Indigenous peoples are better represented in natural resource management institutions and can play meaningful roles in addressing the issue of wildlife management and other kinds of environmental and socio-economic challenges in Canada.

### **Traditional Ecological Knowledge (TK)**

The research for this toolbox focused on “Traditional Knowledge” as a foundation for monitoring. Traditional knowledge refers to the cumulative body of knowledge, practices and beliefs that have developed over many generations by local communities about ecosystems and their relationship to it (Berkes 2012). Although the term Traditional Knowledge is widely used, communities refer to their own knowledge in different ways. For example, Dene knowledge, Cree knowledge or *kiskeyitamowin*.

There has been much written about the opportunities and challenges of including Traditional Knowledge in resource management including wildlife monitoring (R. Brook, Kutz, Veitch, & Elkin, 2008; R. Brook et al., 2009; Lyver, 2005; H. Moller, F. Berkes, P. O. B. Lyver, & M. Kislalioglu, 2004; B. L. Parlee, Goddard, First Nation, & Smith, 2014). Traditional knowledge is unique from local knowledge in that it is longitudinal or based on many years, if not generations, of observing, experiencing and interpreting ecosystems; whereas local knowledge is more short term in scope. It is because of this longitudinal scope, that Traditional Knowledge is increasingly recognized as useful in monitoring by many wildlife biologists and some other scientists, resource managers and governments. They see opportunities to understand long-term ecosystem change. In this context Traditional Knowledge may be able to help answer the following kinds of questions:

- What are useful indicators for understanding ecosystem dynamics?
- What kinds of patterns of ecological variability are characteristic of particular ecosystems and how do those differ from changes that might be caused by a resource development project?
- What are the ways in which different kinds of ecosystem components interact over time?
- How should we respectfully and meaningfully track these changes over time?
- What is the meaning and significance of observed trends and patterns of ecosystem change?

### **Local Knowledge**

Local knowledge is a widely used concept in academic and practical contexts. There is no universally accepted definition of local knowledge given there is a diversity of environments and cultures in which knowledge is generated and myriad uses and outcomes of use (R. Brook et al., 2009). Most descriptions of local knowledge in natural resource management refer to land-based or applied knowledge and skills including observations of ecological conditions and how-to knowledge for coping and adapting to change. Like traditional knowledge, local knowledge also tends to be orally or informally transmitted and shared locally and within family and community groups (McGregor, 2000).

Local knowledge is the knowledge that any peoples might hold about the environment around them. “This includes the way people observe and measure their surroundings, how they solve problems and validate new information. It includes the processes whereby knowledge is generated, stored, applied and transmitted to others” (FAO, 2004). Local knowledge, like traditional knowledge, is a cumulative body of knowledge and may be passed down from generation to generation and closely interwoven with people’s cultural values. This encompasses the skills, experiences and insights of people, applied to maintain or improve their livelihood (FAO, 2004).

Local knowledge of moose and deer hunters is increasingly recognized as a useful source of data. For example, hunters’ knowledge, particularly that of experienced older hunters, can offer insights about moose health, population and distribution patterns (Boyce, Baxter, & Possingham, 2012; Boyce & Corrigan, 2017). Harvest data can offer a simple and cost effective way of determining population trends; biologists suggests the index of abundance can be determined from estimating the probability of hunter success or the kill per unit of effort. Similar to catch per unit effort research, this is measured in terms of the proportion of hunters who harvest a moose and the number of hunter days in the field to harvest a moose (Boyce et al., 2012).

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Number of hunters who harvest a moose

Number of hunter days in the field to harvest a moose

### **Western Scientific Knowledge**

While many kinds of knowledge production processes have similar traits of being systematic and empirically driven, “western science” is often defined as the mainstream body of knowledge behind conventional resource management practices. The increasing interest in alternative knowledge (e.g., Traditional Knowledge) stems in part, from a critique of mainstream science as overly expert-driven, centralized and top down, technocratic and reductionist (Howitt 2001; Sillitoe 1998).

### **Capacity Building**

Capacity refers to the skills, knowledge, resources and experience needed to meaningfully carry out a community-based monitoring program in ways that enhance the process and outcomes of the program as well as contribute to the broader needs, interests and well-being of the community. It is the value-added contributions that can be made through education, mentorship, training and other kinds of resourcing from those individuals, organizations or governments that are playing and supporting role.

“Capacity” is related to other terms such as “empowerment” as well as “social learning” and “capabilities”. While there are some ways of measuring capacity quantitatively, many aspects are qualitative in nature. What is capacity building to one community may not be perceived the same way by others. The cultural context including Indigenous cultural histories can also influence local interpretations of what is capacity. For example, some kinds of formal education programs or the format and context in which they are offered, may be assimilative or inappropriate to Indigenous communities adversely impacted by residential school systems.

The capacity requirements of community-based monitoring programs can also vary significantly by socio-economic, cultural and environmental context. Indigenous communities in settled land claim areas, for example, may have more capacity to carry out their work than communities in unsettled land claim areas. Those close to urban areas may be more or less advantaged than those living in more remote regions of Canada.

The development of a Community-Based Monitoring program in and of itself can add capacity. The primary purpose is to track changes in ecosystems and communities over time so as to produce useful knowledge about ecosystem dynamics. This process of knowledge generation may be viewed as adding capacity to communities who seek to play a greater role in the management of their natural resources including decisions about resource development. Such added capacity can serve to level out (partially) some of the inequities in the knowledge landscape often associated with wildlife management.

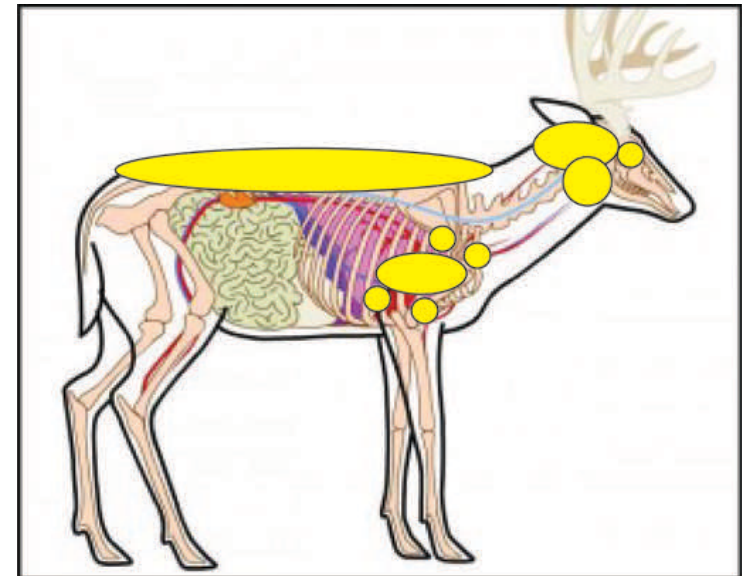
### 1.3 The Socio-Political Landscape of Chronic Wasting Disease

#### *Chronic Wasting Disease*

“Chronic wasting disease (CWD) is a disease that affects elk, deer and moose in Alberta. The disease affects the nervous system of the animal leading to behavioural changes (eating habitats) and organ failure such that the animal in later stages of the disease will become very skinny (emaciated) or “wasted” in appearance.



**Figure 2 – Deer Infected with CWD**  
[https://en.wikipedia.org/wiki/Chronic\\_wasting\\_disease](https://en.wikipedia.org/wiki/Chronic_wasting_disease)



**Figure 3 – Parts of the Deer Infected with CWD (eyes, brain tissue, lymph nodes, spleen, spinal cord)**

There is currently no cure for Chronic Wasting Disease. It is fatal to an animal that is infected. It is also difficult to track. Infected animals can appear strong and healthy in the early stages of being infected and it can be more than two years before the animal starts to appear sick and lose the ability to eat and drink.

The symptoms of the disease are also confusing because they are similar to the symptoms of other diseases. In other words, there are many reasons why an animal can become skinny. For example, moose infected by ticks can also appear very skinny and exhibit similar behavioural symptoms as an animal infected with CWD.

At present, the only way to find out if an animal has the disease is to test after it has been hunted or culled (i.e., there is no good test for the disease that can be used while the animal is alive). However, there are some technologies that may be available soon that can be used to test soil and fecal samples. There is a pilot technology for blood samples available in the United States but it is not available in Canada yet.

Managing the spread of the disease is thus complicated. There is currently no management strategy in place that prevents the spread of the disease. This is a major concern in Canada and the United States as well as a growing number of countries globally. Although CWD was first discovered in farmed elk, it is now being found in wild elk and wild deer populations. To date, over 10000 harvested animals have been tested in Alberta and several hundred animals of those have been diagnosed with the disease.

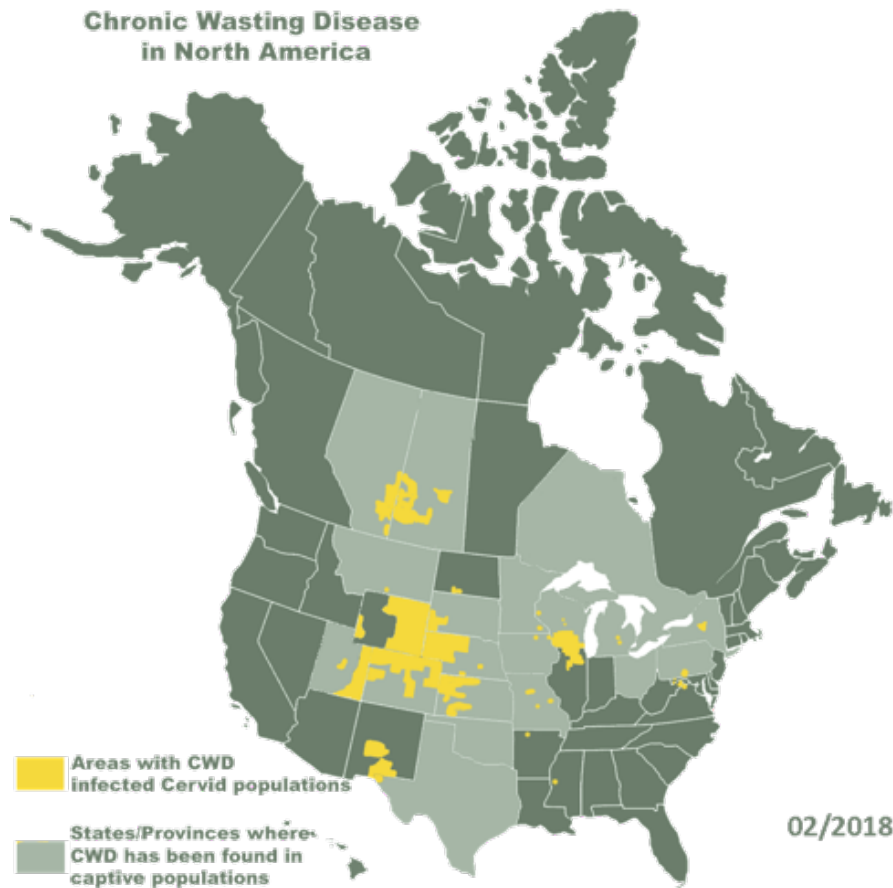
In Alberta, CWD occurs primarily in mule deer, particularly older males but the disease has also been found in several white-tailed deer and one moose. It has also been discovered in reindeer in Norway. This evidence has led to concerns that boreal caribou in western Canada may also at risk of contracting the disease as well as barren ground caribou in the Northwest Territories.

### ***Chronic Wasting Disease and Human Health***

According to the Government of Alberta and the United States Centers for Disease Control, “there is no scientific evidence to suggest that CWD can infect humans and growing evidence that human infection is unlikely to occur”. The United States Centers for Disease Control specifically advise that the human health risks from CWD, if any exist, are extremely low. However, there are many unknowns and uncertainties because rigorous studies of the disease have only been carried out in the last decade. Given those uncertainties, the World Health Organization (WHO) recommends that all products from animals known to be infected with CWD should not be eaten.

### **When did Chronic Wasting Disease Appear in Alberta?**

Chronic Wasting Disease was first discovered in parts of the northwestern United States in the 1970s. Many people trace the origin and spread of the disease back to elk farming in the northwestern United States. Since that time, Chronic Wasting Disease has been spread into western Canada with most cases being found in elk ranches in Saskatchewan and in wild mule deer and white-tailed deer. There have also been cases discovered in Korea and Norway. Although mostly found in deer and elk, the disease has also been discovered in reindeer and moose.



**Figure x - Map of North America with reported locations of CWD (2018)**

### **How has CWD spread in Alberta?**

In 1996 Alberta began testing wild deer and elk that displayed abnormal behaviour or were clinically emaciated. Ongoing annual surveillance of hunter-killed deer and elk began in 1998. In 2002, CWD was identified in a farmed elk and two farmed white-tailed deer in central Alberta. Alberta stopped importing farmed elk from

1988 to 2004 in order to avoid importation of more diseased animals. The government started importing elk and farmed deer again in 2004.

CWD was detected in a wild deer in September 2005. Subsequent surveillance revealed that CWD invaded eastern Alberta via wild deer from adjacent areas of Saskatchewan. The disease is now established in the Battle River and Red Deer/South Saskatchewan River systems in eastern Alberta and continues to spread.

CWD spreads through animal-to-animal contact or through animal contact with infected habitat. An infected animal can infect other animals or its habitat through its feces, urine or saliva. For example, animals that use the same salt-licks or grazing areas as infected animals will become infected as well.

Sometimes the disease is also spread from the mother elk or deer to the fetus or calf. Unlike other kinds of viruses or diseases such as brucellosis (previously found in bison in Wood Buffalo National Park), the prion agent associated chronic wasting disease is very difficult to remove from a habitat once it is infected. Only extremely high temperatures (much hotter than a forest fire), or removal of soil and flora (all plant material) from the area will ensure the disease is no longer present.

### ***Is CWD in the Traditional Territory of Treaty 8 First Nations of Alberta?***

Most of the cases of Chronic Wasting Disease presently found in Alberta are south and east of Treaty 8 territory. However, the disease continues to spread further westward into central Alberta and is of growing concern to First Nations communities who depend on deer and moose for food security. The discovery of CWD in a white-tailed deer northeast of Fort Saskatchewan suggests the disease has spread westward through the North Saskatchewan River watershed.

Over-population of deer, resource development and climate change has also affected the distribution of deer in more northerly regions. The discovery of CWD in reindeer in Norway suggests that boreal caribou and barren ground caribou may also be at risk.



### **What do I do if I see an animal that might be infected?**

Deer, elk and moose infected with the disease may exhibit many different kinds of symptoms ranging from normal condition and behaviour to severe wasting (appear skinny) and behaviourally skittish or very passive. It can take up to 2 years for an infected animal to succumb (die from) the disease.

It is not known to what extent the animal suffers during the progression of the disease. Previous research with First Nations in Alberta have suggested protocols for First Nations hunters to deal with infected animals in a respectful way including:

1. Safely hunt (shoot) the animal if it appears to be suffering;
2. Wear boots, gloves and cloths that can be disinfected with bleach or disposed;
3. Soak knives, or other tools used to trim the carcass in bleach for at least five minutes;
4. Safely protect the carcass of the animal so that it does not become disturbed by other animals or people;
5. Contact the office of Treaty 8 First Nations of Alberta, the University of Alberta or the Government of Alberta to have the animal removed and tested.

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### **1.3.3 Smoking, Soft Drinks – Comparing Risks of CWD**

CWD is a risk that is new and not well understood but it is important to put the risks of the diseases into context or compare to other known risks. There are many other kinds of environmental conditions and lifestyle behaviours which put our health at risk. For example, smoking is a behaviour that we know causes lung cancer but many people still smoke. Over consumption of high sugar soft drinks is strongly related to Type II Diabetes, however, many people drink soft drinks on a daily basis. There is no evidence that CWD can affect human health, however, people may be more fearful of this disease than they are of smoking or drinking high sugar soft drinks. We usually fear things we know less about or we feel we have less ability to manage.

Deciding how to manage these risks of lifestyle on a day to day basis is not a decision that can be made by government. Treaty 8 communities, households and individuals must make decisions about how to manage these risks by thinking about the trade-offs (costs and benefits) in their own lifestyles.

**Resilience to the Spread of CWD**

Many Indigenous communities from the Treaty 8 region live, travel and harvest resources in environments where CWD may be present. Dependence on moose, elk and deer for food means that Indigenous hunters can be in direct contact with infected animals or infected habitats. Lack of knowledge about the disease in communities, poor access to testing facilities and limited voice in decision-making about how the disease is managed means Indigenous peoples are also highly vulnerable to Chronic Wasting Disease. Creating opportunities for communities to participate in decisions about how the disease is managed by government is key to their resilience to the disease. Ensuring individuals and communities have enough information to make decisions about where and if CWD is present in their hunting areas or in the animals they hunt can also increase their resilience or capacity to cope and adapt to changing conditions.

$$R = (V + E) - OAC$$

R = Resilience	The ability to mitigate, cope and adapt to changing environmental conditions including the spread of CWD.
V = Vulnerability	Indicated by levels of poverty (limited healthy food alternatives, limited access to healthcare and educational institutions), lack of voice in natural resource management institutions, poor access to public information (e.g., limited education levels, poor internet access).
E= Exposure	Exposure includes proximity of communities to locations infected by CWD, land use activity in areas affected by CWD, consumption of animals potentially infected by CWD.
OAC = Opportunities to Build Adaptive Capacity	This includes availability of local and traditional knowledge, skills and practices of regular monitoring of wildlife health, emerging relationships and opportunities to co-produce knowledge with governments, academic institutions and other organizations with information about CWD and technology for monitoring, management and treatment).

The World Health Organization suggests limiting contact with areas known to be infected with CWD for two reasons. People who travel regularly in areas where CWD may be present may unknowingly track the prion agent into other areas that were not previously infected. They may also end up in direct contact with prions in food they consume.

There are currently no known cases of CWD in Treaty 8 territory however, hunters and land users should look for more information on a regular basis from the Government of Alberta and other organizations to determine if the disease has spread. This information can help guide local decisions about whether to change their land use activity or hunting practices.

For regular updates see this website for more information:

<http://aep.alberta.ca/fish-wildlife/wildlife-diseases/chronic-wasting-disease/cwd-updates/default.aspx>

Depending on the information they receive and their interpretations of the risks, some people may decide to stop hunting or traveling on the land completely. This may have many more risks and negative impacts on individuals, communities and cultural continuity than those associated with the CWD agent. If people stop hunting and consume less wild meat, they also may end up spending more money on food from the store. Alternative meat sources such as pork, beef and processed meat (e.g., bologna) are much less nutritious than moose or deer meat. Lifestyle choices that limit hunting and consequently lead to decreases in the consumption of traditional foods, may increase the risks of chronic heart disease, Type II Diabetes and some cancers in communities. There are also associated social, cultural and economic effects. (e.g., people cannot practice traditional hunting or exercise their rights to continue their cultural practices).

## 2. Community-Based Monitoring and Citizen Science

Community-based monitoring is a system of watching, listening, learning and adapting to changing environments. Although sometimes described in more technical terms, watching the land is an element of stewardship that is well understood by Indigenous peoples. Hunters, in the Northwest Territories, for example, have been making observations of barren ground caribou movements for generations; they travel and observe changes in the same places, using the same indicators and employing similar methods to those of their fathers, mothers and previous generations. Many current monitoring programs, such as the Innu Guardians Progra, the Ni Hat Hi program led by Lutsel K'e Dene First Nation, or the Haida Watchmen, have historical roots in Indigenous ways of knowing and learning about the land.

Community-based monitoring is also a dimension of the growing social movement toward more participatory science and greater recognition and support for community-based resource management and conservation. The growing wave towards community participating in scientific programs related to emerging environmental issues such as climate change is framed as citizen science. Conservation-focused citizen science projects began in the 1970s when environmental issues caused by urbanization, reclamation, and air pollution were particularly acute and attracted much popular attention (Kobori et al., 2016). The proliferation of many citizen science initiatives and community-based monitoring programs date back to the post world war II period and into the 1960s-70s in the United States. Numerous disasters such as the Love Canal and at Three Mile Island, led to significant triggered significant mistrust of the power dynamics associated with the scientific process, and those representing science-based institutions (Levine, 1982).

Studies of citizen science suggest it has the potential to improve the legitimacy and value of scientific studies and transform the role of “science” in society and decision-making. But according to some critiques, citizen science has not fulfilled this theoretical potential. “A significant and obvious obstacle to citizen scientists' efforts to shape scientific policies and practices are the often extreme disparities of wealth, education, and power (among others) between them and those they seek to influence” (Ottinger, 2010). Standardized data collection measures while creating rigorous data sets as well as complimentary data form different locations and over time, can also serve as barriers to the democratization of the generation of science – the use standards partially structure debates over who can participate, and in what discussions, and essentially rule out the involvement of citizens in knowledge making or policy making (Ottinger, 2010).

### 3. Contributing to CWD Monitoring in Alberta

#### 3.1 Existing Approaches to Monitoring Wildlife Health and CWD

**Deer Hunters 2019**

**Surveillance of Harvested Deer Heads for Chronic Wasting Disease (CWD)**

Mandatory submission of all deer heads is required from WMUs 102, 116, 118, 119, 124, 128, 138, 140, 142, 144, 148, 150, 151, 152, 156, 158, 160, 162, 163, 164, 166, 200, 202, 203, 204, 206, 208, **226**, 228, 230, 232, 234, 236, 238, 240, 242, **244**, 250, 252, 254, 256, 258, 260, 500, 501, 728 and 730 for CWD testing. (**bold numbers NEW for 2019**)

Also new for 2019: Four WMUs are mandatory for MULE DEER ONLY - 130, 132, 134, and 136.

Precise location of each kill is required, either GPS or Sec/Twp/Rng, in addition to the WMU.

A CWD-labelling system provides a unique identification number of each head submitted. Heads should be kept frozen and dropped off at any Fish and Wildlife office or, during rifle seasons, at any of the 24-hr freezers located in or near the CWD risk area. Green CWD labels and instructions are available when you submit the head.

**Results:**  
When your results are available, a message will be sent to the email address in your AlbertaRELM account.

Although CWD is not known to infect humans, health authorities advise against eating CWD-infected deer.

A usable sample consists of the intact head with or without the antler skull plate.  
Please provide all the information requested on BOTH SIDES of the green CWD label so that we can complete each data record and get results back to you in a timely manner.  
Precise location of the kill is required, either GPS or Sec/Twp/Rng, in addition to the WMU.

- Mature males with the antlers and skull plate removed are still usable for testing. If possible, please do not shoot deer in the head.

For more information, including a map of 24-hr freezers available during rifle seasons, visit [alberta.ca/cwd](https://www.alberta.ca/cwd) or contact your local Fish and Wildlife office or Dr. M. Pybus 780-427-3462 (for toll free, dial 310-0000 first).

Thank you for your continued support of this important program.

Alberta

The Government of Alberta depends significantly on hunters in Alberta to provide heads (tissue samples) from elk, deer and moose that have been harvested. Heads can be dropped off at numerous freezer locations in the province for the Government of Alberta.

The submission of heads from harvested animals is not legally required for First Nations communities with Treaty rights to harvest. However, sharing of heads can increase information about the spread of the disease and can provide information to the individual hunter and his/her family and community about whether it is infected with the prion disease.

**Figure x – Government of Alberta Surveillance Areas for CWD in Alberta**

For more information about the surveillance program of the Government of Alberta, please see this website:

<https://www.alberta.ca/chronic-wasting-disease-information-for-hunters.aspx>  
<https://www.alberta.ca/assets/documents/ep-cwd-surveillance-deer-heads-poster-2019.pdf>

### **3.2 Monitoring of CWD by Treaty 8 First Nations of Alberta**

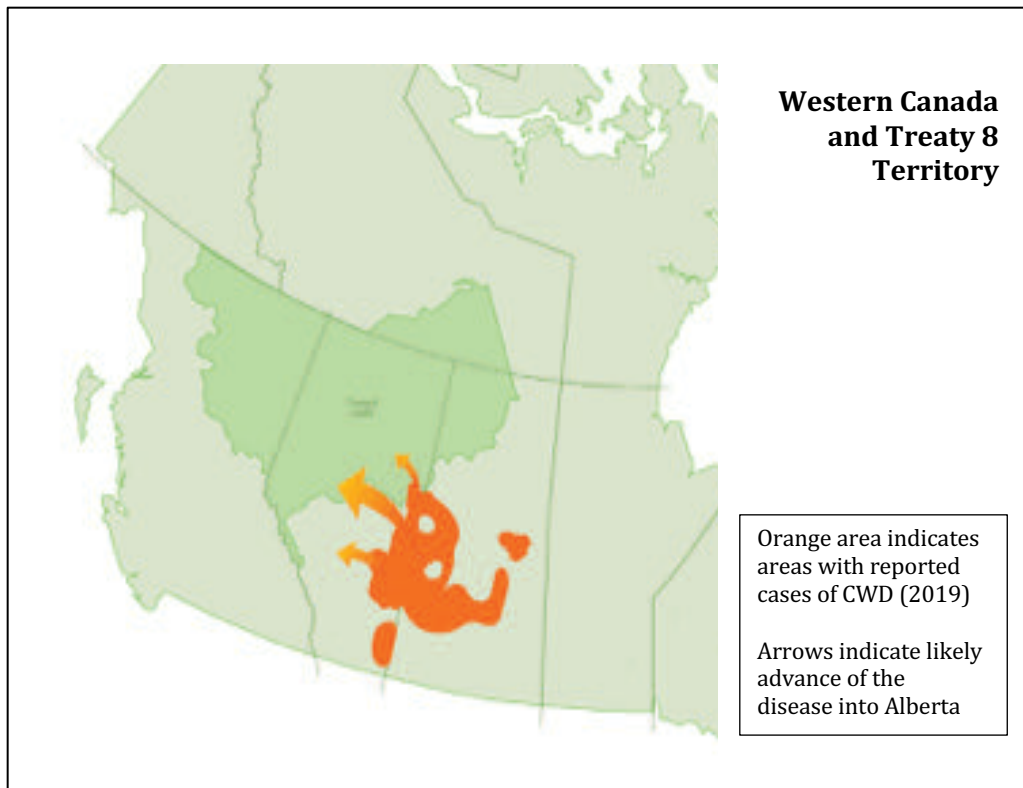
The spread of Chronic Wasting Disease in Alberta represents a major challenge for First Nations communities who depend on moose and deer for food. It also represents a dramatic change in an environment that is culturally, politically and economically important to First Nations people. Beaver, Dene and Cree peoples have been caretakers of the land, water and wildlife in Alberta for generations and will continue to care for the land for many generations to come.

Getting involved in monitoring the health of deer, moose, elk and other wildlife in different regions of the Treaty 8 region is a key way that First Nations can affirm their rights and responsibilities of Treaty and continue to be caretakers of the land. There are multiple signs and signals of changes in the health of elk, moose and deer that can be tracked (by observation) by hunters. When everyone is working together in multiple communities it may be possible to tell where and to what extent the disease has spread and to implement safety measures and management strategies (mitigations) to try and prevent the disease does not spread further west and north.

#### ***Who should become involved in the Treaty 8 Wildlife Health Monitoring Program?***

Recording observations about wildlife and wildlife habitat is always useful no matter where and when one might be traveling or harvesting. However, communities located on the eastern border of Treaty 8 territory may want to invest more time and effort in wildlife monitoring. Given that CWD is spread from animal to animal and by animals foraging in habitat infected by diseased animals, there is a general spreading of the disease westward and north-westward from the Saskatchewan and southern Alberta where the prion disease is well established.

The disease can spread quickly depending on the overlap between home ranges of infected and non-infected animals. The home-ranges of white-tailed deer for example, can range from a 1 square mile to a few square miles at different times of year and depending on factors such as habitat quality and predation risk.



**Figure x – Map of the Spread of CWD into Alberta relative to Treaty 8 Territory**

The Treaty 8 communities who may be most interested in participating in a Treaty 8 Wildlife Health monitoring program are the following:

- Athabasca Chipewyan First Nation
- Bigstone Cree Nation
- Chipewyan Prairie First Nation
- Driftpile First Nation
- Fort McMurray First Nation
- Kapaweno First Nation
- Mikisew Cree First Nation
- Sawridge Band
- Smith's Landing First Nation
- Sucker Creek First Nation
- Swan River Band
- Heart Lake First Nation

### 3.3 Traditional Knowledge Indicators of Moose and Deer Health

#### *Signs and Signals of Changes in Wildlife Health*

There are numerous indicators or ways to measure change in the health of elk, moose and deer. Biologists for example, often take tissue samples to test for different kinds of contaminants or diseases; in the case of CWD, samples of brain tissue are made to test for signs of the prion infection. These are very invasive kinds of ways of assessing health and largely involve post-mortem samples (i.e., the animal must already have died for liver or brain tissue samples to be taken).

Less invasive methods including blood sampling, satellite collaring, mark and recapture practices (to determine population trends and distribution) and wildlife camera imaging provide additional insights (Mejía - Salazar, Waldner, Hwang, & Bollinger, 2018).

Hunters and other kinds of land users in Alberta are increasingly valued for the insights that can be gathered about wildlife health (Boyce et al., 2012; Keane, Jones, & Milner-Gulland, 2011; Moller, Berkes, Lyver, & Kislalioglu Berkes, 2004). This can sometimes be described as “encounter data” and has been used to track distribution of diseased animals in other regions including Chronic Wasting Disease (Boyce & Corrigan, 2017; R. Brook et al., 2009).

- ✓ observations of fat/skinny animals
- ✓ observations of abnormal behaviour
- ✓ observations of habitat use
- ✓ observations of change in distribution
- ✓ observations of changes in population trends and population density
- ✓ observations of other ecological changes (e.g., predators)

#### **Social and Ecological Health**

Hunter observations of elk, moose and deer during hunting trips can offer very important information about ecosystems but can also tell us a lot about the health of First Nations communities. Equally important to our understanding of ecological conditions is information about how the spread of CWD including community fear of the disease may affect the following:

- ✓ Cultural practices of harvesting;
- ✓ Consumption of meat in communities;
- ✓ Perceptions of the risk (anxiety and worry about the health of the animals and community).



### 3.4 Hunter Observation

Observation is a critical foundation of monitoring programs. Although it is assumed that CWD is hard to detect until very late stages of the disease, experienced hunters, particularly Indigenous hunters who have a multi-generational body of knowledge and relationships to elk, deer and moose may be able to observe symptoms of change in the behaviour of animals that others cannot.

But what exactly is observation? Observation, unlike opinion is based on empiricism or a sensory experience of change. In essence, it is an evidence-based understanding of what is happening in the environment. We can have opinions about many things (e.g., politics in Russia, melon farming in Guatemala) but it is the observations in one's own backyard or local environment that are critically useful in the case of wildlife monitoring. Although local in scale, when many hunters are making similar observations about similar kinds of signs of change, a bigger picture story of change is possible.

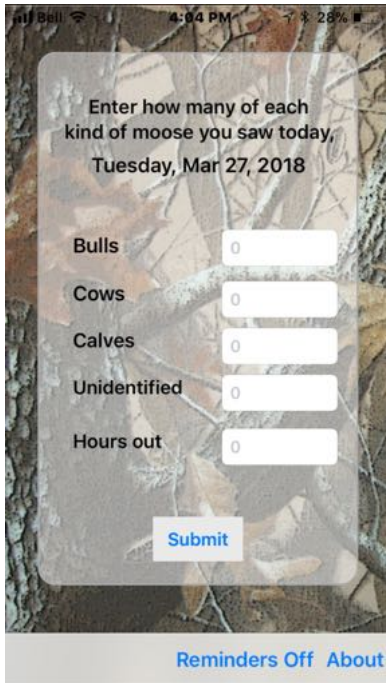
Observation is a process of: “receiving and recording of information about the environment using rigorous methods, tools and instruments”. In simpler terms, it can be framed as *watching, listening, learning and adapting to change*. Being consistent and specific in observations is critical to ensuring that trends and patterns identified in different communities by different hunters can be connected together. However, finding ways to holistically track changes and what they mean for people's land use, livelihood, and well-being is equally important.

Hunters make many kinds of observations about their environments when traveling and tracking animals. Very experienced hunters tend to use the same indicators and the same methods of tracking those indicators every time they go hunting. It is for this reason that hunters are very good “scientists”.

One of the simplest indicators that are tracked by every hunter is “sightings of animals”. Hunter sightings of animals and associated location data (longitude/latitude data) when collected from hundreds of people over many weeks or months can be linked together to provide a good picture of the distribution of animals. Equally important to identify is the absence of animals seen during trips of “no sightings of animals”. Today this kind of information is shared using apps like IHUNTER, through Facebook among small groups of hunters or communities or through word of mouth.

An emerging number of wildlife biologists have become interested in working with hunters to collection harvester data.

Did you see a deer or moose in the last 24 hrs? (YES / NO)



***Moose Hunter Survey***

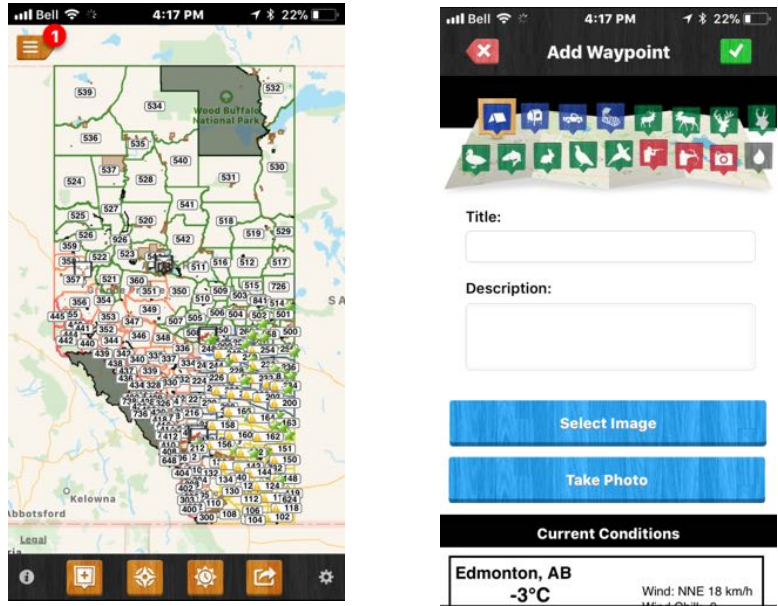
*The Moose Hunter Survey is designed to collect long-term data on the population status and trends of Moose population throughout Alberta. It was initiated in 2012 by [Dr. Mark Boyce](#) and is coordinated at the Department of Biological Sciences University of Alberta. The Moose Hunter Survey is a volunteer “citizen-science” survey that is taking advantage of mobile phones. Using your smart phone system, you can contribute to wildlife management by collecting data. 40% of Albertans own smart phones, so with your contribution we can obtain a substantial sample size large enough from each Wildlife Manage Area (WMU) to secure a reasonable index of abundance of Moose throughout the province.*

*Hunters recognize that accurate reporting is essential. Your Moose sighting reports will, afford wildlife managers with the best possible information for making management decisions.*

<http://www.biology.ualberta.ca/moose/>

**Figure x – Moose Survey App**

The iPhone app “Moose Survey” developed by the University of Alberta – Faculty of Science and Dr. Mark Boyce, asks user of the app (who have hunting licenses) to log sightings of animals and include information about the sex and age of the animal. Other kinds of apps like iHunter provide hunters with the opportunities to log location data about where they have traveled while tracking a moose or deer. It also enables harvesters to add waypoints or location data where they have seen an animal. The app also provides a text option (and an option to upload a photo) where more qualitative data can be added about observations that may have been made at each site.



**Figure x – Moose Survey App with Wildlife Management Units**

By overlaying the base maps in the app include Wildlife Management Units (WMUs) with Google Maps, users can see their current location and which WMU they are in. Hunters can build their own maps and add their own location data into the phone or download all the information to keep track of hunting spots, past animal harvests, and landowner contact information. In addition, the app also includes a range of useful landowner data including agricultural leases (grazing leases, farm development leases) and pipeline utility agreements and utility right-of-ways.

Tracking sightings using such technology is easy there is immediate impact on our understanding of population trends. Because the data is automatically saved into a larger database and immediately uploaded once logged, one can also avoid the risk of losing data. However, not everyone uses phone apps and they do have their limitations.

Paper maps can be just as useful for recording observations made during hunting trips. Good quality base maps at various scales are available online or can be requested through Treaty 8 First Nations of Alberta. Some hunters may be able to use a basic *Alberta Atlas*, which is available at most stationary and large department stores (e.g., Staples, Walmart, Canadian Tire).



**Figure x – Simple Mapping Process for Tracking Wildlife Information**

Given that most hunters travel by road including rural route roads, these kinds of atlases have the majority of necessary landmarks and road info to enable hunters to quickly locate and mark observations. Such road atlases have the benefit of being easily stored and carried in the glove compartment of a truck or in a backpack. Keeping a selection of pens markers along with sticky-notes with the atlas in a large ziplock bag will ensure you have the necessary tools to record information during or immediately after a hunting trip. The atlas can be used repeatedly for multiple hunting trips. Using a different coloured marker for different hunting trips and recording the date in the same colour helps keep track of all the information. You can submit your atlas to the Livelihood Technician in your community to record relevant information about the location of wildlife sightings. Only sightings of unhealthy animals will be share with others.

**To help compensate hunters for their efforts to provide this information, Treaty 8 First Nations of Alberta is offering a \$50 gift card. Hunters and other land users can collect a gift card when they visit the Livelihood Technician.**

### 3.4 Emerging Tools for Tracking CWD

There is currently no well-developed method to test for CWD in elk, deer, moose and other ungulates other than testing brain tissue once the animal has been harvested. Extensive research on CWD has led to some new breakthrough methods to detect CWD through blood samples of live animals, and by testing soil samples and in fecal samples. These technologies although new, may soon be available for wider use. In anticipation of their increased availability and success.

### 3.7 Linking it all Together – Stories of Change

Questionnaires and face to face interviews can be used to learn directly from land users or employed monitors about what they are observing in their environment. These interviews can range from informal story-telling and discussions or formal question/answer interviews. They can be recorded using pen/paper or using audio, video or computerized software (e.g., an online survey). The more structured and formal the interview, the more likely that the data is consistent and can be used and compared over time. “The researcher faces a trade-off between the goal of obtaining data that have a high probability of being consistent across observations and thus answering the original research questions if analyzed appropriately, and the goal of adapting to changing circumstances as the project proceeds” (Cox, 2015).

There is also a trade-off between detail and complexity of the interview and the willingness of participants to complete the interviews. A few simple questions (5-10) asked in an informal manner and recorded using simple technology may yield more interviews and consequently more data / observations for the monitoring program than very detailed and long interviews and questionnaires. Shorter interview guides are also easier to use by staff of the community-based monitoring program who may have limited training or supports.

## **4. Challenges and Opportunities for Using Data from Community-Based Monitoring**

There are numerous challenges associated with the tracking of Chronic Wasting Disease in Alberta. Uncertainties about the disease are a critical concern; because very few people know about the disease and its potential spread, it may be difficult to engage hunters in a monitoring program. A significant level of training may be needed for people to use iPhone apps and related data collection processes. By working closely with environmental technicians in each of the Treaty 8 communities, the Livelihood office of Treaty 8 First Nations of Alberta hopes to provide information to hunters as well as create opportunities for knowledge sharing.

## **Appendix 1 - Resources**

## **Oral History Questions for Elders**

1. Can you tell me about your hunting experience? When was the first time you started hunting?
2. Can you draw areas on the map where you commonly hunt?
3. Are there areas where you used to hunt but where you no longer hunt? Why?
4. Can you provide Cree/Dene place names or good areas to hunt?
5. How have the areas where you hunt changed over the years? (in the last 5 years, last 10 years, last 25 years, last 50 years)?
6. How has the number of moose, deer, elk and other wildlife changed during these periods?
7. How has your access and ability to hunt changed during this period?
8. Can you tell what was taught to you about good and bad areas to hunt? (Rules for hunting)
9. Can you tell me what was taught to you and what you have learned about how to identify a healthy moose, healthy deer and healthy elk?
10. Can you tell me about what was taught to you about how to identify a sick moose, sick deer, or sick moose?
11. Can you tell me about a time you might have seen a sick animal? What do you think caused this sickness?
12. Can you tell me what was taught to you about how to protect and care for the animals?



## Short Answer Questions for Hunters

A. Hunting		
1	How many years have you been hunting in this region?	All my life (more than 25 years) <input type="checkbox"/> The last 25 years <input type="checkbox"/> The last 10 years <input type="checkbox"/> Only the last few years <input type="checkbox"/> I don't hunt. <input type="checkbox"/>
2	Can you highlight where you have been hunting during this period and how it has changed? (Map Sheets – Coloured Polygons)	Green (1950s-1960s) <input type="checkbox"/> Purple (1970s) <input type="checkbox"/> Orange (1980s) <input type="checkbox"/> Pink (1990s) <input type="checkbox"/> Brown (2000s) <input type="checkbox"/> Black (2010-2015) <input type="checkbox"/> Map Sheet(s) # _____ <input type="checkbox"/>
3	If you hunt with others, would you be able to share their names so we can ensure that we do not duplicate information?	

B. Moose Health		
4	How often have you gone hunting for moose in the last six months? <b>If answer is “no hunting trips”, do not complete the rest of section B, move on to section C.</b>	No hunting trips <input type="checkbox"/> Between 1-4 trips <input type="checkbox"/> Between 5-7 trips <input type="checkbox"/> More than 7 trips <input type="checkbox"/>
5	How many moose did you observe during these trips? (Were they mostly bull, female or calves?) _____	None <input type="checkbox"/> Some <input type="checkbox"/> Many <input type="checkbox"/>
6	Was this more or less than in the last 5 years?	a lot less <input type="checkbox"/> somewhat <input type="checkbox"/> less <input type="checkbox"/> same <input type="checkbox"/> more <input type="checkbox"/> a lot more <input type="checkbox"/> don't know <input type="checkbox"/>
7	How many moose did you harvest during the last six months?	None <input type="checkbox"/> 1-3 <input type="checkbox"/> 2-5 <input type="checkbox"/> 5 or more <input type="checkbox"/>

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8	How would you describe the area (habitat) where you harvested these moose?		
9	How would you describe the condition of the moose you have hunted in the last six months?	A lot skinnier Somewhat skinnier Same Somewhat fatter A lot fatter Don't know	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
10	How would you describe the condition of antlers of any bull moose observed or harvested?		
11	How would you describe the condition of the liver and organs?		
12	Did you notice any ticks or other insect/worms?	No ticks or worms Some ticks A lot of ticks  No worms Some worms A lot of worms	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>  <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
13	Did you notice any changes in the condition of the hide?	No marks (lesions) Some marks (lesions) A lot of marks (lesions)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
14	Did you notice any of the following behaviour issues or conditions in moose?	Unnaturally sluggish or disoriented Unnaturally aggressive Frothy mouth (foamy) Unnaturally skinny	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
15	If you have seen changes in the health, population or distribution of moose, what do you consider to be the cause of this change?	Natural variability Winter temperature extremes Summer temperature extremes Predation _____ Wildlife disease Agricultural activity Clear cutting (habitat loss) Disturbance from drilling Disturbance from roads Stress from recreational land users Stress from other hunters Forest fire	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

C. Deer Health			
16	<p>How often have you gone hunting for deer in the last six months?  <b>If answer is “no hunting trips”, do not complete the rest of section C, move on to section D.</b></p>	<ul style="list-style-type: none"> <li>• No hunting trips</li> <li>• Between 1-4 trips</li> <li>• Between 5-7 trips</li> <li>• More than 7 trips</li> </ul>	
17	<p>How many mule deer and white-tailed deer did you observe during these trips?</p>	<p>White tailed deer</p> <ul style="list-style-type: none"> <li>▪ None</li> <li>▪ A few (between 1-9)</li> <li>▪ Some (between 10-20)</li> <li>▪ Many (more than 20)</li> </ul> <p>Mule Deer</p> <ul style="list-style-type: none"> <li>▪ None</li> <li>▪ A few (between 1-9)</li> <li>▪ Some (between 10-20)</li> <li>▪ Many (more than 20)</li> </ul>	
18	<p>Do you think you have seen more or less deer this year than in the last 5 years?</p>	<p>White tailed deer</p> <ul style="list-style-type: none"> <li>• a lot less</li> <li>• somewhat less</li> <li>• same as previous years</li> <li>• more</li> <li>• a lot more</li> <li>• don't know;</li> </ul> <p>Mule Deer</p> <ul style="list-style-type: none"> <li>• a lot less</li> <li>• somewhat less</li> <li>• same</li> <li>• a lot more</li> <li>• don't know;</li> </ul>	
19	<p>How many mule deer and white-tailed deer did you harvest during the last six months?</p>	<p><i>White Tailed Deer</i></p> <ul style="list-style-type: none"> <li>• None</li> <li>• 1-3</li> <li>• 2-5</li> <li>• 5 or more</li> </ul> <p><i>Mule Deer</i></p> <ul style="list-style-type: none"> <li>• None</li> <li>• 1-3</li> <li>• 2-5</li> <li>• 5 or more</li> </ul>	
20	<p>How would you describe the condition of the deer you have hunted in the last six months?</p>	<ul style="list-style-type: none"> <li>• A lot skinnier</li> <li>• Somewhat skinnier</li> <li>• Same</li> <li>• Somewhat fatter</li> <li>• A lot fatter</li> <li>• Don't know</li> </ul>	•
21	<p>How would you describe the condition of antlers?</p>		

22	How would you describe the condition of the liver and organs?		
23	Did you notice any ticks or other insect/worms?	<ul style="list-style-type: none"> <li>• No ticks or worms</li> <li>• Some ticks</li> <li>• A lot of ticks than (more than considered normal);</li> <li>• No worms</li> <li>• Some worms</li> <li>• A lot of worms (more worms than considered normal)?</li> </ul>	•
24	Did you notice any changes in the condition of the hide?	<ul style="list-style-type: none"> <li>• No marks (lesions)</li> <li>• Some marks (lesions)</li> <li>• A lot of marks (lesions)</li> </ul>	•
25	<p>Did you notice any of the following behaviour issues in deer?</p> <p>Unnaturally sluggish or disoriented</p> <p>Unnaturally aggressive</p> <p>Frothy mouth (foamy)</p> <p>Unnaturally skinny</p> <p>(If yes, can you indicate where with an X on the map sheets provided).</p>	<p>Yes / No</p> <p>Yes / No</p> <p>Yes / No</p> <p>Yes / No</p> <p>Map sheet # _____</p>	
15	If you have seen changes in the health, population or distribution of deer, what do you consider to be the cause of this change?	<p>Natural variability <input type="checkbox"/></p> <p>Winter temperature extremes <input type="checkbox"/></p> <p>Summer temperature extremes <input type="checkbox"/></p> <p>Predation <input checked="" type="checkbox"/></p> <p>_____ <input type="checkbox"/></p> <p>Wildlife disease <input type="checkbox"/></p> <p>Agricultural activity <input type="checkbox"/></p> <p>Clear cutting (habitat loss) <input type="checkbox"/></p> <p>Disturbance from drilling <input type="checkbox"/></p> <p>Disturbance from roads <input type="checkbox"/></p> <p>Stress from recreational land users <input type="checkbox"/></p> <p>Stress from other hunters <input type="checkbox"/></p> <p>Forest fire <input type="checkbox"/></p>	

**D. Elk Health**

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26	How often have you gone hunting for <b>elk</b> in the last six months?  <b>If answer is “no hunting trips”, do not complete the rest of section D, move on to section E.</b>	<ul style="list-style-type: none"> <li>● No hunting trips</li> <li>● Between 1-4 trips</li> <li>● Between 5-7 trips</li> <li>● More than 7 trips</li> </ul>
27	How many <b>elk</b> did you observe during these trips?	<ul style="list-style-type: none"> <li>▪ None</li> <li>▪ A few (between 1-9)</li> <li>▪ Some (between 10-20)</li> <li>▪ Many (more than 20)</li> </ul>
28	Do you think you have seen more or less <b>elk</b> this year than in the last 5 years?	<ul style="list-style-type: none"> <li>● a lot less than previous years</li> <li>● somewhat less than previous years</li> <li>● same as previous years</li> <li>● more than previous years</li> <li>● a lot more than previous years</li> <li>● don't know;</li> </ul>
29	How many <b>elk</b> did you harvest during the last six months?	<ul style="list-style-type: none"> <li>● None</li> <li>● 1-3</li> <li>● 2-5</li> <li>● 5 or more</li> </ul>
30	How would you describe the condition of the <b>elk</b> you have hunted in the last six months?	<ul style="list-style-type: none"> <li>● A lot skinnier</li> <li>● Somewhat skinnier</li> <li>● Same</li> <li>● Somewhat fatter</li> <li>● A lot fatter</li> <li>● Don't know</li> </ul>
31	How would you describe the condition of antlers of <b>elk</b> ?	
32	How would you describe the condition of the liver and organs?	
33	Did you notice any ticks or other insect/worms?	<ul style="list-style-type: none"> <li>● No ticks or worms</li> <li>● Some ticks</li> <li>● A lot of ticks than (more than considered normal);</li> <li>● No worms</li> <li>● Some worms</li> <li>● A lot of worms (more worms than considered normal)?</li> </ul>
34	Did you notice any changes in the condition of the hide?	<ul style="list-style-type: none"> <li>● No marks (lesions)</li> <li>● Some marks (lesions)</li> <li>● A lot of marks (lesions)</li> </ul>
35	Did you notice any of the following behaviour issues in <b>elk</b> ? Unnaturally sluggish or disoriented Unnaturally aggressive Frothy mouth (foamy) Unnaturally skinny (If yes, can you indicate with an X on the map sheets provided).	<p>Yes / No Yes / No Yes / No Yes / No Map sheet # _____</p>

<b>E. Food on the Table</b>		
36	How many people live in your household?	<ul style="list-style-type: none"> <li>▪ 1</li> <li>▪ 2-3</li> <li>▪ 4-5</li> <li>▪ More than 5</li> </ul>
37	How much of your household’s meat is bought from the store?	<ul style="list-style-type: none"> <li>▪ All</li> <li>▪ Most</li> <li>▪ Some</li> <li>▪ None</li> </ul>
38	Do you harvest or receive enough meat to meet your family’s needs?	<ul style="list-style-type: none"> <li>▪ None</li> <li>▪ Some</li> <li>▪ Most</li> <li>▪ All</li> </ul>
39	How has your diet of moose, deer, or elk meat changed since:	<p><i>Last year</i></p> <ul style="list-style-type: none"> <li>▪ I eat more moose now than I did last year</li> <li>▪ I eat the same amount of moose as I did last year</li> <li>▪ I eat less moose that I did last year</li> </ul> <p><i>5 years ago</i></p> <ul style="list-style-type: none"> <li>▪ I eat more moose now than I did 5 years ago</li> <li>▪ I eat the same amount of moose as I did 5 years ago</li> <li>▪ I eat less moose that I did 5 years ago</li> </ul> <p><i>10 years ago</i></p> <ul style="list-style-type: none"> <li>▪ I eat more moose now than I did 10 years ago</li> <li>▪ I eat the same amount of moose as I did 10 years ago</li> <li>▪ I eat less moose that I did 10 years ago</li> </ul>
40	How often do you share meat from your hunting trips?	<ul style="list-style-type: none"> <li>▪ Never</li> <li>▪ Sometimes</li> <li>▪ Usually</li> <li>▪ Always</li> </ul>
41	How often do you eat moose meat each week?	<ul style="list-style-type: none"> <li>▪ 1-2 meals</li> <li>▪ 3-4 meals</li> <li>▪ 5-7 meals</li> <li>▪ more than 7 meals</li> </ul>
42	How much of this meat is harvested by you or your household?	<ul style="list-style-type: none"> <li>▪ None</li> <li>▪ Some</li> <li>▪ Most</li> <li>▪ All</li> </ul>
43	How much meat do you share outside of your household?	<ul style="list-style-type: none"> <li>▪ None</li> <li>▪ Some</li> <li>▪ Most</li> <li>▪ All</li> </ul>

44	Do you give meat to family living outside your community?	<ul style="list-style-type: none"> <li>▪ Never</li> <li>▪ Sometimes</li> <li>▪ Usually</li> <li>▪ Always</li> </ul> Comment:
45	How old are you?	<ul style="list-style-type: none"> <li>▪ Between 18-24</li> <li>▪ Between 25-44</li> <li>▪ Between 35-54</li> <li>▪ Over 55</li> </ul>
46	Are you employed?	<ul style="list-style-type: none"> <li>▪ Yes - Full time</li> <li>▪ Yes - Part time</li> <li>▪ Yes - Casual</li> <li>▪ Yes – Seasonal</li> <li>▪ No – Not employed</li> </ul>
47	If you are not employed, is there a member of your household that is employed part time or full time?	<ul style="list-style-type: none"> <li>▪ Yes</li> <li>▪ No</li> </ul>

<b>E. Wildlife Health and Well-being</b>		
48	<p>How concerned are you about the health of moose populations?</p> <p>How concerned are you about the health of deer populations?</p> <p>How concerned are you about the health of elk populations?</p>	<ul style="list-style-type: none"> <li>▪ Not concerned</li> <li>▪ Somewhat concerned</li> <li>▪ Very concerned</li> <li>▪ Don't know</li> </ul>
49	How much information have you received about Chronic Wasting Disease?	<ul style="list-style-type: none"> <li>▪ None</li> <li>▪ Some</li> <li>▪ A lot</li> <li>▪ Don't know</li> </ul>
50	How concerned are you about wildlife diseases such as Chronic Wasting Disease?	<ul style="list-style-type: none"> <li>▪ Not concerned</li> <li>▪ Somewhat concerned</li> <li>▪ Very concerned</li> <li>▪ Don't know</li> </ul>
51	If you are aware of Chronic Wasting Disease in deer and moose in Alberta, where did you receive this information?	<ul style="list-style-type: none"> <li>▪ Community posters</li> <li>▪ Radio or TV (news)</li> <li>▪ Community meetings</li> <li>▪ Others in the community</li> <li>▪ mail-outs</li> <li>▪ I have not heard of it</li> <li>▪ Other _____</li> </ul>
52	Do you agree with culling of deer populations to limit the spread of the disease?	<ul style="list-style-type: none"> <li>▪ Yes</li> <li>▪ No</li> <li>▪ Maybe</li> </ul>

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		<ul style="list-style-type: none"><li>▪ Don't know</li></ul>
53	Would you be willing to participate in monitoring the health of deer and caribou, moose populations in your area by submitting tissue samples or heads of harvested deer or moose?	<ul style="list-style-type: none"><li>▪ Yes</li><li>▪ No</li><li>▪ Maybe</li><li>▪ Don't know</li></ul>

**Biographical Information:**

Do you self-identify as a First Nations or Metis person?

Age:

Place of Birth:

Current Residence:



## Appendix 1 - References

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