Saskatchewan Wildlife Management Report 2016

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General Information

Introduction to Wildlife Management and Guiding Principles in Saskatchewan

What species are involved?

Saskatchewan offers a diverse and plentiful wildlife community. While the Ministry of Environment's Fish, Wildlife and Lands Branch has responsibility for all provincially managed species in Saskatchewan, this report will focus on those species that are regularly hunted and trapped (Table 1). This list includes a variety of ungulates, mammals and birds and the work the ministry does on these species will be discussed in detail.

Table 1. Species hunted and trapped in Saskatchewan.

Big Game	Birds	Furbearers	
White-tailed Deer	Sharp-tailed Grouse	Arctic Fox	Muskrat
Mule Deer	Ring-necked Pheasant	Badger	Otter
Elk	Gray Partridge	Bear	Raccoon
Moose	Ruffed Grouse	Beaver	Skunk
Pronghorn	Spruce Grouse	Bobcat	Squirrel (4 species)
Black Bear	Willow Ptarmigan	Coyote	Weasel (3 species)
Barren-ground Caribou	Sandhill Cranes	Fisher	Wolf
Woodland Caribou	Geese: All Species	Fox	Wolverine
Wolf	Ducks: All Species	Lynx	
	American Coot	Marten	
	Wilson's Snipe	Mink	

History of Wildlife Management Zones

Saskatchewan is divided into Wildlife Management Zones (WMZs) that group similar geographic features and follow ecological boundaries. These WMZs allow for managing wildlife according to regional differences in both wildlife populations and social tolerances, as opposed to making management decisions on a province-wide basis. Wildlife Management Zones have been used to manage game species in Saskatchewan since the early 20th century, although the specific boundaries of each zone have changed over time. Presently there are 83 WMZs (Figure 1) in the province.

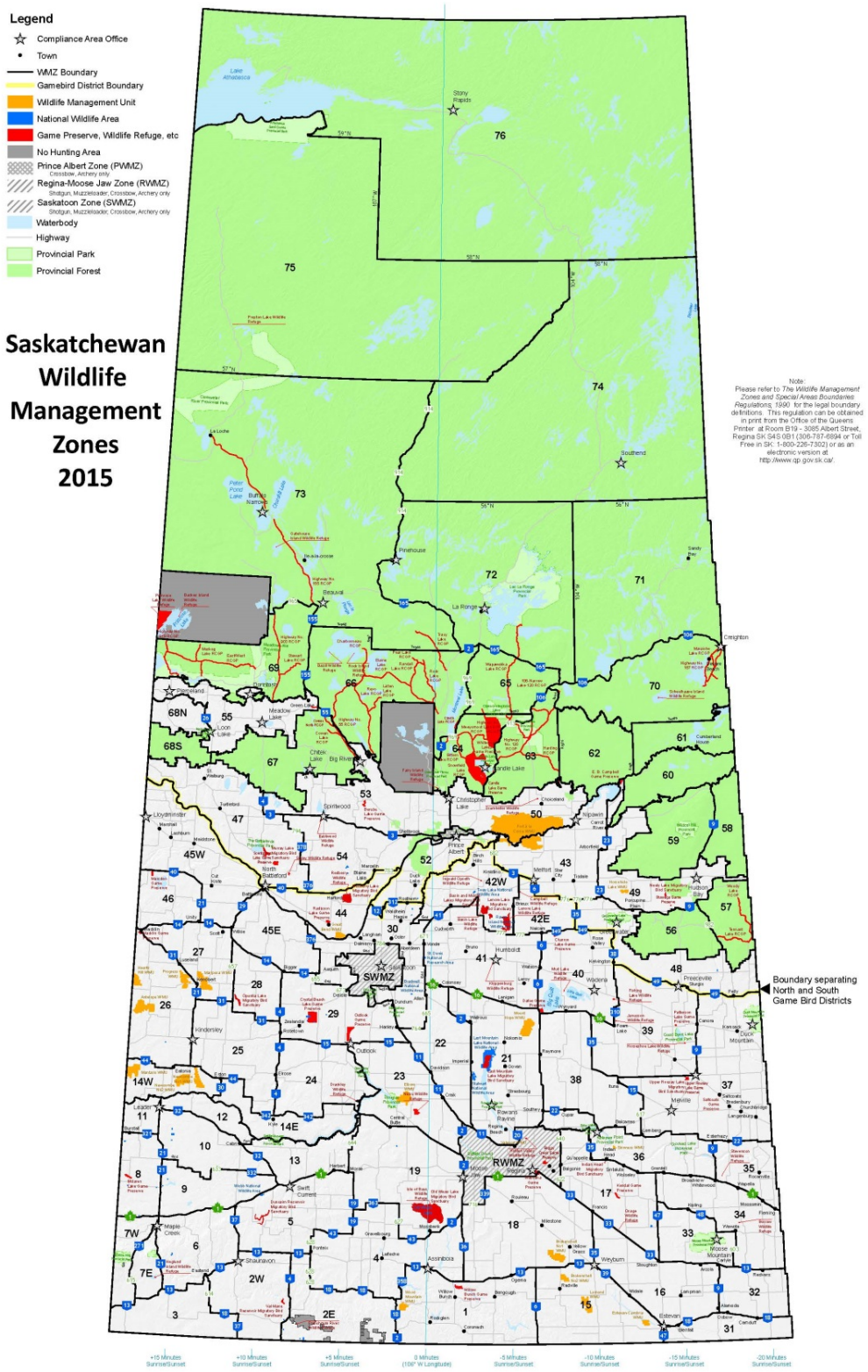

Figure 1. Wildlife Management Zones (WMZ) in Saskatchewan. Some WMZ boundaries were realigned in 2014 to allow for more easily identified boundary markers.

Key Considerations Guiding Wildlife Management

Wildlife populations can be affected by a variety of factors. Subsequently, managing wildlife populations can be a complex task and wildlife managers must consider many variables when making decisions. First and foremost, the demographics of the population being managed are considered. Is the population increasing or decreasing? Does the population have the necessary components (e.g. age structure, reproductive capabilities, etc.) to achieve the goals that are being set? In addition to the demographics of the population, managers must consider other variables that are acting on the population, such as environmental conditions, infectious disease and habitat availability. Finally, given that wildlife is a public resource and that the public interact with wildlife in many different ways, wildlife managers must also consider the needs and wants of the public and how best to mitigate these interactions for positive outcomes. Each of these considerations will be discussed in further detail below.

Population Demographics

It is a popular misconception that wildlife are managed on the basis of a total population count that is accurate both locally and provincially. In fact, such counts would be prohibitively costly and logistically unfeasible. While some jurisdictions may occasionally provide an estimate of the total provincial or state population for a species, these are invariably derived numbers that come from a variety of small scale survey techniques and are not used as a basis for making management decisions.

Wildlife managers rely on many metrics to assess how wildlife populations are faring. Most commonly used are population size/abundance, density and structure. Population size is often presented as an estimate of abundance and derived from surveys of small areas that are then extrapolated to larger areas. True abundance data is time- and cost-intensive to acquire and the dynamic nature of populations makes the information relevant for only short periods of time. Density, or number of animals per kilometer squared, is another metric of interest and allows wildlife managers to extrapolate the carrying capacity of a habitat type or area. As with abundance, this metric is often an estimate and is extrapolated across larger areas. Finally, population structure, or the components the population is made up of, is important to knowing how a population functions. Structure in wildlife management is usually defined as the gender and age components of a population. For example, it is important to know the number of adult (i.e. breeding) females, as well as the number of adult (i.e. breeding) males in a population if one is going to predict how a population may grow or decline over time. It is equally important to know what proportion of the population is young of the year, in order to assess recruitment into the population over a period of time. All of these metrics can be assessed with varying levels of statistical certainty and can be used to evaluate the state of wildlife populations at a variety of spatial scales and over many time periods.

Environmental Conditions - Winter Severity

Environmental conditions during key periods in a species' life cycle can greatly impact population growth or decline. In Saskatchewan, where winter is the dominant season and often the most extreme in nature, winter severity is often a key variable impacting populations. A severe winter can directly impact a species survival by making resources unavailable, or can indirectly impact survival by causing individuals to expend desperately-needed energy to a point where they enter spring in poor health,

which can either result in decreased reproductive capability or subsequent death. Alternatively, a mild winter can result in a larger cohort of the population surviving the winter and entering spring in good health, and a subsequent population increase. Three main factors of winter severity are the temperature, snow depth and length of winter. Temperature can either be ambient temperature or include the wind chill, which is largely related to shelter availability. However, often snow depth is the more important variable, as it has the ability to make resources completely unavailable to grazing wildlife or significantly increase the amount of energy expended to access the resources. Finally, the length of winter can cause animals to enter spring in poor health due to increased depletion of fat reserves if winter extends into the normal spring period. Winter severity affects populations for more than one year and significant changes in wildlife populations can often be attributed to winter severity in previous years. As such, managers consult records of winter severity (Table 2) in previous years quite regularly. Although winter severity measurements have been largely anecdotal to date, the ministry has done preliminary modeling work (A. Schmidt, pers. comm.) to quantify winter severity and found that the average temperature from November to February interacting with the accumulated snowfall between October and February is well correlated to the trend in white-tailed deer populations in the Melville region. Further work is being considered to fine-tune this modeling exercise so that it may be applied more broadly across the province.

Habitat Availability

Habitat availability is quite simply the area and resources available to an individual in a particular location. Driven not only by the physical availability (i.e. habitat is present), but also the functional availability (i.e. habitat can be used by the individual), habitat availability can be a significant driver of population growth and decline both locally and on a larger scale. Historically with settlement and more recently with urban sprawl, natural habitats are becoming fragmented and lost to accommodate other land uses (namely agricultural, industrial and urban development). Even in situations where habitat exists, fragmentation can limit use if individuals cannot move between parcels of habitat, and/or an increase in number of individuals using each parcel (and the resources they sustain) can make them functionally unavailable. The availability of quality wintering habitat is a particularly important factor for Saskatchewan ungulates. The annual carrying capacity of the habitat mosaic in a local area will vary over time such that when environmental conditions are favourable the area may sustain high populations. However, in severe winters in areas with a shortage of quality wintering habitat, populations may decline sharply or come to rely heavily on agricultural food sources leading to increased human conflict. Optimum populations are achieved when management maintains a post-harvest population that is commensurate with what the available wintering habitat can sustain.

Public Input

Wildlife in Saskatchewan is managed as a public resource and residents of Saskatchewan interact with wildlife in a variety of ways. Whether it is a positive interaction (such as viewing wildlife in their natural environment, feeding wildlife in the yard or hunting wildlife for food) or a negative interaction (such as dealing with crop depredation, property damage or vehicle collision with wildlife), how people interact with wildlife is as unique as the individual and changes both with the species of wildlife and the situation under which the interaction occurs. Additionally, interactions with wildlife can be multi-faceted and the landowner who enjoys hunting deer for his year's supply of steaks can simultaneously be dealing with flocks of geese which are consuming large portions of a pea field and thereby impacting the bottom line. Furthermore, often the same wildlife can be viewed in several different lights and the deer that one person enjoys watching on their daily walks, can be the same deer that another person is trying to drive away from their crops and can even be the same deer that a third person is planning to hunt come fall. These complex interactions require wildlife managers to consider all points of view and strive to achieve a solution that appeases all interested parties. Factor in considering population demographics, environmental conditions, and habitat availability, while striving to maintain sustainable wildlife populations, and one can begin to understand the complexities of managing wildlife.

Table 2. Winter severity description (2001-2016).

Year	Description
2001/2002	Mild with below average snowfall (Arsenault 2005).
2002/2003	Mild with below average snowfall (Arsenault 2005).
2003/2004	Mild with below average snowfall, except for WMZs 1-14 where early heavy snowfall caused moderate mortality (Arsenault 2005).
2004/2005	Some mortality in the central forest (WMZ 62-66).
2005/2006	Severe winter in the central and east forest.
2006/2007	Severe winter in the west, central and east forest, north of Hwy #15 in the east and north of Outlook and Rosetown in the west.
2007/2008	Moderate winter, but slow snow melt and late (mid-May) green-up.
2008/2009	Late green-up, possible mule deer winter kill in Great Sandhills, concerns in WMZ 29 (Gary Donald, pers. comm.).
2009/2010	Mid-October snowfall which melted. Mild and no snow in south until 1st week in December. Bitterly cold mid-December.
2010/2011	Mid-October snowfall which melted. Severe winter over most of province especially in the southeast, along United States border and the Cypress Hills. Milder in the northwest. Major snowfall in late April in the southeast. Delayed green-up.
2011/2012	Relatively mild winter over most of the province with warmer-than-average temperatures and below-average snow depth.
2012/2013	Severe winter across most of the province, including colder-than-average temperatures and above-average snow depth. Winter extended into the spring and delayed green-up.
2013/2014	Moderate to severe winter, with colder-than-average temperatures, that extended into the spring and delayed green-up.
2014/2015	Relatively mild winter over most of the province with warmer-than-average temperatures and below-average snow depth.
2015/2016	Relatively mild winter over most of the province with warmer-than-average temperatures and below-average snow depth. Southeast portion of province experienced heavier snowfall and above average snow crust with resulted in moderate deer mortality.

Data Collection Techniques

The Ministry of Environment uses a variety of data collection techniques in order to monitor each species of interest. Each survey is designed to maximize the quality and quantity of information collected, while minimizing the disturbance to wildlife, within the logistical and financial resources of the ministry. Often the information collected includes data related to population size, structure and density within a particular region.

Population Survey Techniques

Population survey techniques are unique to the species that is being surveyed. Each survey is designed to maximize detection of individuals during the time period of interest in order to answer the biological question being asked. Historically, many population surveys were aerial, primarily conducted in the winter months when there is sufficient snow on the ground and deciduous leaf cover is lacking in order to improve observers' ability to detect animals. However, ground-based survey techniques have gained popularity in recent years in response to both the logistical and financial constraints of aerial surveys and interest in additional research questions. Common survey techniques employed by the ministry include; a) Stratified Random Block Surveys; b) Population Structure Surveys (aerial based); c) co-operative deer management surveys; d) Spotlight Surveys; e) Pronghorn Herd Structure Surveys; and f) Saskatchewan Upland Game Bird Survey. Each of these techniques is described in detail below.

a) **Stratified Random Block Survey:** This aerial survey design stratifies areas into sample units (quadrats or blocks) based on habitat type. Sample units are randomly selected from each strata. Observers strive to achieve a population density estimate of ±20% within 90% confidence intervals for the survey area. Put plainly, observers want to ensure that they cover enough area to confidently estimate the density across the entire survey area. A more detailed explanation can be found in Stewart (1983).

b) **Population Structure Survey (aerial based):** These surveys, typically conducted in winter when snow cover and lack of foliage make observations easier, are designed to estimate age (i.e. adult vs. young) and sex composition of ungulate populations. Structures are usually presented as adult males or young per adult female. Survey flight paths are chosen to cover habitat types with high probability of detecting animals. Prior to the survey, minimum animal observations to obtain precise estimates within desired confidence intervals are calculated as per Czaplewski et al. (1993) and Scheaffer et al. (1990).

c) **Co-operative Deer Management Survey (CDMS):** This ground-based, citizen-science survey is conducted annually between September 1 and November 30 and provides valuable herd structure data on white-tailed and mule deer. Participants record deer observations and classify deer by species, sex, and age and provide information on buck antler development, thereby providing information on breeding ecology (i.e. mature buck:doe ratios) and productivity (i.e. fawn:doe ratios). In 2016, the ministry explored the use of a mobile application to boost participation and anticipates launching the Co-operative Wildlife Management Survey

application in 2017, with the inclusion of white-tailed and mule deer, moose, elk and upland game birds.

d) **Spotlight Survey:** This nocturnal, ground-based survey monitors deer population trends along nineteen established routes across the province. A maximum of three observers travel each route in a truck outfitted with powerful spotlights. As deer are detected, observers record the number of deer observed and the species, age (i.e. juvenile or adult) and sex. A hand-held spotlight is used to improve classification once deer are observed, but is not used for detection.

e) **Pronghorn Herd Structure Survey:** This ground-based survey monitors the changes in pronghorn populations over time. In 2013, survey routes were altered and a bridging exercise took place to ensure continuity of the dataset. Seventy 80 kilometre routes were established across the pronghorn range in Saskatchewan and staff complete each one annually between July 1 and July 21. Two surveyors record the number, age and sex of all pronghorn observed within 800 metres either side of the road.

f) **Saskatchewan Upland Game Bird Survey:** This online survey, found at saskatchewan.ca/residents/parks-recreation-heritage-and-arts/hunting-trapping-and-angling/wildlife-population-surveys, provides an opportunity for interested individuals to submit information on upland game bird observations. The survey asks participants to submit observations of all upland game bird species throughout the year and provide information on species, number of individuals observed and location of observation, as well as provide an assessment of the population compared to the year prior. For lek locations, additional information about habitat is requested.

Biological Sample Collection

Biological sample collections are the collection of any tissue (e.g. teeth, fur, feathers, antlers, brains, and skin) from an animal. These samples are often used to determine sex, age, health, genetic makeup and (where applicable) antler configuration of game species. Age of harvested animals older than young-of-the-year is often determined using tooth cementum deposition (moose, elk, white-tailed deer and black bear) and/or molar wear (white-tailed deer only). In game birds, feather wear and length can differentiate young-of-the-year from adults. In 2016, a hunter surveillance program was in place to collect heads and test for chronic wasting disease.

Chronic Wasting Disease

Chronic wasting disease (CWD) is a fatal prion disease that affects the nervous system of deer, elk and moose. CWD belongs to a group of diseases known as transmissible spongiform encephalopathies (TSEs) similar to BSE (mad cow disease) in cattle and scrapie in sheep. The disease was first detected in a wild mule deer in the fall of 2000. As of 2015, CWD has spread to wild white-tailed deer, mule deer, elk and moose populations within Saskatchewan.

The disease is caused by infectious proteins, called prions, which are resistant to breakdown by the animal and the environment. Infectious prions begin to accumulate in the nervous tissue of the animal

and eventually cause microscopic holes to a form in the brain. Symptoms include excessive salivation, exhaustion, poor co-ordination, trembling and drooping head and ears. CWD is transmitted from animal to animal and from soils or environments contaminated with prions shed by infected animals. Prions are shed in urine, saliva, feces and blood of infected deer and are shed up to a year or longer before animals begin to show signs of disease. Contact between animals is not necessary to spread the disease, as it can also be spread by prion-contaminated feed, soils, or shared water sources. When healthy animals come in contact with the bodily fluids of an infected animal or contaminated environment, they too may become infected. The reason we do not see a rapid increase in deaths is because it is a slowly developing disease with infected deer taking a year and half or more to die. However, once infected, none recover as CWD is always fatal.

Population models and empirical evidence from areas of high prevalence indicate that CWD results in a younger age structure, lower recruitment and lower numbers of deer and elk (Bollinger, pers. com., Miller et al. 2008, Dulberger et al. 2010, Edmonds 2013, Monello et al. 2014). Saskatchewan operated a CWD surveillance program from 1997 through 2012 and again in 2015 and 2016. Samples collected from 2012 to 2014 included only sick or dying deer collected by conservation officers and collar-marked research animals. Cervids that tested positive for CWD (2001 to 2016) include: 387 (of 28,175 tested) mule deer, 98 (of 15,773) white-tailed deer, 11 (of 1,566) elk, and 1 (of 179) moose. The 2016 CWD surveillance program revealed the highest proportion of CWD positives/sample size since the disease was discovered in the province. In 2016, a total of 347 cervid heads were tested and 49 were CWD positive and one new CWD zone was identified (WMZ 8). In contrast, the CWD surveillance program from 1997-2003 revealed only 12 positive CWD animals out of 11,209 heads tested.

The ministry established a CWD working group to help development of a long-range strategic plan to outline Saskatchewan's response to CWD. The CWD Working Group consists of members from the ministries of Agriculture, Health and Environment as well as representatives from Saskatchewan Association of Rural Municipalities, Agricultural Producers Association of Saskatchewan, Saskatchewan Wildlife Federation, Nature Saskatchewan, Saskatchewan Bowhunters Association, Saskatchewan Outfitters Association, Regina Fish and Game League, and Parks Canada. The working group members share a common interest in seeing the prevalence of CWD contained to levels that will minimize impacts on wildlife, as well as on agriculture, including game farms and potential contamination of food and feed sources.

Implications of CWD to humans are unknown. The World Health Organization, Health Canada, and the Saskatchewan Ministry of Health continue to recommend that CWD infected meat not be consumed. Hunters are advised to take certain precautions when field dressing, transporting and processing animals. This is of special importance as research indicates that hunters samples are 24 per cent more likely to contain a CWD positive animal compared to the proportion of animals with CWD in the population as a whole (Edmunds 2013).

What Hunters Can Do to Help

- Report any animal acting abnormally to the nearest Ministry of Environment office. Do not shoot, handle or consume any animal that appears sick.
- Wear latex or rubber gloves when field dressing your deer, moose or elk.
- Bone out the meat from your animal. Do not saw through bone, and avoid cutting through the brain or backbone of the animal.
- Avoid handling brain and spinal tissues.
- Wash your hands thoroughly after field dressing is completed and clean instruments used in field dressing in a mild bleach wash.
- Do not consume brain, spinal cord, eyes, spleen, tonsils and lymph nodes of harvested animals. Normal field dressing coupled with boning out a carcass will remove most, if not all, of these body parts. Cutting away all fatty tissue will remove remaining lymph nodes.
- If you have your deer or elk commercially processed, request that your animal is processed individually, without meat from other animals being added to meat from your animal. Avoid transporting a deer carcass from the area where it was taken. If the carcass is transported, dispose of the carcass waste by double-bagging it and taking it to an approved landfill.

Hunting and Harvest Statistics

Continued monitoring of annual licence sales and harvest from hunting and trapping activities is critical for evaluating the implications of management strategies and ensuring the long-term sustainability of wildlife populations, as well as determining trends in hunter and trapper demographics and behaviour. Each year, the Ministry of Environment's Fish, Wildlife and Lands Branch conducts an annual computerized draw for elk, moose, pronghorn antelope and either-sex and antlerless mule deer. Over-the-counter licences are available for white-tailed deer, black bear, moose (bull-calf), elk (bulls-only, either sex), and game birds.

In recent years, the ministry has worked to modernize the licensing system to increase the efficiency of issuing licences and providing valuable licence sale data. The new online-based licensing system was introduced in 2013 with the first angling and black bear licences sold in April and additional hunting and trapping licences going on sale in August. After a careful evaluation process this licensing service was contracted to Active Network, an experienced multi-national company that provides similar services for over 25 other provinces and states within North America. The online licensing system was customized to meet the needs of Saskatchewan and has provided added benefits including real-time data that can be used by conservation officers and wildlife managers, an additional option for hunters, anglers and trappers to purchase their licences online from home, streamlined financial processes, and ensuring that non-residents of Saskatchewan cannot obtain Saskatchewan resident hunting, angling and trapping privileges by including a built-in residency verification.

In order to monitor annual harvest, the Ministry of Environment has, in past, distributed a Hunter harvest survey (HHS) mail-out questionnaire to survey ungulate and upland game bird harvest and hunting activity by licensed resident hunters. Each questionnaire was uniquely numbered and mailed to 27,500 resident hunters annually and phone surveys had been used to supplement information for elk and moose. This form of HHS was discontinued in 2010 and a new species-specific format was piloted

for draw moose and elk in 2011, which continued in 2012. In 2013, draw mule deer were added to the new species-specific format, as well as regular elk, archery mule deer and white-tailed deer licences, and selected participants were given the option to respond online. Canadian resident white-tailed deer hunters were provided a pilot online-only survey to test the feasibility of conducting the survey using this method. In 2014, the hunter harvest survey was conducted entirely online and a survey for hunters who purchased game bird licences was added. In 2015, the hunter harvest survey transitioned to the Hunting, Angling and Trapping Licence (HAL) system. A pilot survey was conducted in the spring with Saskatchewan and Canadian resident black bear hunters and by the fall, included all hunters who purchased the following licences: draw elk, draw moose, draw pronghorn, draw mule deer, regular elk, regular moose, regular archery mule deer, regular white-tailed deer and Saskatchewan, Canadian and non-resident game birds. The primary benefit to moving into the HAL system was that all hunters who purchased a licence for which there was a survey would be able to complete a survey, rather than a randomly-generated sub-sample of hunters, and the current-year results would continue to be made available to ministry biologists in advance of quota setting for the following year. This format continued in 2016.

Hunters have the option to complete their surveys by logging online to their HAL account, in-person at a Ministry office or over the phone by calling the Active Network inquiry line (1-888-773-8450). Those hunters that have an email address associated with their web account receive a notification when a survey becomes available, as well as several reminder emails as the deadline for completion approaches. Hunters are reminded to fill out their surveys even if they did not hunt or were not successful, as this is also important information. The summarized results are provided in advance of the Big Game Draw each year and can be viewed at http://www.saskatchewan.ca/residents/parks-recreation-heritage-and-arts/hunting-trapping-and-angling/hunting/hunter-harvest-survey.

In 2016, 23,510 surveys were completed (Table 3), which was an increase from the 21,149 completed in 2015. Response rate (i.e. the number of surveys completed compared to the number of surveys available) remained relatively stable between the two years for almost all surveys. Adjusted response rate accounts for the approximately 30% of hunters that did not receive notification emails and therefore may not have been aware they had surveys available. Information about the HHS will continue to be included in the Hunters' and Trappers' Guide and in 2017, will be included on all Wildlife Habitat Certificates. The ministry hopes this will improve response rate, as the more surveys that are completed, the more thorough any evaluation of management strategies can be. Outfitter records are used to analyze non-resident harvest and hunting activities for white-tailed deer and black bear, as the HHS does not capture guided harvest of big game animals.

Table 3. Hunter harvest survey response rates in 2016.

Licence Type	2016			
	Surveys Available	Surveys Completed	Response Rate	Adjusted Response Rate
Saskatchewan Resident Game Bird	21,535	3,642	17%	20%
Canadian Resident Game Bird	2,141	305	14%	21%
Non-Resident Game Bird	10,460	1,482	14%	21%
Draw Pronghorn	129	45	35%	36%
Saskatchewan Resident Black Bear	4,149	1,212	29%	32%
Canadian Resident Black Bear	227	40	18%	24%
Saskatchewan Resident White-tailed Deer	40,754	8,702	21%	26%
Canadian Resident Draw White-tailed Deer	962	437	45%	46%
Draw Mule Deer	3,574	1,106	31%	32%
Regular Elk	6,173	1,433	23%	27%
Draw Elk	2,890	849	29%	30%
Archery Mule Deer	2,803	780	28%	30%
Regular Moose	7,221	1,635	23%	27%
Draw Moose	5,573	1,842	33%	34%
Total:	108,591	23,510	22%	26%

Survey History

The surveys conducted in a particular year are directed by many variables. Ministry priorities, information needs, public concern, staff availability and annual budget are just a few of the many variables that come into play when planning where, when and what surveys will be completed in any given year. As these variables change throughout the years, so do the surveys that are conducted. In an effort to capture this change, the surveys conducted over the past five years have been summarized in Table 4.

Table 4. Wildlife surveys completed in 2012 through 2016.

Year	Surveys
2012	CDMS, Spotlight Survey, Pronghorn Herd Structure Survey, Black Bear Index Survey, HHS (Moose/Elk/Mule Deer – Draw Licences Only), Population Structure Survey (WMZ 57 – Moose)
2013	CDMS, Spotlight Survey, Pronghorn Herd Structure Survey, Saskatchewan Upland Game Bird Survey, HHS (Moose/Elk/Mule Deer/White-tailed Deer – Draw and Regular Licences), Population Structure Survey (MMPP – Elk/Moose, Cypress - Elk)
2014	CDMS, Spotlight Survey, Pronghorn Herd Structure Survey, Saskatchewan Upland Game Bird Survey, HHS (Moose/Elk/Mule Deer/White-tailed Deer/Game Birds – Draw and Regular Licences)
2015	CDMS, Spotlight Survey, Pronghorn Herd Structure Survey, Saskatchewan Upland Game Bird Survey, HHS (Moose/Elk/Mule Deer/White-tailed Deer/Game Birds/Black Bear – Draw and Regular Licences), Population Structure Survey (Dana Hills & Parkside - Elk)
2016	CDMS, Spotlight Survey, Pronghorn Herd Structure Survey, Saskatchewan Upland Game Bird Survey, HHS (Moose/Elk/Mule Deer/White-tailed Deer/Game Birds/Black Bear – Draw and Regular Licences), Population Structure Survey (Moose Mountain Provincial Park - Elk)

Outfitting in Saskatchewan

Outfitters and guides employed by outfitters offer both residents and visitors to the province access to a wide variety of hunting and angling experiences. Although anyone can access the services outfitters supply, over 90 per cent of hunters using these services are non-residents, in part because some licences require the use of an outfitter (e.g. guided white-tailed deer licences). The number of outfitters in Saskatchewan has remained quite stable throughout the years, with anywhere between 620 and 630 licensed outfitters in any given year. Each outfitter has an assigned outfitting area (AOA), with the exception of game bird outfitters and bear and moose outfitters in the north (WMZs 70 to 72 and 74 to76), and their licence includes a list of species for which they are endorsed to provide outfitting services. For big game AOAs each area has an assigned allocation by species. Currently, approximately 200 outfitters have white-tailed deer allocations, 320 have bear allocations, 240 have bird allocations (both migratory birds and upland birds), and 75 have moose allocations. At present, no new allocations are available and the only way to obtain an allocation is for an existing outfitter to surrender it and a new outfitter to then apply for it. This often occurs when outfitting businesses are sold.

Outfitting provides significant revenue for the province, with an estimated $40 million generated by outfitted hunting in Saskatchewan in 2006 (Derek Murray Consulting Agencies 2006). This includes payments to outfitters, tourism expenditures other than those paid to outfitters and licensing costs. With that said, the economic downturn in the United States following the 2008 market crash has resulted in significantly fewer non-resident licences being sold and subsequently, fewer hunters using the services of outfitters. As the economy recovers, it is anticipated that these numbers will return.

STATUS OF SPECIES IN SASKATCHEWAN

White-tailed Deer (*Odecoileus virginianus dakotensis*)

Saskatchewan's white-tailed deer are a highly valued game species. They are considered the most abundant and widely-distributed ungulate in Saskatchewan, living in diverse habitats across the province south of the Pre-Cambrian shield (Figure 2), with a preference for open hardwood forests that border native grasslands or agricultural fields. Saskatchewan represents the northern-most extent of their range where population change is largely driven by winter severity which restricts mobility and reduces access to quality forage. After humans, coyotes and wolves represent their most important predators south and north of the forest fringe, respectively.

Population Status

The status of white-tailed deer populations in the province is monitored annually using science-based and anecdotal information collected from a variety of sources. Citizen science currently plays an important role in providing data for white-tailed deer management, including key herd structure data from the volunteer-based co-operative deer management survey (CDMS), harvest data from the voluntary HHS and winter severity data from the voluntary winter weather watcher program (WWWP). Population trends in each white-tailed deer management unit are monitored using annual ground-based spotlight surveys in 19 WMZs spread across the province. Annual assessments of licence sales, evaluations of habitat condition, biological sample collections, deer necropsies and field reports from stakeholder groups, the general public, landowners and Ministry of Environment staff provide additional information. At one time aerial surveys were conducted to estimate white-tailed deer population density in select regions of the province (Table 5). An aerial survey program for white-tailed deer in study areas representing select WMZ's is currently being explored in order to support a stronger science-based approach to management and to validate population trends identified using existing survey methods.

Survey Data

In 2016, white-tailed deer population trends were assessed where possible using ground-based spotlight surveys (Table 6). Poor weather and road conditions limited the completion of all 19 spotlight routes across the province in 2016. Key herd structure data was provided by the CDMS (Table 7) and the HHS provided important data regarding harvest (Tables 8 and 9). The WWWP, launched in the fall of 2016, will be used to gather key winter severity data in select WMZs in 2017/2018 and onwards.

Figure 2. White-tailed deer range in Saskatchewan, including ten white-tailed deer management units (WTDMU) delineated by ecozone, key winter habitat availability as identified by the 1982 Terrestrial Wildlife Habitat Inventory and Wildlife Management Zones.

Table 5. White-tailed deer population and density data collected intermittently in select WMZs by aerial survey (1994-2016).

Survey Area	Year	Population Estimate	Density (km^2)
WMZ 29	2007/2008	5,818 ± 17.5%	1.07
	2008/2009	5,317 ± 16.0%	0.99
WMZ 32	1994/1995	---	1.70
	2000/2001	1,302 ± 17.3%	0.87
WMZ 34	1996/1997	---	2.66
	2008/2009	1,929 ± 19.4%	1.84
WMZ 45	2008/2009	3,743 ± 16.5%	0.81
WMZ 46	2000/2001	2,702 ± 14.7%	1.00
	2008/2009	5,179 ± 19.1%	1.84
WMZ 50 (Herd Reduction Area)	2006/2007	2,351 ± 8.9%	1.37
WMZ 50 (Transition)	2007/2008	407 ± 20.8%	0.33
WMZ 56	2003/2004	19,500 ± 20.8%	3.00
	2007/2008	8,716 ± 18.8%	1.47
WMZ 63, 64 & 65	2004/2005	949 ± 25.5%	0.11
	2007/2008	688± 29.6%	0.08
WMZ 67	2003/2004	17,813 ± 18.4%	2.85
	2007/2008	13,145 ± 17.9%	2.20

Table 6. Spotlight survey population trends for white-tailed deer presented as deer per linear mile observed in 2015 and 2016 compared to the long-term average (LTA) where possible. "--"= data not available, *= new route established in 2014 or 2015, **= adjusted route. Positive and negative percent change greater than 25% from the long-term average is noteworthy and appear **in bold**.

	LTA (2008-2015)	2015 Deer/Mile	2016 Deer/Mile	2016 % change from LTA	2016 % change from 2015
WMZ 1*	--	0.35	0.45	--	**29%**
WMZ 6	0.65	0.91	0.90	**38%**	-1%
WMZ 10	0.4	0.36	--	--	--
WMZ 11	1.73	1	--	--	--
WMZ 14	0.47	0.74	--	--	--
WMZ 18**	--	0.31	--	--	--
WMZ 21	--	2.1	2.40	--	14%
WMZ 23*	--	0.59	1.45	--	**146%**
WMZ 29	--	1.78	1.33	--	-25%
WMZ 46	0.78	0.32	0.75	-4%	**134%**
WMZ 32	1.01	0.84	--	--	--
WMZ 34**	--	0.82	1.16	--	**41%**
WMZ 37	1.60	1.15	1.17	**-27%**	2%
WMZ 39	0.76	0.64	0.62	-18%	-3%
WMZ 42*	--	0.44	0.63	--	**43%**
WMZ 47**	--	0.52	--	--	--
WMZ 49*	--	1.17	1.65	--	**41%**
WMZ 50**	--	1.60	1.6	--	0%
WMZ 54*	--	0.32	0.32	--	0%

Table 7. Estimated provincial white-tailed deer herd structure based on 2016 co-operative deer management survey field observations as compared to the 10-year LTA (2007-2016) in the grassland (WMZs 1-14), farmland (WMZs 15-30), parkland (WMZs 31-47), forest fringe (WMZs 48-55), forest (WMZs 56-69) and northern forest (WMZs 70-76) ecozones.

	Grassland			Farmland			Parkland			Forest Fringe			Forest			Province		
Year	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n
2007	0.42	0.73	1,595	0.4	0.96	2,338	0.4	0.8	3,962	0.37	0.86	2,246	0.44	0.78	650	0.4	0.83	10,791
2008	0.39	0.64	1,032	0.39	0.84	2,625	0.41	0.86	4,373	0.4	0.81	1,867	0.32	0.83	424	0.4	0.82	10,321
2009	0.42	0.75	1,011	0.4	0.79	3,153	0.37	0.77	3,548	0.41	0.79	1,486	0.28	0.72	376	0.39	0.77	9,574
2010	0.29	0.59	1,963	0.35	0.78	2,798	0.36	0.77	4,847	0.42	0.84	2,892	0.27	0.73	662	0.35	0.76	13,162
2011	0.26	0.63	1,460	0.35	0.77	2,322	0.34	0.64	3,483	0.43	0.9	1,597	0.4	0.83	614	0.35	0.72	9,476
2012	0.35	0.67	971	0.44	0.82	2,343	0.33	0.64	3,340	0.33	0.74	1,664	0.33	0.73	432	0.36	0.71	8,750
2013	0.38	0.59	744	0.38	0.59	1,462	0.39	0.65	1,553	0.36	0.66	915	0.38	0.62	268	0.38	0.62	4,942
2014	0.48	0.67	1,161	0.37	0.69	1,228	0.35	0.69	2,061	0.42	0.71	507	0.44	0.45	125	0.39	0.68	5,135
2015	0.36	0.69	990	0.36	0.86	1,217	0.36	0.87	1,513	0.37	0.91	609	0.48	1.15	122	0.37	0.84	4,451
2016	0.49	0.94	223	0.36	0.80	459	0.37	0.93	818	0.28	0.95	349	0.45	0.89	98	0.37	0.90	2,932
LTA (10 Year)	**0.38**	**0.69**	**1,115**	**0.38**	**0.79**	**1,995**	**0.37**	**0.76**	**2,950**	**0.38**	**0.82**	**1,413**	**0.38**	**0.77**	**377**	**0.38**	**0.77**	**7,953**

Biological Sample Collections

In 2016, hunters were encouraged to submit the heads of harvested animals for CWD testing to improve our understanding of CWD prevalence and distribution in Saskatchewan. In 2016, a total of 176 white-tailed deer were submitted for CWD testing; 14 (or 8%) tested positive for CWD. For more information, please refer to chronic wasting disease section (pg 19).

General Overview

White-tailed deer populations in the province peaked most recently between 2004 and 2006 and have since undergone declines in response to severe winter conditions, particularly following the severe winters of 2005-06, 2010-11, 2012-13 and 2013-14. This series of severe winter conditions resulted in all current reproductive age classes being weakened (Figure 3). Although white-tailed deer population trends across the province are generally stable or slightly increasing due to mild winters in 2014-15, 2015-16 and 2016-17, full recovery from these winter mortality events will likely take several more years of mild winter conditions.

As in 2014-15, the 2015-16 winter was considered mild across much of the province which further supported recovery for white-tailed deer populations. The exception to this was a heavy snow pack and extensive snow crust in southeastern Saskatchewan, which appears to have led to what is considered an average level of winter mortality.

Grassland and farmland populations (WMZ 1-30) remained stable and near their long-term average size in the mid-2000s, but there was concern over lower productivity relative to the 1980s and early 1990s. More recently, all spotlight surveys indicate that the white-tailed deer population is stable or slightly increasing after a series of severe winters (2010-2014). In general, populations located in farmland zones (WMZ 15-30) are limited by the shortage of quality wintering habitat, particularly on the west side, which limits population size and growth potential.

Over the history of monitoring white-tailed deer in the parkland (WMZ 31-47) using spotlight surveys, populations have appeared to undergo considerable fluctuations as a result of severe winter conditions and late spring green up. Spotlight surveys conducted in 2014 and 2015 indicated declining population trends for many routes for the long term average (2008-2014). The 2016 spotlight surveys in the parkland indicate that white-tailed deer populations are stable or increasing.

Forest Fringe (WMZ 48-55) populations are subject to higher winter mortality on a more frequent basis relative to southern populations. However, mild winters since the mid-1990s allowed population growth in central and western areas. Until the severe winter of 2005-06, winter populations in the forest fringe were greater than 50% above the long-term average. Populations remained stable following the 2005-06 decline until the severe winters of 2010-11, 2012-13 and 2013-14 caused further local declines, particularly on in the eastern portion of the forest fringe. Population trend data for white-tailed deer in the forest fringe for 2015 and 2016 indicate these populations are recovering from these high winter mortality events.

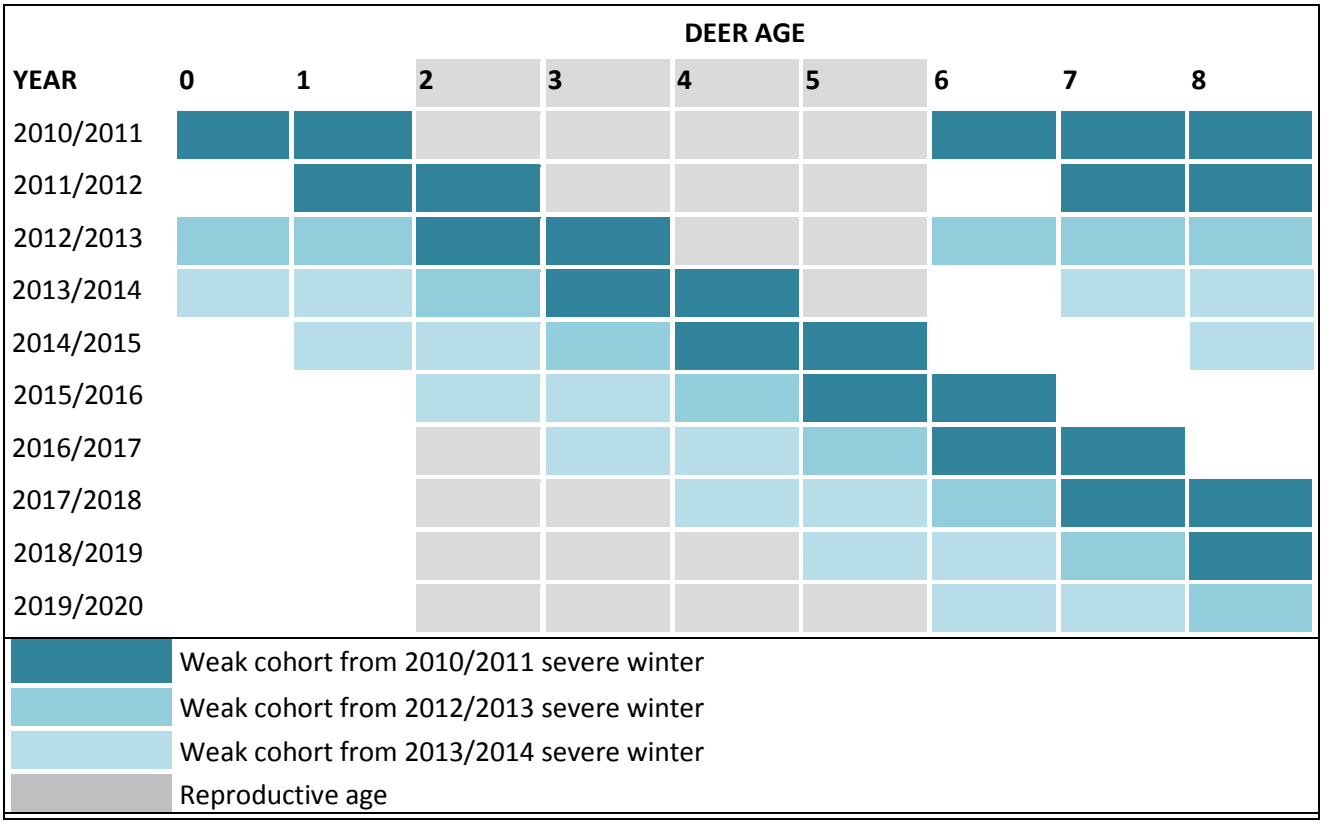

Figure 3. Schematic of the effect of severe winter conditions on all age classes in a deer population over time. Note that it takes multiple years for a population to recover from a winter mortality event due to the impact to the reproductive age classes.

Strictly anecdotal information suggest that forest (WMZ 56-69) populations in the southern boreal forest grew steadily from the mid-1990s onwards due to a series of mild winters, peaking in the mid-2000s. At this time, western forest residents reported deer numbers at an all-time high. Some winter mortality occurred in 2004-05 (central regions), 2005-06 (central and eastern regions) and 2006-07 (all forest WMZs), but declines were reportedly most obvious in the central and eastern forest. Between 2007 and 2010, several consecutive mild winters is thought to have allowed populations in the forest to recover. We anticipate that the winters of 2010-11, 2012-13 and 2013-14 set population recovery back, particularly in the east. Several mild winters in succession will be required to reverse that trend. In 2016, white-tailed deer in the forest appeared to be continuing to recover from this series of severe winters according to anecdotal information.

Northern forest populations (WMZ 70-76) are small and it is believed they suffered significant winter mortality in the past several years. This area is data deficient, which prevents reliable status assessment.

Hunting Season Review

The annual harvest of white-tailed deer holds an important place in provincial hunting heritage for Saskatchewan residents. The ministry strives to provide harvest opportunities where possible according to Saskatchewan's Game Allocation Framework. The Saskatchewan resident regular licence and

Canadian resident draw licence are either-sex licences that have historically placed increased hunting pressure on the buck component of the population. Antlerless licences apply pressure to the reproductive component of the herd and can be used to reduce deer numbers or offset pressure on the buck component, balancing the post- harvest herd structure. The harvest of antlerless white-tailed deer will largely depend on known productivity (i.e., CDMS results) and the social acceptance capacity for a given WMZ (e.g., data from the Saskatchewan Crop Insurance or Saskatchewan Government Insurance agencies).

In 2016, both resident either sex and antlerless white-tailed deer licence sales remained relatively low compared to historic years when populations were high, due to the still reduced number of deer on the landscape and the fact that only a few zones were open to antlerless hunting. Saskatchewan resident white-tailed deer regular licence sales remained over 30,000. Canadian resident licences sales remained reduced as a result of fewer licences available in 2016. Non-resident licence sales remained stable in 2016.

Similar to licence sales, trends in resident either-sex harvest indicate a decrease in harvest in recent years, likely as a result of the low numbers due to the recent series of hard winters. Note that harvest data for resident antlerless and Canadian resident draw harvest is not available prior to 2013 and was not surveyed in 2014 or 2015.

Table 8. Estimated white-tailed deer harvested by Saskatchewan and Canadian resident hunters in Saskatchewan for years when data was collected (2007-2016) relative to the 10-year mean (2000-2009) when harvest data was collected frequently using paper mail-in surveys. After 2013, harvest data was collected using an online survey.

Licence Type	Hunt Year	Estimated Harvest (Voluntary Hunter Harvest Survey)					Hunter-days
		Males	Females	Young	Unknown	Total	
Saskatchewan Resident Either-Sex	2007	21,314	4,419	1,104	85	26,922	233,886
	2008	21,186	4,386	917	333	26,822	277,936
	2009	20,012	11,612	2,035	374	34,033	455,435
	2013	13,200	3,875	904	0	17,979	203,431
	2014	10,103	2,632	554	0	13,290	242,581
	2015	15,722	3,259	444	0	19,424	245,236
	2016	17,253	3,695	520	0	21,468	265,716
	Mean (10 yr)	**21,655**	**6,394**	**1,312**	**123**	**29,483**	**248,637**
Saskatchewan Resident Antlerless	2013	0	833	192	0	1,025	26,285
	2016	---	---	---	---	---	---
Canadian	2013	1,704	93	10	0	1,808	13,479

Resident	2016	483	49	2	0	534	4,710

Table 9. White-tailed deer harvested by non-resident (guided) hunters in Saskatchewan (2007 – 2016) relative to the 10-year mean (2000-2009). Data not available is indicated by "---".

Licence Type	Hunt Year	Estimated Harvest					Hunter-days
		Males	Females	Young	Unknown	Total	
Guided White-tailed Deer Licence	2007	2,933	3	0	116	3,052	15,277
	2008	2,800	2	0	17	2,819	14,650
	2009	1,696	0	0	6	1,702	11,155
	2010	1,864	0	0	0	1,864	10,626
	2011	---	---	---	---	---	---
	2012	---	---	---	---	---	---
	2013	1,278	0	0	19	1,297	---
	2014	---	---	---	---	---	---
	2015	---	---	---	---	---	---
	2016	---	---	---	---	---	---
	Mean (2000-2009)	**2,907**	**1**	**0**	**23**	**2,931**	**15,098**

Although outfitter clients hunt with either-sex licences, their harvest is almost exclusively of bucks (Table 9). Additionally, compared to resident hunters, non-resident hunters are thought to harvest a larger proportion of teenage (2.5 to 3.5 years) and mature bucks (>4.5 years) and a comparatively smaller proportion of yearling bucks.

Research Initiatives

In 2016, a research collaboration with the School of Environment and Sustainability at the University of Saskatchewan was established which led to two student research projects pertinent to white-tailed deer management in Saskatchewan. The first project will examine the feasibility of using camera traps to estimate population abundance and will identify the best strategies for improving deer image capture using remote cameras. The second will explore the motivations underlying participation in the long-running citizen-science based co-operative deer management survey, so as to provide best strategies for engaging participants in this survey using the forthcoming mobile application.

Management Objectives and Strategies

The management goal as presented in the Saskatchewan White-tailed Deer Management Plan is to sustainably manage Saskatchewan's white-tailed deer for herd health and, when possible, provide a harvestable surplus.

Long-term Management Objectives

- Manage Saskatchewan's white-tailed deer populations so as to provide a harvestable surplus, where possible, while maintaining populations within identified social and ecological thresholds, which will be identified in the Saskatchewan White-tailed Deer Management Plan.
- Maintain harvest opportunities that respect the temporal aspect of white-tailed deer breeding ecology by adjusting season dates to avoid the peak of the rut (i.e., when 50% of females are considered bred).

Short-term Management Strategies

- Quantify winter severity in all WTDMU across the province using mean weekly snow depth and temperature data.
- Improve our understanding of the distribution and prevalence of chronic wasting disease (CWD) and the impact of management actions on the transmission of CWD.
- Identify social acceptance capacity thresholds for white-tailed deer south of the provincial forest.

Additional Information

Most recent provincial species plan: None available.

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Mule Deer (*Odecoileus hemionus*)

Mule deer, named for their large mule-like ears, are most commonly found in the prairie and parkland regions of the province. Although primarily browsers of woody vegetation, mule deer have readily adapted to capitalize on agricultural crops and rely heavily on grass in the winter months. Therefore, snow depth plays a key role in determining the severity of winter on mule deer, especially in areas where winter forage can quickly be made unavailable by a major snow event.

Population Status

The status of mule deer populations in the province is monitored annually using science-based and anecdotal information collected annually from a variety of sources. Citizen science currently plays an important role in providing data for mule deer management, including key herd structure data from the volunteer-based CDMS, harvest data from the voluntary HHS and winter severity data from the voluntary WWWP. Mule deer population trends are monitored using annual ground-based spotlight surveys in 10 WMZs spread across the province. Annual assessments of licence sales, evaluations of habitat condition, biological sample collections, deer necropsies and field reports from stakeholder groups, the general public, landowners and Ministry of Environment staff provide additional information. At one time aerial surveys were conducted to estimate mule deer population density in select regions of the province (Table 10). An aerial survey program for mule deer in study areas representing select WMZs is currently being explored in order to support a stronger science-based approach to management and to validate population trends identified using existing survey methods.

Survey Data

In 2016, mule deer population trends were assessed using ground-based spotlight surveys (Table 11). Note that mule deer are only observed on a proportion of spotlight survey routes and that poor weather and road conditions limited our capacity to complete all spotlight routes across the province in 2016. Key herd structure data was provided by the CDMS (Table 12) and the HHS provided important data regarding harvest (Table 13). The WWWP, launched in the fall of 2016, will be used to gather key winter severity data in select WMZs 2017/2018 and onwards.

Table 10. Mule deer population and density data collected by aerial survey (1994-2016).

Survey Area	Year	Population Estimate	Density (km^2)
WMZ 2	2007/2008	13,343 ± 20.0%	1.49
WMZ 9	2007/2008	3,864 ± 17.7%	1.07
WMZ 10	2006/2007	10,170 ± 19.0%	2.72
	2008/2009	7,952 ± 18.3%	2.08
WMZ 14W (Herd Reduction Area)	2006/2007	3,984 ± 17.4%	1.02
WMZ 14E (Herd Reduction Area)	2006/2007	4,662 ± 19.9%	0.67
WMZ 29	2007/2008	7,171 ± 17.9%	1.32
	2008/2009	4,035 ± 13.5%	0.75
WMZ 45	2008/2009	3.347 ± 20.4%	0.72
WMZ 46	2000/2001	2,930 ± 19.1%	1.09
	2008/2009	4,697 ± 19.0%	1.67

Table 11. Spotlight survey population trends for mule deer presented as deer per linear mile observed in 2015 and 2016 compared to the long-term average (LTA) where possible. "---"= data not available, *= new route established in 2014 or 2015, **= adjusted route. Positive and negative percent change greater than 25% from the long-term average is noteworthy and appear **in bold**.

Route (WMZ)	LTA Deer/ Mile (2008-2015)	2015 Deer/ Mile	2016 Deer/Mile	% Change (2016 From LTA)	% Change (2016 From 2015)
WMZ 1*	---	0.44	0.64	2%	**45%**
WMZ 6	0.45	0.45	0.46	---	2%
WMZ 10	1.14	1.42	---	---	---
WMZ 11	1.31	1.93	---	---	---
WMZ 14	0.26	0.27	---	---	---
WMZ 18*	---	0.09	---	---	---
WMZ 21*	---	0.27	0.10	---	**-63%**
WMZ 23*	---	0.87	0.86	**29%**	-1%
WMZ 29	0.92	1.42	1.19	---	-16%
WMZ 46	0.75	0.58	---	---	---

Table 12. Provincial mule deer population structure and number of observations based on results of the 2016 co-operative deer management survey and compared to the 10-year LTA (2007-2016) in the grassland (WMZs 1-14), farmland (WMZs 15-30), parkland (WMZs 31-47), forest fringe (WMZs 48-55), forest (WMZs 56-69) and northern forest (WMZs 70-76). Data not available is indicated by "---".

Year	Grassland			Farmland			Parkland			Forest Fringe			Forest			Province		
	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n
2007	0.66	0.71	2,164	0.49	0.84	1,780	0.4	0.62	740	0.41	0.59	54	0.5	---	6	0.55	0.74	4,744
2008	0.67	0.76	1,679	0.62	0.79	2,519	0.44	0.73	907	0.59	0.98	113	---	2	3	0.6	0.77	5,221
2009	0.65	0.76	1,674	0.65	0.72	1,662	0.59	0.71	1,014	0.46	0.64	59	---	0.33	4	0.63	0.73	4,413
2010	0.6	0.65	1,735	0.52	0.66	2,044	0.45	0.59	1,225	0.28	1.06	218	2	---	6	0.52	0.65	5,228
2011	0.56	0.61	1,445	0.55	0.73	1,689	0.43	0.72	836	0.21	0.65	89	---	---	1	0.52	0.68	4,060
2012	0.69	0.68	1,075	0.58	0.71	1,856	0.39	0.64	1,099	0.37	1.16	170	---	1.25	9	0.54	0.7	4,209
2013	0.76	0.58	935	0.55	0.53	1,286	0.42	0.67	707	0.18	0.59	69	---	---	---	0.48	0.59	2,928
2014	0.67	0.74	1,643	0.50	0.76	1,437	0.43	0.64	797	0.20	0.29	67	---	---	1	0.45	0.61	3,944
2015	0.70	0.82	2,158	0.48	0.70	1,493	0.40	0.66	508	0.38	0.89	41	---	---	---	0.57	0.75	4,200
2016	0.57	1.08	258	0.48	0.63	425	0.56	0.64	261	0.43	0.80	41	---	---	---	0.53	0.82	985
LTA (10 Year)	0.65	0.74	1,521	0.54	0.71	1,593	0.45	0.66	809	0.35	0.77	83	1.25	1.19	4	0.54	0.70	3,969

Biological Sample Collections

In 2016, hunters were encouraged to submit the heads of harvested animals for CWD testing to improve our understanding of CWD prevalence and distribution in Saskatchewan. In 2016, a total of 140 mule deer were submitted for CWD testing; 33 (or 24%) tested positive for CWD. For more information, please refer to chronic wasting disease section (pg 19).

General Overview

In 2016, survey and anecdotal information indicated that provincial mule deer populations were stable or slightly increasing as they continued to recover from the recent series of severe winters (2010-2014). Some anecdotal information from landowners and conservation officers suggest populations in select WMZ south of the forest fringe had fully recovered. The 2016 CDMS observations were substantially lower for mule deer than for white-tailed deer (Tables 7 and 12), which can affect data quality. Note that data is considered most reliable when the number of observations for an ecozone exceeds 300. That being said, mule deer buck:doe ratios were above the long term average across the province. Fawn:doe ratios were above the long-term average in the grasslands, but slightly below in the farmland, parkland and forest fringe.

Hunting Season Review

Saskatchewan resident hunters who have been selected in the Big Game Draw have the option to hunt with an antlerless licence (with a bag limit of one or two animals, depending on the WMZ) and/or a mule deer either-sex licence. In 2016, an archery-only either-sex licence was also available for Saskatchewan residents in WMZs where greater than 50 either-sex licences are offered. Either-sex licences result in increased hunting pressure on the buck component of the population. Antlerless licences attempt to offset this effect, balancing the harvest structure. Canadian resident and non-resident hunters do not have the opportunity to hunt mule deer in Saskatchewan.

Draw licence sales were down as a result of a reduced quota stemming from a decline in the population due to severe winters (Appendix A). In contrast, archery licence sales continued to increase between 2015 and 2016, with 2,666 and 2,803 licences sold, respectively.

Similar to licence sales, harvest of mule deer with draw licences remained low in 2016 (Table 13). From 2015 to 2016, harvest declined, likely in response to low mule deer populations and the shortened season from previous years.

Table 13. Mule deer harvested by resident hunters in Saskatchewan (2007-2016). Data not available is indicated by "---".

Licence Type	Year	Harvest					Hunter Days
		Bucks	Does	Fawns	Unknown	Total	
Draw Either-Sex Mule Deer	2007	7,025	4,974	1,415	35	13,449	56,426
	2008	5,899	8,901	2,260	66	17,126	101,797
	2009	3,688	7,618	1,883	134	13,323	72,659
	2010	---	---	---	---	---	---
	2011	---	---	---	---	---	---
	2012	2,642	255	58	0	2,990	19,017
	2013	2,601	247	97	0	2,945	18,607
	2014*	1,806	136	43	0	1,985	17,814
	2015	2,277	187	25	0	2,489	19,485
	2016	2,515	168	13	0	2,696	20,350
Archery Mule Deer	2013	606	89	10	0	705	19,648
	2014	288	48	12	0	348	17,429
	2015	421	58	7	0	486	17,264
	2016	395	97	0	0	492	20,882

Research Initiatives

In 2016, a research collaboration with the School of Environment and Sustainability at the University of Saskatchewan was established which led to two student research projects pertinent to mule deer management in Saskatchewan. The first project will examine the feasibility of using camera traps to estimate population abundance and will identify the best strategies for improving deer image capture using remote cameras. The second will explore the motivations underlying participation in the long-running citizen-science based co-operative deer management survey, so as to provide best strategies for engaging participants in this survey using the forthcoming mobile application.

Management Objectives and Strategies

Long-term Management Objectives

- Manage Saskatchewan's mule deer populations so as to provide a harvestable surplus, where possible, while maintaining populations within identified social and ecological thresholds, which will be identified in the Saskatchewan Mule Deer Management Plan.
- Continue participation in the WAFWA Mule Deer Working Group to improve knowledge of mule deer management throughout North America.
- Continue to participate in the provincial chronic wasting disease (CWD) working group in an effort to address potential impacts of CWD on Saskatchewan's cervid species.

Short-term Management Strategies

- Promote a mobile application version of the co-operative deer management survey to enhance participation and improve data accuracy.
- Develop a mule deer aerial survey program in order to validate existing sources of information including annual spotlight surveys and the co-operative deer management survey.
- Promote a province-wide citizen-science based winter weather watcher program to improve our understanding of winter severity across Saskatchewan.
- Continue the evaluation of hunting seasons for mule deer to ensure current hunting seasons promote the sustainable management of the species in Saskatchewan and equitable allocation of hunting opportunities.
- Update our understanding of mule deer habitat in Saskatchewan using available remotely-sensed digital imagery.

Additional Information

Most recent provincial species plan: None available.

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Elk (*Cervus canadensis*)

Elk, also known as Wapiti, are one of Saskatchewan's larger ungulates. Found throughout the province (Figure 4), elk are known to select fringe landscapes that contain a mix of forest and open grasslands, particularly those bordering forage crops such as peas and lentils. It is estimated that two-thirds of the province's elk population, outside of the Cypress Hills and Moose Mountain provincial parks, are found in the east-central portion of the province. Populations of elk are also found in semi-isolated pockets throughout the province.

Population Status

Elk populations in the province are monitored using aerial survey data, annual Hunter harvest survey results, Saskatchewan Crop Insurance Corporation (SCIC) reports, as well as field reports from stakeholder groups, the general public, landowners and Ministry of Environment staff. This information is subsequently used to guide elk management in Saskatchewan.

Survey Data

In 2016/17, an aerial survey was conducted for elk in Moose Mountain Provincial Park which provided population census data to complete the third four-year survey cycle. Aerial survey data collected in Moose Mountain Provincial Park will be used to help guide elk management strategies in Island Forest and Farmland regions of the province in the future. Expert surveys, field reports, and anecdotal information from a variety of sources were also used to monitor elk throughout the rest of the province.

Table 14. Elk population, density and herd structure data collected on aerial surveys (1982-2016). Data not available is indicated by "---".

Survey Area	Year	Population Estimate ± Confidence Limits	Density (km^2)	Herd Structure (Bull:Cow:Calf)
WMZ 1 (Wood Mountain Area)	2007/2008	125 ± 0%	0.14	---
WMZ 6 and Cypress Hills Park	2006/2007	624 ± 0%	0.29	---
WMZ 33(Moose Mountain Provincial Park)	1997/1998	289 ± 3.3%	0.26	91:100:17
	2008/2009	1285 ± 0%	0.74	30:100:48
	2012/2013	1212 ± 0%	0.70	42:100:47
	2016/2017	1135 ± 0%	0.66	35:100:52
WMZ 37 (Duck Mountain Provincial Park)	1997/1998	217 ± 16.4%	0.32	33:00:00
WMZ 41 (Dana Hills)	2015/2016	330 ± 0 %	0.49	46:100:41
WMZ 54	2000/2001	172 ± 0%	---	41:100:50
WMZ 54 (Parkside)	2015/2016	139 ± 0%	0.25	32:100:15
Fort a la Corne	1982/1983	477 ± 27%	0.5	---
	2005/2006	620 ± 0%	0.29	37:100:34

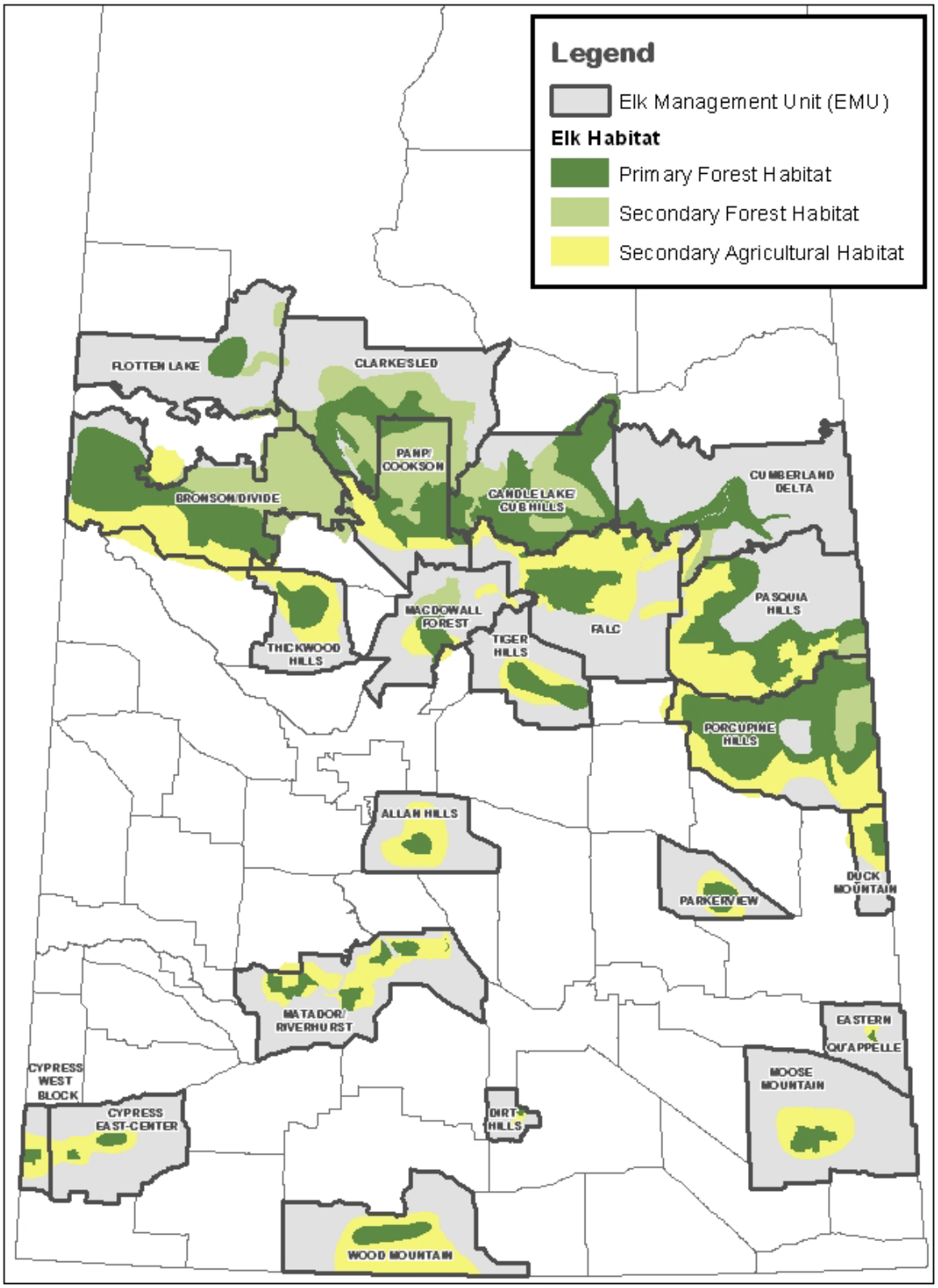

Figure 4. Elk Management Units (EMU), used by biologists to manage elk populations, are identified, along with WMZ boundaries.

Biological Sample Collections

In 2016, heads from harvested elk were eligible for volunteer CWD testing. Based on hunter submissions, a total of 18 elk heads were submitted for CWD testing, with 0 animals testing positive for CWD. However, 1 positive CWD elk was found in 2016 out of 3 samples submitted by conservation officers. For more information on the CWD harvest sampling program please refer to the chronic wasting disease section (pg 19).

General Overview

Elk population trends and hunting opportunities vary regionally throughout the province. According to information including the annual hunter harvest survey, expert surveys and field reports, most elk populations in core areas of elk range along the Boreal forest fringe remain stable following consecutive mild winters. Field reports of high predator numbers and past changes in management objectives may have reduced some elk populations throughout this area. Management in core elk range will continue to focus on maintaining sustainable populations of elk.

Elk populations have grown and in some cases expanded throughout Parkland and Farmland regions of the province over the past several years. Factors contributing to the apparent population increase and expansion are likely due to a combination of mild winters, excess in forage, low levels of predation and the mobile and gregarious nature of elk. In Moose Mountain Provincial Park, elk populations remain above target objectives following mild winters and relatively difficult (e.g. wet) conditions during recent hunting seasons.

Hunting Season Review

Saskatchewan residents have several options for harvesting elk in the province. Elk are included in the big game draw, and successful applicants can obtain a licence to shoot one either-sex animal or one antlerless animal, depending on the zone and licence they applied for. Over-the-counter elk licences can be obtained for one either-sex animal or one bull, depending on the zone of interest. The variety of licences allows hunters to be selective in what they harvest. Canadian resident and non-resident hunters do not have the opportunity to hunt elk in Saskatchewan.

The total number of draw licences sold increased from 2,593 in 2015 to 2,891 in 2016 (Appendix A). In comparison the 10-year average (2007 – 2016) for the number of draw elk licences was 2,972. The number of regular elk licences sold remained relatively stable with 6,174 sold in 2016 compared to 6,288 sold in 2015.

In 2016, all draw and regular elk hunters received a hunter harvest survey. Harvest survey return rate was 29 per cent for draw elk hunters which were below previous years response rates (48% in 2014; 30% in 2015). A similar trend was observed for regular elk hunters, as the 2016 return rate was 23 per cent compared to 39 per cent in 2014 and 24 per cent in 2015. The decrease in response rates may be due to changes in survey methodology and hunters being unaware they had a survey to complete.

Table 15. Estimated elk harvested by resident hunters in Saskatchewan (2007–2016). Data not available is indicated by "---".

Year	Season	Bulls	Cows	Calves	Total
2007	**Combined**	**1,513**	**2,034**	**418**	**3,978**
2008	**Combined**	**1,147**	**1,356**	**289**	**2,840**
2009	**Combined**	**1,367**	**1,312**	**395**	**3,214**
2010	---	---	---	---	---
2011*	Draw	259	848	183	1,292
2012*	Draw	357	671	115	1,144
2013	Draw	392	677	153	1,222
	Regular	1,015	714	239	1,968
	Combined	**1,407**	**1,391**	**392**	**3,190**
2014	Draw	371	573	121	1,065
	Regular	1,125	736	242	2,103
	Combined	**1,496**	**1,309**	**363**	**3,168**
2015	Draw	455	420	110	985
	Regular	974	504	193	1,671
	Combined	**1,429**	**924**	**303**	**2,656**
2016	Draw	493	673	139	1,305
	Regular	1,107	556	155	1,818
	Combined	**1,600**	**1,229**	**294**	**3,123**

*Only draw licence harvest collected.

Research Initiatives

No research initiatives were conducted during this time period.

Management Objectives and Strategies

Long-term Management Objectives

- Update the elk management plan for Saskatchewan to ensure the sustainable management of elk in the province.

Short-term Management Strategies

- Maintain elk populations within social tolerances of local residents, particularly in the southern WMZs.
- Promote the Hunter harvest survey to prospective elk hunters.
- Promote the CDMS mobile application for the public to record locations of elk to assist in management.

Additional Information

Most recent provincial species plan:

Arsenault, A. 2008. Saskatchewan elk (*Cervus elaphus*) Management Plan – Update. Saskatchewan Ministry of Environment, Fish and Wildlife Branch Technical Report 2008-02. 63 pp. (Unpublished)

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Moose (*Alces alces*)

Moose, the largest member of the deer family, historically inhabited all regions of the province, with the exception of the mixed grassland ecoregion, but since settlement of the prairies, have been restricted to boreal regions of the province dominated by spruce, aspen and pine trees (Figure 5). Cover and browse availability were thought to be the limiting factors to moose distribution from the forest and forest fringe ecoregions. Additionally, it was believed that temperature (particularly heat in the absence of cover) in the south would limit their expansion into more southern regions. Although we are only beginning to understand the factors underlying moose re-colonization of farmland and prairie regions of the province (See LaForge et al. 2016 for more detail), the combination of abnormally favourable climatic conditions, lack of predators, decline in the rural population of Saskatchewan, and presence of optimal foraging conditions have likely contributed to moose success in Southern Saskatchewan.

Population Status

Moose populations are monitored annually using information gathered from aerial population surveys, the Hunter harvest survey, relevant research conducted by external organizations and field reports from the general public, landowners and Ministry of Environment staff.

Survey Data

There were no aerial surveys for moose in 2016 (Table 16). In 2014 the Co-operative Moose Management Survey (CMMS) was suspended. This survey was a volunteer survey for one week in November to obtain herd structure and age composition in agricultural WMZs. A plan is in place to develop a wildlife observation application for use in 2017. Big game and game bird observations will be collected on mobile devises and uploaded to a central location for use by Provincial biologists.

Table 16. Moose population, density and herd structure data collected on aerial surveys (2007-2016). Data not available is indicated by "---".

Survey Area	Year	Population Estimate	Density (km^2)	Herd Structure (Bull:Cow:Calf)
WMZ 56	2006/2007	3,380 ± 19.8%	1.09	52:100:51
	2009/2010	2,490 ± 18.6%	0.82	21:100:53
	2014/2015	2,064 ± 20.1%	0.68	28:100:41
WMZ 57	2006/2007	1,898 ± 19.7%	0.76	34:100:43
	2009/2010	1,529 ± 15.7%	0.56	37:100:42
	2011/2012	1,257 ±18.9%	0.46	47:100:35
	2014/2015	----	---	43:100:40
WMZ 59	2006/2007	2,181 ± 18.8%	0.45	41:100:28
	2009/2010	1,985 ± 20.9%	0.42	42:100:35
WMZ 67	2006/2007	2,021 ± 18.9%	0.32	42:100:55
	2009/2010	1,860 ± 18.4%	0.31	43:100:36
FALC	2005/2006	488 ± 0%	0.22	---
MMPP	2008/2009	---	0.50	---
	2012/2013	1,202 ± 0%	0.70	56:100:57

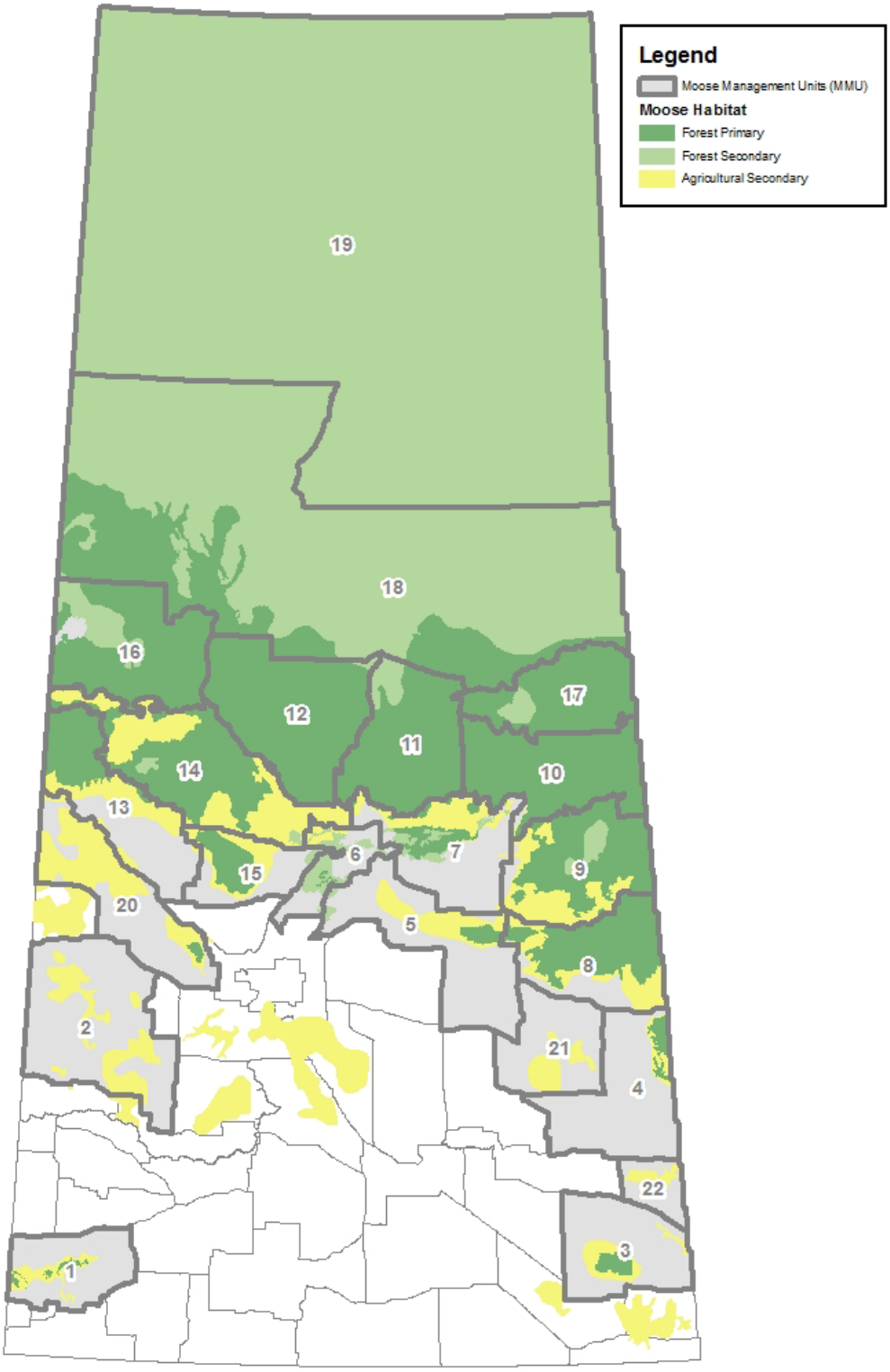

Figure 5. Moose Management Units (MMU), used by biologists to manage moose populations, are identified, along with moose habitat and WMZ boundaries.

Biological Sample Collections

Hunters and trappers have indicated to ministry staff that the moose population is declining in WMZs 56 and 57. In 2015 a disease prevalence/moose tissue sampling project was initiated in cooperation with the Canadian Wildlife Health Cooperative (CWHC). This is the second year of the tissue collection study. The project purpose is to look at disease prevalence with respect to several key diseases that affect moose (meningeal worm, winter tick, and giant liver fluke). In 2015 and 2016, a total of 18 and 5 samples, respectively, were collected from draw hunters in WMZ 56 and 57. Tissue samples included hair, liver, blood, feces, and incisors.

General Overview

Moose in the boreal forest (WMZ 56-73) appear to be declining, and are below the long-term winter average. Moose in the forest fringe (WMZ 48-55) are stable and slightly above the long-term winter average. In both the parkland (WMZ 31-47) and farmland (WMZ 15-30), moose populations have stabilized, with some WMZs showing a decreasing population due to liberal license quotas in the past several years. Isolated pockets of moose are located throughout the grassland (WMZ 1-14).

In 2008, concerns regarding conflicts with moose in southern agricultural wildlife management zones reached a point where it was necessary to introduce moose hunting seasons in a number of zones in order to reduce the moose population and the number of moose/human conflicts. Between 2010 and 2016, 23,799 moose licences were issued to hunters in WMZ 1-47, including Saskatoon WMZ and Regina-Moose Jaw WMZ. Hunter success averaged approximately 83 per cent over a five year period (2012-2016). The Branch is developing a strategy to manage moose in all agricultural zones. The strategy will be based on the quantity of crucial moose habitat available**,** landowner tolerance (to moose and hunters) and public safety issues. The goal is to stabilize the population in all zones, minimize public safety concerns, and still allow moose to exist where sufficient habitat is available. The farmland moose research being undertaken will assist the branch in finalizing the management strategy.

Winter tick (*Dermacentor albipictus*) loads throughout the province, were moderate to low during the winter of 2015-16. The spring of 2016 had moderate tick-related mortality. There were no new cases of meningeal worm (*Parelaphostongylus tenuis*) west of longitude 106° in 2016. Meningeal worm continues to be of low concern for moose in the province.

Hunting Season Review

Moose continue to be an important big game species in Saskatchewan and hunting opportunities remained good in 2016. Several boreal wildlife management zones on the east side of the province saw reduced draw quotas due to concerns over lower moose numbers in those zones. Residents have the opportunity to apply for either-sex or antlerless licences through the Big Game Draw. All hunters can purchase regular “bull only” moose licences, while Canadian and non-resident hunters must purchase a Guided Moose Licence and hunt with an outfitter. Licence sales were slightly down in 2016 with 7,221 regular and 5,575 draw licences being sold in 2016, compared to the 7,556 regular and 5,687 draw licences sold in 2015 (Appendix A).

In 2016 a moose-specific Hunter harvest survey was sent to all licensed draw and regular moose hunters. The return rate was lower than expected. Results of this survey indicated that farmland zones continued to have high harvest success rates. Province-wide, cow and bull harvest were down slightly (Table 17). Bull harvest in 2015 and 2016 appear higher than previous years, but this is due to the fact that regular hunters were surveyed for the first time since 2009.

Table 17. Moose harvest in 2016 compared to the 5-year mean (2012–2016). Data not available is indicated by "---".

Year	Bull	Cow	Calves	Unknown	Total
2009	2,254	1,145	483	80	3,963
2010	---	---	---	---	---
2011	1,401	1,250	518	0	3,173
2012	1,721	1,518	598	0	3,836
2013	1,737	2,006	793	0	4,536
2014*	1,954	2,020	678	0	4,652
2015	3,115	1,800	574	0	5,489
2016	2,893	1,762	574		5,229
Mean	2,284	1,821	643	0	4,748

*Not all zones were surveyed and therefore estimate is derived from surveyed zones.

Research Initiatives

Between 2013 and 2016, a farmland moose research project was conducted in WMZs 22 and 23 (Figure 6). The study looked at habitat selection, home range size, seasonal and annual movement patterns, and assessed landscape features in relation to highway crossings. The initial stage of the project began with 19 female moose being fitted with GPS collars in February 2013. Another 21 animals were collared in March 2014. Hourly data locations were collected from each collar. Over 235,000 fix locations were collected during the study. Results of the research have been delayed but are expected in 2017. Preliminary findings suggest that home range size is considerably larger in the agricultural landscape than in the boreal forest. As predicted tree-ringed wetlands are of significant importance in the summer for thermoregulation (See Brook et al. 2016).

Figure 6. Farmland moose study area for research project. Red line depicts Hwy # 11. (Adapted from Brook 2014)

Management Objectives and Strategies

Long-term Management Objectives

- Maintain stable winter populations in moose management units (MMUs) 1, 3, and 6 to 19.
- Maintain the winter calf:cow ratio >40 calves/100 cows in all forest MMUs.
- Ensure moose are not adversely affected by land-use activities occurring in primary moose habitat.

- Provide hunting opportunities that Saskatchewan sport hunters will take advantage of on an annual basis.
- Manage moose population numbers in farmland MMUs and WMZs that recognize concerns of local residents.
- Increase communication of moose biology, ecology and management to the Saskatchewan public.

Short-term Management Strategies

- Update Management Plan for Moose (*Alces alces*) in Saskatchewan.
- Continue aerial surveys (population density and herd structure) within primary moose habitat on a four-year cycle.
- Focus on access control when addressing forest harvesting plans within the boreal plain ecozone.
- Evaluate harvest strategies within primary and secondary habitat to ensure both conservation and sustainable harvest levels are met.
- Continue with antlerless moose seasons to assist with stabilizing moose populations in agricultural WMZs.
- Complete management objectives for moose in agricultural landscapes.

Additional Information

Most recent provincial species plan:

Arsenault, A. 2000. Status and management of moose (*Alces alces*) in Saskatchewan. Saskatchewan Environment and Resource Management. Fish and Wildlife Technical Report 2000-01. 84pp.

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Pronghorn (*Antilocapra americana*)

Pronghorn, formerly known as antelope, are neither a deer, nor an antelope, but belong to their own separate family, Antilocapridae. This designation is a result of their unique horns, whose keratin sheath is shed annually and makes pronghorn the only species worldwide to do so. Pronghorn primarily inhabit the southwestern portion of the province, although large numbers are being detected in west-central regions (Figure 7). Generally found in semi-arid prairies, pronghorn prefer ecosystems with a mixture of grasses, forbs and shrubs to provide both forage and bedding cover, but will also capitalize on certain agricultural crops (e.g. pulse crops or tame hay) at various times of the year. Given pronghorns reliance on their excellent eyesight to avoid predators, habitat with low-growing vegetation is optimal for this species. Saskatchewan is the northern extent of the pronghorn range and as such, pronghorn are susceptible to the extreme environmental conditions at this latitude.

Population Status

Pronghorn populations are monitored annually using information gathered from Pronghorn Surveys, Hunter harvest survey, Saskatchewan Crop Insurance Corporation (SCIC) data and field reports from the general public, landowners and Ministry of Environment staff.

Survey Data

Ground-based surveys continued in 2016 (Table 18) and all 70 pronghorn routes were completed. The Great Sand Hills (PMU 3) and Govenlock (PMU 5) continue to see a positive population recovery and strong kid:doe ratios. Most other PMUs saw improvements in vital rates in 2016 and the provincial kid:doe ratio was encouraging at 44:100, showing good recruitment into the population. Overall, the population appears to be recovering from recent severe winters and, with milder weather patterns recently, should continue to increase.

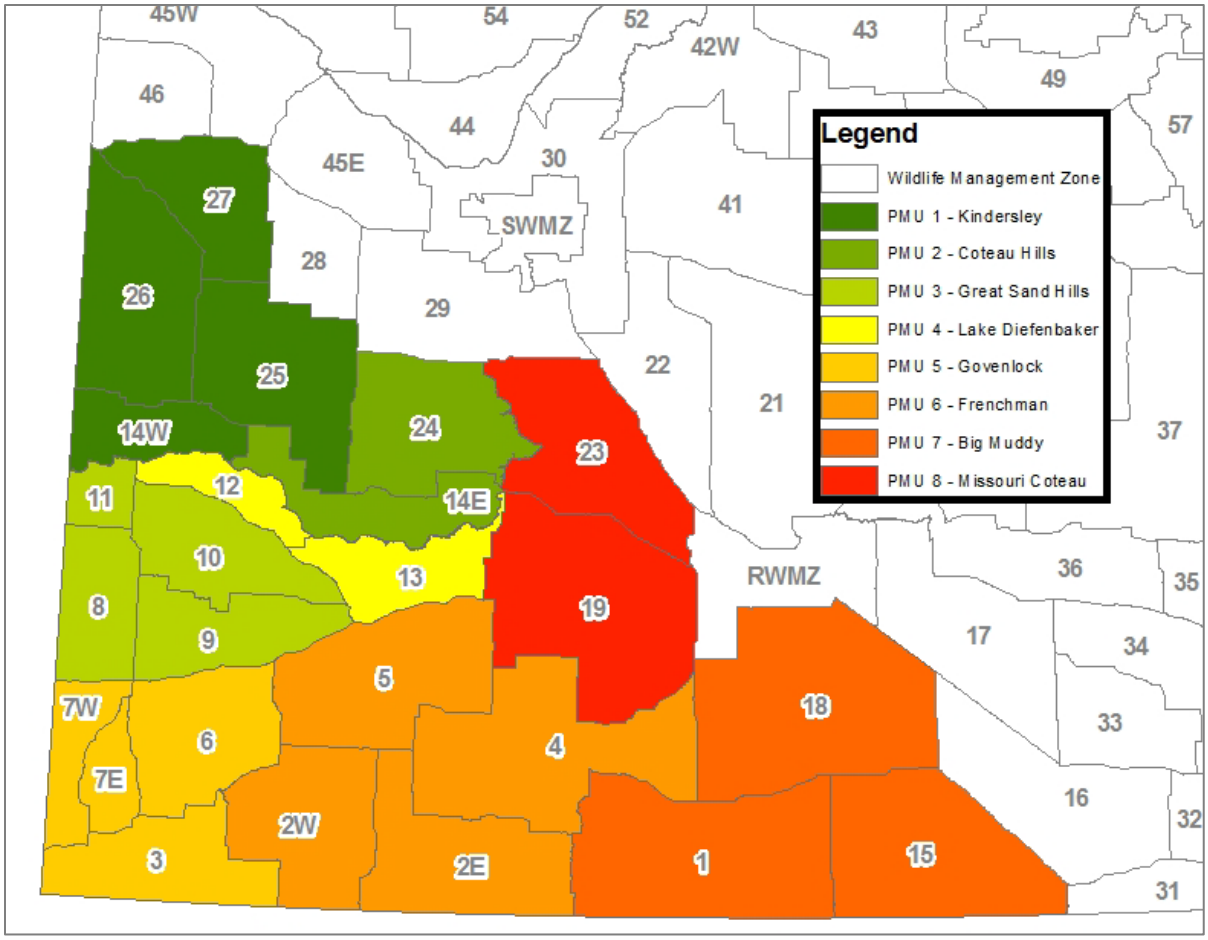

Figure 7. Pronghorn Management Units (PMUs) for Saskatchewan, 2016.

Table 18. Pronghorn herd structure survey results from 2015.

Year	PMU	WMZs	Bucks	Does	Kids	n
2016	1	14W, 25-27	28	49	21	98
	2	14E, 24	13	3	2	18
	3	8-11	57	156	80	293
	4	12-13	11	42	17	70
	5	3,6,7	34	92	36	162
	6	2,4,5	20	30	6	56
	7	1,15,18	15	12	4	31
	8	19,23	3	4	5	12
	Total		181	388	171	740

Biological Sample Collections

No biological samples were collected in 2016.

General Overview

Pronghorn populations continue to recover from the severe winters of 2010-11 and 2012-13. Three consecutive winters with limited snow cover and mild temperatures in southwest Saskatchewan are expected to result in an increase in populations. Surveys conducted in 2016 indicated increasing or stable populations within six of the eight management units. Field reports from hunters and conservation officers indicated that populations were higher in 2016 compared to recent years.

Hunting Season Review

Pronghorn hunting opportunities are restricted to Saskatchewan residents only. Pronghorn licences are awarded through the draw and successful applicants receive one either-sex tag. Opportunities have been limited in recent years due to low population numbers.

Draw licence numbers remained similar to 2015, with a total of 140 tags being offered through the 2016 big game draw. These values are well below average licence allocation for pronghorn prior to the most recent season closure. Hunter participation was strong for 2016 with 87 per cent of licences offered being purchased. Pronghorn harvest remains gender-biased, with more than 90 per cent of the harvest being bucks (Table 19) and harvest success remaining high.

Hunter harvest surveys were distributed to all pronghorn hunters in 2016. Harvest survey return rate was 36 per cent, which was slightly lower than the 38 per cent rate of return in 2015.

Table 19. Pronghorn harvest (2007–2016). Season has been closed since 2011. Data not available is indicated by "---".

Year	Bucks	Does	Kids	Unknown	Total
2007	723	57	6	3	789
2008	683	37	0	0	720
2009	1113	212	11	14	1350
2010	---	---	---	---	---
2011			CLOSED		
2012			CLOSED		
2013			CLOSED		
2014			CLOSED		
2015	131	2	0	0	133
2016	114	6	0	0	120

Research Initiatives

No research initiatives were conducted during this time period.

Management Objectives and Strategies

Long-term Management Objectives

- Survey pronghorn populations annually to obtain current data to inform management decisions.

Short-term Management Strategies

- Increase pronghorn populations and harvest opportunities within the confines of social tolerance.
- Update the Saskatchewan Pronghorn Management Plan to provide guidance and structure to management of pronghorn in the future.
- Promote the Hunter harvest survey to hunters to increase response rate from current levels.

Additional Information

Most recent provincial species plan:

Arsenault, A. 2007. Management strategy for pronghorn (*Antilocapra americana*) in Saskatchewan. Saskatchewan Ministry of Environment. Fish and Wildlife Technical Report 2008-01. 34pp.

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Black Bear (*Ursus americanus*)

Black bears are a sought-after prize by resident and non-resident hunters, alike. Black bears can live in a variety of habitats, but generally prefer the dense woods of the mixed-wood or boreal forest. Requiring significant amounts of food, particularly in the fall when building up fat reserves to survive hibernation, bears will utilize habitat with thick underbrush of berry and nut-bearing plants, which are often found along valleys and other waterways. Black bears will also utilize man-made food sources and can often be found feeding in garbage dumps and campsites. The black bear range extends from throughout the north southward in the Parkland ecoregion as far south as the eastern Qu'Appelle River system in Saskatchewan.

Population Status

Saskatchewan black bear populations are monitored based primarily on data from the hunter harvest survey the current version of which was initiated in 2015. These data are supplemented by reports from hunters, ministry staff and from crop and bee-yard damage compensation data provided by SCIC.

Survey Data

Hunter harvest survey data for Saskatchewan and Canadian residents are presented in Table 20 and 21. Harvest data from non-residents of Canada are summarized in Table 22. The hunter harvest response rate for Saskatchewan resident bear hunters in 2016 was 29 per cent, up from 16 per cent in 2015. The harvest response rate for Canadian residents was 18 per cent compared with 14 per cent in 2015.

Of the 1209 licensed resident bear hunters who responded to the hunter harvest survey, 247 (20 per cent) did not hunt bear in 2016 compared with 14 per cent in 2015. If extrapolated to the total number resident licensed bear hunters in 2016 this would suggest that 829 individuals purchased bear licences but did not hunt bear compared with 616 in 2015. Of the 962 respondents who did hunt bear, 236 harvested an animal indicating a harvest rate of 25 per cent (down from 33 per cent in 2015). The break-down of colour phase harvested was black 171 (142 in 2015), brown 41 (33), cinnamon 18 (15) and blond 6 (2).

Hunter harvest survey respondents were asked to indicate the type of weapon they hunted with and could indicate multiple types as applicable. Most hunters used a rifle (45 per cent compared with 40 per cent in 2015) followed by a bow (43 per cent compared with 47 per cent in 2015), with all others combined at 12 per cent (13 per cent in 2015). Of the 236 bear reported harvested 48 per cent were taken with a bow (53 per cent in 2015), 39 per cent with a rifle (33 per cent in 2105) and 13 per cent with other weapons combined (14 per cent in 2015).

Hunters who hunted bear in the same wildlife management zone in both 2015 and 2016 were asked to provide their impression of the difference in populations between the two years. Of 769 who met the criteria, 45 per cent (432) felt the population had stayed constant compared with 53 per cent in 2015, 26 per cent (247) felt it had increased either significantly (84) or slightly (163) compared with 38 per cent in 2015 and 9 per cent (90) felt it had decreased either significantly (14) or slightly (76) the same as in 2015.

Biological Sample Collections

Saskatchewan currently has no biological sampling program for black bear.

General Overview

Based on anecdotal evidence collected during the period it appears that bear populations were generally stable or increasing. Increases were mainly reported in the east-central and southeast areas. This trend is consistent with most jurisdictions across the North American black bear range.

Hunting Season Review

Black bears in Saskatchewan are hunted under a regular licence during spring (April to June) and fall (August to October) seasons. Each hunter, regardless of residency, may take one bear of either sex, with the exception of taking a female bear that has young-of-the-year cubs at her heels. Non-residents are required to use the services of a licensed outfitter while hunting bears.

Saskatchewan resident licence sales fell slightly to 4,151 in 2016 after a steady increase that began in 2006 at 1,954 licences and reached 4,408 in 2015. Canadian resident sales were nearly stable, decreasing from 248 to 228, while non-resident licence sales began to increase from a decade low of 1,520 in 2012 to 1,759 in 2016 (Appendix A).

Resident harvest undoubtedly increased during this time (Table 20), but the absence of harvest data from 2010 to 2014 prevents determining the details of this trend. The reversal in the decline of non-resident hunters is also assumed to have resulted in an increased harvest. Hunter harvest data confirmed that resident harvest had risen proportional to the increased licence sales. Licence sales during the period 2010 through 2015 increased by 40 per cent, while harvest between those years increased by 38 per cent.

Table 20. Resident black bear harvest in 2007 through 2016. Data not available is indicated by "---".

Year	Boars	Sows	Cubs	Unknown	Total
2007	527	86	6	0	618
2008	443	130	7	14	594
2009	663	156	29	44	892
2010	---	---	---	---	---
2011	---	---	---	---	---
2012	---	---	---	---	---
2013	---	---	---	---	---
2014	---	---	---	---	---
2015	965	251	19	---	1235
2016	682	117	10	---	809

Table 21. Canadian Resident Black Bear Harvest in Saskatchewan, 2015-2016.

Year	Boars	Sows	Cubs	Unknown	Total
These data were not previously available					
2015	58	15	0	---	73
2016	51	23	0	---	74

Research Initiatives

A literature review was conducted in 2015 that focused on methodologies for sampling and modelling with an objective to identify the most reliable methods for assessing bear populations going forward. Results were presented in a 2016 report and these will be used when developing the black bear management plan in 2017.

Management Objectives and Strategies

Long-term Management Objectives

- Continually define the provincial range of black bears.
- Define bear habitat across the province.
- Assess black bear population trend.
- Monitor hunter harvest and other related mortality.
- Create long-term management units.

Short-term Management Strategies

- Assess population status and trend by monitoring trends in harvest rates from the hunter harvest survey and supporting or encouraging dedicated research on bear populations.
- Compile and map observations of black bears outside of their existing normal range in order to document the extent of range expansion.
- Design management units based on regional differences in habitat quality, hunting popularity, and human land use.

Additional Information

Most recent provincial species plan: None available.

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Table 22. Non-resident black bear harvest in 2000 through 2015. Data not available is indicated by "---".

Year	Hunters	Harvest						M:F	C:F	Average Age		Color Phase Black:Off Color
		Spring	Fall	Total	Males (%)	Females (%)	Cubs (%)			Males	Females	
2000	2508	1477	265	1742	67.7	31.8	0.5	2.13	0.02	5.38	7.04	2.57:1
2001	2491	1168	149	1731	66.9	32.2	0.9	2.08	0.03	5.55	6.69	2.84:1
2002	2592	1561	251	1812	69.8	30.1	<0.1	2.32	0.002	4.31	5.86	3.22:1
2003	2476	1553	248	1801	68.5	31.1	0.4	2.21	0.01	4.56	6.46	3.34:1
2004	2478	1618	246	1864	72.8	26.4	0.7	2.76	0.03	4.59	6.45	3.05:1
2005	2449	1446	225	1780	67.1	30.9	0.3	2.17	0.01	4.64	6.01	3.41:1
2006	2368	1405	162	1613	69.1	28.6	0.2	2.41	0.01	5.08	6.50	3.38:1
2007	2244	1366	167	1577	69.4	28.9	---	2.4	---	5.08	6.14	3.91:1
2008	2021	1169	193	1381	70.2	28.4	---	2.47	---	5.17	5.94	4.30:1
2009	1594	999	112	1112	72.4	26.4	---	2.74	---	5.00	5.96	4.17:1
2010	1439	938	136	1074	69.5	28.7	---	2.42	---	---	---	4.11:1
2011	---	---	---	---	---	---	---	---	---	---	---	---
2012	---	---	---	---	---	---	---	---	---	---	---	---
2013	---	---	---	---	---	---	---	---	---	---	---	---
2014	---	---	---	---	---	---	---	---	---	---	---	---
2015	---	---	---	---	---	---	---	---	---	---	---	---
2016	---	---	---	---	---	---	---	---	---	---	---	---

* Data from 2011 – 2016 were being entered at the time of this report and will appear in the 2017 report.

Barren-ground Caribou (*Rangifer tarandus groenlandicus*)

Caribou, a medium-sized member of the deer family, are unique in that both males and females carry antlers. Caribou are well-adapted to the northern regions of the continent, with large, concave hooves that function well to support the animal in deep snow and are efficient scoops when the caribou paws through the snow to uncover its primary food source, lichens. Although specializing on lichens in the winter, caribou shift to green vegetation with higher protein content come spring. Disease, accidents, wolves and humans are the major sources of mortality for caribou. Disturbance, habitat loss and alteration are also important limiting factors on caribou populations over the long-term.

Caribou are split into four subspecies. About half of the caribou in Canada are barren-ground caribou, a smaller and lighter-coloured subspecies of caribou. The ranges of at least three barren-ground caribou herds extend into Saskatchewan, the Beverly, Qamanirjuaq, and occasionally the Bathurst herds. In the late 1980s, retired Government of Northwest Territories (GNWT) biologist Anne Gunn (pers. comm.) named a migratory population of caribou that calved in the Queen Maud Gulf area of the Arctic coast, the Ahiak Herd. From locations of collared females of this population, she found that their range extended south into Saskatchewan and overlapped to some extent with the traditional Beverly Herd range. More recently, biologists John Nagy and Mitch Campbell contend that what she identified as the Ahiak Herd was actually the Beverly Herd using a more northerly calving ground. The current official position of the GNWT and Government of Nunavut is to identify a non-migratory population of caribou that are located along the Arctic coast as the “Ahiak Herd”. All herds calve in Nunavut and portions of the herds migrate into northern Saskatchewan during the winter months (November to March). The Beverly herd typically migrates into northwestern and north central Saskatchewan, sometimes migrating as far south as Carswell Lake and Cree Lake. The Qamanirjuaq Herd migrates into north eastern Saskatchewan from the east, sometimes ranging as far south as the Churchill River. There appears to have been a gradual retraction northward over the past 50 years, especially in the western and central parts of their Saskatchewan range. See map of range (Figure 8).

Figure 8. Barren-ground caribou range map.

Population Status

The monitoring of barren-ground caribou populations is informed by western scientific, local and Indigenous Traditional Knowledge. Contributors include Indigenous people living in caribou range, the Beverly and Qamanirjuaq Caribou Management Board (BQCMB), and professionals working for the various governments presiding over the jurisdictions caribou use. The results of monitoring are documented by the BQCMB and other researchers in the BQCMB Management Plan, land-use plans and protected area strategies.

Population size for each herd is estimated from data collected by June calving ground and spring and fall composition surveys. An effort is made to estimate recruitment of calves into the population each year from spring composition surveys conducted in April. Calving grounds are delineated by reconnaissance flights yearly if possible, cow:calf ratios estimated from the sample. Calving grounds are stratified into high, medium and low concentrations of calving females prior to calving ground population surveys undertaken at longer intervals (i.e. every 2-6 years). Aerial photography of caribou on the calving grounds and visual surveys using double observers in aircraft flying transect strips at different widths depending on prior stratification are the principal methods used to estimate the number of breeding females in the population.

Up to fifty caribou are collared in each population that includes adults of both sexes, but predominately females. Satellite tracking of collared caribou is used to track their movements, map their distribution, estimate adult female and male mortality, locate concentrations of caribou for composition and calving ground delineation/reconnaissance surveys, and to identify important habitats (i.e. migration corridors, water crossings, calving grounds, post-calving areas).

Survey Data

The Qamanirjuaq Herd was most recently surveyed for population size in 2014, resulting in a preliminary estimate of 264,000 ±21,120 caribou. This represents a statistically-significant decline of approximately 80,000 caribou from 2008. High density areas were photo-surveyed while medium and low density areas were visually surveyed using double paired observers and published results are forthcoming in 2015. Recruitment surveys conducted on this herd since 1998 have shown an overall decline in recruitment and at levels well below the comfort level of 30 calves: 100 cows. It appears that pregnancy rate has also declined probably due to nutritional stress of the breeding females.

A population survey of Beverly – Ahiak calving ground complex was completed in June 2011 along the Queen Maud Gulf (QMG) coast of Nunavut (Table 23). As part of this survey the traditional Beverly calving ground and QMG coast were delineated by widely spaced transects to locate calving caribou and stratify the calving grounds by density. Spring recruitment and calving ground reconnaissance surveys were completed in 2012, 2013 and 2014. No females with calves were observed on the traditional Beverly calving ground and overall, very few caribou were seen there in June 2012. Results of these surveys indicated good recruitment of the Beverly herd, few to no calving caribou on the traditional Beverly calving grounds, and similar distribution and densities of calving caribou and calves on the Queen Maud Gulf calving ground.

Biological Sample Collections

No biological data from this time period is currently available.

Table 23. Population surveys of Beverly and Qamanirjuaq Herds between 1967 and 2014. Estimates before 1982 were visual surveys conducted on calving grounds and were based on the number of breeding females. Data not available is indicated by "---".

	Beverly Herd		Qamanirjuaq Herd	
Year	Population Estimate	Breeding Female Estimate	Population Estimate	Breeding Female Estimate
1967	159,000*	---	---	---
1968	---	---	63,000	22,000
1971	210,000*	---	---	---
1974	177,000*	---	---	21,403
1976	---	---	43,800	15,380
1977	---	---	44,095	14,787
1978	131,000	---	---	---
1980	100,000	---	39,000	13,000
1982	193,000**	---	180,000**	41,000
1983	---	---	230,000 ± 59,000**	71,000
1984	262,000**	---	---	---
1985	---	---	272,000 ± 142,000**	97,000
1988	189,000**	---	221,000 ± 72,000**	99,000
1994	276,000**	---	495,665 ± 105,426**	215,158
2008	---	---	348,661 ± 48,861**	156,784
2011	124,189 ***	52,825	---	---
2012	---	---	---	---
2014	---	---	264,000 ± 21,120****	100,000

*Estimates from visual surveys conducted on caribou range but not on calving grounds, and not based exclusively on numbers of breeding females.

**Estimates from photographic surveys conducted on calving grounds and based on numbers of breeding females. Photo surveys consistently produce much higher population estimates.

***Estimates from use of visual survey technique with double observers and very high confidence, low error but qualify that assume all Beverly and not mixed with a formerly defined "migratory" Ahiak Herd

****Estimates from photographic surveys of high density stratum of calving grounds and from use of visual surveys with double paired observers of medium and low density strata, and very high confidence, low error

General Overview

There is ongoing concern about the Beverly Herd whose winter range use in Saskatchewan has retracted northward out of the province into the Northwest Territories (NWT), and that this herd has all but disappeared with stragglers joining a more northerly herd. The Qamanirjuaq Herd has expanded its use of winter range in the NWT immediately adjacent to the northern portions of Saskatchewan, to overlap with the forested part of the historic Beverly herd winter range, but has not expanded its use of winter range in Saskatchewan.

Latest results of the 2014 population surveys and long-term calf recruitment data confirm a decline. Industrial activity on the calving grounds of the Qamanirjuaq Herd is a significant concern at this time. Approvals for infrastructure-rich exploration establishments have occurred on occupied portions of the calving grounds despite appeals from the BQCMB and grassroots organizations not to approve such activity. In addition, a crash in the caribou population on Baffin Island has led to more hunting of mainland arctic caribou herds including the Qamanirjuaq Herd. Internet sales have increased tremendously whereby hunters from the mainland hunt caribou for re-sale to people requesting meat over the internet on Baffin Island. This is legal in Nunavut and NWT and is called inter-settlement trade.

The state of Saskatchewan's portion of caribou winter range continues to be a major source of concern for the BQCMB and caribou-using peoples from northern Saskatchewan. Much of the range has succumbed to forest fire in recent decades, setting back succession to the mature forest states preferred by caribou. This is likely contributing to range retraction, in combination with the increase in human activity in the Athabasca, Cree Lake and Wollaston Lakes regions in recent decades. Caribou were absent from the province in the winter months of 2016, but returned later in the year (fall 2016) along the Saskatchewan/NWT border from Scott Lake east to Selwyn Lake.

Hunting Season Review

Only permanent residents of WMZ 76 may purchase a license to hunt barren-ground caribou. They are entitled to purchase a maximum of two either-sex licenses. A total of 20 licenses were purchased in 2016. (Appendix A).

Barren-ground caribou are highly valued by several northern native cultures and continue to be their primary food source, which they harvest under treaty or métis rights. The estimated value of the harvest is $20 million annually (InterGroup Consultants Ltd. 2013). Data on subsistence harvest is not presently collected, but in 2015 subsistence hunters were thought to be numerous, coming mainly from Wollaston, Black Lake and Fond Du Lac and some additional hunters from Stony Rapids, Southend, Stanley Mission, Uranium City, Fort Chipewyan and Grandmother's Bay. Anecdotally, it has been estimated that two to three thousand caribou have been harvested, mostly in the Wollaston Lake area. Harvest pressure is often higher than usual in years when caribou migrate close to communities.

Harvest Monitoring

A partnership was initiated between the Ministry of Environment, Prince Albert Grand Council (PAGC) and GNWT in 2009 to undertake community-based monitoring in the Athabasca communities, part of which was intended to document harvest. Tina Giroux (ADNDC) was the biologist hired to co-ordinate the monitoring and began a program to have harvest monitored by the communities themselves and results shared based on approval by the range communities (Athabasca Denesuline). The partner named as PAGC changed to Athabasca Denesuline Né Né Land Corporation (ADNLC). The ministry pulled out of the partnership in 2012 and GNWT in 2016. ADNLC was therefore not able to share harvest data with its former two partners in 2016. However, a data sharing agreement between ADNLC and the BQCMB is currently under development. Tina Giroux set a target of getting 100 hunters involved in harvest reporting from each of the communities and reached that target in 2016. She believes this will account for 90% or better of the harvest each year.

In addition, conservation officers have patrolled in the Wollaston Lake, Black Lake and Fond Du Lac areas to check hunter kills for signs of wastage where front quarters of animals were sometimes left behind, and/or others portions of edible meat not retrieved before scavengers made it unsuitable. The officers reported an increase in non-retrieval from previous years. Based on their reports, it is estimated there was approximately 10 per cent wastage of hunter-killed barren-ground caribou in the Wollaston Lake area in 2012. This was lower than expected in comparison to a previous estimate of 25 per cent used by the BQCMB.

The Beverly and Qamanirjuaq herds are managed with advisement from the BQCMB, while the Bathurst and Ahiak herds are managed through Territorial processes. The BQCMB consists of 13 members from the Northwest Territories, Nunavut, Manitoba, Saskatchewan, and Indian and Northern Affairs Canada. Eight of those members represent aboriginal communities on the range.

Research Initiatives

The ministry was involved in an advisory capacity with some research initiatives conducted by the BQCMB during this time period, including recruitment and calving ground delineation surveys.

Management Objectives and Strategies

The BQCMB produced and recently updated the management plan for the Beverly and Qamanirjuaq herds. Our representative on the board along with one community representative (Dennis Larocque) participated in revising the plan to ensure that it meets ministry expectations. Saskatchewan has adopted this plan which can be found on the BQCMB website. Action plans are directed at maintaining and monitoring healthy, sustainable populations at levels adequate for continued subsistence harvest and other uses, if herd size allows, while protecting important caribou habitat, such as calving grounds, from human disturbance.

Long-term Management Objectives

Management of these herds is based on the management plan produced by the Beverly and Qamanirjuaq Caribou Management Board. Thirty-four objectives and their actions are divided among nine goals. The following are goals from that plan (Beverly and Qamanirjuaq Caribou Management Board 2005) are:

- To conserve the Beverly and Qamanirjuaq Herds in a co-operative manner.
- To strengthen support for caribou conservation.
- To increase knowledge of barren-ground caribou and the caribou-human system.
- To monitor caribou population status over time.
- To monitor the harvest of caribou.
- To maintain the Beverly and Qamanirjuaq Herds within their natural range of abundance.
- To maintain adequate amounts of high-quality habitat.
- To manage for the sustainable use of caribou.
- To manage human land use in a way that protects Beverly and Qamanirjuaq caribou and their habitats.

Short-term Management Strategies

The following are strategies taken from those in the BQCMB management plan that the ministry is best able to act upon during this period.

- Use all forms of knowledge, including Local and Traditional Knowledge (Aboriginal Traditional Knowledge/Inuit Qaujimajatuqangit-IQ) and scientific knowledge.
- Develop additional ways for residents of caribou range communities to be involved in monitoring and management actions.
- Maintain and enhance the profile of the BQCMB and caribou issues in range communities.
- Increase awareness of caribou issues and the BQCMB.
- Increase knowledge of land use on the range and impacts on caribou and their habitats.
- Secure funding to adequately monitor both herds.
- Undertake harvest monitoring.
- Develop and apply a technique for estimating harvest levels.
- Re-affirm geographic and demographic boundaries for the herds.
- Strive for protection of key habitats important to caribou.
- Identify and strive for sustainable hunting practices.
- Monitor and assess the impacts of human land use on habitats.
- Describe/evaluate the impact of new and existing roads accessing caribou habitat.
- Support and contribute to land use plans, and encourage land use planning across the range.
- Screen key land use proposals for potential effects on caribou and range.
- Provide guidance on development proposals and environmental assessments where there are potential impacts on caribou.

Additional Information

Most recent provincial species plan: Based on the Beverly and Qamanirjuaq Caribou Management Plan (www.arctic-caribou.com).

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Woodland Caribou (*Rangifer tarandus caribou*)

Woodland caribou are the second subspecies of caribou occurring in Saskatchewan. The largest and darkest of the caribou, woodland caribou are characterized as being sedentary, but this varies among individuals and bands. Some individuals move only a few kilometres seasonally, while others may be significantly more nomadic. Woodland caribou are found extensively across Canada's north, and are present throughout Saskatchewan's boreal forest (Figure 9). The widespread boreal population of woodland caribou, which includes those individuals occurring in Saskatchewan, was listed as threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 2000.

Population Status

Woodland caribou populations in the province are currently assumed to be part of a continuous distribution. Local populations have not been identified, but distribution patterns are emerging where sufficient information is available. Figure 9 illustrates the current provincial range and identifies two conservation units: Boreal Shield and Boreal Plain. These units represent a compromise with the federal assessment of Saskatchewan populations where it is mutually agreed that we do not have information that identifies geographically distinct local populations, but that habitat characteristics and patterns of range use differ between the Boreal Shield and Boreal Plain sections of the provincial range. It also recognizes that we have insufficient data from the Boreal Shield Conservation Unit to determine population status and range condition. There is sufficient information from the Boreal Plain Conservation Unit to determine that range condition is such that caribou are at risk of not being self-sustaining. While there is some population status data for this unit that can inform conservation efforts, a better geographic distribution of population data is required. Woodland caribou in Saskatchewan are monitored using an assortment of information provided by area biologists and field staff, knowledgeable public from communities residing in the woodland caribou range, industry working in these regions, provincial and federal recovery strategies and related documents, as well as research on woodland caribou from both within Saskatchewan and from other regions.

Survey Data

Caribou fecal pellets were collected in conjunction with aerial reconnaissance surveys conducted in SK2 (Figure 9) in 2013, 2014, 2015, and 2016. This effort will contribute to an understanding of caribou distribution, compilation of unique individuals and their relatedness to each other, as well as among bands of caribou across the province. It will also inform on the level of connectivity within the provincial distribution and with neighbouring jurisdictions. Further analysis to reveal gender, pregnancy rates, and pedigree will inform on population condition based on how productive females are and how many males and females breed over time, relative to what the population needs to be sustainable.

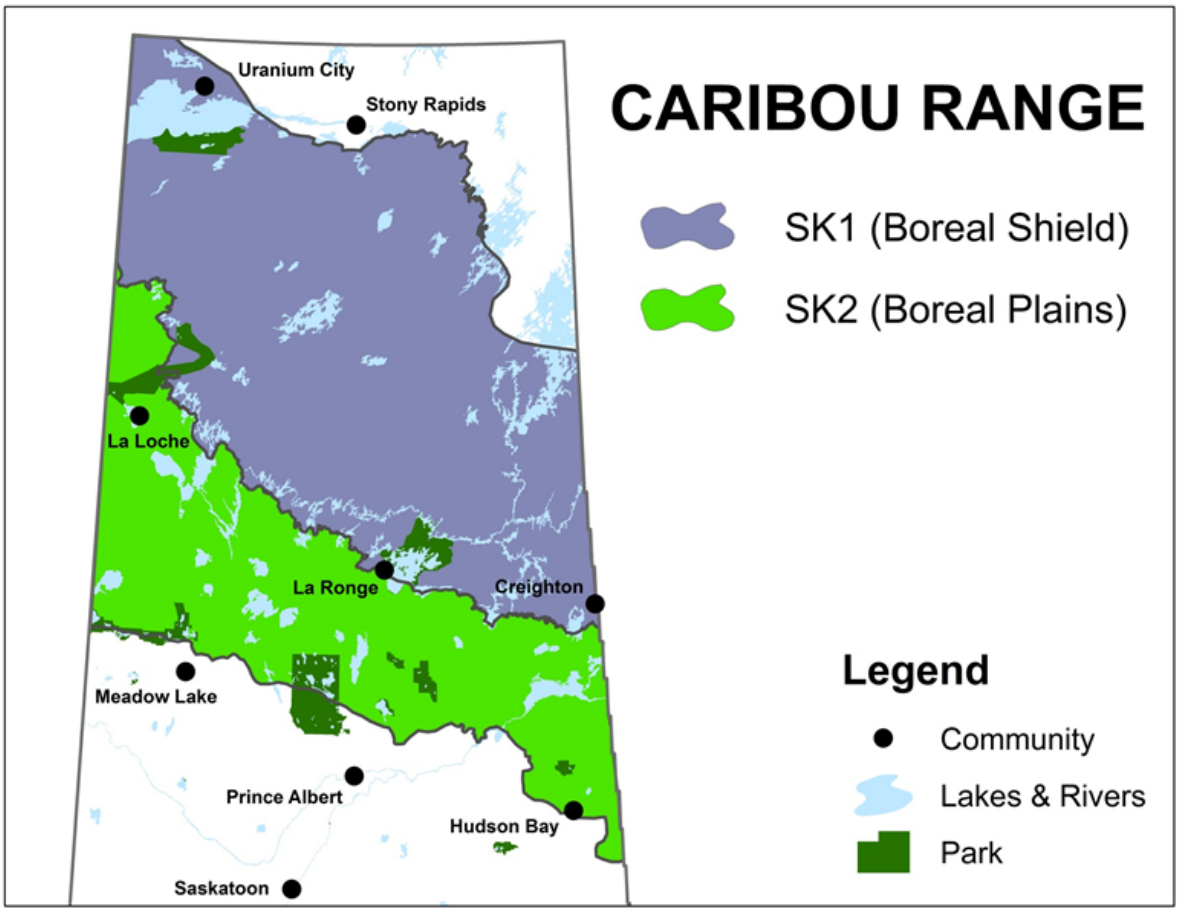

Figure 9. Woodland caribou range in Saskatchewan (Saskatchewan Ministry of Environment 2012).

Biological Sample Collections

Fecal pellets have been collected (~1000 samples to date) for DNA analysis as part of the landscape genetics project. Blood and tissue samples have also been taken from 150 caribou collared in the Boreal Shield for purposes of obtaining genetic profiles and diet through stable isotope analysis.

General Overview

The health of woodland caribou populations, particularly in the Boreal Plain, is in question. Forest management planning for much of the Boreal Plain has commenced and would see an increase in forest harvesting, including in some sensitive caribou areas. In addition to this development, multi-national peat harvesting companies have increased their exploration activities, some of which directly overlap with prime caribou habitat and would see alteration of that habitat to a condition that would be unsuitable for caribou for the next hundred years or more. For example, one of these companies has requested approval to initiate full-scale harvesting in the Pasquia Bog where there is a well-known caribou population straddling the Saskatchewan/Manitoba border east of Hudson Bay.

Within the Boreal Shield, upcoming uranium mining and associated long-distance road networks will be examined with industry participation to determine their effects on local caribou populations and habitat.

The National Boreal Caribou Recovery Strategy was released in September 2012 and included provincial obligations to collect population data on caribou, particularly in the Boreal Shield, as well as direction to undertake range planning in the Boreal Plain that would direct human land use to ensure sustainable caribou populations, while maintaining a minimum of 65 per cent undisturbed critical habitat at any given time in the future. As a result, the ministry embarked on a set of directed studies in response to the federal recovery strategy for the boreal population of woodland caribou.

The Provincial Woodland Caribou Management Team held a final meeting in February 2012 and approved a draft provincial strategy that subsequently was re-named to be a provincial conservation strategy. It has since been approved by the Minister of Environment and is the guiding document for management. The directed studies mentioned above were developed by a Woodland Caribou Technical Committee (WCTC) contrived by the ministry to bring together experienced researchers with an interest in pursuing research in the province according to guidance provided by the ministry. The WCTC is not representative, but combines the ministry staff most directly involved in management with outside researchers and together they developed the directed studies. An integrated internal Woodland Caribou Working Group has also been established with representation from Fish and Wildlife, Environmental Assessment, Technical Resources, Fire Management, Sustainable Lands, Forest Services and Communications branches, as well as the Ministry of Economy.

Management for woodland caribou via habitat will be guided by “range plans” of which the first is underway in the central part of the Boreal Plain. These plans will address how the province meets the federally prompted goal of attaining and maintaining a minimum undisturbed habitat of 65 per cent. Range planning commenced in January 2015 within SK2 Central of the Boreal Plain part of the provincial range known as SK2. This conservation unit was divided into SK2 West, SK2 Central, and SK2 East. Representatives of First Nations, Métis Locals and a wide variety of stakeholders, including industry, join the ministry and other government staff at range planning tables every three or four months to share information and discuss development of the range plans. This process has also triggered the Duty to Consult based on ministry guidelines.

Hunting Season Review

Regulated harvest was closed province-wide in 1987 in response to concerns of declining populations and remains closed today. Sustenance harvest continues, but it is unclear to what degree.

Research Initiatives

Cameco completed its caribou collaring study around Key and Cree Lakes that would help them address concerns about industrial disturbance to caribou and habitat. Results of that effort are yet to be released. Their fieldwork will also be combined with the University of Saskatchewan-led collaring study in the Boreal Shield and will also help to gain a better understanding to what extent natural disturbance (i.e. wildfire burns) affect caribou persistence. An interim report was produced describing results from

the first two years of the Uof S study (McLoughlin et al. . Preliminary conclusions resulting from that report are: 1)habitat is relatively pristine with low levels of anthropogenic disturbance compared to other parts of Canada; 2)despite frequent wildfires in the last 40 years, large tracts of high-quality habitat remain and are available to caribou; 3)some of the highest densities of boreal caribou in Canada were observed (36.9 caribou/1000 km² or approximately 3380 caribou in the study area extrapolated to ~5000 in SK1 – Boreal Shield); 4)wolf densities that appear to be low with much larger territories than observed elsewhere (3.5x) and very low moose densities; 5)very low human hunting pressure; 6)caribou population characterized by high adult female survival (>0.90) and moderate-low recruitment (~0.20 calves per 100 females) but high pregnancy rates (~0.90); 7)a large herbivore population experiencing density-related constraints on further population growth; and 8)age and sex structure combined with survival and reproductive rates indicative of a stable to slightly increasing population.

Genetic research based on pellet collections (mainly SK2) and blood samples (SK1) is showing weak population structure within the southern part of the boreal plain, but overall a continuous distribution of caribou provincially which indicates a relatively-well genetically-connected population characterized by Isolation by Distance (Priadka, 2015). Figure 10 illustrates the results as genetic clusters that are closely related with adjacent clusters, and less closely related to distantly located clusters.

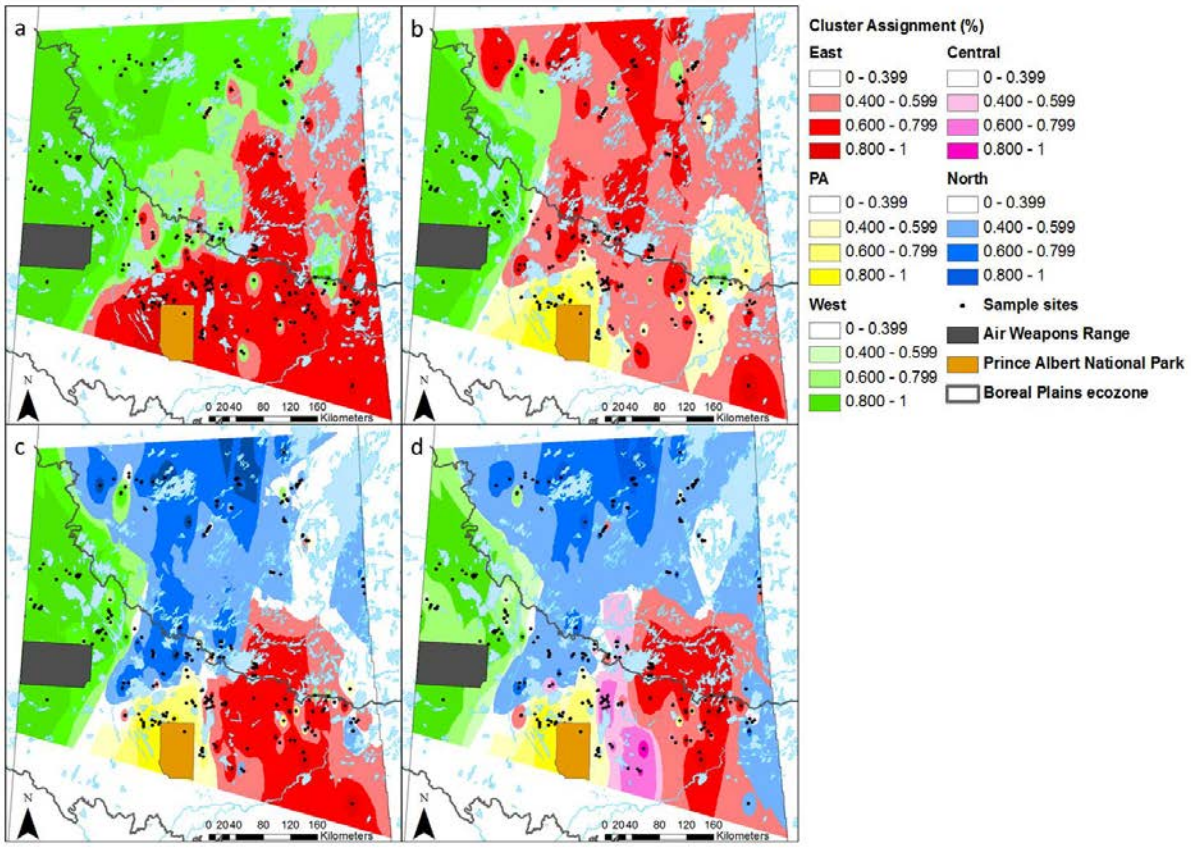

Figure 10. Genetic Population Structure (d) is the preferred depiction based on cluster assignments.

Pellet collections are currently focused on the Boreal Plain portion of the provincial range and will help to understand how the caribou distribute themselves and are influenced by anthropogenic and natural disturbance.

In the Boreal Shield, baseline data is needed and being sought through University of Saskatchewan-led research using telemetry on caribou, wolves and black bears and through vegetation sampling in conjunction with wildfire burns to determine successional pathways after fire and how that relates to caribou movements, distribution and persistence.

A researcher from the U of S has documented Aboriginal traditional knowledge and local knowledge about caribou and caribou habitat. The final report will be available shortly. There is also a dedicated engagement process for ensuring that the public and all others concerned are kept abreast of woodland caribou issues, research and management action.

Management Objectives and Strategies

To sustain and enhance woodland caribou populations and maintain the ecosystems they require throughout their current range.

Long-term Management Objectives

- Develop range plans for each conservation unit.
- Delineate critical habitat for woodland caribou in the Boreal Plain Conservation Unit by 2014 and the Boreal Shield Conservation Unit by 2016.
- Develop or adopt a cumulative effects model in collaboration with industries and other interested parties.
- Link Range Plans with Land Use Plans in collaboration with stakeholders and Aboriginal groups.
- Develop integrated access management plans for each Woodland Caribou Conservation Unit (WCCU).
- Develop a wildfire suppression plan for caribou range.
- Evaluate the long-term effects of climate change on woodland caribou population status, and its effect on caribou habitat and use.
- Establish a reporting system that will identify proposed developments and activities within any WCCU (with impacts to be assessed through cumulative effects model).
- Contribute to forest insect/disease management planning.
- Assess caribou population demographics and trends, beginning with high-risk areas.
- Establish and promote a formal program for collection of track, sighting and telemetry data.
- Monitor health and condition of woodland caribou.
- Analyze genetic variation in and among caribou populations.
- Collaborate with First Nations and Métis with an interest in caribou and caribou range to develop effective conservation practices
- Collaborate with neighbouring jurisdictions in managing for trans-boundary caribou populations
- Collaborate with industries and recreation groups to develop best management practices for caribou and critical habitat.

- Investigate methods of population estimation.
- Complete the process of and finalize listing Woodland Caribou as a provincial species at risk.

Short-term Management Strategies

- Commence delineation of critical habitat starting with examination of forest ecosites to identify those preferred by caribou.
- Identify habitat and local population connectivity issues across the Boreal Plain conservation unit through landscape genetics.
- Formalize and improve the sighting and track reporting program.
- Identify and formalize methods for determining population size and trend.

Additional Information

Most recent provincial species plan:

Saskatchewan Environment. 2007. Recovery Strategy for Boreal Woodland Caribou (Rangifer tarandus caribou) in Saskatchewan. Saskatchewan Environment. Fish and Wildlife Technical Report 2007. 46pp. (Unpublished)

McLoughlin, Phil et al. 2016. Population dynamics and critical habitat of woodland caribou in the Saskatchewan Boreal Shield. Department of Biology, University of Saskatchewan; Interim Project Report, 2013-2016. 162 pp. (Unpublished).

Priadka, Pauline. 2015. Genetic Connectivity of Boreal Woodland Caribou (*Rangifer tarandus caribou*) in Central Canada. Faculty of Graduate Studies of The University of Manitoba; Thesis for the degree of Master of Natural Resources Management. Natural Resources Institute. Winnipeg, Canada. 125 pp.

Mamun, Abdullah Al and Ryan Brook. 2017. Characterizing, Mapping and Modelling Aboriginal Traditional Knowledge about Woodland Caribou in Saskatchewan in Support of Range Planning. Final Report to the Saskatchewan Ministry of Environment. University of Saskatchewan. 119 pp. (Unpublished)

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Plains Bison (*Bison bison bison*)

Plains bison are the largest wild land mammal in North America with adult males ranging in weight from 600 to 850 kg and standing nearly two metres at the shoulder (Caras 1967). They are distinguished by their large head, rounded shoulder hump, broad snout, and short stout black horns that curve upward. The front quarters are heavier than the hind quarters, with the head and front shoulders being covered in a heavy long wooly pelage. Plains bison are sexually dimorphic, with females smaller than males. In Saskatchewan, plains bison are found in two distinct locations (Figure 11), described as the McCusker River population (Figure 12) and the Sturgeon River population (Figure 13).

Population Status

Plains bison were extirpated from Saskatchewan in the late 19th century. In 1969, 50 plains bison (36 females and 14 males) were obtained from Elk Island National Park of Canada and released north of the Thunder Hills near Meyakamew Lake, which is approximately 60 km north of Prince Albert National Park (PANP). These animals did not stay at the original release site. Approximately 10 to 15 of the bison moved south settling in the southwest region of PANP and became known as the Sturgeon River herd. Another 10 to 17 animals were re-captured by the Department of Natural Resources and re-located to the Vermette-Upper Cummings Lake region. These animals eventually settled in the McCusker River area within the Cold Lake Air Weapons Range and became known as the McCusker River herd. The Sturgeon River herd is monitored annually by PANP staff (in the park), the Sturgeon River Plains Bison Stewards (outside the park) and field reports from the general public, landowners and Ministry of Environment staff. The McCusker River herd is not monitored annually.

Survey Data

The Sturgeon River population slowly grew over the past 35 years and in 2007-08 peaked at 400 plus animals. An anthrax outbreak in the population in 2008, along with wolf predation and unregulated hunting, has resulted in a steady decline in the population since 2008. In 2016, the population was estimated to be less than 250 (Figure 14). There is limited information about the McCusker River population. Anecdotal estimates suggest the population remains around 150.

Biological Sample Collections

No biological samples were collected during this time period.

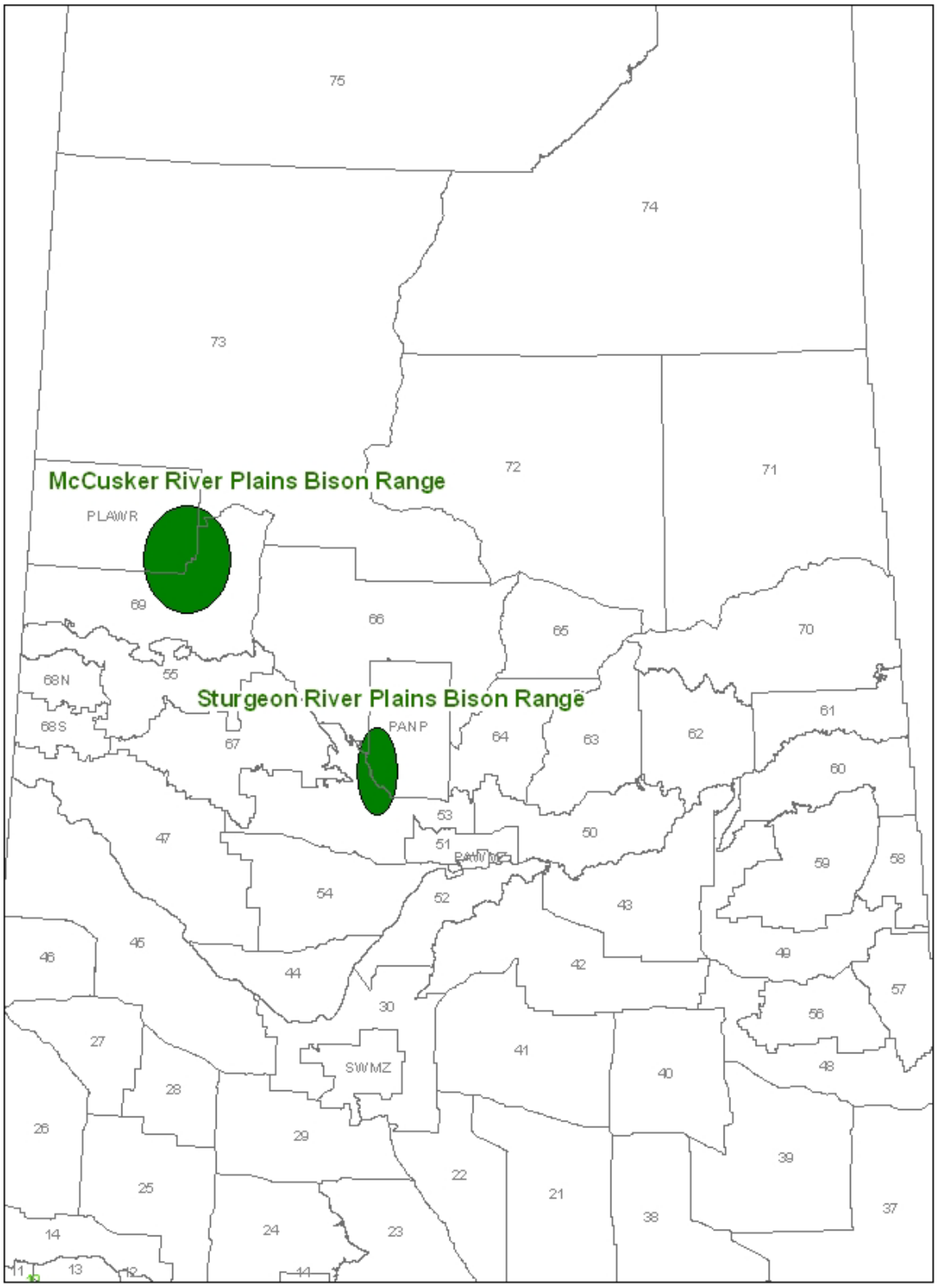

Figure 11. Plains bison range in Saskatchewan.

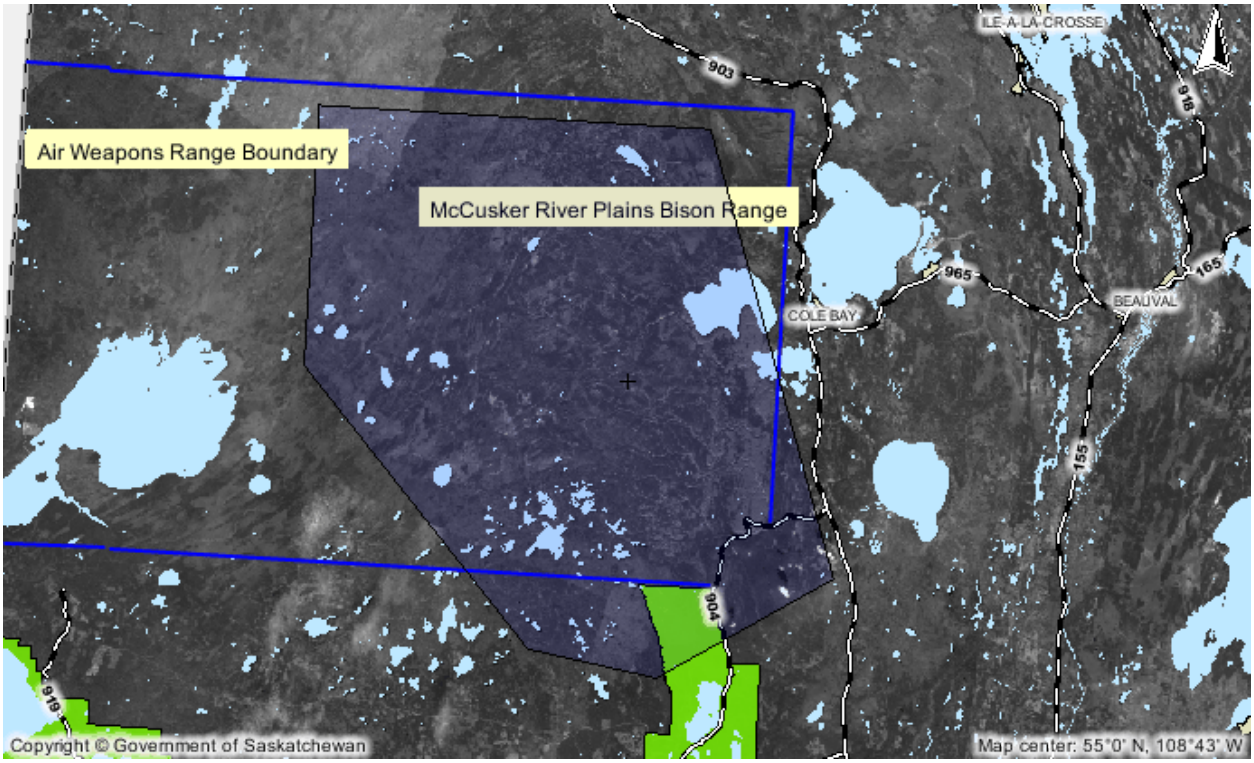

Figure 12. McCusker River Plains Bison Population range in Saskatchewan.

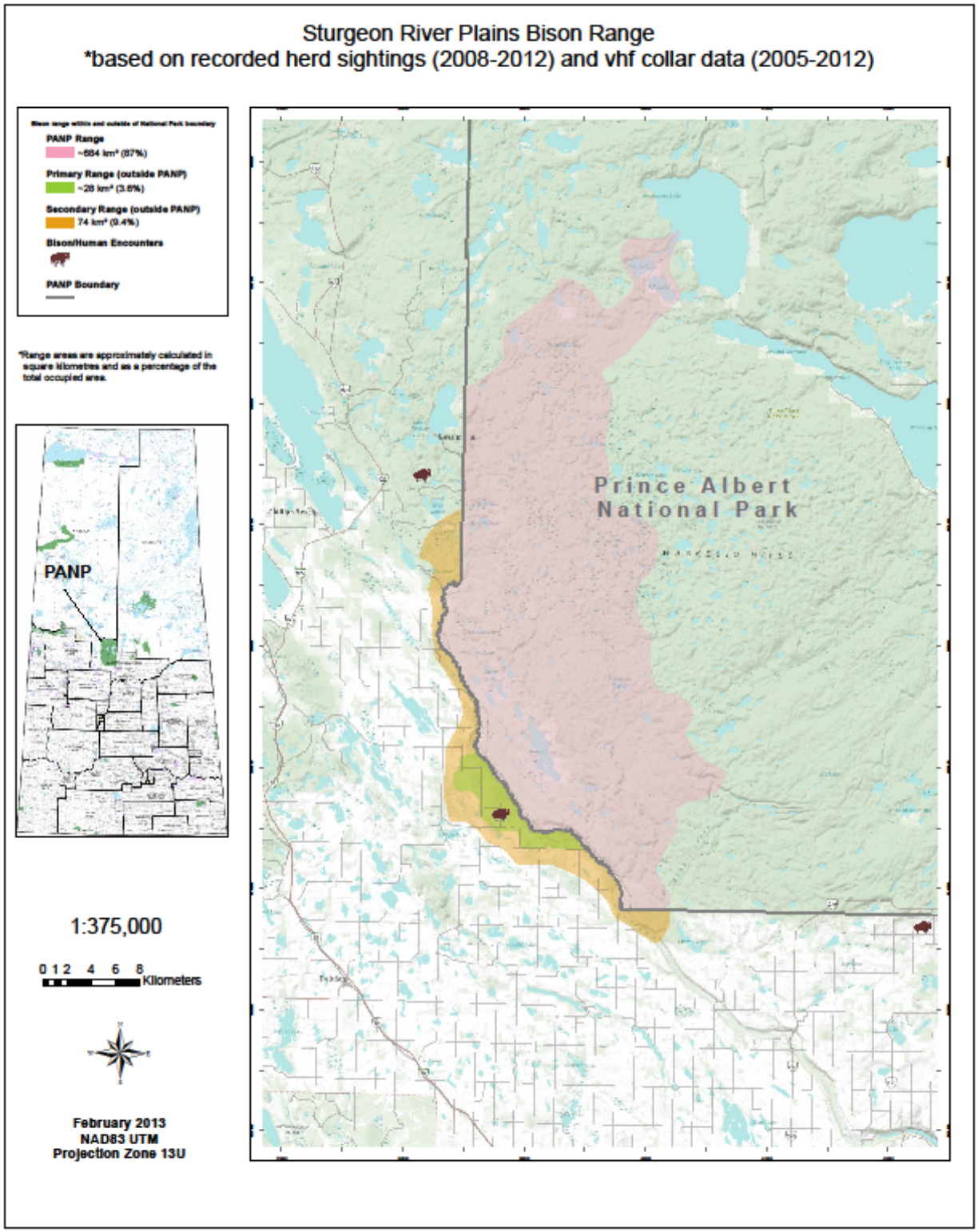

Figure 13. Sturgeon River Plains Bison Population range in Saskatchewan (courtesy of Sturgeon River Plains Bison Stewards).

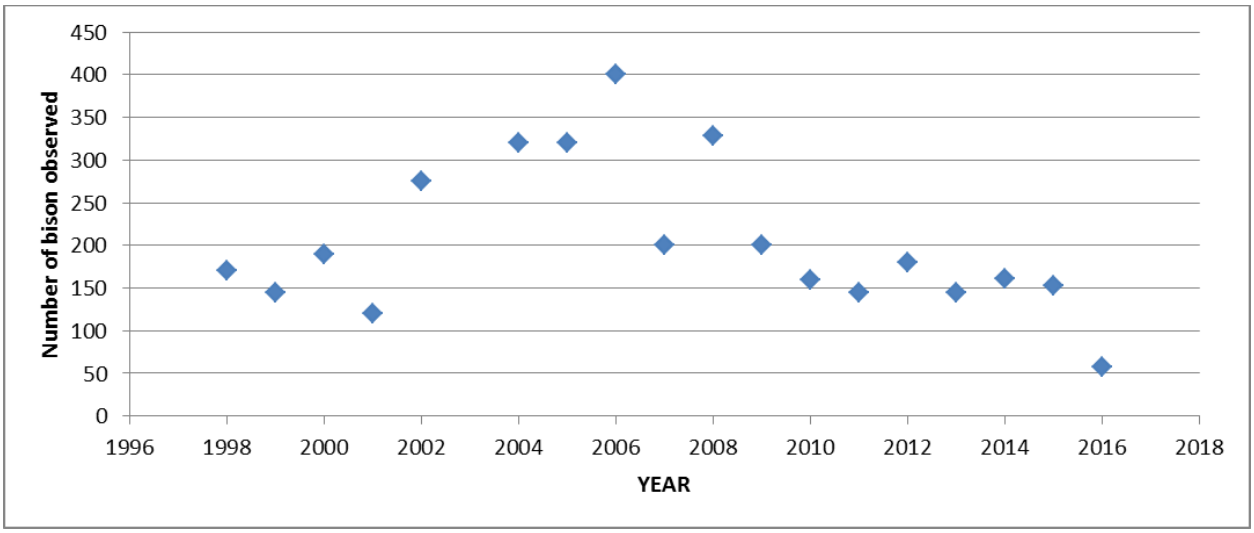

Figure 14. Bison population trend from annual aerial survey conducted by park staff within Prince Albert National Park (Parks Canada. 2014 Free-ranging plains bison census 1996-2016. Prince Albert National Park. Waskesiu Lake, Saskatchewan. Canada. Unpublished files).

General Overview

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) list plains bison as threatened. This designation was given in 2004. Status reassessment began in November 2013 and COSEWIC has re-confirmed the status designation as threatened. Under the *Species at Risk Act* (SARA) plains bison are not considered to be at risk. The federal government is presently reviewing the re-assessment with a decision on listing expected in 2017. The decision not to list bison under SARA in 2004 was due to the potential economic implications for the Canadian bison industry (SARA, SI/2005-72/ annex 1).

In 2006, a draft management strategy was developed to help guide management actions by the federal and provincial governments responsible for the Sturgeon River Plains Bison. Stakeholders were brought together to discuss goals and outcomes for the bison herd. One of the goals was to develop a long-term bison management plan.

In 2010, a co-ordinating committee was established to initiate the management planning process. Members included representatives from the Sturgeon River Plains Bison Stewards, Prince Albert National Park and Saskatchewan Ministry of Environment. The overarching goal of the management plan is for the Sturgeon River plains bison population to be managed as a self-sustaining, naturally regulated, and free-ranging plains bison population that is genetically diverse and able to persist in perpetuity as a natural part of the regional ecosystem.

The management plan establishes two key population thresholds: a minimum viable population threshold of 250 and a recommended management threshold of 430 to accommodate unforeseen environmental changes and/or disease outbreaks. Management actions are triggered as the population reaches either of the thresholds. The Sturgeon River Plains Bison Management Plan was officially signed in May 2013, by Prince Albert National Park and the Ministry of Environment.

Hunting Season Review

There is no sport hunting season for plains bison in Saskatchewan.

Research Initiatives

Current research is being conducted through joint projects lead by the University of Laval and Prince Albert National Park. Research initiatives involving the Sturgeon River Plains Bison herd include understanding bison habitat selection, monitoring range expansion inside and outside the national park, tracking movement patterns, bison reaction to diversionary fences, and studying predator-prey relationships.

Management Objectives and Strategies

Long-term Management Objectives

- Manage bison population numbers and population structure (age/sex) to allow for a self-sustaining and genetically diverse population while ensuring that the social carrying capacity for wild plains bison is not exceeded.
- Ensure that sufficient habitat is available to maintain a self-sustaining and wild plains bison population in the Sturgeon River region while mitigating negative impacts to local agriculture.
- Minimize conflict between bison and private landowners adjacent to Prince Albert National Park by improving prevention materials and methods, and increasing the social carrying capacity of the bison herd (the number of animals tolerated by landowners and the public within the regional geographic area).

Short-term Management Strategies

- Continue to monitor the bison population using aerial survey methods on an annual basis (PANP staff).
- Support ongoing research pertaining to bison food preference and habitat preference throughout the current Sturgeon River plains bison range.
- Increase the use of diversionary fences on private land to steer bison to more preferable locations.
- Maintain a bison anthrax protocol to guide operational procedure for future anthrax outbreaks.
- Implement action items found within the Sturgeon River Plains Bison Management Plan.

Additional Information

Most recent provincial species plan: None available.

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Upland Birds

Seven upland game bird species inhabit Saskatchewan, including ring-necked pheasant, sharp-tailed grouse, gray partridge (formerly Hungarian partridge), ruffed grouse, spruce grouse, rock ptarmigan and willow ptarmigan. While some of these species inhabit prairie landscapes and others more forested landscapes, upland birds inhabit all regions of the province (Figure 15). Wild turkeys are also found locally in pockets of the southeast and southwest corners of the province, but have not reached populations where a hunting season would be considered for them.

Population Status

In past, populations of upland game birds were monitored through a series of population surveys, including lek counts, crow counts, farmyard surveys and wing collections for productivity estimates. These surveys were all discontinued in the late 1990s/early 2000s and since that point, populations were monitored solely on information gathered from the hunter harvest survey and field reports from stakeholder groups, the general public, landowners and Ministry of Environment staff.

Survey Data

No population survey data has been collected since 2004. However, there is a general consensus among most jurisdictions in the Great Plains that upland game bird harvest approximates trends in the population. That is, harvest of game birds tends to be self-limiting such that when populations are abundant, hunters are quite successful, but when populations are limited, so is the harvest. This theory holds true in Saskatchewan, where population estimates obtained in between 1960 and 1980 appear to be well correlated to harvest estimates (Department of Tourism and Renewable Resources 1980). Harvest in Saskatchewan was monitored until 2010, discontinued for several years and reinstated in 2014 (see below).

Biological Sample Collections

No biological samples were collected in 2016. The last wing sample collection occurred in 1998 and informed on relative annual productivity.

General Overview

Upland game bird populations are quite susceptible to adverse environmental conditions. Anecdotal evidence suggests that upland bird populations were hit hard by the severe winters of 2010-11, 2012-13 and 2013-14 and perhaps to a larger degree, the subsequent wet springs in 2011, 2013 and 2014. Stakeholder groups continued calling for a reduction in bag limits and/or season length in 2013 and 2014 in order to allow populations to recover and in response, the ministry reduced the daily bag limits of sharp-tailed grouse and ring-necked pheasants in 2013, followed by gray partridge in 2014. These changes were generally well-received by stakeholders, although beginning in 2014, there was some indication that ring-necked pheasants may be returning to historic levels. Following a relatively mild winter in 2014-15 and favourable conditions in the early days of spring, coupled with harvest data that suggested the population had returned to historic levels, the ministry reinstated the liberal bag limit for ring-necked pheasants. Sharp-tailed grouse and gray partridge populations remained depressed. These conditions were similar in 2016 and the status quo remained.

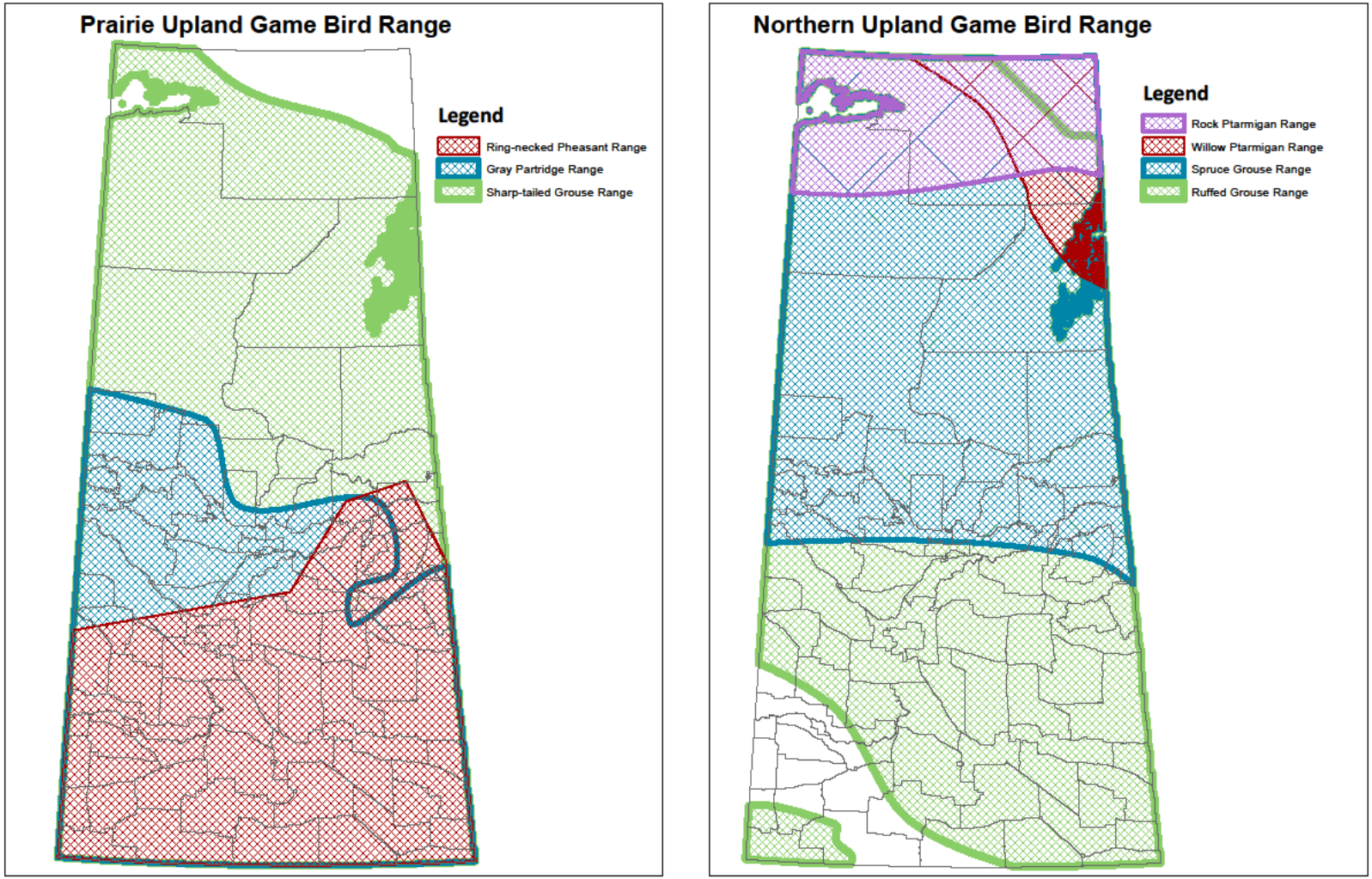

Figure 15. Upland game bird ranges across the province (Ridgely et al. 2007).

Hunting Season Review

With the exception of ring-necked pheasant and ptarmigan, which can only be harvested by residents, all hunters can harvest upland game birds. Saskatchewan is divided into two zones, the North Game Bird District and the South Game Bird District and bag limits and season lengths may vary between these two zones for each species. Bag limits were at their most liberal levels into 2012, but in response to several severe winters, followed by cool, wet springs, in short success, the ministry made reductions to the bag limits of prairie species. In 2013, the daily bag limits of sharp-tailed grouse and ring-necked pheasants were reduced from three to two birds and the possession limit for gray partridge was reduced from 24 to 16 birds. In 2014, additional reductions were made to the gray partridge bag limit to bring it from eight birds daily to four birds daily. Possession limit remained at twice the daily bag limit. In 2015, the ring-necked pheasant daily bag limit returned to three birds. Daily bag and possession limits remained the same in 2016.

Both upland game bird and migratory game bird hunters require a provincial game bird licence, making it difficult to determine unique trends in upland game bird hunters. Resident licence sales continued to increase, with 20,850 and 21,542 licences sold in 2015 and 2016, respectively. Canadian resident licence sales declined slightly between 2015 and 2016 with 2,376 and 2,141 licences sold, respectively (Appendix A). Non-resident licences sales continue their upward trend, with 9,853 and 10,462 licences sold in 2015 and 2016, respectively, after several years of depressed sales as a result of the economic downturn faced by the United States in the late-2000s. In 2014, the hunter harvest survey was made available to hunters of all residencies, rather than just Saskatchewan residents as in past, and surveys included a question about whether participants hunted waterfowl only, upland game birds only or both. Over time, the ministry will be able to use this data to better understand unique trends in game bird hunters.

Hunter harvest survey data collected in 2016 suggests that harvest is beginning to rebound for species that were significantly affected by severe weather conditions several years ago (i.e. sharp-tailed grouse and gray partridge), although continues to remain depressed compared to long-term averages (Table 24). Harvests of the less affected species are returning to normal and ruffed grouse and spruce grouse are nearing a high in their 10-year cycle. This is corroborated by anecdotal evidence that both populations and harvest have been improving.

Research Initiatives

No research initiatives were conducted during this time period.

Management Objectives and Strategies

Long-term Management Objectives

- Maintain sustainable upland game bird populations while offering harvest opportunity for hunters.

Short-term Management Strategies

- Develop a provincial upland game bird management plan to ensure the sustainable management of upland game birds in Saskatchewan.
- Explore options to model weather variables to predict annual productivity of sharp-tailed grouse.
- Model native habitat to predict possible sharp-tailed grouse lek locations.
- Evaluate associations between currently-active lek locations (as well as locations where lek extirpation has occurred) and landcover, landuse, climate, soil and other anthropogenic factors.
- Continue to utilize hunter harvest survey data to inform management strategies, including the annual review of seasons, daily bag limits and possession limits.
- Explore including upland game birds on the co-operative wildlife management survey mobile application.

Additional Information

Most recent provincial species plan:
Department of Tourism and Renewable Resources. 1980. Saskatchewan Game Bird Management Objectives and Strategies for the 80's. Fisheries and Wildlife Branch. Regina, SK

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Table 24. Estimated upland game bird harvest and effort by Saskatchewan residents (2007-2016).

	Sharp-tailed Grouse			Ruffed Grouse			Spruce Grouse			Gray Partridge			Ring-necked Pheasant		
Year	Hunters	Harvest	Days Hunted	Hunters	Harvest	Days Hunted	Hunters	Harvest	Days Hunted	Hunters	Harvest	Days Hunted	Hunters	Harvest	Days Hunted
2007	10,006	14,389	7,117	10,395	29,274	7,188	2,145	4,189	1,632	8,149	19,509	5,985	5,469	9,624	4,564
2008	10,762	28,800	33,000	10,389	60,349	38,999	2,588	9,771	10,555	9,310	35,967	27,098	5,001	19,806	13,788
2009	10,972	27,464	42,888	9,168	40,640	40,282	2,705	9,850	13,524	9,739	40,682	38,088	5,869	23,952	19,637
2010	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
2011	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
2012	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
2013	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
2014	6,248	6,436	19,557	8,237	22,488	36,492	4,850	10,768	19,838	4,519	5,332	15,770	3,978	9,786	12,173
2015	7,971	13,232	35,631	9,519	39,692	49,877	3,337	10,377	18,651	4,883	11,426	22,316	5,413	24,194	23,004
2016	8,951	18,362	42,077	12,563	74,189	62,360	3,702	14,484	19,154	5,886	16,995	25,888	5,281	23,787	20,096

Waterfowl

Saskatchewan is an important area for four species of geese and almost every duck species in western North America (n= 36). Birds wintering in the Central, Mississippi and to a lesser extent Pacific Flyways use Saskatchewan either as breeding grounds during the summer or staging grounds along migrations to and from more northerly locations. Although not technically a waterfowl species, Saskatchewan also provides important staging habitat for sandhill cranes.

Population Status

Given that migratory birds fall under both federal and provincial jurisdiction, and are managed cooperatively with other jurisdictions in the flyways, waterfowl populations have been monitored annually by both the Canadian and United States federal governments. A series of surveys, including air-ground breeding population surveys, waterfowl banding, white-fronted goose fall staging surveys and mid-winter waterfowl surveys across the United States, allow the Central Flyway to compile an annual Harvest and Population Survey Data Book.

Survey Data

Although the ministry does not collect waterfowl population data, the Central Flyway Harvest and Population Survey Data Book (Dubovsky 2017) produced annually allows wildlife managers to monitor populations along the Central Flyway. Additionally, the Status and Harvests of Sandhill Cranes report (Dubovsky 2016) informs on crane populations that use Saskatchewan. Pertinent results from these publications are included below (Tables 25, 26 and 27).

Table 25. Goose population status from 2007-2016. All estimates are three-year running averages. Goose species include greater white-fronted geese (GWFG), Canada geese (CAGO), snow geese (SNOW) and Ross' geese (ROGO). The CAGO Winter Survey estimate includes Central Flyway Tall Grass Prairie, Short Grass Prairie, Hi-line, and Western Prairie/Great Plains populations (p49), while the SNOW/ROGO Winter Survey estimate includes Western Central Flyway Total and Mid-continent Population Central Flyway populations (p50).

Year	GWFG Fall Survey	CAGO Winter Survey	SNOW/ROGO Winter Survey
2005-2007	679,455	1,374,571	1,159,565
2006-2008	755,759	1,492,390	1,091,248
2007-2009	699,733	1,477,500	1,128,248
2008-2010	681,592	1,448,641	998,142
2009-2011	658,250	1,433,559	1,144,450
2010-2012	724,600	1,519,168	1,065,004
2011-2013	732,000*	1,592,601	1,229,884
2012-2014	891,732*	1,561,818	1,219,806
2013-2015	991,483*	1,523,304	1,376,606
2014-2016	994,300	1,461,271	1,399,084

*No survey in 2013.

Table 26. Breeding population estimates (thousands) for 10 species of ducks from the traditional survey area (strata 1-18, 20-50, 75-77) covered by annual breeding population surveys. Duck species include mallard (MALL), gadwall (GADW), American wigeon (AMWI), green-winged teal (GWTE), blue-winged teal (BWTE), northern shoveler (NSHO), northern pintail (NOPI), redhead (REDH), canvasback (CANV) and both greater and lesser scaup (Scaup Spp.).

Year	MALL	GADW	AMWI	GWTE	BWTE	NSHO	NOPI	REDH	CANV	Scaup Spp.	Total
2007	8,307	3,356	2,807	2,890	6,708	4,553	3,335	1,009	865	3,452	37,282
2008	7,724	2,728	2,487	2,980	6,640	3,508	2,613	1,056	489	3,738	33,962
2009	8,512	3,054	2,469	3,444	7,384	4,376	3,225	1,044	662	4,172	38,342
2010	8,430	2,977	2,425	3,476	6,329	4,057	3,509	1,064	585	4,244	37,096
2011	9,183	3,257	2,084	2,900	8,949	4,641	4,429	1,356	692	4,319	41,810
2012	10,602	3,586	2,145	3,471	9,242	5,018	3,476	1,270	760	5,239	44,806
2013	10,372	3,351	2,644	3,053	7,731	4,751	3,335	1,202	787	4,166	41,392
2014	10,900	3,811	3,117	3,440	8,542	5,279	3,220	1,279	685	4,611	44,884
2015	11,634	3,834	3,037	4,081	8,547	4,391	3,043	1,196	757	4,395	44,924
2016	11,792	3,712	3,411	4,275	6,689	3,967	2,618	1,289	736	4,992	43,481

Table 27. Annual spring abundance indices for the Mid-Continent Population of Sandhill cranes derived from surveys of the Central Platte River Valley, NE. All estimates are three-year running averages.

Year	Sandhill Cranes
2005-2007	364,281
2006-2008	382,271
2007-2009	498,420
2008-2010	600,892
2009-2011	579,863
2010-2012	504,658
2011-2013	563,167
2012-2014	608,202
2013-2015	623,812
2014-2016	470,030

Biological Sample Collections

No biological samples were collected during this time period.

General Overview

Although the trend of extensive moisture in 2013 and 2014 did not continue in 2015 or 2016, the water table remained high and resulted in prime waterfowl habitat all across the province. Consequently, duck populations remained relatively stable at high levels. These population increases over the past few years may have been more significant than captured by breeding population surveys, as waterfowl were distributed more extensively across the province, with ephemeral wetlands that were traditionally dry now holding water.

Populations of Arctic nesting geese continued to remain high and/or increase in numbers in 2016. Mid-continent snow geese remained classified as over-abundant in Canada and the United States, while western Arctic snow geese, Ross's geese and "white-cheeked" geese increased to the point where consideration was being given to naming them as over-abundant. Note that "white cheeked" geese is meant to capture both Canada and cackling geese. Both species occur in Saskatchewan though cackling geese are in lower numbers and are mainly in the eastern half of the province.

Hunting Season Review

While Saskatchewan produces a large number and variety of waterfowl, the province's waterfowl harvest is only of continental significance for snow, Ross's, white-fronted and Canada geese, mallards, pintails and sandhill cranes.

Waterfowl can be harvested in Saskatchewan by all hunters and Canadian residents are afforded the same opportunities as Saskatchewan residents. Seasons have generally remained similar for all waterfowl, with the exception being dark geese in the South Game Bird District which began approximately two weeks later than the others for non-resident hunters. This exception was reviewed in 2016 and a proposal was submitted to Environment and Climate Change Canada for public comment

to remove the late start date. This proposal was accepted, but not in time for it to be included in the 2016 provincial *Open Season Game Regulations.* Therefore, the change in provincial regulation will occur in 2017. Hunters can harvest eight ducks (of which four can be northern pintail), 10 coots, 20 white geese and 8 dark geese daily, with a possession limit of three times the daily limit. Ross's geese were designated over-abundant in 2014 and were added to the spring snow goose season, starting in 2015.

Saskatchewan, as part of a joint Mississippi and Central Flyway initiative, lowered bag limits on mid-continent white-fronted geese in response to strong declines from 2000 through 2005. Saskatchewan moved from a bag of five per day for residents and non-residents to a bag of four per day for residents and three for non-residents of Canada. Populations rebounded beginning in 2006 and have stayed within target population thresholds. Bag limits were subsequently increased again in 2011 to a bag of five for residents and four for non-residents. In 2014, the limit was set to five for all hunters. Additionally, the spring white goose season dates were expanded to span March 15 to June 15, which was an extension both earlier (from April 1) and later (from April 30 or May 31, depending on location). No additional changes were made in 2016.

Waterfowl hunters must possess a federal Migratory Bird Permit. The sale of these permits has remained relatively stable between 17,000 and 22,000 permits sold annually in Saskatchewan (Appendix A).

Harvest of waterfowl in Saskatchewan fluctuates annually (Tables 28 and 29), with no significant trends apparent.

Research Initiatives

No research initiatives were conducted during this time period.

Table 28. Duck harvest in Saskatchewan (2007 – 2016).

Year	MALL	GADW	AMWI	GWTE	BWTE	NSHO	NOPI	REDH	CANV	LESC
2007	163,912	13,839	5,227	6,671	12,263	9,777	18,054	4,816	4,905	907
2008	150,906	16,212	4,001	6,683	15,132	5,958	15,076	2,360	2,310	0
2009	135,546	17,720	3,873	1,147	2,624	6,045	17,226	760	456	826
2010	125,686	15,653	5,251	6,093	12,272	14,176	13,625	4,353	491	4,059
2011	143,258	29,404	8,992	3,534	22,787	22,040	20,217	4,563	6,150	2,029
2012	188,380	15,570	5,950	4,360	15,470	12,330	15,470	3,970	1,690	1,410
2013	193,591	18,864	2,527	6,969	38,943	15,458	19,243	5,884	761	1,973
2014	163,468	43,710	4,316	3,895	25,278	10,943	30,717	3,460	5,703	528
2015	179,718	14,492	8,091	9,477	29,860	7,456	11,790	2,407	1,094	48
2016	159,158	25,707	14,329	21,295	15,217	13,360	11,869	3,144	3,967	3,016

Table 29. Goose harvest in Saskatchewan (2007 – 2016).

Year	SNGO	ROGO	GWFG	CAGO/CACG
2007	66,934	12,893	42,467	169,206
2008	112,986	35,227	55,647	155,728
2009	80,753	20,655	30,882	140,922
2010	77,568	26,280	33,558	149,533
2011	85,848	34,682	52,762	173,045
2012	95,620	20,830	36,130	178,540
2013	127,835	29,478	42,181	141,655
2014	121,091	30,269	65,463	161,815
2015	68,341	19,302	31,953	177,475
2016	50,105	14,803	32,304	201,289

Management Objectives and Strategies

Long-term Management Objectives

- Continue to work within the Central and Mississippi Flyways framework to ensure that all waterfowl and sandhill cranes are managed within sustainable and socially-acceptable levels.
- Continue to work in partnerships through the Prairie Habitat Joint Venture to ensure a strong ongoing commitment to waterfowl habitat retention and improvement through the North American Waterfowl Management Plan (NAWMP).

Short-term Management Strategies

- Completion of a new five-year plan to direct NAWMP efforts in Saskatchewan.

Additional Information

Most recent provincial species plan:

Central Flyway Webless Migratory Game Bird Technical Committee. 2006. Management guidelines for the mid-continent population of Sandhill cranes. Central Flyway Council Document.

Central Flyway Waterfowl Technical Committee. 2010. Management guidelines for hi-line Canada geese. Central Flyway Council Document.

White-fronted Goose Subcommittee of the Central Flyway Waterfowl Technical Committee, the Arctic Goose Committee of the Mississippi Flyway Game Bird Technical Section, and the Alaska Department of Fish and Game, with assistance from representatives of the Canadian Wildlife Service and U.S. Fish and Wildlife Service. 2015. Management plan for midcontinent greater white-fronted geese. Flyway Council Document.

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Furbearers

Furbearers include 20 species in Saskatchewan that are trapped and whose pelts are marketed. The trapping industry in Saskatchewan currently includes almost 5,000 registered trappers and generates between $1 and $6 million in revenue every year from the sale of pelts. Furbearers are a renewable resource and many trappers depend on raw fur sales to supplement their annual income and therefore proper conservation management is important to ensure the long-term sustainability of the resource and the trapping industry. A vibrant trapping industry is also important since trappers play an important role in controlling numbers of some potentially problematic species such as coyotes, wolves and beaver.

Population Status

Populations of furbearers are monitored using the Trapper Questionnaire Survey and field reports from the general public, landowners and Ministry of Environment staff. Fur harvest data tracks market conditions and so is generally unreliable for tracking population trends. However, inferential conclusions about population status are possible when harvest volumes fail to track markets in a predictable manner. For some species that are not specifically targeted by trapping so that capture conditions approach randomness, such as wolverine, the number of animals harvested in a year can be indicative of populations but these are only inferential since there is no measure of trapping effort available.

Survey Data

The Trapper Questionnaire Survey asks trappers to assess the abundance of local furbearers. Each is assigned a number between 0 and 4, with 0 corresponding to never being found in the area, 1 to sometimes being found but not present in the year of interest, 2 to being scarce, 3 to being common and 4 to being abundant. The average of all trappers reporting on the species is summarized in order to determine if the species is abundant (>3.3), common (2.8 – 3.2), fairly common (2.3 – 2.7), uncommon (2.0 – 2.3), scarce (<2.0) or never found (0). Species that are not found in the area are excluded from the calculation and species that are not reported on are indicated with a "-". Results of the survey are shown in Table 30.

Table 30. Furbearer species abundance as determined from Trapper Questionnaire Survey.

	South Saskatchewan Trapping Area							Northern Fur Conservation Area						
	2009/ 2010	2010/ 2011	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2009/ 2010	2010/ 2011	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016
Arctic Fox	0	0	0	0	0	0	0	0.1	0.1	0	0.1	0.3	0	0
Badger	3.1	2.4	2.5	3	2.3	2.3	2.4	0.7	1.3	0.7	0.5	0.5	0.5	0.5
Beaver	2.9	3.8	2.6	2.8	3.6	2.8	3.5	3.3	3.4	3.5	3.8	3.4	3.6	3.7
Black Bear	1	1	0.4	0.4	1.4	2	1.9	3.2	3.3	3.3	3.1	3.3	3.2	3.5
Bobcat	1.1	0.6	0.6	0.2	0.3	1	0.8	0.9	0.7	0.5	0.5	0.5	0.2	0.2
Coyote	3.7	2.8	3.4	3.8	3.4	3.5	3.6	2.8	2.8	2.6	2.9	2.2	2.4	2.8
Coyotes with Mange	2.6	2	2	2.4	2.6	2.3	2.8	1.8	1.4	1.4	2.1	1.3	1.1	0.8
Fisher	0.4	0.5	0	0.2	1	1.3	0.4	2.8	2.9	2.9	2.9	2.7	2.9	2.4
Hare	2.6	1.8	2.3	2.2	2.6	2	2.5	2.5	2.6	2.9	3.1	2.8	2.6	2.9
Lynx	0.8	1.3	0.2	0.4	1.3	0.8	0.9	2.5	2.2	2.5	2.6	2.6	2.8	2.6
Marten	0.2	0.5	0	0	0.2	0.3	0.1	2.4	2.5	2.3	2.9	2.8	2.4	2.6
Mink	2	1.4	1.4	1.4	2	2	1.7	2.8	2.5	2.4	2.5	2.6	2.5	2.9
Muskrat	2.6	1.6	2.3	2.4	3.1	2.8	3.4	2.5	2.3	2.3	2.4	2.5	2.4	2.7
Otter	0.3	0	0.1	0	1.4	1.3	0.9	2.9	2.8	2.9	3.1	2.7	2.8	3.4
Raccoon	3.2	2.2	2.6	2.6	2.9	2.5	2.4	1.1	1.3	0.9	1.8	0.9	1.1	1.3
Red Fox (cross & silver)	2.8	2.2	2.3	3.2	2.4	2.7	2.9	2.6	2.5	2.6	2.8	2.6	2.2	2.2
Skunk	2.7	2.2	2.5	2.6	2.8	2.5	2.8	2.5	2.9	2.4	2.1	2.1	2.3	1.8
Squirrel	1.7	2.8	1.4	1.2	2.1	2.7	2.7	3.2	3.3	3	3.5	3.1	2.9	3.2
Weasel	2.4	2.4	2.1	1.8	2.6	2.5	2.8	2.9	2.9	2.9	3	2.8	3	3.2
Wolf	0.9	1	0.8	0.4	1.4	1.5	1.3	3.3	3.1	2.9	2.5	2.9	2.8	3.8
Wolverine	0.3	0.3	0.1	0.2	0	0.3	0.1	0.7	0.9	0.9	0.9	1.1	1.4	1.5
Trappers Responding	11	5	10	5	7	4	11	61	48	43	8	18	18	19

Biological Sample Collections

No biological samples were collected during this time period.

General Overview

Based on trend survey information from trappers (Table 30) populations of coyotes remain generally high in the south despite significantly increased harvest pressure over the previous four years. However, there have been more reports of areas where local populations are below long-term norms. Lynx abundance appears to be declining following a 10-year high in the north. No other species demonstrated any significant changes in trend from previous years.

In 2016, fur prices for key species were above the 20-year average for coyote and marten and below for beaver, lynx, mink, muskrat, otter, raccoon, squirrel and weasel. The Beaver Control Program in six selected provincial parks, announced by the Ministry of Parks, Culture and Sport in 2014, continued through the 2016 trapping season. Similarly, the Ministry of Agriculture continued to provide funding to rural municipalities that would match allotments in order to provide an incentive to harvest beaver in areas with recurring problems with flooding. The number of beaver marketed in 2015 and again in 2016 was the lowest in the previous 20 years indicating that the majority of beaver taken under these incentive programs are not sold at auction.

There were 34,652 coyote pelts marketed in 2016, slightly below the 36,802 in 2015 which was the highest number marketed in the last 16 years. Coyote prices continued to drive fur licence sales in the south which have risen by 2200 during the five-year period when coyote prices have been up.

Trapping Season Review

Only Saskatchewan residents are eligible to trap in Saskatchewan and first-time trappers must pass an education course (or equivalency exam) prior to obtaining a fur licence. Although trapper numbers tend to remain relatively stable, small year to year variations occur and can be particularly obvious in the south where there are fewer species to drive the markets. In 2016, licence sales in southern Saskatchewan increased to a 25-year high of 4,990, driven by the continuing high price of coyote pelts (Table 31).

Fur harvest is driven by a variety of factors. While market conditions are the single largest driver of harvest fluctuations at the species level, they are not the only determinant. Trappers will also target species based on their abundance, trap cost, ease of trap set up, opportunity for by-catch of other profitable species, personal preference for processing of animals once trapped, time available for trapping, as well as a host of other personal preferences. Given that each individual is different, the overall annual harvest is often quite variable (Table 32).

Regardless of the particulars of the annual harvest, trapping generates significant revenue, with between $1 and $6 million in pelts being sold annually (Table 33). More detailed information about annual fur harvest and revenue can be found in the Saskatchewan Wild Fur Harvest and Cash Value reports produced annually by the Ministry of Environment and available at Saskatchewan trapping information.

Table 31. Annual fur licence sales in Saskatchewan (2007-2016). Data not available is indicated by "---".

Year	Northern Fur Conservation Areas Licences	Southern Saskatchewan Licences	Youth Trapper Licences	Total Licence Sales
2006/2007	1,981	1,321	140	3,442
2007/2008	1,976	1,220	131	3,327
2008/2009	1,992	1,143	115	3,250
2009/2010	1,691	1,076	96	2,863
2010/2011	1,665	976	76	2,717
2011/2012	1,662	1,385	86	3,106
2012/2013	1,749	1,783	94	3,626
2013/2014	1,892	2,173	175	4,240
2014/2015	1,848	2,552	209	4,609
2015/2016	1,896	2,878	216	4,990

Table 32. Fur harvest by species (2007 – 2016).

Species	2006/ 2007	2007/ 2008	2008/ 2009	2009/ 2010	2010/ 2011	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016
Arctic Fox	0	0	2	0	0	0	0	11	8	3
Badger	498	450	336	249	371	928	710	286	358	219
Bear	48	51	51	45	35	54	35	9	23	52
Beaver	14,191	12,606	11,926	11,253	11,741	17,125	15,558	12,676	10,498	10,612
Bobcat	9	2	17	4	1	33	1	3	0	2
Coyote	28,803	26,849	17,723	14,207	14,813	25,833	28,599	28,703	36,802	34,652
Fisher	1,225	709	1,110	1,028	1,341	2,115	1,908	2,540	2,082	1,585
Fox	3,542	2,312	1,775	1,173	1,402	2,725	2,609	2,694	3,332	3,102
Lynx	443	263	427	443	878	1,614	1,315	1,203	650	638
Marten	5,492	4,084	3,934	3,490	5,804	10,419	9,035	10,145	7,079	5,736
Mink	1,807	1,602	1,508	964	1,187	1,163	1,454	1,566	1,794	1,042
Muskrat	45,421	22,246	18,956	16,291	14,016	60,494	47,362	66,183	59,115	28,637
Otter	356	265	450	391	450	642	610	522	482	480
Raccoon	1,159	1,224	900	509	720	1,249	997	1,293	1,033	601
Skunk	57	49	64	44	43	68	45	45	112	161
Squirrel	3,206	3,367	2,472	3,270	2,224	3,261	1,516	1,987	984	1,210
Weasel	4,813	2,828	2,155	1,386	1,829	2,985	2,488	2,686	2,412	1,730
Wolf	244	206	320	243	149	225	166	273	204	169
Wolverine	18	10	18	11	5	16	14	19	19	16
# of Licensed Trappers	3,442	3,327	3,250	2,863	2,717	3,106	3,626	4,240	4,609	4,990

Table 33. Annual pelts marketed and associated cash value (2007 – 2016).

Year	Southern Saskatchewan		Northern Fur Conservation Area			
	Pelts Marketed	Total Cash Value	Pelts Marketed	Total Cash Value	Total Pelts Marketed	Total Cash Value
2006/2007	70,913	$2,046,942.48	40,419	$919,921.68	111,332	$2,966,864.16
2007/2008	56,885	$1,248,332.43	22,238	$730,904.09	79,123	$1,979,236.52
2008/2009	42,382	$661,686.16	21,762	$523,760.80	64,144	$1,185,446.96
2009/2010	33,014	$634,315.73	21,987	$493,516.55	55,001	$1,127,832.28
2010/2011	36,532	$1,078,296.30	20,477	$804,422.92	57,009	$1,882,719.22
2011/2012	95,923	$2,432,578.42	35,026	$1,841,001.69	130,949	$4,273,580.11
2012/2013	82,497	$3,277,079.66	31,925	$2,478,710.80	114,422	$5,755,790.46
2013/2014	101,638	$3,265,262.00	31,206	$1,617,697.02	132,844	$4,882,959.02
2014/2015	104,452	$4,271,753.59	22,535	$1,075,712.82	126,987	$5,347,466.41
2015/2016	72,417	$3,076,512.26	18,230	$633,871.30	90,647	$3,710,383.56

Research Initiatives

Trap testing research is ongoing and based on the priorities determined by the Canadian Wildlife Directors Committee. Traps meeting the killing efficiency standards of the Agreement on International Humane Trapping Standards are certified for continued use for the appropriate species.

Management Objectives and Strategies

Long-term Management Objectives

- Continue to maintain a viable fur harvesting industry in Saskatchewan and to ensure there is training and regulatory support for attracting new trappers and managing human-wildlife conflicts.

Short-term Management Strategies

- Work with Saskatchewan trapper's organizations, the Ministry of Agriculture and Saskatchewan Crop Insurance Corporation to co-ordinate approaches for dealing with problem furbearers.

Additional Information

Most recent provincial species plan:
Koback, L. 2016. Saskatchewan Wild Fur Harvest and Cash Values 2015-16. Fish and Wildlife Branch Summary Report. Saskatoon, SK.

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Gray Wolf (*Canis lupus*)

Wolf management is the concern of a wide variety of government agencies, professional organizations and public groups. They are protected in Saskatchewan as a furbearer and a big game species, but most management effort has traditionally been directed toward dealing with human-wildlife conflicts associated with the species.

Population Status

There are no formal surveys of wolf populations in Saskatchewan. Provincial populations were estimated in 2006 using a linear regression model of the relationship of wolf density and ungulate biomass and a habitat model based on typical densities reported in the literature for habitat types prevalent in Saskatchewan. The ungulate biomass method yielded an estimated provincial population of 2,719 wolves based on predicted densities of 1 wolf/150 km^2 in the forest fringe (WMZs 37, 43, 47-55) and forest (WMZ 56-69) and 1 wolf/400 km^2 in the shield (WMZs 70-76). The habitat method resulted in an estimate of 3,773 wolves based on predicted densities of 1 wolf/70 km^2 in the forest fringe, 1/50 km^2 in the forest and 1/200 km^2 in the shield.

There are no new data that could be applied to improve these estimates; however, anecdotally there is some indication that resident wolf densities in the forest fringe may have increased since the 2006 estimates. Populations along the forest fringe have historically tended to fluctuate quite widely, apparently in relation to available food resources, so there is no evidence that increasing the predicted density in this region would improve the long-term estimate. Any long-term increase in provincial population would likely be the result of range expansions which appear to be occurring along the southern forest fringe and in isolated pockets on the prairies.

Survey Data

There was no formal population survey conducted for wolves during 2016. A wolf population index is derived from a questionnaire survey for all furbearers that is aimed primarily at trappers. Since this survey began the sample size of trappers reporting has generally been too small to assess trends with any confidence. Results of this survey are shown in Table 30. An indirect measure of abundance is also obtained from export records of wolf pelts marketed by trappers. These data mainly reflect trapper effort as influenced by market prices, but can indicate population declines where predicted harvest fails to mirror market peaks. Wolf harvest data are presented in Table 32.

Biological Sample Collections

Over 25 hair, blood and tissue samples were collected from legally harvested wolves during 2016 as part of the University of Saskatchewan Boreal Wolf research project. Samples will be used to understand wolf genetic population structure in Saskatchewan.

General Overview

Based on anecdotal evidence, it appeared that wolf populations were normal along the forest fringe and southern forest regions in west and central Saskatchewan. High numbers along the eastern forest fringe in 2014 appeared to have declined by 2016. Compensated livestock losses to wolves were at normal

levels. There were 28 rural municipalities in the Wolf Management Area (WMA; Figure 16) in 2016. Policy allows these municipalities access to some wolf harvest methods not available outside the WMA.

A resident wolf pack was documented in the Great Sandhills southeast of Leader in 2015 but numbers there were substantially reduced by ranchers such that there were few or no wolves remaining in 2016.

Hunting Season Review

Saskatchewan did not have a hunting season for wolves prior to 2014. As a result of reported livestock losses in the Weekes area it was decided to conduct a pilot hunt in 2014 to determine the efficacy of using licensed hunters to increase local wolf harvest in a problem area. Regulatory amendments were made so that the wolf could be hunted under the authority of a big game management licence.

The pilot wolf hunt in WMZ 49 was continued in 2015 with 100 licences (200 tags) offered and an additional hunt was conducted in WMZ 53. The 2015 hunts ran from December 15 through March 31, 2016.

The hunt was again expanded in 2016 when it was open across the forest fringe in WMZs 43, 47, 48, 49, 50, 53, 54, 55 and 68N with the season open from October 15/16 to March 31/17. Results of all hunts are shown in Table 34.

Table 34. Results of Pilot Wolf Hunts in 2014-15 and 2015-16

	Licences Sold/Tags Available	# Hunters Reporting	Response Rate	# Who Hunted	# Wolves Harvested	Adjusted Harvest Success*
2014						
WMZ 49	81/162	36	44%	31	3	5%*
2015						
WMZ 49	14/28	7	44%	3	0	0%*
WMZ 53	93/186	23	25%	15	0	0%*
2016						
WMZs 43,47,48,49,50, 53,54,55,68N	202/202	188	93%**	139	10	7%

* Number animals harvested compared with the number of tags available for respondents who actually hunted.

** Mandatory reporting in 2016.

Research Initiatives

The Saskatchewan Boreal Wolf Project was initiated in March 2014, and is part of a larger project studying woodland caribou in northern Saskatchewan. Over the first year, 37 wolves in more than 20 packs spanning across northern Saskatchewan were fitted with GPS satellite collars designed to provide three years of location data. The project aims to study wolf-caribou relationships, population genetics and habitat selection patterns in northern Saskatchewan. Unlike most wolf-caribou studies conducted

elsewhere in Canada, the Saskatchewan Boreal Wolf Project is taking place in a landscape relatively untouched by anthropogenic disturbance.

The Parks Canada Agency in collaboration with Laval University is currently conducting a study on wolf-bison dynamics in Prince Albert National Park. Research has focused on wolf predation effects on the Sturgeon River Bison population, which has been declining in recent years. The project is also studying wolf diet, habitat selection and movement patterns in Prince Albert National Park.

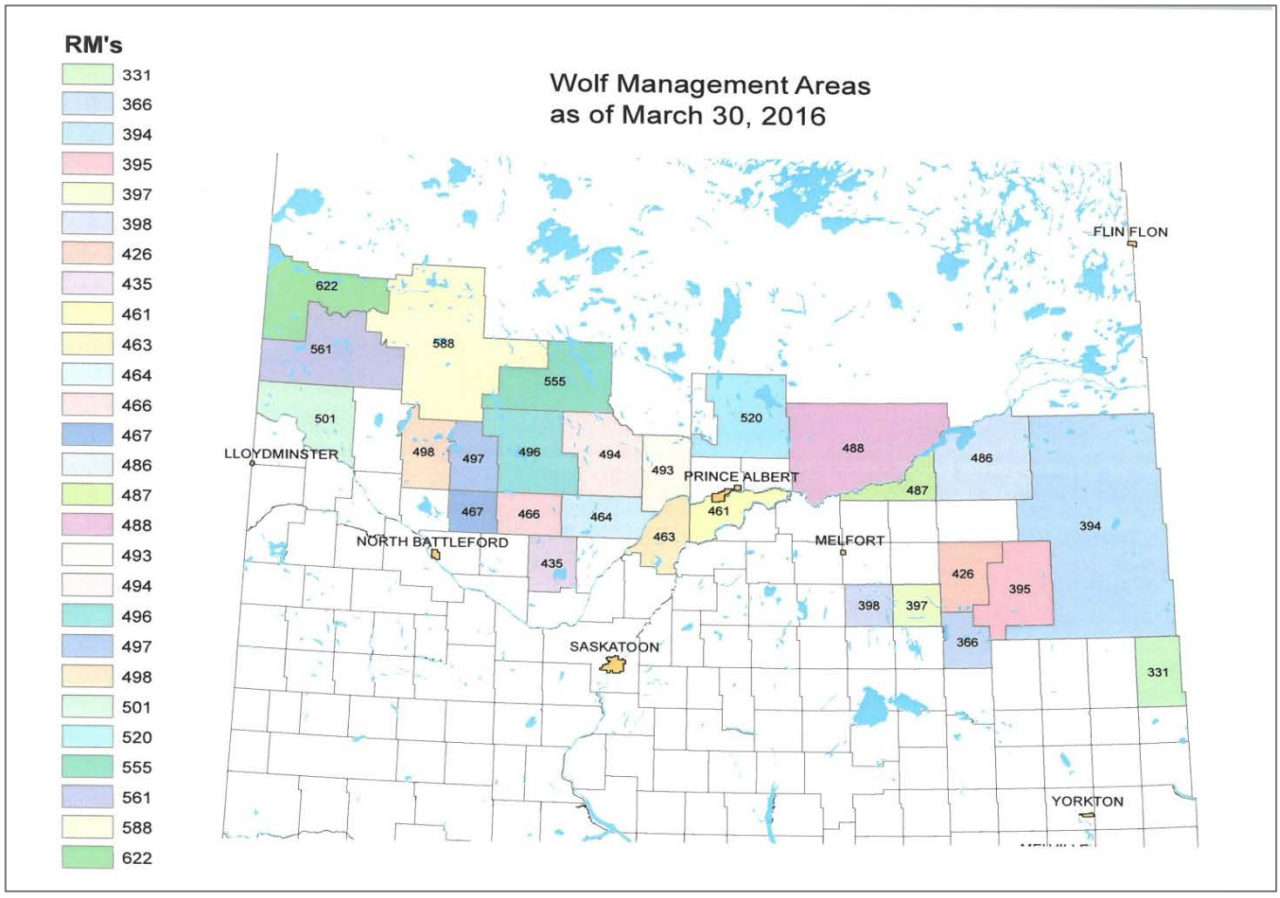

Figure 16. Current Wolf Management Areas in Saskatchewan.

Management Objectives and Strategies

Long-term Management Objectives

- Monitor and document expansion of wolf range in Saskatchewan.
- Increase sample size reporting on the population index survey.
- Improve harvest data by accessing export data for wolves retained for personal use and by acquiring better data on wolves harvested, but not marketed, by trappers.
- Monitor hunter harvest and other related mortality.
- Create long-term management units.

Short-term Management Strategies

- Analyze and assess future use of hunting as a wolf management tool.
- Document wolf distribution from field reports.

Additional Information

Most recent provincial species plan: Seguin, R. J. 1991. A Wolf Management Strategy for Saskatchewan. Editors Mike Gollop (chair), Dave Brewster, Wayne Runge, Tim Trottier. Wildlife Population Management. Information Base, 91-WPM-4

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Additional Species

Cougar (*Puma concolor*)

Cougars are one of the most evasive and secretive of all wildlife. Like many species, cougar numbers dropped and their range decreased dramatically following settlement of the prairies. Beginning about the turn of this century there was an increasing number of cougar sightings outside of the traditional post-settlement range. This trend occurred in western and mid-western jurisdictions across the continent including Saskatchewan. Cougar sightings in Saskatchewan have since been confirmed across the south and as far north as La Ronge and Wintego Lake. Breeding populations have been confirmed in the Cypress Hills, Glaslyn and Porcupine Hills areas with suspected breeding in Moose Mountain and across the parkland-boreal forest interface.

Population Status

Saskatchewan cougar populations are managed based on accepted principles of conservation weighted by trends in the occurrence of human and livestock conflicts. Saskatchewan has never offered hunting or trapping seasons. However, in 2016, legislation was advanced in support of a trapping season for 2017. This was in response to increasing human conflicts in southwest Saskatchewan where local cougar populations have increased substantially since the first confirmation of a breeding population in 2006. Cougars are protected under Saskatchewan's *Wildlife Regulations*; however landowners have the right to kill a cougar in order to protect their livestock or property. Any cougar killed must be reported to the Ministry of Environment immediately.

Research Initiatives

There is currently no research being undertaken on cougars in Saskatchewan. In 2010, University of Alberta master's student, Carl Morrison, began work building on previous cougar research conducted in the Cypress Hills (Bacon 2010). Using GPS radio collars and wildlife cameras, the focus of this research examined the cougars' spatial and temporal behavioral response to a seasonal flux in human use and evaluated habitat selection, movement and dispersal in an isolated and naturally fragmented landscape. This work was completed in 2013.

Additional Information

Most recent provincial species plan: None available.

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Appendix

Appendix A. Licence sales (2007 – 2016) for all licence types in Saskatchewan. Data not available is indicated by "---".

Licence Type	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Habitat Certificates	73,860	73,085	72,410	72,738	72,932	77,209	75,512	70,591	74,769	76,829
Res. Game Bird	16,231	16,924	16,939	17,442	17,861	19,373	19,752	19,983	20,850	21,542
Can. Res. Game Bird	1,959	1,988	1,990	2,018	2,033	2,096	2,221	2,181	2,376	2,141
Non. Res. Game Bird	10,331	9,049	8,596	8,323	8,491	8,823	9,353	9,662	9,853	10,462
Res. 1st Whitetail	33,434	37,072	37,515	37,488	38,818	41,754	38,374	33,552	38,492	40,756
Res. 2nd Whitetail	4,329	---	---	---	---	---	---	---	---	---
Can. Res. Whitetail	3,587	3,509	4,162	4,330	4,558	---	---	---	---	---
Draw Can. Res. Whitetail	---	---	---	---	---	4,381	2,976	892	972	962
Guided Whitetail	4,153	3,624	2,488	2,512	2,453	2,526	2,512	1,920	1,944	2,256
Res. Antlerless Whitetail	4,297	3,645	12,677	13,431	14,025	6,063	4,741	1,435	1,155	2,245
Res. 2nd Antlerless Whitetail	13	20	3,158	---	---	---	---	---	---	---
Regular Elk	5,433	4,415	4,956	5,108	5,018	5,792	6,202	7,552	6,288	6,174
Draw Elk	3,508	3,273	3,313	3,330	3,206	2,444	2,737	2,386	2,593	2,891
Regular Moose	5,428	5,587	5,585	5,413	6,033	6,348	6,590	7,156	7,756	7,221
Draw Moose	2,561	2,610	4,264	3,855	4,410	5,202	5,790	5,720	5,687	5,575
Guided Moose	212	151	125	127	121	105	95	114	120	119
Draw Mule Deer	8,225	6,991	4,628	6,377	4,955	4,530	4,144	3,661	3,622	3,574
Mule Deer Archery	1,503	1,561	1,666	2,313	2,391	2,875	3,221	2,327	2,666	2,803
Draw 1st Antlerless Draw Mule Deer	4,116	7,361	5,775	5,047	3,342	3,156	2,890	3,319	3,240	3,058
Draw 2nd Antlerless Mule Deer	---	---	1,447	1,271	---	---	---	1,402	1,257	1,173
Draw Pronghorn Antelope	902	854	1,626	1,155	---	---	---	---	133	129
Res. Bear (1st & 2nd Licence)	2,045	2,299	2,970	3,144	3,341	3,622	3,694	4,153	4,408	4,151
Can. Res. Bear	137	208	203	219	252	289	263	258	248	228
Guided Bear	2,366	2,032	1,639	1,581	1,545	1,520	1,635	1,651	1,628	1,759
Barren Ground Caribou	15	6	0	6	1	5	7	10	4	10
2nd Barren Ground Caribou	14	6	0	4	1	4	7	10	4	10

Youth Licence	5,960	5,475	5,234	4,949	4,888	5,314	6,009	5,566	5,732	5,780
Northern Fur Con. Licence	1,976	1,992	1,691	1,665	1,527	1,749	1,893	1,854	1,896	1,639
South Sask. Fur Licence	1,220	1,143	1,076	976	1,235	1,783	2,188	2,566	2,878	2,723
Youth Fur Licence	131	115	96	76	78	94	175	214	216	172
Total Licences Sold	197,946	194,995	206,229	204,898	199,794	207,057	202,981	190,135	200,654	206,382
Migratory Bird Permit Sales	19,381	18,082	17,898	17,995	17,533	20,112	21,376	20,518	21,099	20,756