Delegated Aerial Ungulate Surveys 2007/2008 Survey Season

Alberta Conservation Association

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Delegated Aerial Ungulate Surveys
2007/2008 Survey Season

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EXECUTIVE SUMMARY

Alberta Conservation Association (ACA) uses levies on hunting and fishing licenses to collect and analyze population inventory data that can be used by Alberta Sustainable Resource Development (ASRD) in setting hunting and fishing seasons and regulations. Aerial ungulate surveys (AUS) are the primary method used to determine population status and trends for ungulates in Alberta, and therefore are an integral component for setting hunting regulations. Beginning in 2007, ACA became a very active partner in the AUS program, and now works collaboratively with ARSD to plan, conduct and summarize survey data. ASRD continues to set provincial priorities for survey locations and rotations, and uses these survey data in the management of ungulate populations. A portion of the overall survey plan is delegated to ACA for delivery (D-AUS) in collaboration with ASRD. During the 2007/08 fiscal year, ACA funded and delivered 28 AUS in 54 management areas across Alberta. These surveys included summer range trend surveys for pronghorn antelope (A*ntilocapra americana*) and mountain goats (*Oreamnos americanus*), winter range trend surveys for bighorn sheep (*Ovis canadensis*), bison (*Bison bison*) and elk (*Cervus elaphus*), random stratified block surveys for moose (*Alces alces*), white-tailed deer (*Odocoileus virginianus*) and mule deer (*Odocoileus hemionus*), and recruitment surveys for caribou (*Rangifer tarandus*). This report summarizes the methods used to conduct these surveys and the survey results.

ACKNOWLEDGEMENTS

The Alberta Conservation Association (ACA) – Alberta Sustainable Resource Development (ASRD) Wildlife Program Agreement clarifies that ACA is delegated the responsibility to deliver a significant portion of the overall aerial ungulate survey program in Alberta. Toward this end, ACA and ASRD work collaboratively to plan surveys, collect and analyze data, and complete written summaries for the surveys conducted. We thank the following ACA and ASRD staff and volunteers who were involved with the planning and delivery of surveys in 2007/08:

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1.0 BACKGROUND

Alberta Conservation Association (ACA) is a non-profit, non-government organization that has been designated a Delegated Administrative Organization by Alberta Sustainable Resource Development (ASRD) to assist with the responsibilities of conserving Alberta's fish and wildlife resources. A key component of this partnership is the use of hunting and fishing levies to collect and analyze population inventory data that can be used by ASRD in setting hunting and fishing seasons and regulations. Aerial ungulate surveys (AUS) are the primary method used to determine population status and trends for ungulates in Alberta, and therefore are an integral component of the decision process for setting hunting guidelines.

Prior to 2006, ACA's role in the AUS program was limited primarily to funding survey flights, while ASRD determined species and areas to be surveyed, conducted the surveys, and analyzed survey data to estimate population numbers, trends, or demographic parameters. In 2007, ACA became a very active partner in the AUS program, and now works collaboratively with ARSD to plan and conduct surveys and summarize survey data. ASRD continues to set provincial priorities for survey locations and rotations, and uses these data to manage ungulate populations. A portion of the overall survey plan is delegated to ACA for delivery (D-AUS) in collaboration with ASRD.

ACA is committed to providing detailed annual reports to describe the outcome of these surveys. This annual report condenses and combines all delegated survey information into one document, streamlining access to ungulate population estimates for provincial wildlife managers, ACA staff, hunters, and many other interested stakeholders.

2.0 INTRODUCTION

Alberta's hunters and anglers are an important partner in the management and conservation of the province's wildlife resources. Hunting and fishing license fees are used to support a variety of wildlife inventory, enhancement and management efforts

throughout Alberta. For ungulates, population data gathered through aerial surveys are one of the main sources of information used to set harvest regulations and conservation priorities. Since 1997, the majority of these surveys have been funded by hunting license levies that are directed to ACA. This report summarizes results of surveys for moose (*Alces alces*), elk (*Cervus elaphus*), white-tailed deer (*Odocoileus virginianus*), mule deer (*Odocoileus hemionus*), bighorn sheep (*Ovis canadensis*), mountain goats (*Oreamnos americanus*), pronghorn antelope (A*ntilocapra americana*), bison (*Bison bison*) and caribou (*Rangifer tarandus*) conducted by ACA during the 2007/08 fiscal year.

3.0 SELECTING SURVEY PRIORITIES

As the government agency responsible for managing ungulates within Alberta, ASRD sets long-term survey priorities for ungulates. In many cases, wildlife management units (WMUs) are surveyed on a rotational basis to enhance management decisions. Surveys may also be prioritized in order to assess the effectiveness of specific management actions, determine the effects of harsh winters, or in response to unique information requirements for a specific species or area of the province. ACA works collaboratively with ASRD to develop short-term (three year) plans for the implementation of surveys to ensure that they fall within budget constraints. In addition, because of the rarity of good survey conditions (complete snow cover coupled with low winds and high visibility) in some areas of the province, several condition-dependent surveys are identified each year that are prioritized if weather conditions are favourable.

4.0 SURVEY METHODS

The techniques used to survey Alberta's ungulate herds vary across the province according to the habits and habitats of the species of interest, weather conditions that may affect animal movement or sightability, and the safety features of various aircraft. In general, three main approaches are used, each with its own advantages and limitations.

4.1 Summer range trend surveys

For some species, such as mountain goats and pronghorn antelope, the contrast between coat colour and vegetation, coupled with the openness of their habitats, allows population surveys to be conducted during summer months. When possible, summer surveys are ideal from a harvest management perspective because they allow the population status to be assessed immediately prior to hunting seasons and inherently incorporate over-winter mortality unlike traditional winter surveys.

Mountain goat summer ranges are intensively searched by helicopter during the cool parts of the day when goats are most active and visible. In addition to recording the total numbers of goats seen on each range complex, observers enumerate the numbers of adults, yearlings and kids, whenever possible.

Pronghorn antelope surveys are conducted by surveying 1-mi wide transects within long-term census blocks that have been established across pronghorn range. Densities of pronghorn observed in these blocks are extrapolated across the antelope management area (AMA) to estimate total numbers within the unit. In addition, classification of each herd by sex and age allows estimation of buck/doe/kid ratios.

4.2 Winter range trend surveys

For some species, including elk, bighorn sheep and bison, the presence of distinct winter ranges that are predictably occupied year-after-year provides the opportunity to conduct annual minimum counts to estimate population trends (increasing, decreasing or stable) and key demographic information, including male/female/young ratios and per cent of males in various size categories. While useful for monitoring long-term changes in ungulate populations, winter range surveys do not necessarily allow the complete enumeration of population numbers, and therefore are most useful when compared to results from previous years.

Trend surveys are typically conducted with rotary-winged aircraft during ideal weather conditions, such as after a recent snowfall when winds are low. In some cases, fixed-wing aircraft may be used to locate groups of animals for subsequent counting by helicopter. The navigator directs the pilot to navigate to known traditional winter

ranges, where the area is searched intensively to determine whether animals or tracks are present. When animals are observed, the pilot maneuvers the aircraft so observers can obtain a complete count and enumerate the numbers of males, females and offspring. These classifications may not be possible for all species, particularly during late winter when many male ungulates have dropped their antlers. On ranges with large herds, the survey team may take photographs to allow for more precise counts.

4.3 Stratified random block surveys

When possible, ACA and ASRD strive to implement aerial survey approaches that allow for statistically rigorous estimates of ungulate population numbers and density within WMUs. In most cases, this is facilitated using the 'Gasaway Method' (Gasaway et al. 1986) to design and implement counts in a random selection of survey blocks within WMUs. This approach sees widespread application for moose, deer and elk in areas where forest cover is low enough to allow good sightability. In addition to allowing precise population estimates, this approach often allows estimates of male/female/young ratios, as well as the relative number of small-, medium-, and large-antlered males, if surveys are conducted prior to antler drop.

The Gasaway Method divides a WMU or group of adjacent WMUs into several dozen smaller survey blocks that are approximately equal in size, and then classifies each block into a stratum that describes the relative number of animals of the species of interest that are expected to be present within that block. Stratification can be based on observations from fixed-wing aircraft (small, high-winged airplanes) immediately prior to the intensive portion of the survey, previous knowledge of ungulate distribution within the WMU, or habitat features within each survey block. Following stratification, a portion of the blocks within each stratum are randomly selected for intensive searching via rotary-winged aircraft (helicopter). During surveys, each block is thoroughly searched and observers classify each animal observed as an adult male, adult female or young, whenever possible. A series of calculations allow the number of animals observed in the sample of survey blocks to be converted to a population estimate for the entire WMU, and the error associated with the estimate determined; additional blocks are surveyed until the error is deemed acceptable (typically below 20% for a 90% confidence interval).

4.4 Population recruitment surveys

Wildlife managers use total population estimates in conjunction with estimates of reproduction and mortality to model how a population of ungulates may be changing throughout the year or during intervening periods between population surveys. These models can be used to track population rate of change, to identify appropriate harvest levels, or to predict how changes in harvest level might influence the overall population over the short- and long-term. The D-AUS program contributes information to these modeling exercises by providing information on the number of offspring recruited into a population in a given year. These data may be collected by three general means. The first method involves intensively searching areas of known ungulate distribution and good sightability to find females. The number of offspring observed with these females is used to calculate a reproductive rate. The second method involves locating radio-collared females and recording the number of offspring observed with the associated group. This method provides more reliable data, but is only infrequently available as an option because it is generally only associated with larger studies that have deployed radio collars for other purposes. The third method records the number of offspring observed during random stratified block or trend surveys. Although this method provides an efficient use of resources, it is usually only a secondary objective and may not provide adequate data in all cases.

4.5 2007/08 survey effort

During the 2007/08 survey cycle, the Wildlife Management Branch of ASRD delegated 28 ungulate surveys to ACA. Additional surveys were conducted by ASRD as part of their internal survey activities. In some cases, ACA staff participated with the delivery of these additional surveys. ACA conducted at least one survey for every harvestable ungulate within the province, including pronghorn antelope, mountain goats, bighorn sheep, white-tailed deer, mule deer, elk, moose and bison. Details of each individual survey[1] are provided in the following sections.

[1] Some related surveys have been grouped into a single report section to facilitate comparison (e.g., all eight pronghorn antelope management area surveys are described in section 5.1).

5.0 SUMMER RANGE TREND SURVEYS

5.1 Pronghorn

Section Authors: Mike Grue and Kim Morton

Aerial surveys for pronghorn antelope are conducted annually in Alberta to provide trend data, information on population status (density, distribution and herd composition), and to estimate population size. This information is used by ASRD in harvest calculations for the upcoming fall hunting seasons. Recreational hunting opportunity for pronghorn antelope in Alberta is highly sought after, making the information collected during the annual aerial surveys critical for decision making. This summary describes data collected during the 2007 surveys conducted in AMAs A, B, C, D, E ,F ,G and H (Figure 1). AMA S (Suffield area) was not surveyed in 2007.

5.1.1 Survey methods

Following standard census procedures, survey crews conducted antelope surveys on AMAs between 6 – 13 July 2007. Each AMA contains designated survey blocks with fixed transects that were surveyed from rotary-winged aircraft. In an attempt to reduce survey costs, the survey crew conducted non-stop, 3-h flights with the support of strategic fuel cache locations. Each survey day was divided into two periods; the first flight commenced at approximately 0800 h and the second flight began toward evening, after the heat of the day. The survey crew consisted of the pilot, navigator and two rear seat observers in a Bell 206L helicopter. Primary observers maintained constant observation of the ground area for a distance of 0.5 mi. (0.8 km) perpendicular to the flight line on each side of the aircraft. The navigator kept the aircraft on course, recorded observations, and assisted with ground observation and herd classification, whenever possible. The survey crew counted all pronghorn observed on the transect and enumerated the numbers of bucks, does and kids, whenever possible.

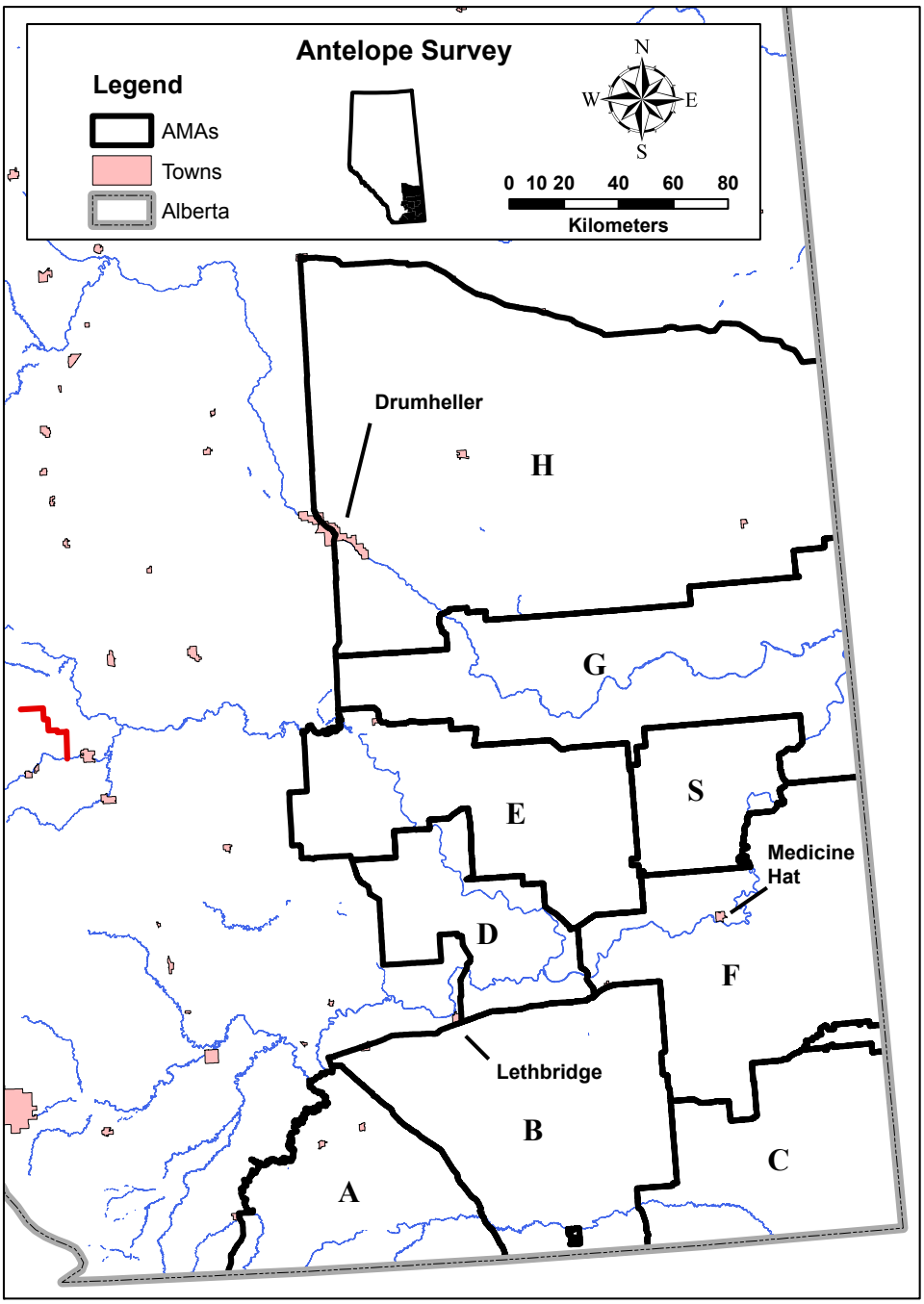

Figure 1. Location of antelope management areas (AMAs) in Alberta.

5.1.2 Population estimation calculations

We calculated the population estimate on an AMA basis by calculating a density (# animals/mi^2) from the number of animals observed on transects divided by the area (mi^2) of primary antelope range flown along transect lines, and applying that density to the area of the unit. Crews only surveyed primary antelope range. For AMAs with secondary antelope range, a density of 0.1 animal/mi^2 was assumed, and multiplied by the total area of the AMA that consisted of secondary range (mi^2). The population estimate for each AMA was added together to create a provincial antelope population estimate.

Step 1) # animals observed ÷ area of antelope range surveyed = antelope density

Step 2) antelope density x total area of primary range = **population estimate**

Steps 3 and 4 are for AMAs G and H only.

Step 3) 0.1 animals/mi^2 x total area of secondary range = **population adjustment**

Step 4) **population estimate + population adjustment = <u>total population estimate</u>**

In years when all AMAs are not flown, an AMA estimate is based on the last year flown, adjusted to reflect standard mortality and recruitment rates (Fish and Wildlife Division 1990), as well as known events that may have caused unpredictable changes in the population (i.e., severe weather event resulting in high mortality).

5.1.3 Results

During the entire survey, crews recorded 743 bucks, 1,891 does and 882 kids on transects resulting in a total provincial population estimate (excluding Suffield) of 18,950 antelope, including 4,220 bucks, 10,430 does, and 4,300 kids. The population densities, areas in primary and secondary ranges surveyed, and resulting population estimates for each AMA are summarized in Table 1.

Table 1. Area surveyed, density, population estimates and herd composition from the 2007 Alberta pronghorn antelope surveys.

	Antelope Management Area							
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**
Primary range surveyed (mi^2)	150	432	354	171	191	475	369	435
Observed antelope density (#/mi^2)	1.24	1.15	2.29	2.42	1.74	1.38	0.96	0.49
Estimated primary range (mi^2)	710	2280	1805	522	1160	2865	2415	2739
Estimated population in primary range	880	2620	4140	1260	2020	3950	2310	1340
Estimated secondary range (mi^2)	n/a	n/a	n/a	n/a	n/a	n/a	819	3513
Estimated population in secondary range	n/a	n/a	n/a	n/a	n/a	n/a	80	350
Total estimated population	880	2620	4140	1260	2020	3950	2390	1690
Bucks/100 Does	24.0	45.7	41.9	23.8	47.8	30.4	44.8	68.0
Kids/100 Does	29.8	66.7	30.1	51.9	37.2	36.7	50.3	38.8

5.2 Southern mountain goats

Section Authors: Mike Jokinen and Carita Bergman

Surveys to determine the status of the southern Continental Divide (north of Waterton Lakes National Park to the Crowsnest Pass) mountain goat population have been implemented on 21 occasions since the first survey in 1979. During the 1979 survey, only complexes along the eastern (Alberta) side of the Continental Divide were searched. Commencing in 1980 and continuing during all subsequent years, entire mountain complexes on both sides of the Divide have been surveyed (Figure 2). With a growing population, a hunt was initiated in 2001 with a small number of licenses issued in three goat management areas. In 2007, the survey objectives were to obtain a minimum count of goats to determine population status and trend, to classify all goats by sex and age to facilitate population analysis and provide an assessment of herd production and recruitment, and to map goat sightings to provide population status information on a regional basis.

5.2.1 Survey methods

The survey crew searched mountain complexes along the Continental Divide over a 4-day period from 26 – 29 June 2007. All surveys occurred in early morning or late afternoon periods to take advantage of peak animal activity, using a helicopter flown at air speeds ranging from 50 to 100 km/h. In most instances, a single flight near the timberline allowed coverage of the goat range, but occasionally extensive mountain faces required a second flight at a higher elevation to ensure complete coverage.

The left front passenger (navigator) maintained the proper flight course and assisted with classification of goats to sex and age categories. Two observers occupying the rear seat provided continuous side observation, with the passenger on the right recording wildlife numbers and Global Positioning System (GPS) locations. Surveyors classified all goats observed into standard sex and age categories of adult male, adult female, unclassified adult, yearling or kid. We did not correct for sightability; therefore, overall counts should be considered as minimum estimates.

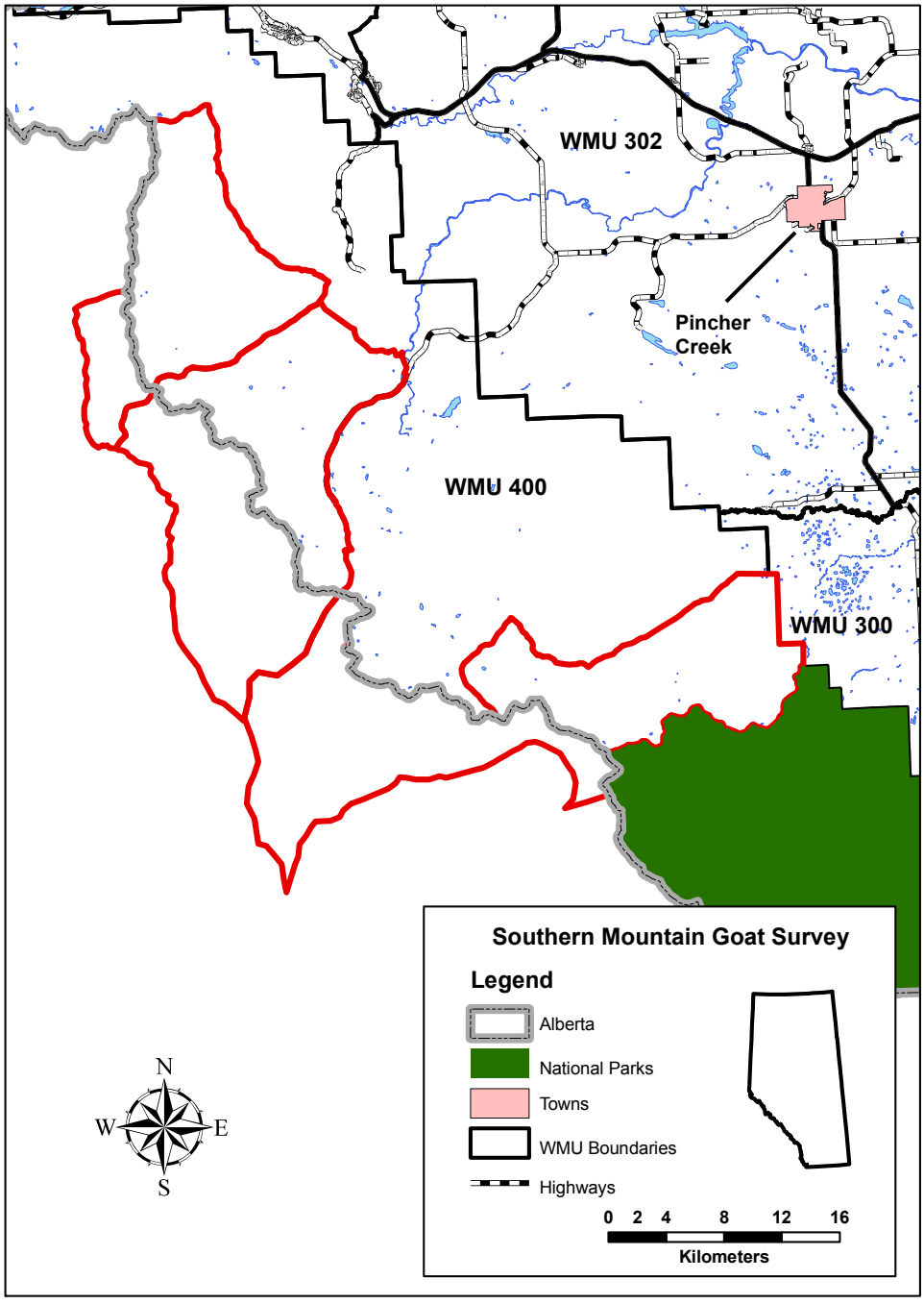

Figure 2. Location of the southern mountain goat survey area in Alberta.

5.2.2 Results

Weather conditions for the 4-day survey were excellent. We observed 193 mountain goats during the survey, including 110 adults, 12 unclassified adults, 41 kids and 30 yearlings (Table 2; Figure 3). Classification of age classes provided estimates of reproduction and recruitment rates of 34 kids/100 adults and 25 yearlings/100 adults.

Assuming counts were consistent among years, the kid per 100 adults ratio of 34 in 2007 appeared lower than that observed in 2005 when 49 kids/100 adults were recorded (all-time high). However, 34 kids/100 adults was higher than the long-term average. The number of yearlings per adult during the 2007 survey (25 yearlings/100 adults) appeared greater than that observed in 2005 (22 yearlings/100 adults).

Incidental wildlife observed in the study area during the mountain goat survey included 176 bighorn sheep, 77 elk, seven moose, 23 mule deer, one white-tailed deer, seven golden eagles (*Aquila chrysaetos*), one wolverine (*Gulo gulo*), and eight grizzly bears (*Ursus arctos*).

Table 2. Mountain goat observations within each mountain complex in 2007.

Complex	Total	Adult Male	Adult Female	Unclassified Adult	Yearling	Kid
O	20	12	3	3	0	2
Upper West Castle	4	0	1	0	2	1
B	51	5	20	5	9	12
Q	20	2	9	0	3	6
C	19	2	10	0	2	5
R	46	8	19	2	9	8
D	32	4	14	2	5	7
N. end Divide to CNP[1]	1	1	0	0	0	0
Overall total	193	34	76	12	30	41

[1]CNP = Crowsnest Pass.

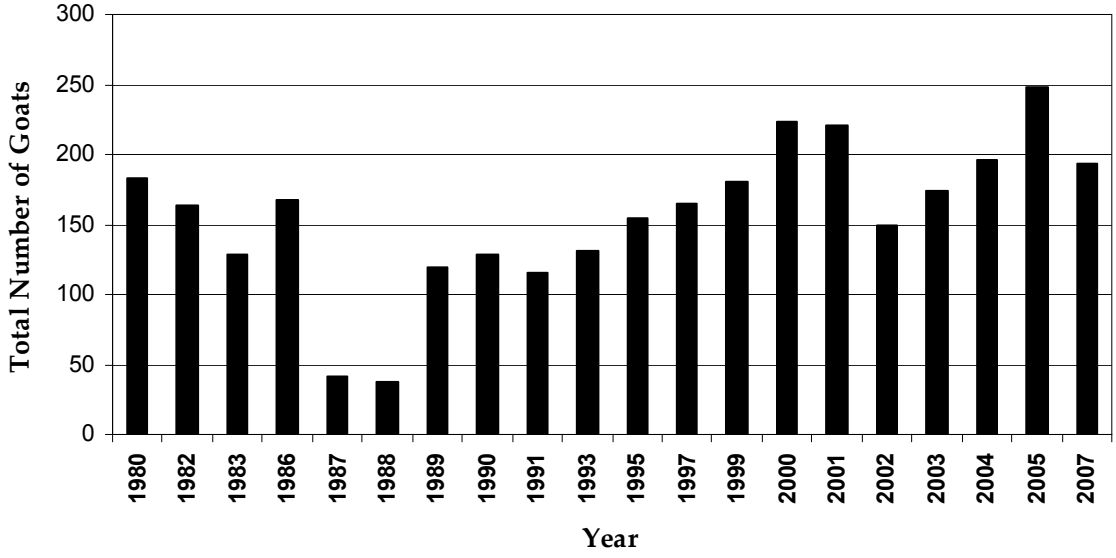

Figure 3. Southern Continental Divide mountain goat minimum population count trend, 1980 to 2007. Surveys conducted in 1987 and 1988 were incomplete.

6.0 WINTER RANGE TREND SURVEYS

6.1 Hay-Zama bison

Section Author: Dave Moyles

The Hay-Zama lowlands were selected in the late 1970s and early 1980s as a site suitable for reintroduction of wood bison (Reynolds et al. 1982). An enclosure designed as a temporary holding facility for these animals was built and a small herd was introduced from Elk Island National Park in 1983. The bison were never released because of concerns about these animals contracting bovine brucellosis and/or tuberculosis from diseased bison wandering out of Wood Buffalo National Park. In 1993, portions of the fence collapsed and the small herd escaped into the Hay-Zama area. The Hay-Zama wood bison herd has spread throughout the low-lying areas between Zama Ridge to the south and the slopes of the Cameron Hills and Bootis Hill to the north. We have monitored an increase in bison numbers in their range through aerial surveys in late winter. The purpose of these surveys was to estimate bison

numbers and their distribution in the Hay-Zama Lakes-Chinchaga River-Zama City area (Figure 4).

6.1.1 Study area

Much of the area in and around the Hay-Zama wetland complex is comprised of sedge meadows and wet sedge grass communities, which are prime foraging areas for bison (Reynolds et al. 1982). Bison also make extensive use of oxbows along the lower reaches of the Chinchaga River to its confluence with the Hay River.

The area surrounding the wetlands and rivers is dominated by black spruce muskeg communities, with aspen and white spruce bluffs on better drained soils. The network of oil patch infrastructure, which includes well sites, borrow pits, road side edges, pipelines, battery sites and airstrips, provides additional habitat for bison because clover has been used extensively for reclamation purposes. Bison have followed this infrastructure into the Shekilie Field and close to the Paramount Bistcho Plant. Bison have also followed the Zama Road to its junction with Highway 35, and have been observed along Highway 58 near Rainbow Lake.

6.1.2 Survey methods

On 6 March 2008, a two-person crew in a Cessna 206 fixed-wing aircraft searched areas where bison had been seen during prior years, as well as new areas that were thought to be attractive to bison. The extra areas surveyed this year included the area along Highway 35 north from the High Level airport to the Steen River area, east of the junction of Highway 35 and the Zama City Road, north of Zama City to the Paramount Bistcho gas plant in 122-2 W6M, along the Hay River to the British Columbia boundary, then north along 120° longitude to 59° 15′ latitude, then east into the Shekilie Field area. The survey crew recorded a GPS waypoint for all sightings of bison or tracks and the number of bison observed.

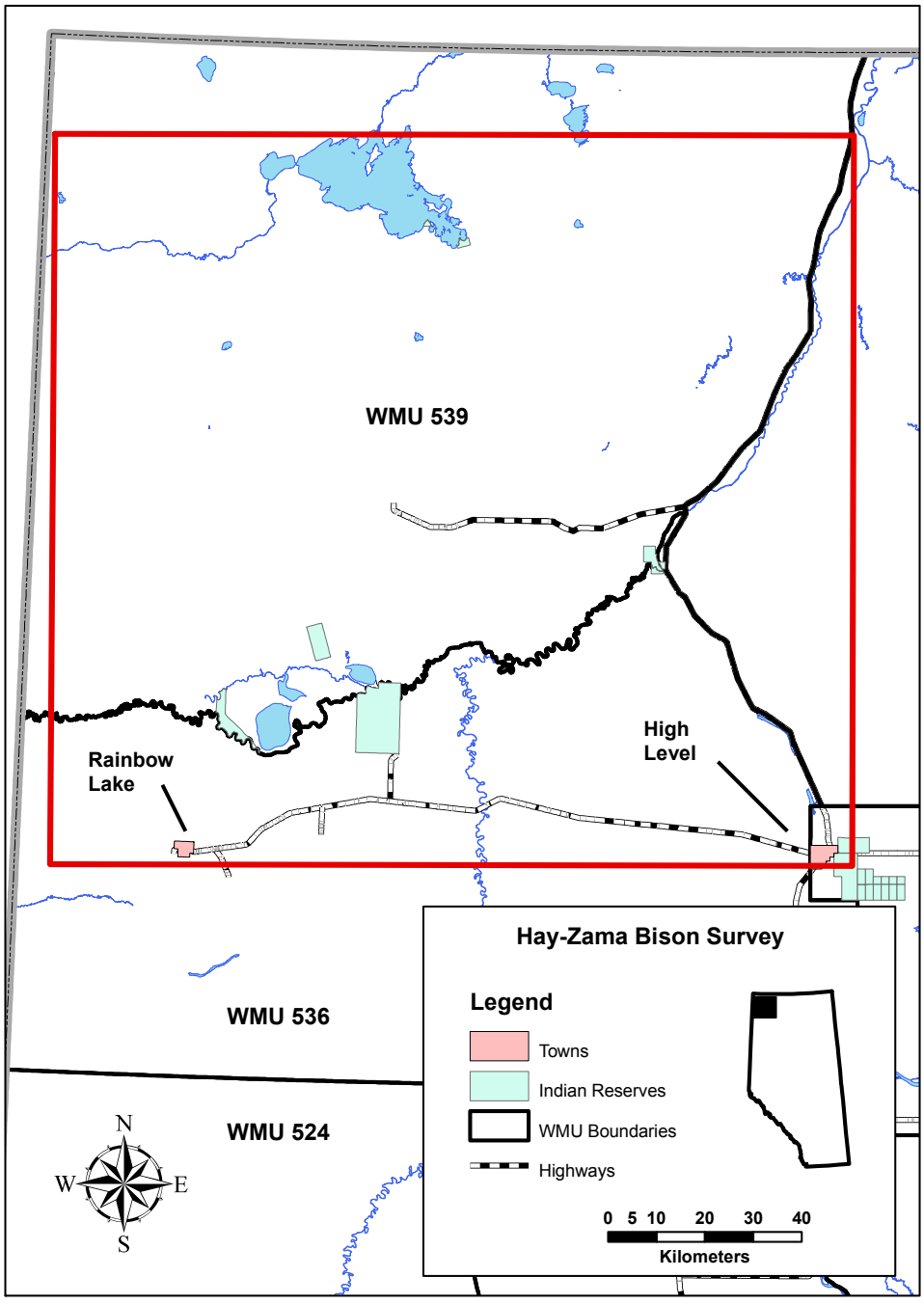

Figure 4. Location of the Hay-Zama bison herd in Alberta.

On 7 March 2008, a two-person crew in a Bell 206 helicopter located all bison observed the previous day. After locating bison, the pilot maintained a relatively high altitude to allow observers to conduct a complete count. The pilot then maneuvered closer to the herd to allow identification of calves. Calves were identified by their smaller body size and horns. If the crew encountered any difficulties with classification or the total count, they took pictures of herds for further analysis. Given this approach, counts were presumably biased toward individuals found in herds and provide minimum estimates.

6.1.3 Results

Fresh snowfalls on 1 and 3 March prior to the survey provided ideal survey conditions. Bison tracks were easily identified in the deep snow conditions. The survey crew located bison or bison tracks at 63 sites throughout the large area surveyed. In total, the crew observed 652 bison (593 adults and 59 calves) and five sites with fresh bison tracks but no bison (Table 3). The crew did not observe bison along Highway 35, the upper reaches of the Hay River, along the Alberta-British Columbia boundary, or in the Shekelie or Paramount Bistcho fields, but did find a few old tracks in the Shekelie Field area.

Table 3. Hay-Zama area bison surveys, 1994 to 2008.

Year	# of Groups	Number of Bison			% Calves[b]
		Adults[a]	Calves	Total	
Mar. 2008	63	593	59	652	9
Mar. 2007	41	499	66	565	12
Feb. 2006	41	499	23[d]	522	5
Mar. 2005	33	365	59	424	14
Mar. 2004	30	267	53	320	17
Feb. 2003	23	236	26	262	10
Feb. 2002	21	200	33	233	14
Mar. 2001	12	158	27	185	15
Mar. 2000	12	132	21	155	14
Mar. 1999	14	81	16	97	17
Feb. 1998	12	106	6[c]	112	5
Mar. 1997	7	75	14	89	16
Mar. 1996	7	61	15	76	20
Nov. 1995	4	62	12	74	16
Mar. 1995	4	48	15	63	24
Dec. 1994	3	41	17	58	30

[a] "Adults" includes yearlings.
[b] % Calves = calves/total population x 100.
[c] This is a minimum count (Morton 2003).
[d] This is a minimum count; difficulty encountered distinguishing calves from yearlings.

6.2 Clearwater Area elk

Section Authors: Anne Hubbs and Chiara Feder

The elk, also known as wapiti, is one of the most prized of Alberta's wild ungulates due to its appearance, size, large antlers and social behaviour. With continued growth of human populations and activities, public interest regarding elk has become numerous and diversified (Fish and Wildlife Division 1997). Elk provide a significant hunting opportunity, both for recreational and subsistence hunting. In addition, elk are an important source of food for predators, especially wolves. In the Clearwater Area, long-term trend surveys, hunter success, and general public perception suggest that elk

are currently experiencing a new phase of decline. As a result, detailed winter range surveys are conducted each year to continue to monitor population trends.

6.2.1 Study area

Elk winter ranges in the Clearwater Area are bordered to the west by Banff and Jasper national parks, to the north by Yellowhead and Brazeau counties, and to the south by the Panther and the Dormer-Sheep Forest Land Use Zones (Figure 5). This area is comprised of a mix of upper-foothill, montane and subalpine habitats (from east to west), with several large river valleys characterized by riparian habitats and meadows. The area includes some unique habitat including a high elevation rough-fescue grassland (Ya-Ha Tinda) in the southwest portion, a plain characterized by mild winters west of Lake Abraham (Kootenay Plains), and an extensive forested area (the R11 Forest Management Area) with unique management characteristics. There is very little agriculture or human settlement in the area covered by elk winter ranges, and the level of forestry and energy activities is low in the western portion of the area, but moderate to high in the eastern portion.

6.2.2 Survey methods

A survey of known elk winter ranges occurred between 23 – 24 January 2008 using a Bell 206 helicopter. The flight crew consisted of a pilot and three passengers: a navigator/observer up front, an experienced observer right-rear, and an observer left-rear. The helicopter crew searched each range and counted all elk observed. When elk tracks were observed, the survey team searched the area intensively in an attempt to locate and count the elk. We did not correct for sightability; therefore, overall counts should be considered to be minimum estimates. Flights occurred at an air speed of approximately 130 km/h and an altitude of 200 m above ground. The crew did not survey ranges within Jasper and Banff national parks.

The crew counted all elk and recorded their GPS location. Males were identified if antlers were present, but most individuals were antlerless at the time of the survey. In addition, the crew counted all other ungulates observed during the survey (sheep, moose, deer and horses) and classified them by sex and age, whenever possible.

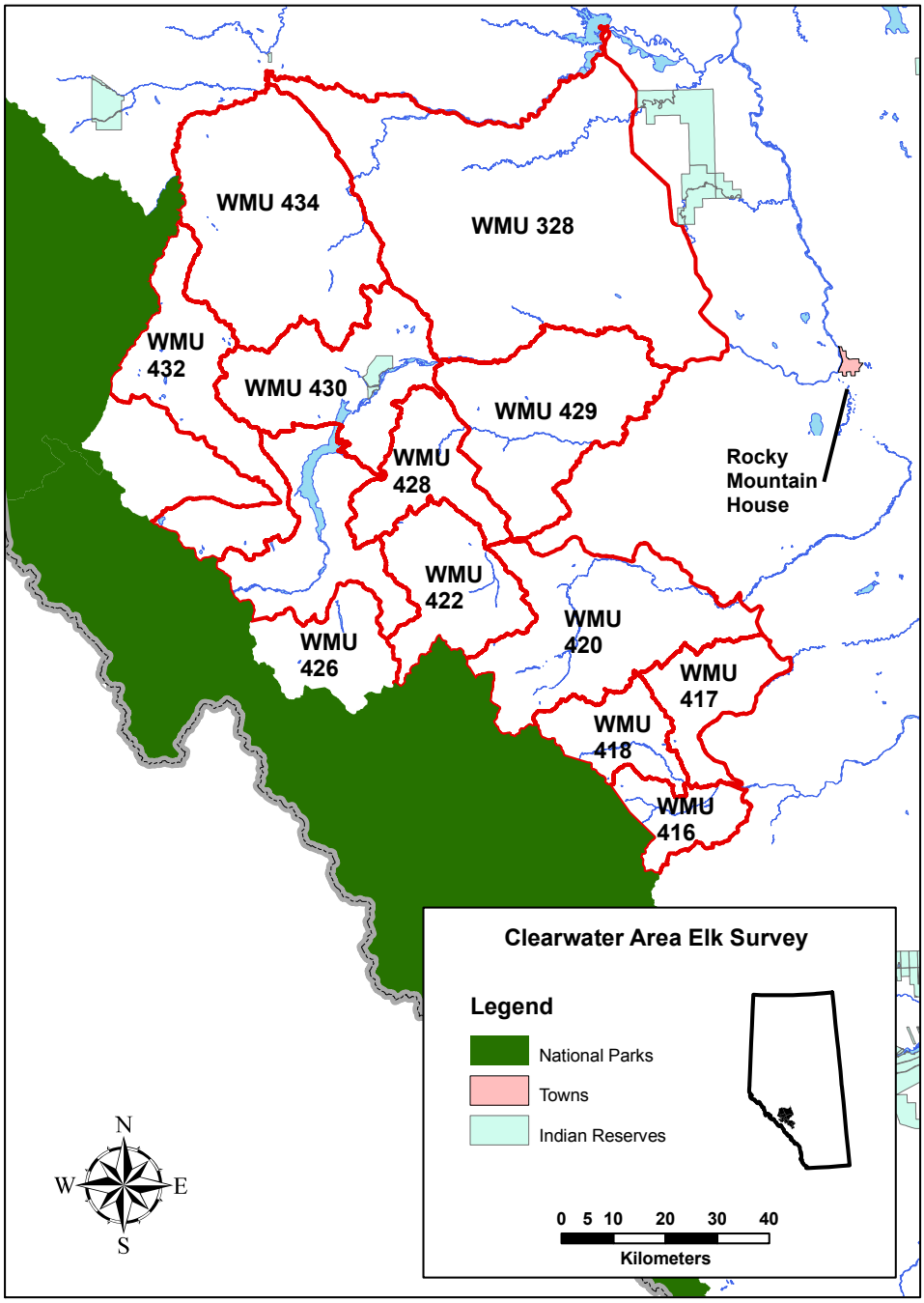

Figure 5. Location of the Clearwater Area elk survey in Alberta.

6.2.3 Results

Complete (100%) snow cover and light winds provided good survey conditions. The crew surveyed all elk winter ranges in the Clearwater Area, except ranges 18 (O'Chiese Natural Area) and 19 (Sand Creek, northeast of Brazeau Canal) because of heavy fog late in the day on 24 January. Visibility of other ranges was unaffected.

In total, the survey crew observed 800 elk. Because of the large number of antlerless bulls, the sex ratio was not determined. Results of the 2008 survey and comparisons to 2007 are reported in Table 4. In 2008, the crew observed many tracks in the Elk Creek winter range, but did not observe many animals. In addition, the crew observed a total of 463 bighorn sheep, 72 feral horses, 39 deer and 87 moose.

Table 4. Number of elk observed on winter ranges within the Clearwater Area during annual surveys conducted in 2007 and 2008.

	# of Elk Observed	
Winter Range	**2007**	**2008**
Ya Ha Tinda Ranch	598	408
Upper Clearwater River	43	142
South Ram River	5	76
Ranger Creek	0	33
Elk Creek	39	1
Rough Creek	0	1
North Saskatchewan River	125	25
Nordegg	0	14
Kootenay Plains	13	90
Blackstone River	0	10
Brazeau River	5	0
Total	**828**	**800**

6.3 Wildlife Management Unit 212 elk

Section Author: Pat Young

Local landowner reports suggest that elk began occupying the southwest portion of WMU 212 in the 1960s. Initially, their numbers were quite low and the population seemed relatively stable. In 1974, the WMU was declared an archery-only hunting zone due to safety concerns expressed by some local residents and landowners. A number of landowners petitioned the government to reduce elk numbers in the mid 1980s. Two rifle hunts were conducted in 1986 and 1988 that were considered successful, but were met with some opposition from the anti-hunting community. An additional rifle hunt was conducted in 1996. Again the hunt was considered successful, but there was considerable opposition expressed by the public.

In an attempt to respond to public concerns, a large, permanent live trap was constructed in the Cross Conservation Area (CCA). This live trap achieved considerable success during the first five years of use. A total of 422 elk (mainly cows

and calves) were captured and relocated to other suitable elk range along Alberta's East Slopes and away from agricultural areas to avoid landowner conflicts. When the local elk herd was reduced near the CCA, a new trap was constructed further south in the WMU to try to capture additional elk from a separate and growing elk herd. This new trap has not been very successful with only 15 elk relocated over the past five years (2003 to present). As a consequence of the poor capture success, the local elk population has steadily increased. Landowner complaints have also risen as crop depredation, fence damage and concern over vehicle collisions increase.

The WMU 212 elk survey has not been flown on a regular basis, mainly due to poor surveying conditions and lack of funding in some years. Over the past year, a survey schedule has been established that will allow annual surveys to occur if weather conditions are suitable. The 2008 survey was intended to verify the elk population in WMU 212 for the winter of 2007/08 and will be used by ASRD to determine transplant goals, hunter allocations, and management options for population control. Future surveys will provide a mechanism to determine the success of management efforts.

6.3.1 Study area

Elk range in WMU 212 is limited to an area southwest of the City of Calgary (Figure 6). Occasional movements of elk into the area from adjacent WMUs, or into normally unoccupied range may occur, but the majority of wintering elk occur within an area south of Highway 22X and west of secondary Highway 552 to the WMU boundary. This area consists of considerable tree cover interspersed amongst farmland, rangeland, acreages and subdivision developments. Only areas offering suitable cover within this landscape were surveyed. Because the area is populated and there are many landowners with horses that can be disturbed by low-flying aircraft, it was necessary to avoid certain areas while trying to optimize survey coverage. Most elk are in large groups during the winter months, and thus readily observed. Smaller groups of bulls often split from the main herds and move into more remote and isolated locations. We assumed that most of the smaller bull groups would be located during this survey if all suitable forested cover was surveyed.

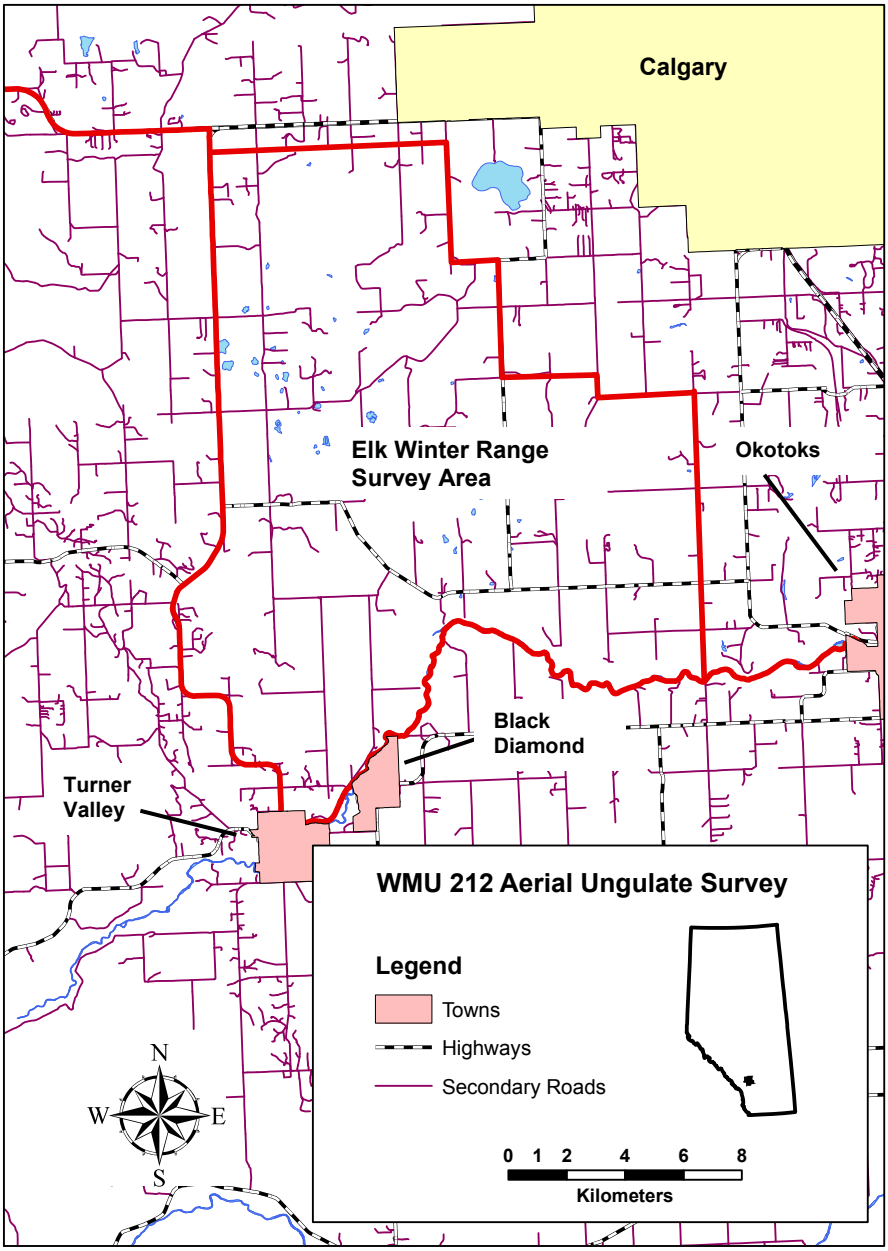

Figure 6. Location of the Wildlife Management Unit 212 elk survey area in Alberta.

6.3.2 Survey methods

The WMU 212 elk survey occurred on 22 January 2008 using a Bell 206 helicopter. The survey proceeded to the west, south and east from the meeting point at Belvedere House in the CCA. Transects were flown in an appropriate orientation to ensure complete coverage of the area. One member of the survey crew acted as a navigator to ensure that all suitable elk range was covered and to provide direction to the pilot during the survey. The other crew members took photos, tallied the larger groups of elk, and took GPS locations for each group encountered. When a large group of elk was observed, the crew estimated a total count by breaking the herd into smaller sub-groups by terrain, landscape changes, or natural divisions within the herd. These smaller groups were tallied as the pilot circled the group at an altitude that avoided spooking the elk. One crew member took digital photographs of large groups for subsequent counting. Elk were classified as cows, calves or bulls. Bull groups were further classified into spike bulls, branch antlered bulls (larger than spike, < 5 points), and trophy bulls (≥ 5 points). Sex ratios and age classes may be inaccurate if some elk drop antlers prior to the survey. We did not correct for sightability; therefore, overall counts are minimum estimates.

The survey crew also counted moose during the survey. The number of animals observed was not considered to be a complete count of moose within the WMU, but we assumed it represents a large proportion of the population because the same land base that supports the elk also supports most of the moose known to occur in the WMU.

6.3.3 Results

Almost complete snow cover at the start of the survey allowed elk to be readily observed against the white background. Winds remained quite light during the entire survey, with maximum winds of about 10 – 15 km/h.

The survey crew encountered 11 elk groups ranging in size from a single bull to a large group of 440 individuals. The crew did not observe elk on the ridge that runs to the northwest from the town of Black Diamond towards Millarville. In most winters, this

ridge is occupied by one or more groups of elk. This ridge has been the location for a number of complaints regarding elk depredation.

In total, the survey recorded 913 elk and 80 moose. In the CCA, which is unavailable for hunting, the crew observed 131 elk in five separate groups. Included in this count of 131 elk were 29 bulls (7 spike, 9 branch and 13 trophy), 24 calves and 78 cows. The location of a number of elk in tree-covered areas made it difficult to distinguish calves from cows, likely resulting in an underestimation of calf numbers. The crew observed 782 elk outside the CCA, including three large groups of 149, 167 and 440 elk. Due to the behaviour of bull elk during winter, the crew may have missed some small bull groups. Also, some bulls undoubtedly occurred in the large, unclassified group of 440 elk.

6.4 Canmore area elk

Section Authors: Jon Jorgenson and Mike Jokinen

In 1974, a systematic winter aerial survey for elk within individual WMUs was initiated in the Canmore and Calgary areas. Since that time, evident elk winter range has been described. The main objectives of these aerial surveys are to determine the winter spatial distribution of elk, the post-hunt herd composition, and the number of elk within the area. Consistent data have been collected over the years, allowing trend comparisons of areas well known as elk winter range within each WMU surveyed. This information is used by ASRD to make wildlife management decisions within defined areas, including land-use decisions and allocation of hunting permits. This section describes the methods and results of the survey conducted in winter 2008.

6.4.1 Study area

The survey area integrated the Bow River, continued south of the Highwood River, and covered mountainous areas of Kananaskis Country and foothills just west of Calgary (Figure 7). More specifically, known elk wintering areas within WMUs 310, 312, 314, 406, 408 and 410 were surveyed, including the area of Bow Valley Provincial Park.

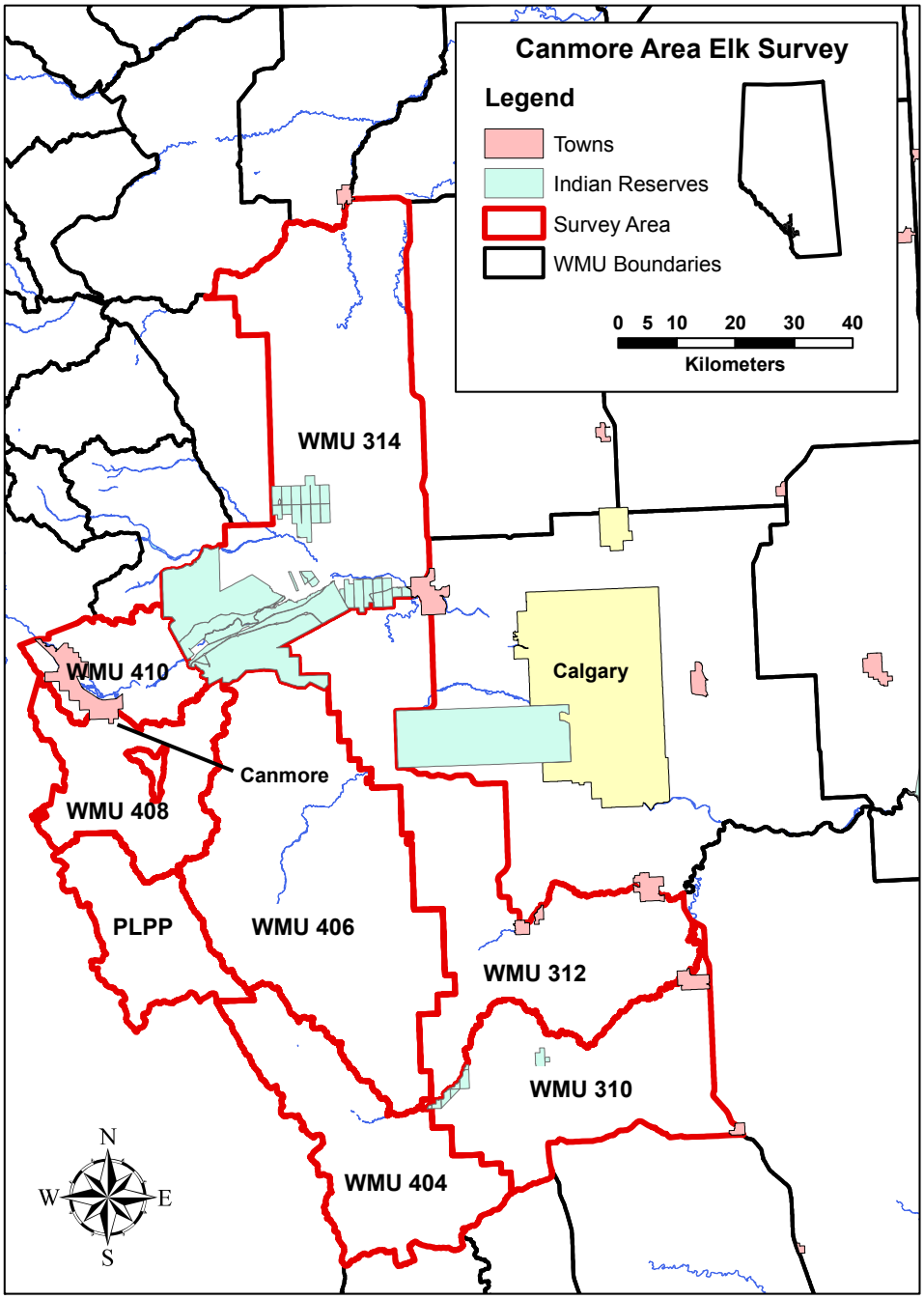

Figure 7. Location of the Canmore area elk survey in Alberta.

6.4.2 Survey methods

Aerial observations occurred on 18, 20, 21, 23, and 24 January and 1 February 2008 using a Bell 206 Jet Ranger helicopter. The survey crew included a navigator/observer in the front seat and two observers in the back seat. The crew recorded elk sightings on a 1:250,000 topographic scale map and used a hand-held GPS unit to log observation points and record Universal Transerve Mercator (UTM) geographic coordinates. All pertinent data were recorded on survey sheets and condensed into table format. The crew tallied and classed elk groups as cows or calves (where possible), spike bulls, branch bulls, or trophy bulls (≥ 5 points). Use of Canon Image Stabilizer binoculars facilitated class identification and photographs taken of large elk groups later served in total counts.

The flight path followed a predetermined trajectory designed to cover traditional elk winter ranges. Parallel transects were flown in some foothill ranges in order to cover the area more thoroughly, because elk tend to be more widely dispersed and more difficult to find in these areas. Search effort was mostly concentrated in areas where elk tracks were visible in the snow.

6.4.3 Results

Complete snow cover and cold temperatures provided good to excellent survey conditions, except for 23 January when the temperature rose to 0°C and snow cover disappeared from some south-facing slopes. In total, the crew observed 2,441 elk on all the winter ranges (Table 5). All traditional winter ranges were flown during the 2008 surveys. Observers recorded the highest number of elk in WMU 312, at just less than 1,000 (minimum count), and the least elk in Peter Lougheed Provincial Park. However, this park was only superficially surveyed, and therefore this count was not considered a total count.

Table 5. Summary of winter elk observations by wildlife management unit (WMU) in the Canmore area in 2008. Abbreviations: Bow Valley Provincial Park = BVPP, Peter Lougheed Provincial Park = PLPP.

WMU	Total	Cows	Calves	Unclassified Antlerless	Spike	Branch	Trophy	Unclassified Bulls	Unclassified Elk	Ratio to 100 antlerless	
										Males	Juveniles
310	324	98	13	0	11	6	6	0	190	21	13
312	979	149	44	164	52	34	24	0	512	31	29
314	293	34	0	227	19	9	4	0	0	12	N/A
404	254	114	18	28	9	11	19	5	50	28	16
406	171	101	15	0	12	11	17	0	15	34	15
408	187	133	15	0	11	9	9	0	10	20	11
410	160	16	-	-	0	9	15	12	108	N/A	N/A
BVPP	67	-	-	-	-	-	-	-	67	N/A	N/A
PLPP	6	6	0	0	0	0	0	0	0	N/A	N/A
Total	2441	651	105	419	114	89	94	17	952	26	16

6.5 Wildlife Management Unit 624 elk

Section Author: John Taggart

No report submitted. Please contact the author for information on this survey.

6.6 Foothills Area bighorn sheep

Section Author: Dave Hobson

Aerial surveys for bighorn sheep have been conducted in the Eastern Slopes of Alberta since the 1970s. Since 1978, surveys have focused on select winter ranges where concentrations of bighorn sheep have been observed during previous flights. These mountain complexes are located within WMUs 437, 438, 439, 440, 442 and 444 (Figure 8). The last survey of these complexes was conducted in 2002 (Hobson and Ficht 2002). This section summarizes observations of bighorn sheep obtained during an aerial survey of select winter ranges during winter 2008.

6.6.1 Survey methods

Aerial surveys occurred on 22, 24, 25 and 31 January and on 27 and 28 February 2008. The survey used a Bell 206 helicopter to search each mountain complex and associated drainages for bighorn sheep and other ungulates. Flights of each selected winter range occurred in a counter-clockwise direction at an altitude of 1,500 - 2,000 m above sea level in an attempt to provide complete coverage of each complex. The flight crew consisted of the pilot, a navigator/observer, an observer, and a recorder/observer. The navigator classified each group of ungulates observed, while the observer provided a total count. The recorder/observer recorded all data and provided supplemental observations. The location of each animal or group of animals was identified using a GPS and was plotted in a geographic information system (GIS).

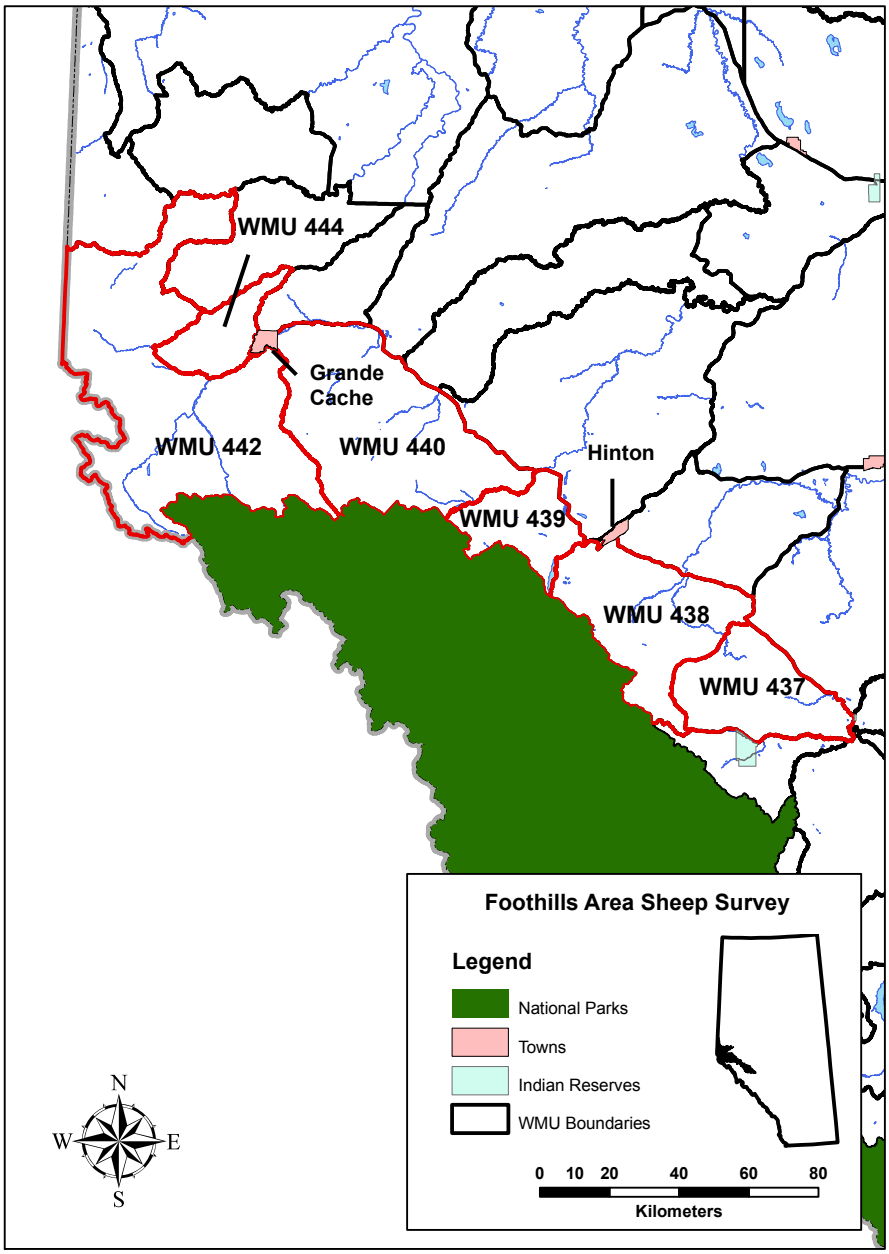

Figure 8. Location of the Foothills Area bighorn sheep surveys in Alberta.

All sheep were classed according to sex (ewes or rams) and age (lambs or adults), with sheep ≥ 1 year old classed as adults. Rams were further categorized by horn-size: ¼ curl, ½ curl, ¾ curl, or legal. Individuals with undetermined horn size or those that could not be identified based on either sex or age were recorded as 'unclassified'. Other ungulates observed during the survey were also classified, if possible, according to sex and age.

Bighorn Wildlife Technologies Ltd. conducted ground surveys of sheep on the Cardinal River and Gregg River coal leases on 22 and 23 January 2008. Rams were classified as Class I, II, III, or IV. Yearling males and females, adult ewes, and lambs were also recorded into separate categories.

Total sheep numbers and herd composition were compared to the results from previous surveys (1972 – 2002) of the study area. We did not correct for sightability; therefore, survey results should be considered to be minimum estimates. The locations of sheep sightings from the 2008 survey were plotted on GIS maps based on winter range designations. Observations of other ungulate species were totaled and summarized.

6.6.2 Results

During the 2008 survey, the crew observed 1,149 bighorn sheep and classified 1,125 from the air between WMU 437 and WMU 444 (Table 6). In addition, 941 sheep were observed and classified from the ground on the coal leases in WMU 438 (Table 7). Poor survey conditions, including high winds and lack of sufficient snow cover, prevented complete surveys of Mt. Stern and the Grande Cache coal lease (original Smoky River coal lease). Sex/age proportions for aerial and ground surveys combined were 53% ewes, 14% lambs and 33% rams. The total count was approximately 400 sheep less than the 2002 survey. Lamb/ewe ratios were down from those observed in 2002 and 1994/95 surveys. The proportion of legal vs. non-legal rams varied widely over the survey area.

Table 6. Total numbers and age/sex classification of bighorn sheep by complex during aerial surveys, January and February 2008.

		Ewe/Lamb Herds				
WMU	**Rams**	**Ewes**	**Lambs**	**Unclassified**	**Unclassified Sheep**	**Total Sheep**
437	28	53	15	0	0	96
438	64	169	43	0	0	276
439	12	7	6	0	0	25
440	74	231	40	1	0	346
442	67	158	30	0	0	255
444	22	86	20	0	23	151
Total	267	704	154	1	23	1149

Table 7. Total numbers and age/sex classification of bighorn sheep on Cardinal River Coals and Greg River Resources mines, 22 – 25 January 2008.

Ewes	**Lambs**	**Female Yearlings**	**Male Yearlings**	**Rams > 1 Year**	**Total**
321	147	64	55	354	941

6.7 Canmore area bighorn sheep

Section Authors: Jon Jorgenson and Michael Jokinen

In 1973, a systematic winter aerial survey for bighorn sheep was initiated in the Canmore area of southwest Alberta. Since this time, repeated surveys have been conducted over the same areas in order to monitor the spatial distribution, post-hunt herd composition and number of bighorn sheep at the population level in each of the WMUs and at the winter range scale. This information is used to support wildlife management recommendations related to land-use decisions and hunting regimes.

6.7.1 Study area

The study area encompassed the Eastern Slopes of southern Alberta from the Ghost River Wilderness Area in the north to Plateau Mountain at the southern boundary of Kananaskis Country (Figure 9). A total of 22 known sheep winter ranges occur in the eight WMUs in this area: 404, 406, 408, 410, 412, 414, 648 (Peter Lougheed Provincial Park) and 734 (Ghost Wilderness Area). Most of the winter ranges in WMU 410 are no longer surveyed due to the difficulty of reliably locating sheep. These ranges are surveyed in the spring from the ground along Highway 1A where sheep congregate during winter and spring. The Sheep River herd has marked individuals that provide supplemental information that can be collected from the ground, and therefore this herd is not surveyed from the air each year. All ground counts of sheep from WMUs 406 and 410 are incorporated in this report.

6.7.2 Survey methods

Aerial observations of sheep occurred on 20, 21, 23 and 24 January 2008 using a Bell 206 helicopter. The survey crew included a navigator/observer in the front and two observers in the rear. The pilot also participated in the survey as an observer. The survey crew logged sheep sightings on a 1:250,000 topographic scale map and used a hand-held GPS unit to record UTM coordinates of each observation. Fresh tracks were easily observed, eliminating the need to search every valley, which consequently reduced search time. Flights of each winter range occurred slightly above tree line and at higher elevations covering mountain ridges and cliffs. Canon Image Stabilizer binoculars aided the classification of sheep into one the following cohorts: ewes, lambs and rams at ¼ curl, ½ curl, ¾ curl, and ⅘ curl (trophy). Yearling ewes and rams were difficult to differentiate from the air and were grouped with the ewe cohort. Observers occasionally found additional sheep outside traditional winter range boundaries; these animals were not included in the totals on conventional winter ranges. We did not correct for sightability; therefore, all counts are minimum estimates. In addition, we assumed that all age and sex categories had equal sightability during the survey.

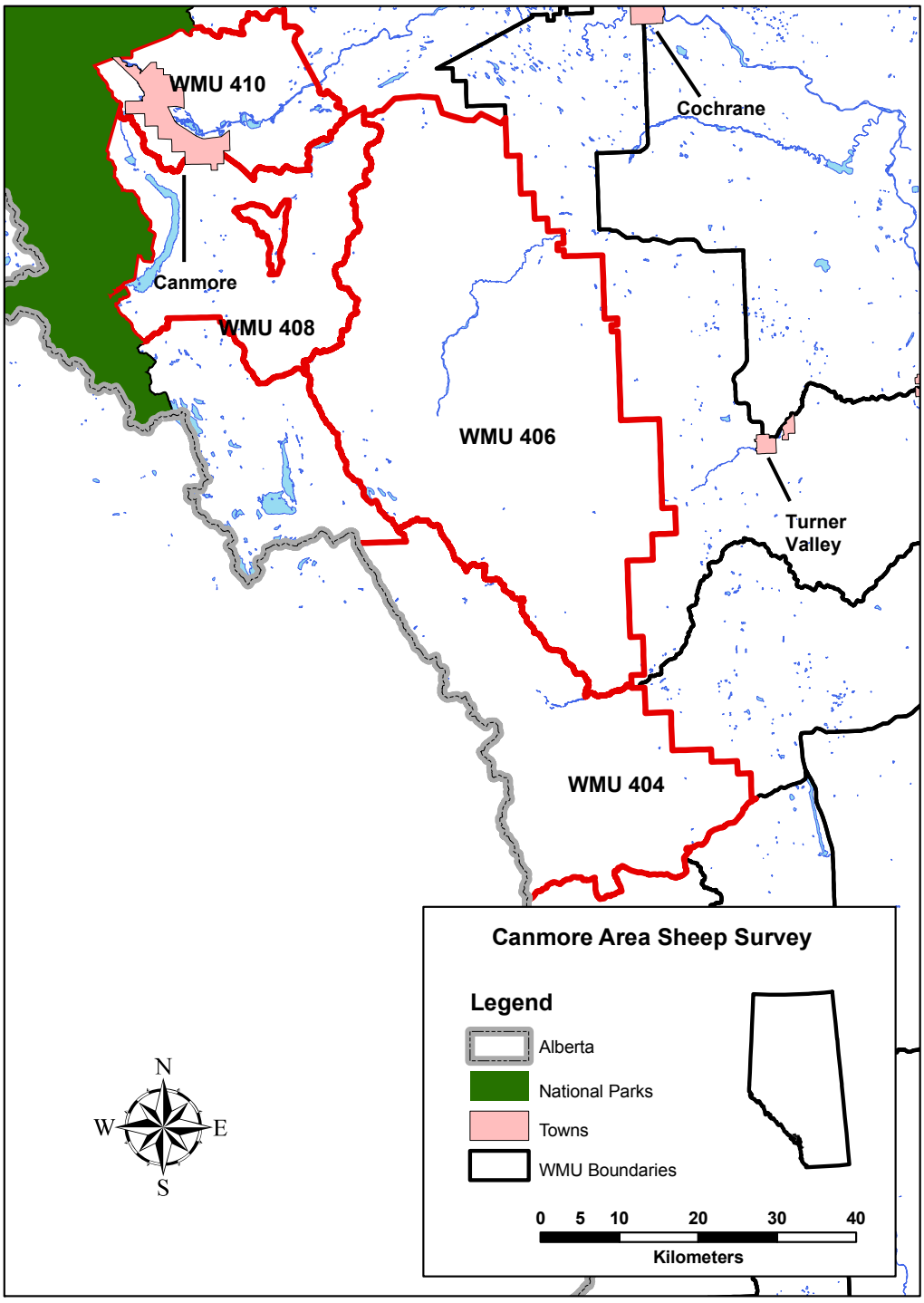

Figure 9. Location of the Canmore area bighorn sheep surveys in Alberta.

6.7.3 Results

Sunshine, calm winds and mostly recent snowfall provided good to excellent flying and observing conditions. Loss of snow cover and resultant poor surveying conditions precluded surveys of winter ranges north of the Bow River. Appropriate survey conditions did not occur for the rest of the surveying season; therefore WMUs 412, 414 and 734 (Ghost Wilderness Area) were not surveyed in 2008.

The crew observed a total of 824 bighorn sheep (including those in Peter Lougheed Provincial Park) in 2008. Comparisons with other survey years are difficult because it has been hard to complete the surveys for all winter ranges during each survey attempt. Loss of snow cover before the entire survey can be completed has been a common problem in recent years. Considering that the 2008 survey did not include any winter ranges north of the Bow River, the count of 824 was at the high end of the range for counts from previous years.

Over 99% of the sheep observed in 2008 could be classified for a total composition of 28% rams, 54% ewes and 18% lambs. The percentage of trophy rams in the population was 5%, which is consistent with previous surveys. The lambs/100 ewes ratio was 34, which was at the low end of the range in comparison to values from previous surveys, but was within the expected range of values for a stable population.

Sheep observations were further subdivided and evaluated on a WMU basis. In 2008, WMUs in which sheep were surveyed included WMU 404, 406, 408 and the Pigeon Mountain portion of WMU 410 (Table 8). Both WMU 404 and 408 had lamb ratios in the low 30s and below their long-term average, whereas WMU 406 was above average at 48 lambs/100 ewes. Only 11 lambs/100 ewes were observed in the Pigeon Mountain herd, which is part of WMU 410.

Table 8. Number of rams, ewes and lambs observed during bighorn sheep aerial surveys in the Canmore area in 2008.

WMU	Rams	Ewes	Lambs	Unclassified	Total Sheep
404	46	104	32	0	182
406	67	123	59	14	263
408	82	123	38	6	249
410	17	45	5	0	67
Total	212	395	134	20	761

7.0 RANDOM STRATIFIED BLOCK SURVEYS

7.1 Wildlife Management Unit 104 mule deer

Section Authors: Mike Grue and Kim Morton

WMU 104 is managed for trophy mule deer and is a desirable zone for hunters. It is scheduled to be flown every three years in the Prairies Area AUS rotation. In the past, most WMUs in the Lethbridge area have been flown using stratified random block surveys. Unpredictable weather and poor snow conditions occur through most winter months. Based on the assumption that good snow cover is essential, multi-day surveys such as modified Gasaway are difficult to conduct. Over the past winter, the Lethbridge area survey team has considered flying surveys during periods of constant weather, with less importance placed on the amount of snow cover. The assumption is that animals are less likely to make unpredictable movements during periods when weather is stable. In the Lethbridge area, during weather events that bring snow, conditions can fluctuate wildly from cold to warm, calm to windy. These conditions hamper survey efforts, affect sightability, and compromise the precision of results.

Most Prairies Area WMUs are managed primarily for mule deer as the key species. With a little extra flying and stratification work, white-tailed deer can also be accommodated (Glasgow 2000). However, time restraints led to the decision to stratify WMU 104 for mule deer only. Survey results will be used to determine changes in populations over time and to determine herd composition. These data will also be used by ASRD to calculate allowable hunter harvest and license allocations for upcoming hunting seasons.

7.1.1 Study area

WMU 104 is located in the Grasslands region of the Prairies Area. It is a small, rectangular-shaped unit lying south and east of the Town of Milk River (Figure 10). The unit is bisected by the Milk River which is oriented east-west. Writing-on-Stone Provincial Park (WOSPP) is located near the middle of the unit along the river. Most of the unit is predominantly native prairie, with some cultivation mostly north of the Milk River and west of WOSPP. Most of the mule deer habitat is associated with coulees and draws along the Milk River.

7.1.2 Survey methods

The study area was stratified for mule deer densities (Gasaway et al. 1986) using a fixed-wing Cessna 185 aircraft on 16 and 17 January 2008. To make more efficient use of AUS budgets and coordinate aircraft charters, flights of WMUs 104 and 106 occurred concurrently. Stratification flights began in WMU 106 on 16 January and ended in WMU 104 on 17 January. Air speed during stratification was approximately 120 km/h and altitude above ground was approximately 120 m. Height and speed of the aircraft varied depending on wind speed and direction, amount of cover, and topography of the area. Stratification lines occurred approximately 2 km apart. Where cover and topography required, distance between lines was reduced. In areas with deep coulees and/or heavy tree cover (i.e., along the Milk River), lines were meandering rather than straight to effectively cover the area for accurate stratification. We assumed observers could see deer up to 800 m from the aircraft in open areas and 400 – 500 m in other areas. When flying rivers and coulees, we assumed observers could see deer up to 100 m. Survey crews for both stratification flights and intensive survey unit flights included one navigator/recorder/observer in the front seat beside the pilot and two observers in the rear, one on each side of the aircraft.

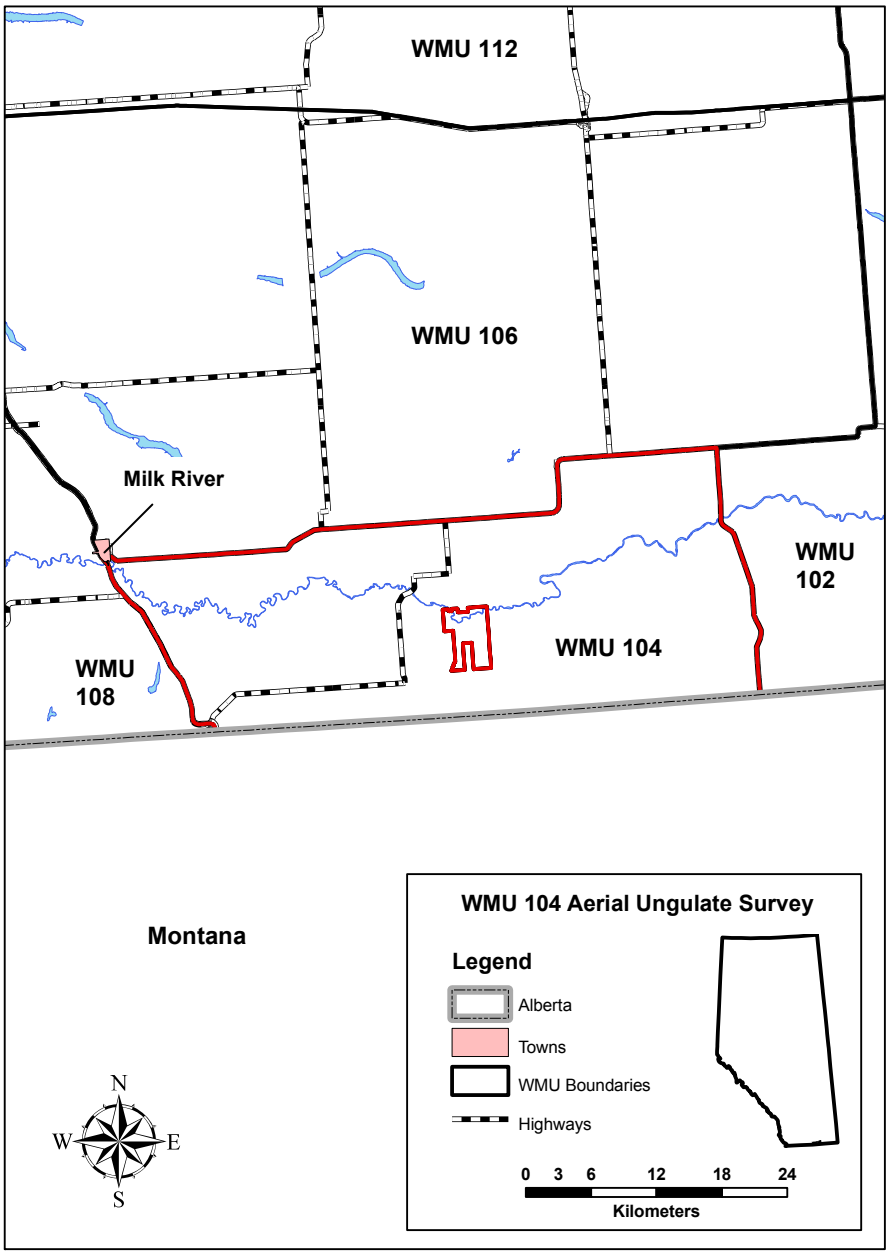

Figure 10. Location of the Wildlife Management Unit 104 deer surveys in Alberta.

For population composition, the presence/absence of antlers determined sex. Sex ratios may be inaccurate if antlers were dropped by some deer prior to the survey. Body size and length of face were used to determine age (adult vs. fawn).

We assumed the mule deer observed provided a good representation of distribution within the unit and allowed for stratifying survey units (3 min latitude x 5 min longitude as per Shumaker (2001a)) into one of three strata (low, medium or high). The assignment of blocks was based on the number of deer seen within the survey unit. A large proportion of survey units had zero deer observed, and thus made up the low stratum for mule deer. The remaining units were stratified based on deer numbers observed during stratification, using cut-off values for each stratum with the goal of keeping the number of units equal between the medium and high strata.

We randomly selected nine survey units (3 units x 3 strata) from WMU 104 using Microsoft Excel (Shumaker 2001b). The crew searched each survey unit intensively (100% coverage) on 18 January 2008 using a Bell 206B helicopter. Results were incorporated into a Quad file program developed for the units as per Gasaway et al. (1986). Strata were evaluated based on the variance associated with deer density and additional units flown for those strata with high variance. This process continued until 90% confidence intervals were less than 25% of the population estimate.

During all survey flights, the crew recorded incidental observations of wildlife. Attempts were made to consistently record coyotes (*Canis latrans*), game birds and raptor species.

Flights of WMU 104 occurred during consistent weather with good snow cover, although initially snow cover was not 100%. To compensate in areas where sightability was considered low, stratification lines were flown closer together if the habitat warranted. We assumed this change in approach allowed for consistent estimates even though survey effort varied.

7.1.3 Results

Mule deer – Fixed-wing stratification flights yielded a total of 745 observations of mule deer. Flights of 12 survey units in rotary-winged aircraft yielded a total of 586 observations of mule deer. From this, we estimated the mule deer population to be 1,392 ± 306 (90% CI = 22.0%), with a density of 1.35 mule deer/km^2 (Table 9). Herd composition was 70 bucks/100 does and 67 fawns/100 does.

White-tailed deer – Fixed-wing stratification flights yielded a total of 194 observations of white-tailed deer. Because WMU 104 was not stratified for white-tailed deer, we did not calculate a population estimate. Herd composition was calculated from individuals observed during intensive survey unit flights. From a total sample size of 136 deer observed, herd composition was 71 bucks/100 does/79 fawns. Of the 136 deer observed, only 70 were classed by age and sex. Most of the unclassified deer were in a single herd. Larger herds are commonly comprised of a high proportion of females and young; therefore, the buck to doe ratio of 71/100 may not be an accurate representation of the sex ratio in the unit.

Incidental wildlife observations – The survey recorded a total of 40 coyotes, 40 sharp-tailed grouse (*Tympanuchus phasianellus)*, 88 gray (Hungarian) partridge (*Perdix perdix)*, 182 pronghorn, one moose, three golden eagles, and one prairie falcon (*Falco mexicanus*).

Table 9. Population estimates and herd composition of mule deer and white-tailed deer in Wildlife Management Unit 104 in 2008.

Species	Population Estimate (90% confidence limits)	Deer/km^2	Ratio to 100 females	
			Males	Juveniles
Mule deer	1392 (22.0%)	1.35	70	67
White-tailed deer	--	--	71	79

7.2 Wildlife Management Unit 106 mule deer

Section Authors: Mike Grue and Kim Morton

WMU 106 is managed for trophy mule deer and is a desirable zone for hunters. It is scheduled to be flown every three years in the Prairies Area AUS rotation. In the past, most WMUs in the Lethbridge area have been flown using stratified trend surveys. Unpredictable weather and poor snow conditions occur through most winter months. Based on the assumption that good snow cover is essential, multi-day surveys such as modified Gasaway are difficult to conduct. Over the past winter, the Lethbridge area survey team has considered flying surveys during periods of constant weather, with less importance placed on the amount of snow cover. The assumption is that animals are less likely to make unpredictable movements during periods when weather is stable. In the Lethbridge area, during weather events that bring snow, conditions can fluctuate wildly from cold to warm, calm to windy. These conditions hamper survey efforts, affect sightability, and compromise the precision of the results.

Most Prairies Area WMUs are managed primarily for mule deer as the key species. With a little extra flying and stratification work, white-tailed deer can also be accommodated (Glasgow 2000). Time restraints led to the decision to stratify WMU 106 for mule deer only. Survey results will be used to determine changes in populations over time and to determine herd composition. These data will also be used by ASRD to calculate allowable hunter harvest and license allocations for upcoming hunting seasons.

7.2.1 Study area

WMU 106 is located in the Grasslands region of the Prairies Area. It is a large, rectangular-shaped unit lying east of Highway 4 between the towns of Stirling and Milk River, as far east as the community of Etzikom (Figure 11). The unit is bisected by Etzikom Coulee, which is oriented east-west. Most of the unit is a mix of native grassland and cultivation.

7.2.2 Survey methods

The study area was stratified for mule deer densities (Gasaway et al. 1986) using a fixed-wing Cessna 185 aircraft on 16 and 17 January 2008. To make more efficient use of AUS budgets and coordinate aircraft charters, flights of WMUs 104 and 106 occurred concurrently. Stratification flights began in WMU 106 on 16 January and ended in WMU 104 on 17 January. During stratification, the aircraft travelled at approximately 120 km/h and approximately 120 m above ground. Height and speed of the aircraft varied depending on wind speed and direction, amount of cover and topography of the area. Stratification lines were approximately 2 km apart. Where cover and topography required, distance between lines was reduced. In areas with deep coulees and/or heavy tree cover (i.e., Milk River), lines were meandering rather than straight to effectively cover the area for accurate stratification. We assumed observers could see deer up to 800 m from the aircraft in open areas and 400 – 500 m in other areas. When flying rivers and coulees, we assumed observers could see deer up to 100 m. Survey crews for both stratification flights and intensive survey unit flights included one navigator/recorder/observer in the front seat beside the pilot and two observers in the rear, one on each side of the aircraft.

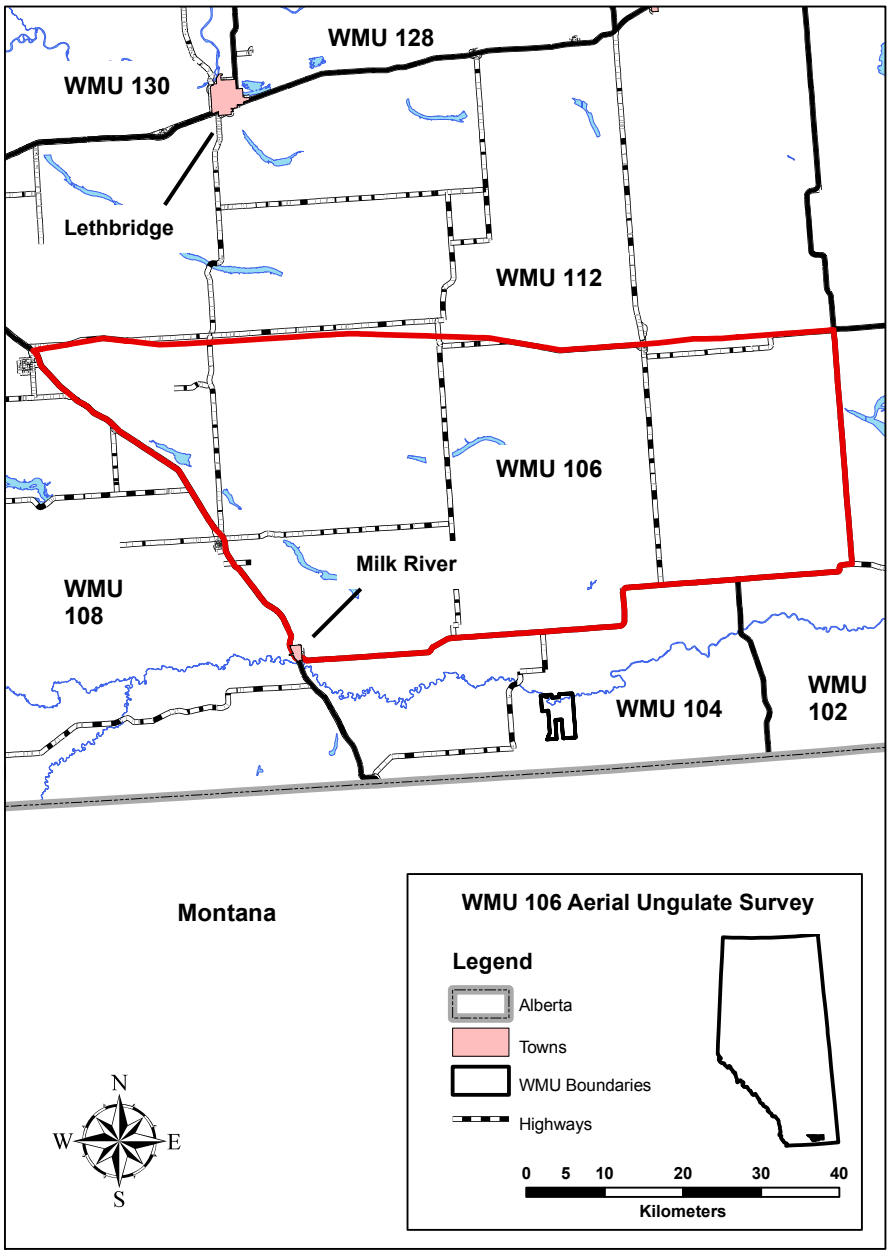

Figure 11. Location of the Wildlife Management Unit 106 deer survey in Alberta.

For population composition, the presence/absence of antlers determined sex. Sex ratios may be inaccurate if antlers were dropped by some deer prior to the survey. To determine age (adult vs. fawn), body size and length of face were used. This provides an accurate means to classify fawns as distinct from adults.

We assumed the mule deer observed provided a good representation of distribution within the unit and allowed for stratifying survey units (3 min latitude x 5 min longitude as per Shumaker (2001a)) into one of three strata (low, medium or high). The assignment of blocks was based on the number of deer seen within the survey unit. A large proportion of survey units had zero deer observed, and thus made up the low stratum for mule deer. The remaining units were stratified based on deer numbers observed during stratification, using cut-off values for each stratum with the goal of keeping the number of units equal between the medium and high strata.

We randomly selected nine survey units (3 units x 3 strata) from the WMU using Microsoft Excel (Shumaker 2001b). The crew searched each survey unit intensively (100% coverage) on 17 January 2008 using a Bell 206B helicopter. Results were incorporated into a Quad file program developed for the units as per Gasaway et al. (1986). Strata were evaluated based on the variance associated with deer density, and additional units flown for those strata with high variance. This process continued until 90% confidence intervals were less than 25% of the population estimate.

The crew recorded incidental observations of wildlife during all survey flights. Attempts were made to consistently record coyotes, game birds and raptor species.

Flights of WMU 106 occurred during consistent weather with good snow cover, although initially snow cover was not 100%. To compensate in areas where sightability was considered low, stratification lines were flown closer together if the habitat warranted. We assumed this change in approach allowed for consistent estimates even though survey effort varied.

7.2.3 Results

Mule deer – Fixed-wing stratification flights yielded a total of 684 observations of mule deer. Intensive searches of 16 survey units in rotary-wing aircraft yielded 233 observations of mule deer. From this, we estimated the mule deer population to be 729 ± 187 (90% CI = 25.6%), with a density of 0.24 mule deer/km^2. Herd composition was 45 bucks/100 does and 38 fawns/100 does (Table 10).

White-tailed deer – Fixed-wing stratification flights yielded a total of 582 observations of white-tailed deer. Because WMU 106 was not stratified for white-tailed deer, we did not calculate a population estimate. Herd composition was calculated from white-tailed deer observed during intensive survey unit flights. From a total sample size of 55 deer observed, herd composition was 31 bucks/100 does/73 fawns.

Incidental wildlife observations – The survey yielded observations of two coyotes, 77 gray (Hungarian) partridge, 35 pronghorn, one rough-legged hawk (*Buteo lagopus*), and one golden eagle.

Table 10. Population estimates and herd composition of mule deer and white-tailed deer in Wildlife Management Unit 106 in 2008.

Species	Population Estimate (90% confidence limits)	Deer/km^2	Ratio to 100 females	
			Males	Juveniles
Mule deer	729 (25.6%)	0.24	45	38
White-tailed deer	--	--	31	73

7.3 Wildlife Management Unit 118 mule deer

Section Author: Mike Grue

WMU 118 is a desirable zone for hunters. Most Prairies Area WMUs are surveyed primarily for mule deer, although extra flying and stratification can also provide white-tailed deer estimates (Glasgow 2000). Time restraints in 2008 led to the decision to stratify WMU 118 for mule deer only. Survey results will be used to determine changes in the population over time and determine herd composition. These data will also be used by ASRD to calculate allowable hunter harvest and license allocations for upcoming hunting seasons.

7.3.1 Study area

WMU 118 is located in the Grasslands region of the Prairies Area. The unit is roughly square-shaped, lying south of Cypress Hills Provincial Park and east of Manyberries (Figure 12), and is bisected diagonally by Lodge Creek, which is oriented northwest-southeast. Habitat is predominantly native prairie, with some cultivation occurring mostly in the northwest and southwest corners. Most of the mule deer wintering habitat is associated with the drainages of Lodge Creek, Manyberries Creek and South Manyberries Creek.

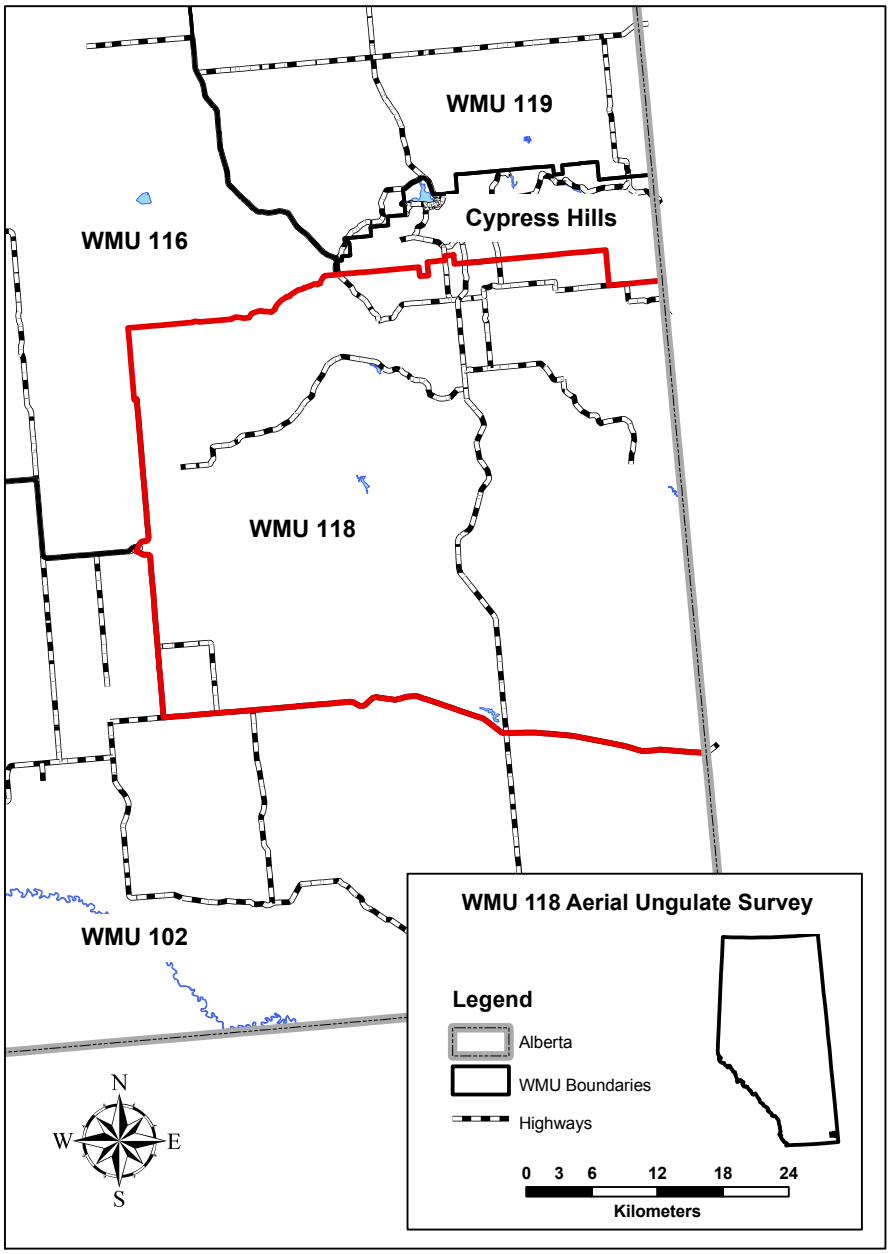

Figure 12. Location of the Wildlife Management Unit 118 deer survey in Alberta.

7.3.2 Survey methods

The study area was stratified for mule deer densities (Gasaway et al. 1986) using a fixed-wing aircraft (Cessna 185 and 206) on 12 to 14 February 2008. During stratification, the aircraft travelled at approximately 120 km/h and approximately 120 m above ground. Height and speed of the aircraft varied depending on wind speed and direction, amount of cover, and topography of the area. Stratification lines were approximately 2 km apart in areas of sparse vegetative cover. Where cover and topography required, distance between lines was reduced and direction of the lines was altered to follow landforms. We assumed observers could see deer within 800 m of the aircraft in open areas. When flying along creeks with thick shrub cover, we expected observers could see deer within approximately 200 m of the aircraft. Survey crews for both stratification flights and intensive survey unit flights included one navigator/recorder/observer in the front right seat beside the pilot and two observers in the back, one on each side of the aircraft.

Stratification flights on 12 February were delayed by aircraft mechanical problems and further delayed by bad weather on 13 February. Another aircraft (Cessna 206) replaced the original Cessna 185. The same pilot flew both aircraft. The stratification flight was completed on 14 February 2008. The lengthy time period required to conduct stratification did not appear to negatively affect the accuracy of our results. The search effort within each survey unit was not equal due to the variable habitat conditions. More importance was placed on sighting as many deer as possible and following strips of habitat which likely contained deer. This method is successful in stratifying WMUs containing clumped distributions of deer in patchy habitat (Gasaway et al. 1986).

While the entire study area was flown, not all animals in the WMU were observed. We assumed that those observed provided a good representation of the distribution within the unit and allowed for stratifying survey units (3 min latitude x 5 min longitude as per Shumaker (2001a)) into one of four strata (low, medium, high or super high). Blocks were assigned to strata based on the number of deer seen within the survey unit. Four strata were used for this survey due to the high variability in the number of deer seen between units. The low, medium, high and super high strata contained 0 – 8 deer, 12 – 48 deer, 52 – 74 deer, and 105 – 526 deer, respectively.

Twelve survey units (3 units x 4 strata) were randomly selected using Microsoft Excel (Shumaker 2001b). Intensive surveys (100% coverage) of each survey unit occurred on 15 February 2008 using a Bell 206L helicopter. Results were incorporated into a Quad file program developed for WMU 118 as per Gasaway et al. (1986). Strata were evaluated based on variance associated with deer density and additional survey blocks were selected and flown in those strata with high variability. This process continued until the upper and lower population estimates were close to ± 20% at the 90% confidence interval.

7.3.3 Results

Snow conditions during the stratification flight ranged from fair in the southern portion on 12 February to good in the northern portion on 14 February. Snow cover conditions during the intensive portion of the survey ranged from good in the morning to poor in the afternoon. Sunny, warm, windy conditions melted snow as the day progressed. As a result, transects were flown closer together as the snow melted to reveal patches of ground. We assumed that sightability was maintained at or near 100% throughout the day by intensifying search efforts as snow conditions deteriorated.

Mule deer – Fixed-wing stratification flights yielded a total of 2,726 observations of mule deer. Flights of 14 survey units in a rotary-wing aircraft yielded 1,297 observations of mule deer. This resulted in a population estimate of 2,808 ± 576 mule deer (90% CI = 20.5%) and a density estimate of 1.42 mule deer/km^2. Herd composition was 35 bucks/100 does and 44 fawns/100 does (Table 11).

White-tailed deer – Fixed-wing stratification flights yielded a total of 45 observations of white-tailed deer. Because WMU 118 was not stratified for white-tailed deer, we did not calculate a population estimate. The intensive survey recorded only 68 observations of white-tailed deer. Herd composition data are not reported due to the low number of white-tailed deer observed.

Incidental wildlife observations – The survey yielded observations of 44 coyotes, 129 sharp-tailed grouse, 232 pronghorn and seven moose.

Table 11. Population estimates and herd composition of mule deer in Wildlife Management Unit 118 in 2008.

Species	Population Estimate (90% confidence limits)	Deer/km²	Ratio to 100 females	
			Males	Juveniles
Mule deer	2808 (20.5%)	1.42	35	44

7.4 Wildlife Management Unit 200 mule deer and white-tailed deer

Section Author: David Moore

Wildlife Management Unit 200 was identified as a priority survey area in 2008 as part of the ASRD Chronic Wasting Disease (CWD) Program. Accurate deer population estimates in this unit were required to identify areas at high risk for CWD presence and to guide management strategies.

7.4.1 Study area

Wildlife Management Unit 200 is located within the Prairies Management Area. It is approximately 2,730 km^2 and is located west of the Saskatchewan border, south of Highway 13, north of Highway 12, and east of Highway 41 (Figure 13). The unit is primarily agricultural crop and range land, with most of the ungulate habitat in the northwest and central portions of the unit.

Photo: Dave Moore

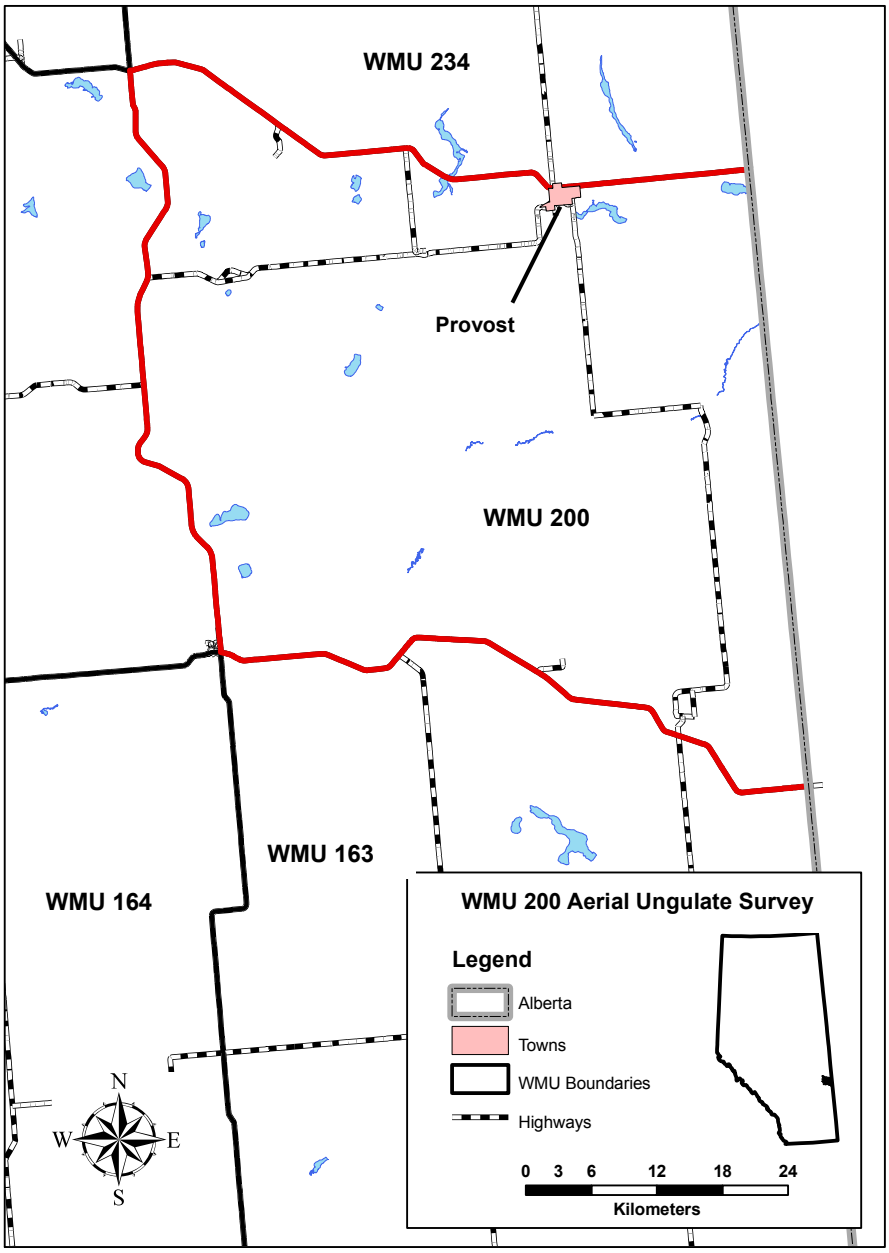

Figure 13. Location of the Wildlife Management Unit 200 aerial ungulate survey in Alberta.

7.4.2 Survey methods

To estimate density across the WMU, we divided the unit into 91 3 min latitude by 5 min longitude subunits, and categorized these into one of three strata based on deer habitat: low, medium and high. We then selected five blocks for each stratum using the same blocks as those used in the survey flown in 1999, for a total of 15 survey blocks. Each of these blocks was surveyed at 100% coverage. Because these blocks were not chosen at random, this survey was not considered to be a true stratified random block design, and results should therefore be interpreted with caution.

The survey occurred between 18 – 20 February 2008 using a Bell 206 helicopter equipped with bubble windows and an on-board GPS unit. The pilot flew the aircraft at a height of approximately 100 m and an airspeed of 60 – 100 km/h, which varied with the type and amount of ground cover. The crew consisted of a pilot, navigator and two observers. All sightings of ungulates and incidental observations of other wildlife species were recorded on survey data forms and plotted on a laptop computer using a hand-held GPS unit. Most males had dropped antlers by the survey date, so we did not class individuals by gender or age.

7.4.3 Results

Survey conditions varied from fair to excellent. Snow cover was poor to fair. The temperature was fairly consistent. Winds were mild apart from one gusty day on 19 February.

Ungulate sightings included 1,389 white-tailed deer, 789 mule deer, 61 moose, and one pronghorn antelope. Also observed during the flight were 121 coyotes, 36 porcupines (*Erethizon dorsatum*), four red fox (*Vulpes vulpes*), one white-tailed jackrabbit (*Lepus townsendii*), 547 sharp-tailed grouse, 60 gray partridge, two great horned owls (*Bubo virginianus*), 13 snowshoe hare (*Lepus americanus*) and two goshawks (*Accipiter gentilis*).

We estimated the total deer population to be 9,426 deer, including 5,738 ± 1,664 white-tailed deer (90% CI = 29.0%) and 3,688 ± 1,033 mule deer (90% CI = 28.0%) (Table 12). Density was 2.11/km^2 for white-tailed deer and 1.36/km^2 for mule deer. Total deer density was 3.47/km^2.

Table 12. Population estimates and density of mule deer and white-tailed deer in Wildlife Management Unit 200 in 2008.

Species	Population Estimate (90% confidence limits)	Deer/km^2
Mule deer	3688 (28.0%)	1.36
White-tailed deer	5738 (29.0%)	2.11

7.5 Wildlife Management Unit 502 white-tailed deer, mule deer and moose

Section Author: Barb Maile

White-tailed deer are an important ungulate species, providing recreational hunting opportunities and subsistence for many residents. Along with moose, white-tailed deer are the primary ungulate species in WMU 502. Within WMU 502, white-tailed deer are hunted under a general season with a two-tag antlerless 'Supplemental' license also available, whereas moose and antlered mule deer are hunted on a priority draw license system. When conducted at regular intervals, surveys offer valuable data for assessing ungulate and other wildlife population trends, in addition to providing an aerial appraisal of natural and anthropogenic changes occurring on the landscape.

The objective of this survey was to obtain a white-tailed deer population estimate for WMU 502. Two previous surveys were conducted in 1995 and 2000 (Gunderson 1996; Saker 2000). The most recent aerial survey conducted in January 2000 revealed a white-tailed deer population estimate of 5,560 ± 17.8% and density of 1.63/km^2. It was assumed that under a general season and high degree of hunter success, long-term harvests would be approximately equal to recruitment rates in the population. In recent years, the public has raised concerns regarding increasing deer populations, vehicle collisions, and crop depredation.

Although the purpose of the survey was to inventory white-tailed deer, coincidental data gathered for moose and mule deer can provide valuable information on distribution and population levels of these species. Members of the public have

expressed concern regarding an increased mule deer population and range expansion, especially in the northern part of the WMU. Currently, only an antlered mule deer harvest is offered in WMU 502. Additionally, concern has been raised regarding a possibly declining moose population. This survey will also serve to provide clearer information on moose and mule deer populations.

7.5.1 Study area

WMU 502 is located approximately 200 km northeast of the City of Edmonton and is comprised primarily of agricultural lands interspersed with small mixedwood stands (Figure 14). The WMU lies within the Central Mixedwood and Dry Mixedwood natural subregions. Larger tracts of mixedwood and conifer stands occur along the northern WMU boundary and through the lake area in the southwest portion of the WMU. Two rivers (Beaver and Sand), in addition to several large lakes (including Moose, Whitefish and Fork), occur within the 2,783 km^2 WMU. While much of the area has been converted to cropland or pasture, numerous wetlands and creek draws also contribute to woodland habitat. Rich Lake and the Beaver River and Sand River valleys provide valuable habitat for moose and deer and are known wintering areas. The Sand River and Mooselake River corridors are characterized by sandy soils and extensive tracts of jack pine (*Pinus banksiana*). Several colonial bird species, including western grebes (*Aechmophorus occidentalis*), nest on larger lakes in the area. Osprey (*Pandion haliaetus*) and bald eagles (*Haliaeetus leucocephalus*) also nest along the shores of several of the large lakes; turkey vultures (*Cathartes aura)* have been observed roosting along the shores of Moose Lake. Historically, several sharp-tailed grouse leks were present throughout the area.

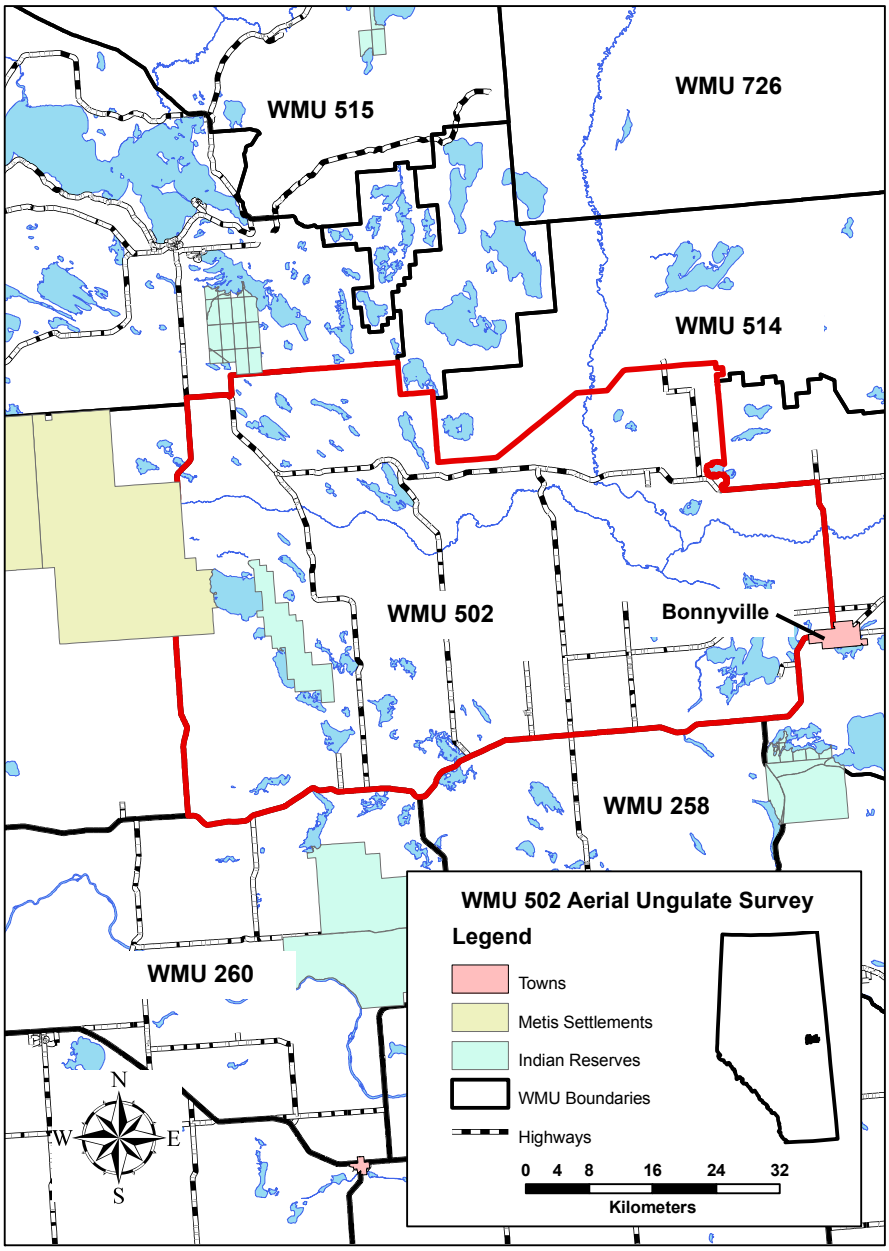

Figure 14. Location of the Wildlife Management Unit 502 aerial ungulate survey in Alberta.

The Town of Bonnyville lies in the southeast corner and numerous hamlets and cottage communities are interspersed throughout the WMU. Additionally, several small recreational grounds and Moose Lake Provincial Park also provide recreational facilities. Whitefish Lake Indian Reserve and a portion of the Kikino Métis Settlement occupy less than 10% of the landbase. Oil and gas extraction has increased in recent years with road access, well sites, pipelines, transmission lines and seismic lines becoming more common across the area. Adjacent WMUs 500, 501 and 514 have received greater industrial pressure than WMU 502. However, current oil and gas development is encroaching from the east and is most evident in the area near the confluence of the Beaver and Sand rivers. Additional industrial development has occurred in the form of small parcels of land leased or purchased by Alberta Pacific Forest Industries and converted to tree crops.

7.5.2 Survey methods

We stratified WMU 502 for white-tailed deer (Gasaway et al. 1986) using a Cessna 185 fixed-wing aircraft between 2 – 4 January 2008. A 1 min latitudinal grid, which is equivalent to a 1.6 km separation between lines, was overlain on the WMU. Because sampling unit blocks were created using whole minutes of latitude and longitude, we flew stratification lines on the half-minute so that observations along a line would not straddle two sampling units. During flights, the aircraft travelled at an approximately 150 m above ground and approximately 150 km/h. This method allowed observers to detect animals within 200 m on either side of the aircraft, resulting in 25% coverage of the WMU. Three observers, including the navigator in the front, conducted the survey. The crew recorded species and number of animals on paper with a geographic coordinate (waypoint) taken using a GPS unit. Height and speed of the aircraft varied slightly depending on the amount and type of tree cover and observational conditions.

We used stratification information to determine the stratum for each sampling unit based on deer density (Glasgow 2000). A sampling unit grid was established using ArcGIS 9 by dividing the WMU into blocks measuring 5 min longitude by 3 min latitude, resulting in blocks of approximately 30 km^2. Areas along the WMU boundary that were less than half of a full block were combined or joined to adjacent areas to ensure sampling units of fairly uniform size, resulting in the generation of 119 units.

The area for each sampling unit was measured using a digital planimeter. We calculated an adjustment for units in which water constituted greater than 25% of the unit, resulting in a measurement of land area only.

Stratification observations were digitally rendered onto the sampling unit grid. We ranked sampling units according to an index of deer density, calculated as the number of deer observed per km^2 within each unit. We categorized sampling units into three strata: low, medium and high, with an assignment of approximately 20% of the blocks within each of the low and high categories. This resulted in the following criteria: 0 – 0.08 deer/km^2 in low density; 0.08 – 0.4 deer/km^2 in medium density; and 0.4 – 0.7/km^2 in high density units.

We randomly selected nine sampling units (3 per stratum) and intensively searched these using a Bell 206 helicopter on 15 – 17 January 2008. Navigation was aided by computer generated maps and a GPS unit. Flights of units occurred in an east-west direction with a flight line separation of 400 m. Three observers, including the navigator in the front, conducted the survey. The crew recorded observations within 200 m of either side of the aircraft, allowing for total coverage of the area. Flights occurred at an altitude of 60 m above ground and air speed of approximately 80 km/h, reaching 100 km/h in more open areas. Observers counted and classified white-tailed deer, mule deer, and moose according to age (juvenile vs. adult) and sex. Deer were classified by sex and age according to presence of antlers, body size and shape, and behaviour. Sex ratios may be inaccurate if antlers were dropped by some deer prior to the survey. Moose were classified using four criteria: presence of antlers or pedicel, presence of vulva patch, face and body shape and pigmentation, and behaviour. We assumed that bull moose without antlers were sexed with the same accuracy as those with antlers present. We recorded all wildlife observations on forms and marked locations using a GPS unit.

After each day of surveying, we entered white-tailed deer data in the Quadrat Survey Method Excel program designed to provide a population estimate and confidence intervals as per the Gasaway population model (Gasaway et al. 1986). We generated crude moose and mule deer population estimates by multiplying the number of animals of each species observed during stratification by four (assuming 25% coverage),

and adjusting this number for sightability by assuming that approximately 20% were not observed along the flight path.

7.5.3 Results

Complete snow coverage, overcast sky, and light winds provided good to excellent survey conditions. After surveying three units within each stratum, the sample variance was greater than acceptable limits. However, surveying additional medium and high units did not result in a reduction in sample variance. The stratification portion of the WMU 502 survey yielded observations of 843 white-tailed deer, 59 mule deer and 178 moose. The intensive search of three low, four medium, and four high sampling units yielded observations of 584 white-tailed deer, 107 mule deer and 118 moose. We estimated the white-tailed deer winter population to be 6,051 ± 1,858 (90% CI = 30.7%), with a density of 1.79 deer/km^2 (Table 13). We estimated a sex ratio (antlered/100 antlerless/fawns) of 17/100/75; however, 79 white-tailed deer could not be classified. Of animals that were classified, 44 were bucks, 254 were does, and 190 were fawns.

Using the rudimentary calculations described above, we estimated the moose population in the survey area to be 557 animals and the mule deer population to be 283 animals. However, mule deer are more gregarious than white-tailed deer or moose, and therefore this estimate should be used with additional caution, especially since 107 mule deer were observed in 11 units alone, equating to greater than one-third of the estimate.

Table 13. Population estimates for 2008 Wildlife Management Unit 502 white-tailed deer, moose and mule deer.

Species	Population Estimate (90% confidence limits)	Animals/km²	Ratio to 100 Females	
			Males	Juveniles
White-tailed deer	6051 (30.7%)	1.79	17	75
Moose[a]	557	0.16	45	48
Mule deer[a]	283	0.08	--	--

[a] Crude, unofficial estimate only.

7.6 Wildlife Management Unit 526 moose, mule deer, white-tailed deer and elk

Section Author: Dave Moyles

Ungulate populations increased throughout the Peace Country agricultural areas during the period of seven consecutive mild to average winters from the winter of 1998/99 to 2005/06 (Moyles and Johnson 2003; ASRD – Alberta Fish & Wildlife Division, unpubl. data). These increases created both excitement from hunters and naturalists, and concerns and complaints from residents dealing with increases in crop and haystack depredation and with increases in ungulate-vehicle collisions. ASRD attempted to reduce ungulate populations by increasing hunting pressure and harvests through several different initiatives including increasing season lengths, allowing hunting on Sundays in White Zone areas in the Peace Country, increasing numbers of hunting licenses, and for antlerless mule deer, providing as many as four tags per hunting license. In addition, ASRD implemented a quota hunt for antlerless deer in WMU 526 in the Bear Canyon area in late winter 2006/07 (Moyles 2007). In past years, elk herds were located and the varying amounts of depredation in these locales was determined. Given the intensive management effort in WMU 526 over the past few years, ASRD needed to determine current population levels to assess the impacts of the increased hunting pressure and the effects of the past winters.

7.6.1 Study area

WMU 526 is bordered by the Peace River to the south, the Clear Hills-Whitemud Hills to the north, and from Highway 35 west to the British Columbia boundary (Figure 15). This unit is relatively large (7,101.7 km^2) and is dominated by settlement and agriculture, with only 15% in the Green Zone. There are two main towns, Grimshaw and Fairview, several smaller communities, including Worsley, Hines Creek, Bear Canyon, Cherry Point, Eureka River, Cleardale, Bluesky, Berwyn, Brownvale and Whitelaw, and farms throughout this unit. This unit is bordered and dissected by the Peace River and its tributaries, including the Clear River, Hines Creek and Montagneuse River. These river valley complexes provide escape and wintering habitat for all ungulate species, while the agricultural areas provide feeding areas.

7.6.2 Survey methods

Moose, mule deer and white-tailed deer – Surveys for moose, mule deer and white-tailed deer followed Lynch (1997). The survey team used two Cessna 185 fixed-wing aircraft from 21 – 22 January 2008 and one aircraft on 23 January to complete the stratification flights of four transects through each survey unit. Transects occurred 1 min of latitude apart and flights of lines proceeded in an east-west direction. Each crew consisted of two observers, one in the front and one sitting behind the pilot. For each sighting of wildlife, the front observer took a waypoint using a hand-held GPS and recorded the sighting. The crew made no attempt to classify any ungulates to age or sex during stratification flights. All waypoints (locations) of sightings of moose, mule deer, white-tailed deer and elk were plotted on the base map.

For moose, we classified survey units based on the number of moose observed, with units containing 0 – 2 moose classified as low strata, units with 3 – 9 moose classified as medium strata, and units with ≥ 10 moose classified as high strata. In addition, all units with significant areas of southwest slopes along river valleys were 'upgraded' to the next stratum to allow for the importance of the river valleys as wintering habitat.

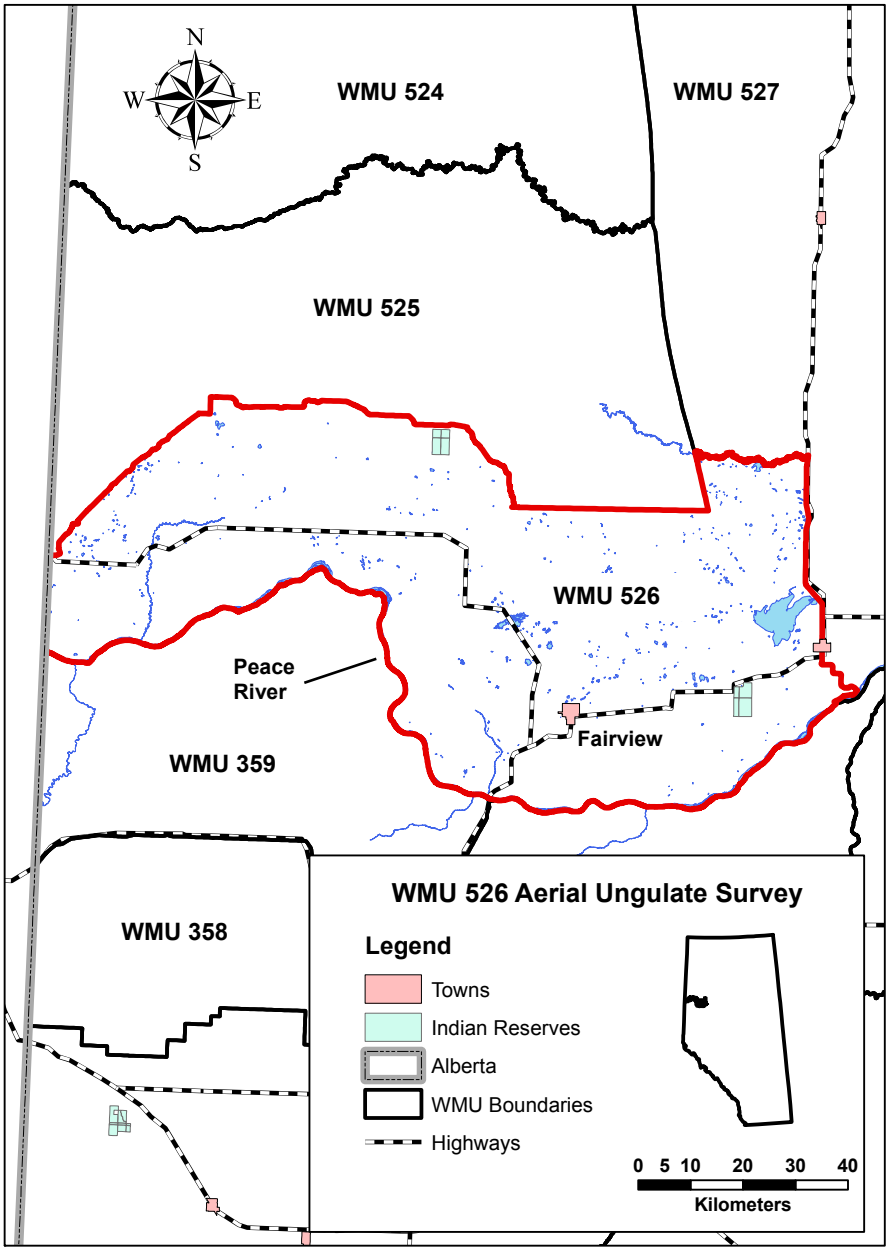

Figure 15. Location of the Wildlife Management Unit 526 aerial ungulate survey in Alberta.

For mule deer, we classified units where 0 – 2 mule deer were observed as low strata, 3 – 15 as medium strata, and ≥ 16 as high strata. Some units were shifted given special circumstances. For example, we classified survey unit 119 as 'medium' even though 25 deer were observed, because the majority of these deer were observed in one herd. As well, we upgraded several units with significant amounts of southwest-facing river valley slopes to the next stratum to allow for wintering habitat.

For white-tailed deer, we pooled units into one stratum because there was no discernable pattern in their distribution. This species was seen on upland farmland and in river valley terrain.

The survey team used one crew in a Bell 206B helicopter on 23 January 2008 and two crews in two helicopters on 24 – 26 January to conduct intensive searches of survey units. In total, crews searched 23 survey units with varying classifications for the three species. Crews flew transects oriented east-west that were spaced to ensure full coverage of the survey unit; in this WMU usually a separation of 400 m was sufficient. Crews made every attempt to classify all ungulates observed, unless the animals were in close proximity to farmyards or domestic livestock.

Crews classified all moose observed as either adults or calves based on body size and length of the nose; all yearling moose were considered adults. All adult moose were classified as cows if a white vulva patch was present. Eight bulls still had antlers, while all other bulls were classified as males because of absence of a vulva patch. We assumed bulls with and without antlers to be equally detectable for gender.

Crews classified deer to species, then to age based on body size and length of the muzzle. Male adult deer with antlers were classified as yearlings if they had small forked antlers, as 'medium' if they had 3 – 4 short, spindly points per side with main beams not extending past the ears, and as 'large' if they had ≥ 4 large, long antler points per side and main beams that extended well past the ears. Some adult deer without antlers were not classified to gender.

Elk – From 17 – 19 March, one three-person crew in a Bell 206 helicopter searched areas with known or suspected presence of elk in WMU 526 and neighbouring WMU 527.

Locations were determined using elk sightings from the January survey, checking areas with reports of elk depredation, and contacting key residents just before the survey. The crew entered all locations of elk into a hand-held GPS and counted elk.

The crew classified elk as either adults or calves, based on body size and length of the muzzle. Male elk were classified as yearlings if they had one antler spike per side, as 'medium' if they had 2 – 5 spindly points per side, and 'large' if they had ≥ 6 points per side. Classification was not always possible, given close proximity to farmyards or livestock, or to the presence of thick coniferous cover.

7.6.3 Results

Moose, mule deer, and white-tailed deer – Survey conditions were cold with adequate snow to cover stumps, but no fresh snow, so the survey crew did not record tracks for stratification. The presence of ice fog in some areas reduced visibility near the upper reaches of the Peace River. We estimated the moose populations to be 2,707 ± 390 (90% CI = 14.4%), with a density of 0.38 moose/km^2 (Table 14). Ratios of bull and calves to 100 cows were 19 and 37, respectively. We estimated the mule deer populations to be 5,429 ± 907 (90% CI = 16.7%), with a density of 0.76 deer/km^2. The ratio of bucks and fawns to 100 does was 48 and 62, respectively. Of bucks, 45% were classified as yearlings, 46% as medium, and 9% as large. We estimated the white-tailed deer population to be 2,325 ± 632 (90% CI = 27.2%), with a density of 0.33 deer/km^2. The ratio of bucks and fawns to 100 does was 40 and 72, respectively.

For both deer species, the number of adult males observed was a minimum number because some antler drop would have occurred by the third week of January. However, few one-antlered deer were seen, suggesting that the majority of bucks still retained their antlers.

Table 14. Results of the 2008 Wildlife Management Unit 526 moose, mule deer and white-tailed deer survey, with comparisons to 1999 and 2003.

Species	Year	Population Estimate (90% confidence limits)	Animals/km²	Ratio to 100 females	
				Males	Juveniles
Moose	2008	2707 (14.4%)	0.38	19	37
	2003	3853 (12.1%)	0.54	37	48
	1999	3154 (12.5%)	0.45	29	53
Mule deer	2008	5429 (16.7%)	0.76	48	62
	2003	8503 (13.0%)	1.20	41	124
	1999	5308 (14.9%)	0.75	11	97
White-tailed deer	2008	2325 (27.2%)	0.33	40	72
	2003	1398 (22.5%)	0.20	26	120
	1999	928 (19.5%)	0.13	8	119

Elk – Crews recorded 26 different sightings of elk herds during the January surveys for a minimum count of 239 elk. In March, the survey crew recorded 34 separate sightings of elk herds with a minimum count of 320 elk (Table 15). During the January survey, crews found that elk had moved into areas in which elk have not previously been seen during surveys (Moyles and Johnson 2003). Elk also seemed to be in smaller groups and more dispersed across the unit, as opposed to being in large herds. In past years, elk from the Figure 8 Lake herd have moved into WMU 527 in the Warrensville area (Johnson 2007). Neighbouring portions of WMU 527 were surveyed, but no elk were found close to the common boundary between these two WMUs.

Table 15. Minimum counts of elk by 'herd areas' in Wildlife Management Unit 526, January and March 2008.

Area	21 – 26 January 2008	17 - 19 March 2008
Clear River – Bear Canyon	51	86
Figure 8 Lake	94	72
Golden Meadows	16	29
Hines Creek	28	0
Many Islands	4	23
Montagneuse River	20	76
Running Lake Road – Worsley	26	34
Total	239	320

7.7 Wildlife Management Unit 359 moose, mule deer and white-tailed deer

Section Authors: Dave Stepnisky and Robb Stavne

Ungulates in WMU 359 were surveyed previously in 1998 and 2004. Although a moose calf harvest and an antlerless mule deer harvest have been in effect for many years, tags were dramatically increased in the last few years (including issuing triple tags for antlerless mule deer). A detailed survey was required to monitor the result of these increased harvest opportunities. Additionally, the relatively high use of this area by hunters, a notable tick outbreak in late winter of 2007, and human-wildlife conflicts in this WMU also necessitated an updated inventory of moose and deer populations. This section contains the results and preliminary analysis of moose and deer surveys conducted in WMU 359 in 2008.

7.7.1 Study area

WMU 359 occurs primarily within the Saddle Hills County, with a small portion to the southeast within the Municipal District of Spirit River No. 133 (Figure 16). The unit is bordered by the Saddle Hills to the south, the British Columbia border to the west, and the Peace River to the north. This area includes portions of the Peace River Parkland, Dry Mixedwood and Lower Foothills subregions, as described by the Natural Regions Committee (2006). Mixedwood forests of aspen and white spruce dominate the non-

agricultural portions of the WMU and are interspersed with peatlands and lotic river systems. Agriculture is prevalent throughout the WMU, and is dominated by annual cereal and perennial forage crops, interspersed with small aspen stands, and both ephemeral and permanent wetlands. The most prominent feature in the WMU is the Peace River and the numerous tributaries that flow into it, providing ideal riparian habitat for ungulates. Increased forestry activity at the Green/White Zone interface has generated substantial amounts of additional forage for moose.

7.7.2 Survey methods

Wildlife staff (ACA and ASRD) from the northwest region flew transects across WMU 359 by fixed-wing aircraft on 30 and 31 January 2008 to stratify the distribution of moose and deer across 69 subunits in preparation for detailed surveys of ungulates using rotary-wing aircraft. Fixed-wing aircraft (Cessna 185) flights ran along lines of 1° latitude (except for every fifth line, which fell on survey unit borders) within the WMU. During stratification flights, the pilot flew the aircraft at approximately 150 km/h and maintained altitude between 60 and 90 m (200 and 300 ft) above ground. The crew marked locations of moose, deer, incidentally encountered elk, and other pertinent wildlife using a GPS.

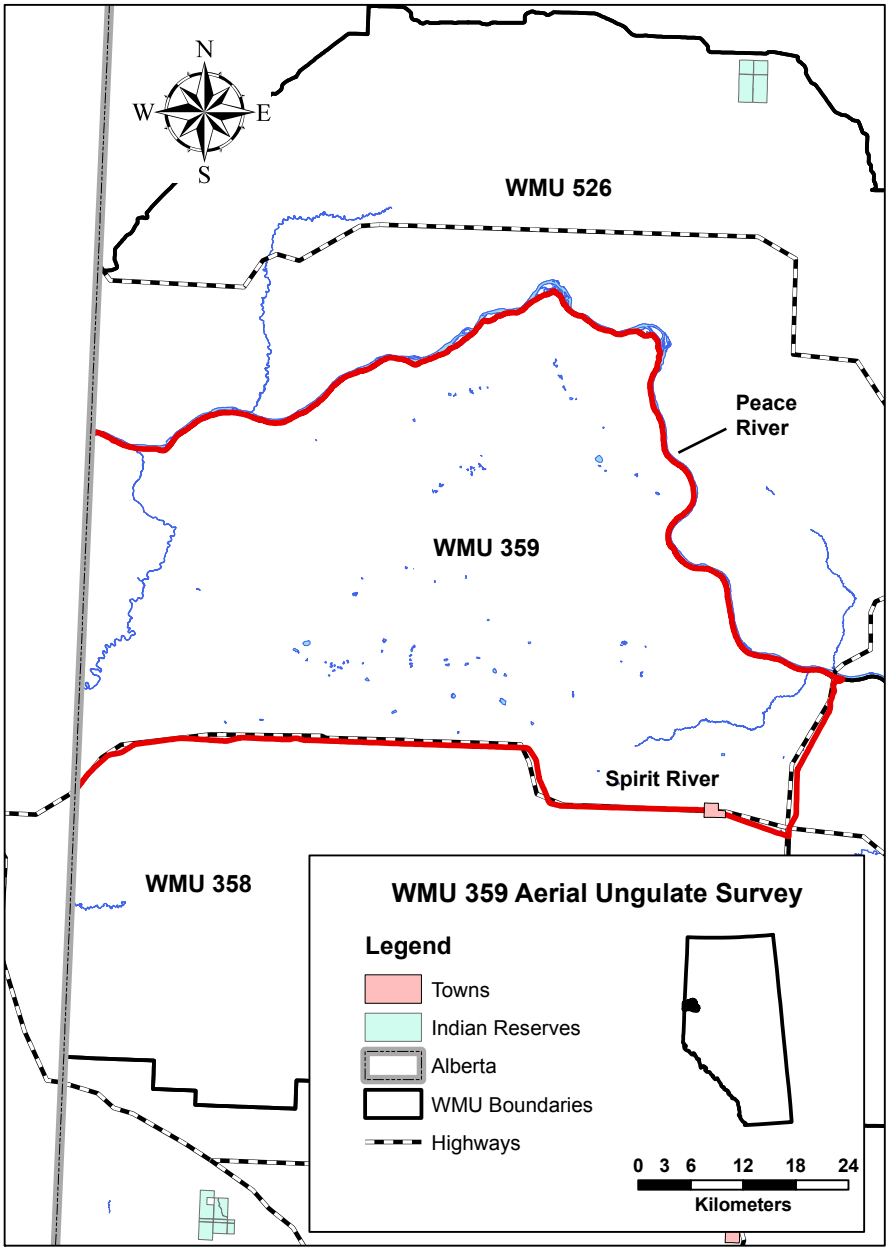

Figure 16. Location of the Wildlife Management Unit 359 aerial ungulate survey in Alberta.

We classified survey blocks according to the number of moose and deer observed during fixed-wing stratification flights, following a modified Gasaway technique (Gasaway et al. 1986, Lynch 1997). Information used to classify survey units into strata was obtained in a variety of ways, depending on the species of ungulate that was enumerated. For the moose survey, we stratified survey units by flying four fixed-wing transects through each survey unit and counting all moose observed during these flights (Lynch 1997). Based on relative counts from stratification flights, we stratified survey units for moose into low (< 5), medium (5 – 9), and high (> 9) classifications with few deviations. For mule deer, we only stratified survey units into high or low strata using a combination of information derived from transect surveys, as well as through application of local knowledge of animal concentrations, food sources, cover availability, and animal movement patterns in winter. In particular, mule deer are known to concentrate in the river valleys throughout the unit. We did not stratify units for white-tailed deer due to the low numbers distributed throughout the landscape. Survey blocks were 5 min latitude x 5 min longitude (approximately 48 km^2). We randomly selected 17 survey blocks for intensive search by helicopter. The classification distribution of these blocks differed by species. For moose, we classed six blocks as low, six as medium, and five as high. For mule deer, we classed 12 survey units as low and five as high.

We used a Bell 206 helicopter to determine the number of moose and deer within each of the randomly selected blocks on 1 – 3 February 2008. Flights of each block proceeded east to west (and west to east) on flight lines approximately 400 m apart, at 100 – 140 km/h, and at an altitude of approximately 30 m. Each flight crew consisted of three passengers: a navigator/recorder/observer up front, an observer left-rear, and an observer right-rear. Observers on each side of the helicopter surveyed a field of view of approximately 200 m from the helicopter. Physical characteristics that were easily observed from the air (e.g., presence of white vulva patch on cow moose, or antlers on males) allowed identification of all ungulates by sex and age. Observers classed adult males into one of three categories, as outlined in Table 16. In addition to observations of moose and deer, observers recorded sightings of elk, wolves or kill sites.

Table 16. Classification criteria for male ungulates during the 2008 aerial surveys in Wildlife Management Unit 359.

Size Class	Moose	Deer
Yearlings	Bulls with small forked antlers	Bucks with small forked antlers
Medium	Bulls with small palmated antlers and one or two small points to the front	Bucks with 3 (occasionally 4) short, spindly points per side, and main beams not spreading past the ears.
Large	Bulls with large palmated antlers and a minimum of 3 large points to the front.	Bucks with a minimum of 4 large, long antler points per side, plus main beams spreading out well past the ears.

We entered data into a Gasaway population estimate spreadsheet ("Quad6.xls") to calculate population estimates, ratios of males and juveniles to 100 females, and population densities.

7.7.3 Results

During stratification flights, winds were calm and snow cover was complete. Visibility was acceptable, but hindered by frosting on windows, a result of very cold temperatures. Mean air temperature was -27°C. Conditions for rotary-wing surveys were generally good with excellent snow coverage. Temperatures varied from -23°C to -27°C.

We estimated the moose population to be 1,709 ± 263 (90% CI = 15.4%) (Table 17). There were 18 bulls/100 cows and 25 calves/100 cows. An estimated 1.3% of cows had twins, and the overall density was 0.52 moose/km^2. Of the bulls that were observed during detailed surveys, 75% had already shed their antlers. Of those bulls still with antlers, 93% were yearlings. No bulls in the large category were observed. Minor patchiness was observed on a few moose in relation to ticks, but was not noticeably high.

We estimated the mule deer population to be 3,016 ± 383 (90% CI = 12.7%), with a density of 0.91 mule deer/km^2 (Table 17). There were 22 adult bucks and 23 fawns per 100 does, and 3.2% of does had twins. Although proportionately fewer large bucks were observed than in previous years (Table 18), this may have been a function of the condition of deer at the onset of winter. Given previous harsh winter conditions, large bucks may have shed their antlers earlier, accounting for fewer observed.

We estimated the white-tailed deer population to be 865 ± 255 (90% CI = 29.5%) (Table 17). There were 14 bucks and 44 fawns per 100 does, and 16.3% of does had twins.

Table 17. Population estimates and herd composition of moose, mule deer and white-tailed deer in Wildlife Management Unit 359.

Species	Year	Population estimate (90% confidence limits)	Animals/km^2	Ratio to 100 Females	
				Males	Juveniles
Moose	2008	1709 (15.4%)	0.52	18	25
	2004	3223 (13.3%)	0.98	31	39
	1998	2586 (13.2%)	0.79	22	52
Mule deer	2008	3016 (12.7%)	0.91	22	23
	2004	4993 (21.2%)	1.52	65	118
	1998	3524 (23.3%)	1.07	12	107
White-tailed deer	2008	865 (29.5%)	0.26	14	44
	2004	483 (36.9%)	0.15	14	117
	1998	355 (36.4%)	0.11	5	116

Table 18. Age structure of classified male mule deer in Wildlife Management Unit 359.

	Mule Deer		
Age classification	**1998 (N = 34)**	**2004 (N = 220)**	**2008 (N = 122)**
Yearling	44%	36%	44%
Medium	41%	52%	51%
Large	15%	12%	5%

Photo: Robb Stavne

7.8 Wildlife Management Unit 360 moose, white-tailed deer and mule deer

Section Authors: Robb Stavne, Dave Stepnisky and Mark Heckbert

Historically, one trend block survey (1993), five detailed population estimate surveys for moose (1993, 1994, 2000, 2001 and 2007), and three detailed surveys (2000, 2001 and 2007) for elk and deer have been completed in WMU 360. Ungulate management efforts in the Lesser Slave area strive to complete surveys in each WMU every three or four years, or more frequently when management issues necessitate increased monitoring and assessment. Regular ungulate surveys in WMU 360 are important in order to determine ungulate population status and trends, to set recreational license permit numbers, and to assist with ungulate depredation and land use management. This section summarizes the results and preliminary analysis of moose and deer surveys conducted in WMU 360 in December 2007.

7.8.1 Study area

WMU 360 is located immediately south of the town of High Prairie and borders the southwestern shore of Lesser Slave Lake (Figure 17). The landbase in WMU 360 includes portions of the Dry Mixedwood, Central Mixedwood, and Lower Foothills subregions, as described by the Natural Regions Committee (2006). Mixedwood forests of aspen and white spruce dominate the non-agricultural portions of the WMU, and are interspersed with the major river systems of the East and West Prairie and Little Smoky River valleys. The mixed farmland is dominated by tame hay and pasture lands with some grazed mixedwood forest. Croplands in the vicinity of High Prairie, Sunset House and Valleyview are dominated by annual cultivation of grains and oilseeds; however, in recent years there has been more conversion of these lands into hay and pasture production.

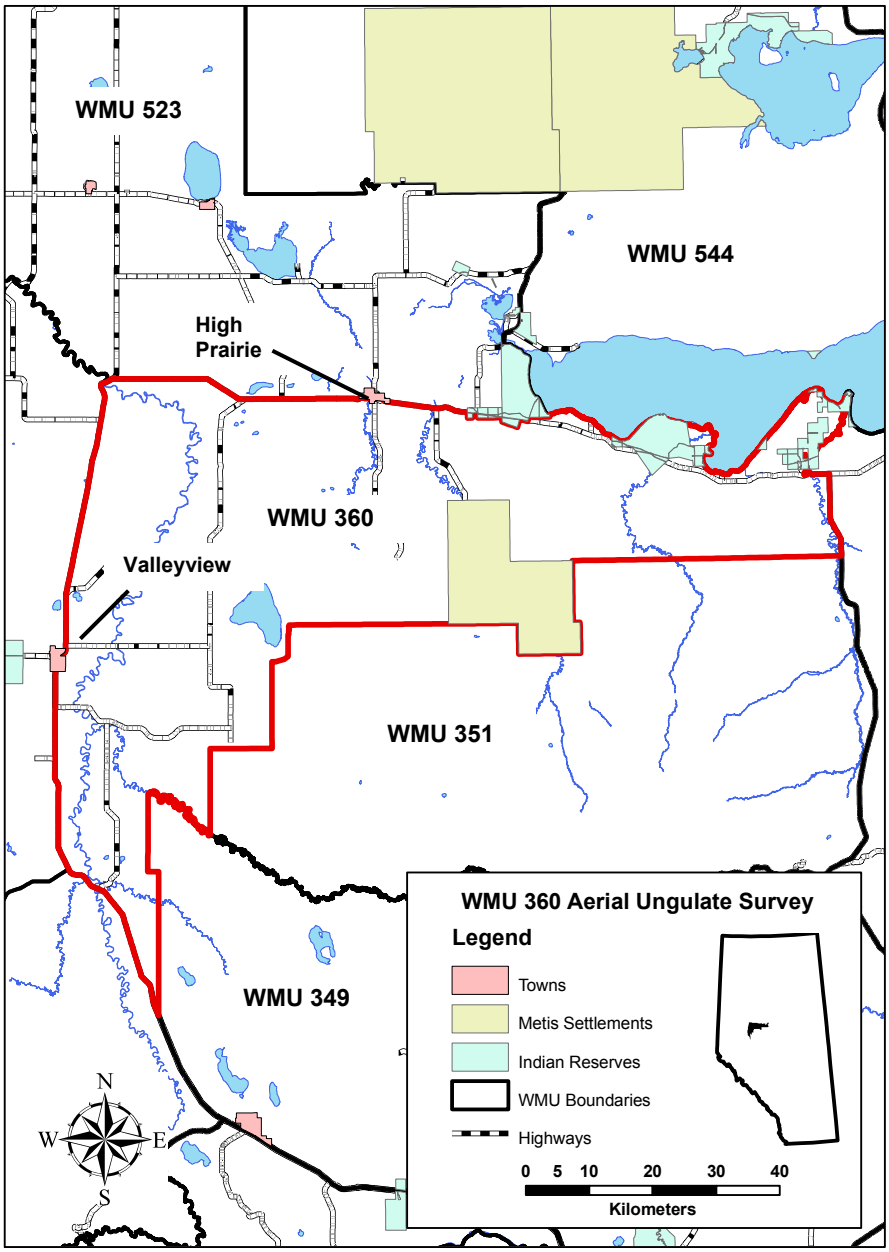

Figure 17. Location of the Wildlife Management Unit 360 aerial ungulate survey in Alberta.

7.8.2 Survey methods

We conducted a modified Gasaway-style survey in late 2007, as described in the Northern Moose Program Moose Survey Field Manual (Lynch 1997). Two Cessna 185 fixed-wing aircraft were used for stratification, with each aircraft occupied by a pilot and three observers. Survey staff flew east-west transects across the WMU on 14 and 15 December 2007, for a total of 21.4 h. Staff used a GPS to mark locations of moose, deer and other wildlife.

Based on relative counts from stratification flights, we stratified survey blocks for moose into low (< 5), medium (5 – 12), and high (> 12) classifications. For white-tailed and mule deer, we stratified survey blocks using a combination of information derived from transect surveys, as well as through application of local knowledge of animal concentrations, food sources, cover availability and animal movement patterns in winter. In WMU 360, deer are known to concentrate in areas with winter food sources such as unharvested cereal grains and unprotected grain piles and livestock forage. Based on relative counts from stratification flights, we classified survey blocks for white-tailed deer as low (≤ 5) or high (> 5). Survey blocks for mule deer were classified as low (≤ 4) and high (> 4). We randomly selected a total of 19 detailed survey blocks for intensive search by helicopter. The classification distribution of these blocks differed by species. For moose, we classed seven of the blocks as low, seven as medium, and five as high. For mule deer, the classification of survey blocks was broken down as 12 low and seven high. White-tailed deer classifications included 11 low survey blocks and eight high.

We used Two Bell 206 helicopters to determine the number of moose and deer within each of the randomly selected blocks on 16 – 18 December 2007. Each block was flown east to west on flight lines spaced 0.25 min of latitude (approximately 400 m) apart, at 100 – 140 km/h, and at an altitude of approximately 100 m. Each flight crew consisted of three observers. Crews identified all ungulates by sex and age, where possible, using physical characteristics that were easily observed from the air (e.g., presence of white vulva patch on cow moose, or antlers on males). Crews classed adult male ungulates into categories using the same criteria as in WMU 359 (Table 16). In addition to observations of moose, crews recorded observations of deer, elk and other wildlife.

The rotary-wing portion of the survey totaled 42.1 h. We entered data into a Gasaway population estimate spreadsheet and calculated population estimates, male/female/juvenile ratios, population densities and twinning rates.

7.8.3 Results

During the stratification portion of the survey, winds were calm, and snow cover was fresh, complete and with a depth averaging 50 cm. Visibility was generally excellent throughout the survey. Mean ground temperature was -8°C during stratification. Conditions for rotary-wing surveys were generally good with fresh and complete snow coverage averaging 50 cm in depth. Air temperatures varied from -1 to -5°C, with a progression towards cooler weather during later portions of the survey. Winds were generally calm throughout the duration of the survey. Observation conditions were excellent throughout all portions of the rotary-wing survey.

Moose – We estimated the population of moose to be 2,964 ± 453 (90% CI = 15.3%) (Table 19). There were 17 bulls/100 cows and 39 calves/100 cows. The occurrence of cows with twins at survey time was 9.4% and the overall density was 0.62 moose/km^2. Of bulls observed during detailed surveys, 21.9% had already shed their antlers. Of bulls still retaining antlers, we classed 40% as yearlings and 52% as medium. We observed very few bulls in the large category.

Mule deer – We estimated the population of mule deer to be 879 ± 260 (90% CI = 29.6%) (Table 19). The observed density of mule deer was 0.18/km^2. There were 44 adult bucks/100 does and 53 fawns/100 does, with an observed twin occurrence of 9.1%. We observed one antlerless mule buck, indicating that antler drop had begun. The proportion of mule deer bucks in each size class was similar to past surveys (Table 20).

White-tailed deer – We estimated the population of white-tailed deer to be 5,096 ± 922 (90% CI = 18.1%) (Table 19). There were 26 bucks/100 does and 51 fawns/100 does and a twin occurrence rate of 8.5%. Two white-tailed bucks lost antlers during the survey, indicating the initiation of antler drop.

Table 19. Population estimates and herd composition of moose, mule deer and white-tailed deer in Wildlife Management Unit 360 during December 2007 and previous survey years.

Species	Year	Population estimate (90% confidence limits).	Animals/km²	Ratio to 100 females	
				Males	Juveniles
Moose	2007	2964 (15.3%)	0.62	17	39
	2001	3551 (17.8%)	0.75	24	63
	2000	1905 (9.5%)	0.40	13	48
	1994	2667 (19.7%)	0.63	19	52
	1993	3357 (24.0%)	0.74	28	53
	1993[a]	-	0.70	13	61
	1990[a]	-	1.1		
Mule deer	2007	876 (29.6%)	0.18	44	53
	2001	536 (26.4%)	0.11	22	100
	2000	467 (12.7%)	0.10	7	116
White-tailed deer	2007	5096 (18.1%)	1.06	26	51
	2001	2059 (8.7%)	0.43	27	78
	2000	1150 (13.6%)	0.30	35	115

[a]Trend block survey.

Table 20. Age structure of classified male mule and white-tailed deer in Wildlife Management Unit 360 during surveys in 2000, 2001 and December 2007.

Age Classification	Mule Deer			White-tailed Deer		
	2000 (N = 5)	2001 (N = 16)	2007 (N = 71)	2000 (N = 39)	2001 (N = 55)	2007 (N = 177)
Antlerless	0%	0%	2%	0%	0%	0%
Yearling	40%	50%	42%	36%	36%	38%
Medium	60%	31%	46%	51%	38%	48%
Large	0%	19%	10%	13%	25%	14%

7.9 Wildlife Management Units 505 and 507 moose

Section Authors: Hugh Wollis and Curtis Stambaugh

WMU 507 is a very popular hunting area for local residents and urban dwellers from nearby Edmonton. Previous surveys were conducted in 1995, 1999 and 2004. In 2006, a significant change in moose management occurred with the elimination of the General Moose Archery Season. This change concerned local archery hunters who met with the Minister, citing (among other things) poor and out-of-date data for aerial surveys. The Minister supported the season change, but agreed to give WMU 507 high priority for aerial surveys in 2008. WMU 505, which is adjacent to WMU 507, had been flown in conjunction with 507 in 2004 and was also surveyed in 2008 in order to coordinate aircraft charters and reduce overall survey costs.

7.9.1 Study area

WMU 507 extends roughly from Whitecourt to Barrhead, which is 100 km northwest of Edmonton (Figure 18). The WMU is bisected by the Athabasca River, an important feature for wildlife. The WMU is in the Boreal Mixedwood natural region and is a mixture of patented agricultural land east of the Athabasca where the land is primarily dominated by forage crops and pasture with some grain. West of the river the land is primarily Crown with some patented land that features mostly forage and pasture land near Ft. Assiniboine. The Connor Creek Provincial Grazing Reserve, the Ft. Assiniboine Wildland Park, and the Holmes Crossing Ecological Reserve are parcels of land with special management considerations.

WMU 505 lies east of WMU 507, bounded on the south by Highway 18 from Barrhead to Westlock, and extending north about 50 km. Most of the area is characterized by agriculture – grain crops, forage and grazing. The northwest portion of the WMU is bounded by the Athabasca River. There is a large muskeg/sand hills complex of wooded Crown land around Goodridge Lake adjacent to the Athabasca River.

7.9.2 Survey methods

The survey occurred over four consecutive days from 4 – 7 February 2008. The survey method followed the modified Gasaway technique (Gasaway et al. 1986). We stratified the WMUs using habitat classifications that have remained relatively constant among previous surveys. We used aerial photos, the Praire Farm Rehabilitation Administration woodlot maps, and personal knowledge to determine whether blocks fell within low, medium or high strata. For this survey, staff attempted to improve the precision of our results by classifying survey blocks along the Athabasca River in WMU 507 into a separate stratum. In previous years, blocks along the river were classified the same as high blocks on the upland, which do not support similar populations of moose in winter. Therefore, for the 2008 survey, the river valley blocks were made into a separate stratum and sampled separately from the upland.

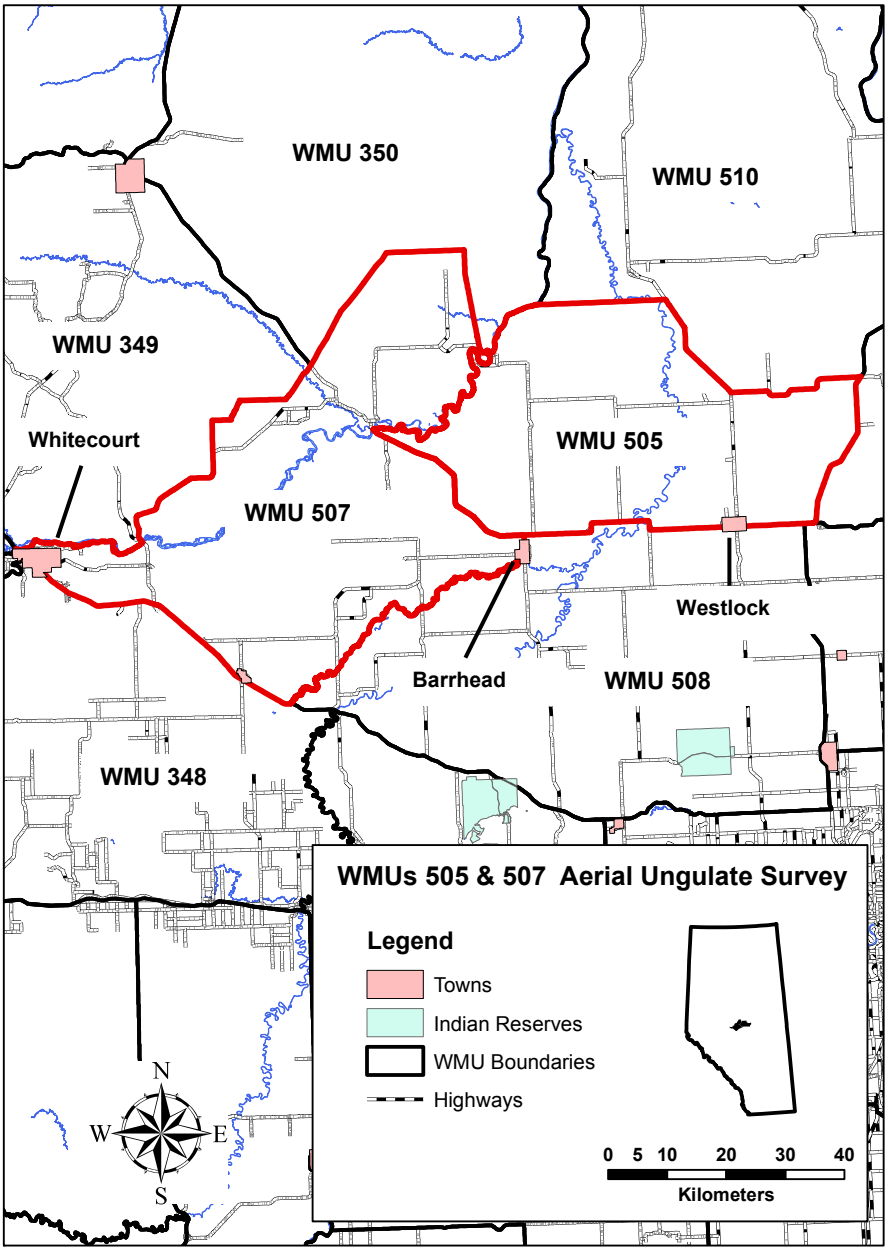

Figure 18. Location of the Wildlife Management Units 505 and 507 aerial ungulate survey in Alberta.

We randomly selected survey blocks for each of the low, medium and high strata. We searched intensive survey lines with 400 m spacing using a Bell 206 helicopter. The front observer/navigator recorded observations using a GPS unit. The observer recorded the species, sex and age of the animal observed and made a note of the habitat. If the sex of the moose was in question, the pilot circled until the observers could verify the presence or absence of a white vulva patch. Therefore, we assumed individuals were correctly classed for gender. The survey crew also recorded all sightings of mule deer, elk, white-tailed deer and great grey owls (*Strix nebulosa*).

7.9.3 Results

All four survey days had good weather conditions.

WMU 507 – We estimated the moose population to be 1,253 ± 238 (90% CI = 19.0%), with an overall density of 0.45 moose/km^2 (Table 21). Classifying the river valley blocks into a separate stratum in 2008 resulted in a density estimate that the survey crew felt was a significant improvement over previous years.

The bull/cow/calf ratio in WMU 507 was 23 bulls/100 cows/68 calves. The proportion of bulls was less than recorded in 2004 (52/100) and 1999 (45/100). The calf/cow ratio for 2008 was similar to that from 2004 and 1999, but was lower than the 81/100 recorded in 1995. The calf ratios recorded in 2008 appear consistent with the previous two surveys.

WMU 505 – We estimated the moose population to be 564 ± 134 (90% CI = 23.8%), with an overall density of 0.30 moose/km^2 (Table 21). The bull/cow/calf ratio was 18/100/49. For WMU 505, there are less historical data for comparison because the boundaries of the unit have changed twice in the past 20 years. The survey in 2004 estimated 487 moose and bull/cow/calf ratios of 32/100/43. The calf/cow ratios were similar between the two years.

Incidental observations of mule deer, white-tailed deer, elk and other wildlife are reported in Table 22.

Table 21. Population estimates, densities, and herd composition for moose in Wildlife Management Units 505 and 507 during 2008, with comparisons to previous years.

WMU	Year	Population Estimate (90% confidence limits).	Moose/km²	Ratio to 100 females	
				Males	Juveniles
505	2008	564 (23.7%)	0.30	19	49
	2004	487 (31.7%)	0.25	32	43
507	2008	1253 (19.0%)	0.45	23	59
	2004	793 (14.5%)	0.37	41	58
	1999	1534 (40.6%)	0.51	45	58
	1995	882 (23.1%)	0.35	52	81

Table 22. Numbers of ungulates and other wildlife species observed incidentally during the 2008 moose surveys in Wildlife Management Units 505 and 507.

Species	Sex/Age Class	Number Observed	
		WMU 505	WMU 507
White-tailed deer	Buck	12	9
	Doe	19	39
	Fawn	15	42
	Unclassified	145	538
Mule deer	Buck	0	43
	Doe	0	44
	Fawn	0	0
	Unclassified	2	64
Elk	Bull	0	6
	Cow	0	8
	Calf	0	0
	Cows and Calves	0	28
	Unclassified	2	0
Other		1 wolf, 2 great grey owls, 4 coyotes	2 sharp-tailed grouse

8.0 POPULATION RECRUITMENT SURVEYS

8.1 Caribou demographics

Section Author: Dave Hervieux

Since the late 1980's, Alberta Fish and Wildlife Division has conducted late winter population composition surveys for select woodland caribou herds in the province. In some cases, these surveys have been funded in partnership with ACA and/or other partners. The number of surveyed populations has gradually increased over time. These data are entered into the provincial caribou database, and in combination with adult female mortality data collected quarterly, are used to calculate an annual population trend estimate for each population. The population trend results are reported to the Alberta Caribou Committee, and in various other places, including the provincial caribou status report updates. Population trend measurements contribute fundamental data to the assessment of woodland caribou recovery and conservation actions, within context provided by the Alberta Woodland Caribou Recovery Strategy (Alberta Woodland Caribou Recovery Team 2005) and by Alberta's obligations within the federal species at risk legislation.

8.1.1 Study area

Surveys in 2008 occurred in the Caribou Mountains, Chinchaga, East Side Athabasca River, Nipisi, Red Earth, Slave Lake, West Side Athabasca River, and Yates caribou ranges (Figure 19). This area includes portions of the Central Mixedwood, Northern Mixedwood, Lower Boreal Highlands, Upper Boreal Highlands, and Boreal Subarctic natural subregions. High levels of industrial activities occur throughout these areas.

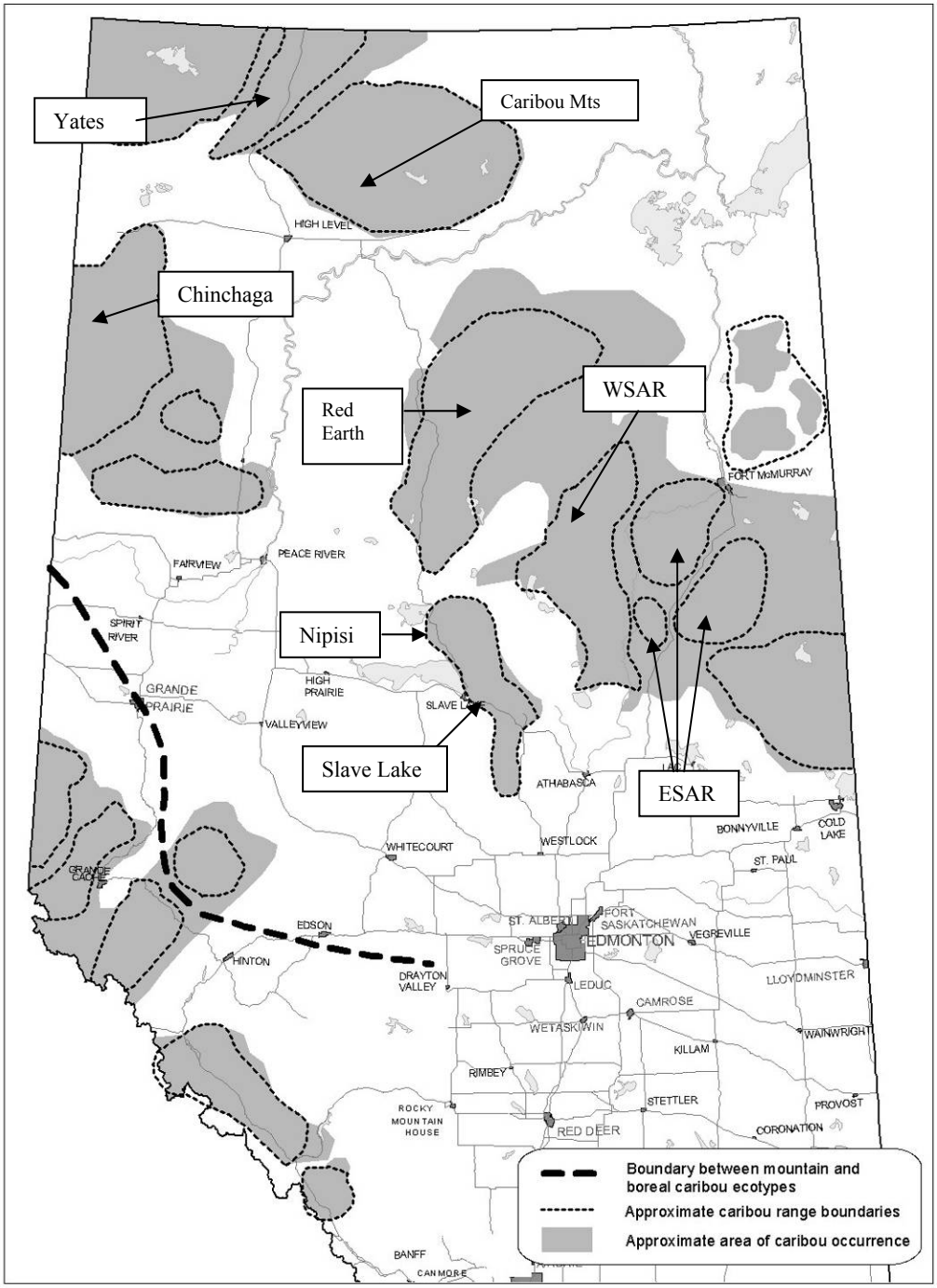

Figure 19. Location of caribou herd composition surveys in Alberta.

8.1.2 Survey methods

Surveys to locate radio-collared female caribou occurred in February and March 2008 and all associated animals were classified. In many cases, non-radio-collared individual caribou or caribou groups were also located and classified. The survey used fixed-wing aircraft to locate radio collared caribou and rotary-wing aircraft for classification activities.

8.1.3 Results

Conditions for rotary-wing surveys were generally good with excellent snow coverage. ACA funded a portion of the overall caribou demographics survey; however, the results presented in this report represent the entire survey effort. A total of 877 caribou were classified during the surveys (Table 23). Lambda (population rate of change) estimates for the caribou populations covered by this report, and for the other woodland caribou populations surveyed in the province, will be calculated prior to the end of June 2008, once data from final quarter adult female caribou mortality surveys are available.

Table 23. Caribou herd composition in 2008.

	Adults			Calves				
Caribou Range	**Bulls**	**Cows**	**Unknown**	**Male**	**Female**	**Unknown**	**Total**	**% Calves**
Caribou Mtns	32	78	0	2	2	5	119	7.6
Chinchaga	49	114	5	0	7	2	177	5.1
ESAR	27	62	17	0	0	10	116	8.6
Nipisi	8	28	2	0	0	4	42	9.5
Red Earth	29	76	0	0	3	2	110	4.5
Slave Lake	4	36	3	0	0	1	44	2.3
WSAR	29	82	4	0	0	15	130	11.5
Yates	39	85	0	9	6	0	139	10.8
Total	**217**	**561**	**31**	**11**	**18**	**39**	**877**	**8.4**

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