

Status and Management of Wildlife in Saskatchewan, 1999 - 2001

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Executive Summary

License Sales and Harvests

Table 1. Hunting license sales and estimated game harvests, 1999 – 2001.

	Licenses Sold				Licensed Harvest			
	1999	2000	2001	Mean (1980-01)	1999	2000	2001	Mean (1980-01)
Wildlife Habitat Certificate	75,086	73,265	68,001	71,632 ^(a)	--	--	--	--
Big Game								
White-tailed Deer ^(b)	61,486	46,958	45,615	59,536	40,152	32,260	32,870	39,538
Mule Deer	5,065	6,074	8,068	10,728	3,637	4,612	6,260	8,683
Elk	5,824	6,826	6,735	5,078	1,687	2,057	2,245	1,159
Moose ^(b)	9,603	9,721	10,488	11,073	2,617	3,510	4,151	3,486
Barren-ground Caribou	60	18	32	49	^(c)	^(c)	^(c)	^(c)
Pronghorn Antelope	0 ^(d)	0 ^(d)	0 ^(d)	3,864 ^(e)	0 ^(d)	0 ^(d)	0 ^(d)	2,744 ^(e)
Black Bear ^(b)	4,360	4,436	4,300	4,055	2,316	2,565	2,337	2,049
Coyote	--	516	452	484 ^(g)	--	?	?	?
Big Game Total	86,398	74,549	75,690	94,911	50,409	45,004	47,863	57,692
Upland Birds								
Saskatchewan Resident	16,664	15,018	13,573	27,407	--	--	--	--
Canadian Resident	1,708	1,678	1,475	1,929	--	--	--	--
Non-resident	9,750	10,539	8,296	5,100	--	--	--	--
Sharp-tailed Grouse	--	--	--	--	20,074	47,822	45,828	52,355
Ruffed Grouse	--	--	--	--	35,151	24,736	33,056	43,351
Spruce Grouse	--	--	--	--	6,784	5,718	7,711	8,109
Hungarian Partridge	--	--	--	--	34,571	104,092	76,807	58,914
Ring-necked Pheasant	--	--	--	--	4,399	5,312	4,639	10,090
Upland Bird Total	28,122	27,235	23,344	36,920	100,979	187,680	168,041	172,819
Youth License	7,794	7,163	6,704	4,957 ^(f)	--	--	--	--
Total Licenses Sold	197,400	182,212	173,739	208,420	--	--	--	--

^(a) Mean of 1987 – 2001. ^(b) includes Canadian and non-resident statistics. ^(c) unknown. ^(d) no hunting season.

^(e) Mean of 1980 – 1996. ^(f) Mean of 1991 – 2001. ^(g) mean of 2000 - 2001

License sales declined in 2000 and 2001 (Table 1) largely due to the reduction in antlerless white-tailed deer licenses, which was a consequence of smaller populations in southeast Saskatchewan. This was also reflected in the white-tailed deer harvest. Total upland bird licenses continue to decline, which is a function of the steady decline of Saskatchewan resident upland bird license sales since the 1980s. This has been somewhat offset by increased non-resident upland bird license sales over the same period. Wildlife Habitat Certificate sales have remained relatively constant since inception (1987).

Executive Summary

License Revenue

Table 2. Gross revenue from license sales, 1999 – 2001.

License Type	1999	2000	2001	10-yr Mean (1992 - 2001)
Wildlife Habitat Certificate	\$ 719,665	\$ 713,297	\$ 661,342	\$ 691,899
Big Game ^(a)	4,213,650	3,917,554	3,893,459	4,078,478
Game Bird	1,314,327	1,379,606	1,105,905	984,931
Youth	62,526	59,704	55,506	41,682
Total	\$ 6,310,168	\$ 6,070,161	\$ 5,716,212	\$ 5,796,990

^(a) does not include revenues from non-resident allocation licenses.

Table 3. License revenue by big game species, 1999 – 2001.

Big Game Species	1999	2000	2001	10-yr Mean (1992 - 2001)
White-tailed Deer	\$ 3,176,209	\$ 2,664,321	\$ 2,570,832	\$ 2,793,060
Mule Deer	171,230	201,279	248,446	303,489
Elk	208,826	247,833	247,175	223,544
Moose	376,605	396,451	405,604	416,130
Barren-ground Caribou	1,336	533	987	1,075
Pronghorn Antelope	0	0	0	104,695
Black Bear	279,444	407,137	400,054	234,449
Total	\$ 4,213,650	\$ 3,917,554	\$ 3,893,459	\$ 4,078,478

Executive Summary

Big Game Population Status

Table 4. Status of big game populations in relation to population objectives.

Species	Estimated 2001 Winter Population	Long-term Population Objective	Status / Performance Measures
White-tailed Deer	277,517	293,986	<ul style="list-style-type: none"> ➤ Grassland populations are stable but productivity lower than desired. ➤ Farmland populations are stable but habitat limited. ➤ Parkland populations increasing except in southeast due to liberal hunting pressure and severe winter conditions (2000/01). ➤ Forest Fringe populations growing in central and western areas due to mild winter conditions. ➤ Forest populations growing due to mild winter conditions.
Mule Deer	36,461	43,237	<ul style="list-style-type: none"> ➤ Grassland populations are increasing but still 15% below long-term average. ➤ Farmland populations are 28% below long-term average, but are increasing ➤ Parkland populations are stable and near the long-term average. ➤ Forest fringe populations are very small, but estimate to be about 30 % below long-term average.
Elk	14,429	14,525	<ul style="list-style-type: none"> ➤ Populations in most of the 22 elk management units (EMUs) are at or near their population objectives. The exceptions are Cypress Hills where populations have greatly exceeded their population objectives, and Cumberland Delta, Bronson/Divide, PANP/Cookson, where populations are lower than desired. ➤ There are a lack of recent survey data for most EMUs, so population status is interpolated from population forecasts based on past population performance, hunter harvest and hunter success rates.
Moose	43,244	50,375	<ul style="list-style-type: none"> ➤ Island populations are stable and near their population objectives (11 of 22 moose management units (MMUs)). ➤ Northern MMU populations (3 MMUs) are considered stable. ➤ Pasquia and Porcupine MMU populations were at their population objectives but moose tick mortality in spring 2002 is thought to have had a significant impact. ➤ The Cumberland MMU population remains 54% below population objective. ➤ Central forest populations (2 MMUs) are 33% below population objectives. ➤ West forest populations (3 MMUs) are 16% below population objectives
Barren-ground Caribou	776,000	>300,000	<ul style="list-style-type: none"> ➤ Last survey was in 1994.
Woodland Caribou	3,510	?	<ul style="list-style-type: none"> ➤ Status is under review.
Pronghorn Antelope	13,506 ^(a)	20,803 ^(a)	<ul style="list-style-type: none"> ➤ 2001 populations in all 7 antelope management units (AMUs) were below long-term population means. ➤ 2002 population surveys indicate the provincial population has significantly increased to a level near the long-term average.
Black Bear	35,000	35 - 40000	<ul style="list-style-type: none"> ➤ There are no formal population surveys for this species. Population estimates are a "best guess" based on habitat potential, population harvest levels, and hunter success rates.

^(a) Fall (pre-hunt) population estimate.

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Big Game Allocation Changes

Table 5. Allocation changes, 1999 – 2001.

Species	Year	Allocation Change
White-tailed Deer	1999	➤ Introduced antlerless license for forest and forest fringe WMZs for resident hunters
	2000	➤ Calendar adjustment
		➤ Eliminated all 1 st antlerless licenses in southern WMZs ➤ Opened province to Canadian resident hunters ➤ WMZ 47 season was shortened
2001	➤ Canadian resident hunting closed in WMZs 15-17, 31-37 and 39 due to effect of severe winter 2000/01 conditions in southeastern WMZs on deer populations. ➤ Rifle season extended by 1 week in forest zones for Canadian resident hunters	
Mule Deer	1999	➤ WMZ 45 was split along grid #674 for antlerless hunt to distribute hunters ➤ New quota of 25 introduced for west side of WMZ 14.
	2000	➤ Calendar adjustment
		➤ Either-sex quota increased in most WMZs in response to increasing populations. ➤ Expanded youth hunter component of antlerless draw.
2001	➤ Antlerless quotas increased in several WMZs. ➤ Either-sex seasons were re-opened in WMZs 8 and 15. ➤ Antlerless seasons re-opened in WMZs 5, 8, 9, 12, 13, 23, 47 and Saskatoon WMZ. ➤ WMZ 13 split to distribute hunters. ➤ WMZ 45W and 46 closed to conduct Chronic Wasting Disease surveillance.	
Elk	1999	➤ A portion of WMZ 47 was opened for elk hunting ➤ Either-sex and antlerless quotas were increased ➤ Cypress Hills bag limit changed to either-sex for all hunting seasons.
	2000	➤ Calendar adjustment
		➤ Antlerless quotas were increased. ➤ Antlerless seasons in the forest fringe (WMZ 37, 40, 48, 49 and 50) were re-scheduled to avoid overlap with white-tailed deer seasons. ➤ WMZ 14 was opened for a limited antlerless hunt. ➤ Hunting in WMZ 67 was expanded to the entire zone.
2001	➤ Fort a la Corne quota was reduced. ➤ WMZ 39 (N of Hwy #5) was opened for bull-only hunting ➤ WMZ 42 and 43 was opened for antlerless hunting. ➤ Antlerless quotas were increased in combined zone 49, 58, and 59.	
Moose	1999	➤ No changes
	2000	➤ Calendar adjustment
	2001	➤ No changes
Antelope	1999	➤ Season Closed
	2000	➤ Season Closed
	2001	➤ Season Closed
Bear	1999	➤ No changes
	2000	➤ Calendar adjustment
		➤ Regulation to make it illegal to harvest a female black bear with young-of-the-year cubs
2001	➤ No changes	
Coyote	2000	➤ Introduced a hunting season for Canadian and Non-resident hunters of WMZs 1-55
	2001	➤ Expanded bag limit to 4 and added WMZ 68N (outside of fur conservation block)

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Methods

1.0 Data Collection Techniques

1.1 Population Surveys

1.1.1 Ungulates

In Saskatchewan, aerial surveys are the fundamental technique used to estimate ungulate population parameters. Surveys are primarily conducted in the winter months when there is sufficient snow background on which to observe animals and deciduous leaf cover is lacking. Notable exceptions are pronghorn antelope surveys, which are flown in the June (population density) and July (population structure). Generally, the survey technique employed depends upon the species being observed and the type of information the survey is designed to collect. The following is a brief description of various survey approaches used by Saskatchewan Environment (SE):

- **Trend Line Aerial Survey** design is the oldest survey method used in the province. Some of the first trend line surveys flown in Saskatchewan occurred in 1949 when Montana, Alberta and Saskatchewan combined efforts to estimate their collective pronghorn antelope resource. The survey design basically consists of transect lines a fixed distance apart and a fixed distance in length. Observers in the aircraft look out a fixed distance from the aircraft depending upon survey design and record animal sightings. See Dirschl (1960) and Hayne (1949) for a more detailed description of trend line aerial survey techniques. This survey approach was replaced by the line-transect survey design.
- **Line-Transect Survey** design is very similar to the trend line survey in that predetermined lines are flown over a designated area. However, the major procedural difference sees the placement of animal clusters into distance bands perpendicular to the transect line. Survey data are entered into a computer program that creates five best-fit mathematical models of the population density estimator. The theoretical advantages of this survey design are that each density estimator is more easily derived (with confidence intervals placed on its value), it is as cost effective as trend line surveys, and observability biases that increase with distance from the aircraft are accounted for in the mathematical model calculations. In 2000, SE began using DISTANCE 3.5 release 5 to assess survey results (Buckland et. al. 1993, Guenzel 1997).
- **Stratified - Random Block Survey** areas are stratified into sample units (quadrats or blocks) based on habitat type. Sample units are randomly selected from each strata. With this method, observers strive for a population density estimate of $\pm 20\%$ within 90% CI for the survey area. Refer to Stewart (1983) for a complete explanation of the stratified random block survey technique used in Saskatchewan.
- **Modified Gasaway Survey** - Beginning in the winter of 1997/98, a modified form of stratified random quadrat surveys based on the method described by Gasaway et al. (1986), and Lynch and Schumaker (1995) was adopted for moose. The modified Gasaway survey method differs from that used in previous years in that the survey units are larger and are stratified based on population densities determined from a pre-flight survey versus stratification based on habitat type. Once all survey units are classified into population density strata, survey units are selected from each strata at random and intensely searched by helicopter. Observers strive for a population density estimate of $\pm 20\%$ within 90%CI for the survey area. Population structure data are collected concurrently during the intensive search.

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- **Population Structure Surveys (aerial based)** are designed to estimate an age (i.e. adult vs. young) and sex composition of ungulate populations. Structures are usually presented as a ratio of adult males or young per adult female or per 100 adult females. Flight paths are usually irregular and occur over habitat types where the probability of sighting animals is high. Minimum animal observations to obtain precise estimates within desired confidence intervals are calculated before the survey per Czaplewski et al. (1983) and Scheaffer et al. (1990).
- **Co-operative Deer Management Survey (CDMS)**. A SE sponsored ground-based survey of white-tailed deer and mule deer population structures is conducted annually between Sep. 1 and Nov. 30, inclusive. The survey is conducted with the assistance of conservation officers, members of sport hunter groups and the general public. Co-operators classify observed deer by species (whitetail or mule), sex (male or female), age (fawn or adult), productivity (#fawns/doe) and provide information on buck antler development. These surveys supply valuable information on herd structures in many areas of the province where aerial population structure surveys were not carried out due to provincial monitoring priorities and limited budgets.
- **Spotlight Surveys** are a less expensive, ground-based population survey technique that is conducted from time to time often to supplement areas where CDMS samples were too small to be meaningful. These are primarily conducted on deer at night, to derive composition estimates for herds in localized situations. Observers usually drive into a field or along a road and shine a powerful spotlight over the area of view. The species, number, age and sex is determined for the night feeding deer.

1.1.2 Upland Game Birds

The spring surveys of breeding areas were used to supply population indices. The following is a brief description of the breeding population survey used for each of the major upland bird species:

Sharp-tailed -Grouse

Males that congregate on dancing grounds or leks within a specific survey block are counted.

The resultant density of males provides an index to the total size of the population (we assume a one to one relationship of adult males to adult females). Surveys are conducted each year between April 15 and May 15 (peak activity mid to late April) to coincide with male habituation to the lek. Ideal observation times are from day-break to 0800 hours.

Hungarian Partridge

This simple spring survey, initiated in 1979, involves 15 to 20 abandoned farmsteads on a survey route. Abandoned farmsteads constitute the most readily identified partridge habitat. The survey is conducted from about 1000 hours to 1500 hours preferably on sunny days with light winds.

Surveyors thoroughly search each farmstead counting the pairs of partridge flushed.

Pheasant

Territorial males, which broadcast their presence by crowing, are counted every mile on a 20-mile route. Crows heard within a two-minute period are considered originating from different cocks.

Surveys are conducted during early morning hours between April 7 and May 15.

1.2 Population Forecasting Models

It is not logistically possible to collect population data (size, structure) for all species throughout their range. Consequently, population forecasting models were developed to aid with assessing the status of ungulate (specifically white-tailed deer, mule deer, elk, moose and pronghorn antelope) populations at the provincial scale and meta-population scale. The first step of model development was to define the species range, and then partition the range into meta-populations (management

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units or wildlife management zones). Meta-population models were then constructed for individual management units (elk, moose, antelope), or wildlife management zones (white-tailed deer, mule deer) for a particular species using survey data. Linear interpolation of survey data was used between survey years for individual meta-populations. The sum of the meta-population estimates for a given year are then used to calculate a provincial total for that year for a given species. The more frequently a specific meta-population (management unit or wildlife management zone) is surveyed, the more accurately the model approximates the true population dynamics of that meta-population.

It is essential that surveys be conducted as regularly and extensively as possible to facilitate effective population assessment both at the provincial and meta-population scales. There are several meta-populations (usually small fringe populations or very low density populations) which have been infrequently surveyed, or that lack survey data, or may only have a “best guess” estimate based on a combination of field reports from local Conservation Officers and/or Regional Biologists, hunting activity, and harvest success rates. In these circumstances, the only option was to use adjacent meta-population trends to model population dynamics for meta-populations that are data deficient. This approach can, and probably does, introduce additional uncertainty (reduced accuracy and precision) into calculating an annual provincial population estimate for a particular species. The uncertainty can be reduced by more frequent and extensive sampling of meta-populations where logistically practical and/or monetarily feasible. For this reason the elk, moose and pronghorn antelope population forecasting models are more accurate and precise than the white-tailed deer and mule deer models.

Meta-population models are recalibrated as new survey data are collected. The models can be used to forecast population growth based on the population dynamics past performance and harvest from various population segments. However, it is absolutely essential that populations be surveyed regularly to ensure effective management, so that the models can be re-calibrated to more accurately represent and assess population status, and to monitor population performance relative to management strategies.

1.3 Biological Sample Collections

Twelve (12) privately operated collection points (Checking Stations) and 76 SE district offices were used to obtain biological samples to determine sex, age and antler configuration of harvested moose and elk, and sex/age of harvested black bears. Age determination for harvested animals older than young-of-the-year, were based on tooth cementum deposition (moose, elk, white-tailed deer and black bear), and/or molar wear (white-tailed deer only). Moose cementum analysis was conducted by trained SE, Fish and Wildlife Branch staff. Cementum analyses for the other species (elk, white-tailed deer, black bear) were conducted by Matson's Laboratories in Milltown, Montana, USA.

The SE district offices served as collection points for acquiring white-tailed deer, mule deer and elk heads for Chronic Wasting Disease sampling.

1.4 Hunting and Harvest Statistics

1.4.1 License Sales

SE, Fish and Wildlife Branch conducts an annual computerized draw for elk, moose, either-sex and antlerless mule deer licenses.

Over-the-counter licenses for white-tailed deer, black bear, moose (bull-calf), elk (bulls-only) and game bird seasons are purchased annually through approximately 1,000 public vendors and SE

Methods

district offices located throughout the province. Vendors return sold and unsold licenses to SE, which then determine provincial license sales figures for each game species.

1.4.2 Hunter Harvest Survey (HHS)

Continued monitoring of the harvest is essential to evaluate implications of harvest strategies. This is accomplished using a mail-out questionnaire to survey ungulate and upland game bird harvest, and hunting activity by licensed resident hunters. Phone surveys were used to supplement the information for elk and moose. Outfitter records were used to collect non-resident harvest and hunting activities for white-tailed deer and black bear.

The current year's hunters were selected for each of the big game draw species. This sample was then augmented with the previous year's white-tailed deer, bull-calf moose and bull-only elk hunters. Regular and draw license holders were cross-referenced to avoid duplication of hunter sampling. White-tailed deer are our most important ungulate species based on hunter participation and economic value, yet may be the most difficult species to obtain adequate samples in each WMZ. Therefore, the timing of the survey (end of November) was meant to ensure the best possible number of survey returns with white-tailed deer hunt information. Each questionnaire was numbered uniquely and mailed to a total of 27,500 resident hunters.

Resident hunters were not specifically sampled for upland game bird hunt activity as acceptable survey representation came from the sampled big game hunters. The HHS is inadequate to sample Canadian and non-resident hunters. Non-resident hunting and harvest data for black bears and white-tailed deer comes exclusively from outfitter records.

2.0 Literature Cited

- Buckland, S.T. D.R. Anderson, K.P. Burnham, and J.L. Laake. 1993. Distance sampling: estimating abundance of biological populations. Chapman and Hall, New York. 446 pp.
- Czaplewski, R.L., D.M. Crowe, and L.L. McDonald. 1983. Sample sizes and confidence intervals for wildlife population ratios. *Wildl. Soc. Bull.* 11(2):121-128.
- Dirschl, H.J. 1960. Aerial antelope survey in Saskatchewan, summer, 1960. Dept. Nat. Resour., Wildl. Br. Report. Regina.
- Gasaway, W.C., S.D. DuBois, D.J. Reed, and S.J. Harbo. 1986. Estimating moose population parameters from aerial surveys. *Biological Papers of the Univ. of Alaska. Instit. of Arctic Biology. No. 22.* ISSN 0568-8604.
- Guenzel, R.J. 1997. Estimating pronghorn abundance using aerial line transect surveys. *Wyoming Game and Fish Dept., Cheyenne.* 174 pp.
- Hayne, D.W. 1949. An examination of the strip census method for estimating animal populations. *J. Wildl. Manage.* 13(2):145-157.
- Lynch, G.M. and G.E. Schumaker. 1995. GPS and GIS assisted moose surveys. *Alces* 31:145-151.
- Scheaffer, R.L., W. Mendenhall, and L. Ott. 1990. *Elementary Survey Sampling*, 4th Ed. PWS-Kent Publishing Co., Boston. ISBN 0-534-92185-X. 390 pp.
- Stewart, R.R. 1983. The stratified random block aerial survey technique. *Sask. Parks and Renew. Resour., Wildl. Br., Wildl. Pop. Manage. Info. Base*, 83-WPM-12.

White-tailed Deer (*Odocoileus virginianus*)

1.0 Long-term Management Objectives

A formal long-term strategic management plan has not been developed for white-tailed deer. The following interim objectives will be used until such time as a long-term strategic plan is available.

- A provincial wintering population objective has not been established.
- To maintain an autumn herd structure > 40 Bucks:100 Does:90 Fawns (measured from CDMS).
- To maintain current amount of occupied habitat.
- Sustainable harvest levels have not been determined for white-tailed deer population in Saskatchewan.

2.0 Population Status

White-tailed deer population status is determined annually from data provided by aerial population density and/or structure surveys, annual pre-season wildlife observations (Co-operative Deer Management Survey (CDMS)), weather severity measurements, habitat condition evaluations, biological sample collections, deer necropsies, dead deer searches, and field reports from the general public, landowners and SE staff. Deviations from the established norm are examined to assess whether populations are changing because of management strategies or other environmental factors.

2.1 Survey Data

Saskatchewan's deer herd occupies the northern limits of the white-tailed deer range in North America. As such, winter weather is the limiting factor on our provincial deer population. Table 1 summarizes current population density and size in relation to long-term (1980-2001) means based on interpolation from limited survey data. Figure 1 illustrates white-tailed deer range in relation to white-tailed deer management units (WDMUs). Recent population density surveys are summarized in Table 2. No aerial population structure surveys were conducted during the past 5 winters. A summary of autumn (Sep-Nov) population structure by ecozone is presented in Table 3 and by wildlife management zone in Appendix 1.

Results of these survey data indicate:

1. **Grassland** populations are stable but lower productivity relative to the 1980s and early 1990s is a concern.
2. **Farmland** populations are limited by the shortage of quality wintering habitat, particularly on the west side, which limits population size and growth potential.
3. **Parkland** populations are increasing except in the southeast, where liberal hunting seasons, depredation hunting strategies, and severe winters (1995/96, 1996/97 and 2000/01) have combined to reduce them.
4. **Forest Fringe** populations are subject to higher winter mortality on a more frequent basis relative to southern populations. Recent mild winters have allowed population growth in central and western areas.

White-tailed Deer

5. **Forest** populations in the southern boreal forest are growing similar to those in the Forest Fringe. Northern forest populations (WMZs 70-76) are small but probably stable, however this area is data deficient, which prevents reliable status assessment.

Table 1. Summary of white-tailed deer status by ecozone and management unit.

Ecozone	WTD Management Unit (WDMU)	WMZ	Area (km ²)	Winter Density Estimate (#/km ²)		Winter Population Estimate	
				Mean (1980-01)	2001/02	Mean (1980-01)	2001/02
Grassland	Big Muddy	1	8,251	0.53	0.53	4,374	4,374
	Frenchman	2,4,5	24,792	0.50	0.50	12,292	12,291
	Govenlock	3,6,7	11,608	0.62	0.62	7,254	7,238
	Great Sandhills	8-10	10,369	0.54	0.53	5,603	5,462
	S. Sask. River	11-14	11,371	0.58	0.55	6,562	6,427
	Total	1-14	66,391	0.54	0.52	36,086	35,791
Farmland	Southeast	15-18	25,978	0.59	0.53	15,248	13,836
	Central ^a	19-23	32,381	0.49	0.47	15,882	15,165
	Northwest ^b	24-30	35,870	0.55	0.55	19,820	19,701
	Total	15-30	94,230	0.59	0.53	50,950	48,702
Parkland	Southeast	31-39	48,137	1.24	0.95	59,508	45,857
	Central	40-43	26,289	0.71	0.72	18,755	18,840
	Northwest	44-47	25,030	1.09	1.15	27,333	28,856
	Total	31-47	105,595	1.06	0.94	105,595	93,553
Forest Fringe	East	48-49	10,017	0.68	0.64	6,806	6,450
	Central ^c	50-54	20,201	0.70	0.75	14,196	15,131
	West	55	4,791	0.56	0.66	2,670	3,157
	Total	48-55	35,008	0.68	0.71	23,673	24,738
Forest	East	56-62	24,478	0.96	0.85	23,415	20,790
	Central + PANP	63-66	27,196	1.03	1.00	28,045	27,155
	West + PAWR	67-69	23,069	1.14	1.16	26,222	26,789
	Total	56-69	74,742	1.04	1.00	77,683	74,733
Forest	North	70-76	---	No data	No data	No data	No data
Province		1-69	369,828	0.81	0.75	293,986	277,517

PANP = Prince Albert National Park
 PAWR = Primrose Air Weapons Range
^a includes Regina/Moose Jaw WMZ
^b includes Saskatoon WMZ
^c includes Prince Albert WMZ

2.2 Biological Sample Collections

The age structure of harvested animals is presented in Table 4. The mean age of mature bucks (≥ 4.5 years old) has remained stable over the past few years. The data indicate that non-resident (guided) hunters harvest proportionately more mature bucks than resident hunters do, but this may be an artifact of small sample sizes from resident hunters. Mean age of all bucks also indicates that guided hunters are selecting older bucks on average, compared to resident hunters.

White-tailed Deer

Whitetail Deer
Range Map

Density
■ high
■ medium
■ low

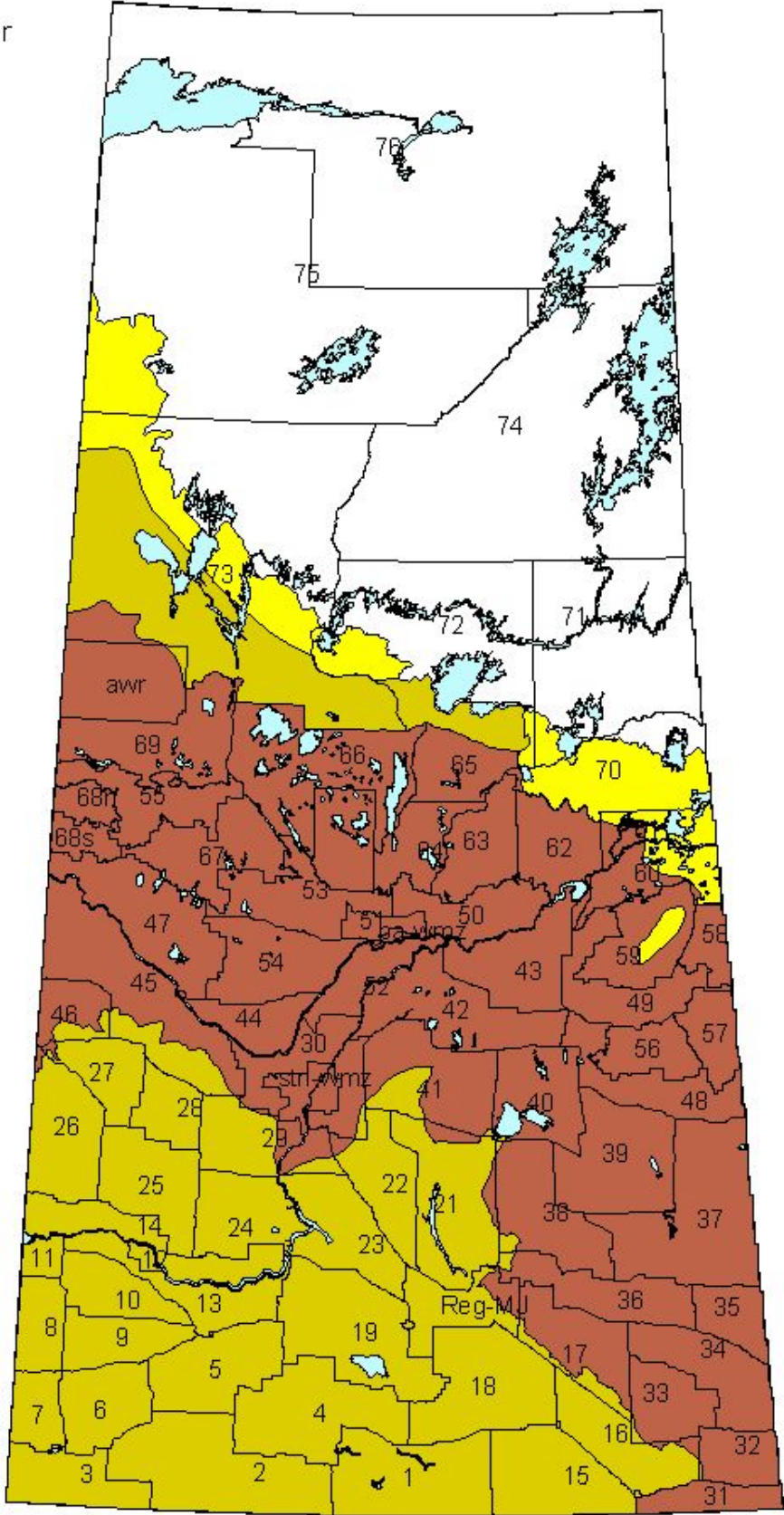


Figure 1. White-tailed deer range.

White-tailed Deer

Table 2. Summary of white-tailed deer density surveys, 1995/96 – 2001/02.

ECOREGION/ Survey Block	WMZ	Survey Area (km ²)	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02
			Density (#/km ²) ±95% CI ^a	Density (#/km ²) ±95% CI ^a	Density (#/km ²) ±90% CI ^a	Density (#/km ²) ±90% CI ^a	Density (#/km ²) ±90% CI ^a	Density (#/km ²) ±90% CI ^a	Density (#/km ²) ±90% CI ^a
GRASSLAND									
Val Marie	2	1,119	---	---	---	---	---	---	---
Eastend	6	1,370	---	---	---	---	---	---	---
Sask. River (Leader)	11, 14	855	---	---	---	---	---	---	---
Sask. River	13, 14	4,994	---	---	---	---	---	---	---
FARMLAND									
Corning	17, 33	---	---	---	---	---	---	---	---
Last Mountain Lk	21	2,505	---	---	---	---	---	---	---
Dundurn	29, 30	1,480	---	---	---	---	---	---	---
PARKLAND									
Souris	31	3,149	---	---	---	---	---	---	---
Alida	32	1,492	---	---	---	---	0.87±17%	---	---
Kipling	33	1,494	---	---	---	---	---	---	---
Moose Mountain ^b	33	681	---	---	---	---	---	---	---
Touchwood	33	---	---	---	---	---	---	---	---
Moosomin	34	932	2.77±16%	2.66±17%	---	---	---	---	---
Parkman	34	1,865	---	---	---	---	---	---	---
Duck Mountain ^b	37	479	---	---	---	---	---	---	---
Melville	37	5,885	---	---	---	---	---	---	---
Wroxton	37	1,176	---	---	---	---	---	---	---
Parkerview	39	1,678	---	---	---	---	---	---	---
Yorkton	39	3,107	---	---	---	---	---	---	---
Pleasantdale	42	2,949	---	---	---	---	---	---	---
Sonningdale	45	1,958	1.28±19%	---	---	---	---	---	---
Manitou	46	2,129	---	1.58±28%	---	---	---	---	---
Manitou	46	3,399	---	---	---	---	---	---	1.00±15%
Marie Hill	46	1,119	---	---	---	---	---	---	---
FOREST FRINGE									
Porcupine Fringe	48	---	0.60±19%	---	---	---	---	---	---
Fort a la Corne ^c	50	---	---	---	---	---	---	---	---
Thickwood Hills W	54	1,492	---	---	---	---	---	---	---
Forest Fringe	50, 51, 62-64	4,311	---	---	---	---	---	---	---
FOREST									
Porcupine Forest ^b	56	3,318	0.94±18%	---	---	---	---	---	---
Cumberland S ^b	60	---	---	---	---	---	---	---	---
Bronson ^b	68	3,186	---	---	---	---	---	---	---
Divide ^b	67	3,385	---	---	---	---	---	---	---

^a Confidence intervals on the population density estimate.

^b Quadrat surveys primarily designed for moose census.

^c Quadrat surveys designed primarily for elk census.

White-tailed Deer

Table 3. Provincial white-tailed deer population structure based on annual (September to November) CDMS field observations, 1983 - 2001.

Year	----- Grassland -----			----- Farmland -----			----- Parkland -----			----- Forest Fringe -----			----- Forest -----			----- Province -----		
	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n
1983	0.38	1.07	1,858	0.42	1.07	2,868	0.42	0.95	6,419	0.53	0.91	1,146	0.51	0.82	1,241	0.45	0.99	13,532
1984	0.42	0.94	2,865	0.39	0.94	5,525	0.35	1.04	6,492	0.40	0.99	1,329	0.39	0.85	1,948	0.38	0.97	18,159
1985	0.33	0.78	2,336	0.35	0.87	3,412	0.45	0.82	5,322	0.44	0.83	963	0.46	0.69	1,287	0.40	0.81	13,320
1986	0.33	0.88	5,134	0.33	0.91	6,072	0.44	0.86	11,815	0.42	0.88	2,419	0.45	0.80	3,600	0.40	0.87	29,040
1987	0.37	0.96	3,246	0.39	0.87	4,599	0.38	1.00	9,890	0.41	1.04	2,249	0.43	0.92	3,833	0.39	0.96	23,817
1988	0.38	0.92	2,503	0.46	0.76	5,187	0.44	1.06	10,450	0.39	1.01	2,723	0.42	0.94	3,882	0.43	0.95	24,745
1989	0.42	1.19	1,799	0.43	0.85	4,425	0.40	1.07	12,373	0.36	1.03	3,272	0.42	0.86	4,497	0.41	0.99	26,467
1990	0.42	1.03	2,079	0.41	0.94	4,503	0.47	1.07	8,309	0.39	1.05	2,762	0.43	0.77	3,147	0.43	0.98	20,798
1991	0.37	0.91	2,678	0.40	1.03	4,759	0.37	1.18	10,772	0.33	1.13	3,994	0.42	1.05	4,023	0.38	1.06	26,226
1992	0.45	0.92	3,394	0.42	1.02	8,091	0.47	1.20	10,539	0.40	1.01	1,646	0.44	0.96	2,365	0.44	1.04	26,035
1993	0.41	0.89	2,813	0.46	0.96	6,818	0.44	1.15	11,012	0.50	0.96	2,204	0.49	0.90	2,552	0.45	1.02	25,399
1994	0.34	0.82	2,867	0.48	0.99	5,512	0.45	1.26	10,139	0.36	1.08	2,533	0.45	0.96	2,657	0.43	1.08	23,708
1995	0.26	0.79	3,291	0.47	0.97	6,069	0.48	1.21	8,582	0.39	1.04	2,990	0.35	0.77	1,094	0.42	1.02	22,026
1996	0.29	0.72	2,170	0.45	0.94	3,275	0.44	0.96	6,724	0.56	0.99	1,888	0.44	0.77	1,102	0.43	0.90	15,159
1997	0.29	0.82	1,965	0.44	0.90	2,364	0.45	0.94	4,189	0.50	1.00	1,129	0.76	0.74	367	0.43	0.90	10,014
1998	0.37	0.84	1,989	0.41	0.82	4,182	0.41	1.00	6,083	0.40	1.00	2,756	0.38	1.03	1,824	0.40	0.94	16,834
1999	0.31	0.86	1,979	0.48	0.80	3,712	0.43	0.93	5,667	0.50	0.99	2,276	0.43	0.94	1,730	0.43	0.90	15,364
2000	0.39	0.82	2,780	0.37	0.81	4,153	0.38	1.02	6,520	0.49	0.86	2,066	0.53	0.95	1,482	0.40	0.91	14,041
2001	0.36	0.80	1,711	0.33	0.73	3,044	0.43	0.92	6,131	0.35	1.06	2,971	0.43	1.07	2,067	0.39	0.91	15,924

White-tailed Deer

Table 4. Estimated number of white-tailed deer bucks harvested from the forest fringe (WMZs 48,49, 50, 53 and 55) and forest (WMZs 56-73) ecozones, by age class, 1993 - 2000.

Age Class	1993		1994		1995		1996		1997		1998		1999		2000	
	SR	G	SR	G	SR	G	SR	G	SR	G	SR	G	SR	G	SR	G
1+			23.8	4.3	31.8	4.5	3.4	1.5	10.2	5.5	17.9	1.3	14.8	1.4	28.8	1.9
2+			29.5	25.3	25.5	25.2	16.4	17.4	28.6	20.2	16.4	13.5	31.5	19.8	28.8	19.5
3+			13.1	29.0	18.6	28.3	38.8	35.4	38.8	37.1	14.2	29.3	11.1	22.4	24.2	31.0
4+	No	No	14.8	17.6	9.1	11.6	14.7	19.5	6.1	18.8	27.6	29.0	14.8	21.3	4.5	16.2
5+	Data	Data	4.1	8.4	5.9	12.7	8.6	11.0	2.0	9.0	9.7	15.0	13.0	20.6	4.5	13.8
6+			6.6	7.6	5.5	7.0	6.9	6.5	4.1	3.6	5.2	5.8	3.7	8.8	4.5	11.0
7+			4.1	5.5	2.3	7.0	6.0	3.9	8.2	1.9	0.7	2.6	5.6	3.2	1.5	4.5
8+			2.5	1.6	1.4	2.8	2.6	3.4	0.0	2.1	4.5	1.7	1.9	1.5	0.0	1.4
9+			0.8	0.5	0.0	0.7	1.7	1.0	2.0	1.2	1.5	1.0	1.9	0.5	3.0	0.2
>9+			0.8	0.3	0.0	0.3	0.9	0.4	0.0	0.4	2.2	0.8	1.9	0.4	0.0	0.3
Sample Size			122	632	220	727	116	673	49	722	134	1,819	54	2,100	66	2,484
Mean age of mature (>3.5 yr old) bucks	---	---	5.9 n=41	5.7 n=262	5.7 n=53	6.0 n=305	6.1 n=48	5.7 n=308	6.5 n=11	5.5 n=268	5.8 n=69	5.4 n=1,016	6.0 n=23	5.5 n=1,184	6.3 n=12	5.7 n=1,182
Mean age of bucks (all age classes)	---	---	3.5 n=122	4.1 n=632	3.1 n=220	4.2 n=727	4.3 n=116	4.3 n=673	3.7 n=49	3.9 n=722	4.1 n=134	4.4 n=1,819	4.0 n=54	4.4 n=2,100	3.1 n=66	4.3 n=2,484
Buck Harvest																
FFringe	1,127	77	1,321	230	1,832	233	2,182	213	1,911	200	2,768	244	2,366	239	3,234	305
Forest	3,515	1,110	3,903	2,148	3,389	2,675	1,544	1,620	1,309	2,020	2,042	2,425	2,030	2,659	2,242	2,816
Total	4,642	1,187	5,224	2,378	5,221	2,908	3,726	1,833	3,220	2,220	4,810	2,669	4,396	2,898	5,476	3,121
% of bucks harvested that were mature (>3.5 yrs old)	---	---	34	42	24	42	41	46	22	37	51	56	43	56	18	48

SR = Saskatchewan Resident Hunters

G = Non-resident Hunters (Guided)

Note that in 1996 and subsequent years, hunters were limited to 1 either-sex license; in 1995 and prior years 2 either-sex licenses were available.

White-tailed Deer

2.3 Mortality

2.3.1 License Sales

Table 5. Summary of provincial white-tailed deer license sales, 1980 - 2001.

Hunt Year	1 st Either-sex License			2 nd Either-sex License			Antlerless License	Sask. Resident Archery	Sask. Resident Muzzle-loading	Total License Sales
	Sask. Resident	Can. Resident	Non-Resident	Sask. Resident	Can. Resident	Non-Resident	Sask. Resident			
1980	64,339	974	80	---	---	---	---	1,004	---	66,397
1981	63,543	1,316	124	6,757	49	---	---	1,376	---	73,186
1982	57,320	1,095	68	6,433	41	21	---	1,590	368	66,915
1983	50,309	607	68	4,594	19	0	---	1,411	575	57,586
1984	49,603	705	60	4,971	9	6	---	1,543	684	57,583
1985	45,532	786	136	---	---	---	419	1,357	577	48,807
1986	48,432	491	157	---	---	---	1,512	1,341	587	52,160
1987	41,533	438	253	4,453	18	71	339	---	---	47,105
1988	43,023	576	532	7,109	39	163	316	---	---	51,758
1989	42,110	738	672	8,124	48	187	864	---	---	52,743
1990	40,170	692	892	7,231	65	286	2,187	---	---	51,523
1991	40,294	867	963	9,583	68	323	1,140	---	---	53,238
1992	44,052	878	1,337	6,731	69	550	14,262	---	---	67,879
1993	41,600	1,063	2,003	5,900	93	857	21,467	---	---	72,983
1994	43,711	1,419	2,926	7,031	184	1,328	16,444	---	---	73,043
1995	43,075	1,424	3,092	6,182	149	1,326	16,252	---	---	71,500
1996	34,207	1,423	3,034	---	---	---	21,737	---	---	60,401
1997	36,371	1,827	3,190	---	---	---	21,891	---	---	63,279
1998	41,229	2,159	3,564	---	---	---	20,686	---	---	67,638
1999	36,981	2,454	4,083	---	---	---	17,968	---	---	61,486
2000	36,049	2,199	4,199	---	---	---	4,511	---	---	46,958
2001	34,225	1,635	4,224	---	---	---	5,531	---	---	45,615
Mean	44,441	1,171	1,621	---	---	---	9,616	---	---	59,536

2.3.2 Hunting Activity and Harvest

There are no data to assess subsistence harvest. Table 6 summarizes harvest by Saskatchewan resident licensed hunters.

Saskatchewan resident hunters have the option to hunt with antlerless and/or either-sex licenses, which allows them to be more selective in what they harvest. The either-sex license results in higher hunting pressure on the buck component of the population. The effects of this are offset with antlerless licenses, which balances the harvest structure. This should facilitate a balanced sex ratio.

There are no data to assess harvest and hunting activities by Canadian resident hunters.

Table 7 summarizes harvest and hunting activities by non-resident hunters. This group is limited to one either-sex license/hunter, mainly in the forest WMZs, with the harvest consisting almost exclusively of bucks. Non-residents consistently harvest a lower proportion of yearling bucks and a larger proportion of teenage (2.5 and 3.5 age classes) and mature bucks (≥ 4.5 year class) than resident hunters (Table 4).

White-tailed Deer

Table 6. Provincial resident white-tailed deer harvest, license types pooled, 1999-2001 (see Big Game Hunter Harvest Survey Statistics for summaries of hunting activity and harvest statistics by season and WMZ).

Ecozone/ WMZs	Hunt Year	# WMZ Hunters	Harvest					Hunter- days	Hunter- days/ Animal
			Bucks	Does	Fawns	Unkn	Total		
Grassland 1 – 14	1999	4,726	1,983	392	86	24	2,485	12,743	5.13
	2000	4,520	2,371	316	36	0	2,723	12,719	4.67
	2001	4,250	2,150	296	49	7	2,502	12,173	4.87
	Mean (1985-00)	8,324	3,327	1,461	420	6	5,215	20,350	3.90
Farmland 15 – 30	1999	17,559	5,854	2,597	708	110	9,269	69,250	7.47
	2000	12,899	6,144	1,286	180	0	7,610	47,845	6.29
	2001	14,323	6,026	1,559	272	0	7,857	55,761	7.10
	Mean (1985-00)	17,126	6,001	2,743	819	19	9,582	54,096	5.65
Parkland 31 - 47	1999	24,681	9,099	4,409	1,396	89	14,993	106,391	7.10
	2000	15,630	8,185	1,567	381	0	10,133	61,649	6.08
	2001	16,380	7,662	1,536	317	0	9,515	65,939	6.93
	Mean (1985-00)	24,043	9,043	4,201	1,571	27	14,841	86,710	5.84
Forest Fringe 48 - 55	1999	12,653	3,440	2,596	901	74	7,011	60,512	8.63
	2000	6,967	3,234	512	124	0	3,870	31,472	8.13
	2001	8,579	3,433	1,428	289	28	5,178	39,068	7.54
	Mean (1985-00)	7,404	2,524	1,254	467	11	4,255	30,522	7.17
Forest 56 - 69	1999	7,374	2,030	1,102	300	13	3,445	32,097	9.32
	2000	9,203	2,235	2,104	447	7	4,793	36,573	7.63
	2001	8,223	2,270	1,773	427	7	4,477	33,469	7.48
	Mean (1985-00)	10,114	3,309	1,488	476	18	5,291	38,502	7.28
Northern Forest 70 - 76	1999	47	0	8	0	0	8	165	20.63
	2000	50	7	0	0	0	7	259	37.00
	2001	28	7	0	0	0	7	42	6.00
	Mean (1985-00)	57	10	4	0	0	14	195	13.80
Province 1 – 76	1999	67,040	22,406	11,104	3,391	310	37,211	281,158	7.56
	2000	49,269	22,176	5,785	1,168	7	29,136	190,517	6.54
	2001	51,783	21,548	6,592	1,354	42	29,536	206,452	6.99
	Mean (1985-00)	67,068	24,214	11,151	3,752	80	39,197	230,375	5.88

Table 7. Non-resident (guided) white-tailed deer harvest, 1999 - 2001 (based on outfitter client reports).

Ecozone/ WMZs	Hunt Year	# WMZ Hunters	Harvest					Hunter- days	Hunter- days/ Animal
			Bucks	Does	Fawns	Unkn	Total		
Forest Fringe 48 - 55	1999	349	239	0	0	0	239	1,510	6.32
	2000	410	305	0	0	1	306	1,773	5.79
	2001	377	283	0	0	0	283	1,525	5.39
	Mean (1994-00)	298	209	0	0	4	213	1,351	6.33
Forest 56 - 69	1999	3,689	2,642	0	0	34	2,676	15,518	5.80
	2000	3,666	2,741	2	0	0	2,743	15,223	5.55
	2001	3,769	2,968	0	0	24	2,992	14,650	4.90
	Mean (1994-00)	3,490	2,376	3	1	81	2,461	15,116	6.14
Northern Forest 70 - 76	1999	45	17	0	0	9	26	314	12.08
	2000	122	75	0	0	0	75	534	7.12
	2001	79	59	0	0	0	59	327	5.54
	Mean (1994-00)	48	29	0	0	1	30	229	7.54
Province 48 - 76	1999	4,083	2,898	0	0	43	2,941	17,342	5.90
	2000	4,198	3,121	2	0	1	3,124	17,530	5.61
	2001	4,225	3,310	0	0	24	3,334	16,502	4.95
	Mean (1994-00)	3,832	2,610	3	1	86	2,700	16,696	6.18

White-tailed Deer

2.3.3 Depredation Hunts

In-season depredation licenses are offered to landowners to address local and/or chronic depredation concerns.

Table 8. White-tailed deer depredation licenses issued, 1992 - 2001.

Hunt Year	Licenses Issued	WMZs Issued	Harvest	Success (%)
1992	1,554	WMZs 24, 29, 31, 32, 33, 35, 44, 45, 54	932	60
1993	600	WMZs 1, 15, 31 - 35	390	65
1994	342	Issued in 11 WMZs in the southeast	253	74
1995	1,645	1,445 issued in 11 WMZs in the Southeast 200 issued in WMZ 54	1,234	75
1996	681	Issued in 11 WMZs in the Southeast	456	67
1997	771	WMZs 31, 32 and 37	632	82
1998	530	14,15,31,32,37	450	85
1999	321	WMZs 31, 32, 37	276	86
2000	10 - 20	WMZ 14W	NA	NA
2001	50	WMZs 7, 10, 11, 14W	NA	NA

NA = not available

2.3.4 Impact of Winter Severity

The winter of 1999/00 was mild with below average snowfall throughout the province. Despite this, productivity remained low in the southeast (WMZs 33-36). The winter of 2000/01 was mild with slightly below average snowfall except in the southeast (WMZs 15-17, 31-37), where snow pack (≥ 45 cm) conditions were similar to the winter of 1984/85 and exceed those of 1996/97 and resulted in significant over-winter deer mortality. The winter of 2001/02 was very mild with well below average snowfall throughout the province.

2.3.5 Chronic Wasting Disease

See mule deer section 2.3.5 page 23.

3.0 Management Strategies

3.1 Southern (WMZs 1 - 55)

- Continue use of antlerless licenses to stabilize or reduce deer densities in WMZs where surplus deer exist (based on landowner and public concerns).
- 2nd antlerless licenses were eliminated in 1998 in all southern WMZs (except Prince Albert WMZ), due to concerns of the incremental impact of the winters of 1995/96 and 1996/97, and potential over-harvest.

White-tailed Deer

- 1st antlerless licenses were eliminated in 2000 in all southern WMZs due to concerns of potential over-harvest.
- 2000 was a calendar adjustment year, consequently the archery, muzzleloader, and rifle seasons were adjusted to open one week later than in 1999. WMZ 47 was included with the southern parkland zones to facilitate a reduced season length and common start date, due to hunter and landowner concerns of high hunting pressure. An earlier opening in WMZs 42, 43, and 48 - 55 was continued, to give northern parkland hunters opportunity to hunt during warmer weather conditions.
- Canadian resident hunters were prohibited from hunting in WMZs 16, 17, 31 - 35 and 37 - 39 following the severe 1984/85 winter. Regulations were changed in 1996 to permit them to once again hunt those zones using an either-sex license. In 2000, Canadian residents were allowed to hunt province-wide using an either-sex license, but the season was reduced to one week due to concerns regarding concentrations of Canadian resident hunters in zones adjacent to the Manitoba and Alberta borders.
- As a result of the severe winter of 2000/01, WMZs 15 - 17, 31 - 37, and 39 were closed to hunting by Canadian residents in 2001. In other southern zones the season remained at one week.
- In 2001, the deer season was cancelled in WMZ 46 to provide flexibility for the Chronic Wasting Disease Control Program.
- An antlerless season was opened in the Saskatoon Wildlife Management Zone in 2001.

3.2 Northern (WMZs 56 - 76)

- Continue the season structure (ie. limit of 1 either-sex license/hunter) in the forest ecozones (WMZs 56 - 76) to reflect concerns of excessive pressure on mature bucks. Maintain the antlerless season to restore some hunting opportunity to resident hunters because of the elimination of the 2nd either-sex license in 1996, and to provide a more balanced sex ratio in the total harvest.
- The 10-week rifle season in WMZs 56 - 66, and 69 continued in 2000 for resident hunters, as did the 5-week (late) rifle season in WMZs 67, 68N and 68S.
- The either-sex deer season overlap with moose was retained in WMZs 70-76.
- Resident hunters possessing a draw moose or elk license were allowed to hunt white-tailed deer during their respective season dates during the 1999, 2000 and 2001 hunting seasons, but only in the zone in which they held their draw license(s).
- Regular elk and moose hunters (Sask. residents) were able to hunt white-tailed deer at the same time in WMZs 56 - 76 during the 1999, 2000 and 2001 hunting seasons.
- In response to increasing deer numbers, an antlerless white-tailed deer season was opened in southern forest zones in 1999.
- Canadian resident hunters were limited to a 1-week either-sex season in 2000 due to concerns from outfitters that a reduced season length in WMZs 1-55 would result in excessive hunting pressure in the forest WMZs (56 - 76).
- In 2001, the season length for Canadian resident hunters was increased to two weeks.
- An antlerless season was opened in 2001 in WMZs 48, 49, and 55 to take advantage of increasing populations in those forest fringe zones. The antlerless season was continued in southern forest zones.

White-tailed Deer

4.0 Appendix 1.

White-tailed deer population structure (based on CDMS) by WMZ, 1999 - 2001.

Ecozone and WMZ	Bucks/Doe			Fawns/Doe			Sample Size		
	1999	2000	2001	1999	2000	2001	1999	2000	2001
Grassland									
1	0.25	0.26	0.38	0.50	0.42	0.68	147	215	136
2	0.27	0.39	0.37	1.01	0.93	0.74	242	209	455
3	--	--	--	1.00	--	--	6	0	0
4	0.26	0.26	0.23	0.86	1.01	0.90	249	510	328
5	0.26	0.58	0.34	0.96	0.84	0.98	298	475	301
6	0.30	0.49	0.47	0.82	0.91	0.76	470	511	174
7	0.49	0.23	0.27	0.89	1.13	1.05	214	123	51
8	0.31	1.20	1.00	1.16	1.40	1.33	79	18	10
9	0.00	1.06	0.45	0.80	0.69	0.45	27	44	21
10	0.11	0.45	0.42	1.11	1.17	0.33	20	123	21
11	0.88	0.17	0.50	1.38	0.57	1.00	26	52	20
12	0.50	1.50	0.33	1.00	1.50	1.00	5	8	7
13	0.33	0.41	0.43	0.81	0.84	0.68	103	302	152
14	0.40	0.18	0.63	0.77	0.38	0.56	93	190	35
Total	0.31	0.39	0.36	0.86	0.82	0.80	1,979	2,780	1,711
Farmland									
15	0.52	0.51	0.50	0.95	0.89	0.80	412	254	124
16	0.46	0.34	0.36	1.08	1.01	0.88	335	273	211
17	0.58	0.30	0.46	0.88	0.71	0.67	372	514	190
18	0.31	0.34	0.70	0.73	0.68	0.73	198	125	97
19	0.65	0.49	0.23	0.57	0.84	0.56	167	180	125
RMZ	0.48	0.22	0.46	0.62	0.92	0.90	216	366	196
21	0.35	0.35	0.22	1.05	0.82	0.86	400	726	799
22	0.71	0.46	0.16	0.98	1.02	1.05	129	161	95
23	0.36	0.18	0.24	0.81	0.73	0.47	411	405	116
24	0.16	0.51	0.31	0.53	0.60	0.21	157	133	73
25	0.51	0.41	0.36	0.45	0.59	0.32	169	82	99
26	0.39	0.22	0.40	0.62	0.59	0.42	209	228	169
27	0.17	0.45	0.39	0.71	1.17	0.48	66	76	58
28	1.50	0.24	0.25	0.86	1.04	0.50	47	57	7
29	0.61	0.68	0.44	0.74	1.07	0.70	165	113	107
30 + SMZ	0.86	0.66	0.34	0.70	0.83	0.84	259	460	578
Total	0.48	0.37	0.33	0.80	0.81	0.73	3,712	4,153	3,044
Parkland									
31	0.38	0.35	0.47	1.41	1.50	1.03	81	645	365
32	0.59	0.52	0.41	1.00	1.48	0.99	171	168	235
33	0.40	0.26	0.51	0.84	0.73	0.63	267	326	186
34	0.34	0.36	0.62	0.71	0.60	0.70	287	180	265
35	0.37	0.37	0.43	0.73	0.84	0.62	486	155	345
36	0.47	0.76	0.33	0.84	1.12	0.58	398	213	375
37	0.33	0.25	0.28	1.08	1.12	1.02	1,562	1,818	1,230
38	0.41	0.35	0.47	0.86	1.06	1.11	280	246	240
39	0.61	0.69	0.59	0.94	1.14	1.08	429	501	540
40	0.35	0.29	0.32	0.78	0.72	0.80	164	185	229
41	0.50	0.61	0.40	0.88	1.03	0.96	314	309	713
42	0.67	0.34	0.36	0.73	0.63	0.96	144	350	280
43	0.46	0.56	0.48	0.95	0.89	0.90	183	135	148
44	0.57	0.44	0.60	1.05	1.09	0.83	490	587	387
45	0.43	0.44	0.56	1.04	1.11	1.19	257	352	437
46	0.38	0.24	0.75	0.63	0.57	1.00	96	137	22
47	0.38	0.41	0.60	1.04	0.68	0.92	58	123	134
Total	0.43	0.38	0.43	0.93	1.02	0.92	5,667	6,520	6,131

White-tailed Deer

Appendix 1 (Continued)

Ecozone and WMZ	Bucks/Doe			Fawns/Doe			Sample Size		
	1999	2000	2001	1999	2000	2001	1999	2000	2001
Forest Fringe									
48	0.57	0.46	0.44	1.07	0.88	1.02	747	409	664
49	0.43	0.40	0.25	1.05	0.98	0.93	490	646	809
50	0.43	0.57	0.38	0.70	0.59	1.12	94	216	235
51 + PMZ	0.61	0.56	0.57	0.63	0.68	1.04	85	92	128
52	0.43	0.60	0.43	0.76	0.65	1.19	92	45	55
53	0.92	0.64	1.29	0.78	0.67	0.95	97	162	68
54	0.42	0.38	0.30	0.90	0.98	1.32	246	222	437
55	0.41	0.65	0.31	1.09	1.06	1.11	425	274	575
Total	0.50	0.49	0.35	0.99	0.88	1.06	2,276	2,066	2,971
Forest									
56	0.34	0.51	0.31	0.87	1.07	1.18	279	393	381
57	0.43	0.70	1.09	0.43	1.12	0.73	13	93	62
58	0.21	0.46	1.00	0.53	0.54	1.00	33	26	3
59	0.43	0.56	0.36	0.61	0.75	0.88	171	111	179
60	1.00	0.35	0.33	1.33	0.53	0.58	20	32	23
61	1.00	---	1.00	0.33	---	1.38	7	0	27
62	0.14	0.29	---	0.43	0.35	---	33	28	0
63	0.33	0.38	0.65	1.29	0.63	0.80	63	32	49
64	0.22	0.90	0.81	0.76	0.77	1.19	169	187	129
65	0.00	1.00	---	1.25	---	---	9	4	0
66	0.44	0.49	0.36	0.70	0.89	0.39	225	107	154
67	0.89	0.85	0.39	1.28	1.77	1.30	203	47	622
68	0.63	0.50	0.49	1.16	0.85	1.09	142	61	121
69	0.42	0.37	0.38	1.39	1.14	1.25	354	356	307
70	---	---	---	---	---	---	0	0	0
71	---	---	---	---	---	---	0	0	0
72	---	---	---	---	---	---	0	0	0
73	0.17	---	---	0.33	0.25	0.67	9	5	10
Total	0.43	0.53	0.43	0.94	0.95	1.07	1,730	1,482	2,067
Province	0.43	0.40	0.39	0.90	0.91	0.91	15,364	14,041	15,924

RMZ = Regina/Moose Jaw Wildlife Management Zone

SMZ = Saskatoon Wildlife Management Zone

PMZ = Prince Albert Wildlife Management Zone

Mule Deer (*Odocoileus hemionus*)

1.0 Long-term Management Objectives

A formal long-term strategic management plan has not been developed for mule deer. The following interim objectives will be used until such time as a long-term plan is available.

- Maintain a stable winter population of 43,000 mule deer
- Maintain a provincial autumn population structure ≥ 50 bucks:100 does:85 fawns (measured by CDMS).
- Retain 10,000 km² of critical mule deer habitat as described by the Terrestrial Wildlife Habitat Inventory. Area specific long-term mule deer range objectives have not yet been established.
- Long-term harvest objectives have not been formally established.

2.0 Population Status

Mule deer population status is determined annually from a combination of data acquired from aerial population density and structure surveys, annual pre-season wildlife observations (Co-operative Deer Management Survey (CDMS)), weather severity measurements, habitat condition evaluations, biological collections, deer necropsies, and field reports from the general public, landowners and SE staff. Deviations from the established norm are examined to assess whether populations are changing because of management strategies or other environmental factors.

2.1 Survey data

Figure 1 illustrates mule deer range. Table 1 summarizes current population density and size in relation to long-term (1984-2001) means based on interpolation from limited survey data. These estimates are subject to change as new data are incorporated into the mule deer population forecasting model. Greatest confidence is in the model estimates for the Great Sandhills, S. Sask. River, and Manitou Sandhills MDMUs.

Recent population density surveys are summarized in Table 2. A summary of autumn (Sep – Nov) population structure by ecozone is presented in Table 3, and by Wildlife Management Zone in Appendix 1.

Mule Deer

Mule Deer Range Map

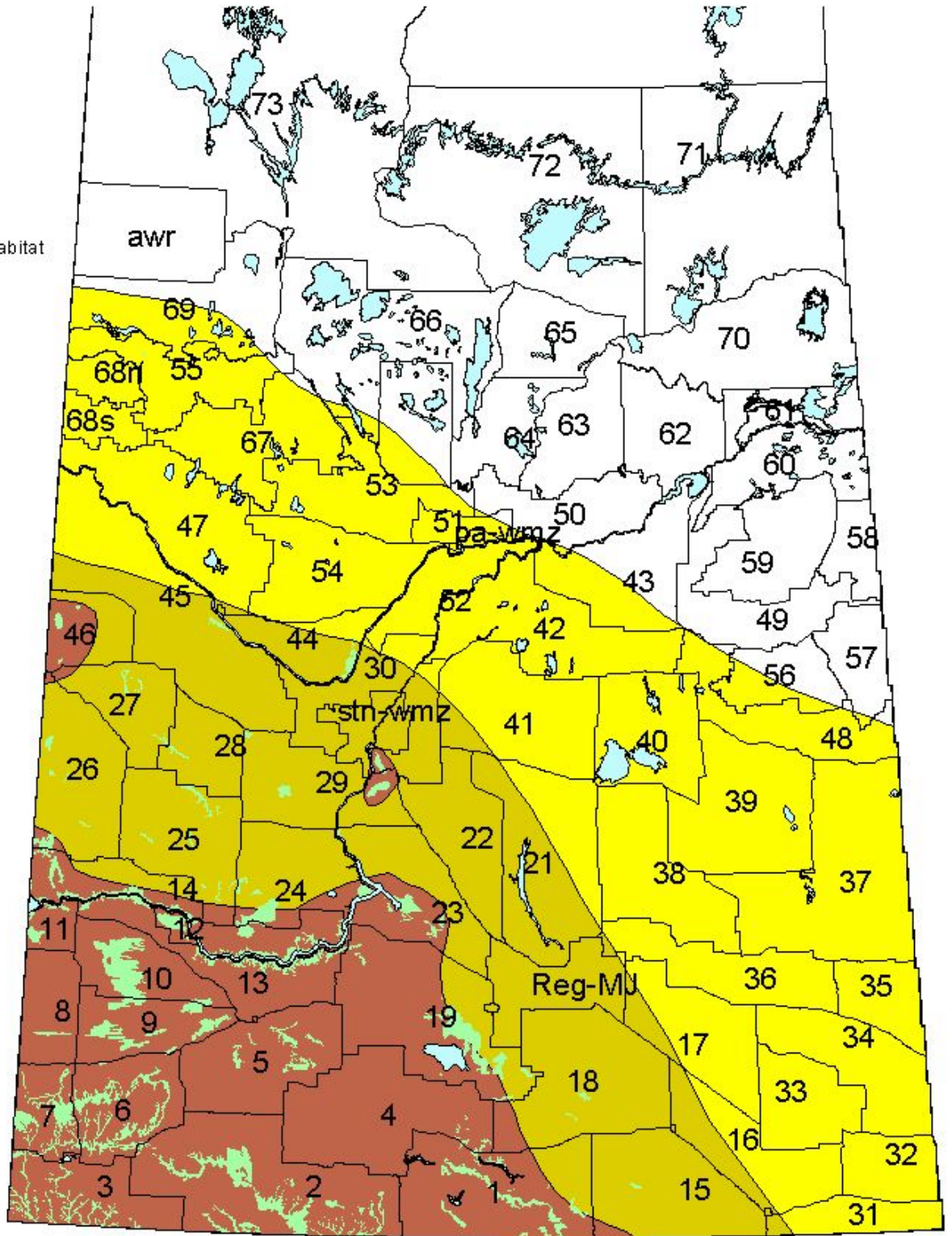
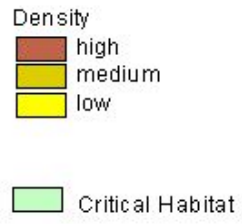


Figure 1. Mule deer range.

Mule Deer

Table 1. Summary of current status by ecozone and management unit.

Ecozone	Mule Deer Management Unit (MDMU)	WMZ	Area (km ²)	Critical Mule Deer Habitat (km ²)	Winter MDMU Density Estimate (#/km ²)		Winter Population Estimate	
					Mean (1984 – 01)	2001/02	Mean (1984 – 01)	2001/02
Grassland	Big Muddy	1	8,251	717	0.18	0.15	1,505	1,271
	Frenchman	2	10,657	1,564	0.31	0.26	3,342	2,824
	Govenlock	3	4,615	492	0.33	0.28	1,505	1,271
	Drainage	4, 5	14,136	320	0.11	0.10	1,507	1,439
	Cypress	6, 7	6,993	1,327	0.47	0.43	3,286	3,035
	G. Sandhills	8 - 10	10,369	1,394	0.80	0.75	8,287	7,801
	S. Sask. R.	11 - 14	11,371	1,860	0.80	0.61	9,110	6,900
	Total	1 - 14	66,391	7,674	0.43	0.37	28,540	24,541
Farmland	Brokenshell	15, 18	15,140	52	0.04	0.02	578	316
	Chapleau	16, 17	10,839	0	0.01	<0.01	88	48
	Dirt Hills	19	9,342	827	0.19	0.10	1,776	974
	Last Mtn. Lk.	RMZ - 22	17,327	0	0.07	0.04	1,155	611
	Douglas	23, 24	10,632	648	0.19	0.15	1,969	1,619
	Kindersley	25 - 28	18,070	421	0.13	0.11	2,392	2,017
	Dundurn	29, 30, SMZ	10,916	216	0.09	0.08	1,010	830
	Total	15 – 30	92,265	2,164	0.10	0.07	8,968	6,416
Parkland	Oxbow	31, 32	5,296	0	<0.01	<0.01	42	30
	Moose Mtn.	33, 34	9,312	0	0.01	0.01	107	77
	QuAppelle R.	35, 36	7,820	0	0.01	0.01	107	77
	Duck Mtn.	37	11,466	0	<0.01	<0.01	43	31
	Quill Lk	38 - 40	19,627	0	0.02	0.01	342	248
	Lenore	41, 42	14,768	0	0.03	0.02	428	309
	Carrot R.	43	6,137	0	0.01	0.01	86	62
	N. Sask. R.	44, 45, 47	22,237	178	0.05	0.05	1,183	1,200
	Manitou	46	2,794	117	1.00	1.09	2,791	3,036
Total	31 - 47	99,457	295	0.05	0.05	5,130	5,071	
Forest Fringe	Porcupine	48, 49	10,017	0	<0.01	<0.01	64	46
	FALC	50	4,330	0	<0.01	<0.01	21	15
	MacDowall	51, 52, PMZ	4,275	0	0.01	<0.01	42	30
	Shellbrooke	53	5,488	0	<0.01	<0.01	43	31
	Thickwood	54	6,108	0	0.04	0.03	214	155
	Meadow Lk	55	4,791	6	0.04	0.03	214	155
	Total	48 - 55	35,008	6	0.02	0.01	599	433
Province	1 - 55	293,121	10,139	0.15	0.12	43,237	36,461	

RMZ = Regina/Moose Jaw Wildlife Management Zone
 SMZ = Saskatoon Wildlife Management Zone
 PMZ = Prince Albert Wildlife Management Zone

Mule Deer

Table 2. Summary of mule deer density ($\pm 95\%$ CI) surveys, 1995/96 – 2001/02.

ECOREGION/ Survey Block	WMZ	Survey Area (km ²)	1995/96 Density (#/km ²)	1996/97 Density (#/km ²)	1997/98 Density (#/km ²)	1998/99 Density (#/km ²)	1999/00 Density (#/km ²)	2000/01 Density (#/km ²)	2001/02 Density (#/km ²)
GRASSLAND									
Frenchman	2	2,489	--	--	--	--	--	--	--
Eastend	6	817	--	--	0.73 \pm 47%	--	--	--	--
Great Sandhills	9	436	0.64 \pm ?%	1.61 \pm 52%	--	2.92 \pm 52%	--	--	--
Great Sandhills	10	896	3.78 \pm ?%	3.82 \pm 23%	--	4.06 \pm 19%	--	--	--
Burstall	11	83	6.25 \pm ?%	8.05 \pm 47%	--	11.07 \pm 71%	--	--	--
Cabri	12	185	2.25 \pm ?%	4.43 \pm 56%	--	3.12 \pm 56%	--	--	--
Stewart Valley	13	114	--	--	--	--	--	--	--
Matador-Beechy	14	148	--	--	--	--	--	--	--
S. Sask. River	13, 14	2,888	--	--	--	1.05 \pm 33%	--	--	--
FARMLAND									
Douglas Park	23	?	--	--	--	4.86 \pm ?%	--	--	--
Couteau Pasture	24	?	--	--	--	7.32 \pm ?%	--	--	--
Progress WMU	26	122	--	--	--	--	--	--	--
Mariposa WMU	27	137	--	--	--	--	--	--	--
Harris	29	222	--	--	--	--	--	--	--
PARKLAND									
Manitou	46	414	--	--	1.82 \pm 39%	--	--	--	--
Manitou	46	2,696	--	--	--	--	--	--	1.09 \pm 18%
Manitou HRA	46	995	--	--	--	--	--	--	1.75 \pm 18%
Paradise Hill / HPA2	47	225	--	--	--	--	--	--	0.03 \pm ?%

HPA = High Priority Area
HRA = Herd Reduction Area

2.2 Biological Sample Collections

There were no biological collections for mule deer other than those submitted for Chronic Wasting Disease testing (see section 2.3.5).

Mule Deer

Table 3. Provincial mule deer population structure based on annual (September to November) CDMS field observations, 1984 - 2001.

Year	----- Grassland -----			----- Farmland -----			----- Parkland -----			----- Forest Fringe -----			----- Forest -----			----- Province -----		
	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n
1984	0.44	0.80	3,581	0.44	0.84	1,365	0.33	0.59	91	0.70	0.30	20	1.43	0.29	19	0.44	0.80	5,076
1985	0.40	0.82	3,753	0.41	0.71	1,331	0.33	0.54	176	0.43	1.29	19	1.25	0.25	10	0.40	0.78	5,289
1986	0.41	0.79	6,487	0.34	0.70	2,807	0.36	0.76	585	0.37	0.58	37	0.61	0.61	69	0.38	0.76	10,033
1987	0.47	0.90	3,839	0.37	0.62	2,163	0.31	0.71	373	0.17	0.56	31	0.49	0.61	86	0.42	0.78	6,492
1988	0.57	0.89	4,371	0.44	0.69	2,764	0.37	0.84	728	0.19	0.23	44	0.36	0.64	44	0.50	0.80	7,951
1989	0.46	0.92	3,096	0.42	0.86	2,173	0.42	0.79	671	0.35	0.81	56	0.80	0.40	33	0.44	0.88	6,029
1990	0.56	0.97	3,945	0.48	0.94	3,707	0.33	0.67	994	0.38	0.50	30	0.63	0.50	17	0.49	0.91	8,693
1991	0.55	0.88	5,032	0.48	0.82	2,894	0.66	0.85	750	0.07	0.56	44	0.00	0.79	25	0.53	0.85	8,745
1992	0.55	0.95	4,608	0.52	0.89	4,951	0.54	0.94	938	0.13	0.75	15	3.00	2.00	6	0.53	0.92	10,518
1993	0.54	0.73	3,566	0.50	0.77	3,826	0.43	0.81	906	0.42	0.67	25	---	---	---	0.51	0.76	8,323
1994	0.47	0.69	3,141	0.62	0.76	2,855	0.43	1.06	579	0.30	0.74	96	0.43	1.00	17	0.52	0.75	6,688
1995	0.38	0.64	2,728	0.54	0.89	2,857	0.27	0.80	669	0.36	1.10	244	0.38	1.00	19	0.43	0.78	6,517
1996	0.46	0.61	1,765	0.49	0.81	2,810	0.35	0.77	1,103	1.14	1.00	22	---	---	---	0.45	0.73	5,700
1997	0.47	0.76	1,438	0.44	0.68	1,988	0.43	1.32	546	0.50	1.00	5	1.00	---	2	0.45	0.78	3,979
1998	0.52	0.75	2,129	0.49	0.74	3,428	0.48	0.88	738	0.50	0.97	89	1.22	1.44	33	0.50	0.76	6,417
1999	0.55	0.79	3,425	0.44	0.74	3,329	0.39	0.77	812	0.32	1.18	142	0.56	1.56	28	0.48	0.77	7,736
2000	0.53	0.77	4,640	0.39	0.69	5,266	0.34	0.78	981	0.57	1.11	142	1.70	1.00	37	0.44	0.74	11,066
2001	0.57	0.71	3,603	0.57	0.65	3,278	0.48	0.77	994	0.36	1.19	225	1.25	1.25	14	0.55	0.71	8,114

Mule Deer

2.3 Mortality

2.3.1 License Sales

Table 4. Summary of provincial mule deer license sales, 1980 - 2001.

Hunt Year	Draw Either-sex License	Draw Antlerless License	Sask. Resident Archery	Sask. Resident Muzzle-loading	Total License Sales
1980	4,100	---	245	---	4,345
1981	4,329	---	351	---	4,680
1982	5,471	---	600	---	6,071
1983	5,754	1,455	775	---	7,984
1984	5,754	6,331	804	---	12,889
1985	6,561	9,069	969	---	16,599
1986	6,860	4,046	1,015	275	12,196
1987	6,857	2,219	841	146	10,063
1988	6,171	2,297	902	253	9,623
1989	6,446	3,615	1,009	379	11,449
1990	6,589	6,439	1,078	479	14,585
1991	7,087	10,731	964	557	19,339
1992	7,007	12,802	1,099	653	21,561
1993	6,983	12,857	1,055	---	20,895
1994	6,248	7,118	1,009	---	14,375
1995	5,966	2,014	889	---	8,869
1996	6,105	1,864	846	---	8,815
1997	5,719	711	845	---	7,275
1998	3,841	252	1,107	---	5,200
1999	3,650	431	984	---	5,065
2000	3,716	1,113	1,245	---	6,074
2001	4,061	2,510	1,497	---	8,068
Mean	4,083	4,625	915	---	10,728

2.3.2 Hunting Activity and Harvest

There are no data to assess subsistence harvest. Table 6 summarizes harvest by Saskatchewan resident licensed hunters. Saskatchewan resident hunters have the option to apply for, and hold both an either-sex and/or antlerless license through the draw system. The either-sex license results in higher hunting pressure on bucks, whereas the antlerless license is used to offset the effects of the either-sex license, and to produce a balanced harvest structure.

Mule Deer

Table 5. Provincial mule deer harvest, license types pooled, 1999 - 2001 (see Big Game Hunter Harvest Statistics for summaries of hunting activity and harvest by season and WMZ).

Ecozone/ WMZs	Hunt Year	# WMZ Hunters	Harvest				Total	Hunter- days	Hunter- Days/ Animal
			Bucks	Does	Fawns	Unkn			
Grassland 1 - 14	1999	2,125	1,304	205	75	24	1,608	6,093	3.79
	2000	2,562	1,395	468	109	0	1,972	7,693	3.90
	2001	4,017	1,722	1,221	256	11	3,210	11,147	3.47
	Mean (1984-00)	8,514	2,925	3,404	1,165	28	7,522	18,837	2.50
Farmland 15 - 30	1999	1,903	889	203	61	13	1,166	8,887	7.62
	2000	2,419	1,199	386	108	7	1,700	10,068	5.92
	2001	3,367	1,447	762	212	7	2,428	14,057	5.79
	Mean (1984-00)	2,562	1,020	746	203	12	1,981	7,324	3.70
Parkland 31 - 47	1999	1,183	372	332	79	13	796	3,991	5.01
	2000	1,356	478	377	72	0	927	5,043	5.44
	2001	889	298	194	67	0	559	3,753	6.71
	Mean (1984-00)	679	228	186	62	1	478	2,290	4.79
Forest Fringe 48 - 55	1999	107	34	14	10	9	67	619	9.24
	2000	44	0	10	3	0	13	170	13.08
	2001	123	47	6	10	0	63	609	9.67
	Mean (1995-00)	93	29	19	4	1	53	397	7.50
Total 1 - 55	1999	5,317	2,599	754	225	59	3,637	19,590	5.39
	2000	6,381	3,072	1,241	292	7	4,612	22,974	4.98
	2001	8,396	3,514	2,183	545	18	6,260	29,566	4.72
	Mean (1984-00)	11,785	4,182	4,344	1,431	42	9,999	28,579	2.86

Note: there were no hunting opportunities in the forest fringe ecozone prior to 1995.

2.3.3 Depredation Hunts.

No data available.

2.3.4 Impact of Winter Severity

Recent mild winters along with restricted hunter harvests in southwestern Saskatchewan have allowed mule deer populations to rebound and grow following the high harvests of the early 1990s that were intended to reduce populations to "normal" levels.

2.3.5 Chronic Wasting Disease (CWD)

Refer to Williams et al. 2002 for a review of CWD in North America. The first case of CWD in Saskatchewan was diagnosed from a game farmed elk in 1996. By January 2002, 39 elk farms were identified as CWD infected, resulting in the destruction of over 7,500 domestic elk. SE began testing wild deer and elk in 1997. The first case of CWD in wild mule deer was detected in 2000. Table 7 summarizes the collection efforts used in Saskatchewan to detect and or eradicate CWD in the wild.

Mule Deer

Table 6. CWD sample collection results, 1997 - 2002.

Sampling Period	Species Sampled	Usable Samples				Confirmed CWD Positives				
		%	&	Sex Unkn	Total Samples	Sex	Age (yrs)	UTM Coordinates (NAD 27, Z13) Easting Northing		General Location
1997	Elk	--	--	--	0	----- No samples submitted -----				
	WT Deer	22	14	36	36	----- No CWD positives -----				
	Mule Deer	2	0	0	2	----- No CWD positives -----				
1998	Elk	2	0	0	2	----- No CWD positives -----				
	WT Deer	9	3	6	18	----- No CWD positives -----				
	Mule Deer	40	20	31	91	----- No CWD positives -----				
1999	Elk	35	10	0	45	----- No CWD positives -----				
	WT Deer	35	21	2	58	----- No CWD positives -----				
	Mule Deer	59	21	1	81	----- No CWD positives -----				
Fall 2000 Hunter Submissions ^(a)	Elk	18	69	2	89	----- No CWD positives -----				
	WT Deer	569	152	5	726	----- No CWD positives -----				
	Mule Deer	106	78	1	185	%	2.5	167105	5839514	Manitou
Spring 2001 SE collection in WMZ 46 and HP2	WT Deer	26	33	0	59	----- No CWD positives -----				
	Mule Deer	49	106	0	155	%	4.5	170405	5841038	Manitou
Fall 2001 Hunter Submissions ^(a)	Elk	144	195	1	340	----- No CWD positives -----				
	WT Deer	1,477	735	24	2,236	----- No CWD positives -----				
	Mule Deer	604	472	1	1,077	----- No CWD positives -----				
Spring 2002 SE collection in WMZ 46 HRA	WT Deer	5	18	0	23	----- No CWD positives -----				
	Mule Deer	58	102	2	162	%	2.5	579817	5828818	Manitou

^(a) Includes only processed samples that were useable from across the province; does not include samples that were unusable (because sample autolyzed, was a fawn, or was damaged by gunshot), nor samples that were processed but yielded an inconclusive CWD test result.

HP2 = High Priority Area 2
HRA = Herd Reduction Area

3.0 Management Strategies

- Monitor mule deer population densities in various portions of mule deer range as funding and survey priorities permit.
- Monitor mule deer population structure and productivity using the Cooperative Deer Management Survey.
- Continue using a selective harvest strategy by adjusting license quotas (see Appendix 2) to maintain population levels in hunted Mule Deer Management Units near their long-term average population sizes (see Table 1) and structure (see Appendix 1).
- Continue the CWD detection and eradication program.
- Develop a long-term population management strategy for mule deer.

Mule Deer

4.0 Appendix 1.

Mule deer population structure (based on CDMS) summary by WMZ, 1999 - 2001.

Ecozone and WMZ	Bucks/Doe			Fawns/Doe			Sample Size		
	1999	2000	2001	1999	2000	2001	1999	2000	2001
Grassland									
1	0.33	0.29	0.72	0.47	0.29	0.68	338	444	228
2	0.40	0.54	0.73	0.72	1.03	0.82	609	504	593
3	0.00	---	0.33	1.00	---	0.33	12	0	5
4	0.50	0.39	0.44	0.67	0.84	0.75	117	273	380
5	0.56	0.49	0.42	0.75	0.76	0.89	215	526	527
6	0.85	0.63	1.07	0.80	0.85	0.93	488	1,008	320
7	0.73	0.86	0.71	1.02	0.77	0.88	440	192	135
8	0.70	0.59	3.13	0.91	0.77	0.75	112	52	39
9	0.90	1.00	0.83	1.50	1.00	0.89	34	195	49
10	0.68	0.86	0.50	1.05	0.77	1.11	135	116	94
11	0.38	0.53	0.58	0.98	1.11	0.58	111	124	123
12	0.00	0.47	0.63	0.67	0.88	0.69	5	150	37
13	0.66	0.47	0.39	0.92	0.85	0.47	230	603	943
14	0.50	0.51	0.93	0.77	0.75	0.96	534	453	130
Total	0.55	0.53	0.57	0.79	0.77	0.71	3,425	4,640	3,603
Farmland									
15	0.68	0.63	0.57	0.92	0.84	0.43	138	153	46
16	0.21	0.43	0.98	0.62	1.06	1.20	77	157	127
17	0.88	0.53	0.34	1.08	0.84	0.56	77	116	61
18	0.45	0.53	0.94	0.95	1.09	0.73	139	202	208
19	0.43	0.62	0.89	0.50	0.52	0.43	230	261	130
RMZ	0.53	0.31	0.47	0.61	0.70	1.08	109	265	153
21	0.28	0.38	0.66	0.64	0.74	0.84	117	267	247
22	0.34	0.56	0.67	1.12	0.98	0.96	123	168	71
23	0.49	0.27	0.45	1.01	0.62	0.43	586	1,022	550
24	0.35	0.43	0.91	0.66	0.88	0.63	617	613	413
25	0.48	0.33	0.40	0.77	0.66	0.38	193	191	254
26	0.51	0.40	0.65	0.57	0.52	0.61	436	1,138	334
27	0.13	0.24	0.25	0.53	0.53	0.76	63	247	187
28	0.38	0.16	0.48	0.83	0.74	0.52	53	116	54
29	0.44	0.52	0.32	0.74	0.94	0.91	281	283	241
30 + SMZ	0.58	0.65	0.49	0.79	0.92	0.94	90	67	202
Total	0.44	0.39	0.57	0.74	0.69	0.65	3,329	5,266	3,278
Parkland									
31	---	---	1.00	---	---	0.00	0	0	2
32	0.57	0.00	0.40	0.57	2.00	0.47	15	3	28
33	---	0.00	---	---	0.86	---	0	13	0
34	---	---	0.50	---	---	0.00	0	0	6
35	0.00	---	---	0.00	---	---	1	0	0
36	0.38	0.64	0.27	0.72	0.64	0.67	143	64	58
37	0.83	0.15	0.62	1.17	0.31	0.15	18	19	23
38	0.00	0.00	0.00	0.50	0.67	0.00	3	10	1
39	0.33	0.30	0.60	0.33	0.60	0.50	10	19	21
40	0.33	0.50	0.00	0.67	0.25	0.00	12	14	3
41	0.45	0.43	0.52	0.80	1.03	0.81	90	74	287
42	0.05	0.33	0.50	0.65	0.92	0.75	34	27	27
43	0.30	0.14	0.00	0.80	0.29	1.13	21	10	17
44	0.65	0.21	0.43	0.85	0.67	0.43	85	98	215
45	0.65	0.47	0.56	1.15	0.98	1.20	73	208	168
46	0.17	0.26	0.00	0.67	0.70	0.00	198	317	1
47	0.67	0.48	0.41	0.67	1.02	1.27	49	105	137
Total	0.39	0.34	0.48	0.77	0.78	0.77	812	981	994

Mule Deer

Appendix 1 (Continued)

Ecozone and WMZ	Bucks/Doe			Fawns/Doe			Sample Size		
	1999	2000	2001	1999	2000	2001	1999	2000	2001
Forest Fringe									
48	0.00	---	0.00	0.00	---	2.50	3	0	7
49	0.25	1.00	0.29	1.00	1.00	0.86	9	6	15
50	0.00	---	0.36	0.50	---	1.27	3	0	29
51 + PMZ	---	0.00	0.00	---	0.00	1.00	0	1	2
52	0.22	0.00	1.00	0.78	0.00	0.67	18	1	8
53	0.00	---	0.00	0.00	---	0.00	2	0	1
54	1.00	0.29	0.13	1.00	1.29	0.63	9	36	14
55	0.27	0.59	0.40	1.35	1.05	1.31	97	98	149
Total	0.32	0.57	0.36	1.18	1.11	1.19	142	142	225
Forest									
56	---	---	---	---	---	---	0	0	0
57	---	---	---	---	---	---	0	0	0
58	---	---	---	---	---	---	0	0	0
59	---	---	---	---	---	---	0	1	0
60	---	---	---	---	---	---	0	0	0
61	---	---	---	---	---	---	0	0	0
62	---	---	---	---	---	---	0	0	0
63	---	---	---	---	---	---	0	0	0
64	---	---	---	2.00	1.00	---	3	2	0
65	---	---	---	---	---	---	0	0	0
66	---	---	---	---	---	---	0	0	0
67	1.00	---	---	1.00	---	---	4	0	0
68	2.00	1.60	1.00	2.00	1.20	1.25	5	19	13
69	0.33	3.00	0.00	1.33	1.00	0.00	16	15	1
70	---	---	---	---	---	---	0	0	0
71	---	---	---	---	---	---	0	0	0
72	---	---	---	---	---	---	0	0	0
73	---	---	---	---	---	---	0	0	0
Total	0.56	1.70	1.25	1.56	1.00	1.25	28	37	14
Province	0.48	0.44	0.55	0.77	0.74	0.71	7,736	11,066	8,114

RMZ = Regina/Moose Jaw Wildlife Management Zone

SMZ = Saskatoon Wildlife Management Zone

PMZ = Prince Albert Wildlife Management Zone

Mule Deer

Appendix 2.

Mule deer license quotas, 1997 – 2002.

WMZ	Either-sex						Antlerless					
	1997	1998	1999	2000	2001	2002	1997	1998	1999	2000	2001	2002
1	400	200	200	200	200	350	200	--	--	--	--	100
2	500	300	300	300	300	--	--	--	--	--	250	--
2 E	--	--	--	--	--	100	--	--	--	--	--	150
2 W	--	--	--	--	--	300	--	--	--	150	--	750
3	150	100	100	100	100	--	50	--	--	--	--	--
4	100	--	--	50	50	100	--	--	--	--	--	--
5	150	50	25	25	75	150	--	--	--	--	100	200
6	200	150	150	150	150	200	50	--	--	100	150	300
7	100	50	50	50	50	75	50	--	--	--	--	100
8	50	--	--	--	25	25	--	--	--	--	25	100
9	150	75	75	50	50	100	--	--	--	--	50	100
10	400	200	200	200	250	300	--	--	--	50	200	400
11	50	50	50	50	50	75	--	50	50	100	200	300
12	50	50	40	40	50	50	--	--	--	--	50	75
13	300	100	100	100	--	--	--	--	--	--	--	--
13 E	--	--	--	--	90	200	--	--	--	--	175	400
13 W	--	--	--	--	60	60	--	--	--	--	75	75
14	300	200	--	--	--	--	--	--	--	--	--	--
14 E	--	--	100	100	100	200	--	--	--	50	200	300
14 W	--	--	50	50	75	100	--	--	25	50	100	200
15	100	75	--	--	25	25	--	--	--	--	--	25
16, 17 & 33	100	50	50	25	25	50	--	--	--	--	--	--
18	100	75	--	--	--	100	--	--	--	--	--	50
19	300	200	150	200	200	250	--	--	--	--	--	50
RMZ	100	75	50	50	75	100	--	--	--	--	--	50
21	100	75	50	50	75	100	--	--	--	25	50	100
22	100	50	50	50	75	100	--	--	--	25	50	100
23	150	150	150	150	200	200	50	--	--	50	50	400
24	150	150	150	150	150	200	100	--	--	50	150	400
25	125	100	100	100	100	100	--	--	--	--	--	100
26	125	125	125	125	125	125	--	--	--	--	--	150
27	100	100	100	100	100	100	--	--	--	--	--	100
28	50	50	50	50	50	75	--	--	--	25	50	125
29	250	150	150	150	250	300	--	--	--	100	200	300
30	100	70	70	70	150	200	--	--	--	50	100	200
SWM	50	35	35	35	50	100	--	--	--	--	50	100
31	50	25	25	--	--	--	--	--	--	--	--	--
36	25	25	25	25	25	25	--	--	--	--	--	--
38, 39, 40	--	--	--	--	100	100	--	--	--	--	--	--
40	50	50	50	50	--	--	--	--	--	--	--	--
41	50	50	50	75	75	75	--	--	--	--	--	--
42	25	25	25	50	50	50	--	--	--	--	--	--
43	--	--	--	--	--	25	--	--	--	--	--	--
44	50	50	75	75	75	75	--	--	--	25	50	75
45	200	200	250	250	100	--	--	--	--	--	100	--
45 E	--	--	--	--	--	150	--	--	100	100	--	150
45 W	--	--	--	--	--	150	--	--	100	150	--	200
46	150	150	150	150	--	300	100	100	150	200	--	400
47	100	100	150	150	150	200	--	--	--	--	50	100
54	50	50	50	50	50	50	--	--	--	--	--	--
55	50	50	50	50	50	50	--	--	--	--	--	--
Total	5,700	3,830	3,620	3,695	4,000	5,860	700	250	425	1,300	2,475	6,775

RMZ = Regina/Moose Jaw Wildlife Management Zone

SMZ = Saskatoon Wildlife Management Zone

5.0 Literature Cited

Williams, E.S., M.W. Miller, T.J. Kreeger, R.H. Kahn, and E.T. Thorne. 2002. Chronic wasting disease of deer and elk: a review with recommendations for management. *J. Wildl. Manage.* 66(3):551 – 563.

Elk (*Cervus elaphus*)

1.0 Long-term Management Objectives

- Maintain stable wintering populations in all Elk Management units (EMUs) to attain a provincial winter population of 14,500 \pm 10% elk.
- Maintain a winter herd structure >15 bulls/100 cows/40 calves in all EMUs.
- Retain 30,870 km² of occupied primary elk range.
- Provide a sustainable licensed harvest of 2,250 \pm 10% elk, with total harvest in any EMU not to reduce the EMU population below the winter population objective of that EMU \pm 10%.

2.0 Population Status

The 2001 winter provincial elk population is estimated to be about 14,400 elk, which is within the long-term population objective of 14,500 \pm 10% elk (Figure 1, Table 1, Arsenault 1998). A population forecasting model (see Methods, section 1.2) was used to calculate population sizes in individual EMUs (Figure 2). Linear interpolation of survey data was used between survey years for individual EMUs. The sum of the EMU estimates were used to calculate an annual provincial total population estimate (Figure 1).

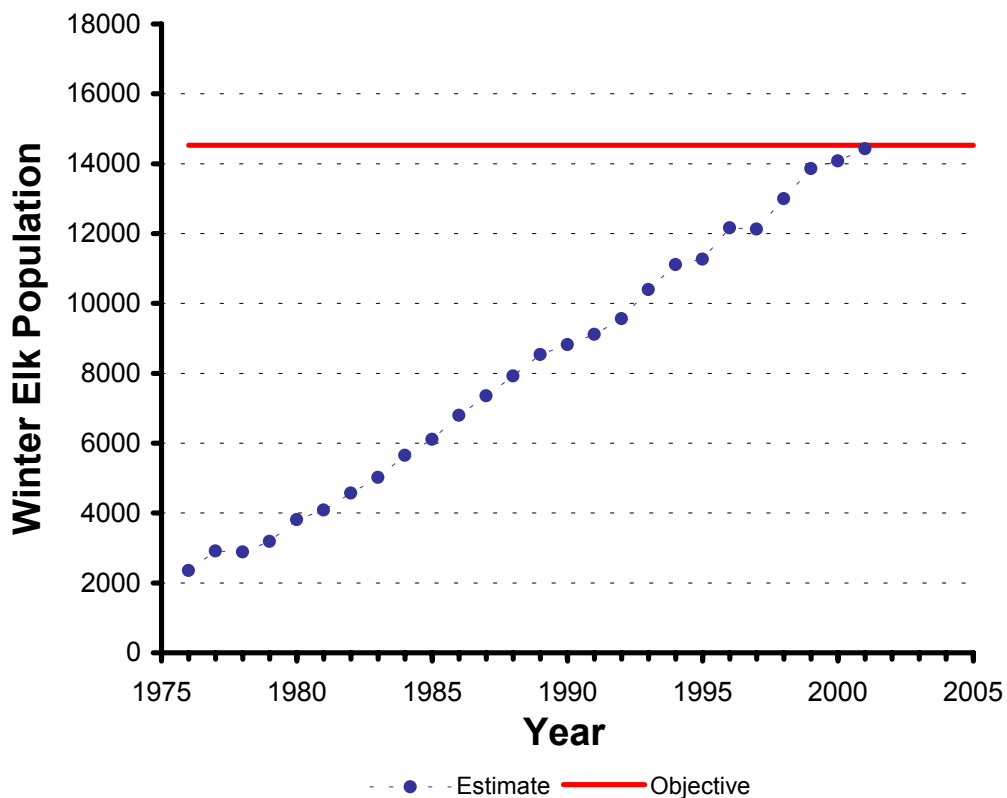


Figure 1. Estimated provincial winter elk population in relation to long-term objective.

- WMZ
- Primary Range
- Secondary Range (Forest)
- Secondary Range (Agricultural)

EMU

1. Cypress West Block
2. Cypress East-Center
3. Moose Mountain
4. Duck Mountain
5. Tiger Hills
6. MacDowall Forest
7. Thickwood Hills
8. Bronson-Divide
9. Porcupine Hills
10. Pasquia Hills
11. Cumberland Delta
12. Candle Lk.-Cub Hills
13. Ft. a la Corne
14. PANP-Cookson
15. Clarke-Sled
16. Flotten Lake
17. Matador/Riverhurst
18. Parkerview
19. Dirt Hills
20. Eastern Qu'Appelle
21. Wood Mountain
22. Allan Hills

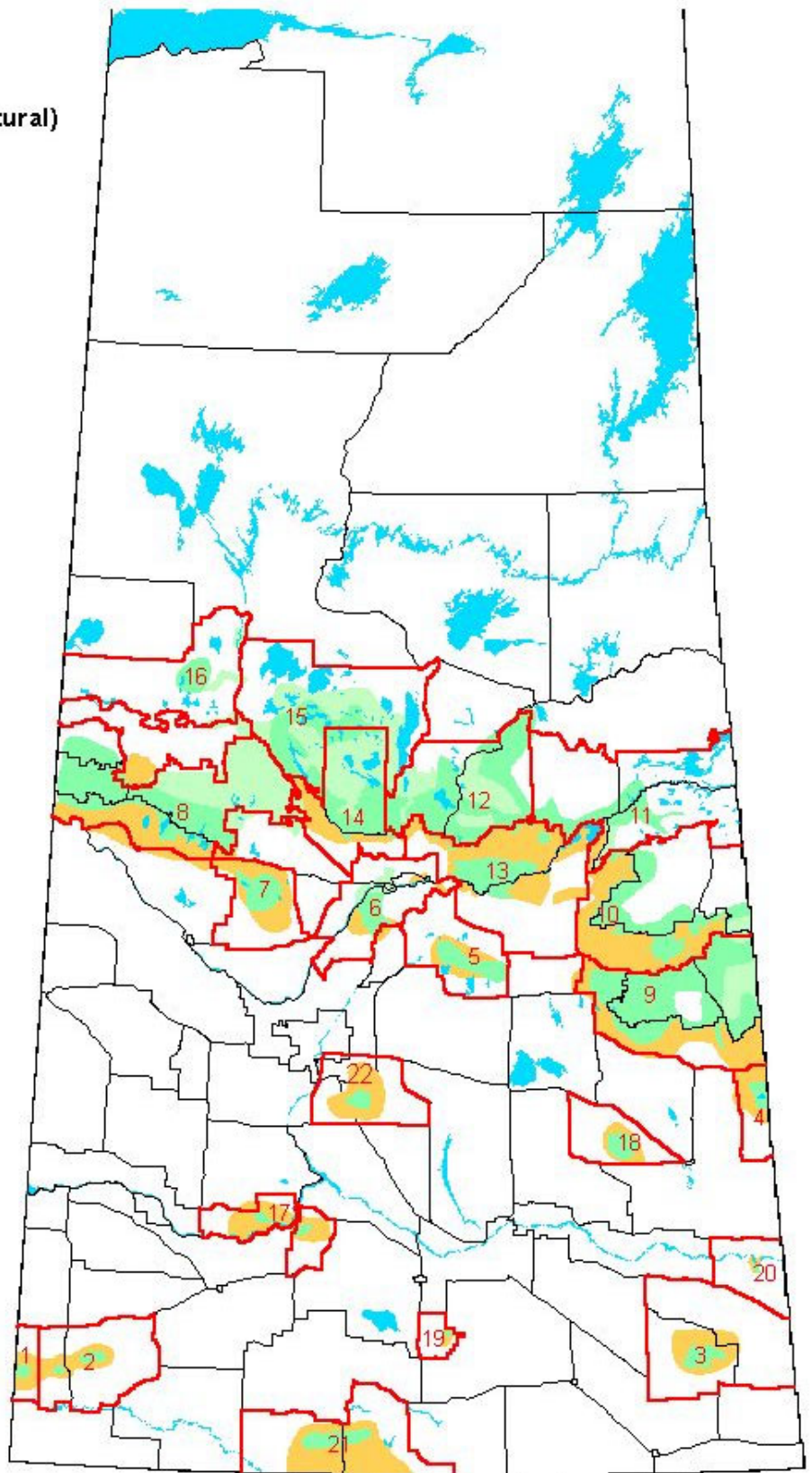


Figure 2. Elk management units (EMUs).

Elk

2.1 Survey Data

Table 1 summarizes current population size in relation to long-term objectives (Arsenault 1998) based on interpolation from limited survey data. A summary of population structure is presented in Table 2.

Table 1. Winter elk population objectives and survey block densities based on aerial survey sampling, 1999/00 – 2001/02.

Elk Management Unit (EMU)	WMZs	Estimate Winter Population Size		Survey Area (km ²)	Survey Estimated Elk Population Size		
		Long-term Objective	2001/02 Estimate		1999/00	2000/01	2001/02
Cypress West Block	7 (west ½)	750	1,083		1,120	--	--
Cypress East-Center	6, 7 (east ½)	200	293		339	--	--
Moose Mountain	33	400	367		--	--	--
Duck Mountain	37	400	309		--	--	--
Tiger Hills	42	350	267		--	--	--
MacDowall Forest	51, 52	200	200		--	--	--
Thickwood Hills	54	200	172	2,950	--	172	--
Bronson-Divide	47, 67, 68N, 68S	750	561		--	--	--
Porcupine Hills	48, 56, 57	4,500	4,500		--	--	--
Pasquia Hills	49, 58, 59	1,500	1,500		--	--	--
Cumberland Delta	60-62	750	550		--	--	--
Candle Lake/Cub Hills	63, 64	1,500	1,595		--	--	--
Fort a la Corne	43, 50	450	450		--	--	--
PANP/Cookson	53, PANP	750	649		--	--	--
Clark - Sled	66	1,000	1,000		--	--	--
Flotton Lake	69	300	211		--	--	--
Matador/Riverhurst	14, 19 (W of hwy 36)	100	57		--	--	--
Parkerview	39	75	250		--	--	--
Dirt Hills	19 (E of hwy 36)	50	39		--	--	--
Eastern Qu'Appelle	35	50	19		--	--	--
Wood Mountain	1, 2	150	235		--	--	250 ^a
Allan Hills	30	100	80	213	--	--	80
Total		14,525	14,429				

^a Field report from district Conservation Officer

Elk

Table 2. Aerial survey results of winter elk herd structure, 1997/98 – 2001/02.

Elk Management Unit (EMU)	WMZs	1997/98			1998/99			1999/00			2000/01			2001/02		
		Bulls/ Cow	Calves/ Cow	n	Bulls/ Cow	Calves/ Cow	n	Bulls/ Cow	Calves/ Cow	n	Bulls/ Cow	Calves/ Cow	n	Bulls/ Cow	Calves/ Cow	n
Cypress W Block	7 (W ½)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cypress E Block	6, 7 (E ½)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moose Mountain	33	0.91	0.17	50	--	--	--	--	--	--	--	--	--	--	--	--
Duck Mountain	37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tiger Hills	42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MacDowall Forest	51, 52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thickwood Hills	54	--	--	--	--	--	--	--	--	0.41	0.50	172	--	--	--	--
Bronson/Divide	47, 67, 68N, 68S	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Porcupine Hills	48, 56, 57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pasquia Hills	49, 58, 59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cumberland Delta	60 – 62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Candle Lake/ Cub Hills	63, 64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fort a la Corne	43, 50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PANP/Cookson	53, PANP	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Clark/Sled	66	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Flotton Lake	69	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Matador/Riverhurst	14, 19 (W hwy 36)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Parkerview	39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dirt Hills	19 (E hwy 36)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Eastern Qu'Appelle	35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Wood Mountain	1, 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Allan Hills	30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Elk

2.2 Biological Sample Collections

Table 3. Summary of cementum age classes of harvested elk, 1995 - 2001 hunting seasons.

Age Class	1995		1996		1997		1998		1999		2000		2001	
	%	&	%	&	%	&	%	&	%	&	%	&	%	&
0.5	13	15	8	8	9	6	4	1	--	4	4	5		
1+	47	12	45	18	32	14	31	11	39	8	41	10		
2+	26	17	43	7	27	12	49	7	41	9	49	10		
3+	20	7	43	12	14	8	22	7	23	9	50	14		
4+	13	8	13	11	15	3	15	12	15	7	19	11		
5+	8	6	8	4	2	4	10	7	8	4	10	6		
6+	3	6	7	5	4		6	9	2	7	8	8		
7+	5	3	1	2	3	6	5	4	1	5	3	10		
8+	2	1	--	3	--	3	3	1	1	4	3	7		
9+	1	1	2	3	2	--	1	4	2	3	1	3		
10+	1	2	1	1	--	--	2	--	1	--	--	2		
11+	1	--	--	--	1	--	--	1	--	2	--	2		
12+	--	--	--	2	--	2	--	1	2	2	--	2		
13+	--	--	--	1	1	--	--	--	--	1	1	1		
14+	--	2	--	1	--	--	--	--	--	2	--	--		
15+	--	1	--	1	--	5	--	--	--	--	--	--		
>15+	--	6	--	--	--	--	--	2	--	3	--	2		
n =	127	68	171	79	110	63	146	67	135	66	185	88	(a)	(a)
Mean age of ≥ 1.5	3.31	4.76	3.13	4.77	3.32	5.04	3.50	5.43	3.23	6.24	3.36	5.74	(a)	(a)
Antler Class	Proportion (%) in Bull Antler Class													
A	32		22		22		19		22		21			
B	4		5		10		9		12		11			
C	15		17		19		15		11		13			
D	21		31		23		34		31		29			
E	15		16		17		10		17		11			
F	13		8		9		14		8		14			
n =	122		167		103		134		111		123		(a) (a)	

(a) Data not available.

2.3 Mortality

2.3.1 License Sales

Table 4. Summary of provincial elk license sales and harvest, 1980 - 2001.

Hunt Year	Regular Licenses Issued	Regular Season Harvest					Draw Licenses Issued	Draw Season Harvest				
		Bulls	Cows	calves	Unkn	Total		Bulls	Cows	calves	Unkn	Total
1980	2,331	0	0	0	254	254	910	0	0	0	307	307
1981	2,774	199	0	0	51	250	900	98	175	45	0	318
1982	3,020	167	0	0	23	190	700	62	45	16	0	123
1983	3,187	265	0	0	43	308	894	127	107	39	0	273
1984	3,698	543	121	35	0	699	784	136	158	44	0	338
1985	3,240	241	15	20	0	276	1,085	106	91	44	0	241
1986	2,819	427	23	15	0	465	1,241	176	175	51	0	402
1987	2,198	372	11	3	0	386	1,288	155	178	74	10	417
1988	2,887	419	5	0	0	424	1,119	147	122	44	0	313
1989	2,599	459	30	4	0	493	1,265	147	234	74	6	461
1990	3,051	330	6	9	0	345	1,764	208	276	147	0	631
1991	3,344	495	16	11	0	522	2,130	267	428	132	4	831
1992	3,699	566	0	0	0	566	2,144	200	299	99	22	620
1993	3,214	569	4	0	0	573	2,018	233	182	66	20	501
1994	6,571	665	351	178	0	1,194	580	109	96	37	0	242
1995	4,772	742	234	113	9	1,098	1,531	95	154	72	8	329
1996	4,594	813	326	130	0	1,269	1,308	131	286	89	1	507
1997	5,151	748	262	145	0	1,155	1,310	150	321	130	22	623
1998	4,878	840	65	32	0	937	1,339	131	407	81	0	619
1999	4,312	870	51	29	41	991	1,512	130	418	132	16	696
2000	5,030	1,082	35	21	7	1,145	1,796	169	535	192	16	912
2001	4,795	1,016	82	12	12	1,122	1,940	213	684	203	23	1,123
Mean	3,735	---	---	---	---	667	1,344	---	---	---	---	492

2.3.2 Hunting Activity and Harvest

There are no data available to assess the impact of subsistence harvest. Saskatchewan resident licensed harvest and hunting activity are summarized in Table 5.

Elk

Table 5. Provincial resident elk harvest by elk management unit (EMU), 1999 - 2001. (see Big Game Hunter Harvest Survey Statistics for summaries of hunting activity and harvest by season and WMZ).

EMU / WMZs	Hunt Year	# Hunters	Harvest					Hunter-days	Hunter-days/Animal
			Bulls	Cows	Calves	Unkn	Total		
Cypress W Block 7 (W ½)	1999 (a)	101	30	21	4	0	55	499	9.1
	2000	188	52	22	18	0	92	1,024	11.1
	2001	201	52	30	21	0	103	959	9.3
	10-yr mean	141.1	26.2	23.3	8.8	0.8	58.7	608.0	10.4
Cypress E Block 6, 7 (E ½)	1999 (a)	125	18	7	2	0	27	537	19.9
	2000	137	47	7	0	0	54	530	9.8
	2001	104	25	8	8	0	41	446	10.9
	10-yr mean	106.3	18.4	6.9	2.4	1.6	29.3	471.1	16.1
Moose Mountain 33	1999 (a)	25	11	7	1	0	19	125	6.6
	2000 (a)	26	9	5	1	0	15	156	10.4
	2001 (a)	25	14	3	0	0	17	104	6.1
	10-yr mean	35.2	8.2	7.5	2.3	0.0	18.0	162.0	9.0
Duck Mountain 37	1999 (a)	89	8	19	8	0	35	393	11.2
	2000 (a)	105	13	24	10	0	47	534	11.4
	2001 (a)	97	14	26	5	0	45	484	10.8
	93-00 mean	76.8	9.2	15.1	4.3	1.8	30.4	348.8	11.5
Tiger Hills 42	1999 (a)	98	17	11	5	0	33	300	9.1
	2000	126	8	41	0	0	49	526	10.7
	2001 (a)	129	27	25	14	0	66	604	9.2
	10-yr mean	124.8	18.7	15.6	4.6	0.7	39.6	369.8	9.3
MacDowall Forest 51, 52	1999 (a)	37	11	3	0	0	14	215	15.4
	2000 (a)	25	4	2	0	0	6	163	27.2
	2001	21	7	0	0	0	7	91	13.0
	92-00 Mean	23.2	6.0	1.9	0.3	0.0	8.2	115.6	14.1
Thickwood Hills 54	1999					No season			
	2000					No season			
	2001					No season			
Bronson-Divide 47, 67, 68N, 68S	1999	84	0	0	6	0	6	299	49.8
	2000	123	21	0	0	0	21	430	20.5
	2001	192	0	0	0	0	0	922	na
	10-yr mean	103.8	10.3	0.0	0.6	0.0	10.9	452.5	41.5
Porcupine Hills 48, 56, 57	1999	3,198	575	257	44	16	892	14,356	16.1
	2000	3,502	574	219	104	11	908	15,827	17.4
	2001	3,430	569	329	70	29	997	15,772	15.8
	10-yr mean	3,103.2	478.8	211.2	77.1	11.7	778.8	14,825.8	19.0
Pasquia Hills 49, 58, 59	1999	1,529	200	89	76	29	394	6,482	16.5
	2000	1,795	331	143	66	12	552	8,145	14.8
	2001	1,716	308	220	59	0	587	7,438	12.7
	10-yr mean	1,468.2	210.7	120.3	49.6	4.5	385.1	7,136.2	18.5
Cumberland 60 – 62	1999	155	28	0	6	0	34	608	17.9
	2000	136	7	0	0	0	7	718	102.6
	2001	210	19	6	0	6	31	743	24.0
	10-yr mean	157.6	18.7	1.1	1.1	0.6	21.5	737.6	34.3
Candle Lk.-Cub Hills 63, 64	1999	194	0	0	0	0	0	360	na
	2000	180	42	0	0	0	42	510	12.1
	2001	147	12	6	0	0	18	622	34.6
	10-yr mean	156.8	19.6	1.0	0.0	0.0	20.6	632.5	30.7
Fort a la Corne 43, 50	1999	621	90	49	9	6	154	2,600	16.9
	2000	806	115	90	7	0	212	3,814	18.0
	2001 (a)	670	140	100	31	0	271	3,164	11.7
	10-yr mean	430.3	88.1	44.7	14.3	2.5	149.6	1,898.1	12.7

Elk

Table 5. Continued.

EMU / WMZs	Hunt Year	# Hunters	Harvest					Hunter- days	Hunter- days/ Animal
			Bulls	Cows	Calves	Unkn	Total		
PANP – Cookson 53, PANP	1999	233	6	6	0	6	18	802	44.6
	2000	236	21	7	7	0	35	890	25.4
	2001	263	19	6	0	0	25	1,186	47.4
	10-yr mean	174.2	13.1	7.2	3.9	0.6	24.8	849.9	34.3
Clark-Sled 66	1999	39	0	0	0	0	0	183	na
	2000	36	0	0	0	0	0	93	na
	2001	25	6	0	0	0	6	135	22.5
	10-yr mean	37.9	1.5	0.0	0.0	0.0	1.5	151.6	na
Flotton Lake 69	1999	55	6	0	0	0	6	276	46.0
	2000	43	7	0	0	0	7	108	15.4
	2001	71	0	0	0	0	0	250	na
	10-yr mean	52.9	5.3	0.0	0.0	0.0	5.3	238.1	44.9
Matador/Riverhurst 14, 19 (W hwy 36)	1999				No season				
	2000	10	0	10	0	0	10	15	1.5
	2001				No season				
Parkerview 39	1999				No season				
	2000				No season				
	2001 (a)	53	11	7	7	0	25	268	10.7
Dirt Hills 19 (E hwy 36)	1999				No season				
	2000				No season				
	2001				No season				
Eastern Qu'Appelle 35	1999				No season				
	2000				No season				
	2001				No season				
Wood Mountain 1, 2	1999				No season				
	2000				No season				
	2001				No season				
Allan Hills 30	1999				No season				
	2000				No season				
	2001				No season				
EMU TOTAL	1999	6,583	1,000	469	161	57	1,687	28,035	16.6
	2000	7,474	1,251	570	213	23	2,057	33,483	16.3
	2001	7,354	1,223	766	215	35	2,245	33,188	14.8
	10-yr mean	6,207.2	934.1	465.6	171.0	24.9	1,595.6	29,069.4	18.2

(a) Phone survey results used in place of Hunter Harvest Survey results.

2.4 Elk Relocation Program

Table 6 updates a summary by Arsenault (1998, page 39) and Loran et al. (1997, page 13). A summary of the Wapusk Lake Elk Re-Establishment Program was summarized by Quennelle and Topley (2001).

Elk

Table 6. Summary of recent elk relocations in Saskatchewan, 1980 - 2002.

Year	Source	Destination	Adults		Yearlings		Calves		Unkn	Total	Purpose
			%	&	%	&	%	&			
1982	EINP	Thickwood Hills	3	21	2	3	2	-	-	31	Supplement low population
1985	EINP	Cub Hills	7	11	7	5	6	3	-	39	Restock into historically used forest habitat
1985	EINP	Bronson Forest	14	9	3	-	2	4	-	32	Restock into historically used forest habitat
1989	EINP	Cub Hills	6	6	12	3	6	8	-	41	Increase density for sport hunting
1989	EINP	Helene Lake	3	38	6	2	6	12	5	72	Increase density for sport hunting
1990	EINP	Helene Lake	10	21	9	3	9	7	-	59	Supplement population that is below carrying capacity
1991	Cypress Hills	Cub Hills	4	12	2	7	8	16	-	49	Restock historically used forest habitat
1991	Boughen Nursery	Cub Hills	-	5	-	-	-	-	-	5	Reduce depredation at nursery
1992	Cypress Hills	Candle Lake	6	37	4	2	29	30	-	108	Restock historically used forest habitat
1992	EINP	Candle Lake	17	15	7	3	6	7	-	55	Restock historically used forest habitat
1992	Boughen Nursery	Candle Lake	-	3	-	-	2	2	-	7	Reduce depredation at nursery
1992	Boughen Nursery	N of Tobin Lake	-	2	-	-	1	1	-	4	Reduce depredation at nursery
1993	Cypress Hills	Sled Lake	-	7	-	-	17	11	-	35	Restock into historically used, recently logged forest habitat
1993	EINP	Sled Lake	9	12	5	3	2	1	-	32	Restock into historically used, recently logged forest habitat
1994	EINP	Sled Lake	1	34	1	2	8	17	-	63	Restock into historically used, recently logged forest habitat
1994	EINP	Candle Lake	19	25	3	2	5	9	-	63	Restock historically used forest habitat
1995	Cypress Hills	Sled Lake	-	13	-	-	31	10	-	54	Restock into historically used, recently logged forest habitat
1995	EINP	Sled Lake	42	105	32	31	45	37	2	294	Restock into historically used, recently logged forest habitat
1998	Cypress Hills	Cumberland House	-	6	4	3	19	13	-	45	Reduce Cypress Hills population and restock historic habitat
1999	EINP	Candle Lake/Cub Hills	10	80	49	24	69	49	1	340	Restock into historically used, recently logged forest habitat
2000	Cypress Hills	Candle Lake/Cub Hills	-	25	4	-	15	10	-	54	Restock historically used forest habitat (Nipekemew Burn)
2000	EINP	Candle Lake/Cub Hills	65	189	-	-	63	62	-	379	Restock into historically used, recently logged forest habitat
2002	Cypress Hills	Weyakwin	-	33	8	-	9	13	-	63	Restock into historically used, recently logged forest habitat

3.0 Management Strategies

3.1 Southern

- Cypress Hills E and W populations exceed the EMU objectives. Increased harvest and continued trapping and relocation of elk (from E Block) will continue as means to reduce population size to their respective objectives.
- Maintain season structure and quota for Moose Mountain EMU. Explore options to relocate elk from Cypress Hills and enter into cooperative management with local First Nations
- Maintain season structure and quota for Duck Mountain EMU as a means to maintaining hunting pressure on farmland elk populations where elk damage to crops and stacked forage are a concern.

3.2 Northern

- Because of the potential to over-harvest some of the forest elk herds, the bag limit during both weeks of the regular elk season was restricted to bulls-only.
- The antlerless seasons facilitate a controlled harvest (through quotas) in order to stabilize forest fringe elk herds and minimize crop depredation.
- The Pasquia and Porcupine EMU strategies are to maintain high quality elk hunting seasons with a focus on distributing hunters to prevent overcrowding, to provide a measure of protection for prime breeding bulls, and to minimize elk depredation concerns. The harvest strategy is designed to maintain stable populations within the long-term population objectives recommended by Arsenault (1998).
- Continue maximizing elk herd growth in the forest and within the tolerance of landowners along the forest/agriculture interface.
- Continue to purchase prime elk habitat lands in agricultural areas under the Fish and Wildlife Development Fund and in partnership with the Saskatchewan Wildlife Federation and Rocky Mountain Elk Foundation.

4.0 Literature Cited

Arsenault, A.A. 1998. Saskatchewan elk (*Cervus elaphus*) management strategy. Sask. Envir. And Resour. Manage. Fish and Wildl. Tech Rep. 98-1. 90 pp.

Loran, T., E.H. Kowal, and A.A. Arsenault. 1997. Status of the elk transplant program in Saskatchewan. Sask. Envir. And Resour. Manage. Fish and Wildl. Tech Rep. 97-2. 17 pp.

Quennelle, J. and J. Topley. 2001. Status report of the Wapus Lake elk re-establishment program. Integrated Resource Management Project Report. SIAST, Woodland Institute, Prince Albert.

Moose (*Alces alces*)

1.0 Long-term Management Objectives

- Maintain stable winter populations in all Moose Management Units (MMUs) to attain a provincial winter population of 50,500 ±10% per Arsenault (2000).
- Maintain adequate adult sex ratios in all MMU's based on the following relationship: $y = 108.5 - 210.5x + 150.8x^2$, where y = number of bulls/100 cows and x = moose density (moose/km²) per Arsenault (2000).
- Maintain the winter calf/100 cow ratio >40 calves/100 cows in all MMUs
- Retain 107,600 km² of occupied primary moose habitat.

2.0 Population Status

The 2001 winter provincial moose population was estimated to be about 42,500 moose, which is 16% below the long-term population objective of 50,500 ±10% moose (Figure 1, Table 1, Arsenault 2000). Moose Management Units (MMUs) are illustrated in Figure 2.

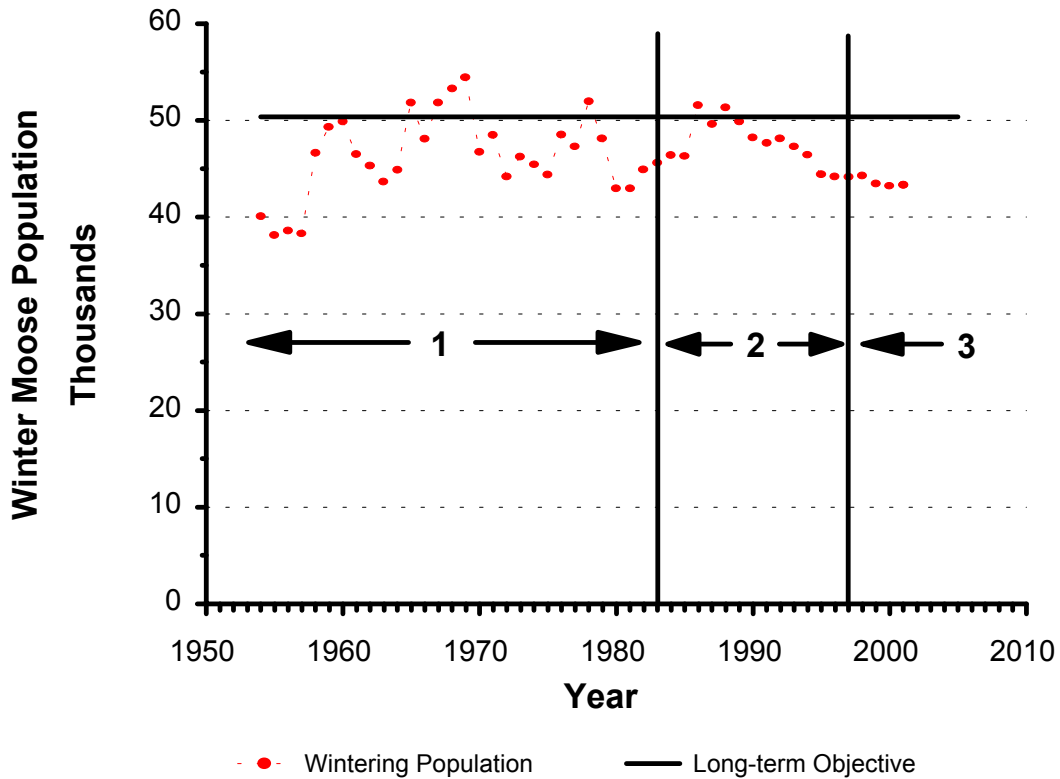


Figure 1. Changes in winter moose population in Saskatchewan, 1954 to present. Data in area 1 were primarily collected using a line transect survey method. Area 2 represents data collected primarily by quadrat surveys stratified by habitat type (per Stewart 1983). Area 3 represents data collected using a modified Gasaway survey method (Gasaway et al 1986, Lynch and Schumaker 1995).

Moose

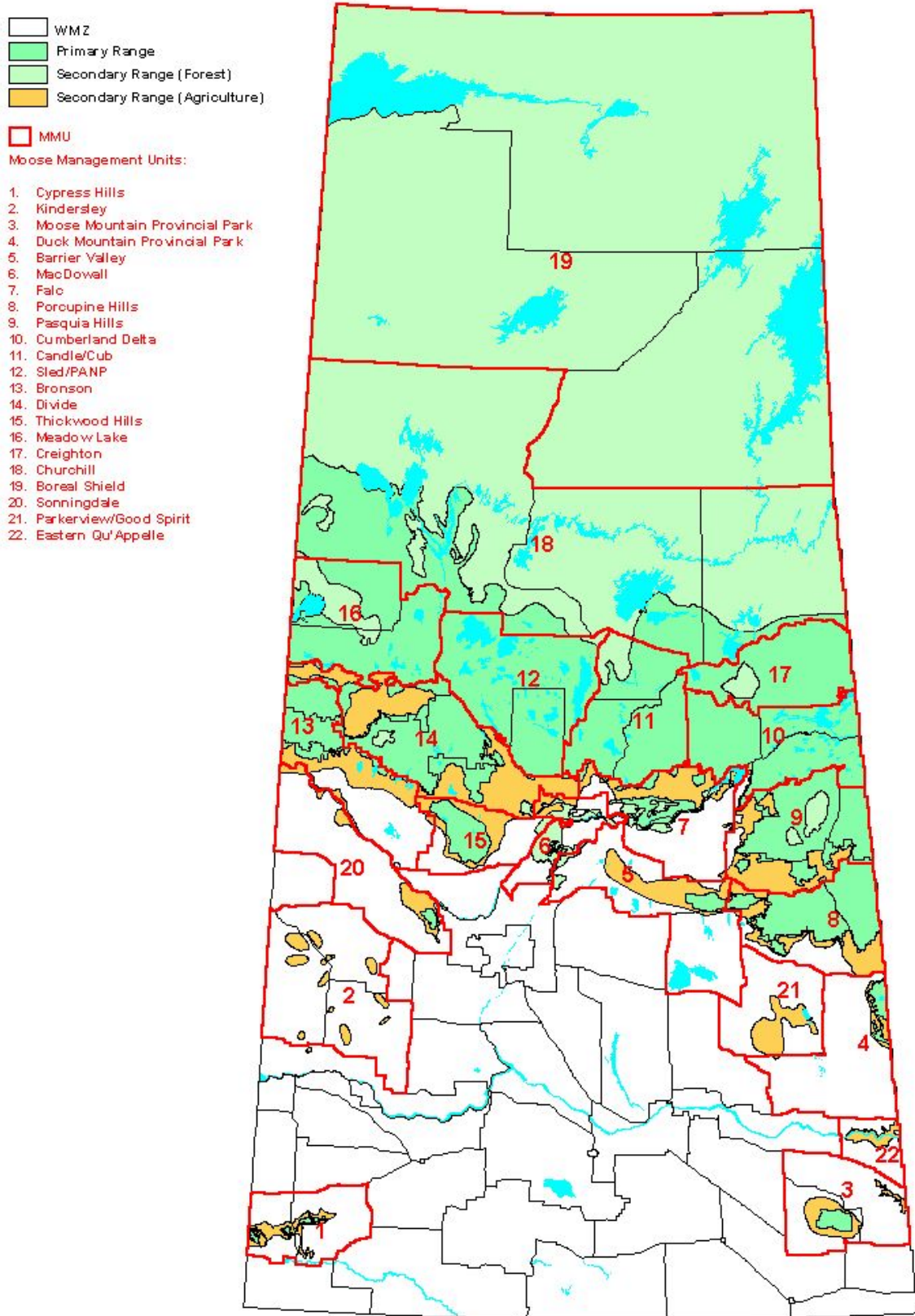


Figure 2. Moose management units (MMUs).

Moose

2.1 Survey Data

Table 1 summarizes current population size and recent population density survey results by MMU (Figure 2). Table 2 summarizes winter population structure survey results.

Table 1. Moose population objectives and survey block densities based on aerial survey sampling, 1998/99 – 2001/02.

Moose Management Unit (MMU)	WMZ(s)	Estimated Winter Population Size		Survey Area (km ²)	Survey Estimated Moose Population Density (moose / km ² ±90% CL)			
		Long-term Obj.	2001/02 Estimate		1998/99	1999/00	2000/01	2001/02
Cypress Hills	6, 7	325	314		--	--	--	--
Kindersley	25 - 27	150	165		--	--	--	--
Moose Mountain	33	350	343		--	--	--	--
Eastern Qu'Appelle	35	30	33		--	--	--	--
Duck Mountain	37	350	325		--	--	--	--
Parkerview	39	75	81		--	--	--	--
Barrier Valley	40, 42	400	412		--	--	--	--
Sonningdale	45	200	208		--	--	--	--
MacDowall Forest	51, 52	145	146		--	--	--	--
Fort a la Corne	43, 50	750	767		--	--	--	--
Porcupine Hills	48, 56, 57	5,500	5,661	3,605	--	0.88±18.1%	--	--
Pasquia Hills	49, 58, 59	5,000	4,484	4,825	--	0.60±19.9%	--	--
Cumberland Delta	60 - 62	5,500	2,532	9,688	--	--	0.21±21.3%	--
Candle Lk/Cub Hills	63 - 65	4,000	2,316	10,600	--	--	0.17±21.8%	--
Sled Lk/PANP	66, PANP	3,500	2,741		--	--	--	--
Bronson Forest	47, 68N, 68S	2,100	1,428	2,925	--	0.35±25.2%	--	--
Divide Forest	53, 55, 67	4,900	4,144		--	--	--	--
Thickwood Hills	54	750	851		--	--	--	--
Meadow Lk/PAWR	69, PAWR	3,000	2,828	1,526	0.29±29.0%	0.18±31.6%	--	--
Creighton	70	850	677		--	--	--	--
Churchill	71 - 73	6,000	5,916		--	--	--	--
Boreal Shield	74 - 76	6,500	6,489		--	--	--	--
Total		50,375	42,861					

Moose

Table 2. Aerial survey results of winter population structure, 1998/99 – 2001/02.

Moose Management Unit (MMU)	WMZs	Long-term Objective		1998/99			1999/00			2000/01			2001/02		
		Bulls/ Cow	Calves/ Cow	Bulls/ Cow	calves/ Cow	n	Bulls/ Cow	calves/ Cow	n	Bulls/ Cow	calves/ Cow	n	Bulls/ Cow	calves/ Cow	n
Cypress Hills	6, 7	0.35	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Kindersley	25 – 27	0.82	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Moose Mountain	33	0.48	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Eastern Qu'Appelle	35	0.98	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Duck Mountain	37	0.40	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Parkerview	39	0.98	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Barrier Valley	40, 42	0.59	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Sonningdale	45	0.59	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
MacDowall Forest	51, 52	0.53	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Fort a la Corne	43, 50	0.67	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Porcupine Hills	48, 56, 57	0.38	≥ 0.40	--	--	--	0.31	0.52	297	--	--	--	--	--	--
Pasquia Hills	49, 58, 59	0.36	≥ 0.40	--	--	--	0.35	0.39	539	--	--	--	--	--	--
Cumberland Delta	60 – 62	0.43	≥ 0.40	--	--	--	--	--	--	0.48	0.39	321	--	--	--
Candle Lk / Cub Hills	63 – 65	0.52	≥ 0.40	--	--	--	--	--	--	0.64	0.59	189	--	--	--
Sled Lk / PANP	66, PANP	0.68	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Bronson Forest	47, 68N, 68S	0.40	≥ 0.40	--	--	--	0.35	0.50	224	--	--	--	--	--	--
Divide Forest	53, 55, 67	0.40	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Thickwood Hills	54	0.51	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Meadow Lake / PAWR	69, PAWR	0.64	≥ 0.40	0.43	0.51	130	0.37	0.47	109	--	--	--	--	--	--
Creighton	70	0.89	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Churchill	71 – 73	0.82	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Boreal Shield	74 – 76	1.00	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--

Moose

2.2 Biological Sample Collections

The age structure of harvested animals is presented in Table 3. Table 4 compares the mean age of moose harvested in the Pasquia (WMZs 49, 58, 59), Porcupine (WMZs 48, 56, 57) and Cumberland WMZs 60-62) MMUs to the provincial moose harvest.

Table 3. Summary of cementum age classes of harvested moose, 1996 – 2001 hunting seasons.

Age Class	1996		1997		1998		1999		2000		2001	
	%	&	%	&	%	&	%	&	%	&	%	&
0.5	60	62	37	32	50	47	13	11	60	59	72	66
1+	42	15	61	21	78	6	29	1	100	13	98	5
2+	62	21	43	12	61	8	40	7	70	8	89	5
3+	49	5	32	8	42	6	46	6	26	2	46	9
4+	19	6	27	6	25	6	34	7	17	2	16	3
5+	14	4	16	5	9	4	19	2	8	0	12	3
6+	3	2	8	3	12	2	8	1	11	3	6	1
7+	7	2	5	1	3	1	8	0	4	1	7	1
8+	0	5	2	0	2	1	0	2	3	1	5	2
9+	1	3	2	2	0	2	1	1	2	0	2	0
10+	1	0	1	1	3	0	1	0	2	1	2	1
11+	2	2	0	2	1	0	1	0	1	0	1	2
12+	0	0	2	1	1	0	0	0	1	0	0	1
13+	0	0	1	1	0	0	0	0	0	0	0	0
14+	0	0	0	0	0	0	0	1	1	0	0	0
15+	0	0	0	0	0	0	0	0	0	0	0	0
>15+	0	0	0	0	0	0	0	0	0	0	0	0
n =	260	127	237	95	287	83	200	39	306	90	356	99
Mean age of ≥ 2.5 year old moose	3.82	4.82	4.34	5.19	3.99	4.60	4.19	4.76	4.05	4.56	3.80	5.39

Moose

Table 4. Mean age of adult (2.5 years and older) moose from check stations and comparison of immature (1.5 to 3.5 age classes) to mature (>3.5 age classes) bulls, 1967 – 2001.

Hunt Year	Mean Age				Comparison of Bulls	
	Cows (Provincial)	Cows NE MMU's	Bulls (Provincial)	Bulls NE MMU's	Harvested Bulls 1.5-3.5 yrs old (%)	Harvested Bulls >3.5 yrs old (%)
1967	5.80	--	4.10	--	--	--
1968	5.50	--	4.39	--	--	--
1969	5.80	--	4.70	--	--	--
1970	6.20	--	5.00	--	--	--
1971	6.20	--	5.00	--	--	--
1972	6.30	--	5.30	--	--	--
1973	6.80	--	5.30	--	--	--
1974	5.70	--	4.70	--	--	--
1975	6.40	--	5.30	--	--	--
1976	5.30	--	4.60	--	--	--
1977	5.10	--	4.30	--	--	--
1978	4.50	--	4.30	--	72	28
1979	5.10	--	4.30	--	73	27
1980	6.20	--	4.60	--	61	39
1981	5.60	--	4.50	--	64	36
1982	5.60	--	4.80	--	63	37
1983	5.50	--	4.60	--	74	26
1984	6.20	--	4.50	--	69	31
1985	5.52	5.69	4.33	4.30	74	26
1986	6.00	5.53	4.11	4.05	77	23
1987	6.13	6.10	4.16	3.91	79	26
1988	5.59	5.65	3.90	3.79	79	21
1989	5.63	5.75	4.18	4.00	74	26
1990	5.14	5.14	4.08	3.94	76	24
1991	5.38	5.53	4.54	4.06	76	24
1992	6.08	6.25	3.89	3.80	81	19
1993	6.04	6.10	3.88	3.88	83	17
1994	6.04	5.82	3.88	4.02	80	20
1995	6.39	6.40	3.75	3.62	85	15
1996	4.82	4.50	3.82	3.68	77	23
1997	5.19	5.03	4.34	4.03	68	23
1998	4.60	4.66	3.99	4.03	76	24
1999	4.76	5.30	4.19	4.14	61	39
2000	4.56	4.31	4.05	3.86	80	20
2001	5.39	5.46	3.80	3.66	82	18

Moose

2.3 Mortality

2.3.1 Moose Tick (*Dermacentus albipictus*)

Moose are generally infested with moose ticks annually, but environmental conditions can result in major tick loads in some years. There were no reports of tick related mortality in the spring of 1999, 2000, nor 2001. The extended mild fall of 2001 resulted in a protracted period of tick infestation. As a result, field reports suggest severe moose mortality occurred during the spring of 2002 in the Porcupine Hills (WMZs 56, 57), Greenwater Lake Provincial Park (WMZ 28), and southern and western slopes of the Pasquia Hills (WMZ 59). Field reports provided a sample of 225 moose composed of 25 adult bulls, 19 yearling bulls, 28 adult cows, 18 yearling cows, 77 calves and 58 unclassified moose. Of those classified (n = 167), 26% were bulls, 28% were cows and 46% were calves. The 2001/02 winter population structure for Pasquia and Porcupine MMUs (pooled) prior to the tick mortality was estimated to be 19% bulls, 57% cows and 24% calves (n =10,493 moose).

2.3.2 License Sales

Table 5. Summary of provincial moose license sales and annual harvest, 1980 - 2001.

Hunt Year	Licenses Sold					Moose Harvest				
	Regular (Bull-calf)	Draw (Either-sex)	Archery	Guided (Bull-calf)	Total License Sales	Regular (Bull-calf)	Draw (Either-sex)	Archery	Guided (Bull-calf)	Total
1980	11,077	2,355	--	284	13,716	4,133	1,365	--	274	5,772
1981	10,542	2,400	--	289	13,232	1,668	579	--	112	2,359
1982	10,212	2,034	--	282	12,527	2,098	456	--	93	2,647
1983	7,894	1,967	29	212	10,073	1,534	579	4	70	2,187
1984	8,006	1,898	41	194	10,165	2,371	821	3	90	3,285
1985	8,125	2,105	38	239	10,507	1,413	653	2	92	2,160
1986	9,159	2,088	31	208	11,486	2,554	910	6	96	3,566
1987	8,653	2,133	43	217	11,046	2,309	1,067	5	108	3,489
1988	9,181	2,202	34	235	11,652	2,768	1,144	2	157	4,071
1989	9,557	1,883	46	252	11,738	3,471	1,121	14	156	4,762
1990	9,240	2,077	41	249	11,607	2,060	896	7	98	3,061
1991	9,238	2,014	--	212	11,464	2,935	1,186	--	161	4,282
1992	8,888	2,095	--	206	11,189	2,200	1,042	--	174	3,416
1993	8,153	2,280	--	206	10,639	2,595	1,195	--	82	3,872
1994	9,316	2,365	--	213	11,894	2,480	1,121	--	113	3,601
1995	9,802	2,053	--	285	12,143	3,864	1,199	--	61	5,124
1996	7,905	2,082	--	223	10,580	2,199	982	--	67	3,248
1997	6,668	1,717	--	237	8,622	1,474	829	--	90	2,393
1998	8,368	901	--	249	9,518	2,460	526	--	122	3,108
1999	8,436	949	--	227	9,603	2,037	532	--	48	2,617
2000	8,521	948	--	272	9,721	2,821	591	--	98	3,510
2001	9,287	947	--	254	10,488	3,519	559	--	73	4,151
Mean	8,919	1,886	--	238	11,073	2,624	906	--	111	3,335

Moose

2.3.3 Hunting Activity and Harvest

There are no data available to assess the impact of subsistence harvest. Saskatchewan resident licensed harvest and hunting activity is summarized in Table 6. Table 7 compares the early and late regular season harvests.

Table 6. Provincial resident moose harvest by moose management unit (MMU), 1999 – 2001 (see Big Game Hunter Harvest Survey Statistics for summaries of hunting activity and harvest by season and WMZ).

MMU/ WMZ(s)	Hunt Year	# of Hunters	Harvest				Hunter- days	Hunter- days/ Animal
			Bulls	Cows	Calves	Total		
Cypress Hills WMZ 6, 7	1999	60	33	14	9	56	142	2.5
	2000	60	28	23	7	58	315	5.4
	2001	60	24	23	9	56	160	2.9
	10-yr mean	47	21	15	6	42	153	3.6
Kindersley WMZ 25 - 27	1999			No season				
	2000			No season				
	2001			No season				
	10-yr mean			No season				
Moose Mountain WMZ 33	1999			No season				
	2000			No season				
	2001			No season				
	10-yr mean			No season				
Eastern Qu'Appelle WMZ 35	1999			No season				
	2000			No season				
	2001			No season				
	10-yr mean			No season				
Duck Mountain WMZ 37	1999	137	31	11	8	50	467	9.3
	2000	138	38	17	0	55	718	13.1
	2001	127	19	16	6	41	472	11.5
	10-yr mean	122	27	18	6	50	594	11.8
Parkerview WMZ 39	1999			No season				
	2000			No season				
	2001			No season				
	10-yr mean			No season				
Barrier Valley WMZ 40, 42	1999	50	17	9	5	31	139	4.5
	2000	50	20	9	10	39	153	3.9
	2001	50	35	10	3	48	140	2.9
	5-yr mean	40	19	10	4	33	144	4.4
MacDowall Forest WMZ 51, 52	1999			No season				
	2000			No season				
	2001			No season				
	10-yr mean			No season				
Fort a la Corne WMZ 43, 50	1999	217	31	5	18	54	1,289	23.9
	2000	179	15	9	27	51	1,026	20.1
	2001	247	37	7	24	68	1,122	16.5
	10-yr mean	160	34	8	18	60	860	14.3
Sonningdale WMZ 45	1999			No season				
	2000			No season				
	2001			No season				
	10-yr mean			No season				

Moose

Table 6. Continued.

MMU/ WMZ(s)	Hunt Year	# of Hunters	Harvest				Hunter- days	Hunter- days/ Animal
			Bulls	Cows	Calves	Total		
Porcupine Hills WMZ 48, 56, 57	1999	3,412	534	90	298	922	17,907	19.4
	2000	3,483	786	65	553	1,404	17,563	12.5
	2001	3,780	905	84	789	1,778	19,591	11.0
	10-yr mean	3,917	727	132	497	1,356	18,863	13.9
Pasquia Hills WMZ 49, 58, 59	1999	2,454	284	33	165	482	11,224	23.3
	2000	2,221	390	84	234	708	10,606	15.0
	2001	2,381	452	53	379	884	12,248	13.9
	10-yr mean	2,416	449	82	240	770	11,779	15.3
Cumberland Delta WMZ 60-62	1999	370	82	12	36	130	2,077	16.0
	2000	383	88	6	20	114	1,742	15.3
	2001	445	43	7	44	94	2,052	21.8
	10-yr mean	619	75	17	31	123	2,786	22.6
Candle Lk/Cub Hills WMZ 63 - 65	1999	794	123	30	24	177	3,112	17.6
	2000	531	114	21	10	145	2,465	17.0
	2001	470	78	27	28	133	2,368	17.8
	10-yr mean	585	97	23	17	137	2,360	17.2
Sled - PANP WMZ 66, PANP	1999	327	59	0	27	86	1,495	17.4
	2000	300	52	13	19	84	1,786	21.3
	2001	302	74	16	21	111	1,647	14.8
	10-yr mean	356	71	10	20	100	1,668	16.6
Bronson Forest WMZ 47, 68N, 68S	1999	293	37	0	12	49	1,405	28.7
	2000	209	68	0	19	87	1,052	12.1
	2001	320	72	0	61	133	2,368	17.8
	10-yr mean	409	82	20	52	154	1,673	10.9
Divide Forest WMZ 53, 55, 67	1999	900	248	0	87	335	6,204	18.5
	2000	1,123	233	12	8	333	5,085	15.3
	2001	1,328	284	6	179	469	6,648	14.2
	10-yr mean	1,230	268	21	110	399	5,429	13.6
Thickwood Hills WMZ 54	1999	50	8	18	14	40	161	4.0
	2000	50	8	16	10	34	164	4.8
	2001	50	0	13	13	26	199	7.7
	10-yr mean	60	7	13	9	29	251	8.8
Meadow Lk - PAWR WMZ 69, PAWR	1999	334	56	0	18	74	1,249	16.9
	2000	328	117	0	31	148	1,416	9.6
	2001	307	79	0	30	109	1,613	14.8
	10-yr mean	285	72	0	24	96	1,208	12.6
Creighton WMZ 70	1999	138	19	0	6	25	850	34.0
	2000	138	18	0	0	18	1,008	56.0
	2001	110	37	0	0	37	800	21.6
	10-yr mean	152	22	0	4	26	830	32.3
Churchill WMZ 71 – 73	1999	178	37	0	6	43	863	20.1
	2000	186	43	0	6	49	1,244	25.4
	2001	140	18	0	6	24	810	33.8
	10-yr mean	162	28	0	6	35	695	20.1
Boreal Shield WMZ 74 – 76	1999	87	19	0	6	25	431	17.2
	2000	77	43	0	6	49	433	8.8
	2001	105	42	0	6	48	629	13.1
	10-yr mean	68	29	0	3	31	443	14.1
MMU Total	1999	9,801	1,618	222	739	2,579	49,015	19.0
	2000	9,456	2,061	275	1,040	3,376	46,776	13.9
	2001	10,222	2,199	262	1,598	4,059	52,867	13.0
	10-yr mean	10,384	2,017	363	1,044	3,424	49,853	14.6

Moose

Table 7. Comparison of moose harvest in the early vs late regular (rifle) seasons, 1984 – 2001.

Hunt Year	Early Regular Season			Late Regular Season		
	Season Dates	Total Harvest (Bulls+calves)	Bull Harvest Number %	Season Dates	Total Harvest (Bulls+calves)	Bull Harvest Number %
1984	8 - 13 Oct	415	357 86.0	19 Nov - 1 Dec	1,626	1,040 64.0
1985	7 - 12 Oct	345	259 75.1	18 - 30 Nov	890	543 61.0
1986	6 - 11 Oct	841	681 81.0	17 - 29 Nov	1,443	909 63.0
1987	5 - 10 Oct	691	560 81.0	16 - 28 Nov	1,611	1,015 63.0
1988	3 - 8 Oct	811	657 81.0	21 Nov - 3 Dec	1,891	1,191 63.0
1989	2 - 7 Oct	1,398	1,104 79.0	20 Nov - 2 Dec	1,846	1,052 57.0
1990	8 - 13 Oct	741	548 74.0	19 Nov - 1 Dec	1,307	836 64.0
1991	7 - 12 Oct	1,154	762 66.0	18 - 30 Nov	1,667	984 59.0
1992	5 - 10 Oct	892	723 81.1	16 - 28 Nov	1,134	624 55.0
1993	4 - 9 Oct	924	739 80.0	15 - 27 Nov	1,552	885 57.0
1994	3 - 8 Oct	823	700 85.1	14 - 26 Nov	1,613	903 56.0
1995	2 - 7 Oct	1,237	1,014 82.0	13 - 25 Nov	2,565	1,513 59.0
1996	7 - 12 Oct	979	832 85.0	18 - 30 Nov	1,220	610 50.0
1997	13 - 18 Oct	778	524 67.4	17 - 22 Nov	727	378 52.0
1998	12 - 17 Oct	1,210	783 64.7	16 - 21 Nov	1,204	680 56.5
1999	11 - 16 Oct	925	681 73.6	15 - 20 Nov	1,019	594 58.3
2000	16 - 21 Oct	947	668 70.5	20 - 25 Nov	1,720	891 51.8
2001	15 - 20 Oct	1,973	1,197 60.7	19 - 24 Nov	1,423	684 48.1
Mean		943	710 75.3		1,470	852 57.9

2.4 Population Status by MMU

Table 8. Summary of moose population status by MMU.

Moose Management Unit	WMZ	Population Status
Cypress Hills	6, 7	Stable, no problems / issues of concern
Kindersley	25 - 27	Stable/slightly growing, but very low density due to habitat limitations. Minor concerns with depredation of fruit trees, and public safety.
Moose Mountain	33	Stable population at long-term density objective, no problems / issues of concern.
Eastern QuAppelle	35	Very small population at very low density.
Duck Mountain	37	Stable population at long-term density objective. Main concern is low calf recruitment.
Parkerview	39	No survey data available. Field reports indicate population is stable.
Barrier Valley	40, 42	No survey data available. Field reports indicate population is stable.
Sonningdale	45	No survey data available. Field reports indicate population is stable.
MacDowall Forest	51, 52	No survey data available. Field reports indicate population is stable.
Fort a la Corne	43, 50	No survey data available. Field reports indicate population is stable.
Porcupine Hills	48, 56, 57	Population was near long-term objective, following a harvest that was 40% larger than recommended by Arsenault (2000). Suspected severe tick-related mortality occurred in late spring 2002, including Greenwater Prov. Park. Also, concern with lack of mature breeding bulls.
Pasquia Hills	49, 58, 59	Population was near long-term objective, following a normal level of harvest. Suspected severe tick-related mortality occurred in late spring 2002 along west and south slopes of this MMU. Also, concern with lack of mature breeding bulls.

Moose

Table 8. Continued.

Moose Management Unit	WMZ	Population Status
Cumberland Delta	60 - 62	Population is 55% below the long-term objective. Calf recruitment is very low.
Candle Lake/Cub Hills	63 - 65	Population density is 42% below long-term objective.
Sled Lake / PANP	66	No recent survey data available. Population density is considered to be 22% below the long-term objective.
Bronson Forest	47, 68S, 68N	Population density is 36% below the long-term objective. Adult sex ratio is below long-term objective.
Divide Forest	53, 55, 67	Population density is 22% below long-term objective. Adult sex ratio is below long-term objective.
Thickwood Hills	54	Population is stable and near it's long-term density objective.
Meadow Lake/PAWR	69	Population density is near it's long-term objective. Adult sex ratio is below the recommended level and calf recruitment is lower than desired.
Creighton	70	Data deficient. Suspect a declining population density in the southern portion of MMU
Churchill	71 - 73	Data deficient.
Boreal Shield	74 - 76	Data deficient.

3.0 Management Strategies

3.1 Northern Harvest Strategies (WMZs 48, 49, 56 - 76)

In 1997 the early regular season was delayed one week to avoid the rut and conserve bulls in the Porcupine MMU. This change was implemented across the province to avoid increasing hunting pressure in some zones, but harvest data indicates it had no effect on bull conservation in the early season. In addition, the late regular season was reduced to one week as a bull conservation measure. Harvest data indicate this had some success at reducing bull harvest, but overall harvest remained unchanged due to increased calf harvest. The over-harvest of mature bulls in the Pasquia and Porcupine MMUs remains an issue needing resolution.

In 1998, the draw quotas were reduced because of concerns with low moose population densities in Porcupine, Cumberland and Divide MMUs, as indicated by surveys conducted during the winter of 1997. The intent was to reduce hunting pressure on cow moose to stimulate population growth. However, this resulted in higher harvest pressure on mature bulls and a subsequent further decline in mature bull numbers in the Pasquia and Porcupine MMUs.

There were no significant changes to the moose allocation strategy for the 1999, 2000 or 2001 hunting seasons.

3.2 Southern Harvest Strategies (WMZs 6, 7, 25 - 27, 33, 35, 37, 39, 40, 42, 43, 50 - 52)

- Cypress Hills MMU (WMZs 6, 7) – Status quo.
- Kindersley MMU (WMZs 25-27) – Population is too small and at too low of a density to support a sustainable hunting season.
- Moose Mountain MMU (WMZ 33) – SE will initiate moose management planning within Moose Mountain Provincial Park, involving user groups (First Nations, licensed hunters, landowners, park users, etc.).
- Eastern QuAppelle (WMZ 35) - Population is too small and at too low of a density to support a sustainable hunting season.
- Duck Mountain MMU (WMZ 37) – Status quo.
- Parkerview (WMZ 39) - Population is too small and at too low of a density to support a sustainable hunting season.
- Barrier Valley MMU (WMZs 40, 42) – Status quo.
- Fort a la Corne MMU (WMZs 43, 50) – the license quota will continue to be restricted to 50 licenses within the Wildlife Management Unit portion of the MMU.
- MacDowall Forest MMU (WMZs 51, 52) - Population is too small and at too low of a density to support a sustainable hunting season.
- Thickwood Hills MMU (WMZ 54) – Status quo.

4.0 Literature Cited

Arsenault, A.A. 2000. Status and management of moose (*Alces alces*) in Saskatchewan. Sask. Envir. And Resour. Manage. Fish and Wildl. Branch Tech. Rep 00-1. 84 pp.

Gasaway, W.C., S.D. DuBois, D.J. Reed, and S.J. Harbo. 1986. Estimating moose population parameters from aerial surveys. Biol. Papers of the Univ. of Alaska. Inst. Of Arctic Biol. No. 22. ISSN 0568-8604.

Lynch, G.M. and G.E. Schumaker. 1995. GPS and GIS assisted moose surveys. *Alces* 31:145-151.

Stewart, R.R. 1983. The stratified random block aerial survey technique. Sask. Parks and Ren. Res. Wildlife Branch. Wildlife Population Manage. Bulletin 83-WPM-12.

Barren-ground Caribou (*Rangifer tarandus*)

1.0 Long-term Management Objectives

- Maintain population levels for each herd between a minimum 150,000 (crisis herd size) and levels that are biologically sustainable on herd range, while maintaining good caribou condition.
- To monitor population levels to determine optimum herd size.
- To protect caribou and their habitat from human disturbance.

2.0 Population Status

2.1 Provincial Overview

The Beverly and Qamanirjuaq caribou herds are jointly managed under the advisement of the Beverly-Quamanirjuaq Caribou Management Board (BQCMB). Both herds calve in Nunavut. The Beverly herd traditionally calves near Beverly Lake and the Thelon River system, and have recently expanded to Gary, Sand and Deep Rose Lakes. The Qamanirjuaq herd calves near Qamanirjuaq Lake. The winter ranges (November to March) of both herds typically extend into Saskatchewan and Manitoba. The Beverly herd has been known to migrate south into northern Saskatchewan as far as Carswell and Cree Lakes. Harvest pressure can be higher than usual in years when their winter range reaches these communities (1979/80). The Qamanirjuaq herd winter range generally extends mainly into northern Manitoba, with some overlap into northern Saskatchewan as far as Reindeer Lake (Figure 1).

2.2 Survey Data

Calving ground surveys of both herds are conducted approximately every 6 years using aerial photography. Table 1 summarizes population survey results.

2.3 Biological Sample Collections

No data available.

Barren-ground Caribou

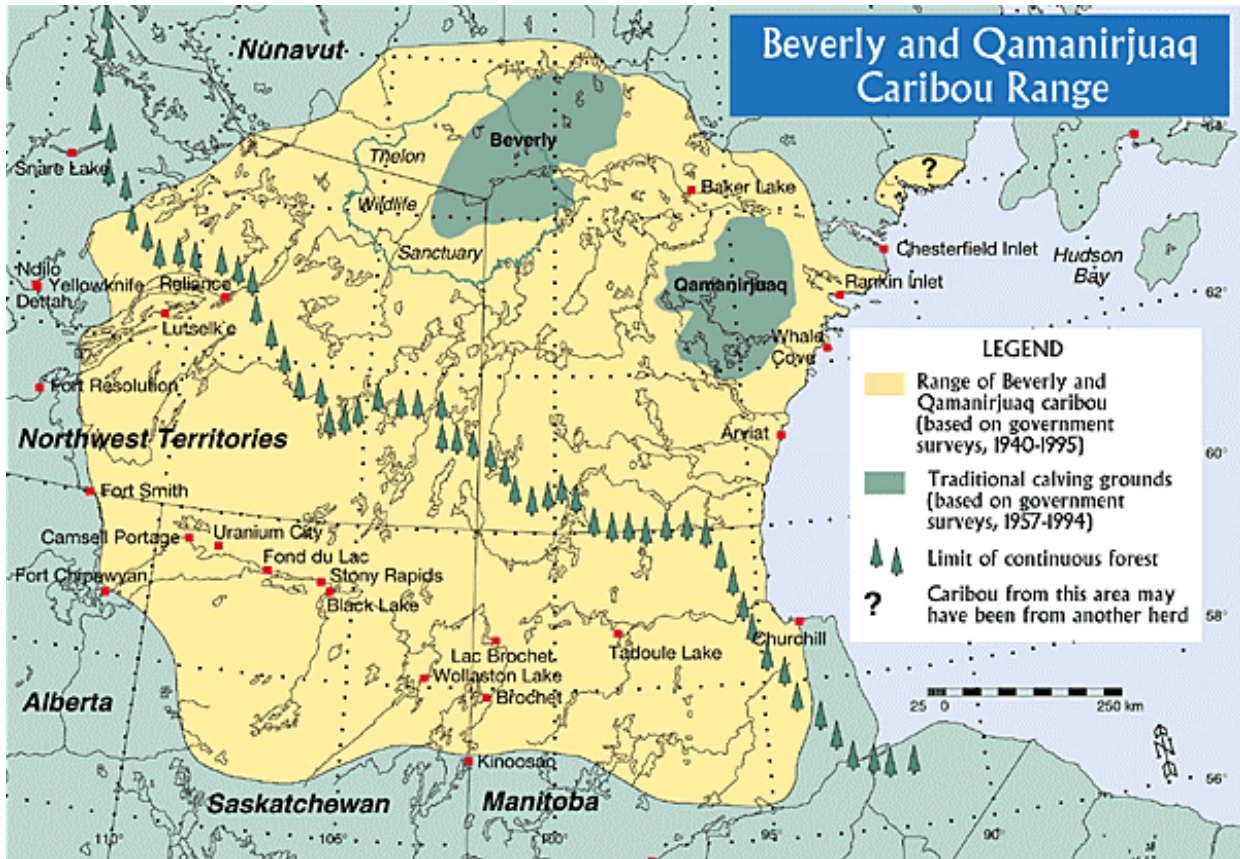


Figure 1. Beverly and Qamanirjuaq caribou herd ranges (from: http://www.arctic-caribou.com/range_map.html).

Barren-ground Caribou

Table 1. Summary of barren-ground caribou population status by herd, 1974 - 2001.

Survey Year	Beverly Herd			Qamanirjuaq Herd		
	Estimated Population	±S.E.	Recruitment Rate (%)	Estimated Population	±S.E.	Recruitment Rate (%)
1974	177,000	--	--	--	--	--
1975	--	--	--	--	--	--
1976	--	--	--	--	--	--
1977	--	--	--	--	--	--
1978	--	--	--	--	--	--
1979	--	--	--	--	--	--
1980	94,000	--	--	39,000	--	--
1981	--	--	--	--	--	--
1982	164,338	72,332	--	--	--	--
1983	--	--	--	230,000	50,000	--
1984	263,691	80,652	--	--	--	--
1985	--	--	--	272,000	60,000	--
1986	--	--	--	--	--	--
1987	--	--	--	--	--	--
1988	189,561	70,961	--	221,000	76,000	23
1989	--	--	--	--	--	--
1990	--	--	--	--	--	--
1991	--	--	--	--	--	--
1992	--	--	--	--	--	--
1993	86,728	17,943	--	--	--	--
1994	286,000	106,600	19	496,000	106,600	--
1995	--	--	--	--	--	47
1996	--	--	--	--	--	--
1997	--	--	--	--	--	--
1998	--	--	--	--	--	--
1999	--	--	--	--	--	--
2000	--	--	--	--	--	--
2001	--	--	--	--	--	--

2.4 Mortality

2.4.1 License Sales and Harvest

Only residents of WMZ 76 are eligible to purchase a license to harvest barren-ground caribou. These individuals are entitled to purchase a maximum of 2 either-sex licenses. License sales and subsequent harvest is negligible in Saskatchewan (Table 2).

2.4.2 Subsistence Harvest

This source of harvest is the most significant kind, however, the harvest study was terminated in 1995 due to budget constraints and consequently no harvest data are available for subsequent years.

2.4.3 Predation

Wolves account for 60-70% of calf mortality from the Beverly herd.

Table 2. Barren-ground caribou license sales, 1984 - 2001.

Barren-ground Caribou

Hunt Year	License Sales				Subsistence Use	
	1 st Either-sex License	2 nd Either-sex License	Total Issued	Harvest	Licenses	Harvest
1984	?	?	41	?	?	?
1985	?	?	42	?	?	?
1986	?	?	51	?	?	?
1987	36	25	61	?	?	?
1988	19	15	34	0	?	?
1989	17	12	29	13	?	?
1990	15	12	27	11	?	?
1991	44	33	77	39	24	48
1992	41	32	73	64	26	52
1993	43	34	77	33	10	10
1994	49	35	84	40	64	10
1995	28	22	50	32	32	12
1996	25	22	47	44	4	6
1997	31	27	58	46	Study terminated	
1998	13	9	22	?	?	?
1999	34	26	60	?	?	?
2000	9	9	18	?	?	?
2001	18	14	32	?	?	?

3.0 Management Strategies

- Monitor industrial development, road and trail access onto the caribou range and recommend mitigation to minimize disturbance to caribou that could result in future herd distribution away from communities and important winter habitat in Saskatchewan.
- Ensure that caribou are accessible and available to traditional users through continued monitoring of herd status and harvest.
- Promote the development of fire management policy that incorporates the fire management recommendations of the Beverly Qamanirjuaq Caribou Management Board (BQCMB). These recommendations are specifically designed to ensure continued access and availability to caribou by the traditional users; and to increase knowledge of caribou ecology.
- Promote and distribute BQCMB information and newsletter to a broad public audience, and encourage attendance of community members to BQCMB related meetings to promote stronger public involvement and gain public support for barren-ground caribou conservation.
- Increase knowledge of caribou ecology and encourage wise use of caribou through cooperation with other northern wildlife management boards, and involvement of local individuals and organizations in caribou management programs.
- Provide adequate incremental funding support for future cooperative population survey and related monitoring efforts.
- Re-establish the harvest study in order to detect crisis herd levels.
- Use the Important Habitats Document and related material to recommend adequate protection of caribou habitat from industrial development and other human activity on caribou range.
- Work with aboriginal representatives on the BQCMB to develop criteria for community involvement in monitoring caribou populations, and to take part in the Arctic Borderlands monitoring initiative concerned with the effects of global warming on the arctic ecosystems.

Woodland Caribou (*Rangifer tarandus caribou*)

1.0 Long-term Management Objectives

A formal long-term strategic management plan has not been developed for Woodland Caribou. The following interim objectives will be used until such time as a long-term plan is available:

- Develop a Status and Conservation Management Framework for woodland caribou in 2003, for use in provincial recovery planning by the provincial Woodland Caribou Management Team (WCMT) and Woodland Caribou Technical Working Group (WCTWG).
- To cooperate with other Canadian jurisdictions as a member of the National Boreal Caribou Technical Steering Committee in developing a national boreal caribou recovery plan.

2.0 Population Status

2.1 Provincial Overview

Woodland caribou in Saskatchewan are the boreal ecotype. At the National scale, woodland caribou received a designation of “rare” by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 1984. The COSEWIC “rare” designation was redefined as “vulnerable” in 1995. The “vulnerable” designation was upgraded to “threatened” in May 2000 by COSEWIC, which placed woodland caribou under the purview of the Recovery of Nationally Endangered Wildlife (RENEW) program. The change in designation to “vulnerable” was a consequence of reported declines in numbers and distribution of woodland caribou throughout most of their range due to habitat loss and fragmentation, human related disturbance, increased predation, and the sensitivity of woodland caribou to those factors due to their low reproductive rate.

At the provincial scale, Godwin and Thorpe (2000) reviewed the status of woodland caribou. They estimated the provincial mid-1990s population to be about 5,000 animals, and recommended a provincial designation of “threatened” for woodland caribou in Saskatchewan on the basis of:

1. Observed elimination of individual woodland caribou bands due to their sedentary nature.
2. Indication of population declines in the mid-boreal ecoregion concurrent with logging, mining and associated road development.
3. Planned expansion of the forest industry under current government policy.

In October 2001, Saskatchewan initiated woodland caribou recovery planning by organizing a Provincial Woodland Caribou Management Team (WCMT) composed of representatives from industry, First Nations, government and interest groups. The WCMT first met in January 2002. A Woodland Caribou Technical Working Group (WCTWG) was chosen from the WCMT in March 2002. At the direction of the WCMT, the WCTWG is responsible for drafting a woodland caribou recovery plan for review and endorsement by the WCMT. Once complete, the woodland caribou recovery plan and recommendations will be presented to the Minister of Saskatchewan Environment for consideration.

Woodland Caribou

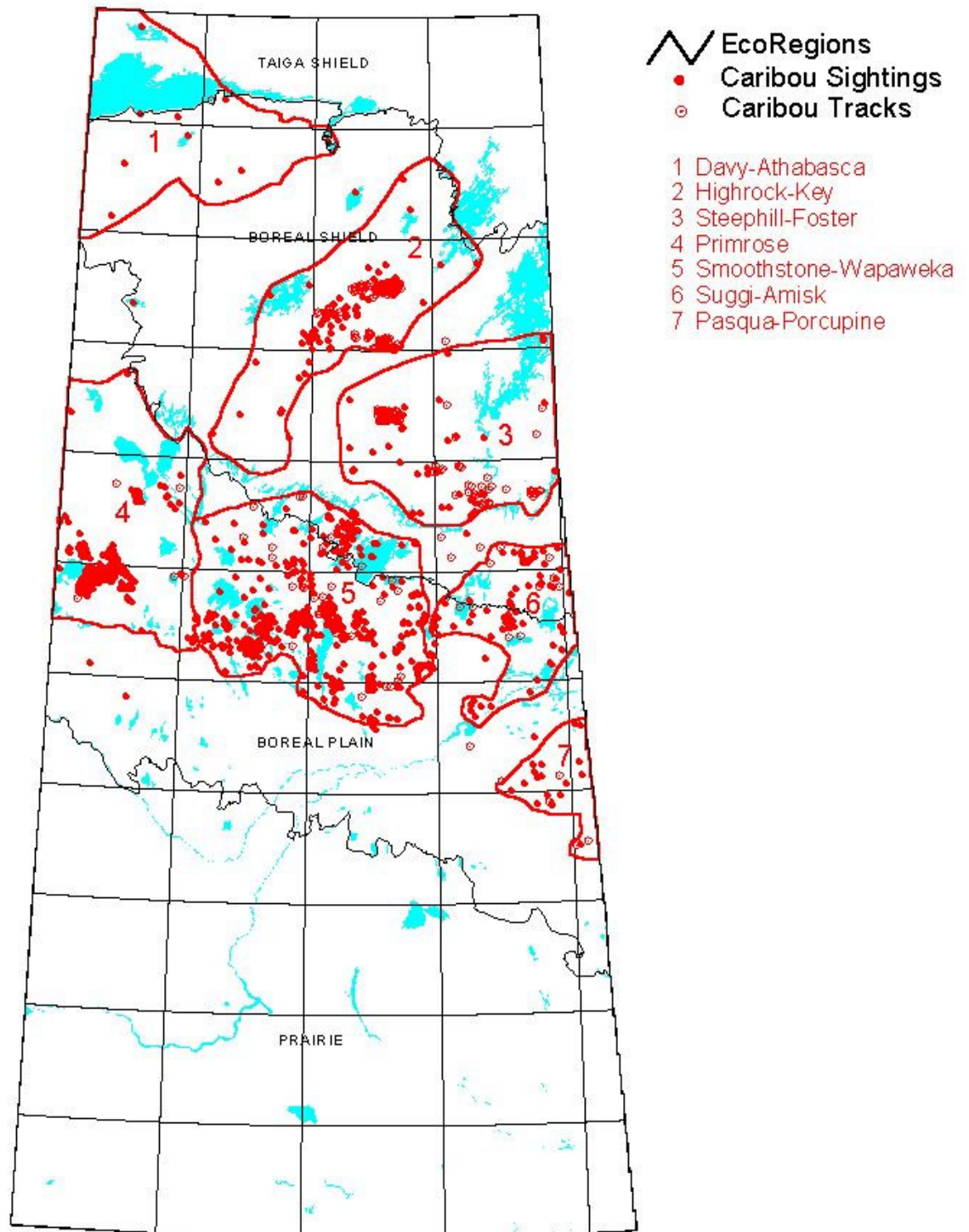


Figure 1. Woodland caribou management units (WCMUs) as defined by observational data from various sources and traditional knowledge (See Table 1). WCMU boundaries may be adjusted in the future as new observational data are collected.

Note: Much of the data presented for the Primrose WCMU is caribou telemetry data provided courtesy of a data usage licensing agreement (20 Dec. 2001) between Sask. Environment and the Boreal Caribou Research Program.

Woodland Caribou

2.2 Survey Data

Woodland Caribou meta-population distributions were identified using all available observational data obtained from several sources (incidental sightings from ungulate aerial surveys, woodland caribou population surveys, tracks/sightings observations survey (Trottier 1988), and traditional knowledge (Dorion and Hiebert 2002). Table 1 summarizes estimated size of woodland caribou meta-populations in relation to range, based on interpolation from limited survey data.

Table 1. Summary of woodland caribou status by management unit.

Woodland Caribou Management Unit (WCMU)	Range Area (km ²)	Survey Year	Survey Area (km ²)	Geographic Area	Population Density (#/km ²)	Source	Estimated Population Size
Davy - Athabasca	31,520	---	---	West Athabasca Plain ecogregion	0.008	Godwin and Thorpe (2000)	240 ^(a)
Highrock - Key	32,852	1979	9,000	Key Lake	0.030	Beak Consultants Ltd. (1979)	1,350 ^(b)
		1987	697	Cigar Lake	0.030	Beak Assoc. Consulting Ltd. (1988)	
		Jan 1988	2,380	Key Lake	0.043	Brewster (1988)	
		1988	1,656	Island Falls – Points North	0.033	Beak Assoc. Consulting Ltd. (1989)	
		Jan 1992	2,380	Key Lake	0.039	Trottier (1994)	
Steepphill - Foster	33,190	1988	1,656	Island Falls – Points North	0.033	Beak Assoc. Consulting Ltd. (1989)	1,100 ^(c)
Primrose	32,601	---	---	Primrose WCMU	0.011	Godwin and Thorpe (2000)	350 ^(a)
Smoothstone - Wapaweka	41,639	1960		West La Ronge	0.045	Ruttan (1960)	350 ^(a)
		Dec 1986	2,400	Weyakwin	0.024	Rock (1988)	
		Jan 1987	718	Sled Lake	0.038	Rock (1992)	
Suggi - Amisk	15,196	Jan 1987	1,080	Hanson Lake	0.050	Rock (1992)	100 ^(a)
		Jan 1987	920	Attiti Lake	0.059	Rock (1992)	
Pasquia - Porcupine	6,825	---	---	Pasquia-Porcupine WCMU	0.003	Godwin and Thorpe (2000)	20 ^(a)
WCMU Total	193,823						3,510

^(a) Godwin and Thorpe (2000) estimates for mid 1990s.

^(b) Range area x 0.041 caribou / km²

^(c) Range area x 0.033 caribou / km²

2.3 Biological Sample Collections

There were no biological samples collected in 1999, 2000, or 2001.

2.4 Mortality

2.4.1 License Sales and Harvest

The regulated harvest of this species was closed province-wide in 1987 due to concerns of declining populations.

2.4.2 Subsistence Harvest

Subsistence harvest still occurs with this species but the magnitude is not known.

3.0 Management Strategies

- To identify critical habitat within each WCMU as required by the Species at Risk Act (SARA).
- Continue to collect and compile observations of woodland caribou and their tracks, to better define caribou range and to identify areas of recent occupancy.
- Monitor industrial development, road and trail access in caribou range and recommend mitigation to minimize disturbance to caribou bands in WCMUs affected by development.
- Develop a peatland classification and GIS coverage to better define areas of important habitat relative to caribou sightings within each WCMU.

4.0 Literature Cited

Beak Associates Consulting Ltd. 1989. Island Falls-Points North 138 kV transmission line EIS. Sask. Power Corp.

Beak Associates Consulting Ltd. 1988. Cigar Lake Mining Corporation proposed permanent access road EIS.

Beak Consultants Ltd. 1979. Key Lake Project. Vol. 3. App. VII: Wildlife. 84 pp.

Boreal Caribou Research Program. 2001. Caribou Telemetry Data provided by Boreal Caribou Research Program, 15810 – 114 Avenue, Edmonton, AB, Canada T2M 2Z4: Agreement for Data Usage signed on 20 December 2001 with Sask. Environment.

Brewster, D. 1988. Status of woodland caribou and moose populations near Key Lake in northern Saskatchewan. Sask. Parks, Rec, and Cult., Wildl. Br. Tech. Rep 88-1. 25 pp.

Dorion, A., and D. Hiebert. 2002. Woodland Caribou Communications Strategy. Project Report by Prince Albert Grand Counsel to the Habitat Stewardship Program for Species at Risk. HSP Saskatchewan Working Group, Canadian Wildlife Service. 131 pp.

Godwin, B. and J. Thorpe. 2000. Status of the woodland caribou (*Rangifer tarandus caribou*) in Saskatchewan. Sask. Environ. and Resour. Manage., Fish and Wildl. Br. 44 pp.

Rock, T.W. 1992. A proposal for the management of woodland caribou in Saskatchewan. Sask. Nat. Resour., Wildl. Br. Tech. Rep. 92-3. 28 pp.

Woodland Caribou

Rock, T.W. 1988. An assessment of survey techniques and population characteristics of woodland caribou (*Rangifer tarandus caribou*) on three study areas in Saskatchewan. Sask. Parks, Rec. and Cult., Wildl. Br., Wildlife Popn. Manage. Info. Base 88-wpm-8. 16 pp.

Ruttan, R.A. 1960. A preliminary study of woodland caribou in Saskatchewan. Sask. Dept. of Nat. Resour., Wildl. Br. 22 pp.

Trottier, T. 1994. Status of woodland caribou and moose populations near Key Lake in northern Saskatchewan. Sask. Env. and Resour. Manage., Wildl. Br. Tech. Rep 94-4. 21 pp

Trottier, T. 1988. A survey of woodland caribou occurrences in Saskatchewan, 1960 – 1987. Sask. Parks, Rec. and Cult., Wildl. Br., Wildl. Popn. Manage. Info. Base 88-WPM-9. 24 pp.

Pronghorn Antelope (*Antilocapra americana*)

1.0 Long-term Management Objectives

- Maintain the core (WMZs 1 – 13) fall (pre-hunt) population near it's long-term mean size of 17,500±10% antelope.
- Maintain the fall (pre-hunt) core herd structure near it's long-term mean of 46 Bucks/100 Does/55 Kids.
- Maintain 57,500 km² of core range (WMZs 1 – 13).

2.0 Population Status

2.1 Provincial Overview

Based on aerial survey data and population modeling, the provincial antelope population during fall 2002 was estimated to be 18,327. The core (WMZs 1 – 13) antelope population was estimated to be 16,444 (Figure 1). Antelope management units (AMUs) are illustrated in Figure 2.

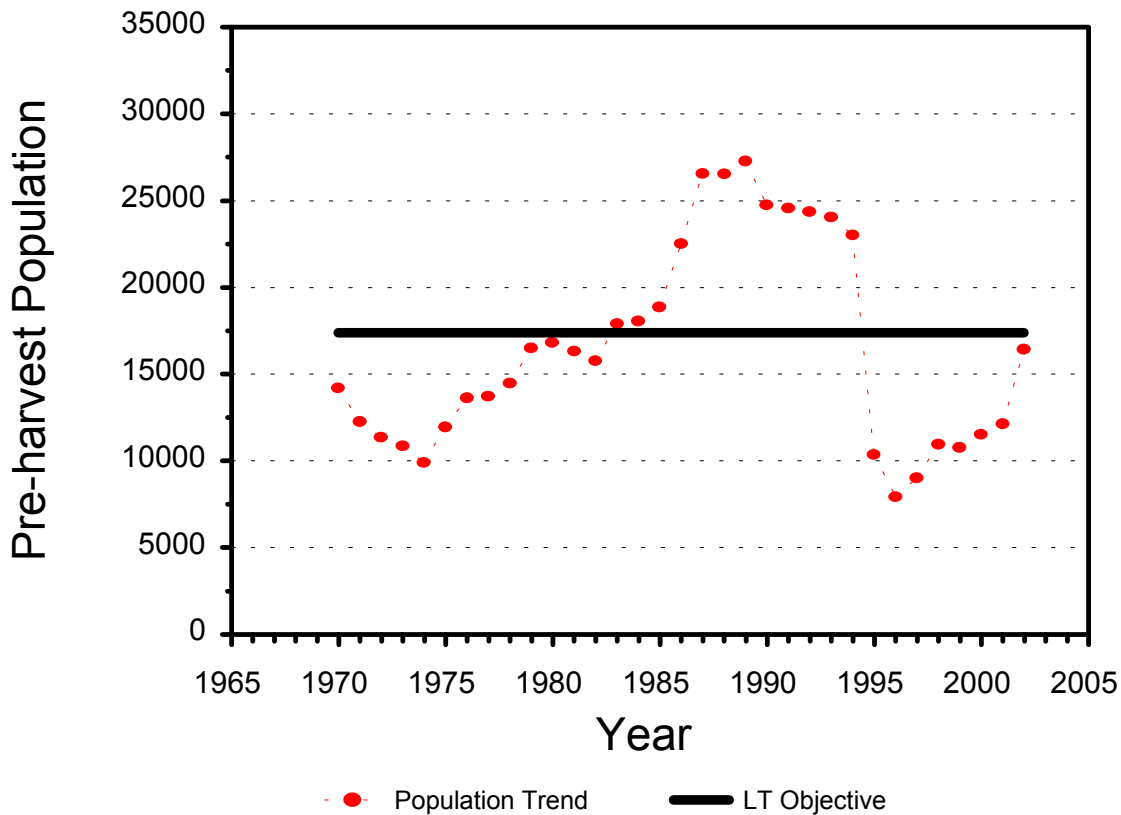


Figure 1. Estimated core range (WMZ 1-13) pronghorn fall population in relation to long-term objective.

Pronghorn Antelope

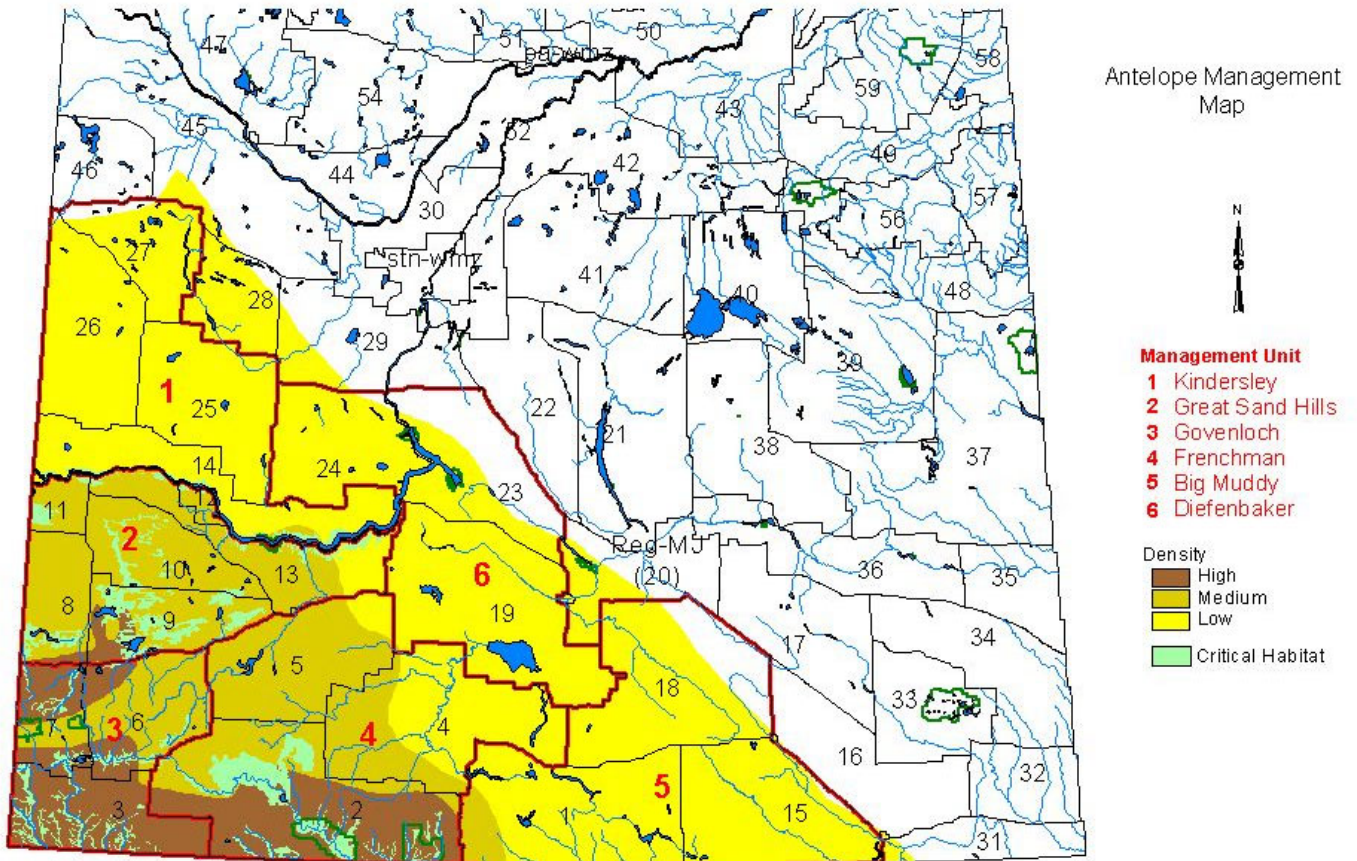


Figure 2. Antelope management units (AMUs).

2.2 Survey Data

Table 1 summarizes current population size and structure in relation to long-term averages based on model interpolation from survey data (Tables 2 and 3).

The fall 2002 provincial population estimate (18,327 antelope) is 12% below the long-term population objective (20,803 antelope) (Table 1). The adult segments of the population exceed their long-term objectives, particularly in the core range AMUs (ie. Govenlock and Frenchman). However, the continued low kid survival, since 1991, remains a concern (Table 4). The low kid survival in 2002 (Tables 3 and 4) is attributed primarily to inclement weather conditions (snow) during parturition, which likely caused significant kid mortality.

Pronghorn Antelope

Table 1. Fall (pre-hunt) pronghorn population size, structure, and density estimates based on aerial surveys, 1999 – 2002.

Antelope Management Unit (AMU)	WMZs	Year	Estimated Fall Population Size				AMU Density (#/km ²)	Fall Population Structure		
			Bucks	Does	Kids	Total		Bucks/100 Does	Kids/100 Does	n
Govenlock (11,608 km ²)	3, 6, 7	1999 ^(a)	753	2,815	951	4,519	0.389	27	34	228
		2000 ^(a)	1,011	2,469	991	4,471	0.385	41	40	382
		2001	1,248	2,378	472	4,098	0.353	52	20	729
		2002	1,719	3,656	471	5,846	0.504	47	13	767
		Mean (1964-2001)	1,321	2,969	1,503	5,794	0.499	45	51	
Frenchman (24,792 km ²)	2, 4, 5	1999 ^(a)	1,021	2,695	612	4,328	0.175	38	23	143
		2000 ^(a)	1,285	2,867	833	4,984	0.201	45	29	106
		2001 ^(a)	1,389	3,308	1,169	5,866	0.237	42	35	507
		2002	2,327	4,845	503	7,675	0.310	48	10	1,149
		Mean (1964-2001)	1,741	3,468	1,676	6,886	0.278	50	48	
G. Sand Hills (16,122 km ²)	8 - 13	1999	--	--	--	--	--	--	--	--
		2000	--	--	--	--	--	--	--	--
		2001	--	--	--	--	--	--	--	--
		2002 ^(a)	779	2,362	415	3,556	0.221	33	18	--
		Long-term Objective ^(b)	1,118	2,192	1,556	4,866	0.302	51	71	
Big Muddy (23,391 km ²)	1, 15, 18	1999	--	--	--	--	--	--	--	--
		2000	--	--	--	--	--	--	--	--
		2001	--	--	--	--	--	--	--	--
		2002 ^(c)	--	--	--	500	0.021	--	--	--
		Long-term Objective ^(b)	324	636	451	1,411	0.060	51	71	
Kindersley (22,356 km ²)	14, 25-27	1999	--	--	--	--	--	--	--	--
		2000	--	--	--	--	--	--	--	--
		2001	--	--	--	--	--	--	--	--
		2002 ^(c)	--	--	--	500	0.022	--	--	--
		Long-term Objective ^(b)	291	570	405	1,265	0.057	51	71	
Diefenbaker (19,974 km ²)	19, 23, 24	1999	--	--	--	--	--	--	--	--
		2000	--	--	--	--	--	--	--	--
		2001	--	--	--	--	--	--	--	--
		2002 ^(c)	--	--	--	250	0.013	--	--	--
		Long-term Objective ^(b)	134	262	186	582	0.029	51	71	
Total Range (118,243 km ²)		1999	2,405	7,469	2,119	11,992	0.101	32	28	371
		2000	3,112	7,232	2,472	12,816	0.108	43	34	488
		2001	3,574	7,707	2,224	13,506	0.114	46	29	1,236
		2002	5,150	11,595	1,582	18,327	0.155	44	13	1,916
		Long-term Objective	4,929	10,097	5,777	20,803	0.176	49	57	

^(a) projected from partial survey of AMU
^(b) per Killaby et al. (1992)
^(c) best guess estimate based on field reports

Pronghorn Antelope

Table 2. Summary of adult pronghorn antelope population density survey results (surveys were conducted during late May/early June), 1999 – 2002.

Antelope Management Unit (AMU)	WMZs	AMU Area (km ²)	Survey Area (km ²)	Survey Density (Adult Antelope/km ² ± 90% CI)			
				1999	2000	2001	2002
CORE ^(a)							
Govenlock	3, 6, 7	11,608	10,480	ns	ns	0.31 ±30.0%	0.50 ±24.8%
Frenchman	2, 4, 5	24,792	10,656 (Primarily WMZ 2)	ns	ns	0.31 ±28.4%	0.48 ±22.9%
G. Sand Hills	8 - 13	16,122	7,120 (Primarily WMZs 8 & 9, and portions of adjacent WMZs)	ns	ns	ns	0.44 ±19.8%
FRINGE ^(b)							
Big Muddy	1, 15, 16	23,391	0	ns	ns	ns	ns
Kindersley	14, 25-27	22,356	0	ns	ns	ns	ns
Diefenbaker	19, 23, 24	19,974	0	ns	ns	ns	ns

^(a) "Core" refers to the populations found in the 1990 range defined by Killaby et al. (1992).

^(b) Occurrence of fringe populations is considered to be strongly influenced by winter severity.

Table 3. Number of pronghorn antelope in each sex and age class by AMU, based on aerial surveys conducted in July, 1999 - 2002.

Antelope Management Unit (AMU)	Year	Sample Size					Population Structure	
		Yearling Bucks	Mature Bucks	Does	Kids	Total	Buck / Doe Ratio	Kid / Doe Ratio
Govenlock	1999	2	36	142	48	228	0.27	0.34
	2000	23	79	249	100	451	0.41	0.40
	2001	60	162	423	84	729	0.52	0.20
	2002	43	181	481	62	767	0.47	0.13
Frenchman	1999	9	16	66	15	106	0.38	0.23
	2000	33	75	241	70	419	0.45	0.29
	2001	32	88	286	101	507	0.42	0.35
	2002	21	95	241	25	382	0.48	0.10

Pronghorn Antelope

Table 4. Summary of provincial fall (pre-season) pronghorn antelope population structure, 1960 - 2002.

Year	Population Structure Sample Size				Buck:Doe	Kid:Doe
	Bucks	Does	Kids	n	Ratio	Ratio
1960	208	362	283	853	0.575	0.782
1961	359	605	470	1,434	0.593	0.777
1962	205	215	216	636	0.953	1.005
1963	696	800	859	2,355	0.870	1.074
1964	505	723	461	1,689	0.699	0.638
1965	512	968	528	2,008	0.529	0.545
1966	832	1,682	1,424	3,938	0.495	0.847
1967	678	1,078	882	2,638	0.629	0.818
1968	902	1,694	1,258	3,854	0.532	0.743
1969	972	1,658	1,438	4,068	0.586	0.867
1970	1,188	1,778	1,374	4,340	0.668	0.773
1971	828	1,706	1,204	3,738	0.485	0.706
1972	648	1,468	1,036	3,152	0.441	0.706
1973	869	2,156	1,368	4,393	0.403	0.635
1974	844	1,970	1,082	3,896	0.428	0.549
1975	462	1,099	692	2,253	0.420	0.630
1976	498	1,106	896	2,500	0.450	0.810
1977	459	1,044	668	2,171	0.440	0.640
1978	424	1,009	697	2,130	0.420	0.691
1979	393	820	738	1,951	0.479	0.900
1980	449	936	758	2,143	0.480	0.810
1981	538	1,239	841	2,618	0.434	0.679
1982	680	1,721	881	3,282	0.395	0.512
1983	707	1,442	1,120	3,269	0.490	0.777
1984	931	1,607	892	3,430	0.579	0.555
1985	259	571	394	1,224	0.454	0.690
1986	131	221	186	538	0.593	0.842
1987	456	712	686	1,854	0.640	0.963
1988	660	1,262	826	2,748	0.523	0.655
1989	830	1,469	943	3,242	0.565	0.642
1990	310	587	360	1,257	0.528	0.613
1991	490	968	360	1,818	0.506	0.372
1992	382	962	202	1,546	0.397	0.210
1993	321	1,042	350	1,713	0.308	0.336
1994	261	584	203	1,048	0.447	0.348
1995	237	682	122	1,041	0.348	0.179
1996	180	605	168	953	0.298	0.278
1997	125	473	124	722	0.264	0.262
1998	189	435	130	754	0.434	0.299
1999	63	208	63	334	0.303	0.303
2000	210	490	170	870	0.429	0.347
2001	342	709	185	1,236	0.482	0.261
2002	340	722	87	1,149	0.471	0.120
Mean (1960-2001)					0.455	0.548

2.3 Biological Sample Collections

There were no biological samples collected for this species in 1999, 2000, or 2001.

Pronghorn Antelope

2.4 Mortality

2.4.1 License Sales

Table 5. Summary of provincial antelope license sales and harvest, 1980 - 2001.

Hunt Year	Licenses Issued				Antelope Harvest					Hunter-days	Hunter-Days/Animal
	Either-sex	Archery	Antlerless	Total	Bucks	Does	Kids	Unkn	Total		
1980	2,244	141	--	2,385	935	601	134	0	1,670	3,515	2.10
1981	2,395	150	--	2,545	1,193	667	113	0	1,973	3,753	1.90
1982	2,554	200	--	2,754	1,207	729	176	0	2,112	3,920	1.86
1983	2,411	260	--	2,671	1,181	714	173	0	2,068	3,955	1.91
1984	2,717	298	--	3,015	1,206	693	132	0	2,031	4,315	2.12
1985	2,921	260	--	3,181	1,073	550	94	0	1,717	5,596	3.26
1986	2,983	296	--	3,279	1,672	712	149	0	2,533	6,282	2.48
1987	3,461	252	--	3,713	1,958	855	137	0	2,950	6,188	2.10
1988	4,339	301	--	4,640	2,586	972	204	0	3,762	9,240	2.46
1989	5,047	344	--	5,391	3,659	618	130	0	4,407	10,883	2.47
1990	6,429	331	--	6,760	3,804	1,545	216	2	5,567	12,589	2.26
1991	5,043	376	3,780	9,199	3,169	3,783	701	6	7,659	29,916	3.91
1992	5,200	446	7,406	13,052	2,787	4,410	881	71	8,149	22,897	2.81
1993	6,454 ^(a)	--	4,451	10,905	2,917	3,260	508	4	6,689	23,994	3.59
1994	5,598 ^(a)	--	--	5,598	1,810	1,210	182	0	3,202	12,303	3.84
1995	3,490 ^(a)	--	--	3,490	1,408	692	87	0	2,187	8,610	3.94
1996	2,419 ^(a)	--	--	2,419	1,081	540	61	0	1,682	5,489	3.26
1997	--	--	--	0	--	Season Closed	--	--	0	--	--
1998	--	--	--	0	--	Season Closed	--	--	0	--	--
1999	--	--	--	0	--	Season Closed	--	--	0	--	--
2000	--	--	--	0	--	Season Closed	--	--	0	--	--
2001	--	--	--	0	--	Season Closed	--	--	0	--	--

^(a) one license for "archery, rifle and muzzleloader", prior to 1993 the either-sex license was for "rifle and muzzleloader only".

2.4.2 Hunting Activity and Harvest

There was no hunting season for 1999, 2000 or 2001. See Table 5 for summary of annual harvest (1980 to present).

2.4.3 Other Mortality Factors

Pronghorn numbers declined throughout most of their range since the mid-1990s (Oehler 2001). This was attributed to severe winter conditions (1995/96 and 1996/97) resulting in low recruitment of kids. High kid mortality during the first 2-3 months following parturition was also attributed to a large coyote population and limited alternative prey (small mammals) in spring when coyotes are raising their litters, and to poor range conditions during recent drought years.

3.0 Management Strategies

- Monitor pronghorn population size and structure so any changes can be readily detected.
- Retain the pronghorn antelope hunting season closure until population levels recover and surplus animals are available for a sustainable harvest. This will maximize the number of breeding adults in the population and subsequent kid production.
- Continue communication with other jurisdictions to assess the cause(s) and impacts of poor antelope kid survival and recruitment.

4.0 Literature Cited

Killaby, M., D. Dobson and C. Dunn. 1992. Pronghorn antelope in Saskatchewan – status and management strategies. Sask. Nat. Resour. Wildl. Tech. Report 92-2. 137 pp.

Oehler, M. 2001. American pronghorn population study. N. Dakota State Game and Fish Dept. Wildl. Div. Project W-67-R-41, Phase C, Big Game Investigations Report No. A-149. Dickinson, N. Dakota.

Black Bear (*Ursus americanus*)

1.0 Long-term Management Objectives

- Maintain stable winter populations of black bears throughout their range, to attain a provincial population of 24,000 – 40,000 bears.
- Maintain 469,000 km² of occupied black bear habitat.

2.0 Population Status

2.1 Provincial Overview

Black Bear range is illustrated in Figure 1. Black bears in Saskatchewan have a dual harvest management designation as a fur-bearer (in Fur Conservation Areas), and as a big game species (licensed hunting seasons). International concerns over the status of bear populations (other than North America) led to the black bear being added to the CITES II listing under the “look-a-like” clause in 1992.

2.2 Survey Data / Population Indicators

Direct survey data are not collected for this species, but population indicators are used to assess changes in population status relative to other years.

2.2.1 Hunter Success and Effort

In years where **hunter success** is greater, and **hunter effort** (hunter-days/bear) is lower than for previous year(s), the population can be considered to be growing. Over the past 3 years hunter success for both resident and guided hunters has been lower and hunter effort has increased relative to the 10-year mean. These indices suggest the provincial population has declined in size relative to previous years.

2.2.2 Mean Age of Harvested Females

Female bears become reproductively active at 4 - 6 years of age, and tend to produce offspring every second year. Since black bears have a low reproductive potential, it is necessary to maintain a sufficient number of females of reproductive age in the population. The mean age for female bears harvested during the past 3 years fell within the traditional breeding age ranges (Table 2). This is suggestive of a stable bear population.

Black Bear

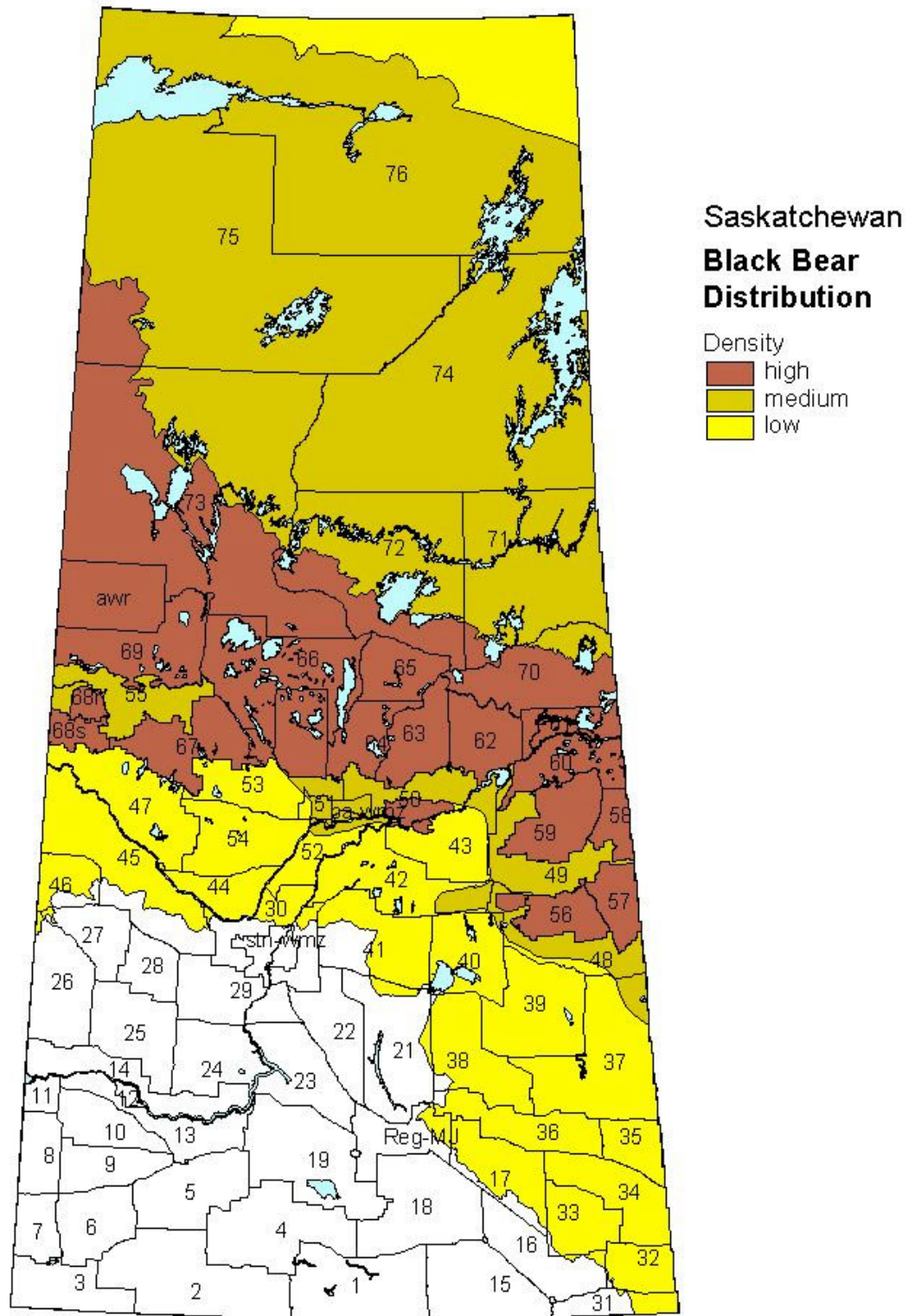


Figure 1. Black bear range.

Black Bear

Table 1. Summary of annual hunter success and hunter effort for resident and guided hunters, 1984 - 2001.

Hunt Year	Resident Hunters		Non-resident (Guided) Hunters	
	Hunter Success (%)	Hunter-days/bear	Hunter Success (%)	Hunter-days/bear
1984	43	6.0	na	na
1985	20	20.0	na	na
1986	37	10.8	na	na
1987	34	12.2	na	na
1988	29	14.8	na	na
1989	28	17.8	na	na
1990	24	12.8	na	na
1991	27	11.8	na	na
1992	36	9.8	86	4.8
1993	37	12.4	81	4.7
1994	24	14.3	67	5.1
1995	36	11.7	68	5.4
1996	38	11.5	76	4.8
1997	41	12.3	78	4.3
1998	34	12.9	79	4.8
1999	26	17.7	73	5.2
2000	27	17.0	72	5.5
2001	28	15.9	70	5.8
10-yr Mean	32	13.3	74	5.1

Table 2. Average age of male and female black bears harvested in Saskatchewan, 1986 – 2001.

Hunt Year	Male Age		Female Age	
	Mean	n	Mean	n
1986	4.48	31	5.50	31
1987	4.70	53	5.56	34
1988	5.03	92	4.18	51
1989	4.00	233	4.97	179
1990	3.91	172	4.77	92
1991	3.91	186	4.51	71
1992	5.01	261	6.01	139
1993	4.63	306	5.96	166
1994	4.52	310	6.31	177
1995	4.93	406	6.82	191
1996	4.87	338	5.87	168
1997	4.95	570	6.63	280
1998	5.38	613	6.45	380
1999	5.41	732	7.26	372
2000	5.38	721	7.04	381
2001	Data not yet available			

2.2.3 Harvest Adult Sex Ratio

Hunters select for larger bears. This affords some protection to females, which tend to be smaller than males of the same age class. The adult sex ratio (**boars/sow**) in the harvest during the past three years increased slightly (Table 3), indicating a reduced exposure of females to hunting pressure. This suggests a slight population increase during the past 3 years because of the proportionately larger number of males harvested.

Black Bear

Table 3. Harvest structure for black bears, Saskatchewan, 1986-2001.

Hunt Year	Licensed Harvest				Boars/Sow	Cubs/Sow	Prop. (%) Cubs in Harvest
	Boars	Sows	Cubs	Total ^(a)			
1986	1,239	547	245	2,031	2.27	0.45	12.1
1987	922	469	71	1,462	1.97	0.15	4.9
1988	976	389	68	1,433	2.51	0.17	4.7
1989	813	363	65	1,241	2.24	0.18	5.2
1990	778	301	20	1,099	2.58	0.07	1.8
1991	623	204	38	865	3.05	0.19	4.4
1992	731	255	6	922	2.87	0.02	0.7
1993	784	324	9	1,095	2.42	0.03	0.8
1994	656	302	6	964	2.17	0.02	0.6
1995	834	391	0	1,225	2.13	0.00	0.0
1996	1,130	454	34	1,618	2.49	0.07	2.1
1997	1,298	651	47	1,996	1.99	0.07	2.4
1998	1,421	755	36	2,212	1.88	0.05	1.6
1999	1,449	637	21	2,107	2.27	0.03	1.0
2000	1,521	678	21	2,220	2.24	0.03	0.9
2001	1,464	662	21	2,147	2.21	0.03	1.0
10-yr Mean	1,129	511	20	1,841	2.21	0.04	1.0

^(a) Sample does not include bears of unknown sex.

2.2.4 Proportion of Cubs in Harvest

Another indicator of an over-exploited bear population is a marked increase in the **proportion of cubs in the harvest**. Over the past few years there has been a very low representation of cubs in the annual harvest structure (Table 3), which indicates a stable population. The vast majority of cubs in the harvest are taken during the fall hunt.

2.2.5 Color Phase Ratio

Hunters tend to select for off-colored bears. This leads to shifts in color phase ratio in the harvest, which can serve as a measure of the degree of hunting pressure on a bear population (Table 4). Decreasing ratios of black:off-colored bears in the harvest would serve as an indication that the bear population is increasing.

2.2.6 Population Status

Population indicators suggest that the bear population has remained stable to slightly increasing over the past few years

Black Bear

Table 4. Color phase ratios for black bears harvested in Saskatchewan, 1986 – 2001.

Hunt Year	Black	Brown	Cinnamon	Blonde	Total	Black:Off Color
1986 ^a	na	na	na	na	74	2.89 : 1.00
1987 ^a	na	na	na	na	118	3.50 : 1.00
1988 ^a	na	na	na	na	169	5.04 : 1.00
1989 ^a	na	na	na	na	430	2.14 : 1.00
1990 ^a	na	na	na	na	272	2.20 : 1.00
1991 ^a	na	na	na	na	263	1.86 : 1.00
1992	294	138	--	--	432	2.13 : 1.00
1993	381	123	34	26	564	2.08 : 1.00
1994	362	120	42	16	540	2.03 : 1.00
1995	486	131	66	9	692	2.36 : 1.00
1996	410	118	42	22	592	2.25 : 1.00
1997	357	77	45	20	499	2.51 : 1.00
1998	876	221	84	32	1,213	2.60 : 1.00
1999	1,007	225	86	45	1,363	2.83 : 1.00
2000	991	217	114	54	1,376	2.57 : 1.00
2001	1,031	239	92	32	1,394	2.84 : 1.00

^a unable to locate empirical data, used information reported from previous years.

2.3 Biological Sample Collections

Table 5. Summary of cementum age classes of harvested bears, 1996 - 2001.

Age Class	1996		1997		1998		1999		2000		2001	
	%	&	%	&	%	&	%	&	%	&	%	&
0.5	--	--	--	--	--	--	10	2	--	--		
1+	13	8	21	14	22	9	23	5	28	12		
2+	70	43	135	44	99	53	118	37	120	39		
3+	90	20	151	63	138	69	157	56	181	85		
4+	37	19	73	30	128	63	132	67	123	57		
5+	55	24	46	19	65	42	108	47	75	32		
6+	29	17	45	19	32	25	43	22	41	21		
7+	13	10	30	11	34	16	24	12	40	25		
8+	8	6	22	23	35	26	26	23	21	10		
9+	3	1	14	10	11	18	18	23	15	15		
10+	6	1	3	5	12	14	12	15	13	18		
11+	5	4	6	4	1	3	16	13	21	13		
12+	--	1	5	1	5	6	3	5	11	17		
13+	--	3	3	4	8	6	12	5	5	4		
14+	1	2	3	5	3	5	7	4	10	4		
15+	1	1	2	7	3	3	6	6	3	5		
16+	1	3	2	2	3	7	5	6	4	3		
17+	--	1	1	6	3	1	3	4	1	--		
18+	3	2	1	4	--	6	1	1	2	4		
19+	--	--	--	3	3	2	3	2	2	2		
20+	3	--	3	1	3	3	1	6	2	4		
21+	--	2	1	--	1	1	--	3	1	--		
22+	--	--	2	--	2	--	1	2	--	1		
23+	--	--	--	--	1	--	2	3	--	--		
24+	--	--	--	--	--	1	--	--	--	1		
25+	--	--	--	--	--	--	--	2	2	2		
26+	--	--	--	--	--	--	--	--	--	1		
27+	--	--	--	--	1	--	1	--	--	2		
28+	--	--	--	--	--	1	--	--	--	1		
29+	--	--	--	--	--	--	--	1	--	2		
30+	--	--	1	--	--	--	--	--	--	--		
31+	--	--	--	--	--	--	--	--	--	--		
32+	--	--	--	--	--	--	--	--	--	--		
33+	--	--	--	--	--	--	--	--	--	1		
n =	338	168	570	280	613	380	732	372	721	381	na	na
Mean Age	4.87	5.87	4.95	6.63	5.38	6.45	5.41	7.26	5.38	7.04	na	na

na = data not available yet.

Black Bear

2.4 Mortality

2.4.1 License Sales

Table 6. Summary of provincial black bear license sales, 1980 - 2001.

Hunt Year	1 st License			2 nd License			Total License Sales	Free Fall Permits (WMZ 58-61)
	Sask. Resident	Can. Resident	Non Resident	Sask. Resident	Can. Resident	Non Resident		
1980	4,920	?	?	?	?	?	5,440	--
1981	3,602	?	?	?	?	?	3,873	--
1982	3,611	?	?	?	?	?	4,024	--
1983	?	?	?	?	?	?	4,375	--
1984	?	?	?	?	?	?	4,899	3,170
1985	3,601	67	380	319	3	22	4,392	3,142
1986	4,303	95	634	460	6	115	5,613	2,489
1987	3,817	92	891	393	12	123	5,328	2,375
1988	3,353	95	1,162	284	7	244	5,145	--
1989	2,903	70	906	--	--	--	3,879	--
1990	2,539	75	776	--	--	--	3,390	--
1991	1,740	49	701	--	--	--	2,490	--
1992	1,685	71	802	--	--	--	2,558	--
1993	1,758	76	1,140	--	--	--	2,974	--
1994	1,848	68	1,436	--	--	--	3,352	--
1995	1,492	36	1,477	--	--	--	3,005	--
1996	1,809	63	1,601	--	--	--	3,473	--
1997	1,821	70	1,788	--	--	--	3,679	--
1998	2,262	74	1,888	--	--	--	4,224	--
1999	1,908	77	2,375	--	--	--	4,360	--
2000	1,928	96	2,412	--	--	--	4,436	--
2001	1,809	86	2,405	--	--	--	4,300	--
Mean	2,635	74	1,340	--	--	--	4,055	--

2.4.2 Hunting Activity and Harvest

There are no data to assess subsistence hunting activity or harvest. Table 7 summarizes harvest by Saskatchewan resident licensed hunters. There are no data to assess Canadian resident hunting activity or harvest. Table 8 summarizes harvest and hunting activities by guided (non-resident) hunters. Table 9 summarizes total annual licensed harvest of bears.

2.4.3 Nuisance Bears

No estimates are available for number of problem bears that were destroyed.

Black Bear

Table 7. Provincial black bear harvest by resident hunters, 1999 - 2001 (see Big Game Hunter Harvest Survey Statistics for summaries of hunting activity and harvest statistics by season and WMZ).

Season and Ecozone	Hunt Year	Zone Hunters	Harvest					Hunter Success (%)	Hunter-days	Hunter-days/Bear
			Boars	Sows	Cubs	Unkn	Total			
SPRING										
Parkland (WMZs 35-47)	1999	130	13	19	0	0	32	24.6	519	16.2
	2000	172	48	27	0	0	75	43.6	1,029	13.7
	2001	124	35	18	0	0	53	42.7	649	12.3
	10-yr Mean	156	38	14	1	0	53	34.1	624	11.8
Forest Fringe (WMZs 48-55)	1999	350	97	39	0	0	136	38.9	1,485	10.9
	2000	446	69	48	7	0	124	27.8	1,942	15.7
	2001	271	53	12	6	6	77	28.4	1,380	17.9
	10-yr Mean	381	81	23	6	1	111	29.1	1,477	13.3
Forest (WMZs 56-73)	1999	765	194	26	0	0	220	28.8	3,780	17.2
	2000	720	199	41	0	0	240	33.3	3,349	13.9
	2001	613	124	71	0	0	195	31.8	3,102	15.9
	10-yr Mean	922	215	67	4	3	288	31.3	3,678	12.8
Shield (WMZs 74-76)	1999	13	0	0	0	0	0	0.0	52	---
	2000	34	14	0	0	0	14	41.2	89	6.4
	2001	24	18	0	0	0	18	75.0	59	3.3
	10-yr Mean	17	5	1	0	0	5	31.9	60	11.4
SPRING TOTAL	1999	1,258	305	84	0	0	389	30.9	5,835	15.0
	2000	1,372	329	117	7	0	453	33.0	6,409	14.2
	2001	1,032	230	100	6	6	342	33.1	5,189	15.2
	10-yr Mean	1,466	339	105	10	5	458	31.2	5,812	12.7
FALL										
Parkland (WMZs 35-47)	1999	65	19	0	0	0	19	29.2	214	11.3
	2000	151	0	0	0	0	0	0.0	714	---
	2001	71	29	0	0	0	29	40.8	259	8.9
	10-yr Mean	74	12	2	2	0	16	21.9	258	15.9
Forest Fringe (WMZs 48-55)	1999	272	26	0	0	0	26	9.6	1,102	42.4
	2000	192	7	21	0	0	28	14.6	624	22.3
	2001	242	24	6	0	0	30	12.4	1,014	33.8
	10-yr Mean	212	33	16	3	0	53	24.9	749	14.2
Forest (WMZs 56-73)	1999	370	32	0	13	13	58	15.7	1,601	27.6
	2000	350	34	0	7	0	41	11.7	1,132	27.6
	2001	401	71	24	0	0	95	23.7	1,409	14.8
	10-yr Mean	292	44	17	3	2	65	22.3	1,022	15.7
Shield (WMZs 74-76)	1999	19	6	0	0	0	6	31.6	65	10.8
	2000	7	0	0	0	0	0	0.0	21	---
	2001	6	0	0	0	0	0	0.0	6	---
	10-yr Mean	10	2	0	0	1	3	31.3	45	14.6
FALL TOTAL	1999	726	84	0	13	13	110	15.2	2,982	27.1
	2000	700	41	21	7	0	69	9.9	2,491	36.1
	2001	719	124	29	0	0	153	21.3	2,689	17.6
	10-yr Mean	584	91	35	9	3	138	23.6	2,065	14.9

Black Bear

Table 8. Provincial black bear harvest by non-resident (guided) hunters, 1999 - 2001.

Season and Ecozone	Hunt Year	Zone Hunters	Harvest					Hunter Success (%)	Hunter-days	Hunter-days/Bear
			Boars	Sows	Cubs	Unkn	Total			
SPRING										
Parkland (WMZs 35-47)	1999	19	2	4	2	0	8	42.1	91	11.4
	2000	38	18	11	0	0	29	76.3	127	4.4
	2001	67	20	18	2	0	40	59.7	281	7.0
	10-yr Mean	49	9	5	0	0	15	30.2	188	12.6
Forest Fringe (WMZs 48-55)	1999	203	76	42	0	4	122	60.1	762	6.25
	2000	176	72	51	4	0	127	72.2	626	4.93
	2001	152	58	45	5	1	109	71.1	582	5.34
	10-yr Mean	180	47	30	1	9	87	48.1	591	6.82
Forest (WMZs 56-73)	1999	1,831	814	444	2	91	1,351	73.8	6,746	4.99
	2000	1,842	865	387	2	20	1,274	69.2	7,148	5.61
	2001	1,824	810	402	8	24	1,244	68.2	7,260	5.84
	10-yr Mean	1,276	528	268	2	65	862	67.6	4,364	5.06
Shield (WMZs 74-76)	1999	11	8	0	0	0	8	72.7	39	4.88
	2000	44	33	7	0	0	40	90.9	161	4.03
	2001	103	85	10	0	0	95	92.2	319	3.36
	10-yr Mean	35	21	2	0	2	25	70.9	136	5.45
SPRING TOTAL	1999	2,064	900	490	5	95	1,490	72.2	7,638	5.13
	2000	2,101	992	458	7	21	1,478	70.4	8,062	5.45
	2001	2,173	982	481	16	26	1,505	69.3	8,508	5.65
	10-yr Mean	1,552	610	307	5	76	997	64.2	5,526	5.54
FALL										
Parkland (WMZs 35-47)	1999	7	6	1	0	0	7	100.0	19	2.71
	2000	24	7	4	1	12	24	100.0	68	2.83
	2001	16	6	2	0	0	8	50.0	65	8.13
	10-yr Mean	24	5	4	2	2	12	51.0	83	6.76
Forest Fringe (WMZs 48-55)	1999	100	45	19	4	0	68	68.0	303	4.46
	2000	83	34	26	0	0	60	72.3	256	4.27
	2001	101	37	13	0	2	52	51.5	393	7.56
	10-yr Mean	64	24	15	0	1	40	62.0	199	5.01
Forest (WMZs 56-73)	1999	257	110	43	0	5	158	61.5	988	6.25
	2000	259	119	55	0	11	185	71.4	1,160	6.27
	2001	184	85	36	0	3	124	67.4	683	5.51
	10-yr Mean	198	77	37	0	15	129	64.9	672	5.23
Shield (WMZs 74-76)	1999	4	1	0	0	0	1	25.0	32	32.0
	2000	6	2	0	0	0	2	33.3	33	16.5
	2001	5	0	2	0	1	3	60.0	27	9.0
	10-yr Mean	13	5	0	0	0	5	39.4	55	10.9
FALL TOTAL	1999	364	160	64	4	5	233	64.0	1,311	5.63
	2000	407	166	86	1	11	264	64.9	1,517	5.75
	2001	318	132	55	0	9	196	61.6	1,220	6.22
	10-yr Mean	304	111	56	2	17	186	61.2	1,083	5.83

Black Bear

Table 9. Total licensed harvest (does not include subsistence harvest or nuisance bears), 1984 - 2001.

Hunt Year	Licensed Harvest					Total Licensed Harvest
	Saskatchewan Residents			Canadian Residents	Non-residents	
	Hunted	Free Permits	Commercial Trapping			
1984	1,778	0	272	?	?	2,050 +
1985	892	147	378	35	216	1,668
1986	1,968	423	345	49	324	3,109
1987	1,338	333	250	52	655	2,628
1988	1,257	0	174	51	585	2,067
1989	805	0	178	38	563	1,584
1990	821	0	268	35	565	1,689
1991	596	0	259	23	605	1,483
1992	597	0	302	24	663	1,586
1993	646	0	276	41	923	1,886
1994	463	0	110	31	960	1,564
1995	539	0	100	18	1,005	1,659
1996	681	0	100	39	1,220	2,040
1997	747	0	103	41	1,389	2,280
1998	773	0	58	41	1,490	2,362
1999	499	0	69	25	1,723	2,316
2000	522	0	242	59	1,741	2,565
2001	495	0	153 ^a	35	1,689	2,337
10-yr Mean	596	0	161	38	1,280	2,060

^a Estimated harvest as of December 2002

3.0 Management Strategies

- Monitor Saskatchewan resident hunting activity and harvest using the annual Hunter Harvest Survey, and monitor non-resident hunting activity and harvest using Outfitter Client Reports. These data are used to calculate population indicators to assess the status of black bear populations.
- To sustain healthy populations in Saskatchewan, the annual licensed harvest of black bears should remain near 2,000±10% bears. Harvest during the past 5 years has exceeded this limit. Therefore, population indices and harvest levels should be closely monitored to assess if continued high harvests in future years are sustainable, or whether a change of allocation strategy is required.
- Status and management of bears needs to be reviewed in Saskatchewan, including establishment of area-specific population and sustainable harvest objectives. Currently population estimates and harvest objectives are interim estimates.
- Collect data (sex, age, location) on number of nuisance bears that are destroyed annually as a means of monitoring the level and types of damage caused by bears, and to assist with management decisions on population regulation.

Upland Birds

Upland bird data will be presented in a future report.