Rocky Mountain Bighorn Sheep Status Report - Alberta

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Current Population Size and Trend

Rocky Mountain bighorn sheep are distributed across the contiguous Rocky Mountain range in the southern half of Alberta along the border with British Columbia as well as on an isolated mountain range – the Ram Mountain/Shunda Mountain complex. Sheep distribution and numbers are known fairly accurately (at least relative to most other wildlife species) through periodic surveys of key winter ranges. Seasonal distribution at other times of the year is less well understood except for a few intensively studied populations.

There are currently 60 well delineated winter ranges and most have been surveyed periodically since 1968 by fixed wing or helicopter. Sheep populations in the National Parks (Banff, Jasper, and Waterton) are not surveyed on any kind of a regular basis.

The total provincial population estimate including an estimate for the number of sheep in areas not part of the provincial survey and an estimate from the National Parks was 11,185 (Table 1). This represents an increase in the Provincial population of about 11% since 1989.

Table 1. Alberta Sheep Populations Estimates, 1989 and 2008

	1989	2008
Surveyed Winter Ranges:	5215	5815
Unsurveyed Areas:	785	870
National Parks:	4000	4500
(Banff, Jasper, Waterton)		
Totals:	10,000	11,185

In 2008, most of the winter ranges in Alberta were surveyed and subsequent preseason population estimates per Sheep Management Units (SMU) were determined using the minimum winter count from each of the respective winter ranges and factoring in the average productivity for that SMU. SMUs are groupings of winter ranges and Wildlife Management Units (WMU) that are used to try and manage on an individual herd basis in an effort to eliminate issues related to sheep movements across smaller unit boundaries (Figure 1). Estimates were compared to a similar count from 1989 to look at long-term trends in each of the SMAs. Between 1989 and 2008, counts of sheep within each SMU were similar except for SMUs 1 and 8 (Figure 2). In both these units, sheep numbers were significantly higher in 2008 especially in SMU 8 where the 2008 count was three times what it was in 1989. Most of the overall provincial population increase is almost entirely due to increases in these two SMUs which include populations at Cardinal River Coals and Smokey River Coals. Within both units there have been long-term open pit coal extraction operations with subsequent reclamation which has contributed to an increase in high quality bighorn sheep range. There have been declines in other populations e.g. Ram

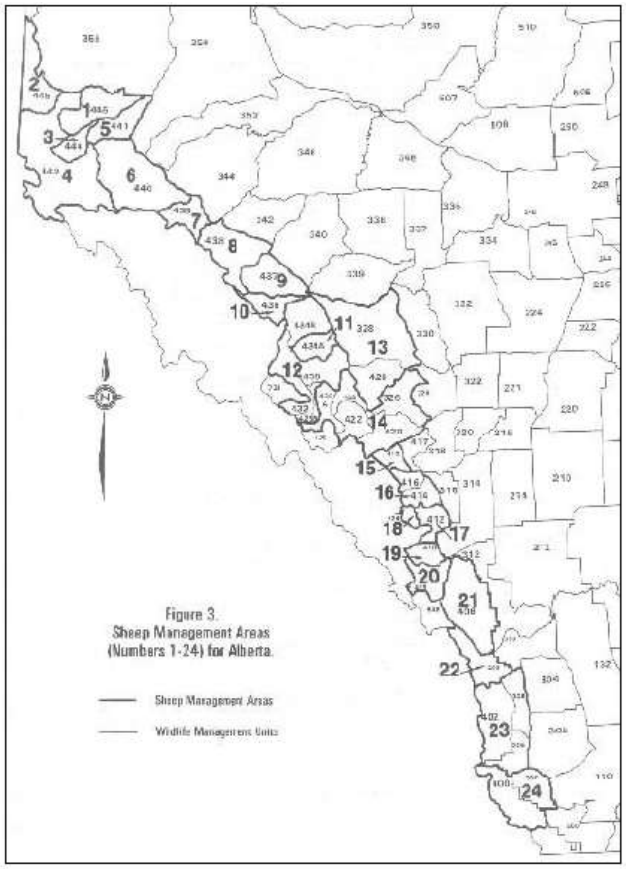


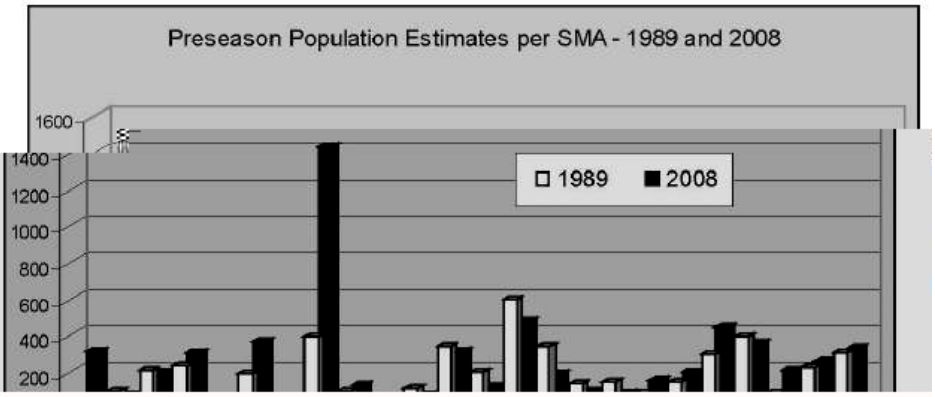
Figure 1.
Sheep Management Units and Wildlife Management Units in Alberta

Hunter Harvests:

For hunting management, Alberta is divided into Wildlife Management Units (WMU) (Figure 1). There are 35 WMUs where bighorn sheep are hunted. Of these 35 WMUs, 33 have a general unlimited entry trophy ram season for residents that runs from either late August or early September to October 31. One of these units is an Archery only unit. The remaining 2 WMUs are on limited entry draw. Additional late-season opportunities are offered in 3 of the general season units in the form of a late November hunt to take advantage of animals moving out of protected areas later in the season. These late season hunt areas are all on a limited entry draw and two are Archery only. Non-resident opportunity is restricted by an outfitter allocation system and a shorter season. Outfitter guide allocations are only available north of the Bow River. All but 4 units hunt trophy rams under a minimum 4/5ths curl restriction. The remaining 4 have a minimum full curl restriction.

Over the last 10 years the number of resident licenses purchased for trophy sheep has averaged 1800 with about 85 additional licenses allocated to outfitters for non-residents (Figure 3). Annual average resident and non-resident harvest has been approximately 141 and 39 respectively (Figure 3).

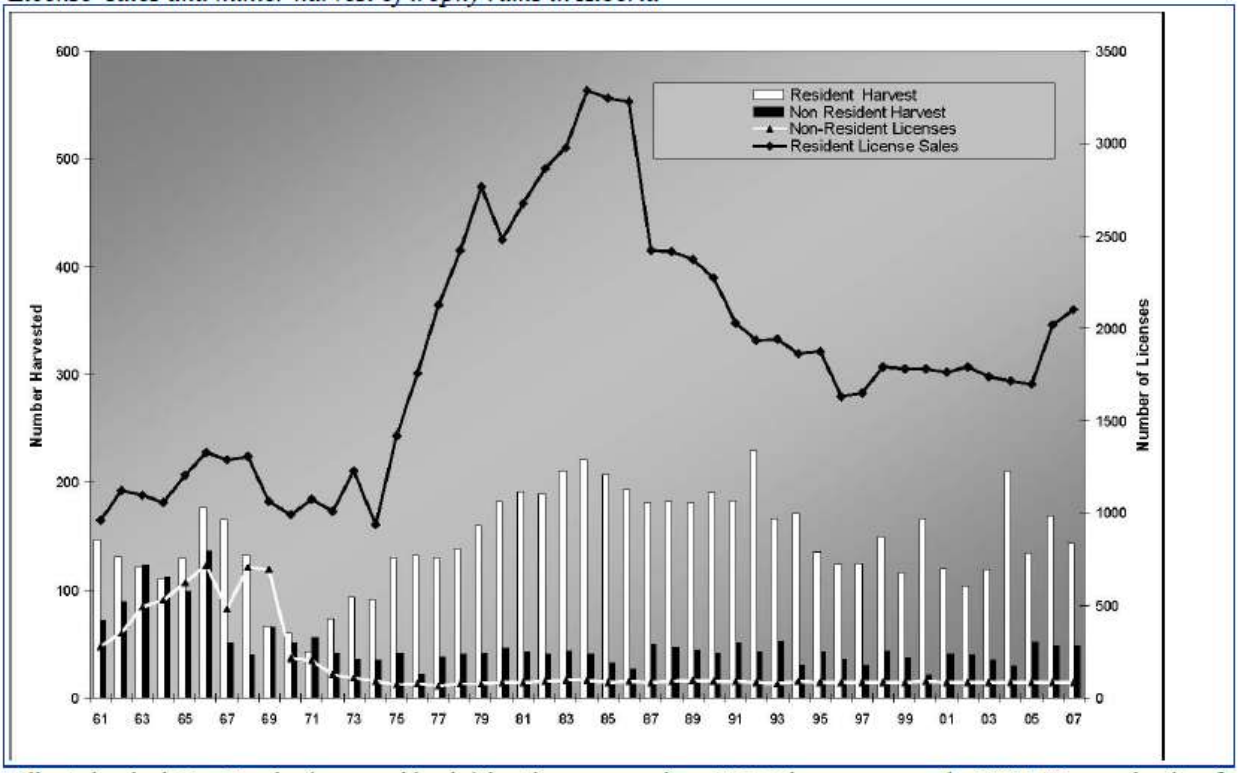
Figure 2.
Comparison of sheep population estimates for each Sheep Management Area between 1989 and 2008.



The most terrifying sound in nature is not the roaring of a charging lion or the whistle of a descending bomb, rather its a c

Figure 3.

License sales and hunter harvest of trophy rams in Alberta



Alberta has had Non-Trophy (ewes and lambs) hunting seasons since 1968. There are currently 29 WMUs or subunits of WMUs with non-trophy seasons. All are hunted under a limited entry draw system with the annual number of permits adjusted each year according to desired harvest rates, population estimates and success rates. Approximately 250 permits are issues each year with a yearly harvest of about 65 sheep.

Transplant/Re-introductions

Since 1922, 659 Rocky Mountain bighorn sheep have been transplanted from various locations within Alberta to jurisdictions outside of the province as well as to some areas within (Table 2). Source herds have primarily been from the National Parks (Banff, Jasper, and Waterton) while Cadomin has been the principle source in recent years.

Research Programs

Ram Mountain:

Long term (30+ years) population dynamics study continues. Currently looking at the genetic and population dynamics consequences of an attempted genetic rescue. In 2007, have transplanted lambs from Cadomin herd. Will compare survival, productivity, and growth of sheep in future years according to proportion of introduced genetics. Expect the level of out breeding will improve growth, survival and reproductive success. Looking at how parasite load and parasite diversity are associated with individual heterozygosity and possible resistance to infection.

Continue with work on potential selective effects of trophy hunting. Wish to analyse long term dataset on harvested rams from both British Columbia and Alberta to look for any temporal changes.

Analyzing the long term data to examine what factors affect ewe reproductive strategy and reproductive success, focusing on senescence, causes and consequences of variation in age of primiparity, and the cumulative costs of reproduction under different environmental conditions, population densities, and phases in the population dynamics. Population showed very strong density dependence between 1975 and1990 but not subsequently from 1991 onwards. Trying to determine why.

Sheep River:

Continuing to look at the effects of weather, predation, and disease on the population dynamics of bighorn sheep at Sheep River. Population shows no evidence of density dependence but instead appears driven by pneumonia epizootics and cougar predation.

Looking at dominance hierarchies and reproductive strategies in male bighorns and how these correlate with testosterone and stress levels of individual rams. Also investigating the effects of free-range darting and capturing of bighorn sheep by measuring stress levels before, during and after captures.

Are also investigating the social structure of ram groups as well as female dominance and potential benefits thereof. Male dominance is directly linked to reproductive success but not in females. Nevertheless, females have well-established linear dominance hierarchies.

Table 2.

Transplants and Relocations of bighorn sheep within and out of Alberta

Year	No.	Origin	Destination	Reference
1922	12	Banff NP	Ntl Bison Range, Montana	Rognrud, 1983
1927	49	Banff NP	Spences Bridge (Thompson R.), B.C	Stelfox & Stelfox, 1993
1928	50	Banff NP	Squilax, Chase, B.C.	Stelfox & Stelfox, 1993
1928	14	Banff NP	Wichita Mtns., Oklahoma	Stelfox & Stelfox, 1993
1932	6	Banff NP	Peco Wilderness, NM	Sand, 1967
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	12	[illegible]	South Dakota	[illegible]
[illegible]	[illegible]	Banff NP	Turkey Creek, New Mexico	Sand, 1967
[illegible]	[illegible]	Banff NP	Pecos Wilderness, NM	Sand, 1967
[illegible]	40	Valentine	Brigham City, Utah (also NP)	Smith, 1988
[illegible]	10	Banff NP	[illegible]	[illegible]
[illegible]	12	Banff NP	Brigham City, Utah	Smith, 1988
[illegible]	[illegible]	Jasper NP	Deer Canyon, [illegible]	Stelfox & Stelfox, 1993
[illegible]	20	Banff NP	Challis NF, Forest, ID	Stelfox & Stelfox, 1993
[illegible]	15	Banff NP	Brigham City, Utah	Smith, 1988
[illegible]	20	Jasper NP	Dease, Dall's Canyon, Oregon	Stelfox & Stelfox, 1993
[illegible]	20	Jasper NP	Deadman River, Oregon	Woody, 1987
[illegible]	18	Valentine	Dall Mt. Washington Lakes NF	Johnson, 1987
[illegible]	[illegible]	Valentine	Fort Wingate, NM Lakes NF	Stelfox, 1982
[illegible]	12	Valentine, Elko NF	Desolation Canyon, Utah	Smith, 1988
[illegible]	20	Cadomin	Ruby Mountains, Nevada	Alberta Nat. Res. 1989
1990	25	Cadomin	Ruby Mountains, Nevada	MacCallum, 2006
1992	31	Cadomin	Ruby Mountains, Nevada	MacCallum, 2006
1995	46	Cadomin	Snake River, Oregon	MacCallum, 2006
1997	14	Ram Mtn.	Pedatiqe Lakes, AB	Alberta Fish & Wildlife Div.
1998	31	Cadomin	Plateau Mtn., AB	Alberta Fish & Wildlife Div.
1999	20	Cadomin	Custer State Park, Sth Dakota	MacCallum, 2006
1999	20	Cadomin	Dell's Canyon, Oregon	Coggins, 2000
2000	37	Cadomin	Dell's Canyon, Idaho/Oregon	Cassirer, 2005 18
2000	7	Cadomin	Mt Baldy, AB	MacCallum, 2006
2001	22	Cadomin	Kelk Canyon - Provo Peak, Utah	MacCallum, 2006
2001	10	Cadomin	Crowe Creek - Mt. Timpanogos Utah	MacCallum, 2006
2004	6	Cadomin	Ram Mtn., AB	Alberta Fish & Game Org.
2005	6	Cadomin	Ram Mtn., AB	Alberta Fish & Game Org.
2007	12	Cadomin	Ram Mtn., AB	Alberta Fish & Game Org.
2007	2	Cadomin	Calgary Zoo, Calgary, AB	MacCallum, 2006
[illegible]	659			

ıp Looking at potential benefits and costs of being a dominant ewe, such as priority access to limited resources, leading grou decisions on when and where to forage, being at the head of the group while foraging but at the centre while bedded. Investigating sexual segregation in winter and how population density, sex ratio, group structure and composition affect vigilance and activity budgets.