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.

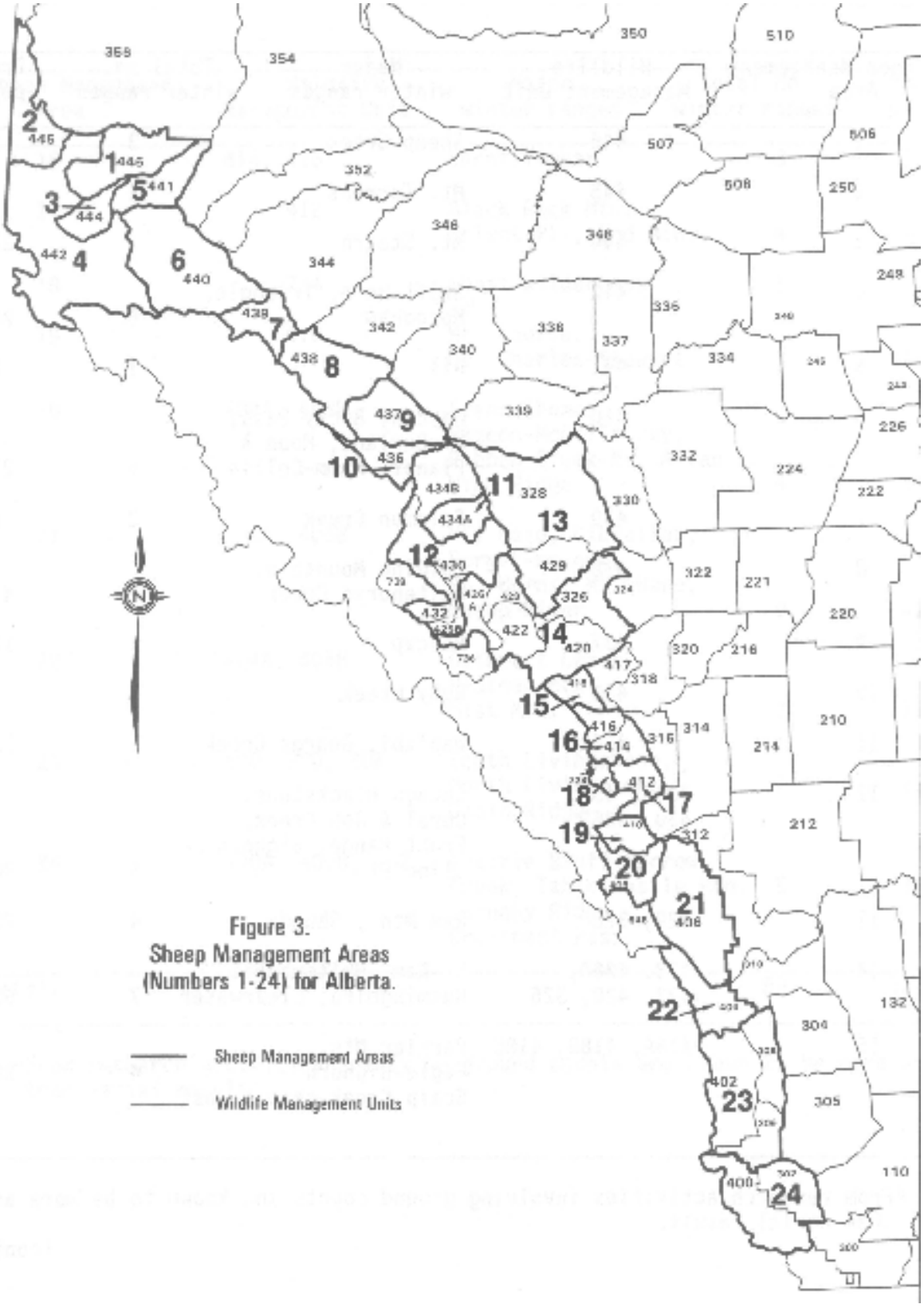
The total provincial population estimate including an estimate for the number of sheep in areas not part of the provincial survey and an estimate from the National Parks was 11,165 (Table 1). This represents an increase in the Provincial population of about 11% since 1989.

Table 1. Alberta Sheep Population Estimates, 1989 and 2008

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

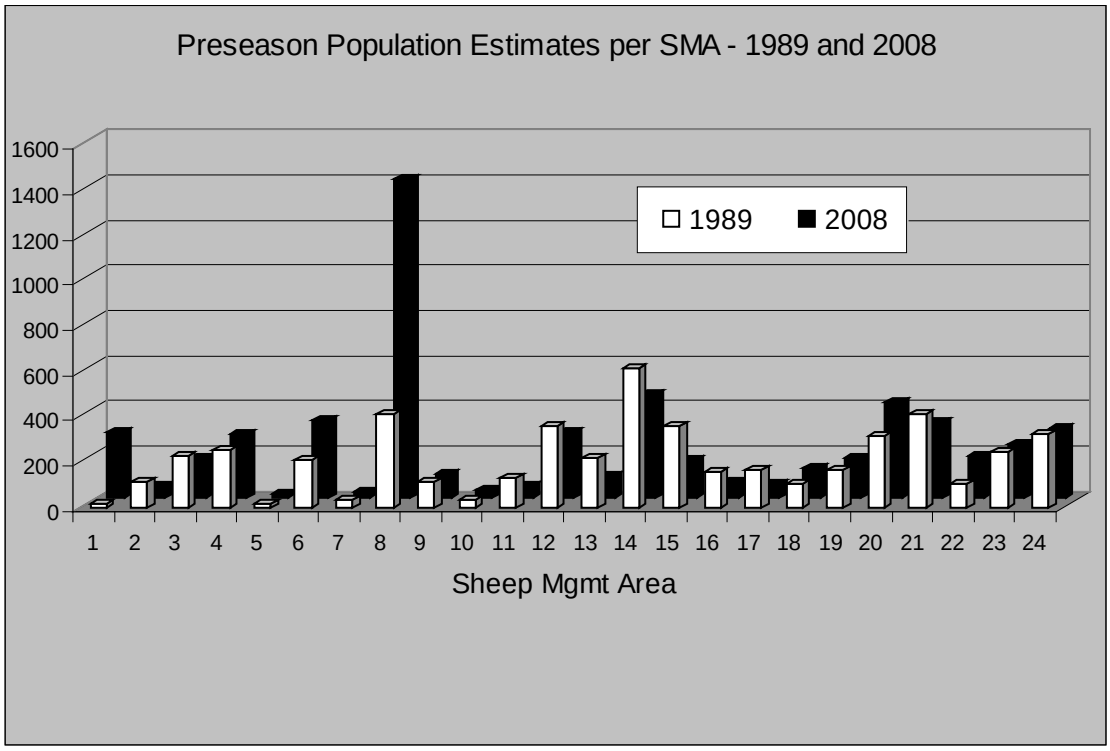
In 2008, most of the winter ranges in Alberta were surveyed and subsequent preseason population estimates per Sheep Management Units (SMU) were determined using the minimum winter count from each of the respective winter ranges and factoring in the average productivity for that SMU. SMUs are groupings 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

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



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 Mountain, Sheep River.

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



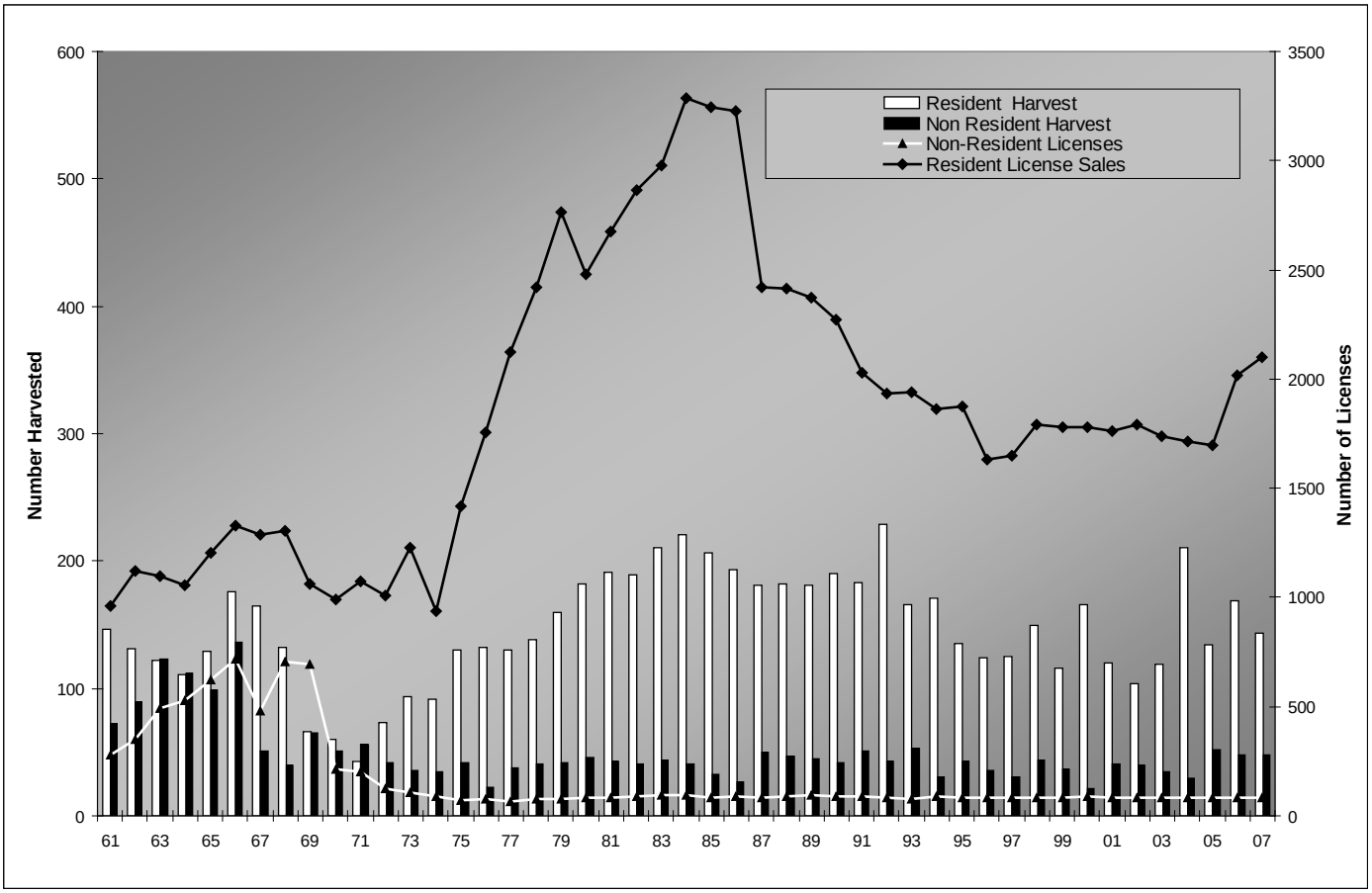
Hunter Harvests:

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 3. License sales and hunter harvest of trophy rams in Alberta (1961 – 2007)



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
1927	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
1940	3	Banff NP	Sandia Mtns, New Mexico	Sand, 1967
1941	3	Banff NP	Sandia Mtns. New Mexico	Sand, 1967
1942	3	Banff NP	Sandia Mtns. New Mexico	Sand, 1967
1961	12	Sheep R.	South Dakota	Wishart, 1961
1964	10	Banff NP	Turkey Creek, New Mexico	Sand, 1967
1965	15	Banff NP	Pecos Wilderness, NM	Sand, 1967
1966	20	Waterton Lakes NP	Brigham City, Utah	Smith, 1988
1968	10	Banff NP	Wheeler Peak, New Mexico	Larsen, 1970
1969	12	Banff NP	Brigham City, Utah	Smith, 1988
1970	12	Jasper NP	Fraser Canyon, B.C.	Stelfox & Stelfox, 1993
1970	24	Banff NP	Challis Ntl. Forest, ID	Stelfox & Stelfox, 1993
1970	15	Banff NP	Brigham City, Utah	Smith, 1988
1971	20	Jasper NP	Upper Hell's Canyon, Oregon	Stelfox & Stelfox, 1993
1971	20	Jasper NP	Lostine River, Oregon	Woody, 1971
1972	18	Waterton Lakes NP	Hall Mt. Washington	Johnson, 1983
1973	7	Waterton Lakes NP	Fort Wingate, NM	Sandoval, 1987
1973	12	Waterton Lakes NP	Desolation Canyon, Utah	Smith, 1988
1989	20	Cadomin	Ruby Mountains, Nevada	Alberta Nat. Res. Serv. Files
1990	25	Cadomin	Ruby Mountains, Nevada	MacCallum, 2006
1992	31	Cadomin	Ruby Mountains, Nevada	MacCallum, 2006
1995	49	Cadomin	Snake River, Oregon	MacCallum, 2006
1997	14	Ram Mtn	Picklejar 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	Hells Canyon, Oregon	Coggins, 2000
2000	37	Cadomin	Hell's Canyon, Idaho/Oregon	Cassier, 2005:18
2000	7	Cadomin	Mt Baldy, AB	MacCallum, 2006
2001	22	Cadomin	Rock Canyon - Provo Peak,, Utah	MacCallum, 2006
2001	10	Cadomin	Grove Creek - Mt. Timpanogos Utah	MacCallum, 2006
2004	6	Cadomin	Ram Mtn., AB	Alberta Fish & Wildlife Div.
2005	6	Cadomin	Ram Mtn., AB	Alberta Fish & Wildlife Div.
2007	12	Cadomin	Ram Mtn., AB	Alberta Fish & Wildlife Div
2007	2	Cadomin	Calgary Zoo, Calgary AB	MacCallum, 2006
TOTAL	659			

Looking at potential benefits and costs of being a dominant ewe, such as priority access to limited resources, leading group 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.

Literature Cited

Coggins, V. L. 1980. Present Status of Rocky Mountain Bighorn Sheep in Northeastern Oregon. Bienn. Symp. North.Wild Sheep and Goat Counc. (2):90-105.

Coggins, V. L. et al. 2000. Rocky mountain Bighorn Sheep Transplant in Hells Canyon. Bienn. Symp. North. Wild Sheep and Goat Counc. (12):68-74.

Johnson, R. L. 1980. Re-introductions of Bighorn Sheep in Washington. Bienn. Symp. North. Wild Sheep and Goat Counc. (2):106-114.

Larsen, P. A. 1970. Bighorn Sheep population estimates and harvest information. Prog. Rep. New Mexico Dept. Game and Fish, Aid in Wildl. Restor. Proj. W-93-R11. Job 1 Santa Fe, NM. 10pp.

MacCallum, B. 2006. Summary of Health and Trace Mineral Testing of Bighorn Sheep at the Luscar and Gregg River Mine Sites of West-Central Alberta. Bienn. Symp. North. Wild Sheep and Goat Counc. (15):69-88.

Rognrud, M. 1983. Final report – general restocking in Montana. 1941-1982. Federal Aid Project W-5-D.

Sand, J. L. 1967. Bighorn Sheep. Pages 69-82 *in* New Mexico Wildlife Management. New Mexico Dept. of Game and Fish, Santa Fe.

Sandoval, A. V. 1987. Funds assist desert bighorns, mountain bighorns. New Mexico Wildl. 32:9-12

Smith, T. S. et al. 1988. Status and Distribution of Rocky Mountain Bighorn Sheep in Utah. Bienn. Symp. North.Wild Sheep and Goat Counc. (6): 5-12.

Stelfox, J. B., and J. G. Stelfox. 1993. Distribution *in* Hoofed Mammals of Alberta. J. B. Stelfox (ed), Lone Pine Publishing, Edmonton, AB. 241pp.

Wishart, W. E. 1961. Bighorn roundup. Alberta Land, Forest & Wildlife. Vol 3(6):4-17.

Woody, N. 1971, General bighorn sheep files. Warden Service, Canada Parks Service, Jasper, Unpubl.