Ram Harvest Strategies for Western States and Provinces—2007

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Abstract: At the 2007 Professional Wildlife Biologist Meetings held in conjunction with the Western Hunting Exposition in Salt Lake, Utah, a review of the current harvest strategies for wild sheep rams was conducted. A questionnaire, designed to collect data on ram harvest strategies, was distributed to biologists from the 20 jurisdictions hunting sheep in 2007. Results from this questionnaire are presented in this manuscript. Most hunting of bighorn sheep is a function of limited entry drawings, although unlimited entry hunting occurs in much of Alberta and parts of Montana. Draw odds as high as >4000:1 exist for these rare permits. An estimated 1310 bighorn sheep (*Ovis canadensis*) and 1690 thinhorn sheep (*Ovis dalli*) rams were harvested in 2007.

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Introduction

The evolution of wild sheep hunting in North America has progressed from the market hunting days that pre-date the earliest game protection laws to the current regulations in place by all state and provincial wildlife agencies (jurisdictions). In this manuscript we review the regulations in place during the 2007 hunting season. A questionnaire (Appendix A) was developed and sent to 20 jurisdictions (Appendix B) that hunt wild sheep. The results from that questionnaire were presented at the 2008 Wild Sheep Foundation (WSF) Professional Meeting in Salt Lake City, UT and again at the 2008 Northern Wild Sheep and Goat Council Symposium held in Midvale, UT. An Excel spreadsheet with the data generated by each jurisdiction is included as Appendix C.

Harvest numbers varied substantially among jurisdictions, e.g., New Mexico issues a single public desert bighorn sheep permit compared with thousands of permits in Alaska and more than 900 rams harvested annually. Ram hunts were primarily permitted via a limited entry draw. More rarely, jurisdictions allowed over-the-counter, unlimited entry hunts. In addition, the results were partitioned between bighorn and thinhorn sheep. In 2007, both Montana and British Columbia were substantially redesigning their respective ram harvest regulations.

Results

Limited Entry Draw Hunts

Legal Ram

The majority of jurisdictions have gone to an 'any' ram regulation with neither a horn-curl or age restriction. Exceptions for bighorn sheep are California, Colorado, and Alberta where either ½-curl, ¾-curl, or *4/5*-curl restrictions are in place. Montana and South Dakota allow for harvest of either sex during the bighorn season.

In Alaska and Yukon full-curl or 8 years-old restrictions are in place. In Northwest Territory, a ¾-curl rule is applied.

Minimum Population Size

The minimum population size to hunt varied among jurisdictions. The general rule was a population between 50 and 100, although some jurisdictions hunted

subpopulations as small as 25 if linked to a population in a 'protected' area such as National Parks, National Monuments, or military reservations. California requires a minimum female component of 50 ewes prior to hunting.

Boone and Crockett Scores

Most jurisdictions required that ram heads be sealed and Boone and Crockett (B&C) measurements are recorded at that time. Some jurisdictions only measured basal circumferences and horn lengths, i.e., not the quarter circumference measurements for a B&C score. Jurisdictions where thinhorns are harvested did not collect B&C measurements. This is primarily a function of the large number of rams harvested each year. In New Mexico ram age and B&C measurements are closely monitored in populations to allow maximum harvest without inducing long-term declines in either age or B&C scores.

Rams/100 Bighorn Sheep

One measure of ram harvest is the number of rams harvested/100 bighorn sheep in the population. Among jurisdictions this value ranged from 1.3-3.5 rams/100 sheep with a mean of 2.5 rams/100 sheep. The 2 jurisdictions with the highest harvest ratio were Montana and Wyoming at 3.5 rams/100 sheep. The jurisdictions with the lowest ratios were Texas and Arizona at 1.3 and 1.5 rams/100 sheep respectively. For thinhorn sheep the lowest ratio was in the Northwest Territory where 1.2 rams/100 sheep was harvested.

Colorado issues 1 license per 29 bighorn sheep in the population, which translates to 3.4 rams/100 bighorn sheep with 100% hunter success. Monitoring of age and B&C scores has allowed New Mexico Department of Game and Fish to increase the number of permits from ~1.3/100 bighorn sheep to ~2.7/100 bighorn sheep in the Pecos Wilderness.

With an estimated 72,000 bighorn sheep in the United States and Canada, and approximately 1310 rams harvested, the ratio would be 1.8 rams/100 bighorn (Appendix C). This number is substantially lower than the average across all jurisdictions because of a proportion of each jurisdiction's bighorn sheep are in protected areas, i.e., areas that are not hunted. The range of percentages for bighorn sheep in protected areas was <1% in Texas to 78% in California. Making an assumption that 25% of bighorn sheep are in protected areas in Canada and the United States would increase the ratio to 2.4 rams/100 bighorn.

A population estimate in Yukon was not available to create a species-wide estimate for thinhorn sheep. However, using the midpoint population estimates for Alaska, British Columbia, and Northwest Territory resulted in ratios of 1.6, 2.4, and 1.2 rams/100 sheep respectively. Using the 25% in protected areas assumption, the ratios would increase to 2.1, 3.2, and 1.6 rams/100 sheep.

Percent of Ram 8+ Years Old at Harvest

The percent of rams that were 8 years old or older at harvest ranged from 30-73%, with a mean of 51% (Appendix C). The lowest percentages were in Wyoming (28%) and Alberta (41%) and highest in New Mexico (78%) and Texas (64%). It was noted that California bighorn rams (race not state) rarely live to be 8 years old and therefore this may not have been the appropriate cut-off age to delineate 'mature' rams for that race of bighorn.

Harvested Rams as a Percent of Total Rams

There was the greatest amount of 'noise' in this variable. This may be because rams are more difficult to

enumerate during helicopter surveys because of their predilection to move into timbered habitat. The range of values reported were 7-12% of all rams and 20-30% of Class III and Class IV rams (Appendix C). Because most herds are not surveyed just prior to hunts, the denominator in this ratio is inexact. Therefore most jurisdictions base this ratio on estimates generated from multiple sources including ground surveys, hunting guides, and long-term knowledge of the age structure. If ram harvests were based solely on number of rams *observed* during helicopter surveys, harvest ratios would generally be much more conservative.

Between 2000-2008, in the Pecos Wilderness in New Mexico, ram harvest is estimated to be about 7% of total rams using estimates from all sources to construct total rams. However, ram harvest based on rams *observed* during helicopter surveys alone was 21% (range=8-55%). The actual ram numbers were thought to vary little among years in this alpine population that has an asymptotic growth curve. Because rams, particularly large rams, are dominant at constricted winter feeding sites mortality rates for males during winter is hypothesized to be lower and more stable than for subordinate sex and age classes.

Number of Rams Harvested

Within jurisdictions the number of bighorn rams harvested annually ranged from 1-2 in Nebraska to ~200 in Wyoming (Appendix C). Approximately 1310 bighorn sheep rams were harvested in the United States and Canada in 2007.

For thinhorn jurisdictions the annual harvest was ~240 in Northwest Territory, ~250 in Yukon, ~300 in British Columbia, and ~900 in Alaska. Approximately 1690 thinhorn rams were harvested.

Success Rates

Success rates for jurisdictions with bighorn sheep ranged from 44-100% with a mean of 85% (Appendix C). Twelve of 17 jurisdictions with bighorn sheep reported success rates of $\geq$90%. The lowest success rates were in British Columbia (~65 for non-residents but only about 10% for residents) and Alberta (44%). Colorado reported a relatively low success rate (50%) but 80 archery licenses, which typically have a much lower success rate than rifle licenses, were included. Non-resident thinhorn harvest success averaged 62%, however the success rate for residents were substantially lower, e.g., in Alaska it is ~38%.

Over-the-counter Hunts

Two jurisdictions, Alberta and Montana, offer 'over-the-counter' hunts where unlimited entry can occur to hunt bighorn sheep. Most hunting for bighorn in Alberta is unlimited hunting with a 4/5th horn curl restriction. Between 1988 and 2007 there were an average of 144 rams killed in over-the-counter hunts and 25 in limited entry hunts. In a province-wide analysis this equated to 1.5 rams harvested/100 bighorn sheep. Using populations from just the hunted proportion of Alberta bighorn sheep results in 2.9 rams harvested/100 bighorn sheep.

Montana had 4 unlimited entry areas in 2007. Success rates are typically much lower than in draw hunts and Alberta averages just 7.5% and Montana ~6.5%. Montana sets a predetermined quota in these units and the hunting season is terminated when the quota is met, or in some instances approached. In 2005, 43% of hunter numbers were from the 4 unlimited entry units, however just 6% of the statewide harvest came from these units.

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Appendix A. Questionnaire sent to the 20 jurisdictions that hunt wild sheep in the United States and Canada.

Questions for Ram Harvest Management Strategies

A. Goal is trophy harvest (limited entry/draw hunt units):

1. Are there minimum population sizes/numbers of rams to hold hunts?
2. Hunts based on total population numbers or on total ram numbers?
3. Do you track ram age/B&C scores for herds?
4. What factors affect decisions to reduce permits or cancel hunts?
5. Using a 10-year average, what percentage of rams harvested are mature—8+ years old.
6. What is the mean success rate in these units?
7. On average, how many rams are harvested/100 bighorn sheep?
8. On recent average…how many rams are harvested annually?

B. Goal is high hunter opportunity (over the counter/open hunt units):

1. Are there different criteria for these open hunt units vs. draw units?
2. Do you track ram age/B&C scores for herds?
3. What factors affect decisions to reduce permits or cancel hunts?
4. Using a 10-year average, what percentage of rams harvested are mature—8+ years old.
5. What is the mean success rate in these units?
6. On average, how many rams are harvested/100 bighorn sheep?

Appendix B. List of 20 jurisdictions that hunt wild sheep in the United States and Canada.

- Alaska
- Alberta
- Arizona
- British Columbia
- California
- Colorado
- Idaho
- Montana
- Nebraska
- Nevada
- New Mexico
- North Dakota
- Northwest Territory
- Oregon
- South Dakota
- Texas
- Utah
- Washington
- Wyoming
- Yukon

Appendix C. Excel spreadsheet with the results from the questionnaire sent to each jurisdiction.

State	Representative	Ram	Ewe
Alaska	Becky Kellyhouse	X	X
Alberta	Jim Allen	X	X
Arizona	Brian Wakeling	X	
British Columbia	Chris Addison	X	X
California	Tom Stephenson	X	
Colorado	Bruce Watkins	X	X
Idaho	Dale Toweill	X	
Montana	Tom Carlsen	X	X
Nebraska	Todd Nordeen	X	
Nevada	Mike Cox	X	
New Mexico	Eric Rominger	X	
North Dakota	Brett Weidmann	X	
NW Territory	Alasdair Veitch	X	X
Oregon	Thompson/Torland	X	
South Dakota	Ted Benzon	X	
Texas	Calvin Richardson	X	
Utah	Kent Hersey	X	
Washington	Donny Martorello	X	
Wyoming	Kevin Hurley	X	
Yukon	Jean Carey	X	

State--subspecies	Pop. Est. BHS	
Alberta--RM	**11200**	
Arizona--DE	**4600**	
British Columbia	**4100**	
California--DE	**4400**	
Colorado--RM	**7000**	
Idaho--RM/CA	**4000**	
Montana--RM	**6700**	
Nebraska--RM	**220**	
Nevada--CA/RM/DE	**8800**	

New Mexico--RM/DE	**1400**	
North Dakota--RM	**300**	
Oregon--RM/CA	**4250**	
South Dakota--RM	**450**	
Texas--DE	**1200**	
Utah--RM/DE	**5500**	
Washington--RM/CA	**1600**	
Wyoming--RM	**6200**	
TOTAL	**71920**	