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This Procedure Replaces:

None

Staff, Organizations Directly Affected:

Director
Regional Managers
Wildlife Management Staff
First Nations
Resident Hunters
Guide Outfitters

Policy Cross-Reference:

Ministry Policy Manual, Volume 4, Section 7

Subsection:

— 01.07 Game Harvest Management

Other Cross-References:

Ministry Policy Manual, Volume 4, Section 7


Subsections:

— 01.01 Allowable Harvest
— 01.02 Open Seasons
— 01.03 Harvest Allocation
— 01.05 Quota Allocation – Guided Hunting
— 01.06 Limited Entry Hunting
— 01.10 Resident Hunter Priority
— 01.11 Commercial Hunting Interests
— 04.01.3 Control of Species
— 13.01 Goal of Wildlife Management

Ministry Procedure Manual, Volume 4, Section 7

Subsections:

— 01.01.1 Allowable Harvest
— 01.02 Open Seasons
— 01.03.1 Harvest Allocation
— 01.05.1 Quota
— 01.05.2 Administrative Guidelines
— 01.06.1 Limited Entry Hunting
— 01.07.1 Big Game Harvest Management

PREPARED BY		AUTHORIZATION	
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		SIGNATURE	
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— 04.01.3 Protecting Species at Risk From Other Species

Mountain Goat Management Team. 2010. Management Plan for the Mountain Goat (*Oreamnos americanus*) in British Columbia. Prepared for the B.C. Ministry of Environment, Victoria, BC. 87 pp. Available at: http://www.env.gov.bc.ca/wld/documents/recovery/management%20plans/MtGoat_MP_Final_28May2010.pdf

Purpose:

To establish a sound and transparent approach for developing management objectives and harvest regulations for Mountain Goats province-wide.

Definitions:

“adult” – a Mountain Goat that does not meet the definition of “kid”.

“allocation” – the division of the annual allowable harvest (AAH) remaining after the legal rights of First Nations have been recognized and provided for, between resident hunters and guided hunters.

“allocation period” – the five year period to which an allocation share applies, as defined in the Harvest Allocation Procedure.

“annual allowable harvest” (AAH) – the number of Mountain Goats that are allowed to be killed by resident hunters and guided hunters each year.

“big game” – means big game as defined in the *Wildlife Act*, RSBC 1996 c.488.

big game stock assessment – the process of collecting, analyzing and reporting demographic information for the purpose of determining the effects of harvesting on big game populations.

“director” – means director as defined in the *Wildlife Act*, RSBC 1996, c.488.

“kid” – a Mountain Goat with horns that are less than 10 cm in length.

“management unit” (M.U.) – a specific and legally designated land area denoted by the initials M.U. and a hyphenated number, e.g. M.U. 3-18 (B.C. Reg. 64/96).

“population” – a biological unit or a discrete group of potentially interbreeding individuals in a given locality, and includes all ages and gender classes. Distinct populations of Mountain Goats can be surmised within individual mountain blocks or groups of mountain blocks where regular exchange is known or suspected and can be considered to be relatively discrete. Due to the difficulties in accurately identifying distinct populations of Mountain Goats within often continuous habitat, for the purposes of this procedure, ‘population’ will also refer to the managed unit of Mountain Goats for harvest.

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“population management unit” (PMU) – the spatial scale at which a given big game population will be managed for hunting. This normally will be the geographic area that represents the year-round range of a big game population, while keeping interchange with other populations to a minimum.

“regional section head” (RSH) – a section head responsible for the management of fish and wildlife within a region, Regional Operations Branch, Ministry of Forests, Lands and Natural Resource Operations.

“sightability correction factor” – a quantitative coefficient which is estimated or derived and applied to a survey population estimate to account for visibility or sightability bias of the observers.

“visibility bias” – a failure to observe all animals during aerial or ground surveys.

“wildlife manager” – the Manager of the Wildlife Management Section, Fish, Wildlife and Habitat Management Branch, Ministry of Forests, Lands and Natural Resource Operations, Victoria.

Procedure:

1 Population Management Units

- 1.1 Mountain Goats should generally be managed at the population level.
- 1.2 As specified in the Big Game Harvest Management Procedure, Mountain Goats may be managed at smaller or larger spatial units, provided that the resulting units conform to the criteria outlined in the Big Game Harvest Management Procedure and take into consideration criteria outlined in the Management Plan for the Mountain Goat (*Oreamnos americanus*) in British Columbia¹.
- 1.3 The RSH should consider, and where appropriate, make changes to the spatial units identified in 1.2 before the start of each new allocation period.

2 Management Objectives

- 2.1 Mountain goat populations are a species that are highly sensitive to overharvest due to their low reproductive rates and because they lack of sufficient sexual dimorphism to enable hunters to consistently identify and select males for harvest¹. This should be taken into consideration when developing Mountain Goat management objectives.
- 2.2 Management objectives should be defined for each Mountain Goat PMU, and should take into consideration the big game management objectives described in the Big Game Harvest Management

¹ Mountain Goat Management Team. 2010. Management Plan for the Mountain Goat (*Oreamnos americanus*) in British Columbia. Prepared for the B.C. Ministry of Environment, Victoria, BC. 87 pp.

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Procedure and in the Management Plan for the Mountain Goat (*Oreamnos americanus*) in British Columbia².

- 2.3 Unless contrary management objectives have been identified, hunted Mountain Goat populations should be managed to avoid population declines.
- 2.4 Where feasible, management objectives should take other values such as wildlife viewing into consideration.

3 Harvest Strategy

3.1 Population Assessment

- 3.1.1 The appropriate Resource Information Standards Committee (RISC) standards should be used when performing inventories of Mountain Goat populations.
- 3.1.2 Population estimates based on direct counts should be adjusted upwards to account for visibility bias using a sightability correction factor or relevant model, where appropriate (Appendix A)
- 3.1.3 Extrapolations of population size estimates to the PMU should be based on survey results, adjusted for habitat suitability of non-surveyed areas, and other factors as deemed appropriate by the RSH.

3.2 Harvest Management Rules

- 3.2.1 Mountain Goat populations with less than an estimated 50 adults (i.e. non-kids) should not be hunted due to population viability concerns².
- 3.2.2 The AAH for each Mountain Goat population should typically be calculated by applying a harvest rate of not more than 3% to the estimated population size³.
- 3.2.3 Harvest rates should be based on the estimated size of the Mountain Goat population and recent percent female Mountain Goats in the harvest, and should conform to the rates described in Table 1 of Appendix B.

² Mountain Goat Management Team. 2010. Management Plan for the Mountain Goat (*Oreamnos americanus*) in British Columbia. Prepared for the B.C. Ministry of Environment, Victoria, BC. 87 pp.

³ Côté, S.D. and M. Festa-Bianchet. 2003. Mountain Goat. Pages 1061–1075 in G.A. Feldhamer, B. Thompson, and J. Chapman, eds. Wild mammals of North America: biology, management, and conservation. The John Hopkins Univ. Press, Baltimore, MD.

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- 3.2.4 The harvest of female Mountain Goats should be minimised, and the percent of females in the harvest of a population should not exceed the maximums described in Table 1 of Appendix B.
- 3.2.5 In addition to 3.2.3, when setting the harvest rate for each Mountain Goat population, consideration should be given to:
- management objectives determined in section 2;
 - variations in recruitment rates;
 - rates of harvest by First Nations for food, social or ceremonial purposes;
 - rates of non-hunting human caused mortalities (e.g. road/rail kills); and
 - rates of illegal harvest.
- 3.2.6 The RSH should consider recommending reduced harvest rates below those described in Table 1 of Appendix B if:
- inventory data have not been updated within the previous five years for hunted populations estimated to have greater than 100 adults, or when inventory data have not been updated within the previous three years for hunted populations of an estimated 50 to 100 Mountain Goats;
 - an analysis of data suggests a continued (i.e. multi-year) reduction in hunter harvest success;
 - an analysis of data suggests high levels of female harvest in excess of the maximums described in Table 1 of Appendix B; or
 - there is uncertainty in the population estimate.
- 3.2.7 Where sufficient population-specific demographic information exists, a big game stock assessment that utilizes a population-specific population model should be performed to determine the appropriate AAH that will enable the population management objectives to be achieved. Harvest rates should be approved by the Wildlife Manager in cases where the big game stock assessment indicates that harvest rates higher than those described in Table 1 of Appendix B may be used to achieve population management objectives.
- 3.2.8 Isolated populations should be managed more conservatively than those that have adequate connectivity with adjacent populations.

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3.2.9 For allocated PMUs where there is insufficient information to estimate the size of the Mountain Goat population, the AAH may be estimated from the historical average annual harvest of Mountain Goats by licensed hunters, providing all available evidence suggests that the historic harvest has been sustainable.

3.2.10 It is recommended that an AAH be established for unallocated PMUs.

3.3 Hunting Regulations

3.3.1 Season dates should fall within the bounds outlined in Table 2 of Appendix B.

3.3.2 Numbers of Limited Entry Hunting (LEH) authorizations and guide outfitters' quotas should be set in accordance with the Harvest Allocation Procedure, Limited Entry Hunting Procedure, Quota Procedure, and Administrative Guidelines Procedure.

3.3.3 Success rates used to determine the number of LEH authorizations should reflect the most recent three years that were open to Mountain Goat hunting. Success rates should be determined for each individual LEH hunt.

3.3.4 Despite section 3.3.3, LEH success rates should be limited to a minimum of 10%. Other minimum success rates may be applied where approved by the Wildlife Manager. Limited Entry Hunting areas with consistently low success rates should be reviewed and other regulatory options considered for implementation.

3.3.5 Hunting regulations should prohibit the harvest of female Mountain Goats accompanied by kids, or female Mountain Goats in a group that contains one or more kids.

3.3.6 Before proposing regulation changes so that populations will meet the performance measures of management objectives (e.g. avoid population declines), staff should examine lines of evidence as described in Appendix C to determine if those performance measures are not being met, and report that information to the Wildlife Manager.

4 Bag Limits

4.1 Normally, provincial and regional bag limits should be no more than one Mountain Goat per hunter per year.

5 Regulation Review

5.1 Regulations should be reviewed, and the results of any regulation changes monitored, according to Appendix C and the procedure outlined in the Big Game Harvest Management Procedure.

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APPENDIX A: Information on the Use of Sightability Correction Factors

The following is an excerpt from the Management Plan for the Mountain Goat (*Oreamnos americanus*) in British Columbia document, including references, discussing the use of sightability correction factors.

Sightability

Portions of the animals in an area are not observed during aerial surveys. For example, out of 100 mountain goats in a surveyed area, perhaps only 65 will be seen. To provide a more accurate estimate of the number of animals present, an adjustment for sightability is often applied to the number seen. The average sightability during Mountain Goat surveys for interior populations are 60–70% (Gonzalez-Voyer *et al.* 2001; Poole 2007b). Rice *et al.* (2009) modeled 85% sightability for an interior population in Washington, but lower sightability is assumed for most coastal populations (46%: Smith and Bovee 1984; Alaska 45–65%: K. White, pers. comm. 2008). For south coastal British Columbia, aerial sightability values of 15–25% were estimated based on mark-recapture techniques using radio-collared animals (K. Brunt, pers. comm. 2009).

References

Gonzalez-Voyer, A., K.G. Smith, and M. Festa-Bianchet. 2001. Efficiency of aerial surveys of mountain goats. *Wildlife Society Bulletin* 29:140–144.

Poole, K.G. 2007b. Does survey effort influence sightability of mountain goats *Oreamnos americanus* during aerial surveys? *Wildlife Biology* 13:113–119.

Rice, C.G., K.J. Jenkins, and W. Chang. 2009. A sightability model for mountain goats. *Journal of Wildlife Management* 73:468–478.

Smith, C.A. and K.T. Bovee. 1984. A mark-recapture census and density estimate for a coastal mountain goat population. *Biennial Symposium of the Northern Wild Sheep and Goat Council* 4:487–498.

Personal Communications

Brunt, Kim. 2009. B.C. Ministry of Environment, Nanaimo, BC.

White, Kevin. 2008. Alaska Department of Fish and Game, Douglas, AK.

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APPENDIX B: Recommended Harvest Rates, Percent Females in Harvest and Season Bounds for Mountain Goat

Table 1. Maximum harvest rates and maximum percent females in harvest for different sized Mountain Goat populations.

Estimated Population Size	Maximum Harvest Rate	Maximum Percent Females in Harvest
< 50 adults	0%	N/A
≥ 50 adults to < 100 Mountain Goats	2%	≤ 25%
≥ 100 Mountain Goats	3%	25–30%

Table 2. Season bounds (minimum/maximum season dates) for Mountain Goat harvest seasons⁴.

Region	Season Bounds
1, 2, 3, 4, 5, 8	Sep 1 – Nov 30
6	Aug 1 – Feb 28
7A, 7B	Aug 1 – Nov 15

⁴ Season dates represent outer bounds of seasons for each season type. It is expected that any open season will fall within the dates specified, but not that the entire date range is used in each region.

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Appendix C: Assessing and Monitoring Performance Measures of Management Objectives

Prior to Proposing a Regulation Change:

Population management units for Mountain Goats should have one or more performance measures that are used to determine if management objectives are being met (e.g. avoid population declines). It is important to note that these performance measures are meant to be used as general guidance and should not be used as a precise threshold for immediate initiation of a regulation change. This is because of the general problems associated with assessing populations (e.g. unfavourable weather conditions or observer bias when conducting aerial surveys).

It is recommended that multiple lines of evidence be examined that could indicate performance measures are not being met. These include:

- successive population surveys (i.e. repeat surveys over a year or number of years);
- a big game stock assessment (analysis of population and hunter harvest information); and
- observational information from a variety of sources.

The spatial area to be used to assess a management concern will normally be the PMU (e.g. the population). There may be circumstances where the performance measure is not being met in a portion of a PMU. In these situations, options should be examined for adjusting harvest regimes in the affected area only so as not to reduce hunting opportunities throughout the entire PMU. Where this occurs, the management focus should be recovery within the affected area, so as to restore consistent regulations throughout the PMU.

Monitoring the Regulation Change:

To evaluate if the regulation change has had the desired population effect (e.g. recovery above management threshold limits), a big game stock assessment should be conducted 3-5 years after the regulation change has been implemented in order to provide adequate time for the desired change in the population to occur. Normally the stock assessment would include a minimum of one population survey in addition to the analysis of hunter harvest information.

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