

Mountain Goats in North America: A Survey of Population Status and Management

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Abstract: We surveyed the 13 state and provincial fish and wildlife agencies in North America to collect information on population status and management of mountain goats. Data were collected on funding, survey methodology, harvest management, and ongoing research. Range wide total estimated mountain goat populations in 2010 ranged from 80,278 to 116,278 individuals with population status being variable by area.

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Mountain goats occur in 13 states and provinces in North America (Figure 1). Biologists from those areas typically present status reports for each state and province during the biennial Northern Wild Sheep and Goat Council Meeting. Instead of individual status reports, we surveyed all 13 states and provinces with mountain goats and summarized the data across mountain goat range in North America. We obtained range-wide information on funding for management and research, population status, surveys conducted, hunter and harvest management, current research being conducted, and concerns and issues affecting the species.

METHODS

Surveys were sent to representatives from each state and provincial fish and wildlife agency within the range of mountain goats. Surveys were completed using an online survey tool call Survey Monkey (www.surveymonkey.com). We surveyed for information on management funding, populations surveys, hunter and harvest information, population trends, and current research (Table 1). We summarized

data by topic and location. Incomplete responses, insufficient detail and/or lack of data lead to incomplete summaries of some topics.



Figure 1. Alaska, Yukon, British Columbia, Alberta, Washington, Oregon, Idaho, Montana, Colorado, South Dakota, Wyoming, Utah and Nevada reported having mountain goat populations in 2010.

Table 1. Summary of survey questions sent to the state or provincial biologist responsible for mountain goat management.

Does your state/province have mountain goats?
What is the primary source of funding for this species?
What are your historic (1970-2000) and current population estimates?
Are populations stable, increasing, or decreasing?
What methods are used to collect population and ratio estimates?
Are these estimates statistically valid?
How frequently do you update your population estimates?
What are the 3 primary reasons for changes in population levels over the last 30 years?
Please provide a summary of recent transplants and/or reintroductions in the last 5 years.
Please provide information on historic (1970-2000) and current male and female harvest.
Please provide information on historic (1970-2000) and current hunter numbers and harvest success.
What type of hunts do you have?
What type of season restriction (i.e. bag limit) do you have?
Please identify any ongoing research your agency is conducting.

RESULTS

Funding

Fifteen percent of states/provinces reported receiving goat funding from the auction and/or raffle tags, 38% from hunting licenses and tags, 31% from general funds, 15% from federal funds, and 8% from other (Table 2).

Population Estimate and Status

Population estimates provided by participants ranged in detail and duration, so we can only provide a range-wide population estimate for 2010 of 80,278 to 116,278 goats. Between 78% and 85% of the estimated North American population occurs in Alaska and British Columbia (Table 3). Thirty eight percent of participants described their populations as stable, 31% as increasing, 8% as declining, 15% as stable to declining, and 8% as variable (Table 4).

Respondents reported a wide range of survey methodologies and timing. The majority (85%) reported using aerial methods for population estimation, while 46% and 38% reported ground and computer modeling, respectively (Table 5). Sixty-two percent of respondents reported using

ground methods to estimate ratios, while 46% reported using aerial methods. Most of the survey effort was in the summer, with some in the fall and spring, and minimal effort in the winter. Most respondents reported that their methodologies were not statistically valid. Sixty nine percent of respondents updated their population estimates annually, 15% every 5 years, 7% said it varied by year and funding, and 7% reported their estimates were just crude figures (Table 6).

Respondents provided a wide variety of reasons why populations have changed in the last 30 years, but some reported that there were insufficient data to even detect a population change. The most common reasons were changes in harvest management, population introductions or augmentations, or expansion into unoccupied habitat. Reasons that were mentioned once or twice were conifer encroachment into alpine habitat, human disturbance, increased access to hunters, climate change, pneumonia, and predation. Fifty-four percent of respondents reported no change in goat distribution, while 38% and 7% reported expanding and reduced

populations, respectively (Table 7). Forty-six percent of respondents reported moving goats as part of population reintroduction or augmentation efforts (Table 8).

Harvest

Respondents reported Harvest of mountain goats had increased since 1970, with a 2009 range-wide harvest estimate of 1,273 males and 467 females (Table 9). Mountain goat hunter numbers increased from 2,006 in 1980 to 3,709 in 2009 (Table 10). Hunter success averaged 72%, but ranged from 36% to 100% (Table 10). All respondents reported having limited entry hunts, 15% had general seasons, 15% had a quota system, and 30% had a special auction and/or raffle tag (Table 11). All respondents

reported a bag limit of “one goat” (i.e. non-gender specific), while 15% had some “male only” hunts and 23% had some “female only” hunts (Table 12).

Research

Six of 13 states or provinces reported conducting mountain goat research. Table 13 lists the responses for those states/provinces that reported conducting research.

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Table 2. Funding sources for the management of mountain goats.

Jurisdiction	Auction/ Raffle Tags	License Tag Fees	General Fund	Federal Fund	Other
Alaska				X	
Alberta			X		
British Columbia			X		X
Colorado		X			
Idaho			X		
Montana		X			
Nevada				X	
Oregon	X				
South Dakota		X			
Utah		X			
Washington	X				
Wyoming		X			
Yukon			X		

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Table 3. Current (2009) mountain goat population estimates.

Jurisdiction	1970	1980	1990	2000	2010
Alaska				24,000- 29,000	24,000- 33,500
Alberta			1,560	1,650	1,963
British Columbia					39,000 - 65,500
Colorado	475	0	1,090	1,620	1,600
Idaho	2,600	2,415	3,000	2,700	2,600
Montana					2,700
Nevada	30	80	170	280	340
Oregon	30	75	200	300	800
South Dakota	300	100	150	150	70
Utah	10	50	250	960	1,900
Washington					2,815
Wyoming	75 - 100	75 - 100	150 - 200	275	325
Yukon				1,700	1,700

Table 4. Status of mountain goat populations by jurisdiction.

Jurisdiction	Status
Alaska	Stable
Alberta	Increasing
British Columbia	Stable to declining
Colorado	Stable
Idaho	Stable to declining
Montana	Stable
Nevada	Declining
Oregon	Increasing
South Dakota	Stable
Utah	Increasing
Washington	Variable
Wyoming	Increasing
Yukon	Stable

Table 5. Methods of mountain goat population and ratio estimation by jurisdiction. Statistically valid methods are marked with an asterisk.

Jurisdiction	Population Estimate			Ratio Estimate	
	Ground	Aerial	Model	Ground	Aerial
Alaska	X	X	X	X	X
Alberta		X			
British Columbia	X*	X	X*	X	X
Colorado	X	X		X	X
Idaho		X		X	
Montana		X			
Nevada		X	X		
Oregon	X			X	
South Dakota	X	X	X*	X	X
Utah		X	X	X	
Washington		X*			
Wyoming	X	X		X	X
Yukon					X

Table 6. Frequency of population estimate updates by jurisdictions with mountain goats.

Jurisdiction	Update Frequency
Alaska	Variable
Alberta	Annually
British Columbia	5 years
Colorado	Annually
Idaho	5 years
Montana	Annually
Nevada	Annually
Oregon	Annually
South Dakota	Annually
Utah	Annually
Washington	Annually
Wyoming	Annually
Yukon	Estimates are crude figures

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Table 7. Change in distribution of mountain goats by jurisdiction from 1980 to present.

Jurisdiction	Distribution Change
Alaska	No Change
Alberta	No Change
British Columbia	Reduced
Colorado	Expanding
Idaho	No Change
Montana	No Change
Nevada	Expanding
Oregon	Expanding
South Dakota	No Change
Utah	Expanding
Washington	No Change
Wyoming	Expanding
Yukon	No Change

Table 8. Jurisdictions that reported capturing and/or releasing mountain goats for population reintroduction or augmentation.

Jurisdiction	Total Moved	Capture Jurisdiction	Release Jurisdiction	Release Events
Colorado	18	CO	SD	2
Idaho	24	UT	ID	1
Montana	30	MT	MT	3
Oregon	77	OR	OR	5
South Dakota	18	CO	SD	1
Utah	44	UT	UT 20 ID 24	2

Table 9. State and provincial male and female mountain goat harvest from 1970 to 2009.

Jurisdiction	Male Harvest					Female Harvest				
	1970	1980	1990	2000	2009	1970	1980	1990	2000	2009
Alaska	0	189	300	309	362	0	139	136	155	160
British Columbia	0	499	747	545	527	0	267	365	171	126
Alberta	0	7	0	0	5	0	13	0	0	1
Colorado	0	33	59	114	101	0	21	43	73	55
Idaho	157	67	52	33	28			24	15	14
Montana	354	230	215	225	113	0	0	0	0	64
Nevada	0	0	4	16	18	0	0	0	0	9
Oregon	0	0	0	3	13	0	0	0	0	0
South Dakota	14	6	3	3	0	10	4	1	0	0
Utah	0	0	4	19	77	0	0	0	9	30
Washington			54	20	11			41	10	2
Wyoming	3	5	5	14	15	0	2	2	1	6
Yukon	0	13	10	3	3	0	0	0	0	0
Total	528	1,049	1,453	1,304	1,273	10	446	612	434	467

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Table 10. State and provincial mountain goat hunter numbers and success rates from 1970 to 2009.

Jurisdiction	Number of Hunters					% Hunter Success				
	1970	1980	1990	2000	2010	1970	1980	1990	2000	2010
Alaska	0	767	1170	1267	1184		43	37	37	44
British Columbia	0	0	2178	1994	1819			52	36	36
Alberta	50	45	0	0	7	30	44			86
Colorado	0	77	110	210	201		70	93	91	78
Idaho	290	141	93	56	46	52	48	82	86	91
Montana	803	339	283	295	270	44	68	76	76	68
Nevada	0	0	4	18	28			100	89	96
Oregon	0	0	0	3	11				100	91
South Dakota	25	10	4	4	0	96	100	100	75	
Utah	0	0	6	29	107			67	97	100
Washington		619	189	35	15		43	49	86	79
Wyoming	4	8	8	15	21	75	88	88	100	100
Yukon										
Total	1,172	2,006	4,045	3,926	3,709	Average	59	63	74	79

Table 11. State and provincial mountain goat hunt types.

Jurisdiction	General Season	Limited		
		Entry Draw	Harvest Quota	Auction / Raffle
Alaska		X		
Alberta		X		
British Columbia	X	X	X	
Colorado		X		X
Idaho		X		
Montana		X		
Nevada		X	X	
Oregon		X		X
South Dakota		X		
Utah		X		X
Washington		X		X
Wyoming		X		
Yukon	X	X		
Total	2	13	2	4

Table 12. State and provincial mountain goat harvest restrictions.

Jurisdiction	Gender Specific		Non-Gender Specific
	Male Only	Female Only	
Alaska			X
Alberta			X
British Columbia			X
Colorado		X	X
Idaho			X
Montana			X
Nevada			X
Oregon			X
South Dakota			X
Utah	X	X	X
Washington			X
Wyoming			X
Yukon			X
Total	1	2	13

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Table 13. Responses from states and provinces reporting ongoing mountain goat research.

Jurisdiction	Research Information
Alaska	Nepal, N. Mountain goat habitat modeling for the Kenai Peninsula. U.S. Forest Service and the Alaska Department of Fish & Game. Manuscript in prep.
Alaska	White, K., and N.L. Barten. Mountain goat assessment and monitoring along the Juneau access road corridor and near the Kensington Mine, Southeast Alaska. Alaska Department of Fish & Game. Project is ongoing and includes assessment of life history and climate effects on survival.
Alaska	Shafer, A.B.A., S.D. Cote, and D.W. Coltman. Temporal and geographic patterns of genetic differentiation in mountain goats. Collaboration with Alaska Department of Fish & Game. Project is ongoing.
Alberta	Caw Ridge Goat Research with Steve Cote, University of Laval
British Columbia	Meagher Mountain and Bell 2 - summaries are in new plan
Oregon	Evaluating effects of trapping and transplanting on kid survival.
Oregon	Opportunistically monitoring movements of dispersing animals when they can be captured.
Wyoming & Idaho	Comparative studies of sympatric bighorn sheep and mountain goats in the Greater Yellowstone Area. Dr. Bob Garrott/Montana State University - Principal Investigator (please see Garrott et al. abstract for 2010 NWSGC Symposium). Information online at < www.homepage.montana.edu/~rgarrott/html/sheep_goat.htm >