Status of Rocky Mountain Bighorn Sheep and Mountain Goats in Montana

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Abstract: Rocky Mountain Bighorn Sheep under went major declines in Montana as settlement of the west occurred by European man. Hunting of bighorn sheep was closed in 1915, and populations didn't recover sufficiently to reopen hunting until 1953. A total of 2,258 bighorns were trapped for transplants within Montana, and an additional 406 bighorns were made available to other western states. In 2008, there were 49 populations with an estimated 6,685 bighorn sheep in Montana. As hunting resumed, regulations required that rams have a minimum ¾-curl. Some areas were limited entry, while as many as 6 hunting districts were unlimited. In 1974 unlimited areas accounted for 89% of the bighorn sheep hunters and 47% of the ram harvest. The contribution of the unlimited areas to hunter effort and harvest has gradually declined. Since 1984, 14 major die-offs have occurred resulting in losses of bighorn sheep ranging from 75%-97%. Montana is currently developing a Conservation Strategy to provide management direction for bighorn sheep.

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Historically, mountain goats were indigenous to Montana primarily west of the Continental Divide. Statewide trend data is lacking, but based on aerial survey data there were an estimated 2,719 goats in 2007. From 1941-2008, a total of 443 mountain goats were translocated to 27 different sites, resulting in 20 populations capable of sustaining some level of limited-entry hunting. Hunting regulations were first established for mountain goats in 1905, and the season closed briefly from 1936-1938. In 1953, quotas were established in some areas to manage the number of hunters and harvest. From 1954-1971, there were as many as 6 hunting districts that provided unlimited hunting however, this opportunity was phased out after the 1971 hunting season. From 1980-2007, there were an average of 297 hunters harvesting an average of 215 mountain goats annually. In 2007, there were a total of 53 mountain goat hunting districts or populations, with 41 open for hunting in 2008, and a total of 280 either-sex licenses issued. For the period of 1994-2008, ten hunting districts have closed due to significant declines in numbers. Seven of these districts had introduced populations. The cause of these declines is not entirely known. Recent transplants or augmentations have occurred in two areas.

Status of Bighorn Sheep

Although Rocky Mountain Bighorn Sheep (*Ovis canadensis canadensis*) were numerous in Montana, and used for food and other implements by Native Americans and the early explorers, the settlement of the west led to significant declines of bighorn sheep and other big game species (Mussehl and Howell 1971). The causes of the decline most often cited were contact with domestic sheep, range competition from livestock, contraction of diseases, and subsistence hunting (Buechner 1960). Often, poor range conditions, severe weather events, and high numbers of wild sheep were cited as concurrent factors present during reported outbreaks of scabies,

anthrax, lungworm, and pneumonia-related diseases.

Hunting of bighorn sheep in Montana was closed in 1915 and remained closed until 1953. By 1930, bighorn sheep were reduced to small, remnant bands and were considered by some to be an endangered or rare species (Couey and Schallenberger 1971).

At the turn of the century, Montana sportsmen, landowners and agency personnel worked together to begin to restore Montana's wildlife populations. The first transplant of bighorn sheep into Montana occurred in 1922 on the Moiese Bison Range with 12 bighorn from Banff, Alberta. Passage of the Pittman-Robertson Act (PR) in 1937 by the United States Congress initiated the Federal Aid in Wildlife Restoration Program, which provided federal funds to states from excise taxes on firearms, archery equipment and ammunition for wildlife restoration projects. This funding allowed the Montana Fish and Game Department to begin a bighorn sheep research and management program in 1941, with the objective of increasing populations (Couey and Schallenberger 1971).

Couey (1950) estimated that about 1200 bighorn sheep occupied 16 different areas within the state in 1950. The availability of PR funding provided the impetus for transplants of all game species including bighorn. From 1941 to 1950, new populations of bighorn were established through transplants to Wildhorse Island in Flathead Lake, the Gates of the Mountains, West Fork of the Gallatin River, and Billy Creek in the Missouri Breaks. From 1939 to 2008, 2,258 bighorns have been trapped within Montana for transplants within the state (Picton and Lonner 2008). An additional 406 bighorns were trapped in Montana and were made available for transplants to other states, including, Oregon, Idaho, Washington, Nebraska, Utah, Wyoming, Colorado and North Dakota. Most bighorn sheep, about 2,456, were transplanted after 1960. The majority of transplant source animals have either come directly from Sun River populations or from transplants established from Sun River stock.

Today, there are 49 different populations in the state with an estimated 6,685 total bighorn sheep (Figure 1). The occupied habitat is diverse, from the badlands and breaks habitat of eastern Montana to the high alpine mountains of south-central Montana, and from the lower elevation mountains of southwestern Montana to the higher elevations of northwestern Montana and Glacier Park (Figure 2).

When hunting of bighorn sheep reopened in 1953, a total of 30 permits were issued in three areas for ¾-curl rams. In 1956, two areas, the Spanish Peaks and the Absaroka-Stillwater, were combined and established as unlimited hunting districts. This area has remained in an unlimited status for the most part although, some districts have closed due to declines and the area has also been portioned into smaller districts over time. Initial hunting regulations consisted of a ¾-curl regulation and a long season length (McCarthy 1986). To control harvest, a quota was implemented in the unlimited districts in 1975. Beginning in 1967, some districts went to an either-sex regulation and the hunting of ewes in certain populations was implemented in 1974 as a method of managing populations. In 1977, a simplified legal ram definition was implemented primarily in the unlimited districts to make it easier for the hunter to determine what a legal ram is in the field.

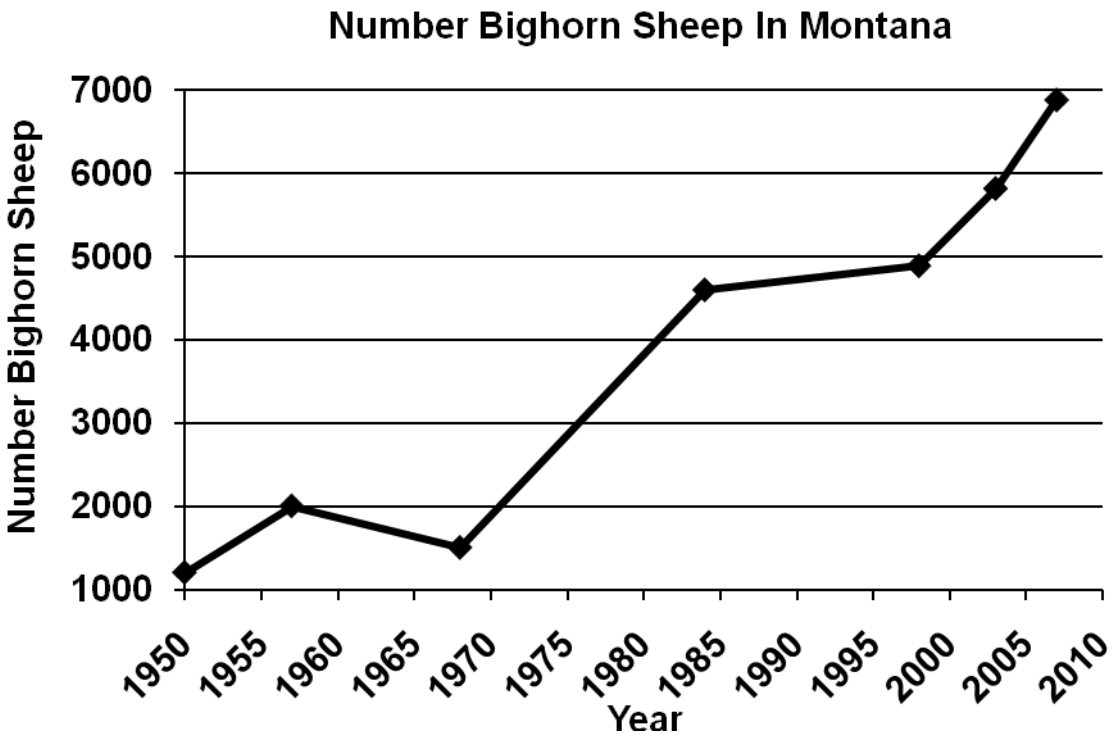

Figure 1. Trend in the number of bighorn sheep in Montana, 1950-2008.

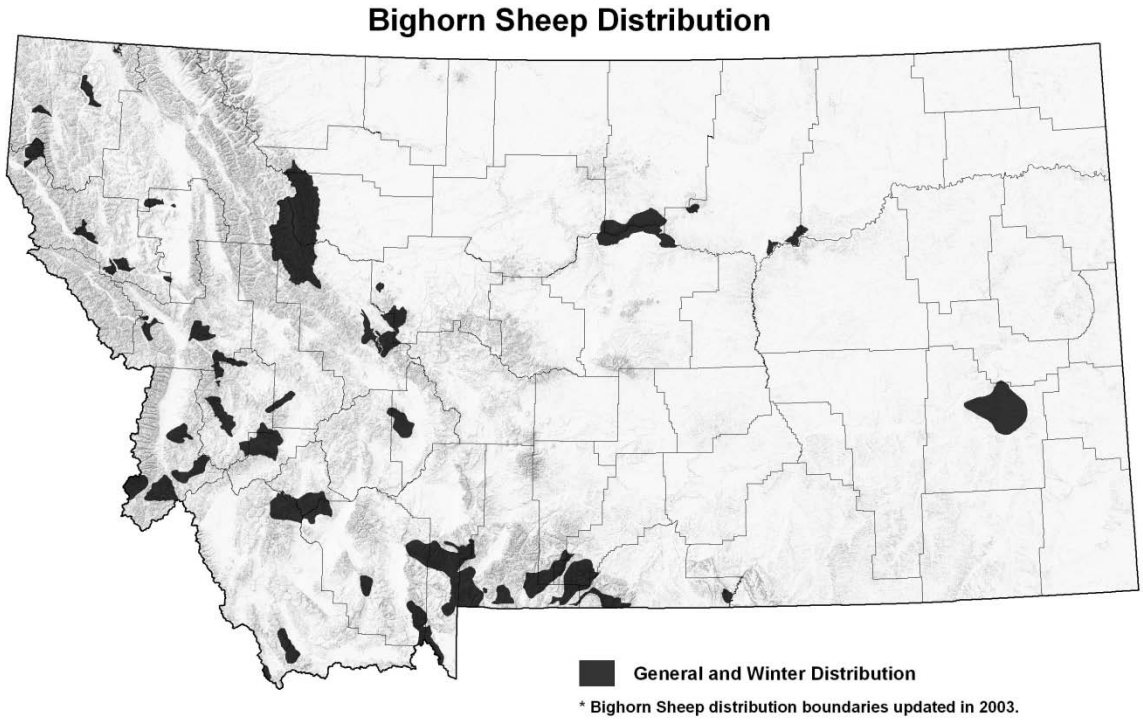

Figure 2. Distribution of bighorn sheep in Montana, 2008.

The unlimited districts, which allow anyone to purchase a license and go hunting, have over time provided significant hunting opportunity and harvest. In 1974, when hunter numbers and harvest peaked, the six unlimited districts accounted for 89% of the hunters and 47% of the ram harvest. Following that hunting season, population declines in some unlimited districts resulted in their closure and a subsequent decline in hunting opportunity and harvest (Figure 3). In 2005, the remaining four unlimited districts accounted for 43% of the state's bighorn sheep hunters but just 6% of the ram harvest.

Ewe seasons have been used since 1974 to manage bighorn populations and to provide additional bighorn sheep hunting opportunity. The number of licenses issued has varied over time depending on the objectives for certain populations and the status of those populations (Figure 4). In 2006, there were a total of 15 hunting districts providing some level of ewe harvest, and there were a total of 169 ewe licenses issued through special drawing. In some years some of the more productive bighorn populations, such as in the Sun River and Missouri River Breaks areas, require a combination of translocation of bighorn sheep in conjunction with ewe harvest to manage population numbers. Success on ewe licenses varies depending on the area, increasing with ease of access, and ranges from 75% to 90%.

In 2008, there were a total of 35 hunting districts open for the hunting of bighorn sheep. Thirty hunting districts were limited entry, and there were a total of 168 either-sex, 245 adult ewe, one legal ram and five any ram licenses issued. In the five unlimited hunting districts, there was a total quota of 11 legal rams. In the unlimited districts, licenses were purchased at license providers or through the regular drawing. Non-Residents were eligible for up to 10% of the licenses. License costs in 2008 for resident and non-resident hunters was $130 and $755, respectively, and ram and ewe license costs were the same.

Major population declines due to epizootic events are still a periodic challenge to maintaining bighorn sheep populations. Since 1984, there have been significant die-offs in 14 bighorn populations (Table 1). Most native populations tend to experience periodic gradual declines or less severe drops in population due to weather events. Although many transplanted herds seem to prosper for a decade or two, they tend to be more vulnerable to the catastrophic all age die-offs often associated with *Pasturella* outbreaks. Although several of these transplanted herds tended to recover, following augmentation, some do not. Those that did tended to be fewer in number and had reduced lamb survival for many years.

Although most of the herds experiencing die-offs recovered, some due to augmentation, the specter of another die-off still exists. Many different attempts were made over the years to prevent die-offs from occurring however; none were proven effective enough to be applied broadly. Thus, prevention included minimizing the effects of the die-offs by maintaining lower populations (herd segments generally less than 200), issuing adult ewe licenses, transplanting to control herd size, maintaining separation from domestic sheep and goats to minimize disease transmission, and inoculation of transplant stock to reduce the likelihood of disease or parasite transfer to new areas.

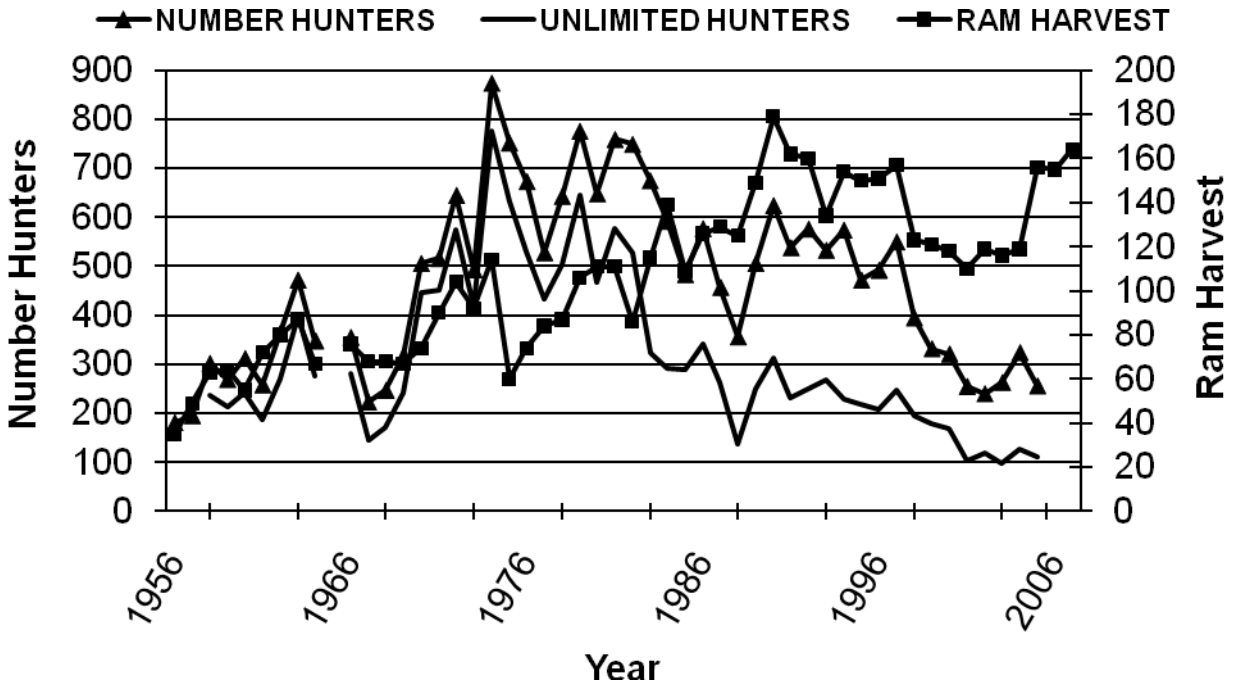

Figure 3. Total number of hunters, number of hunters in unlimited districts, and ram harvest in Montana, 1956-2007.

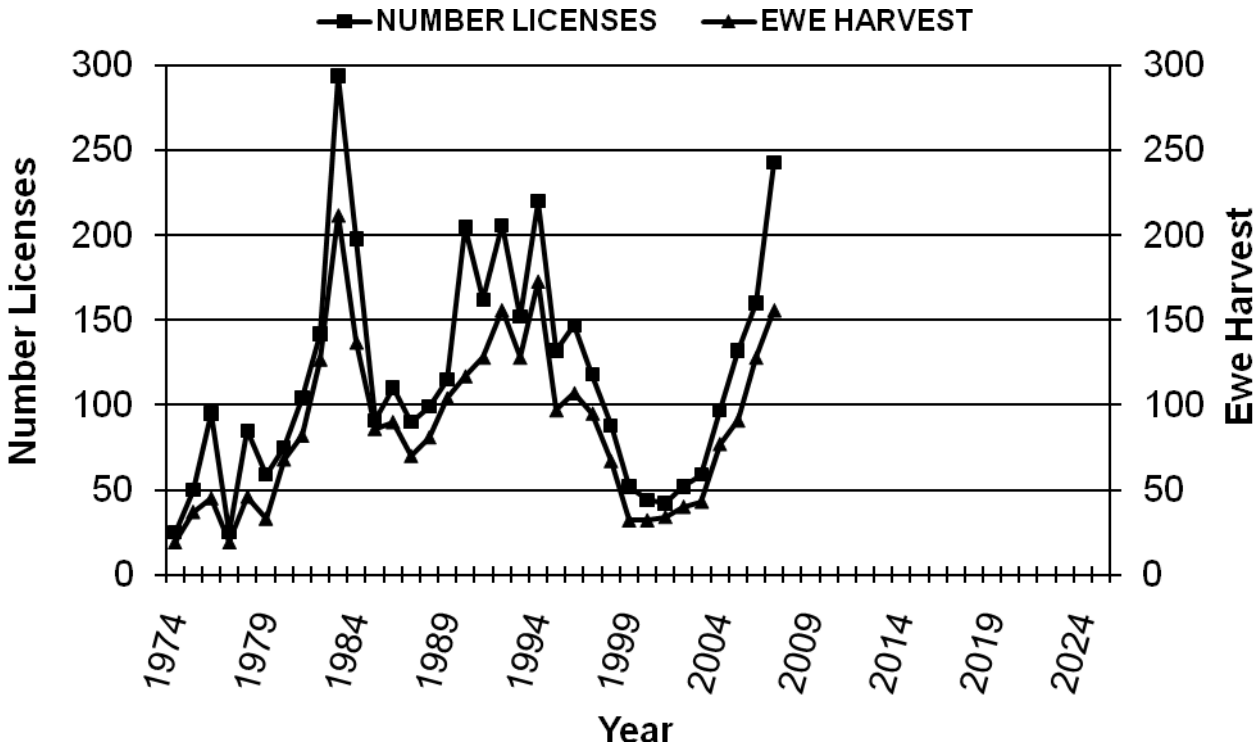

Figure 4. Number of ewe licenses and ewe harvest in Montana, 1974-2007.

Table 1. History of recent die-offs in Montana bighorn sheep populations, 1984-2008.

Population	Hunting District	Pre die-off number	Post die-off number	Native or Transplanted	Year(s) Transplanted	Year(s) of Die-off
Sun River	441, 421,423, 424	900	500	Native		1984
Ural Tweed	101	200	<100	Native	Augmented 1963	1999
Mickey Brandon Buttes	622	150	50	Transplanted	Transplanted 1980	1997,01
Kootenai Falls	100	100	30	Transplanted	1954, 55	1995
Spanish Peaks	301	200	<100	Native	Augmented 1944,47	1999
Pryor Mtns	503	250	145	Transplanted	1971,74	1995
Highlands	340	400	12	Transplanted	1967-69	1994
Tendoys	315	150	20	Transplanted	1984-86,96	1994
Lost Creek	213	400	100	Transplanted	1967	1991
Beartooth WMA	455	300	50	Transplanted	1971,73,75	1984
Taylor/Hilgards	302	>100	20-30	Native	Augmented 1988,89,93	1997
Lower Boulder River	504	100	2	Transplanted	1987, 89	1999, 2000
Sleeping Giant	381	115	39	Transplanted	1992, 93	2001,06
Elkhorn Mtns	380	230	20	Transplanted	1996,97,00	2008

Montana does not have a statewide management plan for bighorn sheep. Montana Fish, Wildlife and Parks is currently in the process of developing a comprehensive "Conservation Strategy" for bighorn sheep. The primary objectives of that strategy include:

1. Document the history of Rocky Mountain Bighorn Sheep in Montana from decline to recovery.
2. Include a history of all existing herds in the state with a discussion of past and current management and the challenges facing each of these populations.
3. Develop protocols for how we survey bighorn sheep, monitor the health of our herds, track the status and condition of important habitats, and update our guidelines for trapping and transplanting bighorns.
4. Identify areas that might be suitable for transplanting that currently don't have bighorn sheep.
5. Make the Conservation Strategy available to the public and use as a tool for informing them about Montana's management of bighorn sheep.

Status of Rocky Mountain Goats

Rocky Mountain goats are indigenous to Montana, and historically occurred mostly west of the Continental

Divide (Figure 5). While periodic surveys are conducted on most mountain goat populations in Montana, long-term statewide data hasn't been compiled on a consistent basis. In 1947, it was estimated there were a total of 4,451 goats in Montana (Vogel et al. 1995). Based on most recent survey information, there were approximately 2,719 goats in Montana in 2007. The source of the 1947 number could not be determined, so direct comparison of number estimates is questionable.

Mountain goat populations were evidently more stable than bighorn sheep populations as European man moved into the west, presumably because their habitat is more isolated, high elevation, and unsuitable for human settlement. However, Montana did begin transplanting mountain goats into unoccupied habitat in 1941. From 1941-2008, a total of 443 mountain goats were translocated to 27 different sites, resulting in 20 populations capable of sustaining some level of limited-entry hunting. A total of 56 mountain goats were provided for transplant to other states, including, Colorado, Wyoming and Washington.

Hunting regulations were established for mountain goats in 1905, when the hunter was restricted to one goat per hunting season (Foss and Rognrud 1971). The one-goat regulation was in effect for several years and was followed by a closure of the entire state to the hunting of goats. From 1929 through 1935, a season was authorized for goats on the west side of the Bitteroot River in Ravalli County. A closure was in effect for the entire state from 1936 through 1938. In 1939 and 1940, seasons were again opened in parts of the Flathead, Lewis and Clark, Missoula, Powell and Ravalli Counties. During the preceding interval, the season length was approximately one month with a variety of opening dates (mid-September to early November). During the next decade, areas that were open for hunting varied, but generally, the northwest part of the state, currently Region 1 had the majority of the areas open. A special goat license was created in 1953 in an attempt to limit both the number of hunters and harvest in certain areas. In 1954, there were 14 hunting districts open for hunting with several districts in Region 1 open for unlimited hunting (no quota). The unlimited areas occurred mostly in the northwest part of the state with as many as six hunting districts providing unlimited hunting opportunity. These areas included the Swan Range, Lower South and Middle Fork of the Flathead River, Upper South and Middle Fork of the Flathead River, Cabinet Mountains and the Mission Mountains. In the mid 1960's, two areas in Region 2, the West and East Fork of the Bitteroot River, also provided unlimited hunting opportunity. Seasons generally extended from mid-September through late November.

Similar to the earlier discussion of unlimited areas for bighorn sheep, unlimited hunting areas for mountain goats provided a tremendous amount of hunter recreation and mountain goat harvest (Figure 6) (Table 2). In 1963, when the number of mountain goat hunters and harvest peaked, the number of hunters in unlimited areas represented 68% of the total and accounted for 58% of the total harvest. Unfortunately, this level of harvest could not be sustained, and the unlimited areas were phased out after 1971 when only one district in Region 1 still provided unlimited hunting.

Figure 5. Distribution of Rocky Mountain Goats in Montana, 2008.

From approximately 1980-2007, the number of hunters has been relatively stable with an average of 297 hunters harvesting an average of 215 mountain goats annually (Figure 6). In 2007, there were a total of 53 mountain goat hunting districts or populations, with 41 of those open for hunting in 2008 and a total of 280 either-sex licenses issued.

Population declines have plagued many mountain goat populations in recent years. For the period 1994-2008, 10 Hunting Districts have closed due to significant declines. Seven of these districts included introduced populations. The cause of these declines is not entirely known. In some cases, circumstantial evidence implicates predation, primarily by mountain lions as playing a role. Hunting is not thought to be a factor, as many of the introduced populations, while relatively small in numbers, were being hunted very conservatively. Interestingly, other introduced populations, specifically in the Crazy Mountains and the Absaroka Mountains, have some of the more robust populations and are providing significant hunter opportunity and harvest. During this same period of decline, five new populations were established (Figure 7).

Recent transplants or augmentations have occurred in two areas. Ten mountain goats from the Crazy Mountains were released during the winter of 2002 on Red Mountain in the Scapegoat Wilderness Area north of Helena, Montana. In 2008, 10 mountain goats from Round Butte near Great Falls, Montana were released on the Ear Mountain Wildlife Management Area on the Rocky Mountain Front west of Great Falls and augmented an existing population.

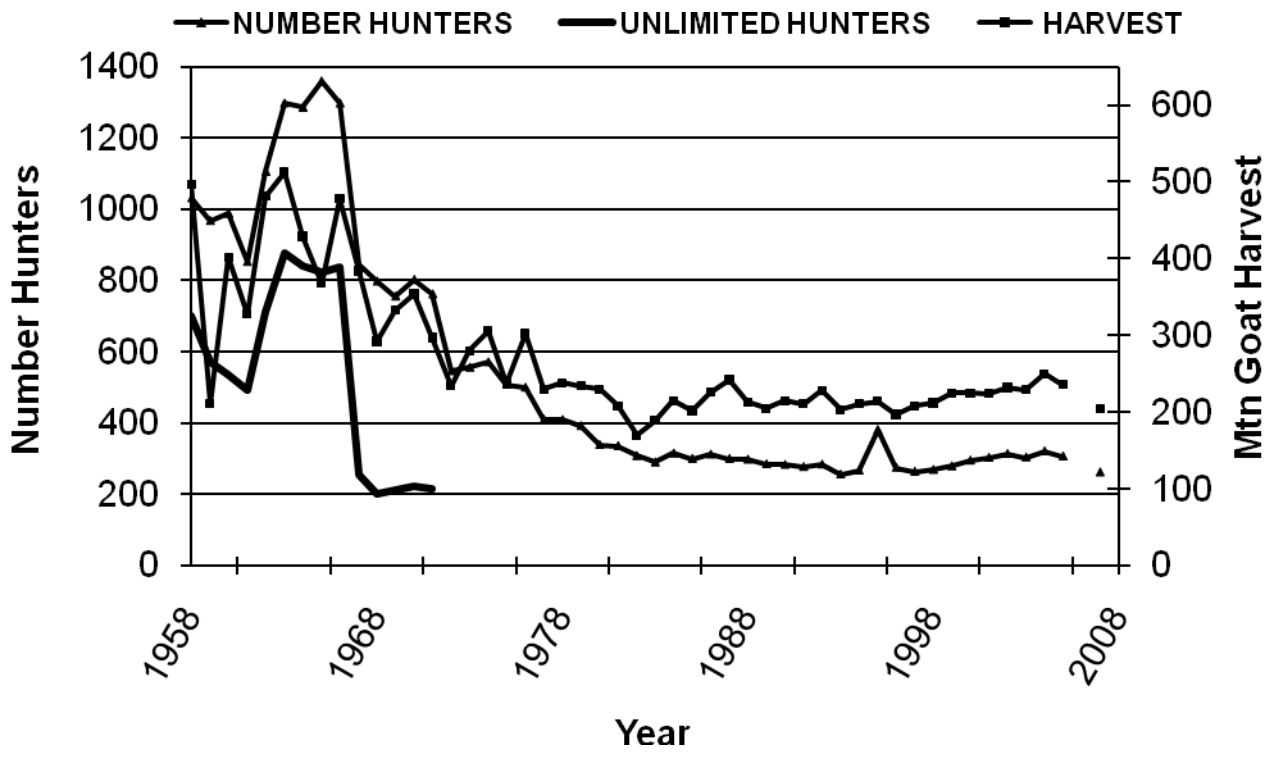

Figure 6. Total number of mountain goat hunters, number of hunters in unlimited areas and total harvest in Montana, 1958-2007.

Table 2. The number of mountain goat hunters and harvest in Montana, 1958-2007.

Year	Total Hunters	Hunters-Unlimited Areas	Total Harvest	Harvest-Unlimited Areas
1958	1032	700	497	296
1959	968	573	211	62
1960	988	535	402	205
1961	853	493	328	136
1962	1106	712	481	236
1963	1298	878	513	296
1964	1286	843	429	184
1965	1360	824	368	112
1966	1298	836	478	250
1967	845	256	384	90
1968	798	200	292	
1969	756	213	333	66
1970	803	223	354	51
1971	762	215	297	59
1972	546		234	
1973	556		280	
1974	571		306	
1975	508		237	
1976	500		302	
1977	410		230	
1978	409		238	
1979	392		234	
1980	339		230	
1981	336		208	
1982	308		170	
1983	290		189	
1984	315		215	
1985	300		202	
1986	312		226	
1987	300		242	
1988	298		213	
1989	285		205	
1990	283		215	
1991	277		211	
1992	284		228	
1993	256		203	
1994	267		211	
1995	381		214	
1996	275		197	
1997	264		208	
1998	269		212	
1999	279		225	
2000	295		225	
2001	303		224	
2002	314		232	
2003	304		229	
2004	321		250	
2005	307		236	

2006				
2007	262		204	

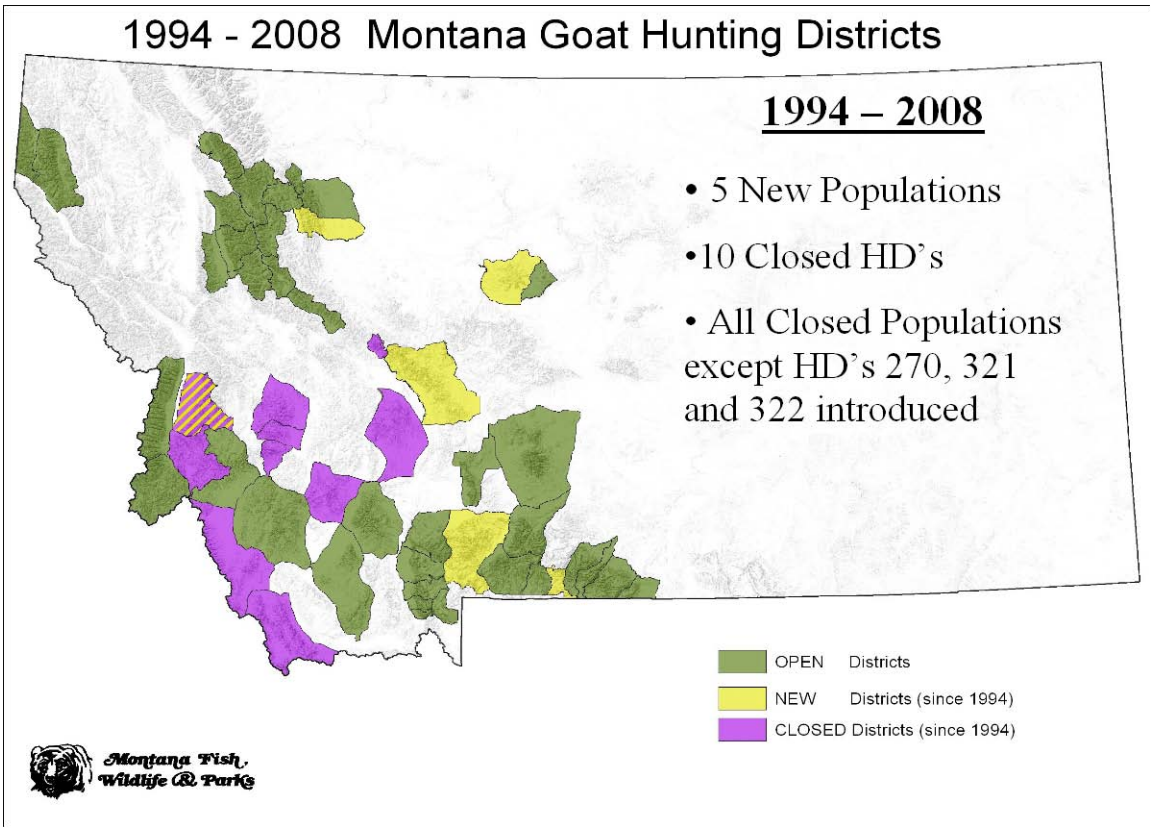

Figure 3. Status of mountain goat hunting districts in Montana, 1994-2008.

Conclusion

The development of the Conservation Strategy for bighorn sheep will provide needed management direction. Protocols and policies on how Montana Fish, Wildlife and Parks will deal with certain issues will be defined. Challenges remain regarding herd health, specifically maintaining separation between domestic sheep/goats and wild sheep to prevent disease transmission. Identifying potential new transplant sites has become difficult due, in part, to the proximity of domestic animals.

The decline in mountain goat populations is alarming and deserves investigation by Montana Fish, Wildlife and Parks. When mountain goat populations decline, it appears they don't recover. A management plan, similar to what's being developed for bighorn sheep, needs to be developed for mountain goats.

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