

Wyoming's moose population is managed geographically by 10 herd units, shown above.



Then & Now

SHIRAS' MOOSE > WYOMING

Moose are relative newcomers to the state of Wyoming. The journals of early explorers indicate moose were rare in Wyoming prior to 1850. Moose appear to have expanded fairly rapidly, and by 1916 there was an estimated 2,000 moose in western Wyoming. In addition to natural dispersion throughout western Wyoming, managers transplanted moose to the Bighorn Mountains in the late 1940s and early 1950s. Moose were also transplanted from the Jackson area to North Park and the Upper Laramie River in Colorado from 1979-1987. Moose from the Colorado transplant expanded their range back into the Snowy Range west of Laramie, Wyoming, where a viable, hunt-able population now exists.

By Steve Kilpatrick
Wyoming Game and Fish Department

FAR RIGHT: Arthur E. Chandler stands next to his award-winning Shiras' moose taken in Fremont County, during the 1944 season. The bull was given a First Place Award at the 1947 Competition and subsequently rescored with the Club's new system in 1951. His bull still ranks as the number two Shiras' moose taken from Wyoming.

NEAR LEFT: Wyoming hunter, Scott A. Wodahl harvested this bull during the 2002 season in Johnson County, Wyoming. With a score of 183-7/8, this is the largest Shiras' moose entered in the Club's Records Program since 2000.



Then & Now



Eight of the twelve Shiras' moose from Wyoming taken in the 1930s and 40s still rank in top 100 for Shiras' moose. There weren't many moose entered in those early years, but they were top-quality trophies. Dick Gaudern is pictured at left with his bull taken in September of 1946 in Teton County. The next era—from 1950 through 1979—continued to produce top-quality trophies in increasing numbers with a total of 134 entries accepted by the Club. It was during that time period that John M. Oakley harvested the current World's Record (left) near Green River Lake. The bull, which has a score of 205-4/8 points, is currently owned by the Jackson Hole Museum.

1830-1949

TOTAL SHIRAS' MOOSE ENTRIES IN WYOMING – 12 Top Eight Listed Below

SCORE	LOCATION	HUNTER	OWNER(S)	DATE	RANK
205 1/8	Fremont Co.	Arthur E. Chandler	Arthur E. Chandler	1944	2
199	Teton Co.	Amos E. Hand	B.W. & M. Smith	1946	5
195 5/8	Atlantic Creek	Alfred C. Berol	Alfred C. Berol	1933	7
184 4/8	Fremont Co.	Jack C. Dow	Jack C. Dow	1948	23
183 4/8	Sublette Co.	Norb Voerding	Loaned to B&C Natl. Coll.	1940	25
182 2/8	Teton Co.	Dick Gaudern	Dick Gaudern	1946	31
180	Green River	L.W. Isaacs	L.W. Isaacs	1948	46
177	Teton Co.	Elgin T. Gates	Elgin T. Gates	1947	79

The first Wyoming moose-hunting season occurred in 1915, with the issuance of 19 licenses. Today, the Wyoming Game and Fish Department manages its moose resource on a “herd unit” concept. Herd units are defined by a distinct geographic area where immigration and emigration of moose between herd units is considered to be minimal (i.e., less than 10 percent). Population objectives are established for each herd unit and are based on ecological and social constraints within each herd unit. Herd units are further divided into hunt areas where harvest strategies are developed to address specific management issues within specific portions of the herd unit. There are currently 10 distinct herd units within the state with multiple hunt areas per herd unit.

The Wyoming moose population and associated hunting opportunities have generally been declining over the past 10-15 years as can be seen from the table on the

opposite page. The number of licenses issued to hunters was fairly consistent from 1980 through 2003, ranging from a high of 1,919 licenses in 1990 to 1,147 in 2003. Since 2003, managers have generally reduced the number of licenses available to hunters due to population declines in most herd units. Exceptions are the herd units which received relatively recent transplants, the Bighorns and Snowy Range herds.

The Jackson herd unit appeared to be the herd unit experiencing the most precipitous decline in numbers. The decline appeared to have started in the early- to mid-1990s. The population continued to fluctuate after the early 1990s, and by 2007, populations appeared to be what they were in the late 1970s, with calf ratios the lowest they had been in the previous 30 years. The Wyoming Game and Fish Department teamed up with the University of Wyoming Cooperative Wildlife and Fisheries Unit in

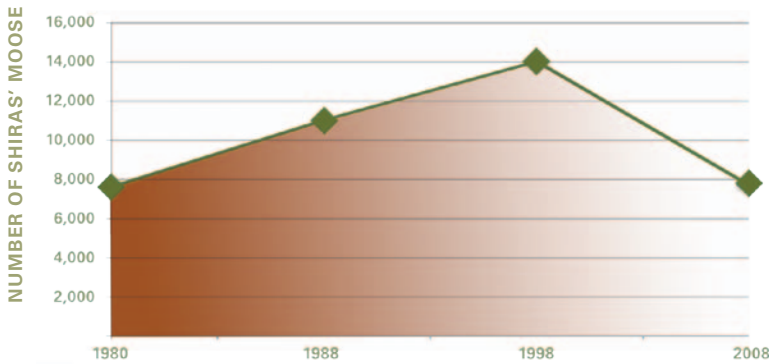
2005 to address the declining moose population in the Jackson herd unit.

Previous researchers indicated there may be habitat issues within the Jackson moose herd unit, and it was also thought that predation by bears and wolves may be a factor as well. With the use of GPS and VHF radio collars, researchers and managers identified three main research objectives: (1) Investigate the seasonal movements and habitat selection, (2) Evaluate the physical condition and nutritional status, and (3) Estimate reproductive parameters, calf survival, adult female and male survival and the rate of population growth in the Jackson moose herd unit. Ninety-three adult females and 31 adult males were fitted with radio collars. Twenty cows received GPS collars, and the remainder received VHF collars.

The first phase of this research project was completed in 2008 with the following major findings:

- Moose generally seek nutritious forage resulting from wild and prescribed fires. However, the large-scale fires of 1988 may have removed thermal cover (i.e., conifers), resulting in additional thermal summer stress and animals entering the winter in reduced physical condition. (Research shows that temperatures above 57°F stress moose.)
- Measures of physiological health of adult female moose indicated they were in moderate physical condition and appeared to have deficiencies of several important nutrients. Consequently, they may be more

SHIRAS' MOOSE POPULATIONS IN WYOMING



susceptible to environmental stressors, resulting in increased mortality and decreased reproductive performance.

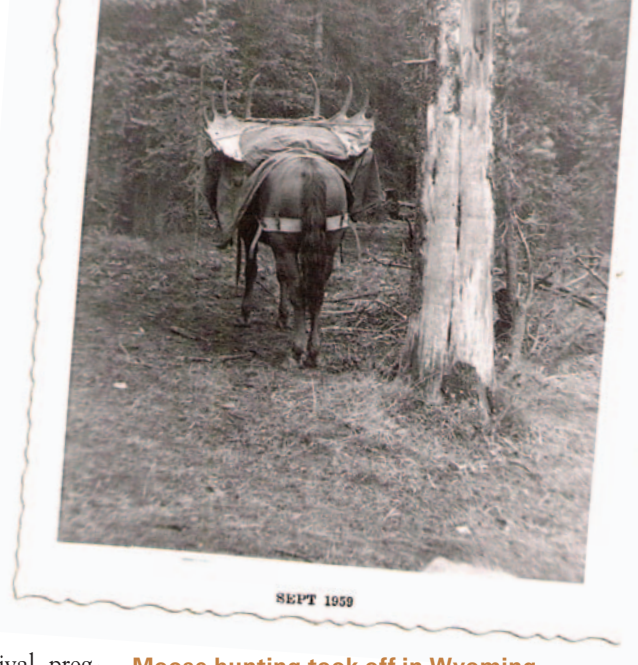
- Diseases and parasites did not appear to impact moose.
- Low reproductive potential and decreased spring survival of adult female moose indicated habitat may be the primary limiting factor.
- Calf and adult survival rates indicated that predation was relatively low.
- The nutritional quality of available forage may be the most important determinant in limiting population growth.
- Drought and climate change as it relates to forage quantity and quality may also be contributing to population declines.
- The potential effects of predation cannot be discounted as a contributing factor.

We have initiated a second phase to the research project which is investigating habitat conditions, nutritional quality of browse, adult cow survival, pregnancy, parturition and calf survival, moose diets and predation parameters. This phase should be completed during early 2011.

While the Jackson herd has seen the most precipitous population decline, all other herd units in western Wyoming have experienced declining population. The Sublette moose herd unit, located in the west-central portion of the state, which is the largest moose herd in Wyoming—and possibly the lower 48 states—is a good example of population decline. The number of harvested moose in that herd unit decreased almost 40 percent—from 712 in 1990 to 270 in 2008. This herd

Moose hunting took off in Wyoming in 1950s. Larry Arndt harvested the Shiras' moose shown above in 1959 near Bridger Lake, Wyoming. The bull scores 165-6/8 points.

unit receives very limited predation from two relatively new and effective predators, wolves and grizzly bears. Thus, it appears something in addition to, or besides predation is affecting moose populations in many herd units. Moreover, all western Wyoming moose herd units show signs of declining populations during similar timeframes of the early 1990s and/or early 2000s. This indicates something



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Then & Now

John A. Mahoney, Jr., holds the Shiras' moose he harvested in Park County in 1957. According to the correspondence in his file, Mahoney was shooting a Remington .30-06, with 180-grain factory loads from 130 yards. The bull was sent to the American Museum of Natural History where it was verified and received a Second Place Award at the Ninth Big game Competition.



region-wide may be affecting moose populations. Possibly the drought from 2000-2008 had an effect. Minnesota has concluded the lost of an entire moose herd of 4,000 in the northwestern portion of that state is due to factors associated with climate change. The Green and Bear River drainages have fallen below the 113-year precipitation average for the past 11 years. Similar situations exist for the Snake and Wind rivers. But if drought or climate change is the culprit, why are the Snowy Range and Bighorn herd units, which have stable to increasing moose populations, not affected?

What about parasites and diseases?

Moose in western Wyoming are often seen with a heavy infestation of winter ticks. Winter tick (*Dermacentor albipictus*) infestations are thought to be a contributing factor to population declines especially when associated with other stress factors such as poor winter forage and/or severe winters. Infestations can exceed 100,000 ticks per animal. The relatively frequent occurrence of carotid artery worms (*Elaeophora schneideri*) prompted the Wyoming Game and Fish Department to initiate a sampling effort this past fall and winter. Over 150 moose samples were acquired from hunter kills and highway mortalities. Carotid artery worms were found in approximately 50 percent of the moose sampled. This parasite can cause blindness and impaired circulation to the brain and head area, but beyond that, specific impacts to moose have not been well-researched and documented.

The Jackson study indicated habitat issues are most likely contributing to the decline of moose in that area. Other habitat factors besides extensive removal of summer thermal cover with large-scale fires include lack of fire within important winter ranges. Fire suppression has resulted in advanced

succession stages and the conversion of many nutritional mountain shrubs and aspen to conifers on winter ranges. An example is aspen, a highly preferred browse plant for moose; we have lost approximately 50 percent of the aspen groves in Wyoming. Many western states and Canadian provinces use mechanical and prescribed fire to set back succession and promoted more palatable and nutritious browse species for moose and other wild ungulates. The Wyoming Game and Fish Department is also actively pursuing similar habitat enhancements with the U.S. Forest Service, Bureau of Land Management and private landowners. Conservation easements designed to preserve and enhance moose habitat on private lands are also being pursued.

In summary, the potential reasons for moose declines in many of the Wyoming moose herd units is most likely a combination of complex habitat and nutrition factors (i.e., micro nutrients, over-browsing, old-age plants, fragmentation, fire suppression, etc.), diseases, parasites, predation, climate change, and competition with other ungulates for forage. Some factors may be more prominent within certain areas than others. Factors may also have varying effects over time. For example, over-browsing and parasites may be the initial cause of a population decline, while a simultaneous increase in predators may continue to keep the population suppressed.

The Club's Big Game Records Department continues to receive a steady stream of Shiras' moose entries from Wyoming. However, it appears the scores of these bulls are incrementally lower than the trophies entered decades earlier. Time will tell if the management efforts outlined here will help the state's moose population rebound to the levels found in the late 1980s and 1990s. In the meantime, quality hunting opportunities still exist, as do trophy bulls, they are just harder to come by. ■

2004-2010

TOTAL SHIRAS' MOOSE ENTRIES IN WYOMING - 50 Top Five Listed Below

SCORE	LOCATION	HUNTER	OWNER(S)	DATE	RANK
177 2/8	Sublette Co., WY	James B. Hattan	James B. Hattan	2009	74
174	Teton Co., WY	Louie M. Anderson	Louie M. Anderson	2004	125
171	Teton Co., WY	David F. Bishop	David F. Bishop	2008	170
168	Albany Co., WY	Torrey S. Powers	Torrey S. Powers	2004	217
166 2/8	Lincoln Co., WY	Ross M. Hinschberger	Ross M. Hinschberger	2008	265