

STATUS AND MANAGEMENT OF MOOSE IN COLORADO

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ABSTRACT: Prior to 1978 moose (*Alces alces shirasi*) were rare in Colorado. To augment the population moose were transplanted into North Park near Rand, Colorado, in 1978 and 79, the Laramie River area north of Rocky Mountain National Park in 1987, and southwestern Colorado near Creede in 1991-93. The present population in Colorado is estimated at 740. Preferred habitat is primarily willow bottoms (*Salix* spp.) surrounded by lodgepole pine (*Pinus contorta*), Englemann spruce (*Picea engelmannii*) and aspen (*Populus tremuloides*) forests. Moose hunting was initiated on a very limited scale in 1985, and the number of licenses issued was substantially increased from 7 in 1991, to 62 in 1992, and 114 in 1993, to control a growing population. Poaching is a major management problem. At the present time management plans to allow the moose population in southwestern Colorado to grow to 350, and maintain the North Park herd, the largest in the state, at current levels (450 to 525) until completion of a cooperatively funded state and federal land management agency study to evaluate impacts of moose and livestock browsing on willow habitat.

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HISTORY

Historically moose were rare in Colorado (Lechleitner 1969). During the 1800s and early to mid-1900s scattered animals were infrequently observed or killed in northcentral and northwestern Colorado (Warren 1942, Bailey, 1944).

After considerable discussion with the public, private landowners and land management agencies, 12 moose (*Alces alces shirasi*) were transplanted in 1978 from the North Slope of the Uinta Mountains in Utah to North Park, Colorado. The release site was the Illinois River area approximately 13 km south-east of Rand, in Jackson County (Fig. 1). Twelve more moose were transplanted to this same site from Grand Teton National Park, Wyoming in 1979. Another 12 were transplanted in 1987 from Grand Teton National Park, Wyoming, to the Laramie River area in Larimer County, Colorado. This area is north of Rocky Mountain National Park and south of Wyoming on the east side of the Medicine Bow Mountain Range (Fig. 1). Details of these transplants, negotiations preceding them, and initial results have been described by Duvall and Schoonveld (1988). Move-

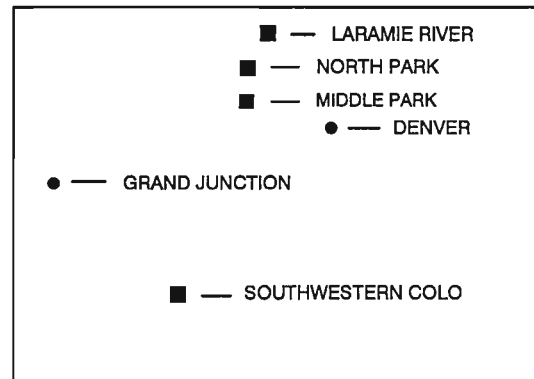


Fig. 1. Colorado map showing locations of the Laramie River, North Park, Middle Park, and Southwestern Colorado moose populations.

ments of moose immediately following the North Park transplants were described by Nowlin (1985).

During December 1991, January 1992, and January 1993, 106 moose were transplanted from north central Colorado, north-east Utah, and southwestern Wyoming to the upper Rio Grande River basin near Creede, Mineral County, Colorado (Fig. 1) (Olterman *et al.* 1994).

COLORADO MOOSE HABITAT

The North Park and Laramie River transplant sites support extensive willow (*Salix* spp.) bottoms surrounded by forests of primarily lodgepole pine (*Pinus contorta*), Englemann spruce (*Picea englemannii*) and aspen (*Populus tremuloides*). This is considered excellent moose habitat, similar to that reported for Jackson Hole, Wyoming, by Houston (1968). Moose feed heavily on willow throughout the year, and use willow and pine and spruce forests for hiding cover. Main willow species in North Park are *S. geeyeriana*, *S. monticola*, *S. boothii*, *S. drummondiana*, *S. planifolia*, and *S. wolfii*. Aspen is also a preferred forage plant. Except for *S. boothii* these same willows plus *S. lasiandra*, *S. brachycarpa*, and *S. lutea* have been identified in the upper Rio Grande River basin. Coniferous trees in the upper Rio Grande are primarily spruce (*Picea* spp.), and fir (*Abies* spp.). Aspen is also common. Elevations range from approximately 2,400 to 4,000 m in North Park and Laramie River moose habitats, and 2,600 to 4,300 m in the upper Rio Grande River basin. During winter most moose move to lower elevations where snow depth is <1.2m, and occupy willow dominated riparian habitats or nearby lodgepole pine forests. Winter temperatures in those habitats may be as low as -23° to -40°C.

CURRENT STATUS AND TRENDS

In January 1994, the North Park moose population was estimated at 450 to 525 animals based on helicopter counts adjusted for 58% sightability. Approximately 65 moose were estimated to occur in the Laramie River vicinity, 110 in southwestern Colorado, and 75 in Middle Park. Middle Park moose emigrated from North Park across the continental divide. Thus, approximately 740 moose were estimated to occur in Colorado during the winter of 1993-94. Bull/cow and calf/cow ratios observed in North Park and Southwestern Colorado (Table 1) were similar to those

reported for a hunted Shiras moose population in southeastern Idaho during a 7 year period (Ritchie 1978). However, sex and age ratios in the Laramie River area were comparatively low (Table 1).

Table 1. Estimated sex and age ratios of Colorado moose populations in January, 1994.

Area	Bulls / 100 cows	Calves / 100 cows
North Park	73	56
Laramie River	33	44
Southwestern Colorado	64	67

Hunting began in North Park in 1985 after the population grew large enough to sustain a small harvest. Seven or fewer licenses were issued each year through 1991 (Table 2). In 1992, it became necessary to increase the number of permits substantially to control the population which had reached levels agreed upon with local residents and land management agencies when moose were transplanted to the area. Another relatively large increase in licenses issued occurred in 1993. In addition to these increases in license numbers 5 moose were transplanted from North Park to Creede in 1991-92 and 46 more were transplanted in 1992-93.

Prior to 1993 the Colorado moose hunting season ran for approximately 2 weeks during the last half of November. In 1993, moose license applicants could choose, on their application, one of 5 hunting seasons. Season choices are shown in Table 2. These 5 seasons corresponded to the established hunting seasons for deer (*Odocoileus hemionus* and *O. virginianus*), and elk (*Cervus elaphus*). It allowed hunters flexibility in choosing the time of year to hunt and allowed them to combine their hunt for moose, deer, and elk if desired. Comments on followup questionnaires indicated this new season struc-

Table 2. Hunting season dates and structure for moose in Colorado.

1985	5 antlered licenses issued for North Park. November 16 through 24.
1986	3 antlered licenses issued for North Park. November 15 through 23.
1987	3 antlered licenses issued for North Park. November 14 - 22.
1988	3 antlered licenses issued for North Park. November 14 - 29.
1989	5 antlered licenses issued for North Park. November 13 - 28.
1990	5 antlered licenses issued for North Park. November 12 - 27.
1991	7 antlered licenses issued for North Park. November 10 - 25.
1992	62 licenses issued for North Park. (32 antlered, 30 antlerless). November 14 - 29.
1993	110 licenses issued for North Park: (48 antlered 62 antlerless) Archery: September 7 - 26; Muzzleloading rifle: September 11 - 19); Regular rifle: October 16 - 20; October 23 - 3; November 6 - 14.
1993	4 antlered licenses issued for Laramie River: Same dates as for North Park during 1993.

ture was well received by moose hunters. Colorado moose hunters have enjoyed a high rate of success. Although few licenses were issued between 1985 and 1991 hunter success was 60% in 1985 and 100% from 1986 through 1991. Even after the number of licenses was increased in 1992 and 93 (Fig. 2) hunter success was 92%.

A major problem in managing Colorado moose is illegal harvest (Fig. 3). Moose are some times mistakenly killed by elk hunters, poached for meat, or shot and left. Illegal harvest estimates shown in Fig. 3 are conservative because they represent only known kills. Comparison of legal harvest by year in Fig. 2. to yearly illegal harvest in Fig. 3. suggests that illegal kill may approach 50% or more of the legal harvest once unreported illegal kills are considered.

FUTURE OF MOOSE MANAGEMENT AND RESEARCH

A long term objective of 350 moose in southwestern Colorado has been set based on a preliminary environmental assessment approved by the US Forest Service (Oltzman *et*

al. 1994). That objective will be reviewed and possibly modified once it is attained. Due to the rapid rate of increase in the North Park moose population the need for studies to evaluate impacts of moose and livestock browsing

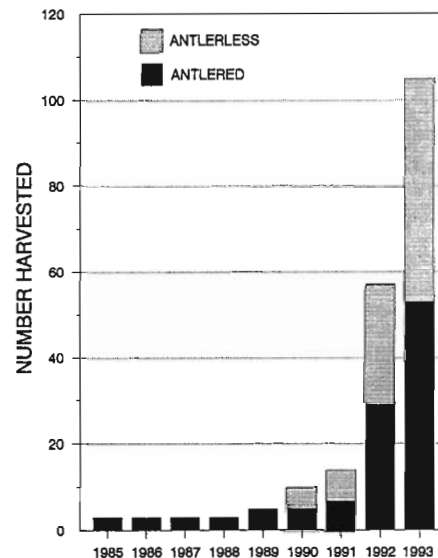


Fig. 2. Moose legally harvested in Colorado, 1985-93. All were harvested in North Park except that in 1993, 4 were harvested in the Laramie River area.

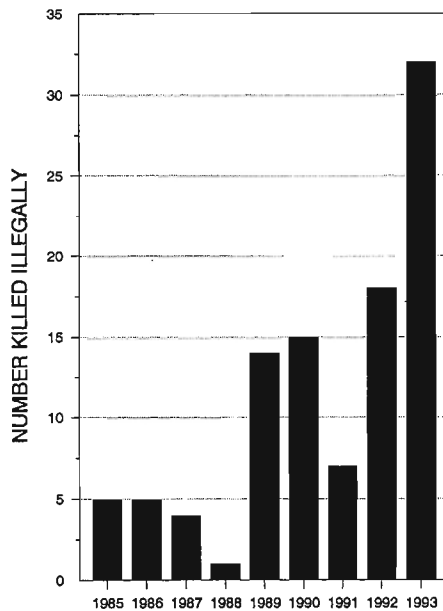


Fig. 3. Moose illegally killed in Colorado, 1985-93.

on willows has been expressed by the U.S. Forest Service. Current management plans provide for maintaining current population levels until research is completed. The study would be conducted by the University of Wyoming and funded by the Forest Service, Colorado Division of Wildlife, and other interested land management agencies. Management plans for moose in the Laramie River and Middle Park are being formulated.

Moose viewing, particularly in North Park where moose are most abundant, has become a popular form of recreation. The value of moose as a watchable wildlife species will be a strong consideration in future moose management plans in Colorado.

Since 1991, a research project has been in progress in North Park to determine moose sightability during aerial counts, home range size, migration routes and rates of emigration out of North Park, mortality rates and causes, and habitat selection. The study involves yearlong radio-tracking of moose at approximately 2-week intervals. Results of the study will be submitted for publication in scientific journals when completed.

CONCLUSIONS

Moose numbers in North Park, Middle Park, and the Laramie River area have increased to their present levels from transplants of 24 animals in 1978 and 79 and 12 in 1987. Although 191 were harvested legally, illegal harvest was substantial and 46 were removed for transplant to southwestern Colorado, the population has literally erupted. It is important moose numbers and habitat impacts be monitored and populations carefully controlled to keep them in balance with their habitat.

The problem of illegal kill must be addressed and solutions found. This would allow increased opportunity for legal hunters to harvest moose, and would provide for more accurate estimates of moose mortality rates needed to properly manage the population.

REFERENCES

BAILEY, A. M. 1944. Records of moose in Colorado. *J. Mammal.* 25:192-193.

DUVALL, A. C., and G. S. SCHOONVELD. 1988. Colorado moose: Reintroduction and management. *Alces* 24:188-194.

HOUSTON, D. B. 1968. The Shiras moose in Jackson Hole, Wyoming. *Grand Teton Nat. Hist. Assoc. Tech. Bull.* 1. 110pp.

LECHLEITNER, R. R. 1969. Wild mammals of Colorado. Pruett Publishing Co., Boulder, CO. 254pp.

NOWLIN, R. A. 1985. Distribution of moose during occupation of vacant habitat in north central Colorado. Ph.D. thesis, Colorado State Univ. Fort Collins. 60pp.

OLTERMAN, J. H., D. W. KENVIN, and R. C. KUFELD. 1994. Moose transplant to Southwestern Colorado. *Alces* 30:1-8.

RITCHIE, B. W. 1978. Ecology of moose in Fremont County, Idaho. *Idaho Dept. Fish and Game. Wildl. Bull. No. 7.* 33pp.

WARREN, E. R. 1942. The mammals of Colorado. Univ. Oklahoma Press, Norman. 2nd revised ed. 330pp.