

UTAH DIVISION OF WILDLIFE RESOURCES  
STATEWIDE MANAGEMENT PLAN FOR MOOSE

I. PURPOSE OF THE PLAN

A. General

This document is the statewide management plan for moose in Utah. The plan will provide overall guidance and direction to Utah's moose management program. The plan assesses current information on moose; identifies issues and concerns relating to moose management in Utah; and then establishes goals, objectives and strategies for future moose management programs. The plan will be used to provide overall guidance and direction for management plans on individual moose units throughout the state.

B. Dates Covered

The plan will be in effect for five years beginning April 20, 2000 as approved by the Wildlife Board.

II. SPECIES ASSESSMENT

A. Natural History

The moose (*Alces alces*) is largest member of the deer family. Four subspecies of moose are recognized in North America (Franzmann 1978). The Shiras or Wyoming moose (*Alces alces shirasi*) is found in Utah and is the smallest of the four subspecies. Mature Shiras moose bulls weigh considerably less than other moose but can still reach 800 pounds. Moose produce the largest antlers of any mammal. Antlers are used in dominance displays and fighting behavior during the rut or breeding season. The rut begins in early September and lasts for several weeks, peaking in late September. Both cows and bulls vocalize and are very aggressive during the breeding season. Gestation for moose is approximately eight months with a peak of calving in late May. Cows usually give birth to one or two young. Calves grow rapidly and achieve sufficient size by five months of age to endure deep snow and cold weather conditions.

Historical records indicate moose were not present in Utah prior to the early 1900's (Wilson 1971). Moose immigrated into Utah from Idaho and Wyoming on their own. The first recorded sighting of a moose in Utah was in 1906 or 1907 at the head of Spanish Fork Canyon. The next reported sighting was in 1918 in the Bear River Drainage of the Uinta Mountains. Sparse reports over the next few decades were mainly from the north slope of the Uintas where a population was gradually establishing itself. It was not until 1947 that it was determined a resident herd existed on the North Slope.

The first aerial survey specifically for moose was conducted along the north slope of the Uintas in the spring of 1957 when 59 moose were counted. Moose populations continued to expand on the North Slope and observations in other areas of northern Utah began to increase. Moose numbers have gradually increased since then and have expanded throughout the mountainous areas of the northern half of the state.

## B. Management

### 1. DWR Regulatory Authority

The Utah Division of Wildlife Resources presently operates under authority granted by the Utah Legislature in Title 23 of the Utah Code. The division was created and established as the wildlife authority for the state under Section 23-14-1 of the Code. This Code also vests the Division with its functions, powers, duties, rights, and responsibilities. The Division's duties are to protect, propagate, manage, conserve, and distribute protected wildlife throughout the state.

The Utah Division of Wildlife Resources is charged to manage the state's wildlife resources and to assure the future of protected wildlife for its intrinsic, scientific, educational and recreational values. Protected wildlife species are defined in code by the Utah Legislature.

### 2. Past and Current Management

Management programs for moose have included regular aerial surveys of populations, management of harvest, transplants, and research. Aerial surveys have been done primarily by helicopter in areas where moose populations are well established. During these surveys, moose are classified into bulls, cows and calves to estimate herd productivity and bull:cow ratios.

The first legal hunting season for moose in Utah was held in 1958. A moose hunt has been held every year since that time (Table 1 and Figure 1). Harvest is carefully monitored to assure older age class bulls are maintained in populations and balanced sex ratios are sustained. Teeth are generally collected from harvested animals and size and age of harvested moose is monitored.

Utah has also been involved in an experimental moose transplant program since 1973. This program was initiated to help encourage expansion into other areas of the state. Moose have been relocated from northern Utah to the Manti, Fishlake, Currant Creek and Hill Creek in the Book Cliffs (Table 2). These transplants have met with only limited success. A viable population has been established in Currant Creek where some resident moose existed prior to the transplant. Only a few moose remain in the other release areas. Moose from Utah have been relocated to Colorado with better results. The reasons for Colorado's success are not known. However, it is thought that the higher elevation mountain ranges in Colorado probably provided better habitat for moose.

Moose that wander out of the mountains and into populated areas are also relocated. These nuisance moose are generally younger animals that roam into cities and towns and need relocation to more suitable habitat. Most nuisance moose situations occur along the Wasatch Front in the spring and summer months. Some of these moose have been moved to the same areas where transplants have occurred. Others have been relocated to suitable habitat away from cities and towns.

Research has been conducted on several moose populations in Utah. Two studies have been conducted on the north slope of the Uintas (Wilson 1971 and Babcock 1977). Other research has included radio telemetry studies on transplanted herds and research on the effects of tranquilizers on moose.

### C. Habitat

The primary limiting factor for moose in Utah and across their range is habitat. Moose are primarily browsers and depend on a diet of shrubs and young deciduous trees for much of the year. In northern climates, moose are often associated with river bottoms, ponds and lakes with an abundance of shrubby and aquatic vegetation. While moose in Utah are often associated with these riparian habitat types, they are not tied to them exclusively. Moose have done well in drier habitats in northern Utah which are dominated by an abundance of shrubs. Moose are frequently associated with mountain mahogany stands, Gambel oak, serviceberry, quaking aspen forests, and burned over coniferous forests. Moose also use thick stands of conifer as shelter in the winter and for thermoregulation during the summer.

Moose live in some of the coldest climates in the world. Winter weather and snow depth is not thought to be a seriously limiting factor to moose in Utah. They can tolerate deep snow and cold weather very well. Moose in Utah generally live at higher elevations throughout the year, although some moose are observed at lower elevation habitats even in summer. It is possible that moose are limited by prolonged hot weather in parts of Utah. The lack of success of transplants to central and southern Utah may well be due to summer climatic conditions and lack of high elevation habitat.

Geist (1971) recognized two types of moose habitat, permanent and transient. Permanent habitats are those that persist through time and do not succeed to other vegetative communities (Peek 1998). Examples of permanent habitat include riparian and high elevation shrub communities. Annual flooding, avalanches, or timberline conditions help maintain these more permanent moose habitat types.

Transient habitat is more common and is usually associated with forest fires and timber harvesting which removes coniferous trees and reverts the habitat to early seral stages dominated by shrubs and young deciduous trees. Throughout much of its range in North America, the moose is associated with short-lived subclimax plant communities that follow in the wake of forest fires (Geist 1971). Moose habitat can be dramatically improved by the use of fire. Habitat improvement projects which favor early stages of seral development and shrub growth can be very beneficial to moose.

## D. Population Status

Moose are well established in the northern half of the state. The majority of the moose in Utah exist on nine management units. Smaller populations are present on four other units. The current estimated population in Utah is approximately 3400 moose. Current population estimates for each unit are listed in table 3.

The general trend of the moose herd has been upward since the late 1950's. However, population trends vary considerably by unit. Some herds are increasing rapidly while others are stable or declining. It appears that some herds, especially in the northern part of the state, may be reaching capacity and are no longer increasing at previously observed rapid growth rates.

## III. ISSUES AND CONCERNS

### A. Habitat Degradation or Loss

The single biggest influence on moose populations in Utah is quantity and quality of available habitat. Habitat can be degraded, fragmented, or lost to a variety of causes including human development and plant succession. Reductions in habitat can result in corresponding population declines. Improvements in habitat can mitigate losses and result in increased moose populations.

Moose are usually tolerant of people. However, conversion of moose habitat into highways, summer homes, ski resorts or other developments, results in a permanent loss of habitat. Any losses of habitat to human developments should be carefully planned and mitigated.

Moose habitat can also be lost or degraded due to plant succession. As deciduous forests are converted to coniferous forests, habitat is degraded for moose. Forest fires and carefully planned logging can help remove coniferous trees and return the habitat to early successional stages which are beneficial for moose.

### B. Competition

Moose coexist with other wild ungulates and domestic livestock across much of their range in Utah. Moose are found in the same areas as mule deer, elk, cattle, sheep and to a lesser extent bighorn sheep, mountain goats, and antelope. The reason similar species can coexist is best summarized by Boer (1998). "Resource partitioning mechanisms facilitate coexistence of sympatric species of large mammals; they may take the form of spatial or temporal segregation, species-specific preferences for forage plants and plant parts, and different feeding heights."

Although there is overlap in use areas, moose utilize a forage resource which is largely unavailable to other ungulates. Moose eat primarily browse and to a lesser extent grass and forbs. Moose also feed at a height which is well above the ability of other ungulates to reach, and moose live in a deep snow environment during critical winter months where few other

ungulates can survive.

### C. Disease

Like all other wild ungulates, moose are susceptible to a wide variety of viral, bacterial, and parasitic diseases. Although the list of potential diseases is long and varied, it is not unusually so for wild or domestic animals (Lankester and Samuel, 1998). Pneumonia and pink are two diseases that have been observed in Utah. However, the extent of the impact of these diseases and others on moose populations is unknown and deserves further study.

### D. Poaching

Poaching of moose has been a significant problem in Utah. Many moose have been killed intentionally or unintentionally during deer and elk season. Poaching may have been the main cause of the failure of the original moose transplant on the Manti. More moose were documented to have been poached over a several year period than were originally released on the unit. The Northern Region has also experienced extensive poaching of moose. Publication of high profile moose poaching cases including assessed fines has contributed to fewer moose poaching cases. An extensive public information campaign and signing effort has helped reduce the number of moose kills due to misidentification.

### E. Predators

In Utah, black bears and mountain lions are the principal predators of moose. Despite their large size, adult moose can and are killed by mountain lions. Four out of seven radio collared moose released on the Manti in 1995 were killed by mountain lions. Geist (1998) discussed the efficiency of moose in avoiding pursuing and pack hunting predators such as wolves. However, moose may not be as well adapted to ambush type predators such as the mountain lion.

Black bears are also efficient predators of newborn moose calves. Black bears have been reported to kill 2 to 50 percent of the calves in moose populations. Some researchers believe black bear predation can play a major role in determining moose density.

The impact of predation on a moose population is not entirely clear. Ballard and Van Ballenberghe (1998) stated: "We suggest that the evidence for predation acting as a major limiting factor in many moose populations is strong but the evidence that predation regulates moose populations is debatable."

### F. Human Interaction

Moose are very tolerant and unafraid of humans which results in frequent interaction. Humans also live in some of the best moose habitat in the state. Moose often wander from the mountains into the valleys where they interact with people. During the spring and summer, numerous moose

are captured and relocated away from cities and towns.

Auto collisions with moose are a major problem in some parts of North America. Auto collisions with moose usually result in extensive damage to vehicles and injury to the occupants. In Utah, moose/auto collisions are infrequent and not a widespread problem.

#### G. Wilderness/Native Status

There are some who question the native status of moose in Utah. Although not present at settlement times, moose immigrated into Utah of their own accord and are considered a native species by the Division. Moose inhabiting wilderness areas in Utah should be considered native. Administration of wilderness areas could create problems for the management of moose and other wildlife in Utah by prohibiting accepted wildlife management practices such as the use of aircraft for surveys, transplants and research projects. Wilderness management should not preclude traditional wildlife management practices.

#### H. Transplants

Utah has been involved in an experimental moose transplant program since 1973 (Table 2). It has been shown that moose can be successfully captured, transported and released into new areas. However, it appears that most transplants have not resulted in the establishment of new viable populations. Numerous moose have been released on both the Manti and the Fishlake without apparent success. The reasons for this lack of success are unclear especially in light of the success of transplants from Utah to Colorado.

Most managers are now hesitant to pursue further transplant projects to new areas. Transplants in the future should focus on supplementing previous transplants or expanding small populations where moose have pioneered on their own.

#### I. Hunting

Moose are often more easily observed and approached than other big game animals and some people question whether moose should be hunted in Utah. However, most moose herds produce surplus animals which can be harvested without harming the population. In fact, most moose populations in Utah need to be hunted to control population size and keep herds in balance with limited habitat. Hunting of moose is an important management tool and should remain a legitimate use of a natural resource. However, hunters need to be ethical, proficient, safe and socially responsible while hunting moose or any other wildlife.

Across most of their range, moose are managed primarily for their meat value with less emphasis on trophy management (Timmerman and Buss 1998). In Utah, however, moose are highly sought after by hunters primarily for their trophy value and secondarily for their meat. Because moose hunting is a once-in-a-lifetime opportunity in Utah, there is an expectation by hunters that there will be a reasonable opportunity to harvest a mature bull. Moose should

continue to be managed for high quality hunting opportunities.

#### IV. USE AND DEMAND

Moose are an important wildlife species in Utah which should be managed for their intrinsic, scientific, educational, and recreational values. The primary uses of moose can be classified as nonconsumptive and consumptive.

Most people who have the opportunity to view moose in the wild consider it a unique and exciting experience. It is often the highlight of a camping or hiking trip for many Utahns. Viewing opportunities for moose have not been extensively promoted by the Division. There are many options to expand viewing opportunities of moose in Utah.

There is very high demand for hunting permits for moose. Hunters also consider moose hunting a very unique and exciting experience. Applications currently exceed available permits by more than fifty to one. Hunting permits for Shiras moose are considered the most difficult permits to obtain for any species of North American big game other than bighorn sheep. As a result, conservation permits have sold at very high prices in Utah.

#### V. CONCLUSION

Moose are a unique and valuable addition to our wildlife heritage in Utah. Moose are relatively recent arrivals in our state with no record of moose prior to the twentieth century. They have become well established in the mountainous areas of the northern half of the state with a statewide population of approximately 3400 animals in the year 2000.

Moose are well adapted to the riparian and mountain browse habitats in northern Utah. They can easily withstand the deep snow and cold weather in Utah's northern mountains but may not be as well suited for warmer climates in southern Utah.

The Division of Wildlife Resources has carefully managed Utah's moose populations to ensure herds are productive and balanced with available habitat. Southern expansion of moose has been encouraged by transplant efforts with only limited success. There are numerous issues involved in the proper management of moose including habitat loss, competition, disease, poaching, predators, human interactions, wilderness management, transplants and hunting. These issues should all be considered in future management programs.

Observing a moose in the wild is an exciting experience for most people. Hunting of moose is a unique opportunity for a limited number of sportsmen. High quality viewing and hunting opportunities should be expanded in the state.

## VI. STATEWIDE MANAGEMENT GOALS AND OBJECTIVES

### **A. Population Management Goal: Maintain optimum populations of moose in all suitable habitat within the state.**

*Objective 1: By 2005, increase the total numbers of moose in the state from 3400 to 4100.*

Strategies:

- a. Develop management plans for individual units with population goals and objectives.
- b. Survey all moose herd units by helicopter every two or three years to monitor population size and herd composition.
- c. Utilize population or sightability models to determine the relationship between population surveys and population size.
- d. Transplant moose to augment small existing populations (Table 4).
- e. Conduct research projects to determine limiting factors to moose populations in Utah.
- f. If necessary, initiate predator management as specified in predator management plans
- g. Support law enforcement efforts to reduce illegal taking of moose.

*Objective 2: Maintain a minimum of 50 bulls per 100 cows on all management units to assure older age class bulls in the herd.*

Strategies:

- a. Survey all herd units by helicopter every two or three years to monitor bull:cow ratios.
- b. Recommend a limited harvest of bulls to maintain bull:cow ratios.
- c. Monitor the harvest of bulls including horn size and age class.

### **B. Habitat Management Goal: Assure sufficient habitat is available to sustain healthy and productive moose populations.**

*Objective: Maintain or improve sufficient moose habitat to allow herds to reach population objectives.*

Strategies:

- a. Identify critical moose habitats and work with land managers and private landowners to protect these areas.
- b. Assist land managers agencies in monitoring moose habitat.
- c. Work with land managers to minimize and mitigate loss or degradation of moose habitat.
- d. Initiate vegetative treatment projects to improve moose habitat lost to plant succession or human impacts.



- e. Utilize antlerless harvest to control populations and maintain habitat quality.

**C. Recreation Goal: Provide high quality opportunities for hunting and viewing of moose.**

*Objective 1: By 2005, increase hunting opportunities by 25% while maintaining high quality hunting experiences.*

Strategies:

- a. Recommend permit numbers commensurate with herd growth and based on a consistent percentage of the estimated bull population.
- b. Utilize sub units to maximize hunting opportunities and distribute hunters.
- c. Recommend long hunting seasons to provide extended hunting opportunity.
- d. Maintain high hunter success on all units.

*Objective 2: By 2005, increase public awareness of moose and expand viewing opportunities by 100%.*

Strategies:

- a. Install interpretive signs in moose areas for public information.
- b. Produce written guides or brochures to help educate the public and provide viewing opportunities.
- c. Work with news media sources to inform and educate the public about moose and moose management programs in Utah.

Table 1. Yearly summary of moose harvest 1958 to 1998.

Year	Hunters Afield	Bull Harvest	Antlerless Harvest	% Success
1958	10	7		70
1959	9	5		55
1960	19	10		53
1961	14	8		56
1962	15	7		47
1963	15	9		60
1964	14	8		57
1965	15	8		53
1966	9	5		50
1967	15	13		87
1968	15	14		93
1969	25	22		88
1970	34	24		71
1971	63	32		51
1972	105	71		68
1973	101	56		55
1974	25	16		64
1975	25	20		80
1976	60	55		92
1977	50	30	18	96
1978	89	65	16	91
1979	127	57	65	96
1980	118	81	21	86
1981	116	78	18	83
1982	106	94	0	89
1983	107	89	0	83
1984	130	113	0	87
1985	120	105	0	88
1986	155	134	15	96
1987	155	140	14	99
1988	176	141	26	95
1989	209	181	25	98
1990	283	192	90	99
1991	296	192	99	98
1992	303	198	100	98
1993	299	174	59	98
1994	157	110	47	100
1995	177	140	16	88
1996	153	139	11	98
1997	171	142	25	98

1998	170	137	27	96
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Table 2. History of moose transplants in Utah, 1973-1999.

Unit #	Unit Name and Area	# Released	Year	Source Unit
9	South Slope	5	94-99	Wasatch Front
10	Book Cliffs, Hill Creek	19	1991	Ogden (So. Fork)
10	Book Cliffs, Ute Tribe	38	90-94	Wasatch Front
10	Book Cliffs, Hill Creek	20	1993	North Slope
10	Book Cliffs, Hill Creek	15	94-99	Wasatch Front
10	Book Cliffs, Hill Creek	20	2000	Morgan Rich/Ogden
16	Manti, Fish Creek	18	1973	North Slope
16	Manti, Fish Creek	19	1974	Chalk Creek
16	Manti, Fish Creek	6	1978	North Slope
16	Manti, Fish Creek	4	1987	Morgan Rich
16	Manti, Joe's Valley	26	1987	Morgan Rich
16	Manti, Joe's Valley	12	1989	Morgan Rich
16	Manti, Joe's Valley	26	1996	North Slope
17	Wasatch Mtns, Currant Cr.	6	1989	Morgan Rich
17	Wasatch Mtns, Currant Cr.	12	1991	Ogden (So. Fork)
25	Plateau, Fish Lake	27	1988	Morgan Rich
25	Plateau, Fish Lake	10	1989	Morgan Rich
25	Plateau, Fishlake	32	1990	Chalk Creek
25	Plateau, Fishlake	30	1992	Ogden

Table 3. Estimated populations and population goals of moose management units.

Unit Number	Unit Name	Population Est. 2000	Population Goal 2005
2	Cache	200	200
3	Ogden	700	700
4	Morgan Rich	640	640
5	East Canyon	150	150
6	Chalk Creek	550	550
7	Kamas	65	65
8	North Slope	300	400
9	South Slope	175	225
10	Book Cliffs	10	100
11	Nine Mile	10	40
16	Manti	40	150
17	Wasatch Mountains	550	800
25	Plateau	25	150
Total		3415	4170

Table 4. Potential relocation sites to augment small existing population of moose. <sup>1</sup>

Unit #	Unit Name	Areas
9	South Slope	Diamond Mountain
10	Book Cliffs	Willow Creek, Bitter Creek, Meadow Creek
11	Nine Mile	Range Creek, Argyle Canyon, Nine Mile Canyon
16	Manti	Scofield, Huntington Canyon, Joe's Valley, Ferron Canyon, Starvation Canyon, West Side, Nebo.
17	Wasatch Mtns.	Avintaquin/Strawberry
25	Plateau	Fishlake

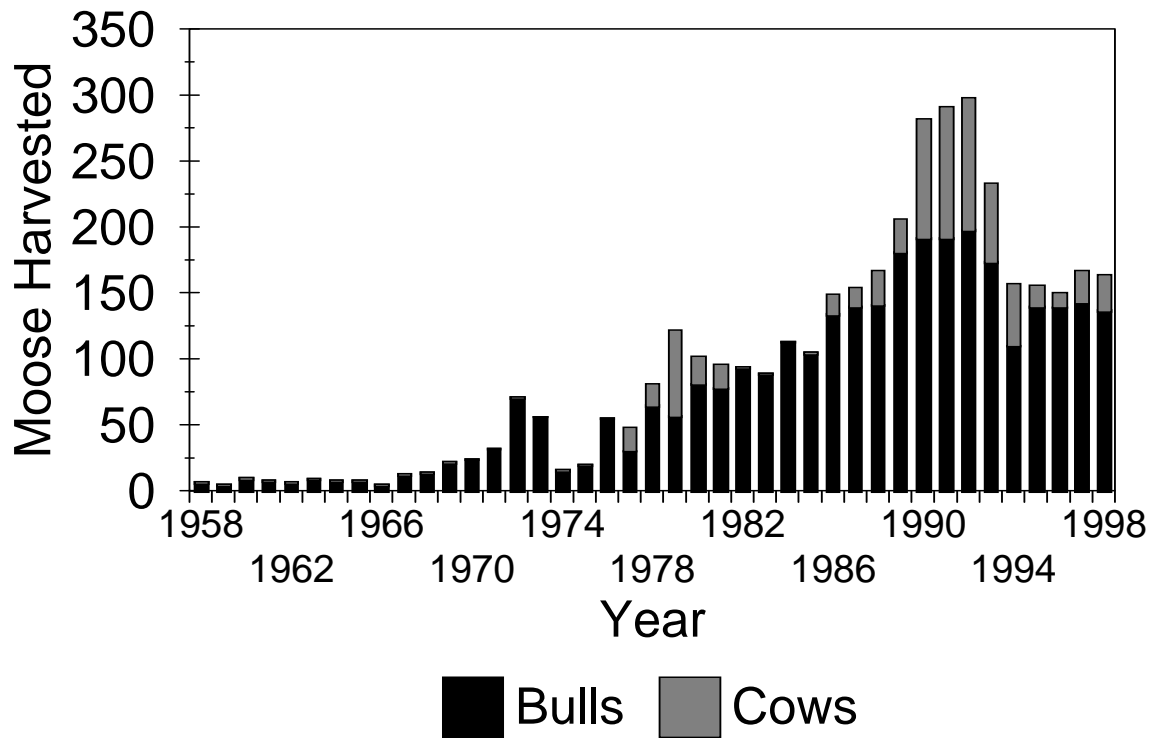
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<sup>1</sup>In accordance with Utah Code 23-14-21

Figure 1.

# Utah Moose Harvest

## 1958-1998



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