Chapter 1 describes the history of mule deer and the development of deer management in Utah. Chapters 2-8 deal with the biology of mule deer. Hunter preferences, ethics and hunting success are covered in Chapters 9-11. How, when, and where to hunt, guns, strategy, equipment, and the like are not detailed in this book because that information can be obtained from numerous magazines and hunting guides. Data on Utah harvests of mule deer are covered in Chapter 12. Chapters 13-17 explore various aspects of managing mule deer.

The descriptions, analysis, and recommendations in this handbook are solely the conclusions of the author. This handbook does not represent the views of any agency, organization or other individuals. All errors in this handbook are solely the responsibility of the author.
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The adult, four-point, mule deer buck has become an icon of the American West.
Historical Overview
During early winter, large, mature bucks may be found on every Utah deer unit.
Chapter 1

A Brief History of Mule Deer Management in Utah

Prehistory Period: Before 1776

Indirect sources provide the only records of the diversity and abundance of wildlife prior to the Domínguez-Escalante historic exploration of Utah in 1776. For an estimated 10,000 to 14,000 years prior to written records, Native Americans evolved culturally and flora and fauna evolved biologically in Utah and throughout North America. Evolution in western North America, where water resources were limited, led to dry climate adaptations and decreased land productivity to support flora and fauna. Because of the dryer climate, the abundance of flora and fauna resources necessary for human survival probably fluctuated over time and space, and Native Americans developed community mobility to relocate readily to take advantage of food resources. However, it is also clear that some locations having reliable year-around or at least seasonally abundant food resources served as permanent quarters for at least a portion of the year. At least some of those quarters were probably located in the vicinity of big game and mule deer winter ranges. It is likely populations of Native Americans over these thousands of years increased and decreased with the availability of food resources. It is also likely that as human populations increased, their vulnerability to population collapse also increased because of rapid seasonal or annual changes in climate. Surely populations of mule deer followed similar cycles controlled primarily by climate, especially extremes in climate. Thus, frigid and extended winters or severe droughts over several years resulted in fluctuating food resources and limited populations of mule deer and many other species, including humans, in western North America.
The primary indirect sources of reliable information on wildlife prior to 1776 are from Utah’s abundant rock art and the findings of archaeologists (Jennings 1978). Occasionally petroglyphs provide hints of the prehistory of wildlife in an area. In Cache Valley, Utah, for example, rock art is rare. However, at the only known rock art location in the Blacksmith Fork drainage, one of the few remaining petroglyphs shows two human figures, one small and standing, and the second larger, kneeling and pointing at a clearly defined mule deer with distinctively branching antlers.

Note: My interpretation of this rock art comes simply from a father teaching a son the skills (and joys) of hunting. The lesson is equally simple, that is, teaching in the field by example and by a parent is the most precious and lasting of all educational experiences. If children are to obtain the same joys from the fields and woods as experienced by their parents, the parents must take the time to provide those lasting experiences. In today’s fast driving, high tech, multi-communications world, it remains a parent’s privilege, opportunity, and responsibility to show and teach their children in the out-of-doors.

Based on petroglyphs, pictographs, and excavation sites, archaeologists judge that compared to human populations in the early 21st century, only small and scattered populations of Native Americans lived in Utah prior to 1776. Those peoples apparently relied heavily upon fish and wildlife for survival, especially during those seasons when plant foods were scarce.

The mule deer was probably moderately important in the diet. In one comprehensive study, of 193 rock art locations inventoried in Utah, mule deer were identified at 59 sites (31 percent) (Castleton 1979, 1984). For comparison, bighorn sheep were identified at 134 sites (69 percent), bison at 19 sites (10 percent), elk at 7 sites (4 percent), and pronghorn at 6 sites (3 percent). Moose, mountain goats, and white-tailed deer were not identified.

Results from many archeological studies indicate wildlife were probably never very abundant, except perhaps locally, in Utah, the Great Basin, or more broadly, in the Intermountain West. Numbers of big game and mule deer fluctuated primarily due to climatic cycles, and the animals were decimated by the occasional severe winter. Predators—primarily wolves, coyotes, black bears, bobcat, and cougar—limited population
growth, but the key long-term factor was climate, which controlled population size and geographical range.

Probable Origins of the Mule Deer

Archeological records suggest the mule deer evolved from a combination of specialized hybridizations from the white-tailed deer (Geist 1990). The white-tailed deer has been found on the North American continent for about 4 to 4.5 million years. Most other members of the deer family are relatively new inhabitants since about the last 13,000 to 14,000 years. At one time in the distant past, estimated at 700,000 to 1,000,000 years ago, white-tailed deer were found across the continent from the Pacific to the Atlantic oceans. However, climate changed separating and isolating the west coast deer from those on the rest of the continent. Over many thousands of years of isolation, speciation occurred, and the west coast white-tailed deer gradually developed into a new species or subspecies, named the black-tailed deer. Climate changed again for a geologically short period of time near the end of the Ice Age, allowing the white-tailed deer to again advance toward the west coast and the black-tailed deer toward the east. The ranges of the black-tailed and white-tailed deer temporarily overlapped. On these areas of sympatric ranges in the Intermountain West, 11,000 to 13,000 years ago, interbreeding and hybridization occurred; the progeny were the beginning of the mule deer. The hybridization probably occurred one way, that is, from white-tailed deer females and black-tailed deer males.

Climate changed once more and mule deer of the Intermountain West were again separated and isolated from the white-tailed and black-tailed deer. White-tailed and mule deer were separated on the east by the barrier of the Great Plains with the great herds of bison and other, now mostly extinct, ungulates. The deer species could not successfully compete with the grazers on the Great Plains. On the west, the Sierra Nevada Mountains separated the black-tailed and mule deer.

During about the last 13,000 years, the deer species within the Intermountain West slowly evolved into today’s mule deer. With mid-twentieth century expansion of agriculture from coast to coast, white-tailed deer expanded westward and now are once again found in all continental states. The first Utah white-tailed deer in recent times was verified in North Logan in Cache County in 1996 (McClure et al. 1997), and populations have since slowly expanded throughout many
Mule Deer

counties of Utah. White-tailed deer were not found in Utah before 1996 (Durrant 1952, McClure et al. 1997).

Also occurring about 13,000 years ago, near the end of the Ice Age, but before the draining of Lake Bonneville, was the migration of humans into the Western Hemisphere. At that time, the oceans were about 500 feet lower in elevation than today, due to the colder temperatures and the immense build-up of polar ice. A land bridge formed between the continents, and humans migrated from Siberia to Alaska across the Bering Strait. Along with humans, numerous mammals, including elk, moose, caribou, grizzly bear, and gray wolf, migrated from Siberia, adapted, and became established. These new species gradually evolved away from the species found on the European continent and added to the established fauna of North America.

Based on archeology an estimated 70 percent of the large mammal species native to North America became extinct between 10,000 and 13,000 years ago. This massive extinction was previously considered as caused primarily by changing climate, but newer findings have indicated disease and hunting by humans as significant, perhaps controlling factors. Species evolving on the North American continent had no previous contact with the human predator, and many species may not have been able to adapt to humans' increased intelligence, which led to hunting effectiveness. In addition to climate change, disease, and hunting, a fourth theory on North American extinctions is evidenced by numerous geologic reports indicating that an extraterrestrial comet, meteor, asteroid or inter-stellar object exploded over North America between 11,500 and 12,900 years ago, with the impacts having global effects, but particularly over North America (Allan and Delair 1997, Firestone et al. 2007). The much smaller and diminished but perhaps similar Tunguska Event occurred over Siberia in 1908. In my opinion, all four factors probably contributed to the extinctions to varying degrees depending upon the adaptability, mobility, population dynamics, geographic range, and ecology of each species. Further, it appears plausible that following this period of major shifts in populations North American mammals began a new era of adapting to climate and environment.

Nevertheless, several established species of North American mammals did survive and adapt to human presence. The most prominent of those mammals included the black-tailed deer, pronghorn, black bear, llama, the only large native mammal from North or South America
domesticated for human use, the highly adaptable white-tailed deer, and the extremely adaptable coyote. Since the massive extinctions near the end of the Ice Age, it is noteworthy that the mule deer has become the only known mammalian species to have evolved into a separate species in North America.

1776–1846: The Period of Explorers and Trappers

Early Utah explorers and trappers recorded variable abundance of wildlife, but only rarely mentioned mule deer (Rawley 1985). Although horses were occasionally sacrificed for food, as with the Domínguez-Escalante expedition, most trappers and explorers lived primarily off the land. Fish were found in the streams and lakes, and waterfowl were abundant around the Great Salt Lake and other marshes. Bighorn sheep, bison, and pronghorn were mentioned frequently in journals, with elk and mule deer noted occasionally. Some examples (Rawley 1985) include the following:

In 1825, William Ashley recorded several species of big game in the Uinta Basin, but did not include mule deer.
During 1825–1830, Peter Skene Ogden on several trips in Box Elder and Cache Counties of northern Utah recorded numerous kills of pronghorn and an occasional bison, but no deer.
In 1840, Osborne Russell recorded eating abundant bighorn sheep, elk and deer in Cache Valley.
In 1846, Edwin Bryant described good fishing on the Weber River. “Every angler was more or less successful. . . numerous waterfowl in the Farmington Bay area . . . and some abundance of big game . . . and [Indians]brought deer and elk skins, which they wished to trade.”
In 1846, John C. Fremont wrote about an area in Beaver County as “containing more deer and mountain sheep than we had seen in any previous part of our voyage.”

From these early journals, one may surmise mule deer were seen infrequently along the explorers’ routes. Since most of the trapping was for beaver and river otter at lower elevations during fall and winter, it is not surprising that only ‘few’ deer were seen in those habitats. It seems probable that mule deer existed in only very low numbers, and mostly in the higher mountains. Interestingly, there were never any reports of moose.
Mule Deer

Russell’s 1840 report of abundant big game, including mule deer, seems somewhat inconsistent with other observations. However, it is very possible that concentrations of big game occurred in very well defined pockets of winter range where slope, aspect and vegetation combined to create a more favorable microclimate and allowed big game to flourish in limited, distinct areas.

1847–1906: The Period of Settlement and Pioneers

When the Mormon pioneers arrived in Utah in 1847, wildlife in the Salt Lake Valley and adjacent valleys was very scarce. Indeed, during the first years of pioneer settlement, the settlers struggled with finding enough sustenance. Generally, mule deer were not easily found by settlers, although they were relished and hunted whenever possible. In some valleys, such as Cache Valley before 1880, even finding a mule deer track during winter was a rare occurrence. However the abundance of mule deer was undoubtedly variable throughout the state with several small areas containing good populations during at least some years.

For examples, in Cache Valley two “warmer” winter ranges are apparent. These lie between Logan and Green canyons, and between Millville and Blacksmith Fork canyons. During deep snow conditions in winter, an observer looking east from the Mendon bench across Cache Valley can note that these two areas are the first in the Bear River Range to show bare ground; therefore, they are traditional winter ranges for big game. The Utah Division of Wildlife Resources recognized the value of these two ranges and purchased most of the Millville-Blacksmith Fork range and part of the Green-Logan range in the 1930s. Although wildfire has destroyed parts of both ranges, and most of the Green-Logan Canyon range has been sold to Logan City, these rangelands continue to support significant numbers of mule deer and elk in winter. Similar warmer winter ranges are located throughout northern Utah, such as in Rich County along the east side of Bear Lake and the south facing slopes of Otter Creek near Randolph. Another example of an area with a good population was recorded in 1884, when John Brown reported seeing “plenty of deer . . . and getting three or four of them” north of Paragonah, Utah.

Commonly, settlers recorded taking big game species other than mule deer. For example, in 1863, Charles C. Rich recorded in his journal killing two elk and one bear on a trip from Cache to Bear Lake valleys.
This trip most likely was taken between Preston and Liberty, Idaho, over Strawberry Canyon, now Idaho State Road 36, but could have been taken up Blacksmith Fork Canyon and down Cottonwood Canyon into Round Valley. Elk were later extirpated from northern Utah and were reintroduced into Cache Valley from the Yellowstone herd in 1917.

**Primary Reasons for Low Deer Numbers before 1906**

The most significant factor in consistently low numbers of mule deer across varied geographic areas was the extreme winter weather conditions. Journal entries during the 1800s as well as natural evidence, such as tree rings, strongly suggest that occasionally winters were extremely severe prior to and during the nineteenth century. Evidence suggests these severe winters usually occurred at intervals of between seven and twenty years. A period of seven to twenty years would not usually be of sufficient length for a population to fully recover to the carrying capacity of the range, especially if the population was almost annihilated at regular intervals and if population recruitment was greatly curtailed by uncontrolled predator populations.

The second factor likely limiting mule deer population was competition for prey species among Native American and mammalian predators. The presence of mammalian predators was a chief concern of the early settlers. Journal entries often noted the presence of predators, the difficulties of protecting livestock from predation, and pioneer efforts to not just control but eradicate predators. During the winter of 1847–1848, which in many locations was considered a severe winter, pioneer hunting parties in the Salt Lake and nearby valleys recorded killing 2 bear (likely black bear), 2 wolverines (likely now almost extirpated from Utah), 2 wildcats (probably bobcat but possibly cougar), 783 coyotes, 400 foxes (possibly gray, kit, and red), 31 mink, 9 eagles (probably both golden and bald), 530 magpies, hawks, and owls (probably mostly great horned), and 1,629 ravens (possibly included American crows) (Rawley 1985). Unquestionably, these predatory animals helped stock the settlers’ meager food supply.

Hunting by Native Americans certainly contributed to the scarcity of prey species. Game species were harvested over the entire year whenever opportunities occurred. The comparative effectiveness of Native Americans and mammalian predators is unknown. However, it is likely the Native Americans were at least as effective in harvesting prey species
Mule Deer

as the entire group of mammalian predators, especially in the vicinities of the Indians’ winter quarters.

The third major factor that limited big game and particularly mule deer was the vegetation on winter ranges. In the 1850s during the period of settlement, the foothills of the valleys had far different vegetative cover from that observed a century later in the 1950s. Utah juniper (*Juniperus osteosperma*) and big sagebrush (*Artemisia tridentata*), now the vegetative symbols of the western valley and foothill big game winter ranges, grew in low density on most ranges. Instead of the shrubs and trees found at the turn of the twenty-first century on productive winter ranges, the foothill winter ranges contained luxuriant growth of perennial grasses (Christensen and Johnson 1964; Hull and Hull 1974). Because mule deer require browse for food in winter, especially when snow depth exceeds about 8 inches, and because dry grass has little, if any, nutritional value for deer, few deer would be expected to survive (Austin and Urness 1983). Of interest, elk, bison and probably moose and bighorn sheep, but not pronghorn, are much more capable of digesting dry grass for forage during winter, and consequently, would have been more likely to have persisted under those early pristine vegetative conditions.

Note: Wildfire was certainly a factor in maintaining grasslands on winter ranges under pre-settlement conditions. The common winter range perennial bunch grasses, including the widespread bluebunch wheatgrass (*Agropyron spicatum*), as well as the native perennial forbs such as Utah’s state flower the sego lily (*Calochortus nutallii*), easily recovered and maintained populations after periodic fires. Big sagebrush and other shrubs invading the grassland community were mostly killed by fire, whereas the roots of grasses and bulbs of forbs were protected by the soil; the grasses and forbs would sprout vigorously in the spring following fire. Following a foothill fire, soil nutrients contained in the shrub’s leaves and stems were, in part, returned to the soil, adding to the quick recovery of the native grasses and forbs.

Livestock Grazing—The Necessary Factor for Maintaining Browse on Winter Ranges

When the Mormon settlers arrived, they brought with them considerable numbers of livestock. With open rangelands and high forage availability,
livestock numbers rapidly increased. Intensive grazing, particularly in the spring and fall, of the foothills, now mule deer winter ranges, occurred. Since livestock mostly graze grasses and forbs in spring and summer, domestic grazing shifted the growing advantage to shrubs and trees less palatable to grazing livestock. Heavy livestock grazing in the spring not only reduces understory growth and reserves soil nutrients for shrubs, but also leads to longer retention of soil moisture for continued growth of shrubs later, into the summer. As a direct consequence of heavy livestock grazing, shrubs became an increasingly dominant vegetative type on winter ranges.

The shift in vegetation from grasslands to ranges dominated by shrubs steadfastly continued throughout the West until about the 1930s. Although vegetative changes were evident throughout the Intermountain Region, changes were particularly obvious along the Wasatch Front, where the Mormon settlers and their livestock operations were first concentrated.

However, in the 1930s, mud rock slides and massive soil erosion—caused by decades of heavy overgrazing on protective plant cover and the subsequent slow destruction of grass root systems, followed by more recent years of drought—forced state and federal agencies to begin to reduce and eventually in some cases to eliminate grazing from sensitive watersheds. With the reduction of livestock grazing, many of these ranges have slowly returned to domination by grasses with associated native grassland species (Austin et al. 1986).

**First Estimates of Big Game Numbers in Utah**

It is likely that throughout most of the nineteenth century big game animals and particularly mule deer were generally scarce in Utah. Orange Olsen, the first regional forester in charge of wildlife management, worked for the agency which was to become the United States Forest Service; he estimated in 1900 that the total Utah population of mule deer was only 10,000! In addition, he estimated the population for Utah of other big game species as 500 pronghorn, 200 bighorn sheep, and only 25 elk. It is interesting to note that Rocky Mountain goats, moose, white-tailed deer, and bison were not included in his estimates.

The first law protecting big game in the territory of Utah was written in 1876 under “Laws for the Preservation of Game and Fish.” This law simply established that the taking of big game, defined as mule
deer, pronghorn, bighorn sheep, and elk, could only occur during the period July 1 through December 31, a six-month season. No bag limits were established and hunting from January 1 through June 30 was only a misdemeanor (Rawley 1985). It is again interesting to note that Rocky Mountain goat, moose, and bison were not included on the big game list. It is likely that populations of two of these species, moose and bison, were very low or nonexistent, in part due to their high vulnerability to hunting. Rocky Mountain goats were not present in Utah at that time.

**Note:** The Rocky Mountain goat is generally not considered a native species to Utah, even though sufficient habitat is available in the Wasatch and Uinta Mountains. Through transplanting efforts the Utah Division of Wildlife Resources has established numerous small populations in northern Utah Mountains. The USFS is monitoring sensitive alpine vegetation for any negative effects grazing by Rocky Mountain goats may have on this habitat type. It is my opinion that it is very unlikely any Rocky Mountain goat lived in Utah during historical times, since about 1800. However, over the last 13,000 years, in consideration of the great cycles in climate, the probability that Rocky Mountain goats migrated into Utah and temporarily became established seems reasonable. Nonetheless, even if this scenario is correct, migrating populations were unable to withstand mortality factors such as climate and predators and a permanent population was apparently never established under presettlement conditions. The ability of populations to become temporarily established on fringe or marginal habitats is a common occurrence with most species of wildlife including mule deer. That is, under favorable reproductive and survival periods, populations expand into marginal habitats and regress slowly back to primary habitats under unfavorable conditions.

By 1894, the need to manage Utah’s wildlife resources was clearly recognized, as demonstrated by organization of a new branch of the territorial government, currently named the Division of Wildlife Resources, and the appointment of a fish and game commissioner. However, little control over hunting occurred during the next 12 years, and the six-month season continued.
Table 1-1 summarizes, in chronological order, the major events defining mule deer management in Utah from 1876 through 2008. Emphasis in this table was placed on the research and development of Utah’s critical winter ranges.

1907–1913: The Period of Complete Protection

Utah received statehood in 1896, but it was not until 1907 that the first license fee of $1.00 was required to hunt big game. In 1907, only a few hunters participated in the hunting of big game, primarily because the number of big game animals available in Utah was very small, and probably less than the numbers that were estimated by Orange Olsen in 1900. Big game populations had been decimated by years of hunting seasons lasting six months, high predator populations, intermittent but extremely harsh winters, and still a preponderance of grass on many winter ranges, although shrubs were increasing. Unfortunately, no data on licenses sold or harvest are available for 1907. It is likely no data were recorded for the 1907 hunt, particularly because prior to that year the only hunting restriction had been the six-month season. Since hunting had previously been free, it is quite likely that only a few hunters bothered to purchase a license and most hunters continued to hunt without the newly required license.

By 1907, Utah’s wildlife commissioner as well as hunters clearly recognized the absence of big game in the State and the need to protect remaining animals from all hunting. As a consequence, all big game hunting was closed for the next six years between 1908 and 1913.

Note: During this period of closure, unquestionably poaching occurred, especially in the remote rural communities. However, it should be noted that poaching before the latter half of the twentieth century was much different from the last 50 or 60 years. That is, most of the current poachers are dedicated to killing trophy animals, often leaving the carcass and only taking the head or antlers, whereas almost all of yesterday’s poachers were simply trying to put a supply of meat on the family table.

1914–1950: The Period of Buck-Only Hunting

The ‘buck-only’ law was passed by the Utah State Legislature in 1913, ending the moratorium period of no hunting. The new law became
**Mule Deer**

effective at the beginning of the hunting season in 1914. In that first year an estimated 600 buck mule deer were harvested in Utah. No record is available on the number of hunters.

Under buck-only hunting regulations, numbers of mule deer gradually increased. In 1925, the Board of Elk Control, renamed the Board of Big Game Control in 1935, was established to determine elk regulations. In 1927, the duties of this board were expanded to cover all big game regulations. Between 1914 and 1933 only buck deer were hunted in Utah. By 1934, deer populations in the State had increased to the degree that depredation problems were causing significant crop losses in some agricultural areas. The board responded and established the first antlerless-control deer hunts in 1934.

Research into deer problems, data collections on deer herds throughout the state, and management expertise improved rapidly, leading toward more scientific management during the 1930s and 1940s. Before about 1946, Utah regulations were very simple and applied over the entire state. Differences in population sizes, productivity, hunter impacts, and numerous other factors were generally not considered.

After the end of World War II returning veterans showed renewed interest in hunting and the deer resource. In response, important changes in the management of Utah's mule deer resource were adopted abruptly in 1946. In that year, 53 individual deer units were identified based on geography and migration patterns, Utah State University established a big game–livestock relationships and research problem-solving project, and with interagency cooperation and contributions, detailed research into mule deer ecology was begun on the Oak Creek deer unit. In 1948, the three-person Interagency Committee was formed to determine big game regulations. This committee was composed of a representative from the Division of Wildlife Resources, the Bureau of Land Management, and the U.S. Forest Service. Also in 1948, the first description of overall range conditions for the State was published. In 1949, the first attempt at identifying the summer and winter ranges of mule deer was completed. In 1957, The Great Basin Research Center, which continues the essential work of range revegetation, was established in Ephraim. In 1958 the big game range trend surveys were begun.

By the late 1940s, deer numbers had expanded to extremely dense populations throughout Utah. Deer populations had gradually increased in response to increased browse availability on winter ranges, increased
predator control, and buck-only hunting in most areas. The limited number of antlerless-control permits issued before 1950 accomplished little in curbing the growth of most mule deer populations. At this time the high deer density was observed to be out-of-balance with the forage available on the winter range. On most ranges it is estimated the appropriate balance between deer numbers and available forage on winter ranges occurred between 1940 and 1945. By 1946, the number of deer on winter ranges greatly exceeded the carrying capacity of most ranges. Consequently, because of the extreme overwinter utilization of shrubs, winter range conditions rapidly deteriorated and grasses replaced winter browse forage. Even more importantly, overutilization of the browse resource was leading to shrub decadence and mortality, reduced browse productivity, and decreased future carrying capacity. Annually during the late 1940s, overwinter mortality losses caused by starvation and harsh winters were staggering, particularly during the especially severe winter of 1948–1949.

1951–1972: The Period of Either-Sex, Hunter-Choice Hunting

Finally in 1951, after at least five years of significantly overpopulated herds of mule deer throughout most of Utah, the Utah legislature repealed the 1914 ‘buck only’ law and hunters were allowed to harvest ‘either-sex’ on their deer hunting permit. Tangential to the initiation of either-sex or hunter choice hunting, the Department of Fish and Game began an aggressive harvest program designed specifically to decrease herd sizes, including the establishment of two deer permits, pre-season hunts, post-season hunts, extended hunts, conditional hunts, and others. Deer were plentiful everywhere, so to attract hunters, areas distant from human population centers had fewer restrictions and more opportunities than areas along the Wasatch Front where hunter pressure was higher. For a few years around 1960, a hunter could have legally harvested up to 11 deer during a single season in Utah. Either-sex hunting opportunity continued on most units through 1972. In addition to either-sex hunting, the number of antlerless-control permits reached the peak in 1961 at about 40,000 statewide and slowly declined during the 1960s and into the 1970s.

During the 1950s, permanently marked pellet group plot transects, browse utilization transects, pre-season classification counts, post-season
Mule Deer

classification counts, and checking station data collection points became standard tools for wildlife biologists to assess populations. In 1953, the Utah Legislature established by statute the Saturday nearest October 20 as the beginning date of the general deer hunt, due to established tradition, optimum physical condition of deer in the fall, and average weather conditions. In 2008 the Utah Legislature gave the Wildlife Board the authority to change the date, and thus, the date for opening day may be changed in the future.


The numbers of mule deer significantly and drastically declined in the early 1970s (Workman and Low 1976). After a decade of generally average climatic conditions with high reproductive and recruitment rates, which had led to very successful hunting during the 1960s, the early 1970s marked the beginning of a long decline in mule deer numbers. Several factors contributed to this decline of mule deer (Utah DWR 1951-2008, Hancock 1981, Utah DWR 2003). The harsh winter of 1972–73 showed a significant loss of deer due to starvation, and as a consequence, most of the 1972 fawn crop was lost. Antlerless harvest had remained high during the first four years of the new decade: 1970, 1971, 1972, and 1973. Poor fawn crops were produced during those same years. Cold and delayed spring seasons continued into May and weakened does in the later stages of gestation. Summer drought in several parts of the state dried up many traditional watering places. The effects of predators increased with declining deer populations. Finally, a statewide jump in hunter license sales from about 180,000 in 1969 to 200,000 in 1970 caused a noticeable increase in hunter pressure, particularly on does, and an observed decline in deer numbers.

In response to these conditions the Division of Wildlife Resources established hunting regulations that were much more restrictive and the period of either-sex hunting came to an abrupt close. Few antlerless deer permits were issued in 1973 and 1974. By 1975 buck-only hunting regulations, which had not been in place for 25 years, replaced either-sex hunting. In that year a statewide total of only about 6,000 hunter choice permits were issued.
**1975–1984: The Period of Conservative Antlerless Harvest**

The solution to the decline in deer numbers adopted by the Division of Wildlife Resources was to revert back to buck-only hunts with antlerless-control permits. Under conservative doe harvest regulations, deer populations increased quickly. In many areas deer numbers again soon exceeded range carrying capacity. In just two years, by 1977, statewide buck harvest had recovered to harvest levels achieved before 1973. However, the hunters’ and general public’s desire to maintain high deer numbers on public lands often resulted in harvest considerably below the biological goals of maintaining populations within carrying capacity. The difficulties of harvesting adequate numbers of antlerless deer on privately owned ranges, where landowners controlled hunter access and the effectiveness of antlerless-control permits, also contributed to harvests considerably below biological goals.

The extremely harsh winter of 1983–1984 was a grim reminder of the consequences of excessive populations. For most of Utah’s deer units, the severe winter weather caused total herd losses usually in the range of 50% mortality, and on some units as high as 70%.

**1985–1992: The Period of Experimental Seasons**

Hunters and wildlife biologists desiring a higher quality hunt and a higher proportion of mature bucks in the harvest, as were often available during the 1950s and 1960s, caused the establishment of special hunts: limited entry and high country (hunter restriction), and three point and better (antler restriction). The advantages and disadvantages of these hunt types were intensively debated. The continuance of special hunts in the twenty-first century will probably depend less on biological inputs and harvest and more on hunter preferences. Indeed, the need to evaluate the quality of the hunting experience was poignantly recognized during these years. The two major issues of hunting quality—too many hunters and too few mature bucks—led to the major changes in regulations and hunter choices in the 1993 fall hunts.
In 1993, hunters were required to choose and hunt only one season: archery, rifle or muzzleloader. This was a very significant and primary change from the wildlife management policy adopted and practiced for 80 years, since 1914. Prior to 1993, hunters obtaining a deer tag could hunt any legal season. This new policy, which has continued through the 2009 season, was adopted to reduce hunter crowding during the rifle hunt and increase the percentage of surviving bucks. To meet that goal, a secondary regulation restricting hunters with an antlerless tag from also hunting bucks was adopted, but that regulation was repealed the following year.

Hunting opportunity was again significantly restricted in 1994 when deer permit sales for the general season buck hunts were capped at 97,000. That was an even more significant and primary change from the 1914 wildlife management policy. Prior to 1993, deer license sales were not limited. However, because of the difficulty of monitoring sales throughout Utah, sales exceeded the cap by several thousand through at least 1998. In 1999 and thereafter, the monitoring of license sales was greatly improved and the 97,000 buck deer hunter permit cap became firmly established and enforced. With considerable discussion, the deer permit sales cap has been widely accepted by hunters and has continued with only minor changes.

In the mid to late 1990s, the economic value of hunting on private lands finally became evident. Ranchers wanted to make a profit from hunting, even though the state owned and controlled all game animals. The Wildlife Board, which had replaced the long established Interagency Committee, adopted the concept of Cooperative Wildlife Management Units (CWMUs) to allow private landowners to share in the profit of hunting. Ranchers who maintained big game on their lands during the fall hunting seasons, and owned a minimum of 5,000 contiguous acres, were given monetary incentive and the opportunity to privatize big game hunting in Utah. This was the third departure from long-term wildlife management policy established in 1914. Ranchers who maintained big game on their lands only during the winter had little or no advantage, and continued to struggle with depredation problems and crop losses. In
some cases their depredation problems in winter were augmented and exasperated by the management of adjacent CWMUs. The Cooperative Wildlife Management Unit opportunity has continued to be a successful economic venture for many large acreage landowners, and over the state has decreased depredation problems.

Also in the late 1990s, the Wildlife Board approved the dedicated hunter program. This special interest program allowed hunters who were willing to donate labor for various habitat improvements or other approved wildlife projects to hunt all three seasons: archery, muzzleloader, and rifle. However, they were only allowed to harvest a maximum of two bucks every three years. The potential hunter success rate was 67%, or about double the actual success rate for the general public hunter. The dedicated hunter program has also continued through at least 2009 with enthusiastic response from many hunters.

Prior to 1994 hunters could hunt almost anywhere open in the state of Utah using the same permit and tag. Beginning in 1994, as a result of low deer numbers, hunter crowding, the influence of special interests groups, and for improved management, the state was divided into five regions. Hunters were forced to select and hunt in a single region. Many families with brothers, uncles, and other relatives living in diverse parts of the state encountered tough decisions on which region to hunt. For example, some hunters had to choose to hunt close to home for the entire season or far away, usually with family, for only the opening weekend. Many family hunting groups, some comprised of many generations, were divided. The regional requirement has also continued through at least 2009.

Following closely behind the designation of region-restricted hunting was the development and establishment of the Regional Advisory Councils (RACs). These councils are comprised of government-appointed sportsmen, biologists, and individuals from numerous outdoor interests. The RACs hold public meetings for the purpose of obtaining managerial opinions from the general public, various sportsmen groups, and other interested organizations. Meeting discussions center on current DWR management regulations and issues. The RACs take the public input, determine solutions, and present management recommendations to the Wildlife Board, which makes final policy decisions. The RACs have become a strong voice for Utah's sportsmen, and the work of these councils will continue through at least 2009 and probably indefinitely.
Note: Considerable discussion has occurred on changing state regulations to strictly limited-entry deer hunting on all units. Statewide limited-entry hunting would have the advantage of improved harvest control, but the disadvantages of fewer hunting opportunities and limiting hunters to smaller geographical locations.

Several other less significant changes were also made during this period. Most of these changes favored special interest groups and were designed to increase hunter interest. These changes included lowering the age required to obtain a hunting license from 16 to 14 years with recommendations in 2006 to lower the age to 12 years; allowing young hunters under the age of 18 years to hunt all three seasons; shortening the rifle hunt from 11 to 9 or fewer days; bonus points and preference points for hunts having limited permits and high demand; increased complexity of the proclamations; separating into two proclamations the antlerless and bucks/bulls regulations; and sales of limited special buck tags available to the highest auction bidder. Receipts from these sales are mostly earmarked for habitat projects. Other changes included maintaining a minimum ratio of 15 bucks (of which 5 must be mature) to 100 does during post-season classification counts on every unit. This management goal was mostly achieved by regulations limiting hunter pressure.

Although deer numbers unquestionably declined during the period, alternative solutions to decreasing hunter numbers, decreasing geographic range available to hunters, and attempting to satisfy the desires of several special interest groups were and continue to be available to the state for deer management. The first and obvious solution was not to change policy or add any new restrictions, thereby allowing decreased hunter success and hunter discouragement to be the controlling factor in license sales, and also allowing buck-to-doe post-season ratios to be controlled by hunter efforts. This solution is biologically sound as long as buck-to-doe ratios do not become so wide as to affect reproductive and recruitment success. A second solution was to restrict license sales to only a single big game species per hunter per year. A third solution of restricting hunters to a single hunt for each species per year has been adopted, but was probably weakened by allowing the dedicated hunter program.

A fourth potential solution was to apply adaptive management strategies to each unit. Adaptive management is based solely on the resources
within each unit. Under this solution, the strategy for each unit would be different and determined by many factors including population dynamics, habitats available, land ownership, acreage of summer and winter ranges, location with respect to human population centers, hunter access, etc. Selected criteria and population dynamics' data collected by DWR would directly define the hunt restrictions for the following year based on the adaptive management plan for individual units. For example, units having poor population dynamics and low deer populations would have more restrictions, such as road closures, shorter seasons, weapon restrictions, or muzzleloader hunters moved to the rifle (any weapons) hunt, whereas units having very good population dynamics and high deer populations would have no restrictions and probably increased opportunity, such as longer seasons or an increase in the number of antlerless permits. In my opinion, adaptive management strategies provide the highest population oversight and control, and will likely be adopted at some future time.

Before 1993, the direction of the DWR was clearly to provide, within resource boundaries, the maximum hunting opportunity, equally available to anyone, and with family-friendly regulations. Indeed, the fourth or fifth most important Utah “holiday” during the school year was the opening weekend of the general deer hunt. Guys went hunting and gals went shopping. However, the restrictions imposed during this period, and especially during the 1990s, were clearly in response to the decrease in the number of deer. Unquestionably, the Division of Wildlife Resources had to make difficult choices.

Hunting opportunity and deer numbers are clearly not dependent, and management decisions may be altered according to numerous factors and interests related to the uses of the deer resource. Nonetheless, a management philosophy focused on providing the optimum hunting opportunities for Utah hunters, but including input from other interest groups, will continue to be a primary consideration for the state of Utah.

Table 1-1. Chronology of the major events defining the management of Utah's mule deer and winter range resources.

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tr>
<td>1876</td>
<td>First law protecting big game in the Utah territory titled, “Laws for the Preservation of Game and Fish.”</td>
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<tr>
<td>1894</td>
<td>Utah Fish and Game Department organized. First fishing and hunting regulations adopted.</td>
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