# LOGAN MOUNTAIN DEER MANAGEMENT PLAN

## DATA ANALYSIS UNIT D-41
## GAME MANAGEMENT UNITS 31 & 32

APRIL 2012

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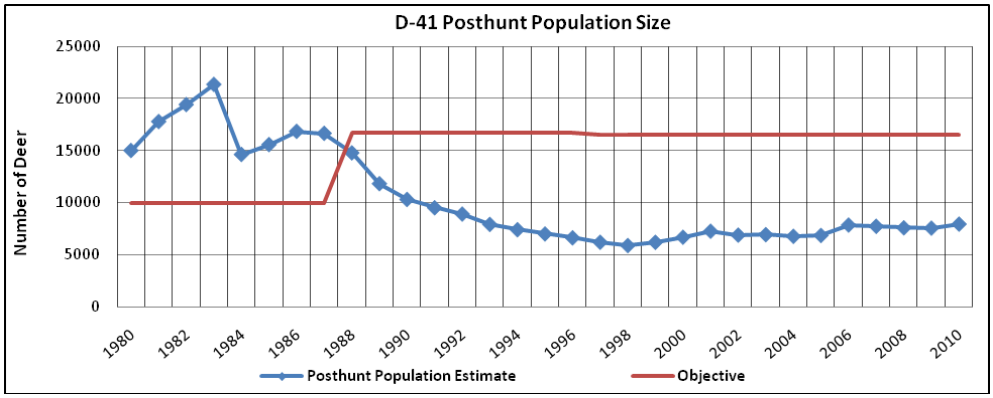
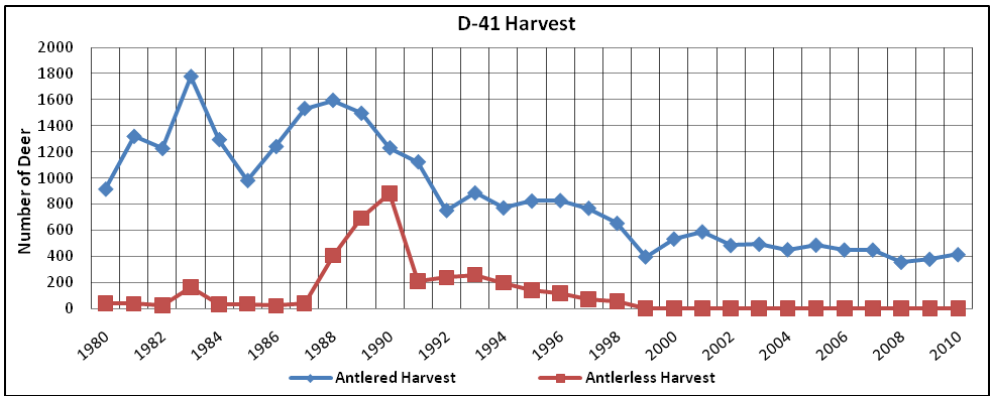
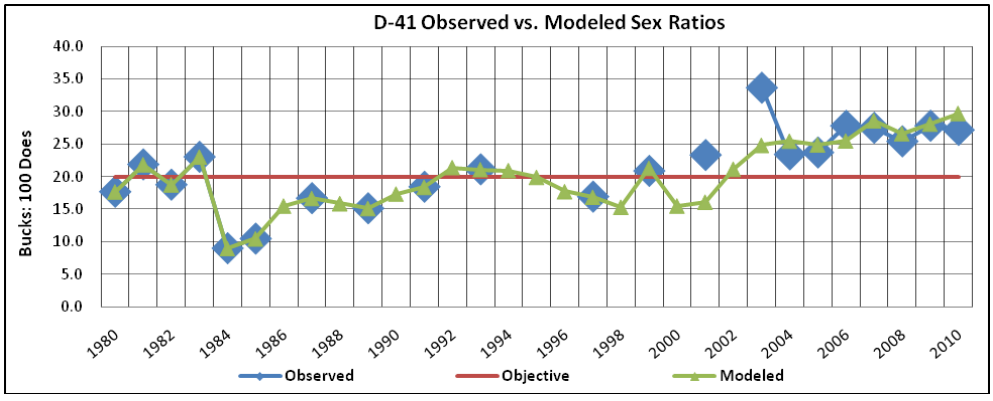
# DAU D-41 LOGAN MOUNTAIN
# EXECUTIVE SUMMARY
APRIL 2012

Game Management Units: 31 & 32
Land Ownership: 51% BLM, 48% Private, <1% State of Colorado
Previous Post-hunt Population Objective: 16,500 — 2010 Estimate: 7,963
Current Objective: 6,500 – 8,500 deer
Previous Post-hunt Composition (Bucks: 100 Does) Objective: 20 — 2010 Observed: 27.2
Current Objective: 25 – 30 bucks: 100 does



## D-41 BACKGROUND

Mule deer Data Analysis Unit (DAU) D-41, Logan Mountain, is located in west-central Colorado and includes Game Management Units (GMUs) 31 & 32. The primary geographic features in this DAU include the high elevation, gently sloping Roan Plateau that is bisected by deep drainages that compose Roan and Parachute Creeks. The DAU is approximately 1004 square miles and is nearly evenly divided between public (Bureau of Land Management) and private ownership. Since 1995, the population size objective for the Logan Mountain deer herd has been 16,500 deer. The current sex ratio objective is 20 bucks: 100 does.

The deer population in D-41 was relatively high through the 1980's, and then declined dramatically through the 1990's. There has been some limited recovery in the population size in recent years. The decline of this herd mirrored the falling numbers in most mule deer populations in Colorado and the western United States. The 2010 posthunt population estimate is 7,963, which is above the low of approximately 6,000 in the late 1990's.

The CDOW has conducted aerial sex and age composition surveys in D-41 since the late 1970's. Prior to 2003, these flights were conducted every other year. Since 2003, flights have been completed annually. Early records in the 1980's show that buck: doe ratios were quite low and rarely climbed above the high teens. Since antlered licenses were limited in 1999, buck: doe ratios have improved dramatically and have remained 27.2 bucks: 100 does were observed during 2010 posthunt classification surveys.

Posthunt fawn: doe ratios are indicators of how successful reproduction was the past spring and how well fawns survived into December. This is a critical indicator of the condition of the herd. Fawn production in this DAU has varied over the years and has been over 65 fawns: 100 does for the last three years.

## D-41 SIGNIFICANT ISSUES

The most important aspect of the DAU planning process is obtaining input from all segments of affected local populations including land management agencies, county commissioners, interested individuals, and local groups. Meetings were held to solicit input from the Bureau of Land Management (BLM), the Mesa and Garfield Boards of County Commissioners, and the local public. A questionnaire was available at these meetings and on the CDOW's website for a 30 day period to encourage written input.

During this process, there were several significant issues associated with the mule deer herd in the Logan Mountain area. The most significant issue is the long-term decline and stagnation of the herd. Despite virtually no antlerless harvest in over 15 years, the population has not rebounded from the decline of the 1990's. Additionally, landscape-scale energy development is a significant concern. Habitat quality and quantity decline resulting from the loss of winter range and pinon-juniper encroachment also impact this deer herd. Sportsmen expressed concerns about hunter access, hunting opportunity, and buck: doe ratios.

Generally, most stakeholders expressed a desire to increase the size of the deer herd and improve the quality of harvested antlered deer.

## D-41 MANAGEMENT ALTERNATIVES

During the public input period of this DAU planning process, three alternatives were presented for both the population size objective and the sex ratio objectives. Participants were also encouraged to provide the CDOW with other feasible alternatives.

***Post-hunt Population Size Alternatives***

Alternative 1: 5,500 – 7,500 deer. This alternative would result in a decrease of approximately 20% from the 2010 posthunt population estimate. It is likely that antlered license numbers would be increased short term and antlerless licenses would be introduced to bring the population size to within the objective range.

Alternative 2: 6,500 – 8,500 deer. This alternative would maintain the population size at approximately the same size as the 2010 post-hunt population estimate. Antlerless licenses could be introduced to maintain the population size within the objective range.

Alternative 3: 7,500 – 9,500 deer. This alternative would increase the population size approximately 10% from the 2010 post-hunt population estimate. License number reductions would be necessary in the short term, and it is unlikely that antlerless licenses would be introduced until some growth of the herd toward the middle or upper end of the objective range.

***Post-hunt Composition Alternatives***

Alternative 1: 20 – 25 bucks: 100 does. This alternative would increase the current objective, but would result in a reduction of the buck: doe ratio by approximately 20%. There would be an increase in buck licenses in both the short- and long-term. The quality of bucks harvested would decline, as there would be fewer antlered animals on the landscape, and the resulting age structure would be younger. Hunting opportunities could be increased, and no preference points would likely be required to hunt in these units annually.

Alternative 2: 25 – 30 bucks: 100 does. This alternative would result in an increase in the current objective, but would maintain the buck: doe ratios at levels maintained in these units for roughly the last five years. License numbers would likely remain the same, and preference points would likely not be required to hunt during most seasons.

Alternative 3: 30 – 35 bucks: 100 does. This alternative would result in an increase in the total number of bucks in the population, and would improve the quality of bucks harvested. Antlered hunting opportunities would decrease to maintain more and larger bucks. It is likely that preference points would be required to hunt in this DAU.

## D-41 PREFEERRED ALTERNATIVES

There was strong public support for more deer and larger bucks. For this reason, alternative two was selected for both the population size and composition objectives. Both objectives are within the ability of the habitat to support, and will continue to provide good hunter opportunity.

***This management plan was approved by the Parks and Wildlife Commission on April 12, 2012.***

# INTRODUCTION AND PURPOSE

The Colorado Division of Wildlife (CDOW) manages wildlife for the use, benefit and enjoyment of the people of the state in accordance with the CDOWs Strategic Plan and mandates from the Wildlife Commission and the Colorado Legislature. Colorado's wildlife resources require careful and increasingly intensive management to accommodate the many and varied public demands and growing impacts from people. To manage the state's big game populations, the CDOW uses a "management by objective" approach (Figure 1). Big game populations are managed to achieve population objective ranges and sex ratio ranges established for data analysis units (DAUs).

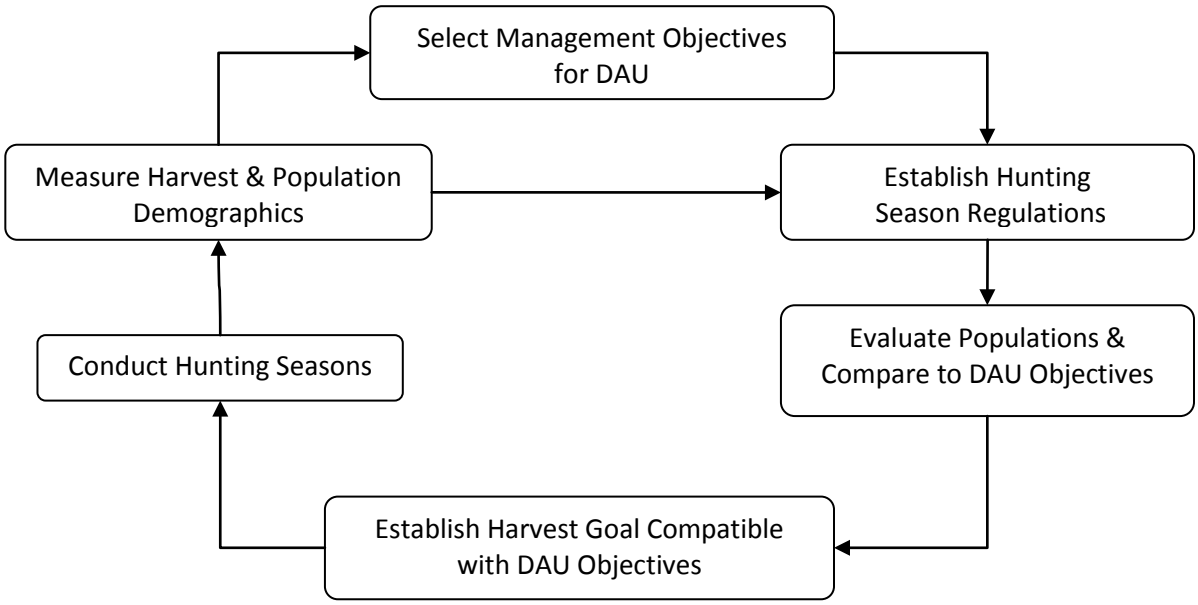



**Figure 1. Management by Objectives process used by the CDOW to manage big game populations on a DAU basis.**

A DAU is the geographic area that represents the year-around range of a big game herd and delineates the seasonal ranges of a specific herd while keeping interchange with adjacent herds to a minimum. A DAU includes the area where the majority of the animals in a herd are born and raised as well as where they die either as a result of hunter harvest or natural causes. Each DAU usually is composed of several game management units (GMUs), but in some cases only one GMU makes up a DAU.

The purpose of a DAU plan is to provide a system or process which will integrate the plans and intentions of the Division of Wildlife with the concerns and ideas of land management agencies and interested publics in determining how a big game herd in a specific geographic area, DAU, should be managed. Key features of the DAU plan are the herd size and herd composition objectives, which are developed after considering input from all interested entities.

In preparing a DAU plan, agency personnel attempt to balance the biological capabilities of the herd and its habitat with the public's demand for wildlife recreational opportunities. Our various publics and constituents, including the U.S Forest Service, the Bureau of Land Management, sports persons, guides and outfitters, private landowners, county commissioners, local Chambers of Commerce and the general

public, are involved in the determination of DAU population and herd composition objectives and related issues. Public input is solicited and collected by way of questionnaires, public meetings and comments to the Wildlife Commission.

The primary decisions needed for an individual DAU plan are how many animals should exist in the DAU and what is the desired sex ratio for the population of big game animals e.g., the number of males per 100 females. These numbers are referred to as the DAU population and herd composition objectives, respectively. Secondarily, the strategies and techniques needed to reach the population size and herd composition objectives also need to be selected. The selection of population and sex ratio objectives drive important decisions in the big game season setting process, namely, how many animals need to be harvested to maintain or move toward the objectives, and what types of hunting seasons are required to achieve the harvest objective.

# DESCRIPTION OF DATA ANALYSIS UNIT

## Location

Logan Mountain Data Analysis Unit D-41 is located in west-central Colorado (Figure 2). It is bounded on the north by the Colorado River-White River divide and the Parachute Creek-Piceance Creek Divide; on the east by Colo 13/789; on the south by the Colorado River; and on the west by the Bookcliffs, the Little Salt Wash-Roan Creek divide, the Big Salt Wash-Roan Creek divide, and the East Salt Creek-Roan Creek divide. It is comprised of two game management units, 31 and 32 and includes the Roan and Parachute Creek drainages. The DAU is approximately 1004 square miles in size.

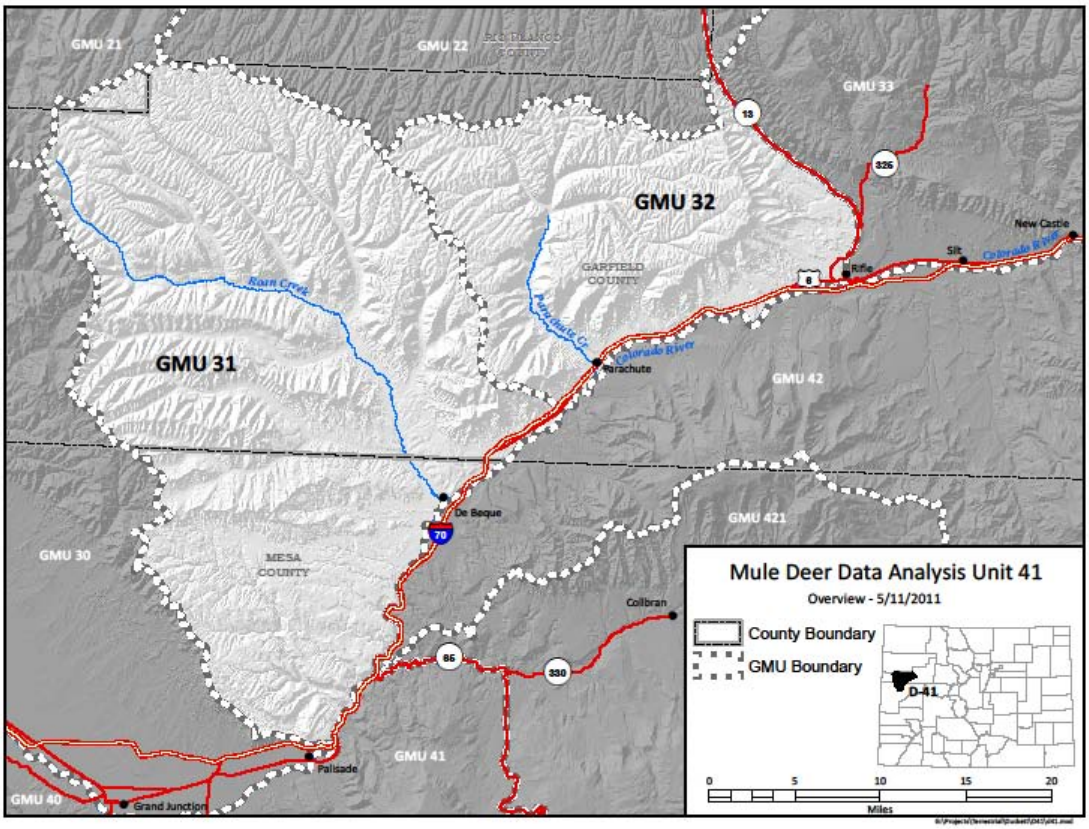



Figure 2. Location of DAU D-41 in west-central Colorado.

## Physiography

### Climate and Precipitation

As with all of mountainous Colorado, the climate varies greatly with the season, elevation, and aspect. The high elevation Roan Plateau is generally cool and receives significantly more moisture than the rest of the DAU. These areas are generally associated with summer and fawning ranges. The lower elevations, particularly near the towns of Debeque and Palisade, are much warmer and drier and provide a greater proportion of winter range.

Precipitation varies drastically across the DAU, averaging less than 10 inches per year near Palisade, and over 16 inches per year in the Dry Fork drainage. Upper portions of the Roan Plateau receive significantly greater amounts. The majority of precipitation falls as snow in the winter, although localized summer thunderstorms add significantly to some locations. Temperatures vary considerably as well. Average high temperatures near Palisade generally reach 94 degrees in July, and average below 10 degrees in the Dry Fork drainage. Higher elevations receive considerably more snow.

## Topography

This DAU is characterized by rolling sagebrush and aspen hills of the Roan Plateau on the northern boundary of the unit, and the deep, narrow canyons of the Parachute and Roan Creek drainages. These canyons are bisected by long, sloping ridges extending southward from the Roan Plateau. The highest point in the DAU is approximately 9,300 feet near Anvil Points in GMU 32. The lowest elevation point is on the southern boundary of GMU 31 along the Colorado River.

Roan Creek and Parachute Creek are the two primary water sources and geographic features within the DAU. There are other smaller drainages, but no natural lakes. Springs and small ponds used by livestock dot the landscape and provide water for wildlife. There are many side drainages, dry washes, and ephemeral streams throughout the DAU.

## Vegetation

The vegetation within this DAU varies with the wide range of elevations that occur, but is similar to most vegetation types found throughout western Colorado.

At lower elevations, the vegetation is typical of most semi-arid regions in western Colorado. Saltbush, sagebrush, and greasewood are common shrub species found in the open areas. Cheatgrass dominates the lower understory in many areas in these areas, as well as in pinon-juniper woodlands. Pinon-juniper woodlands are common on the lower and intermediate slopes throughout the DAU. Oakbrush is found at higher elevations. Serviceberry, snowberry, and other mountain shrubs are commonly intermediate and higher elevations. Higher elevations, which receive considerably more moisture, are dominated by aspen and Douglas fir woodlands, sagebrush steppe, and serviceberry dominated shrublands. Often, the aspen and fir are found in pockets, as opposed to large, continuous forested areas. Vegetative communities grade into each other in response to slope, aspect, and moisture condition, forming a mosaic pattern across the landscape.

At lower elevations, particularly along Roan Creek and its tributaries, irrigated lands composed primarily of grass/alfalfa meadows are common. Cottonwoods, willow, sagebrush and greasewood are also commonly found in riparian areas throughout the DAU. Other riparian species include boxelder, tamarisk, and alders. The southwest corner of the DAU is predominantly pinon-juniper woodlands interspersed with some sagebrush, rabbitbrush and greasewood.

The vegetation in the DAU has traditionally been managed for livestock forage. Cattle grazing occurs throughout the unit. Historically, domestic sheep were grazed in significant numbers, and are still a significant forager on the landscape. Human activities have strongly influenced the vegetation in D-41. Natural fire has been suppressed in the DAU for many decades, and pinon-juniper encroachment on the sagebrush steppe is a significant concern that is impacting wildlife populations by reducing habitat available to many sensitive wildlife species.

## Land Status

D-41 is nearly evenly split between public and private ownership (Figure 3, Figure 4). Public lands are managed jointly by the Grand Junction, Colorado River Valley, and White River Bureau of Land Management (BLM) Field Offices. Of the 642,000 acres of land in this DAU, approximately 330,000 are owned by the BLM and 310,000 acres are privately held. The CDOW's Squares S State Wildlife Area occupies just over 2100 acres in DAU D-41. Small portions are also owned by the Bureau of Reclamation and Colorado State Parks.

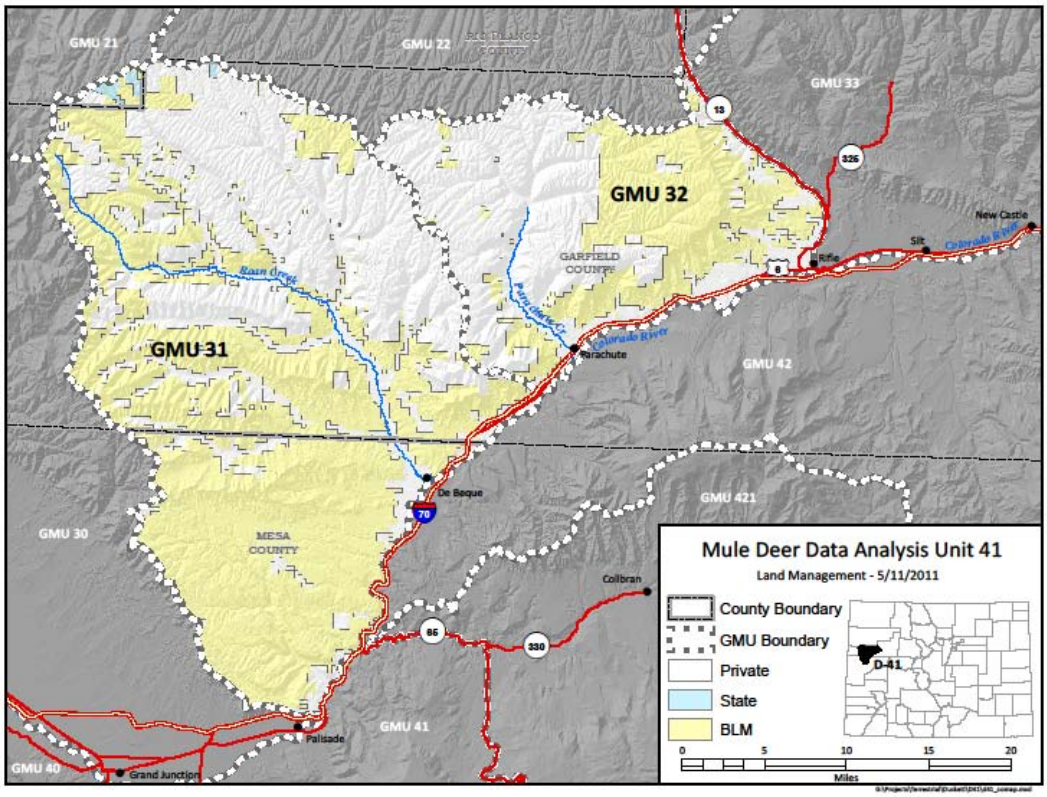



Figure 3. Map of land ownership in DAU D-41.

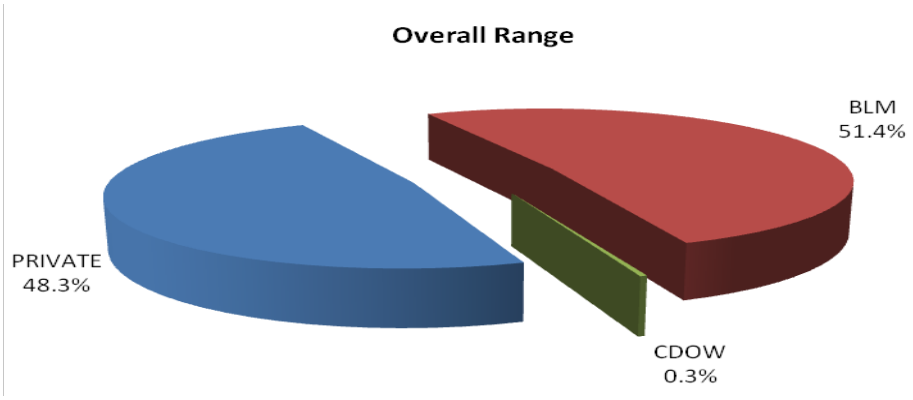



Figure 4. Proportionate land ownership in DAU D-41

## Land Use

Because of the wide range in elevations and dramatic variations in topography, there are a variety of uses occurring across the landscape. The primary uses are energy development and agriculture, primarily livestock grazing.

### Energy Development

The predominant use across the landscape in this DAU is energy development. There are significant deposits of oil and natural gas beneath DAU D-41 and are being developed at an unprecedented level. The impacts of energy development are discussed in more detail under the Habitat Condition and Capability section.

### Agriculture

Agriculture is still a primary land use in this DAU. Livestock grazing and crop production are still important activities. Cattle are the predominant grazers, although some flocks of sheep are still found in smaller numbers. Most public lands have seasonal grazing allotments. Private lands owned by energy companies are frequently grazed by private lessees. Many producers summer their animals at higher elevations in the DAU and winter them in the lower elevations.

Hay production and grazing are common land uses in lower elevations, particularly along Roan Creek. There has been some conversion of alfalfa fields, which provided valuable winter forage to deer, to hay, which is far less beneficial. Some residents of the Roan Creek area cited this conversion as a contributing factor in the decline of the deer herd.

### Residential Housing

There are four main population centers in this DAU; the towns of Palisade, Debeque, Parachute, and Rifle, are all found along the southern boundary of the DAU. There is increasing development in these areas, resulting in some decrease in deer winter range. There is very little residential development in the interior of the DAU or along the northern boundary. Much of the private land in the DAU is owned by large energy companies or large, single landowners that benefit from maintaining the land in a natural, contiguous sate. For these reasons, it is unlikely that housing will significantly impact deer winter range.

### Recreation

Much of the recreation in D-41 is associated with hunting. Some non-hunting recreation, including OHV use, camping, hiking, biking, occurs on public lands in the DAU. The southwestern boundary of the DAU, in particular, experiences a great deal of non-consumptive use by horseback riders and OHV users. OHV use is particularly increasing in the Winter Flats area and has the potential to adversely impact wintering deer. Fishing is limited to some of the larger perennial streams and is not a significant use on the landscape. The BLM has recently implemented a travel management plan on the Roan Plateau which restricts motorized travel to designated routes. This plan has substantially decreased motorized access into drainage bottoms, benefiting deer throughout the year.

During the fall, big game hunting is a major event in the DAU. Each year, nearly two thousand elk hunters and over one thousand deer hunters hunt in GMUs 31 and 32. Hunting is a significant economic contributor in both Mesa and Garfield counties. Direct expenditures for deer hunting alone are approximately $3.5 million in Mesa County and $5.7 million in Garfield County (Pickton 2011). Projections based on proportionate land mass of D-41 in these two counties suggest that deer hunting in D-41 brings in approximately $1.72 million to local communities.

# HABITAT RESOURCE

## Habitat Distribution

### Deer Overall Range

Deer utilize the nearly entire landscape of D-41 during different portions of the year, with the exception of the largest human population centers (Figure 5). Utilization changes seasonally with elevation. At lower elevations, densities are generally lower during the summer and higher during the winter, when heavy snows force deer onto more accessible winter ranges. Higher elevations experience higher deer densities during the summer fawning months when the land is accessible and forage is plentiful.

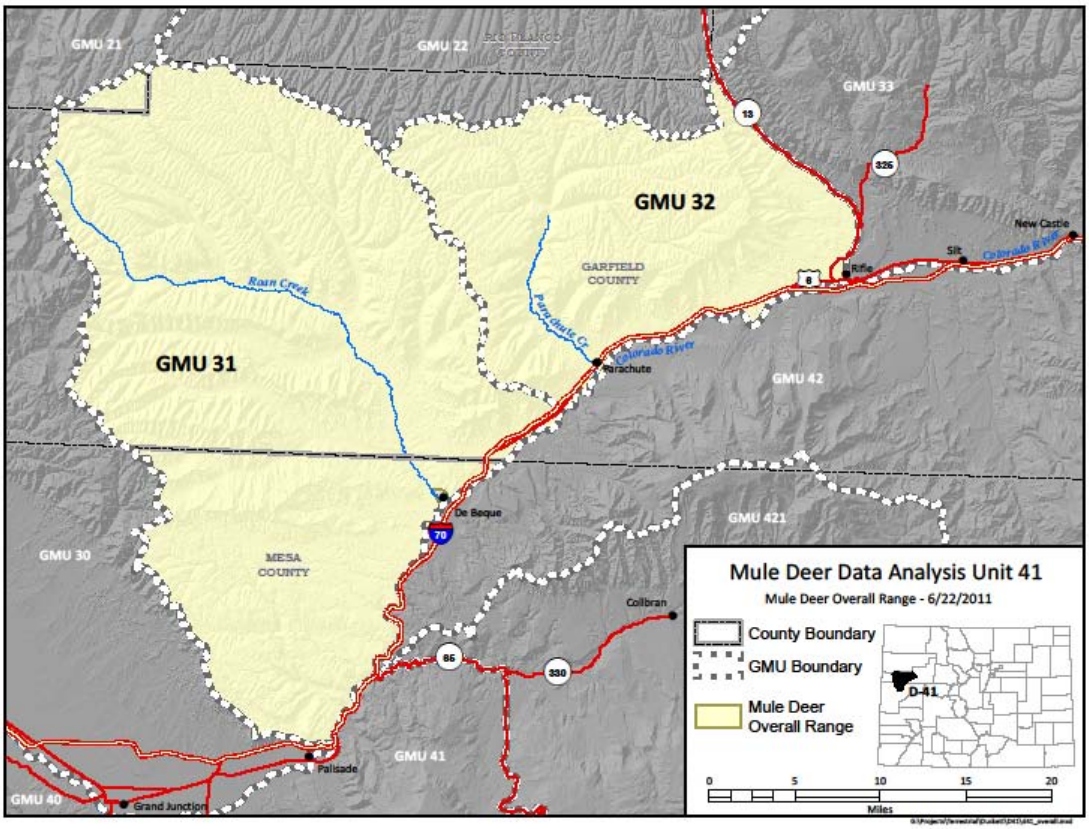



Figure 5. Deer overall range in DAU D-41.

## Deer Summer Range

The upper reaches of the Roan and Parachute drainages and the Roan Plateau are the primary summering areas. Deer summer at the highest elevations of the DAU where forage is of high quality, temperatures are cooler and fawning habitat is plentiful (Figure 6). Of the over 1000 square miles of deer habitat in DAU D-41, 584 square miles is summer range. Summer ranges are generally characterized by aspen stands intermixed with mountain shrub and generally have a healthy forb component.

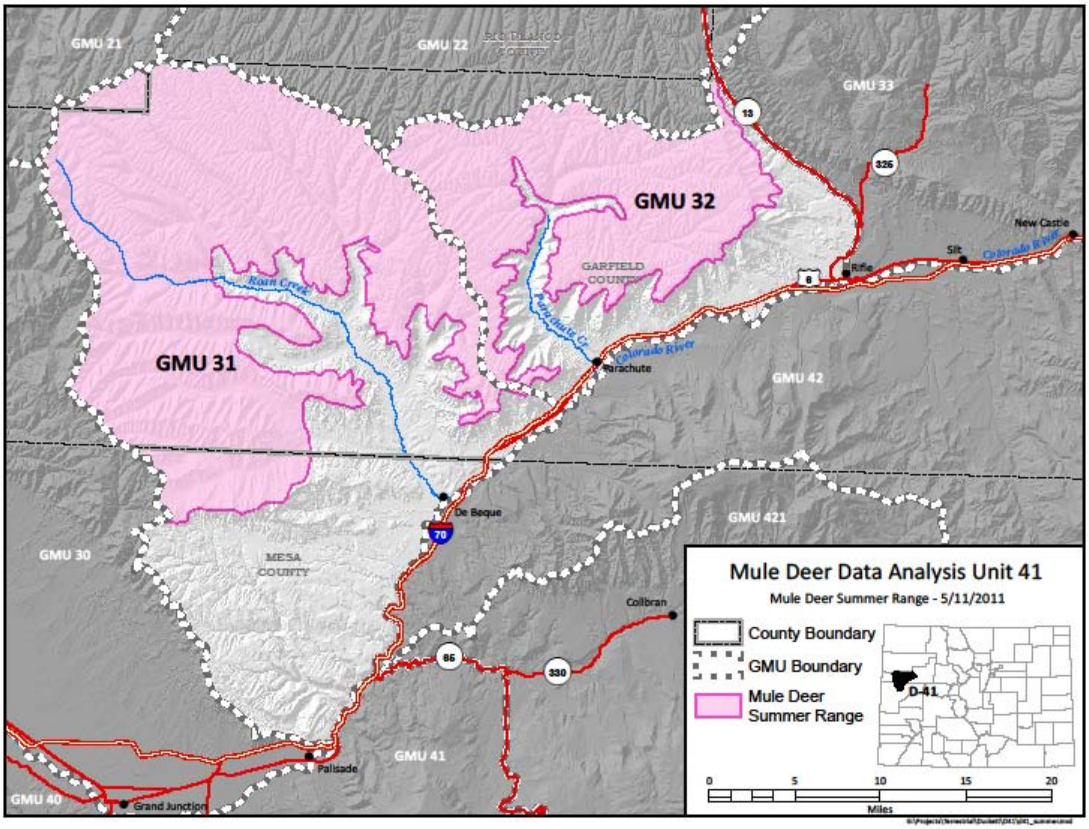



Figure 6. Deer summer range in DAU D-41.

## Deer Winter Range

Deer winter at the lowest elevations of the DAU, where snow levels are the lowest and temperatures more moderate. The primary wintering areas for deer in D-41 include lower Roan and Parachute Creeks, Webster Mesa and Winter Flats. These are predominantly pinon-juniper woodlands intermixed with sagebrush parks. These areas provide both forage and shelter during the most critical months of the year. There are approximately 480 square miles of winter range in DAU D-41. Of those 480 square miles, approximately 185 square miles are winter concentration areas. These areas are defined as "*that part of the winter range where densities are at least 200% greater than the surrounding winter range density during the same period used to define winter range in the average five winters out of ten.*"

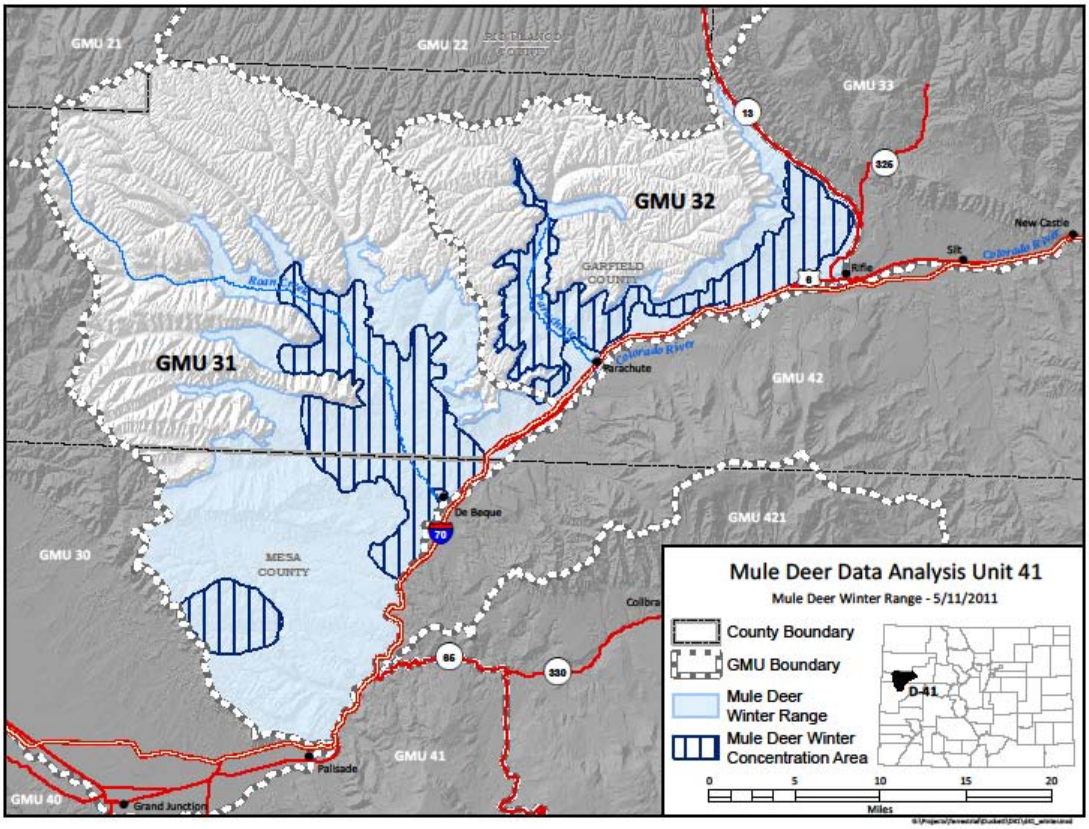



**Figure 7. Deer winter range and winter concentration areas in DAU D-41.**

## Seasonal Land Ownership

Land ownership in D-41 varies somewhat on deer summer and winter ranges, although the land is still shared primarily between BLM and private owners. Unlike most areas in western Colorado, however, the majority of winter range is under public management, while private landowners hold the majority of summer range (Figure 8)

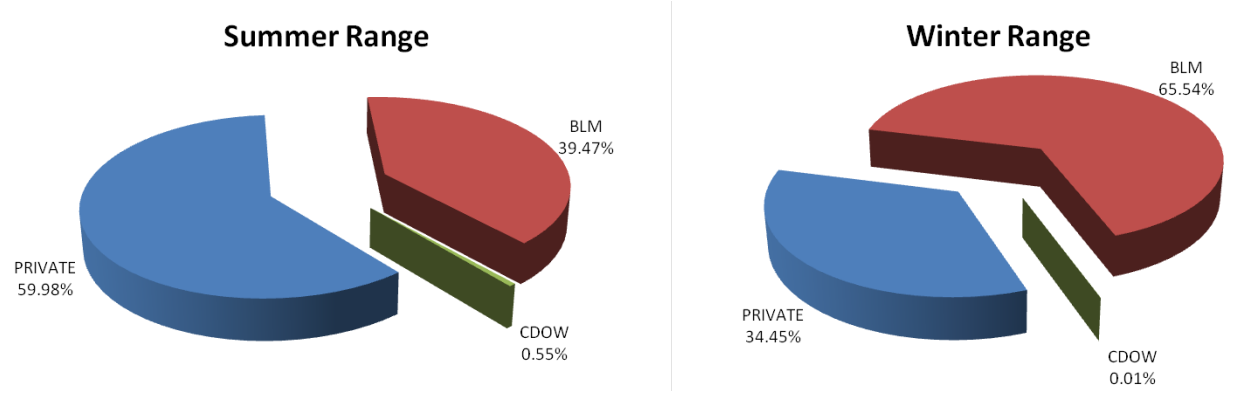



**Figure 8. Landownership in summer vs. winter range in DAU D-41.**

# HABITAT CONDITION AND CAPABILITY

## Condition of Mule Deer Range

The current conditions of mule deer ranges vary considerably across the DAU and across elevations, but mule deer habitat is in generally poor condition due to long-term drought, habitat loss, fragmentation, and activity associated with natural gas development. Generally, high elevations that have not been lost to energy development are in good condition.

Lower elevation ranges tend to be in relatively worse condition, generally attributable to historic grazing practices, drought, and non-native species invasion. Unfortunately, these lower elevation areas are important deer winter ranges that support deer during the leanest times of the year. Sage flats and pinon-juniper woodlands, areas that are crucial to deer in the winter, are in the worst condition, particularly in the southwest and southeast corners of the DAU. Poor range condition, coupled with significant development and disturbance on winter ranges, cannot support a productive deer herd.

Like most of western Colorado, invasive weeds are an issue at all elevations. These species generally outcompete native species and rarely provide the nutritive value upon which deer rely throughout the year. Cheat grass has predominated over native perennials in many low elevation areas. Musk and bull thistle, whitetop, houndstongue, Russian and diffuse knapweeds are also found in the DAU. Diffuse knapweed is a priority species and its control is among the top three priorities for the BLM Grand Junction Field Office (Lincoln, et al 2004). Weed treatments on both large and small scales are ongoing throughout the DAU on BLM lands.

There have been some low elevation vegetative treatments to improve the vigor of older age class stands of sagebrush. Unfortunately, due to drought, many of these have resulted in an increase in the predominance of cheat grass. One exception, a roller chop on the southwest end of the DAU near Winter Flats improved the native understory of grasses and forbs and reinvigorated the sagebrush overstory.

Additionally, private landowners have been proactive in improving higher elevation summer ranges in an effort to benefit deer, elk, and sage-grouse. Over 15 miles of road closures, over twenty water developments, and nearly 2000 acres of deferred livestock grazing have improved forage conditions. Over 100 acres of encroaching pinon-juniper have been hydro-axed, and approximately 1000 acres of prescribed burns are in the planning stages. The prescribed burns are intended to improve the vigor of aging aspen stands.

Long-term drought has most likely been the major factor in the decline of this deer herd. The 1990 license number objective sheet notes that the population is below objective and is not growing due to drought.

In addition to the decline in habitat quality through drought, there has been direct and indirect loss of habitat due to energy development. The combination of these two impacts has reduced the carrying capacity of the DAU and has limited the ability to manage the deer at or near the current population objective. With virtually no antlerless licenses in nearly 20 years, the population has shown some recovery, but is well below the population objective.

## Impacts of Energy Development

There are significant natural gas reserves underneath DAU D-41. It is estimated that there are approximately 8.9 trillion cubic feet (TCF) of natural gas underneath in the eastern portion of GMU 32 alone. Of these reserves, approximately 4.2 TCF are under the top of the Roan Plateau (deer summer

range) and another 4.7 TCF are under the lands below the rim, including cliffs (deer winter range). In this area, extraction of 90% of the estimated resources will require up to 1,570 new wells over the course of 20 years. Of these wells, 210 will be on the Roan Plateau in deer summer range, and 1,360 will be below the Roan Plateau on deer winter range. Overall, these wells will likely require 193 pads. Many more wells and pads are planned across DAU D-41, but the planning has not been nearly as comprehensive and the relevant data are not readily available for these areas.

Both deer summer and winter ranges on public and private lands across the DAU are being developed to access the natural gas (Figure 9). The most significant activity to date has been in GMU 32, particularly in the eastern portion. However, applications to drill are increasing and major developments are planned In Mesa County, 45 drilling permits were issued during the first quarter of 2011. During that same time period, 390 permits were issued in Garfield County. Only Weld County had more permits issued during that period.

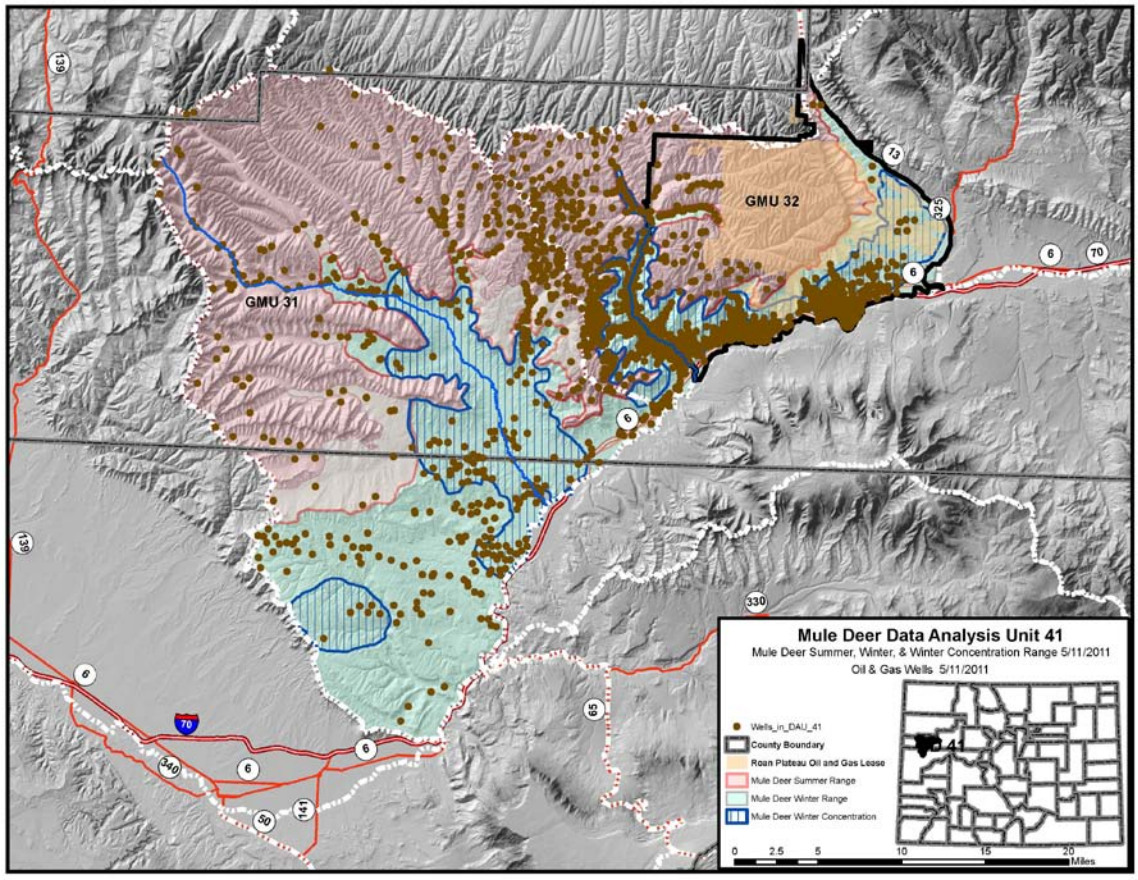



**Figure 9. Oil and gas wells and BLM mineral leases in DAU D-41.**

Numerous studies have documented negative impacts to mule deer by human activity (Hebblewhite, et al. 2008). Conversion of deer winter range into natural gas developments, can affect the habitat selection and distribution patterns of mule deer (Sawyer, et al, 2009). Although more research is necessary to confirm, it is likely that displacement of deer from native winter ranges to less desirable ranges in response to natural gas development has the potential to adversely impact survival, reproduction and recruitment (Sawyer, et al, 2006).

In an effort to minimize and mitigate the impacts of this development, the BLM has developed a Resource Management Plan for the Roan Plateau. By emphasizing directional drilling and tightly controlling development, the plan allows for maximum natural gas recovery while protecting fish and wildlife habitat, water resources and scenic views.

Key aspects of the plan include:

- Clustered, phased drilling
- Surface disturbance on top of the plateau is limited to about one percent of the area at any one time – which means no more than 350 acres total of drill pads, new access roads, pipelines and other areas of surface disturbance. Previous areas disturbed must be satisfactorily reclaimed before development would be approved for new acres.
- A single oil and gas operator will conduct all natural gas operations on behalf of all lessees under a federal unit, which allows BLM greater control of how, when and where development takes place.
- Oil and gas development will be restricted to the high ridges on the plateau and staged over time, with one ridge being developed and reclaimed before moving to the next
- More than 50 percent of the area on top and below will have “no surface occupancy” stipulations, meaning no surface disturbance.
- Habitat fragmentation will be greatly reduced because wells will be clustered on multi-well pads not closer than one-half mile apart on top of the plateau, resulting in a maximum surface density of one pad per 160 acres on top.
- This approach allows for the recovery of 90 percent of the estimated 8.9 trillion cubic feet of federal natural gas under the Roan Plateau Planning Area.

Although the BLM is able to regulate development on public lands, and has been proactive in reducing impacts to wildlife, there is very little regulation to ensure best management practices, or any mitigation measures for wildlife are followed on private lands. .

It is likely that energy development will continue to impact the deer in DAU D-41 for the foreseeable future. Adaptive management strategies must be developed and implemented to most effectively handle these impacts and ensure the long-term sustainability of this herd.

## Conflicts

There is very little conflict between deer and domestic livestock in DAU D-41 due to the low population size of the deer herd and little dietary overlap. There are occasional small issues with deer foraging in alfalfa fields, but these are very minor and rarely result in game damage claims. There are no areas within the DAU that are of concern due to over-utilization by deer.

Competition with elk, however, may be affecting the deer in D-41. The elk herd that overlaps the deer range in DAU D-41 (DAU E-10) has grown dramatically; from approximately 4,000 elk in 1980, to nearly 12,000 in 2010. This increase in elk numbers mirrors the decline in deer numbers (Figure 9). Although DAU E-10 (GMUs 30, 31, 32, 21 and 22) incorporates a much larger area than just D-41, the increase in population has been relatively proportionate across the landscape and the increase can be extrapolated to the more limited areas of D-41. PLO cow elk licenses were first issued in GMUs 22, 32, and 31 in 1990 to help "concentrate and increase elk harvest in those areas where elk are numerous".

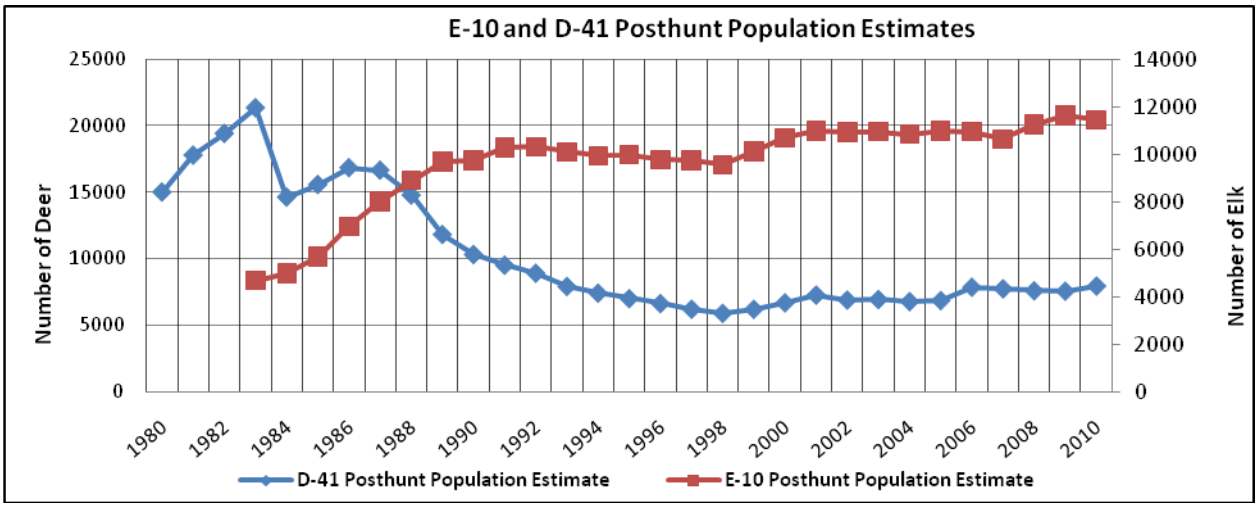



Figure 10. Deer and elk population estimates in D-41 and E-10.

Considering the increase in elk numbers, loss of habitat, and long-term drought, it is likely that these elk have impacted the deer herd. Dietary overlap is most significant during spring and summer, when forbs are a primary component of both species diet (Beck, et al 2005). This overlap in forage selection occurs at the same time that fawning and calving occur. This high elevation habitat has been disproportionately impacted by energy development. It is possible that increased elk numbers, coupled with direct and indirect loss of fawning and summer habitat, have contributed to the decline and stagnation of this herd.

# HISTORICAL HERD MANAGEMENT

## Prologue

The total number of animals in a big game population fluctuates throughout the year. Normally, the population peaks in the spring just after birth of the young. Populations then decline throughout the year as natural mortality and hunting seasons take animals from the population. Traditionally, the CDOW uses post-hunt populations (immediately after conclusion of the last hunting season) as a frame of reference when we refer to the size of a population of deer. In this manner we have established a reference point and can eliminate confusion when referring to populations.

Realistically, deer population objectives are determined by taking into account many different variables to arrive at a final population objective number. Some prominent variables include biological data, political and economic considerations, recreational interests, domestic livestock concerns, and vegetative capabilities. Population objectives are often set at a level consistent with the herd's maximum sustained yield (MSY). However, it is very difficult to determine the MSY and carrying capacity for any given area and herd (see Appendix A for a brief summary of the concept of MSY and carrying capacity).

Post-hunt population size estimates in this plan have been generated by computer models referenced in the Introduction and Purpose. These population estimates are just that: estimates, and are used primarily to identify trends and issues of major concern. A brief discussion concerning population assessment is contained in a *Population Assessment Procedure Overview*.

## Population Assessment Procedure Overview

Estimating populations of wild animals over large geographic areas is an extremely difficult and inexact science. Our current method of determining deer populations is based upon population models, which integrate measured biological factors into a computer generated population simulation. The biological factors incorporated in these models include post-hunt sex and age ratios data taken from winter helicopter surveys, hunter harvest information, measured survival rates, estimated wounding loss, illegal kill, and other information from field observation. The surveys provide baseline information which is used to align the models. When better information becomes available, such as new estimates of survival rates, wounding loss, density estimates, or new modeling techniques and programs, the CDOW reserves the right to use this new information and the new techniques. Making these changes may result in significant changes in the population estimate. It is recommended that the population estimates presented in this document be used only as an index or as trend data. They represent CDOW's best estimate of populations at the time they are presented.

## Post-hunt Population Size

In DAU D-41, population models have been used the early 1970's to estimate the number of deer in the herd. These early models were rough and experimental in nature. The first computer modeling program was called ONE POP. Modeling methods were improved in the 1980's with the introduction of the POP II models, which were used until 1999. In 2000, modeling techniques were updated again with the introduction of spreadsheet-based models. Spreadsheet models were standardized statewide in 2008 using modeling methods developed by White and Lubow (2002). All models work in basically the same manner based on annual harvest data, mortality estimates, initial population size, sex ratio at birth, and wounding loss.

Deer populations in D-41 have generally been declining since the 1980's, but the most dramatic losses were during the early 1990's (Figure 6). Since 1998, the population has recovered from a low of 5,913 to 7,963. Although this is an increase of over 30%, the population is still less than half of the highest levels seen in the early 1980's.

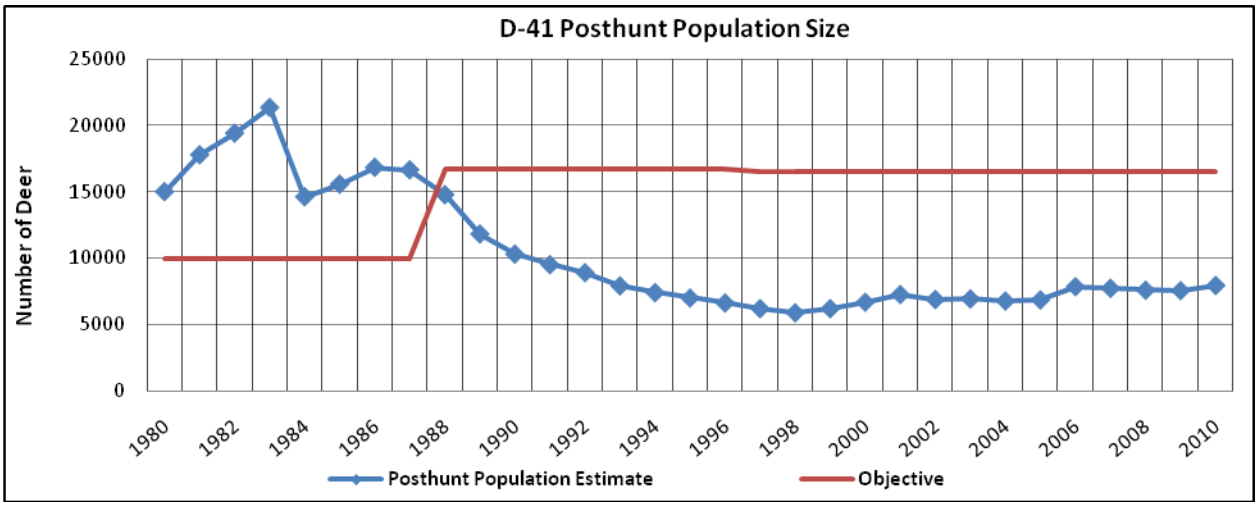



Figure 11. Posthunt population size and objective in D-41.

It is likely that habitat and climatic conditions are most responsible for this decline. The objective sheet in 1990 specifically cites drought as the reason for the population being below objective and failing to recover.

The population objectives set in the 1980's resulted from the best model estimates at the time, and reflects the desire to increase population size to much higher historic levels. It is likely that the population size at that time was at or near habitat carrying capacity. Landscape scale changes in habitat, including significant development of oil and gas resources and long-term drought, have likely dramatically decreased the number of deer that the habitat in D-41 can support. The current population size objective, while once a feasible goal, is probably not within reach of this herd.

## Post-hunt Herd Composition

### Fawn: Doe Ratios

Posthunt fawn: doe ratios are indicators of how successful the reproduction was for the spring and how well fawns survived into December. This is a critical indicator of the condition of the herd. Good fawn production indicates a strong, healthy herd, while low production may show poor or declining herd health. Generally, fawn production at 75 – 85 fawns: 100 does indicates a growing herd. Fawn ratios below 60 fawns: 100 does indicate a decreasing population.

Since 1980, the fawn: doe ratios have fluctuated in D-41, but have averaged above 60 fawns: 100 does since 2005(Figure 7).

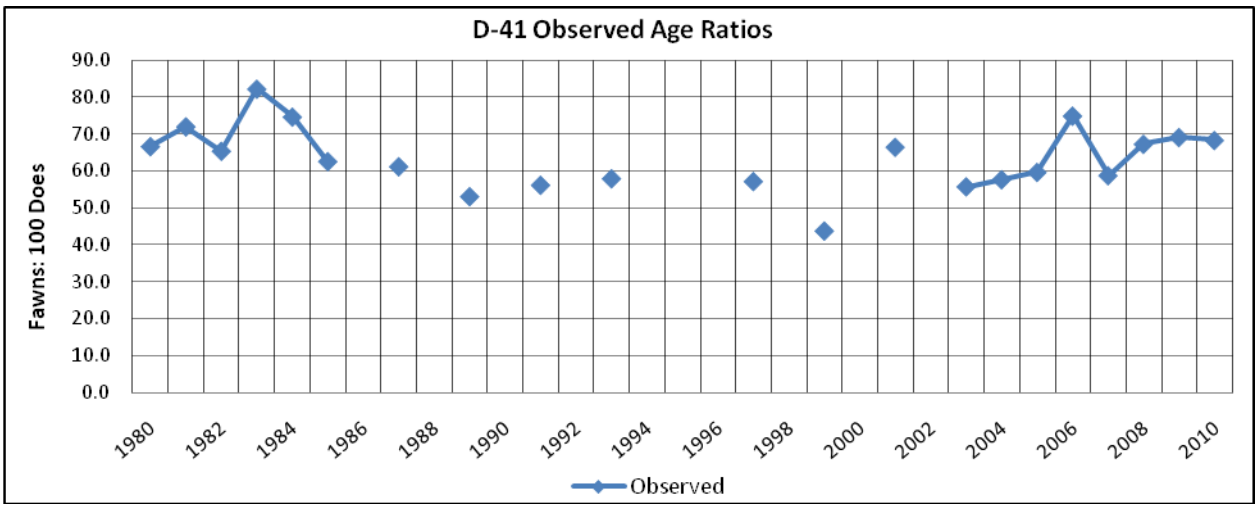



Figure 12. Fawn: Doe Ratios in DAU D-41.

Fawn production was relatively low from the mid-1980s through the mid-2000s, dropping as low as 43.8 fawns: 100 does in 1998. These years of poor production are reflected in the population decline. Fawn: doe ratios since 2005 have averaged 66.4 fawns: 100 does. The slow increase in the population mirrors this small improvement in production.

## Buck: Doe Ratios

Generally, buck: doe ratios above 10 bucks: 100 does are sufficient to ensure good reproduction. Higher buck: doe ratios provide for larger, older-age class animals and better quality of harvest. Buck: doe ratios in D-41 have mimicked the season structure. During the 1980's and 1990's, antlered licenses were not limited and seasons were quite liberal. Buck: doe ratios were generally below 20 bucks: 100 does. Since 1999, however, all antlered licenses have been limited, and buck: doe ratios have responded accordingly, averaging 27 bucks: 100 does for the last 5 years. There has been increasing interest in the improved buck quality, and strong support for further increases in the buck: doe ratio.

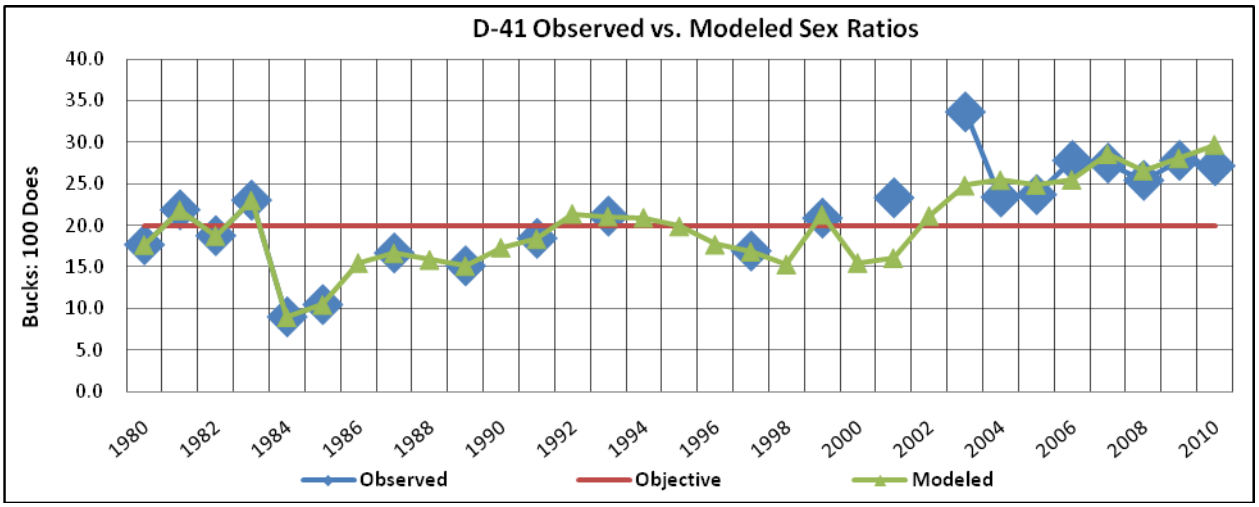



Figure 13. Buck: Doe Ratios in DAU D-41.

## Harvest History

Harvest history in D-41 was quite high during the times of highest population levels and dramatically lower since the dramatic declines of the 1990's (Figure 14). Since the late 1990's, approximately 400 bucks have been harvested each year, and there has been minimal or no antlerless harvest in that time. Prior to the dramatic crash in the early 1990's, there was liberal antlerless harvest, and a late season on the eastern edge of the unit to assist with damage prevention.

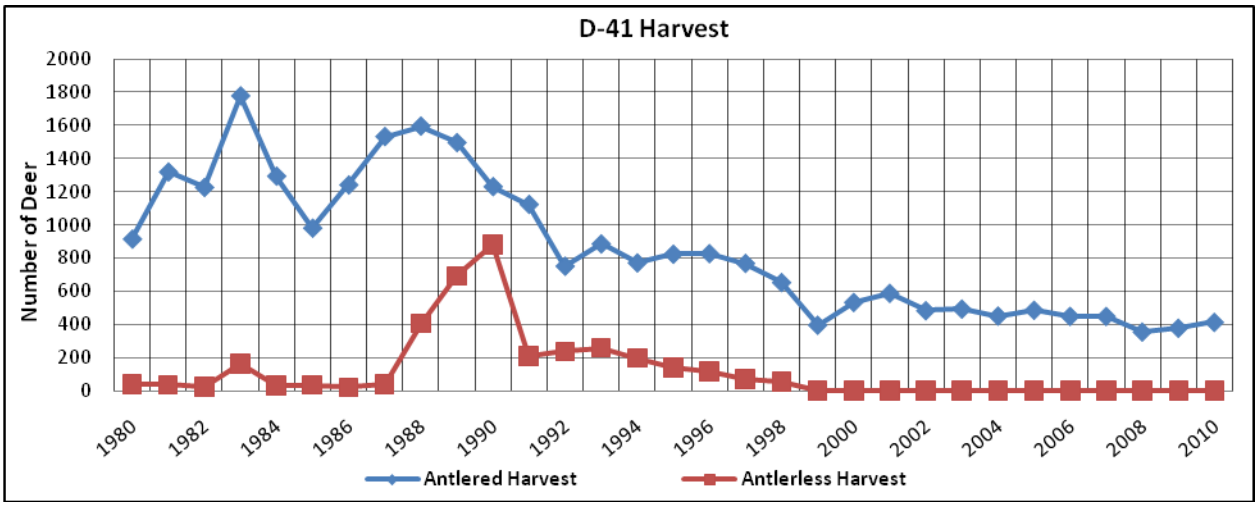



Figure 14. Deer harvest in DAU D-41.

## Hunting Pressure and Hunter Numbers

Because all deer licenses in D-41 are limited, there is very little concern about pressure and crowding by deer hunters. However, elk licenses are quite liberal, and archery, and 2nd and 3rd season licenses are not limited and are available over-the-counter. For this reason, there is some concern over crowding and pressure in the area. Since 2000, the number of elk hunters has averaged nearly 8000 individuals annually. During the same time period, the number of deer hunters has averaged only 850 individuals each year.

# CURRENT HERD MANAGEMENT

## Current Population and Composition Objectives

The current management objectives were selected by CDOW staff in 1997. There was no public DAU planning process. The current population size objective is 16,500. This objective was based on then-current population size estimates and a desire to return the population size previously higher levels. Current modeling techniques estimate that there were approximately 6,200 deer in D-41 in 1997. The population has been virtually stagnant in that time and has never approached the population size objective. The current sex ratio objective is for 20 bucks: 100 does and was selected to provide maximum hunting opportunity. Classification surveys in 2010 observed 27.2 bucks: 100 does in D-41. This is higher than the objective, but there is significant internal and external demand for higher buck: doe ratios and better quality harvested animals.

## Harvest Management

### Antlered Licenses

Antlered harvest has been relatively stable since the early 2000's. Less than 1,000 licenses have been issued annually since 2005, and approximately 400 antlered animals are harvested each year. This conservative harvest strategy was implemented as part of statewide policy in 1999 in response to the dramatic declines in the mule deer population across the state.

### Antlerless Licenses

There have been no antlerless licenses issued in DAU D-41 since 1998. In 1999, all antlerless and either-sex licenses were eliminated in an effort to curb the population decline. Antlerless license numbers were quite low until the late 1980's, when a more liberal management strategy increased the availability dramatically. These license numbers were quite high for several years, then decreased in 1991 due to population decline.

# PUBLIC INVOLVEMENT

## Issue Solicitation Process

The most important aspect of the DAU planning process is obtaining input from all segments of the affected local populations, including land management agencies, local residents, stakeholder groups, and local governments.

In an effort to solicit information from the interested public, the CDOW help public meetings in Parachute, Debeque, and Grand Junction in May 2011, to gather input on the goals and objectives of the DAU plan. CDOW staff requested input from and met with BLM staff and Mesa and Garfield Boards of County Commissioners.

Letters were sent to interested stakeholders, including Colorado Farm Bureau, Colorado Cattleman's Association, Colorado Wool Growers Association, Colorado Mule Deer Association, Mule Deer Foundation, Colorado Outfitters Association, and Rocky Mountain Elk Foundation.

The text of all comments received can be found in the Appendices of this document.

## Significant Issues

### Low Population Size

The small and stagnant population size, in relation to historically high levels, was the most frequently cited concern among questionnaire respondents.

### Energy Development

Energy development and the direct and indirect impacts were frequently identified as a significant concern among most stakeholders. This issue is of significant internal concern as well, and efforts to work with land management agencies and leaseholders to minimize and mitigate the impacts of energy development on deer are ongoing.

### Quality and Quantity of Deer Habitat

Many members of the public were concerned about the loss of quality habitat for deer in D-41. Energy development, over-grazing by livestock, loss of winter range, and fire suppression were all cited as the causes of the decreased availability of deer habitat.

### Improving buck: doe ratios

There was strong public demand for improved buck: doe ratios and either a quality or trophy management strategy. Few people expressed interest in maintaining high numbers of licenses to continue providing hunting opportunity.

## ALTERNATIVE DEVELOPMENT

Three alternatives were suggested to interested stakeholders during the DAU planning process. Although these alternatives were used as starting points for discussion, participants were strongly encouraged to present other ideas if they felt they were more appropriate. Generally, the three alternatives were based on the current modeled estimates and observed data. For both the population size and composition objectives, alternatives were presented that would increase, decrease or maintain the status quo.

There was strong public demand for more deer and more bucks. Therefore, we selected a range of 6,500 – 8,500 deer and 25 – 30 bucks: 100 does as the preferred management objectives. These preferred alternatives were presented to the Parks and Wildlife Commission in March 2012 and approved in April 2012.

### Post-hunt Population Size Alternatives

The post-hunt population size determines the total number of animals within a given herd.

***Alternative 1: 5,500 – 7,500 deer***

This alternative would result in a decrease in population size of approximately 20% from the 2010 post-hunt population estimate. In an effort to achieve this objective, it is likely that antlered license numbers would be increased and antlerless licenses would be introduced to bring the population size to within the objective range.

***Alternative 2: 6,500 – 8,500 deer***

This alternative would maintain the population size at approximately the same size as the 2010 post-hunt population estimate. Antlerless licenses could be introduced to maintain the population size within the objective range.

***Alternative 3: 7,500 – 9,500 deer***

This alternative would increase the population size approximately 10% from the 2010 post-hunt population estimate. License number reductions would be necessary in the short term, and it is unlikely that antlerless licenses would be introduced until some growth of the herd toward the middle or upper end of the objective range.

### Post-hunt Composition Alternatives

The post-hunt composition is the proportionate number of bucks within a population, and affects the quality of the harvest opportunity.

***Alternative 1: 20 – 25 bucks: 100 does***

This alternative would increase the current objective, but would result in a reduction of the buck: doe ratio by approximately 20%. There would be an increase in buck licenses in both the short- and long-term. The quality of bucks harvested would decline, as there would be fewer antlered animals on the landscape, and the resulting age structure would be younger. Hunting opportunities could be increased, and no preference points would likely be required to hunt in these units annually.

***Alternative 2: 25 – 30 bucks: 100 does***

This alternative would result in an increase in the current objective, but would maintain the buck: doe ratios at levels maintained in these units for roughly the last five years. License numbers would likely remain the same, and preference points would likely not be required to hunt during most seasons.

***Alternative 3: 30 – 35 bucks: 100 does***

This alternative would result in an increase in the total number of bucks in the population, and would improve the quality of bucks harvested. Antlered hunting opportunities would decrease to maintain more and larger bucks. It is likely that preference points would be required to hunt in this DAU.

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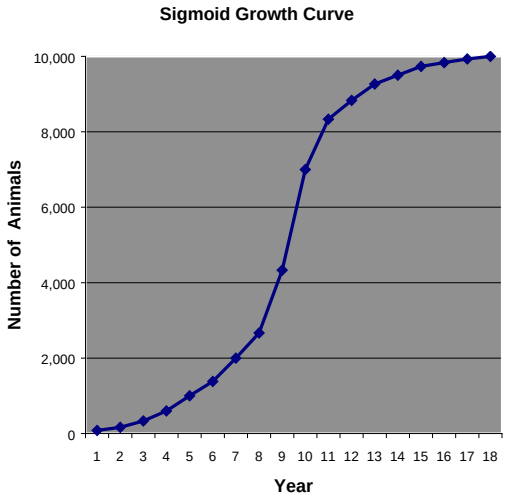
# APPENDIX A: POPULATION DYNAMICS, MAXIMUM SUSTAINED YIELD, AND DENSITY DEPENDENCE

Numerous studies of animal populations, including such species as bacteria, mice, rabbits, and white-tailed deer have shown that the populations grow in a mathematical relationship referred to as the "sigmoid growth curve" (right). There are three distinct phases to this cycle. The first phase occurs while the population level is still very low and is characterized by a slow growth rate and a high mortality rate. This occurs because the populations may have too few animals and the loss of even a few of them to predation or accidents can significantly affect population growth.



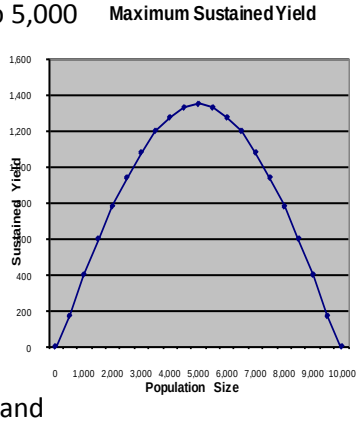

The second phase occurs when the population number is at a moderate level. This phase is characterized by high reproductive and survival rates. During this phase, food, cover, water and space are not a limiting factor. During this phase, for example, animals such as white-tailed deer have been known to successfully breed at six months of age and produce a live fawn on their first birthday and older does have been known to produce 3-4 fawns that are very robust and healthy. Survival rates of all sex and age classes are also at maximum rates during this phase.

The final or third phase occurs when the habitat becomes too crowded or habitat conditions become less favorable. During this phase the quantity and quality of food, water, cover and space become scare due to the competition with other members of the population. These types of factors that increasingly limit productivity and survival at higher population densities are known as density-dependent effects. During this phase, for example, white-tailed deer fawns can no longer find enough food to grow to achieve a critical minimum weight that allows them to reproduce; adult does will usually only produce 1-3 fawns; and survival of all deer (bucks, does and fawns) will decrease. During severe winters, large die-offs can occur due to the crowding and lack of food. The first to die during these situations are fawns, then bucks, followed by adult does. Severe winters affect the future buck to doe ratios by favoring more does and fewer bucks in the population. Also, because the quality of a buck's antlers is somewhat dependent upon the quantity and quality of his diet, antlers development is diminished. If the population continues to grow, it will eventually reach a point called "K" or the maximum carrying capacity. At this point, the population reaches equilibrium with the habitat. The number of births each year equals the number of deaths, therefore, to maintain the population at this level would not allow for any "huntable surplus." The animals in the population would be in relatively poor body condition, habitat condition would be degraded from over-use, and when a severe winter or other catastrophic event occurs, a large die-off is inevitable.

What does all this mean to the management of Colorado's big game herds? It means that if we attempt to manage for healthy big game herds that are being limited by density-dependent effects, we should attempt to hold the populations more towards the middle of the "sigmoid growth curve." Biologists call this point of inflection of the sigmoid growth curve the point of "MSY" or "maximum sustained yield." In the example below, MSY, which is approximately half the maximum population size or "K", would be 5,000 animals. At this level, the population should provide the maximum production, survival, and available surplus animals for hunter harvest. Also, at this level, range habitat condition should be good to excellent and range trend should be stable to improving. Game damage problems should be lower

and economic return to the local and state economy should be higher. This population level should produce a "win - win" situation to balance sportsmen and private landowner concerns.

A graph of a hypothetical deer population showing sustained yield (harvest) potential vs. population size is shown (right). Notice that as the population increases from 0 to 5,000 deer, the harvest also increases. However, when the population reaches 5,000 or "MSY", food, water and cover becomes scarce and the harvest potential decreases. Finally, when the population reaches the maximum carrying capacity or "K" (10,000 deer in this example), the harvest potential will be reduced to zero. Also, notice that it is possible to harvest exactly the same number of deer each year with 3,000 or 7,000 deer in the population. This phenomenon occurs because the population of 3,000 deer has a much higher survival and reproductive rate compared to the population of 7,000 deer. However, at the 3,000 deer level, there will be less game damage and resource degradation but lower watchable wildlife values.




Actually managing deer and elk populations for MSY on a DAU basis is difficult if not impossible due to the amount of detailed biological information about habitat and population size required. Additionally, carrying capacity is not static, the complex and dynamic nature of the environment cause carrying capacity to vary seasonally, annually, and trend over time. In most cases we would not desire true MSY management even if possible because of the potential for overharvest and the number of mature of bulls and bucks is minimized because harvest reduces recruitment to older age classes. However, the concept of MSY is useful for understanding how reducing densities and pushing asymptotic populations towards the inflection point can stimulate productivity and increase harvest yields. Knowing the exact point of MSY is not necessary if the goal is to conservatively reduce population size to increase yield. Long-term harvest data can be used to gauge the effectiveness of reduced population size on harvest yield.

Research in several studies in Colorado has shown that density-dependent winter fawn survival is the mechanism that limits mule deer population size because winter forage is limiting (Bartmann et al. 1992, Bishop et al. 2009). Adult doe survival and reproduction remain high but winter fawn survival is lower at higher population sizes relative to what the winter habitat can support. The intuition to restrict, or even eliminate, female harvest in populations where productivity is low and when populations are below DAU plan objectives is counterproductive and creates a management paradox. In that, for populations limited by density dependent processes, this “hands-off” type of management simply exacerbates and perpetuates the problem of the population being resource limited, and countermands the goals and objectives of the DAU plan. As Bartmann et al. (1992) suggest, because of density-dependent processes, it would be counterproductive to reduce female harvest when juvenile survival is low and increase harvest when survival is high. Instead, a moderate level of female harvest helps to maintain the population below habitat carrying capacity and should result in improved survival and recruitment of fawns. Increased fawn recruitment allows for more buck hunting opportunity and a more resilient population.

Thus, the key for DAU planning and management by objective is to set population objectives in line with what the limiting habitat attributes can support. A population objective range aptly set must be below carrying capacity.

# APPENDIX B: PUBLIC SURVEY ANALYSIS

## Questionnaire Analysis

**BACKGROUND INFORMATION**

1) Are you a resident of Colorado?

__**14**___ Yes __**2**___ No

***The majority of respondents are residents of Colorado.***

2) Do you live in D-41?

__**8**___ Yes __**8**___ No If yes, how many years? ___**29.4**_____

***Half the respondents live in D-41. Of those that live in D-41, the average length of residence is 29.4 years.***

3) Do you own or lease property in D-41?

__**9**___ Yes __**7**___ No If yes, how many years? ___**21.5**_____

***More than half the respondents own or lease property in D-41. Of those that own or lease property in D-41, the average length of ownership/lease is 19.8 years.***

4) What groups represent your interests in deer management in DAU 41? (Check all that apply)

__**8**__ Rancher/Farmer/Landowner
__**1**__ Business Owner
__**3**__ Guide/Outfitter
__**14**__ Hunter/Sportsperson
__**4**__ Environmentalist/Conservationist
__**0**__ Other, please explain _____

***Of the sixteen respondents, a strong majority of respondents identify themselves as hunter/sportsperson. Half the respondents identify themselves as rancher/farmer/landowner. Fewer numbers of individuals identify themselves as business owners, guide/outfitters, or environmentalist/conservationists.***

5) If you checked more than one response above, write the letter corresponding to the interest group which best represents your opinions __**4**__

***Of the twelve respondents, seven identify hunter/sportsperson as the interest group which best represents their opinions.***

**DEER MANAGEMENT**

1) How would you like the deer population in D-41 to change?

__**0**___ Decrease
__**1**___ Stay the same
__**15**__ Increase
__**0**___ Don't know

***Of the fifteen respondents, fourteen want the deer population to increase.***

2) The population is currently significantly below the population objective. How would you like the deer population objective in D-41 to change?

__**0**___ Decrease
__**5**___ Stay the same
__**11**__ Increase
__**0**___ Don't know

***Over two-thirds of respondents want the population objective to increase, while less than one-third wants the population size objective to stay the same.***

3) How would you like the number of buck deer in D-41 to change, if at all?

__**0**__ Decrease
__**6**__ Stay the same
__**8**__ Increase
__**1**__ Don't know

***A majority of respondents want the number of bucks in D-41 to increase. A minority of respondents want the number of bucks in D-41 to stay the same.***

4) The objective for buck deer is currently 20 bucks: 100 does. How would you like the objective for the number of buck deer in D-41 to change, if at all?

__**0**__ Decrease
__**9**__ Stay the same
__**7**__ Increase
__**0**__ Don't know

***A majority of respondents want the buck: doe objective in D-41 to stay the same. A slight minority of respondents want the buck: doe objective in D-41 to increase.***

**PEOPLE AND DEER**

1) Please indicate how concerned you are about each of the following in D-41.

| | | No Concern.....Very Concerned | | | | |
|---|---|---|---|---|---|---|
| a | Deer/vehicle collisions | 1 | 2 ***2.7*** | 3 | 4 | 5 |
| b | Economic losses due to damage to range, crops, fences | 1 ***1.6*** | 2 | 3 | 4 | 5 |
| c | Deer competition for livestock forage | 1 ***1.9*** | 2 | 3 | 4 | 5 |
| d | Damage to trees, shrubs, & gardens by deer | 1 ***1.3*** | 2 | 3 | 4 | 5 |
| e | Loss of deer habitat due to residential development | 1 | 2 | 3 | 4 ***4.1*** | 5 |
| f | Loss of deer habitat due to energy development | 1 | 2 | 3 | 4 ***4.3*** | 5 |
| g | Revenue deer hunting provides to local businesses | 1 | 2 | 3 ***2.9*** | 4 | 5 |

***The greatest concern was expressed over the loss of deer habitat due to energy development, and only slightly less concern was expressed over the loss of deer habitat due to residential development. There was slightly less concern over the revenue that deer hunting provides to local business, and little concern about deer/vehicle collisions, game damage, competition with livestock, and damage to ornamental plants.***

2) In D-41, have you been personally affected by any of the concerns listed in the above question?

***Ten of the thirteen respondents had been affected by one of the above concerns. Of those, four had been affected by F (loss of deer habitat to energy development); 2 had been affected by G (revenue deer hunting provides); and one each had been affected by A (deer vehicle collisions), D (damage to ornamental plants) and E (loss of deer habitat to residential development).***

3) How do you personally feel about deer in D-41? **(CHECK ONE)**

__**0**__ I do not enjoy the deer in D-41, AND regard them as a nuisance.
__**2**__ I enjoy the deer in D-41, BUT worry about the problems they cause.
__**14**__ I enjoy the deer in D-41 AND do not worry about the problems they cause.
__**0**__ I have no particular feelings about deer in D-41.

***Fourteen of sixteen respondents enjoy the deer and don't worry about the problems they cause. Two respondents enjoy them, but worry about problems.***

**DEER HUNTING**

1) Have you ever hunted deer in D-41?

__**11**__ Yes If yes, how many years? __**10.2**___ average

__**5**___ No If yes, which GMU? GMU 31 __**3**_ GMU32_**2**_ Both GMUs__**4**__

***Eleven respondents had hunted in D-41 for an average of 10.2 years, while 5 had not hunted in D-41. Three respondents had hunted only GMU 31, two respondents had hunted only GMU 32, while four had hunted both GMUs.***

2) To what extent have you felt crowded by other hunters while deer hunting in D-41? **(CHECK ONE)**

__**0**___ Extremely crowded

__**3**___ Moderately crowded

__**4**___ Slightly crowded

__**5**___ Not at all crowded

***The respondents were almost evenly split in how crowded they felt in D-41. However, the majority indicated that they did not feel at all crowded.***

3) Please rate the quality of deer hunting opportunities available in D-41? **(CHECK ONE)**

___**6**___ Poor

___**4**___ Fair

___**4**___ Good

___**0**___ Excellent

***The majority of fourteen respondents indicated that deer hunting opportunities were fair or poor. A small minority rated them as good.***

4) Which ONE factor is the MOST important to you when deer hunting in D-41? **(CHECK ONE)**

__**1**___ Not seeing other hunters

__**9**___ Obtaining game meat

__**4**___ Harvesting a trophy deer

__**2**___ Opportunity to hunt every year

***The majority of sixteen respondents indicated that obtaining game meat was the most important factor to them when hunting D-41. Harvesting a trophy deer was a far second, and the opportunity to hunt every year and not seeing hunters were most important factors to 2 and 1 hunter, respectively.***

## Text of Written Comments

D-3

I have only hunted in GMU 32 1 year for deer because there is not that many mature bucks, the reason being everybody is shooting immature bucks, so quality of deer will never be. Need to work on habitat for them would help. Livestock is another thing, sheep are allowed to be turned in before cattle by 1 month when fawns are little and should not be disturbed. Also have been elk hunting on the Plateau in November and sheep are still up there, when they should be gone Oct 15 just like cattle, they destroy way more feed than cattle, and I feel deer and elk will not be found ½ mile of them the sheep drive them away. If we don't have any better management for deer in D-41 we won't have any quality bucks, maybe should bring back the point restriction, you may say it won't work, well look what it did for the elk, still say no-well take the point restriction of of the elk and see what it does, it won't be good. Then everybody will be shooting immature bulls. Quality is gone then. The quality of elk is betting better and better with point restriction. IT WILL WORK FOR DEER TOO!!!

D-5

I think the deer hunting opportunity to harvest a quality buck is very low. I believe the game & fish department should try to increase the number of deer, the number of bcucks per doe ratio and definitely do more to control predators.

D-6

I haven't hunted in this area but I would like to. I feel the deer need more protection from affects of energy development.

D-7

Predators are decreasing the number of deer, and then you have gas and oil development and traffic causing more stress. I used to see over 1,000 deer in the ten miles on the Piceance Creek road, now if I see 5 it is a big deal. So you need to decrease the predators and have more busing to decrease deer/traffic fatalities. Predators are hurting the fawn crop, as do some hunting seasons when the make the breading seasons change so fawns are born at the wrong time.

D-10

I feel that the deer need management and protection (especially from expansion and over exploitation) so that we can still have deer and the opportunity to hunt them.

D-11

The DOW needs to manage more for deer and less for people that includes predator control and habitat inhancement along with less hunting pressure by elk hunters. ie less season days that harrass the deer without shooting at them.

D-12

Please do not undersell the habitat's productivity as a means of justifying a lower population objective in order to achieve aparent success via reduced expectations. Please remember that by continuing to manage for herd recovery, and even increasing that focus, if at some sacrifice to hunter preference in the short term, you will be providing for larger sustainable harvest and hunter satisfaction in the long term. For many reasons I urge this course in your efforts as stewards perpetuating and enhancing Colorado's wildlife resources and people's opportunities to enjoy them. Thank you for your hard work!

D-13

1)The deer herd in 32 is not increasing there are very few mature bucks and most bucks taken are spikes up to 3 pts. Would like to see if nothing eles manage population as is but try and build quility and better age class you have a better chance of killing a 300 class bull than a buck that will go over 150.

2)I feel that early sheep grazeing in mid to late May and mid to late November is impacting the habitat in the calving and fawning areas and also drawing in more preditors in early sping Early spring grass and a quiet area is what they need.

3) Habitat work needs done weather by Fire or Removal of dead and down trees to open up areas. Mowing sagebrush and overseeding would be good in a lot of areas deer use in 32

4) Most of the winter range is in bad shape around the Rifle area of 32. From oil and gas development or over grazeing. I think some of the landowners in 32 and statewide that get vouchers should have to put a % back into habitat to be elegeble to get them. They are leaching off the general public Hunters. we need to manage for some quality instead pounds of red meat. Seeing a few quality animals is what keeps hunter comeing back resident and nonresidend if they can see some good animals or some improvement they will keep comeing. 31 & 32 would be a good test area, not necessarily trophy but good quality.

D-14

Lived in Colorado my whole life and have continued to watch the deer population decrease. The division of wildlife has done very little to stop the decrease. Maybe Colorado should be known for their deer heards instead of being an easy state to get an out of state tag. What do you guys do with all our money? Why not stop hunts for a year or more where deer populations are below objective? When I was a kid in Colorado there were tons of deer.

D-15

I do not presently deer hunt in D-41, but have a rooting interest in good deer hunting throughout the state. It's on my very short list of new units to try, but I am concerned about long term mule deer declines, especially in Western Colorado due to various, development/ habitat, predation and hunting issues. You're running close to half of the present population objective in the unit, and that concerns me, but more concerning is the fact that the population hasn't been near objective for some time and appears to be struggling to grow much, despite what is essentially no doe harvest for several years. While we all have opinions on the root causes of the mule deer declines, all I ask that you do SOMETHING to help the population out. Units like 31/32 or 40 that cannot meet the old population objectives need to have SOMETHING done. I don't profess to know what needs to be done, but as with nearly all population problems, they could probably be helped to some degree through habitat management. Other managers have simply reduced their population objectives in units where they didn't feel they could get the population to increase to the objective level. Please don't do that too, that's like wiping your hands of the issue. I'm glad you aren't issuing doe tags, especially public land doe tags like some managers are, even in units that are barely half the population objective, please continue that. Also, if there are deer damage concerns, please address those issues with private land doe tags. I like that you haven't been too rough on the bucks, despite the fact that they are well above the objective sex ratio.

Thank you for your time.

D-16

I would like to see the number of licenses to be cut. I would really like to see Unit 31 be put to a trophy unity with at least 2 – 3 points to obtain a license. What I believe has most directly hurt our deer population is two things. First is Ranching for Wildlife which I refer to as "Ranching Against Wildlife". The DOW allows these places to hunt with their own set of rules and seasons. Why?? You allow them to harvest dear clear till the end of Dec. Why?? Dear are <u>not</u> fit to eat, they waisting the meat. Hunting them in the rut and while they are trying to fatten up for the winter. This season might be acceptable for blind people in wheel chairs. There is absolutely no sport or fair chase involved. Personally I think it is criminal!!! Second, this unit has way too many predators, mainly lions, I would like to see more efforts to control these predators. I would like to see these big landowners be incouraged to allow predator control. We need to act now on some of these issues before we have <u>no</u> dear to hunt. I would like to see fewer dear seasons, make them earlier so people are not killing them in the rut… Thanks. TB

Received via electronic mail 7/5/11

As I feared, it looks like you are going to reduce the population objective because you no longer feel the 16,500 deer number is viable. That's a reality I don't want to accept. When looking at your plan, I saw nothing that would help to increase the deer population. It's obvious that harvest management wasn't helping to increase the herd since you haven't issued doe tags for many years, and the BLM energy development guidelines are only designed to minimize the additional losses that are sure to come. Given the parameters with which we are allowed to select, I vote for Alternative 3 7,500-9,500 deer, but would really prefer that you manage for something above 10,000. Because additional habitat losses and fragmentation are sure to occur, something needs to be done to make the habitat that is still available is more productive.

I know lots of people like to blame predation too, but just looking at the lion harvests, it appears the lion hunters aren't even hitting the quotas. Not sure what could be done to encourage more lion harvest outside of bounties or free licenses (which I'm sure won't happen) or allowing incidental lion harvest during the deer and elk seasons (probably fat chance there too, but South Dakota and Oregon manage a healthy lion harvest solely by utilizing the hunters that are in the field for deer and elk). Point is, this is a fairly unproductive, stagnant herd that needs some kind of a boost. And since we can't control the weather, we need to improve conditions somehow, whether that's improving habitat quality in the face of declining habitat quantity, more predator hunting(I know predators don't control populations, but I do believe in the predator pit hypothesis in that they can do some short term suppression during dry years or rough winters), or some magic pixie dust to improve fawn: doe ratios, I'd like to see some sort of emphasis on improving the herd, not just maintaining it at the present levels.

As you can see from the responses, the vast majority of respondents wanted to see a population increase too. One other danger that I see in going with a lower deer herd objective to the present size is the temptation to then issue doe tags if the population experiences a small, temporary spike from a good combination of weather factors or something of that nature. Look at what happened to units 68/681 (read the Saguache deer management plan). Due to a screwy population estimate, they then issued a bunch of doe tags, which cut the herd in half. And since you don't think the higher population is attainable, but it is publicly socially acceptable, there wouldn't be any harm in allowing the herd to maintain a temporary high.

As for the sex ratio/post hunt composition, either Alternative 2 or 3 is fine with me. Since it's not like you'd be able to draw a 31/32 deer tag with a 2nd choice even if you reduced the sex ratio objective to 20-25, you may as well continue manage it for decent quality bucks. I think Alternative 2 best meets that description. Since the herd here seems to struggle so badly and since you're already at objective(if you went with population Alternative 3), I wouldn't want to reduce the doe population in order to accommodate better buck hunting. However, one could make a case for going for the higher sex ratio in order to get the best hunting out of a herd that appears doomed to be sacrificed for energy development.

Anyway, thanks for hearing me out, and in review, I vote for Alternative 3 for the population objective(unless 10,000-12,000 could be an option), and Alternative 2 for the sex ratio objective.

Thanks for your time,

[name redacted]

APPENDIX C: PUBLIC SURVEY

# *LOGAN MOUNTAIN DEER MANAGEMENT*

## *Public Input Opportunity*

The Colorado Division of Wildlife has begun developing the deer management strategies for Game Management Units (GMUs) 31 and 32 and needs the public's input.

In Colorado, big game populations are managed for a specific geographic area called a Data Analysis Unit (DAU). A DAU generally includes several GMUs. In this case, the Logan Mountain DAU D-41 includes GMUs 31 & 32.

The purpose of the DAU plan is to determine: 1) how many deer the DAU should support, and 2) what the appropriate ratio of bucks to does should be.

The DAU planning process attempts to balance biological considerations with public preferences by determining the appropriate deer herd size and sex ratio for a specific area. Annual hunting seasons are then designed with the intent of keeping the population at or near these approved levels.

Your input is a critical part of the DAU planning process. The information you provide will help develop CDOW's recommendations for deer herd objectives. These recommendations will then be reviewed by the Colorado Wildlife Commission, which will give final approval.

Please fill out the form as accurately as possible. Your responses and identity will remain confidential.

This survey is also available online at www.wildlife.state.co.us

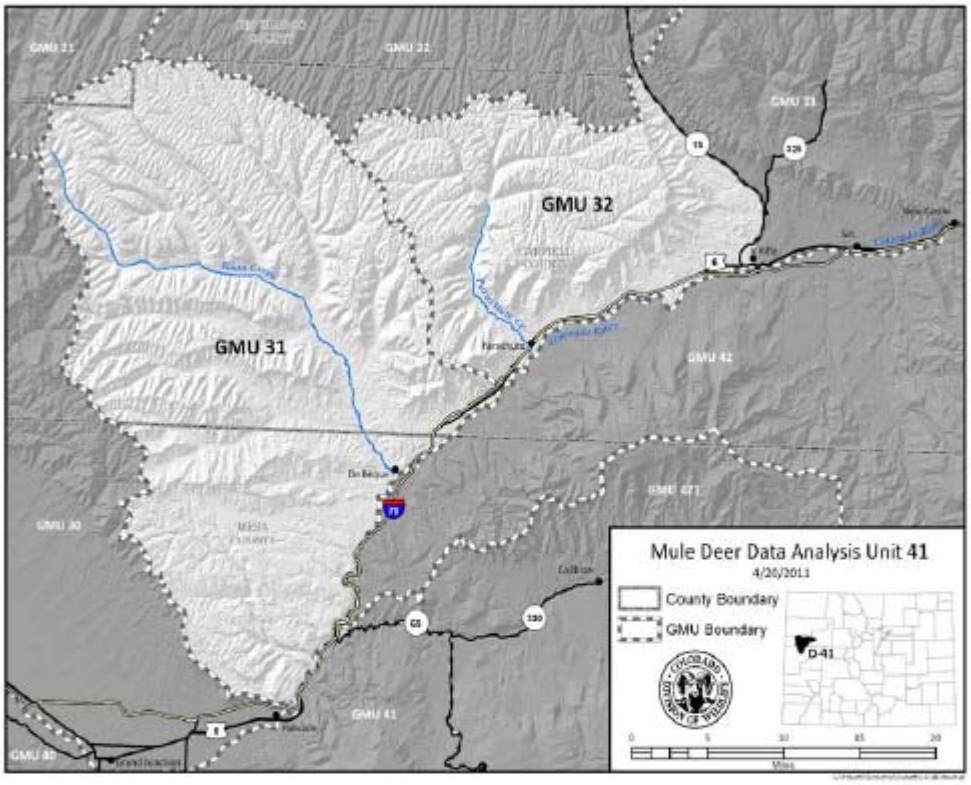
**SURVEYS MUST BE RETURNED TO THE**
**CDOW GRAND JUNCTION SERVICE CENTER**
**BY**
**JUNE 21, 2011.**

Thank you for taking the time to complete this survey. Your input will help the Colorado Division of Wildlife manage your wildlife!

To return this survey, please hand-deliver or mail to:

**Colorado Division of Wildlife**
**Attn: Terrestrial Biologist**
**711 Independent Ave.**
**Grand Junction, CO 81505**

***Please examine the map and written description of the areas designated as Data Analysis Unit D-41, Game Management Units 31 & 32 located in west-central Colorado, then go to Question 1.***




***Description of DAU D-41 (Game Management Units 31 and 32):***
Those portions of Mesa, Garfield and Rio Blanco counties bounded on the north by the Colorado River-White River divide and the Parachute Creek-Piceance Creek Divide; on the east by Colo 13/789; on the south by the Colorado River; and on the west by the Bookcliffs, the Little Salt Wash-Roan Creek divide, the Big Salt Wash-Roan Creek divide, and the East Salt Creek-Roan Creek divide.

***BACKGROUND INFORMATION***

1. Are you a resident of Colorado?

_____ Yes _____ No

2. Do you live in D-41?

_____ Yes _____ No If yes, how many years? _____

3. Do you own or lease property in D-41?

_____ Yes _____ No If yes, how many years? _____

4. What groups represent your interests in deer management in DAU 41? (Check all that apply)

____ Rancher/Farmer/Landowner
____ Business Owner
____ Guide/Outfitter
____ Hunter/Sportsperson
____ Environmentalist/Conservationist
____ Other, please explain _____

5. If you checked more than one response above, write the letter corresponding to the interest group which best represents your opinions ____

***DEER MANAGEMENT***

1. How would you like the deer population in D-41 to change?

_____ Decrease
_____ Stay the same
_____ Increase
_____ Don't know

2. The population is currently significantly below the population objective. How would you like the deer population objective in D-41 to change?

_____ Decrease
_____ Stay the same
_____ Increase
_____ Don't know

3. How would you like the number of buck deer in D-41 to change, if at all?

_____ Decrease
_____ Stay the same
_____ Increase
_____ Don't know

4. The objective for buck deer is currently 20 bucks: 100 does. How would you like the objective for the number of buck deer in D-41 to change, if at all?

_____ Decrease
_____ Stay the same
_____ Increase
_____ Don't know

***PEOPLE AND DEER***

1. Please indicate how concerned you are about each of the following in D-41.

| | | No Concern.....Very Concerned | | | | |
|---|---|---|---|---|---|---|
| a | Deer/vehicle collisions | 1 | 2 | 3 | 4 | 5 |
| b | Economic losses due to damage to range, crops, fences | 1 | 2 | 3 | 4 | 5 |
| c | Deer competition for livestock forage | 1 | 2 | 3 | 4 | 5 |
| d | Damage to trees, shrubs, & gardens by deer | 1 | 2 | 3 | 4 | 5 |
| e | Loss of deer habitat due to residential development | 1 | 2 | 3 | 4 | 5 |
| f | Loss of deer habitat due to energy development | 1 | 2 | 3 | 4 | 5 |
| g | Revenue deer hunting provides to local businesses | 1 | 2 | 3 | 4 | 5 |

2. In D-41, have you been personally affected by any of the concerns listed in the above question?

_____ Yes If yes, circle one: A B C D E F G

_____ No

3. How do you personally feel about deer in D-41? ***(check one)***

_____ I do not enjoy the deer in D-41, AND regard them as a nuisance.

_____ I enjoy the deer in D-41, BUT worry about the problems they cause.

_____ I enjoy the deer in D-41 AND do not worry about the problems they cause.

_____ I have no particular feelings about deer in D-41.

***DEER HUNTING***

1. Have you ever hunted deer in D-41?

_____ Yes If yes, how many years? _____

_____ No If yes, which GMU? GMU 31 ___ GMU 32___ Both GMUs____

2. To what extent have you felt crowded by other hunters while deer hunting in D-41? ***(check one)***

_____ Extremely crowded

_____ Moderately crowded

_____ Slightly crowded

_____ Not at all crowded

3. Please rate the quality of deer hunting opportunities available in D-41? ***(check one)***

_____ Poor

_____ Fair

_____ Good

_____ Excellent

4. Which ONE factor is the MOST important to you when deer hunting in D-41? ***(check one)***

_____ Not seeing other hunters

_____ Obtaining game meat

_____ Harvesting a trophy deer

_____ Opportunity to hunt every year

***WRITTEN COMMENTS:***
Please use the space below for any additional comments about deer management in D-41.

# APPENDIX D: WRITTEN STAKEHOLDER COMMENTS

## Bureau of Land Management, Grand Junction Field Office

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Grand Junction Field Office
2815 H Rd
Grand Junction, Colorado 81506
www.co.blm.gov/gjra/gjra.html

TAKE PRIDE IN AMERICA

6810 (LLCON03000)

June 6, 2011

Ron Velarde
Colorado Division of Wildlife
711 Independent Ave.
Grand Junction, CO 81506

Re: Data Analysis Unit management plan for mule deer in Game Management Unit 31

Dear Mr. Velarde:

The Bureau of Land Management, Grand Junction Field Office, has reviewed the proposed changes to deer management goals in Game Management Unit 31. We have provided Stephanie Duckett with our Land Health Assessment and other pertinent information for this area. We have reviewed the three proposed population size and composition alternatives and have no further comments or recommendations. If you or your staff requires any additional information please contact Heidi Plank, Wildlife Biologist, at (970) 244-3012 or hplank@blm.gov.

Thank you for the opportunity to comment and provide information.

Sincerely,

Catherine Robertson
Field Office Manager

cc: Stephanie Duckett