Mule Deer Herd Management Plan
Data Analysis Unit D-21
West Elk Herd
Game Management Unit 54

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Approved by the Colorado Parks and Wildlife Commission, January 2013

DAU D-21 (West Elk)

EXECUTIVE SUMMARY

January 2013

Game Management Unit: 54

Land Ownership: 60% USFS, 22% Private, 11% BLM, 4% State, 3% NPS

Post-hunt Population:

Current Objective (2013): *5,000-5,500* **Post-hunt 2011 Estimate: *4,400***

Post-hunt Sex Ratio:

Current Objective (2013): *35-40:100* **Post-hunt 2011 Observed: *45:100***

Figure 1. D-21 Post-hunt Population Estimates 1980-2011

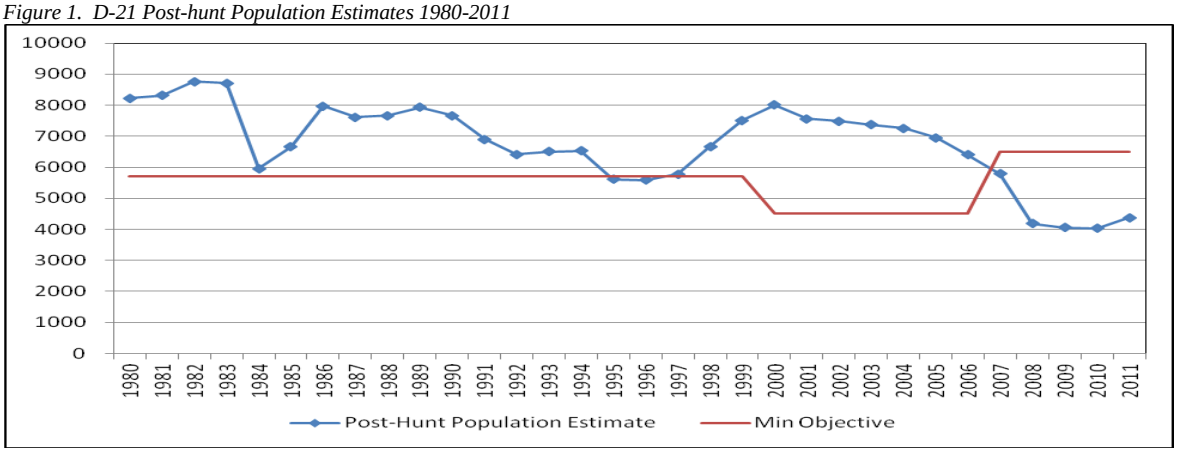


Figure 2. D-21 Harvest 1980-2011

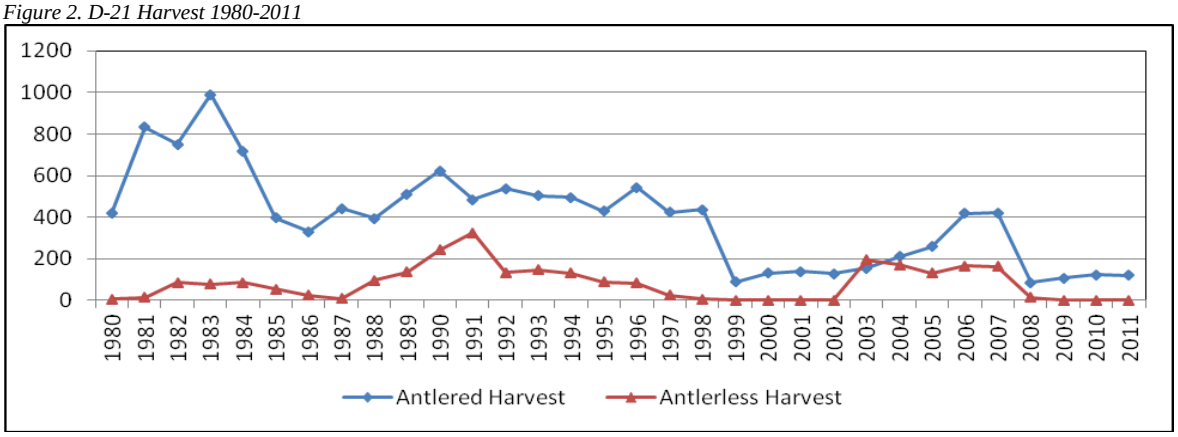
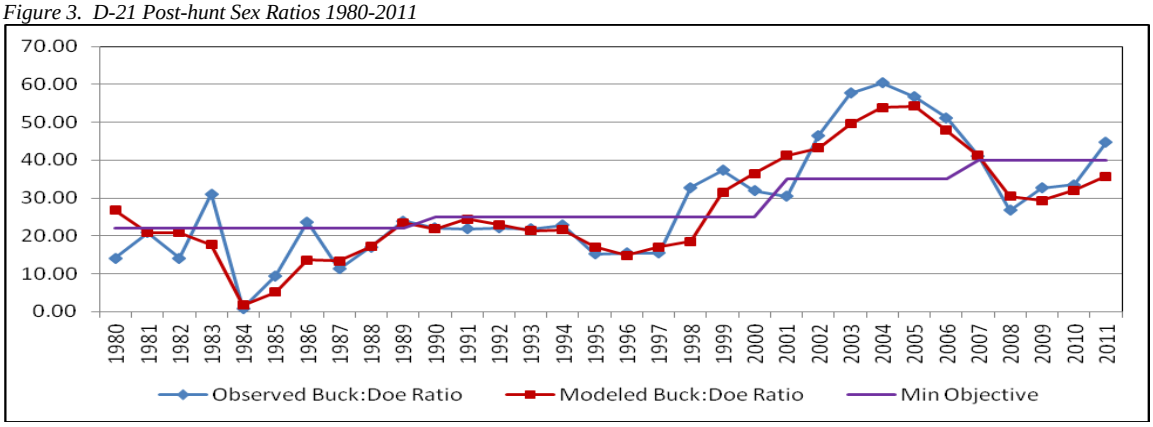


Figure 3. D-21 Post-hunt Sex Ratios 1980-2011



Population

The current model estimates suggest that there was a larger deer population in D-21 during the early 1980's, which declined as a result of the severe winter of 1983-84. Although not as high as pre-1983-84 levels, the deer population in D-21 increased to over 8,000 estimated animals during the late 1980's before experiencing a gradual decline during the first half of the 1990's. Following statewide license limitation in 1999 and a series of exceptionally mild winters, the mule deer herd in D-21 increased substantially. More recently, the population in D-21 declined considerably as a result of the severe winter of 2007-2008. Prior to the 07-08 winter, the population had hit a recent high and was actively being reduced through sustained antlered and antlerless harvest. Since 2008, hunting license allocation has remained extremely conservative, with no antlerless hunting occurring. The 2011 post-hunt population estimate for D-21 was approximately 4,400 animals on a moderately increasing trend.

Sex Ratio

During the early to mid-2000's, extremely conservative license allocation produced some of the highest buck to doe ratios in the state, and hunting licenses became highly sought after. The ratio increased to an observed high of 60:100 post-season 2004. The post-season 2007 sex ratio had been intentionally reduced to 41:100, and was within the DAU plan objective range of 40-45:100. Mortality during the 07-08 winter reduced the sex ratio in D-21 to 27:100 post-season 2008, well below the management plan objective. After nearly five years of conservative license allocation, the observed buck:doe ratio post-hunt 2011 was approximately 45:100.

Hunter & Harvest Trends

Between 1986 and 1998, the average number of deer hunters in GMU 54 was approximately 2,800 (buck and doe hunters combined). The average number of hunters in D-21 between 1999 and 2011 was around 430. The average buck harvest from 1986 through 1998 was 473, with the total harvest averaging 585 animals. Between 1999 and 2011, the average buck harvest was 184, with a total harvest of 248. The highest documented harvest in the DAU occurred in 1983 with 1,068 deer harvested, including 990 bucks. The lowest annual harvest took place in 1999, with a total of 88 antlered deer taken. Success rates have varied over time, but have averaged around 55% since 1999 across all seasons. In 2011, an estimated 121 bucks were taken by 296 hunters.

Model Revision

The previous DAU plan for D-21 was approved by the former Wildlife Commission in 2007; however subsequent model updates post-season 2008 created a disparity between existing DAU plan objectives and revised population estimates. This in turn necessitated DAU plan revisions. CPW occasionally revamps population models in order to produce the most defensible, science-based estimates possible. The downside to this process is that management plan objectives often have to be revised, which typically leads to considerable public scrutiny. Population models are subject to change over time; however, in most cases those changes will not influence the on-going management philosophy for a given DAU, nor will they change the actual number of animals "on-the-ground." Although DAU plans are tied to a specific

population objective, it is often more productive to focus on population trends rather than specific year to year variation.

Key Issues

Many issues surround mule deer management in the Gunnison Basin, and they generally fall into either a biological or socio-political category. Many of the issues raised during this planning process were similar to those discussed in 2006 during the previous planning effort. There are a number of important factors influencing mule deer population dynamics in the Gunnison Basin other than hunter harvest. Some of those factors include, but are not limited to, winter severity, habitat condition, competition with elk, and human development. Wildlife managers are continuously monitoring and evaluating these factors in order to incorporate them into management objectives and annual license setting processes as necessary.

Key Issue: Winter Range Carrying Capacity

Like many places in the Rocky Mountain west, spring and summer ranges in D-21 are much more expansive than the limited winter range. Most winter range areas occur many miles from summer range and can only be reached following lengthy migrations. Winters may be severe in the Gunnison Basin and the quantity and quality of winter habitat is arguably the primary limitation for herd productivity and sustainability in this region. Although superbly adapted to Rocky Mountain climates, mule deer in the Gunnison area are periodically subjected to severe winters which may result in significant mortality. The winters of 1978-79, 1983-84, 1996-97, and 2007-08 are recent examples of how unforgiving winters may be in the area. In general, dramatic population fluctuations are no longer acceptable to the general public and big game hunters, based on the emotional response to seeing large numbers of animals die and the potential impacts to hunt quality and opportunity. The same may be said for local economic interests that rely on predictable levels of wildlife related tourism. CPW maintains a policy pertaining to feeding big game animals during severe winters, and supplemental feeding programs have been initiated during the four winters previously mentioned with variable success. The winter of 2007-08 was particularly severe and has had lasting repercussions. Mule deer management in the Gunnison Basin is ultimately constrained by severe winters.

Key Issue: Hunter Opportunity

A key element of mule deer management is the public's desired level of hunting opportunity. Some hunters prefer to hunt every year, whereas others would wait five or more years in order to hunt in a highly sought after unit. Some hunters forego multiple years of hunting in order to build preference points, while others are willing to buy expensive landowner vouchers in order to hunt every year. Trophy mule deer bucks remain one of the most sought after big game animals in the western United States, and hunters are continuously seeking opportunities to hunt trophy deer. In 1999 there were 921 first choice applicants for buck licenses in D-21. In 2007, there were 2,393 applicants for either-sex and antlered licenses, which amounted to more than a 150% increase. Demand for limited deer licenses in the Gunnison Basin has declined since the winter of 07-08, however it is likely that there will be a resurgence of interest as future management objectives are achieved, and as buck age structure improves over time. In 2011, there were 802 first choice applicants for buck licenses in GMU 54. The potential trade-offs between quality management and hunting opportunity were discussed at length with the public during this planning process.

Public Process

Considerable public scoping and dialogue occurred during this process through meetings, on-line surveys, written comments, emails, phone conversations, and face-to-face communications. As expected, the majority of individuals engaged were resident deer hunters. Input on objectives was diverse; however there was an apparent majority opinion regarding future management of this herd. Population and sex ratio are discussed separately below:

Population: It was evident that most hunters were interested in seeing the D-21 deer population increase. This was not surprising following the declines that resulted from the 2007-08 winter. The population remains below pre-07/08 levels so there is certainly potential to grow the herd. CPW does not support increasing this population back to mid-2000 levels, but supports a moderate increase. The reality, however, is that it will take several years to grow the population assuming average winter severity and average or

above average survival rates. Limited doe hunting will not be possible if management aims to increase the D-21 population.

Sex Ratio: Based on public comment, there was an apparent majority of GMU 54 hunters that were willing to sacrifice more frequent hunting opportunity for higher sex ratios, and interest in maintaining or increasing the current buck:doe ratio. The sex ratio in D-21 is already quite high; therefore additional hunting opportunity may already be possible. License allocation is driven by management plan objectives and the array of other factors influencing mule deer population dynamics. There was discussion during this planning process of creating three separate management "regimes" for the three DAU's in the Basin. Some suggested one DAU be managed for maximum quality, one be managed for maximum opportunity, and one be managed somewhere in between. That idea was certainly worth considering, but after considerable discussion, CPW managers decided that maintaining a similar management philosophy between the DAU's provided the greatest degree of equity for constituents across the board.

In conclusion, there are a multitude of objectives that could have been selected for managing the D-21 population; however after thorough consideration the following management objectives were selected:

- **Post-hunt Population Objective = 5,000-5,500**
- **Sex Ratio Objective = 35-40 bucks : 100 does**

Potential advantages:

- This management scenario continues to provide high quality buck hunting and maintains older age classes of males
- This management scenario is expected to enhance the balance between hunt quality and opportunity
- Most survey respondents indicated they would prefer to hunt every five years or less; this alternative strives to accommodate that public desire
- A slightly reduced sex ratio objective potentially allows for increased license allocation; this is expected to help partially mitigate future preference point requirements
- Following severe winters, slightly shorter recovery periods are anticipated for restoring the overall population and the male segment of the population
- Post-rut bucks may enter winter in better condition, thus increasing survival
- Success rates will likely remain high across all seasons
- This population level is expected to be below the winter range carrying capacity during most winters, thus reducing the overall utilization of key forage species, while recognizing the importance of density dependent population constraints

Potential disadvantages:

- This scenario recognizes the public demand for a larger deer population, but will preclude antlerless hunting until the objective has been reached and maintained
- National publicity of Gunnison mule deer hunting is expected to keep preference point requirements at least at their current level; however it is likely that point requirements may increase over time
- Although reduced from the former plan objective of 40-45:100, restoring a buck:doe ratio of 35-40 following a severe winter will still require an extended and indeterminate recovery time
- Severe winters will result in reduced overall hunting opportunity for indefinite periods of time
- Hunters should be cognizant that winter feeding programs are not sufficient for maintaining older age classes of mule deer bucks, and should expect that the number of mature bucks will be reduced as a result of severe winters; recovery times will be variable
- Many negative comments were received during public scoping related to the current landowner voucher program and other social issues. Selecting these management objectives is not likely to result in changes to these programs or issues over time. Hunters should expect that both the biological and social landscapes will look very similar to what they have over the last 10 years in D-21

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INTRODUCTION AND PURPOSE

Colorado Parks and Wildlife (CPW) manages wildlife for the use, benefit, and enjoyment of the people of the state in accordance with CPW's Strategic Plan and mandates from the Parks and 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, CPW uses a "management by objective" approach (Figure 4). Big game populations are managed to achieve specific population and sex ratio objectives established for Data Analysis Units (DAUs). Each DAU generally represents a geographically discrete big game population. The DAU planning process establishes herd objectives that support and accomplish the broader objectives of CPW's Strategic Plan.

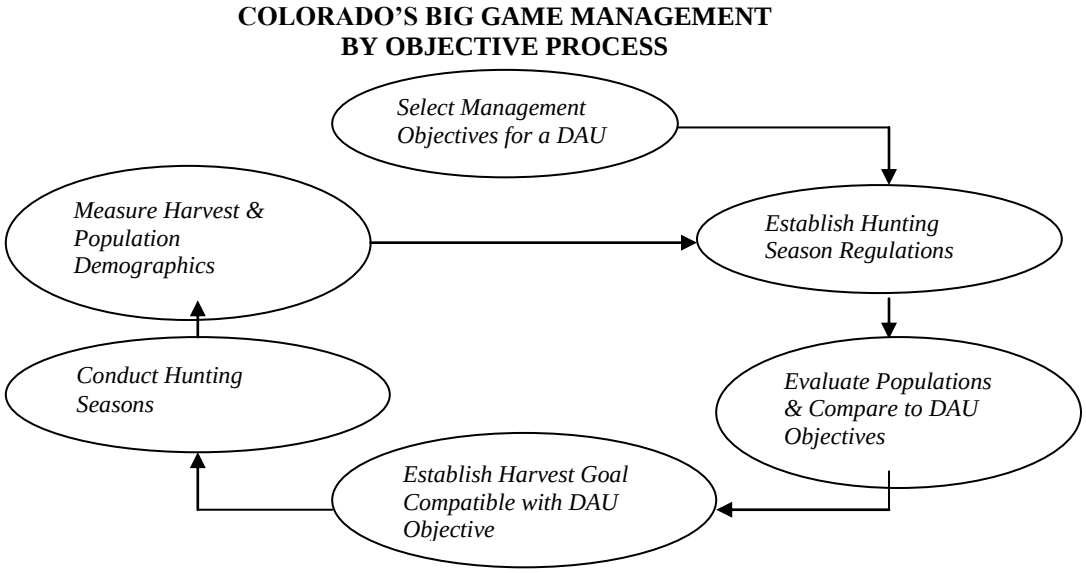


Figure 4. Management by objective process used by CPW to manage big game populations on a DAU basis

The DAU planning process incorporates public input, habitat capabilities, and herd considerations into management objectives for each of Colorado's big game herds. The general public, sportsmen, federal land management agencies, landowners, and agricultural interests are involved in determining DAU plan objectives through surveys, public meetings, comments on draft plans, and input to the Parks and Wildlife Commission. Limited license numbers and season recommendations result from this process.

Each DAU is managed to meet herd objectives that are established through the DAU planning process. The DAU plan establishes post-hunt herd objectives for the size and structure of the population. Once the Parks and Wildlife Commission approves DAU plan objectives, they are compared with modeled population estimates. Model inputs include:

- Harvest estimates determined by hunter surveys
- Post-hunt sex and age ratios derived from winter classification flights
- Estimates of wounding loss, illegal kill, and survival rates that are based on field observations and telemetry studies.

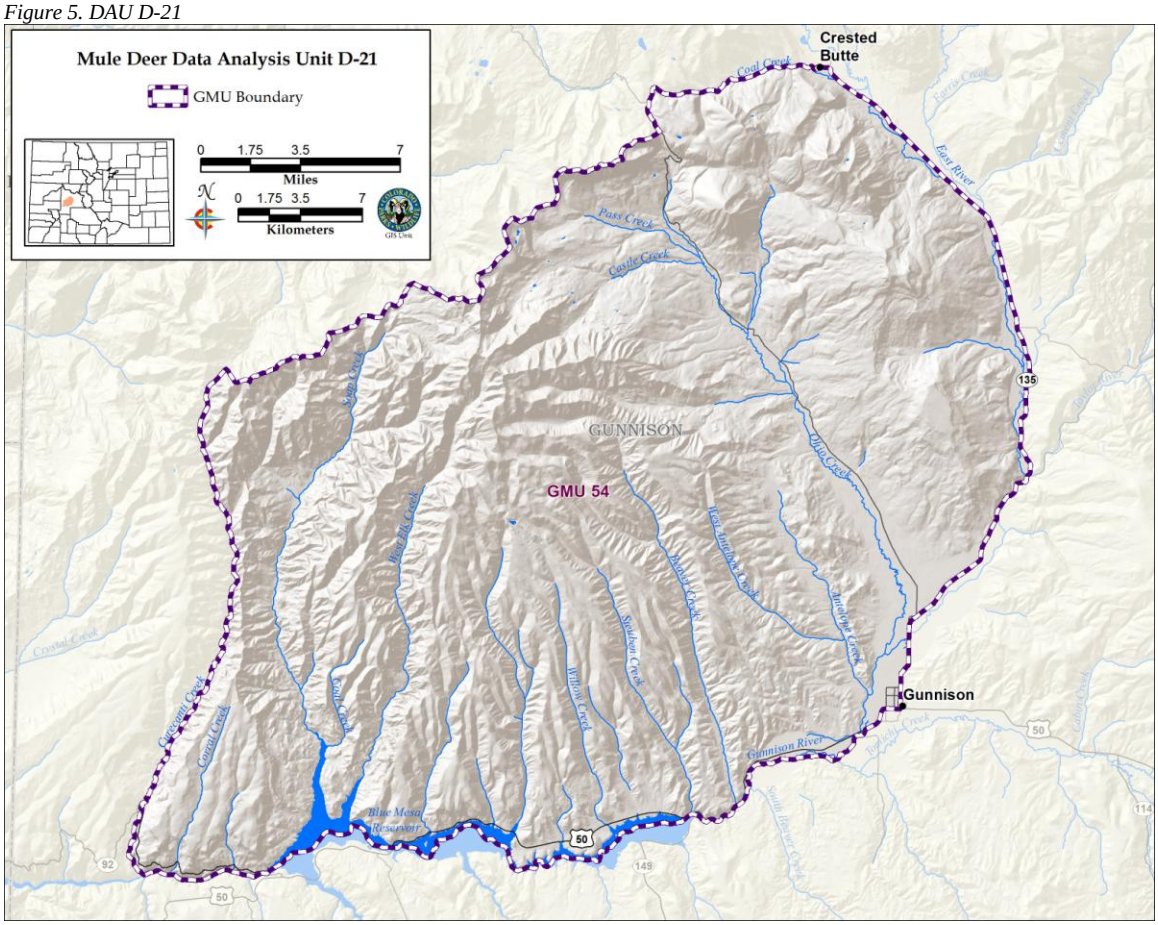
A computer model calculates the population's size and structure based on the most accurate information available at the time. The final step in the process is to develop harvest recommendations that align population estimates with the herd objectives.

DESCRIPTION OF D-21

Location

Data Analysis Unit (DAU) D-21 is located in southwestern Colorado and includes Game Management Unit (GMU) 54 (Figure 5). The unit is commonly referred to as the "West Elk" deer DAU, and lies entirely within Gunnison County. The unit encompasses approximately 585 square miles and is bound on the north by the North Fork of the Gunnison River/Gunnison River divide, on the east by Highway 135, on the South by the Gunnison River, and on the west by Curecanti Creek. Communities adjacent to or within the DAU include Crested Butte, Almont, and Gunnison.

Figure 5. DAU D-21



Topography/Climate

Elevations within the DAU range from approximately 7,500 feet near Blue Mesa Reservoir, to over 13,000 at the summit of West Elk Peak in the West Elk Wilderness. Some of the most prominent geographic features in D-21 are found in the West Elk Wilderness, which comprises a significant portion of the unit. Some of the most recognized rivers and creeks in the DAU include the Gunnison and East Rivers, and Ohio, Mill, Beaver, Red, Soap, and Curecanti creeks. Linear drainages running from north to south occur in the southern half of GMU 54 creating large, broken canyons separated by vast ridges. Many of the drainages in the unit flow into Blue Mesa Reservoir, which is one of the largest man-made bodies of water in Colorado. On the eastern side of the unit, prominent geographic features include Red Mountain and Flat Top Mountain, which provide important mule deer habitat year-round.

Elevation and season have a profound effect on climate within D-21. Low elevation valleys generally receive less annual precipitation, while higher elevation mountainous environments are prone to heavy snow accumulations and much shorter growing seasons. The elevations from 9,000 to 13,000 feet generally receive around 40 inches of annual precipitation, while lower elevations at the southern end of the

unit typically average 12-16 inches. By October each year, snow generally begins accumulating, which may persist until June or July of the following year. The Gunnison Basin has the distinction of being one of the coldest places in the continental United States. The area is prone to severe winters in terms of both snow accumulations and temperatures, which often stay below zero for weeks or months at a time.

Vegetation

Plant communities are diverse in D-21 and vary depending on many factors including elevation, aspect, moisture regime, and soils (Table 1). Topographic features which include riparian corridors, deep broken canyons, vast sloping expanses of forest, and high elevation subalpine and alpine valleys provide a mosaic of excellent habitat for mule deer. The Gunnison Basin is a high mountain valley dominated by big sagebrush ecosystems at lower elevations that are interspersed with wetland/riparian areas, irrigated hay meadows, and artificially seeded rangelands. Bitterbrush and Rocky Mountain juniper are commonly found in sage dominated communities in the DAU, and are of importance to local mule deer herds. Mixed-mountain shrub communities comprised of serviceberry, chokecherry, mountain mahogany, and oak are found at slightly higher elevations with occasional pockets of aspen, Douglas fir, and Ponderosa pine. Higher elevations are dominated by aspen, Lodgepole pine, and Engelmann spruce/Subalpine fir forests. Alpine tundra occurs at the highest elevations, primarily in the West Elk Wilderness Area.

Table 1. ECOLOGICAL TYPES OF THE GUNNISON BASIN (Johnston 2001)

Zone	Dominants	Elevation on north and east slopes, ft	Elevation on south and west slopes, ft	Soil Temperature Regime(s)	Soil Moisture Regime(s)
Alpine	Gravity and freeze-thaw processes, mostly very low herbaceous plants such as curly sedge, alpine avens, tufted hairgrass	>11,800	>12,200 ft	Pergelic, Cryic	
Subalpine	Subalpine fir, Engelmann spruce, aspen, lodgepole pine, Douglas-fir, bristlecone pine, mountain big sagebrush, Thurber fescue, planeleaf and Wolf willows, Idaho fescue	9,700-11,800	10,100-12,300	Cryic	
Montane	Douglas-fir, ponderosa pine, lodgepole pine, aspen, Arizona fescue, big sagebrush, Saskatoon serviceberry, blue and serviceberry willows	9,100-10,700	9,400-11,100	Frigid	
Mountain Shrub	Douglas-fir, big sagebrush, muttongrass, Utah serviceberry, Gambel oak, yellow-Geyer-Bebb willows, narrowleaf cottonwood	7,600-10,100		Frigid	
Piñon-Juniper*	Missing	Missing		Mesic	Aridic (Torric)
Foothills-Semidesert Shrub	Wyoming big sagebrush, Indian ricegrass, Needle-and-thread, Rocky Mountain juniper, narrowleaf cottonwood	<8,400		Mesic	Aridic (Torric)

* Piñon-Juniper is sparsely represented in the Upper Gunnison Basin.

Land Use

Ownership

D-21 contains a mixture of public and private lands, but is primarily public. Approximately 78% of the DAU is public land with 11% managed by the BLM, 60% by the USFS, 3% by the National Park Service (NPS), and 4% under the jurisdiction of Colorado Parks and Wildlife and the State Land Board. The remaining 22% of the land in D-21 is under private ownership that is primarily managed for livestock and hay production (where undeveloped). The majority of private land in the DAU is found at lower elevations within mule deer transition and winter ranges, with the largest block located in the southeastern portion of GMU 54 in and adjacent to the Ohio Creek drainage.

Agriculture

Agriculture remains of considerable importance to the local communities in D-21, and is perhaps one of the oldest and most prolific land uses in the DAU both on private and public lands. In the Gunnison area, livestock producers almost exclusively raise beef cattle, and rely heavily on private and public lands for livestock forage throughout the year. Most cattlemen produce grass hay on private lands during the

growing season to provide winter forage for herds returning from public land allotments. Similar to many mountainous areas in Colorado, the largest blocks of private land in D-21 are situated in valley bottoms and riparian corridors where productivity is highest.

Recreation

The public lands surrounding Gunnison sustain a significant amount of recreation throughout the year. Many different forms of recreation occur in D-21 including hunting, hiking, camping, fishing, wildlife watching, cross-country skiing, horseback riding, shed antler hunting, mountain biking, OHV use, and snowmobiling. Recreational demand and intensity on public lands in this DAU continues to increase, and some local resource managers and members of the public are concerned about the potential long-term impacts to wildlife. For example, the burgeoning interest in collecting shed antlers during mid-to-late winter led to the enactment of a shed antler hunting season in 2008. As set forth by the Parks and Wildlife Commission, antler collection is now prohibited between January 1st and March 14th annually. For mule deer, fragmentation and displacement into suboptimal habitats are of chief concern, particularly on limited winter range areas. Recent radio collar studies in the Gunnison Basin have demonstrated the strong level of fidelity mule deer show to seasonal ranges, which is information that should not be overlooked during land use planning and recreational development.

Human Development

In addition to primary residential development and enhanced infrastructure, the Gunnison area, like many places in the Rocky Mountain west, is a fashionable location for second home owners. The majority of D-21 is public land, but considerable development has occurred in and adjacent to the Ohio Creek drainage and the East and Slate River Valleys. Much of the development has taken place on transition and winter ranges, which is of concern to wildlife managers. Loss of habitat or fragmentation of habitat (ie. blocked migratory corridors) due to human development is cumulatively detrimental to mule deer populations. Participation in land use planning processes, working cooperatively with local landowners, and opportunistically acquiring conservation easements or fee title ownership of important properties should remain priorities for local resource agencies. Preservation and enhancement of critical winter range is essential.

HERD MANAGEMENT HISTORY

The Gunnison area contains large expanses of excellent mule deer habitat. It is likely that deer populations in the area were regulated historically by habitat conditions and winter severity. Predation by large carnivores, such as the gray wolf may have also limited population growth under certain circumstances. More recently, there are a host of factors believed to be exerting influence over mule deer population dynamics throughout the west. These factors have included competition with local elk populations, fire suppression & plant succession, drought, over hunting, noxious weed proliferation, human development/habitat fragmentation, and predation.

D-21 Management Summary

Estimating population numbers of wild animals over large geographic areas is an inexact science. Whenever attempts have been made to account for a known number of animals in large fenced enclosures, investigators have consistently failed to see every animal. In some cases, less than 50% of the animals have been observed. High-tech methods using remote sensing have also met with very limited success. Most population estimates derived using computer model simulations involve estimations of sex ratio at birth, survival rates, wounding loss, and annual production. These simulations are then adjusted to align on measured post-hunt age and sex ratio data or, in some instances, density estimates derived from line-transect or quadrat surveys. CPW recognizes population estimation as a serious limitation in our management efforts and attempts to minimize this problem by using the latest technology and inventory methodology available. As better information is obtained on survival rates, wounding loss, fetal sex ratios and density estimates, and whenever new modeling techniques and programs have emerged, these have been assimilated into the process for estimating populations. These changes may result in significant differences in the population size estimate and make new management strategies more appropriate. It is recommended that the population estimates presented in this document not be viewed as an exact

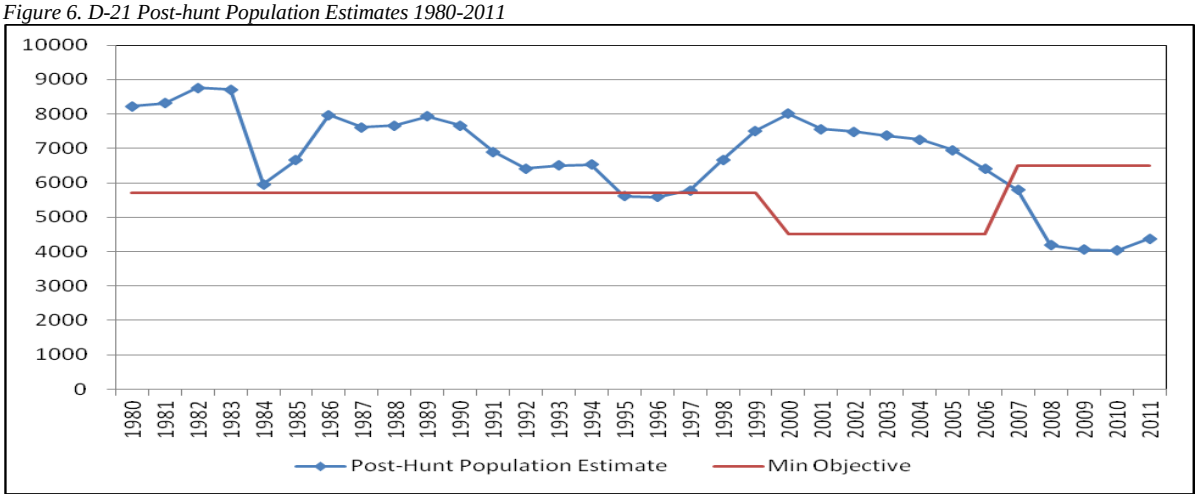
representation of the number of animals in the DAU; instead, their utility is in helping to evaluate population trends over time.

CPW has traditionally used *post-hunt* population information to assess annual trends in overall numbers and sex and age composition. All data presented in this DAU plan, other than harvest, is derived from post-season classification flights and modeling sessions. Post season flights are conducted in order to classify a representative sample of the overall population and should not be misinterpreted as an all-inclusive population "count."

Post-hunt Population Size

Population objectives are established based on a variety of different biological and social variables. These often include the productivity and condition of animal and plant communities, regional climatic considerations, agricultural and private land concerns, local economics, and hunting opportunity. The current model estimates suggest that there was a larger deer population in D-21 during the early 1980's, which declined as a result of the severe winter of 1983-84 (Figure 6). Although not as high as pre-1983-84 levels, the deer population in D-21 increased to over 8,000 estimated animals during the late 1980's before experiencing a gradual decline during the first half of the 1990's. Following statewide license limitation in 1999 and a series of exceptionally mild winters, the mule deer herd in D-21 increased substantially. More recently, the population in D-21 has declined considerably as a result of the severe winter of 2007-2008. Prior to the 07-08 winter, the population had hit a recent high and was actively being reduced through sustained antlered and antlerless harvest. Since 2008, hunting license allocation has remained extremely conservative, with no antlerless hunting occurring. The 2011 post-hunt population estimate for D-21 was approximately 4,400 animals on a moderately increasing trend. The former DAU plan (2007) for this unit contained a post-hunt population objective of 6,500-7,500 animals, which was based on previous population model estimates. Revisiting the population objective was the central motivation for revising this DAU plan.

Figure 6. D-21 Post-hunt Population Estimates 1980-2011



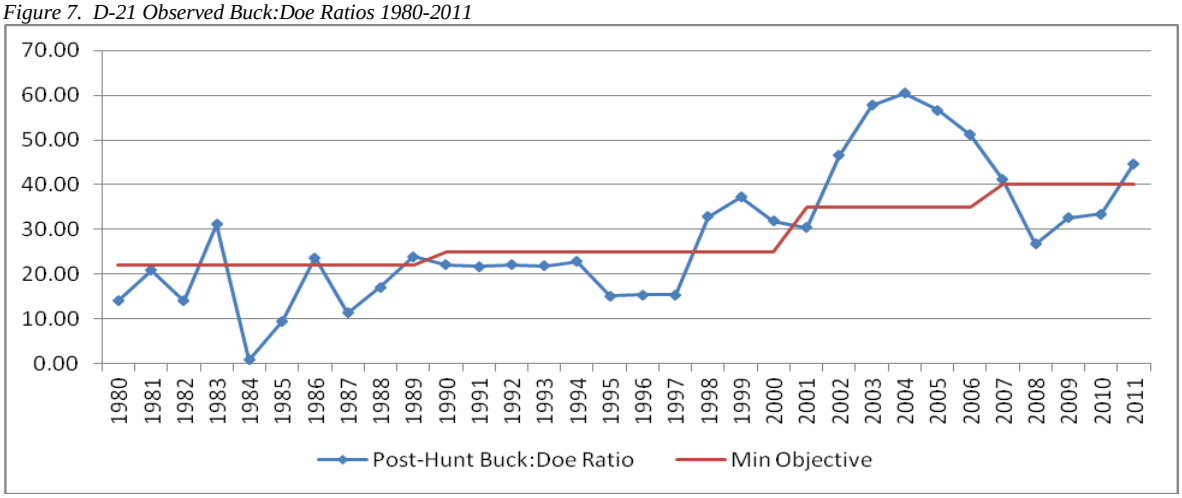
Post-hunt Herd Composition

Sex Ratio (bucks:100 does)

When mule deer licenses became limited statewide, a variety of management strategies were implemented across Colorado. In the Gunnison Basin, largely based on a public demand for higher post-season buck:doe ratios, license numbers were reduced by 90% from the previous three-year average. The observed sex ratios in the early 1980's and mid 1990's were markedly lower than post-limitations. The lowest buck:doe ratio observed in the DAU occurred post-hunt 1984 with <1 bucks per 100 does. As expected following limitations, post-season observed buck:doe ratios steadily increased (Figure 7). In the Gunnison Basin, extremely conservative license allocation produced some of the highest buck to doe ratios in the state, and hunting licenses became highly sought after. In this unit, the ratio increased to an observed high of 60:100 post-season 2004. The post-season 2007 sex ratio had been intentionally reduced to 41:100, and was within the former DAU plan objective range of 40-45:100. Mortality during the 07-08 winter reduced the sex

ratio in D-21 to 27:100 post-season 2008, well below the management plan objective. After nearly five years of conservative license allocation, the observed buck:doe ratio post-hunt 2011 was approximately 45:100. Evaluating the sex ratio objective was an important element of this DAU plan revision.

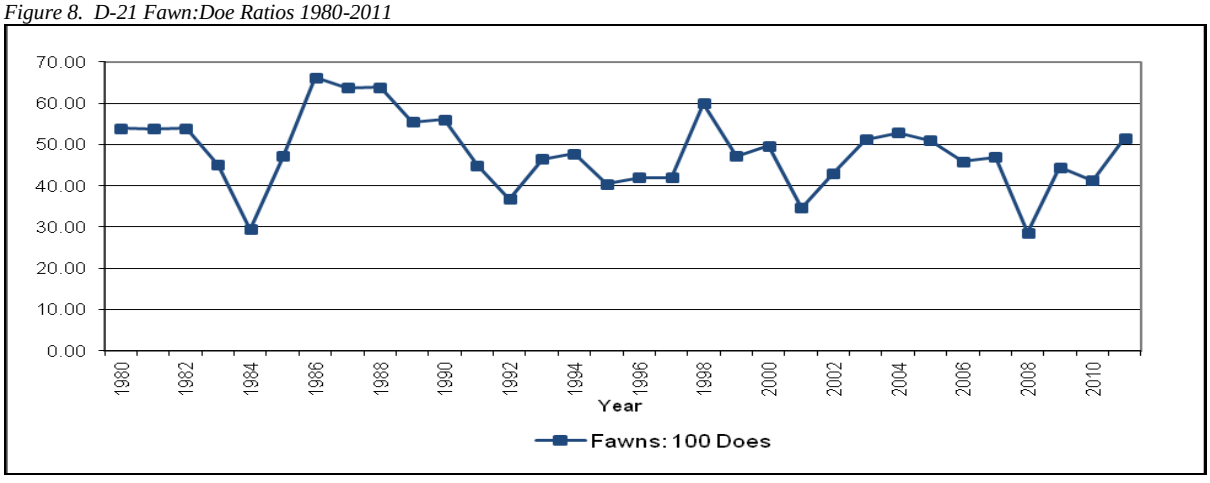
Figure 7. D-21 Observed Buck:Doe Ratios 1980-2011



Age Ratio (fawns:100 does)

Fawn to doe ratios have varied considerably in D-21 over the last 30 years. The 2011 observed fawn:doe ratio was approximately 52:100, which was noticeably above the five-year average ratio of 43:100 (10-year average is 46:100). Age ratio trends are of interest to wildlife managers as they can be indicative of population performance and productivity. However, managing for a desired age ratio on an annual basis is unrealistic due to the tremendous variability in annual natality and mortality rates. Recruitment of fawns into the breeding population is critical for population maintenance, but changes in population size may be influenced by many factors including age-specific survival rates, reproductive rates, and climatic / habitat conditions. Post-hunt fawn:doe ratios and overwinter fawn survival are two key factors contributing to population performance. Figure 8 shows changes in fawn:doe ratios since 1980.

Figure 8. D-21 Fawn:Doe Ratios 1980-2011



Hunter/Harvest History

Game Management Unit 54 has traditionally been a popular mule deer hunting destination for resident and non-resident hunters. Management strategies have varied over the years and have included antler point restrictions, separate and combined deer and elk seasons, and conservative three and five-day buck deer seasons (1992-1994 & 1995-1999 respectively). Buck licenses in GMU 54 were traditionally available "over the counter" and sold on an unlimited basis. Doe licenses were also issued annually on a limited basis prior to 1999. In 1999, mule deer licenses became limited statewide and significant license

reductions occurred in D-21. Based primarily on a local public sentiment to maintain or increase the deer population and sex ratio, antlerless licenses were abolished in the unit and buck licenses were reduced by 90% of the previous three-year average.

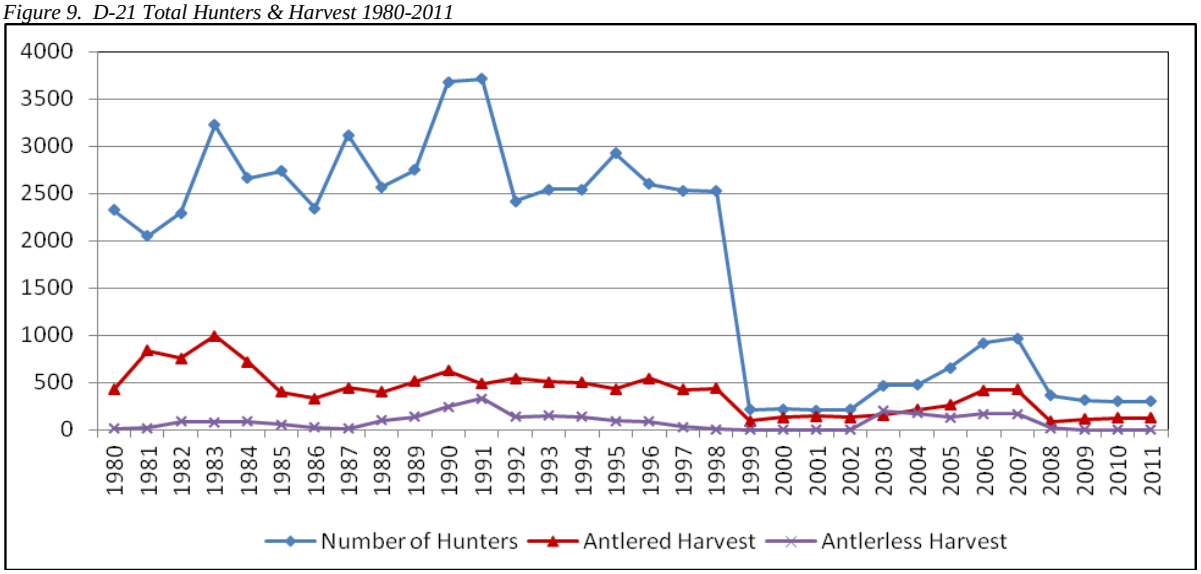
Hunter Trends

Between 1986 and 1998, the average number of deer hunters in GMU 54 was approximately 2,800. The average number of hunters in D-21 between 1999 and 2011 was around 430 (buck and doe hunters combined). The highest estimated number of hunters in the DAU was documented in 1991 at more than 3,700, while the lowest number of hunters recorded in the DAU was around 200 during the 2001 hunting seasons. In the fall of 2007, prior to the pending severe winter, managers had increased licenses to the point that nearly 1,000 hunters were in the field across all seasons. Licenses were drastically reduced following the 07-08 winter. In the fall of 2011, approximately 300 buck hunters participated in the mule deer hunting seasons in D-21. Figure 9 shows changes in the total number of hunters between 1980 and 2011.

Harvest Trends

The average buck harvest from 1986 through 1998 was 473, with the total harvest averaging 585 animals. Between 1999 and 2011, the average buck harvest was 184, with a total harvest of 248. The highest documented harvest in the DAU occurred in 1983 with 1,068 deer harvested, including 990 bucks. The lowest annual harvest took place in 1999, with a total of 88 antlered deer taken. Success rates have varied over time, but have averaged around 55% since 1999 across all seasons. In 2011, an estimated 121 bucks were taken by 296 hunters.

Figure 9. D-21 Total Hunters & Harvest 1980-2011



CURRENT MANAGEMENT STATUS

Under current five-year season structure constraints, mule deer hunts in D-21 begin in late August and extend through November. All seasons run concurrently with the regular elk hunting seasons. In addition to the archery and muzzleloader seasons, there are three potential rifle hunts in Colorado which begin in late October and end by mid-November. There are no regulatory antler point restrictions, and a legal buck is at a minimum required to have spike antlers equal to or greater than five inches long. Any doe or fawn may be harvested by hunters with valid antlerless licenses. Limited 4th season buck hunting is typically offered when a unit has achieved and maintained its established sex ratio objective for several years. Other novel hunt-codes such as early, high-country rifle seasons are instated on a case by case basis depending on local management considerations.

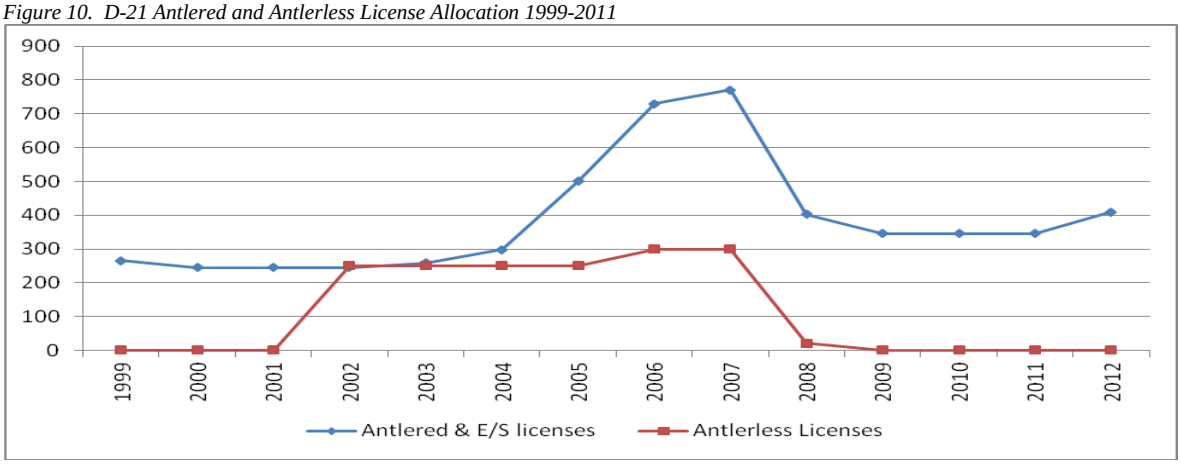
Doe Licenses & Harvest

As a result of the severe winter of 2007-08, antlerless licenses have not been issued in this unit since 2008 (Figure 10). From 2003 through 2007, between 250 and 300 doe licenses were issued in D-21. The highest recorded female harvest in this unit occurred in 1991 with 326 animals reported (Figure 9). More recently, a high of 196 antlerless animals were harvested during the 2003 season. Antlerless licenses were not issued in the DAU between 1999 and 2002 in an attempt to expedite population increase following statewide license limitations. Minimal hunter harvest and a series of mild winters occurred during this time period and deer populations increased noticeably. When the former population objective of 4,500 was exceeded post-hunt 2002, a limited number of antlerless licenses were once again issued. Doe licenses are typically not issued in a management unit until the population has achieved an established management objective.

Buck Licenses & Harvest

During the fall of 1983, harvest estimates indicate that 990 bucks were taken by hunters (Figure 9). Following limitations, the highest buck harvest recorded in D-21 was in 2007 with 422 bucks reportedly taken. The number of buck licenses issued in this DAU has declined as a result of the winter of 2007-08 (Figure 10). In 1999, a total of 265 antlered licenses were issued; a stark contrast to the more than 2,500 deer hunters that participated in the 1998 season. From 2000-2002, 245 licenses were issued annually; from 2003 through 2007, license allocation was gradually increased to the point where 770 either-sex and antlered licenses were available. In 2008, licenses were cut by nearly 50% in response to the mortality experienced during the previous winter. Between 2009 and 2011, 345 antlered licenses were issued annually. Post-hunt 2011, the sex ratio in D-21 was observed at 45:100, which led to a modest license increase resulting in 410 licenses available in 2012. Future license allocation will focus on maintaining the sex ratio objective established in this management plan.

Figure 10. D-21 Antlered and Antlerless License Allocation 1999-2011



Model Updates

In Colorado, population models have been overhauled several times over the last ten years as new information and methodology has emerged. In 2003, modifications were made to the D-21 population model that resulted in substantial changes to population estimates. Prior to 2003, all of the deer populations in the Gunnison Basin were being estimated using POP II, which predated spreadsheet models. The former Colorado Division of Wildlife began converting to spreadsheet population models during the mid-to-late 1990's in an effort to improve the precision of modeled estimates. Spreadsheet models currently provide the most scientific and cost-effective method of estimating ungulate populations based on a variety of measured data inputs.

The most recent model updates occurred post-season 2008. While these updates improved statewide consistency, they also resulted in new population estimates that differed from previous models. This in turn, resulted in population estimates that were out of sync with existing DAU plan objectives, which in many cases has necessitated DAU plan revisions. As discussed previously, CPW will occasionally revamp population models in order to produce the most defensible, science-based estimates possible. The downside to this process is that management plan objectives often have to be revised, which typically leads to

considerable public scrutiny. Population models are subject to change over time; however, in most cases those changes will not influence the on-going management philosophy for a given DAU, nor will they change the actual number of animals "on-the-ground." Although DAU plans are tied to a specific population objective, it is often more productive to focus on population trends rather than specific year to year variation. One positive aspect of opening DAU plans for revision is that it provides an opportunity for dialogue and discussion relevant to the current big game management in a particular unit.

KEY ISSUES

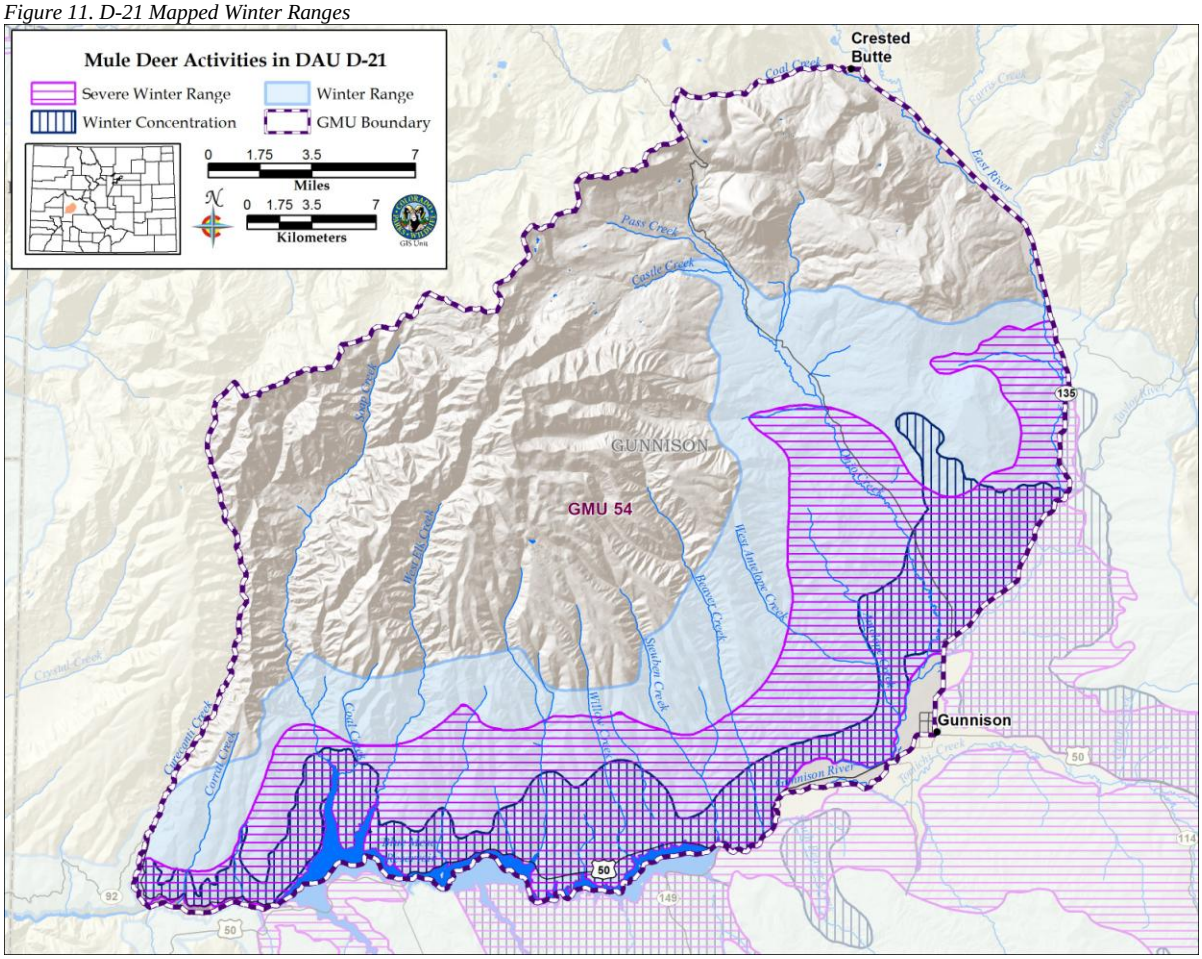
Many issues surround mule deer management in the Gunnison Basin, and they generally fall into either a biological or socio-political category. Many of the issues raised during this planning process were similar to those discussed in 2006 during the previous planning effort. There are a number of important factors influencing mule deer population dynamics in the Gunnison Basin other than hunter harvest. Some of these factors include, but are not limited to, winter severity, habitat condition, competition with elk, and human development. Wildlife managers are continuously monitoring and evaluating these factors in order to incorporate them into management objectives and annual license setting processes as necessary.

HABITAT

Winter Range Evaluation

Like many places in the Rocky Mountain west, spring and summer ranges in D-21 are much more expansive than the limited winter range (Figure 11). Most winter range areas occur many miles from summer range and can only be reached following lengthy migrations. Winters may be severe in the Gunnison Basin and the quantity and quality of winter habitat is arguably the primary limitation for herd productivity and sustainability in this region. In D-21, mule deer typically begin arriving on winter ranges during late October or early November where they remain until the following May. Winter habitats in the Gunnison Basin consist of sagebrush dominated systems interspersed with other key forage species such as aspen, serviceberry, mountain mahogany, bitterbrush, chokecherry, snowberry, rabbitbrush, and occasionally scrub oak. Winter ranges generally receive lower annual precipitation than higher elevation sites and contain less productive soil types. These conditions result in systems that are slow to recover from excessive herbivory and/or climatic stress. A reduction in the quantity and quality of winter range forage across the landscape will ultimately result in declining productivity for local mule deer herds. Although difficult to quantify, the observed post-season fawn:doe ratios in the Gunnison Basin suggest that a decline in productivity may have already occurred. Degradation of sagebrush systems is also of concern to wildlife managers with regard to Gunnison sage-grouse, and other sage obligate species.

Figure 11. D-21 Mapped Winter Ranges



For many years, local resource managers have expressed concern about the current condition of big game winter ranges in the Gunnison Basin. Data have been collected throughout the area by federal land managers, but there remains a paucity of current and comprehensive analysis. However, two habitat assessment projects have been conducted in the Gunnison area over the last 10-15 years which are worthy of mention.

Habitat Assessment Project:

In the late 1990's, Roy Roath et al. (1999) attempted to quantify winter range condition in important winter range areas within the Gunnison Basin. This project, referred to as the "Gunnison Basin Habitat Assessment Project," was intended to aid Colorado Parks and Wildlife in DAU planning efforts that were underway at the time. There were a variety of facets to the project, but the main objective of the study was to determine "whether the standing herd of grazing animals is in balance with the current forage resource and whether current use is compatible with long term sustainability of that forage resource." Due to various constraints, the team was not able to assess all of the DAU's in the Gunnison Basin and chose to focus on GMU's 54 & 55 north of Highway 50. The results of the assessment indicated that winter range forage resources were not in good condition, and suggested that big game populations in the Basin had exceeded winter range carrying capacity. Dry Mountain Loam range types, which made up the majority of the study area, were in the poorest condition of any of the range types measured by the assessment team. The results section of their report states, "The relative health and productivity of both species of sagebrush are low. Many if not most of the sagebrush plants show little annual growth of leaves and new leaders. Some sagebrush plants and nearly all of the palatable shrubs, like bitterbrush and mountain mahogany, show excessive cumulative use." The results of this project led to local contention; however they were quite useful in fostering discussion regarding the inextricable link between big game populations, habitat condition and the concept of carrying capacity.

BLM Shrub Monitoring Project:

Another noteworthy winter range assessment project was initiated in 2001 by the Gunnison Field Office of the Bureau of Land Management. At that time, biologists established 37 transects located throughout BLM lands in the Gunnison Basin. Transects were placed within key winter range areas containing shrub communities. The target or key shrubs for the study were bitterbrush, serviceberry, and mountain mahogony. Each transect consisted of 50 plots. At each plot, the closest key shrub was measured so on each transect 50 individual shrubs were surveyed (Figure 12). Overall, a total of 1,850 plants were surveyed. The variables measured for each plant were degree of hedging, plant volume, and percent dead. The transects were surveyed again in 2006, which allowed comparison with the 2001 data. Those data indicated that on average the degree of hedging had increased, plant volume had decreased, and the percent dead had increased for the three key shrub species measured. This study concluded that the condition of key shrub species on winter ranges was declining at a rapid rate in the Gunnison Basin. The BLM also pointed out that utilization of sagebrush plants had increased since the 2001 survey (United States Department of the Interior, 2006).

Figure 12. Serviceberry on winter range in the Gunnison Basin, summer 2006

Photo courtesy of BLM

It is important to recognize that many variables have contributed to the current condition of plant communities in the Gunnison Basin. Historic and present grazing regimes by domestic livestock, herbivory by mule deer and other wild ungulates, climate, noxious weed invasion, fire suppression, and land use changes (roads, development, etc.) are just a few of the many factors influencing present plant condition. Southwest Colorado experienced the worst drought of the century during the early 2000's, which had profound effects on some local plant and animal communities. More recently, the winter of 2011-12, and the spring/early summer of 2012 were exceptionally mild with well below average precipitation. Initially, this drought was expected to surpass the drought of the early 2000's, but fortunately the rain came in mid-to-late June. The long-term impacts of this extended and severe drought have yet to be quantified, but certainly it will reduce the availability and quality of browse on area winter ranges. Although not socially desirable, drought is a naturally occurring climatic phenomenon that may periodically result in successional changes in the flora and fauna within a given area. The data collected by the BLM on key shrub species in the Gunnison Basin clearly were influenced by recent drought conditions. The data suggests, however, that the level of shrub utilization across the landscape continues to be an issue of concern on big game winter ranges.

Caution is recommended before concluding that reduced herbivory equates to an immediate increase in vigor and production of plants on winter ranges. Although some areas may receive temporary respite, smaller populations of wild ungulates may still cause localized degradation within winter concentration areas. In the absence of disturbance (specifically fire), many decadent shrub and aspen communities may continue to be unproductive, and remain of lesser value to wintering big game animals and other mountain-shrub/sagebrush dependent species. Local BLM range specialists, however, have documented that shrubs protected from browsing have shown significant recovery in 3-5 years, and that the production of available forage can increase 5-10 times. A mosaic of disturbed and undisturbed sites across the landscape would be expected to enhance plant condition while improving wildlife distribution and grazing/browsing intensity.

Carrying Capacity / Supplemental Feeding

Although superbly adapted to Rocky Mountain climates, mule deer in the Gunnison area are periodically subjected to severe winters which may result in significant mortality. The winters of 1978-79, 1983-84, 1996-97, and 2007-08 are recent examples of how unforgiving winters may be in the area. In naturally functioning systems large-scale winter mortality events regulate mule deer populations, which allows plant communities' recovery time following periods of increased herbivory during population peaks. In general, dramatic population fluctuations are no longer acceptable to the general public and big game hunters, based on the emotional response to seeing large numbers of animals die and the potential impacts to hunt quality and opportunity. The same may be said for local economic interests that rely on predictable levels of wildlife related tourism. CPW currently maintains a policy pertaining to feeding big game animals during severe winters, and supplemental feeding programs have been initiated during the four winters previously mentioned with variable success. The winter of 2007-08 was particularly severe and warrants additional discussion. Mule deer management in the Gunnison Basin is ultimately constrained by severe winters.

Winter 2007-08

The winter of 2007-2008 was perhaps the worst in recorded history for the Gunnison Basin. Based on weather data compiled at the Gunnison County Electric Association (GCEA) weather station for the National Oceanic and Atmospheric Administration (NOAA), total snowfall from October 2007 through March 2008 was 95.5 inches. Twenty inches of heavy wet snow fell December 6th and 7th resulting in a heavy snow layer that compressed and encased mountain shrub communities across the Basin. From January 4-7 another 19 inches of lighter snow fell on the heavy December blanket. During February, 21 inches of snow fell from the 1st through the 8th. These measurements were from the weather station to the west of Gunnison in the valley floor. Thus, snow accumulations may have been more substantial in higher elevation winter range areas in many parts of the Basin. Furthermore, based on the GCEA weather station data, December through March temperatures were significantly colder than the 107 year averages.

The heavy snowfalls and low temperatures resulted in nearly 100% snow cover across the landscape from the second week in December 2007 through most of March 2008. By January, big game animals throughout the Basin had become more concentrated in severe winter range areas and mobility was significantly restricted. Overall, the snowpack was still relatively soft, but areas with heavy drifting and crust development were being observed. Periodic wind events were critical, however, for maintaining small strips of windblown ridgeline on west and southwesterly aspects. Deer and elk were still able to move short distances through deep snows although locomotion was becoming energetically expensive. At this time, some mule deer mortality had already been observed, primarily of older age-class bucks. With potentially four to five more months of winter ahead, discussions began about starting a supplemental feeding program, which ultimately was authorized by the Director of the former Colorado Division of Wildlife on January 8, 2008.

Mule deer are a very important game species in Colorado, and are of tremendous interest in the Gunnison Basin. Local predictions of mortality resulting from the 07-08 winter varied. The debate over the magnitude of deer losses during the winter predictably progressed into discussions pertaining to hunting license allocation for the fall of 2008. Despite the multi-million dollar feeding program, local sentiment ranged from no reductions in license numbers to multi-year closure of all deer hunting in the game management units surrounding Gunnison. The DAU plan objectives at that time were set largely based on public desire, despite the history of periodic severe winters in the Gunnison area and the notion that winter feeding programs would be able to maintain herds at high population levels over time. Various lessons were learned from the 2007-08 winter, which were relevant in the development of current management objectives:

- <u>*Population Objectives:*</u> Most would agree that the mule deer herd in the Gunnison Basin had exceeded winter range carrying capacity by the mid-2000's. Prescribed hunter harvest had been gradually reducing the population prior to the 07-08 winter; however the level of harvest was insufficient for reducing the high density of animals. While it may not be requisite to manage specifically for an 07-08 winter, these types of events must be recognized as the primary limiting factor for deer populations in the Gunnison Basin. Deer are going to die during severe winters, however, maintaining lower densities of animals is logically going to promote overall higher survival rates.

- *Buck:Doe Ratio:* Mature bucks were some of the first animals to die during the 07-08 winter, which was not unexpected. For many years, big game managers have discussed the ramifications of "stockpiling" mule deer bucks in areas prone to severe winters. The breeding period for mule deer in the Gunnison Basin typically peaks during mid to late November and extends into early December. Bucks exert a tremendous amount of energy tending does and competing with rival males during the rut, and many enter winter in a weakened condition. Mule deer bucks use up precious fat reserves and often sustain injuries during the breeding season which has obvious survival implications. Dominant bucks in their prime (ie. those with the largest antlers and body size) often enter the winter in the poorest condition and are much more likely to succumb to the rigors of the season. There is a direct correlation between the cumulative "cost" of the rut and the number of males maintained in a population. Sportsmen should be mindful of the long-term impacts severe winters have on mule deer populations managed for high buck:doe ratios.

- *Hunting Opportunity:* Hunting opportunity for both bucks and does is dependent on population performance, with winter severity playing a key role. Following the 07-08 winter, despite an intensive feeding program that at its peak reached nearly 10,000 deer on feed grounds, hunting licenses were dramatically reduced. Significant license reductions were made in 2008 Basin-wide, followed by additional license reductions and the elimination of doe hunts in 2009. Managing for high buck:doe ratios and population objectives will require longer periods of recovery following severe winters. This equates to reduced hunting opportunity for an indeterminate period of time. Population recovery is dependent on a number of variables, many of which are outside of management control. Those include annual natality rates, summer & winter fawn survival rates, and adult female survival rates. In 2012, managers recommended moderate buck license increases for the first time since 2007. Doe licenses have not been issued since 2008, and may not be issued for several more years depending on how quickly this population reaches population objective. Higher objectives = longer recovery times = reduced hunting opportunity.

- *Lag Effects:* Severe winter events are likely to directly impact a population across multiple years. Not only was the D-21 population reduced in 07-08, but substantially below average survival rates were also observed the following year (particularly for fawns with a measured 29% over-winter survival rate). This was likely a response to extremely poor body condition and the lengthy physiological recovery that 07-08 survivors experienced. This lag effect substantially reduced the recovery potential in the DAU.

- *Population objective & buck:doe ratio* There is an important relationship between a DAU population objective and the buck:doe ratio. These two objectives dictate how many *does* are maintained within a given population, and therefore what the reproductive potential of the herd is. When the population level is capped and you are required to maintain a higher proportion of bucks, the relative proportion of does is decreased. Higher buck:doe ratios = lower reproductive potential which may prolong recovery time following severe winters.

HUNTING

Quality Management

The concept of managing big game populations for "quality" hunting continues to foster debate, and hunters clearly disagree on the definition of quality. To some hunters, quality is synonymous with trophy antler size and the opportunity to see numerous trophy class animals over the course of a hunt. Others perceive quality as being in the field with reduced hunter crowding, and having the opportunity to see undisturbed animals on a regular basis. There are also hunters that consider a week in the woods with friends and family a quality hunt, regardless of whether they see numerous animals while hunting. In the Gunnison Basin, discussions related to quality focus on trophy buck management. Record book mule deer (measured in terms of their Boone & Crockett score) remain a highly sought after commodity amongst big game hunters and the Gunnison area continues to receive notoriety as one of the premier places in the west to find a trophy mule deer buck. Despite the severe winter of 2007-08, application rates for limited licenses remain strong. Auction and Raffle hunters continue to come to the Gunnison Basin and have harvested

several bucks in recent years. Landowner vouchers in the area are still selling for thousands of dollars, demonstrating the local interest in mule deer hunting.

The deer population in the Gunnison Basin is currently below the level it was prior to 07-08, however conservative license allocation and several average to below-average winters have resulted in noticeable increases in the total number of deer and observed buck:doe ratios. The winter of 2011-12 was particularly mild, resulting in fawn survival rates that were well above the statewide average. Most would agree that the deer hunting up through 2007 was extraordinary in the Gunnison area, albeit unsustainable. Hunters that participated in deer hunts prior to 2008 will likely always compare management with their previous experiences. Managers will always strive to promote healthy deer populations and hunter satisfaction, but it is unlikely that the deer herds will ever look as they did prior to the 07-08 winter. Future management attempts to put greater emphasis on winter range carrying capacity, while also maintaining a quality hunting experience.

One final point should be made regarding quality management and sex ratio objectives. As discussed in the 2007 DAU plan, there remains the perception that extremely high buck:doe ratios must be maintained in order to produce trophy mule deer bucks (ie. $\geq$ 40:100). While this may be partially true, it is not entirely requisite, as evidenced by the numerous mature bucks that are taken by hunters across the state in units managing for lower sex ratios. CPW manages for a specified buck:doe ratio and not a specific age class or size of animal. In migratory, predominately public land residing mule deer herds, that level of micro-management is not practical, nor is it necessary for sustaining healthy deer populations. In Colorado, a six year old three-point buck that scores 160 B&C is not treated any differently than a six year old four-point that scores 190 B&C. This is an important concept, and one that is discussed annually with hunters and landowners not familiar with Colorado management systems. There are many factors that contribute to the number and age structure of bucks in a given population. Hunter access and selectivity, winter severity, and media attention are all factors that play a role in the availability of older-age class bucks in a DAU. High preference point requirements and management for high buck:doe ratios, does not necessarily equate to a Boone & Crockett animal for every license holder.

Hunter Opportunity

A key element of big game management is the publics' desired level of hunting opportunity. Some hunters prefer to hunt every year, whereas others would wait five or more years in order to hunt in a highly sought after unit. Some hunters forego multiple years of hunting in order to build preference points, while others are willing to buy expensive landowner vouchers in order to hunt every year. Trophy mule deer bucks remain one of the most sought after big game animals in the western United States, and hunters are continuously seeking opportunities to hunt trophy deer. Technological and societal changes over the last ten to fifteen years (internet, hunting media, hunting consultants, etc.) have led to an environment where hunting "hot-spots" are quickly disseminated to the hunting community. Many hunters now apply for licenses in multiple states each year and the demand for highly sought after permits has increased markedly. In 1999, there were 921 first choice applicants for buck licenses in D-21. In 2007, there were 2,393 applicants for either-sex and antlered licenses, which amounted to more than a 150% increase. Demand for limited deer licenses in the Gunnison Basin has declined since the winter of 07-08, however it is likely that there will be a resurgence of interest as future management objectives are achieved, and as buck age structure improves over time. In 2011, there were 802 first choice applicants for buck licenses in GMU 54. The potential trade-offs between quality management and hunting opportunity were discussed at length with the public during this planning process.

ELK MANAGEMENT

Elk management in the Gunnison Basin has generated considerable controversy over the last ten to fifteen years, specifically with regard to limited vs. unlimited hunting opportunity, and the difficulties in achieving herd objectives in some DAU's. There are currently three elk DAUs in the Basin, with healthy populations residing in each. Elk management has been a topic of interest with regard to mule deer based primarily on the potential for competition between species, specifically during heavy winters. During severe winters, elk and deer become concentrated on limited winter ranges and the level of direct and indirect competition for space and forage increases. Members of the public and agency personnel have expressed concern that static or increasing numbers of elk may have deleterious effects on local mule deer populations; however

that is difficult to quantify. Elk harvest in the northern Gunnison Basin has been of chief concern, as it is driven primarily by weather and success rates are highly variable. In these units, CPW is currently reducing elk herds, and recognizes that the number of elk maintained in the Basin has some influence over mule deer populations.

PUBLIC INVOLVEMENT / ALTERNATIVE SELECTION

Local big game management issues are of interest to constituents in the Gunnison Basin, Colorado, and across the country, both from a biological and socio-economic standpoint. CPW provided substantial opportunity for the public to participate in the development of this DAU plan. The following chronology is provided, which highlights key steps during the process:

June 2012: Development of on-line surveys using Survey Monkey. Considerable discussion occurred during the creation of these surveys, with reliance on the expertise provided from CPW's Public Involvement section.
July 10, 2012: DAU Surveys posted on-line; links were available on the CPW website. At approximately the same time, 4,000 postcards were sent to 2012 & 2011 first-choice license applicants and all of the landowners enrolled in the priority preference landowner program in the three DAU's. This consisted of 790 postcards sent for D-21, 1,636 for D22, and 1,574 for D25. The postcards were intended to cultivate interest and provide notification that the DAU plans were being reviewed and that an on-line survey was available (with the survey links). Postcard recipient or not, any individual interested in the process was welcomed to take the survey(s). They were available until August 10th with the goal of maximizing participation.
July 20, 2012: Personalized letters were sent to various constituents outlining the DAU process and requesting attendance at several public meetings. The mailing also solicited formal comments pertaining to mule deer management in the local DAUs. Those letters were sent to the Saguache, Gunnison, and Hinsdale County Commissioners, Gunnison Wildlife Association, Gunnison Guides & Outfitters, Colorado Outfitters Association, Hinsdale and Gunnison County Chambers of Commerce, Gunnison County Stockgrowers Association, Gunnison Basin HPP Committee, and the local Forest Service and BLM offices.
July-October 2012: Multiple press releases and web postings were made informing the public of the DAU planning process, advising them of upcoming meetings, and providing them with the links to take the on-line surveys.
July 26, 2012: The first public meeting was held in the evening at the Western State Colorado University campus in Gunnison. At this meeting managers discussed the DAU planning process, mule deer management issues, and solicited public comment. CPW provided basic DAU information and provided the on-line survey links. 11 people attended that meeting.
August 6, 2012: A second public meeting was held in the evening at the Coursey Annex in Lake City. At this meeting managers discussed the DAU planning process, mule deer management issues, and solicited public comment. CPW provided basic DAU information and provided the on-line survey links. 8 people attended that meeting.
August-September 2012: Review of on-line survey data, development of draft DAU plans.
October-January 2012 /2013: Draft DAU plans & Survey results posted on CPW website for public review; comments welcomed.
October 17, 2012: Meeting with Hinsdale County Commission; discussion of draft DAU plans. Open to public.
October 18, 2012: Meeting with Gunnison Basin Habitat Partnership Program (HPP) committee; discussion of draft DAU plans.
October 23, 2012: Meeting with Gunnison County Commission; discussion of draft DAU plans. Open to public.
December 6-7, 2012: Colorado Parks and Wildlife Commission meeting; Draft DAU plans introduced. Open to public.
January 10-11, 2013: Colorado Parks and Wildlife Commission meeting; Draft DAU plans approved as final. Open to public.

Survey Results

Public participation in this process exceeded expectations. Clearly this can be attributed to the development of internet surveys, and the convenience that on-line participation allows. One of the questions asked in the surveys (*Question #27*) was how folks would like to be kept informed about management issues. In all three surveys, the number one response was the CPW website or other websites. For comparison, in all three surveys, less than 6% of respondents indicated that public meetings or open houses were their preferred method of informing themselves about mule deer management issues. These results suggest that managers seeking to expeditiously and inexpensively solicit input from the broadest audience possible should incorporate on-line surveys into their scoping processes.

Similar to previous public outreach efforts, the goal of this survey was to attain a broad, representative sample of opinions from constituents interested in Gunnison Basin mule deer management. When the survey closed, 231 individuals had submitted responses for D-21. The survey summary was lengthy and was available by request as a separate appendix. The written comments were perhaps the most interesting portion of the surveys; however the following key survey results are worth including here:

- ✓ 67% of respondents were residents; 93% of respondents identified themselves as "hunter or sportsperson"
- ✓ 55% of respondents indicated they would give up more frequent hunting opportunity to maximize the number of older aged bucks in the unit
- ✓ The majority of respondents (91%) indicated they would like to draw buck licenses on a frequency of five years or less
- ✓ 63% of respondents indicated that harvesting an animal with a high Boone & Crockett score was somewhat important or very important
- ✓ 74% of respondents indicated they preferred to maintain the current number of licenses or reduce the current number of licenses in order to maintain or increase the unit sex ratio
- ✓ 79% of respondents indicated they preferred to see the population increase somewhat or increase greatly
- ✓ 77% of respondents indicated they would like the number of bucks in the unit to increase somewhat or increase greatly

Objective Alternatives

This section includes some of the potential alternatives for managing the D-21 mule deer herd that were presented during the planning process. For DAU planning, there are logically three general alternatives available with some variation. Selection of an alternative sets population and sex ratio objectives, and subsequently dictates the number of licenses issued in a GMU. These basic alternatives include status quo, increased population and/or sex ratio objectives, or decreased population and/or sex ratio objectives.

Various alternatives were presented in Table 2. Alternatives were stated as a range rather than a fixed number. Setting an objective range recognizes that population management is a continuously evolving, inexact science, but more importantly, a range allows greater flexibility on an annual basis for management in the DAU. As stated earlier in this plan, there is an important relationship between the buck:doe ratio selected and the total population objective; however they can be viewed as independent variables. In Table 2, "Alternative 1" for population did not directly correspond to "Alternative 1" for the sex ratio. Any combination of these population and sex ratio alternatives could have been selected.

Table 2. D-21 Population & Buck:DoeRatio Alternatives

Possible Alternatives for D-21 Population & Buck:Doe Ratio Objectives		
Population Alternatives	Post-hunt Population	***2011 Post-hunt Estimate = 4,400***
Alternative 1	4,000-4,500	
Alternative 2	4,500-5,000	
Alternative 3	5,000-5,500	
Alternative 4	5,500-6,000	
Sex Ratio Alternatives	Bucks:100 Does	***2011 Post-hunt Estimate = 45 bucks:100 does***
Alternative 1	30-35:100	
Alternative 2	35-40:100	
Alternative 3	40-45:100	
Alternative 4	45-50:100	

Final Management Plan Objectives

Considerable public scoping and dialogue occurred during this process through meetings, on-line surveys, written comments, emails, phone conversations, and face-to-face communications. As expected, the majority of individuals engaged were resident deer hunters. Input on objectives was diverse; however there was an apparent majority opinion regarding future management of this herd. Population and sex ratio are discussed separately below:

Population: It was evident that most hunters were interested in seeing the D-21 deer population increase. This was not surprising following the declines that resulted from the 2007-08 winter. The population remains below pre-07/08 levels so there is certainly potential to grow the herd. CPW does not support increasing this population back to mid-2000 levels, but supports a moderate increase. The reality, however, is that it will take several years to grow the population assuming average winter severity and average or above average survival rates. Limited doe hunting will not be possible if management aims to increase the D-21 population.

Sex Ratio: Based on public comment, there was an apparent majority of GMU 54 hunters that were willing to sacrifice more frequent hunting opportunity for higher sex ratios, and interest in maintaining or increasing the current buck:doe ratio. The sex ratio in D-21 is already quite high; therefore additional hunting opportunity may already be possible. License allocation is driven by management plan objectives and the array of other factors influencing mule deer population dynamics. There was discussion during this planning process of creating three separate management "regimes" for the three DAU's in the Basin. Some suggested one DAU be managed for maximum quality, one be managed for maximum opportunity, and one be managed somewhere in between. That idea was certainly worth considering, but after considerable discussion, CPW managers decided that maintaining a similar management philosophy between the DAU's provided the greatest degree of equity for constituents across the board.

In conclusion, there were a multitude of objectives that could have been selected for managing the D-21 population; however after thorough consideration the following management objectives were selected:

- **Post-hunt Population Objective = 5,000-5,500**
- **Sex Ratio Objective = 35-40 bucks : 100 does**

Potential advantages:

- This management scenario continues to provide high quality buck hunting and maintains older age classes of males
- This management scenario is expected to enhance the balance between hunt quality and opportunity
- Most survey respondents indicated they would prefer to hunt every five years or less; this alternative strives to accommodate that public desire
- A slightly reduced sex ratio objective potentially allows for increased license allocation; this is expected to help partially mitigate future preference point requirements
- Following severe winters, slightly shorter recovery periods are anticipated for restoring the overall population and the male segment of the population
- Post-rut bucks may enter winter in better condition, thus increasing survival
- Success rates will likely remain high across all seasons
- This population level is expected to be below the winter range carrying capacity during most winters, thus reducing the overall utilization of key forage species, while recognizing the importance of density dependent population constraints

Potential disadvantages:

- This scenario recognizes the public demand for a larger deer population, but will preclude antlerless hunting until the objective has been reached and maintained
- National publicity of Gunnison mule deer hunting is expected to keep preference point requirements at least at their current level; however it is likely that point requirements may increase over time
- Although reduced from the former plan objective of 40-45:100, restoring a buck:doe ratio of 35-40 following a severe winter will still require an extended and indeterminate recovery time
- Severe winters will result in reduced overall hunting opportunity for indefinite periods of time
- Hunters should be cognizant that winter feeding programs are not sufficient for maintaining older age classes of mule deer bucks, and should expect that the number of mature bucks will be reduced as a result of severe winters; recovery times will be variable
- Many negative comments were received during public scoping related to the current landowner voucher program, and other social issues. Selecting these management objectives is not likely to result in changes to these programs or issues over time. Hunters should expect that both the biological and social landscapes will look very similar to what they have over the last 10 years in D-21

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APPENDIX I. History of the Citizen's Task Force (CTF): 2001 DAU Plan Development

Data Analysis Unit (DAU) plans are the cornerstone of big game management for each mule deer population in the state. DAU plans are written in order to provide management direction that potentially spans over a ten-year period, making plan objectives critical. In the late 1990's, it became evident that local publics were strongly interested in becoming more involved in wildlife decision making processes. In order to increase the level of local public participation in the Gunnison Basin, CPW recommended that a new process be tested for developing DAU plan objectives. A coalition known as the Citizen's Task Force (CTF) was created, which was based on a process developed in New York State. It is important to mention the CTF process, as it was largely responsible for the previous management objectives presented in local mule deer DAU plans.

Public meetings were held in Lake City and Gunnison on December 16th and 17th, 1997 where the CTF process was described and issues were identified, ranked and recorded using a nominal group technique. Interested parties identified their "stake" or interest in the process, and several individuals volunteered to serve as CTF members. In January 1998, representatives of CPW, Gunnison Basin Habitat Partnership Committee (HPP), Forest Service, and BLM met to nominate individuals to serve on the CTF. Twenty-five people were contacted to determine if they would serve on the task force, with 17 accepting. There were three members representing business interests, two representing sportspersons, two representing the environmental community, two to represent ranchers, two to represent outfitters, three representing the general public, and three representing local, state and federal agencies. A third sportsman was added at the request of a sportsman's group, bringing the CTF to 18 members.

The first CTF meeting was held January 13, 1998 in Gunnison. The CTF was delegated the task of developing recommendations for post-season herd size and sex ratio composition for each of the seven DAUs in the Gunnison Basin (three elk, three deer, and one pronghorn). The premise of the CTF was that each member would solicit input from their constituents, which would be brought back to the group and incorporated into selected management recommendations. All meetings were open to the public and consensus was sought for each recommendation. Members of the public in attendance (which varied from 4 to 100) were allowed to ask questions or make statements of fact or opinion. However, only members of the CTF were allowed to vote on decision items.

The initial strategy was to have three CTF meetings in order to develop recommendations. However, due to a variety of factors, the CTF met a total of eleven times with the final meeting taking place in April of 2000. All recommendations except the population size for the three deer DAUs were reached by consensus. Decisions on deer numbers ultimately were reached by a 9-4 majority vote. The final CTF recommendations were presented to the Colorado Wildlife Commission and were integrated into the previous DAU plans approved in 2001. The 2001 DAU plan objectives were: Population = 4,500; sex ratio: 35 bucks: 100 does.

APPENDIX II. Gunnison Basin Chronic Wasting Disease (CWD) Monitoring 2002-2005

Chronic wasting disease (CWD) is a neurological disease occurring in members of the cervid family, which includes mule deer. CWD has been of concern to wildlife managers both from a herd health and human health standpoint. With regard to mule deer, issues such as population density, supplemental feeding, and sex and age specific prevalence rates are important when discussing Chronic Wasting Disease. In 2005, CWD testing was mandatory for mule deer in the three Gunnison Basin mule deer DAUs. This regulation was implemented based primarily on the fact that sample sizes were not being achieved through voluntary submissions, and because winter feeding had occurred several times over the last 30 years. CPW determined that a sample size of 300 animals over a three-year period was adequate for determining presence or absence of CWD within a DAU. In 2005, head submission rates were around 80% in the Gunnison Basin, and no CWD positive animals were detected (Table 3).

CWD testing is currently voluntary in the Gunnison Basin, and submission rates are typically quite low. If Chronic Wasting Disease is detected in one of the local DAUs, managers may need to reevaluate management objectives if they are deemed incompatible with CWD risks.

Table 3. Gunnison Basin CWD Submissions by DAU 2002-2005

	Estimated harvest	***CWD submissions***	***Estimated submission rate***
D-21 2002	*129*	*32*	*24.8%*
D-21 2003	*350*	*30*	*8.6%*
D-21 2004	*383*	*21*	*5.5%*
D-21 2005	***389***	***343***	***88.2%***
D-22 2002	*234*	*53*	*22.6%*
D-22 2003	*491*	*41*	*8.4%*
D-22 2004	*576*	*30*	*5.2%*
D-22 2005	***661***	***538***	***81.4%***
D-25 2002	*202*	*51*	*25.2%*
D-25 2003	*430*	*45*	*10.5%*
D-25 2004	*385*	*31*	*8.1%*
D-25 2005	***486***	***380***	***78.2%***