

# DAU E-10 (Yellow Creek) EXECUTIVE SUMMARY

January 2006

**GMUs:** 21, 22, 30, 31, 32

**Land Ownership:** 29% Private, 70% BLM, 1% State

**Post-hunt Population Objective:** 7,000-9,000    **2004 Estimate:** 8,700    **Previous:** 8,000- 10,000

**Post-hunt Composition Objective:** 18-22    **2004 Observed:** 16    **2004 Modeled:** 26

**Previous:** 18-22

Figure 1. E-10 Post-hunt Population Estimate

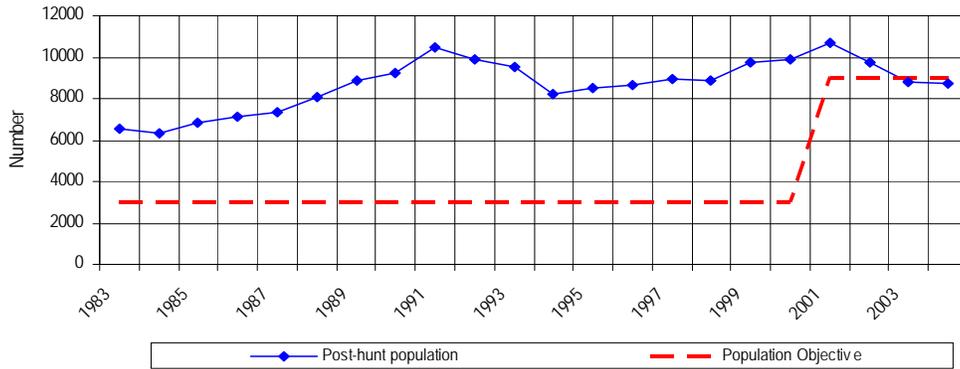


Figure 2. E-10 Harvest

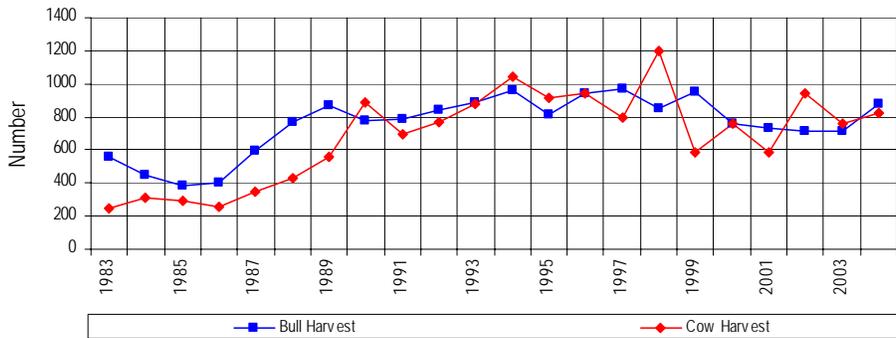
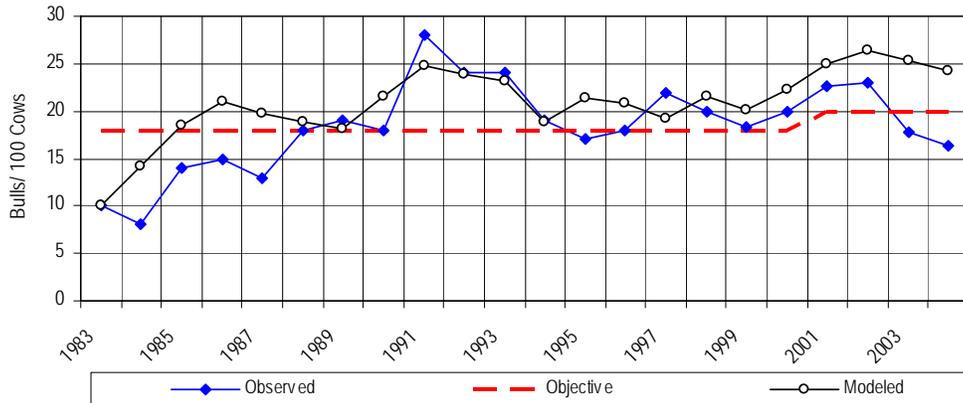


Figure 3. E-10 Post-hunt Bulls/100 Cows



## **E-10 BACKGROUND**

The Yellow Creek E-10 DAU is located in west-central Colorado and includes the Bookcliffs, Piceance Basin, Roan Plateau areas. The elk population in DAU E-10 was relatively low in the 1950's and has shown steady growth in recent years. The population peaked in 2001 at 10,725 elk, and is now approximately 8,700 elk.

The population objective for the Yellow Creek DAU of 3,000 elk has never been formalized. The objective was based on early models that underestimated the population and is unrealistically low. More advanced and sophisticated models estimate a current population size of 8,700. The population objective was established prior to the development of DAU plans and process of development of population objectives. Thus, there has not been extensive public review or review by the BLM of the population objective of 3,000 elk.

A more realistic population objective is probably 8,000- 10,000 elk. This objective was first introduced during the DAU planning process begun in 1999 and was selected as the preferred alternative, prior to the postponement of plan approvals due to CWD concerns. This population objective is the basis for this DAU planning process.

The current composition objective is 18-22 bulls: 100 cows. In the past it has been 18 bulls: 100 cows: the change reflects an awareness of the inherent vacillations associated with unlimited bull harvest and is not a significant change in management strategy.

The CDOW has conducted aerial sex and age composition surveys in E-10 since 1981. Early records in the 1980's show that total bull: cow ratios were around 10 bulls: 100 cows. These ratios have steadily increased to average approximately 18.4 bulls: 100 cows.

Calf production in the DAU has been excellent over the years, as high as 61 calves: 100 cows. However, calf production has been declining in recent years, and is currently around 40 calves per 100 cows.

Elk harvest in the DAU E-10 has changed substantially over time, increasing with the population. About 40 times more animals were killed in 1998 as in 1953. In 1953 the harvest was 39 antlered and 10 antlerless. By 1998 the harvest had increased to a record 2042 elk, of which 845 were antlered and 1197 were antlerless elk. Approximately 1700 animals were harvested in 2004, of which 880 were antlered and 820 were antlerless.

## **SIGNIFICANT ISSUES:**

The most important aspect of the DAU planning process is obtaining input from all segments of the affected local populations, including the BLM and interested public.

Public meetings were held to solicit input from the BLM, the local public, and the Boards of County Commissioners. A questionnaire was available at these public meetings and on the DOW web site to solicit opinions from the public. BLM concerns were focused primarily on maintaining the elk population numbers at current levels and the potential impact of future oil and gas development on elk numbers and distribution. Primary public concern centered on loss of elk habitat, competition with livestock, and the revenues that elk hunting produces.

Various issues regarding this DAU have also arisen internally. The most significant issues involve habitat quality on winter range, wild horse competition with wildlife, and oil and natural gas development. The most significant of these is the oil and gas development.

Proposed oil and gas development in this DAU, particularly on the Roan Plateau and in the Piceance Basin has and will continue to significantly increase. These impacts may have a dramatic and potentially negative effect on the quality of elk habitat, thereby affecting this herd in the future. Although the scope of this document does not include anticipating the impacts of proposed projects, the potential impacts must be recognized and an adaptive management strategy must be employed to most effectively account for impacts caused by oil and gas development.

## **E-10 MANAGEMENT ALTERNATIVES**

Three post-hunt population objective alternatives were proposed for E-10 (1) 8,000 – 10,000, (2) 6,000 – 8,000, or (3) 12,000-14,000. This population has been within the current objective range for the last 4 years, and a downward or stable trend will maintain the population within the objective range.

Three post-hunt composition objectives were proposed for E-10 (1) 18-22 bulls: 100 cows, (2) 12-15 bulls: 100 cows, or (3) 30-35 bulls: 100 cows. Alternative 1 would maintain the current management regime; alternative 2 would slightly increase the bull licenses available, while alternative 3 would require a shift to completely limited bull licenses.

As a result of this DAU planning process, a final population size objective of 7,000 – 9,000 elk was selected and a population composition objective of 18– 22 bulls: 100 cows was selected to manage the E-10 elk herd.

YELLOW CREEK  
DAU E-10  
HERD MANAGEMENT PLAN

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# YELLOW CREEK ELK MANAGEMENT PLAN

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## INTRODUCTION AND PURPOSE

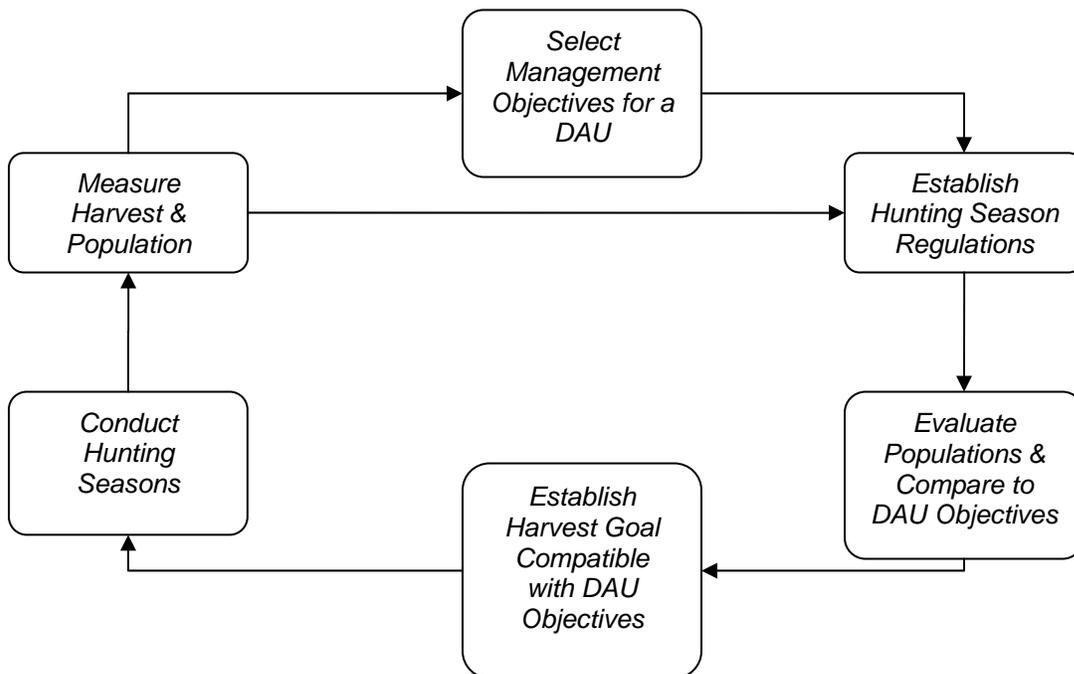
The Colorado Division of Wildlife (CDOW) manages wildlife for the use, benefit, and enjoyment of the people of the state within the guidelines set forth in the CDOW's Strategic Plan, Five Year Season Structures, and mandates from the Wildlife Commission and Colorado legislature. Colorado's wildlife resources require careful and increasingly intensive management to accommodate the many and varied public demands, as well as increasing impacts from a steadily growing human population. The primary tool that the CDOW uses to manage game wildlife within the state is annual hunting seasons. Historically, big game seasons have been set as a result of tradition or political pressures. Often, the seasons that resulted did not adequately address big game population dynamics or current habitat conditions and pressures.

More recently, big game herds within the state are managed at the herd level, called a Data Analysis Unit (DAU). DAU boundaries are drawn so that they approximate an area where most of the animals are born, raised, and die with as little ingress or egress from other herds as possible. Normally, each DAU is composed of several game management units (GMUs). Within these DAU's, the herd is managed using the guiding principles set forth in the comprehensive DAU plan.

These DAU plans are updated at five year intervals through a public planning process that incorporates big game management principles and the many and varied public interests associated with Colorado's wildlife, as well as the mandates of the Wildlife Commission and state legislature. As many interested parties as possible are involved in the planning process, including the U.S. Forest Service, Bureau of Land Management, sportsmen, guides and outfitters, farmers, ranchers, the business community, outdoor recreationists, anglers, and the wildlife viewing public. All these groups have a vital interest in the size and composition of the state's big game herds.

The DAU plan establishes two primary management objectives: the approximate post-hunt population size objective, and the post-hunt composition (number of bulls per 100 cows) objective. They are referred to as the DAU population and composition objectives, respectively. These two objectives determine the overall size and structure of the population and influence the management strategies used to reach the goals. The DAU plan also collects and organizes most of the important management data for the herd into one planning document, determines relevant issues through a public scoping process, identifies alternative management strategies to resolve these issues, and finally selects the preferred management objective alternative.

Once these population and composition objectives are set through the DAU planning process, the CDOW has the responsibility to work to achieve these goals on a yearly basis. The population objective drives the most important decision in the establishment of the annual big game hunting seasons: how many animals need to be harvested to maintain or achieve the population objective. To reach these objectives, the CDOW uses a method called "Management by Objectives" approach (Figure 1).



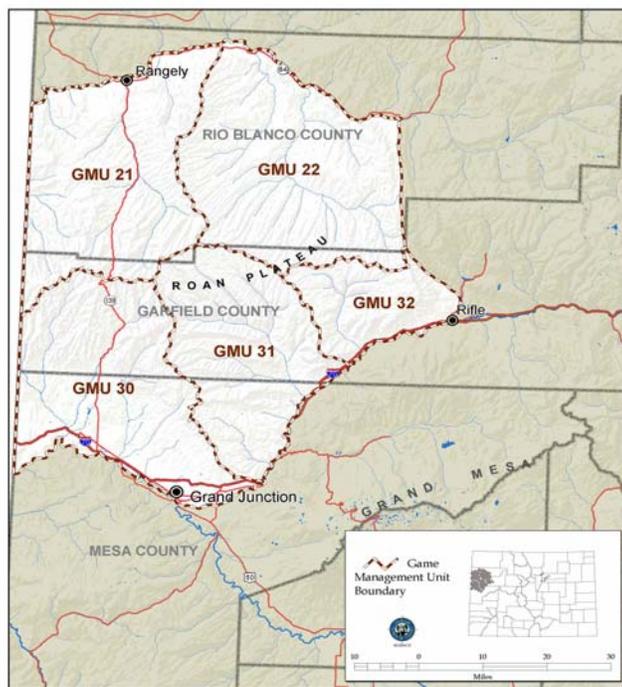
**Figure 1. CDOW's Management by Objective Process.**

To collect and analyze the data necessary to attain these goals, CDOW biologists use post-hunt aerial classification surveys and computer models. The data collected during annual aerial surveys are used in these computer models and allow biologists to estimate population size and structure. These estimates are then used to generate harvest recommendations that will align population estimates with the herd population objectives generated by the DAU planning process.

# DESCRIPTION OF DAU E-10

## Location

Data Analysis Unit E-10 is located in west-central Colorado and is commonly called the Yellow Creek DAU. It is bounded on the north by the White River, on the east by Colorado State Highway 13, on the south by the Colorado River, and on the west by the Colorado-Utah state line (Figure 2). There are three counties within the DAU: Mesa, Garfield, and Rio Blanco.



Location of Elk DAU E-10 (GMUs 21, 22, 30, 31, 32), West-central Colorado

**Figure 2. DAU E-10 and its location within Colorado.**

DAU E-10 is comprised of five GMUs. The GMUs are the following sizes: GMU 21: 889 sq. mi.; GMU 22: 988 sq. mi.; GMU 30: 868 sq. mi.; GMU 31: 702 sq. mi.; GMU 32: 301 sq. mi. The total DAU is 3748 sq. mi. in size.

## **Geography**

The southern portion of the DAU is dominated by the Bookcliffs, an escarpment that runs from the Utah state line to Rifle, CO. In the northern portion of the DAU, Piceance Creek and the Piceance Basin comprise a large portion of the area. Yellow Creek, which flows into the White River, is the drainage for which the DAU is named.

The topography varies greatly in the DAU. The highest elevations are at the center at the top of the Bookcliffs, and the elevations decrease in all directions from there. The highest elevation in the DAU is approximately 9,300 near Anvil Point in GMU 32. The lowest elevation is approximately 4,600 feet where the Colorado River meets the Utah state line. The area is noted for its canyon country to the south and rolling pinyon-juniper/sagebrush/mountain shrub steppe to the north.

The Colorado River forms the southern boundary of the DAU. Interstate 70 parallels the Colorado River over a large portion of the southern boundary, forming a significant barrier that restricts elk movements throughout much of the southern portion of the DAU. Additionally, desert-like, open terrain north of Grand Junction acts as another natural barrier restricting elk movements in this area. Along the eastern boundary, Highway 13 is the DAU boundary and is the most likely area where substantial elk ingress and egress from the DAU can occur.

Steep-sided sandstone and shale canyons are one of the dominant geographic features of this DAU. The Bookcliffs are a generally continuous, uniformly high cliff formation with canyons and washes running north to south toward the Colorado River. In the upper reaches of GMUs 30, 31, and 32, large canyons bisect the topography at frequent intervals. The interior portions of the DAU are composed of mesas and rolling sagebrush hills. The general terrain is less fragmented and more open in these interior areas.

The Colorado and White Rivers border the DAU on the north and south. Large drainages in the DAU include Douglas Creek, Roan Creek, Parachute Creek, Piceance Creek, and Salt Creek. There are numerous dry washes throughout the DAU. However, due to the significantly high elevations in the center of the unit, considerable moisture falls throughout the year, such that perennial streams are not uncommon. There are no large natural lakes in the DAU although small reservoirs, primarily for livestock, have been constructed.

The wide range of terrain in E-10 provides a variety of physical features that elk populations find very suitable for their needs year-round. The majority of elk summer in the interior of the DAU at high elevations. Winter ranges are generally on the periphery, at lower elevations.

## **Vegetation**

Vegetation within this DAU varies with the wide range of elevations that occur. 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

desert areas. Cheatgrass dominates the lower understory in many areas in the desert. Pinyon-juniper woodlands are common on the lower and intermediate slopes throughout the DAU. Oakbrush is found in the pinyon-juniper woodlands at higher elevations. A combination of sagebrush and snowberry are commonly found in open areas in the oakbrush zone at 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 in valleys, irrigated lands composed primarily of grass/alfalfa meadows are common. Roan and Piceance Creeks have numerous irrigated fields. Cottonwoods, willow, sagebrush and greasewood are commonly found in riparian areas throughout the DAU. Other riparian species include box elder, tamarisk, and alders.

The vegetation in the DAU, particularly within elk range, has been intensively managed for livestock forage. Cattle grazing occurs throughout the unit. Historically, domestic sheep were grazed in significant numbers, but are now limited to a few small flocks.

Human activities have strongly influenced the vegetation in E-10. Natural fire has been suppressed in the DAU for many decades, and pinyon-juniper encroachment on the sagebrush steppe is a significant concern that is impacting wildlife populations by reducing forage suitable for elk.

### Land Ownership

The DAU contains a mixture of public and private lands. Approximately 71% of the total 3748.9 square miles within DAU E-10 is public property. Of the entire DAU, 70% (2622 sq. mi.) of the land is owned by the Bureau of Land Management, 1.1% (42.2 sq. mi.) is owned by CDOW, 0.1% (3.3 sq. mi.) is owned by the State Land Board and 28.8% (1081.6 sq. mi.) is privately owned (Figure 3).

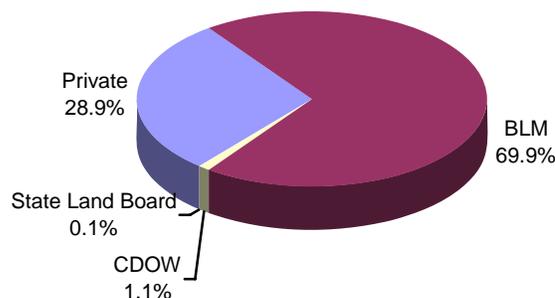


Figure 3. Land Ownership in DAU E-10.

The BLM lands are managed jointly by three Field Offices, located in Grand Junction, Meeker, and Glenwood Springs. The CDOW lands comprise two State Wildlife Areas, Piceance Creek SWA (in GMU 22), and the Square S summer range (GMU 21 & 31).

Primary human population concentrations exist in Grand Junction and throughout the Grand Valley, in Meeker, Rangely, Rifle, Debeque, and Parachute.

## **Land Use**

Because of the wide range in elevation found in DAU E-10, there are many uses occurring across the landscape. Livestock production and outdoor recreation in its many forms are both significant land uses throughout the DAU. Agriculture, in the form of crop production, is limited to specific areas within the DAU, but plays a significant role in wildlife management. Development is primarily limited to concentrated population centers. The major land use that will see significant increases and changes in coming years is the potential for oil and gas development within the DAU.

- **Agriculture**

Much of the private land in the DAU is used to graze livestock throughout the year. Cattle and sheep ranchers graze livestock on BLM lands during various seasons of the year. Livestock are grazed on allotments during the summer and are then moved to home ranches for the winter. Some livestock grazing occurs on BLM during the winter months. The Grand Valley area around Grand Junction and Fruita is extensively farmed with irrigated field. This portion of the DAU is not elk range and thus does not impact elk habitat.

- **Timber Harvest**

Commercial timber is limited mostly to small blocks on private lands. Some Douglas fir has been harvested in recent years. Most of this harvest occurs in GMUs 21 and 31 in rugged canyon areas. Aspen has also been harvested, sometimes as part of other land management practices including benefits for wildlife, including deer and elk. Some firewood is harvested, both commercially and privately.

- **Development**

This DAU has several population centers that lie primarily along the major river drainages. The Grand Valley, in Mesa County, has the largest population in the DAU. Grand Junction is the largest town and is surrounded by other growing populations (Table 1).

The DAU has seen a great deal of population growth within recent years, primarily in the Grand Valley and along Interstate 70. The majority of new housing developments have occurred in elk winter range, fragmenting former sagebrush and agricultural lands. The area north of Grand Junction, in GMU 30, in particular, is seeing rapid conversion of agricultural lands to suburban housing developments. The resulting loss of deer and elk winter range is a significant and increasing concern within the DAU.

<b>COUNTY</b>	<b>TOWN</b>	<b>POPULATION</b>
Mesa	Grand Junction	48,000
	Fruita	8,100
	Debeque	480
	Total County	127,500
Garfield	Silt	2,100
	Rifle	7,500
	Total County	48,400
Rio Blanco	Meeker	2,300
	Rangely	2,100
	Total County	6,000

**Table 1. Human Population Estimates within DAU E-10.**

- **Recreation**

Recreation is probably one of the most visible and extensive uses occurring on all lands in this DAU. Excellent back county hiking, biking, and off highway vehicle (OHV) trails provide numerous days of recreational activity for a large number of visitors. Fishing is limited to some of the larger perennial streams and to several public and private reservoirs.

During the fall, big game hunting is a major event in the DAU. Over 7,000 elk hunters are in the field each season in this DAU. Archery and muzzleloading seasons attract approximately 1200 hunters during late August and September, accounting for approximately 15% of the annual harvest.

Vehicular access varies throughout private and public lands. A network of roads provides ample access to many areas that are open to multi-purpose land uses.

- **Mining and Oil & Gas Development**

A large portion of this DAU lies atop significant deposits of natural gas and oil shale. The Piceance Basin, Roan and Parachute Creek areas, and Dragon area in GMU 21 are being extensively developed for natural gas. Huge reserves are found in these areas and many private companies are either planning for or are undertaking the task of extracting these reserves.

In the past, most oil and gas development has occurred primarily on winter ranges. In the future, it is likely that planned developments will be spread out across both summer and winter ranges, increasing the impact of each development. In addition to the direct impacts of the development, many oil and gas companies own large tracts of former ranch lands. These lands are generally not accessible to the public for hunting, thereby creating vast preserves of un hunted lands, increasing the difficulty of reaching harvest objectives.

This oil and gas development in DAU E-10 will likely significantly impact the quality of deer and elk herds within this DAU and a discussion of these potential impacts can be found in the Issues and Strategies section under Issues and Concerns: CDOW.

Since 2003, natural gas development has increased exponentially in GMUs 22 and 32, with 3 major and 2 large independent oil companies having initiated aggressive drilling programs throughout the central and southern portions of Piceance Basin (about 90 wells). In the short term, forecasts call for steady increases in drilling activity, with about 200 wells anticipated from the White River BLM Field Office in 2006. As infrastructure strengthens and if oil markets remain strong, sharp increases in drilling activity are likely. Surface disturbance attributable to access roads, pads, and pipelines is expected to be substantial in the long term, involving primarily summer range and general winter ranges, with lesser involvement of severe winter range. Development activity will impose dramatically on ranges formerly supporting only ranching and seasonal big game hunting use and is expected to exceed the extent and intensity of influence experienced during the oil shale boom of the 1980's.

Conversely, since the upsurge in natural gas development in Piceance Basin, drilling activity in GMU 21 has declined appreciably, both in extent and intensity. Since 2003, limited drilling activity (e.g., about 70 wells) has been confined to the western margin of GMU 21.

Although projections would be tentative at best, there are indications that an experimental oil shale program in central Piceance Basin will develop over the next 5 years, with as many as four 160-acre tracts being leased and actively developed.

# HABITAT RESOURCE

## Habitat Condition and Capability

The value of the habitat resource is measured by both its condition and its capability (quality and quantity). Both aspects are integral in the overall health and value of the environment available to elk and deer. Availability of food, water and cover are the most basic needs of all wildlife. However, many other aspects of habitat condition and capability influence the overall value of the habitat to wildlife.

Roads and fences fragment the landscape and make wildlife more vulnerable to vehicular collisions and poaching. Elk and deer both tend to avoid roads and other areas of increased human activity. This effectively decreases the overall habitat capability as these roaded areas become essentially useless to elk and deer. Fences impede movement and contribute to mortality in both elk and deer.

### ▪ Browse Conditions

Understory deciduous browse characteristic of Piceance Basin's lower elevation winter ranges generally suffer from low plant vigor and production due to excessive and persistent utilization. The age distribution of these plants is invariably skewed heavily to mature and over mature age classes. Through at least 1989, preferred browse on transitional and early winter ranges incurred average browse utilization levels of 80 to 90% of current annual growth, with the condition intensifying (well in excess of 100% of current leader growth) on lower elevation severe winter ranges where site conditions impose further limitations on plant reproduction and recovery and where maximum animal densities are attained. These utilization levels exceed rates considered maximum for sustained productivity and regeneration (60-70% dormant season use of current annual growth). Since the mid-1990's, declines in deer populations have provided considerable relief to bitterbrush, mountain mahogany and serviceberry plants on the winter ranges, but it is likely that overall utilization on lower elevation severe winter ranges remains near 100% of current annual growth. Furthermore, at least as late as 2000, small transient groups of wintering elk appeared very efficient at quickly removing nearly all current annual growth from bitterbrush and serviceberry plants on severe winter ranges along Piceance Creek.

Similarly, and also characteristic of low elevation winter ranges in the Douglas Creek drainage, Wyoming big sagebrush, black sagebrush, and rubber rabbitbrush sustain heavy utilization during the later winter and early spring months. These plants are generally capable of withstanding intense use, but in many cases, and particularly in the case of big sagebrush, stands are mature or over mature, which may reduce their forage production potential.

In GMU 21, there has been a considerable die-off in sagebrush, primarily among basin big sage stands. These die-offs appear to be primarily among decadent sagebrush stands and may be drought related. Sagebrush die-offs have also been observed in the

Roan Creek area, another major winter range for elk. These losses also appear to be related to over-maturity and drought. This large scale loss of sagebrush could significantly contribute to the overall decline in winter range habitat quality for deer and elk.

Serviceberry dominated stands, particularly in Piceance Basin (7200' and above) are mature and appear to be composed almost entirely of large 30-year old plants whose meager annual growth is beyond the reach of big game. These communities show little history of fire over the last 50 years and are believed to require extreme natural fire conditions to burn. These types have been the target of a number of prescribed burns by BLM over the past 20 years. Much of this habitat type has come under private control since patenting of the 82,000 acres of oil shale claims.

#### ▪ **Rangeland Conditions**

Most livestock operations within the DAU are on a deferred rotation system and range conditions within the DAU generally meet the BLM's Standards and Guidelines for Rangeland Health. Herbaceous composition, density, and growth remaining after the livestock use period are acceptable throughout the uplands. Herbaceous composition and production are consistently in an upward trend. Instances of excessive use or those areas that fail to meet Standards and Guides (estimated at about 5%) is generally confined to the larger drainage bottoms and near sources of water and are typically represented by introduced and/or grazing-tolerant species (e.g., Kentucky bluegrass, cheatgrass). These areas are slow to respond to improved grazing management practices, but recent and continuing emphasis on reducing the duration and intensity of seasonal livestock use is expected to yield progressive improvements on these sites over time. Of mounting concern is the influence of yearlong wild horse use in the larger drainages and basins in the upper Texas Creek drainage where season-long grazing is expanding the conversion of cool-season bunchgrass communities to warm season grasses (i.e., blue grama). Once established, these warm season grass communities are very stable, grazing tolerant, and offer inferior ground cover and forage production properties.

The northern quarter of GMU 21 is made up of a shadscale/sagebrush/Utah juniper complex that is used primarily as winter sheep range. These ranges invariably display excellent range conditions and host strong herbaceous residual through the winter.

About 65% of the Piceance Basin is grazed by livestock on deferred and/or rotation management schemes and, similar to GMU 21, nearly half of this total has been implemented over the past 3 years. Range conditions across GMU 22 generally meet or exceed BLM's Standards and Guidelines for Rangeland Health. Herbaceous composition, vigor, and ground cover are generally acceptable throughout the uplands, but improving trends are evident only outside the HMA. Herbaceous understory trends within the HMA have tended to remain in a slowly declining trend since about 1990 when horse populations became elevated. Instances of areas failing to meet Standards and Guides are estimated to comprise between 5 and 10% of the Unit, and like Douglas, are generally confined to the larger drainage bottoms and near sources of

water. These areas are slow to respond to improved grazing management practices, but recent and continuing emphasis on reducing the duration and intensity of seasonal livestock use, as well as continuing efforts at intervening with seeding treatments, are expected to yield progressive improvements on these sites over time.

The most serious noxious weed problem in the DAU is houndstongue, which is most prevalent in the aspen and mountain shrub communities and in riparian sites. Cooperative control efforts continue among BLM, Rio Blanco County, and the livestock permittees. Some of the remaining and more formidable houndstongue infestations involve the private lands on the Roan Plateau. There are localized infestations of yellow toadflax, leafy spurge, and the knapweeds in Piceance Basin, but these sites have been subject to intensive control and monitoring and are not expected to expand.

#### ▪ **Horse Background**

Although horses compete with big game for forage resources, authorized forage use within the Piceance/East Douglas Herd Management Area (HMA) has been integrated in a multiple use context. The HMA presently encompasses 15-20% of general winter, severe winter, and summer and transitional ranges available to big game in Piceance Basin (~GMU 22), and 15% of general winter range, 5% of severe winter ranges, and 2% of summer ranges available in the Douglas basin (~GMU 21).

BLM is in the final stages of considering whether to authorize the establishment of a population of horses in the central half of GMU 21 (West Douglas Herd Area) through a land use plan amendment. This Herd Area involves 64% of the general winter range, 40% of the severe winter range, and 16% of summer range available in the Douglas basin.

#### ▪ **Fire and Vegetative Succession**

Fire suppression activities over the past 30 years have interfered with plant succession patterns in these GMUs, but, owing primarily to slow rates of successional advance, the role of fire in rejuvenating these more xeric communities has not been compromised to the point of prompting radical or extensive response. Over the past 3 years, the White River BLM Field Office has actively implemented its Fire Management Plan that attempts to more fully integrate fire as a fundamental vegetation management process. Although a continuing pattern of small scale fires throughout the DAU's pinyon-juniper and sagebrush communities is desired, the recent drought has accelerated the frequency and especially the individual size of fire events since 2002.

Fires in recent years have impacted the landscape to a degree. Although the distribution of woodland involvement is thought to be less than ideal in terms of big game (especially deer) management, an annual rate of 1,889 acres per year is fairly consistent with the gross number of acres thought necessary to maintain the present extent of mature woodlands assuming a 350-year rotation interval (i.e., roughly 800 acres for GMU 21 and 1000 acres for GMU 22). Recent drought conditions and active

implementation of prescribed fire programs and, particularly, fire use strategies (i.e., natural ignitions allowed to burn for resource benefit) appear to have increased the rate of woodland acreage burned in these GMUs over the past 6 years. Since 2003, prescribed and fire-use burns have accounted, respectively, for about 20 and 50 percent of woodland and shrubland acreage burned in the Piceance and Douglas Basins. During this timeframe about 3,600 acres of sagebrush, 311 acres of mountain shrub, and 257 acres of Douglas-fir/spruce-fir forest have also burned.

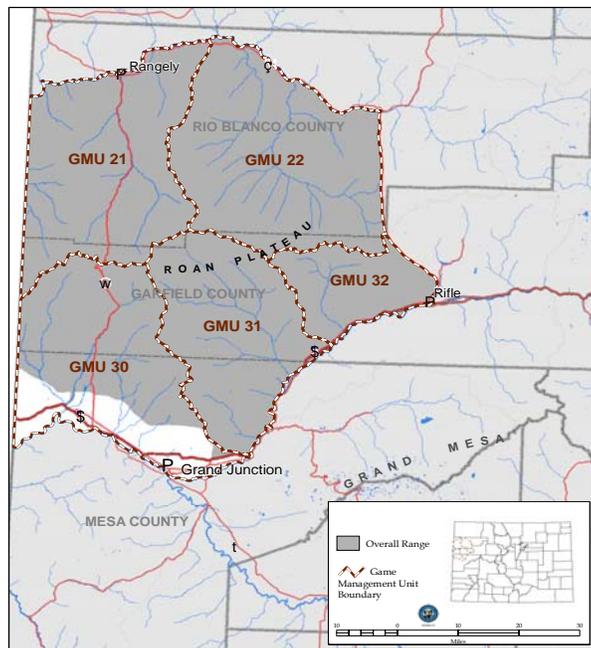
There remain two prominent situations where seral conditions indicate that increased incidence of fire is necessary to correct imbalanced forage and cover properties. This situation is most apparent on the southern rim of Magnolia (Piceance Triangle) and in the southern half of the Piceance Basin between 7,200 and 7,800 feet, where pinyon pine is aggressively colonizing several thousands of acres of mountain shrub (i.e., primarily Utah serviceberry) and mountain big sagebrush communities. This situation is problematic since there is little to indicate that these mixed shrub types have had a fire history over the last 50 or more years that is capable of maintaining the extent and condition of these fire-induced disclimax communities. Serviceberry stands in particular may require a young pinyon component before becoming susceptible to natural fire. Likewise, in the absence of fire, Gamble oak/mountain shrub communities have become increasingly dense and mature, resulting in restricted wildlife movement, less accessible forage, and reduced understory productivity.

Throughout the DAU's mid-elevation pinyon-juniper ranges, tree regeneration (especially Utah juniper) is progressively encroaching on sagebrush parks between about 6,500' and 7,000'. The rate of advance is slow and the degree of encroachment highly variable depending on the time since the last fire event had maintained the disclimax. Predictably, more conspicuous tree regeneration in these parks appears to correlate strongly with an aged sagebrush component and a declining herbaceous understory.

## Habitat Distribution

- **Elk Overall Range**

Elk are found throughout DAU E-10 with the general exceptions of the largest human population areas, and the desert like lowlands in the Grand Valley (Figure 4). Elk herds move across the remainder of the DAU during the year, utilizing different areas during different seasons.

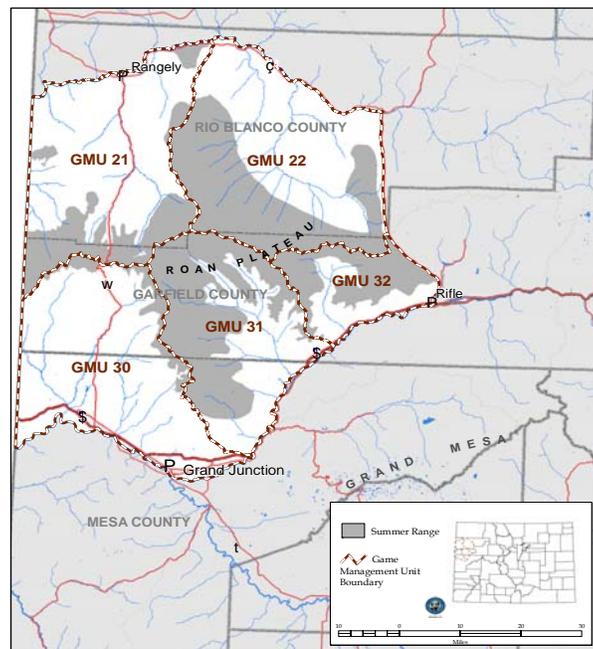


Location of Elk DAU E-10 (GMUs 21, 22, 30, 31, 32), West-central Colorado showing Elk Overall Range

Figure 4. Elk Overall Range in DAU E-10.

- **Elk Summer Range**

The majority of elk summer in the highest elevations, near the center of the DAU (Figure 5). In the spring, they tend to follow the retreating snowline and subsequent green-up in vegetation. Although some elk remain at low elevations year-round, the majority move to higher elevation summer ranges. There are over 1300 square miles of summer range. The quality of summer range is important for elk to ensure they recover from winter weight loss, cows can support late fetal development and lactation, and all animals in the population go into winter in good body condition. The competition with domestic livestock is probably the major conflict in the quality of summer range.



Location of Elk DAU E-10 (GMUs 21, 22, 30, 31, 32), West-central Colorado showing Elk Summer Range

Figure 5. Elk Summer Ranges within DAU E -10

- **Land Status in Elk Winter Range vs. Elk Summer Range**

The majority of elk spend their winters on public land owned by the BLM. Most elk summer in the higher country, on private land.

- **Elk Winter Range**

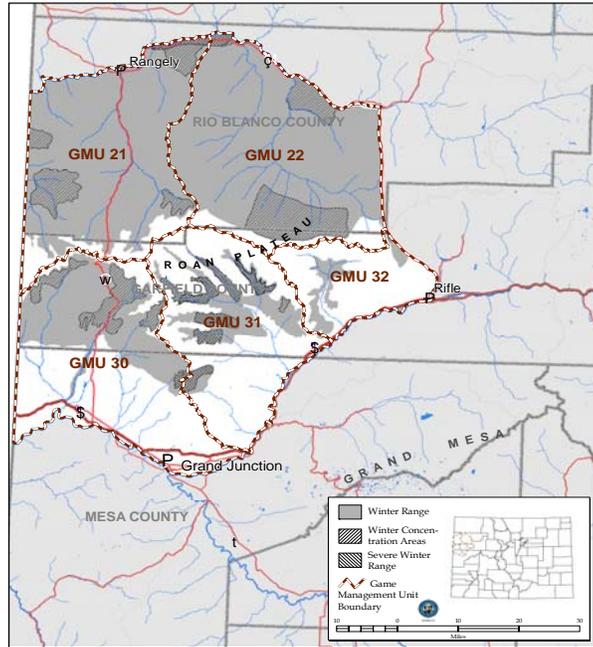
Winter range is often considered to be more important to elk than summer range because it is generally more limited due to weather conditions. The CDOW characterizes winter range into winter range, winter concentration areas, and severe winter range. They are defined as:

*Winter Range:* that part of the range where 90% of the animals are located during average winters.

*Winter Concentration Area:* the part of the range where densities are at least 200% greater than the surrounding winter range in average winters.

*Severe Winter Range:* that part of the range where 90% of the elk are located during the two worst winters in 10 years as determined by the maximum annual snow pack and minimum temperatures.

DAU E-10 has approximately 1757 square miles of suitable elk winter range as estimated by CDOW GIS mapping (Figure 6). Of this winter range, approximately 78% is found on public land, and 22% is held by private landowners. The majority of elk are wintered on public lands. Important private land wintering areas are found in the lower drainages throughout the DAU, including Roan Creek, Parachute Creek, and the Piceance Basin. The lower elevation lands across the DAU comprise the most important winter range for both deer and elk. Areas such as the Piceance Basin, Roan Creek, and Roan Plateau, Douglas Creek, and the Bookcliffs, support the DAU's elk populations during the winter. Favorable snow depths, slope and aspect, and winter temperatures create accessible forage and make these areas suitable for wintering big game. Elk are generally found at higher elevations than mule deer due to their ability to forage in deeper snow conditions. However, during severe winters, both deer and elk are forced to winter at the lower elevations. During light winters, elk often remain at higher elevations. It is not unusual to see elk winter above the canyon on the mesas above Roan Creek, north of Debeque.



**Location of Elk DAU E-10** (GMUs 21, 22, 30, 31, 32), West-central Colorado showing Elk Winter Range, Severe Winter Range, and Winter Concentration Areas.

**Figure 6. Elk Winter Range, Winter Concentration Areas, and Severe Winter Ranges in DAU E-10.**

## **Conflicts**

- **Elk Damage to Agricultural Crops**

The State of Colorado is liable for compensating landowners for documented damage to commercial agricultural products, livestock forage, and fences by elk and other big game provided the landowner allows reasonable hunting access and charges no more than \$100 per hunter. DAU E-10 has traditionally seen little damage from elk to agricultural crops. This damage type, however, is increasing. Recently, farmers and ranchers have complained more frequently about damage to growing hay in the spring and summer, particularly in the west end of GMU 21, along the White River corridor. There are also increasing complaints DAU-wide regarding elk consumption of stacked hay during the winter months.

- **Elk Competition with Domestic Livestock**

There is some competition with domestic livestock, primarily cattle, for forage within the DAU. This has primarily occurred in elk summer ranges, but some lower elevation winter ranges have also seen rising competition issues. These types of competition will most likely increase as human activity is increasingly spreading out from population centers and more heavily impacting traditional winter and summer ranges. It is difficult to mitigate for this type of damage, particularly as available habitat decreases due to many human disturbance.

- **Elk Competition with Mule Deer**

The mule deer in the overlapping DAU (D-11) are a generally stable to declining population. There is concern that the increasing elk herd has negatively impacted the deer herd through direct competition for spatial and forage resources.

Although a causal relationship has never been concretely established, state-wide mule deer declines have coincided with increasing numbers of elk. Several studies in the western U.S. have shown that mule deer and elk have only moderate dietary overlap except during periods of food shortage such as during severe winters. Elk generally prefer to graze on grass, sedges, and forbs during much of the year; while deer tend to prefer forbs, young grasses, and new leader growth during the growing season, and select browse during the winter. Thus, except during severe winters, dietary overlap is probably minimal. It is likely that within DAU E-10 there is some competition between elk and mule deer, but mule deer population declines within the DAU are probably more directly related to habitat fragmentation, drought, decadent vegetation structure, and increased human activity than simply increased elk numbers.

# 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 elk. In this manner we have established a reference point and can eliminate confusion when referring to populations.

Realistically, elk population objectives are determined by a combination of variables that are woven together in a manner, best suited to satisfy all the demands, to arrive at the final objective number. The variables involved include biological data, economic considerations, political considerations, recreational considerations, domestic livestock concerns, and vegetative considerations to name some of the most prominent factors. 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 range's MSY and carrying capacity (see Appendix A for a brief summary of the concept of MSY and carrying capacity).

Post-hunt populations in this plan have been generated by the computer model 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* at the end of this section.

## Population Assessment Procedure Overview:

Estimating populations of wild animals over large geographic areas is an extremely difficult and inexact science. As an example, there is currently no statistically sound method available to determine elk population densities. The CDOW, as well as other western states, are conducting research studies to try and answer these questions concerning populations. There are several systems being studied that may hold some promise, but the techniques are not refined and very expensive to perform. Difficulties with censuses are due to elk habitats and distribution problems. They tend to group into large herds, which play havoc with statistics and randomization. Numerous studies have attempted to accurately count all the known number of animals in large fenced areas. All of these efforts have failed to consistently count 100% of the animals. In some cases less than 50% of the animals can be observed and counted. Highly sophisticated methods using infrared sensing have also met with very limited success. The CDOW attempts to minimize this problem using the latest technology and inventory methodology that is available today.

Our current method of determining elk populations is based upon population models, which integrate measured biological factors into a computer generated population simulation. The biological factors used include post-hunt sex and age ratios data taken from helicopter surveys in January and hunter harvest information. The surveys provide baseline information which is used to align the models. Hunter harvest surveys are another factor. Other data requirements include winter survival for different age classes and sexes, wounding loss, and winter severity factors. If better information becomes available, such as new estimates of survival rates, wounding loss, sex ratio at birth, 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

Elk populations in DAU E-10 were relatively low in the 1950's and have shown both steady and remarkable growth in recent years (Figure 7). The growth of this herd mirrors the growth of elk populations throughout Colorado and the Western U.S. Elk are highly adaptable and hardy big game animals and have proven to be adaptable to various habitat conditions in Colorado. While populations were almost extirpated from Colorado near the turn of the century due to over hunting, they have rebounded dramatically.

Limited hunting in the 1950s and 60s provided protection for the herd and allowed numbers to increase. The Yellow Creek elk herd was impacted significantly by the severe winter of 1983-84, but was not impacted as badly as other areas of the state in terms of numbers of elk that succumbed to the winter conditions. Elk populations have increased at rates greater than would be expected from reproduction alone due to immigration of elk from DAU E-6 (GMUs 23 and 24). A series of harsh winters in the late 1970s and early 1980s caused elk to migrate west across highway 13. Many of these elk returned in the springs, but an unknown number of elk remained in the Piceance Basin increasing the size of the resident herd. During the late 1980s and 1990s elk numbers in the DAU have not been supplemented to a great extent by immigration, since winters have not been extreme with heavy snows and cold temperatures.

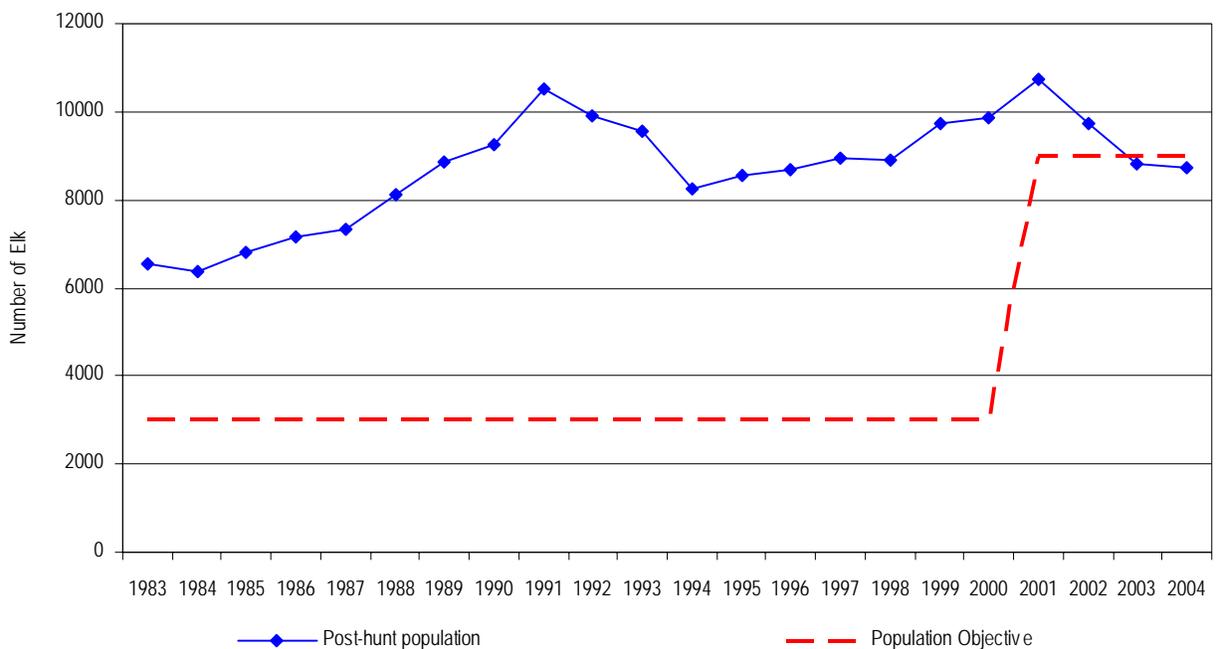


Figure 7. DAU E-10 Elk Population Over Time.

## Post-Hunt Herd Composition

The CDOW has conducted aerial sex and age composition surveys in E-10 since 1981. Initially, these surveys were conducted sporadically, depending on available funding. However, in recent years, the surveys have been done every other year; when funds are available they may be conducted more often. These surveys, accomplished by helicopter, are designed to sample only a portion of the existing post-hunt population and determine the ratio of bulls to cows and calves to cows. These surveys are often mistaken by the public as total counts of the population. The results are presented as the number of bulls/100 cows and the number of calves/100 cows. Usually, the bulls ratios are subdivided into yearling bulls, young bulls (2-4 yrs old), and mature bulls.

The CDOW began statewide classification surveys in the 1970s. Initially, these surveys were done without much thought and with untrained observers. By the late 1970s Data Analysis Units had been established and a systematic survey system was instituted. Observers were trained and data was analyzed statistically.

Early records in the 1980's show that total bull: cow ratios were around 10 bulls: 100 cows. These ratios have steadily increased to average approximately 18.4 bulls: 100 cows (Figure 8). Prior to 1986, any bull was legal and licenses were unlimited in number. Bulls ratios tended to steadily increase, particularly after antler point restriction came into effect in 1986. The highest ratio was almost 28 bulls: 100 cows in 1991. In 1996 the bull ratio had increased to an all time high of 42.9 bulls: 100 cows. The largest portion of the bull component, however, is yearling bulls. In this DAU 75% to 85% of the bulls are harvested as soon as they become legal. This DAU has also allowed the harvest of spike bulls in the last season. They regulation has most likely kept the bull ratio lower than if spikes had been protected completely. During the 1999 season, the 4-point antler point restriction was applied to all seasons due to changes in statewide elk management regulations.

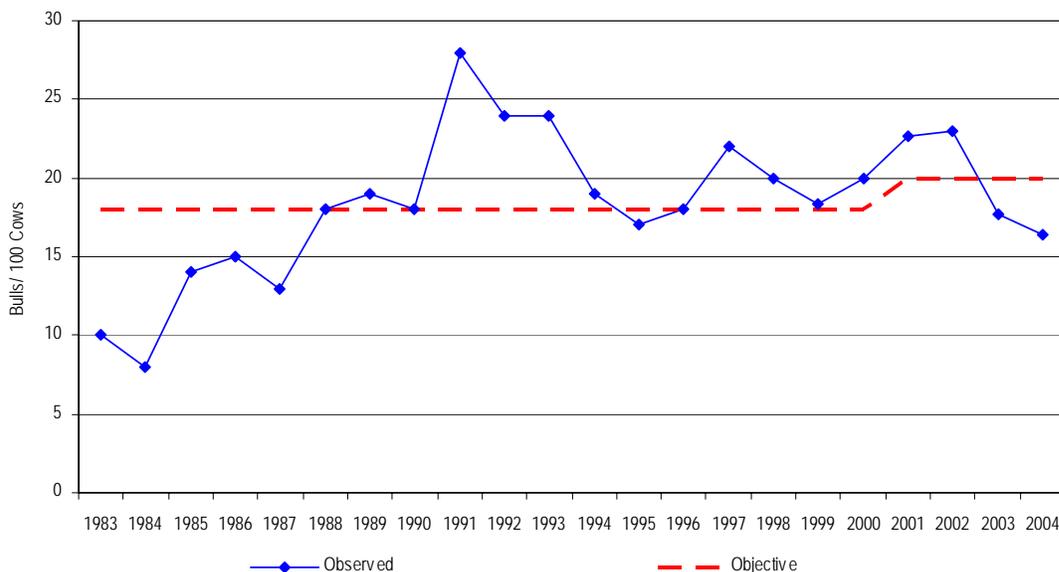
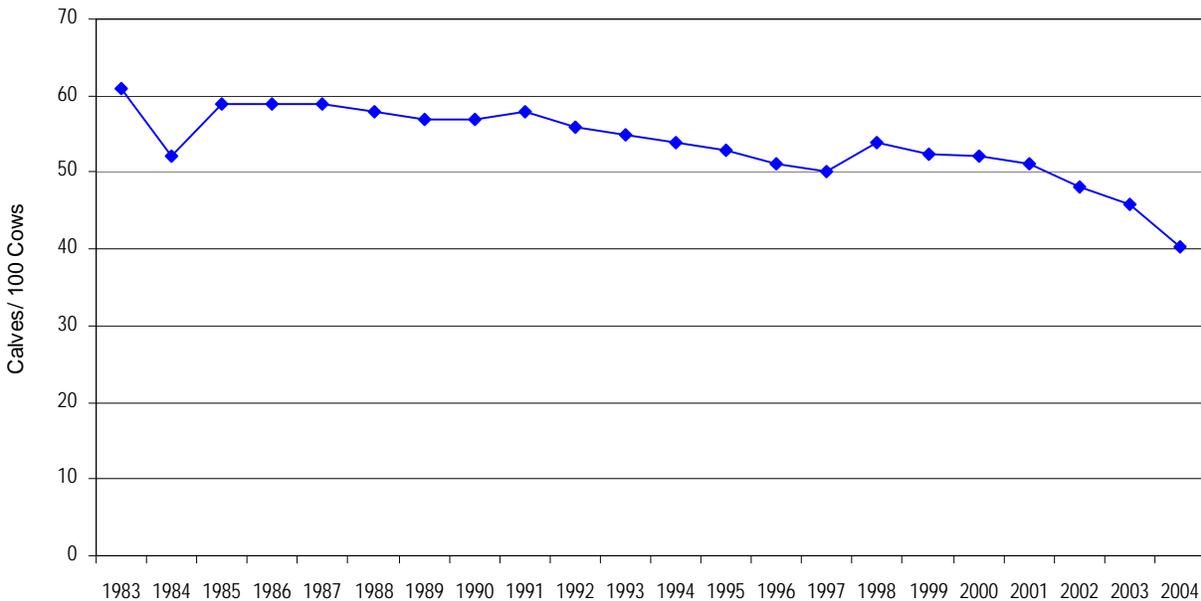


Figure 8. DAU E-10 Post-Hunt Bull: Cow Ratios.

The post-hunt calf: cow ratios are indicators of how successful the reproduction was for the past spring and how well calves survived until December. This is a critical indicator of the condition of the herd. Good calf recruitment indicates a strong, healthy herd, while low recruitment may show poor or declining herd health. Calf production in the DAU has been excellent over the years, as high as 61 calves: 100 cows. However, calf production has been declining in recent years, and is currently around 40 calves per 100 cows (Figure 9).

Due to this good calf production and survival, the herd has been able to increase in size when combined with the limited license quotas. Calf production has decreased somewhat over time. This may be a result of high production when the herd was smaller and rapidly growing. However, the calf production in this DAU is still considered to be sufficient to maintain a healthy and viable elk population.



**Figure 9. DAU E-10 Post-Hunt Calf: Cow Ratios.**

### Harvest History

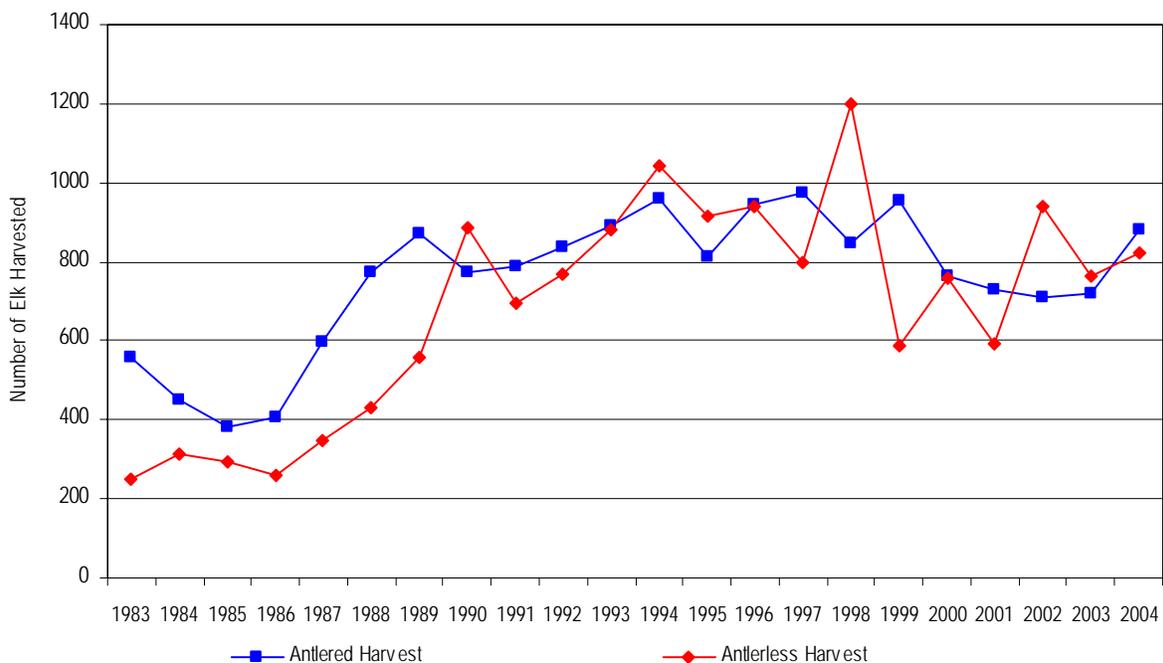
Elk harvest in the DAU E-10 has changed substantially over time, increasing with the population (Figure 10). About 40 times more animals were killed in 1998 as 1953. In 1953 the harvest was 39 bulls and 10 cows. By 1998 the harvest had increased to a record 2042 elk. The harvest history generally reflects the increasing elk population. The highest harvests have occurred in conjunction with the highest populations. These high harvests have been maintained during the last few years when the CDOW has been attempting to maintain the elk population at about its present size.

Elk seasons have evolved from being quite simple to rather complicated. The driving force behind this change has been due to the dramatic elk population growth. The herd numbers of today coupled with the many factors exerting their force on populations have driven the hunting process to the format we have now. Hunting pressure in both archery and muzzleloading special seasons have increased from virtually nothing in the early 1970's to the numbers we see now. On the average about 1100 archers and 280 muzzleloaders accounted for a harvest of about 220 animals in 1999, or about 14% of the total harvest.

The regular rifle seasons have also changed. In the 1950's and 1960's there was one fall hunting season. Now there are four rifle seasons for elk and three for deer. The elk herd has also been managed with a series of early, private land only and late seasons. These seasons were initiated to help achieve annual harvest objectives and in some instances, such as GMU 22, reduce damage to growing hay and winter feed.

The new format of one separate elk season followed by 3 combined seasons is an effort to address the need for quality hunting experiences and still provide ample time for general elk hunting. The three combined seasons have been maintained to reduce hunter pressure and crowding. This has increased the quality of the hunts and allowed more opportunities for the hunters to choose seasons that fit their preferences.

Hunter interest remains very high for elk in this DAU as well as the entire state of Colorado. The growth of the herds has stimulated and maintained a high public interest in both the viewing and hunting populations in Colorado.



**Figure 10. DAU E-10 Annual Harvest.**

## Hunting Pressure and Hunter Numbers

Hunting pressure and hunter numbers have steadily increased in a direct relationship with elk population growth (). In 1954, 265 hunted; in 1998 there were 9458 elk hunters, in 2004, there were approximately 7300.

This DAU has some of the highest hunter interest in the state. The large amount of public land and the close proximity of Grand Junction make this an attractive area for many local hunters. Local ranchers and outfitters also attract a number of non-resident hunters to this DAU every year. In some the GMUs, particularly 31 and 32, hunter access is somewhat difficult due to the rugged terrain and patterns of private landownership in the bottom of the drainages. In these areas the access to good elk hunting areas requires hiking up into steep canyon country. Harvested elk in these situations are difficult to retrieve and usually are packed out in quarters.

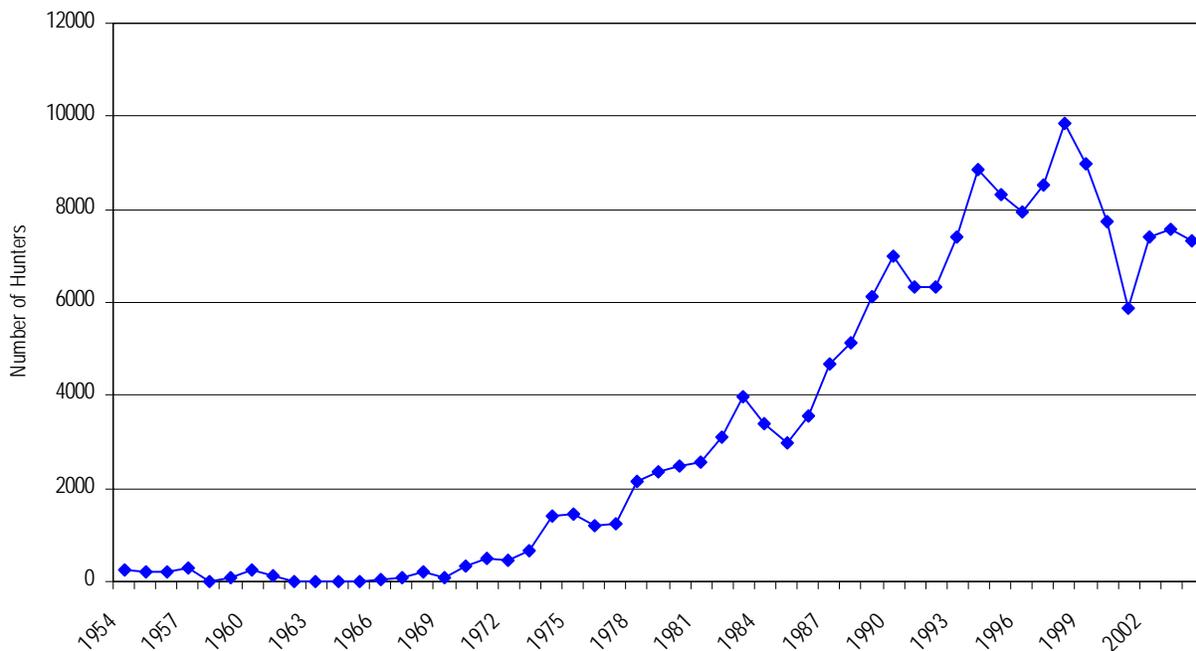


Figure 11. DAU E-10 Hunter Numbers.

# CURRENT HERD MANAGEMENT

## Current Population and Composition Objectives

The population objective for the Yellow Creek DAU is 3,000 elk and is considered to be a provisional objective because no final DAU plan has been approved. The population objective was established prior to the development of DAU plans and process of development of population objectives. Thus, there has not been extensive public review or review by the BLM.

This objective was first introduced during the DAU planning process begun in 1999. Until the early 1990's, the CDOW believed that the elk herd in the DAU was approximately 3,000 elk during most years. More refined and reliable data and effective computer modeling, however, indicates the population is far higher than 3,000 elk.

Thus, a more feasible population objective for the Yellow Creek DAU is 8,000-10,000, and is the basis for this DAU planning process. As mentioned earlier, all wildlife management is subject to the best available science and most accurate data. Wildlife management agencies must be flexible to take advantage of improvements in modeling and data collection.

The current, and likely unchanging, composition objective is 18-22 bulls: 100 cows. In the past it has been 18 bulls: 100 cows: the change reflects an awareness of the inherent vacillations associated with unlimited bull harvest and is not a significant change in management strategy.

## Harvest Management

This DAU has been managed in recent years with unlimited over-the-counter antlered (bull) licenses and limited antlerless (cow) licenses. The CDOW has been aggressive in setting annual harvest objectives in this DAU. The primary harvest goal has been to provide maximum harvest opportunity, while still meeting the population and composition objectives. Populations have been managed to create a balance between elk numbers and habitat capabilities. Additionally, some harvest in recent years has been directed specifically to prevent and minimize agricultural damage within the DAU.

- **Antlered Licenses**

The CDOW initiated antler point restrictions across the West Slope in 1986 to increase bull: cow ratios by requiring that all bulls harvested have at least 4 antler points on one antler. Between 1986 and 1999, this unit was managed more liberally under this point program by allowing spike harvest in the last season of each year. Beginning in 2000, spike harvest was eliminated.

Bull licenses in the past have primarily been unlimited and sold over-the-counter. In 2001, the first season was changed to a completely limited elk structure to provide a

more quality hunt during the first season state-wide. Until the 2005 season, the remaining three seasons have remained unlimited. Beginning in 2005, however, fourth season licenses will be sold over-the-counter, but the total licenses will be capped. This change resulted from the Five Year Season Structure policy developed by the Wildlife Commission in an effort to improve bull quality statewide.

- **Regular Season Antlerless Licenses**

Regular season antlerless licenses are available for all four regular elk season through the CDOW's limited license drawing process. There have been problems in the past with large numbers of cow licenses not being taken in the initial public license drawing. When these licenses are sold over-the-counter, hunters may not have permission to hunt on private lands. Once in the field, hunters discover problems with obtaining access on private lands. It has been difficult to achieve harvest objectives solely using regular season antlerless licenses.

- **Private Land Only Licenses, Late Season and Damage Hunts**

Elk licenses, particularly antlerless, have been adjusted to provide opportunity and to alleviate situations where elk are causing damage. Thus, private land only licenses, late season, and damage hunts have been created to encourage harvest of elk when during late fall and early winter.

## **ISSUES AND STRATEGIES**

There are many issues associated with elk management in DAU E-10. The primary goal of this management plan is to document those issues and, whenever possible, to identify strategies for resolution through solid wildlife management principles. Some primary concerns that have been identified in this area are elk competition with agriculture, deer, and domestic livestock, hunting opportunity and quality, habitat quality and quantity, and the present and future impacts of increased oil and gas developments.

Oil and gas development has been an ongoing issue in this DAU and its importance will only increase in the coming years. The impacts from the massive development of these oil and gas reserves will very likely significantly impact elk management in the future.

It is not within the scope of this document to anticipate and manage for all future impacts, particularly those of oil and gas development. However, through this DAU plan and planning process, the CDOW will attempt to quantify public opinion on elk management and elk populations within this DAU. In doing so, any and all impacts that detract from chosen herd management objectives and strategies will be identified as undesirable and the CDOW will work to minimize and mitigate for these impacts.

This is an adaptive process and the DAU process is repeated on a regular basis to account for the changing conditions within this DAU.

### **Issue Solicitation Process**

The most important aspect of the DAU planning process is obtaining input from all segments of the affected local populations, including the BLM and interested public. A meeting was held in Rifle on August 2, 2005, with officials from local BLM offices to solicit input regarding deer management in their Resource Areas. BLM officials were provided a draft copy of the plan prior to the meeting to have advance time to prepare issues and concerns. These issues and comments were noted and have been incorporated into this plan. Exact text of these comments can be seen in Appendix D of this document.

In an effort to solicit information from the interested public, the CDOW held open public meetings in Rangely, Grand Junction, and Rifle, CO during August, 2005, to gather recommendations on the goals and objectives of the DAU plan. At these meetings, current management objectives were presented and alternatives were presented. Input was requested, in the form of an optional questionnaire (Appendix C), from participants at the time of the meeting regarding any issues or concerns. Notes on comments and concerns were taken during the meetings and these comments and the questionnaire responses have been incorporated into this plan. A comprehensive analysis of these comments, along with text of written comments, is available in Appendix B of this document.

The Boards of County Commissioners (BOCC) from Mesa, Rio Blanco, and Garfield Counties were also requested to provide input on the draft management plans. They

were invited to the meeting with the Bureau of Land Management and the local public meetings. At the time of this writing no comments had been received from any of the BOCC's. If any input is received, it will be incorporated into this plan at a later date.

## **Issues and Concerns: CDOW**

### **▪ Habitat Quality on Winter Range**

Elk populations throughout Colorado are closely tied to the amount of available winter range. Elk populations in E-10 are similarly restricted to a maximum size due to limitations on the amount of available winter range. After migrating from the summer ranges on BLM and private lands, generally, elk are forced by snow into the valleys surrounding the high country on the Roan Plateau.

The range conditions on the winter grounds are of concern in this DAU. Vegetation is predominately pinyon-juniper interspersed with smaller amounts of mountain shrub. In many areas, range conditions are less than optimal. Sagebrush ranges appear to be over-mature in many areas and this decadence, combined with drought, has led to some large scale die-offs. Pinyon-juniper encroachment in these declining sagebrush areas is exacerbating the declines associated with decadent sagebrush stands.

Cheatgrass often dominates where native grasses have been crowded out. In many sagebrush communities, grasses represent only a small portion of the available forage.

Additionally, as discussed in sections concerning oil and gas development, winter ranges are increasingly being fragmented, particularly in the Piceance Basin and the Parachute and Roan Creeks. This somewhat localized problem will be a challenge DAU-wide once widespread oil shale development occurs.

### **▪ Housing/Ex-Urban Development**

The DAU has had substantial development in areas that were once part of elk winter range, particularly in the Grand Valley north of Grand Junction. Ranches have been subdivided and natural habitat quality is significantly reduced by fragmentation. This includes direct loss of habitat, effective loss of surrounding habitat due to harassment from people and pets. Development has combined to reduce the amount of useable winter range.

### **▪ Declining Mule Deer Population and Potential Competition with Increasing Elk Population**

In recent years, CDOW's objective for this deer DAU has been to increase the population size. However, the deer population is stable. Very few doe licenses are issued in this DAU but this reduction in doe mortality has not compensated for other mortalities. As previously mentioned, there is concern that the increasing elk population is negatively impacting the mule deer herds. An important aspect to the elk DAU plan

is minimizing the impact of the elk herd on the deer herd. In particular, the expansion of elk onto winter ranges that in the past were used solely by deer is a primary concern.

- **Maintenance of Stable Elk Population and Meeting Public Demand for Elk Resource**

CDOW's current objective is to maintain E-10 as a highly productive elk population that can annually support a harvest similar those it has supported in the past. However, the maintenance of population levels that are acceptable to all segments of the interested publics is very difficult to achieve. A population balance in harmony with public desires and available habitat is particularly elusive.

- **Hunter Access**

An increasing problem in the DAU is access to huntable lands by non-landowning hunters. Large tracts of property owned by oil and gas companies are rarely accessible for hunting and create huge preserves, concentrating the elk, and reducing harvest opportunity. Many other large private properties are largely unhunted and serve as preserves, primarily in the Piceance Basin, and Roan and Parachute Creeks.

- **Maintaining Acceptable Bull: Cow Ratios**

The maintenance of acceptable bull: cow ratios is a delicate balance between the higher quality, larger bulls, and providing maximum opportunity. Unfortunately, unlimited antlered harvest invariably results in bull: cow ratios in the general area of 18-22 bulls: 100 cows. Significant deviations from that range would require a dramatic shift in management regime and a change to limited antlered hunting.

- **Forage Competition with Livestock on Private Lands**

Ranchers are increasingly concerned about elk forage on summer ranges interfering with livestock forage. Recent spring and fall elk concentrations on hay meadows, and damage to stacked hay in the Piceance Basin are also of concern within the DAU. Near Debeque, ranchers have seen increased damage from elk on stacked hay and growing crops. Upper Roan Creek is experiencing higher damage from elk on growing hay.

These conflicts, while important, are localized and can be handled at a local level with damage hunts and other small scale solutions. There is not a significant enough damage concern at this time to deal with damage at a population level.

- **Natural Gas and Oil Development**

Natural gas and oil development is and will continue to significantly impact the elk habitat and population within this DAU. Oil and gas development has already impacted significant acreages in the Piceance Basin and in Parachute and Roan Creeks. Further exploration and development is planned for the Roan Plateau, Parachute Creek, Roan Creek, and Piceance Basin.

There is very little data available documenting the impact of oil and gas development on elk populations. It is not within the scope of this planning document to determine, prevent, or mitigate these impacts. However, it is mandatory that the likely negative impacts be noted and mitigation practices be recommended wherever possible.

These oil and gas developments generally have both direct and indirect impacts. Direct disturbance entails those impacts resulting directly from the installation and maintenance of drilling operations. They include the loss of habitat resulting from the footprint of the drill sites, fragmentation of habitat from roads and drill sites. Elk and deer avoid areas of higher human activity, and thus directly lose that habitat component.

Indirect impacts are frequently as or more significant than direct impacts and include increased elk/vehicle collisions, erosion in disturbed areas, noise disturbance, displacement away from human activity, increased poaching near roads and drill sites, habitat quality decline from introduction of non-native weeds.

- **Horse Competition with Wildlife**

Wild horse encroachment on elk habitat, particularly on winter range, has become an issue in recent years. The Oil Springs Wilderness Area in GMU 21, although not designated as wild horse range, has seen increasing horse populations recently. In other parts of the DAU, particularly in the Bookcliffs area, there is little competition or conflict between elk and horses.

## **Issues and Concerns: BLM**

Bureau of Land Management land in this DAU is managed jointly by three different Field Offices representing the White River, Glenwood Springs, and Grand Junction Resource Areas. The full text of their comment can be seen in Appendix D.

The Grand Junction field office expressed little significant concern regarding elk populations in this DAU. Generally, they were supportive of the preferred alternative of 7,000 – 9,000 elk.

The Glenwood Springs field office generally supported the lower end of the current population objective of 8,000, indicating support for the preferred alternative of 7,000 – 9,000 elk. This support was related to the current and projected habitat conditions within their area and that this population level would improve or maintain these habitat conditions while decreasing conflicts with landowners. Primary concerns from this field office related to the quality of elk winter range and how it is impacted by private land development, lack of fire, overgrazing, recreational use and oil and natural gas

development. Site specific impacts of elk on habitat were noted and were attributed to distribution concerns rather than overall population levels. Of greatest concern to this field office is the potential impact of natural gas development on the resident elk populations within the Roan Plateau Planning Area.

The White River field office also generally supported the maintenance of elk populations at current levels, indicating support for the preferred alternative of 7,000 – 9,000 elk. The field office was against elevating the elk population, citing potentially harmful impacts to habitat quality in the DAU from higher populations. The primary concerns from this field office were associated with elk distribution changes resulting from energy development in the Piceance Basin area and the potential impacts to BLM lands.

### **Issues and Concerns: Public Stakeholders**

The following is a summary of responses received from the public questionnaire available at the public meetings and the CDOW website. A total of fourteen questionnaires were returned and a complete analysis of these questionnaires is available in Appendix B.

The majority of respondents indicated that their interests were primarily as hunter/sportspersons, while the next largest group was landowners, followed by rancher/farmers. All had hunted elk in Colorado, although two had not hunted in this DAU.

The issue that was most concerning to the majority of respondents was loss of elk habitat due to increased human population and development, followed by predation on elk. Elk competing with livestock for forage was another concern. There was the least amount of concern overall for damage to trees, shrubs, and gardens by elk.

The majority of respondents, when asked about their personal feelings regarding elk, indicated that they enjoyed the presence of elk and did not worry about the problems they cause. A minority of respondents indicated that they enjoy the elk but worry about problems they may cause.

When asked about the size of the elk population, the majority of questionnaire respondents and meeting attendees indicated a desire to see the herd size stay the same and a corresponding maintenance in the objective. The majority of respondents indicated that changing the elk population was either important or very important to them.

All respondents desired to either maintain or increase bull elk numbers in the DAU, with a minority wanting to increase the bull ratio. However, the majority of interest was in seeing the bull ratio objective remaining the same, as opposed to increasing the objective.

Hunter satisfaction was moderate in this DAU, with most respondents indicating slight satisfaction. A few hunters indicated they were either slightly dissatisfied or very satisfied.

Hunter crowding was somewhat of an issue among elk hunters, although the perception of crowding was widely varied. A small minority felt either extremely or not at all

crowded, while the majority of respondents indicated feeling either moderately or slightly crowded.

Overall hunting quality was rated as fair to good by nearly all respondents, with the majority reporting good hunting quality in this DAU.

An equal number of hunters indicated that obtaining game meat and harvesting a trophy bull were the most important aspects to their hunting in this DAU. A small number of hunters indicated that not seeing other hunters was the most important aspect of hunting in this DAU. Seeing more mature bulls was identified as the most effective way to improve hunting experience in this DAU, while higher hunting success was the least likely tool to improve hunting experience.

### **Issues and Concerns: County Commissioners**

Although input was solicited from all three Boards of County Commissioners within this DAU, no comments or concerns were received at the time of this draft. If any information is received, it will be included in future drafts.

## **PREFERRED ALTERNATIVE**

### **Preferred Population Size Objective Alternative:**

7,000 – 9,000 elk

### **Preferred Population Composition Objective Alternative:**

18 – 22 bulls/ 100 cows

### **Preferred Alternative Justification:**

- **Population Objective**

The E-10 elk population steadily increased in this DAU for much of the last 50 years, and has stabilized in recent years. Management of this herd with primarily unlimited bull hunting and limited cow harvest provided a basis for the strong growth. The long-term management philosophy of this herd has been to provide maximum elk hunting opportunity to as many hunters as possible. This management strategy has succeeded in leveling off the growth of this elk herd, while maintaining hunter opportunity.

The results of the public survey that was conducted during the preparation of this plan showed that there was generally a similarity of opinion on how the population, and thus the harvest of elk, should be managed. This alternative to slightly lower the population objective, while maintaining the current population size, is based on the following significant issues.

The majority of both landowners and hunters indicated a desire to see the elk population in the DAU stay the same, while a small minority of both groups wanted the population to either increase or decrease.

Significant portions of the elk range in this unit are found on private lands and are critical to the maintenance of the elk populations. Primarily, these private lands are used to graze cattle, which provide a sole or major income source to many ranchers. However, many landowners supplement their income through elk hunters. The best objective for this DAU would be to strike a balance between elk numbers and livestock numbers. These animals should be managed to maintain healthy, sustainable habitats that support a diversity of vegetative communities.

Management of elk numbers must also consider mule deer populations. Declining mule deer are of concern to virtually everyone in this DAU. There is some concern that elk may out-compete mule deer for limited forage on both summer and winter ranges. There may also be social interactions that favor elk. The preferred alternative, which considers a broad spectrum of issues, also reflects this concern.

The BLM indicates that elk populations currently appear to be at levels consistent with the sustainable management of the range resources and public lands. Winter range conditions are critical to mule deer populations. The large decline in mule deer

populations has reduced the pressure on habitats that were being heavily browsed. This may have allowed for some vegetative recovery in these habitats and increasing use by elk may delay or reverse this trend. All three BLM field offices support maintaining the elk populations at current levels, and therefore a population objective that would maintain, rather than increase or decrease the population, is supported by the BLM.

Elk hunting popularity is at an all-time high and the demand appears to be stable to perhaps increasing. However, high elk numbers are accompanied by numerous other issues. One of the major concerns in this DAU is the distribution of hunters who hunt on public lands. Currently, public lands in this DAU are considered by many to be near the limits of hunter density. Questionnaire respondents reported feeling slightly to moderately crowded under the current license numbers. However, increasing populations would cause a proportional increase on lands that are already saturated with public hunters and unacceptable levels of crowding would probably occur. If populations are increased, it may be necessary to change season structure to distribute hunter pressure and reduce crowding.

One concern is refuge situations caused by large blocks of land owned by oil and gas companies that do not allow big game hunting. These tracts of land provide unhunted habitat that provides seclusion for elk and protection from harvest.

Damage caused by an over-abundance of elk is a concern to ranchers, some more than others. At present populations, elk damage has not been eliminated but has been at a level that is acceptable to most ranchers.

The results of the questionnaire indicate that a reduction in elk is not desired. Additionally, when the public was asked at public meeting if they would approve of reduction in elk numbers to benefit deer the response was negative on a reduction. This discussion evolved out of concern for deer, but hunters did not want to see elk number reduced even if it were proven to benefit mule deer populations.

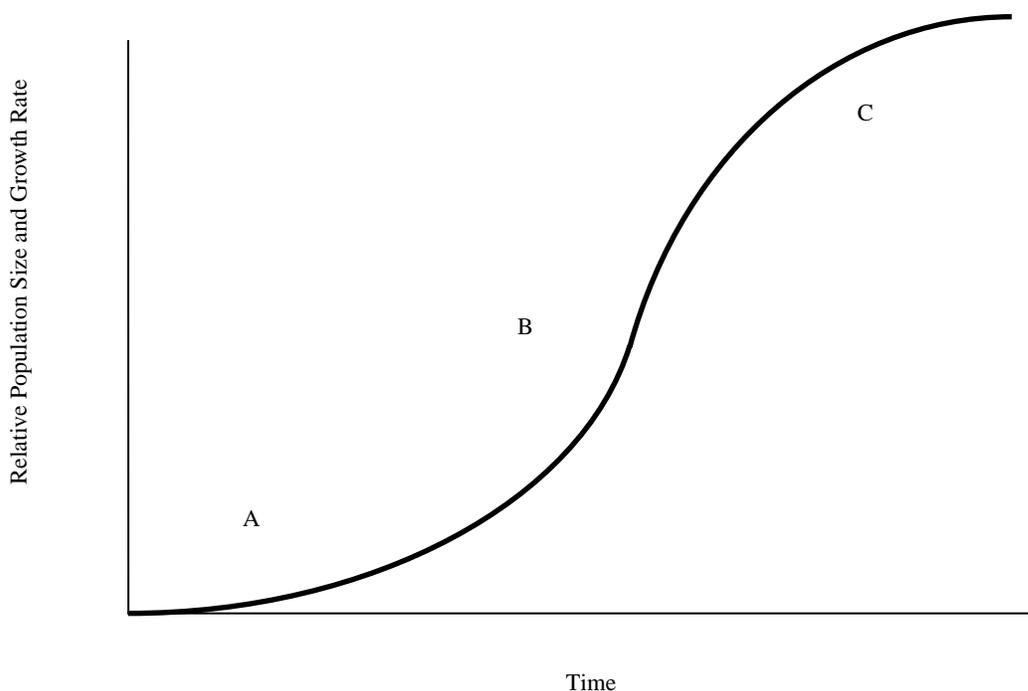
Due to the majority public input received, the CDOW recommends maintaining the elk population at current levels (approximately 8,700 animals). The current population objective of 8,000 – 10,000 elk, however, does not support maintenance of the population at this level and should therefore be lowered somewhat to 7,000 – 9,000 elk. This will maintain the population at current levels, while allowing for natural population fluctuations.

- **Composition Objective**

The CDOW recommendation is to maintain the current composition objective of 18 – 22 bulls/ 100 cows. Increasing the bull ratio significantly would require a significant reduction in the harvest of bull elk. While there is a strong demand for mature elk (age 4+) by hunters, hunters also expressed a strong demand for continued availability of antlered licenses in this DAU. There is very little demand to change the management from unlimited elk hunting into a limited, quality hunt despite a general desire for more large bulls.

## APPENDIX A: ELK POPULATION DYNAMICS

Numerous studies of biological populations of such species as bacteria, mice, rabbits, and white-tailed deer have shown that animal populations grow in a mathematical relationship that biologists refer to as a “sigmoid growth curve” or “S” curve (Figure 12). 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 or death rate (see A in Figure 12). 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 the population. In other words, there appears to be some truth to the old saying “There’s strength in numbers”.



**Figure 12. Sigmoid Growth Curve.**

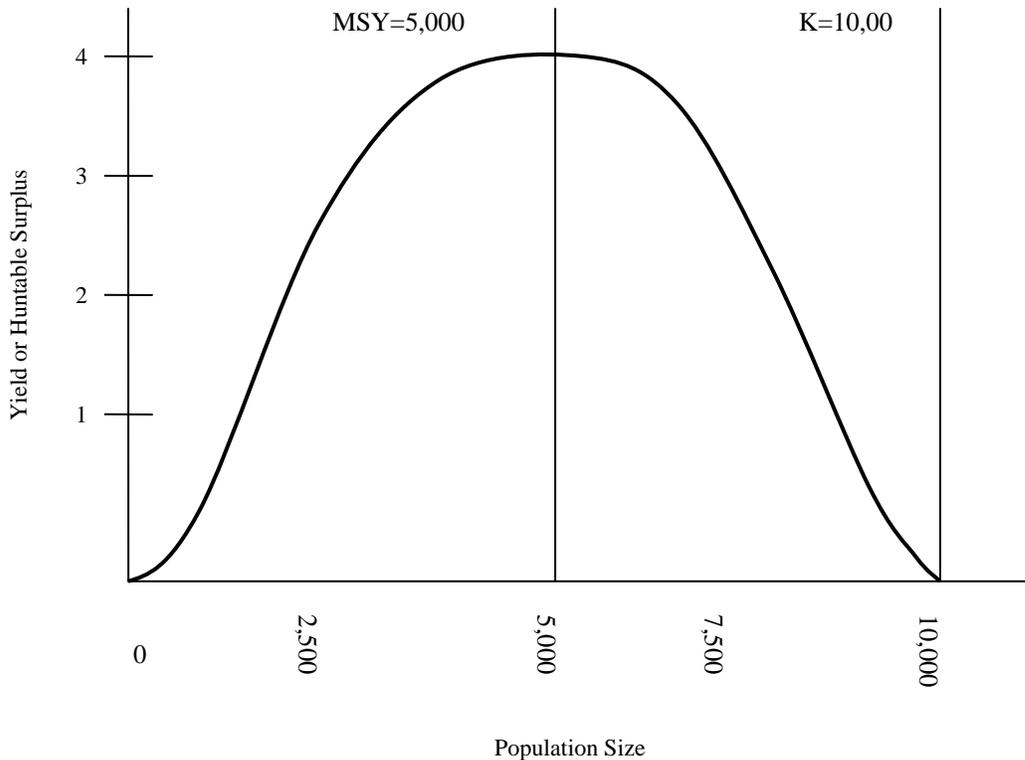
The second phase occurs when the population number or density is at a moderate level. This phase is characterized by a very high reproductive and survival rate (see B in Figure 12). During this phase, food, cover, water, and space (habitat) is optimal and abundant. These high reproductive rates during this phase can be seen in white-tail deer, when does may breed successfully at 6 months of age and produce a live fawn on their first birthday. Older does have been known to produce 3-4 fawns that were very robust and healthy. Survival rates of all deer (bucks, does, and fawns) are at maximum rates during this phase.

The third and final phase occurs when the habitat becomes too crowded. The quality and quantity of food, water, cover, and space become scarce and poor due to the competition with other members of the population. This phase is characterized by

decreased reproduction and survival (see C in Figure 12). For example, white-tail deer fawns can no longer find enough food to grow to a critical minimum weight to reproduce; adult does will only produce 1-3 fawns, and survival of all deer (bucks, does, and fawns) decreases. During severe winters, large die-offs can occur due to overcrowding and lack of forage. The first to die in these situations are fawns, followed by bucks, finally followed by adult does. Thus, severe winters affect future buck: doe and fawn: doe ratios by favoring more does in the populations. Additionally, since buck's antlers are dependent upon nutrition, antlers are stunted during this phase.

If the population continues to grow, it will eventually reach the maximum carrying capacity, or "K" (Figure 13). At this point, the population reaches a dynamic equilibrium with the habitat. The number of births each year equals the number of deaths, therefore, maintaining the population at this level would not allow for any "hunnable surplus." The animals in the population would be in relatively poor condition and when a severe winter or other catastrophic event occurs, a large die-off is inevitable. Thus, another old expression, "the bigger they are the harder they fall" may be appropriate here. A recent example of such a population die-off occurred in the relatively unharmed Northern Yellowstone elk herd during the severe winter of 1988-89. This winter followed the forest fires of 1988 that raged in the National Park.

What does all this mean to the management of Colorado's big game herds such as deer and elk? It means that if we attempt to manage for healthy big game herds, we should attempt to hold the populations at about the middle of the "sigmoid growth curve." Biologists call this "MSY" or "maximum sustained yield." At this level, which is exactly half the maximum population size or "K", the population will display the maximum production, survival and available surplus animals for hunter harvest (Figure 13). Also, at this level, range condition and trend should be good to excellent and stable, respectively. Game damage problems should not be significant and economic return to the local and state economy should be at the maximum. This population level should produce a "win - win" situation to balance sportsmen and private landowner concerns.



**Figure 13. Maximum Sustained Yield and Maximum Carrying Capacity.**

A graph of a hypothetical deer population showing sustained yield (harvest) potential vs. population size is shown above. 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. This phenomenon occurs since the population of 3,000 deer has a much higher survival and reproductive rate compared to the population of 7,000 deer.

## APPENDIX B: PUBLIC QUESTIONNAIRE RESPONSE

### Background Information

1. Are you a resident of Colorado?

  14   Yes

  0   No

100% of responders are residents of Colorado.

2. Do you live in GMUs 21, 22, 30, 31, and 32?

  12   Yes

  1   No

All responders, except one (92%) live in GMUs 21, 22, 30, 31, or 32.

- 2a. If yes, how many years and in what GMU? \_\_\_\_\_

6 responses

6 GMU 21

11 responses

min: 4 yrs

max: 60 yrs

range: 56.0 yrs

Avg.: 29.4 yrs

Median: 25 yrs.

Of the six that chose to respond to the first part, all (6) are from GMU 21.

Of the 11 that chose to respond to the second part, the average time living in the DAU was 29.4 years, the minimum was 4 years, and the maximum was 60 years.

3. Do you own or lease property in GMUs 21, 22, 30, 31, and 32?

  7   Yes

  6   No

Of the 13 responders, 53.8% own or lease property within the DAU, while 46.2% do not.

- 3a. If yes, how many years and in what GMU? \_\_\_\_\_

5 responses

5 GMU 21

7 responses

min: 3 yrs

max: 43 yrs

range: 40 yrs

Avg.: 24.6 yrs

Median: 21 yrs

Of the six that chose to respond to the first part, all (5) own or lease within GMU 21.

Of the 7 that chose to respond to the second part, the average time leasing or owning property within the DAU was 24.6 years, the minimum was 3 years, and the maximum was 43 years.

4. Which group(s) best represent your interests in elk management in GMUs 21, 22, 30, 31, and 32? (Check all that apply)

- 4   A) Rancher/Farmer
- 3   B) Business owner
- 4   C) Landowner
- 2   D) Guide/Outfitter
- 12  E) Hunter/Sportsperson
- 2  H) Environmental/Conservation
- 0  I) Other, please explain \_\_\_\_\_

Of the 13 that responded, 12 identified themselves as hunter/sportsmen, four as rancher/farmer, 4 as landowners, 3 as business owner, 2 as guide/outfitter, and 2 as environmental/conservation.

5. If you checked more than 1 response in the above question, write the letter corresponding to the interest group which most represents your opinions. \_\_\_\_\_

12 responses

- A: 1
- B: 0
- C: 3
- D: 0
- E: 8
- H: 0
- I: 0

Of the 12 that responded, 8 identified themselves as primarily hunter/sportsmen, 1 as primarily rancher/farmer, and 3 as primarily landowners.

### People and Elk

1. Please indicate how concerned you are about each of the following in GMUs 21, 22, 30, 31, and 32. (Circle one number for each item).

	No Concern			Very Concerned	
	1	2	3	4	5
A) Elk/Vehicle collisions	1	2	3	4	5
B) Economic losses to ranchers/farmers from elk damage to rangeland, crops, or fences	1	2	3	4	5
C) Damage to homeowners' trees, shrubs, and gardens caused by elk	1	2	3	4	5
D) Predation on the elk population by coyotes, bears and mountain lions	1	2	3	4	5
E) Loss of elk habitat due to increased human population & development	1	2	3	4	5
F) Potential starvation of elk during the winter	1	2	3	4	5
G) Elk spreading disease to pets, livestock, or humans	1	2	3	4	5
H) Elk competing with livestock for forage	1	2	3	4	5
I) Potential competition between elk and deer for habitat	1	2	3	4	5
J) Revenue that elk hunting provides local business	1	2	3	4	5

12 responses

A: Elk/Vehicle collisions

Mean: 2.5 (little concern)

Mode: 1.0 (no concern)

B: Elk damage to ranchers/farmers

Mean: 2.0 (little concern)

Mode: 2.0 (little concern)

C: Elk damage to homeowners

Mean: 2.5 (little concern)

Mode: 1.0 (no concern)

D: Predation on elk

Mean: 3.1 (some concern)

Mode: 2.0 (little concern)

E: Loss of elk habitat to development

Mean: 3.9 (concerned)

Mode: 5.0 (very concerned)

F: Elk starvation during winter

Mean: 3.0 (some concern)

Mode: 4.0 (concerned)

G: Spread of disease

Mean: 1.8 (little concern)

Mode: 2.0 (little concern)

H: Elk competition with livestock

Mean: 2.9 (some concern)

Mode: 1.0 (no concern)

I: Elk and deer competition

Mean: 2.6 (some concern)

Mode: 3.0 (some concern)

J: Revenue from elk hunting

Mean: 2.8 (some concern)

Mode: 1.0 (no concern)

The highest average concern was for loss of elk habitat due to development (average response: 3.9-concerned). The most frequent highest concern was also loss of habitat due to development (7 respondents indicated they were "very concerned"). Other major concerns were predation (mean 3.1-some concern); starvation during winter (mean 3.0- some concern); and elk competition with livestock (mean 2.9-some concern).

2. Have you been personally affected by any of the concerns listed in Question 2 in GMUs 21, 22, 30, 31, and 32?

8 Yes

4 No

Of the 12 respondents, 8 had been personally affected by one of the concerns, and 4 had not.

- 2a . If yes, circle one: A B C D E F G H I or J

Of the 7 respondents who responded correctly, 4 had been affected by J-the revenue produced from elk hunting; 2 had been affected by E-loss of elk habitat; and 1 had been affected by D-predation.

3. How do you personally feel about elk in GMUs 21, 22, 30, 31, and 32? (Check ONE)

0 I do not enjoy the presence of elk in GMUs 21, 22, 30, 31, and 32, AND regard them as a nuisance.

4 I enjoy the presence of elk in GMUs 21, 22, 30, 31, and 32, BUT worry about the problems they may cause.

10 I enjoy the presence of elk in GMUs 21, 22, 30, 31, and 32 AND do not worry about the problems they may cause.

0 I have no particular feelings about elk in GMUs 21, 22, 30, 31, and 32.

Of the 14 respondents, 71.4% enjoy the elk and do not worry about problems. The remainder, 28.6%, enjoy the elk and do worry about problems they may cause.

## Elk Management

1. How would you like the elk population in GMUs 21, 22, 30, 31, and 32 to change, if at all?

     Decrease

10 Stay the same

4 Increase

     Don't know

Ten out of 14 (71.4%) respondents want the elk population to stay the same, while 4 respondents (28.6%) wanted the population to increase.

2. The population is currently within the objective range. How would you like the elk population objective in GMUs 21, 22, 30, 31, and 32 to change, it at all?

     Decrease

9 Stay the same

3 Increase

1 Don't know

Nine out of 14 (64.3%) respondents want the elk population objective to stay the same, while 3 respondents (21.4%) wanted the population objective to increase. One respondent did not know.

3. How important to you is the change in the size of the elk population that you indicated in Question 1 above? (Circle One)

Not

Important

Slightly

Important

Important

Very

Important

Don't

Know

Six out of 12 respondents (50%) indicate that the change is important to them. Four (33%) indicate that the change is very important, while 2 respondents (17%) indicate the change is only slightly important.

4. How would you like the number of bull elk in GMUs 21, 22, 30, 31, and 32 to change, if at all?

     Decrease  
  9   Stay the same  
  5   Increase  
     Don't know

The majority of respondents (9 out of 14, or 64.3%) want the number of bull elk to stay the same. The remainder of respondents (5 out of 14, or 35.7%) wanted the number of bull elk in the DAU to increase.

5. The objective for bull elk is currently 18 bulls: 100 cows. How would you like the objective for the number of bull elk in GMUs 21, 22, 30, 31, and 32 to change, if at all?

     Decrease  
  8   Stay the same  
  6   Increase  
     Don't know

The majority of respondents (8 out of 14, or 57.1%) want the bull elk objective to stay the same. The remainder of respondents (6 out of 14, or 42.9%) wants the bull elk objective in the DAU to increase.

## Elk Hunting

1. Have you ever hunted elk in Colorado?

 14  Yes  
     No

All fourteen respondents (100%) had hunted elk in Colorado.

- 1a. If yes, how many years? \_\_\_\_\_

The average number of years hunted in Colorado was 24.8, with the least being 2 years, and the most being 43 years.

2. Have you ever hunted elk in GMUs 21, 22, 30, 31, and 32?

 12  Yes  
  2  No

Twelve of the fourteen respondents (85.7%) had hunted elk in this DAU, while two (14.3%) had not hunted elk in this DAU.

3. Overall, how satisfied have you been with your elk hunting experience(s) in GMUs 21, 22, 30, 31, and 32 in the last 5 years? (Circle ONE)

Very Slightly Neutral Slightly Very  
Dissatisfied Dissatisfied Satisfied Satisfied

The majority of respondents (7 out of 12 or 58.3%) are slightly satisfied with their hunting experience in the DAU. Four out of twelve (33.3%) are slightly dissatisfied, while one respondent indicated very satisfied.

4. Overall, to what extent have you felt crowded by other hunters while elk hunting in GMUs 21, 22, 30, 31, and 32? (Circle ONE)

Extremely Moderately Slightly Not at all  
Crowded Crowded Crowded Crowded

Out of the eleven respondents, 2 (18.2%) indicated feeling extremely crowded, 4 (36.4%) felt moderately crowded, 5 (45.5%) felt slightly crowded and 1 (9.1%) felt not at all crowded.

5. Rank the following items from 1 to 5 in the order that they would most likely improve your elk hunting experience in GMUs 21, 22, 30, 31, and 32. (1=most likely to improve, 5=least likely to improve) Do not use any number more than once.

- Less hunter crowding
- Higher hunter success rate
- Less motorized vehicle access
- Seeing more mature bulls
- Seeing more elk

41.7% of respondents (5 out of 12) indicate that seeing more mature bulls would most likely improve their hunting experience in the DAU. Higher hunter success rates were ranked as the item least likely (5 out of 11 respondents or 45%) to improve the hunting experience.

6. Overall, how would you rate the quality of elk hunting opportunities available in GMUs 21, 22, 30, 31, and 32? (Circle ONE)

Poor Fair Good Very Good Excellent No Opinion

41.7% of respondents (5 out of 12) indicate that hunting opportunity quality is good, while 33.3% (4 out of 12) indicate that hunting opportunity quality is fair.

7. Which ONE factor is the MOST important to you when elk hunting in GMUs 21, 22, 30, 31, and 32? (Check ONE)

- Not seeing other hunters
- Obtaining game meat
- Harvesting a trophy elk

Of the twelve respondents, 5 (41.7%) indicated that obtaining game meat is the most important aspect of hunting in the DAU, while 5 (41.7%) indicated that harvesting a trophy elk is the most important. Not seeing other hunters is most important for the remaining 2 (16.7%) hunters.

## Written Comments

1. If DOW continues with it's present practices (providing present lic. Allocations to private land owners) there will be no public hunting in the future, only hunting on private land for a price. All that the land owners and DOW care about is \$\$\$\$\$.
2. I enjoy elk hunting and we need a unit close to home to hunt without it taking 14 preference points to shoot a good bull.
3. I would like to some day hunt these units but probably will not be able to because it takes so many point to get a tag.
4. We need to increase the number of elk – so that more residents that rely on elk for meat has a better chance to harvest their licence quota.
5. Option 3.
6. Because of increased livestock on BLM land, the elk are being pushed out of some areas; livestock meaning wild horses as well as cattle. Hunting rules should apply to ALL hunters. Example: a hunter on an ATV with his weapon in a hard case and totally unloaded is being followed by a hunter in a pickup with his weapon uncased and loaded. Elk are spotted by both hunters. Now who has the unfair advantage? Think back! Prior to domestic “elk ranches” there was no such thing as “mad cow disease.”
7. Raise the objective to around 25 bulls to 100 cows – how many square miles is in this unit – landowner vouchers – make the owner draw his tags like the common man – in unit 10 or special units I to be able to sell my tag for \$10,000 dollars and get myself out of debt – Poaching – nail the poacher to the wall – no plea bargins – set an example and stick to it. Reduce the number of out of state tags 90% to 10% in the special units. Elk in 21, 22, 30, 31 are on a comeback get them to the objective with more mature bulls. Try to get cows sheep off the land to support our deer and elk herds better – “Good though but won't happen” – Elk and deer congregate with the cows and sheep on the critical winter/spring range – domestic livestock destroys more range than deer and elk.
8. I injoy hunting elk in 21 -30 and 22 don't always see a lot of animals but with hard hunting always see something – but elk for me is about meat! I'm not going to carry a cow a mile from a road, neither are 98% of other hunters...
9. I hunt Unit 21 every year. The elk hunting has improved greatly in the last 20 years, especially after the 4 pt. regulation was instituted. The wild horse herd in West Douglas and East Douglas has decimated the forage in at least two areas that require walking or horseback to achieve access so the general public does not see the result. If livestock was creating this type of damage the BLM would require the rancher to remove them. If it was elk causing this damage, the DOW would be having special depredation hunts.

# APPENDIX C: PUBLIC QUESTIONNAIRE



## OPPORTUNITY FOR PUBLIC COMMENT

### ELK MANAGEMENT

In the Yellow Creek Area

COLORADO

Data Analysis Unit E-10

(Game Management Units 21, 22, 30, 31, and 32)

The Colorado Division of Wildlife is interested in your opinions about elk management in the Yellow Creek Area. The results of this effort will help wildlife managers prepare elk management plans for this area. This questionnaire is your opportunity to provide input on the management of elk in Game Management Units 21, 22, 30, 31, and 32.

**Colorado Division of Wildlife**

**Northwest Region Service Center**

**711 Independent Ave.**

**Grand Junction, CO 81505**

July 2005

Dear Interested Citizen:

The Colorado Division of Wildlife (CDOW) is interested in your opinions about elk in the Yellow Creek Area, including Game Management Units (GMU) 21, 22, 30, 31, and 32. Wildlife managers have begun the process of updating the elk management plan for this area, which will affect future harvest strategies and permit setting.

In Colorado, big game populations are managed for a specific geographic area, which we call a Data Analysis Unit (DAU). A DAU generally includes several GMUs. In this case, the Yellow Creek DAU includes GMUs 21, 22, 30, 31, and 32. The purpose of the DAU plan is to determine: 1) how many elk the DAU should support, and 2) what sex ratio (number of bulls per 100 cows) the herd be managed for.

The DAU planning process attempts to balance biological considerations with public preference. An appropriate balance is sought and reflected in the elk herd objectives (population size and sex ratio). Annual hunting seasons are then designed with the intent of keeping the population at or near the selected herd objectives.

Your input is an important part of the DAU planning process. The information you provide will help develop CDOW's recommendation for elk herd objectives (population size and sex ratio) in the Yellow Creek area. Our recommendation will then be incorporated into the DAU plan, which will be reviewed, and ultimately approved, by the Colorado Wildlife Commission. Please be assured that your responses will remain confidential.

**Surveys must be returned to the**  
**CDOW Grand Junction Service Center by**  
**August 20, 2005.**

**THANK YOU FOR TAKING THE TIME TO COMPLETE THIS SURVEY. YOUR INPUT WILL HELP THE COLORADO DIVISION OF WILDLIFE MANAGE YOUR WILDLIFE!**

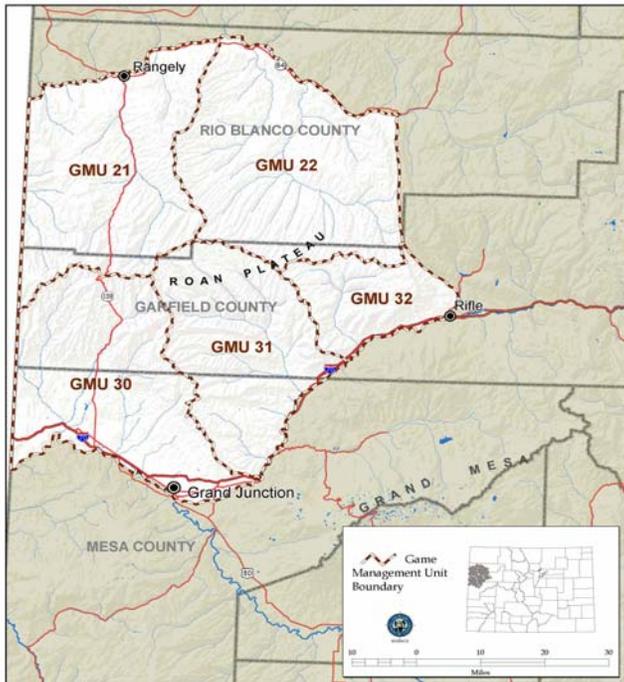
**TO RETURN THIS QUESTIONNAIRE:**

**Please fold in half on dotted line, tape it closed (do not staple) and complete during the meeting, hand deliver, or mail to:**

**Colorado Division of Wildlife  
711 Independent Ave.  
Grand Junction, CO 81505,**



First, please examine the map and written description of the areas designated as Data Analysis Unit E-10, Game Management Units 21, 22, 30, 31, and 32 located in West-Central Colorado, then go to Question 1.



Location of Elk DAU E-10 (GMUs 21, 22, 30, 31, 32), West-central Colorado

#### Description of DAU E-10:

Data Analysis Unit E-10 is located in west-central Colorado and is commonly called the Yellow Creek DAU. It is bounded on the north by the White River, on the east by Colorado State Highway 13, on the south by the Colorado River, and on the west by the Colorado-Utah state line. There are three counties within the DAU: Mesa, Garfield, and Rio Blanco.

**BACKGROUND INFORMATION**

1) Are you a resident of Colorado?

\_\_\_\_\_ Yes

\_\_\_\_\_ No

2) Do you live in GMUs 21, 22, 30, 31, and 32?

\_\_\_\_\_ Yes      If yes, how many years and in what GMU? \_\_\_\_\_

\_\_\_\_\_ No

3) Do you own or lease property in GMUs 21, 22, 30, 31, and 32?

\_\_\_\_\_ Yes      If yes, how many years and in what GMU? \_\_\_\_\_

\_\_\_\_\_ No

4) Which group(s) best represent your interests in elk management in GMUs 21, 22, 30, 31, and 32? *(Check all that apply)*

\_\_\_\_\_ A) Rancher/Farmer

\_\_\_\_\_ B) Business owner

\_\_\_\_\_ C) Landowner

\_\_\_\_\_ D) Guide/Outfitter

\_\_\_\_\_ E) Hunter/Sportsperson

\_\_\_\_\_ H) Environmental/Conservation

\_\_\_\_\_ I) Other, please explain \_\_\_\_\_

5) If you checked more than 1 response in the above question, write the letter corresponding to the interest group which most represents your opinions. \_\_\_\_\_

**ELK MANAGEMENT**

1) How would you like the elk population in GMUs 21, 22, 30, 31, and 32 to change, if at all?

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

2) The population is currently within the objective range. How would you like the elk population **objective** in GMUs 21, 22, 30, 31, and 32 to change, if at all?

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

3) How important to you is the change in the size of the elk population that you indicated in Question 1 above? *(Circle One)*

- |                              |                                   |                               |                                |
|------------------------------|-----------------------------------|-------------------------------|--------------------------------|
| <input type="checkbox"/> Not | <input type="checkbox"/> Slightly | <input type="checkbox"/> Very | <input type="checkbox"/> Don't |
| Important                    | Important                         | Important                     | Know                           |

4) How would you like the number of bull elk in GMUs 21, 22, 30, 31, and 32 to change, if at all?

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

5) The objective for bull elk is currently 18 bulls: 100 cows. How would you like the **objective** for the number of bull elk in GMUs 21, 22, 30, 31, and 32 to change, if at all?

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

**ELK HUNTING**

1) Have you ever hunted elk in Colorado?

\_\_\_\_\_ Yes      If yes, how many years? \_\_\_\_\_  
\_\_\_\_\_ No

2) Have you ever hunted elk in GMUs 21, 22, 30, 31, and 32?

\_\_\_\_\_ Yes  
\_\_\_\_\_ No

3) Overall, how satisfied have you been with your elk hunting experience(s) in GMUs 21, 22, 30, 31, and 32 in the last 5 years? (*Circle ONE*)

Very                      Slightly                      Neutral                      Slightly                      Very  
Dissatisfied              Dissatisfied                      Satisfied                      Satisfied

4) Overall, to what extent have you felt crowded by other hunters while elk hunting in GMUs 21, 22, 30, 31, and 32? (*Circle ONE*)

Extremely              Moderately                      Slightly                      Not at all  
Crowded                      Crowded                      Crowded                      Crowded

5) Rank the following items from 1 to 5 in the order that they would most likely improve your elk hunting experience in GMUs 21, 22, 30, 31, and 32. (1=most likely to improve, 5=least likely to improve) Do not use any number more than once.

\_\_\_\_\_ Less hunter crowding  
\_\_\_\_\_ Higher hunter success rate  
\_\_\_\_\_ Less motorized vehicle access  
\_\_\_\_\_ Seeing more mature bulls  
\_\_\_\_\_ Seeing more elk

6) Overall, how would you rate the quality of elk hunting opportunities available in GMUs 21, 22, 30, 31, and 32? (*Circle ONE*)

Poor      Fair      Good      Very Good      Excellent      No Opinion

7) Which ONE factor is the MOST important to you when elk hunting in GMUs 21, 22, 30, 31, and 32? (*Check ONE*)

\_\_\_\_\_ Not seeing other hunters  
\_\_\_\_\_ Obtaining game meat  
\_\_\_\_\_ Harvesting a trophy elk

**PEOPLE AND ELK**

1) Please indicate how concerned you are about each of the following in GMUs 21, 22, 30, 31, and 32. (Circle one number for each item).

	<u>No Concern</u>		<u>Very Concerned</u>		
A) Elk/Vehicle collisions	1	2	3	4	5
B) Economic losses to ranchers/farmers from elk damage to rangeland, crops, or fences	1	2	3	4	5
C) Damage to homeowners' trees, shrubs, and gardens caused by elk	1	2	3	4	5
D) Predation on the elk population by coyotes, bears and mountain lions	1	2	3	4	5
E) Loss of elk habitat due to increased human population & development	1	2	3	4	5
F) Potential starvation of elk during the winter	1	2	3	4	5
G) Elk spreading disease to pets, livestock, or humans	2	3	4	5	
H) Elk competing with livestock for forage	1	2	3	4	5
I) Potential competition between elk and deer for habitat	1	2	3	4	5
J) Revenue that elk hunting provides local business	1	2	3	4	5

2) Have you been personally affected by any of the concerns listed in Question 2 in GMUs 21, 22, 30, 31, and 32?

\_\_\_\_\_ Yes      If yes, circle one: A B C D E F G H I or J

\_\_\_\_\_ No

3) How do you personally feel about elk in GMUs 21, 22, 30, 31, and 32?

**(Check ONE)**

\_\_\_\_\_ I do not enjoy the presence of elk in GMUs 21, 22, 30, 31, and 32, AND regard them as a nuisance.

\_\_\_\_\_ I enjoy the presence of elk in GMUs 21, 22, 30, 31, and 32, BUT worry about the problems they may cause.

\_\_\_\_\_ I enjoy the presence of elk in GMUs 21, 22, 30, 31, and 32 AND do not worry about the problems they may cause.

\_\_\_\_\_ I have no particular feelings about elk in GMUs 21, 22, 30, 31, and 32.

## **APPENDIX D: BUREAU OF LAND MANAGEMENT RESPONSE**



United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Glenwood Springs Resource Area  
50629 Highway 6 and 24  
P.O. Box 1009  
Glenwood Springs, Colorado 81602

September 2, 2005

IN REPLY REFER TO:

6800  
CO-140

Mr. Ron Velarde  
Regional Supervisor  
Colorado Division of Wildlife  
711 Independent Ave.  
Grand Junction, Colorado 81505

Subject: DAW E-10 Yellow Creek Elk Herd

Dear Ron,

We appreciate the opportunity to review and provide input on the E-10 DAW plan currently being revised by your agency. As public land managers we recognize the many challenges of maintaining viable, productive big game herds, given current land patterns and uses. In summary, the DAW, based on the most current population estimate data, is proposing to manage the Yellow Creek Elk Herd somewhere between 8,000 to 10,000 animals. The proposed sex ratio objective would be 18-22 bull: 100 cows.

The BLM generally supports the lower end of this population objective (8,000 animals). This is based primarily on the current and projected availability and condition of important habitats. Based on information presented by Stephanie Buckett at the agency meeting, managing for the proposed number of animals should benefit resident herds by maintaining productivity rates, and increasing/maintaining desired sex ratio compositions. In addition, we feel that managing at the lower end of the range will help to maintain or improve the condition of important habitats, while potentially reducing conflicts with private landowners. Based on land management emphasis for the area, the lower end of this population objective may be more in line with projected long-term habitat carrying capacity.

In general, elk winter range appears to be less impacted to date, and is in better condition than lower elevation mule deer winter range. However, elk winter range habitat is being lost as private and public lands are developed. This increases management conflicts and in some cases concentrates use by wintering big game on limited remaining public and private land winter range. Site-specific elk winter range condition varies across the DAW due to a variety of factors including but not limited to: private land development, lack of fire, wild and domestic ungulate grazing, OHV and other recreation use, and natural gas development, among others.

Natural gas development in particular is increasing within the DAW. It is likely that continued natural gas development will soon begin to impact more elk winter, transition, and summer range habitat. According to analysis in the Draft Roan Plateau Resource Management Plan Amendment (BLM 2004) it is possible that future impacts associated with natural gas development could reduce resident elk populations within the Roan Plateau Planning Area (GMU 32) by 6-7% or higher.

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SEP 06 2005

Northwest Reg. DOW

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One additional habitat issue is the general condition of aspen stands located on top of the Roan Plateau in GMU 32. Aspen stands are generally old and decadent with very little recruitment. It is likely that elk browsing on saplings is a contributing factor affecting long-term aspen health in the area. Other factors include disease, lack of natural disturbance (fire), and trend towards late succession with increased abundance of sub-alpine fir. We recognize that in many cases site specific vegetation impacts resulting from elk are due more to landscape distribution patterns rather than overall population size.

We appreciate the opportunity to review and provide input on this plan, and we look forward to continued cooperation regarding the management of big game habitats located on public lands administered by the Glenwood Springs Field Office. If you have any questions, please contact Tom Fresques in our office at (970) 947-2814.

Sincerely,



Jamie Connell  
Field Manager

Attachments:  
Grazing Allotment Information for DAU E-10  
Rifle Creek Land Health Assessment Report  
Rifle West Land Health Assessment Report  
Roan Cliffs Land Health Assessment Report

cc: Dean Riggs, Area 7 Supervisor  
Stephanie Duckett, Terrestrial Biologist



United States Department of the Interior

BUREAU OF LAND MANAGEMENT  
White River Field Office  
73544 Highway 64  
Meeker, Colorado 81641



SEP 12 2005

Stephanie Duckett, Terrestrial Biologist  
Colorado Division of Wildlife  
711 Independent Ave.  
Grand Junction, Colorado 81501

Dear Ms. Duckett,

Based on supporting information provided to the Colorado Division of Wildlife (CDOW) for the Yellow Creek Elk Management Plan, the Bureau of Land Management's (BLM) White River Field Office supports a long-term objective that would maintain current elk populations and their prevailing influence on BLM-administered lands. This position is consistent with BLM's continuing efforts to enhance or restore proper rangeland functions, in particular, by attempting to reduce the intensity and duration of collective growing season use by wild and domestic ungulates through improved livestock management, noxious weed control, and more aggressive implementation of our Fire Management Plan. We believe that effective elevation of elk abundance on BLM-administered lands would tend to counteract or retard rangeland gains achieved by these means. BLM supports the management flexibility inherent in proposing a desired population range and is encouraged by CDOW's recent success in managing burgeoning elk populations in DAU E-6. In the same vein, and although we do not anticipate dramatic changes in current elk distribution patterns, BLM has lingering concerns in the event energy development in Piceance Basin prompts substantive redistribution of elk onto BLM-administered lands in GMUs 21 and 22.

Although we believe that present vegetation status and a pattern of increasingly large wildfire events in GMU 21 argues for a period of sustained advantage for elk, the BLM's White River Field Office has no basis to object to current deer population objectives for DAU D-11. We feel land management applied with an emphasis toward deer would continue to complement balanced management of woodland and shrubland communities across GMU 21 and would add impetus for restoring ecological conditions and processes that better meet the BLM's Public Land Health Standards.

If you have questions concerning our response to your DAU Plans, please contact myself or Ed Hollowed of my staff at 970-878-3834.

Sincerely,

  
for Kent E. Walter  
Field Manager



IN REPLY REFER TO

## United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Grand Junction Field Office

2815 H Road

Grand Junction, Colorado 81506



October 4, 2005

Ms. Stephanie Duckett  
Terrestrial Biologist  
Colorado Division of Wildlife  
711 Independent Ave.  
Grand Junction, CO 81501

Dear Ms. Duckett,

The Grand Junction Field Office (GJFO) of the Bureau of Land Management (BLM) appreciates the opportunity to comment on elk and deer management in Game Management Units (GMUs) 30 and 31. Based on review of the information you provided, we concur with CDOWs deer and elk management objectives for these two GMUs.

The BLM continues efforts to enhance or restore rangeland functions and conditions across the GJFO. By virtue of site location, our work to monitor big game use – by conducting annual pellet group counts on winter range – has been geared more toward assessment of mule deer use than that of elk. Even with considerable natural variation in those assessments, that work generally indicates that deer use has declined in recent years. We have observed that substantial decline of range condition associated with drought years (particularly 2002-2004) have recently been reversed with increased precipitation this year. We conclude that, at current big game population levels, recent trends in range condition on BLM-administered public land appear to be influenced more by annual environmental factors than by utilization by ungulates.

You have presented evidence that elk and deer populations are within objectives, and CDOWs recent successes in managing above-objective elk populations in other GMUs encourage our support of your current management strategies in GMUs 30 and 31.

If you have further questions, please contact me at 970-244-3012.

Sincerely,

Brendan Moynahan, Ph.D.  
Wildlife Biologist