ELK MANAGEMENT PLAN

DATA ANALYSIS UNIT E-4

Red Feather- Poudre Canyon Herd

GMUs 7, 8, 9, 19 & 191

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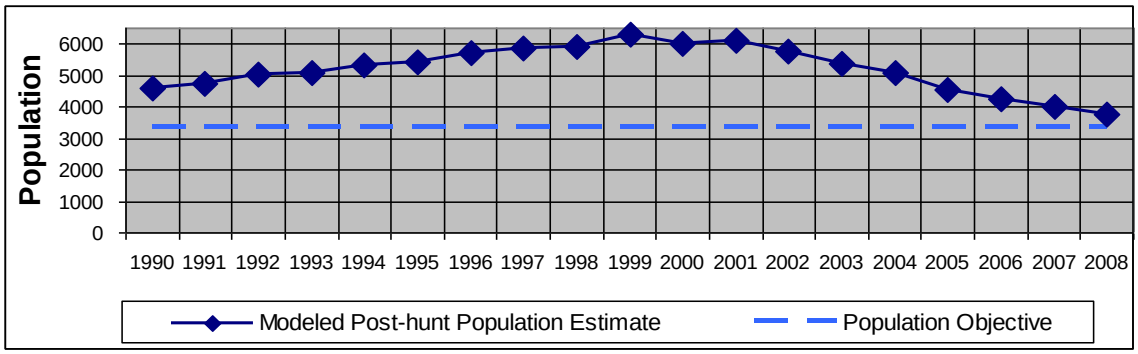
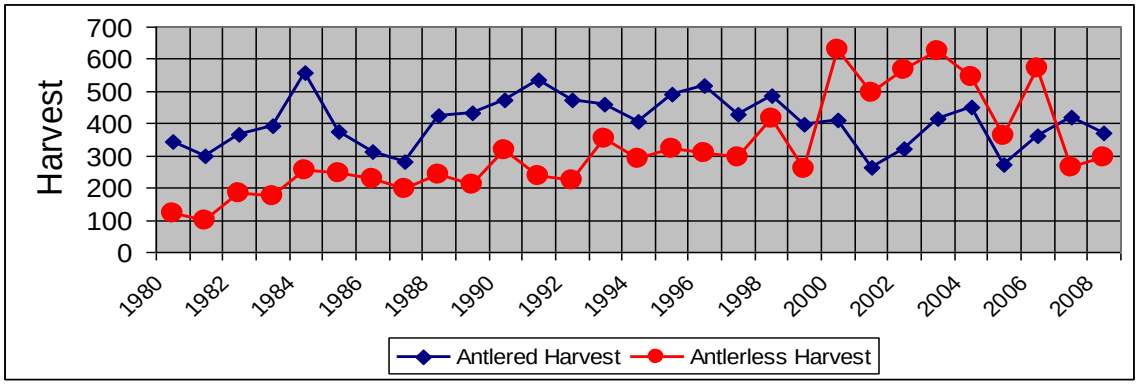
DATA ANALYSIS UNIT PLAN FOR E-4
EXECUTIVE SUMMARY

GMUs: 7, 8, 9, 19 and 191 (Northern Larimer County)
Land Ownership: 40% Private, 46% USFS, 6% City/County, 5% State, 2% BLM
Post-hunt Population:
Previous Objective: 3,300 2008 Estimate (Modeled): 3,750
Current Objective**:** 3,600-4,200
Post-hunt Sex Ratio (bulls:100 cows):
Previous Objective: 25 2007 Observed: NA 2008 Modeled: 40
Current Objective: 30-35 bulls:100 cows

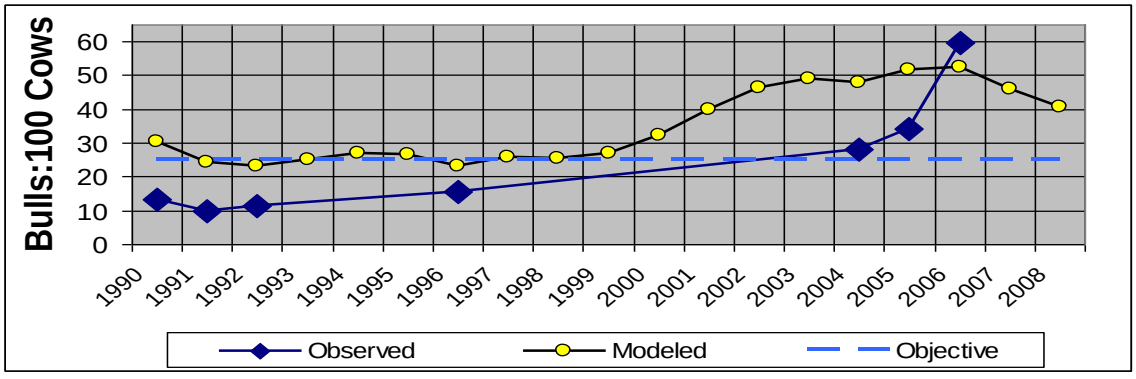
E-4 Post-hunt Population Estimate



E-4 Harvest



E-4 Post-hunt Sex Ratios



Background

The Red Feather-Poudre Canyon elk herd (E-4) consists of Game Management Units (GMUs) 7, 8, 9, 19 and 191. It is located in northern Larimer County in the area north and west of Fort Collins.

Before 2001, E-4 had been managed with unlimited, over-the-counter bull licenses (in the 2nd, 3rd and 4th seasons) and a moderate level of cow licenses. Unlimited statewide archery and statewide muzzleloading licenses were valid until 2001 in E-4. Under season structures since 1999, limited and specified 1st season bull licenses have been available. Beginning in 2001, all licenses in E-4 were issued through a limited drawing to assist the CDOW in providing information to hunters regarding chronic wasting disease (CWD) and the CWD surveillance program. However, while the DAU is limited, many hunting seasons are undersubscribed with leftover licenses available throughout the season. Bull elk hunting is managed with a 4-point minimum antler point restriction in all seasons.

From 1980-1999 antlered harvest ranged between 300-550 bulls. Antlerless harvest was between 100-250 cows from 1980 to 1989. Harvest increased during the 1990s and ranged between 250-400 cows killed per year. With the inception of private land-only (PLO) tags in 2000 and an increase in the number of late-season cow licenses that same year, E-4 antlerless harvest from 2000-2006 increased to its highest levels at 400-600 per year. Difficult hunting conditions and antlerless license reductions in 2007 and 2008 contributed to a return to a lower cow harvest of around 300. Bull harvest from 2000-2008 ranges slightly below pre-2000 levels with annual harvests between 250-450.

Through 2007, management efforts have been focused on reducing the herd and reaching a long-term population objective of 3,300 elk as specified in the 1997 DAU plan (previous). Tactics to reduce population levels have included making antlerless licenses additional (List B), and the use of PLO and late seasons. The herd in E-4 is approximately 10-15% over the current objective with a post-hunt 2008 estimate of 3,750.

Post-hunt sex ratios observed in 2005 and 2006 were significantly over the long-term objective of 25 bulls:100 cows. This may partially be an artifact of the sampling technique, but bull:cow ratios are undoubtedly high for units with considerable hunter pressure as evidenced by the modeled post-hunt 2006 ratio of 34 bulls:100 cows.

Significant Issues

There are no significant issues that have been raised by the public or through internal agency discussions regarding E-4. Game damage and landowner complaints regarding elk numbers are minimal. From the 435 returned public surveys, 2 out of 3 respondents favored increasing the elk herd while input on bull:cow ratios was evenly split between support of increasing bull ratios and the status quo. The public desire to increase or maintain bull:cow ratios would be difficult to sustain under a return to over-the-counter (OTC) bull hunting. Additionally, given the proximity of E-4 to the increasingly populated Front Range, it is likely crowding would become an issue under OTC management. Based on public comments as part of the DAU revision and DOW staff discussions, the most prominent issue seems to be future herd size.

Management Alternatives

This management plan provides 3 alternatives for a herd population objective and 3 options for sex ratio objectives. These population and sex ratio objectives are independent of one another, and represent different biological issues, social aspects and hunting strategies in herd management.

Population Objective Alternatives

The first population alternative calls for a herd of approximately 3,000-3,600 elk. This would represent a stabilization/slight reduction of the current herd size with no sizable change in numbers from the post-hunt 2008 levels. The second alternative increases the herd to approximately 3,600-4,200 elk. This would require a small decrease in antlerless hunting opportunity during the time the herd was growing. The final population option calls for significantly increasing the herd to 4,200- 4,700 elk. This option would require decreases in antlerless hunting for the longest period of time until the new objective has been reached.

Herd Composition-Sex Ratio Objective Alternative

The first sex ratio alternative calls for managing the herd for a 25-30 bull:100 cow ratio. This is substantially less than both the current modeled and observed ratios. Since bull licenses are currently issued at liberal levels and some GMUs are undersubscribed, it is difficult to predict how bull ratios could be reduced to this level. This alternative would offer maximum opportunity with no real limits on the number of bull licenses available each year. Alternative #2 calls for a 30-35 bull:100 cow ratio which would be relatively similar to the current modeled level in E-4. Based on variations in the observed ratio, this objective could lead to bull license levels similar to 2006-2008. Annual license reductions would likely not be required to maintain bull ratios at this level. The third alternative manages for 35-40 bulls:100 cows, which would be considered a high ratio, with more older, large-antlered bulls. To reach that ratio, some reduction in bull harvest would likely be necessary.

Preferred Alternatives

The CDOW recommends population objective Alternative # 2; increasing the herd to between 3,600-4,200 elk. This is an increase from the current objective, but would not occur equally across the DAU. Elk numbers on predominantly public land GMUs 7, 8, and 19 would increase, while current levels would be maintained in GMUs 9 and 191. This will require reductions in antlerless hunting opportunity during the short-term while the herd increases to the new objective. The population level will be similar to the herd size in E-4 during the 1990s. The CDOW recommendation on sex ratio alternatives is for Alternative #2 (30-35 bulls:100 cows). Although this represents an increase from the current objective, since observed bull:cow ratios have been over-objective, this alternative doesn't require any changes in herd composition.

This plan was approved by the Colorado Wildlife Commission on November 12, 2009.

RED FEATHER-POUDRE CANYON
ELK MANAGEMENT PLAN
DAU E-4 (GMUs 7, 8, 9, 19 & 191)

TABLE OF CONTENTS

DATA ANALYSIS UNIT PLAN FOR E-4

INTRODUCTION

The purpose of a Data Analysis Unit (DAU) plan is to give the Colorado Division of Wildlife (CDOW) direction in managing a big game species in a given geographical area. It identifies suitable habitat, gives the herd history and current status, and identifies issues and problems. Key features of a DAU plan are the herd size and herd composition objectives, which are developed after considering input from all interested entities. CDOW intends to update these plans as new information and data become available, at least once every ten years.

DAU PLANS AND WILDLIFE MANAGEMENT BY OBJECTIVES

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

DAUs provide the framework to manage individual herds of big game animals. DAUs are generally discrete geographically, and attempt to identify an individual big game population. However, individual animal movements may at times straddle or encompass more than one DAU. While DAU boundaries are administrative, they represent the best way to encompass the majority of a herd within a biological area, and allow the most practical application of management tools such as hunting, to reach objectives. DAUs are typically composed of smaller areas designated as game management units (GMUs), which provide a more practical framework where the management goals can be refined and applied on a finer scale, typically through hunting regulations.

The DAU plan process is designed to balance public demands, habitat capabilities and herd capabilities into a management scheme for the individual herd. The public, hunters, federal land use agencies, landowners and agricultural interests are involved in the determination of the plan objectives through input given during public meetings, the opportunity to comment on draft plans and when final review is undertaken by the Colorado Wildlife Commission.

The objectives defined in the plan guide a long term cycle of information collection, information analysis and decision making. The end product of this process is a recommendation for numbers of hunting licenses for the herd (Figure 1). A traditional DAU plan addresses two primary goals: the number of animals the DAU should contain

and the sex ratio of those animals expressed as males:100 females. The plan also specifically outlines the management techniques that will be used to reach desired objectives. The fact that DAU plans are reviewed and revised on a 5-10 year basis provides some assurance against the longer-term fluctuations experienced by Colorado's big game herds. Changes in land development, public attitudes, hunter success, hunter access, research results, disease prevalence and game damage may all contribute new information needed when reviewing or revising a DAU plan. The CDOW strives to maintain a tight link between the inclusion of publics in the development of population objectives and the yearly iteration of data collection, analysis and renewed decision-making to reach those objectives.

Individual DAUs are managed with the goal of meeting herd objectives. Herd data, which is typically collected annually, is entered into a computer population model to get a population projection. The parameters that go into the model include harvest data from hunter surveys, sex and age composition of the herd gathered by field surveys, and mortality factors such as wounding loss and winter severity, generally acquired from field observations. The resultant computer population projection is then compared to the herd objective, and a harvest is calculated to align the population with the herd objective.

COLORADO'S BIG GAME MANAGEMENT BY OBJECTIVE PROCESS

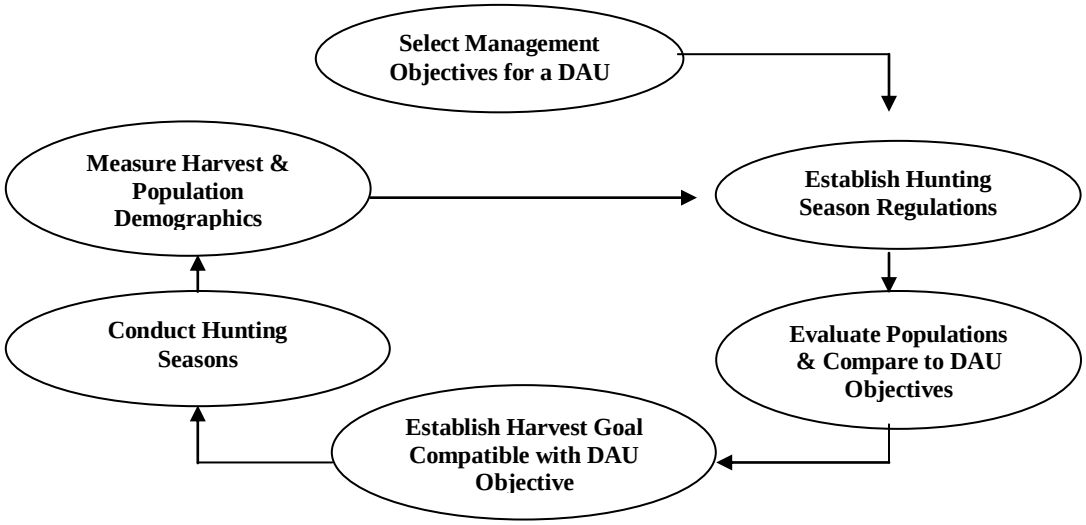


Figure 1. Management by objectives process used by the CDOW to manage big game populations on a DAU basis.

DESCRIPTION OF DAU AND HABITAT

Geography

Elk DAU E-4 is located in Larimer County in northcentral Colorado. E-4 is bounded on the north by the Wyoming state line, on the west by Jackson County, and on the east by I-25. The southern boundary is defined by Harmony Road, Larimer County roads 19, 38E, 27 and 44H, the Elk Creek and Pennock Creek divide and Rocky Mountain National Park's northern border. E-4 is drained by the Laramie River, and the north fork and mainstem of the Cache la Poudre River. The DAU is comprised of GMUs 7, 8, 9, 19 and 191 (Figure 2).

Elevations range from 12,795 feet at the highest point in the southwestern part of the DAU to 4,921 feet along the eastern edge near Fort Collins. The DAU covers much of the northern part of the Arapaho/Roosevelt National Forest.

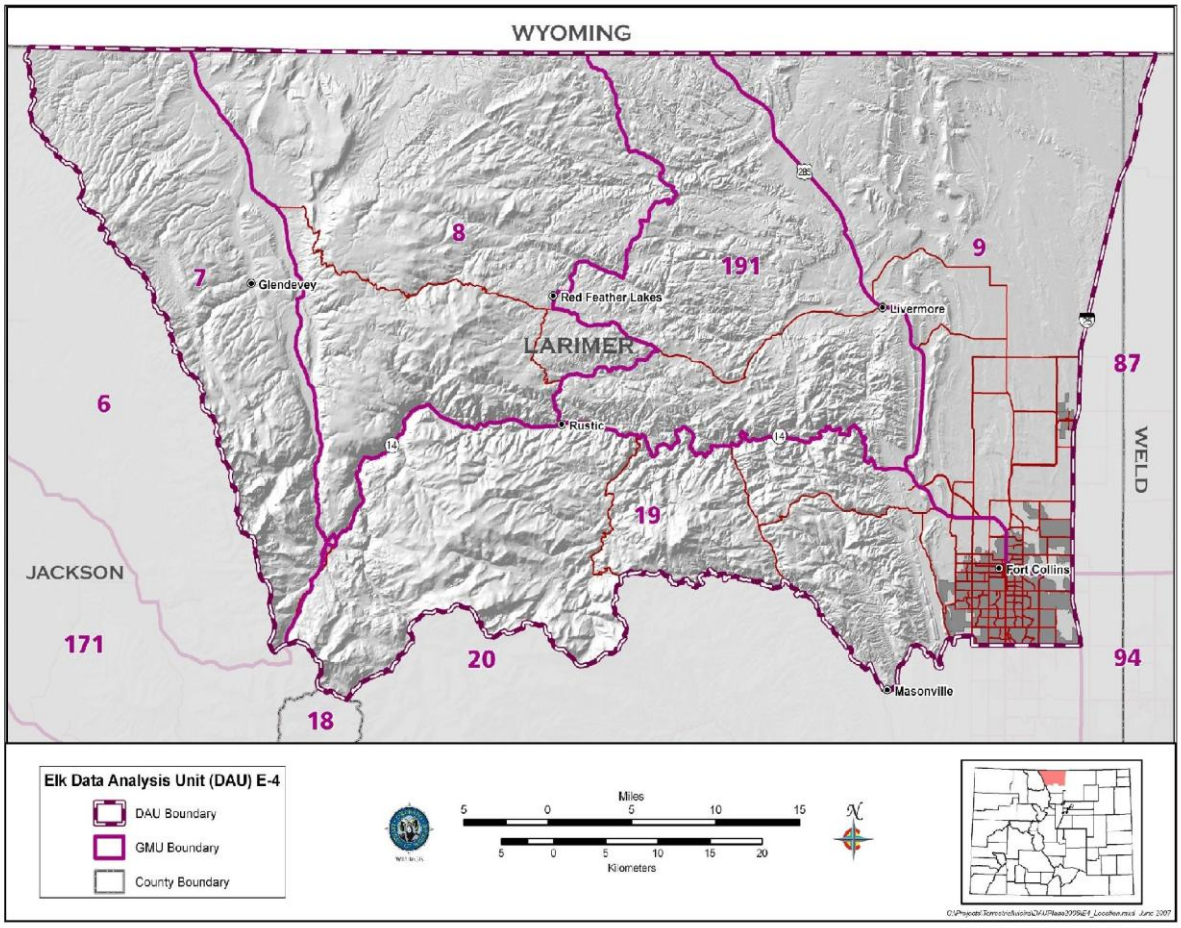


Figure 2. Location of DAU E-4

Climate

The overall climate in E-4 is relatively dry with low humidity. Climate varies across the DAU as a function of elevation. Conditions on the eastern edge are standard for the foothills/short grass prairie interface, with relatively mild winters, smaller snow accumulations and hotter summers. The higher elevation portions in the west experience a harsher climate, with long, cold winters, abundant snowfall, and short, cool summers. Elk summer range generally includes areas between 9,500 and 11,500 feet in elevation. These areas usually become available to elk as snowlines recede in mid to late May. The majority of elk in E-4 winter at elevations between 7,000 and 9,500 feet (Figure 3). A large proportion on the elk herd in northern E-4 winter along the Colorado/Wyoming stateline, and as such are often not in Colorado during the winter months. Many west and south-facing slopes are typically clear of snow all year, with occasional spring and late winter storms depositing accumulations which quickly melt off. Weather-related winter elk mortality is usually not a factor in E-4.

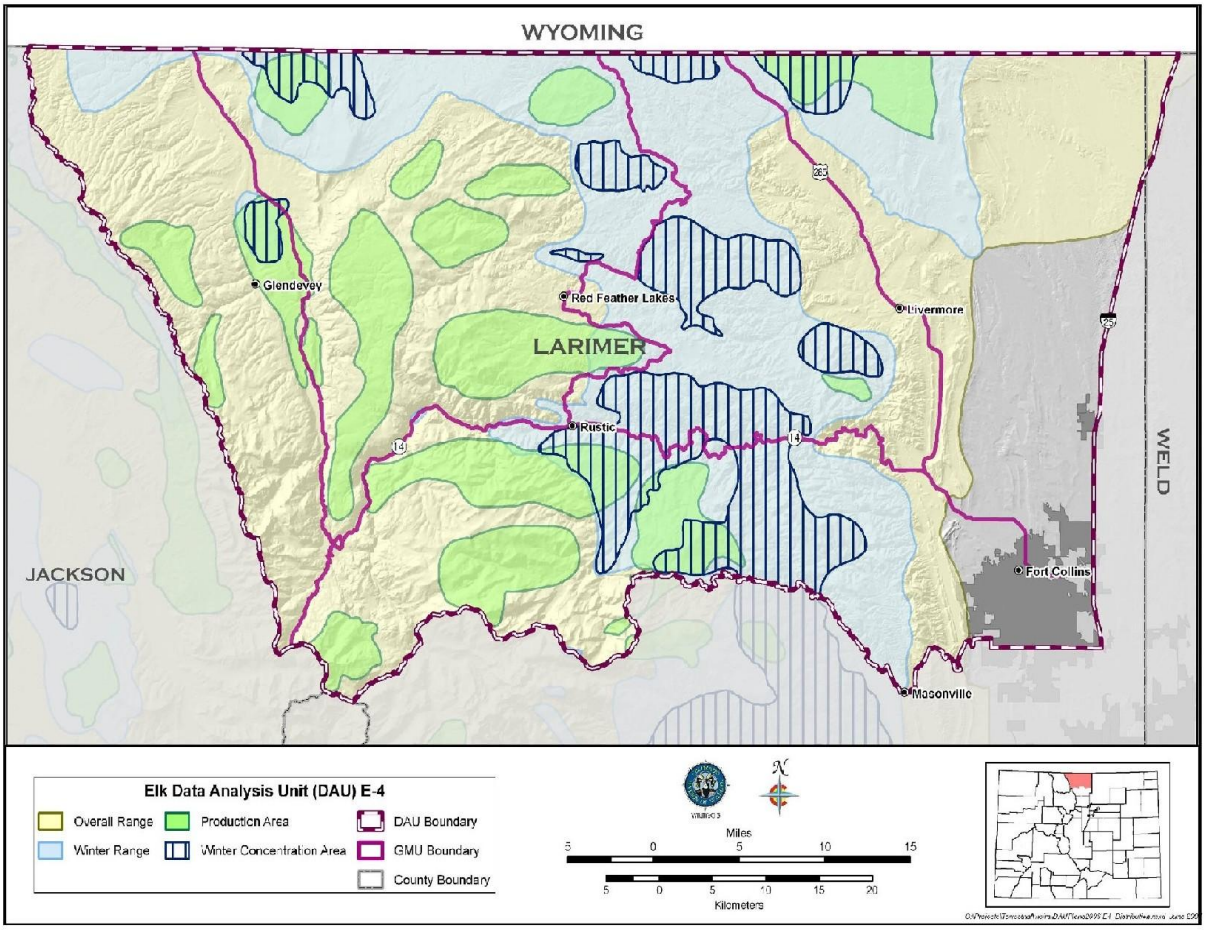


Figure 3. E-4 elk distribution

Land Ownership and Use

Elk habitat in E-4 is spread across a wide range of land ownership categories (Figure 4). The largest single land manager is the United States Forest Service (USFS), followed closely by private landowners. Private lands encompass 716 sq. miles, or 40% of the DAU while the USFS has stewardship over 829 sq. miles (46% of DAU). The vast majority of USFS land is National Forest or designated wilderness. There are 4 USFS wilderness areas in the DAU; Cache La Poudre Wilderness (14 sq. mi.), Comanche Peak Wilderness (96 sq. mi. in E-4), Neota Wilderness (15 sq. mi.) and Rawah Wilderness (113 sq. mi.). There are some small areas in E-4 managed by the Bureau of Land Management (BLM) (43 sq. miles or 2% of DAU). Among state lands, those managed as State Wildlife Areas (CDOW) or State Land Board holdings account for almost all of the total area (97 sq. miles or 5%). Many of these state properties provide elk hunting opportunities. Outside of private land, USFS, BLM and CDOW lands receive almost all elk hunting pressure.

Both the City of Fort Collins and Larimer County manage parcels of land in E-4, several of which are in elk habitat. Overall, city and county ownership of land totals 104 sq. miles or 6% of the DAU. Larimer County Open Space's (LCOS) Red Mountain property is the primary parcel with heavy elk use, although elk can occasionally be found on the City of Fort Collins Soapstone property and LCOS Eagle's Nest property.

While Rocky Mountain National Park (RMNP) is not in the DAU, it provides a refuge from hunting on the southern edge of E-4. Radio telemetry data from elk marked on winter range near the E-4/ RMNP interface indicate that the E-4 elk herd doesn't use RMNP as part of its main concentration area. However, some E-4 elk will utilize RMNP on a limited, short-term basis to escape early season hunting pressure.

Besides some areas on the far eastern side that receive little elk use due to urban development or unsuitable habitat the rest of the DAU falls under the broad category of overall elk range (see Figure 3). Winter range, however, is more limited, and is generally found across the central parts of the DAU, such as the areas around Stove Prairie, Salt Cabin Park, Kelly Flats, Virginia Dale and Cherokee Park. A number of elk also winter in the far northwestern part of the DAU in the lower Laramie River valley and along the Wyoming/Colorado state line (see Figure 3).

Human occupation is limited, particularly in the western (Laramie River valley) and south-western portions of E-4 (upper Poudre, Joe Wright Creek). To the east, especially in portions of eastern GMU 8 and most of GMU 191, rural developments are more common. Irrigated hay and ranching form the main landscape use in the western part of the DAU, however, increased fragmentation due to home construction, small acreage pasturing and hobby livestock ranching is occurring, particularly on the eastern side. GMU 9 is largely private land with very limited hunting access; however recent purchases by the City of Fort Collins and LCOS may allow some public access for hunting in the northern part of the GMU.

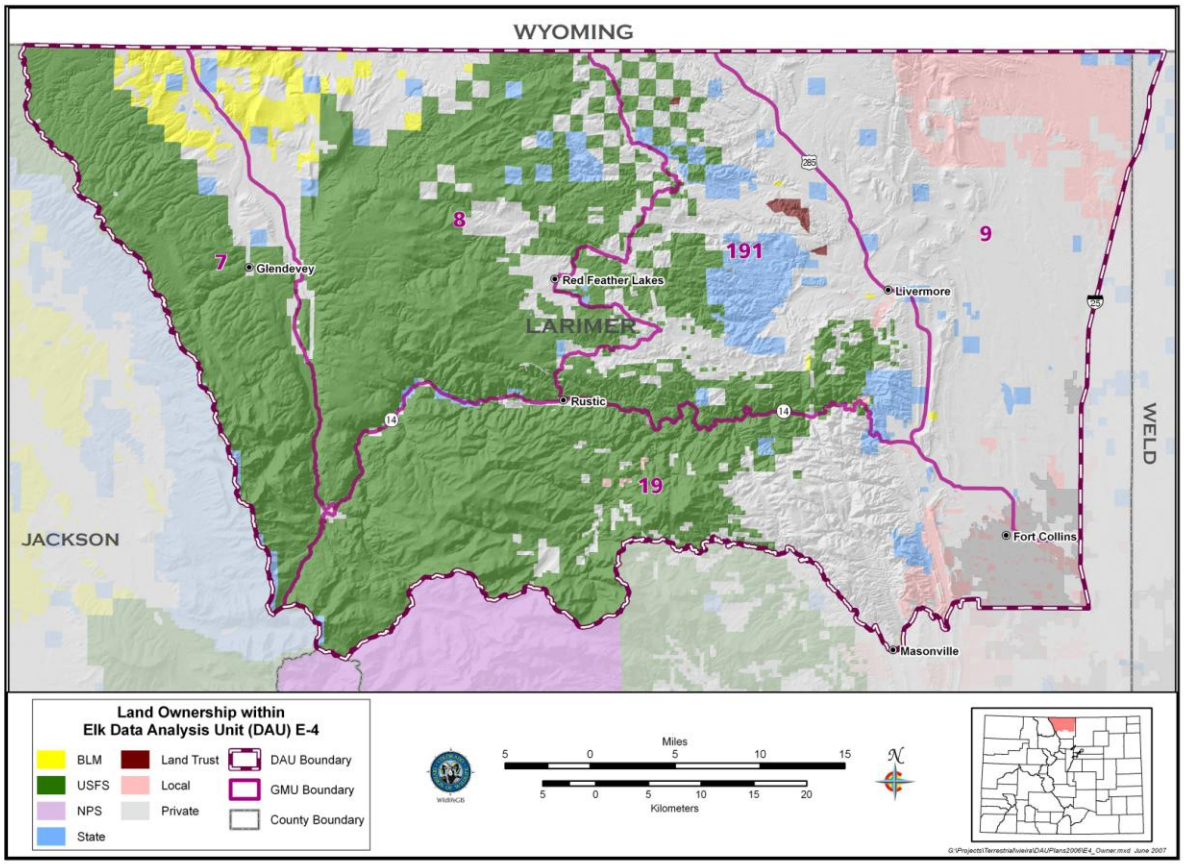


Figure 4. Land ownership in E-4

Vegetation

Vegetation on the eastern side of the DAU bordering I-25 is composed of shortgrass prairie. Native grasses, non-native grasses and croplands dominate much of the landscape, with areas of sagebrush, rabbitbrush and cacti. Riparian areas are comprised of cottonwoods, along with alders and willows. Elk in GMU 9, which is the eastern-most unit, rarely venture east into the shortgrass prairie community, but rather stay in the mixed ponderosa pine/mountain mahogany complexes along the north-central parts of that area.

Foothills vegetation from approximately 5,500 to 7,000 feet is characterized by various shrub types and ponderosa pine. Shrubs such as mountain mahogany, juniper, wild plum, and serviceberry all are present, although the localized diversity varies greatly.

Moving higher in elevation from the foothills brings a change in vegetation and a new ecological region, the montane zone. Ponderosa pine forests may continue to elevations above 8,000 feet, but often Douglas-fir stands begin at middle elevations and continue up to 9,000 feet. Both aspen and lodgepole pine appear as early colonizers, inhabiting areas of disturbance.

Areas on the far western and southwestern portion of the DAU represent the subalpine region. Aspen is present at the lower end of the zone, giving way to lodgepole

stands as elevation increases. Spruce/fir communities are the standard forest type through the subalpine until 11,500 feet, at which point timberline is reached and tree growth is nearly impossible given the cold, snow and wind. Above timberline, the landscape is dominated by tundra vegetation such as cushion plants, willow species and small groups of krumholtz trees.

HERD MANAGEMENT HISTORY AND BACKGROUND

The current DAU plan for E-4 was written in 1997. Management objectives were to maintain the herd at 3,300 animals with a bull:cow ratio of 25:100.

History

Elk have historically inhabited E-4. Due to market hunting, the population reached its low point during the late 1800s and early 1900s. Laws were enacted by the Colorado Legislature in 1913 to stop uncontrolled hunting. This protection, along with elk transplant programs resulted in dramatic increases in Larimer County's elk population (DAUs E-4 and E-9). In 1913 and 1914, fifty elk were captured in Yellowstone and released in Rocky Mountain National Park (south of E-4). It is probable that some of these elk and their descendants migrated north and provided the nucleus for part of the present herd. Since the late 1960s, the herd has generally been expanding its range in the DAU. There are areas in E-4 that now have regular elk use or hold non-migratory groups of elk even though as recently as 20 years ago these areas weren't considered elk habitat.

A radio telemetry study was initiated in 1993 to determine movements of sub-herds of elk within E-4 and the DAU to the south (E-9). The justification for this study was to determine if the recurring damage to fences and crops in the Stove Prairie area during the early 1990s was being caused by a specific sub-herd of elk. Approximately 45 adult cow elk were radio collared and periodically monitored aerially to obtain locations over a 4-year period. The study identified at least 5 sub-herds that often summer together in the same general area of high-elevation range, but which migrate and winter in distinct areas from one another. The project also showed that the E-4 and E-9 DAU boundary is relatively realistic in delineating a break point between the separate herds. Although some radioed elk from each DAU used summer range near each other and the E-4/E-9/RMNP boundary, no elk collared in E-4 was ever found to have joined elk in E-9 or had more than an occasional/peripheral aerial location on E-9 winter range.

Population and Sex Ratio

Estimating population numbers of wild animals over large geographic areas is a difficult and approximate science. Numerous attempts have been made to accurately count known numbers of wild animals in large fenced areas. All of these efforts have failed to count 100% of the animals. The CDOW recognizes the difficulties of estimating the size of elk populations as a challenge in managing populations and attempts to maximize the accuracy of these estimates by using the latest technology and inventory methodology available. As better information and techniques become available (e.g.,

new estimates of survival/mortality, wounding loss, sex ratios, density, or new modeling techniques and software) they are evaluated and used where appropriate. The population estimate presented in this document should, therefore, not be considered a completely accurate enumeration of the animals in the DAU.

Elk numbers in E-4 have exceeded the long-term population objective (3,300) for the last 18 years, however modeled results for the post-hunt 2008 herd (3,750) indicate that numbers are now within 10-15% of objective (Figure 5). Increased harvest pressure on antlerless elk since 2000 has largely been responsible for reducing herd numbers since the 1990s.

Observed bull:cow ratios in E-4 have been higher than would be expected in a DAU receiving similar bull hunting pressure (Figure 6). Although licenses are limited, hunting pressure is more representative of an over-the-counter (OTC) unit, as leftover rifle bull licenses are commonly undersubscribed. Comparison of E-4 with a large OTC-license DAU like E-6 (White River) indicates that from 1996-2006 hunter numbers per elk are at least equal, if not higher, in E-4. Therefore, E-4 can be currently considered a "maximum opportunity" limited unit. Observed ratios in 2004 and 2005 were well above the 25 bulls:100 cows objective, with a surprising 59 bulls:100 cows observed on the post-hunt 2006 flight. Typically, cervid winter herd composition ratios tend to underestimate male:female ratios due to reduced detection probabilities of males (McCorquodale 2001). Cows and calves winter in large herds of up to several hundred, often in open habitats, while bulls tend to be in male-only bachelor herds at that time of year. Under "normal" non-random sampling conditions a higher proportion of bull groups often go undetected because they tend to use more broken/timbered terrain and are present in smaller group sizes. Conversely, completely random flight sampling protocol or unfavorable survey conditions (i.e. warm temperatures and lack of snow) can promote overlooking some large cow-calf groups and result in insufficient sample size for a good estimate. Failing to detect a large proportion of cow/calf groups or sampling in areas that tend to only hold wintering bull groups can bias the bull:cow ratios toward the high end. In 2006, the classification flight failed to observe a number of large cow/calf groups in areas that traditionally have held wintering herds. These groups were in Wyoming at the time of the flight (if only by a few miles) and unavailable for the survey.

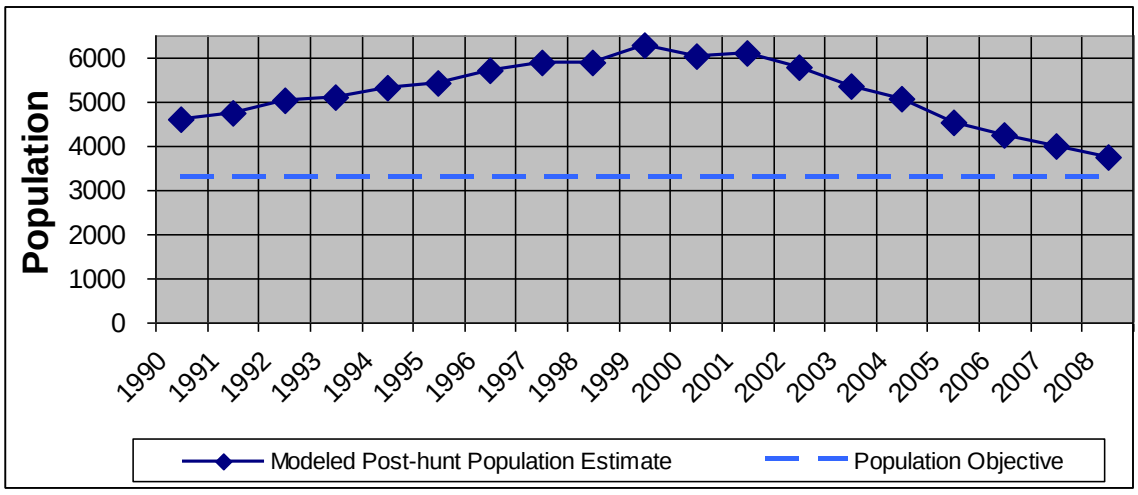


Figure 5. E-4 modeled post-hunt population 1990-2008

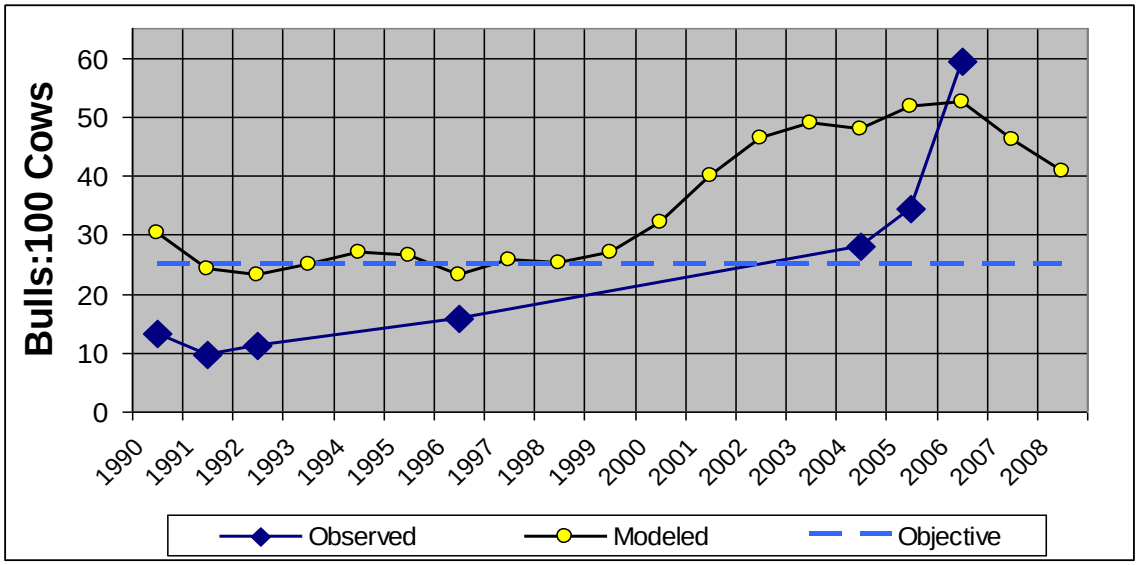


Figure 6. Observed & modeled bull:cow ratios from aerial surveys 1990-2008

Licenses

Prior to 2001, E-4 was managed with OTC statewide bull rifle during the general combined deer and elk seasons (see discussion evaluating E-4 OTC versus limited licensing in Appendix F). During most of the 1990s, this provided 3 regular elk rifle seasons. During season structures after 1999, an elk-only first season was added; tags were limited in number, for bulls-only and specified to E-4. Archery licenses prior to 2001 were either-sex, unlimited in number and valid state-wide. State-wide muzzleloading licenses were valid in E-4 until 2001 as well. To allow the CDOW to contact and inform hunters in E-4 about CWD and DAU surveillance efforts, all elk licenses were limited in the 5 units to provide a "known universe" of hunters beginning in the fall of 2001. License numbers were set at or above previous levels of hunter participation to assure that maximum opportunity for bull hunting was still available. In every year, some antlered rifle and all either-sex archery seasons were undersubscribed with leftover licenses available for sale at the end of the seasons. Since 2001, E-4 has functioned as a limited DAU, in that hunters needed licenses valid only in the DAU to hunt it, but it still provides hunting opportunity levels for bulls similar to units where statewide OTC tags are in place. In an effort to reduce the number of unsold leftover licenses, the number of 2nd, 3rd and 4th season rifle bull licenses allocated in 2007 and 2008 were reduced to just above the number sold in the previous 2 years.

Regulations have stayed in place across the unlimited and limited management scenarios protecting yearling bulls from harvest with a minimum four-point antler restriction. Currently, this regulation is in place across all antlered seasons and methods of take, including archery.

License numbers available have not changed dramatically since becoming limited in 2001 (see Figure 7). Most changes deal primarily with antlerless late-seasons that have expanded in both the number of hunts available as well the number of licenses issued. In setting licenses for 2008, some reductions were made in the numbers of antlerless late-season and PLO tags.

Currently E-4 is managed with liberal numbers of archery and muzzleloading licenses, a moderate level of first season antlered-only licenses, liberal 2nd, 3rd and 4th season antlered and antlerless licenses and a limited number of late-season and PLO antlerless tags. Antlerless licenses in E-4 are considered "additional" or "List B", meaning that a hunter could possess 2 elk licenses (one List A, one List B) in the same year in the DAU. Since many seasons are undersubscribed and bull licenses were only recently limited, graphical depiction of hunter numbers (Figure 8) provides a more accurate illustration of how license levels may have changed over the last 18 years.

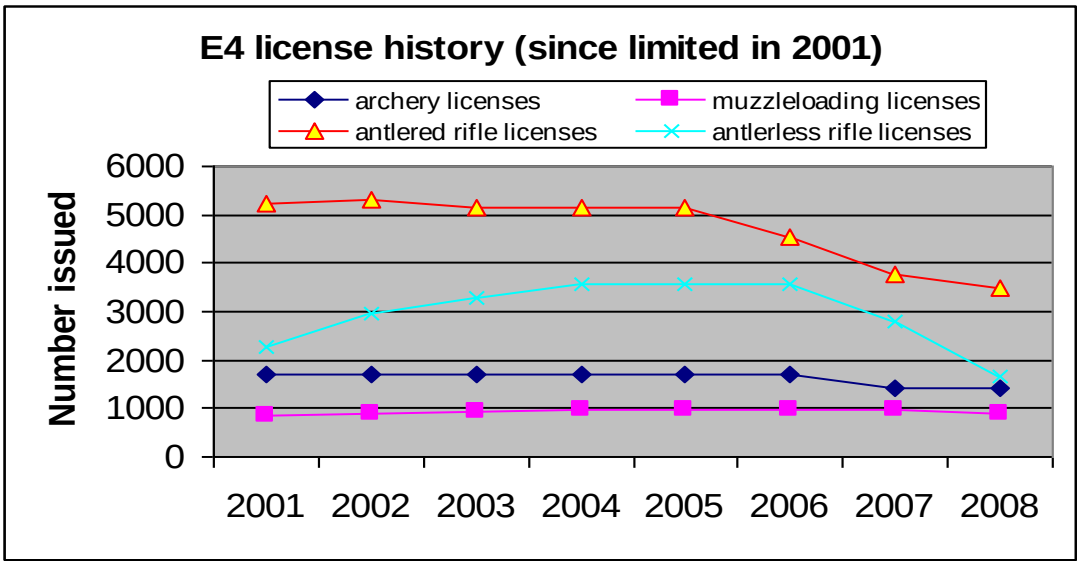


Figure 7. E-4 license numbers 2001-2008, (from 1996-2000 statewide licenses were valid for archery, muzzleloading, antlered rifle)

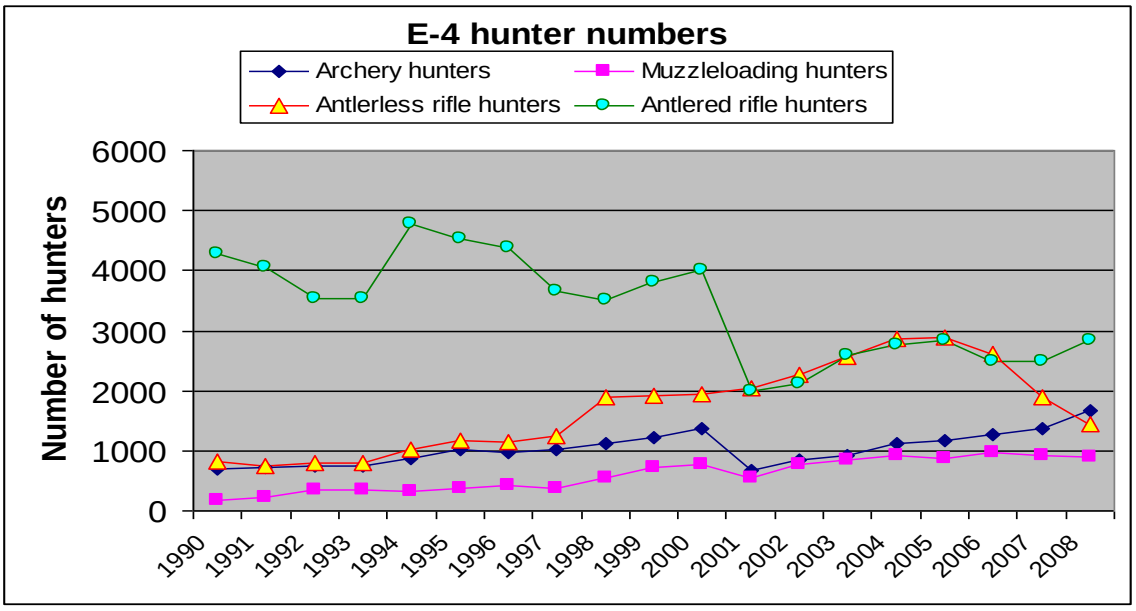


Figure 8. Hunter numbers in E-4, 1990-2008 for archery, muzzleloading, antlered and antlerless rifle.

The number of muzzleloading and antlerless rifle hunters has steadily increased from 1990 to 2005 (see Figure 8). This increase is directly related to the increase in license numbers over those same years. The stabilization in muzzleloader numbers and decrease in antlerless rifle hunter numbers from 2006-2008 is also directly related to license availability. Archery tags were unlimited in number when valid statewide and since becoming limited, license levels have been set above demand. Even with a sharp drop in 2001 when the DAU went limited, archery hunter numbers have increased overall from 1990-2008. Since archery license availability is not an issue (unlike antlerless rifle and muzzleloading), the steady increase in archery hunter numbers each year (except the 2001 "limited" effect) is not an artifact of more available licenses, but rather of a growing demand.

Harvest

Antlered harvest during the 1980s was between 300 and 450 bulls except in 1984 when 559 bulls were killed. There were large snow events during that winter, so weather may have played a large role in that record harvest. Cow harvest was low in the beginning of the decade with less than 200 cows killed from 1980-1983. From 1984-1989 antlerless harvest ranged between 200 and 250. Cow harvest during the 1980's represented the lowest harvest levels of the last 25 years (Figure 9).

Harvest levels from 1990 through 1999 were relatively consistent with 400-500 bulls and 250-400 cows harvested (Figure 9). Antlerless harvest averaged about 30% less than antlered harvest in these years. Antlerless harvest surpassed antlered harvest when the number of private land-only (PLO) tags increased from 50 in GMU 19 in 1999 to 500 allocated across all 5 units in 2000 (Figure 9). The late-season antlerless tags in GMU 19 also nearly doubled at the same time from 100 in 1999 to 175 in 2000. Antlerless harvest continued to exceed antlered harvest every year from 2000 to 2006. Antlerless license reductions and poor hunting conditions in 2007 and 2008 brought cow harvest back down to around 300.

While antlered harvest has decreased slightly since the pre-limited years before 2001 with harvest between 250-450 bulls, cow harvest (2001-2006) has been anywhere from 20% to 80% higher than bull harvest with a range of around 400-600 killed per year. The decline in bull harvest, at least in 2001 and 2002, is most likely explained by the inception of limited bull licenses in E-4. Bull rifle hunter numbers dropped 50% from 4,012 hunters in 2000 to 1,991 hunters in 2001 (see Figure 8). The change from a statewide tag to a unit-specific tag, even with a great availability of licenses, reduced participation to some degree and that in turn translated to a reduced bull harvest, as seen in both 2001 and 2002 (see Figure 9). Trends in bull harvest in the last 5 years however, are probably a function of weather as it relates to elk distribution, elk movement and hunter access, compounded by E-4 currently having fewer elk.

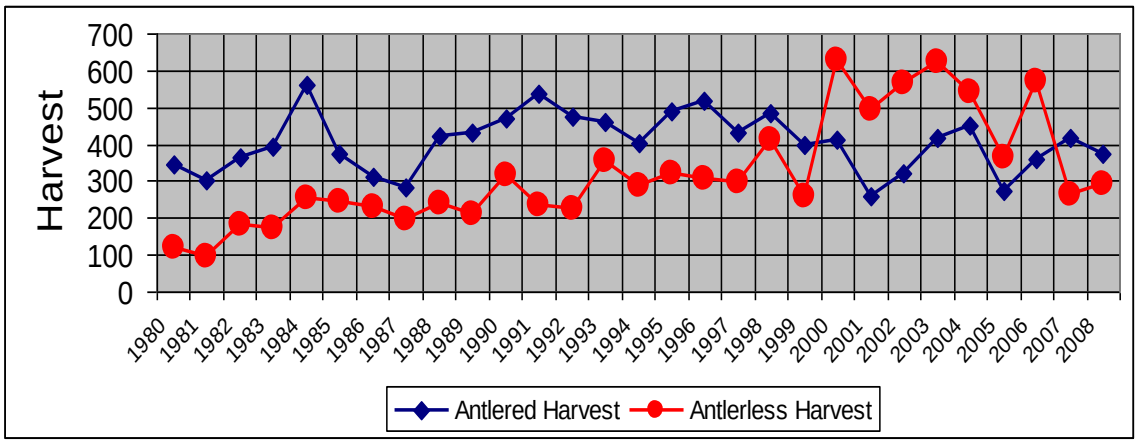


Figure 9. E-4 antlered and antlerless harvest 1980-2008

Success Rates

Success rates were defined and analyzed in this document as being the number of animals harvested divided by the numbers of hunters afield for that particular method or season. In seasons where all licenses are sold, this creates a similar success rate whether calculated as harvest per hunters afield or harvest per licenses sold. In units where a large number of licenses are never sold (E-4 archery for example) using harvest per hunter afield to define success rate is a more meaningful statistic than harvest per license issued. Including unsold licenses will bias success rates low, as they would be included in the calculation although they were never purchased by hunters.

As in many parts of Colorado, E-4 hunter success is often driven by weather conditions that optimize the balance between snow events that move animals while still allowing relatively good hunter access. Archery, muzzleloading and antlered rifle success rates seem to have maintained a relatively low, but consistent, level over the last 10 years (Figure 10). During the early 1990s however, muzzleloading success was at its highest levels, with several years in the 20-30% range. It is unclear if this was related to weather or other factors in those years; archery hunters who hunted during the same time in September didn't experience higher success rates. As expected, rifle success rates are at least as high or higher than either archery or muzzleloading. Rifle bull harvest success is low in E-4, averaging 10% for the last 18 years (1990-2008).

Across Colorado, cow rifle seasons can traditionally have one of the higher success rates in a given DAU, and this is true in E-4. While E-4 is consistent with other DAUs in having antlerless rifle as the most successful method of take, the actual success rate itself is low relative to other Colorado units. From 1990- 1999 antlerless rifle success averaged 24% with a downward trend over the decade. In 1999, the rifle success rate on cows dropped as low as 16%. The inception of PLO cow tags in 2000 brought a 1-2 year increase in antlerless rifle success with 28% of cow rifle hunters harvesting in 2000. This was a very short-lived increase in success, by 2002 cow rifle success rates were back down to 20% and haven't surpassed that level since.

This recent decreasing success rate trend in rifle cow harvest seems to be mirrored to some extent in the bull rifle and archery harvests, both of which were at their lowest levels in 10 years in 2005. Graphical analysis of cow rifle hunter numbers versus

antlerless rifle success rates indicate a negative relationship between those categories in E-4 (Figure 11). This graph indicates that as rifle cow hunter numbers increase, overall success rates decrease. It is probable that the decrease in the elk population since 2000 has had some negative effect on success rates, particularly for antlerless elk. From 2001-2006, the number of elk available to hunters decreased, while the number of elk hunters increased. This negative relationship presumably reduced opportunities for elk for any given hunter and therefore impacts overall success rates. Despite decreasing individual antlerless hunter success, increased cow harvest through 2006 has been sustained by keeping overall antlerless license numbers at a very high level.

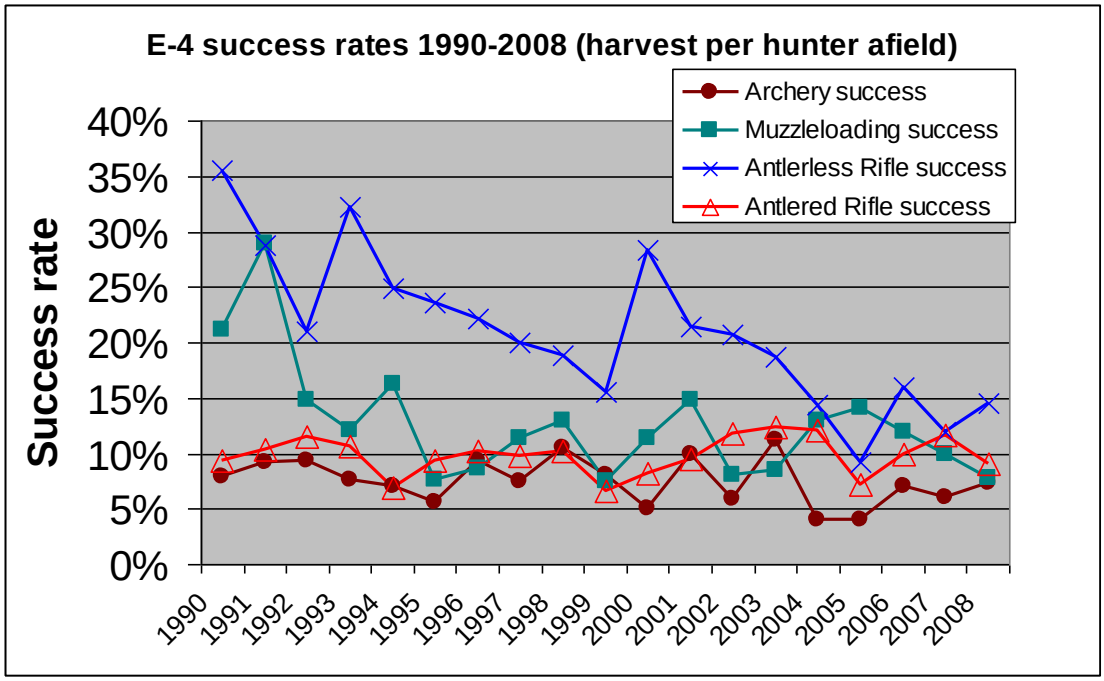


Figure 10. E-4 harvest success rates for archery, muzzleloading, antlered and antlerless rifle 1990-2008

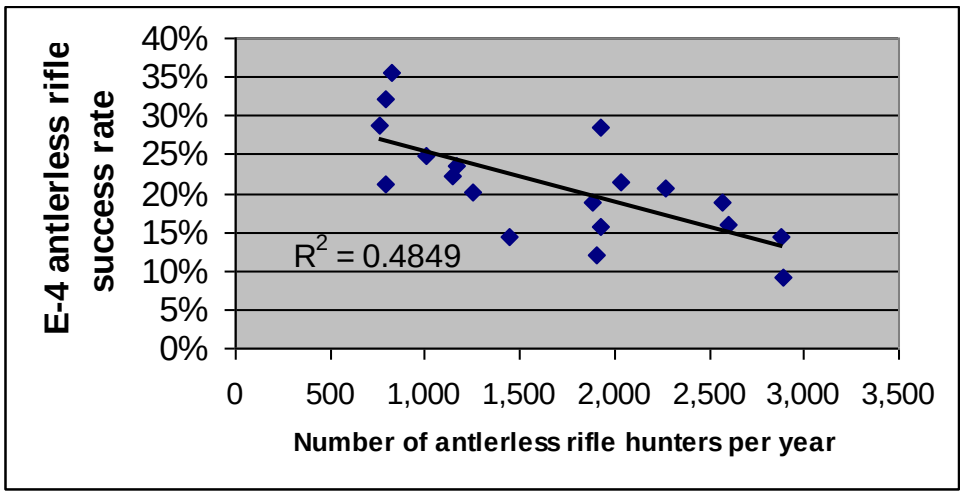


Figure 11. E-4 antlerless rifle hunter numbers versus success rates 1990- 2008

Disease

Chronic wasting disease (CWD), a transmissible spongiform encephalopathy, is a disease of deer and elk, characterized by behavioral changes and progressive loss of body condition leading to death (Williams and Young 1992). Currently, there are no known treatments or antemortem tests for CWD in elk, although a tonsilar biopsy live-test for deer has been developed. CWD has been detected in elk in each of the 5 GMUs in E-4.

The 3 year total (2005-2007) of submitted elk heads from harvested animals (n = 443) produces a DAU-wide CWD prevalence rate of 2.0% for E-4 (Miller 2008). Based on these data, E-4 prevalence is among the highest observed in elk DAUs in the state. Only E-9, which is directly south of E-4 has a higher estimated prevalence rate (Miller 2008). Through June 2008, at least one CWD case has been detected statewide in 12 of 46 elk DAUs. Hunter concerns over CWD vary, but do not seem to impact hunter participation in E-4. Since becoming a limited DAU (when CWD informational outreach could directly reach E-4 hunters) total hunter numbers have continued to increase. This is similar to observations made in several other states with CWD where positive disease status has not decreased participation or hunter numbers (Miller 2003, Gigliotti 2004, Holsman and Petchenik 2006). Over the last 5 years various collection systems have been in place for hunters to have their elk tested. Most recently, samples have been accepted at selected CDOW offices and hunters charged a small, subsidized fee to cover the testing process.

Game Damage

There is currently no significant level of claimed landowner game damage (see Table 1) as the 10-year average annual total payment (1995-2006) on all claims has been $900. During the early 1990s there were a number of claims filed by one or two landowners in the Stove Prairie area. This damage led to the initiation of the previously mentioned radio telemetry study as well as the inception of the GMU 19 late seasons. Game damage has not been a problem in this area during at least the last 10 years.

For landowners in GMUs 7, 8, 9, 19 and 191, the Northern Larimer County Habitat Partnership Program Committee (HPP) can also provide financial compensation for documented losses, however to date there haven't been any elk damage claims submitted for HPP consideration. Relatively low elk numbers compared to other parts of the state, reduced livestock numbers and mild winter weather have contributed to a minor level of conflicts and damage.

Table 1. Game damage claims paid over the last 10 years (1995-2006) in E-4

Claim Date	Damage Type	Claim Paid	GMU
07/24/95	Fence	$250.00	8
06/11/96	Fence	$357.50	19
07/01/96	Fence	$125.00	8
04/09/97	Harvested Crop	$770.00	15
05/19/97	Nursery	$2,816.75	19
06/02/97	Fence	$357.50	19
07/14/98	Fence	$420.00	19
08/06/98	Fence	$250.00	8

08/09/98	Fence	$421.00	19
05/05/99	Fence	$125.00	8
05/31/99	Fence	$233.14	19
05/30/00	Fence	$329.20	19
06/16/01	Fence	$207.25	19
07/14/01	Fence	$140.60	19
08/06/02	Forage	$2,196.00	191
	TOTAL	$8,998.94	

Habitat Management

The CDOW will continue to work with the USFS, BLM and Larimer County to assure healthy habitat conditions on public lands within E-4. The population objective recommended in this DAU plan will aim to maintain elk numbers below a level where habitat overuse or degradation might occur.

During 2008, both the local CDOW staff and NLCHPP committee supported contracting with Colorado State University (CSU) for inclusion of E-4 (and D-4) in the statewide DAU habitat modeling process. Project leaders from CSU attended a number of HPP meetings and met with CDOW staff to acquire data on the DAU. The final product was delivered in December 2008; this included a "Habitat Assessment Model" created specifically for range, livestock and wildlife attributes in E-4, applicable software and written summary (Wockner et al 2008). With deer, pronghorn and moose numbers at current levels in E-4 and present levels of forage production and livestock stocking, all 3 considered herd population Alternatives were considered compatible based on this model. In fact, selecting the midpoint numbers for deer and elk assuming average precipitation, average livestock rates, etc suggests the habitat could support a deer herd of 9,815 (this is significantly more than currently exist in D-4 but new DAU plan calls for herd between 10,000-12,000) and an elk herd of 4,207. Part of the written conclusion as supplied by the authors is attached as Appendix A.

There are currently a number of active cattle grazing allotments in E-4 (Table 2). To date, producer problems of competition between elk and cattle for forage have not been an issue. Habitat carrying conditions on a large-scale seem to be adequate to support current levels of both elk and livestock.

Table 2. Active 2006 livestock allotments on USFS lands in E-4. USFS acreage, remaining allotment acreage (other agency or private), season dates of use, and numbers of cow/calf pairs.

Allotment	Total USFS Acres	Remaining Altmt. Acr.	Season	Numbers
Bennett Creek	26562	850	6/16-9/30	150c/c
North Poudre	2523	2418	05/25-10/30	92c/c
Prairie Divide	8163	658	6/15-9/10	200c/c
Greyrock	7920	2224	6/1-9/15	135c/c
			12/1-12/31	135c/c
Fanning	120	854	6/10-8/25	8c/c
Hansen	273	557	11/1-12/31	6c/c
Swan	2663	160	6/11-9/30	50c/c
Mill Creek	630	162	7/1-9/30	11c/c
Moen	1119	723	6/15-9/15	21c/c
Schaffer	1592	2296	6/6-10/5	36c/c
South Trail Creek	1150	2532	5/28-10/10	100c/c
Elkhorn/Ladymoon	11586		6/11-9/30	75c/c
Lone Pine	3733		11/1-4/15	20 bulls
			6/5-9/15	120c/c
Dowdy Lake	3833		6/11-9/30	100c/c
Sheep Creek	13444		6/21-9/30	26c/c
			6/19-9/25	100c/c
George Creek	14414		6/19-9/25	100c/c
Eaton	10121		6/21-9/25	152c/c
Sand Creek	8834		6/16-9/15	334 yrlg
Gabrielson	1696		6/1-7/15	135c/c
Grace Creek (N)	33301		7/1-9/15	180c/c
Grace Creek (S)	33301		6/16-8/30	100c/c
Forrester	3282		7/1-7/31	75c/c

CURRENT HERD MANAGEMENT

Current Post-hunt Population

Based on the E-4 population model, as well as observed data from aerial inventories, the 2008 post-hunt population is estimated at approximately 3,750 animals (see Figure 5). The philosophy under the 1997 DAU plan was to continue to lower the population via liberal cow harvest and "maximum opportunity" bull hunting down to the objective of 3,300 elk.

Current Sex/Age Composition

Annual computer modeling estimates a 2008 post-hunt ratio of 40 bulls:100 cows. While the aerial classification flight in 2006 estimate a post-hunt bull:cow ratio of 59 bulls:100 cows (see Figure 6) this is very likely an over-estimate, with a probable ratio being closer to the 35-40 bulls:100 cows range. Field staff observations and observed flight data from years before 2006 also support a ratio at or below the 35-40 bulls:100 cows level.

Current Management Strategies

To date, the strategy under the current 5-year season structure has been to provide maximum opportunity for bull hunting in the 2nd, 3rd and 4th rifle seasons while still operating under a limited license framework. First season licenses are bull-only and are issued conservatively with small numbers available after the limited drawing. Liberal cow hunting opportunity (List B licenses, increasing late seasons, PLOs) has been used to decrease the DAU population size towards objective.

Current Management Problems

There are no pronounced management problems in E-4. Game damage and landowner complaints are at low levels. Based on non-quantitative assessments by CDOW staff, elk numbers are not negatively impacting habitat. Like much of Colorado, E-4 is experiencing changes in landscape through rural subdivision growth, small acreage development and subsequent loss of elk overall and winter range. Due to the high proportion of public land in E-4, these changes have had limited impact on a DAU/population-scale, however localized issues of habitat loss have occurred and will continue to develop. There are also several water development projects in E-4 in various stages of planning. If these reservoir projects are completed, the cumulative impacts on elk overall and winter range in GMU 191 could be significant (based on proposed inundation footprints). As local municipalities (city, county) purchase and manage large working ranches, the continuance of active wildlife management on those parcels is crucial. In most cases, herds can be managed via harvest to keep their size and distribution compatible with habitat on the property and to minimize impacts on surrounding landowners. A small amount of limited hunting has been occurring on one LCOS property, and evaluations are on-going regarding a limited access hunting program on at least 2 other properties managed by municipalities.

ISSUES AND STRATEGIES

Issue Solicitation Process

A letter inviting hunters to attend two DAU planning meetings and requesting written input in the form of a 4-page questionnaire was sent to all 2005 D-4 or E-4 license holders (+8,000). Additional input on the E-4 plan was solicited by advertising in local newspapers, the CDOW web page, and issuing press releases about both the DAU plan meetings and ways to provide written comments. DAU meetings occurred on February 6, 2007 in Greeley and February 15, 2007 in Fort Collins. Approximately 10 members of the public attended in Greeley and 55 attended in Fort Collins.

Attendees completed a questionnaire highlighting what they felt the major management issues were, as well as providing general comments on population management, bull:cow ratios, maturity of bulls in the herd versus hunting opportunity, etc.

The E-4 questionnaire that was available on-line as well as at the DAU meetings is attached as Appendix B.

A summary of results (raw numbers for each response as well as percentages) from the survey that were received during the initial comment period are attached as Appendix C.

During July 2007 the draft E-4 plan was posted on the CDOW web page to allow additional public comments. Draft copies were sent to Larimer County Commissioners, USFS Canyon Lakes Ranger District and the Northern Larimer County Habitat Partnership Program committee. Comments received on the draft plan from this second public (and agency) outreach effort are included as Appendix D. Appendix E provides further information and CDOW response to the USFS letter shown in Appendix D.

Issue Identification

Surveys were returned by 435 individuals. Essentially everyone responding (96%) had hunted for either deer, elk or both in the DAU sometime in the last 5 years. Thirty one percent of the respondents were from the immediate Fort Collins area and 29% live outside the DAU. Colorado residents represented 82% of the returns, with 18% of respondents living out of state.

Nearly two thirds of the survey respondents (64%) stated they would like to see an increase in the E-4 elk population, while 31% wanted it to stay at the same level it is now. Two percent wanted to see a decrease in population and 3% didn't have a preference. When asked about bull:cow ratios 47% wanted to see higher bull:cow ratios and fewer hunters in the field, even if it meant a more difficult to draw bull license. Forty percent of the responses wanted to maintain the status quo in E-4, which focuses on maximum hunting opportunity (no preference points needed, hunters can hunt every year). The remaining 13% of the responses were in support of more opportunity, with the consequence of lower bull:cow ratios and more hunters afield.

MANAGEMENT ALTERNATIVES DEVELOPMENT

Post-hunt Population Level

Population Alternative #1

Maintain the herd at approximately 3,000-3,600 elk (current objective).

This would represent a continuation of the current herd size objective with a small decrease in numbers needed from the post-hunt 2008 levels. This would require a slight decrease in female harvest in the coming years, as the population is modeled to be at or just slightly above that target currently (post-hunt 2008). To date, cow harvest has been aimed at lowering overall numbers. Once at this new objective however, cow harvest would be reduced relative to current levels. This would probably not represent a dramatic reduction in antlerless hunting opportunity; stabilization could occur through some combination of elimination/reduction in late seasons and PLO harvest. Given that there are currently no game damage problems, this alternative would presumably represent the status quo in terms of predicted conflict levels between elk and private landowners.

Population Alternative #2

Increase the herd from current size to 3,600-4,200 elk.

This would require a small reduction in antlerless licenses for whatever period of time it took to accomplish the increase (2-4 years). Once the herd reaches this new objective, cow hunting opportunity would increase over current levels to stabilize the population at that new level provided that other parameters (survival, cow:calf ratios, etc) remained constant. This option would initially lower cow hunting opportunity slightly followed by a sustained increase over the long term. This would address many of the comments submitted by the public desiring more elk. As Alternative #2 would increase overall elk numbers, there would probably be an increase in elk using private lands. This might result in increased game damage and damage claims or other conflicts with landowners (current levels are very low). Conflicts could include vehicle collisions, fence damage and other factors beyond traditional game damage.

Population Alternative #3

Increase the herd from current size to 4,200- 4,700 elk.

This alternative would represent the largest shift from current management. To achieve a significant increase in herd size in a short time span, female harvest would have to be substantially reduced as an option for a number of years (3+). Bull harvest could continue at the present level with graduated increases in opportunity as the herd increased. Once the new population objective is approached, cow hunting would resume again as the primary tool to stabilize the population. The elimination of nearly all cow hunting including PLO and late-seasons for short term management might prove contentious to the both the public hunter as well as the private landowner. Damage claims would likely increase as the elk herd grows. This population level would be the largest of the 3 options and therefore has the largest potential for vehicle collisions, fence and forage damage. This level should be compatible with present habitat conditions as current forage levels can sustain an increased number of elk. Localized overutilization may occur in areas where elk densities are highest or concentrated seasonally.

Herd Composition- Sex ratios

Composition Alternative #1

25-30 bulls:100 cows

This alternative includes the current sex ratio objective for E-4 and is lower than the current estimate of 34:100. While current bull license allocation is liberal, access limitations on public lands (wilderness areas and open space), refuges (RMNP) and private lands contribute to a high bull:cow ratio in E-4, even with significant numbers of bull licenses being issued each year. The sex ratio offered in this alternative could be considered low compared to other limited bull DAUs.

This alternative represents the lowest level of maturity and body/antler size in the bull segment of the population relative to the other options. Compared to the other alternatives this option would offer more bull licenses and smaller antlered/bodied bulls. Hunters could expect to draw a bull license every year and see the fewest bulls afield

compared to the other options. This would not require any reductions from current bull license levels. In fact if demand increased license numbers could be increased as well.

Composition Alternative #2

30-35 bulls:100 cows

This alternative represents an intermediate option between the other 2 alternatives. This would be an increase from the past DAU plan management objective. However, as the current modeled post-hunt sex ratio is within this range and recent observed bull:cow ratios have been over this level, it may be that current numbers of antlered licenses are sustainable at this ratio. This alternative strikes a balance where most or all bull hunters could hunt every year and they should see moderate levels of older, larger bulls while afield. If observed and modeled ratios decreased, only small reductions in bull harvest would be needed to maintain this ratio, relative to current license numbers.

Composition Alternative #3

35-40 bulls:100 cows

This herd composition alternative would provide the oldest, largest antlered bulls of the 3 options. Increasing the bull:cow ratio objective over the current objective to this extent would require a reduction in bull licenses. The 2005 and 2006 observed bull:cow ratios were at or above this level, however this likely an anomaly based on how the sample was collected in those 2 years. The 3-year average observed bull:cow ratio from 2004-2006 is 40 bulls:100 cows which would put the modeled 2006 estimate of 34 at the low range of this option and the 3-year average (40) at the top range.

PREFERRED ALTERNATIVES

Population Objective

The CDOW recommends population objective Alternative # 2; increasing the herd from current size (3,750 post-hunt 2008) to between 3,600-4,200 elk. This will require reductions in antlerless hunting opportunity during the short-term while the herd increases to the new objective. Harvest from rifle cow seasons, including PLO seasons, will need to be reduced. Late-seasons will be eliminated or reduced in number to decrease antlerless harvest. This recommended population objective will be similar to herd levels seen in E-4 during the 1990s. Conflicts could increase under Alternative #2 relative to Alternative #1 (status quo); more game damage and auto/elk collisions are possible. Current levels of game damage are minimal however, and allowing elk herd increases only on the 3 predominantly public land GMUs should help alleviate conflicts. Once this new objective has been reached, this new herd level will produce a greater opportunity for elk hunters. As the population objective is neared, antlerless hunting license numbers will need to be increased over current levels to stabilize the herd. Although habitat conditions are not static, and presumably have changed some since the 1990s, the population under Alternative # 2 should be sustainable under current forage conditions, livestock numbers, and other wildlife densities (Wockner et al. 2008)(see Habitat Model, Appendix A). An increased population objective was supported 2:1 in public comments.

Composition Objective

The CDOW recommendation on sex ratio alternatives is for Alternative #2 (30-35 bulls:100 cows). This provides an intermediate level of bull maturity and antler size relative to the other options. Survey respondents were nearly evenly split on composition alternatives with 47% wanting an increase in ratios and 40% comfortable with the status quo. Although this recommended alternative is higher than the previous objective (25 bulls:100 cows), it shouldn't necessitate any significant changes in bull harvest management as current observed bull:cow ratios have been over-objective and at least as high as the proposed level for several years. Given present levels of bull hunter success and bull survival and no large change in observed bull:cow ratios, antlered license levels should remain relatively consistent with current numbers.

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APPENDIX A
Habitat assessment model: A tool to improve wildlife habitat management.
Elk DAU E-4, Wockner and Boone, contracted by Northern Larimer HPP.

Applicable Excerpt from Appendix 11 (Northern Larimer County), Section E, Pages 130-131

E. Habitat Model Results for the Northern Larimer HPP Area
Because the Habitat Model in the Northern Larimer County area has been developed to run for multiple GMUs, and with several variables, many different results tables can be generated. In the discussion below we present two of the potential results tables with some associated interpretation.
The entire North Fork study area currently has an estimated 3,800 elk and 5,600 deer, which comes out to approximately 40% elk and 60% deer, and thus the corresponding row in the tables is highlighted in yellow. Figure 156 below offers results for the whole study area, winter range, mean precipitation, livestock long-term average, and 6 months of wildlife on the winter range.

Figure 156. Sample Results for the Whole Study Area specified by the table title.

% Elk	Elk #s Low Threshold	Elk #s Midpoint	Elk #s High Threshold	Deer #s Low Threshold	Deer #s Midpoint	Deer #s High Threshold	% Deer
0	0	0	0	3956	23836	43716	100
10	321	1933	3545	2889	17397	31905	90
20	539	3250	5961	2156	13000	23844	80
30	698	4207	7715	1628	9815	17999	70
40	***819***	***4932***	***9045***	***1229***	***7398***	***13568***	***60***
50	913	5501	10088	913	5501	10088	50
60	989	5960	10931	659	3969	7280	40
70	1052	6335	11619	451	2718	4985	30
80	1104	6652	12200	276	1663	3050	20
90	1149	6920	12692	128	768	1409	10
100	1187	7151	13115	0	0	0	0

The results in Figure 156, for the winter range, suggest that the current numbers of elk and deer are slightly below the middle threshold. This suggests that the range in the Northern Larimer County area is not being over-grazed, but is roughly at or slightly below "carrying capacity" situation. Over the last decade many elk and deer have been harvested in the area due to research on chronic wasting disease – this may explain why wildlife numbers are somewhat below carrying capacity.

The results in Figure 157 are for GMU 19. These numbers roughly correspond with the on-the-ground estimate for elk and deer in the GMU. Given that the model suggests that the North Fork study area is being grazed at or near carrying capacity, we could then suggest that, on an area-wide basis, if there are conflicts occurring between wildlife and

livestock, those conflicts are more likely to be caused by the distribution of animals on the range (overlapping ranges, periods of grazing) instead of an overabundance of animals. Likewise, the programs and manipulations employed by HPP to deal with overlapping ranges and periods of grazing are likely a better solution to addressing conflicts than to consider drastic changes in the hunting quotas of elk and deer.

APPENDIX B
Public questionnaire used jointly for E-4 and D-4 DAU process

OPPORTUNITY FOR PUBLIC COMMENT

ON DEER and ELK MANAGEMENT

In Data Analysis Units E-4 and D-4
(Deer and Elk Game Management Units 7, 8, 9, 19 and 191- **Red Feather/Poudre Canyon**)

Dear Interested Citizen:

Deer and elk herds in Colorado are managed at the Data Analysis Unit (DAU) level. The management of each herd is guided by a herd specific management plan called a DAU plan. DAU plans describe herd population and management histories, population objectives and management strategies for a 10 year period. The DAU planning process is the (CDOW) method for incorporating the concerns and desires of the public with the biological capabilities of a specific elk herd. Public input is, therefore, a very important part of the DAU planning process.

Wildlife managers have begun the process of updating both the deer and elk management plans for the Red Feather/ Poudre Canyon area (GMUs 7, 8, 9, 19 and 191). The CDOW is seeking your input on the future management of this herd. The information you provide will help the CDOW develop objectives and management strategies both species of big game in northern Larimer County.

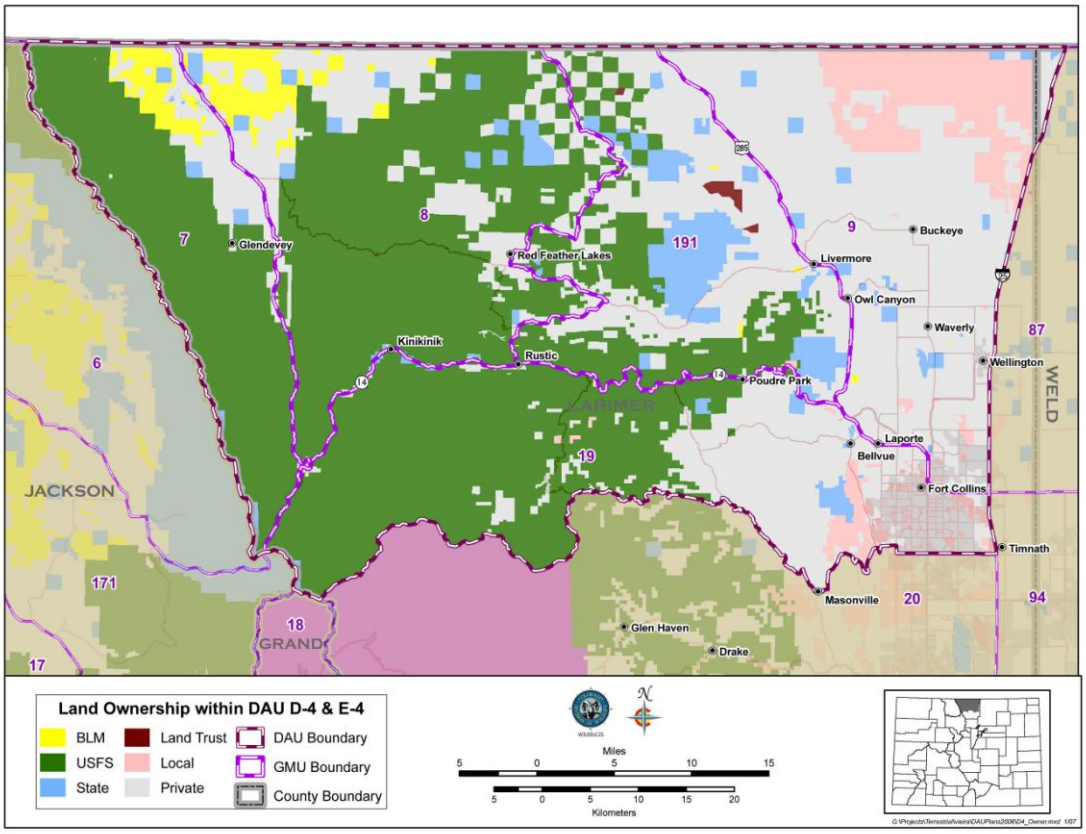
Please complete the following survey and return it to:

COLORADO DIVISION OF WILDLIFE
Attn: Mark Vieira
317 W. Prospect
Fort Collins, CO 80526

Surveys must be received by the CDOW by March 1, 2007

Both the Red Feather/ Poudre Canyon Elk and Deer Data Analysis Units (DAU E-4 for elk and DAU D-4 for deer) consists of Game Management Units (GMUs) 7, 8, 9, 19 and 191. This area is bounded by the Larimer County/Jackson County line on the west, Interstate 25 on the east, and Wyoming to the north. This area includes the northern portion of Larimer County, with Rocky Mountain National Park as the southern boundary (Figure 1).

Figure 1: Deer DAU D-4 and Elk DAU E-4.



The Colorado Division of Wildlife manages these deer and elk herds to provide the public with hunting and viewing opportunities while minimizing conflicts and habitat damage. Often in order to do this, a balance is needed in both the total number of animals and the proportion of males (bulls and bucks) in the herd. Both management plans (DAU plans) will therefore, define 1) a population objective and 2) a male to female ratio objective (bull:cow and buck:doe-- see below).

Population Objectives: The Division strives to manage big game populations within both the biological and social carrying capacity of the herd. The biological carrying capacity is the number of animals that can be supported by the available habitat. The social carrying capacity is the number that will be tolerated by the people who are impacted by the herd. The E-4 elk herd is currently right at the previous long-term objective. When elk populations are controlled at levels below both the biological and social carrying capacity, people enjoy viewing, photographing and hunting elk while elk/human conflicts are minimized. As the number of elk in an area increases, conflicts between elk and people arise due to, auto/animal collisions, impacts to gardens or yards, damage to agriculture, etc. Many of these issues are similar with deer as well. From 2000-2005

D-4 deer numbers were managed towards a reduced objective as a chronic wasting disease (CWD) management tactic. That population reduction didn't have the desired effect of reducing prevalence and therefore a new population objective is needed.

Question 1:
Would you like the number of **elk** in GMUs 7, 8, 9, 19 and 191 to:

_____ Increase

_____ Stay the same

_____ Decrease

_____ Don't Know

Why?

Would you like the number of **deer** in GMUs 7, 8, 9, 19 and 191 to:

_____ Increase

_____ Stay the same

_____ Decrease

_____ Don't Know

Why?

Male:Female Ratio Objective: Elk herds can be managed to maximize the bull hunting opportunity (which creates higher hunter numbers) or to maximize the maturity of bulls available for hunting (typically less hunters afield), or some compromise between the two. If the herd is managed to maximize the quantity of hunting opportunity, more bull hunting licenses are made available and bull hunters will be able to hunt more frequently and probably every year. However, this results in fewer total bulls in the herd (lower bull:cow ratio) as well as fewer large/mature bulls. If a herd is managed to maximize the mature, larger-antlered bulls, fewer bull licenses are issued in order to increase the number of bulls in the population (higher bull:cow ratio). As a result, the size of bulls harvested will be larger, but the frequency that hunters are able to hunt bulls decreases. Therefore a trade-off exists between the number of licenses (amount of opportunity) and the size and maturity of bulls available for hunters. Currently, E-4 is a limited license unit (with significant left-over licenses) and is managed for a lower bull:cow ratio and maximum bull hunter opportunity.

Question 2:
For the purposes of **elk** hunting, should GMUs 7, 8, 9, 19 and 191 be managed for:

_____ Increased **quality** of hunting opportunity (higher bull to cow ratio, fewer hunters in the field, but more difficult to draw a bull license)
_____ Maximum **quantity** of hunting opportunity (lower bull to cow ratio, more hunters in the field, and easy to draw bull licenses)
_____ Status Quo (current management which focuses on maximum opportunity)

Similar trade-offs between hunter opportunity and numbers of mature bucks exist in D-4. The additional component that should considered in deer, however, is the fact that older, mature male deer have been found to have a significantly higher prevalence of chronic wasting disease (CWD- a fatal neurological disease) than younger bucks or females. Lower buck:doe ratios (or less mature bucks) could reduce CWD prevalence.

For the purposes of **deer** hunting, should GMUs 7, 8, 9, 19 and 191 be managed for:

_____ Increased **quality** of hunting opportunity (higher buck:doe ratios,)
_____ Maximum **quantity** of hunting opportunity (lower buck:doe ratios)
_____ Status Quo (current level which focuses on maximum opportunity and lower buck:doe ratios for disease control)

Question 3:

Do you hunt deer in D-4?	Yes	No
Do you hunt elk in E-4?	Yes	No
Do you hunt both deer & elk in E-4/D-4?	Yes	No
Have you hunted elk and/or deer in the last 5 years?	Yes	No

Question 4:

Where do you live (circle one from the seven options below)?

Fort Collins area	Greeley/Windsor area	Livermore	Laporte/Bellvue
Other location in GMUs 7, 8, 9, 19 or 191	Outside GMUs 7, 8, 9, 19 or 191		
Outside Colorado			

Please provide additional comments on the future management of DAUs E4 and/or D4 below.

APPENDIX C

Summary of public input

ELK POPN

Would you like the number of **elk** in GMUs 7, 8, 9, 19 and 191 to:

Decrease n=8 (2%)
Don't know n=14 (3%)
Increase n=273 (64%)
Stay the same n=130 (31%)

ELK RATIO

For the purposes of **elk** hunting, should GMUs 7, 8, 9, 19 and 191 be managed for:

Increased **quality** of hunting opportunity (higher bull to cow ratio, fewer hunters in the field, but more difficult to draw a bull license) n=200 (47%)

Maximum **quantity** of hunting opportunity (lower bull to cow ratio, more hunters in the field, and easy to draw bull licenses) n=56 (13%)

Status Quo (current management which focuses on maximum opportunity) n=170 (40%)

Do you hunt in:	Where do you live	
251 out of 435 hunt D4	n=137 Fort Collins area	31%
348 out of 435 hunt E4	n= 46 Greeley/Windsor	11%
237 out of 435 hunt both for deer and elk	n=17 Laporte/Bellvue	4%
	n=21 Livermore	5%
417 out of 435 hunted in the last 5 years	n=128 other location outside DAU	29%
	n=78 outside Colorado	18%

APPENDIX D
Outside agency and public comments on draft E-4 plan

Public comments

I vote for option 3 for herd objective (largest populations), and don't have much preference on sex ratios

Northern Larimer County Habitat Partnership Program (NLCHPP) comments on draft E-4 plan

September 5, 2007

TO: Mark Vieira, Terrestrial Biologist, Area 4

Dear Mark, Thank you for presenting the draft DAU management plans for deer and elk in D4 and E4. Both DAU's encompass much of the Northern Larimer County Habitat Partnership boundary.

Our understanding is that both DAU plans look at the possibility of increasing population numbers. Game damage from deer is non-existent in this DAU, and elk damage to private lands is at a very minimal level, primarily on the western ends of the DAU.

Deer numbers were lowered in 2001 primarily in favor of disease management. The three alternatives of 7100-7600 deer(status quo), 9,000-10,000 deer (pre 2001 levels) and 11,000-12,000 deer have been discussed by the committee. The Northern Larimer County HPP Committee has not taken a position yet on any of the 3 alternatives, but we do not see a concern or increase in landowner conflict by deer with any of these 3 alternatives. White tail deer appear to be increasing in the eastern portion of DAU 4, particularly in eastern GMU 191. The committee recommends considering managing white tail deer numbers in the DAU to control further expansion of white-tail deer.

Elk populations are near or just above the current DAU plan objective of 3,330 elk. Options in the new plan range from status quo, to increasing elk numbers up to 25%, to a level of 4,200-4,700. This increase would still below than the total elk population in the DAU seen in the late 1990's through about 2001. Game damage issues in the DAU have been negligible. The Northern Larimer county HPP Committee recommends that the CDOW not increase elk numbers above current population estimates.

Sincerely,

Mike Ptasnik
Chairman
Northern Larimer County Habitat Partnership Committee

United States Forest Service, Canyon Lakes District comments on draft E-4 plan

Rec'd Jan 2

USDA United States Department of Agriculture | Forest Service | Canyon Lakes Ranger District
2150 Centre Avenue, Building E
Fort Collins, CO 80526-8119
Voice: (970) 295-6710 TDD: (970) 295-6794
Web: www.fs.fed.us/r2/arnf
Fax: (970) 295-6795

File Code: 2610
Date: December 20, 2007

Mr. Mark Vieira
Colorado Division of Wildlife
317 W. Prospect
Fort Collins, CO 80526

Dear Mark:

This letter is to submit comments on CDOW's Draft Elk Management Plan (Plan) for Data Anaylsis Unit E-4 (Red Feather-Poudre Canyon Herd), which overlaps much of the Canyon Lakes Ranger District north of Rocky Mountain National Park. We received the Plan from you in mid to late-July with a request for comments. I apologize that we did not submit comments promptly. However, when my District Wildlife Biologist, Dale Oberlag, became involved in the Northern Larimer County HPP Committee, which was also considering the Draft Plan, he discussed concerns about the large herd increase proposed under Alternative 3 at the November HPP Committee meeting. This letter is a follow-up to formally submit those comments and concerns.

Three alternatives are listed in the Plan: Alternative 1 proposes a herd size range of 3000 to 3600 (midpoint of 3300); Alternative 2 proposes a herd size range of 3600 to 4200 (midpoint of 3900); and Alternative 3 proposes a herd size range of 4200 to 4700 (midpoint of 4450). We note that the existing 1997 E-4 Elk Management Plan has a population objective of 3300, which represents a significant decrease from estimated populations (about 4000 to 6000) from 1990 to nearly the present, as presented in the Plan. The current 2006 post-hunt population estimate is 3700 elk. Consequently, the alternatives would represent percent changes in population from the 1997 Plan objective and current herd estimate as shown in the following table.

Draft DAU E-4 Alternative	Herd Objective Range (and midpoint)	% Change[1] from 1997 Plan Objective (3300)	% Change[1] from 2006 herd estimate (3700)
1	3000 – 3600 (3300)	0	11% decrease
2	3600 – 4200 (3900)	18% increase	5% increase
3	4200 – 4700 (4450)	35% increase	20% increase

[1] Percent change numbers are based on **midpoint** of herd objective ranges for each alternative.

Observations of existing stand conditions and browse effects in aspen stands by Dale indicate that moderate to heavy browsing impacts are occurring to some, if not many stands on the

District, particularly on winter range areas. This does not appear to be an uncommon condition. Lynne Deibel, our Forest Wildlife Biologist, has also noted these conditions, and Dale conferred with Lynne on this prior to the HPP Committee meeting and discussion of the Plan. We realize that elk, deer, moose, and our permitted livestock all are contributing to these observed browse impacts. Similar observations have been made in some willow stands. Both aspen and willow communities are important habitats for numerous wildlife species, including two of our Forest Management Indicator Species (warbling vireo for aspen and Wilson's warbler for willow).

As Dale conveyed in the HPP meeting, given the apparent stand conditions in portions of the District with the current elk, deer, and moose numbers, as well as permitted livestock, we are concerned that a large increase in the elk population can only exacerbate this situation. We are mindful of the Rocky Mountain National Park elk herd situation and their proposals to substantially reduce the elk herd in order to restore aspen and willow communities that have been damaged by elk and deer browsing, without the added impacts from livestock grazing that we have to consider. Given the available information, we cannot support the large elk increase proposed under Alternative 3. We can support the smaller increase under Alternative 2. We note that the HPP Committee supported your proposed increase in the D-4 deer herd, and assume the D-4 Herd will be allowed to grow to the target herd size. Consequently, we still have concerns about the potential long-term impacts to aspen and willow communities from a substantially increased deer herd and also an increased elk herd, as well as moose and livestock.

Thank you for the opportunity to comment on your Draft E-4 Elk Management Plan. Should you have questions or wish to discuss this issue further, please contact myself or Dale.

Sincerely,

Ellen L. Hodges

ELLEN L. HODGES
District Ranger

cc:

APPENDIX E.
CDOW response letter and site visit description provided as a followup to the USFS, Canyon Lakes District comments on draft E-4 plan.

February 18, 2008

Ms. Ellen L. Hodges
District Ranger
United States Department of Agriculture
Forest Service-Canyon Lakes Ranger District
2150 Centre Avenue, Building E
Fort Collins, CO 80526-8119

Dear Ellen,

Thank you for commenting on the Division's Draft Red Feather-Poudre Canyon Elk Herd Management Plan in your letter dated December 20, 2007. We also appreciate District Wildlife Biologist, Dale Oberlag, and Forest Wildlife Biologist, Lynne Deibel, meeting with the Division's Area Terrestrial Biologist, Mark Vieira, to further discuss concerns regarding the level of elk browsing on aspen and willow stands in your District.

The observation reported in your letter as "moderate to heavy browsing impacts occurring to some, if not many aspen stands on the District" was unexpected. Currently, estimated elk and deer numbers are almost 40% less then they were 10 years ago due to the Division's intentional reductions in herd numbers in response to concerns over chronic wasting disease in deer and to meet herd management plan objectives for elk. Game damage complaints from landowners over the last 10 years have been minimal, even when elk numbers were considerably higher, with claims averaging $900 per year. Further, Division field staff have not reported significant browsing damage by elk and this is the first time your agency has expressed concern over the level of elk browsing on aspen or willow.

In response to our initial request for more information, we appreciate Dale and Lynn providing a 2007 paper from Ecological Applications entitled, "Reconciling Divergent Interpretations of Quaking Aspen Decline on the Northern Front Range." Mark and I have reviewed the paper and it is good to see the authors found that 52% of aspen stands on your District were self-replacing or persistent and that only 15% of aspen forest areas were considered in decline. In declining stands, the effect of fire exclusion has played as large of a role in the decline as elk browsing. The authors found that in the remaining 33% of aspen stands, conifer encroachment was an issue. The author's concluded that "aspen forests are in no danger of disappearing from the landscape in the northern Colorado Front Range, and recommend that management actions target aspen decline on an individual stand basis where appropriate." The author's recommendation of management actions being specific rather than broad scale are compatible with the Division's experience that in many cases heavy elk browsing, like game damage, occurs in relatively small areas and is a symptom of elk distribution rather than total elk herd numbers. These situations can often be remedied with site specific actions such as fencing to control excessive browsing or targeted hunting pressure to disperse elk concentrations.

In an effort to address the concerns that you and your staff have raised, we will delay completing the final draft of the Red Feather-Poudre Canyon Elk Herd Management Plan until further

assessments of elk and other ungulate browsing on aspen and willow stands can be completed. I understand that Lynn and Dale showed photos of browsed aspens to Mark which was helpful. In addition, we believe site visits are necessary to view browsing impacts in a landscape context and to determine the relative contribution of elk, moose and domestic livestock. Therefore, the Division formally requests that your District biologists, the Division's area terrestrial biologist, Mark Vieira, and the Division's district wildlife managers make one or more site visits during spring and summer, 2008 to evaluate browsing impacts.

On a broader scale, the Division will pursue assessment of current forage production levels and appropriate stocking rates for elk and deer within the DAU through the use of a habitat assessment model developed by Colorado State University's Natural Resource Ecology Lab (NREL). Dr. Gary Wockner and Dr. Randy Boone of NREL have applied this model to several other areas of Colorado as part of herd management planning processes. The process will involve the Northern Larimer County Habitat Partnership Program (HPP) committee so Dale, as your representative on the committee, will be involved and we anticipate receiving model projections by fall of 2008.

Thank you for taking the time to comment on elk management in the Red Feather Lakes-Poudre Canyon area. We look forward to further discussions through Dale's participation in the Northern Larimer County HPP committee and during site visits to access browsing on aspens and willow. Mark will contact Dale to schedule the site visit. If you have further questions, please contact Mark Vieira or myself.

Sincerely,

Janet George
Senior Terrestrial Biologist – Northeast Region

Cc: Mark Vieira, Mark Leslie, Larry Rogstad, Chad Morgan, Shane Craig, Kathi Green, Rick Kahn

Visit to field sites described by the USFS as having had aspen browsing by herbivores on September 24, 2008.

USFS District Ranger, District Biologist and Forest Biologist meet with CDOW AWM, DWM, Terrestrial Biologist and Senior Terrestrial Biologist for site visit to 3 locations on the Canyon Lakes Ranger District (USFS land). These were the sites described in the USFS comment letter (Appendix D) as having heavy to moderate browsing on aspen (by elk, moose, cattle, etc.). There was some disagreement between CDOW staff and USFS staff over what level of browsing would be considered "heavy to moderate". Based on inspection by CDOW staff with significant experience assessing intense elk browsing on aspen in other parts of the NE Region, these sites did not appear to be "heavily" browsed and only one site was browsed at all during the winter of 2007-08 or the early fall of 2008. There was also concern by CDOW staff that what browsing was occurring was being incorrectly attributed to elk, when tracks and scat at the sites indicated domestic cattle as the principle herbivore in that area. CDOW staff knowledge of the areas also suggests that these sites were not used substantially by elk at any point in the year.

APPENDIX F.
Over-the-counter (OTC) Bull Hunting Versus Limited Licensing in E-4

The tradeoffs between OTC hunting (currently in the 2nd and 3rd rifle seasons) versus the current strategy of "maximum opportunity limited" were evaluated early in the E-4 DAU revision process. It was considered by staff internally, as well as in the public input process. At the time the DAU plan revision began (2006-2007) there was direction in the 2005-2009 Big Game Season Structure policy to consider increasing the statewide proportion of limited elk hunting opportunity up to 30%. Since E-4 was already limited, and considered in that total, there were some internal concerns over moving in a direction counter to policy. In addition, there were staff concerns over hunter crowding and maintaining relatively high bull:cow ratios under an OTC licensing structure. During the public input phase, a small number of comments were received both in conversations at the 2 public meetings and in the 435 survey responses supporting a return to OTC licensing in support of returning to OTC bull hunting. However, the vast majority of comments (87%) requested a bull hunting strategy that was either more conservative (47%- "Increased quality of hunting opportunity higher bull to cow ratio, fewer hunters in the field, but more difficult to draw a bull license)" or the status quo (40%-- "status quo, current management which focuses on maximum opportunity"). The remaining 13% of respondents supported managing the DAU for a maximum quantity of hunting opportunity with lower bull:cow ratios and more hunters afield.

Hunter densities in E-4 have been relatively high, even compared to OTC units. Data from 1995-2005 in E-4 show that total annual hunter (antlered and antlerless) numbers per E-4 elk range from a low of 0.8 to 1.7 hunters per elk. As a comparison, the White River elk herd (DAU E-6), which is an OTC DAU, had total hunters per elk densities between 0.5-1.0 during the same years (see table below). DAU E-4 is hunted primarily by residents from along the northern Front Range of Colorado; this regional population has grown even larger since the end of OTC licensing and it is likely that a return to OTC would result in increased hunter crowding.

YEAR	E-4 Total Hunter #s	E-4 Popn Estimate	E-4 hunters/elk		E6 Total Hunter #s	E6 Popn Estimate	E6 hunters/elk
1995	7078	5429	1.30		27300	42690	0.64
1996	6931	5720	1.21		29787	43898	0.68
1997	6282	5888	1.07		31607	44920	0.70
1998	8312	5907	1.41		39304	43950	0.89
1999	7694	6287	1.22		32115	48632	0.66
2000	8081	6018	1.34		35261	49267	0.72
2001	5254	6090	0.86		27069	54066	0.50
2002	5997	5782	1.04		35641	49929	0.71
2003	6942	5353	1.30		41044	48960	0.84
2004	7708	5075	1.52		39238	43092	0.91
2005	7758	4527	1.71		38817	37934	1.02

As expected, even with a "maximum opportunity limited" or "liberal limited" licensing model for bull hunting, bull harvest has been reduced in E-4 since becoming limited in 2001. The 5-year average bull harvest from 1996-2000 was 448 (range 397-517) while the post-limited (2001-2005) 5-year average dropped 23% to 344 (range 261-451). This reduction in bull harvest is in part responsible for the increase in bull:cow ratios that were found in both observed and modeled data over the same time period. If the management direction in E-4, based on public and staff input is to maintain current bull:cow ratios (Herd Composition Alternative #2 30-35 bulls:100 cows), it is unlikely this could be maintained under OTC bull hunting as bull harvest should predictably increase. A review of the 1997 DAU plan (when the DAU was OTC) shows that hunter densities and bull:cow ratios were already a concern when evaluating sex ratio objectives. The conclusion was that sex ratio objectives in E-4 over 25:100 were not attainable without totally limited bull licensing.

In summary, current levels of bull size, bull maturity and hunter opportunity/density in a DAU this close to Front Range urban areas would likely not be maintained under a return to OTC licensing. Current bull:cow ratios, both modeled (40 bulls:100 cows) and outlined as Alternative 2 supported by 87% of survey respondents (30-35 bulls:100 cows) would likely not be achievable under OTC licensing.