Piney River Elk Herd E-12
Data Analysis Unit Plan

Game Management Units 35, 36, and 361

View from Muddy Creek in GMU 36 with Castle Peak and Alkali Creek in GMU 35 in the distance. These areas include some of the elk winter range in DAU E-12.

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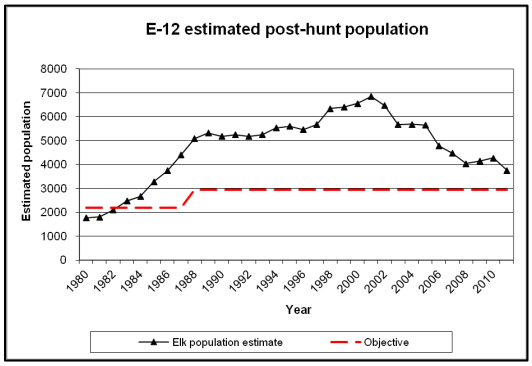
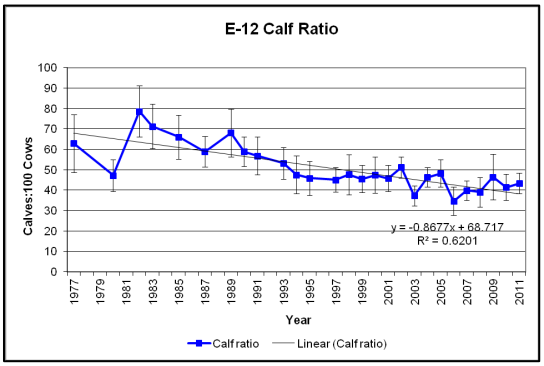
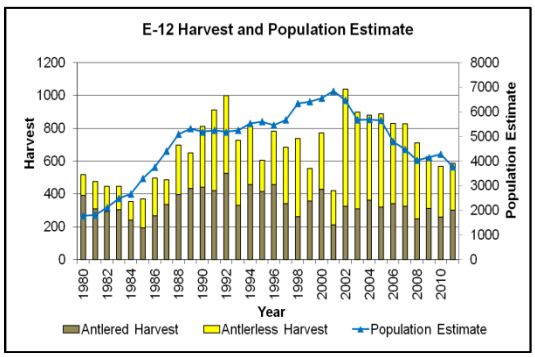
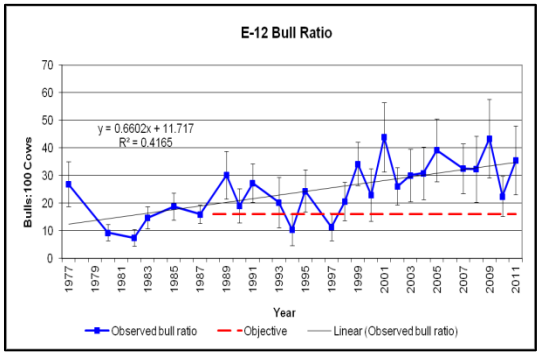
Previous (1988) Population Objective:	2,950 elk
Population Estimate (post-hunt 2011):	3,800 elk
New Population Objective Range:	**3,000 – 4,600 elk**
Previous (1988) Sex Ratio Objective:	16 bulls:100 cows
Current Sex Ratio (3-year average 2009-2011):	34 bulls:100 cows
Expected sex ratio range:	**22-44 bulls:100 cows**









Background

The Piney River Elk Data Analysis Unit (DAU) E-12 is located in northwest Colorado and consists of Game Management Units (GMU) 35, 36, and 361. This DAU is located in Eagle and Grand Counties. Major towns in and near E-12 include Eagle, Edwards, Avon, and Vail. Burns, McCoy, and State Bridge are small communities on the northern edge of DAU E-12. E-12 covers 1,600 km^2 (~395,000 acres) of land area. Three-fourths of the DAU is public land and one-fourth is private. Elk winter range is 69% public and 31% private land. The western portion of the Eagles Nest Wilderness lies in this DAU.

Since 1988, the population objective for E-12 has been 2,950 elk. Through the 1990s and early 2000s, the herd numbered between an estimated 5,000-6,800 elk. To reduce the population toward the herd management objective, liberal antlerless harvest has been promoted to achieve cow harvest. Since the early 2000s, the elk population has been reduced and is currently estimated to be 3,800 elk.

The 1988 herd management plan set a sex ratio objective for E-12 of 16 bulls:100 cows. However, as an over-the-counter (OTC) DAU with unlimited bull licenses in 2nd and 3rd rifle seasons, E-12 is not specifically managed for a sex ratio objective, but rather to provide ample hunting opportunities.

Antler-point restrictions have been effective at improving the quality of bulls and increasing the bull ratio without requiring totally limited licenses. Thus, despite being an OTC unit, the bull ratio has averaged well above the previously established objective. The current (2009-2011) 3-year average is 34 bulls:100 cows, and the long-term average since 2000 is 33 bulls:100 cows.

Significant issues

Outdoor recreation and other human disturbance, habitat loss and fragmentation due to land development, continued lack of large-scale habitat improvement projects have been the major issues for this elk herd. Increased predator populations could also be affecting the elk population.

The human population in and immediately south of E-12 has grown rapidly in the past ~30 years, as many people are drawn to the area by the nearby ski areas, abundant public lands, wildlife, open space, scenery and lifestyle. As a result, land development and recreation have become the major impacts on wildlife. Land development has led to loss of habitat quantity and quality in the form of conversion of habitat into houses, other buildings, and infrastructure; and fragmentation of habitat due to roads, trails, and structures. As more people have moved into the area, motorized and non-motorized outdoor recreation activities of all kinds have become a year-round presence on the landscape, particularly on public lands close to the I-70 corridor and Muddy Pass. There is increasing demand for more recreational trails to be established, as well as frequent use and expansion of unofficial trails, all of which fragment and diminish the quality of remaining wildlife habitat. Human disturbances during critical periods for wildlife can reduce calf recruitment and increase stress on wintering wildlife. More roads and vehicle traffic, along with increased driving speeds, have resulted in more roadkill of elk and other wildlife. Dogs, both on- and off-leash, also present another stressor on wildlife and a potential source of mortality.

Existing, undeveloped habitat has been degraded not only by human recreational impacts, but also due to long-term fire suppression and lack of habitat management which has led to older-aged, less productive forage. Areas close to human developments are now unlikely to be allowed to burn due to potential damage to property. The cumulative effect is that both quantity and quality of habitat has declined for elk in E-12.

Bear, mountain lion, and coyote populations are believed to have increased over the past several decades, and their predation on calves (as well as adult elk mortality by lions) could potentially limit the elk population. Whether predation has a population-level effect on the elk herd depends on how close the elk population is to carrying capacity, i.e., whether predation is additive or compensatory to other causes of elk mortality (such as malnutrition, disease, and human-caused mortality).

Alternatives for Population Objective Range

E-12's current population objective of 2,950 elk was established in 1988 and is long overdue for an update. Many changes have occurred since then in land use, human population growth, recreation pressure, habitat condition, elk population size, predator population sizes, climate, and population modeling methods. For the past two decades or more, the effort has been made to decrease the elk population toward the 2,950-animal objective to achieve a moderate population density.

Input from public meetings held in July 2012 and from a questionnaire conducted in July and August 2012 indicates that most (55% of 133) respondents, nearly all of whom are hunters, prefer to maintain the current population size. Most hunters' primary interest in E-12 is in harvesting an elk for meat rather than as a trophy.

Colorado Parks and Wildlife considered three alternatives for the new population objective range. The alternative of 3,000-4,600 elk was selected as the new population objective because it will balance the public's desire to have enough elk on the landscape for hunting and wildlife viewing opportunities, while still keeping the elk population at a moderate density (i.e., below ecological carrying capacity at a number of animals that the habitat can support in healthy body condition). The objective for the DAU provides guidance for the general management of the entire elk population, but there will still be flexibility to allow for management at the GMU scale to address smaller scale issues such as localized elk concentrations and landowner concerns.

Alternative 1: 3,800-5,400 elk

This alternative would increase the current population size by about 20% (range 0% to +40% change). Because elk have a high natural survival rate, reducing hunter harvest to achieve elk population growth may allow elk numbers to take off when weather conditions are favorable for survival. At a higher population density, elk will compete more intensely with each other as well as with mule deer for forage and space, particularly during hard winters. The health of individual elk may be compromised due to this heightened competition, and disease may spread through the population more easily. Mortality by predation, harvest, disease, and malnutrition would be more compensatory to each other at this higher elk density. Overall, calf recruitment rate would be lower. Winter range habitat - which has already been diminished by land development, lack of regeneration, and over-use by past high densities of ungulates - could be further degraded. Agricultural crop damage may become an issue, and damage to residential trees, shrubs, and gardens may increase. More elk-vehicle collisions may occur. Catastrophic weather, such as a very severe winter restricting access to forage and requiring animals to use more of their body fat to stay alive, could result in large numbers of elk dying.

Antlerless license numbers would need to be reduced, at least for the first several years, to achieve population growth. There would be less opportunity to draw a cow license and hunters might not be able to draw a license every year. However, those who do successfully draw would experience less crowding and would likely have a better chance of harvesting an elk because there would be more elk on the landscape. As the herd reaches the higher population objective, more antlerless licenses could be issued to stabilize the herd at the new population objective. Also at a higher population, there would be more bulls available, so bull hunters could have higher success rates. However, because bull licenses for 2nd and 3rd rifle season are unlimited, hunter crowding and success rates during these seasons would depend also on how many bull hunters choose to hunt in these units.

Economic benefits to the local community could be reduced due to having fewer antlerless licenses available and therefore fewer hunters contributing to local establishments during hunting season. This effect could be offset if more hunters purchase over-the-counter bull licenses, but is unlikely, given current declining trends in hunter participation overall.

Alternative 2: 3,000-4,600 elk (Selected)

This alternative would maintain the current population size (+/-20%). There would be less competition for forage and habitat among elk than in the past. Calf recruitment might remain relatively low given current conditions (i.e., high recreation pressure, reduced habitat availability and condition, increased predator densities), but because adult elk have high natural survival rates, the population can be maintained at this size with low recruitment rates and continued moderate harvest.

To achieve this population objective, antlerless licenses would either remain the same or initially be reduced slightly to stabilize the population at the current size. As population size is evaluated over the subsequent years, license quotas could resume thereafter back to quotas similar to current levels. Hunting opportunity, harvest success rates, and economic impact would be intermediate compared to Alternatives 1 and 3, and would be similar to those of today.

Alternative 3: 2,200-3,800 elk

This alternative would continue to reduce the population size by around 20% (range 0% to -40% change). At a lower population density, individual elk would experience less competition and overall better health. Survival rates could improve, and therefore, the herd would be more resilient to extreme weather events. However, at lower elk population density, the effects of predation could become more pronounced.

To achieve this population objective, it could take many years and would depend on harvesting enough cow elk to continue to drive the population down. Increasing antlerless quotas would not be useful because even at the current license quotas, many licenses go unsold. Therefore, antlerless license

quotas would remain the same as current quotas. As the population continues to decline, harvest success rates would likely decline because of having relatively fewer animals available, and hunter crowding may be an issue. Eventually as the lower population objective is reached, antlerless licenses would need to be reduced to stabilize the herd at the new population size. Initially, economic benefits from hunting and wildlife watching would be similar to those of today; later, there would be fewer economic and recreational benefits as the elk population declines.

Expected Sex Ratio Range

For herds that have unlimited over-the-counter (OTC) bull elk licenses in 2nd and 3rd rifle seasons, CPW does not manage for a particular sex ratio. Instead, bull:cow ratio in these OTC units is determined by a combination of harvest factors (e.g., hunter participation, hunter success), biological factors (e.g., differential survival rates of bulls vs. cows, sex ratio of calves when born), and abiotic factors (primarily weather). Therefore, we report an expected sex ratio, rather than a sex ratio objective.

The expected sex ratio range for E-12 is 22-44 bulls:100 cows, based on the post-hunt bull ratios observed over the last decade since the antler-point restriction was extended to all seasons.

This plan was approved by the Colorado Parks and Wildlife Commission on July 12, 2013.

Introduction and Purpose

Herd management plans

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

The purpose of a herd management plan is to provide a system or process which will integrate the plans and intentions of Colorado Parks and Wildlife with the concerns and ideas of land management agencies and interested publics in determining how a big game herd in a specific geographic area should be managed. In preparing a herd management plan, agency personnel attempt to balance the biological capabilities of the herd and its habitat with the public's demand for wildlife recreational opportunities. Our various publics and constituents, including the U.S Forest Service (USFS), the Bureau of Land Management (BLM), sports persons, guides and outfitters, private landowners, county commissions, and the general public, are involved in the determination of herd population and sex composition objectives and related issues. Public input is solicited and collected by way of questionnaires, public meetings, and comments to the Parks and Wildlife Commission.

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

The primary decisions needed for an individual herd management plan are (1) how many animals should exist in the DAU and (2) the desired sex ratio for the population of big game animals, i.e., the number of males per 100 females. These numbers are referred to as the population and sex ratio objectives, respectively. Secondarily, the strategies and techniques needed to reach the population size and herd composition objectives also need to be decided. The selection of population and sex ratio objectives drive important decisions in the big game season setting process, namely, how many animals need to be harvested to maintain or move toward the objectives, and what types of hunting seasons are required to achieve the harvest objective.

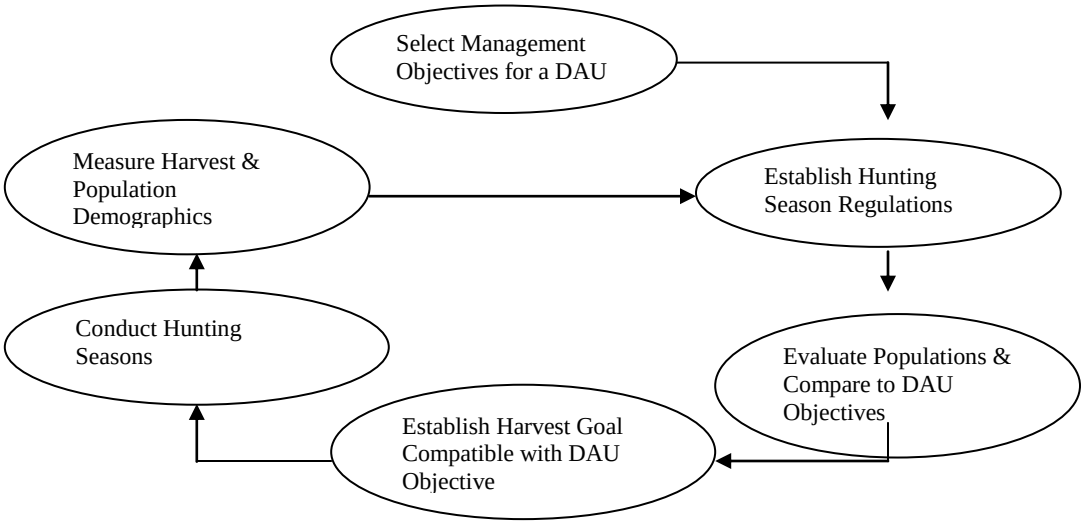


Figure 1. Management by objectives process used by the CPW to manage big game populations on a DAU basis.

Population Dynamics, Maximum Sustained Yield, and Density Dependence

Numerous studies of animal populations, including such species as bacteria, mice, rabbits, and white-tailed deer have shown that the populations grow in a mathematical relationship referred to as the "sigmoid growth curve" (Figure 2). There are three distinct phases to this cycle. The first phase occurs while the population level is still very low and is characterized by a slow growth rate and a high mortality rate. This pattern occurs because the populations may have too few animals and the loss of even a few of them to predation or accidents can significantly hinder population growth.

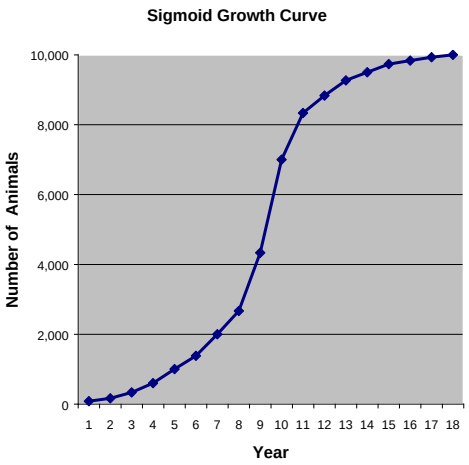


Figure 2. Sigmoid growth curve.

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

The final or third phase occurs when the habitat becomes too crowded or habitat conditions become less favorable. The quantity and quality of food, water, cover, and space become scare due to the competition with other members of the population. These types of factors that increasingly limit productivity and survival at higher population densities are known as density-dependent effects. If the population continues to grow it will eventually reach a point

called the carrying capacity. At this point, the population growth rate slows to zero and the population reaches an equilibrium with its environment. The number of births each year equals the number of deaths; therefore, to maintain the population at this level would not allow for any "huntable surplus." The animals in the population would be in relatively poor body condition, habitat condition would be degraded from over-use, and when a severe winter or other catastrophic event occurs, a large die-off is inevitable.

What does all this mean to the management of Colorado's big game herds? It means that if we attempt to manage for healthy big game herds, we should attempt to hold the populations more towards the middle of the "sigmoid growth curve." Biologists call this mid-point "maximum sustained yield." In the example below, maximum sustained yield, which is approximately half the maximum population size, would be 5,000 animals. At this level, the population should provide the maximum production, survival, and available surplus animals for hunter harvest. Also, at this level, range habitat condition should be good to excellent and range trend should be stable to improving. Game damage problems should be lower and economic return to the local and state economy should be higher. This population level should produce a "win - win" situation to balance sportsmen and private landowner concerns.

A graph of a hypothetical elk population showing sustained yield (harvest) potential vs. population size is shown (Figure 3). Notice that as the population increases from 0 to 5,000 animals, the harvest to sustain the population at this size also increases. However, when the herd reaches maximum sustained yield at a population size of 5,000 elk, resources become scarcer; survival rates begin to decline; and the harvest potential decreases. Finally, when the population reaches the maximum carrying capacity (10,000 elk in this example), the harvest potential will be reduced to zero. Also, notice that it is possible to harvest exactly the same number of elk each year with, for example, 3,000 or 7,000 elk in the population. This phenomenon occurs because the population of 3,000 elk has higher survival and/or reproductive rates (e.g., pregnancy rate, age at first reproduction) compared to the population of 7,000 elk, so there is proportionally more harvestable surplus.

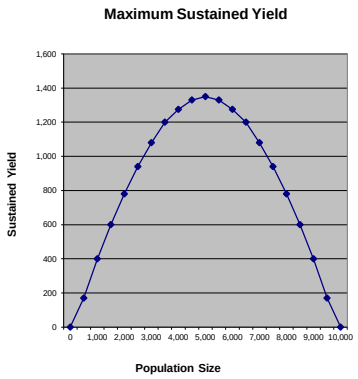


Figure 3. Maximum sustained yield occurs at moderate population size.

Realistically managing elk populations for maximum sustained yield is difficult, if not impossible, due to the amount of detailed biological information about habitat and population size required. Additionally, carrying capacity is not static; the complex and dynamic nature of the environment cause carrying capacity to vary seasonally and annually, and can also change as environmental conditions change. In most cases we would not want true maximum sustained yield management even if possible because of the potential for overharvest. Also there would be fewer mature of bulls because maximized harvest reduces the survival of individuals to reaching older age classes. However, the concept of maximum sustained yield is useful for understanding how reducing population densities can stimulate productivity and increase harvest yields. Knowing the exact point of maximum sustained yield is not necessary if the goal is to

conservatively reduce population size to increase yield. Long-term harvest data can be used to gauge the effectiveness of reduced population size on harvest yield.

Besides density-dependent factors that *regulate* populations, extrinsic factors that are independent of population density can also *limit* populations. These density-independent factors include weather, predator species, competitor species, and human activities. To further complicate matters, density-dependent and density-independent factors can interact with each other to either amplify or mitigate their overall effects on a population.

Description of Data Analysis Unit

Location

The Piney River Elk Data Analysis Unit (DAU) E-12 is located in northwest Colorado and consists of Game Management Units (GMU) 35, 36, and 361 (Figure 4). This DAU is located in Eagle and Grand Counties. It is bounded on the north by the Colorado River, from State Bridge to Inspiration point; on the east by the Gore Range Divide; on the south by I-70 from Vail Pass to Dowd Junction and by the Eagle River from Dowd Junction westward; and on the west by the Colorado River. Major towns in and near the DAU include Eagle, Edwards, Avon, and Vail. Burns, McCoy, and State Bridge are small communities on the northern edge of DAU E-12. Interstate 70 follows the southern edge of the unit. Highway 131, Forest Road 401, Muddy Pass and the Colorado River Road provide additional access to the area. The western portion of the Eagles Nest Wilderness lies in this DAU.

GMU 361 was created in 2010, splitting the former GMU 36 into the current GMUs 36 and 361, to separate out Sheephorn Creek and nearby drainages in the northeast portion of the DAU. This change was made primarily because of differing game damage and trespass issues between the two areas.

Climate and Precipitation

The climate varies with altitude. Low elevations have moderate winters and warm summers, and high elevations have long, cold winters and short, mild summers. Precipitation varies from 10 inches annually at 6,000 feet to 30 inches at 13,500 feet above sea level. Prevailing winds are out of the west. Temperature varies from a low of –20 degrees to a high of 95 degrees. Deep snow forces the elk to migrate to lower elevation winter ranges, on wind-swept ridges, or warmer south and west-facing aspects where more snowmelt occurs. Moisture comes throughout the year, although winter and spring months often have more precipitation than summer and fall months.

Topography

Topography in the DAU is highly varied. The Gore Mountain Range, along the eastern boundary, has elevations in excess of 13,000 ft. Low-lying regions are found adjacent to the Colorado River with an average elevation of just over 6,000 ft. Elevations range from a low of around 6,157 feet above sea level at the Colorado River at Dotsero to the high of 13,448 feet at Mount Powell. All natural surface water in this area drains into the Colorado River, Eagle River and Gore Creek. Alkali Creek, Sheephorn Creek, and Piney River are also in this DAU.

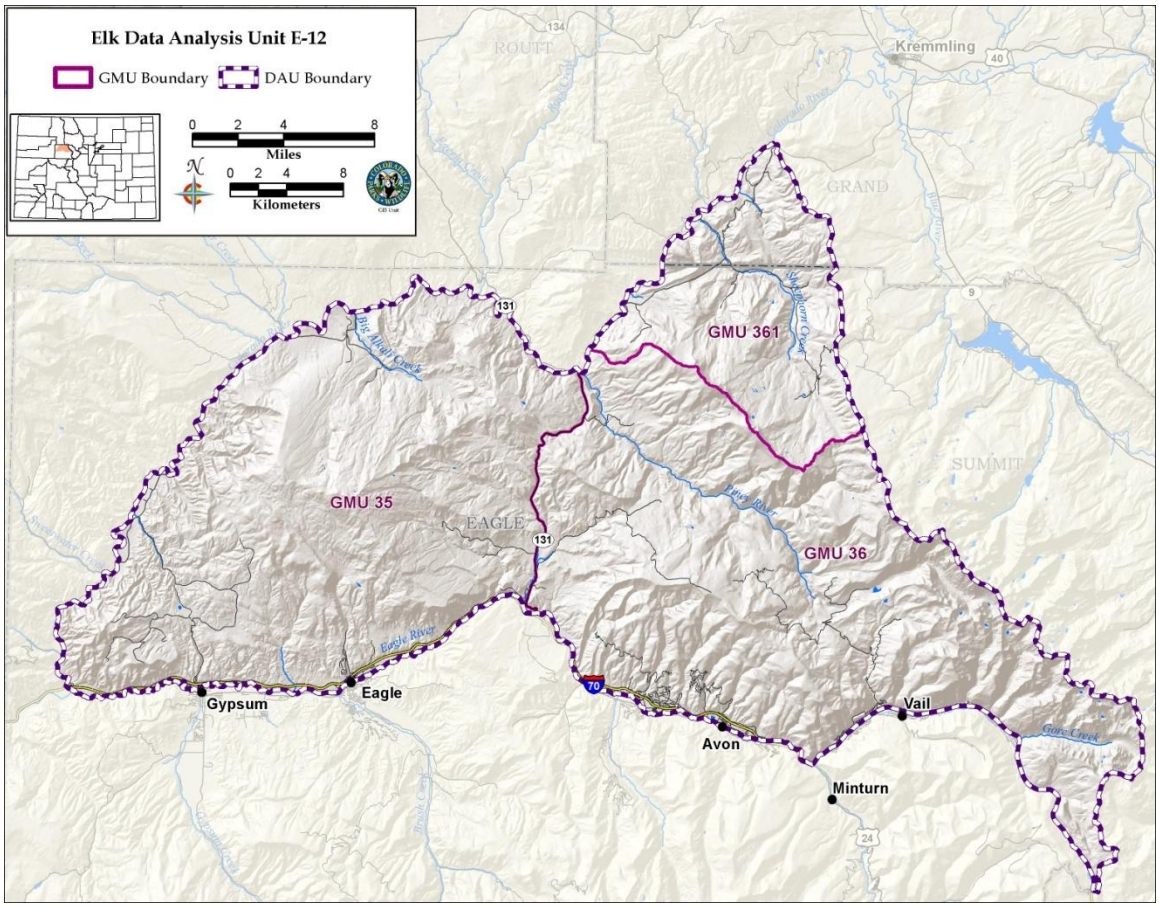


Figure 4. Location of elk DAU E-12.

Vegetation

Vegetation types in this unit are largely determined by elevation and aspect (Figure 5). The mountain peaks above approximately 11,600 feet in the Gore Range contain mostly bare rock or alpine communities. Spruce-fir occurs mostly between the elevations of 8,000 and 11,600 ft. Aspen and aspen-conifer mixes dominate the slopes from 7,000 to 8,500 feet. Mountain shrubs show up on lower slopes near 7,000 feet. In the western two-thirds of the unit, pinyon-juniper covers the foothills, and sagebrush parks appear on the more level sites as elevation drops. Aspen, an early successional species, is found mostly on sites that have been burned or disturbed within the past 150 years. Riparian vegetation parallels creeks and rivers. Elk prefer areas with a diversity of vegetation types in close proximity to each other. These areas occur because of disturbance and changes in slope, aspect and microclimates. The best habitat areas generally have a ratio of 40% cover to 60% open foraging habitat.

The vegetation in this DAU can be categorized into five main groups: cropland, riparian, shrublands, forests, and alpine. Croplands are found in the valleys at the low elevations and are mostly hay grounds of timothy, orchard grass, wheatgrasses, and alfalfa.

Riparian vegetation is found along the major creeks and rivers. These communities support the greatest abundance and diversity of plant and animal species. Cover types range

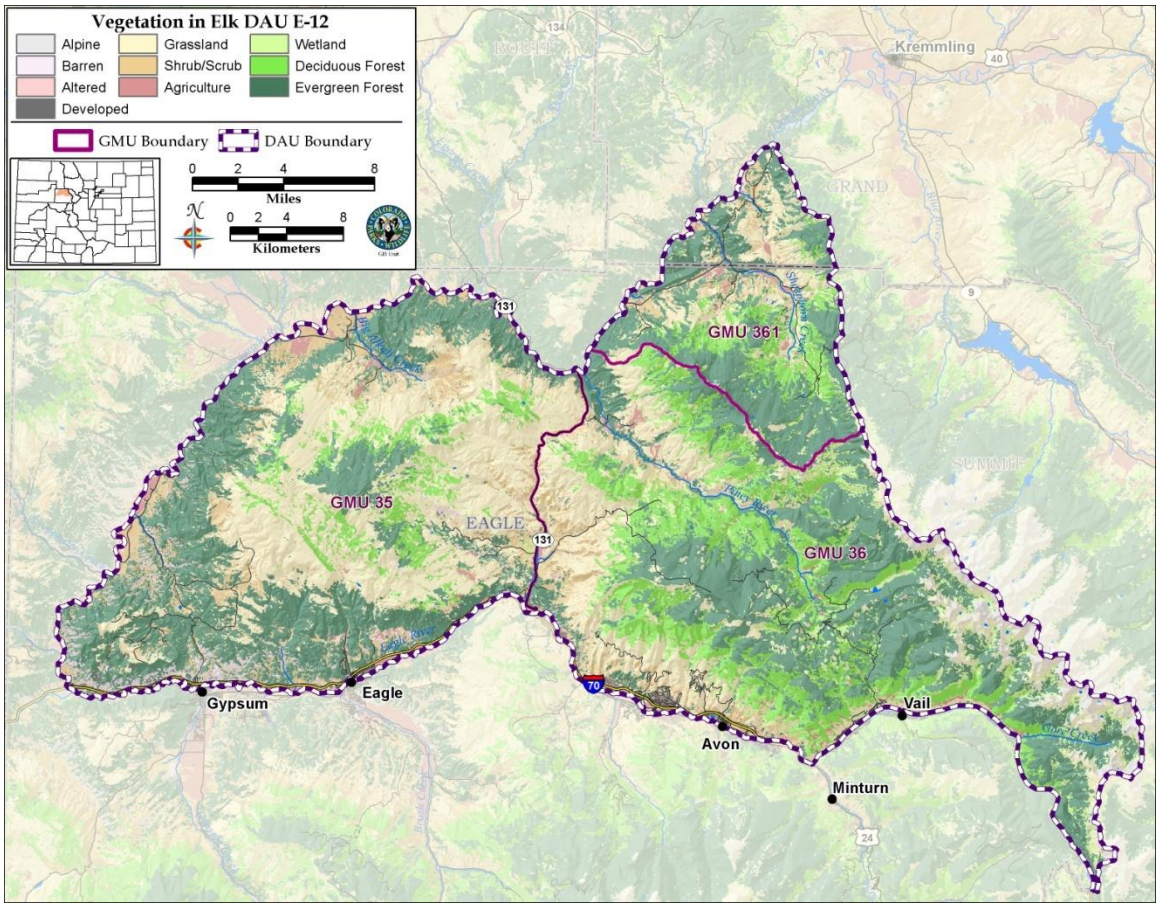


Figure 5. Vegetation types in elk DAU E-12.

from spruce-fir to blue spruce, Douglas fir, ponderosa pine, aspen, narrowleaf cottonwood, and willow as you go from high to low elevations.

Shrublands consist of sagebrush, mountain shrublands, and grassland communities. Sagebrush is the most common land cover at the lower elevations. Rabbitbrush, western and slender wheatgrass, and native broadleaf plants commonly grow with the sagebrush. Mountain shrubs include serviceberry, snowberry, mountain mahogany, chokecherry, bitterbrush and a small amount of Gamble's oak. The shrublands' grasses and forbs provide forage for elk in the spring months. Grasslands occur on the more level sites in forested areas (large bunchgrasses such as Thurber's fescue, wildrye, needlegrass, and brome) and in the alpine areas (Idaho and Thurber's fescue, Sandberg bluegrass, blue bunch wheat grass mixed with forbs).

Forests fall into 5 major groups: pinyon-juniper, aspen and aspen-conifer mix, Douglas fir, lodgepole pine, and spruce-fir. Pinyon-juniper woodlands occur in the lower elevation foothills. They provide good thermal and hiding cover but poor forage. Aspen and mixed aspen-conifer woodlands occupy the middle elevations. The understory consists of emerging conifers (where aspen is not the climax specie), grasses and forbs, and some shrubs. This community provides some of the most important calving habitat and summer cover and forage for elk. Douglas fir shares the middle elevation zone mostly on the moister sites usually on north facing

aspects, but is less represented than the aspen woodlands. It is a long-lived species valued for wildlife habitat diversity, scenic value, and big game cover. Lodgepole pine grows in even aged stands and below the spruce-fir. In mature stands, the dense overstory limits the growth of understory forage, but provides good cover. Spruce-fir (Engelmann spruce and subalpine fir) dominates the higher elevations up to tree line. This habitat provides excellent summer cover for elk.

Alpine sites occur on high mountain peaks and basins. Grasses, sedges, and numerous forbs are present. Short willows grow in moister areas. These sites provide important elk summer range.

Habitat Resource and Capabilities

Land Status

The Piney River DAU E-12 covers >1,600 km^2 of land area. Three-fourths of the DAU is public land, and one-fourth is private (Table 1 and Figure 6). Eagle's Nest Wilderness area makes up 13% of the DAU.

Table 1. Area (square kilometers) by GMU and land status in elk DAU E-12. 1 km^2 = 0.386 mi^2 = 247 acres. "Other" includes city, county, land trust, and non-governmental organization lands.

Land Manager	GMU 35	GMU 36	GMU 361	DAU E-12 total	% of DAU
BLM	485	28	54	567	35%
USFS	0.0	554	93	647	40%
CPW	0.4	0.3	14	14	0.9%
Private	201	118	54	372	23%
Other	8	12	0.0	20	1.2%
Total area (km^2)	694	713	214	1,621	100%
% of DAU	43%	44%	13%	100%	

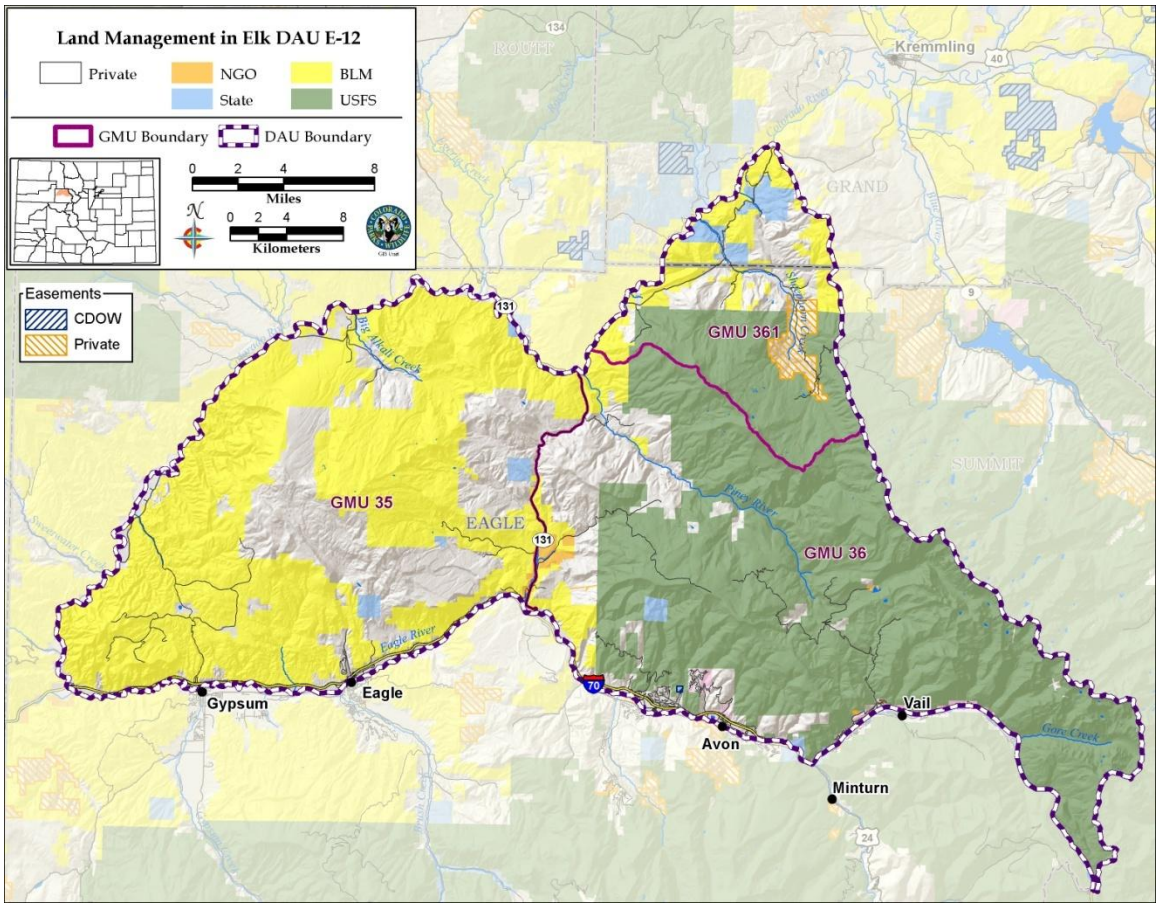


Figure 6. Land management status in elk DAU E-12.

E-12 contains 915 km^2 of elk winter range in the lower elevations of GMUs 35 and 361 and the western portion of GMU 36 (Figure 7). Roughly 1/3rd of winter range is private land and 2/3rd is public land (Table 2). Elk winter range along the I-70 corridor is in areas of greater human population and land development. Winter range further north has not been as affected by development and recreation pressures.

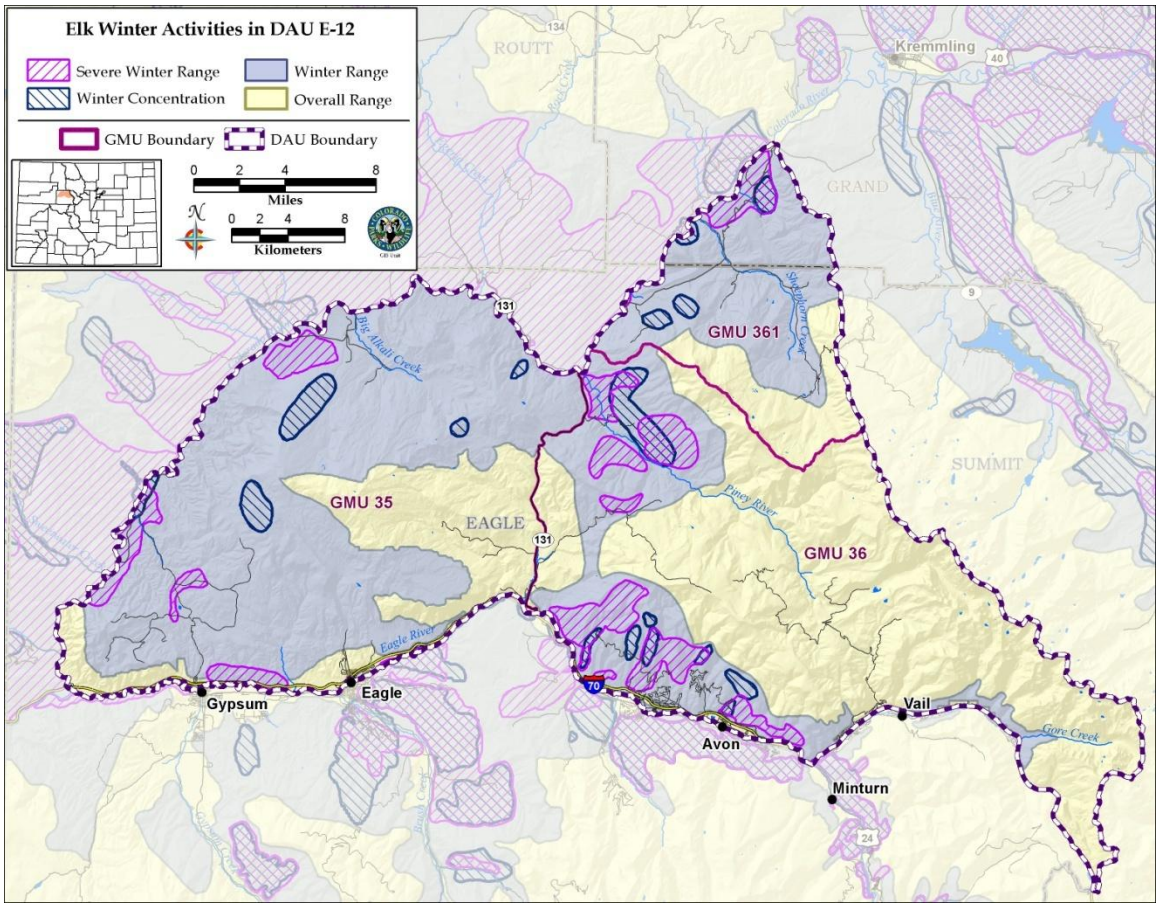


Figure 7. Elk winter range in DAU E-12.

Table 2. Elk winter range area (square kilometers) by land manager in elk DAU E-12. 1 km^2 = 0.386 mi^2 = 247 acres. "Other" includes city, county, land trust, and non-governmental organization lands.

Land Manager	Area (sq. km.)	% of DAU
BLM	458	50%
USFS	147	16%
CPW	14	2%
Private	287	31%
Other	9	1%
Grand Total	915	100%

E-12 contains 112 km^2 of severe winter range (Figure 7). Severe winter range is defined as that part of the overall range where 90% of the individuals are located when the annual snowpack is at its maximum and/or temperatures are at a minimum in the two worst winters out of ten. There are 49 km^2 of winter concentration areas (Figure 7). Winter concentration areas are

defined as areas on the winter range that have a density of at least 200% more elk than the surrounding winter range density in the average five winters out of ten.

Land Use

Land use is varied and diverse in E-12. The main industries are tourism, outdoor recreation, ranching, construction, real estate and logging.

The local economy in the DAU is strongly influenced by tourism. The main tourist attractions are Vail and Beaver Creek Ski areas just south of the DAU. Interstate 70 along the southern edge of the DAU is the major east-west artery through the Colorado Rocky Mountains. These areas have become four-season resorts that draw visitors for numerous outdoor recreational activities.

Hunting and fishing generate substantial economic revenue (BBC Research & Consulting 2008). Hunters can pursue deer, elk, mountain goat, bear, mountain lion, blue (dusky) grouse, and waterfowl. Fishing is provided in the area's numerous small streams and high country lakes. The National Forest provides many areas for hiking, four-wheeling, hunting, fishing, horseback riding, snowmobiling, wilderness trips and general sightseeing. Motels, restaurants, gift shops, gas stations, and all the local businesses benefit from these visitors. Over the past few decades, however, the tremendous increase in recreational activity has become a source of disturbance and competition with wildlife for public lands. (See "Current Management Status" section for further discussion on recreation impacts.)

Construction and real estate development and sales are also major industries in the area. Many visitors and the people who serve them have decided to build homes in this area. Unfortunately many of the new developments are in elk and mule deer winter range. Forty-eight percent of the elk winter range is privately owned, much of which has already been or may be subject in the future to land development. In the past 30+ years, much of the private lands along the I-70 corridor and some areas along Highway 131 have been subdivided and developed. Amount of development varies from dense suburban housing to larger ranchettes. The human population in counties in and near E-12 has grown by 1.4 to 2.4 times from 1990 to 2010, with the fastest growth occurring in Garfield and Eagle Counties (Appendix 1).

Ranching is still an important land use in Piney River, Sheephorn Creek. and north and east portions of Castle Peak. Many of the traditional ranches have been purchased by individuals who are not heavily involved in the ranching business. Some of these ranches are now managed more as wildlife habitat or wildlife refuges. From 1997-2004, the Piney Valley Ranch trust was enrolled in the former Colorado Division of Wildlife (CDOW)'s Ranching for Wildlife (RFW) program in GMU 35 and 36. In 2000, the Burns Hole RFW was added and this includes some lands in GMU 35. Some private lands are irrigated for hay production or are kept as dry land pasture. These private ranches are beneficial to elk and deer because they preserve open space in their winter range. However, as discussed below, if unhunted, these properties become refuges for elk and deer from hunting pressure and these areas may experience game damage issues.

Most of the commercial logging on USFS land in the past was centered around the Red Sandstone, Moniger Park, Piney Ridge, Muddy Pass, and Sheephorn areas. The current mountain pine beetle outbreak in lodgepole pine stands has affected areas in Piney River, Red

and White Mountain, Muddy Pass in GMU 36 and the Sheephorn Drainage in GMU 361. USFS has several active or future timber sales in these areas.

Public land in the DAU is used for livestock grazing, although this use has declined with the general decline in agriculture in the DAU. Classes of livestock using these allotments include mostly cattle and horses, and some sheep and goat. The Bureau of Land Management has all or part of 34 active grazing allotments in the DAU. Use occurs primarily in the spring, summer, and fall. The National Forest Service has 8 active grazing allotments occurring totally or partially in the DAU. The period of livestock use is variable, but primarily occurs from late June through October. Domestic livestock can compete with elk and mule deer for herbaceous forage, although moderate levels of grazing can also help promote shrub growth by limiting grasses. However, grazing practices have changed greatly since the 1960s, such that impacts of livestock on the land are much less than earlier in the late 19th and early 20th centuries.

Cinders are mined at the Dotsero Volcanic site for making blocks and for road surfacing. Gypsum is mined just north of the town of Gypsum for the wallboard plant. There were several oil and gas wells drilled in this unit since 1940, but most of these were not productive.

Habitat Condition and Capability

Elk winter range in E-12 is in poor to fair condition due to maturation and succession of plant communities, as well as habitat loss and fragmentation due to land development. As a result of decades of fire suppression and lack of large-scale habitat improvement projects, pinyon and juniper woodlands have encroached upon sagebrush shrublands and converted them to much less productive sites. Pinyon and juniper stands tend to be mature with a closed canopy that severely reduces understory vegetation. Also, many of the mixed mountain and sagebrush shrublands are over-mature and less productive. Browse seedlings and young plants are not abundant, and in many areas the grass/forb understory is sparse and lacks diversity.

Heavy livestock grazing, in combination with drought, occurred on many rangeland areas in western Colorado from the late 1800s to the 1960s. Since the late 1960s the BLM and USFS have developed improved grazing management approaches that have addressed many of the historic livestock problems. Also, due to the general decline in agriculture in the area, there is much less public land grazing today compared to 40+ years ago.

Higher elk populations in the 1990s and 2000s combined with loss of winter range on private lands to land development resulted in higher elk densities on public land winter range, which probably contributed to heavy browsing of shrubs. Heavily browsed shrubs are evident on winter range areas in some parts the DAU. However, in the past decade, warmer, drier winters have allowed elk to use mid-elevation areas that were historically traditional range during early and late winter. This distributional shift, along with the reduced elk population, has reduced some of the elk grazing/browsing intensity on traditional winter range.

Land development along the I-70 corridor was constant from the 1970s to mid-2000s, resulting in significant loss and fragmentation of winter range habitat. While elk still might winter in these areas, the land is not as productive due to loss of habitat to roads, structures, fences, and vegetation alterations, and elk must face the added stress of human disturbance. The growth of residential developments adjacent to public lands has also made it more difficult to

achieve habitat improvement projects because some homeowners object to habitat changes that will impact their views or otherwise affect their property.

Most of the timber stands in E-12 are mature and considered susceptible to insects, disease, drought and other stressors. The timber stands are comprised of aspen, lodgepole pine, sub-alpine fir and Engelmann spruce. Small amounts of Douglas-fir and blue spruce are found in localized areas. The recent mountain pine beetle outbreak (2004-present) has affected most of the lodgepole pine stands and also caused tree mortality in Engelmann spruce stands. The widespread mortality of beetle-killed trees and the consequent opening of the forest canopy are expected to enhance understory forage for elk and deer. This effect may at least partially substitute for forest fires as a habitat improvement, although nutrient cycling in burned vs. cut forest is not necessarily the same.

Various habitat improvement projects, including prescribed burns, removal of pinyon-juniper encroachments, and improvement of sagebrush and mountain shrub habitats, have been conducted or are on-going (Table 3). USFS and CPW plan to improve sagebrush habitats in the Berry Creek area in GMU 36 through pinyon-juniper removal, sagebrush mechanical treatments, and seeding/planting of grasses, forbs, and sagebrush. Small-scale brush treatments on winter range, such as the Berry Creek project, will be heavily grazed and browsed by wildlife as regrowth occurs, so future repeated treatments will be needed there and throughout the DAU. BLM and CPW are also working cooperatively to conduct pinyon-juniper removals near Burns in GMU 35. Due to the loss of important elk and deer winter range throughout Colorado, the continued conservation and rejuvenation of existing habitat is paramount.

Table 3. Habitat projects in elk DAU E-12. * = data not available at present.

Dates	Location	GMU	Acres	Treatment Type	Agency or Organization(s)	Cost
1997	Oxford Dam	35	n/a	Repaired	Piney RFW	n/a
1999	Mountain Star	36	100	fertilized	Mitigation trust	$ 5,472
2000	Piney RFW	36	200	Burn	Piney RFW	n/a (requirement of RFW program)
2000	Piney RFW	36	65	Aspen regeneration	Piney RFW	
2000	Piney RFW	36	400 shrubs	Plantings	Piney RFW	
2002	Piney RFW	36	100	Aspen regeneration	Piney RFW	
2002	Piney RFW	35	42	Food plots	Piney RFW	
2002	Piney RFW	36	58	Food plots	Piney RFW	
2002	Piney RFW	36	60	Seeding	Piney RFW	
2002	Piney RFW	36/35	3	Springs development	Piney RFW	
2002	Piney RFW	36	n/a	No cattle	Piney RFW	
2002-present	Deer Pen	35	5,700	Sagebrush/mountain shrub improvement, PJ removal, re-seeding - hand/fire/mechanical treatments	BLM, CDOW	$ 200,000
2002-present	State Bridge	35	1,000	PJ removal - hand/fire/mechanical treatments	BLM	$ 50,000
2003	Piney RFW	36	40	Aspen regeneration	Piney RFW	n/a (requirement of RFW program)
2003	Piney RFW	36	60	Thinning	Piney RFW	
2003	Piney RFW	36/35	30	Seeding	Piney RFW	
2003	Piney RFW	36/35	n/a	No cattle	Piney RFW	
2003	Ute Creek	36	350.5	Fertilized	RMEF, HPP, mitigation trust	$ 15,000
2004	Ute Creek	36	320	Fertilized	RMEF, HPP, mitigation trust	$ 25,518
2004-present	Radium SWA	361	1,000	Prescribed burns, soil aeration, PJ removal, re-seeding, water development	CDOW, BLM, Mule Deer Foundation, Rocky Mountain Elk Foundation, Colorado Sheep and Goat Raffle funds, Rocky Mountain Bighorn Society	$ 209,700
2006	Eagle County Landfill	36	730	Fertilize, seed, hydro ax	HPP, Eagle County	$ 50,691
2008-2009	Windy Point	35	1,500	PJ removal - hand/mechanical treatments	BLM	$ 120,000
2010	Muddy Pass	36	30 acres	Sage mowing	*	*
2010	Walsh Reservoir	35	n/a	Repaired	*	*
2010-2011	Piney	35/36	n/a	No sheep/cattle	n/a	n/a
2010-2011	Vail	36/45	~200	Urban fire breaks	*	*
2010-2011	Eby Creek	35	*	Urban fire breaks	BLM	*
2011-present	Winter Ridge	35	1,600	PJ Removal to improve sagebrush	CPW/BLM	$ 60,000
2012	Piney	35/36	n/a	No cattle	n/a	n/a
2012	Eby creek	35	8	Widlfire (PJ)	n/a	n/a
2012 -2018	WRNF- Eagle Holy Cross RD-Sagebrush Enchancement project	36	155 completed + 122 pending	Remove pinon pine juniper, mow sagebrush, burn sagebrush, re-seeding	USFS/CPW	$ 100,000

Conservation Easements

Conservation easements or similar protection comprise 14 km^2 (4%) of private lands, most of which is the Colorado Cattlemen's Agricultural Land Trust's holding in Sheephorn Creek (Figure 6). Only 5% of private land elk winter range is protected under conservation easements. Because winter range is highly limited in this DAU and because of the high monetary incentive for land development in this area, conservation of any remaining winter range habitat, as well as calving areas, is imperative.

Agricultural Conflicts

Game damage due to elk is less of problem in the DAU compared to in the 1980s and early 1990s due to the general decline in livestock and agricultural uses. Since 1995, 3 claims totaling $4,450.00 in elk-related damages have been paid.

Herd Management History

Overview of Procedures to Estimate Population Size

Estimating population size of wild animals over large geographic areas is a difficult and inexact exercise. In several research projects, attempts have been made to accurately count all the known number of animals in large fenced areas. All of these efforts have failed to consistently count all of the animals. In most cases fewer than 30% of the animals can be observed and counted.

Biologists estimate the elk population size in the DAU using a computer modeling process. Starting in the early 1970s, Colorado Division of Wildlife (CDOW) used a computer modeling program called ONE POP. In the early 1980s, CDOW switched to a personal computer program based program called POP II. After 1999, CDOW has used a computer spreadsheet model to predict population size.

In 2008, these spreadsheet models were standardized statewide based upon population modeling methods developed by White and Lubow (2002) which integrate multiple biological factors, including mortality rates, hunter harvest, wounding loss and annual production. These models are aligned on post-hunting season age and sex ratios measured during winter classification flights, and for some units, density estimates derived from line transect and quadrat surveys. At present, these population modeling methods represent CPW's best estimate of populations. It is recommended that the population estimates presented in this document be used as an index or as trend data and not as an absolute estimate of the elk population in the DAU. As better information become available, such as new estimates of age-specific or sex-specific survival rates, wounding loss, sex ratio at birth, density estimates, or modeling techniques, better population estimates may be derived in the future.

Post-Hunt Population Size

Historically elk were abundant throughout western Colorado. By the early 1900s, market hunting had depleted most elk herds in the state to supply miners in Leadville, Aspen, and other mining towns. Around this time, elk were extirpated in the Eagle and Roaring Fork drainagles,

and estimates of nearby herds were 50 elk in Middle Park, 120 elk in the Yampa drainage, and a "large group" remaining in the White River (Swift 1945). With reintroductions and harvest regulations, the elk population in this area grew steadily through the last century.

In recent decades, the population of E-12 increased through the 1980s and 1990s, peaking in 2001 at an estimated 6,800 elk (Figure 8). During most of the 1980s the population objective was 2,200 elk. In 1988, the population objective was raised to 2,950 elk. With increased cow harvest in the late 1990s/early 2000s and declining calf:cow ratios over the past 3 decades, the population was reduced toward the previous objective established in the 1988 herd management plan. The 2011 post-hunt population estimate for E-12 was an approximated 3,800 elk.

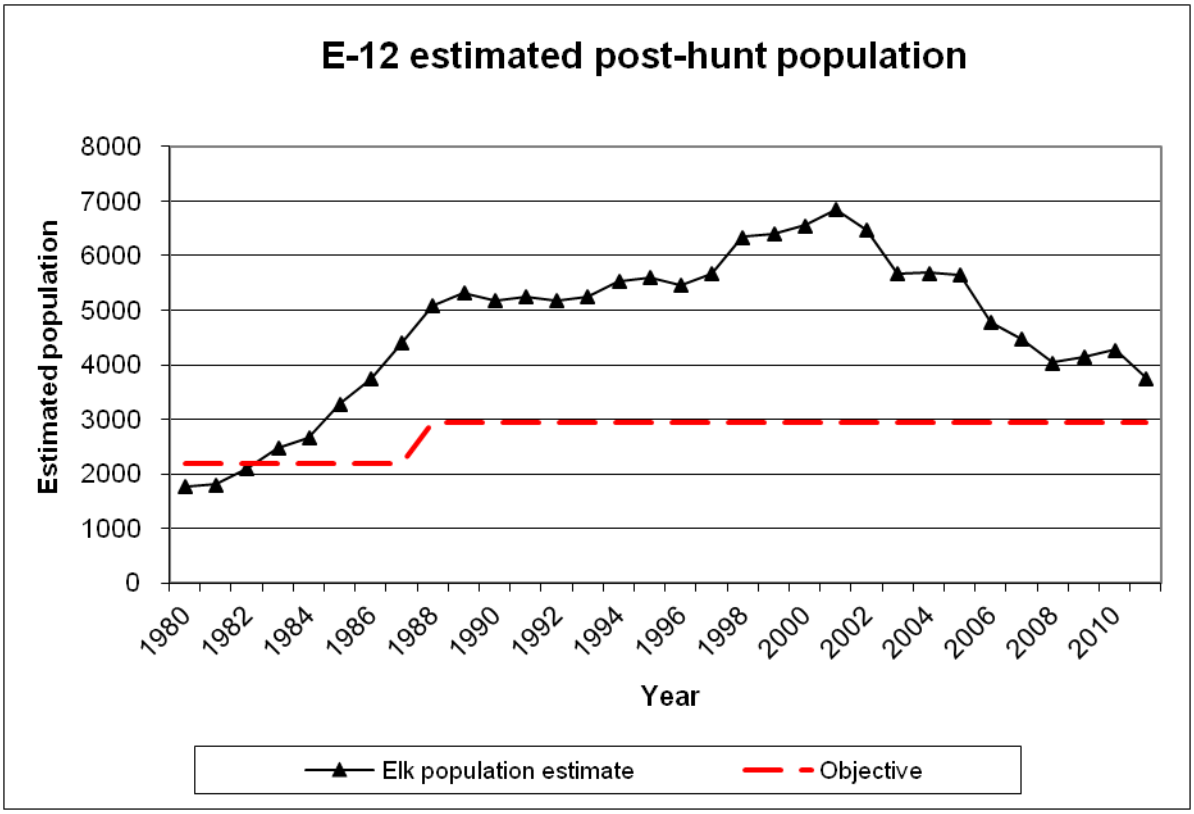


Figure 8. Post-hunt population estimate for elk DAU E-12, 1980-2011.

Post-Hunt Herd Composition

Age and sex classification surveys using a helicopter have been conducted in the DAU since 1977. The DAU was surveyed every 2-3 years at first. Since 1989, flights have been conducted almost every year. These surveys are flown "post-hunt" in December/early January before the bulls and bucks start to shed their antlers. Loss of calves due to starvation and predation typically occurs after this time. During severe winters, the number of calves surviving through the whole winter could be significantly lower than this early winter estimate.

Calf ratio

The post-hunt calf:cow ratio, expressed as calves per 100 cows, is used as an index of herd productivity. This index grossly reflects the combined summer natality and summer-to-early winter survival rate of calves relative to cows. In E-12, the post-hunt calf:cow ratio has been in a general decline for the past 3 decades, although this trend has been leveling off in the past 5-8 years (Figure 9). In the 1980s, the calf ratio averaged 65 calves:100 cows; in the 1990s, the average was 50; and by the 2000s, the average was 43. The current 3-year average (2009-2011) is 44.

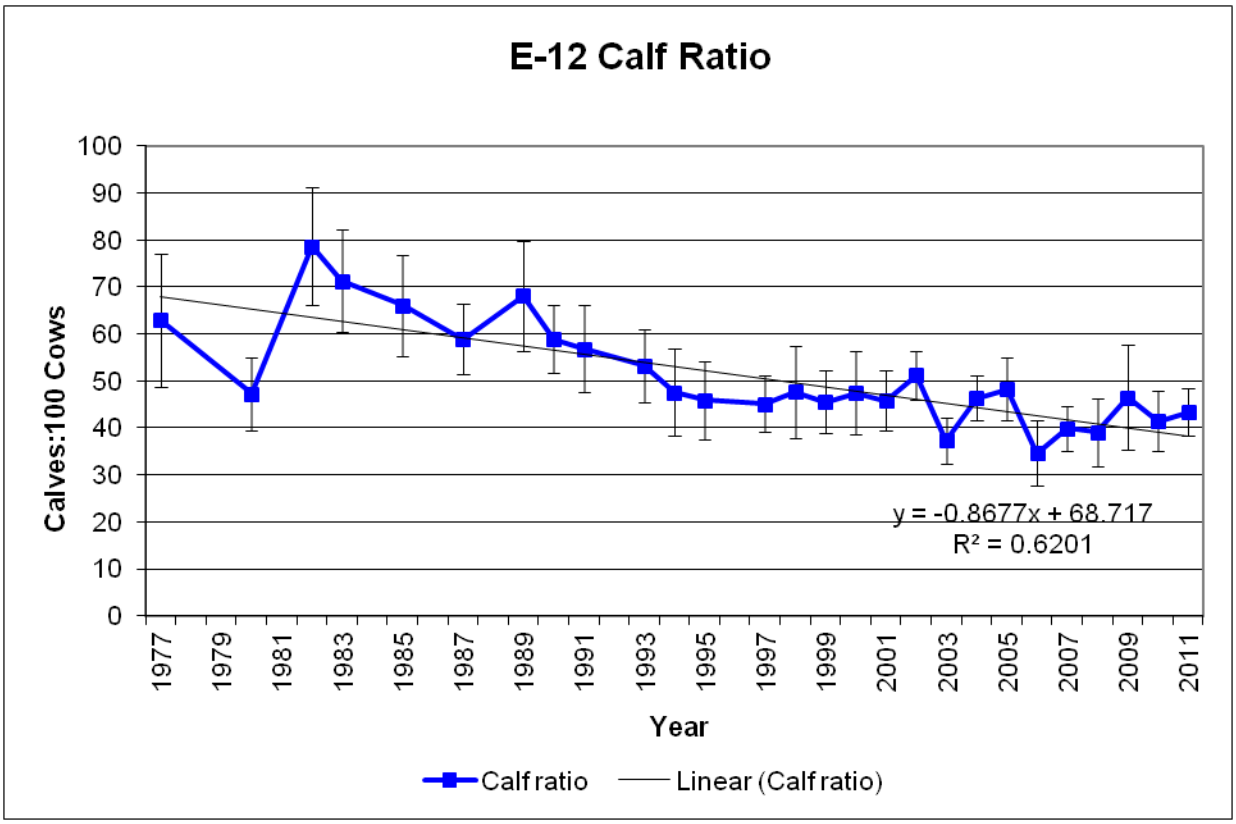


Figure 9. Calf ratio (calves per 100 cows) observed in elk DAU E-12, 1977-2011. Error bars indicate the 95% confidence intervals.

Bull Ratio

The post-hunt bull:cow ratio is used as an index of bull quality of the herd. Bull ratio (bulls per 100 cows) in E-12 were low in the early 1980s. However, the bull ratio has increased since antler-point restrictions were enacted starting in 1986. From 1986-1999, only 4-point or larger bulls were legal in 1st and 2nd rifle seasons in efforts to increase the bull ratio. From 2000-present, this antler-point restriction was expanded to all seasons. Bull ratio has increased over this timespan (Figure 10).

The average bull ratio from 1977-1985 was 16 bulls:100 cows; the average from 1987 through 1999 was 21 bulls:100 cows; and the average from 2000-2011 is 33 bulls:100 cows. The current 3-year average (2009-2011) is 34 bulls:100 cows. In all but 2 years since 1988, the observed bull ratio has exceeded the objective of 16, set in the 1988 herd management plan.

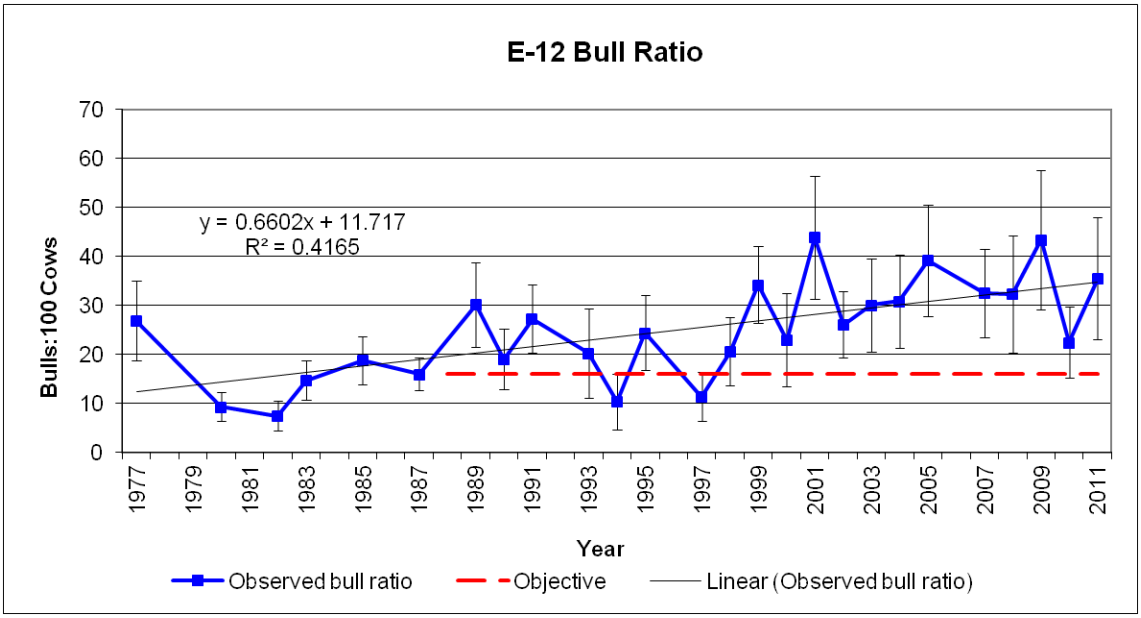


Figure 10. Bull ratio (bulls per 100 cows) observed in elk DAU E-12, 1977-2011. Error bars indicate the 95% confidence intervals.

Harvest History and Seasons

For the past 30 years, annual elk hunting seasons in E-12 have generally included an either-sex archery season, a limited muzzleloading season and unlimited bull and limited cow rifle seasons. In 1986, the Wildlife Commission approved the three combined deer and elk rifle season structure to spread increasing hunter pressure after hunter crowding became an issue.

Low bull ratios in the 1970s and early 1980s prompted the Wildlife Commission to approve bull antler point restrictions (APR) in 1986 for the first and second combined seasons. If the DAU had been able to maintain reasonable bull ratios of at least 12 to 15 bulls per 100 cows in the past, spike elk were legal to harvest in the archery, muzzleloading and third rifle seasons. DAU E-12 met this qualification. In this DAU, APR followed this seasonal pattern until 2000 at which time most of the bull elk hunting in the state was restricted to four points or better. As indicated in the Bull Ratio section, the bull ratio has increased over this time period.

Favorable weather through most of the 1980s and 1990s, combined with limited public access, large private land refuges, and increased developments resulting in less harvest than desired, contributed to the elk population growing well above the herd's population objective.

To reduce the population toward the objective, a number of measures have been taken to encourage cow harvest. In 1998, over-the-counter/unlimited either-sex licenses for 2nd and 3rd seasons were available instead of limited antlerless licenses. However, because many spikes were being shot, the following year, 2nd and 3rd seasons were reverted back to separate limited antlerless and over-the-counter bull licenses. Antlerless license quotas were raised through the early 2000s (Figure 11). Antlerless harvest did increase initially, but in part because of large private lands that function as refuges for elk, there is a limit to the amount of harvest possible.

As license quotas were raised, success rate dropped off somewhat and many licenses went unsold. Antlerless license quotas were reduced in the mid-2000s to match demand for licenses with a realistically achievable amount of antlerless harvest. Since 2002 antlerless licenses in E-12 have been "List B" licenses, i.e., they can be purchased as a 2nd license. Also, to focus some harvest on private lands and redistribute elk onto public lands, private-land-only (PLO) antlerless licenses have been available in the DAU since 1993. Under the current season structure, PLO antlerless licenses in E-12 are valid from mid-August to mid-January. There is also a late season which was instituted in 1990 in GMU 35, and expanded to include GMU 36 in 2000. In 2010, GMU 361 was created to alleviate trespass issues in this GMU during the late season. Presently, the late season runs from the day after Thanksgiving for 10 days in all 3 GMUs, plus mid-December to mid-January in GMUs 35 and 36. This season attracts many youth hunters who did not fill their tags during earlier seasons.

The Piney Valley Ranching for Wildlife seasons were started in 1997 through 2002, and Burns Hole Ranching for Wildlife seasons have been in place since 2000. The Ranching for Wildlife program allows large ranches, greater than 15,000 contiguous acres, to have separate, private land only, 90-day hunting seasons that are not confined to the normal season structure. In return, the public are given a share of the antlerless and antlered licenses. In most cases this is about 10% of the antlered licenses and 100% of the antlerless licenses. The landowners cannot charge the public hunters a trespass fee and in most cases the hunts are a minimum of 10 days long.

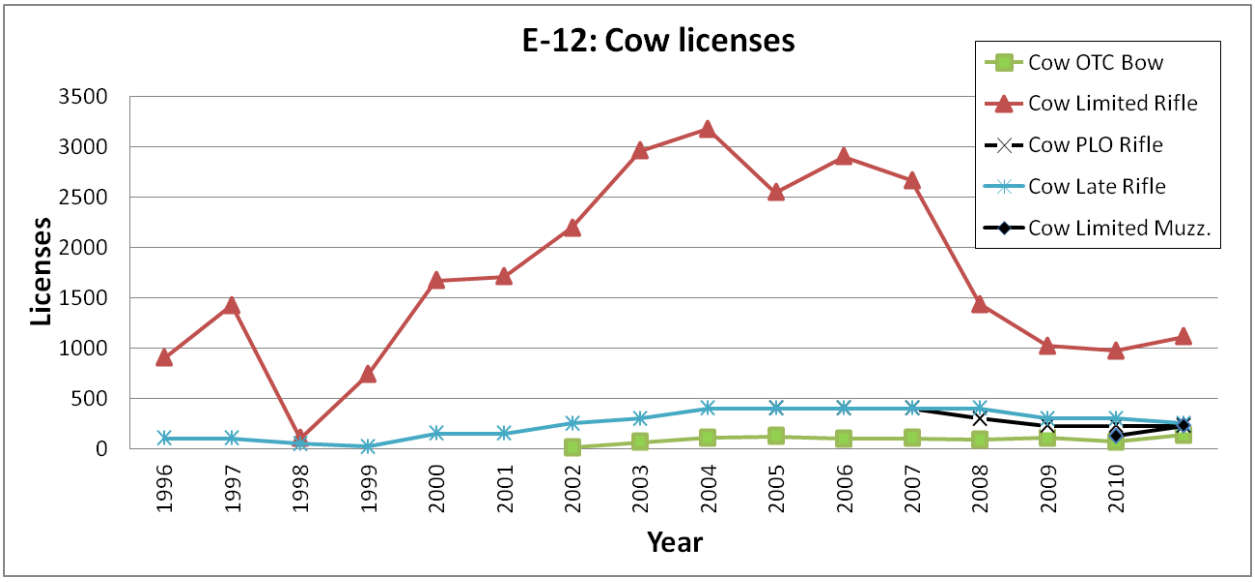


Figure 11. Antlerless license quotas for limited muzzleloader, rifle, late, and private-land-only (PLO) rifle seasons, and estimated number of licenses used in unlimited/over-the-counter (OTC) antlerless archery season in elk DAU E-12, 1996-2011. In 1998 only, 2nd and 3rd season limited antlerless and OTC bull licenses were replaced with OTC either-sex licenses. Estimates for number of antlerless OTC muzzleloader licenses used in the DAU prior to 2010 were not available at time of publication.

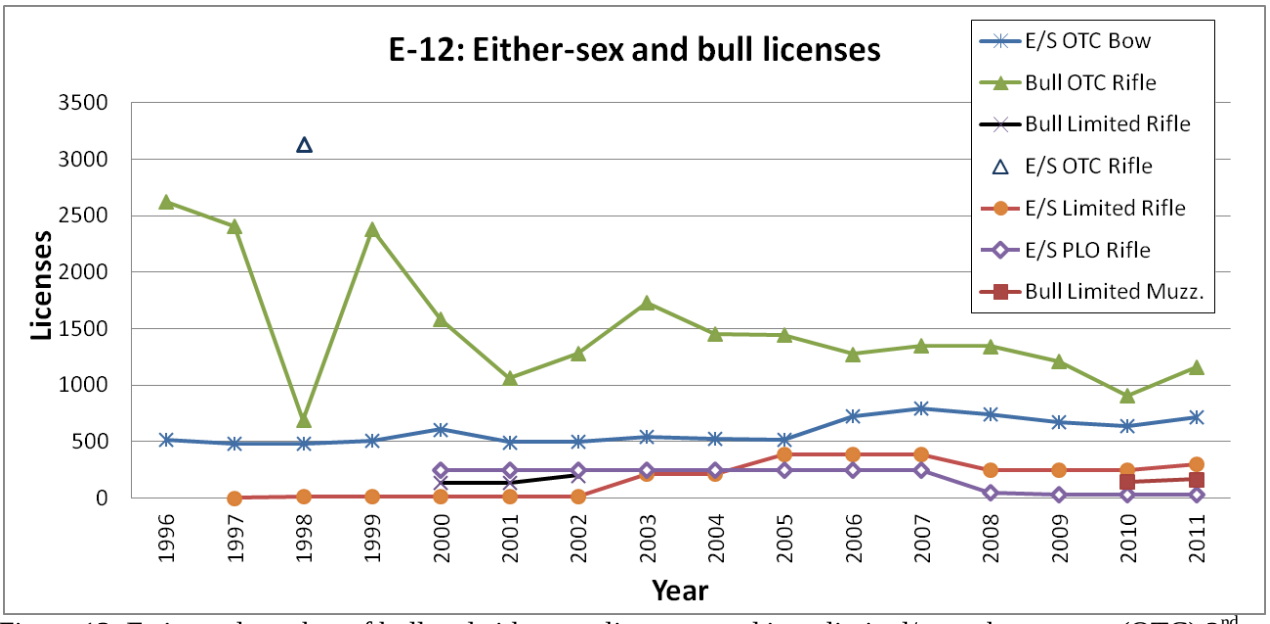


Figure 12. Estimated number of bull and either-sex licenses used in unlimited/over-the-counter (OTC) 2nd and 3rd rifle and archery seasons, and license quotas for limited muzzleloader, 1st, 4th, and private-land-only seasons in elk DAU E-12, 1996-2011. Estimates for number of bull OTC muzzleloader licenses used in the DAU prior to 2010 were not available at time of publication.

License Demand

For unlimited OTC bull licenses in 2nd and 3rd rifle seasons, the number of hunters who reported hunting in E-12 has dropped substantially since the mid- and late-1990s when there were around 2,500 OTC licenses sold, and has leveled off recently in the range of 1,100-1,300 OTC hunters (Figure 12). The number of archery hunters for has been stable to slightly increasing over the past decade (Figure 11 and Figure 12). In the past 3 years, there have been about 670 either-sex and 100 antlerless archery hunters each year.

For most of the limited license seasons, there currently ample quota available to fulfill license demand (Appendix 2). Most of the antlerless licenses (all 4 regular rifle seasons, PLO, muzzleloader, and GMU 361 late season) and the either-sex 1st season PLO either never sell out or they sell out as leftover licenses. The either-sex 1st rifle licenses, the GMU 35/36 late cow season, and the new (as of 2010) DAU-specific limited bull muzzleloader license are in high demand and have been selling out in the draw. The either-sex 4th rifle season has moderate demand and sometimes sells out during the draw.

Annual Harvest

The annual number of elk harvested increased from 1953, when the earliest records are available, through the 1990s. Over the past 3 decades, harvest has remained high with some fluctuations due to license numbers, hunter participation, and weather conditions during hunting seasons (Figure 13). The highest total annual harvest (1,038 elk) occurred in 2002, which was also the year that had the highest cow harvest (712 cows). The highest bull harvest was 527 which occurred in 1992. The lowest total annual harvest was 20 elk in 1953, which also had no antlerless harvest. The lowest bull harvest season was in 1958 when 12 bulls were taken.

A caveat in the harvest data is that antlerless harvest in E-12 is underestimated by an unknown amount because of youth harvests during the late cow season. Youths with an unfilled antlerless or either-sex tag from the regular seasons are eligible to hunt in almost any unit statewide that has a late cow season, regardless of the GMU of the original regular season license (with exceptions as of 2012 for units in elk DAUs E-2 and E-6 in northwest Colorado). However, in the harvest survey of randomly selected hunters, there is likely mis-reporting of the GMU of harvest (i.e., youths may incorrectly report the GMU of the original regular season license rather than the GMU of the late season where they actually hunted), leading to inaccurate estimates of total antlerless harvest for each GMU. This could be a significant issue for E-12 because it is one of the closest units to Denver to offer this late hunt and is popular among youth hunters. Underestimating antlerless harvest can result in incorrectly higher population size estimates and lower than actual success rates, meaning that more licenses could be available than intended.

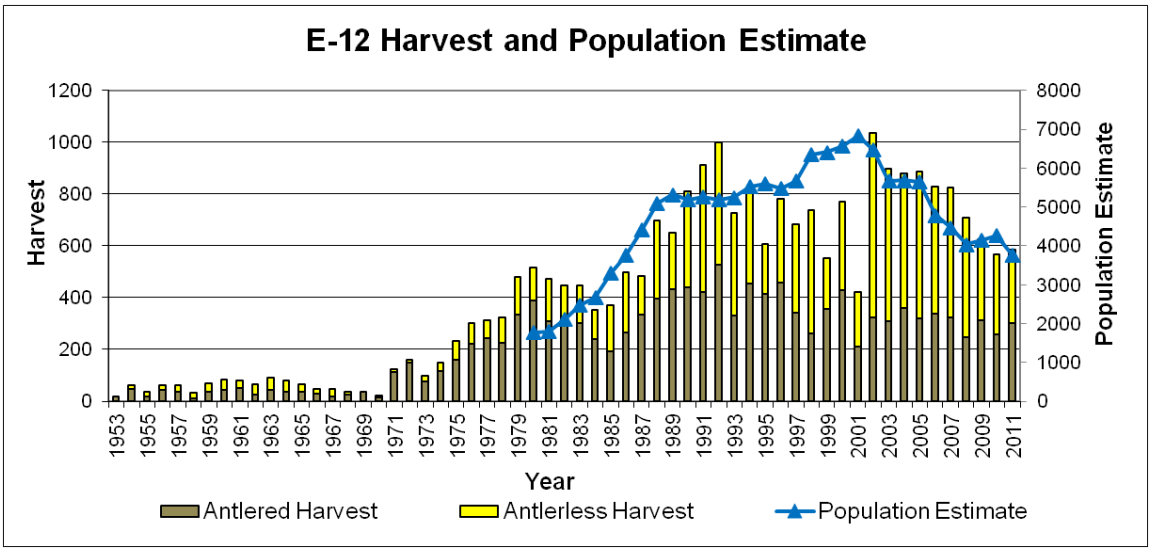


Figure 13. Annual harvest and population estimate in elk DAU E-12, 1953-2011.

Hunter Success

Hunter numbers in E-12 increased from 1954 through the 1990s. The average number of hunters in the 1980s was 3,400. In the 1990s through 2008, there was an average of 4,500 hunters annually. Participation has recently dropped off; the 3-year average for 2009-2011 is 3,600 hunters annually (Figure 14). Success rate has varied over the years, often a factor of weather conditions during the seasons. The average success rate since 1990 has been 17% (Figure 14).

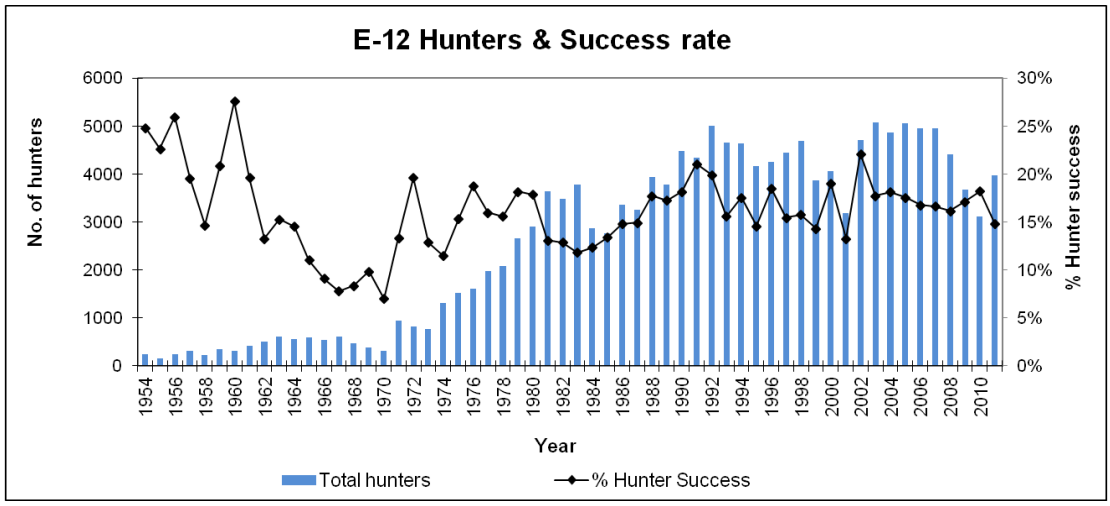


Figure 14. Number of hunters and harvest success rate in elk DAU E-12, 1954-2011. No data was available for 1953.

Current Management Status

Previous (1988 herd management plan) Objectives

Population Size Objective = 2,950 elk
Sex Ratio Objective = 16 bulls:100 cows

Current Population (post-hunt 2011)

Population Size Estimate = 3,800 elk
3-year Average Sex Ratio = 34 bulls:100 cows

Current Management Issues

1) **Human disturbance**
   a) *Recreation impacts* – Outdoor recreation, including hiking, dog-walking, cross-country skiing, mountain biking, ATV riding, jeep tours, dirt-biking, snowmobiling, and antler shed hunting, has increased tremendously in the past 15-20 years. Altogether, these recreational activities are occurring throughout all elk seasonal ranges, particularly on winter and transitional ranges and during critical periods of winter and calving. Recreational use has expanded into year-round activities and is especially high in areas along I-70 and Muddy Pass. Recent mild winters have also meant that areas without timing restrictions have opened up to biking, hiking, etc. earlier in the spring and later into fall. Even where restrictions are in place, they are often disregarded and go unenforced.

   This heightened level of human activity on the landscape is a major disturbance to elk and other wildlife that can ultimately lead to reduced fitness, lower survival rates, and reduced reproductive success. For example, elk increased their travel time and decreased their foraging time in response to off-road recreation activity, with ATV-riding producing the most change in behavior, followed by mountain biking, hiking, and horseback-riding (Naylor et al. 2009). Summer calf ratios declined in response to experimental disturbance in the form of recreational hiking (Phillips and Alldredge 2000), but recovered to control levels in subsequent years when human disturbance was experimentally removed (Shively et al. 2005). Dogs both on- and off-leash also contribute to the harassment and mortality of wildlife (e.g., Miller et al. 2001 for mule deer). These behavioral stressors and additional mortality can reduce recruitment of calves into the population directly by limiting calf survival, as well as indirectly by pushing elk off of preferred feeding and bedding areas.

   There is increasing demand for more recreational trails to be established, as well as frequent use and expansion of unofficial trails, all of which will impinge upon wildlife habitat. With human and wildlife activities now competing for the same lands, if wildlife are to be adequately protected, then wildlife conservation must be a primary value and consideration when planning land use. Measures such as timing regulations and restrictions on human recreational activities need to be enforced, especially during key seasons for elk and deer survival (wintertime through calving/fawning), to help reduce the detrimental impacts of recreation on these species.

Recreation pressure has also led to competition among ATV riders, mountain bikers, dirt bikers, and hunters in the fall for use of public lands. Complaints are becoming more common from hunters about other recreationists scaring elk and deer due to noise and the overall numbers and expansion of people using the landscape.

b) *Land development* – Substantial land development along the I-70 corridor, as well as Willow Creek along Highway 131, has occurred in the past 20-30 years. Valley bottoms and lower elevation slopes that were once elk winter range and transitional range have been severely developed and are no longer considered suitable elk habitat. Because of the high monetary value of land in the DAU, along with a decline in the livestock industry, there is great financial incentive for large ranches to subdivide and develop into residential housing. Conservation easements are difficult to secure because of the high cost of land. With only 1% of private land that is on elk winter range protected under conservation easements, the need for conservation of the remaining habitat on both private and public lands is critical.

2) **Habitat availability and condition**

a) *Limited winter range* - Winter snow forces elk down out of the higher elevations of the DAU to limited lower-elevation areas around 6,500-9,000 feet. Winter range is considered the most limiting factor for elk in Colorado and in this DAU. Compared to other DAUs in the area, E-12 is fortunate to have more than half of the land area in the DAU as elk winter range, and over two-thirds of its elk winter range is on public lands. However, much of it has declined in quality due to long-term fire suppression and lack of habitat improvement treatments, as well as an increase in year-round recreation over the past 15-20 years. Much of the private land winter range along the I-70 corridor has been developed into residential housing. As elk have been displaced off of these areas and motor vehicle traffic has increased, many elk were being struck on I-70 and Highway 131. Highway fencing was installed along much of I-70 to limit elk and deer vehicle collisions. On Highway 131 and other secondary roads, roadkill continues to be an issue.

b) *Unfavorable range conditions* - As discussed in the Habitat Resource section, big game habitat condition on winter ranges has declined. The causes of most range problems include plant successional movement towards later seral stage or climax communities and localized excessive big game use (a possible result of loss of traditional winter ranges to development, displacing and concentrating elk and deer on the remaining available habitat). Much of the landscape is composed of uniform-aged, old-growth shrubs that provide marginal nutritional value. Land development in this DAU has limited the use of prescribed burns on the adjacent public lands because of concerns about the risk of fire damaging personal property.

3) **Predation** – Large and medium-sized carnivores (black bears, mountain lions, coyotes) are frequently thought to be the cause of ungulate population declines and poor recruitment of young. Indeed, predation is often a major proximate cause of mortality for elk calves (e.g., Singer et al. 1997, Smith et al. 2006, Barber-Meyer et al. 2008, White et al. 2010). The effects of predation on prey populations are complex and vary with predator and prey

densities and species composition, habitat cover and forage conditions, weather, body condition, and other biological and ecological factors (Singer et al. 1997, Smith et al. 2006, White et al. 2010, Griffin et al. 2011). When an ungulate population is close to its habitat carrying capacity, the various sources of mortality (predation, harvest, disease, winter kill/malnutrition, etc.) are generally compensatory to each other. Compensatory mortality may span multiple seasons within a year, such that animals (usually young of the year) that are preyed upon in the summer might have otherwise died in the fall harvest or in the winter due to malnutrition or disease (Boyce et al. 1999).

Predator control is often suggested by the public to improve ungulate populations. Predator control may be effective when prey density is low relative to carrying capacity. For example, in an Idaho elk population thought to be below its carrying capacity, reducing black bear and mountain lion densities boosted summer calf survival (White et al. 2010) and calf ratios going into winter (C. G. White, Idaho Department of Fish and Game, *pers. comm.* 2012). However, predator control may be ineffective when prey populations are close to carrying capacity and when predation is compensatory to other sources of mortality (Bartmann et al. 1992, Ballard et al. 2001, Zager and Beecham 2006, Hurley et al. 2011).

Black bear, mountain lion, and coyote populations have likely increased in Colorado over the past several decades with the decline of sheep herding-associated kills and ban of poisons, and the readily available human foods (trash) for bears during years of berry failures. Locally, bear licenses in bear DAU B-11 have been increased up to 5-fold since 2009 and lion quotas in lion DAU L-6 were increased in 2011 to achieve higher harvest. Whether predator reduction has an effect on elk survival rates and recruitment depends on how close the elk population is to carrying capacity and how much impact other major factors, namely recreation and other human impacts, are also contributing to limiting the elk population.

4) **Low calf ratio** - The calf ratio in E-12 declined slightly over the past 30 years, paralleling trends across the western U.S. This decline in calf recruitment is thought to be due to a suite of factors: intraspecific competition for forage, decrease in quality of forage, increase in predator populations, weather conditions, hunting, and human activity (Johnson et al. 2005). Nutrition is the ultimate determinant of a population's productivity, and the magnitude of the effects that other factors have on an elk population depend on the population's nutritional status (Johnson et al. 2005). Winter forage is often thought to be the most limiting factor, but summer and fall forage also determine nutritional status of elk going into winter, which in turn affects winter survival rates, pregnancy rates, and timing of breeding (Cook et al. 2004).

   Despite managing E-12 purposefully for population reduction in efforts to reduce population density and improve the population's productivity, calf ratio has not rebounded as would be expected under density-dependent population dynamics. E-12's calf ratio has not declined as much as the other 2 elk DAUs in the Glenwood Springs area, likely because although it has seen an increase in recreation activities, it has not been as widespread as in these other DAUs. However, the continued low calf ratio could be due to a combination of the impacts discussed above (#1-3).

5) **Private land refuges** – Large private ranches that do not allow public hunting create areas where elk may seek refuge, both for forage and for fewer disturbances from human activity. This is also true of developments where elk become habituated and tolerate close proximity to people rather than venture onto public lands where they could be harvested. While these areas can serve as important habitat for wildlife, they are often unavailable for the public hunter. The major ranch in the DAU, Piney Valley Ranch, limits hunting to high-paying clients looking for a trophy bull. The effect is that elk groups will seek out these private lands to avoid hunting pressure, cumulatively resulting in a less than desired amount of cow harvest in the DAU. Some large ranches, including the portion of the Burns Hole Ranch that is in GMU 35 (the rest is in GMU 26), do allow hunters on their properties, which has helped to redistribute elk and to obtain some cow harvest on these private lands. To solve the elk distribution problem, CPW and the hunting public must continue to work cooperatively with private landowners to enable adequate harvest on these large parcels.

6) **Competition with deer** - As the elk population grew in the 1970s and 1980s, they expanded their historic winter ranges and moved to lower elevations where they compete with deer on the limited winter ranges. Elk and deer overlap in both diet and habitat types, but elk have more versatile food habits and aggregate in larger groups than deer. On a small spatial and temporal scale, deer and elk partition their resource use (Stewart et al. 2002), with deer likely avoiding elk (Johnson et al. 2000). High elk numbers may have competitively displaced deer, especially during severe winters when forage and space are particularly limited.

Public Involvement

CPW held public meetings and also conducted a questionnaire to gauge public opinion on elk management in E-12. A public meeting for both E-12 and E-16 took place in Eagle on July 19, 2012. Thirteen people attended this meeting. Another public meeting for E-12 was held in Kremmling on July 25, 2012, but no one attended.

The questionnaire was available online from July 11-Aug 11, 2012. Postcards with the questionnaire's website address were sent to a random sample of 750 people who either purchased or applied for E-12 licenses in 2010 and 2011. The questionnaire was also announced on CPW's website and publicized in a press release. Those without internet access could request paper copies of the questionnaire. There were 125 online surveys and 8 paper responses completed (Appendix 3).

Most respondents identified their interests primarily as hunters and supported maintaining the current elk population size. An overwhelming majority ranked obtaining game meat as their highest priority when hunting elk in E-12, and generally rated opportunity for meat as "good," and opportunity to harvest a high quality bull as "fair." Some respondents commented that elk numbers were low, whereas others felt that numbers were increasing. A common complaint was of elk congregating during the hunting seasons on private ranches without public access. Another common complaint was that new USFS road closures limited their access, but others wanted less ATV use to reduce pressuring animals out of an area. Some experienced hunter crowding on public lands. Some hunters had conflicts with dirt bikers and ATVs. Some felt that predator

numbers were high.

Meetings were also held with the Lower Colorado Habitat Partnership Program (HPP) committee and Eagle and Pitkin County Commissioners. Comments were solicited from these entities, as well as from the USFS and BLM. Written comments from HPP, Eagle County and USFS were received and are attached in Appendix 4.

A draft plan was posted on the CPW website from mid-December 2012 to mid-January 2013 for a 30-day public review period.

Alternatives for Population Management Objectives

Previous (1988) population objective:	2,950 elk
Previous (1988) sex ratio objective:	16 bulls:100 cows
Current (post-hunt 2011) population estimate:	3,800 elk
3-year (2009-2011) average observed sex ratio:	34 bulls:100 cows

New population objective alternatives considered:

Alternative 1	3,800-5,400 elk
Alternative 2	3,000-4,600 elk
Alternative 3	2,200-3,800 elk

New expected sex ratio: 22-44 bulls:100 cows

Population objective alternatives

Elk DAU E-12 has been managed for the past decade or more to decrease the elk population toward the objective set in 1988 of 2,950 elk to match the available habitat and, in some areas, to reduce game damage. Antlerless license quotas have generally been liberal in efforts to reduce the population. Bull licenses are over-the-counter/unlimited for 2nd and 3rd rifle seasons. The 2011 post-hunt estimate for this herd is 3,800 elk.

Colorado Parks and Wildlife considered three alternatives for the new population objective range. The objectives for the DAU provide guidance for the general management of the entire elk population. There will still be flexibility that will allow for management at the GMU scale to address smaller scale issues such as localized elk concentrations and landowner concerns.

Alternative 1:
3,800-5,400 elk

This alternative would increase the current population size by about 20% (range 0% to +40% change). Because elk have a high natural survival rate (examples from Colorado: Lubow et al. 2002, Freddy 2000, Freddy 2003, Webb et al. 2011), reducing hunter harvest to achieve elk population growth may allow elk numbers to take off when weather conditions are favorable for survival. At a higher population density, elk will compete more intensely with each other as well

as with mule deer for forage and space, particularly during hard winters. The health of individual elk may be compromised due to this heightened competition, and disease may spread through the population more easily. Mortality by predation, harvest, disease, and malnutrition would be more compensatory to each other at this higher elk density. Overall, calf recruitment rates would be lower. Winter range habitat, which has already been diminished by land development and over-utilized by past high densities of ungulates, could be further degraded. Agricultural crop damage may become an issue, and damage to residential trees, shrubs, and gardens may increase. More elk-vehicle collisions may occur. Catastrophic weather, such as a very severe winter restricting access to forage and requiring animals to use more of their body fat to stay alive, could result in large numbers of elk dying.

Antlerless license numbers would need to be reduced, at least for the first several years, to achieve population growth. There would be less opportunity to draw a cow license and hunters might not be able to draw a license every year. However, those who do successfully draw would experience less crowding and would likely have a better chance of harvesting an elk because there would be more elk on the landscape. As the herd reaches the higher population objective, more antlerless licenses could be issued to stabilize the herd at the new population objective. Also at a higher population, there would be more bulls available, so bull hunters could have higher success rates. However, because bull licenses for 2nd and 3rd rifle season are unlimited, hunter crowding and success rates during these seasons would depend also on how many bull hunters choose to hunt in these units.

Economic benefits to the local community could be reduced due to having fewer antlerless licenses available and therefore fewer hunters contributing to local establishments during hunting season. This effect could be offset if more hunters purchase over-the-counter bull licenses, but is unlikely, given current declining trends in hunter participation overall.

Alternative 2:
3,000-4,600 elk (Selected)

This alternative would maintain the current population size (+/-20%). There would be less competition for forage and habitat among elk than in the past. Calf recruitment may remain relatively low, given current conditions (i.e., high recreation pressure, reduced habitat availability and condition, increased predator densities), but because adult elk have high natural survival rates, the population can be maintained at this size with low recruitment rates and continued moderate harvest.

To achieve this population objective, antlerless licenses would either remain the same or initially be reduced slightly to stabilize the population at the current size. As population size is evaluated over the subsequent years, license quotas could resume thereafter back to quotas similar to current levels. Hunting opportunity, harvest success rates, and economic impact would be intermediate compared to Alternatives 1 and 3, and would be similar to those of today.

Alternative 3:
2,200-3,800 elk

This alternative would continue to reduce the population size by around 20% (range 0% to -40% change). At a lower population density, individual elk would experience less

competition and overall better health. Survival rates could improve, and therefore, the herd would be more resilient to extreme weather events. However, at lower elk population density, the effects of predation could become more pronounced.

To achieve this population objective, it could take many years and would depend on harvesting enough cow elk to continue to drive the population down. Increasing antlerless quotas would not be useful because even at the current license quotas, many licenses go unsold. Therefore, antlerless license quotas would remain the same as current quotas. As the population continues to decline, harvest success rates would likely decline because of having relatively fewer animals available, and hunter crowding may be an issue. Eventually as the lower population objective is reached, antlerless licenses would need to be reduced to stabilize the herd at the new population size. Initially, economic benefits from hunting and wildlife watching would be similar to those of today; later, there would be fewer economic and recreational benefits as the elk population declines.

Expected Sex Ratio Range

For DAUs that have unlimited over-the-counter (OTC) bull elk licenses in 2nd and 3rd rifle seasons, CPW does not manage for a particular sex ratio. Instead, bull:cow ratio in these OTC units is determined by a combination of harvest factors (e.g., hunter participation, hunter success), biological factors (e.g., differential survival rates of bulls vs. cows, sex ratio of calves when born), and abiotic factors (primarily weather). Therefore, we report an expected sex ratio, rather than a sex ratio objective.

The expected sex ratio range for E-12 is 22-44 bulls:100 cows, based on observed post-hunt bull ratios from 2000 (when the antler-point restriction was extended to all seasons) through 2011. The average observed bull ratio during that time period is 33 bulls:100 cows.

Selected Alternative and New Objectives

The alternative of 3,000-4,600 elk was selected as the new population objective because it will balance the public's desire to have enough elk on the landscape to provide hunting and wildlife viewing opportunities, while still keeping the elk population at a moderate density within carrying capacity. Responses from the public questionnaire (see Appendix 3) indicated that most (55%) prefer to maintain the current population (i.e., Alternative 2); 26% prefer a population increase; 14% prefer a population decrease; and 5% were uncertain. Eighty-five percent rated their preference on population objective as "somewhat" or "very" important.

The expected sex ratio range is 22-44 bulls:100 cows, assuming continued over-the-counter bull licenses and 4-point antler restrictions.

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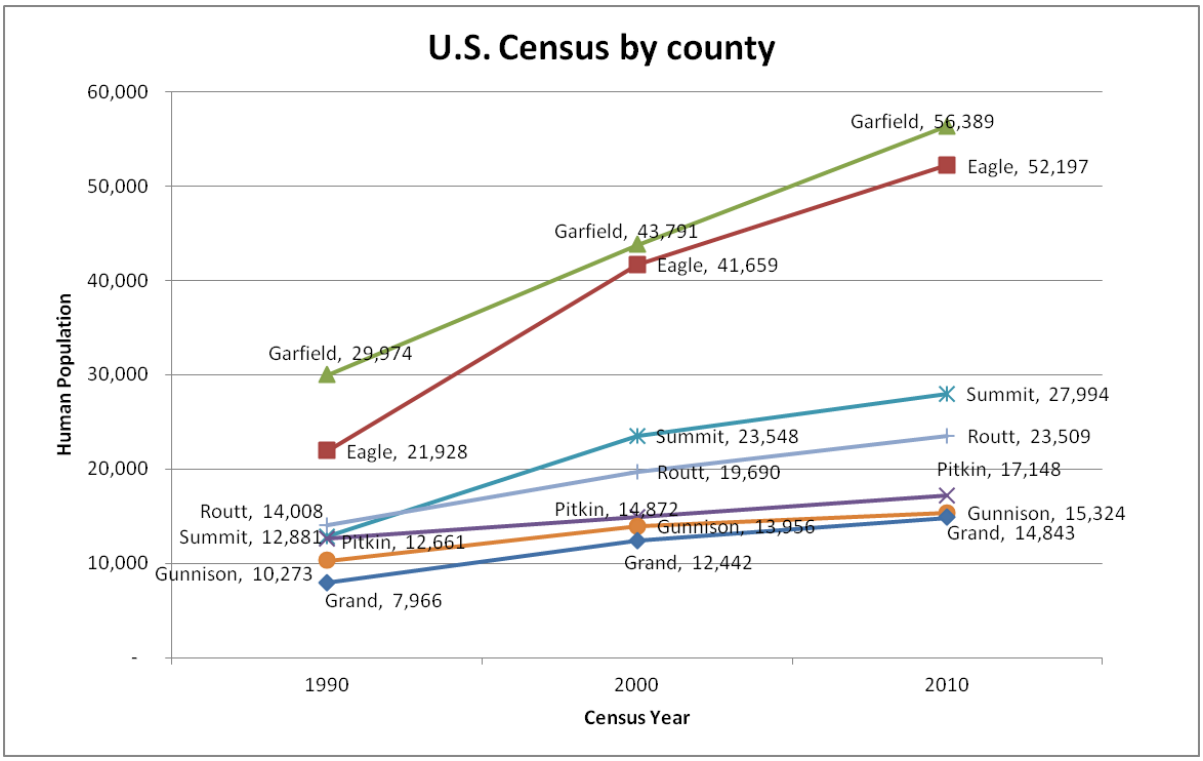
Appendix 1. Human population in counties in and near elk DAU E-12, 1990-2010.
Source: U.S. Census Bureau.



Appendix 2. License quota and demand in elk DAU E-12, 2007-2011. "Quota" is the maximum number of licenses CPW could issue; "Sold out" is the stage at which the hunt code sold out; "1st choice demand" is the number of 1st choice applicants as a percentage of the license quota.

Year	Season	Quota	Sold Out	Number of 1st choice applicants	1st choice demand relative to quota
2010	Cow, muzzleloader, DAU-wide	125	Leftovers	55	44%
2011		225	Never	54	24%
2010	Bull, muzzleloader, DAU-wide	140	At Choice 1	220	157%
2011		165	At Choice 1	191	116%
2007	Cow, 1st rifle, DAU-wide	700	Never	23	3%
2008		125	Leftovers	29	23%
2009		125	Leftovers	23	18%
2010		125	At Choice 4	35	28%
2011		225	Leftovers	31	14%
2007	Either-sex, 1st rifle, DAU-wide	200	At Choice 1	269	135%
2008		150	At Choice 1	283	189%
2009		150	At Choice 1	289	193%
2010		150	At Choice 1	239	159%
2011		200	At Choice 1	292	146%
2007	Either-sex, 1st PLO, DAU-wide	250	Never	12	5%
2008		50	Never	10	20%
2009		30	Never	14	47%
2010		30	Never	9	30%
2011		30	Never	12	40%
2007	Cow, late PLO, GMU 35	200	Never	10	5%
2008		150	Never	7	5%
2009		125	Never	12	10%
2010		125	Never	5	4%
2011		125	Never	8	6%
2007	Cow, late PLO, GMUs 36 & 361	200	Never	6	3%
2008		150	Never	7	5%
2009		100	Never	5	5%
2010		100	Never	1	1%
2011		100	Never	3	3%
2007	Cow, 2nd/3rd/4th rifle, GMU 35	410	Leftovers	141	34%
2008		310	Leftovers	121	39%
2009		220	Leftovers	103	47%
2010		225	Leftovers	97	43%
2011		245	Leftovers	128	52%
2007	Cow, 2nd/3rd/4th rifle, GMUs 36 & 361	1,555	Never	296	19%
2008		1000	Leftovers	235	24%
2009		675	Leftovers	238	35%
2010		620	Leftovers	261	42%
2011		640	Leftovers	236	37%
2007	Either-sex, 4th rifle, GMU 35	95	Leftovers	57	60%
2008		50	At Choice 2	49	98%

2009		50	At Choice 2	39	78%
2010		50	At Choice 2	40	80%
2011		50	Leftovers	21	42%
2007	Either-sex, 4th rifle, GMUs 36 & 361	90	Leftovers	49	54%
2008		50	At Choice 2	46	92%
2009		50	At Choice 2	43	86%
2010		50	Leftovers	32	64%
2011		50	Leftovers	23	46%
2007	Cow, late season, DAU-wide	400	At Choice 2	350	88%
2008		400	At Choice 2	355	89%
2009		300	At Choice 1	397	132%
2010	Cow, late season, GMUs 35 & 36	250	At Choice 1	259	104%
2011		200	At Choice 1	261	131%
2010	Cow, late season, GMU 361	50	Leftovers	9	18%
2011		50	Leftovers	11	22%

Appendix 3. Summary of public questionnaire for elk DAU E-12.

1. What is your CID number? You can find your CID number listed above your name on the postcard you were mailed inviting you to participate in this survey or on your Colorado hunting or fishing license. If you do not have a CID number, please leave this box blank.

104 responses, 29 skipped this question

2. Are you a resident of Colorado?

77.3% (102) Yes
22.7% (30) No

3. Do you live in any of the following GMUs: 35, 36, or 361? Please see the map on page 1.

9.1% (12) Yes
90.9% (120) No

4. In which of the following GMUs do you live?

50.0% (6) GMU 35
41.7% (5) GMU 36
8.3% (1) GMU 361

5. For how many years have you lived in GMU 35, 36, or 361?

Average 18 years (12 responses) Years

6. Do you own or lease any land in the following GMUs: 35, 36, or 361?

7.6% (10) Yes
92.4% (122) No

7. In which of the following GMUs do you own or lease property?

40.0% (4) GMU 35
50.0% (5) **GMU 36**
10.0% (1) GMU 361

8. For how many years have you owned or leased land in GMUs 35, 36, or 361?

Average 18 years (10 responses) Years

9. During the last 12 months, have you participated in any outdoor recreation other than hunting (such as camping, backpacking, snowmobiling, etc.) in GMUs 35, 36, or 361?

53.1% (68) Yes
46.9% (60) No

10. Which of the following groups represent your interests in elk management in GMUs 35, 36, or 361? (Please check all that apply.)

3.0% (4) (A) Rancher or farmer
3.8% (5) (B) Business owner
5.3% (7) (C) Landowner
0.8% (1) (D) Guide or outfitter
99.2% (131) (E) Hunter or sportsperson
12.1% (16) (F) Member of an environmental or conservation group
7.6% (10) (G) Other (please specify) Rocky Mountain Elk Foundation, Backpacker, Wildlife Advocate, Professional photographer, local resident, Concerned citizen, Camper, ATV RIDING

11. If you checked **more than one** response in question 10, write the letter corresponding to the interest group which **most** represents your opinions:

Business owner: 1.2% (1)
Landowner: 2.4% (2)
Hunter or sportsperson: **94.1% (80)**
Member of an environmental or conservation group: 2.4% (2)

12. How interested are you in each of the following activities related to elk? *(Circle only one number for each item.)*

	No interest	Slight interest	Moderate interest	High interest	I am not sure
Watching or photographing elk	5.4% (7)	16.9% (22)	30.0% (39)	**47.7% (62)**	0.0% (0)
Hunting trophy elk	8.5% (11)	14.7% (19)	24.8% (32)	**51.9% (67)**	0.0% (0)
Hunting elk for meat	0.0% (0)	1.6% (2)	7.0% (9)	**91.5% (118)**	0.0% (0)
Learning more about elk management	2.3% (3)	6.2% (8)	38.5% (50)	**52.3% (68)**	0.8% (1)
Providing input for decisions regarding elk management	3.8% (5)	9.9% (13)	24.4% (32)	**61.8% (81)**	0.0% (0)

13. How concerned are you about the following items? *(Circle only one number for each item.)*

	Very concerned	Somewhat concerned	Not at all concerned	I am not sure
Elk-vehicle collisions	20.3% (26)	**46.1% (59)**	30.5% (39)	3.1% (4)
Damage caused by elk to ranchers' and farmers' rangeland, crops, or fences	13.7% (18)	**57.3% (75)**	26.7% (35)	2.3% (3)
Damage caused by elk to homeowners' trees, shrubs, and gardens	8.5% (11)	41.5% (54)	**48.5% (63)**	1.5% (2)
Loss of elk habitat due to increased human population growth and land development	**76.2% (99)**	19.2% (25)	4.6% (6)	0.0% (0)
Potential for elk to starve during the winter	**68.5% (89)**	27.7% (36)	3.8% (5)	0.0% (0)
Potential for elk to spread diseases to pets, livestock, or humans	30.5% (40)	32.1% (42)	**35.9% (47)**	1.5% (2)
Competition for forage between elk and livestock	34.4% (45)	**41.2% (54)**	24.4% (32)	0.0% (0)
Competition for forage between elk and mule deer	21.5% (28)	**45.4% (59)**	30.8% (40)	2.3% (3)
Revenue earned by local businesses as a result of elk hunting	26.9% (35)	**48.5% (63)**	23.1% (30)	1.5% (2)

14. Have you personally experienced any of the following events related to elk? (Please check all that apply.)

43.8% (14)	Elk-vehicle collision
25.0% (8)	Economic losses because of elk damage to range, crops, or fences
18.8% (6)	Economic losses because of elk damage to residential trees, shrubs, and gardens
3.1% (1)	Elk spreading disease to pets, livestock, or humans
62.5% (20)	Competition for forage between elk and livestock

15. Which of the following best describes your general attitude about elk in the Piney River area? (Please check one.)

0.0% (0)	I do not enjoy elk in the Piney River area and regard them as a nuisance.
18.6% (24)	I enjoy elk in the Piney River area, but worry about problems they may cause.
76.6% (99)	I enjoy elk in the Piney River area and do not worry about the problems they may cause.
4.7% (6)	I do not have particular feelings about elk in the Piney River area.

16. The Piney River elk herd has been managed to decrease the elk population, and this herd is now approaching the population objective set in 1988. We are considering several alternatives for a new population objective for the next 10 years. Increasing, maintaining, or decreasing the population size will have consequences on the health of the herd and its habitat, the number of antlerless licenses issued, and the number of elk available for harvest.

Please read the descriptions below and mark the option you would most prefer to guide management of the Piney River elk herd. (Please check *only one* response.)

25.6% (33) 20% increase from current elk population size. Antlerless licenses would be reduced temporarily to allow the population to grow, but could increase later when the higher population objective is reached. Elk would be seen more often, but individual elk may be less healthy because of diseases and competition. A higher elk population could also further degrade winter habitat and compete more with mule deer for food and space.

55% (71) Maintain the elk herd at the current population size. Antlerless license quotas would decrease initially to allow the herd to stabilize, but might resume to current quotas later. Harvest success rates would likely stay the same. Elk will be seen as often as they are now and would experience similar levels of competition for food and space as they do currently.

14.0% (18) 20% reduction from the current elk population size. Antlerless licenses would stay the same to continue to reduce the population. Harvest success rates may decrease as fewer elk would be available for harvest and hunters may feel more crowded. Elk would experience less competition, calf recruitment might increase, and the population would have greater ability to rebound from severe winters.

5.4% (7) I am not sure.

17. How important to you is the change in the size of the elk population you indicated in question 16? (Please check one.)

45.0% (58) Very important
39.5% (51) Somewhat important
7.0% (9) Neither important, nor unimportant
3.9% (5) Somewhat unimportant
0.8% (1) Very unimportant
3.9% (5) I am not sure

18. The following are 2 options that Colorado Parks and Wildlife may use to **decrease** elk populations in GMUs 35, 36, and 361. How acceptable are these methods to you? (Please check one for each item.)

Responses for Question 18 have been subdivided based on how the respondents answered Question 16:

		Responses from those who prefer a population increase	Reponses from those who prefer maintaining current population size	Responses from those who prefer a population reduction	Responses from those who did not have a preferred population size	Overall responses
Increase cow licenses	**Very acceptable**	**23.3% (7)**	**42.6% (29)**	**76.5% (13)**	**66.7% (4)**	53
	Somewhat acceptable	16.7% (5)	23.5% (16)	11.8% (2)	33.3% (2)	25
	Neither acceptable nor unacceptable	20% (6)	19.1% (13)	5.9% (1)	0% (0)	20
	Somewhat unacceptable	20% (6)	8.8% (6)	5.9% (1)	0% (0)	13
	Very unacceptable	20% (6)	4.4% (3)	0% (0)	0% (0)	9
	I am not sure.	0% (0)	1.5% (1)	0% (0)	0% (0)	1

		Responses from those who prefer a population increase	Reponses from those who prefer maintaining current population size	Responses from those who prefer a population reduction	Responses from those who did not have a preferred population size	Overall responses
Increase either-sex licenses	**Very acceptable**	**29% (9)**	**28.4% (19)**	**66.7% (10)**	**50% (3)**	41
	Somewhat acceptable	12.9% (4)	34.3% (23)	13.3% (2)	16.7% (1)	30
	Neither acceptable nor unacceptable	12.9% (4)	13.4% (9)	6.7% (1)	0% (0)	14
	Somewhat unacceptable	12.9% (4)	16.4% (11)	13.3% (2)	16.7% (1)	18
	Very unacceptable	**29% (9)**	6% (4)	0% (0)	0% (0)	13
	I am not sure.	3.2% (1)	1.5% (1)	0% (0)	16.7% (1)	3

19. The following are 2 options that CPW may use to **increase** elk populations in GMUs 35, 36, and 361. How acceptable are these methods to you? (Please check one for each item.)

Responses for Question 19 have been subdivided based on how the respondents answered Question 16:

		Responses from those who prefer a population increase	Reponses from those who prefer maintaining current population size	Responses from those who prefer a population reduction	Responses from those who did not have a preferred population size	Overall responses
Reduce cow licenses	**Very acceptable**	**43.3% (13)**	20.9% (14)	20% (3)	16.7% (1)	31
	Somewhat acceptable	23.3% (7)	**40.3% (27)**	20% (3)	16.7% (1)	38
	Neither acceptable nor unacceptable	6.7% (2)	22.4% (15)	6.7% (1)	0% (0)	18
	Somewhat unacceptable	13.3% (4)	10.4% (7)	**33.3% (5)**	**33.3% (2)**	18
	Very unacceptable	13.3% (4)	4.5% (3)	20% (3)	16.7% (1)	11
	I am not sure.	0% (0)	1.5% (1)	0% (0)	16.7% (1)	2

		Responses from those who prefer a population increase	Reponses from those who prefer maintaining current population size	Responses from those who prefer a population reduction	Responses from those who did not have a preferred population size	Overall responses
Reduce either-sex licenses	**Very acceptable**	**45.2% (14)**	19.4% (13)	**41.2% (7)**	16.7% (1)	35
	Somewhat acceptable	32.3% (10)	28.4% (19)	11.8% (2)	**33.3% (2)**	33
	Neither acceptable nor unacceptable	3.2% (1)	**29.9% (20)**	5.9% (1)	0% (0)	22
	Somewhat unacceptable	6.5% (2)	16.4% (11)	29.4% (5)	16.7% (1)	19
	Very unacceptable	12.9% (4)	4.5% (3)	11.8% (2)	0% (0)	9
	I am not sure.	0% (0)	1.5% (1)	0% (0)	**33.3% (2)**	3

		Responses from those who prefer a population increase	Reponses from those who prefer maintaining current population size	Responses from those who prefer a population reduction	Responses from those who did not have a preferred population size	Overall responses
Eliminate List B and C cow licenses	**Very acceptable**	**40% (12)**	12.1% (8)	6.7% (1)	0% (0)	21
	Somewhat acceptable	16.7% (5)	**28.8% (19)**	13.3% (2)	0% (0)	26
	Neither acceptable nor unacceptable	3.3% (1)	19.7% (13)	26.7% (4)	0% (0)	18
	Somewhat unacceptable	20% (6)	18.2% (12)	6.7% (1)	20% (1)	20
	Very unacceptable	13.3% (4)	10.6% (7)	**46.7% (7)**	20% (1)	19
	I am not sure.	6.7% (2)	10.6% (7)	0% (0)	**60% (3)**	12

		Responses from those who prefer a population increase	Reponses from those who prefer maintaining current population size	Responses from those who prefer a population reduction	Responses from those who did not have a preferred population size	Overall responses
Eliminate late cow elk hunt	**Very acceptable**	**48.4% (15)**	**38.8% (26)**	31.3% (5)	20% (1)	47
	Somewhat acceptable	22.6% (7)	23.9% (16)	6.3% (1)	20% (1)	25
	Neither acceptable nor unacceptable	3.2% (1)	13.4% (9)	6.3% (1)	0% (0)	11
	Somewhat unacceptable	0% (0)	7.5% (5)	18.8% (3)	0% (0)	8
	Very unacceptable	25.8% (8)	14.9% (10)	**37.5% (6)**	**40% (2)**	26
	I am not sure.	0% (0)	1.5% (1)	0% (0)	20% (1)	2

20. Have you ever hunted elk in Colorado? (Please check one.)

100.0% (128) Yes
0.0% (0) No

21. For how many years have you hunted elk in Colorado?

Average 17 years (128 responses) Years

22. Have you ever hunted elk in GMU 35, 36, and 361? (Please check one.)

98.4% (125) Yes
1.6% (2) No

23. Overall, how satisfied were you with your elk hunting experience(s) in GMUs 35, 36, and 361 in the last 3 years? (Please check one.)

27.4% (34) Very satisfied
35.5% (44) Somewhat satisfied
7.3% (9) Neither satisfied nor unsatisfied
18.5% (23) Somewhat unsatisfied
11.3% (14) Very unsatisfied
0.0% (0) I am not sure

24. How would you describe the crowding you felt while hunting elk in GMUs 35, 36, and 361? (Please check one.)

23.8% (30) Not at all crowded
36.5% (46) Slightly crowded
32.5% (41) Moderately crowded
7.1% (9) Very crowded

25. Please rank (1-5) the following items based on how you feel they would improve the quality of your elk hunting experience in Colorado. Rank the item you feel would **most** improve your hunt as **#1**, and do not use any number more than once.

	Response (N=124)					Average rating
	1	**2**	**3**	**4**	**5**	
Seeing more elk of all ages and sexes	**26.6% (33)**	24.2% (30)	20.2% (25)	16.1% (20)	12.9% (16)	2.65
Seeing more mature bulls	22.6% (28)	**29.8% (37)**	18.5% (23)	16.9% (21)	12.1% (15)	2.66
Fewer hunters and less crowding	19.4% (24)	14.5% (18)	24.2% (30)	**33.1% (41)**	8.9% (11)	2.98
Higher hunter success rates	12.1% (15)	21% (26)	**30.6% (38)**	24.2% (30)	12.1% (15)	3.03
Less access for motorized vehicles	19.4% (24)	10.5% (13)	6.5% (8)	9.7% (12)	**54% (67)**	3.69

26. How would you rate your opportunity to hunt to obtain game meat in GMUs 35, 36, and 361? (Please check one.)

11.9% (15)	Excellent
26.2% (33)	Very good
31.0% (39)	Good
21.4% (27)	Fair
8.7% (11)	Poor
0.8% (1)	I am not sure

27. How would you rate your opportunity to harvest a high quality bull in the GMUs 35, 36, and 361? (Please check one.)

2.4% (3)	Excellent
6.4% (8)	Very good
20.8% (26)	Good
40.0% (50)	Fair
26.4% (33)	Poor
4.0% (5)	I am not sure

28. Which of the following is MOST important to you when elk hunting in GMUs 35, 36, and 361? (Please check only one.)

8.7% (11)	Not seeing other hunters
76.2% (96)	Obtaining game meat
15.1% (19)	Harvesting a high quality bull

29. Please use the space below to share any additional comments you have about the management of the elk herd in GMUs 35, 36, and 361. *Note: the comments below have not been edited or verified for accuracy.*

Keep in mind that with the beetle kill and likely new fires, you'll be increasing your carrying capacity in the area. I don't know how much you're presently paying in game damage, but I'd guess it wouldn't increase much given the future increase in hunting licenses that you could sell.
Excessive road closures by the Forest Service has dramatically reduced access into the Piney River Valley which limts huntable areas of unit 36. This particualry true of access into the Big Park area by any mechanized means. The closure of Forest Service Road 449 closed accesses that had been available for many decades. Thes road closures have resulted in larger congregations of hunting camps in smaller areas. Disbursing the campsites in the northern part of 36 is nearly impossible. As it now exists, hunters must leave the combined campsites in a single file for a sizeable hike before they can begin to spread out for a quality hunt.
My family has been hunting in unit 36 for many years. I beleive the closure to ATV's is a terrible idea. I think that open roads should be able to be accessed by all, and I beleive that there are many hunters such as my father inlaw that has had heart surgery and both hips replaced are being shut out of hunting, by not letting him use his razer to get to his hunting spot that he has used for years. I think that you will lose a lot of hunting revenue from both in state and out of state hunters. It seems to me that it is getting harder to find the elk and they are not seen in abundance like they used to be. So I think decreasing the herd is a bad idea. My husband and I hunt for meat to feed our family for the year, and it seems to be harder and harder each year. Although, if you are persistant and you know where to look for them you can still find them. I can't stress enough to you how many hunters were very upset last year when the USFS came to all of our camps and told us all to leave our 4 wheelers home next year. They were all talking about contacting our state and federal represenatives to see what could be done to stop this, and I did just that when I got home. My husband and I got married at unit 36 and we hunt in unit 36 and we used to ride our 4 wheelers in unit 36. I feel as though the only off trail problems that I have seen is motorcycles, and a lot of damage on the roads from ruts from trucks. I really feel like the decision to close the roads is going to force people to a place where they are opened and hunt there instead. Thank You!
the only unit i hunted was 361 in a late cow hunt. my assumption would be the elk would be down on the river. i contacted a very cute dow agent at hot sulpher who was very helpful. she told me, the previous january they flew the area and the elk were at 9600 ft. elevation. well she was right. on day three i found the elk on top of the mountain about two miles in from where the road was snowed shut. there was no way in hell anyone was going to get one of those unless they snow mobiled in early or had a snowmobile and was tough enough to wait them out and shoot one as they came off the hill to feed at dusk. which would have been after shooting hrs. the elk came off the hill at dusk, fed and lounged all night in the aspen and then back up the hill at sunrise. thats all i know about unit 361. except i could have shot plenty of deer with in a half mile of the river, and saw some bad ass mtn lion tracks. not sure if he was following me or not. but i put in for the latest deer tag for that unit this season.
Hi! The big problem motorbikes cutting in the back woods above Edwards, muddy pass, 734# on top looking down on

Edwards . I bow hunt and love the time of the season in which I get to hunt and spend Quiet time in the changing season of Autumn. The hunt stops, Quiet time stops, when the Roar of a motorbike doing 30 to 40 M.P.H. 100 yrs. away . The area show deep cuts in the ground in the last 4 yrs. Thank you so much ! HAVE A SUPER TIME & KEEP A SMILE !
tired of lazy ass hunters road hunthing i apoligize for the language but i walk a lot an way back into country an ive had hunters complain im scaring animals cause im in the woods an there lazy ass is sitting on a road or in a vehicle waitting im sorry im not lazy an off road vehicles 4 wheelers off the trail is a very big problem up there
I talked to a division officer last year and he indicated there was plans in place to close Rd 734 to ATVs but would allow vehicles to use the road. This decision would limit access to a lot of area that hunters now hunt. I personally would not take my vehicle beyond the first camp site as the road is too damaging on a vehicle, however my ATV is made for that kind of rough road. I make two trips a day up Rd 734 and my ATV leaves less of a footprint than a full size vehicle would. I do not understand the logic in closing Rd 734 to ATVs exclusively?
When I started hunting Unit 36 in the mid 1980's, I could always call in a number of decent bulls during archery and muzzleloader seasons. It became my "go to" place to harvest a bull. In the last 5 years, my experience has been that the areas I always found elk in the past may now have an spike or two pass through occasionally. The elk population decrease and the significantly higher use of roads and trails as a recreation area for trail bikes and ATV's has forced me to go elsewhere...like Idaho and Montana for a quality hunt. There's nothing like hiking in a couple miles to set up on a calling sequence only to have 4 dirtbikers come tearing through on trails closed to motorvehicles. The numerous daily jeep tours out of Vail are also a constant nusiance along with big group camps and family camp dogs barking and running loose. I never saw any of this in the 80's or 90's. It was just a nice quiet place to enjoy a week or two of hunting. With the difficulty to draw decent areas and losing most of my preference points because DOW can't make up their mind how many years between applications before points are erased I have chosen to hunt other states where I have drawn licenses regularly. I am currently considering moving to Idaho now that I'm retired and have more time to hunt. The opportunities just dont exist in Colorado anymore. Examples: I did not draw a CO tag for mule deer with 16 preference points. However I did draw an Idaho mule deer tag in the highest quality unit in the state the very first time I applied. I also drew a NM bighorn sheep tag the first time applying. The CO "weighted point" system is crap and allows for the opportunity of corruption. The CO drawing process is so convoluted and lacks transparency that it's easy to presume that the process appears tainted.
Mangement is doing a great job trying to please everyone, I know this is hard to do. Please keep up the great work.
My only experience with this herd is in unit 36. I typically bowhunt and see a few bulls, but nothing too large. During third season rifle I typically have a cow license and get a cow more often than not. At least for unit 36, I think the herd is at a good level right now and seems to have been stable over the past 5-6 years...
to much elk on private land
I have hunted up there for years and really enjoy it have yet to take an elk but still love the area. My father inlaw has shot a few up there. Just have to be in the right spot at the right time i guess. I believe that the management has been done very well as last year i saw more elk in one day that i have seen up there the last 10 years which made it the best hunting trip i have ever been on. Had my chances but did not suceed do to other incosiderate hunters. My father in law shot a really nice 6x6 bull which made the whole trip worthwhile seeing carried out half and he shared the meet with me. I am a hunter that goes for the meat and am not a trophy hunter but if one came along yes i would try my best to bag it.
I only able to hunt one day last year in the area.
I hunted during 4th rifle in the mentioned units described herein for 2011. I only saw one (1) elk in that time period. Saw plenty of Moose. Mostly cows and calves (6-9) during my elk hunt. I saw one small herd of mule deer as well.
One of the biggest problems with hunting GMU 36 is the private land guardians. Many hunters are so scared of even putting a toe over the line and getting fined that it takes the enjoyment out of hunting there. It would be nce to have a map that literally show exactly where the lines are. Also, this year, there is ony a 2 day rest between 1st rifle and 2nd rifle. As Colorado Resident, I was very disappointed with that decision.
In my opinion the Elk hunting in the last three years has declined in GMU 36 and GMU 361, due to ranches in the area holding all the elk. In the past, one of the ranches we called Ellison's held a lot of elk, but he also allowed hunters on his property and since it was sold off, the elk stay there and do not move due to no pressure since the new ranch owner does not allow hunting. Piney Peak Ranch on the other hand just began allowing hunting through a guiding service, and clearly it is obvious why. One can drive around Sheephorn road and see hundreds of elk during the hunting seasons which sounds great for us hunters in national forest, but with the Piney Peak Ranch having a guide service there are numerous witness's seeing the Piney Peak ranchers patrolling the fences to keep the elk on there property after a gun shot from one of there clients. This is awful for the hunters below because the elk are not getting pushed. Not only is this bad for the hunters success rate, but there is no way that us the hunters can help manage the herds if the ranch is holding them and herding them back onto their property.
Not many elk in 36 during Black Powder.
The biggest issue that I see is that the elk are concentrated on large ranches with almost zero hunting pressure. I can't see any way to manage the herd by changing the harvest on public land. It will only reduce public hunting quality. (By the way, I do hunt on a small private ranch that allows hunting but have been hunting this 36 and 361 for over 20 years). If the big ranches are worried about problems associated with large elk herds, they have created them. If some hunting was opened up on the large ranches (other three or four trophy bulls each year), the herds would probably spread out some and maybe improve some of the public ground hunting.
Increasing the wilderness area would allow meeting a lot of objectives (more roadless, increase herd numbers....I don't see, with the exception of a very few landowners, how elk would be damaging a lot of property in UNit 35 (I am most familiar with 35) thanks
I have heard rumors teh trail will be cosed to ATV traffic. If this happens I will never be back to hunt in Colorado again. I am retired and living on a fixed income. I bring all of my own equipment to hunt in Area 36 including an ATV. I can not physically walk from the trail head to the top of the mountain and can not risk damage to my truck in a remote mountain area 27 hours away from home. I feel the sporsman who use the area are respectful of the current rules and are good stuarts of the land.. I do not see garbage or other litter in the woods and I am very grateful for that. Sometimes decisions like

limiting ATV traffic are clearly politicl and are not common views of the people who currently use the trails with ATVs.
large land oweners and outfitters have too much say in making policy
New plan should be to increase the size of the herd.
I hunt mainly in unit 35 near the Castle Peak WSA on the Big Alkali Cr. The camping is very limited because the BLM has closed off many of the spur roads. Now I'm not advocating for total access but I think something more reasonable could be reached, so people are not so crowded together. This is a big problem during second and third seasons. Also you guys need to have more of a presents. I personally have seen many violations in regards to party hunting, riding atv's with guns uncased, and people "flock" shooting a group of elk and not following up on wounded elk. All and all the elk hunting has been very good. Though we haven't been that successful, it wasn't because of lack of elk. And every year we see a couple bulls that push the 320 mark and more. I have a archery buck tag this year for up there and I'll be buying a otc elk tag for the bow season. I can hardly wait.
There are a few big herds but they use the private ground to their advantage. In 35 it would be nice to have one more herd to bounce around outside of the private ground. We hunt the Pisgah Mountain area and see them every year. Number of hunters in that area is fair, not too crowded. In 36, I've heard them, called them in (a one antlered 6 point bull) but either due to the number of hunters on Red and White or the cover, they seem harder to spot there. There seems to be more people on Muddy Pass every year. In the Castle Peak area, there are always going to be a lot of people there but this seems like there is no way to control that because that's where people prefer to go, so we avoid it.
most elk seem to huddle up on the private ranches out of reach for public hunters. Any way to get them off the ranches and back into public land would be good for the public hunters.
I have hunted this area for the past 17 years. We have years when we see no animals and others when we see elk almost every day. Over this period of time my son, daughter and myself have been fortunate enough to harvest 8 bulls and 2 cows. We run a cow calf operation in eastern Kansas so I do have concern regarding the interaction of elk and cattle. I must admit that I have little knowledge about the areas ability to carry more or maintain its current level of animals so I would leave it up to you to use your judgement to provide a strong and healthy herd. Thank You
would like to see fewer hunters in unit 361
Have the quota chart in line with the actual draw outcome. Example; currently the area states that no preference points are needed for a non resident bull tag. We do not see that as the rule but the exception. 3 of my hunting group this year put in for non resident bull tags, but only 1 drew it.
I think that 36 anbd 361 shoudl be one area again. I believe we should have the late cow season to allow folks to harvest som of the cows from the area. the cow season should extend to the end of january to allow time for the elk to migrate to public lands so a few can be harvested. Without the late harvest, the heard continues to grow. During the earlier seasons, many elk just stay on private lands and the population continues to grow!
I think the management of Elk herds are the best. I just don't want to see any loss of National Forest land to Private Property.
Better access.
Too many atv's.
The elk are there, you just have to get to them. We use horses, and please keep road 449 closed to motor use. I used to be against it, but in the long run its the best thing that's happened. It really helped the game have a place with no pressure except for the guys that work for what they get. I think the population is just about right although I'm no game manager nor do I see what happens there after the season is over. I would hate to see a reduction in the elk population, and more hunters. I think the economy is really affecting the amount of hunters in the field....I can see less and less hunters since times have gotten harder. Non resident fees aren't cheap either, and with the cost of fuel to get there makes for a very expensive trip, hence the less people I've been seeing. Keep up the good work!!!!
I answered all the other questions and sent my servey too soon. I want to comment about the preditors. They are decimating the elk and deer herds and kill pets and attack humans. They kill the calves and fawns and there will be no elk and deer left for Colo. to have the income from hunting. Give all the preditor liscenses free to anyone who will hunt them. Bait the bears to keep down the population. Farmers and Ranchers used to keep these preditors under control but now there are way too many bears, lions and cyotes. Utah has a bounty for cyotes, Colo used to have a bounty on them. Lets look at this as the first means of controling the herds.
I would like to see cpw monitor the ranchers trying to hold the elk on their property during hunting season more.
I would like to see more early season tags like black powder season available especially for residents.
unit 361 needs to be in the late rifle season as well as 35 36 lick it use to be. I think this was a wrong direction that it was put into. This is a wintering grounds for them and with no snow fall elk do not come down early in the season. Please change it back to the way it was. Thanks
Unforeseen closure of access roads by the BLM in recent years has shown that there is a lack of communication between the BLM and the DOW. If I had known that the roads that I expected to be open would be closed off I would not have bought a license. Granted, the roads were eventually opened but only after someone illegally bypassed the gates. Recent climate shifts have changed migration patterns in the late hunting season. The animals do not come down to the lower country if there is no snow up high. They don't need to. Personally I don't believe the climate will revert any time soon. Managing the herds with climate factored in must be a significant consideration.
Watching all the game sit on private land sucks!!! Lots of hunters around but a lot of elk on private land undisturbed.
The Elk take refuge on private ground which makes it very difficult to harvest one. The cattle should be removed from public hunting ground well in advance of the hunting season which should provide better a more abundant food source for the Elk and Mule deer. If land owners would allow hunting they might not experience so much damage by wildlife.
if this herd is now approaching the population objective set in 1988 why did you eliminate the late season hunt in unit 361 ? and why was this unit even created im not happy about that either. i think this unit was created for the wrong reasons by the private land owner and the local dow to keep local hunters from hunting land ajacent to there private property
Most of the hunting I have done in this area has been in unit 35. It is my opinion that cow elk licenses are heavily oversold in this unit. In the last three years I have hunted this unit during at least one of the general seasons, and I have not seen a

single cow elk on public land during that time. One other observation I have is the amount of predator sign I have seen in unit 35 particularly. With an increasing bear population and an obviously healthy mountain lion population I would suggest higher quotas for these two species. Thank you for asking me to participate in this survey!
mike chamos and dusty walls need to stop dragging dead mountian lions around the fence line on the old eagle ranch on castle peak to keep the elk on the ranch they have been spotted doing this several times
To many hunting area's are be closed off by farmers or land owners. Some area's I have tried to get into and have found no access. When I asked the local wild life inspector they said they didn't know either.
It s a great place to hunt. Thank you.
I am 79, I hunt area 35 near Burns for ease of foot travel. Stop opening the gates during late season, especially in Jan. Lazy road hunters driving the roads day and night only keep the elk driven back up high on the Big Piney private land and out of reach for harvest by foot hunters.
Too many ranchers in the area pushing the heards onto their propert during hunting season. Way too many people in the same area and also seeing the same thing. If the heards were allowed to roam naturally it would be better but as long as there are greedy ranchers, this will never be a good area to hunt any longer. I have moved onto a different unit closer to where I live and have a much better experience.
The biggest problem with Area 36 are the private ranchers that work to keep the elk herd on their property (I have witnessed this several times)... walking the property line & banging on the fence with a hammer before sunrise, driving the property lines & honking horn to turn the herd back to private property, etc.. These are the same ranchers that make alot of money (average is $7500 per hunter) selling rights to hunt elk on their land.
I think the rancher is luring the elk to his property with feed,cant prove it but I really believe it.
The elk seem to be under a lot of hunting pressure well into the Winter, when they're in their survival mode. This may have something to do with declining cow/calf ratios
More emphasis on habitat enhancement/improvement. Too much emphasis is being placed on hunting as the main mgmt tool. If habitat is fair/poor, resulting in low cow/calf ratios then habitat mgmt should be the emphasis. 30 years ago there were habitat improvement projects on a yearly basis--for the last 20 years the few projects that are done are mainly instigated and paid for by conservation groups (RMEF, MDF, NWTF) and town & county wildlife mitigation trusts. Why isn't the CPW the agency taking the lead??? Work with large landowners to eliminate sanctuaries/refuges for elk during hunting seasons Don something about the abuses regarding landowner licenses (don't allow hunters to turn licenses in within 30 days of the start of the season, restrict hunting to only the private land used to obtain the license and eliminate the sale of these licenses to other parties-the licenses should be for the immediate family ond employees of the private property)
Over the past seven years of elk hunting in the same are of GMU 36 I have noticed a decline in the number of game animals. I rarely see the elk any more and have not harvested one in the last 5 years. I have spoken with other hunters in the same are and many are of the same opinion the elk are very few in number already. Continuing to drive down the population will most likely cause me to hunt in a different state. I greatly enjoy hunting elk but when there is no opportunity to even see an elk (as in the past two years second rifle season) I must reconsider where I choose to hunt out of state. I don not mind paying the non-resident fees but I also like to see the game animals I am pursuing, regardless of harvest success. As a do-it-yourself hunter I will also not be able to return if the ban on the use of ATV's on the Red and White Mountain trail is put in place. If the state is looking to chase out middle income non-resident hunters this is a good start. Please take these opinion points into consideration. Thanks.
I have hunted elk in Colorada since 1981. I have actually hunted elk in colorada close to 20 seasons. Most of my hunts have been in various locations in the Piney area. I have hunted 100% public land, some by horseback, mostly on foot. My last few trips have been less crowded (in past 5-6 years) our success rate was better, and more elk were sited.
We have a huge gap between poor over hunted units and quality units. We need more quality elk hunting units.
I believe the ranchers will decide the issues for us. I moved from the Red Sandstone area several years back because I was tired of running into large herds of sheep all summer long and into hunting season. When they did leave the area looked like a wasteland with little food left for wild game.I've been trying the Sheephorn valley the last several years. These elk had been concentrated on the ranch for years with fewer elk scattered or in the high country. The hunting on the ranch the past few years has helped,but when the elk move off how long will this last?
there seem to be a lot of hunters - two years ago my partner and I hiked for hours toward Castle Peak only to find we had 5 outfitter camps surrounding us by the next morning - the trip was worthless because for the next 5 days we saw hunters/horses every turn we made.....i don't need solitude but would like some degree of 'aloneness' - not seeing orange every place I look - like a pumpkin patch.
The program in Eagle was the worst I have seen but a little better than the last one done for deer. You need to get people in there that have some knowledge of the area. There is no game damage issue in this unit, body condition of the deer and elk is excellent. The unit was open to spike up until you went with a statewide restriction and even then the unit had good bulls. It is insultinig to have someone up there giving this program that does not have any idea of the history of th unit or what the conditions are. To have a slide say the body condtion of the elk is going to get worse if you increase the herd numbers what a pile of BS. The elk condition have been great and there were way more elk and deer and livsetock in the past then there is now. There is an issue with the quality of the winter habitat but if you would start to push the USFS to do some projects that could be changed. I think it is unbeleiveable that uyou give a program and make no mention of predators or weather conditions that have far more impact on the herd than does your management. Thanks to the public guy who mentioned predators and even more thanks to the local wardens who addressed the issue. The ratios you mentioned about cow to young well everyone knows weather and predator play a huge role in that quite trying to down play predators they are part of the problem you must think we are stupid when you try to do such a program and not mention them. The same with weather anyone that has been here for more than a couple of years knows what bad weather does to the herds. The fact that you could not even get feed to alot of the areas that had seer and elk in 2007 showed the impact of bad winters. Again the program was lacking any real information on the herd like how many spikes are there in each winter count that should give you some type of idea on just what is going on during the winter and just how many survive. I did find it interesting that one of the warden mentioned a research study on recreation and impacts on elk young. Why was

there nothing mentioned on this in the program. If you have lived here at all then you know the problems with recreation increases. I am very disappointed in the lack of information at the program and the lack of knowledge by the presenter. Don't be fooled those of us in the woods are dump we know when someone is trying to shovel the BS to us. Get someone that knows what they are doing.
many of the proposed road closures in the White River National Forest will have a negative impact on hunting access thus a negative impact on the economy
I would like to see the Colorado Game and Fish managing the big game herds instead of just selling licenses. There are too many seasons since the seasons start in August and continue into January. This is far too much pressure on the elk herds. When you think about it, the elk season is longer than the rabbit season. This way of managing the elk herd has greatly decreased the quality of hunting around the state.
I would like cpw to encourage possibly through offering some incentives to private landowners hunting on their lands so that elk don't get concentrated on land. Hunting on private land helps distribute animals to public lands. Sheep grazers should have sheep off elk habitat by time archery season starts.
reopen trails and roads that was closed for atv use like going back to chimney rock area by eagle nest wildernest not everyone tears trails up with atvs and not all of us hunt off atvs we only go from camp to good areas to walk in
keep up the work u are doing
Make it more accessible for handicapped or restrict usage by non hunters during hunting seasons to allow less pressure on the few elk in more assessable aeries.
We would like to see more elk, would like to see a few trails open to ATV's to bring the meat back to camp. We are not road hunters; we walk in miles to get our game.
Most of the elk in the Sheephorn area stay on private property during the season. Mainly on Piney Peak Ranch and the Ellison Ranch.These ranches don't allow public hunting! Therefore the elk kill in area 36 on this area is very low.
I have hunted unit 36 for 20 years and allthough I have not hunted this unit for the past 6 yrs I have seen an increase in the elk herd and look forward to start to hunt the area again every year or two and definitely would like to see more trophy bulls in this unit.
I think it is hard to manage the herd in these units due to the elk spend the majority of hunting seasons on private property.
In 2011 we saw quads traveling on closed roads. We alerted the game warden. We primerally hunt unit 35. We were encouraged by the herd numbers. We hunt hard and put on many miles of walking doing so. Keep up the good work. The elk and mule deer seem to co-exist well in this area. Thanks for the opportunity to have a say.
Nothing on predators-why?-What disease problems? Body condition for deer + elk is great-where do you get this poor body condition? Low #'s of young are from predator impacts not too many elk or deer. What damage too ranchers- there are none. You need to get somebody out in the field if this is your idea of management. You are asking questions that don't pertain to these units-but nothing on real issues like predators + too many people. Why no questions on age classes + young per adult I don't see that this survey does anything for asking or getting serious information about elk management. What does it matter where you live-the survey is about elk management. Poorly done survey-terrible presentation in Eagle no real information provided other than what the public + local wardens gave-not interested in computer shows I came to get information on elk in Piney + to provide feedback but it was a waste of my time - Increase elk - reduce predators - pretty basic to understand -
The late cow tag for these units is a great tag that is highly-coveted by myself and many of my friends in eagle county. It seems quite popular also, because it is rare to draw that tag multiple years in a row. When one draws this tag, the success ratio is relatively high. I think this is a great tag to keep in place for the local hunters just trying to stock the freezer. The regular seasons in this area are intensely hunted in my opinion and I try to avoid these units in general during those times. Hunting pressure during the late season in the area I hunt is practically a non-issue. If we are nearing targeted populations, I would recommend reducing quantity of elk tags and deer tags (both buck & doe) issued for regular season hunts. Maybe even consider limiting bull tags for these units to help reduce intense regular season pressure.

Appendix 4. Input from Habitat Partnership Program (HPP) committees, county commisssions, federal land management agencies.

Lower Colorado River HPP Committee
6274 County Road 301
Parachute, CO 81635

Julie Mao, Terrestrial Biologist
Colorado Division of Parks and Wildlife
0088 Wildlife Way
Glenwood Springs, CO 81601

August 10, 2012

RE: DAU Plan E-12, E15 and E-16

Dear Julie,

After reviewing and discussing the information that was presented regarding the Elk DAUs E-12, E-15 and E-16 Management Plan, it is the consensus of the Lower Colorado HPP Committee we support Alternative 2, Status Quo for all three DAUs. We as a committee feel that the bull/cow ratios are where they need to be and that the population number is at a good objective. The problems the committee sees are more due to distribution than population numbers. We support Alternative 2 for E-12, E-15 and E-16.

If you have any further questions, please feel free to contact me by phone at (970) 260-0147 or by e-mail at danielles@willowwisp.net , I will be happy to help. Thank you.

Sincerely,

Danielle Lemon
Administrative Assistant
Lower CO River HPP
6274 County Road 301
Parachute, CO 81635

EAGLE COUNTY

January 7, 2013

Julie Mao, Terrestrial Biologist
Colorado Division of Parks and Wildlife
0088 Wildlife Way
Glenwood Springs, Colorado 81601

RE: Elk Herd Management Plans for Data Analysis Units E-12 (Piney) and E-16 (Frying Pan)

Dear Julie:

Thank you for your presentation of the draft Elk Herd Management Plans for DAU's E-12 (Piney) and E-16 (Frying Pan) to the Board of County Commissioners on December 4, 2012.

Based on the recommendation of the Colorado Parks and Wildlife, it is the consensus of the Board of County Commissioners to support Alternative No. 2 for both DAU's and that the proposed bull/cow ratios and population numbers are the preferred objectives moving forward.

If Eagle County may be of further assistance regarding this matter, please contact me at (970) 328-8750 or by email at bob.narracci@eaglecounty.us.

Sincerely,

Bob Narracci, AICP
Planning Director

xc: file

USDA United States Department of Agriculture | Forest Service | White River National Forest

Supervisor's Office
900 Grand Avenue
Glenwood Spgs., CO 81601-3602
(970)945-2521
FAX (970)945-3266

File Code: 2640
Date: January 25, 2013

Mr. Perry Will
Area 8 Wildlife Manager
Colorado Parks and Wildlife
0088 Wildlife Way
Glenwood Springs, CO 81601

Dear Perry,

Thank you for the opportunity to review and make comments on the draft Data Analysis Unit (DAU) plans for elk herd management units E-12 (Piney River) , E-15 (Avalanche Creek) , and E-16 (Fryingpan River). The plans are well written and include pertinent information relevant to setting elk herd population management objectives.

Attached you will find comments from the Eagle/Holy Cross and Aspen/Sopris Ranger Districts pertaining to the draft DAU plans for E-12, E-15, and E-16. Comments from district resource managers take into account continued discussions with your staff.

I understand and concur with the information and goals outlined in the DAU plans. I understand the publics' desire to keep elk numbers similar to current levels for hunting and viewing opportunities. In addition, I believe that herd population management objectives should be based primarily on habitat capability of winter ranges.

White River National Forest Plan goals, objectives, standards, and guidelines provide management direction to maintain healthy and available habitats to support populations of elk, deer and other wildlife populations on the National Forest. As land managers we strive to meet these goals, and consider habitat condition and improvement important components in program planning.

While these efforts continue, current conditions of winter range habitats are described in the DAU plans as poor and declining for E-15, and poor to fair and declining for E-12 and E-16. In addition to this, increasing human pressures on these same winter ranges (including development on private land and extensive recreation use on public lands) are acknowledged. I am concerned that an increase in elk herd population objectives could lead to increased conflict and negative consequences for elk, as well as for deer, sage grouse, and other wildlife that rely on these same winter ranges for survival.

I agree that warming and drying climate trends and the increased forage available to elk in lodgepole pine stands with high levels of mortality caused by the mountain pine beetle epidemic have resulted in changes to elk distributions and timing of their use of winter ranges. Although shortening the period of time that elk spend on winter ranges has positive implications for winter range health, when severe winters occur, I am concerned about whether the winter ranges in E-12, E-15, and E-16 are adequate to maintain elk herds at the proposed higher levels (there is no

discussion in the DAU plans of supplemental winter feeding of elk under severe conditions, and I assume and agree that is not a desired scenario).

In summary, I believe elk herd population objectives for E-12, E15, and E-16 should be linked to the winter range habitat conditions and the ability to sustain increased numbers of elk along with other game and non-game species. I commend Colorado Parks and Wildlife in continuing to show reductions in elk herd population numbers through management, from their highs in the mid to late 1990s, getting ever closer to those 1988 population objectives. The White River National Forest will continue to implement the recent decisions for travel management, the sagebrush enhancement project on the Eagle/Holy Cross Ranger District, and the wildlife habitat improvement project on the Aspen/Sopris Ranger District so that elk winter and transitional ranges improve their condition to support elk, deer, sage grouse, and other wildlife species that depend on these habitats. I appreciate your help and support of these projects and look forward to our continued partnership.

If you have any questions or would like to discuss further, please contact Wendy Magwire at (970) 945-3244.

Sincerely,

SCOTT G. FITZWILLIAMS
Forest Supervisor

Enclosures

cc: Julie Mao

Comments prepared by Lara Duran, Eagle-Holy Cross District Wildlife Biologist, with minor edits by Wendy Magwire, WRNF Forest Wildlife Biologist:

Thank you for the opportunity to comment on the draft Piney River Elk Herd E-12 Data Analysis Unit Plan and the Frying Pan River Elk Herd E-16 Data Analysis Unit Plan. The Eagle-Holy Cross Ranger District appreciates close collaboration with local Colorado Parks and Wildlife managers in managing for elk and their habitats on National Forest System lands.

The Forest Service is directed to manage and balance for multiple uses, including elk management, elk hunting, elk viewing and the myriad of recreational and other pursuits that can affect elk and their habitats. In attempts to do this, the 2002 White River National Forest Land and Resource Management Plan (Forest Plan) identified American elk as a Management Indicator Species as a means to measure overall ecological conditions, monitor federal management actions on large game, effects of motorized and non-motorized travel management especially road density, and represent terrestrial wildlife species that are sensitive to recreation activities. In addition, the Forest Plan designated key areas to be managed specifically for the benefit of elk (5.41 Deer and Elk Winter Range and 5.43 Elk Habitat) with the specific guideline to collaborate closely with Colorado Parks and Wildlife and adjacent land owners to manage elk, their habitats and federal actions in doing so. This includes managing for adequate browse, forage, cover and solitude by restricting disturbance, special uses, domestic livestock grazing, vegetation management activities, infrastructure, recreation, motorized vehicle use, and road density. Seasonal restrictions are designated in the Forest Plan for these key areas, coincident with key biological times and habitats critical to elk.

Recreation, including motorized and non-motorized travel, can affect elk and their habitats. Recreation on National Forest System lands in E-12 and E-16 is expected to expand in type, number of recreationists, frequency of visits, area of use, and level of impact. Managing motorized travel on National Forest System lands is a quandary when it comes to elk and elk habitat management. On one hand, reduction in motorized use, seasonal restrictions to motorized travel and closure of roads and trails is known to benefit elk and their habitats. On the other hand, these actions may be perceived to limit hunting opportunities. Colorado Parks and Wildlife participated in many iterations of the public Travel Management Planning process, which included the opportunity to help shape management alternatives and address issues affecting elk related to motorized travel management. Motorized travel equipment, including winter transportation modes, are becoming more popular and more technically proficient in travelling over areas previously unreachable. Like other forms of recreation, motorized vehicle use is predicted to increase in numbers, frequency, and expand in area of use. Elk population objectives in E-12 and E-16 need to be cognizant of these predicted trends for recreation and motorized travel, regardless of enforcement challenges and Forest Plan restrictions.

Winter range on National Forest System lands in E-12 and E1-6, for the most part, is in relatively poor condition for a variety of reasons. Elk are one of many contributing factors. It is assumed that winter range conditions are similar across other land jurisdictions throughout E-12 and E-16. Observations indicate decadent winter range conditions with depauperate grass and forb understories. Over utilization by both native and domestic ungulates along with historic fire and juniper encroachment have established vegetation trends that are concerning. Droughts limit the availability of forage and browse for elk on both summer and winter ranges, and this exerts additional pressure on the vegetation. Predicted climate change effects would exacerbate vegetation conditions on winter range. Thus, the long-term resiliency of winter range in E-12 and E-16 is a concern. While management projects in E-12 and E-16 are underway to address these concerns, we question whether the winter

range in E-12 and E-16 can continue to support the preferred population objective without more extensive habitat management across all land jurisdictions in the area. Local National Forest System and Colorado Parks and Wildlife managers will need to continue to work collaboratively to meet our mutual objectives with projects like the Sagebrush Enhancement Project.

The effect of elk population levels on mule deer population levels is a concern for the WRNF which lists mule deer as a Species of Concern in the 2002 Forest Plan. Elk are very effective at outcompeting mule deer. Maintaining the current elk populations in E-12 and E-16 would continue to exert pressure on mule deer, especially given the existing condition of winter range for both. We would like to see elk population objectives be tiered more closely to mule deer population objectives, with the management emphasis to favor mule deer over elk because of elk's strength as a competitor.

Land use conversion in E-12 and E-16 is likely to continue as it is throughout Eagle County in low lying valleys. Lands along Colorado Highway 131 are being considered for reservoir development and commercial development by private entities. Other large privately owned land tracts are posted for sale in E-16. These land use changes would not only affect elk, but also mule deer, greater sage-grouse (a candidate for listing under the Endangered Species Act), and other wildlife species that depend on those areas. Elk population objectives need to carefully consider the long-term trends in land uses on privately owned lands in E-12 and E-16 for more than just elk management.

Accurate and updated map products, data, and collaboration from Colorado Parks and Wildlife greatly assist the Eagle-Holy Cross Ranger District with implementing Forest Plan standards and guidelines designed to benefit elk and their habitats in attempts to co-manage for elk population objectives. Funding for winter range improvement projects like the Sagebrush Enhancement Project through the Habitat Partnership Program and non-game programs are valuable means of collaboration that local Colorado Parks and Wildlife managers contribute to the local National Forest System to benefit elk.

Finally, as National Forest System lands comprise over 40% of DAU E-12 and 71% of DAU E-16, the Eagle-Holy Cross Ranger District recognizes our important role in managing the habitat on which elk rely. Collaborative landscape scale conservation projects will have long-term positive effects on elk vitality and enhance the resiliency of their habitats with particular emphasis on winter range. The Eagle-Holy Cross Ranger District looks forward to working with local Colorado Parks and Wildlife managers as well as our other federal and private partners to continue managing public lands and multiple uses to benefit American elk.