Uncompahgre Plateau Elk Management Plan

DATA ANALYSIS UNIT E-20
GAME MANAGEMENT UNITS 61 & 62

Wildlife Commission Approved January 2006

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UNCOMPAHGRE PLATEAU ELK MANAGEMENT PLAN

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EXECUTIVE SUMMARY

GMUs: 61 and 62
Land Ownership: 24% Private, 37% USFS, 38% BLM, 1% State
Posthunt Population: Objective 8,500-9,500 **2004 Estimate** 9,700
Posthunt Sex Ratio (Bulls/100 Cows): Objective 16-20 **2004 Observed** 18 **2004 Modeled** 22

Figure 1. E-20 Posthunt Population Estimate

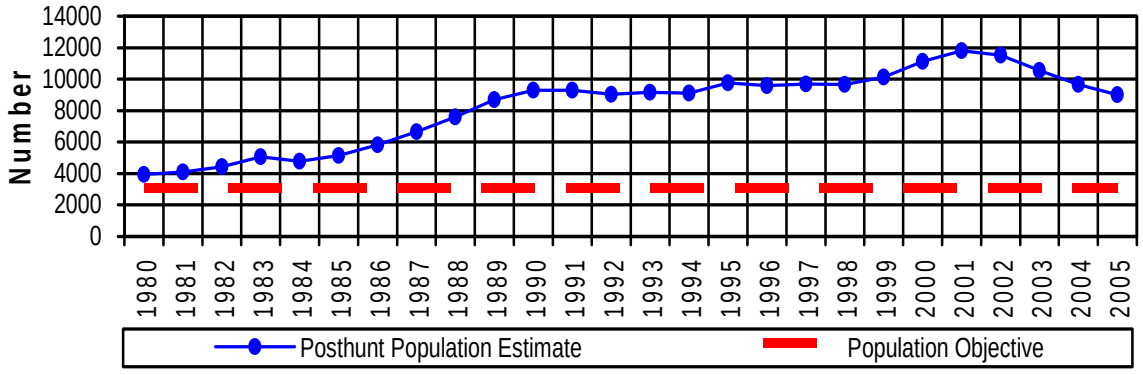


Figure 2. E-20 Harvest

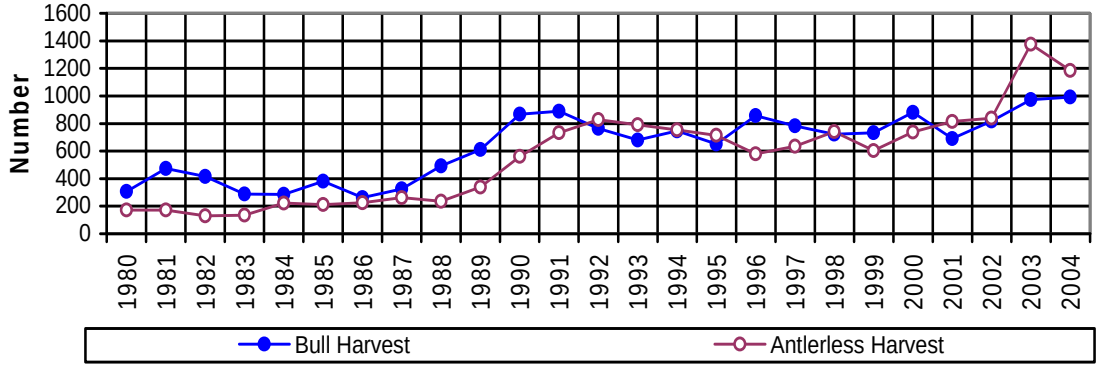
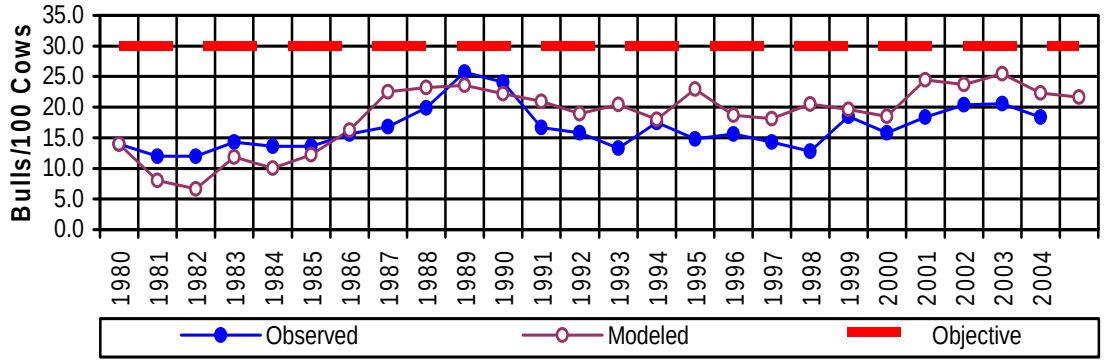


Figure 3. E-20 Posthunt Bulls/100 Cows



E-20 Background

GMU 61 has been managed as a quality elk hunting unit with limited licenses and greatly reduced hunting pressure for antlered elk since 1983. In contrast, GMU 62 has been managed as an unlimited, over-the-counter (OTC) license unit for bull elk hunting and has been one of the most heavily hunted units in Colorado. GMU 62 accounts for over 90% of bull and either-sex hunters and over 70% of the bull harvest in the DAU.

The current posthunt population objective of 3,050 elk was based on early population models that underestimated the population and is unrealistically low. The current, observed posthunt sex ratio objective of 30 bulls/100 cows is impossible to achieve under current management that allows unlimited bull hunting in GMU 62.

From 1990-1999, the estimated posthunt elk population in E-20 was fairly stable and averaged approximately 9,500 elk (Fig. 1). In 2000, the estimated posthunt population began increasing rapidly and reached a record high of 11,800 in 2001. Cow harvest was increased considerably in 2003-2004 to reduce the population. The 2004 posthunt elk population in E-20 was estimated to be 9,700 elk.

The average, observed posthunt sex ratio between 1986 (the first year the 4 point antler restriction was implemented) and 2004 was 18 bulls/100 cows (Fig 2). The observed posthunt sex ratio in 2004 was also 18 bulls/100 cows.

Observed posthunt age ratios for E-20 averaged 43 calves/100 cows (range 32–57) between 1984 and 2004. The trend in calf:cow ratios in E-20 has generally been downward at a rate of 0.5 calves/100 cows per year possibly indicating density-dependent factors are acting on the population.

In 2002, a draft E-20 DAU Plan was submitted to the Wildlife Commission for approval. The preferred management alternatives in this plan were to manage both GMUs as totally limited, quality units for elk with a posthunt population objective of 8,500-9,500 elk and a posthunt, observed sex ratio objective of 30 bulls/100 cows. This proposal was based on (1) direction from the Wildlife Commission to create more quality hunting opportunity for elk in the state, (2) a CDOW ranking process that identified E-20 as the highest priority in the state for future quality elk hunting opportunity, and (3) a public comment questionnaire that indicated over 50% of the respondents supported totally limited bull licenses in GMU 62. Because of vocal public opposition to the alternative to limit bull licenses in GMU 62, the Wildlife Commission rejected the draft E-20 plan.

E-20 Significant Issues

Habitat capability in E-20 for elk is difficult to assess but declining calf/cow ratios and poor condition of some winter ranges due to drought and overgrazing suggest that habitat capability was probably being approached when elk numbers exceeded 11,000. Continued development within the DAU and increased recreational use will likely further reduce habitat capability in the future.

E-20 is very popular with hunters. Bull and either-sex elk licenses in GMU 61 require 6-12 preference points to draw. E-20 ranks among the top DAU's in the state for elk harvest and hunting pressure due primarily to GMU 62. Based on a survey done in 1998, 65% and 87% of respondents wanted elk numbers and bull/cow ratios in E-20 to increase, respectively.

Although claims for elk damage in E-20 are rare because of paid bull hunting on many properties, complaints from landowners and permittees about elk fence/forage damage and elk competition with livestock are not uncommon. These complaints increased considerably during 2000-2002 when estimated elk numbers exceeded 11,000.

E-20 Management Alternatives

Three posthunt population objective alternatives are being considered for E-20 (1) 7,500 – 8,500, (2) 8,500 – 9,500, or (3) 9,500-10,500. The CDOW does not recommend managing for more than 10,500 elk in E-20 because of habitat and conflict concerns. Conversely, the majority of public comment received on the 2002 draft E-20 Plan did not support a major decrease in the number of elk in E-20.

Under current management with OTC bull licenses in GMU 62, it is not possible to manage for more than 20 bulls/100cows. Any sex ratio objective above 20 bulls/100 cows would require all antlered elk licenses in Unit 62 to be limited. Management alternatives for E-20 include (1) status quo with GMU 61 managed as a quality, limited unit and GMU 62 managed as an OTC unit (the range of possible objectives with this alternative would be 16-20 bulls/100 cows), (2) making both GMUs unlimited, OTC elk units (the range of possible objectives with this alternative would be 14-17 bulls/100 cows) , or (3) making both GMUs limited, quality elk units (the range of possible objectives with this alternative would be 20-30+ bulls/100 cows).

The area staff recommendation is to set the population objective at 8,500 to 9,500 animals in order to have the flexibility to manage game populations according to various factors including drought conditions. The preferred management alternative would be status quo to maintain GMU 61 as a limited unit and GMU 62 as an OTC unit during the 2nd and 3rd season to provide opportunity. The preferred sex ratio objective for E-20 would be 16-20 bulls/ 100 cows. The preferred alternatives were approved by the Wildlife Commission in January 2006.

INTRODUCTION AND PURPOSE

The Colorado Division of Wildlife (CDOW) manages wildlife for the use, benefit and enjoyment of the people of the state in accordance with the CDOW's Strategic Plan and mandates from the Wildlife Commission and the Colorado Legislature. Colorado's wildlife resources require careful and increasingly intensive management to accommodate the many and varied public demands and growing impacts from people. To manage the state's big game populations, the CDOW uses a "management by objectives" approach (Figure 4). Big game populations are managed to achieve population and sex ratio objectives established for data analysis units (DAUs). Each DAU generally represents a geographically discrete big game population. The DAU planning process establishes herd objectives that support and accomplish the broader objectives of the CDOW's Strategic Plan.

COLORADO'S BIG GAME MANAGEMENT BY OBJECTIVE PROCESS

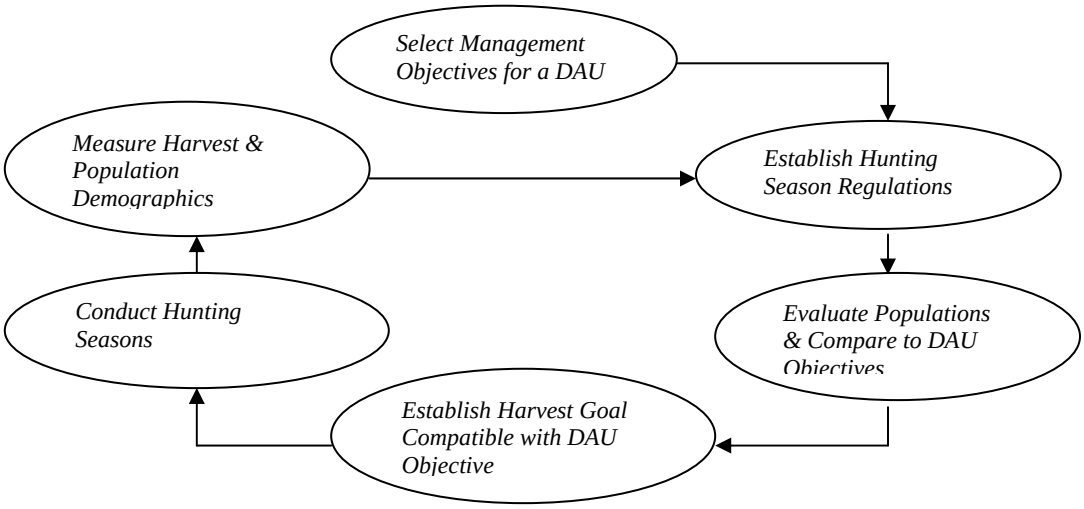


Figure 4. Management by objectives process used by the CDOW to manage big game populations on a DAU basis.

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

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

- Harvest estimates determined by hunter surveys
  - Post-hunt sex and age ratios determined by aerial counts
    - Estimated wounding loss, illegal kill, and survival rates based on field observations and telemetry studies.

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

DESCRIPTION OF DATA ANALYSIS UNIT E-20

Location

Data Analysis Unit E-20 encompasses 2,262 square miles of the Uncompahgre Plateau in southwestern Colorado and includes parts of Delta, Mesa, Montrose, Ouray, and San Miguel Counties (Figure 5). DAU E-20 consists of Game Management Units 61 (948 square miles) and 62 (1,314 square miles) and includes parts of the Uncompahgre, San Miguel, Gunnison, and Dolores River drainages. The DAU is bounded on the north by Colorado Highway 141, on the east by US Highways 50 and 550, on the south by Colorado Highway 62, and on the west by the San Miguel and Dolores Rivers. GMUs 61and 62 are separated by the Divide Road (USFS Rd 402) and the Dave Wood Road.

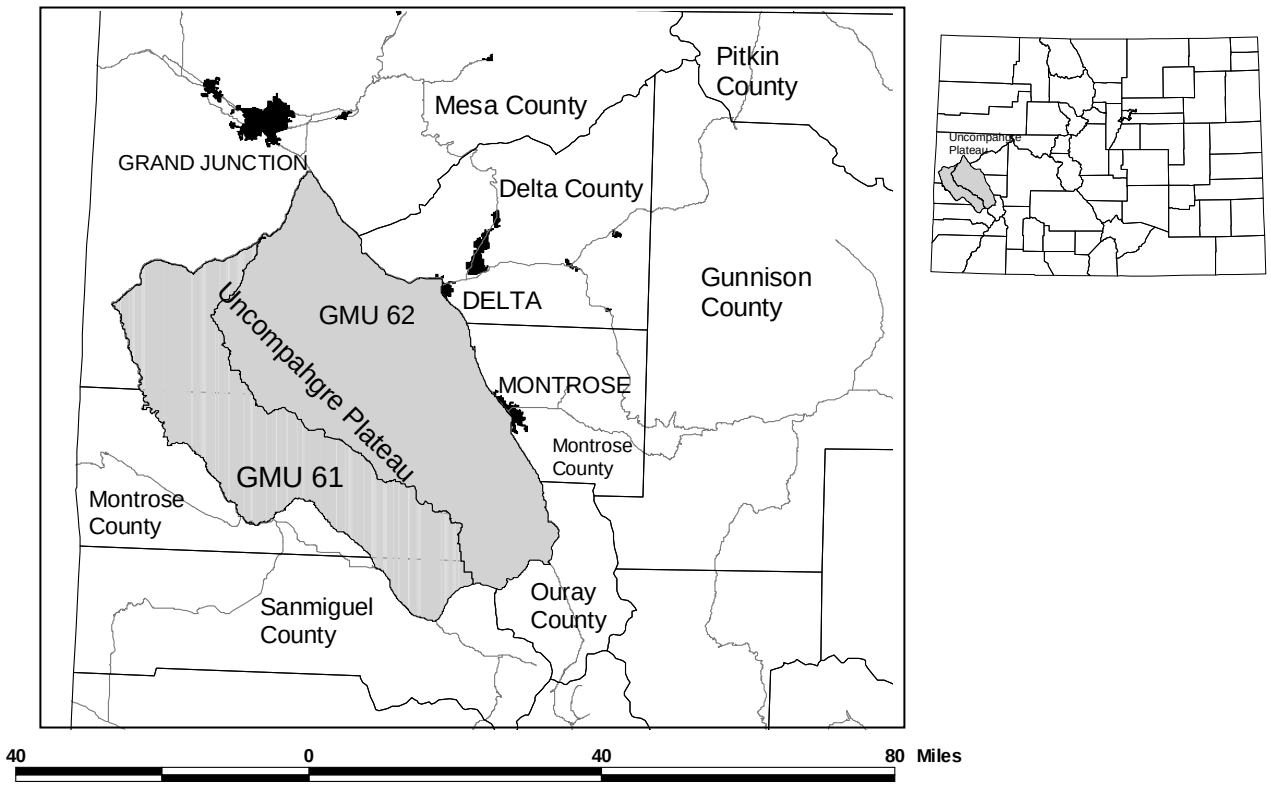


Figure 5. Location of DAU E-20, GMUs 61 & 62, in southwestern Colorado.

Physiography

The Uncompahgre Plateau is a broad structural uplift within the Colorado Plateau physiographic province. The Uncompahgre Plateau consists of a relatively flat 9,000 – 9,800 foot summit that runs northwest from Ridgway to the Unaweep Canyon. The summit drops off quickly on the Unit 61 side and more gradually slopes downward on the Unit 62 side. Both sides of the Uncompahgre Plateau are incised by deep canyons separated by relatively flat mesas that typically run perpendicular to the main summit ridge and end at the San Miguel, Dolores, Gunnison or Uncompahgre Rivers. The elevation in DAU E-20 ranges from 4,570 feet along the Dolores River near Gateway to 10,338 feet at the summit of Horsefly Peak near the southeast end of the Plateau.

Vegetation

At elevations below approximately 6,500 ft near the Dolores, San Miguel, Uncompahgre and Gunnison Rivers, a high desert plant community is the predominant, extant vegetation type. Important plant species of this community include four-wing saltbush, shadscale saltbush, black sagebrush, winterfat, broom snakeweed, rabbitbrush, greasewood, and, in the Gateway area, black brush. Elevations between approximately 6,000-7,500 ft, are characterized by pinyon pine and Utah juniper woodlands and grassland/shrub (e.g., basin big sagebrush, black sagebrush, Wyoming/mountain big sagebrush, mountain mahogony, Indian ricegrass). The pinyon-juniper type covers approximately 40% of DAU E-20 and is the predominant plant community. From approximately 7,500 to 8,500 ft, ponderosa pine/mountain shrub (e.g., Gambel oak, serviceberry, mountain mahogany, mountain big sagebrush, silver sagebrush, snowberry, manzanita) is the dominant vegetation type. Elevations above 8,500 ft are generally characterized by aspen forests and a mixed spruce-fir complex (aspen, Douglas fir, sub-alpine fir and Engleman spruce). Common plant species found in lowland riparian areas on the Uncompahgre Plateau include narrowleaf cottonwood, coyote willow, chokecherry, tamarisk, and boxelder. In higher elevation riparian areas characteristic species include thinleaf alder, birches, willows, and blue spruce.

Agricultural areas and cultivated croplands within the DAU occur primarily in the Uncompahgre Valley between Montrose and Delta.and in the other major river valleys surrounding the Plateau.

Climate

The climate of the Uncompahgre Plateau varies depending on season and elevation. Areas below 6,500 ft are usually hot and dry during the summer and generally remain free of snow during most of the winter. Elevations between 6,500-8,000 ft usually have persistent snow only between late November and March. Areas above 8,000 ft can receive heavy snowfall and from December through late April are generally inaccessible except by foot or snow-machine. Mean annual precipitation varies from less than 8 inches at lower elevations to over 30 inches on top of the Plateau. Snowfall accounts for the majority of the precipitation at the higher elevations. Monsoonal moisture between July and September can also be an important source of precipitation at all elevations.

Land Use

Ownership

Land ownership in DAU E-20 is 24% private, 38%BLM, 37% US Forest Service, and 1% state. Municipalities that border the DAU include Montrose, Delta, Olathe, Ridgway, Norwood, Nucla, Naturita, and Gateway.

Development

The Uncompahgre Plateau is surrounded by a growing human population that is placing increased demands on E-20 for development and recreation. Approximately 190,000 people live in the five counties that comprise DAU E-20 (Table 1). The human population in these counties increased over 30% between 1990 and 2000 and it is expected to continue increasing at a rapid rate well into the 21st Century.

Table 1. Human population in the 5 counties that comprise DAU E-20, 1960-2000 (source U.S. Census Bureau).

COUNTY	1960	1970	1980	1990	1995	2000	2004
Delta	15,602	15,286	21,225	20,980	25,077	27,834	29,774
Mesa	50,715	54,374	81,530	93,145	106,548	116,255	127,253
Montrose	18,286	18,366	24,352	24,423	28,829	33,432	36,674
Ouray	1,601	1,546	1,925	2,295	3,033	3,742	4,139
San Miguel	2,944	1,949	3,192	3,653	4,929	6,594	7,116
TOTAL	**89,148**	**91,521**	**132,224**	**144,496**	**168,416**	**187,857**	**204,956**

Habitat loss due to development and fragmentation is primarily occurring near the outer edges of the DAU. Relatively little development is occurring in the interior parts of the DAU which are primarily USFS and BLM lands. The most rapid residential development is occurring on the west side of the Uncompahgre Valley between Ridgway and Delta. Some of these developments, such as those on Loghill Mesa and in the Government Springs area, occur in important wintering areas for elk. Other areas of increased residential development in elk habitat include the Norwood and Nucla areas, Dallas Divide, Iron Springs Mesa, and Unaweep Canyon.

Agriculture

Agricultural use in E-20 includes cultivated crop production and orchards on irrigated private lands below 6,000 ft in the Uncompahgre Valley and Nucla area, alfalfa and grass hay production primarily on irrigated private lands below 7,500 ft, and livestock grazing throughout most of the DAU on private and public lands. As a result of extensive water distribution networks, the Uncompahgre Valley has become one of the major crop producing areas on the Western Slope and agriculture contributes greatly to the local economy. Major crops include corn, pinto beans, wheat, onions, and alfalfa. Although some elk can be found in crop producing areas, major crop damage due to elk rarely occurs in E-20. Crop damage by deer is a much greater problem. Problems with elk primary relate to competition with livestock for range forage and fence damage.

Since the 1880's, livestock grazing has been a mainstay of the Uncompahgre region. Cattle grazing occurs throughout most of E-20 including most of the Uncompahgre National Forest and most BLM lands. Sheep grazing occurs primarily on private land and BLM land on the eastside of the Plateau south of Escalante Canyon. In 1999, there were approximately 31 cattle grazing allotments with a total of 89,000 AUMs available on the Uncompahgre National Forest in GMUs 61 & 62. In addition there were 51 BLM grazing allotments for cattle with 19,824 AUMs available and 14 grazing allotments for sheep with 6,935 AUMs available. USFS lands are grazed by cattle primarily between June and October and BLM lands are generally grazed by cattle and sheep between October and June.

From the mid-1930's to the early 1970's, many range improvement projects were undertaken on BLM and USFS lands on the Plateau primarily to benefit livestock. Projects included contour ditching, chaining of pinyon-juniper woodlands, herbicide treatment of sagebrush and Gambel oak, water impoundments, and seeding with non-native species such as crested wheatgrass and intermediate wheatgrass. Deer and elk likely benefited from some of these livestock range improvement programs. In addition, intensive predator control with toxicants and other methods was undertaken on the Plateau between the late 1950's and the early 1970's.

Recreation

The Uncompahgre Plateau has long been a popular destination for recreation. Recreation activities on the Plateau include hiking, camping, hunting, fishing, wildlife viewing, photography, mountain biking, horseback riding, four-wheeling, OHV use, snowmobiling, and cross-country skiing. According to the BLM and USFS, recreational use is increasing rapidly on the Uncompahgre Plateau. The impact of increased non-consumptive recreation activities on elk and other wildlife is largely unknown but is, at some point, assumed to be detrimental because of increased disturbance and habitat degradation.

Hunting impacts to elk are not limited to actual harvest. Hunters have a major affect on the distribution of elk in the fall and can affect where elk will winter. Hunters also create new roads that can increase disturbance to elk by a variety of motorized users outside of the hunting seasons. From an economic standpoint, hunting makes the greatest contribution to the local economy of any recreational activity.

Mining

Energy and mining activities in E-20 include open-pit coal mining, oil and gas wells, sand and gravel extraction, and mineral mining claims. Intensive exploration and mining for uranium and vanadium occurred in the west-end of Unit 61 between the 1930's and early 1980's. Habitat impacts (i.e., roads, runways, mines, seismic lines, tailings) from this industry are readily apparent in Unit 61 between Nucla and the Unaweep Canyon. Reclamation of prior mining and milling sites is now the primary focus of the uranium/vanadium industry in the area. Reclamation is also

an ongoing aspect of open-pit coal mines. Little precious metal mining activity has occurred within DAU E-20. Some placer mining for gold has occurred along the San Miguel and Dolores Rivers. Intensive gold and silver mining activity began in the San Juan Mountains to the south of the Uncompahgre Plateau in the 1870's. It is likely that unregulated market hunting and subsistence hunting associated with mining activities in the San Juan Mountains contributed to the extirpation of elk from the Plateau near the turn of the 20th century.

Mining impacts to elk are mostly undetermined. Networks of mining roads, primarily between Nucla and Gateway, have provided increased motorized access to elk hunting and winter range areas and possibly have increased disturbance. Mining has also had beneficial effects on elk. Elk heavily use reclaimed mine sites and, in some cases, can hamper reclamation efforts.

Timber Harvest

Timber harvest on the Plateau consists primarily of aspen clear-cutting, ponderosa pine timber sales, and fuel wood collection on the Uncompahgre National Forest and private lands. On BLM land, timber harvest consists primarily of pinyon and Gambel oak fuel wood collection and selective cutting of juniper for posts.

The impact of timber harvest on elk is mostly undetermined. Roads created by the timber industry have allowed increased motorized access and possibly greater disturbance to elk. Conversely, elk often prefer timber harvested areas because forage production often increases following silvicultural activities. Elk especially prefer aspen clear cuts unless stands become so dense that movement is restricted.

Uncompahgre Plateau Landscape Assessment

A more detailed description of the Uncompahgre Plateau and its resources will be provided in the upcoming 2002 Uncompahgre Plateau Landscape Assessment being produced by the USFS and BLM.

HERD MANAGEMENT HISTORY

Post-Hunt Population Size

It is assumed that elk were probably fairly common on the Uncompahgre Plateau prior to European settlement in the late 1800's. However, as a result of unregulated hunting (particularly market hunting during the silver and gold rushes), heavy livestock use, and habitat alterations, elk were extirpated from the Uncompahgre Plateau by the early part of the 20th century. In 1923, 18 elk from Jackson Hole, WY were released approximately 24 miles west of Montrose and presumably many of the elk on the Plateau today originated from this transplant. CDOW records of elk numbers on the Uncompahgre Plateau date back to 1964 when the estimated population was approximately 800 elk (Figure 6).

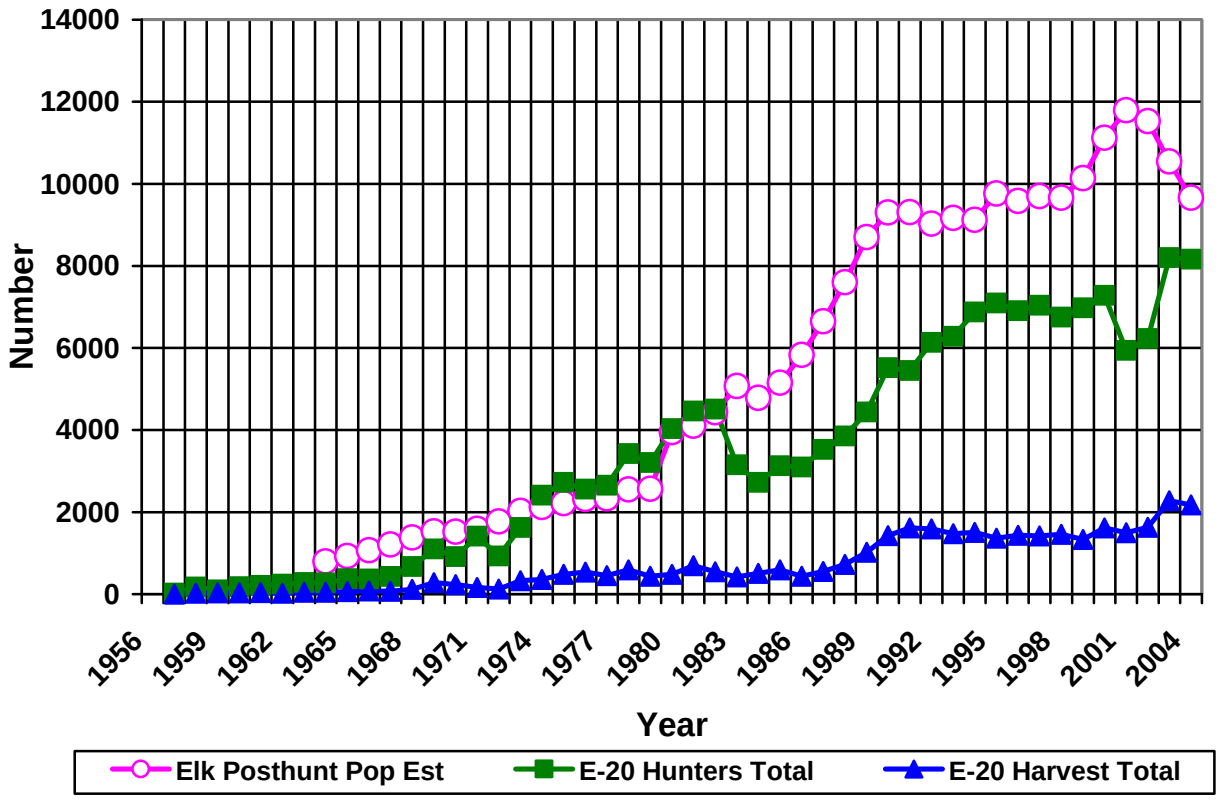


Figure 6. DAU E-20 estimated post-hunt elk population, elk hunters, and elk harvest, 1957- 2004. 95% confidence intervals average ±7% for elk harvest and ±3% for hunters since 1995.

Elk hunting was not allowed on the Uncompahgre Plateau during the first half of the 20th century. Regulated elk hunting began on the Plateau in the 1950's and initially only bulls could be hunted by special permit. Conservative numbers of antlerless elk licenses were issued beginning in the mid-1960's into the 1980's and the number of elk in E-20 steadily increased to an estimated post-hunt high of approximately 9,200 in 1990 (Figure 7).

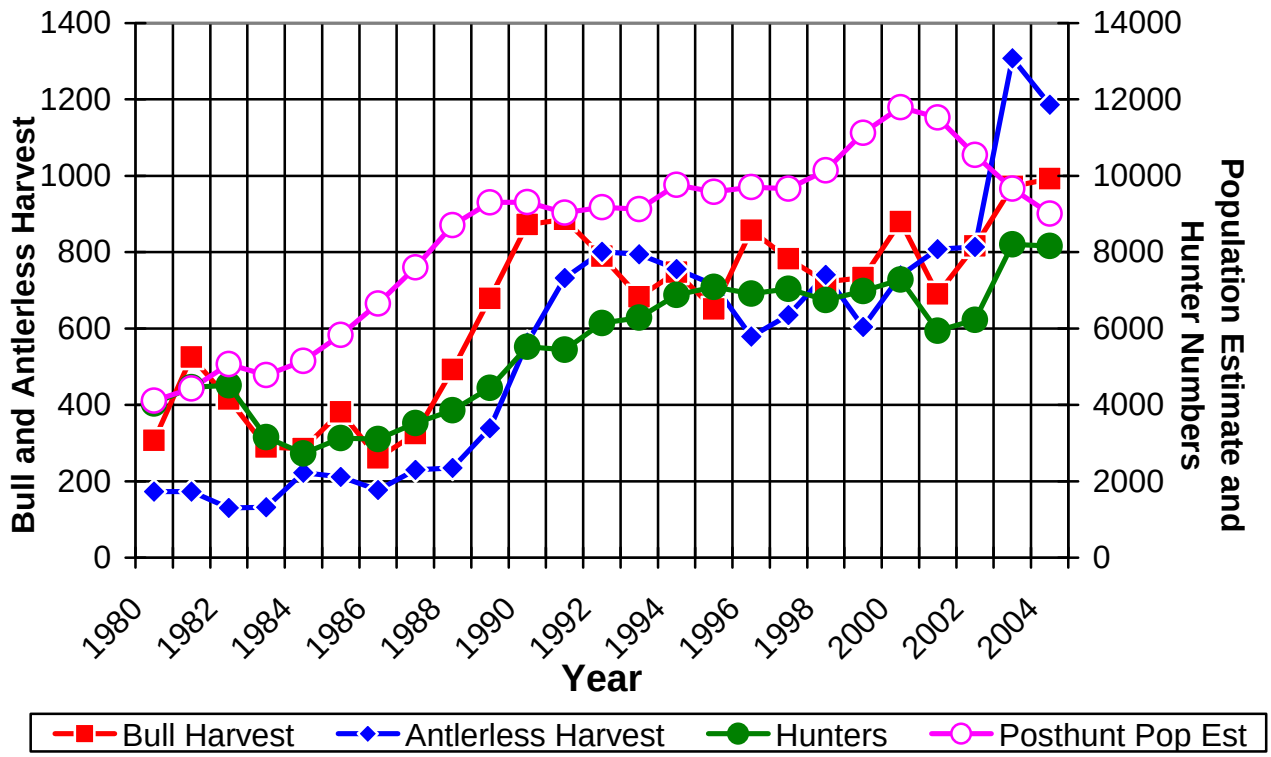


Figure 7. DAU E-20 estimated post-hunt elk population, elk hunter numbers, bull harvest, antlerless harvest, and elk hunters, 1980-2004. 95% confidence intervals average ±10% for bull and cow harvests and ±3% for hunter numbers.

In 1990, the number of antlerless licenses for the DAU doubled and by 1994 the number of antlerless licenses in E-20 had more than quadruped over limited license numbers in the 1980's. The number of antlerless licenses averaged 1,700 between 1996-1998. The number of antlerless and either-sex elk licenses in E-20 reached a maximum in 2003 with 3,795 licenses available, largely due to drought conditions. The increase in antlerless licenses during the 1990's and subsequent increased cow harvest stabilized the elk population at about 9,000 animals. The estimated post-hunt population in E-20 in 2004 was approximately 9,006 elk.

Post-Hunt Herd Composition

Post-hunt herd composition is determined by aerial surveys in late December or early January after the animals have moved to their winter range. It is believed that bull:cow ratios observed on the Uncompahgre Plateau during aerial surveys are biased low because small groups of bulls are more difficult to sight from the air than larger herds of cows and calves and branch antlered bulls on the Plateau often winter in dense pinyon-juniper where sightability is much lower than in the mountain shrub areas preferred by cows and calves. Modeled bull:cow ratios averaged 40% higher than observed bull:cow between 1999 and 2001.

Observed post-hunt bull:cow ratios for E-20 averaged 17 bulls:100 cows between 1984 and 2004 (range 13/100 to 24/100) (Figure 8). Observed bull:cow ratios have been higher in Unit 61 than in Unit 62 for only 7 of the 19 years counts have been completed in both units since 1984. The higher bull:cow ratios observed in Unit 62 are in spite of the fact that hunting pressure on bulls 2yrs and older, based on the number of licensed bull hunters, was over 10 times greater in Unit 62 than in 61 since 1984. This anomaly suggests that elk movement between 61and 62 obviates the independent management of the two units. Many elk, particularly cows and calves, are believed to move from Unit 62 to winter in Unit 61.

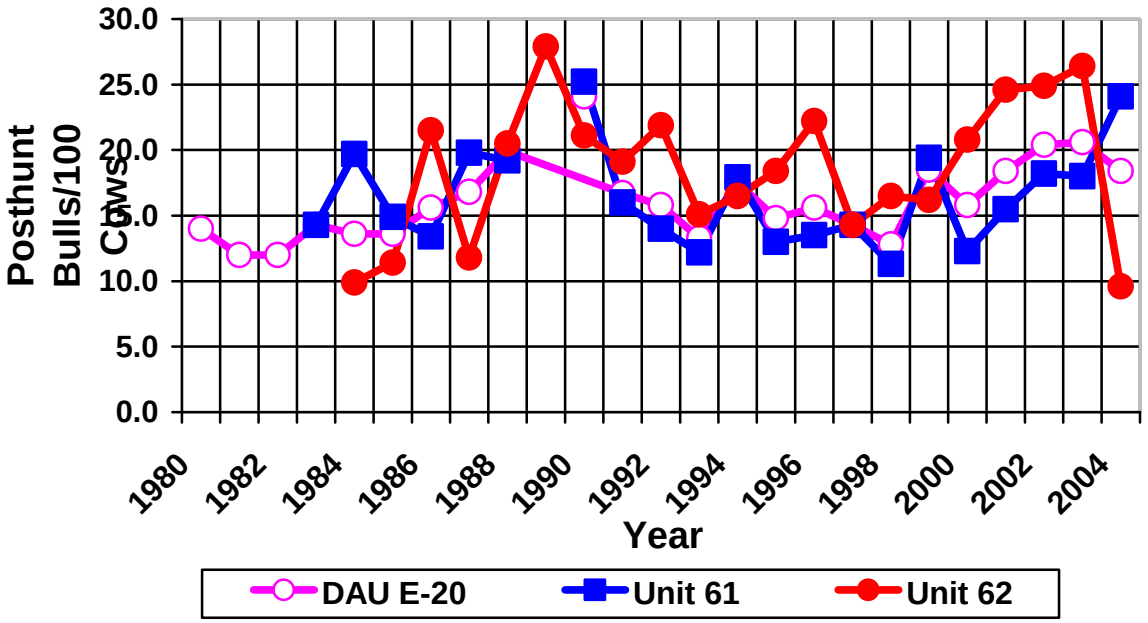


Figure 8. DAU E-20 post-hunt bulls per 100 cows observed during aerial counts, 1983-2004. 95% confidence intervals for E-20 are generally ±25%.

Age structure of bulls observed during post-hunt aerial counts has not differed greatly between Unit 61 and Unit 62 (Figures 9 & 10). Between 1984-2004, yearling bull:cow ratios averaged 12.4 bulls per 100 cows in Unit 61 and 13.7 in Unit 62. During this same period, the ratio of 2 year old and older bulls per 100 cows averaged 3.1 in Unit 61 and 4.6 in Unit 62. Between 1984 and 2001, 79% of the bulls observed in the E-20 post-hunt population were yearlings, 8% were 2-year olds, and 13% were 3 years and older. This indicates that 2-year old bulls make up the majority of the harvest in E-20. The current long-term objective for E-20 is 30 bulls/100cows. This objective is not realistic as long as over-the-counter bull licenses are valid in Unit 62.

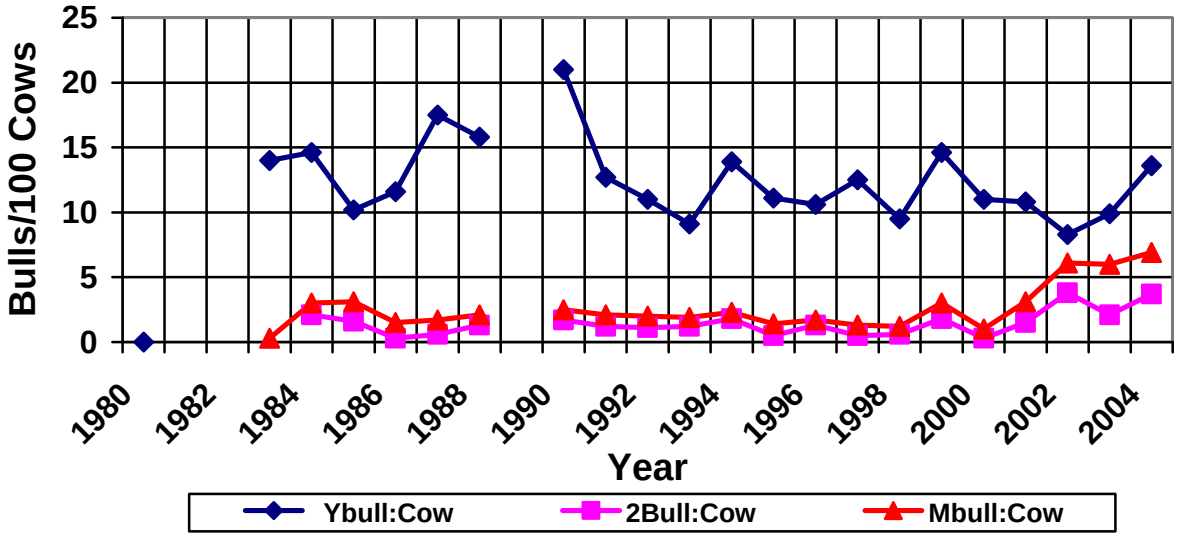


Figure 9. Unit 61 bull age structure observed during post-season counts, 1983-2004. Ybull = yearling, 2Bull = 2-year old, >2Bull = 3 years and older.

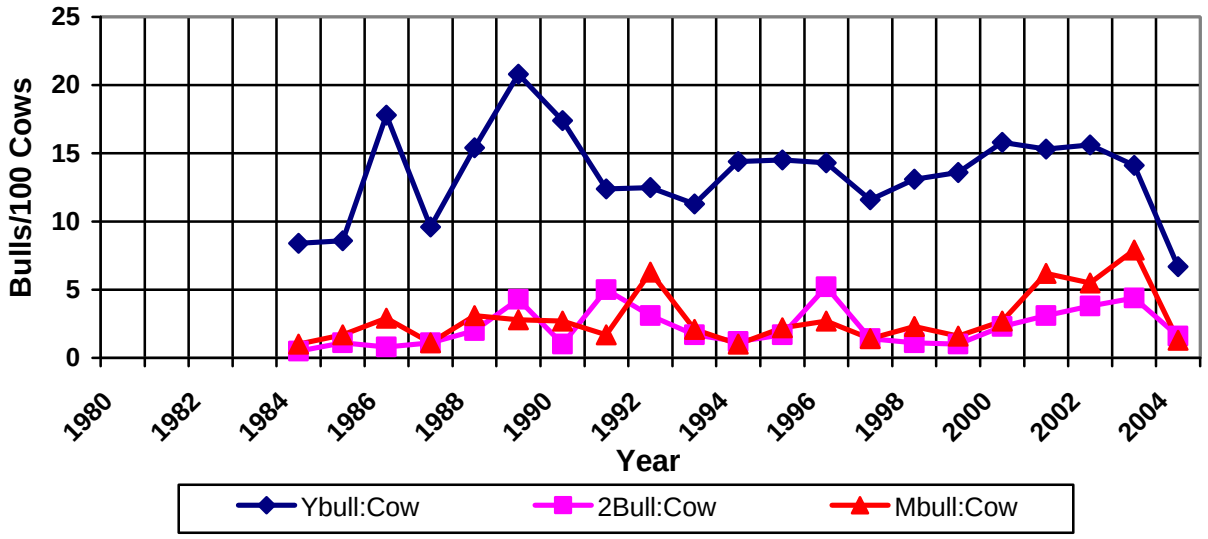


Figure 10. Unit 62 bull age structure observed during post-season counts, 1983-2004. Ybull = yearling, 2Bull = 2- year old, >2Bull = 3 years and older.

Calf:cow ratios observed during aerial counts are generally believed to be non-biased and represent actual ratios. Cow elk do not calve until they are 2 years old and typically produce a single calf. Observed calf:cow ratios for E-20 between 1984 and 2004 averaged 42.8 calves:100cows (range 32:100 to 52:100) (Figure 11). These ratios are similar to cow:calf ratios observed in many other DAUs in Colorado. The trend in calf:cow ratios in E-20 for the last 20 years has generally been downward at a rate of 0.5calves/100 cows per year. The reason for this decline is unknown but could suggest density-dependent effects acting on the population. There is no consistent difference between Units 61 and 62 in observed cow:calf ratios.

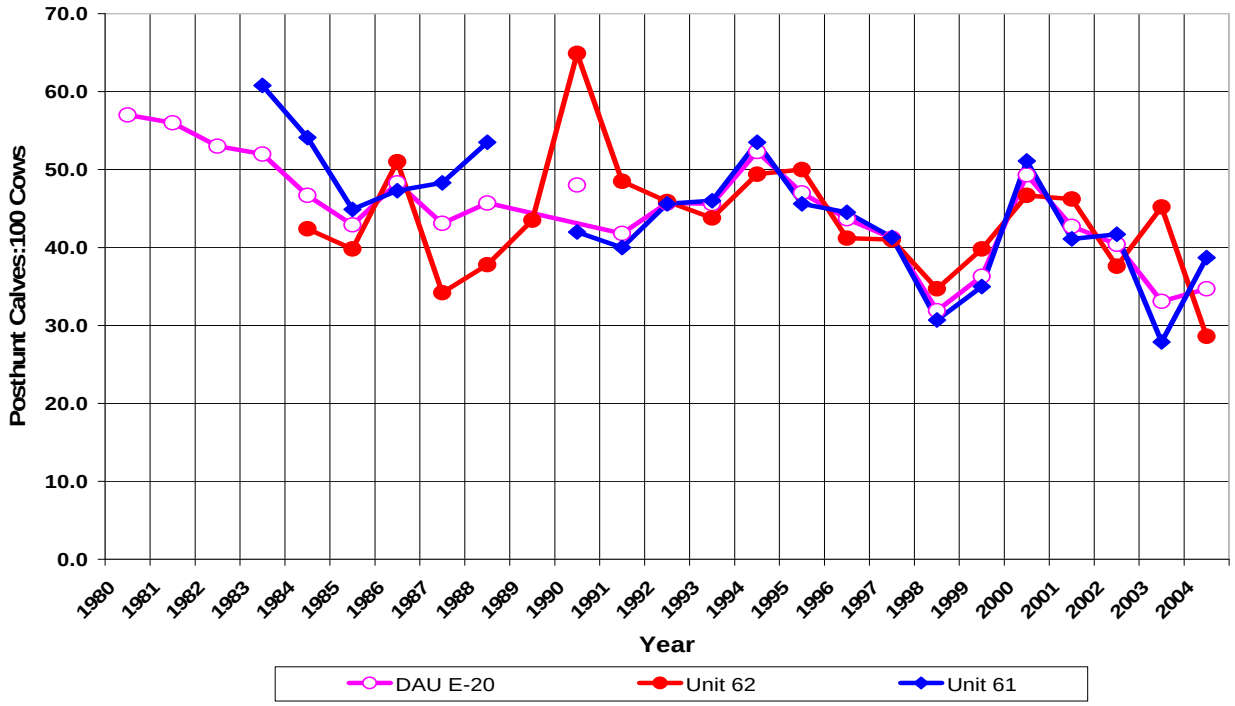


Figure 11. DAU E-20 post-hunt calves per 100 cows observed during aerial counts, 1983-2004. 95% confidence intervals for E-20 are generally ±13%.

Harvest

Factors Affecting Harvest

Factors affecting the number of elk harvested each year include: (1) hunting pressure from over-the-counter license holders (i.e., archery either-sex and general rifle bull hunters choosing to hunt in Unit 62); (2) the number of limited licenses issued (i.e., antlerless licenses in Unit 62 and all licenses in Unit 61); (3) season structure and antler point restrictions; (4) weather; and (5) population size and structure.

Harvest History

The first hunting season for elk in E-20 was held in 1957. Between 1957-1972, less than 300 elk per year were harvested in E-20 (Figure 6). Between 1973 and 1987, elk harvest was fairly consistent and averaged approximately 500 elk per year. Between 1990 and 2001, the E-20 elk harvest increased to an average of 1,590 elk per year with the highest harvest (2,280) recorded in 2003 (Figure 12). Archery hunters accounted for 11% of the harvest from 1988-1994 and 12% of the harvest from 1995-2004.

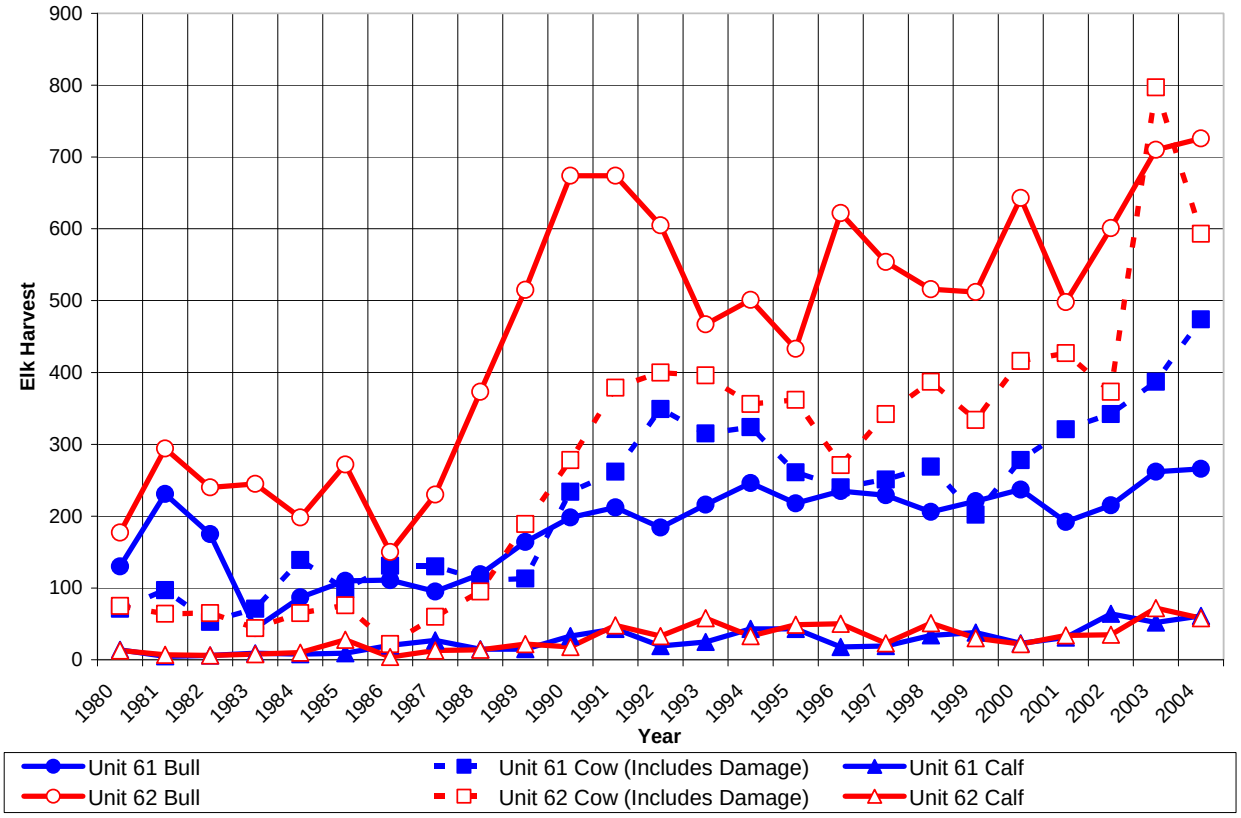


Figure 12. DAU E-20 elk harvest, 1980-2004. 95% confidence intervals for E-20 average ± 10% for bulls and cows and ± 36% for calves.

From 1992 to 2000, E-20 ranked an average of 8th out of 44 elk DAUs and Unit 62 ranked an average of 7th out of 127 GMUs for the number of elk harvested. Between 1983 and 2004, Unit 62 accounted for 63% of the total elk and 72% of the bulls harvested in E-20.

Changes in season structure and regulations have impacted the elk harvest in E-20 (Appendix 1). Changes of note include (1) the introduction of limited antlerless elk licenses for Units 61and 62 in 1965, (2) designation of Unit 61 as a quality elk unit with all elk hunting restricted to limited licenses in 1983, and (3) implementation of a four point antler restriction for all bulls during all seasons in Unit 62 in 1986.

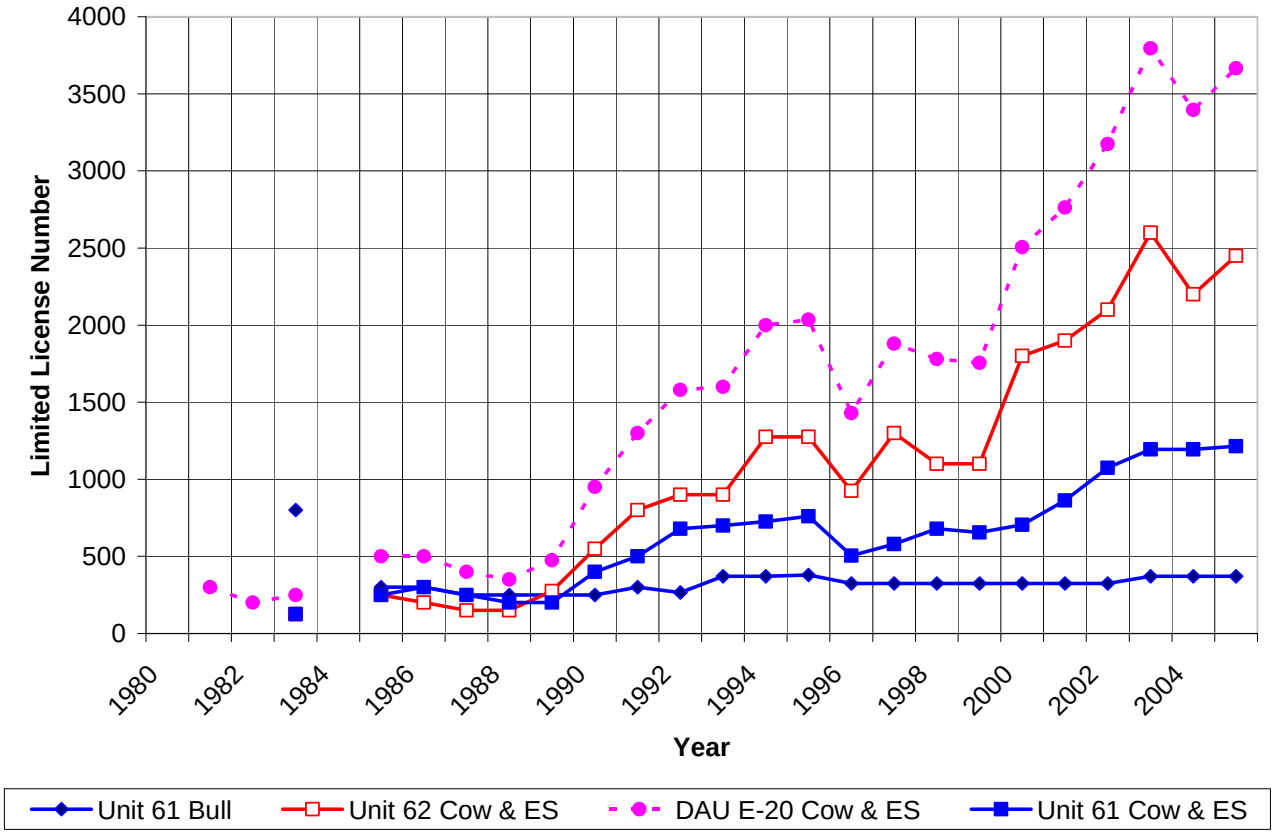


Figure 13. DAU E-20 limited elk licenses, 1981-2004.

The number of antlerless and either-sex elk licenses available in E-20 each year has varied from zero prior to 1965 to 3,665 in 2,005 (Figure 13). Antlerless harvest has generally followed the trend of the number of antlerless licenses issued.

Between 1990 and 2001, elk in E-20 were harvested at an average rate of 15% of the estimated pre-hunt population assuming a 10% wounding loss. The cow harvest rate increased from an average of 5% between 1981-1989 to an average of 12.7% between 1990-2004 (Figure 14). A similar trend occurred in the legal bull (i.e., $\geq$ 2 years) harvest rate, which increased from an average of 34% between 1986-1989 to 74.8% between 1990-2004. This increase generally followed the trend of increased hunting pressure in Unit 62 during the same periods.

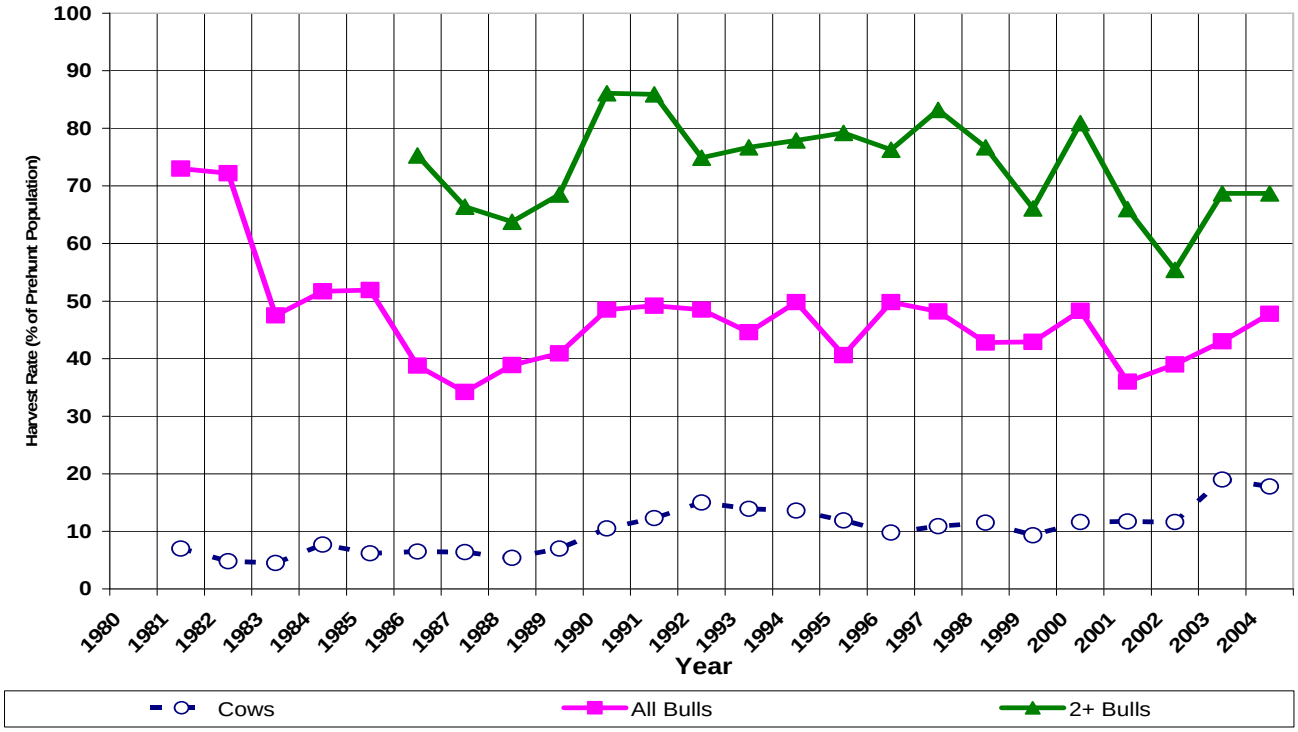


Figure 14. DAU E-20 cow elk harvest rate, bull harvest rate, and legal bull harvest rate as percentages of the prehunt cow population, bull population, and legal bull population, respectively, 1980-2004.

Public versus Private Land Harvest

In 2000, the CDOW began collecting information on harvest on public versus private land (Table 2). Based on hunters surveyed, over 90% of all the elk killed in Unit 61 and over 90% of the antlerless elk killed in Unit 62 were on public land. In contrast, over one-third of the bulls killed in Unit 62 were on private land. Unit 62 consists of 31% private land and 69% public land. Approximately half of the private land in Unit 62 is in the Uncompahgre Valley and affords little elk hunting opportunity. These data indicate a disproportionately high number of bulls are being killed on private lands outside of the Uncompahgre Valley in Unit 62. Minimal antlerless harvest occurs on private land in both units indicating the emphasis on paid bull hunting. Seventy-two percent of the bulls harvested on private land in E-20 in 2000 were taken by non-residents.

Table 2. E-20 elk harvested on public versus private lands, 2000.

UNIT	Antlered Harvest		Antlerless Harvest	
	Private Land	Public Land	Private Land	Public Land
61	8%	92%	7%	93%
62	37%	63%	9%	91%

Hunters

Hunter Numbers

The number of licensed elk hunters per year in E-20 has varied from 25 in 1957 to 8,202 in 2,003. Between 1984 and 1995, the number of elk hunters in E-20 steadily increased from less than 3,000 to over 7,000 (Figure 15). An average of 7,008 elk hunters per year hunted in E-20 during 1995-2000. The doubling of elk hunters in E-20 between 1984 and 1995 primarily represents increased hunting pressure in Unit 62. Archery hunters accounted for 15% of the total hunters from 1992-1999. Between 1992 and 2000, E-20 ranked 12th out of 44 elk DAUs for the number of elk hunters and total hunting pressure. From 1994 to 2000, Unit 62 had, on average, the greatest number of elk hunters, the most total elk hunting recreation days, and the greatest total elk hunting pressure out of 127 GMUs statewide that had an elk harvest.

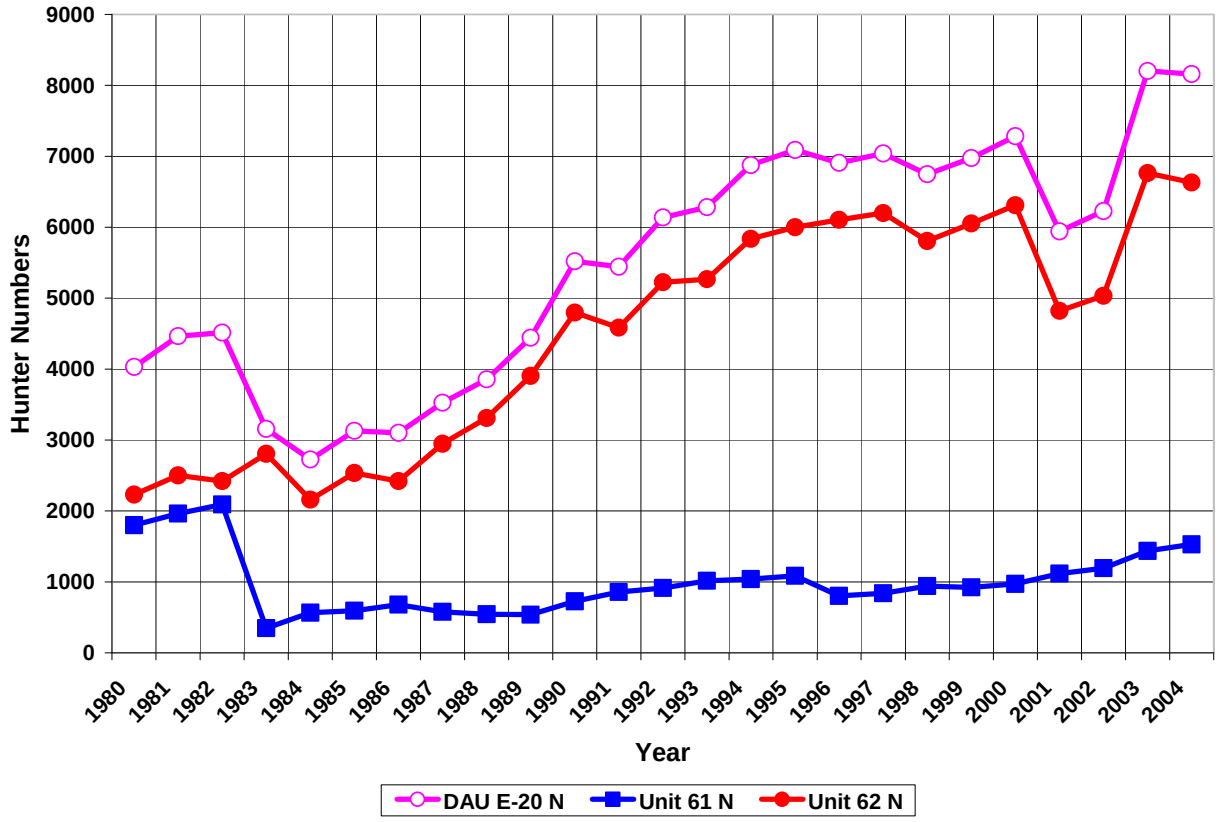


Figure 15. DAU E-20 elk hunter numbers,1980-2004. 95% confidence intervals for E-20 average ±3%.

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Because all elk licenses are limited in Unit 61, elk hunting pressure differs greatly between Units 61 and Unit 62. From 1983, the year Unit 61 became totally limited, to 2001, Unit 62 has accounted for 85% of the elk hunters in E-20. The highly skewed hunting pressure in E-20 (e.g., 972 elk hunters in Unit 61versus 6,311 elk hunters in Unit 62 in 2000) likely affects the distribution of elk in the DAU as animals move out of Unit 62 to escape hunting pressure.

Hunter Success

Hunter success in E-20 averaged 20.6% (range: 11.9-29.7%) from 1980-2004 (Figure 16). Hunter success declined in 1986 with the implementation of the 4-point antler restriction but then increased to the highest rates in the early 1990's concurrent with the highest ratios of elk numbers to hunter numbers. For the period 1995-2004, the success rate averaged 22.7%. Since Unit 61 became totally limited in 1983, hunter success in Unit 61 has averaged over three times higher than in Unit 62 through 2004.

Hunter success rates for bulls averaged 17% (range 13-21%) in E-20 between 1997-2001 (either-sex license holders were assigned to antlered or antlerless hunter categories in proportion to their antlered and antlerless harvest). Hunter success rate for bulls in Unit 61 averaged 50% (range 47-54%) between 1997-2001 compared to 14% success in Unit 62. Hunter success rate for bulls is significantly correlated with the posthunt bull/cow ratio. Hunter success rates for antlerless elk averaged 31% (range 30-34%) in E-20 between 1997-2001. Hunter success rate for antlerless elk in Unit 61 averaged 50% versus 26% success in Unit 62 between 1997-2001.

Archery success rates for elk averaged 16% (range 13-20%) in E-20 between 1992-2001. Archery success rates for elk in Unit 61 averaged 41% versus 13% in Unit 62 during this period.

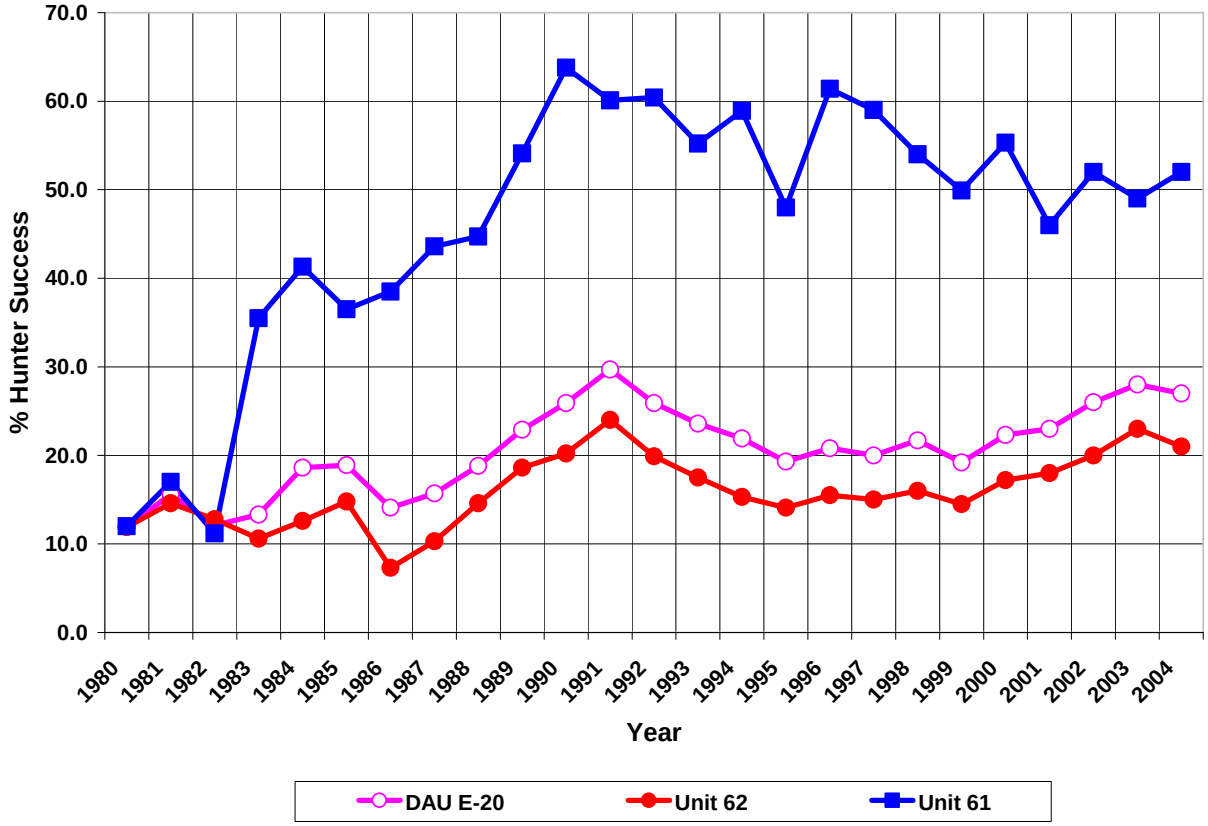

Figure 16. DAU E-20 hunter success,1980-2004.

Elk harvest per 100 hunting recreation days in E-20 averaged 4.2 (range: 2.6 to 5.5) during the period 1984 to 2004. The general trend of elk harvest per unit effort generally follows the trend of the estimated post–hunt population (Figure 17).

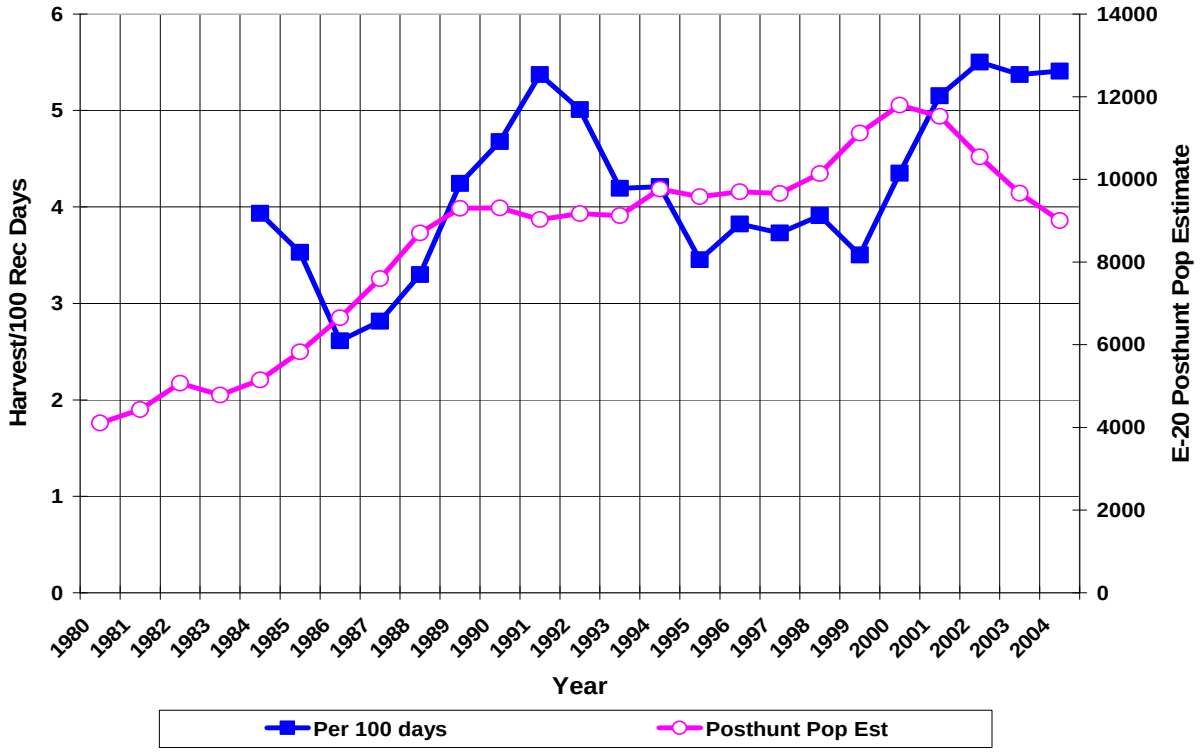

Figure 17.. DAU E-20 elk harvest per 100 recreation days, 1984-2004.

Preference Points

The number of preference points required to draw a Unit 61 bull or either-sex elk license continues to increase (Table 3). A minimum of 6 preference points was needed to draw a Unit 61 bull license in 2005. Unit 61 antlerless licenses can often be drawn without preference points. No preference points have been required to draw a Unit 62 antlerless license or 1st season bull license.

Table 3. Preference points required for E-20 limited licenses, 1998-2005.

YEAR	Unit 61 Archery Either-sex	Unit 61 Muzzle-Loader Bull	Unit 61 Muzzle-Loader Cow	Unit 61 Rifle Bull	Unit 61 Rifle Cow	Unit 61 Rifle Cow Late	Unit 62 Rifle Bull 1st Season	Unit 62 Rifle Cow
1998	4	7	1	4	1	NA	NA	0
1999	5	7	1	4	0	1	NA	0
2000	5	8	2	5	1	1	0	0
2001*	6 (6)	8 (9)	1 (1)	5 (6)	0 (0)	1 (1)	0 (0)	0 (0)
2002*	7 (7)	9 (10)	2 (3)	6 (6)	0 (0)	0 (0)	0 (0)	0 (0)
2003*	7 (7)	8 (10)	1 (1)	6 (7)	0 (0)	0 (0)	0 (0)	0 (0)
2004*	7 (8)	7 (9)	1 (1)	6 (7)	0 (0)	0 (0)	0 (0)	0 (0)
2005*	8 (9)	9 (12)	1 (1)	6 (8)	0 (0)	0 (0)	0 (0)	0 (0)

* *Beginning in 2001, nonresidents were limited to 40% of limited licenses for any hunt code not undersubscribed. Preference points required by non-residents are shown in parentheses.*

Up to 15% of Unit 61 elk licenses are allocated to landowners with at least 160 acres of land within the unit. Unit 61 landowners have had 100% success drawing antlerless licenses for Unit 61 for all seasons as a first choice and can usually draw as a second choice. Landowners have usually been able to draw a Unit 61 bull license every other year (Table 4). Many Unit 61 landowners choose to sell their landowner preference. A new priority landowner

preference program began in 2001. This program gives landowners up to 6 applications per year based on the acreage and the wildlife habitat value of their property.

Table 4. First choice landowner preference (LOP) applications and quotas for Unit 61 bull and either-sex licenses, 1999-2002.

Year	Unit 61 First Choice LOP Applications and (Quotas)		
	Archery Either-sex	Muzzle-Loader Bull	Rifle Bull
1999	12 (11)	5 (4)	82 (45)
2000		4 (4)	74 (45)
2001	19 (10)	8 (3)	98 (45)
2002	8 (10)	6 (3)	88 (45)

Resident versus Nonresident Hunters

Nonresident hunters made up 44% of all the elk hunters in E-20 in 1997and accounted for 30% of the limited licenses (Table 5). In 2000, nonresident hunters made up 47% of all the elk hunters in E-20 and accounted for 40% of the limited licenses (Table 6). The first rifle elk season became limited for bulls in Unit 62 in 2000. In 2001, the number of nonresident hunters was limited to 40% for any limited huntcode, exclusive of landowner preference licenses, unless under-subscribed. Nonresident hunters dropped to 36% of the elk hunters in E-20 and accounted for 27% of the limited licenses (Table 7). An 80% increase in the price of a nonresident elk license and national concerns after September 11th likely contributed to the decline in nonresident hunters in 2001.

Table 5. E-20 resident versus nonresident elk hunter numbers and elk harvest, 1997 hunting season.

	HUNTERS		HARVEST			
			ANTLERED		ANTLERLESS	
	RESIDENT	NONRES	RESIDENT	NONRES	RESIDENT	NONRES
UNIT 61						
All Licenses	567 (67%)	274 (33%)	94 (41%)	135 (59%)	247 (91%)	23 (9%)
UNIT 62						
All Licenses	3398 (55%)	2802 (45%)	230 (42%)	324 (58%)	239 (65%)	126 (35%)
Limited Only	939 (72%)	373 (28%)	23 (61%)	15 (39%)	221 (73%)	83 (27%)
DAU E-20						
All Licenses	3965 (56%)	3076 (44%)	324 (41%)	459 (59%)	486 (77%)	149 (23%)
Limited Only	1506 (70%)	647 (30%)	117 (44%)	150 (56%)	468 (82%)	106 (18%)

Limited Only = all licenses minus over-the-counter rifle bull and archery either-sex licenses. All Licenses are limited in Unit 61.

Table 6. E-20 resident versus nonresident elk hunter numbers and elk harvest, 2000 hunting season.

	HUNTERS		HARVEST			
			ANTLERED		ANTLERLESS	
	RESIDENT	NONRES	RESIDENT	NONRES	RESIDENT	NONRES
UNIT 61						
All Licenses	638 (66%)	331 (34%)	87 (37%)	150 (63%)	237 (79%)	64 (21%)
UNIT 62						
All Licenses	3205 (51%)	3106 (49%)	202 (31%)	441 (69%)	245 (56%)	193 (44%)
Limited Only	1212 (58%)	893 (42%)	27 (16%)	137 (84%)	215 (61%)	136 (39%)
DAU E-20						
All Licenses	3843 (53%)	3437 (47%)	289 (33%)	591 (67%)	482 (65%)	257 (35%)
Limited Only	1850 (60%)	1224 (40%)	118 (29%)	287 (71%)	452 (69%)	200 (31%)

Limited Only = all licenses minus over-the-counter rifle bull and archery either-sex licenses. All Licenses are limited in Unit 61.

Table 7. E-20 resident versus nonresident elk hunter numbers and elk harvest, 2001 hunting season.

	HUNTERS		HARVEST			
			ANTLERED		ANTLERLESS	
	RESIDENT	NONRES	RESIDENT	NONRES	RESIDENT	NONRES
UNIT 61						
All Licenses	862 (77%)	256 (23%)	109 (57%)	83 (43%)	270 (84%)	51 (16%)
UNIT 62						
All Licenses	2944 (61%)	1879 (39%)	162 (33%)	336 (67%)	242 (65%)	130 (35%)
Limited Only	1515 (71%)	622 (29%)	62 (30%)	141 (69%)	220 (72%)	85 (28%)
DAU E-20						
All Licenses	3806 (64%)	2135 (36%)	271 (39%)	419 (61%)	512 (74%)	181 (26%)
Limited Only	2377 (73%)	878 (27%)	145 (37%)	250 (63%)	490 (78%)	136 (22%)

Limited Only = all licenses minus over-the-counter rifle bull and archery either-sex licenses. All Licenses are limited in Unit 61.

Table 8. Percentages of resident (RES) versus nonresident (NON) E-20 hunters, harvest, and success rates, 1997 and 2000-2001..

YEAR	BULL						ANTLERLESS					
	HUNTERS		HARVEST		SUCCESS RATE		HUNTERS		HARVEST		SUCCESS RATE	
	RES	NON	RES	NON	RES	NON	RES	NON	RES	NON	RES	NON
1997	51%	49%	41%	59%	13%	19%	68%	32%	77%	23%	34%	23%
2000	47%	53%	33%	67%	13%	23%	65%	35%	65%	35%	30%	29%
2001	50%	50%	36%	64%	16%	27%	71%	19%	74%	26%	24%	36%

Observations based on the 1997, 2000, and 2001 seasons (Table 8):

- Approximately ½ of the bull hunters in E-20 were non-residents.
- Non-resident hunters took almost 2/3 of the bulls harvested.
- Non-resident bull hunters had a higher success rate than resident bull hunters. This is likely due in part to nonresidents being more likely to pay to hunt on private land and use guides/outfitters.
- Less than 1/3 of the antlerless hunters were non-residents.
- Non-resident hunters took less than 1/3 of the antlerless harvest.
- Success rates were similar between non-resident and resident antlerless hunters. Unlike bulls, only a small percentage of cows are killed on private land in E-20. Most non-resident antlerless hunters presumably hunt on public land similar to residents.
- The non-resident cap for limited hunt-codes implemented in 2001 did not appear to have a major influence on the overall proportions of resident versus nonresident hunters, harvest, or success. However, the cap did appear to reduce the proportion of non-residents drawing Unit 61 limited licenses.

Until 2001, the majority of Unit 61 bull and either-sex licenses have gone to nonresidents (Table 9). In 2001, nonresidents accounted for 49% of the bull and either-sex licenses in Unit 61. Although a 40% cap was placed on nonresidents in 2001, this cap does not apply to private-land only and landowner preference applicants. The majority of landowner preference applicants for Unit 61 bull and either-sex licenses were nonresidents.

Table 9. Percentage of Unit 61 bull and either-sex elk licenses (395 licenses/year) issued to residents versus nonresidents, 1998-2002.

YEAR	Unit 61 Bull & Either-Sex Licenses	
	Resident	Nonresident
1998	38%	62%
1999	35%	65%
2000	41%	59%
2001*	51%	49%
2002*	51%	49%

* 40% nonresident cap implemented exclusive of landowner preference licenses.

Economic Impact

The economic impact of hunting in E-20 includes expenditures by hunters for licenses, lodging, meals, gas, equipment, and services. According to the CDOW's 1997 Hunting and Fishing Economic Impact Model, each resident elk hunter in Colorado spent an average of $609/yr and each nonresident elk hunter spent an average of $787/yr in Colorado as a result of elk hunting, excluding license fees. Based on 44% of the 7,041 elk hunters in E-20 in 1997 being nonresidents, an estimated $4.8 million would have been spent in Colorado by E-20 elk hunters in 1997 ($0.6 million by Unit 61 hunters; $4.2 million by Unit 62 hunters). Although data are not available, it is assumed that the majority of these expenditures would have been made in the five counties that comprise E-20. In addition, E-20 hunters spent an estimated $889,710 on elk licenses in 1997.

Based on 1997 costs, an average of $4.71 million was spent annually by E-20 hunters between 1997 and 2001.

CURRENT HERD MANAGEMENT

CURRENT POPULATION OBJECTIVES

The current post-hunt objectives for E-20 are 3,050 elk with an observed bull /cow ratio of 30/100. These provisional objectives have been in effect since 1989.

The 2001 post-hunt elk population for E-20 is estimated at approximately 9,100 based on population modeling. This estimated population is almost 300% over the current objective. The large discrepancy between the objective and the 2001 population estimate resulted from changes that have been made to the model since 1998. These changes included increasing calf winter survival rates after 1980 from an average of 82% to 86% and increasing the number of age classes in the model to include elk over 15 years of age. These changes were made based on measured calf winter survival rates observed in recent telemetry studies in other parts of Colorado and on age structure studies that showed that cow elk over 15 years of age were common and still reproduced. The increase in the population estimate made the continued high bull harvest observed in the late 1990's mathematically possible. It must be remembered that herd modeling is an evolving process and model estimates can change as new, more accurate information becomes available. Also, it should be emphasized that only the estimate and not the actual number of elk increased. Therefore the current objective of 3,050 was based on a grossly underestimated posthunt population.

HARVEST MANAGEMENT

Unit 61 versus Unit 62 Management

Bull harvest management in E-20 has been contradictory at best. GMU 61 has been managed as a quality elk unit since 1983. Since 1997, 395 bull and either-sex licenses have been issued each year in Unit 61 and there have been no antler point restrictions. In contrast Unit 62 has been managed as an over-the-counter elk unit with bull hunter numbers exceeding 5,000 per year. A 4-point antler restriction for all seasons was implemented in Unit 62 in 1986. Since 1983, Unit 62 has accounted for almost 3/4ths of the bulls harvested in the DAU.

Regular Season Antlerless Licenses

The CDOW has used a combination of regular season limited licenses, private land only licenses, late season licenses, and damage hunts to achieve antlerless harvest objectives in E-20. The majority of the antlerless harvest in E-20 occurs during the regular season. Unit 62 accounts for most of the regular season E-20 cow harvest. Increasing regular season cow hunting pressure in Unit 61 results in increased complaints from Unit 61 bull hunters that feel that large numbers of cow hunters decrease the quality of their hunting experience.

Private Land-only Licenses

Private land only (PLO) licenses are used to help achieve antlerless harvest objectives and provide landowners or their designees more opportunity to hunt on their own property. Since 1996, all or part of the PLO licenses south of the Transfer Road in Unit 62 have been for either-sex. This was done to provide private land hunters, particularly paid bull hunters, with the alternative to shoot a cow elk and thereby increase private land antlerless harvest. PLO antlerless harvest accounted for 16% of the total antlerless harvest during the 2000 and 2001 seasons, exclusive of damage harvest.

Late Seasons

Late hunting seasons occur after the regular seasons have closed (i.e., November 16 – February 28). The purpose of late seasons is to increase antlerless harvest and to distribute elk. Late season hunts have not occurred in Unit 62 since 1993. Late season hunts prior to this time primarily occurred on private land south of the Transfer Road. Late season PLO hunts have been held in Unit 61 since 1992. In 2000 and 2001, the late Unit 61 season accounted for less than 5% of the total antlerless harvest. Unit 61 has not had late public land seasons because most elk in the unit winter on public land and there is concern that such hunts would cause elk to move to private land in Unit 61 and Unit 70 and increase landowner conflicts.

Damage Hunts

Damage hunts are used to reduce confirmed elk damage on specific private properties. Damage hunts are for antlerless animals only and can be held between August 15th – February 28th. The primary purpose of damage hunts is not to achieve DAU harvest objectives but to help alleviate ongoing damage. License applications are given to landowners for distribution. In 2001, 11 damage hunts with 154 total licenses resulted in the harvest of 123 antlerless elk in E-20. The number of damage licenses issued in 2001 was unusually high because large numbers of elk wintered at lower elevations than normal possibly due to dry conditions and poor forage production.

HABITAT RESOURCE

Habitat Distribution

Summer Range

In the spring, most of the elk move to higher elevations following the retreating snowline and green-up. Although some elk remain at low elevations year-round, the majority of the elk on the Uncompahgre Plateau can be found above 8,000 ft during the summer months. Aspen stands and open parks are especially favored during late spring and summer. Cows often select aspen and oak brush areas in close proximity to dense conifer cover for calving. Except for the area between the Transfer Road and Dallas Divide, relatively few elk summer on private land. During the breeding season in September and early October, most elk remain at fairly high elevations and in close proximity to dense cover. Fall hunting pressure begins pushing the elk to lower elevations. By the end of the hunting season in November, large numbers of elk are in the pinyon-juniper and mountain shrub zones below 8,000'.

The quality of summer range is important to ensure elk can recover from winter weight loss, cows can support late fetal growth and subsequent lactation, and bulls and cows will go into the breeding season and winter in good body condition. Herd bulls can lose significant amounts of weight during the rut and cows in poor body condition may not come into estrous.

It is unknown to what extent summer range might be a limiting factor for elk on the Uncompahgre Plateau.

Winter Range

Depending on snowfall, many elk move back to higher elevations after the hunting season. The majority of elk in E-20 winter in Unit 61. In normal winters, most of the elk can be found in the Gambel oak/mountain shrub/manzanita community-type between 7,500-8,500'. During mild winters, elk can sometimes be found on top of the Plateau. However, many branch-antlered bulls will remain at lower elevations in the pinyon-juniper zone during winter regardless of mild conditions.

Winter range is often considered to be more critical than summer range because it is usually much more limited. The CDOW characterizes winter range into three categories:

- *Winter Range* - that part of the range where 90% of the animals are located during average winters.
- *Winter Concentration Area* – that part of the range where densities are at least 200% greater than the surrounding winter range in average winters.
- *Severe Winter Range* – that part of the range where 90% of the elk are located during the two worst winters in 10 years as determined by the maximum annual snowpack and minimum temperatures.

The BLM manages 50%, 70%, and 48% of the elk winter range, winter concentration area, and severe winter rage in the DAU, respectively (Table 10). Private property comprises 20%, 19%, and 30% of the elk winter range, winter concentration area, and severe winter range in E-20. Based on aerial classification counts conducted each year in E-20, it is apparent that the large majority of elk in E-20 winter on public land. Important private land wintering areas for elk in Unit 61 include the Nucla area, Unaweep Canyon, and Iron Springs Mesa. In Unit 62, important wintering areas on private land include Spruce Ridge, Pleasant Valley, Loghill Mesa, the Colona/Government Springs area, and the Dry Creek drainage.

Although radio-collar data are not available, it is believed that there is a major movement of elk from GMU 62 to GMU 61 prior to winter. This movement is likely due to differential hunting pressure between the two units and better winter habitat on the south facing slopes in GMU 61.

Table 10. Land ownership of DAU E-20 elk winter range in square miles and percent.

DAU E-20	Total	Winter Range	Winter Concentration Area	Severe Winter Range
BLM	860 (38%)	567 (50.6%)	76 (47.8%)	468 (70.4%)
USFS	837 (37%)	318 (28.4%)	34 (21.3%)	65 (09.8%)
State	22 (1%)	8 (00.7%)	1 (00.6%)	4 (00.6%)
Private	543 (24%)	226 (20.2)	48 (30.2%)	128 (19.2%)
TOTAL	2,262 (100%)	1,119 (100%)	159 (100%)	665 (100%)

Habitat Condition and Capability

Habitat Condition

Land health problems on the Uncompahgre Plateau that have been identified by the BLM include accelerated erosion, noxious weed invasion, low levels of perennial grasses, lack of cool season grasses, lack of forbs, low plant species diversity, pinyon and juniper invasion into sagebrush and mountain shrub communities, dominance by late seral vegetation, lack of age-structure diversity, and dense mature shrub communities with low vigor. On the Uncomaphgre National Forest land health concerns include conifer invasion into aspen communities, dense mature forest and shrub communities with low productivity, and tree invasion into open parks and meadows.

BLM range trend plots on the Uncompahgre Plateau, many established in the late 1960's and 1970's, indicate the complexity of assessing habitat condition. Of 496 plots, 165 showed an upward trend, 178 showed a downward trend and 180 were stable or cyclic. When grouped by plant type, the trends indicate trees and shrubs are increasing on BLM lands on the Plateau.

- *Downward Trend* – some resource damage may be occurring.
- *Stable or Cyclic Trend* – neither damage nor improvement is occurring.
- *Upward Trend* – improvement in the ecological condition from baseline.

The current habitat conditions on the Uncompahgre Plateau have been greatly influenced by historic and recent human activity. Human activities impacted the Plateau long before Euro-American settlement. Historical accounts indicate the Ute Indians used fire extensively to improve hunting conditions and facilitate movement. Two of the

most significant post-settlement influences on the Plateau ecosystem have been historic overgrazing and fire suppression.

Intensive, unregulated cattle grazing began on the Plateau in the early 1880's and sheep were introduced three decades later. Early in the 20th century, the effects of severe overgrazing had become readily apparent and concern increased about poor range conditions. Grazing on public lands on the Plateau became regulated by the federal government with the creation of the Uncompahgre National Forest in 1905 and the passage of the Taylor Grazing Act in 1934. Even with federal control, stocking rates on public lands on the Plateau remained high well into the 1950's. Today grazing on USFS and BLM lands is regulated to avoid overuse and ranchers are much more knowledgeable about range science. Elk also factor into the grazing equation and can contribute to negative impacts.

Historic overgrazing is believed to have had major long-term consequences on the ecological complexion of the Uncompahgre Plateau. Heavy grazing by livestock removed grasses and forbs that provided the fine fuels necessary to carry periodic, less-intense natural fires. In the absence of fire and competition by grass, woody species (pinyon/juniper, mountain shrubs, and sagebrush) became more dominant and proliferated. Runoff and erosion increased and streams began down-cutting at accelerated rates.

Over 100 years of fire suppression has allowed woody species to continue to mature and become denser and less productive. In addition, fire suppression has allowed fuels to build up to the point that when infrequent fires do occur they are much more intense and destructive. Elk show a strong preference for burned areas and seek the nutritious new growth that occurs after fire. Burned areas are generally considered to be beneficial for elk.

The pinyon/juniper (PJ) type is the most widespread plant community in E-20. Prior to European settlement it is believed that some PJ stands were more open with greater understory productivity. Fire suppression allowed PJ forests to fill in and invade sagebrush and mountain shrub areas. Only a small percentage of elk stay in the PJ zone year-round but many elk use PJ as winter range and/or to escape hunting pressure. Mature PJ stands provide little food for elk and large, uninterrupted PJ woodlands have limited value for elk except as thermal and escape cover. The value of PJ woodlands to deer and elk can be improved by creating mosaic openings to create more forage and diversity.

Aspen and mountain shrub communities are very important for elk. Loss of aspen due to conifer invasion is a concern on the Plateau. Some aspen communities appear to be very resilient to conifer replacement whereas others appear to be an intermediate successional stage. Silvicultural treatment of aspen can be beneficial for maintaining some aspen stands.

In the absence of fire, Gamble oak/mountain shrub communities can become increasingly dense and mature resulting in restricted movement, less accessible forage, and reduced understory productivity. A large percentage of the elk in E-20 winter in the Gamble oak/ mountain shrub type.

Between the 1930's and the early 1970's, extensive habitat treatments occurred on the Plateau primarily to benefit livestock. These treatments included contouring, plowing, PJ chaining, herbicide spraying of sagebrush and Gambel oak, seeding with non-native grasses, controlled burning, and water developments. Tens of thousands of acres were treated. Elk frequently use these treated areas and it is assumed that many were beneficial to elk. Most of these treated areas that have not been retreated are rapidly filling in with PJ and shrubs.

One of the primary goals of the current Uncompahgre Project, a collaborative effort between USFS, BLM, CDOW, the Public Lands Partnership, and the local community, is to improve habitat conditions for deer, elk, and other wildlife species on the Uncompahgre Plateau using coordinated habitat restoration projects. For example, paired treatments in mountain shrub and PJ are being considered to benefit deer and elk and help encourage spatial segregation.

Other factors that can influence habitat conditions for elk include roads and fences. Numerous studies have shown that elk generally avoid roads and effective habitat capability for elk decreases as road density and road use increases. Fences contribute to elk mortality and can impede movement. In particular, woven-wire fences and

improperly constructed worm fences create major obstacles for young calves. These fences are primarily a problem on the southern end of the Plateau.

Habitat Capability

There is no easy or accurate way to assess habitat capability (i.e., carrying capacity) for elk on a DAU basis. Current elk numbers have far exceeded carrying capacity expectations from 10-20 years ago. Habitat models such as HABCAP used by the USFS are attempts to estimate habitat capability by using readily available inputs (e.g., forest overstory structure, road density). Although such models can be useful tools for evaluating different management options, they greatly oversimplify very complex systems. Carrying capacity is dynamic and can shift dramatically depending on weather conditions, the arrangement of habitat components, animal distribution, disturbance factors, and multispecies interactions. Body condition and population productivity are probably the best indicators of density-dependent effects and habitat capability. Low reproductive success, high mortality of young, and poor body condition are indicators that a population is at or approaching the capacity of the habitat. No quantitative data are available to assess these indicators for E-20 except post-hunt calf/cow ratios. These ratios show a general downward trend (see page 14) suggesting that density-dependent effects may be acting on the E-20 elk population.

Conflicts

Elk Damage

The state of Colorado is liable for compensating landowners for documented damage to commercial agricultural products, livestock forage, and fences by elk and other big game animals provided the landowner allows reasonable hunting access and charges no more than $100 per hunter. The CDOW also provides stackyards and fencing materials at no charge to qualifying landowners to mitigate big game damage problems.

There have been few elk damage complaints submitted to the CDOW in E-20 in the last decade. Between July 1992 and June 2002, only three claims for elk damage in DAU E-20 have been approved. Two claims for hay damage in Unit 62 totaled $1,015 and a claim for fence and forage damage in Units 62 & 65 was paid for $19,140. In comparison, 59 claims for deer damage, primarily to corn, totaling approximately $155,000 were approved in Units 61 & 62 during the same period. Although few elk damage claims have been submitted to the CDOW in recent years, many landowners in E-20 have expressed concern about potential and realized elk conflicts. Primary conflict areas include the Unaweep Canyon and the Nucla area in GMU 61, and the Colona and Pleasant Valley/Loghill Mesa areas in GMU 62.

In September 1996, the Uncompahgre Habitat Partnership Program (UHPP) was created. The UHPP area includes Game Management Units 61 and 62 as well as 60, 64, 65, and 70. The mission of the UHPP is to identify and solve livestock/big game conflicts that pertain to rangeland forage, growing and harvested hay crops, harvested crop aftermath grazing, and fences on both private and public lands. The UHPP receives 5% of the hunting license revenue generated in the 6 game management units that it encompasses (1998 budget approximately $140,000; 2,000 budget approximately $80,000). Projects that have been approved by the UHPP for funding include providing materials to repair fences damaged by elk, roller chopping on public and private lands to improve deer and elk habitat, fertilizing hay meadows to compensate for elk grazing, and noxious weed control. Elk conflicts identified by the UHPP in DAU E-20 include elk grazing spring pastures and hay meadows in the Unaweep Canyon, fence damage throughout the DAU, elk competition with cattle for range forage on private and public lands, and elk damage to cured forage.

In addition to agricultural damage, elk can also cause damage to lawns and ornamental plants in residential areas and other non-agricultural areas such as open space and golf courses. Elk/vehicle accidents, although much less common than deer/vehicle accidents, are another concern.

As a general rule, elk will go where they are least disturbed given adequate food resources. Hunting pressure is the best way to disturb an elk and habitat improvement projects are the best way to actively manage for adequate food resources away from conflict areas.

It should be noted that many landowners in E-20 realize significant economic benefits from elk by leasing hunting rights, guiding elk hunts, and charging hunter trespass fees.

Elk Competition With Domestic Livestock

Several ranchers on the Uncompahgre Plateau have expressed concern about elk competition with cattle and sheep on private land and on public lands permitted for livestock grazing. For game damage purposes, the CDOW considers 2.5 elk months to equal 1 AUM. Some livestock producers believe that elk in E-20 are significantly reducing their useable forage yields by grazing spring and summer rangelands prior to cattle. There is also concern that the potential benefits of controlled livestock grazing are not realized when subsequent elk grazing is uncontrolled.

Studies across the west have shown that elk and cattle diets often have moderate to high overlap. However, elk and cattle use is often temporally and spatially segregated. At times elk will graze among cattle but they generally avoid concurrent use. In areas where cattle occur, elk often prefer ridges and steeper slopes, avoid roads, and do more grazing near the edges of openings than cattle. Although elk can compete with livestock, each mouthful taken by an elk is not necessarily a mouthful taken from a cow or sheep.

The point where forage use by elk actually begins to negatively affect livestock production is difficult to determine. Recent studies in Utah have indicated that elk grazing rested pastures can have little effect on forage available to cattle the following year. A study by the CDOW comparing calf weights of cattle grazing pastures with different elk densities failed to show a clear relationship between calf weights and elk numbers but did indicate a small reduction in calf weights at higher elk densities. By artificially penning cattle and elk in the same enclosures, this study obviated any resource partitioning dynamics that might normally occur.

Interactions between elk and livestock can be positive. Elk often show a preference for areas that have been previously grazed by cattle because of the nutritious regrowth. Conversely, elk can help maintain openings and create trails used by livestock.

Elk Competition With Deer

Potential competition and conflicts between elk and mule deer are largely undetermined. Several studies in the western United States have found that mule deer and elk generally show only moderate diet overlap except during periods of food shortage such as during severe winters. An elk's larger body and rumen size allow it to utilize diets higher in fiber and lower in digestibility than those tolerated by deer. Elk generally prefer to graze on grass, sedges and forbs during much of the year whereas deer often elect to browse during the winter and select forbs, succulent young grass, and new leader growth during the growing season. Deer are not able to utilize high fiber, grass diets as effectively as elk and therefore have a narrower dietary tolerance. Although deer are probably better adapted to browse diets than elk (e.g., deer have tannin binding proteins in their saliva), elk can effectively utilize browse diets when necessary. In periods of food shortage, elk will out-compete deer. During most winters, there is spatial segregation between the majority of elk and deer on the Plateau. Elk generally winter in the Gambel oak/mountain shrub/manzanita community types above 7,500' whereas most deer winter in the pinyon-juniper/sagebrush/agricultural interface zone below 7,500'.

Other potential interspecific conflicts between deer and elk such as negative social interactions (e.g., species intolerance, competition for calving and fawning areas) are complex and poorly understood. For example, it has been hypothesized that large numbers of elk might force deer into less preferred habitat where the deer are more susceptible to predation. Casual observation during 3 years of neonatal fawn capture work on the Plateau indicated little evidence that elk are negatively impacting deer during fawning. Elk calving on the Plateau occurs 2-4 weeks prior to fawning and by the peak of fawning elk have already grouped into nursery herds. Deer are often observed in close proximity to elk with no apparent negative interaction.

The mule deer population on the Uncompahgre Plateau has generally been in decline since the early 1980's. Although a causal relationship has never been conclusively established, this decline, as in many other areas of Colorado, coincides with an increase in the number of elk. It is likely that the mule deer decline on the

Uncompahgre Plateau and throughout most of the western United States is multi-factorial with habitat loss and fragmentation, decadent and maturing habitats, increased human activity, predation, disease, and elk competition each playing a role.

ISSUES

Issue Solicitation Process

Input for the DAU planning process has been or will be solicited by the following methods: (1) in the fall of 1998, a DAU questionnaire was mailed to affected agencies, organizations, and individuals (i.e., landowners, outfitters, businesses), and distributed in the field during the 1998 big game season and at the CDOW Montrose Service Center (Appendix 2); (2) a letter requesting comment and AUM's for the E-20 area has been sent to local U.S. Forest Service and Bureau of Land Management offices, yet comments have not been received to date; (3) a draft of the DAU plan will be available at the Montrose and Grand Junction CDOW offices, distributed to target individuals, land management agencies, the HPP committee, and organizations for review and comments; and (4) public meetings were held at locations around the DAU including Montrose, Norwood, and Redvale.

Issue Identification

The primary purpose of the DAU planning process is to determine objectives for the size and structure of the post-hunt population. A secondary purpose of the process is to gather public input on the best manner to achieve the desired DAU objectives. In the case of DAU E-20, this includes the issue of placing all or part of Unit 62 under quality elk management.

Population and Sex Ratio Objectives:

- Post-hunt population size.
- Post-hunt bull/cow ratio.

Management Objectives:

- Should Unit 61 continue to be managed as a quality elk unit with all licenses limited?
- Should all of Unit 62 be managed as a quality unit for elk similar to Unit 61?

ALTERNATIVE DEVELOPMENT

POST-HUNT POPULATION & SEX RATIO OBJECTIVES

The estimated post-hunt elk population in E-20 has been maintained at between 8,400 and 9,300 elk, other than a brief surge over 10,000, for the last 14 years. Although there have been conflicts with elk in E-20 during this period, they have generally been localized or relatively minor. There is little evidence to suggest a lower elk population would be greatly beneficial from a habitat, interspecies competition, or game damage basis. A major reduction in elk numbers and maintenance of the population at a lower level would be difficult. Alternatively, higher elk numbers could increase the potential for habitat degradation, interspecies competition, and increased game damage conflicts. The declining trend in calf:cow ratios in the last decade could indicate that density-dependent effects are already acting on the population. For these reasons, the CDOW recommendation for the E-20 population objective is to maintain the post-hunt elk population between 8,500 and 9,500 elk.

Sex ratio objectives are dependent on which management strategy is adopted. If GMU 62 continues to be managed as an over-the-counter unit for bull elk, the observed bull:cow ratio objective should not exceed 20 bulls/100 cows. Establishing a higher objective would be unrealistic with unlimited bull licenses in GMU 62. If GMU 62 becomes totally limited and is managed as a quality unit along with GMU 61, bull:cow ratio objectives can exceed 30 bulls/100 cows. Management alternatives and how they affect bull cow ratio objectives are discussed in the following sections.

POST-HUNT POPULATION OBJECTIVE ALTERNATIVS

Three post-hunt population objective alternatives are being proposed for E-20: (1) 7,500-8,500, (2) 8,500-9,500, or (3) 9,500-10,500. The CDOW does not recommend managing for more than 10,500 elk in E-20 because of habitat and conflict concerns. Conversely, the majority of public comment received on the 2002 draft E-20 Plan did not support a major reduction in the number of elk in E-20.

MANAGEMENT STRATEGIES

There are three basic management strategies that the Colorado Division of Wildlife is currently using for elk DAUs. Ideally, all units within a DAU should be managed under the same strategy. E-20 is the only elk DAU in western Colorado that is currently being managed under multiple strategies.

STRATEGY 1. ***Management for Maximum Opportunity & Economic Benefits.*** The current management of Unit 62 is typical of this strategy which seeks to maximize hunter opportunity and local economic benefits and minimize land-owner conflicts. This management strategy is characterized by large numbers of bull hunters, low hunting success for bulls (i.e., < 20%), and a high annual removal of 2 yr old bulls resulting in an observed post-hunt bull/cow ratio that is usually less than 20 bulls/100 cows. Whereas rifle licenses for antlerless elk are limited and issued in numbers necessary to achieve population objectives, bull licenses during the archery season and the 2nd, 3rd, and 4th rifle seasons are unlimited in number and sold over-the-counter (OTC).

STRATEGY 2. ***Management for Improved Experience & Reduced Impacts.*** This strategy limits the number of hunters for all methods of take for all seasons to reduce hunting pressure and improve the quality of the hunting experience. The primary objective is not to increase bull/cow ratios or have more bulls in older age classes. Moderate numbers of limited bull licenses are issued for all seasons and success rates are typically higher than in OTC units. This management strategy is similar to that in E-25 (Units 66 & 67) and E-51 (Unit 51).

STARTEGY 3. ***Management for Quality Animals & Quality Experience.*** This strategy greatly limits the number of bull hunters to achieve a post-hunt bull/cow ratio of at least 30/100. The quality management strategy is characterized by a small number of limited bull licenses, high hunter success for bulls (i.e., $\geq$ 50%) with a good proportion of harvested bulls three years and older, and usually 5 or more preference points to draw a rifle bull license. The current management of Units 2, 10, and 201 in northwest Colorado are examples of this category.

Although the intent has been to manage Unit 61 under this strategy since 1983, it has not been possible to achieve bull/cow and bull age structure objectives because of the influence of unlimited bull licenses in Unit 62.

MANAGEMENT ALTERNATIVES

Four management alternatives are being presented for E-20. These alternatives include different combinations of Strategies 1 and 3. Management Strategy 2 is not being considered for E-20.

ALTERNATIVE 1. ***Status Quo.*** This alternative would keep Unit 62 as an over-the-counter unit for elk (Strategy 1) and Unit 61 would remain a limited unit (Strategy 3). E-20 would probably continue to attract over 5,000 elk hunters per year and the observed post-hunt bull/cow ratio would likely remain in the range of approximately 16-20 bulls/100 cows. Hunter success for bulls would remain about 16% for the DAU. Producing large, mature bulls in Unit 61 would remain problematic because of heavy hunting pressure in Unit 62.

ALTERNATIVE 2. ***Manage both 61 & 62 as OTC units (Strategy 1)***. This alternative would result in Unit 61 being changed back to an OTC elk unit. Elk hunting pressure in Unit 61 could potentially increase four fold with over 10,000 elk hunters each year in E-20. The observed post-hunt bull/cow ratio for E-20 would likely not exceed 12 bulls/100 cows and success rate on bulls for all manners of take would likely not exceed 12%. Antlered harvest would consist almost entirely of 2-year old bulls.

ALTERNATIVE 3. ***Manage both 61 & 62 as limited, quality units (Strategy 3).*** Alternative 3 would place all of Unit 62 and therefore all of E-20 under quality animal management. The observed bull/cow ratio would be managed for at least 30 bulls/100 cows. The number of bull licenses in Unit 62 would probably need to be reduced by at least 70% to achieve objectives. With a post-hunt population of 9,000 elk, bull hunter numbers would need to be reduced to approximately 1,000-1,500. Six or more preference points would likely be required to draw a bull license. Success rates would be expected to increase to over 50% with a higher proportion of older age class bulls in the harvest. Surrounding OTC units would likely experience increased hunting pressure. Private landowners that charge for elk hunting in GMU 62 would no longer be guaranteed that specific hunters could get bull licenses. There would be the option to have licenses valid for the entire DAU. **NOTE: This alternative management plan can only be developed after the unit is nominated by the public to become limited and is accepted by the Wildlife Commission.**

ALTERNATIVE PROJECTIONS

Model simulations can be used to project the outcome of different management alternatives on elk harvest, hunter numbers, success rates, and local economic impact. For comparison purposes, actual E-20 data from 1997-2001 are provided in Table 12. Simulations representing a post-hunt population of 9,000 elk managed for 10 post-hunt bull/cow ratios are presented in Table 13.

The following assumptions based on CDOW radio-collared elk studies were made for all projections: 88% natural winter calf survival, 96% natural annual adult survival, 15% bull wounding loss, 25% cow wounding loss, 10% illegal take of yearling bulls. The post-hunt ratio of calves/100 cows was assumed to be 44. This cow/calf ratio is similar to the average ratio observed in E-20 between 1990 and 2001. Calf harvest was assumed to be equal to the average E-20 calf harvest between 1990-2001 (i.e., 68 calves/year). Additional assumptions used for model simulations: 50:50 post-season calf sex ratio, 50% of bull hunters are non-residents, 30% of cow hunters are non-residents, and local expenditures of $609 per resident elk hunter and $787 per nonresident elk hunter. Modeled bull:cow ratios were assumed to be 40% higher than observed ratios based on the current E-20 elk model.

Success rates for bull hunters were assumed to vary from 10-60% depending on the bull/cow ratio. Bull hunter success rates were aligned on the mean success rates observed in Unit 62, E-20, and Unit 61 (i.e., 14%, 17%, and 50%, respectively). Success rate for antlerless elk hunters was assumed to be 31% for all bull:cow ratios. This is similar to the average antlerless success rate observed in E-20 between 1997-2001. To achieve observed bull/cow ratios greater than 20, Unit 62 must be managed as a limited unit and the number of bull hunters reduced. Bull and cow harvest rates represent the number of animals that must be annually removed from the population exclusive of normal natural mortality to stabilize the population at the post-hunt population objective once the desired ratio has been achieved. To increase the bull/cow ratio to the desired ratio from current ratio, bull harvest would need to be reduced to less than the simulated harvest until the desired ratio was achieved.

Table 11. Elk harvest, hunters, and economic impact for DAU E-20, 1997-2001. Either- sex license holders (e.g., either-sex archery hunters and either-sex PLO hunters) were assigned to bull or cow hunter categories in proportion to the harvest of bulls and cows by each group. Local expenditure does not include license sales.

Year	Post-hunt Population Estimate	Observed Bulls/100 Cows	Bull Harvest	Bull Success Rate (%)	Antlerless Harvest	Antlerless Success Rate (%)	Bull Hunters	Antlerless Hunters	Local Expenditure (Millions $)
1997	9,200	14.3	783	15.9	635	30.2	4936	2105	4.84
1998	8,800	12.8	722	16.2	741	32.5	4469	2279	4.63
1999	8,800	18.5	733	13.2	604	34.4	5545	1755	5.03
2000	9,100	15.8	880	18.3	739	29.8	4802	2478	4.99
2001	9,100	18.4	690	21.3	808	29.8	3244	2714	4.06
Ave	**9,000**	**16.0**	**762**	**17.0**	**705**	**31.3**	**4599**	**2,266**	**4.71**

Simulations resulted in annual bull harvests from 622 to 828 bulls/year, hunter numbers from 3,000 to over 10,000 per year, and local expenditure from $2.09 million to $7.52 million/year. Hunter numbers projected for Alternative 2 (manage for an observed bull:cow ratio of 11 bulls/100 cows) assume that hunter interest in E-20 would not decrease if both Unit 61 and Unit 62 were opened to over-the-counter elk hunting. However, it is likely that interest in hunting Units 61 and 62 would decline as crowding increased and success rates declined. Heavy hunting pressure in Unit 62 has no doubt occurred in part because it has been adjacent to a quality unit.

Some of the reduced local expenditure resulting from limiting all elk licenses in Unit 62 would likely be offset by increased hunting pressure in surrounding over-the-counter units.

Table 12. Projected annual elk harvest, hunters, and economic impact to maintain a post-hunt population of 9,000 elk with 10 different post-hunt, bull:cow ratios. Shaded rows most closely approximate management alternatives (Mgmt Alt) discussed on pages 31-32. Local expenditure does not include license sales.

Mgmt Alt	Observed Post-hunt Bull/Cow Ratio	Modeled Post-hunt Bull/Cow Ratio	Bull Harvest & (Success Rate %)	Antlerless Harvest & (Success Rate %)	Bull Hunters	Antlerless Hunters	Local Expenditure Millions $
2	11/100	15/100	828 (10%)	763 (31%)	8,280	2,461	7.52
	14/100	20/100	793 (15%)	742 (31%)	5,287	2,394	5.28
1	16/100	22/100	777 (17%)	731 (31%)	4,571	2,358	4.75
	18/100	25/100	761 (20%)	723 (31%)	3,805	2,332	4.20
	21/100	30/100	729 (25%)	705 (31%)	2,916	2,274	3.54
	25/100	35/100	700 (35%)	687 (31%)	2,000	2,216	2.86
	29/100	40/100	673 (50%)	669 (31%)	1,346	2,158	2.37
3	30/100	42/100	662 (50%)	663 (31%)	1,324	2,139	2.35
	32/100	45/100	647 (55%)	653 (31%)	1,176	2,106	2.22
	36/100	50/100	622 (60%)	638 (31%)	1,037	2,058	2.09

RESULTS OF THE 1998 E-20 SURVEY AND 2005 PUBLIC MEETINGS

In 1998, 823 public comment questionnaires were distributed to obtain public input on the management of D-19 and E-20. Results of the E-20 portion of the survey are shown in Appendix 2. A total of 266 questionnaires (32% response rate) were returned (85% resident; 15% non-resident). Sixty-five percent of all respondents and 52% of landowner respondents desired an increase in the E-20 elk population. Fifty-six percent of the respondents supported totally limited bull licenses in Unit 62; 40% were opposed. In response to the question of how E-20 should be managed, 8% answered that bull licenses in Unit 61 should be increased; 38% answered that Unit 62 should be managed as a limited unit; 25% preferred a combination of increasing bull licenses in Unit 61 and limiting bull licenses in 62; and 21% preferred current management.

In August and September of 2005 public meetings were held in Montrose, Norwood and Redvale to collect more recent public input on how elk should be managed in E-20. A total of 21 people attended the 3 meetings. Sixty-four of attendees that responded indicated that they were happy with the current elk population. In regards to elk population numbers, 67% of respondents indicated that their preferred population objective was 8,500-9,500 animals. For management alternatives, 14% of respondents indicated they would prefer alternative #1 (status quo), 7% preferred alternative #2 (making both GMU's unlimited), and 79% indicated they would prefer alternative #3 (to limit GMU 62 similarly to GMU 61). However, if there is a desire to make a GMU limited, the GMU must be nominated by the public, have illustrated support from communities, and be presented to the Wildlife Commission.

CDOW PREFERRED OBJECTIVES & ALTERNATIVE

The CDOW's preferred objectives for E-20 are to manage for a post-hunt population of 8,500 – 9,500 elk with an observed, post-hunt ratio of 16-20 bulls/100 cows. The CDOW's preferred management alternative for E-20 is **Alternative 1 (Status quo*).***

Reasons for selecting Management Alternative 1:

- It will allow the CDOW to manage E-20 for a quality hunting experience, while still providing opportunity to sportsmen.
- Current management status appears to be controlling the elk population, while providing diverse hunting opportunity.
- The public has to nominate GMUs to go limited, so until this happens Alternative 3 is not an option.
- It will not shift un-needed pressure to surrounding units.
- Local economy will not be affected.

The potential negative impacts of Management Alternative 1:

- Management will remain difficult to grow older age-class bulls in GMU 61 due to potential harvest in GMU 62.
- Law enforcement issues remain concerning use of OTC licenses in premium unit.

A population objective of 8,500 – 9,500 elk is realistic based on population estimates during the past decade. Habitat improvements planned as part of Uncompahgre Project are expected to enhance habitat conditions for elk in E-20.

Licenses issued to achieve antlerless harvest objectives in E-20 will continue to include 1) regular season antlerless licenses, 2) PLO antlerless licenses, and 3) late season PLO antlerless licenses. In addition, late public land antlerless licenses, either-sex licenses in lieu of bull licenses, and antlerless licenses as additional licenses could be considered as possible options.

The Wildlife Commission approved the preferred alternatives in January 2006.

APPENDIX 1

Chronology of E-20 Elk Hunting Regulations

Year	Regulation Change
1957	First elk season in Units 61 and 62 by limited antlered-only permit.
1958	Over-the-counter antlered-only elk licenses valid in Units 61 & 62.
1965	Limited antlerless elk licenses are issued for the first time in units 61 & 62. Archery licenses are introduced.
1971	First year of separate deer and elk rifle seasons. Only branch antlered bulls are legal during regular rifle seasons.
1973	Antler point restrictions on bulls eliminated statewide.
1974	Archery hunters placed under the "one and only one hunt" concept.
1976	Deer and elk license fee increase.
1977	Separate (October) and combined (November) season format implemented for deer and elk.
1983	Preference point system implemented for limited elk licenses. Unit 61 designated a quality elk unit and restricted to limited licenses for all elk hunting.
1986	Three combined rifle deer and elk season structure implemented. Four point antler restriction implemented in Unit 62 for all seasons. Four point antler restriction implemented in Unit 61 during the 1st and 2nd combined rifle seasons. Antlerless elk licenses are not issued for the 1st combined season.
1989	Antler point restrictions eliminated in Unit 61.
1991	Deer and elk license fee increase.
1992	Four point antler restriction modified to allow the take of any elk with a brow tine. Antlerless elk licenses are issued for the 1st combined season in Units 61 & 62.
2000	New season structure implemented with a limited first rifle elk season in Unit 62 followed by three OTC elk seasons.
2001	Non-resident deer and elk license fee increase with subsequent increases based on the consumer price index. Non-residents limited to no more than 40% of the licenses for any limited licenses hunt code, exclusive of private land only and land owner preference licenses, that is not under-subscribed. Priority landowner preference system implemented.
2002	Non-resident antlerless elk license fee reduction.
2003	Additional antlerless licenses made available due to extensive severe drought conditions and concerns for winter range health and viability to extensive grazing.

APPENDIX 2

PUBLIC INPUT QUESTIONNAIRE

DISTRIBUTION & RETURN

In September 1998, a press release providing information about the public comment questionnaire for deer and elk management in Units 61 & 62 was sent to all newspapers in and around Units 61 & 62.

Between September 1998 and November 30, 1998, a sign was posted at the CDOW's Montrose Service Center informing the public of the questionnaire. Questionnaires were available only on request and recipients were asked to identify the group they felt their opinions most represented.

During the 1998 archery, muzzleloader, and tree combined rifle seasons, hunters contacted in the field in Units 61 & 62 by CDOW Area 18 officers and the terrestrial biologist were informed about the questionnaire and copies were provided on request. Recipients were asked to identify the group they felt their opinions most represented.

Questionnaires were mailed or delivered to the following groups in October 1998: 1) all landowners in Units 61 & 62 on the Uncompahgre Habitat Partnership Program list; 2) registered outfitters operating in Units 61 & 62; 3) wild meat processors and taxidermist in the surrounding area; 3) locally owned sporting goods businesses in the surrounding area; 4) USFS, BLM, and DPOR employees and local county and municipal governments.

A total of 823 questionnaires were distributed and 266 were returned (32% return) (Table 14).

Table 13. Distribution and return of E-20 public input questionnaires.

GROUP	DISTRIBUTED	RETURNED	% RETURN
Rancher/Farmer/Landowner	214	48	22
Business	20	9	45
Guide/Outfitter	20	9	45
Local Government/Government Employee	26	7	27
Resident Hunter	357	136	38
Nonresident Hunter	181	40	22
Environmental/Conservation Interest	10	10	100
TOTAL	**823**	**266**	**32**

RESULTS

Results are presented in the same format as the questionnaire. Results are presented for all 266 respondents and for 116 respondents that identified themselves as landowners in E-20. Landowner results are in *italics* surrounded by parentheses.

E-20 PUBLIC INPUT QUESTIONNAIRE RESULTS

Section A. BACKGROUND INFORMATION

A-1. Are you . . . a resident of CO **85% *(100%)*** a non-resident of CO **15% *(0%)***

A-2. Do you live in GMUs 61 or 62?

54% *(14%)* No
46% *(85%)* Yes

yrs in GMU 61 **31 *(32)*** yrs in GMU 62 **27 *(29)***

A-3. Do you own or lease property in GMUs 61 or 62

56% *(0%)* No
44% *(100%)* Yes

acres in GMU 61 **1931 *(1968)*** acres in GMU 62 **893 *(893)***

A-4. During the past 12 months, have you participated in outdoor recreational activities other than hunting (e.g. snowmobiling, 4-wheeling, camping, etc) in GMUs 61 or 62?

30%*(24%)* No **70%*(76%)*** Yes

A-5. Are you . . . **92% *(88%)*** Male **8% *(12%)*** Female

A-6. What is your age?

20 or less	21-40 yrs	41-60 yrs	61-80 yrs	80+ yrs
3% *(3%)*	**23% *(18%)***	**53% *(56%)***	**20% *(23%)***	**1% *(1%)***

A-7. Which group(s) do your opinions about deer & elk management in GMUs 61 & 62 most represent? *(Check all that apply)*

	Answer to Question A-8 below:
a. **30% *(50%)*** Rancher/Farmer	**12% *(27%)***
b. **14% *(25%)*** Business Owner	**3% *(7%)***
c. **38% *(69%)*** Landowner	**6% *(12%)***
d. **11% *(16%)*** Guide/Outfitter	**3% *(16%)***
e. **7% *(6%)*** Government Employee	**3% *(2%)***
f. **86% *(78%)*** Hunter/Sportsperson	**68% *(44%)***
g. **33% (*37%)*** Environmental/Conservation Interest	**4% *(3%)***

A-8. If you checked more than one response in Question A-7 above, write the letter of the one group listed that you MOST represent: **see above**

Section B. PEOPLE & ELK

B-1. Please indicate how interested you are in doing each of the following. *(Circle one number for each item).* How interested are you in .....

	No Interest 1	2	3	4	Very Interested 5	
Watching or photographing elk?						**4.1** ***(4.1)***
Hunting elk in GMUs 61 & 62?						**4.6** ***(4.5)***
Seeing elk in GMUs 61 & 62?						**4.7** ***(4.6)***
Learning more about elk management in GMUs 61 & 62?						**4.4** ***(4.4)***
Providing input for decisions about elk management in GMUs 61 & 62?						**4.5** ***(4.5)***

B-2. Please indicate how concerned you are about each of the following in GMUs 61 & 62. *(Circle one number for each item).* How concerned are you about.....

	No Concern 1	2	3	4	Very Concerned 5		**Personally Affected**
a. Elk-Auto accidents						**2.6** ***(2.7)***	**8%** ***(13%)***
b. Economic losses to ranchers/farmers from elk damage to rangelands/hay/ crops/fences						**3.1** ***(3.6)***	**29%** ***(46%)***
c. Damage from elk to homeowners' trees, shrubs & gardens						**2.2** ***(2.4)***	**7%** ***(12%)***
d. Predation on the elk population from coyotes, bears and mountain lions						**4.2** ***(4.2)***	**46%** ***(45%)***
e. The reduction of elk habitat due to increased human population & development						**4.2** ***(3.8)***	**44%** ***(42%)***
f. The potential of starvation of elk during the winter						**3.7** ***(3.3)***	**10%** ***(11%)***
g. Elk spreading diseases to livestock, pets or humans						**2.7** ***(2.6)***	**3%** ***(6%)***
h. Elk competing with livestock for forage						**3.3** ***(3.2)***	**43%** ***(43%)***
i. The revenue that elk hunting or viewing provides for local businesses						**3.1** ***(3.1)***	**26%** ***(29%)***

B-3. Have you personally been affected by any of the concerns listed in Question B-2 in GMUs 61 or 62?

No Yes

40%*(26%)* **60%*(74%)***

(please circle the letter(s) below corresponding to those elk-related concerns from Question 2 that you have personally been affected by in GUMs 61 or 62.)

% of yes answers are listed in Question B-2:

a b c d e f g h i

B-4. How do you personally feel about elk in GMUs 61 & 62? *(Check one)*

0% *(1%)* I do <u>not</u> enjoy the presence of elk in GMUs 61 & 62 AND regard them as nuisances.

35% *(44%)* I enjoy the presence of elk in GMUs 61 & 62, BUT I worry about problems elk may cause.

64% (*57%)* I enjoy the presence of elk in GMUs 61 & 62, AND I do <u>not</u> worry about problems elk may cause.

1% *(0%)* I have no particular feelings about elk in GMUs 61 & 62.

Section C. ELK MANAGEMENT

C-1. How would you like the elk population in GMUs 61 & 62 change, if at all? *(Check one)*

2% *(4%)* Decrease greatly (over 50%)
7% *(11%)* Decrease moderately (26-50%)
7% *(9%)* Decrease slightly (1-25%)
18% *(21%)* No change
27% *(30%)* Increase slightly (1-25%)
20% *(15%)* Increase moderately (26-50%)
18% *(7%)* Increase greatly (over 50%)
2% *(3%)* Don't know

All respondents: 16% want decrease, 65% increase
Landowners: 24% want decrease, 52% increase

C-2. How important to you is the change in the size of the elk population that you indicated in Question 1 above? *(Circle one).*

Not Important	Slightly Important	Important	Very Important	Don't Know
2% *(3%)*	**12% *(18%)***	**39% *(41%)***	**44% *(37%)***	**2% *(2%)***

C-3. If you indicated that you would like an **increase in the elk population** in Question C-1 above, what methods would you support or oppose to increase the elk population? *(Circle one number for each item)*

	Strongly Oppose 1	Oppose 2	No Opinion 3	Support 4	Strongly Support 5
Reduce hunter harvest of cows	..... **2.9** ***(2.7)***				
Predator control	..... **4.4** ***(4.5)***				
Controlled burning to improve habitat	..... **4.2** ***(4.2)***				
Mechanical treatment to improve habitat (e.g. cutting, roller-chopping, chaining)	..... **4.1** ***(4.1)***				
Chemical treatment to improve habitat (e.g. herbicide, fertilizer)	..... **3.3** ***(3.4)***				
Controlled livestock grazing to improve habitat (holistic management)	..... **3.7** ***(3.2)***				
Reduce deer numbers	..... **1.5** ***(1.4)***				
Reduce livestock grazing on public lands	..... **2.7** ***(3.3)***				
Restrict public access to important elk calving and wintering areas	..... **3.6** ***(3.3)***				
Supplemental winter feeding of elk	..... **3.5*(3.2)***				
Other, please specify:	..... **4.7*(4.8)***				

C-4. How would you like the number of bull (male) elk in GMUs 61 & 62 to change, if at all? *(Check one)*

0% ***(1%)*** Decrease greatly (less than 5 bulls/100 cows)

2% ***(3%)*** Decrease moderately (10 bulls/100 cows)

2% ***(5%)*** Decrease slightly (12 bulls/100 cows)

7% ***(10%)*** No change (16 /100 cows)

29% ***(28%)*** Increase slightly (20 bulls/100 cows)

31% ***(34%)*** Increase moderately (25 bulls/100 cows)

27% ***(18%)*** Increase greatly (over 30 bulls/100 cows)

2% ***(3%)*** Don't know

All respondents: 4% want decrease, 87% increase
(Landowners: 8% want decrease, 80% increase)

C-5. If you indicated that you would like an **increase in the bull population** in Question C-4 above, what methods would you support or oppose to increase the bull/cow ratio? *(Circle one number for each item)*

	Strongly Oppose 1	Oppose 2	No Opinion 3	Support 4	Strongly Support 5
Minimum antler-point restrictions (eg., 5 or more points)	..... **3.1** ***(3.1)***				
Maximum antler-point restrictions (eg. spikes only)	..... **2.2** ***(2.1)***				
Fewer bull licenses	..... **3.3** ***(3.0)***				
Shorter bull seasons	..... **2.8** ***(2.7)***				
No bull hunting during the rut	..... **2.9** ***(2.9)***				
More expensive bull licenses .	..... **2.7** ***(2.7)***				
Increased cow harvest	..... **3.1** ***(3.3)***				
More restricted motorized access during hunting season	..... **3.2** ***(3.2)***				
Other, please specify:	..... **4.7** ***(4.8)***				

C-6. Currently, all elk licenses in GMU 61 are limited and only available through a drawing process. In GMU 62, an unlimited number of over-the-counter bull licenses are available. If all elk licenses were to become limited in GMU 62, elk hunters interested in hunting in GMU 62 would have to apply for a license through the drawing process in early April each year. Only successful applicants would be allowed to hunt and an applicant might not successfully draw an elk license in GMU 62 every year if all elk licenses become limited.

Do you support or oppose a total limitation of elk licenses in GMU 62? *(Circle one)*

Strongly Oppose	Somewhat Oppose	Slightly Oppose	No Opinion	Slightly Support	Somewhat Support	Strongly Support
32% ***(40%)***	**4%** ***(3%)***	**4%** ***(4%)***	**4%** ***(7%)***	**11%** ***(7%)***	**13%** ***(10%)***	**33%** ***(30%)***

All respondents: 40% oppose, 56% support
(Landowners: 46% oppose, 46% support)

C-6a. Why do you feel that way?

_____

C-7. Since 1992, GMU 61 has been managed as a limited-license unit for elk whereas GMU 62 has been open to over-the-counter bull licenses. How would you like these units to be managed in the future? *(Check one)*

Manage GMUs 61 & 62 the same as one another by:

a. **8% *(8%)*** Increasing the number of bull licenses in GMU 61.

b. **38% *(26%)*** Making GMU 62 a limited license unit for elk andreducing the number of bull licenses.

c. **25% *(26%)*** A combination of a & b above.

Manage GMUs 61 & 62 differently from one another by:

d. **21% *(25%)*** Continuing to manage GMU 61 with few elk licenses available and GMU 62 with many elk licenses available.

e. **8% *(14%)*** Other, please specify:

Section D. ELK HUNTING

D-1. Have you ever hunted elk in Colorado?

5%*(8%)* No (Please go to page 18)
95%*(92%)* Yes How many years? **20 *(23)*** years

D-2. Have you ever hunted elk in GMUs 61 or 62?

10% *(9%)* No (Please go to page 18)
90% *(91%)* Yes How many years? in GMU 61? **10*(12)*** in GMU 62? **12*(14)***

D-3. Overall, how satisfied or dissatisfied have you been with your past elk hunting experiences in GMUs 61 & 62? (*Circle one number for each GMU you have hunted)*

	Very Dissatisfied		Slightly Dissatisfied	Neutral	Slightly Satisfied		Very Satisfied
	1	2	3	4	5	6	7

GMU 61 ..... **5.3 *(5.0)***

GMU 62 ..... **3.4 *(3.8)***

D-4. *Rank the following items from 1 to 5* in the order that they would be most likely to improve your elk hunting experience in GMUs 61 & 62. (1=most likely to improve, 5=least likely to improve) Do not use any number more than once.

GMU 61		GMU 62	
3.1 ***(3.0)***	Less hunter crowding	**2.6** ***(2.7)***	Less hunter crowding
3.9 ***(3.7)***	Higher hunter success rate	**3.8** ***(3.6)***	Higher hunter success rate
3.2 ***(3.2)***	Less motorized vehicle access	**3.3** ***(3.2)***	Less motorized vehicle access
2.1 ***(1.9)***	Seeing more mature bulls	**2.3** ***(2.2)***	Seeing more mature bulls
2.7 ***(2.5)***	Seeing more elk	**2.7** ***(2.7)***	Seeing more elk

D-5. Would you like to see more or less of the following as they relate to elk hunting in GMUs 61 and 62? *(Circle one number for each item)*

	Much Less 1	Less 2	Same 3	More 4	Much More 5	
Landowner license preference						**2.8** ***(3.4)***
Non-resident elk hunters						**2.9** ***(2.1)***
Resident elk hunters						**3.2** ***(3.3)***
Temporary road closures during hunting season						**3.1** ***(3.1)***
Permanent road closures						**2.6** ***(2.7)***

D-6. Overall, how would you rate the quality of elk hunting opportunities available in GMUs 61 & 62? *(Circle one number for each GMU you have hunted)*

	Very Poor 1	Fair 2	Good 3	Good 4	Excellent 5	
GMU 61						**3.8** ***(3.7)***
GMU 62						**2.2** ***(2.6)***