TROUBLESOME ELK HERD MANAGEMENT PLAN
DATA ANALYSIS UNIT E - 8
Game Management Units 18 and 181

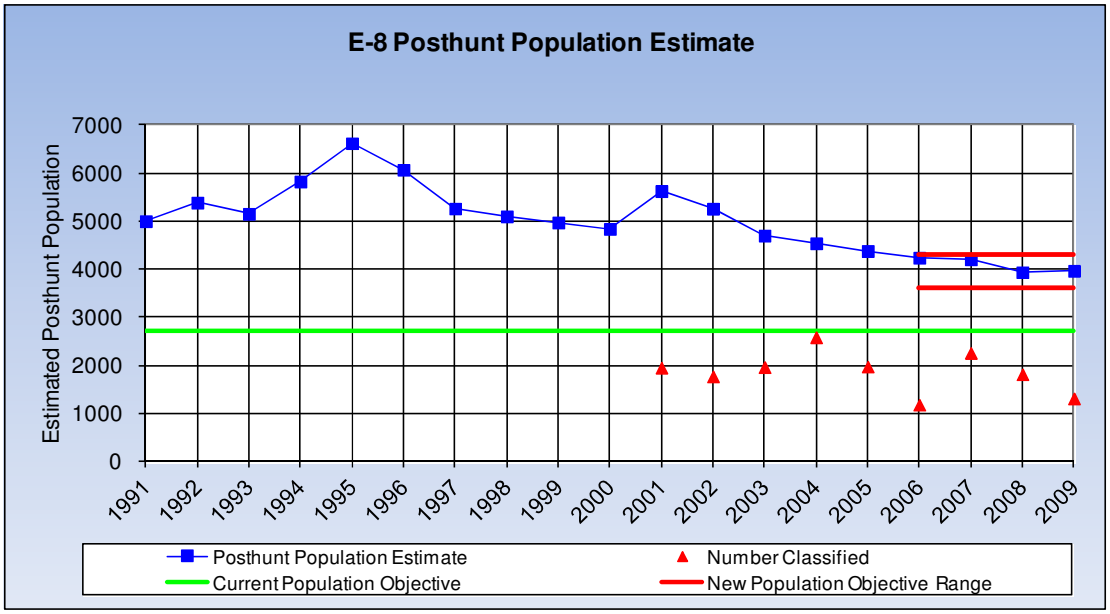
Kirk Oldham
Colorado Division of Wildlife
Terrestrial Biologist
PO Box 216
Hot Sulphur Springs, CO 80451

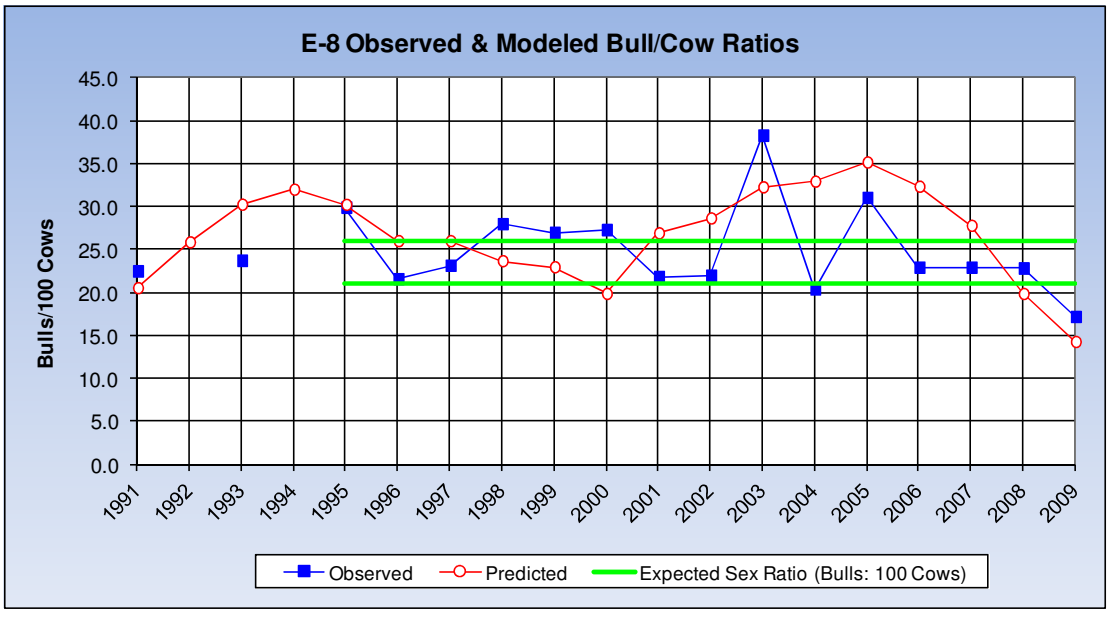
September 2, 2010

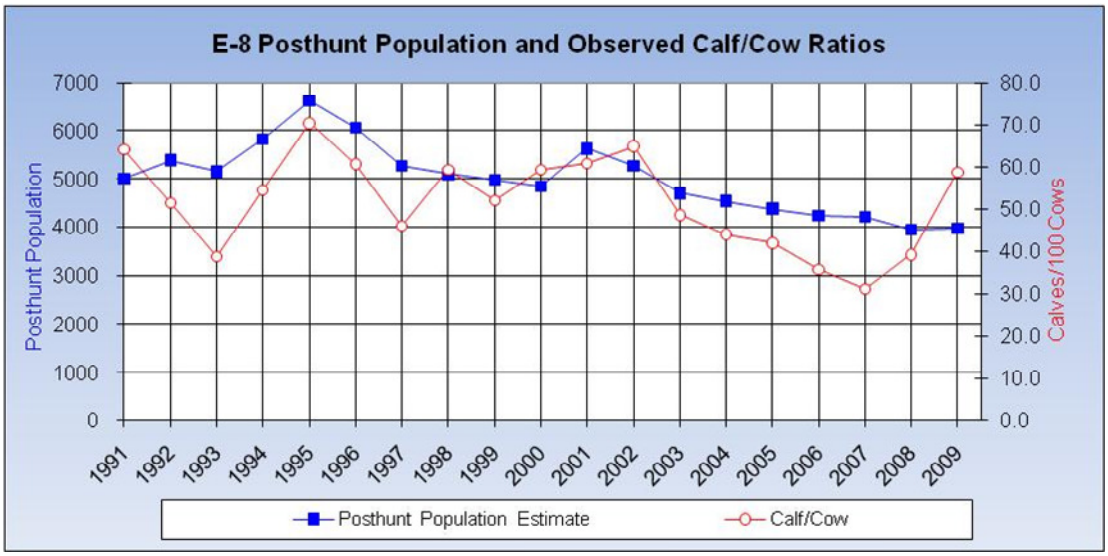
DATA ANALYSIS UNIT PLAN E-8
Contents

DAU E-8 (Troublesome)
EXECUTIVE SUMMARY

GMU's: 18 and 181
Land Ownership: 18% Private, 44% USFS, 19% NPS, 16% BLM, <1% State, 3% SLB
Post-hunt Population: Previous Objective 2,700, 2009 Post-hunt Estimate 3,970 **New Objective 3,600 to 4,300**
Post-hunt Sex Ratio (Bulls:100 Cows): Previous Objective: 24, 5-Year Average Observed: 23.4, 5-Year Average Modeled 25.9
Expected Sex Ratio: 21-26 Bulls:100 Cows
Sex Ratio Lower Management Threshold: 21 Bulls:100 Cows







E-8 Background

Data Analysis Unit (DAU) E-8 is located near the headwaters of the Colorado River in north-central Colorado (Grand county) surrounding the towns of Kremmling and Grand Lake and contains Game Management Units (GMU) 18 and 181. The primary goal of this DAU plan is to set the population objective closer to the number of elk that exist within the DAU. The previous population objective of 2,700 was set in 1991 and 1999 at a level when elk numbers were significantly higher and underestimated. New modeling techniques and biological information from research projects, such as higher elk survival rates observed in radio telemetry studies, will adjust population objectives closer to the current population size. Additional years of experience and data should also improve our population estimation and objective setting abilities.

The current population objective is 2,700. The post-season elk population in this DAU has been above 5,000 animals on several occasions and at a high of over 6,600 elk in 1995. Antlerless harvest has reduced the population to the current post-hunt population estimate of 3,970. Antlerless licenses have been liberal and are additional since 1999. Antlerless harvest has exceeded antlered harvest 7 out of the past 10 years. Attempting to reduce this herd to 2,700 animals has resulted in declining hunter success and satisfaction. Private land game damage conflicts have been minimal within the past 10 years within this DAU.

The current plan has a sex ratio objective of 24. Observed sex ratios averaged 25 bulls:100 cows from 1991 to 2009 and 23 bulls:100 cows from 2005 to 2009. Applying antler point restrictions, limiting 1st and 4th rifle seasons, and increased antlerless harvest has maintained bull to cow ratios and has balanced good opportunity and quality.

E-8 Significant Issues

Only a limited amount of habitat is available in this DAU to support elk in the winter. Habitat continues to be converted to housing and associated development. Only 10% of elk severe winter range is in this DAU, the majority of it lies within private property.

Rocky Mountain National Park (RMNP) lies on the east side of this DAU. Elk utilize the portion of RMNP within this DAU throughout summer and fall and then migrate during the winter complicating management. Additionally, hunter harvest does not occur within RMNP.
Since 1998, the mountain pine beetle infestations and resulting lodgepole pine mortality has significantly altered the vegetation type in this DAU. Forage for elk has increased significantly

within the lodgepole forest. Carrying capacity for elk has increased within this DAU and distribution of elk had been dramatically altered. This distribution and increased use of the lodgepole forest has contributed to the reduction in game damage conflicts.

The majority of this DAU lies within public land management (USFS, BLM, or NPS). Changes in recreational use such as the increase in mountain bikes, all-terrain vehicles, and snowmobiles within the public land have made areas more accessible throughout the year. Elk are increasingly susceptible to these types of recreational disturbances. Coupling these recreational changes with an increased concentration of hunters within certain area of public land, elk are often displaced onto private land where they are minimally hunted or not hunted at all.

E-8 Management Alternatives
Three post-season population objective alternatives for E-8 have been evaluated:

1. 2,700 to 3,600 (current population objective)
2. Preferred Alternative 3,600 to 4,300 (current population)
3. 4,500 to 5,500 (20% increase)

Alternative 1 continues to decrease the population by 20%. Alternative 2 is the preferred alternative that is the current population. Alternative 3 is approximately a 20% increase in the current population size, but is still below population peak of 5,800 to 6,600 in 1994 through 1996 when game damage issues were much greater. The preferred alternative of 3,600 to 4,300 is appropriate given habitat capabilities and was selected to attempt to balance population size between current reduced hunter satisfaction and minimal game damage conflicts.

Preferred Alternative Population Objective: 3,600 to 4,300

Expected Sex Ratio Range (Bulls:100 Cows)
The sex ratio expected range for E-8 is 21-26 bulls:100 cows. Currently the 5-year bull to cow ratio average of 23.4 and the 10-year average of 24.6 are within the management range of 21-26 bulls:100 cows. Only 12% of the sex ratio estimates since 1991 fall below the lower threshold of this range. The majority (52%) of the estimates fall within the management range. Observed sex ratios in E-8 have a high degree of variability. For example, sex ratio observed estimates ranged from 22.0 to 33.8 and back to 20.4 between 2002 and 2004.

Thus for this DAU plan a range of 21-261 bulls:100 cows is the expected sex ratio range given continued management with an OTC licensing system, antler point restrictions, and the current 5-year season structure.

Management Thresholds
This expected range does not affect current bull harvest management of limited 1st rifle season, 4th rifle season, and muzzleloader season and over-the-counter bull licenses in archery, 2nd rifle season, and 3rd rifle season. This is supported by the majority of the public and balances hunter opportunity with quality.

If 3-year averages of observed sex ratios fall below the lower threshold of the management range (21 bulls:100 cows), strategies that would reduce bull harvest will be implemented. This will included limiting hunter opportunity within the current management framework. Currently this affects muzzleloader, 1st season rifle, and 4th season rifle licenses.

When 3-year averages of observed sex ratios rise above the management range (26 bulls:100 cows) a potential increase in hunter opportunity would exist. Management strategies to provide an increase in harvest and opportunity may be considered if current conditions are not significantly affected (overall hunter success, hunter crowding, etc.).

INTRODUCTION AND PURPOSE

The Data Analysis Unit (DAU) provides the Colorado Division of Wildlife (CDOW) direction in managing a big game species in a given geographical area. It identifies suitable habitat, gives the herd history and current status, identifies issues and problems, and provides direction for future management.

The Colorado Division of Wildlife 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 Colorado Wildlife Commission and the Colorado Legislature. Colorado's wildlife resources require careful and increasingly intensive management to accommodate the many and varied public demands and growing impacts from people. To manage the state's big game populations, the CDOW uses a "management by objective" approach (Figure 1).

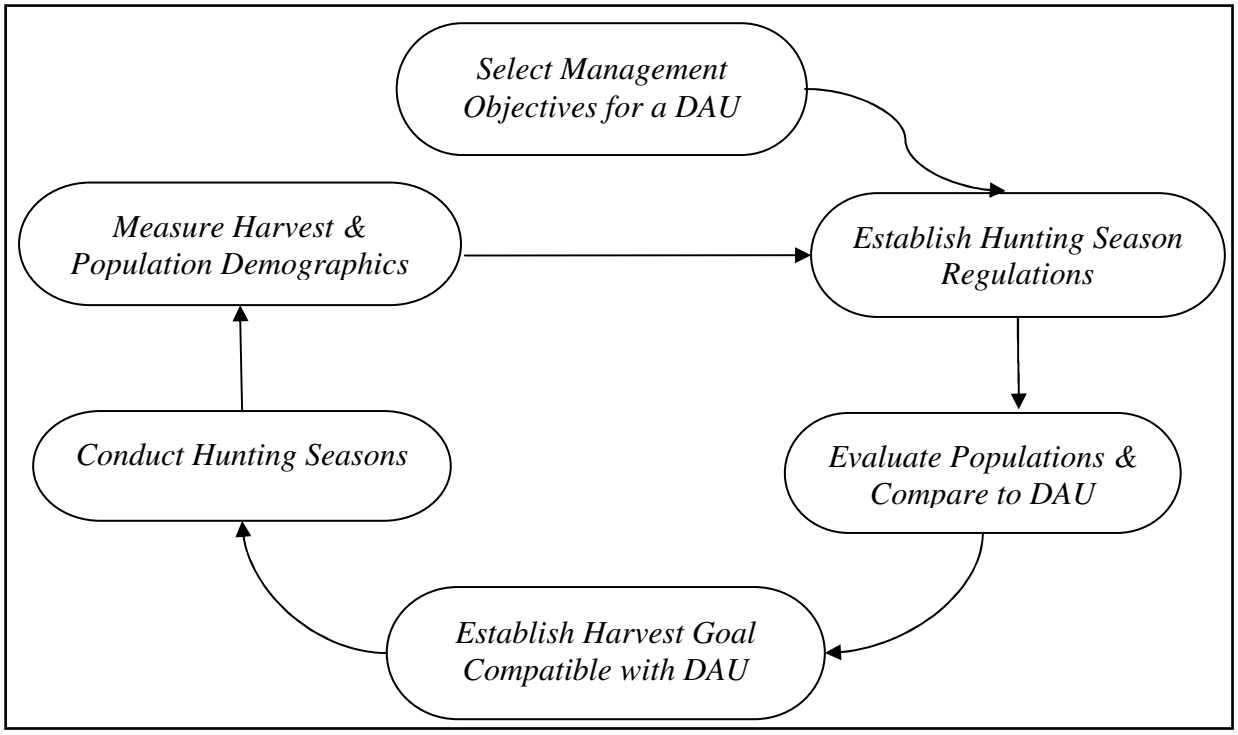


Figure 1. Management by objective process that CDOW uses to manage big game populations on a DAU basis

DAUs provide the framework to manage individual herds of big game animals. DAUs are generally discrete geographically, and attempt to identify a distinct big game population. However, individual animal movements may at times straddle or encompass more than one DAU. While DAU boundaries are administrative, they represent the best way to encompass the majority of a herd within a biological area, and allow the most practical application of

management tools such as hunting to reach objectives. DAUs are typically composed of smaller areas designated as game management units (GMUs), which provide a more practical framework where the management goals can be refined and applied on a finer scale, typically through hunting regulations.

The DAU plan process is designed to balance public demands, habitat capabilities, and herd capabilities into a management scheme for the individual herd. The public, hunters, federal land use agencies, landowners, and agricultural interests are involved in the determination of the plan objectives through questionnaires, public meetings, comments on draft plans, and comments to the Colorado Wildlife Commission (WC). Limited license numbers and season recommendations result from this process.

The objectives defined in the DAU plan guide a long-term cycle of information collection, information analysis, and decision making. The DAU plan establishes the number of animals the DAU should contain and the herd composition. Once approved by the WC, the DAU objectives are compared to modeled population estimates. From these models, license numbers are set. The inputs to these models include:

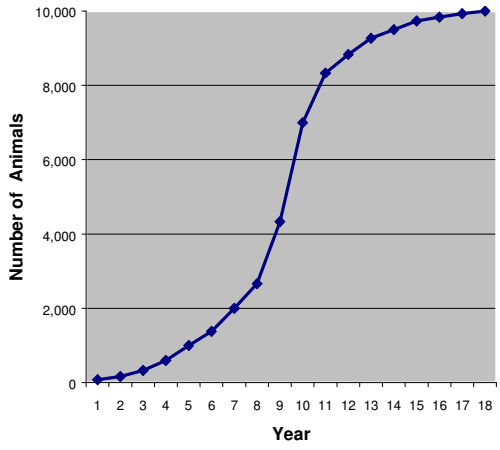
- Harvest estimates determined from harvest surveys
- Post-hunt sex and age ratios determined by aerial classifications
- Estimated wounding loss, illegal kill, and survival based on field observations.

Population objectives and herd composition objectives both influence and are influenced by current population size, carrying capacity, harvest, reproduction and survival, viewing opportunity, and hunter success. Bull:cow ratios objectives also influence hunter opportunity, hunter density, bull harvest, trophy potential, and hunter success.

Population Dynamics and Managing For Sustained Yield

Big game populations grow in a mathematical relationship referred to as the "sigmoid growth curve" or "S" curve (Figure 2). There are three distinct phases to this cycle. The first phase occurs while the population level is still very low and is characterized by a slow growth rate. This occurs because the populations may have too few animals and the loss of even a few of them to predation or accidents can significantly affect the population.

Figure 2. Sigmoid Growth Curve

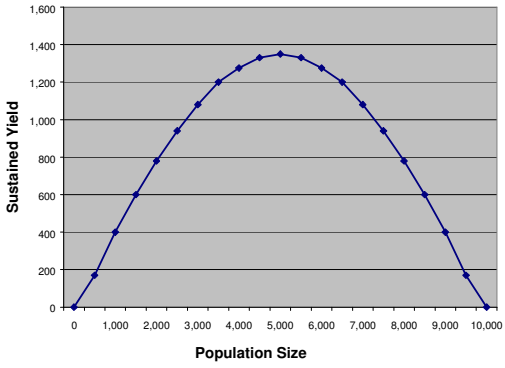


The second phase occurs when the population number is at a moderate level. This phase is characterized by a very high reproductive and survival rate. During this phase, food, cover, water

and space are not limiting factors. Also, during this phase, animals such as white-tailed deer have been known to successfully breed at six months of age and produce a live fawn on their first birthday; older does have been known to produce 3-4 fawns that are very robust and healthy. Survival rates are at maximum rates during this phase.

The final or third phase occurs when the habitat becomes too crowded or habitat conditions become less favorable. During this phase the quantity and quality of food, water, cover and space become scarce due to the competition with other members of the population. This phase is characterized by a decrease in reproduction and survival. Also, during this phase animals such as white-tailed deer fawns can no longer find enough food to grow to achieve a critical minimum weight that allows them to reproduce; adult does will usually only produce 1-3 fawns; and survival will decrease. During severe winters, large die-offs can occur due to the crowding and lack of food. The first to die during these situations are fawns, then bucks followed by the adult does. The severe winters thus affects the future buck to doe ratios by favoring more does and fewer bucks in the population. Also, since the quality of a buck's antlers is somewhat dependent upon the quantity and quality of his diet, the antlers are stunted during this phase. If the population continues to grow, it will eventually reach a point called "K" or the maximum carrying capacity. The level is not static but varies from year to year based upon such factors as the severity of the winter. At this point, the population reaches”equilibrium" with the habitat. The number of births each year approximately equals the number of deaths, therefore, to maintain the population at this level would not allow for any "huntable surplus." The animals in the population would be in relatively poor condition and when a severe winter or other catastrophic event occurs, a large die-off is inevitable.

Figure 3. Maximum Sustained Yield



In an attempt to manage for healthy big game herds, managers should attempt to hold the populations around the middle of the "sigmoid growth curve or even slightly above this point." Biologists call this "MSY" or "maximum sustained yield." At this level, which is approximately half the maximum population sizes or "K", in this example it would be 5,000 animals, the population should provide the maximum production, survival and available surplus animals for hunter harvest. Also, at this level, range condition should be good to excellent and range trend should be stable. Game damage problems should not be significant and economic return to the local and state economy should be at the maximum. This population level should produce a "win - win" situation to balance sportsmen and private landowner concerns.

A graph of a hypothetical deer population showing sustained yield (harvest) potential vs. population size is shown (Figure 3). Notice that as the population increases from 0 to 5,000 deer, the harvest also increases. However, when the population reaches 5,000 or "MSY," food, water and cover becomes scarce and the harvest potential decreases. Finally, when the population reaches the maximum carrying capacity or "K" (10,000 deer in this example), the harvest

potential will be reduced to zero. Also notice that it is possible to harvest exactly the same number of deer each year with 3,000 or 7,000 deer in the population. This phenomenon occurs since the population of 3,000 deer has a much higher survival and reproductive rate compared to the population of 7,000 deer. However, at the 3,000 deer level, there will be less game damage, less resource degradation, and fewer watchable wildlife opportunities.

DESCRIPTION OF THE DATA ANALYSIS UNIT

Location
The Troublesome Elk DAU (E-8) is located in north-central Colorado and consists of GMUs 18 and 181 (Figure 4). It is bounded on the north and east by the Continental Divide, on the south by Arapaho Creek, Lake Granby and the Colorado River, and on the west by US Highway 40. The DAU occupies the northeast portion of Middle Park and takes in slightly less than half of Grand County. It includes the headwaters of the Colorado River and all of the Troublesome, Antelope, Corral and Willow Creek drainages. Major towns include Kremmling and Grand Lake. Hot Sulphur Springs and Granby lie just outside the boundary.

Topography
Middle Park is a large basin surrounded by high mountain ranges. As an inter-mountain park it is unique in two respects. It does not have the level interior characteristic of other large mountain parks in Colorado, such as North Park and South Park, and it lies west of the Continental Divide. The Troublesome Creek DAU has numerous peaks along the Continental Divide reaching altitudes above 13,000 feet. The highest of these is North Arapaho Peak at 13,502 feet in the southeast corner of the DAU. All the natural surface drainage for this area funnels through Gore Canyon, downstream from Kremmling.

Climate
Weather in Middle Park varies greatly depending on location and altitude. In general, the climate is cold and the majority of annual precipitation falls as snow. Drought years occur with some regularity. During winter when there is no wind, cold air becomes trapped by the surrounding mountains, causing extreme temperature inversions. During the middle of winter, nighttime low temperatures in the minus 20-degree Fahrenheit range are to be expected, and can drop much further.

The summer growing season is extremely short and variable. Lower elevations may have daytime temperatures reaching into the 90-degree F. range; however, valleys become significantly cooler than uplands during the night as colder air settles.

Local topography also affects the amount and type of moisture. Kremmling only averages about 11 inches of moisture per year; whereas at Grand Lake, where prevailing winds push clouds up against the Continental Divide, average precipitation is approximately 20 inches. Thunderstorms occur almost daily during the summer along the Continental Divide.

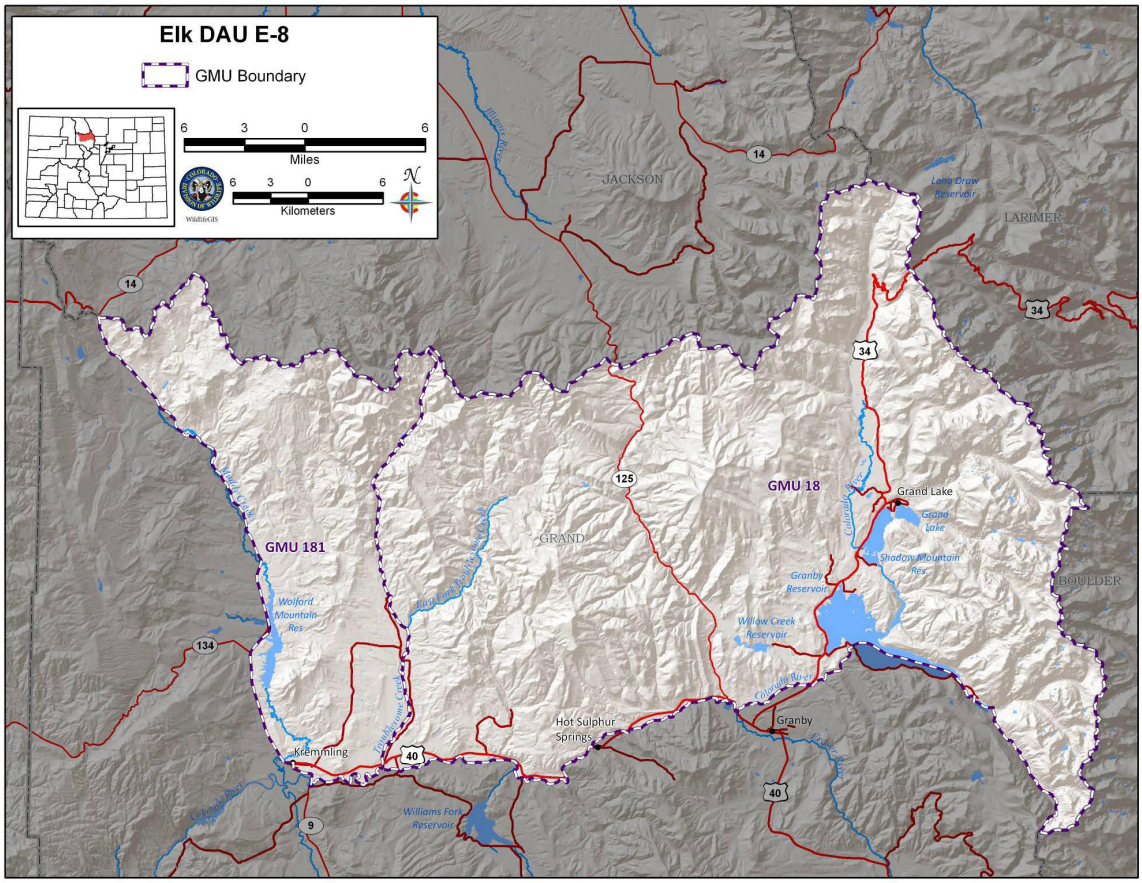


Figure 4. Figure shows DAU E-8 boundaries, GMU's, and towns.

Most of the moisture that falls in the area comes during the period of October to late April. Snow accumulations of 30" are typical at the 9,000-10,000 foot level. At higher elevations, upwards of 20 feet of snow may fall over the course of winter.

Vegetation

Vegetation in Middle Park can be categorized into five broad types – cropland, wetland/riparian, rangeland, forestland and alpine (Figure 5). The variety of vegetation types scattered throughout Middle Park creates a highly desirable mosaic very beneficial to wildlife. However, plant communities at lower elevations are becoming increasingly disturbed by intensive human use.

Croplands consist of irrigated hay meadows and terraces that have been re-seeded to desirable forage plants. Most hay ground is "native hay," consisting of timothy and smooth brome, with sedges and some rushes. A few hay meadows have been seeded to alfalfa.

Wetlands and transition riparian occur along the river bottoms and irrigated meadows. The most extensive riparian habitat lies along the Colorado River between the towns of Granby and Kremmling. This area is dominated by narrowleaf cottonwood and willow. The riparian habitat

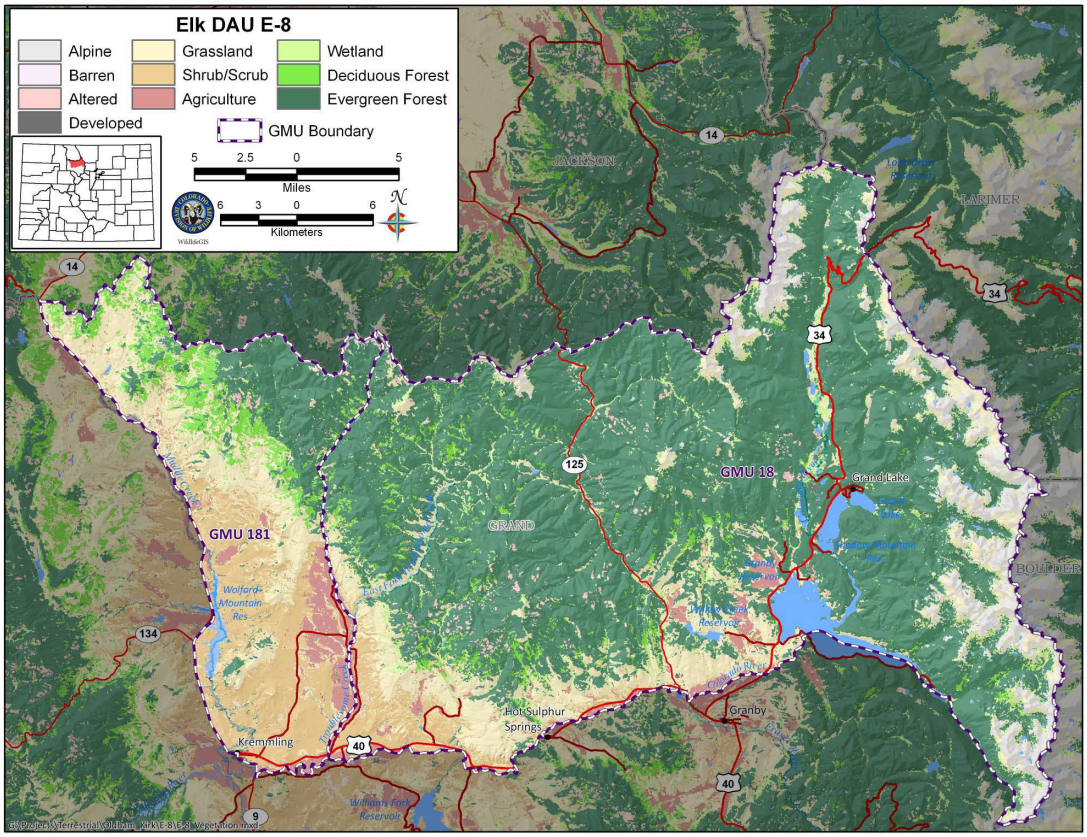


Figure 5. Figure shows vegetation types in E-8.

is one of the least represented vegetative types in Middle Park but is extremely valuable as wildlife habitat. It supports the greatest abundance and diversity of wildlife.

Rangelands consist of sagebrush steppe, mountain shrub and grassland communities. The sagebrush community is by far the most common rangeland in Middle Park at elevations up to 9,000 feet. It is found on drier non-agricultural areas on the valley floors and the lower hills. Mountain shrub, consisting of big sagebrush mixed with serviceberry, chokecherry and antelope bitterbrush, is found on better soils at lower elevations. This plant community is not widely represented in Middle Park but provides important wildlife food and cover. Both sagebrush steppe and mountain shrub have grass and forb understories, making them suitable for rangeland. Bluebunch wheatgrass is prominent in these vegetative types under good range conditions. Native grasslands are found in two different sites. Mountain meadows, consisting of grasses, forbs and some shrubs, occur at higher elevations in association with lodgepole, aspen and spruce-fir forest types. Low elevation grasslands occur on windswept sites with poorly developed soils incapable of supporting sagebrush.

Forestlands in Middle Park can be subdivided into four major types: piñon-juniper, lodgepole pine, aspen, and spruce-fir. Piñon-juniper woodlands are found on some of the lower slopes. Piñon-juniper provides cover during the winter, along with low quality forage.

Lodgepole pine is the most widely distributed forest type. This species typically occurs in even-aged stands at elevations between 7,500 feet and 10,500 feet. The mountain pine beetle (MPB) has impacted these lodgepole pine forests within the past decade and the majority (over 90%) of the mature lodgepole pine stands have been reduced to a large landscape of standing dead trees with a large grass/forb understory that did not occur previously. MPB affected lodgepole pine forest is showing an increased use by elk throughout the year, but most noticeably during fall, spring, and average winters due to the increased grass/forb understory. The previous dense overstory of lodgepole pine provided little forage for elk but was important from the standpoint of cover.

At higher elevations, Engelmann spruce and subalpine fir regularly occur in uneven-aged stands. This habitat provides excellent summer cover for deer and elk. Aspen stands usually are found in areas with better soil moisture, or in areas of less severe exposure at elevations up to 10,500 feet. The understory in aspen typically consists of vigorous herbaceous growth, shrubbery and emerging conifers. This forest type is attractive to a variety of wildlife and provides important cover and forage for big game animals. On some sites aspen is the climax species; on other sites it is a transitional species that occurs for only a relatively short period of time after a disturbance, such as fire. Douglas-fir, ponderosa pine and limber pine forest types also occur in Middle Park, but to a lesser extent.

The alpine community occurs above 11,000 feet in elevation. This community is dominated by stunted Engelmann spruce and subalpine fir giving way to forbs, grasses and sedges. Low growing plants are typically nestled among lichen-covered rocks. In those protected areas blanketed by snow during the winter, and kept moist by melting snow banks during the summer, thickets of bog birch and willows can exist. Alpine sites provide high quality elk forage from July through early September.

Land Status

The DAU covers a total of 519,770 acres. Within this DAU, 59.9 percent of the landscape is administered by the USDA Forest Service (USFS) or the Bureau of Land Management (BLM), 18.6% is Rocky Mountain National Park, and 18.2% is in private management. The State of Colorado (State Land Board and DOW) administers slightly more than 3% of the land area. DOW's portion of this consists of approximately 400 acres on the west side of Byers Canyon. Land management is categorized in Table 1 and Figure 6.

TABLE 1
Land management in DAU E-8 by GMU shown in acres.

GMU	PRIVATE	CITY/COUNTY	CDOW	SLB	NPS	USFS	BLM	TOTAL
18	49,178	45	1,732	2,762	96,521	210,196	44,705	405,138
181	45,221			12,985		20,097	36,328	114,631
TOTAL	**94,399**	**45**	**1,732**	**15,747**	**96,521**	**230,292**	**81,033**	**519,770**
PERCENT	**18.2%**	**0**	**.3%**	**3%**	**18.6%**	**44.3%**	**15.6%**	**100%**

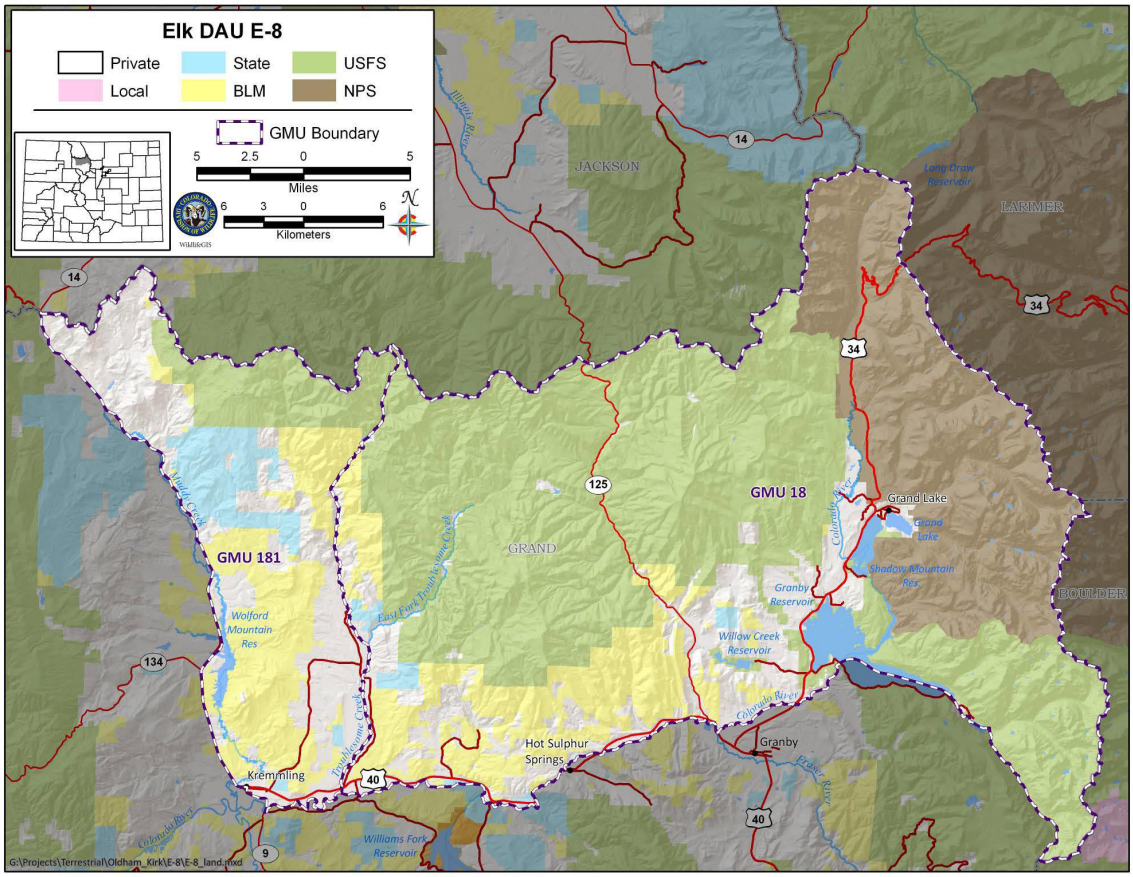


Figure 6. Figure shows land management status of E-8.

Land Use

The main industries in E-8 are recreation and ranching. Expansive mountain communities occur in the areas surrounding Granby and Grand Lake. The Sulphur Ranger District of the Arapaho/Roosevelt National Forest, the Parks Ranger District of the Medicine Bow/Routt National Forest, the Kremmling Resource Area of the BLM and Rocky Mountain National Park administer federal lands within the DAU. Recreation, livestock grazing and wildlife production are predominant uses of USFS and BLM lands, with timber harvest occurring in areas where there are suitable forest products; other activities such as right-of-way administration, mineral production, watershed protection and cultural resource protection are common to the two agencies. The mission of the NPS is to preserve ecosystems and scenery, along with natural and historic objects for future generations.

Grand County is a popular destination for summer recreation users, with numerous campgrounds, dude ranches and other resorts. The west side of Rocky Mountain National Park receives more than 400,000 visitors annually. Reservoirs built to divert water to east slope

metropolitan areas provide good fishing, along with opportunities for recreational boating. The USFS administers the Arapaho National Recreation Area which takes in Lake Granby and Shadow Mountain Reservoir and associated developed recreation sites. The Colorado River Water Conservation District administers Wolford Mountain Reservoir and associated developed recreation sites. Rafting companies offer trips down the Colorado River, and local rivers also provide opportunities for kayaking. All, or portions, of Indian Peaks and Never Summer Wilderness Areas are located within the DAU. The Bowen Gulch Protection Area, administered by the USFS, is also within the DAU. Cross-country skiing and snowmobiling are both popular wintertime activities. The Town of Grand Lake strives to maintain a reputation of being the snowmobile capital of Colorado.

Big game hunters can hunt deer, elk, moose, black bear, pronghorn, bighorn sheep, mountain goat, and mountain lions. Waterfowl hunting, small game, and upland hunting opportunities also occur in this area. Good fishing is provided by several Gold Medal streams, four large reservoirs and numerous high lakes. Hunters and anglers make substantial contributions to local economies. Hunting contributes over 28 million dollars annually to the local economy with over 8 million dollars from out of state hunters (BBC Research and Consulting 2008)[a]. People who take trips to observe and photograph wildlife also buy gas, groceries and other supplies, substantially impacting both destination areas and retailers along travel routes.

Besides providing recreational opportunity, undeveloped lands in the DAU are also used to raise livestock. Most livestock operations are cow-calf enterprises. Most livestock are pastured on USFS or BLM allotments during summer months. Private lands are used for hay production and winter/spring pasture.

HABITAT RESOURCE

Winter habitats are the most limiting habitats for elk within this DAU. DAU E-8 contains approximately 195,528 acres of elk winter range, 51,754 acres of severe winter range and 63,889 acres of elk winter concentration areas (Table 2 and Figure 7). Severe winter range is defined as the area of winter range where 90% of the elk will be confined during the worst two winters out of ten when the snow pack is at the maximum. Winter concentration areas are defined as areas of the winter range having a density of at least 200% more elk than surrounding areas during the normal five out of ten winters.

The bulk of the winter range occurs on BLM land (54%), followed by private land (30%), SLB lands (8%), USFS lands (5%), NPS lands (3%), and DOW lands (<1%).

[a] BBC Research and Consulting. September 2008. The Economic Impacts of Hunting, Fishing, and Wildlife Watching in Colorado. Final Report. 22pp.

TABLE 2
DAU E-8 elk winter use shown in acres

	Overall	Winter Range		Winter Concentration		Severe Winter Range	
GMU	Acres	Acres	% of Overall	Acres	% of Overall	Acres	% of Overall
18	405,138	115,630	29%	36,231	9%	30,991	8%
181	114,631	79,898	70%	27,657	24%	20,763	18%
TOTAL	**519,770**	**195,528**	**38%**	**63,889**	**12%**	**51,754**	**10%**

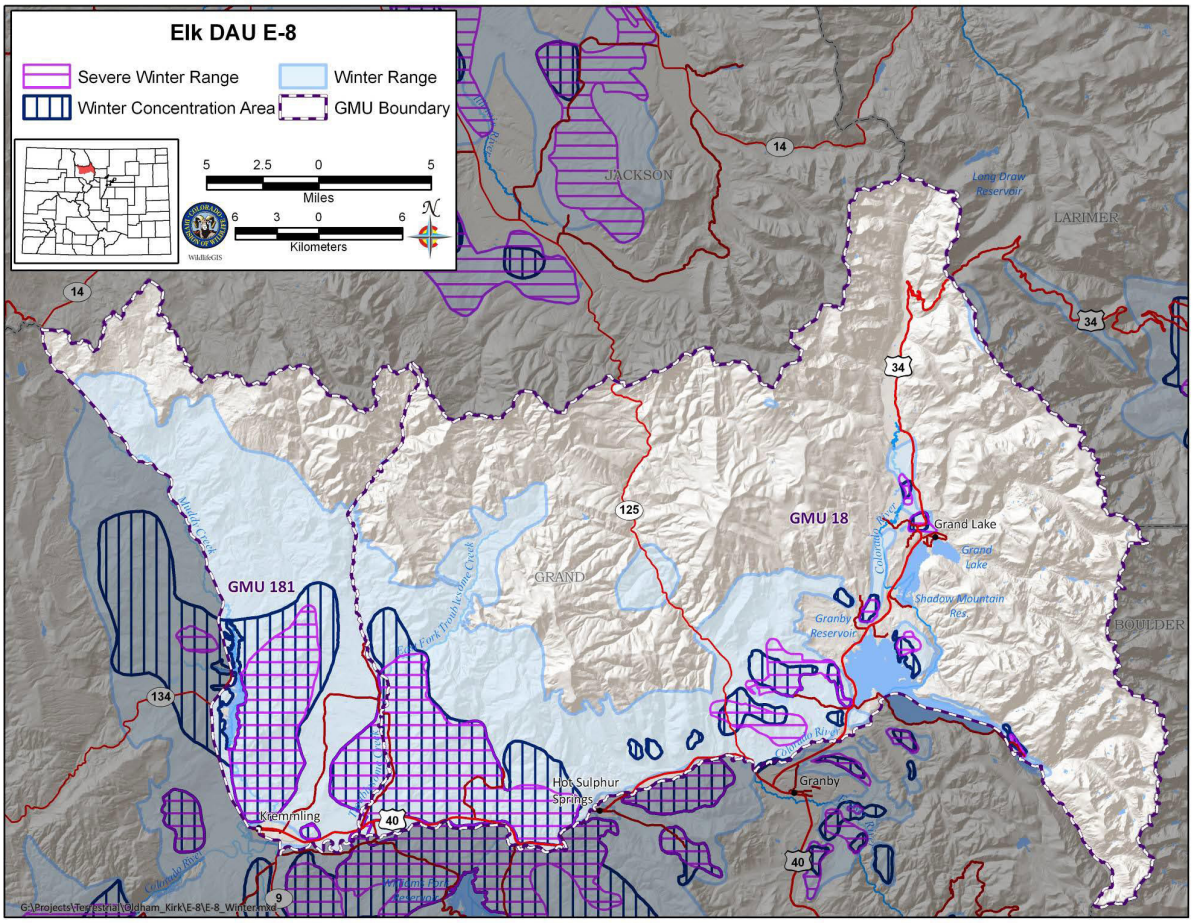


Figure 7. Figure shows E-8 winter elk activity areas.

Elk winter range is a priority habitat in E-8. Of the private property within E-8, 77% (72,406 acres) lies within elk winter range. Conservation easements protect 12,938 acres of private property within E-8 held by a number of groups including Middle Park Land Trust, Rocky Mountain Elk Foundation, The Nature Conservancy, Colorado Open Lands, and the Colorado Cattleman's Agricultural Land Trust. The DOW holds 1,121 acres of private property in conservation easements (Figure 8). Of the land held by conservation easements, 8,432 acres are within elk winter range, 3,569 acres are within elk winter concentration areas, and 2,685 acres are within elk severe winter range.

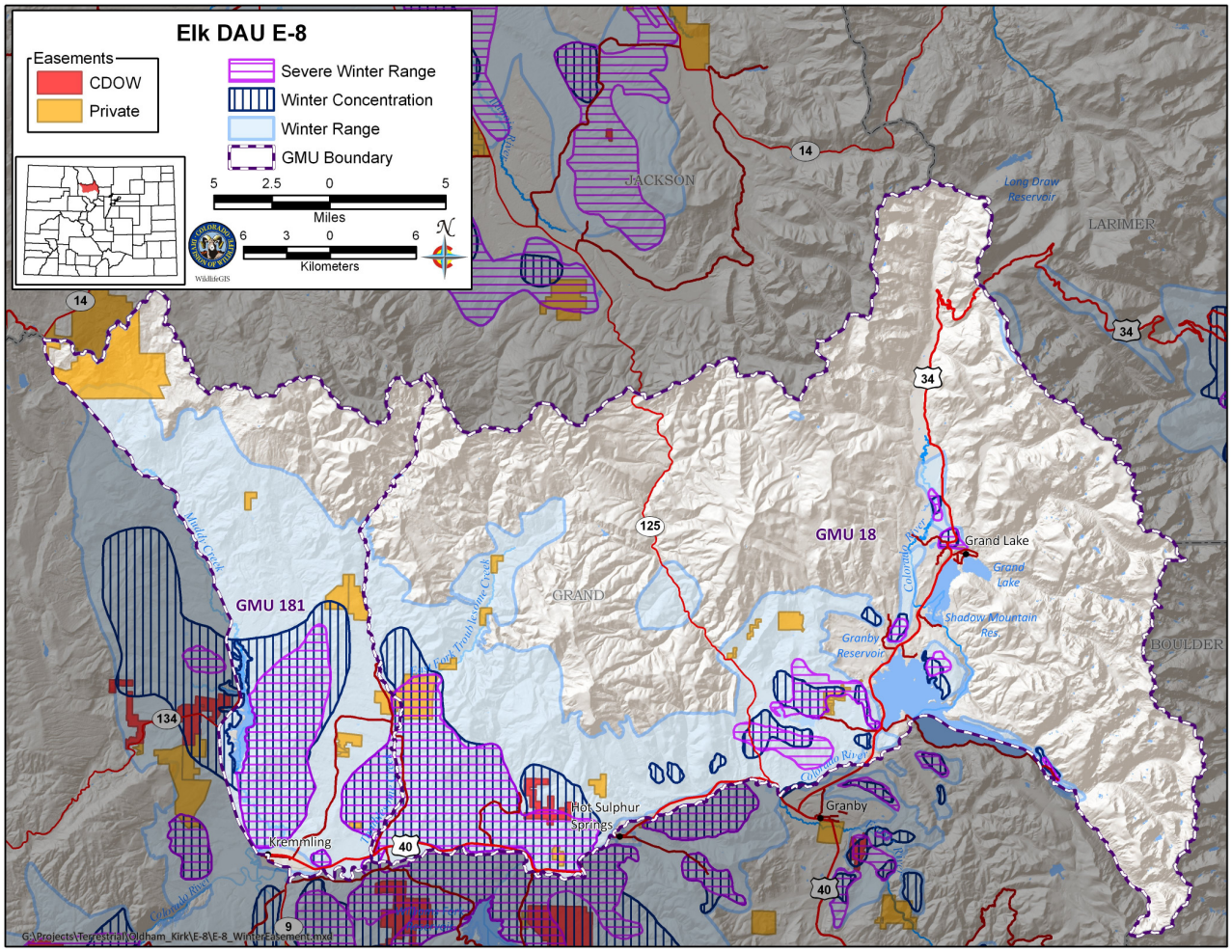


Figure 8. Figure shows private lands protected by conservation easements

Public Lands

USFS

The USFS manages 13 grazing allotments occurring totally or partially in DAU E-8. Three of these have been vacated and are not being used by domestic livestock at this time. All together,

the 13 allotments provide 6,083 AUMs of forage for livestock on an annual basis. The period of utilization is variable, but primarily occurs from late June through September. Classes of livestock using these allotments are cattle and horses.

Standing forage, security cover, road access and the mix of these largely determine the quality of elk habitat. Habitat conditions on USFS lands are believed adequate to meet the needs of the current population in the DAU. Habitat diversity is high throughout the area, providing good forage:cover ratio. Additional logging is not generally needed for elk or other wildlife species in the DAU in the near future except where aspen stands are being invaded and crowded out by conifers. Livestock graze over most of this DAU and forage condition is fair to good overall. Competition between cattle and elk does not appear to be a significant problem, based on the fact that adjustments in allotment management plans have not occurred because of wildlife impacts. In the southern and eastern portion of the DAU, high concentrations of roads decrease habitat effectiveness. The USFS has developed travel management plans that should improve these conditions, so long as road closures are enforced. In the roadless central portion of the DAU it is unlikely that management activities requiring new roads will occur in the near future.

Only a small percentage (5%) of winter range in this DAU is on USFS lands. However this appears to be changing with the significant increase of mortality in the lodgepole forest. There is an increase in use of the lodgepole forest by elk throughout the year, but most noticeable during the fall and average winter months.

BLM

The Bureau of Land Management has 11 cattle allotments within E-8; 2 of which are vacant (Grass and Rabbit Ears: 16,797 total acres). The 9 active allotments total 88,158 acres. Use occurs primarily in the spring and fall, although some use occurs in summer and winter. Classes of livestock using these allotments are almost exclusively cattle and horses.

During the years 2000 through 2003, the area experienced a severe drought which affected vegetative productivity on the sagebrush rangelands. All animals, domestic and wildlife, were impacted by the decrease in vegetation production in the drought stricken areas. Livestock grazing permittees were asked to voluntarily reduce livestock numbers on BLM rangelands during the 2001 and 2002 grazing seasons due to the drought conditions. AUMs were reduced about 40% during these two grazing seasons on BLM allotments in Middle Park. The 2003 grazing season was a better moisture year than the two previous years; however, livestock numbers were less than permitted on BLM allotments since most operators had not increased their herd sizes to pre-drought numbers and to allow vegetation to recover from the drought. In 2004, the Kremmling Field Office sent a letter to grazing permittees warning of another potential reduction in grazing due to dry conditions, however no changes were required.

The Kremmling Resource Management Plan emphasizes the management, production and use of renewable resources on the public lands in the Troublesome DAU. Sustained yield and multiple uses are primary tenets of this management philosophy. Range forage has been allocated to optimize both livestock production and big game populations wherever feasible. In grazing

allotments where optimizing for both was not possible, livestock production was favored while providing sufficient forage to support 1980 big game levels.

BLM lands provide more than half the winter range for elk in this DAU. Large herds may form up in these areas during severe conditions, such as January 1997, when nearly 1,900 elk were located within five miles of Kremmling in GMU 181.

Range monitoring results (funded by HPP) have indicated that BLM rangelands have been able to support the numbers of big game animals and domestic livestock which have been grazing them the past 15 years. Some concern has been expressed regarding big game numbers, especially elk, which have been recorded inhabiting BLM rangelands during winter in recent years. However, neither the BLM nor HPP studies have documented range forage damage on public land caused by elk or other big game animals. The DOW has attempted to decrease elk numbers in the past 10 years in most parts of Middle Park since elk populations are above objective levels. Livestock numbers grazing BLM land have decreased in the past 20 years due to the changes in land ownership and changes in uses of these private lands. Less livestock grazing has resulted in more forage available for wildlife, especially for big game animals in Middle Park.

Private Lands

While game damage claims with private property owners within DAU E-8 are minimal, there is intermittent damage of crops, fences, and haystacks by elk. Occasionally elk compete with livestock for spring forage, damage aspen trees, and have other impacts on privately owned habitat in parts of DAU E-8. Wintertime concentrations of elk on private property sporadically lead to conflicts, with regard to cattle feeding operations. Most hay storage areas are permanently fenced to keep elk out. The CDOW has provided materials for this protection. The 10-year average annual game damage payment in E-8 is $145 with an overall average annual game damage payment since 1995 in E-8 of $390. The 5-year average game damage material payment is $493 with an overall average game damage material payment of $1021 since 1999. The CDOW also has purchased pyrotechnics and temporary elk panels to provide to landowners for conflicts. These materials have cost an average of $220 annually for pyrotechnics and $699 annually for elk panels in Middle Park (E8, E13, and parts of E-7 and E-12).

Whenever damage to livestock fencing or forage occurs, or that potential exists, the Middle Park HPP Committee has typically become involved in the resolution of these conflicts. Aerial fertilization of elk habitat on public lands has been used with some success to attract animals away from private rangelands. In addition, HPP funds have been used to construct a high-tensile livestock fence in an area where perennial fence damage was occurring, and also to provide materials for “Middle Park Gates.” Landowners are encouraged to install these metal gates in existing travel corridors of elk. These can then be left open during times when cattle are not being pastured, and elk seem willing to go out of their way to use these gates when they aren’t hurried. HPP has also paid to build several high-tensile division fences to improve grazing management of BLM allotments, and has been involved in improving grazing practices in other

ways, such as water development. Distribution management hunts, where landowners are allowed to bring in hunters of their own choosing when elk are causing conflicts during the period from August 15-January 30 (excluding regular hunting seasons), have also proven useful in reducing damage. An average of 70 licenses for distribution management hunts have been issued annually since 2000 for ranches in E-8 with an average harvest of 45. In situations where elk take spring forage intended for cattle use because snow prevents them from moving onto the national forest, HPP can make lease payments for pasture if there is nowhere else for the elk to be at that time of year.

HPP has continued to support measuring the condition of rangeland vegetation and utilization of this vegetation by big game animals in the area of their jurisdiction. HPP has funded a variety of activities which were designed to measure big game forage utilization levels on important winter ranges in Middle Park. Beginning in the early 1990's, wire cages were set out on numerous locations in heavy winter use areas and then the amount of forage on key species removed by big game was compared to protected plants of the same species inside the cages. These measurements were made as soon as the cages were accessible in spring when big game animals had moved from the cage locations. These studies, over the course of four years, indicated elk use of key grass species varied from 30% to 60%. These use levels did not appear to damage the grazed plants and in normal growing seasons, the growth of grazed plants soon caught up with the growth of adjoining ungrazed plants. Data regarding the location of the cages and the estimated utilization levels of forage plants at each cage site are recorded in the Kremmling Field Office of the BLM.

HPP has also funded measurements in the Middle Park area which were used to estimate overall condition of rangeland vegetation on important big game winter habitat. Individuals were contracted by the HPP to measure vegetation in various locations throughout Grand County using techniques similar to those measured by BLM range specialists. Numerous trend transects were established, mostly in sagebrush steppe vegetation, and vegetation attributes such as canopy cover, plant composition, and key plant frequency were monitored. This monitoring was carried out in Middle Park in 1999, 2000, and 2001. Only a few trend transects were performed in 2002 and none were done in 2003.

HERD MANAGEMENT HISTORY

Elk were plentiful in Middle Park in pre-settlement times, but were soon exploited when Europeans began arriving on the scene. Market hunters supplied mining camps near Leadville and in Clear Creek and Summit counties with wild game meat. Later, thousands of elk were shot throughout Colorado for just their teeth. The disappearance of elk brought about closed seasons from 1902-1928. In 1913, it is estimated that only 50 head remained in the entire upper Colorado River Basin (500-1000 in all of Colorado). Between 1912 & 1928 there were 14 reintroductions in Colorado totaling 350 animals. (The Elks Lodge was instrumental in getting these done). One such transplant occurred at Estes Park in 1913, with 36 elk from Yellowstone; another release occurred near Steamboat Springs. During the late teens and twenties the entire

Williams Fork drainage in Middle Park (in the adjoining DAU) was maintained as an elk refuge, along with an area centering on Corral Creek. Due to these protections afforded elk, numbers in the Troublesome Creek DAU have been gradually increasing since the turn of the century, and elk are now a prominent feature of the local fauna.

Posthunt Population Size

The Troublesome Creek elk herd has been steadily increasing in the last half of this century, except for a few setbacks such as the winter of 1983-84. The highest posthunt population estimate from computer modeling was during 1995-96 when the DAU may have had more than 6,000 elk (see Figure 9). The lowest population estimate was 800 elk in 1953. Estimated populations have been reduced over the past ten years to 4,000 elk. **The 2009 post hunt population estimate is 3,970 elk.**

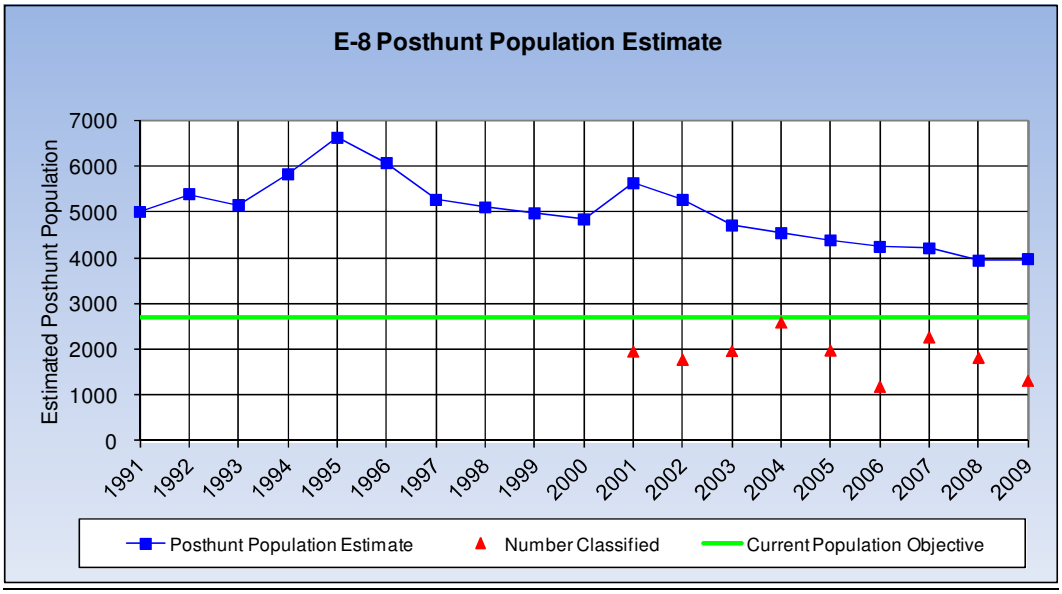


Figure 9. E-8 Population Estimate

The posthunt population in DAU E-8 has been above 5,000 animals on several occasions, most recently in 2002. Based on the large harvests (approaching 1,000 on average) consistently occurring in this DAU, it can be predicted that this level is well within carrying capacity of the habitat.

Posthunt Herd Composition

The first documented age and sex ratio surveys of the Troublesome Creek elk herd were conducted in 1972. Since 1991 the DOW has conducted a total of 17 posthunt age (calf to cow ratio) and sex (bull to cow ratio) classifications. Sex ratios have averaged 25 bulls:100 cows, with a range of 17 to 38. The highest observed bull:cow ratio was in 38.3 in 2003 with the lowest being 17.2 in 2009. (Figure 10).

Sex ratios in this herd have consistently been in the range of 20-30 bulls, even without any restriction on hunter numbers. There has been a four point antler point restriction within this

DAU since 1986. Continued limited access to private land, difficult physical access, and the proximity of Rocky Mountain National Park likely are factors that impact these sex ratios. There have also been a large number of cow permits in this unit this decade. The combination of these factors has maintained the bull ratio at higher levels.

Posthunt age ratios are measured at the same time as sex ratios – early in the winter. These give some indication of reproductive success but, depending on severity of the winter, may not accurately reflect recruitment into the population (*i.e.*, those animals surviving to one year of age). Significant mortality of young can occur between the time of the counts and May.

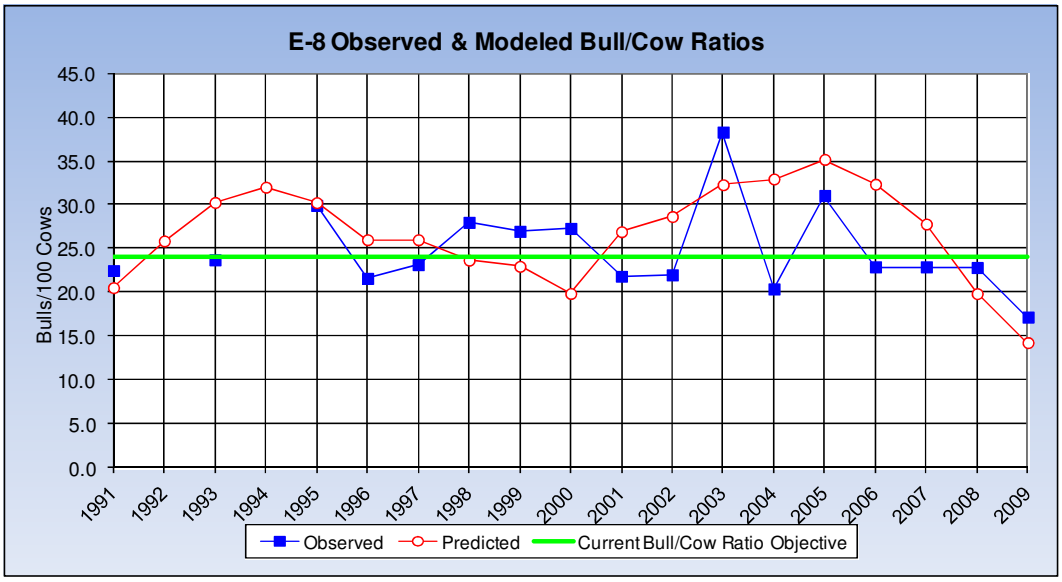


Figure 10. E-8 Bull: Cow Ratios

Posthunt age ratios have been more variable than sex ratios. Since 1991 the average age ratio has been 52 calves:100 cows (range: 31 to 70). The highest observed calf:cow ratios were 70.4 in 1995 and the lowest was 31.1 in 2007. There is a slight decline in observed calf: cow ratios since 1991 (Figure 11).

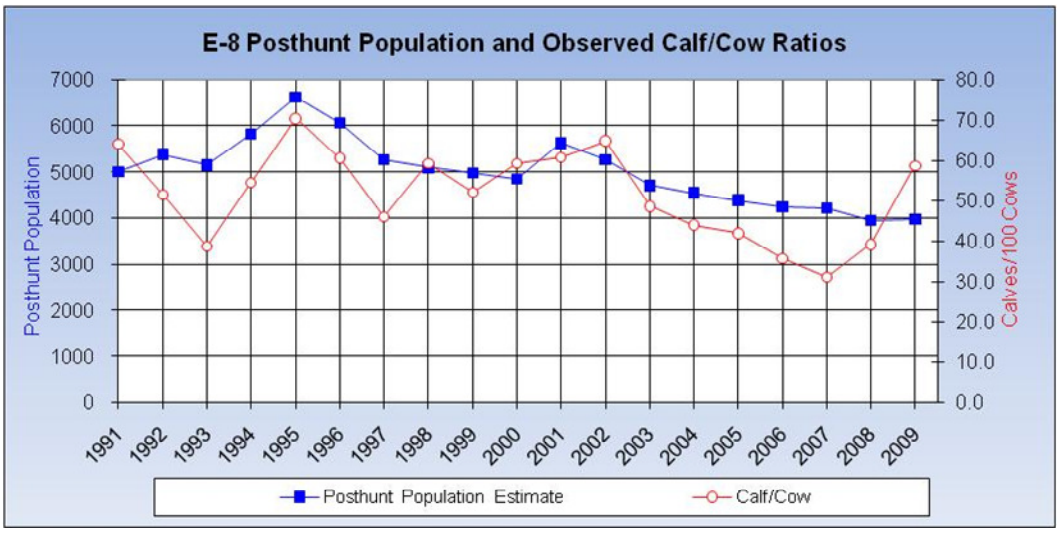


Figure 11. E-8 Calf: Cow Ratios

Harvest History

Both bull harvest and antlerless (cow and calf) harvest have steadily increased since the 1950s in the Troublesome Creek DAU. In the 1950's the harvest averaged 64 elk per year; this rose to 224 in the 1960's, 352 in the 1970's, 617 in the 1980's and 894 in the 1990's. Since 1991, the low antlerless harvest was 220 in 2007 and the high was 739 in 2002 (Figure 12). The mean antlerless harvest from 1991 to 2009 was 424. Since 1991 the low bull harvest was 275 in 2003. The high was 620 in 1996 with the mean bull harvest between 1991 and 2009 being 397. The combined antlerless and bull harvest since 1991 was a low at 593 in 2007 and high in 2002 at 1213. The mean harvest between 1991 and 2009 was 821.

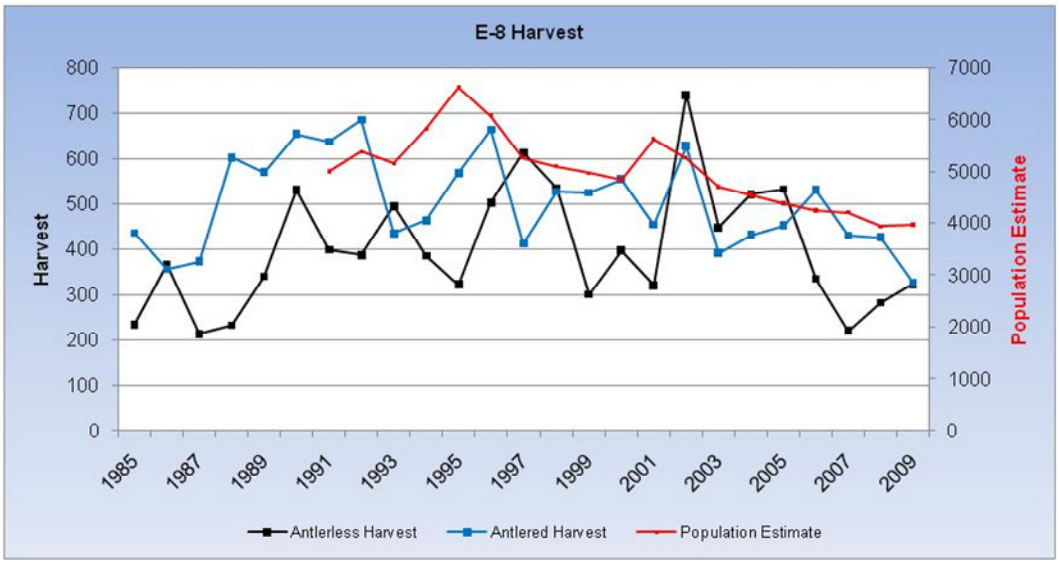


Figure 12. E-8 Antlerless and bull harvest from 1985 – 2009.

All antlerless licenses are limited within this DAU and set annually to meet population

objectives. Other factors cause fluctuation in harvest including weather affects on hunter success, private property access, and hunter densities.

Hunting Pressure

Hunting pressure in the Troublesome DAU has increased along with the elk population (Figure 13). The lowest number of elk hunters since 1985 was 3,376 in 1988 and the highest was 8,173 in 1998. During the period 1991-1999 hunter numbers averaged 5,740 and from 2000-2009 hunter numbers have averaged 5,933. Archery hunter participation has increased steadily from a low in 1987 of 270 to a high in 2008 of 991. Rifle hunter numbers have varied from a low in 1987 of 2,939 to a high in 1998 of 7,263. Muzzleloader hunter participation was at its lowest in 1991 of 87 hunters and its highest participation in 2000 with 543 hunters.

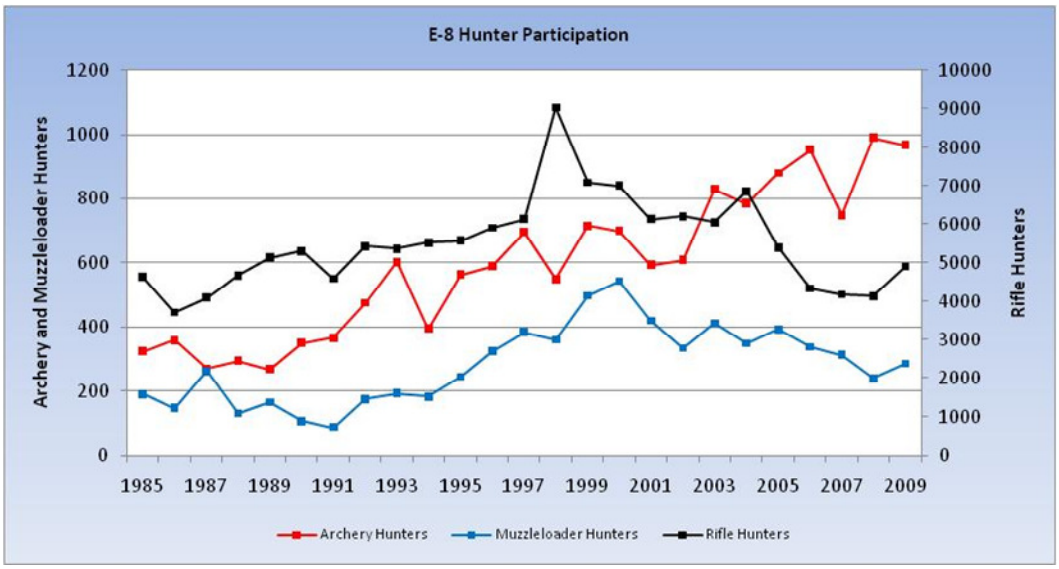


Figure 13. Archery and Muzzleloader Hunters 1985 – 2009.

.

Overall hunter success in E-8 has varied significantly over the last fifty years. During the 1950's, percent success averaged 21%; it climbed to 23% in the 1960's, then dropped to 15% in the 1970's, crept back upward to 16% in the1980's and averaged 16% from 1991 through 1999. Overall success averaged 13% between 2000 and 2009 (Figure 14).

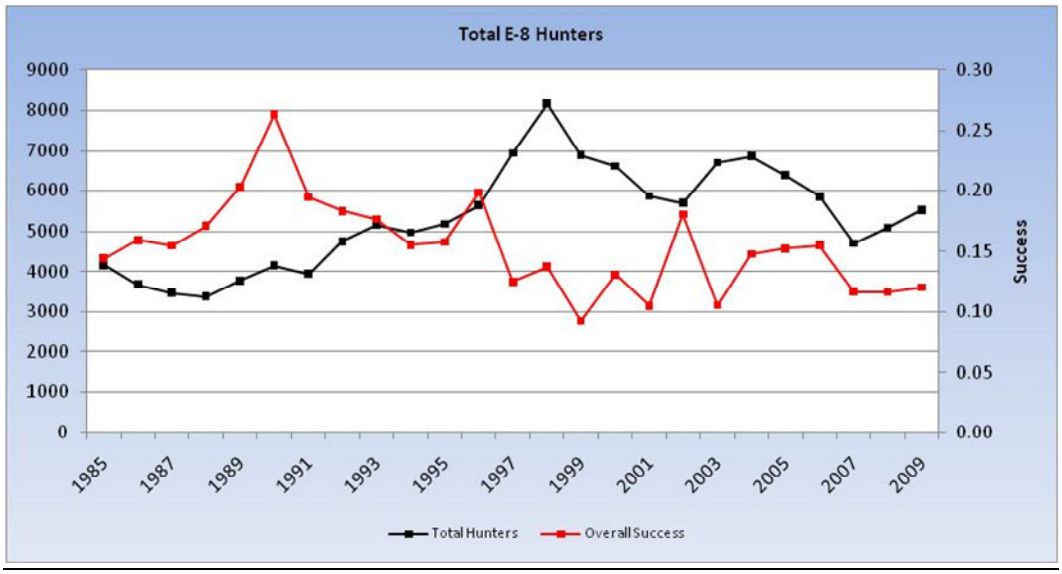


Figure 14. Total hunters in E-8 with overall hunter success 1991 - 2009.

Season Structure

Hunters have been able to buy a general license to hunt bulls in DAU E-8 since 1947 or before (unlimited either sex seasons were held from 1948-51). Starting in 1953, limited antlerless licenses have been available by drawing.

An elk season separate from that of deer was initiated in 1971, and Colorado went to two separate and one combined seasons in 1976. Another major overhaul of the season structure occurred in 1986 when the three combined season structure made its appearance.

Antler point restrictions have been used at times to improve the number of bulls 2½ years and older in the population. An antler point restriction (4 point) has been in effect in E-8 since 1986.

Besides either-sex licenses, DOW has tried various methods of increasing cow harvest in Middle Park. In 1990 and 1991 late private land only (PLO) seasons were held. These proved unpopular with landowners and there were problems with hunters pushing elk off public lands, so these hunts were discontinued. DOW started issuing limited antlerless licenses in 1st combined season beginning in 1992. A nine-day late season was held three weeks after the close of the 3rd season in 1997, with 1,000 antlerless licenses for all of Middle Park north of I-70. Licenses for this late season were sold first come first served and demand for these far outstripped availability; hunters succeeded in harvesting about 350 cows in Middle Park, but the season was not without its problems (agents and offices were swamped, and there were safety concerns, poor sportsmanship and illegal bull harvest). The late season continues through 2010 with limited licenses numbering 125 from 2007 – 2010.

PLO antlerless licenses were again instituted in 1996 and PLO either sex licenses were offered beginning in 2000. Both these licenses continue to be offered through 2010.

Beginning in 1999 all antlerless licenses in E-8 are considered additional and this continues through 2010. Beginning in 2000, bull licenses were limited in the first rifle season. Beginning in 2005, the first and fourth rifle seasons were limited with eithersex licenses. This continues through 2010.

CURRENT HERD MANAGEMENT

Prior to 1979, the CDOW's intent was to increase elk numbers in DAU E-8. Following the severe winter of 1978-79 the objective was to stabilize the population. In 1988 the population objective was raised from 2,540 to 3,300 elk, and this was retained for 1989.

The first DAU planning process was completed in 1990, which resulted in the lower objective of 2,700 elk in the post-season population, along with a sex ratio objective of 24 bulls:100 cows. In 1999 a second DAU planning process was completed for E-8 resulting in maintaining the population objective at 2,700 elk with a sex ratio objective of 24 bulls:100 cows.

Current Management Problems

Limited Winter Range
Only a limited amount of habitat is available in Middle Park to support deer, elk, and pronghorn during the winter. Habitat continues to be converted to housing and associated development and there may not be enough traditional winter range remaining in the eastern part of the E-8 to sustain present elk numbers during the severest of winters. Wintering herds also have to coexist with an increasing number of recreational users. When recreation occurs on winter range, animals often seek refuge on private lands, aggravating existing conflicts. The larger elk herds of the last two decades have also encroached on winter range needed by deer. Elk also continue to utilize the lodgepole pine forest impacted by the mountain pine beetle. This has also resulted in an increase of use by elk in this forest during average winters, fall, and spring.

Competition with Deer
While deer numbers were in general decline over the past 15-20 years in Middle Park, elk numbers were building. During this period of increase elk have expanded their historic winter ranges into lower elevations, setting up the possibility of competition with deer. Elk are stronger and more aggressive than deer, and have more diverse food habits. Deer may also be impacted at other times of the year on transition ranges.

Refuge Areas and Changes in Land Use
Many traditional ranches around Granby and Grand Lake are being subdivided. As patchwork ownership develops, it becomes increasingly difficult provide recreational hunting opportunities and to obtain appropriate harvest. In those situations where a family continues to control a large area, owners are tending to become very conservative in the amount of hunting they allow. Conflicts with public land hunters and small parcel landowners occur with some regularity.

Hunters become upset about the lack of animals on public lands and complain that large parcel landowners are holding elk on private lands for their own paying hunters. On the other hand, large numbers of hunters on public land often create a formidable barrier, unwittingly pushing elk back onto private lands as soon as animals try to cross over onto public ground. A sizable elk herd resides in Rocky Mountain National Park where they are not hunted. This impacts a large land area (23% of GMU 18). However, the Park Service provides a valuable hunter access to adjoining USFS lands through the Bowen/Baker trailheads.

Changes in Recreational Use

Mountain bikes, all-terrain vehicles, snowmobiles and sport utility vehicles have all come into existence within the last 20-30 years. Recent technological advances have made these more efficient, with increased comfort and reliability. Bikes and ATVs allow humans to visit areas that were once the domain of the dedicated hiker or those on horseback. Extensive road and trail networks have been developed since these inventions came onto the scene. During winter flights conducted by DOW in helicopter and fixed-wing plane in Middle Park, snowmobile tracks are observed throughout many parts of the winter range. Changes in demographics and culture have increased the portion of the urban residents that recreate in these areas. The resident population residing in Grand County has also increased. Residents regularly go biking, driving, hiking or jogging before or after work. Ownership of large dogs has increased over the years and people frequently bring their pets with them to the mountains. All of this adds up to a tremendous increase in the presence of humans and pets in important parts of elk habitat. Elk are displaced with this disturbance to areas of fewer disturbances (often large private land parcels). Such displacement could be increasing use on transitional ranges which deer and elk typically occupy during the spring and early winter. These areas are important to animals needing to build fat reserves for the winter, and rebounding from the rigors of winter in preparation for lactation.

Habitat Changes due to the Mountain Pine Beetle

Since 1998, the mountain pine beetle infestations and resulting lodgepole pine mortality have greatly altered the vegetation type in Middle Park and E-8. The response of the vegetation under the trees after the mature trees die is dramatic and widespread. Forage has increased significantly. Carrying capacity is increasing until new trees shade out the ground vegetation, also altering distribution of big game. Deer and elk tend to be dispersed more widely through the lodgepole pine vegetation type and can be difficult to harvest. In addition, deer and elk are utilizing the lodgepole pine vegetation type later into the fall and winter. This reduces game damage conflicts. These changes create challenges for wildlife managers in maintaining current harvest objectives for big game in E-8. As timber falls, hunter access will become difficult, while at the same time sheltering deer and elk. Potential large wildfires could occur, further altering big game use and distribution.

Elk Ingress from Adjacent Areas

DAUs are delineated on the assumption that there is very limited interchange with adjoining areas. Elk numbers may be fluctuating in this DAU due to migrations of elk back and forth to adjacent areas such as Gore Pass, North Park and Rocky Mountain National Park. A major influx or departure of animals greatly increases the difficulty of maintaining the elk population at the predetermined number.

Low Hunter Success
Hunter success has tended to be low in this DAU since the early seventies and it has become increasingly difficult to harvest enough cow elk in recent years. Over the past five years harvest success has averaged 13%. There appears to be a diminishing return when increasing the number of cow licenses issued – more hunters result in lower success with no increase, or only slight increases, in harvest. This problem appears to be a result of limited access, both physical and legal, to key elk hunting areas in the DAU, such as the East Fork of Troublesome Creek. It is also related to hunter overcrowding problems and the fact that there is a limited pool of dedicated elk hunters on which to draw.

Herd Vigor and Habitat Concerns
As herd size increases, particularly where it begins to tax available forage in critical areas, vigor of the herd and ability to grow large bulls diminishes. Age ratios may also decline. Particularly on limited range (*e.g.*, winter range or spring pastures), elk can create localized problems and impact the productivity of such areas for a period of time. Deteriorating range condition impacts other wildlife species and livestock operations dependent on the same resource.

Extended Hunting Seasons
Distribution management hunts can begin in mid-August and extend until the end of January (except during the regular hunting season). Game damage hunts can occur as late as February. Applying hunting pressure for up to a half year increases stress on animals. Sometimes the harassment that accompanies late seasons increases energy consumption of the animals, in turn raising forage demands, and further intensifying conflicts with livestock operations.

Hunter Overcrowding
There are several areas in the DAU where hunters tend to over-concentrate. These are in areas with extensive road networks accessible to ATVs. This problem is also affected to some extent by the number of antlerless permits issued. At one point during 3rd Combined Season in 1997, more than 150 vehicles parked along the first four miles of Chimney Rock Road (FSR 103) where it hits the State Land Board lease in GMU 181. When hunters dispersed from their vehicles and campsites they formed a wall that turned back animals trying to move through the area. These situations are counterproductive to achieving harvest goals. The quality of the hunt is obviously affected, and hunters of better ability typically avoid such areas.

Chronic Wasting Disease
Chronic wasting disease (CWD), a naturally-occurring prion disease of North American cervids (species of the "deer" family), is an important wildlife health issue. CWD has been endemic in free-ranging cervid populations in north central Colorado and southeastern Wyoming since at least the early 1980s, and has been detected in a number of other states and provinces. Surveys continue to show that CWD is relatively well-established and widely distributed in Colorado including E-8. Surveys in E-8 began in 2001 and the first positive detection of CWD in E-8 was in 2002. Since then, 30 elk in E-8 have tested

positive for CWD. Between the years 2006-2008, 286 samples were submitted with 9 positive samples and a 2.1% prevalence.

ALTERNATIVE DEVELOPMENT

Population Objective Indexing

Population modeling is an evolving process whereby modeled estimates can change over time based on additional data or improved modeling methodology. As such, when modeled estimates change irrespective of an actual change in the population, it is reasonable to adjust or index population objectives relative to the new modeled estimate accordingly. The basis of harvest-based population management is to increase harvest when a population exceeds objective, decrease harvest when a population is below objective, and maintain harvest when a population is at objective. Because population objectives are only meaningful in the relative context of the population estimates available at the time the objective was established, indexing the objective maintains the integrity of the objective based on the fundamental criteria of whether there are too many, too few, or the desired number of animals in the population.

The following is an example of objective indexing:

In 2007, a population objective range of 5,000 to 6,000 animals based on an estimated population of 8,000 animals is approved by the Wildlife Commission. However, based on newer information (e.g., occasional sample-based population estimates) the 2010 population model shows a 2007 population estimate of 10,000 animals is more defensible. In this case the objective would be indexed by multiplying 10,000/8,000 by the original objective range to yield a new objective range of 6250-7500.

Indexed objectives will be rounded to the nearest multiple of 10, 50, 100, 500, or 1,000 based on whether 10% of the objective is < 50, <100, < 500, < 1000, or ≥ 1000, respectively. For example, if a new indexed objective is 5433, 10% would be 543. Therefore, the objective would be rounded to the nearest 500 (i.e., 5,500). Median values will be rounded up (e.g., 6250 from the indexing example would be rounded to 6,500).

Population Estimation and Population Objective Setting

1999 DAU Plan objectives	**Post-season 2009 estimates**
Population = 2,700	Population = 3,970
Sex Ratio = 24 bull:100 cows	Sex Ratio = 17 bulls:100 cows

Since 1999 attempting to reduce this herd to population objective of 2,700 elk has resulted in reduced hunter success and satisfaction. Significant reductions in game damage and private land conflicts also have occurred and the changes to the lodgepole forest community (from the mountain pine beetle) have increased the habitat for elk.

In 1999, when the last population objective was set, DOW significantly underestimated the size of the elk population in Middle Park. At the time, it was felt that reducing the population by 18% would bring the population in DAU E-8 down to the objective of 2,700 animals. We now know that this assumption was incorrect, and that a much larger reduction (46%) in the population was needed to achieve the objective.

Alternative 1 – 2,700 to 3,600 elk post season
Alternative 2 – 3,600 to 4,300 elk post season (current population)
Alternative 3 – 4,500 to 5,500 elk post season

Alternative 1 reduces the current number of elk by 20%. This level would require a higher harvest on antlerless animals and would reduce legal bull opportunity. The lower range of this alternative is what the population objective has been set at since 1990. Short term, this would significantly increase hunter crowding to approach this population objective.

Alternative 2 (preferred alternative) is the current population level. This population level would continue to provide opportunity for antlerless and bull elk hunters. This level maintains populations at levels since 2005 where game damage issues with landowners have been minimal. This alternative provides the best balance of hunter satisfaction and opportunity while minimizing potential for landowner conflicts.

Alternative 3 is an increase of the current population by 20%. The lodgepole forest component of the habitat (as a result of mountain pine beetle) has resulted in a significant change in use by elk. The habitat can sustain this increase in elk populations and will provide the maximum benefit for bull elk hunters. This higher population level may lead to more landowner conflicts primarily during more severe winters and on refuge situations where little or no elk hunting is allowed.

Sex Ratio Range
The term "sex ratio objective" has been replaced by a more appropriate term of "management range" and is presently at 21-26 bulls:100 cows. The current bull harvest regime in E-8 is limited 1st rifle season, 4th rifle season, and muzzleloader season and over-the-counter bull licenses in archery, 2nd rifle season, and 3rd rifle season. This existing bull harvest framework has shown to result in observed sex ratio estimates post season within the range of 21-26 bulls:100 cows observed post-season 52% of the time since 1991 (Table 3 and Figure 15). Twelve percent (12%) of the observed sex ratios since 1991 have been below this management range. The 5-year average of 23.4 and the 10-year average of 24.6 are within this range.

Since 1991, the 3-year average observed sex ratio has never been below 21. The lowest 3-year average was between 2007 and 2009 (21.0). Only four of the 3-year averages since 1991 have been above 26. These include 1998-2000 (27.4), 2001-2003 (27.4), 2002-2004 (26.9), and 2003-

2005 (29.9). There is a high degree of variability with observed estimates of sex ratios in E-8. For example, they have ranged from 22.0 to 33.8 and back to 20.4 between 2002 and 2004.

Table 3
Table shows observed sex ratios for E-8.

E-8 Bull:Cow Ratios		
Year	**Observed**	**SE**
1991	22.5	4.37
1992		
1993	23.7	4.79
1994		
1995	29.9	3.87
1996	21.6	1.59
1997	23.1	4.87
1998	28.0	5.27
1999	26.9	4.85
2000	27.3	6.16
2001	21.8	3.34
2002	22.0	3.54
2003	38.3	7.12
2004	20.4	2.57
2005	31.0	5.72
2006	22.9	4.21
2007	22.9	3.30
2008	22.8	4.50
2009	17.2	3.6

Achieving a higher sex ratio would require limiting licenses in archery, 2nd and 3rd seasons because only 31% of predicted bull harvest occurs in limited 1st, 4th, and muzzleloader seasons.

Increasing sex ratios above the current management range, with OTC 2nd and 3rd seasons, would be unlikely because favorable hunting conditions during 2nd and 3rd seasons would result in higher harvest and lower post-season sex ratios. The following year the only option would be to considerably reduce 1st and 4th season license quotas to attempt a measurable impact on post-

season ratios the next year. The overall reduction in harvest would be minimal because hunters that don't draw are likely to hunt 2nd or 3rd season.

Cow harvest has exceeded bull harvest in 7 of the last 10 years while attempting to reach the population objective. A new population objectives closer to the existing population size would result in somewhat reduced cow harvest and change some cow hunters to bull hunters if they don't draw a cow licenses, both of which could lower bull:cow ratios.

If 3-year averages of observed sex ratios fall below the lower threshold of the management range (21 bulls:100 cows), strategies that would reduce bull harvest will be implemented. This will included limiting hunter opportunity within the current management framework. Currently this affects muzzleloader, 1st season rifle, and 4th season rifle licenses.

When 3-year averages of observed sex ratios rise above the management range (26 bulls:100 cows) a potential increase in hunter opportunity would exist. Management strategies to provide an increase in harvest and opportunity may be considered if current conditions are not significantly affected (overall hunter success, hunter crowding, etc.).

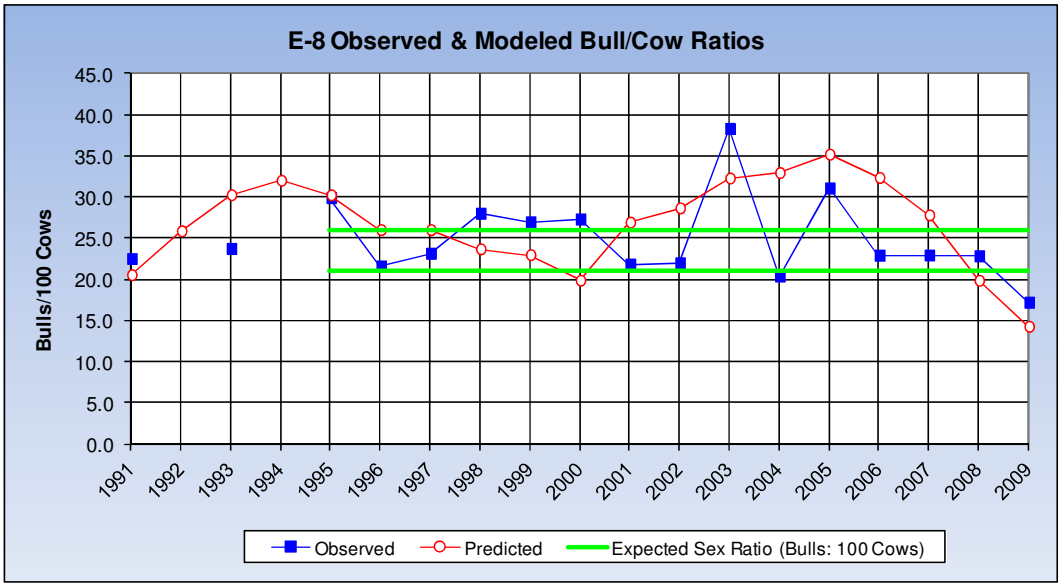


Figure 15. Figure shows E-8 sex ratios with management range.

Public Involvement

Public input for the DAU process was gathered in a variety of methods. The draft DAU was posted on the DOW website along with a public questionnaire. Public questionnaires were mailed to a random sample of 200 limited license holders for E-8 and nearly 90 questionnaires were mailed to the HPP landowner list within E-8 (see Appendix B). Of these mailed questionnaires, 44 questionnaires were returned to the DOW.

The DOW conducted three public meetings with one in Frisco, Kremmling, and Granby each. A total of 30 participants attended the public meetings.

Additionally, notices were sent to land management agencies including the Bureau of Land Management Kremmling Field Office, the Sulpur Ranger District of the Arapaho National Forest, the Dillon Ranger District of the White River National Forest, the Parks Ranger District of the Route National Forest, and Rocky Mountain National Park.

The DOW provided presentations of the draft DAU plans to the local Middle Park Habitat Partnership Program committee, the Grand County Board of County Commissioners, and the Summit County Board of County Commissioners.

Public survey responses are summarized in Appendix C. Additionally, several letters were received by the DOW regarding the draft DAU plans (Appendix D). These include the Bureau of Land Management Kremmling Field Office, the Sulphur Ranger District of the Arapaho National Forest, the Dillon Ranger District of the White River National Forest, the Middle Park Habitat Partnership Program, the Middle Park Conservation District, and Rob Firth.

Overall, approximately 32% of the respondents owned or leased property within the DAU while 70% of the respondents indicated that they had participated in recreational activities in the DAU within the past 12 months. For the best interests for elk management within the DAU, 51% of the respondents were primarily hunters with 19% being conservationists, 14% being interested as landowners, and 9% as ranchers.

Of the respondents, 19% thought that the elk hunting in DAU E-8 was poor, 26% felt that the elk hunting was fair, 23% felt that the elk hunting was good and 30% felt that the elk hunting was very good. Only 2% of the respondents felt that the elk hunting within DAU E-8 was excellent.

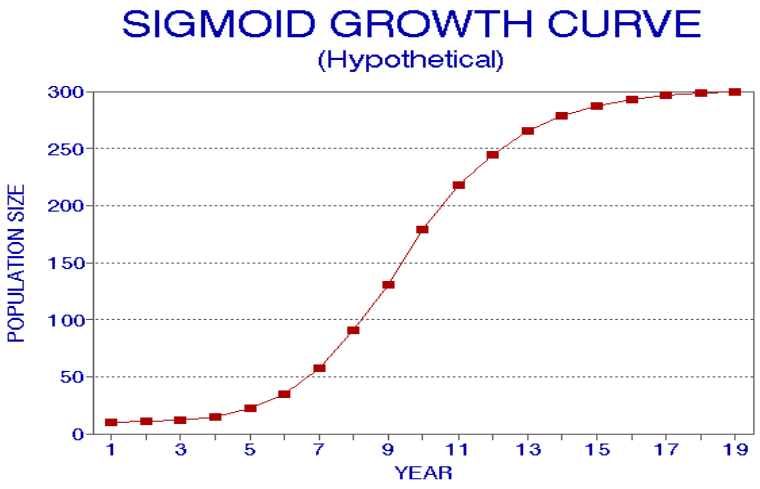
Most (59%) would like to see more elk in DAU E-8, 14% preferred the same, and 14% wanted a decrease in herd size.

Of these hunters 61% thought it was very important to harvest an animal for game meat, while 18% did not want to see other hunters and 20% considered harvesting mature animals a priority.

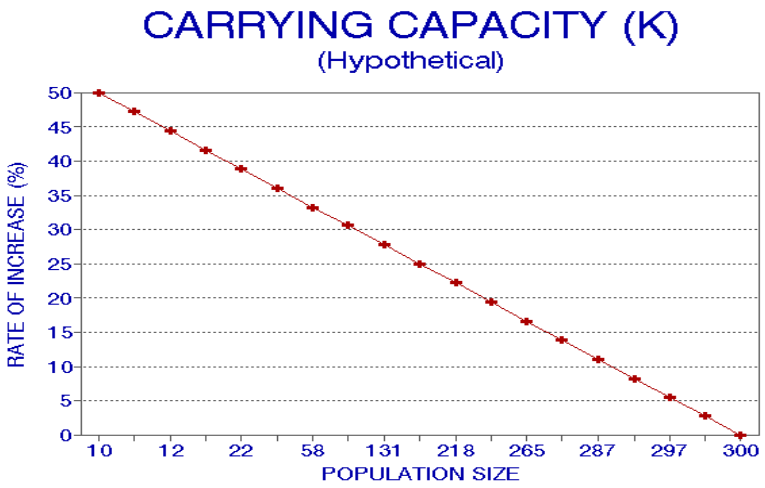
APPENDIX A
Population Dynamics

The sigmoid curve can be used to describe various phenomena in nature, including the typical growth pattern for animal populations. Three phases of this population growth curve are readily apparent:

Establishment phase (years 1-5 on the graph): here the population is gaining a foothold; numbers are low, and the population will be significantly affected by mortality and recruitment (recruitment being animals added to the breeding component of the population). In this situation the rate of increase may be high, but due to the small core population, the increase in actual numbers is small (*e.g.*, a 50% increase in ten animals is only five individuals).



Prosperity Phase (years 6-15 on the graph): food, cover, water and living space are still abundant. Survival rates are at their highest. Although the rate of increase is declining, the population begins to build "momentum" because of the increasing size of the core population; this results in larger increases in actual numbers (*e.g.*, a 30% increase in a population of 100 animals results in 30 additional animals). Since the population is experiencing its greatest recruitment in this range, the largest surplus would be available for hunting (see the concept of MSY on the following page). The situation at this point tends to be ideal from several management

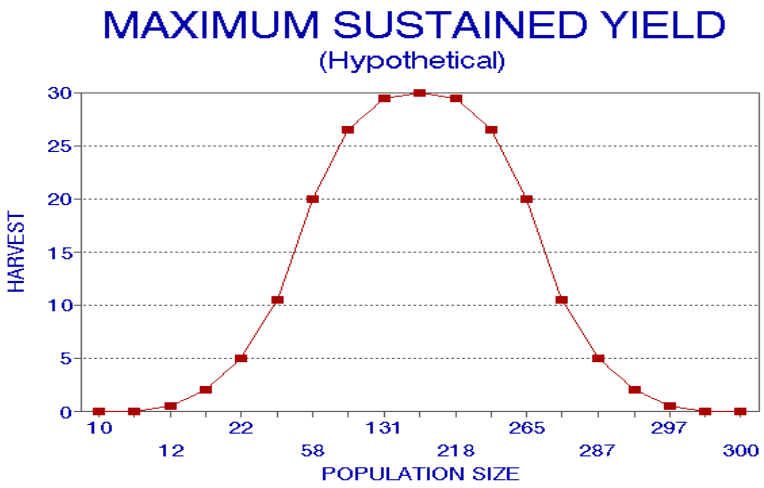


aspects – range condition and trend are optimal, economic return to state wildlife agencies is the greatest, while game damage problems are still minimal. These circumstances represent a win-win situation for both sportsmen and landowners.

Equilibrium Phase (Years 16-19 on the graph): the population continues to grow until it reaches the maximum carrying capacity of the habitat (the K value). Animals become crowded into available habitat, bringing them into direct competition with each other. Environmental resistance develops due to the scarcity of some resources. Game damage problems tend to be the worst under these circumstances. Momentum developed in the prosperity phase begins to dissipate as the rate of increase approaches zero. Overall condition of animals declines and mortality is high, especially among young and those under stress. Only the fittest animals breed successfully. Animals recruited into the population will equal those dying. If condition of the habitat deteriorates further, then deaths begin to exceed recruitment.

The straight-line regression graph shown above illustrates how growth rates vary at different population levels.

Maximum sustained yield (MSY) theoretically occurs at half the population that would be present at maximum carrying capacity. At this point, the greatest harvest of animals can be sustained over the long term, providing animals are removed randomly (without regard to age or sex). Hunting doesn't normally occur in this manner; however, the concept can still be viewed as a general guideline for purposes of discussion. In the MSY curve shown at the right, it is noteworthy that at points equidistant above and below MSY the same surplus of animals will likely be available in any given population. Maintaining a population at a point to the left of MSY is an exacting business, however. Population size must be accurately measured, along with recruitment and mortality. Any over-harvest or under-harvest will require dramatic adjustments in future harvests, creating a boom-or-bust management scenario. On the other hand, managing at a point to the right of MSY tends to be very forgiving, since population dynamics naturally compensate for any management "mistakes."



APPENDIX B
Public Questionnaire

OPPORTUNITY FOR PUBLIC COMMENT

ELK MANAGEMENT

In the Middle Park Area
COLORADO

Data Analysis Unit E-8
(Game Management Units 18 and 181)

The Colorado Division of Wildlife is interested in your opinions about elk management in the Middle Park Area. The results of this effort will help wildlife managers prepare elk management plans for this area. This questionnaire is your opportunity to provide input on the management of elk in Game Management Units 18 and 181.

Colorado Division of Wildlife

Hot Sulphur Springs Service Center

P.O. Box 216

Hot Sulphur Springs, CO 80451

June 2010

Dear Interested Citizen:

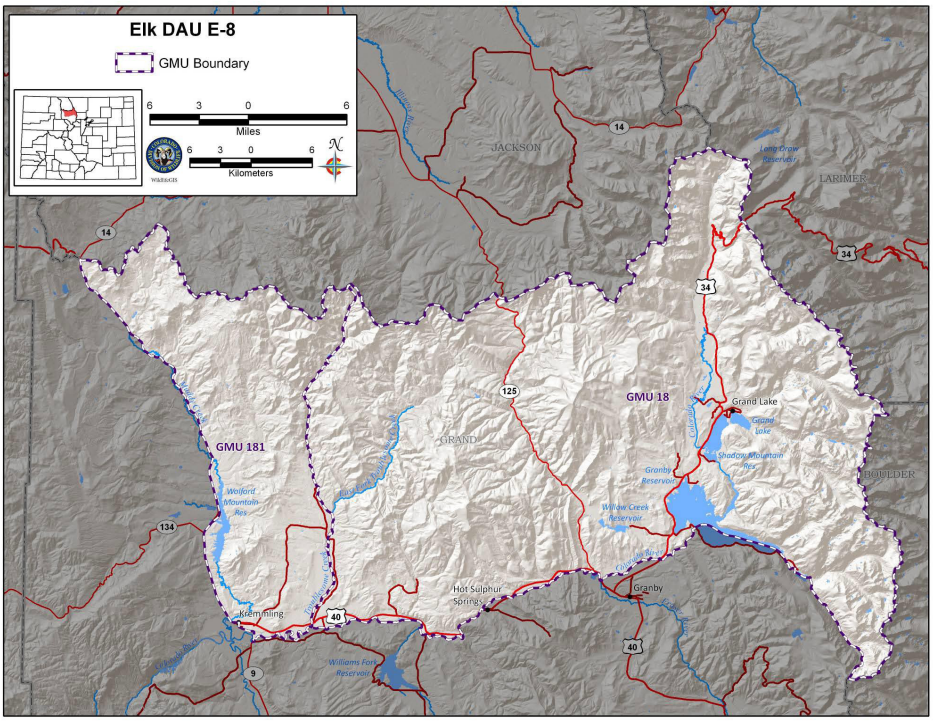
The Colorado Division of Wildlife (CDOW) is interested in your opinions about elk in the Middle Park Area, including Game Management Units (GMU) 18 and 181. Wildlife managers have begun the process of updating the elk management plan for this area, which will affect future harvest strategies and license setting.

In Colorado, big game populations are managed for a specific geographic area, which we call a Data Analysis Unit (DAU). A DAU generally includes several GMU's. In this case, the Middle Park DAU includes GMU's 18 and 181. The purpose of the DAU plan is to determine: 1) how many elk the DAU should support, and 2) what sex ratio (number of bulls per 100 cows) the herd be managed for.

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

Your input is an important part of the DAU planning process. The information you provide will help develop CDOW's recommendation for elk herd objectives (population size and sex ratio) in the Middle Park area. Our recommendation will then be incorporated into the DAU plan, which will be reviewed, and ultimately approved, by the Colorado Wildlife Commission. Please be assured that your responses will remain confidential. **Surveys must be returned to the CDOW Hot Sulphur Springs Service Center by July 16, 2010.** For a copy of the entire draft E-8 DAU plan go to the Colorado Division of Wildlife at http://wildlife.state.co.us/Hunting/BigGame/HerdManagementDAUPlans/.

First, please examine the map and written description of the areas designated as Data Analysis Unit E-8, Game Management Units 18 and 181, located in North Central Colorado, then go to Question 1.



Description of DAU E-8: Troublesome Elk DAU (E-8) is located in north-central Colorado and consists of GMUs 18 and 181. It is bounded on the north and east by the Continental Divide, on the south by Arapaho Creek, Lake Granby and the Colorado River, and on the west by US Highway 40.

The DAU occupies the northeast portion of Middle Park and takes in slightly less than half of Grand County. It includes the headwaters of the Colorado River and all of the Troublesome, Antelope, Corral and Willow Creek drainages. Major towns include Kremmling and Grand Lake; Hot Sulphur Springs and Granby lie just outside the boundary.

BACKGROUND INFORMATION

1) Are you a resident of Colorado?
   ____ Yes
   ____ No

2) Do you live in GMU's 18 or 181?
   ___ Yes If yes, how many years and in what GMU?
   ___ No

3) Do you own or lease property in GMU's 18 or 181?
   ___ Yes If yes, how many years and in which GMU? _____ Years _____GMU (18 or 181)
   ___ No

4) During the last 12 months, have you participated in outdoor recreational activities other than hunting (e.g., camping, backpacking, snowmobiling, etc.) in GMU's 18 or 181?

___ Yes
___ No

5) Which group(s) best represent your interests in elk management in GMU's 18 or 181? *(Check all that apply)*

___ A) Rancher/Farmer
___ B) Business owner
___ C) Landowner
___ D) Guide/Outfitter
___ E) Hunter/Sportsperson
___ H) Environmental/Conservation
___ I) Other, please explain

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

PEOPLE AND ELK

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

	No Interest				Very Interested
Watching or photographing elk…..…….……	**1**	**2**	**3**	**4**	**5**
Hunting elk…..……..….	**1**	**2**	**3**	**4**	**5**
Seeing elk…..…….	**1**	**2**	**3**	**4**	**5**
Learning more about elk management……..	**1**	**2**	**3**	**4**	**5**
Providing input for decisions regarding elk management…….…….	**1**	**2**	**3**	**4**	**5**

2) Please indicate how concerned you are about each of the following in GMU's 18 and 181. *(Circle one number for each item).*

	No Concern				Very Concerned
A) Elk/Vehicle collisions…….……	**1**	**2**	**3**	**4**	**5**
B) Economic losses to ranchers/farmers from elk damage to rangeland, crops, or fences…….	**1**	**2**	**3**	**4**	**5**
C) Damage to homeowners' trees, shrubs, and gardens caused by elk……	**1**	**2**	**3**	**4**	**5**

D) Predation on the elk population by coyotes,
bears and mountain lions…….. **1** **2** **3** **4** **5**

E) Loss of elk habitat due to increased human
population & development…….. **1** **2** **3** **4** **5**

F) Potential starvation of elk during the winter…… **1** **2** **3** **4** **5**

G) Elk spreading disease to pets, livestock, or
humans……..**1** **2** **3** **4** **5**

H) Elk competing with livestock for forage…… ……..…**1** **2** **3** **4** **5**

I) Potential competition between elk and deer for
habitat……**1** **2** **3** **4** **5**

J) Revenue that elk hunting provides local business. ……..**1** **2** **3** **4** **5**

3) Have you been personally affected by any of the concerns listed in Question 2 in GMU's 18 and 181?

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

___ No

4) How do you personally feel about elk in GMU's 18 and 181? *(Check ONE)*

___ I do not enjoy the presence of elk in GMU's 18 and 181, AND regard them as a nuisance.

___ I enjoy the presence of elk in GMU's 18 and 181, BUT worry about the problems they may cause.

___ I enjoy the presence of elk in GMU's 18 and 181 AND do not worry about the problems they may cause.

___ I have no particular feelings about elk in GMU's 18 and 181.

ELK MANAGEMENT

1) How would you like the elk population in GMU's 18 and 181 to change, if at all?

___ Decrease (20%)

___ No Change

___ Increase (20%)

___ Don't know

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

If you indicated that you would like a decrease in the elk population (in Question #1 above), what methods would you support or oppose to decrease elk numbers? (Circle one number for each item)

	Strongly Oppose	Oppose	No Opinion	Support	Strongly Support
Either sex licenses…….……..….	**1**	**2**	**3**	**4**	**5**
Additional cow tags……..…….	**1**	**2**	**3**	**4**	**5**
Increase cow licenses…….	**1**	**2**	**3**	**4**	**5**

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

	Strongly Oppose	Oppose	No Opinion	Support	Strongly Support
Reduce cow licenses……..…….	**1**	**2**	**3**	**4**	**5**
Reduce eithersex licenses…..……. …….	**1**	**2**	**3**	**4**	**5**

ELK HUNTING

1) Have you ever hunted elk in Colorado?

___ Yes If yes, how many years?

___ No

2) Have you ever hunted elk in GMU's 18 or 181?

___ Yes

___ No

3) Overall, how satisfied have you been with your elk hunting experience(s) in GMU's 18 and 181 in the last 5 years? *(Circle ONE)*

Very Dissatisfied	Slightly Dissatisfied	Neutral	Slightly Satisfied	Very Satisfied
1	**2**	**3**	**4**	**5**

4) Overall, to what extent have you felt crowded by other hunters while elk hunting in GMU's 18 and 181? *(Circle ONE)*

Extremely Crowded	Moderately Crowded	Slightly Crowded	Not at all Crowded
1	**2**	**3**	**4**

5) Rank the following items from 1 to 5 in the order that they would most likely improve your elk hunting experience in GMU's 18 and 181. (1=most likely to improve, 5=least likely to improve) Do not use any number more than once.

___Less hunter crowding

___Higher hunter success rate

___Less motorized vehicle access

___Seeing more mature bulls

___Seeing more elk

6) Overall, how would you rate the quality of elk hunting opportunities available in GMU's 18 and 181? *(Circle ONE)*

Poor Fair Good Very Good Excellent No Opinion

7) Which ONE factor is the MOST important to you when elk hunting in GMU's 18 and 181? *(Check ONE)*

___ Not seeing other hunters

___ Obtaining game meat

___ Harvesting a trophy elk

WRITTEN COMMENTS:

Please use the space below for any additional comments you would like to make about elk in GMU's 18 and 181**.**

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

Surveys must be returned to the CDOW Hot Sulphur Springs Service Center by July 16, 2010.

TO RETURN THIS QUESTIONNAIRE:

Please drop it in the mail to:

Colorado Division of Wildlife

P.O. Box 216

Hot Sulphur Springs, CO 80451,

or deliver in person to the

Colorado Division of Wildlife

346 County Road 362

Hot Sulphur Springs, Colorado 80451

APPENDIX C
Public Questionnaire Results
(Sample size 44)

Background Information

1) 80% Resident and 20% Non-Resident
2) 30% did live in DAU E-8 and 70% did not live in DAU E-8
3) 32% did own or lease property within DAU E-8 and 68% did not
4) 70% did recreate in DAU E-8 within the past 12 months and 30% did not
5) Which group represents interest in elk management within the DAU
    a. 9% Rancher
    b. 5% Business Owner
    c. 14% Landowner
    d. 3% Guide/Outfitter
    e. 51% Hunter/Sportsman
    f. 19% Environmental/Conservation
6) Of those that indicated multiple groups the one that best represents are:
    a. 10% Rancher
    b. 0% Business Owner
    c. 5% Landowner
    d. 10% Guide/Outfitter
    e. 76% Hunter/Sportsman

People and Elk

1) Out of 5 being the most interested, how interested were individual interested in the following:
    a. Watching/Photographing elk 3.9
    b. Hunting elk 4.8
    c. Seeing elk 4.4
    d. Learning about elk management 3.8
    e. Providing input for elk decisions 4.1
2) Out of 5 being very concerned, how concerns were individuals of the following:
    a. Elk/Vehicle collisions 3.0
    b. Economic losses to ranchers 3.4
    c. Damage to homeowners property 2.6
    d. Predation on elk 3.4
    e. Loss of elk habitat due to human development 4.3
    f. Potential starvation during winter 4.1
    g. Elk spreading disease 3.3
    h. Elk competing with livestock 3.6
    i. Potential competition between elk and deer 3.5
    j. Revenue that elk hunting provides to local businesses 3.6
3) 35% of respondents indicated that they had been affected by concerns in Question 2.
    a. Economic losses to ranchers 26%

b. Damage to homeowners property 11%
c. Loss of habitat due to human development 26%
d. Elk competing with livestock 16%
e. Competition between elk and deer 11%
f. Revenue to local businesses 11%

4) How did respondents personally feel about elk within DAU
   a. 2% regarded them as a nuisance
   b. 23% enjoyed having elk but worry about the problems they may cause
   c. 70% enjoyed having elk and did not worry about the problems they may cause
   d. 5% had no opinion about elk

Elk Management

1) How did respondents want the elk population to change
   a. 14% would like the population to decrease
   b. 14% would like to see no change
   c. 59% would like to see an increase
   d. 14% didn't know
2) How important is the change of the elk population
   a. 15% felt it was slightly important
   b. 34% felt it was important
   c. 51% felt it was very important
3) Of those that indicated they would like a decrease in elk population, 63% would strongly support either sex licenses while 14% were opposed, 86% supported additional cow licenses, and 86% supported increasing cow licenses.
4) Of those that indicated they would like an increase in elk population, 36% opposed reducing cow licenses while 40% supported reducing cow licenses. Opinions about reducing either sex licenses were split evenly.

Elk Hunting

1) 100% of respondents indicated that they have hunted in Colorado
2) 98% of respondents indicated that they had hunted within the DAU while 2% indicated that they had not hunted within the DAU
3) 30% of the respondents indicated that they were dissatisfied with the elk hunting within the DAU while 65% indicated that they were satisfied with the hunting within the DAU.
4) 19% of the respondents felt that the DAU was extremely crowded by other hunters, 19% indicated that the DAU was slightly crowded by other hunters, 46% indicated that the DAU was slightly crowded by other hunters, and 19% felt that the DAU was not at all crowded by other hunters.
5) Seeing more elk was the number one item that would improve the hunting experience followed by seeing more mature bulls, then less hunter crowding. Higher success rates and less motorized vehicle access was the least likely factor to improve the hunting experience.
6) Overall, 19% felt that the elk hunting opportunity was poor. 26% felt that the elk hunting opportunity was fair and 53% felt that the elk hunting opportunity was good. 2% of the

respondents indicated that the elk hunting opportunity was excellent.

7) 18% of the respondents felt that the most important factor in elk hunting within the DAU is not seeing other hunters. 61% indicated that obtaining game meat and 20% indicated that harvesting a trophy were the most important factors in elk hunting within the DAU.

APPENDIX D
Comments from Land Management Agencies and Stakeholders

A11

June 15, 2010

Colorado Division of Wildlife
PO Box 216
Hot Sulphur Springs, CO 80451

Dear Kirk:

Kirk Oldham, Colorado Division of Wildlife, made a presentation at the Middle Park HPP committee's June meeting on the elk population objectives for DAUs E-8 and E-13. The Middle Park HPP committee was asked to send a letter of recommendation for elk population objectives and sex-ratio objectives to be included in the Appendices of the finalized DAU plan. The committee would like to recommend the following:

- E-8 - 3600-4300 for the elk population objective
- E-13 – 4700-5500 for the elk population objective and
- 21-26 for the bull to cow ratio.

The committee understands that these figures are based on winter capacity levels. If you have any questions, please feel free to contact me at 970-725-3471.

Sincerely,

Duane Scholl

Duane Scholl, Chairman
Middle Park HPP

United States Department of Agriculture
Forest Service
Sulphur Ranger District
9 Ten Mile Drive
P.O. Box 10
Granby, CO 80446
Voice: (970) 887-4100 TDD: (970) 887-4101
Web: www.fs.fed.us/r2/arnf
Fax: (970) 887-4102

File Code: 2640 E8/E13 Comments
Date: July 12, 2010

Kirk Oldham
Terrestrial Biologist
Colorado Division of Wildlife
PO Box 216
Hot Sulphur Springs, CO 80451

Dear Kirk:

Thanks for the opportunity to comment on the Draft DAU Plans for E-8 and E-13, including parts of the Sulphur Ranger District.

I support Alternative 2 for E-8 (Troublesome elk herd) and Alternative 3 for E-13 (Williams Fork elk herd) and the preferred alternatives for sex ratios for both DAUs.

Maintaining current elk population levels appears biologically sustainable and socially practical. Reducing current herd sizes does not appear to be possible as herds have remained relatively consistent since 1999 despite reduction attempts and increasing licenses sold can often lead to even lower hunter success.

Assuming available winter range is still the limiting factor of biological carrying capacity in Middle Park, the temptation to increase herd size in response to the flush of herbaceous vegetation currently available within dead stands of lodgepole pine leaves winter ranges vulnerable to over use. A return to average or severe winters could also leave larger elk herds susceptible to increased conflicts on private lands, increased elk-vehicle collisions along highways and railroads and overall decreased winter survival.

Please contact me or Doreen Sumerlin, Wildlife Biologist, at 887-4124 or 887-4129, respectively, if you have any questions or concerns.

Sincerely,

CRAIG A. MAGWIRE
District Ranger

BOARD OF COMMISSIONERS

JAMES L. NEWBERRY
District I, Winter Park 80482
NANCY STUART
District II, Granby 80446
GARY BUMGARNER
District III, Kremmling, 80459

E-Mail: grndcty1@co.grand.co.us
PHONE: 970/725-3347
Fax: 970/725-0565
LURLINE UNDERBRINK CURRAN
County Manager
ANTHONY J. DICOLA
County Attorney

July 13, 2010

Lyle Sidener
Area Wildlife Manager
D.O.W.
P.O. Box 216
Hot Sulphur Springs, CO 80451-0216

Re: Elk Herd Management Plan

Dear Lyle:

Thank you for the presentation that you and Kirk gave to us on Tuesday. It was extremely informative and helpful. After your presentation, we discussed the three alternatives presented. Grand County supports Alternative #2 which is maintaining the current population level. As you well know, big game hunting is a major economic driver for the county, and the use of the public lands during the hunts is also important to the county.

Enclosed please find the survey that we filled out. As you will see by the written comments, this survey was done by the commissioners as a board, and reflects the board's opinions as a whole.

Again, thank you for your presentation and your time.

Sincerely,

James L. Newberry
Chairman

Nancy Stuart
Commissioner

Gary Bumgarner
Commissioner

JLN:ke

cc: Kirk Oldham

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

Dillon Ranger District
P.O. Box 620
680 Blue River Parkway
Silverthorne, CO 80498
(970)468-5400
FAX (970)468-7735

File Code: 1500/5330-6/2600
Date: July 14, 2010

Colorado Division of Wildlife
Hot Sulphur Springs Service Center
P.O. Box 216
Sulphur Springs, CO 80451

To whom it may concern:

Thank you for this opportunity to comment on the Draft E-13 (Williams Fork Elk) Data Analysis Unit Plan.

To provide context for our comments, I would first like to update you on Dillon Ranger District projects that could impact the decisions you make on the Plan.

The Dillon Ranger District (District) has begun implementing projects in response to the Mountain Pine Beetle attack on lodgepole pine. The projects are primarily designed to perform vegetation treatments around infrastructure in the county to protect homes and private property, but some portions of the projects are also intended to harvest dead lodgepole pine in the areas considered suitable timber lands base.

Since 2006, the District has started implementing the **Dillon Reservoir Project** which is currently being actively logged. The project targets areas of mature/dead lodgepole pine with a requirement to reserve all conifer species less than 5 inch dbh and all spruce and fir that occur in small groups or as understory to the lodgepole pine. These project timber units are in Ryan and Salt Lick Gulches, Frisco Peninsula, Keystone Ranch, Soda Creek, and Frey Gulch. County or Forest Service roads are the main access with temporary roads as needed within the units. The temporary roads will be used for logging and then when logging has concluded the roads will be closed along with some other primitive roads in the areas of the units that do not access units. The project also includes treatment of 400 foot wide strips along the boundary between Forest Service and private property in Summit Cove and Keystone areas.

Another effort underway is the **North Summit WUI** project that we are starting to implement this summer. This project includes a 400 to 600 foot wide treatment along the boundary between Forest Service and private land to form a Community Protection Zone. This project is located from Wildernest north to Sierra Bosque with small units around Hamilton Creek and Pioneer Ranch and Ute Pass. This treatment is a fuels project that will affect only lodgepole pine stands.

A project for which the decision was recently made and is currently being laid out is the **Lower Blue Forest Health Project**. This project targets dead stands of lodgepole pine primarily in the Not Rock/Harigan Creek/Slate Creek area, Brush Creek/Doig Gulch area, and Spring Creek

Area. The project has a requirement to leave advance regeneration and protect other species of conifer that occur in the units. When the timber crews lay out the cut units they leave out inclusions of spruce fir so the actual cuts look somewhat different than the maps in the EA.

We are in the process of implementing the **Road and Trail Hazard Tree Project** which involves cutting hazard trees along roads and trails. Hazard trees within about one tree length each side of the roads and trails will be cut. Most roads and trails on the district that occur in lodgepole pine will be treated over the next three or four years.

We are currently writing the Environmental Assessment for the **Breckenridge Forest Health and Fuels Project**. This involves a community protection zone (400 to 600 feet wide) along the Forest Service Private land boundaries on the north side of the Swan River to Parkville, several zone areas in the Golden Horseshoe along Gold Run Gulch, East of Breckenridge and the homes in French Gulch and Baldy Road areas, and east of Town of Blue River to Hoosier Pass and along the west side of the Valley through Spruce Creek to the Peak 7 neighborhood. Timber units have been proposed in the South Barton and Middle Barton area. In the Golden Horseshoe timber units are proposed in the Gibson Hill, Prospect Hill, Lincoln Park and Brewery Hill areas. More timber units are proposed in the Indiana Gulch area. The project proposes both mechanical timber harvesting and hand treatments in areas inaccessible to logging due to steep slopes or limited access. Much of the community protection zone will be hand treatment or limited mechanical treatment directly adjacent to homes.

We are in the planning stages for a project tentatively named **Ophir Mountain Project** in the North Barton/Gold Hill/Ophir Mtn/Miners Creek area. This is essentially the same area the Upper Blue 2002 Project was to cover, but due to changed circumstances with the pine beetle kill we have not cut any of the timber units and are revamping that project with clear cuts instead of group patch cuts. The Wildland Urban Interface south of Frisco to Gold Hill has been cut as part of the implementation of the Upper Blue Project.

All projects except for the Breckenridge Forest Health & Fuels project will impact elk winter ranges in some way. We have or plan to have restrictions on the project activities in areas that overlap elk winter ranges that prohibit logging activity during winter and also have or plan to have restrictions on project activities to protect elk calving areas.

We agree that in the near term that with the loss of lodgepole pine over story, the vegetation will convert to more grass and forbs that would increase the available elk forage on winter ranges; but, we do have some concerns that we feel need consideration. One is that we expect to also see a flush of aspen regeneration as the sunlight stimulates aspen suckering in near dormant clones in the lodgepole pine stands. We want to encourage aspen and feel that too many elk may impact aspen regeneration on the winter range areas in a lot of the areas that we have planned projects. The second concern is the possible impact of elk on winter ranges grazing on the conifer regeneration and impacting the recovery of the lodgepole pine stands. At current population levels we have not seen heavy use on conifer regeneration but too high a population could impact both aspen and conifer reestablishment.

We are also seeing increasing recreation levels in the project areas in both summer and winter. Our biggest concern is winter recreation since much of the logging is taking place near homes and people tend to want to recreate out their back doors. As dead trees are removed, cover will also be removed so we will have more of an open forest over the next few years. The combination of increased winter recreation and lack of cover may affect elk use in these new openings. The concern is elk will be forced into other areas which may create new concentration areas that may result in impact to regenerating vegetation.

Given our large acreage of lodgepole pine timber projects that are being implemented or planned, we feel that much of the overall elk winter range on the district will be somewhat impacted. Although we have taken steps to protect elk habitat and allow elk use of habitat some elk winter range habitat will degrade in the short term and will likely force elk to utilize less area therefore increasing the possibility of overuse of localized areas.

Therefore, our recommendation for the E-13 (William Fork Elk DAU) would be Alternative 3, 4,700 to 5,500 elk post season. We feel that this is a balance of elk population with habitat and impacts to habitat that we foresee occurring. This alternative could also allow a higher number of elk to occur if we have several mild winters and lower harvest so we would have a "cushion" to allow the elk population to grow without damage to regenerating forests.

Please feel free to contact our District Wildlife Biologist, Vernon Phinney, if you have any questions about our comments and recommendation. He can be reached at 970-262-3491.

Sincerely,

JAN CUTTS
District Ranger

cc: Vernon R Phinney

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
Kremmling Field Office
P.O. Box 68, 2103 East Park Avenue
Kremmling, Colorado 80459-0068
www.blm.gov/co/st/en/fo/kfo.html

TAKE PRIDE IN AMERICA

In Reply Refer To:
6500 (CON020)

JUL 15 2010

Kirk Oldham
Colorado Division of Wildlife (CDOW)
P.O. Box 216 / 346 Country Road 362
Hot Sulphur Springs, CO 80451

Dear Mr. Oldham:

The Bureau of Land Management (BLM) in Kremmling has reviewed the draft Data Analysis Unit (DAU) plans for E-8 and E-13 and attended a presentation at the Middle Park HPP committee's June meeting on the elk population objectives. The BLM has been asked to send a letter of support for one alternative in order to move forward in the planning process. We recommend the following elk population and sex-ratio objectives:

E-8

- 3600-4300 for the elk population objective (Alternative 2) and
- 21-26 for the bull to cow ratio (Preferred Alternative).

E-13

- 4700-5500 for the elk population objective (Alternative 3) and
- 21-26 for the bull to cow ratio (Preferred Alternative).

Thank you for the opportunity to provide comments for the DAU management plans for elk in the Middle Park (E-8 and E-13) herds. If you have any questions, please feel free to contact Megan McGuire at 970-724-3028.

Sincerely,

David Stout
Field Manager

Middle Park Conservation District
PO Box 265 106 S 2nd ST
Kremmling, CO 80459
Phone: 970-724-3456 Fax: 970-724-0807

July 16, 2010

Mr. Kirk Oldham
Terrestrial Biologist
Colorado Division of Wildlife
P.O. Box 216
346 Country Road 362
Hot Sulphur Springs, Colorado 80451

Dear Mr. Oldham:

Please accept the enclosed comments on the E-13 and E-8 draft DAU plans from Middle Park Conservation District (MPCD). MPCD is one of Colorado's 76 conservation districts established under the Soil Conservation Act of 1937 to address conservation and stewardship of Colorado's natural resources. MPCD is responsible for on-the-ground conservation projects and technical support for private landowners within the District boundary. The District covers all of Grand and Summit Counties, which includes the area described for both E-13 and E-8.

For E-8, MPCD supports Alternative 2, a post-hunt population objective of 3,600 – 4,300 elk
For E-13, MPCD supports Alternative 2, a post-hunt population objective of 4,100 – 4,900 elk

In addition to supporting the above alternatives, MPCD would also like to stress the importance of setting population objectives in accordance with habitat carrying capacity and the potential for habitat impacts. In particular, winter range and winter carrying capacity are limiting to elk populations, especially when they come into conflict with livestock and other big game animals such as mule deer.

The MPCD appreciates the opportunity to provide input to the DAU planning process. Please contact the District office with any questions at: (970) 724-3456.

Respectfully Submitted,

Middle Park Conservation District

Blue Valley Ranch

July 16, 2010

Mr. Kirk Oldham
Terrestrial Biologist
Colorado Division of Wildlife
P.O. Box 216
346 Country Road 362
Hot Sulphur Springs, Colorado 80451

Dear Mr. Oldham:

Thank you for the opportunity to provide input to the Draft DAU Plan for E-13, and for the informative presentation last Tuesday, July 6 in Kremmling. The Ranch appreciates the work the Colorado Division of Wildlife has done in managing the elk population in Middle Park, its efforts to mitigate game damage on private land, and its desire to consider public input in its planning process.

As you know, Blue Valley Ranch (BVR) is located entirely within DAU E-13, and the ranch has worked hard to provide habitat for a variety of wildlife, and Rocky Mountain elk in particular. A ground-based census conducted by Private Lands Consulting of Springville, UT, in 2009 found just fewer than 500 animals on BVR, which is just over 10% of the current population estimate of 4,700 in the post-season of 2009. This is a large population, despite the fact that the ranch constitutes less than 3% of the land area of the DAU. Efforts by BVR to provide for and manage this population have included habitat improvement projects, fencing of aspen stands to protect them from browsing, and recruiting local public hunters to harvest animals on ranch management hunts at no additional cost to them. BVR's annual elk harvest, totaling 550 cows over the last fifteen years, has ranged from 3.3% to 5.4% of the mean annual harvest of 1,265 for the DAU between 1985 and 2009.

Despite these efforts, BVR continues to see the impacts of a large elk herd on habitat. Elk browsing has been cited as a significant factor limiting recovery of aspen stands from the Sudden Aspen Decline (SAD) phenomenon (Worrall, et al. 2008), and BVR has documented elk browsing on over 86% of aspen shoots in unfenced aspen stands. The ranch would like to see further herd reduction to help alleviate habitat damage, as well as to relieve game damage to agricultural resources and infrastructure. We would also like to see a more thorough consideration of the potential impacts of a large elk herd on the deer population in Middle Park,

which is more sensitive to environmental stressors. Finally, the ranch would encourage the plan to establish population objective alternatives based more on habitat availability, especially limited winter range, as well as social and political factors.

Of the four alternatives listed in the draft DAU plan, Blue Valley Ranch supports Alternative 1, with a post-season population objective of 3,000 to 3,600 animals. We realize that this constitutes a change from the current population estimate of 4,700 in the post-season of 2009. However, we might echo the rationale cited on page 36 of the 1999 DAU E-13 Plan for establishing a population objective of 3,000 animals: "This option addresses habitat concerns... and should give landowners with damage problems some relief... reducing the herd to 3,000 animals in the posthunt population should take some of the pressure off the winter range and transition range – improving habitat condition and herd vigor. The deer population will also probably benefit from a reduction in the elk population." This rationale reflects many of the main concerns of Blue Valley Ranch, namely: limited winter range, game damage on private land, habitat impacts, herd vigor, and impact to the mule deer population. All of these issues are mentioned as constraints in the 2010 draft plan as well.

We hope that these comments are helpful in completing the DAU plan for E-13. Please feel free to contact me with any questions.

Sincerely,

Perry Handyside
General Manager

cc. Ron Velarde
Lyle Sidener
Becky Manly

Oldham, Kirk

From: hssrobnjul@comcast.net
Sent: Friday, July 16, 2010 12:45 PM
To: Oldham, Kirk
Cc: Crosby, Mike; Murdoch, Scott; Abram, Gene; becky.manley@state.co.us; Schwab, Shannon; Sidener, Lyle; Holland, Andy; Velarde, Ron; Broderick, John
Subject: Middle Park Elk DAU plan comments

Hi Kirk,

Was unable to attend the public meetings but said I would be sending comments to you. Hope these comments are timely and of value to you. I am in agreement with much of the plan for the DAUs. To manage within a range is wise and prudent. The overall population numbers are also something I agree with as well as productive ranges of cow/calf numbers. It is the bull/cow ratio that I would like to comment on. I was somewhat surprised to learn that there is only one alternative for the bull/cow ratio offered in any of the alternatives. While 21 to 26 bulls per hundred cow elk is quite easily attained in these units with little or no change in current management strategy - I would like to advocate for an incremental increase in the bull/cow ratio with the result of more mature bulls in the population(s) - something along the order of 30 to 35 bulls per 100 cows. I believe this can be accomplished without going to a full-blown totally limited designation for these units - and without having to make drastic cuts to the current number of license offered or sold for these units. I definnitely do NOT buy into the idea that it takes drastic cuts in current participation rates to achieve an increase in the bull cow/ratio...

A bit of history... As you recall when I spoke to you last week at lunch, after having conversations with then A-9 biologist Chuck Wagner and his boss, Jim Olterman, I had conversations with then statewide Big Game Manager John Ellenberger about creating BOTH quality elk and deer DAUs for Middle Park back when we switched to quality deer units for this (D-9) DAU. At that time, I explained to John that it would NOT take dramatic license restrictions to accomplish increases in buck/doe and bull/cow ratios. After some discussion, John agreed - but still declined to go forward with a recommendation of "Quality" designation for BOTH deer and elk due to overplaying the total numbers of quality elk units statewide and the overall possible fiscal impacts as well as the CWD concerns for both elk and deer... The reason we still went forward with deer had to do with the public support for totally limited deer licenses statewide that was going into effect anyway. Also, there were other DAUs nominated for quality elk management at the time that did not also have the CWD concerns and had more established public support than the Middle Park units... So we went with deer, but not elk at the time - but I can tell you that there was support for it (quality elk) - both within the Area and from the public!

Bottom line was that there was honest agreement that it doesn't take much in these Middle Park big game DAUs (D-9, E-8, E-13) to achieve increases in buck/doe and bull/cow ratios due to factors such as topography, land ownership and weather patterns (now add beetle killed lodge pole) for elk and deer to hide out in and evade hunting pressure - and John, Chuck and Jim all did agree with that... And that is why I would advocate for the slight increase now as you go forward with new DAU plans... I am still of the opinion that it would only take small changes (decreases) applied to the overall number of ES permits issues in primarily the first rifle elk season - and possibly the fourth rifle elk season - to see bull/cow ratios rise and remain in the 30 - 35 bull/cow range. I do not believe it will take much more than that. As I understand it, there has been a recent increase in archery elk licenses issues for these units and if that is in fact the case and that trend continues, it may take a cap on the total number of archery licenses at some point - but I'm not convinced we are there yet.

The muzzle loader tags are already totally controlled for these units. I DO NOT advocate for totally limited elk unit designation. I don't think it is necessary to achieve the slight increase in bull/cow numbers that I am trying to achieve. There would be no need to limit participation during the over the counter elk seasons if steps are taken during 1st and 4th to limit participation... Just as the current bull/cow ratio happens to be up around 35+bulls /100 cows in E-13 right now without ANY manipulation - I believe you could achieve this annually without greatly cutting hunter participation with the exception of those two seasons.

I am offering up my own participation here Kirk as I hunt the 1st rifle season for elk in E-13. Having seen the quality of bulls increase slightly since the advent of our current season structure, I firmly believe that this current structure allows for an increase in bull/cow ratio to be achieved with a minimal impact to current hunter participation rates... I know that as a wildlife manger of this area for over twenty years - there is definitely greater support for an effort such as this - as opposed to going totally limited on elk - but even that effort is probably still at the 50-50 point as far as overall public support. I know that Blue Valley Ranch supports any effort to pursue "quality" as it pertains to bull/cow increase as do a number of other private landowners, outfitters and individuals that reside and hunt in these units. If you doubt that or you feel the need to see how extensive a list of supporters I can drum up for this effort - say the word and I will pass this email along to them and we can see where it goes in terms of support - but that is not my intent here. I just happen to believe that this is a realistic request and quite doable under the current framework.

Thanks for your time and effort in this regard Kirk. I have no plans to "push" for this opinion to carry the day - but I do hope it rings a bell with the Area personnel and that they feel it is something they can support. I cannot imagine that it bears any heavy fiscal cost to achieve in terms of lost revenue... and I would definitely like to see those numbers if you care to convince me otherwise! Promise I won't cry like a baby if it cannot happen! Belive me, I am not dissatisfied with the current state of affairs! I am getting ready for elk season as we speak!

Would love to hear from those cc'd above as to their opinions on this latest essay...

Thanks for the time!

Rob