E-26 HERD MANAGEMENT PLAN
SAGAUCHE ELK HERD

Game Management Units: 68 and 681

Revised By
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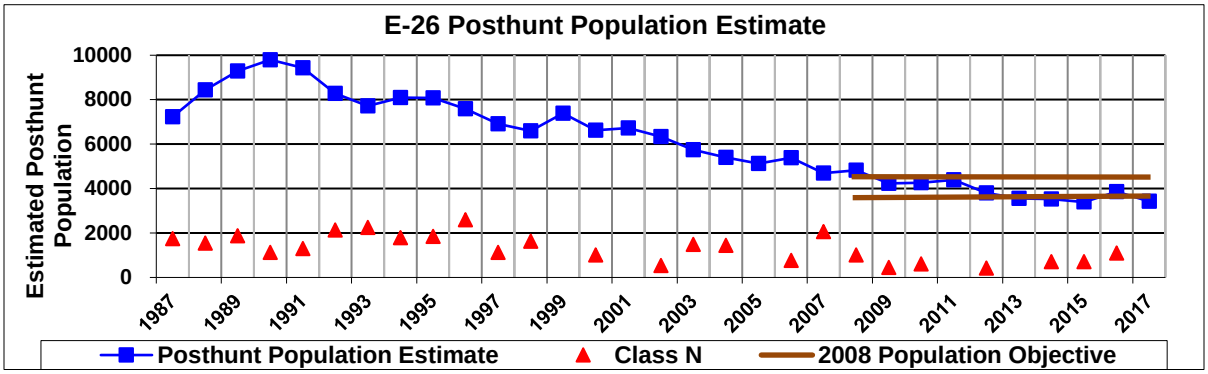
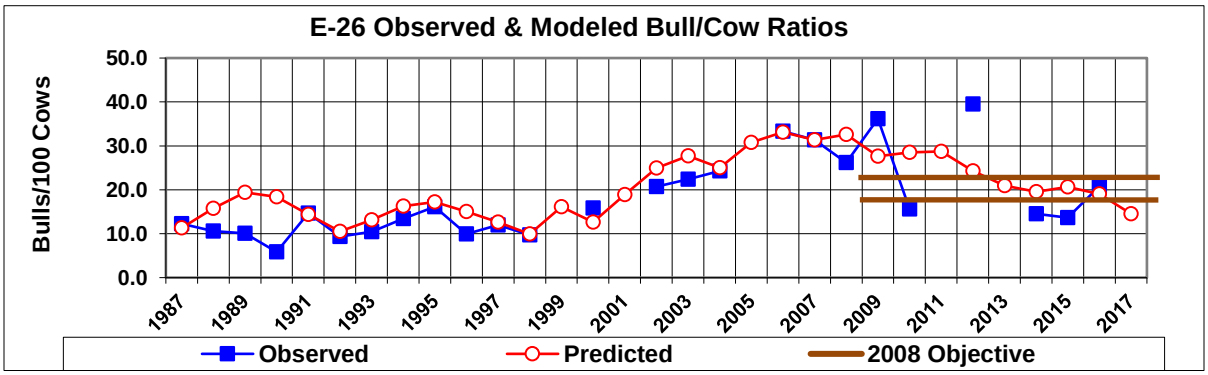
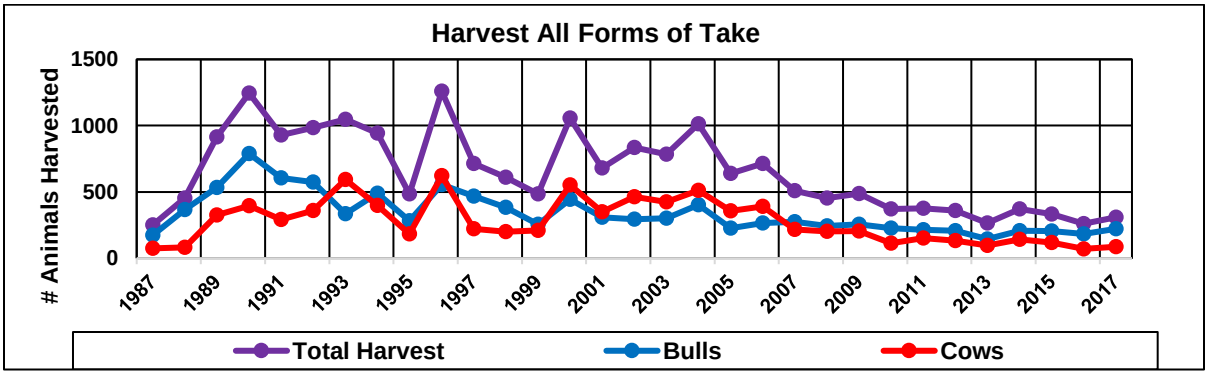
E-26 SAGUACHE ELK HMP DRAFT EXECUTIVE SUMMARY

GMUs: 68 and 681	**Landownership:** 12% Private, 58% USFS, 25% BLM, 5% CO State
Post-hunt Population (2017): 3,400	**Post-hunt Sex Ratio (Bucks : 100 Does):** 20 (Observed 5 yr. average)
2008 (Previous Herd Plan Objectives):	3,500 to 4,500 deer; 18-22 Bulls : 100 Cows
2019 Herd Plan Objectives (Preferred):	4,000 to 4,800 deer; 18-22 Bulls : 100 Cows







E-26, the Saguache Elk Population, is located in the northern portion of the San Luis Valley in Colorado. The DAU is bounded by the continental divide on the north and west side, on the south by Carnero Creek and County Road G, and on the east by Colorado Highway 285. E-26 is approximately 1,047 square miles (or approximately 670,000 acres) and encompasses primarily Saguache County. Land ownership composition in this unit is comprised of 12% private, 58% U.S. Forest Service, 24% Bureau of Land Management, Colorado State land 5% and 1% other. E-26 consists of Game Management Units (GMUs) 68 and 681. Both Game Management Units have been managed as over-the-counter bull hunting units. In addition, both units had generous numbers of antlerless licenses in the 1990's during regular and private land only seasons. Either sex tags were employed in the first rifle season from 2003 to 2007.

The E-26 population was increasing during the late 1980's. In 1990, the population reached an estimated number of approximately 9,700 animals. At this time, wildlife managers began efforts to control the growing population by increasing the number of antlerless elk licenses because the herd was considered to have been above the social tolerance and habitat carrying capacity. Increased harvest aimed at cows began in 1989 and continued through 2006 with the intent of reducing the population to acceptable levels. The high antlerless harvest was reduced in 2006 as fewer elk were being located. Even with the reduced harvest rate, the population continued declining. This downward trend brought the elk herd to its lowest level in 2015. In 2008, the preferred population objective was set at 3,500-4,500 elk, which at the time expressed a public desire to maintain the current population, based on elk population model estimates at the time, and curb the downward trend.

Since 1987, sex ratios have averaged 18 bulls to 100 cows. In 2008, the sex ratio objective was set at 18-22 bulls per 100 cows, continuing to allow for hunter opportunity. The previous 5- and 3-year modeled averages, for overall bull ratios have been 19 and 16 bulls to 100 cows, respectively.

Harvest success in E-26 appears to be influenced greatly by weather and changes to elk distributional movements. Bull harvest from 2008 to 2017 averaged approximately 210 with a high of 256 in 2009 and a low of 144 in 2013. Antlerless harvest since 2008 has ranged from 78 in 2016 to 231 in 2009 with an average of 147.

E-26 Significant Issues.

From the public input, the major issue brought up by the majority of respondents is the desire for having more elk on the landscape. From an environmental perspective, the main limiting factors for this herd are the winter range conditions, forage and water availability, and human social tolerance on agricultural lands. According to the Rio Grande National Forest, forage availability on summer range is not likely to be limiting, having received new information from their ecological condition assessment. Water availability and forage affects the amount of quality habitat available for elk year-round. Increased recreational activity in E-26 may also reduce usable habitat for elk. Depleted habitat resources could negatively influence elk recruitment and survival. As a result, elk and other ungulates, including mule deer and pronghorn could be forced onto irrigated agricultural land with abundant forage and water resources. This movement onto private land had caused numerous game damage issues in the past. Today, Colorado Parks and Wildlife has greater ability in addressing these issues, if they should arise, through redistribution efforts using dispersal applications for effected landowners.

Management Alternatives

Three alternatives for E-26 were considered for post-hunt population size and sex ratio objectives:

Population Objective Alternatives	**Expected Bull Ratios**
3,200 to 3,800 (Present population estimate)	18 to 22 bulls : 100 cows (Remains the same)
3,600 to 4,200 (Approximately 10%-20% population increase)	
4,000 to 4,800 (Approximately 20%-40% population increase) - **Pr**eferred	

Preferred Alternatives:

Population **-** The responses received during all public involvement processes, including feedback from partner agencies, suggest that the majority support increasing the elk population in GMUs 68 and 681. The preferred alternative is a **population objective of 4,000 to 4,800** elk, which allows for an increase in the population by 20-40%. It would maintain current hunting opportunity, being an OTC unit.

Expected Sex Ratio **-** This herd has been managed as an over-the-counter unit since 1987. The expected sex ratio based on the existing season structure is **18-22 bulls per 100 cows**. If the season structure were to change, a possible change could be expected in the "expected bull ratio". These ratios would remain the same as those established in 2008, which would allow for ample hunting opportunity in archery, 2nd and 3rd rifle seasons and limiting the 1st and 4th rifle seasons.

Strategies for Achieving the Preferred Objectives:
Population – To increase the population by 20-40%, antlerless harvest will need to be reduced by more than 90%, to allow for herd growth. Reductions would occur during all available cow seasons. However, game damage licenses would still be offered, if necessary, to reduce agricultural depredation issues should they arise.
Herd Composition – Any changes that could be expected to occur in the sex ratios in E-26, would entail changing the license season structure throughout the unit. It has been proposed that the same expected sex ratio remain in place as what had been set as a preferred alternative in 2008.

Strategies to Address Management Concerns:

Elk Population Levels and Demographics – CPW is in the process of conducting research projects in different areas of the state of Colorado, in an effort to understand elk recruitment (pregnancy and birth rates, neonatal survival and cause of death), to assist in determining differences in elk numbers from what they had been in the past. E-26 is an over-the-counter unit that provides ample bull hunting opportunity but this could cause overcrowding of hunters in the field. CPW will attempt to work with as many hunters as possible to encourage different areas to be hunted, in an attempt to prevent hunter-crowding issues, but this could be extremely challenging, considering the number of hunters.
Elk Distribution and Movements – Winter range and water availability are limiting factors, especially with increasing human pressure, and extreme weather condition changes. Habitat improvement and restoration efforts have been imple-mented by the Rio Grande National Forest to address significant beetle kill on summer and winter range. Increased elk numbers could be accommodated with increasing availability of quality forage and water resources. Harvest success rates and hunter satisfaction are likely to improve as hunters become aware of changing elk distribution patterns and cover requirements.
Damage to Agricultural land – Human social tolerance is also a major limiting factor for elk herds in E-26. This would be addressed by game damage claims through game damage and dispersal licenses and the HPP Committee, should this become an increased issue. CPW will work jointly with the Rio Grande National Forest and the BLM on habitat improvement projects that should help in attracting elk away from agricultural lands.
Increasing Year-round Recreational Disturbance – CPW is working with partnership federal agencies to address in-creasing OHV usage, particularly during spring, summer and fall periods, as well as increasing winter snow-machine usage on winter range.
Diseases – There is continued surveillance for CWD as well as any other diseases.

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INTRODUCTION AND PURPOSE

Primary Goals

The primary goal of this Herd Management Plan (HMP) is to establish appropriate population objective ranges, sex ratio ranges, and population performance objectives. The population objective set for Data Analysis Unit (DAU) E-26 in 2008 was 3,500-4,500 elk, which had been based on models and data that were believed to have underestimated populations. Since that time, social demands have called for a larger elk herd. The short-term goal is to allow this elk herd to continue increasing within biological and social carrying capacities. The goal for the ten-year term of this plan is to manage to the most appropriate population level within the objective range based on climatic patterns, habitat conditions, forage availability and public desires.

Secondary Goals

The secondary goal of this plan is to outline strategies and techniques needed to achieve objectives. Traditional tools include adjusting harvest rates, number of limited licenses, and types of hunting seasons. Additional important considerations are habitat conservation and improvement. Managing this elk herd within the long-term objective range has the intent of producing healthier and more productive elk, greater hunter satisfaction, but still being able to maintain the social carrying capacity tolerance on private agricultural lands.

Management by Objective

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

The purpose of a Herd Management Plan is to provide a system or process which will integrate the plans and intentions of Colorado Parks and Wildlife with the concerns and ideas of land management agencies and interested publics in determining how the elk population in a specific DAU should be managed. In preparing a HMP, agency personnel attempt to balance the biological capabilities of the herd and its habitat with the publics demand for wildlife recreational opportunities. Various constituents, including the Rio Grande National Forest, the Bureau of Land Management, sports persons, guides and outfitters, private landowners, the local chambers of commerce and the public, are involved in the determination of population and herd composition objectives and related issues. Public input is solicited and collected through questionnaires, public meetings, and comments sent to the Area CPW office.

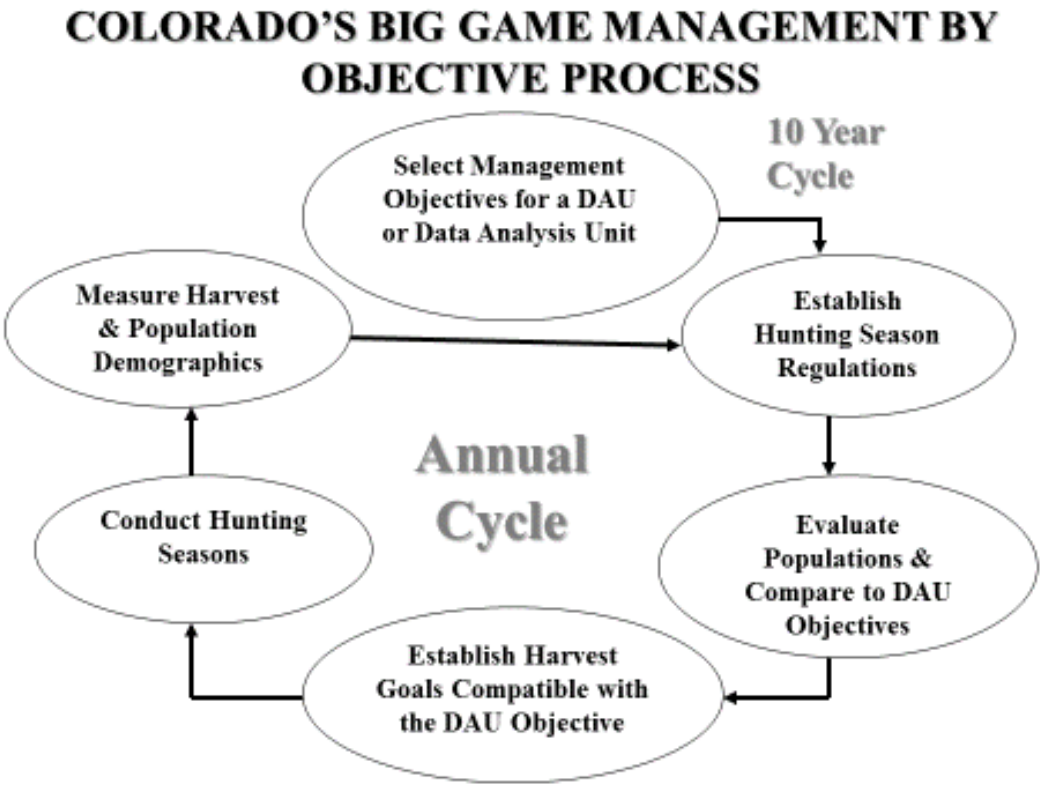

Figure 1. Management by objectives process used by Colorado Parks and Wildlife to manage big game populations on a DAU basis.

A Data Analysis Unit is the geographic area that represents the year-around range of an elk population and delineates the seasonal ranges of a specific population while keeping interchange with adjacent populations to a minimum. A DAU includes the area where the majority of the elk in a population are born and raised as well as where they die, either as a result of hunter harvest or natural causes. Each DAU usually is composed of several game management units (GMUs).

The strategies and techniques needed to reach the population size and herd composition objectives need to be selected. The selection of population and sex ratio objectives drive important decisions in the big game license setting process, the foremost being, the number of elk needed to be harvested to maintain or move toward the objectives.

DESCRIPTION OF THE DATA ANALYSIS UNIT

LOCATION

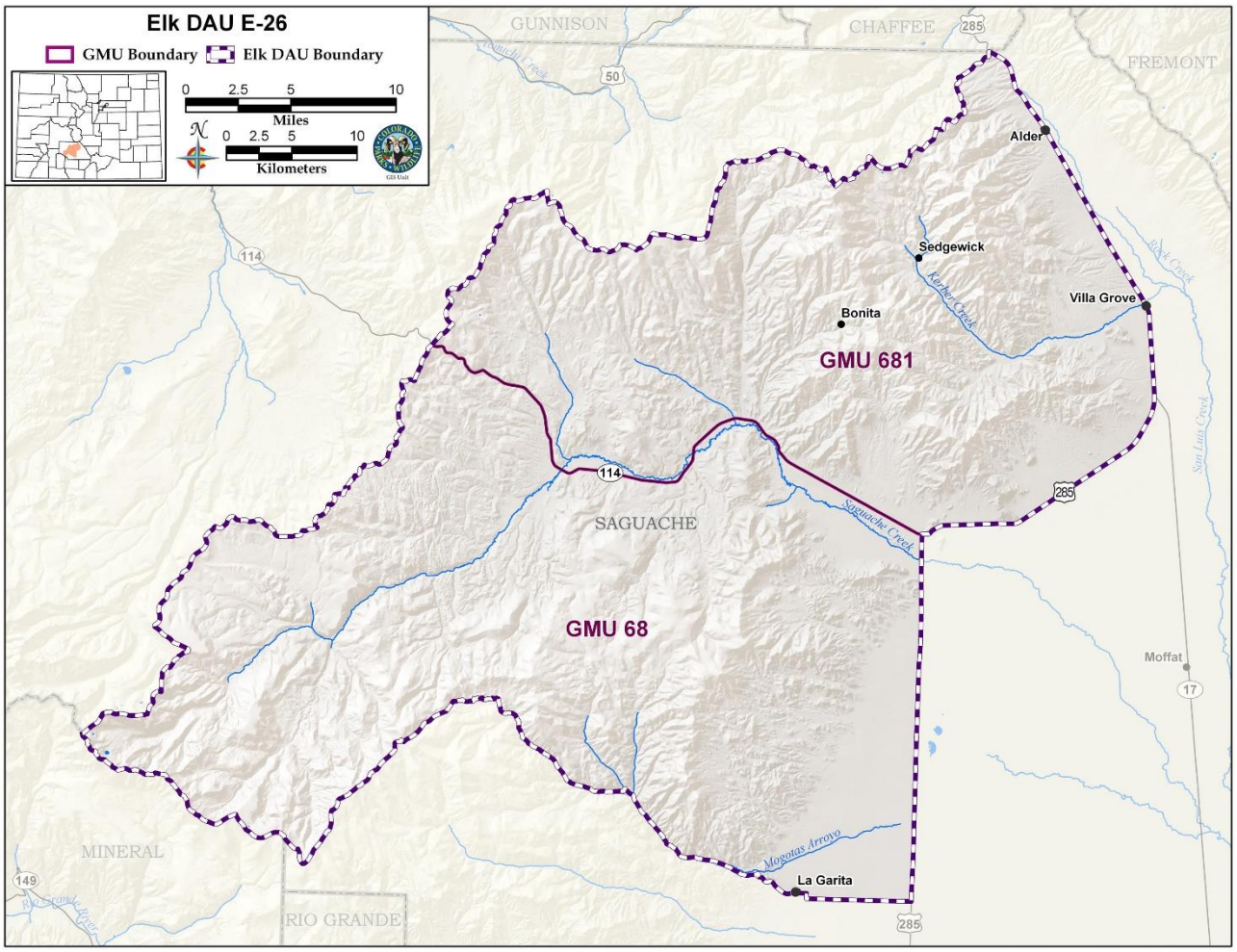

Figure 2. Geographic boundaries for DAU E-26, GMUs 68 and 681 in southwest Colorado.

The Saguache elk herd E-26 is located in south central Colorado, on the northern side of the San Luis Valley. It consists of Game Management Units 68 and 681 (Figure 2). The DAU is bounded by the continental divide on the north and west side, on the south by Carnero Creek and County Road G, and on the east by Colorado Highway 285. E-26 is approximately 1,047 square miles (or approximately 670,000 acres) in size and is entirely within Saguache County. Its primary drainages are Saguache Creek, Kerber Creek, and Carnero Creek.

PHYSIOGRAPHY

Topography

E-26 includes a combination of valley floor, foothills, and mountains. The elevation ranges from a low of about 7,500 feet on the valley floor to the La Garita Mountains, which rise to over 13,000 feet elevation to the west along the Continental Divide and to the Cochetopa Hills in the north. Prominent mountain peaks include Trickle Mountain, Windy Peak, and Flagstaff Mountain in the northern section, and Lookout Mountain, Mesa Mountain and Stormking Mountain in the southern section. Saguache Creek flows along the middle of the DAU. Tributaries that flow into the Saguache Creek in E-26 include Sheep Creek, Jacks Creek, Middle Creek, Houselog Creek and Park Creek.

Climate and Precipitation

E-26 has a highland or mountain climate with cool summers and cold winters with moderate snows. The higher elevations of the La Garita Mountains receive 30 inches of precipitation annually. The valley floor gets only approximately 7 to 8 inches and is considered a semi-arid high elevation desert. Most annual precipitation comes in the form of snow; however, summer moisture in the form of rain can have a significant impact on the growth of forage resources.

Vegetation

The lower elevations include montane grasslands, shrublands with winterfat (*Krascheninnikovia lanata*) and rabbitbrush (*Chrysothamnus* spp.*)* and agricultural lands (Figure 3). Riparian areas support cottonwoods (*Populus* spp.), willow (*Salix* spp.), and wetland plants. As elevation and precipitation increase, the vegetation changes to pinyon pine (*Pinus edulis*), juniper (*Juniperus scopulorum*), ponderosa pine (*Pinus ponderosa*), then Douglas fir (*Pseudotsuga menziesii*) and white fir (*Abies concolor*) combined with extensive stands of aspen (*Populus tremuloides*). Between 9,500 and 12,500 feet elevation, stands of Engelmann spruce (*Picea engelmannii*) and subalpine fir (*Abies lasiocarpa*) are dominant with occasional bristle-cone pine (*Pinus aristata*) stands. Vast areas of alpine occur above 12,500 feet.

Spruce/fir stands typically provide excellent thermal cover during summer months, as well as security areas during the hunting seasons. Beetle-kill is affecting the spruce/fir habitat. According to the Rio Grande National Forest, the spruce beetle has had the greatest influence, from approximately 17,500 acres in 2010 to more than 69,000 acres in 2016. This is almost a 4-fold increase in the forest area within the DAU that has been affected by the spruce beetle. Dead standing timber is becoming more common in E-26 spruce/fir stands. Over time, canopy cover and understory growth will change as dead trees fall. As the canopy cover opens from beetle-kill effects, more prolific growth takes place in understory grasses/forbs and shrubs. This understory growth provides additional forage for the elk, however less cover. Aspen stands are usually found in areas with high soil moisture content and are often associated with diverse, productive grass and forb understories. Aspen stands provide high quality elk forage throughout the spring, summer, and fall. Additionally, aspen habitats provide moderate cover and are commonly used by elk for calving areas.

A mix of pinyon-juniper and desert shrub dominates the foothills. This zone is used primarily as winter range by elk although isolated year-around populations exist. North aspects of ridges throughout this zone and extending into the mountain-shrub zones contain pinyon-juniper woodlands, which serve as important winter cover and limited winter forage. Wetland/riparian vegetation types are found along the river bottoms and associated irrigated meadows.

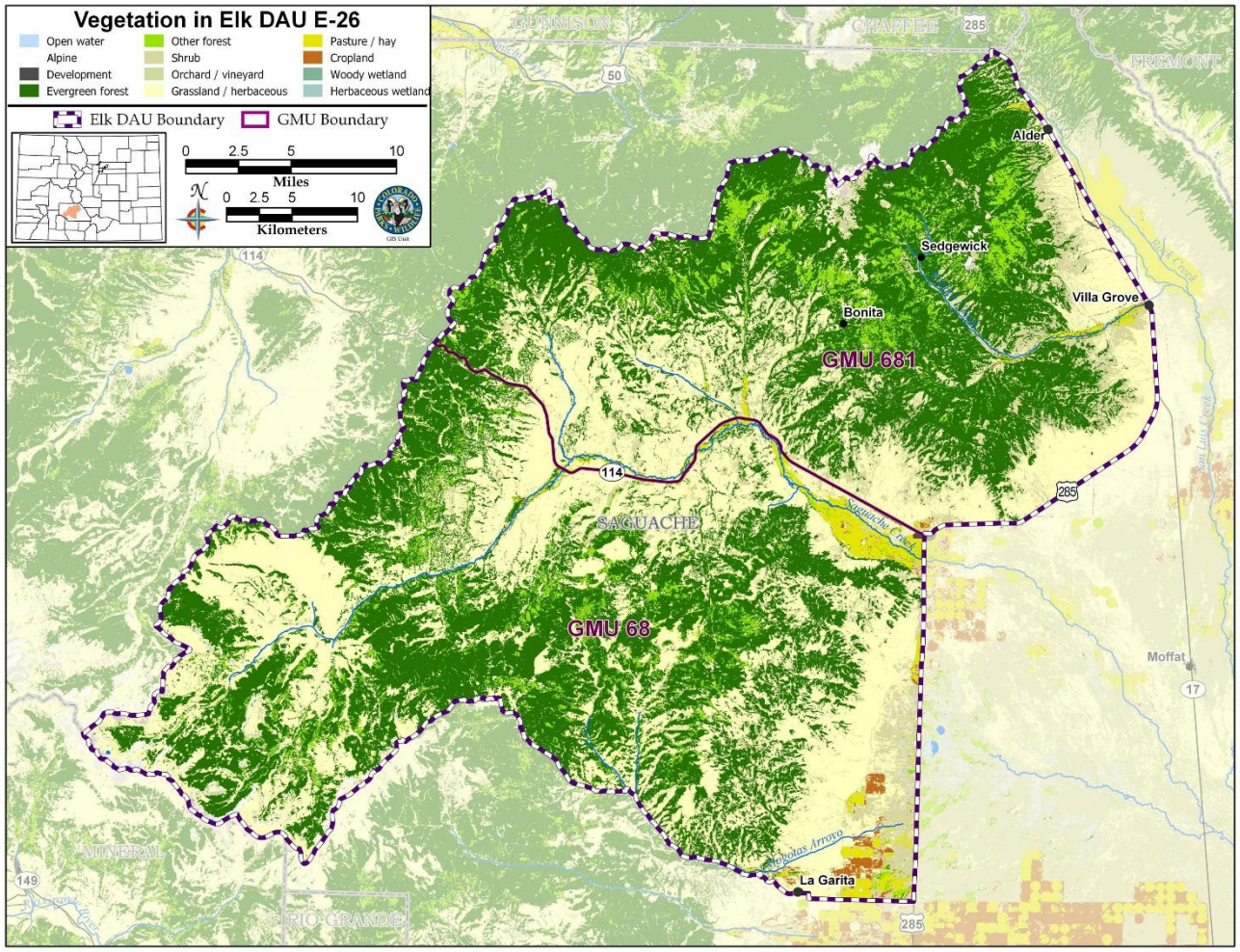

Figure 3. DAU E-26 map showing the Vegetation Cover.

LAND OWNERSHIP

Of the entire DAU E-26, approximate 670,000 acres, public land comprises approximately 88% of the area. Land ownership composition in E-26 encompasses approximately 12% private, 58% Rio Grande National Forest, 25% Bureau of Land Management, and Colorado State land 5% (Table 1, Figure 4).

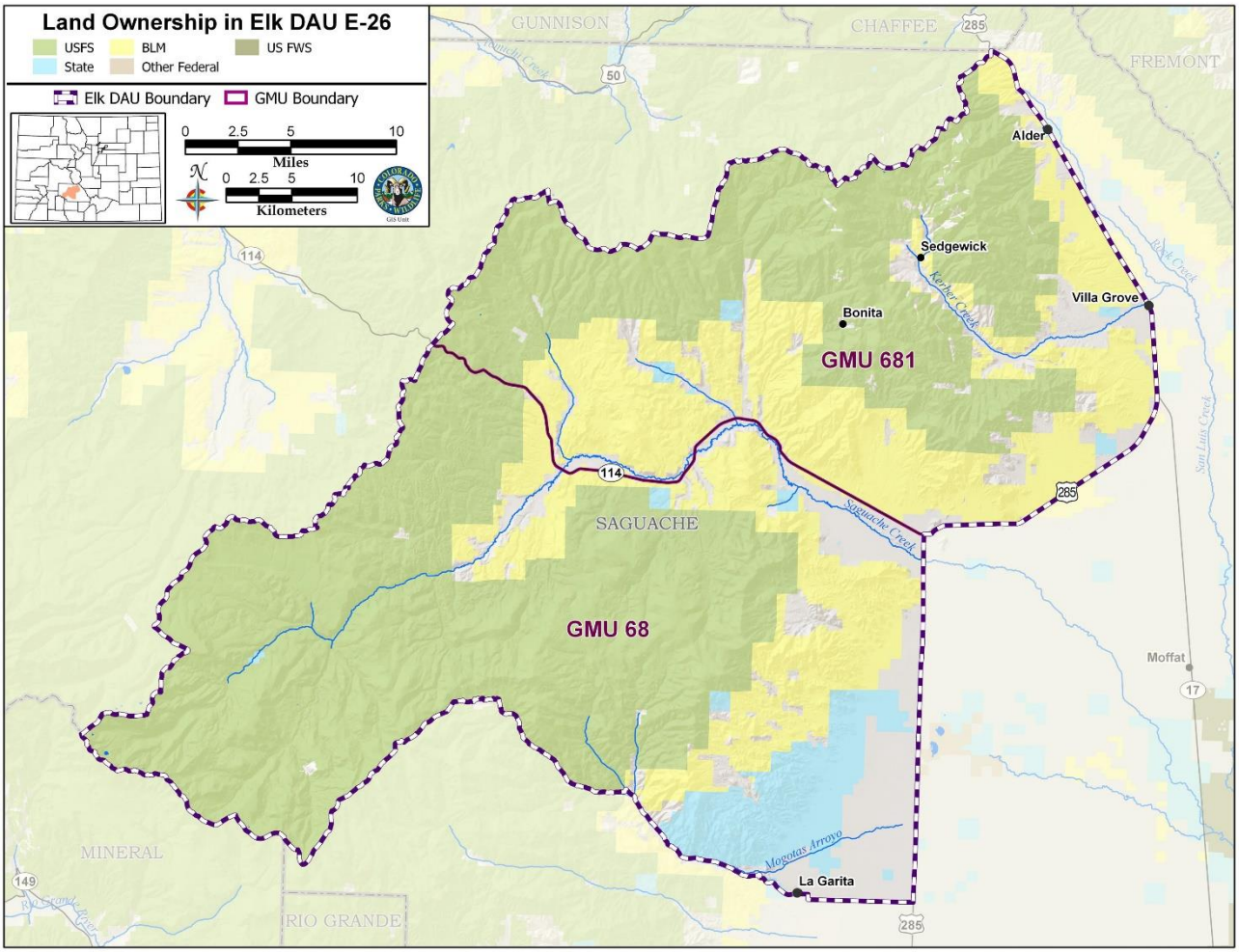

Figure 4. Surface land ownership in the DAU E-26.

HABITAT RESOURCE

One of the major limiting factor for the elk herd in this Data Analysis Unit is quantity and quality of winter range (Figure 5). Elk may be in competition for the same or similar resources with mule deer during the winter months. Winter range conflicts on public lands are primarily snowmobile and off-highway vehicle (OHV) harassment. Illegal harvest and use of closed roads can also be an issue. Subdivision of private land that is within winter range is an increasing concern. Summer range conflicts on public lands are also primarily due to increasing OHV usage.

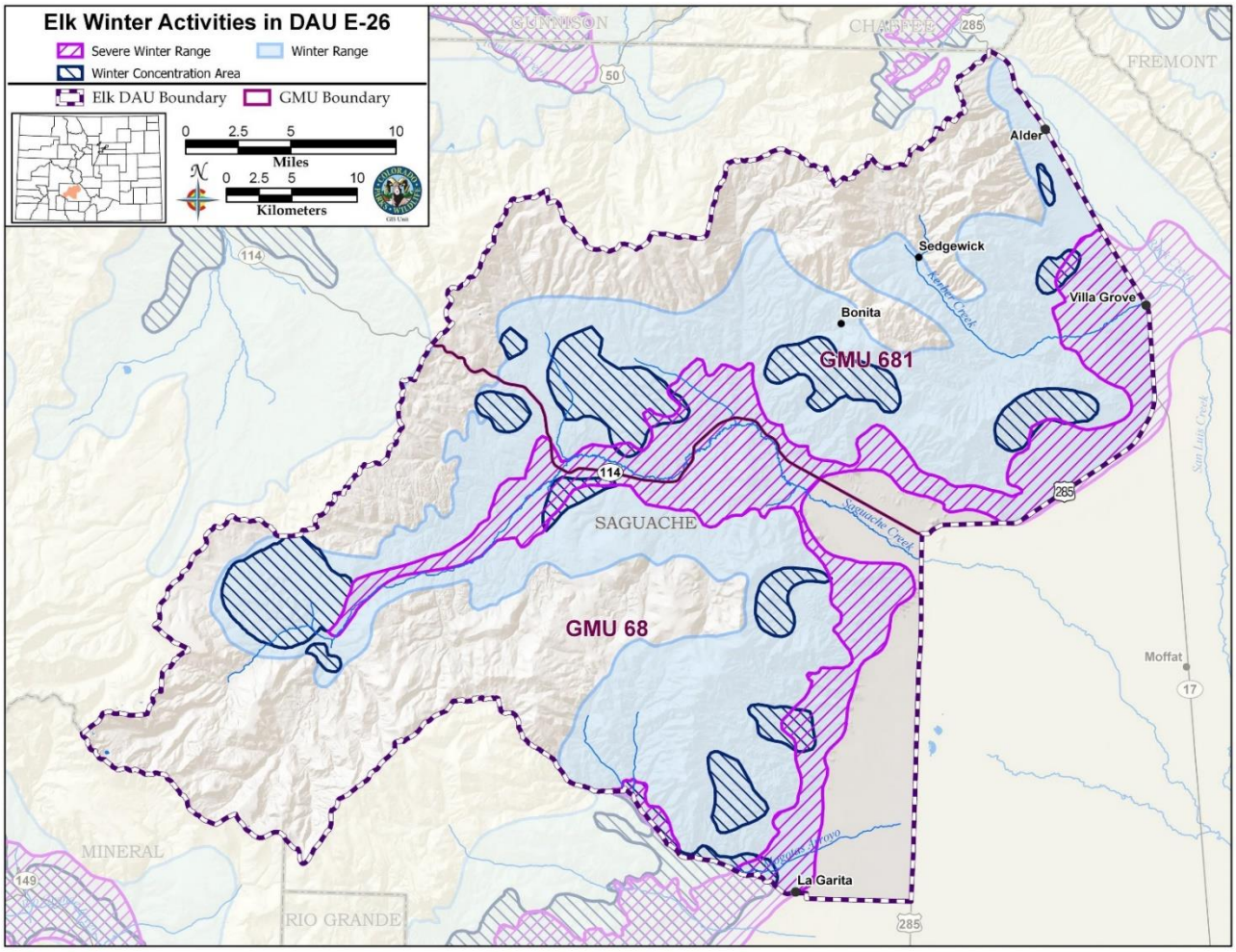

Figure 5. Winter range, severe winter range, and winter concentration areas for DAU E-26. Winter range is defined as, "that part of the overall range where 90% of the elk are located during the average five winters out of ten from the first heavy snowfall to spring green-up period." Severe winter range is, "that part of the overall range where 90% of the individuals are located when the annual snow pack is at its maximum and/or temperatures are at a minimum in the two worst winters out of ten." Winter concentration area is, "that part of the winter range where elk densities are at least 200% greater than the surrounding winter range density".

	Winter Range	Winter Concentra-tion Areas	Severe Winter Range	Summer Range	DAU D-26
Overall	**384,500** **57%**	**63,500** **9%**	**103,500** **15%**	**492,000** **73%**	**670,000** **100%**
BLM	**154,000** **23%**	**24,000** **4%**	**64,000** **10%**	**75,500** **11%**	**164,500** **25%**
RGNF	**15,500** **23%**	**29,000** **4%**	**4,000** **1%**	**387,000** **58%**	**388,000** **58%**
Colorado State	**25,500** **4%**	**4,500** **1%**	**10,500** **2%**	**4,000** **1%**	**33,500** **5%**
Private	**49,500** **7%**	**6,500** **1%**	**24,500** **4%**	**25,000** **4%**	**83,500** **12%**

Table 1. Land ownership and mule deer winter, winter concentration, and severe winter range areas. All figures are in acers and percentages have been rounded off.

Habitat Capability and Condition

While widespread habitat is available for most elk to use, habitat quality influences the health of the elk population. At the same time, the elk population size affects habitat quantity and quality. Elk generally occupy E-26 from the grassland/shrub and pinyon/juniper areas of the foothills on the winter range, through all vegetative zones up to the alpine tundra during the summer and early fall. Landscape carrying capacity can change over time. With drought conditions occurring more frequently and with severe winters cycling through once a decade, the number of elk this habitat can support fluctuates. Managers work to keep the elk population from exceeding biological carrying capacity to prevent large-scale habitat impacts.

Several factors can limit the elk population. Water is an important biological consideration, particularly when annual precipitation is below average. Annual precipitation affects the recharge of reservoirs and flow of streams as well as rivers. This moisture also influences the forage conditions including productivity and value. Long-term predictions indicate that extreme weather will likely happen more frequently. Carrying capacity may be reduced by these temperature and precipitation fluctuations. Adaptive management will be needed to keep the elk population balanced with these anticipated changes. Furthermore, riparian and wetland areas are heavily used by elk especially under drought conditions. These habitats should be protected and enhanced to prevent elk impacts, that could result in habitat degradation.

Elk movement to the winter range is usually initiated by increasing snow cover and decreasing forage availability, along with hunting pressure. This movement generally begins in November and continues until January. The movement is elevational and in an easterly or southerly direction. Wintering concentrations of elk are usually found in the foothills between Carnero and Saguache Creeks. Saguache Park can be an important wintering area, but its use is entirely dependent on snow cover. In GMU 681 the elk tend to be more scattered over the winter range. Increasing exurban housing development has been occurring, affecting habitat at a lower intensity. If these developments continue to grow, ongoing habitat fragmentation may have long-term impacts, particularly on winter range. Elk may try to adapt to houses

being nearby, and this situation could increase stress levels, potentially lower fecundity and survival rates, and create greater human conflicts. Elk may also be forced to move to other area that may be utilized by other species, particularly mule deer.

Elk movement back to summer range usually follows snowmelt and the return of forage quality, while during the summer and fall months the elk have dispersed throughout the DAU. Increasing hunting pressure in DAU E-26 could move elk further west into the Gunnison Basin where the elk are managed by means of limited harvest. Once the pressure from the rifle seasons have ended and with the progression of winter weather, elk would move back into the DAU.

Agriculture

Agriculture and ranching dominate the private land use within E-26. These industries support the local economy. The majority of agriculture occurs at the lower elevations in the eastern and southern portion of the DAU. Major crops include alfalfa, barley, winter wheat, potatoes, and grass/alfalfa hay. Domestic livestock grazing occurs on private and public land. Areas of the BLM and Rio Grande National Forrest managed land are allocated for seasonal livestock grazing. These allotments have been in place since the 1800's. Duration, intensity, timing, and frequency of grazing depend on range conditions. Forage quality and quantity along with access to water resources are considered when stocking grazing allotments. Competition for resources may occur between elk and livestock. If the E-26 population ever exceeded social carrying capacity, game damage could increase. Distribution of the elk population and additional dispersal tools available to CPW personal could decrease the magnitude of elk depredation effects. Most game damage in E-26 occurs in areas adjacent to or within winter range, the greater majority of which is on agricultural land.

Recreation

The Rio Grande National Forest land receives the majority of use from summer recreationists. These same lands tend to be where most of the elk summer range and calving grounds are located within the DAU. Recreation occurs year round. Notable concentrations of recreationists occur with spring antler shed-hunting, summer tourism with increasing OHV use, fall hunting, and winter snowmobiles use.

Summer recreation has continued to increase in this area over the past decade. People make their way to higher elevations within this DAU to escape the summer heat and enjoy the mountain environment. Activities include: camping, touring, hiking, horseback riding, mountain biking, fishing, antler shed-hunting, firewood harvesting, and use of OHV's. Non-motorized recreationists tend to cover less area and produce less noise than motorized recreationists do. While non-motorized recreationists can have some effects on elk, the cumulative magnitude of impact is less likely. These various forms of recreation can disturb elk by causing them to move differently than they would naturally (Altmann 1951, Knight and Cole 1991, Knight and Cole 1995, Phillips and Alldredge 2000). These impacts could include altered distribution of elk and/or reduced calf survival.

Off-highway vehicles continue to be a growing concern in the summer and during hunting seasons. They are designed to travel in all but the most rugged terrain. However, the Rio Grande National Forest laws prohibit the use of OHV's off maintained roads and marked trails, at all times. Unfortunately, these laws are sometimes ignored and users go where they please, often damaging the resource and creating new roads. Impacts on the elk herds during the summer can be detrimental if they force elk to abandon traditional birth beds (Seidel 1977, Knight and Cole 1991). Calving or lactating cows and newborn calves are most vulnerable to disturbance from OHV's. During the hunting season, OHV use often displaces elk,

making them more difficult for hunters to find, which in turn decreases harvest and hunter satisfaction. Unfortunately, just one person using an OHV illegally can have major negative impacts to the resource and enjoyment of other recreationists.

During hunting seasons, some hunters drive vehicles and trailers into the mountains then camp or pack to a base camp. OHV's are one method hunter's use for scouting and for accessing areas to hunt. The Rio Grande National Forest allows hunters to use OHV's to recover harvested game from the field during designated daylight hours, which is in the afternoons from noon to 5pm. Sometimes these motorized vehicles can disturb other hunters or the elk.

Once snowfall accumulates, winter recreation takes over. Recreationists often use snowmobiles, OHV's with tracks, snowshoeing, or cross-country skiing. These activities can occur in elk winter range, winter concentration, and severe winter range. Impacts to elk depend on the duration, intensity, timing, and frequency of the winter recreation. Susceptibility of elk to negative effects from these recreationists also relates to winter range conditions and availability of undisturbed sites.

Energy Development – Solar, Oil and Gas

Oil and gas development has been explored in some of the foothills of E-26. The possibility for oil and gas development may occur in the future if new methods of extraction or demand for these products reignite the search for these non-renewable resources.

Solar energy development may be more likely. The high elevation and frequent sunlit days of the San Luis Valley has attracted attention from a number of companies. The technology is still being developed and requires expensive start up as well as high maintenance costs. Solar energy companies' use of public land would likely necessitate mitigation measures. The added expense of mitigation implementation may prevent extensive development of solar energy plants on public land. However, these energy plants could be targeted at neighboring private lands. These potential solar energy development zones can overlap with elk winter range, winter concentration areas, and severe winter range. Impacts of solar energy fields on elk and other ungulates would need to be assessed and minimized to prevent fragmentation of the habitat.

HERD MANAGEMENT HISTORY

Colorado Parks and Wildlife uses a computer modeling process to estimate the size of elk populations in each DAU. The computer modeling programs used by CPW biologists have changed significantly since the early 1970's. The most recent change in modeling programs occurred in 1999, when CPW switched from a program called POP II to a computer spreadsheet model. Since switching to the spreadsheet model, continual efforts are being made to further refine these models. These refinements often result in changes to the population estimates for a DAU. All of the modeling programs have worked in the same basic manner, using an initial population size, sex ratio at birth, survival rates, wounding loss rate, harvest, winter severity, and sex/age data to estimate a population. Modeled post-hunt population estimates are generated by solving for the best fit between measured (observed) vs. predicted post-hunt sex ratio data for E-26. Observed post-hunt sex ratios often vary annually. This variation makes alignment between observed and predicted values difficult because models work to align the sex ratios. Obtaining representative sex ratio data on a regular basis is important for improving model fit over time.

Population Size Estimates

It is recommended that the population estimate presented in this document be used only as a trend, rather than a precise calculation of the number of elk in the DAU. Estimating numbers and sex/age composition of free-ranging animals over large geographic areas is extremely challenging. In addition to budget and time constraints, the accuracy of sex/age composition surveys (and resulting population estimate) may be influenced by weather, habitat type, species, group size, and a number of other factors. CPW recognizes these limitations and strives to produce the best estimates with the resources available. Population models do represent trends well and these trends are a tool used by biologist to make management decisions concerning big game herds.

Historical Elk Population

The elk population in E-26 appears to have been on an upward climb before 1990. CPW recognized that the population might have reached the biological and socio-political carrying capacity, having received numerous reports of game damage on private agricultural land, particularly in winter months, and deterioration of forest forage conditions. The human social tolerance became one of the major limiting factors determining elk population numbers. Thus, increased harvest on cows occurred between 1989 and 2006, with the intent of reducing the population to manageable levels. After this, many people started complaining of not seeing elk. The previous Herd Management Plan was implemented, to accommodate a lowered population. However, the newly updated, more accurate models were incorporated, suggesting that the herd was larger than was being estimated at that time.

DAU E-26 is open to over-the-counter, or unlimited, bull hunting in second and third season as well as unlimited either sex archery licenses. Because of this, harvest numbers, particularly on bulls can be highly variable from year to year. A four-point antler restriction was implemented in 1990. All rifle antlerless licenses and either sex licenses remain limited.

Post-Hunt Population Size

Based on current computer model estimates, during the 1990's the herd averaged approximately 8,000 animals, peaking at approximately 9,700 in 1990. Modeled estimates of this population show the E-26 elk herd on a downward trend since 1990 (Figure 6). Drought conditions significantly impacted range conditions in this area during the early 2000's. CPW offered increased cow licenses in an effort to reduce the population to socio-politically acceptable levels. This downward trend brought the elk herd to an estimated post-hunt population of approximately 4,200 elk in 2009, at which time it appeared to have stabilized for a few years, however a slight downward trend continued from 2011 to 2015. Since then, E-26 has remained relatively stable with reduced cow harvest and low observed calf recruitment. The 2017 modeled post-hunt estimate depicts the population at approximately 3,400 elk. The information that is used in the models is collected following most hunting seasons (late December - mid January), a period after which most animals have migrated to winter ranges.

The population has the potential to grow with increased calf recruitment, reduction in cow harvest and the availability of quality forage resources. The area has had two consecutive years (2015 and 2016) of average precipitation through the summer and winter periods, which created additional forage for the animals, particularly in areas where beetle kill or past fires have occurred; this allowed for openings in the canopy cover for understory plants to get access to sunlight and more prolific growth. Elk were not classified during the 2017 inventory period, due to low precipitation levels and the wide distribution of the animals throughout the area. The population estimate for 2017 was calculated from the average of the previous three years of observed data.

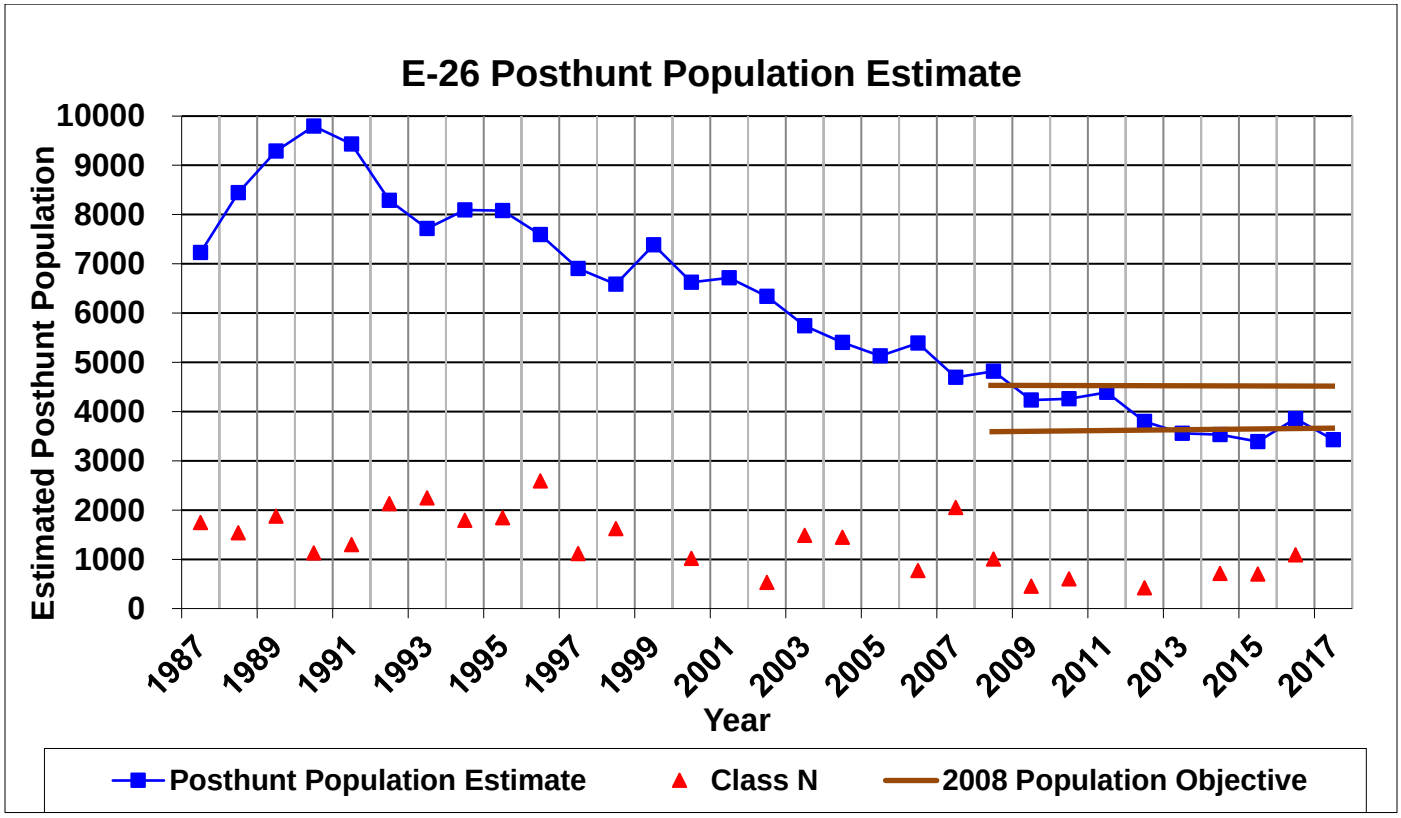

Figure 6. DAU E-26 elk population trend.

Post-Hunt Herd Composition

Post-hunt herd composition is determined using helicopter aerial surveys. The classification flights do not result in a population census, but rather observed sex and age ratios from large enough samples (10-25% or more of population), to be representative of the entire DAU. Classification flight data from this elk herd had not been collected in 1999, 2001, 2005, 2011, 2013 and 2017, due to time and economic constraints.

Calf Ratios: - The observed post-hunt age ratio (# of calves per 100 cows) has averaged approximately 34 since 1987 (Figure 7). The highest observed age ratio was 45 calves to 100 cows in 2006 and the lowest was 17 calves to 100 cows in 2003. Since 2008, the observed recruitment ratio has averaged approximately 29 calves to 100 cows. Recent observed calf to cow ratios appear to be increasing slightly; however, there is still a long-term downward trend since the late 1980's.

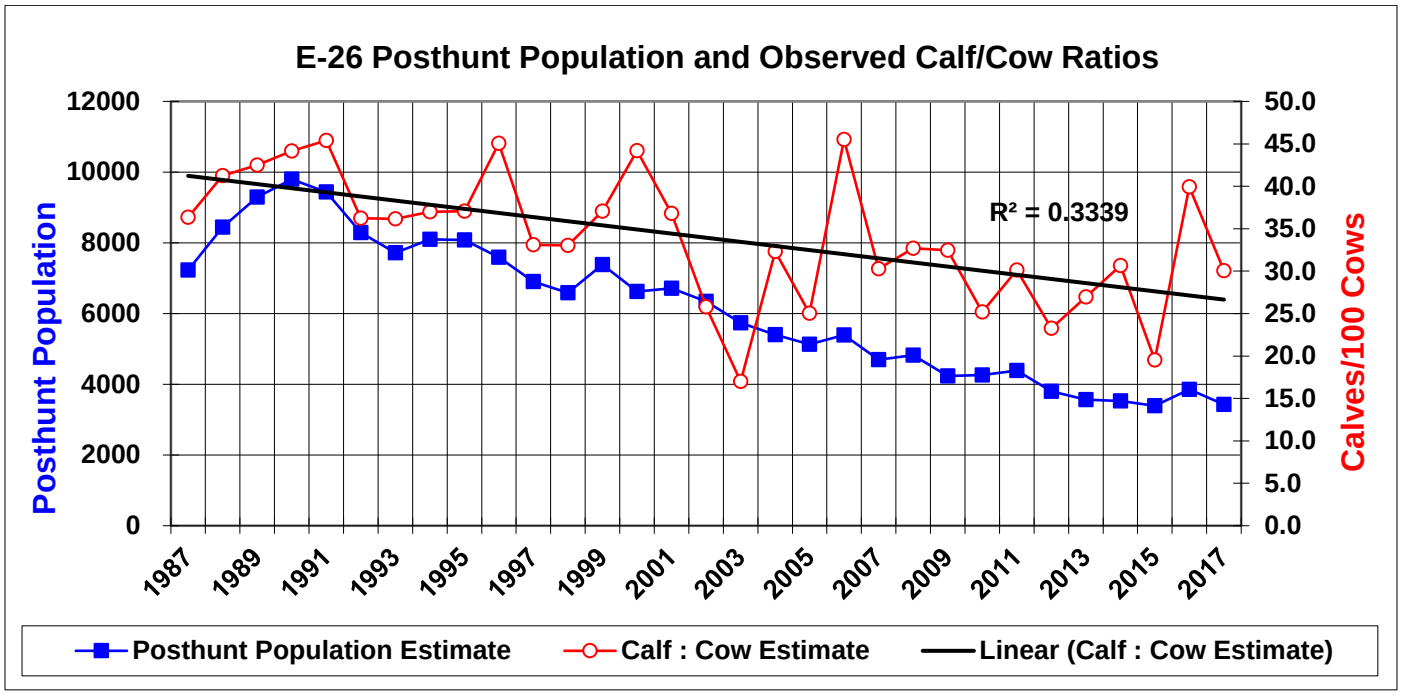

Figure 7. DAU E-26 elk calf ratios.

Bull Ratios: - The management objective for the Saguache elk herd has been to maintain a sex ratio of 18-22 bulls per 100 cows. Bull ratios for this DAU are driven largely by over-the-counter (OTC) seasons during archery, second and third rifle seasons. OTC licenses makes it difficult for management towards an increased sex ratio. The average observed sex ratio for the past ten years was 23 bulls to 100 cows, the highest being in 2012, at 39 bulls to 100 cows, and the lowest bull to cow ratio was 13 in 2015. Higher bull ratios were observed from 2006 to 2009. These observations may relate to areas searched during classification flights. The observed 5- and 3-year average sex ratios have been 19 and 16 bulls to 100 cows, respectively.

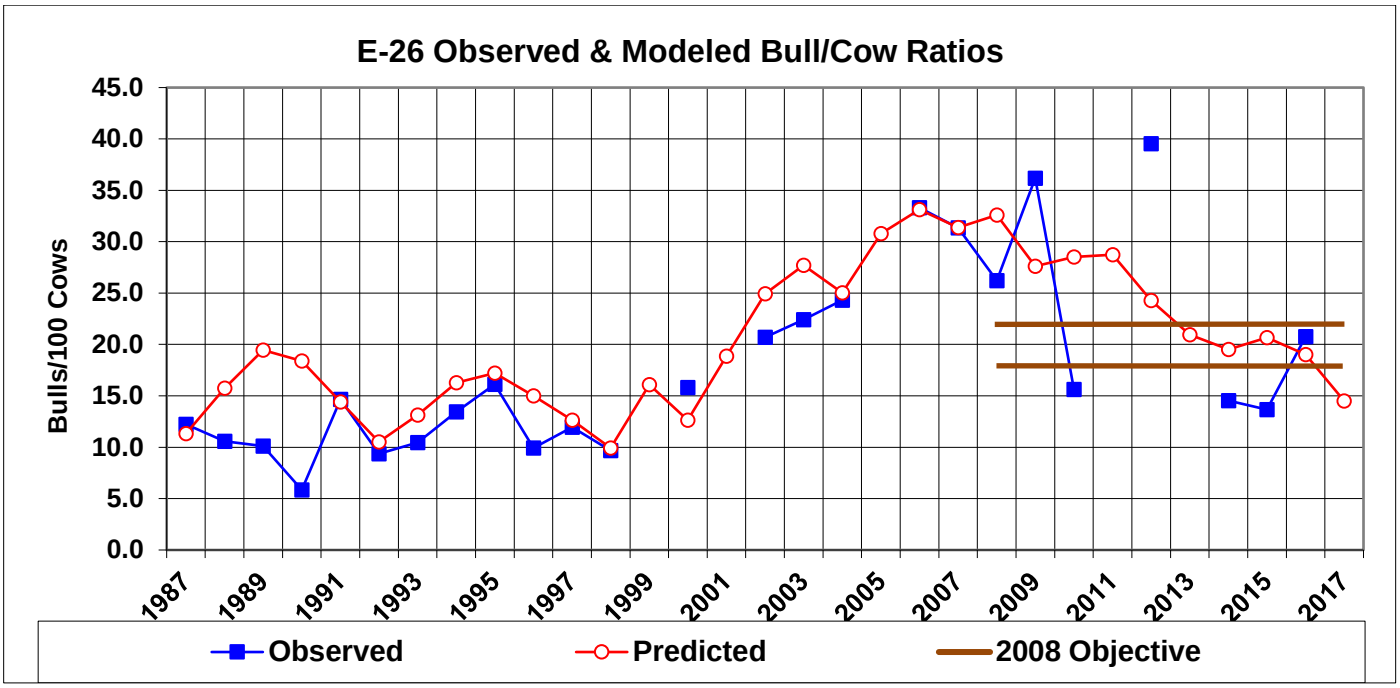

Figure 8. DAU E-26 Elk bull ratios.

Harvest History.

Harvest estimates are produced by statistical sampling techniques, not by any attempt of a total sample or count. Colorado Parks and Wildlife conducts online and phone surveys annually to obtain harvest statistics. Harvest depends on the number of permits issued, season structure, weather and population size. If a population is over objective, surplus animals plus recruitment must be taken into account to decrease the population. To decrease the population an increased number of antlerless licenses typically are made available, which increases harvest. If the herd objective is reached, only annual recruitment needs to be removed to maintain the herd within the objective range. If a population is under objective and needs increasing, antlerless licenses need to be reduced. The purpose of reducing these licenses is to lower harvest below annual recruitment so the population can grow. When adjusting licenses to meet annual harvest objectives, changes should be made gradually when possible to allow time for the population to show response and to help hunters to adjust to license availability.

Bull hunting in E-26 includes unlimited and limited seasons. During the era before point-restrictions were implemented on bull elk (1974-1985) the bull harvest varied from 238 in 1977 to 590 in 1984. Bull harvest since 1987, after partial limited antler restrictions were implemented, has remained relatively stable, averaging approximately 336 bulls per year. During the late 1980's bull harvest averaged approximately 357 animals. In the 1990's, the average number of bulls harvested increased to approximately 472 animals. From 1987 to 2008, with the point restrictions in effect, the harvest on bulls ranged from a low of 173 bulls in 1987, to a high of 788 bulls in 1990, averaging 389 animals per year. From 2008 to 2017 (under the previous 2008 HMP) the bull harvest had remained relatively low, averaging approximately 210 bulls annually, with a low of 144 bulls in 2013 and high of 256 bulls in 2009.

Antlerless harvest is influenced by management objectives. In the 1990s, CPW had moderate antlerless harvest at 396 animals averaged annually. Drought conditions in 2001 and 2002 prompted concerns about high elk numbers and poor range conditions. At the same time, CPW was evaluating the modeling techniques used to estimate elk populations. These modeling changes resulted in higher projections of elk populations and more accurately reflected the actual number of elk on the ground. Antlerless harvest remained variable until 2009, with the highest being 712 animals harvested in 1993 and the lowest being 77 animals in 1987. Since 2009, antlerless harvest has been reduced annually to promote elk population growth. From 2008 to 2017, the annual average harvest for antlerless elk had dropped dramatically to approximately 147 animals harvested, ranging from 78 in 2016 to 231 in 2009.

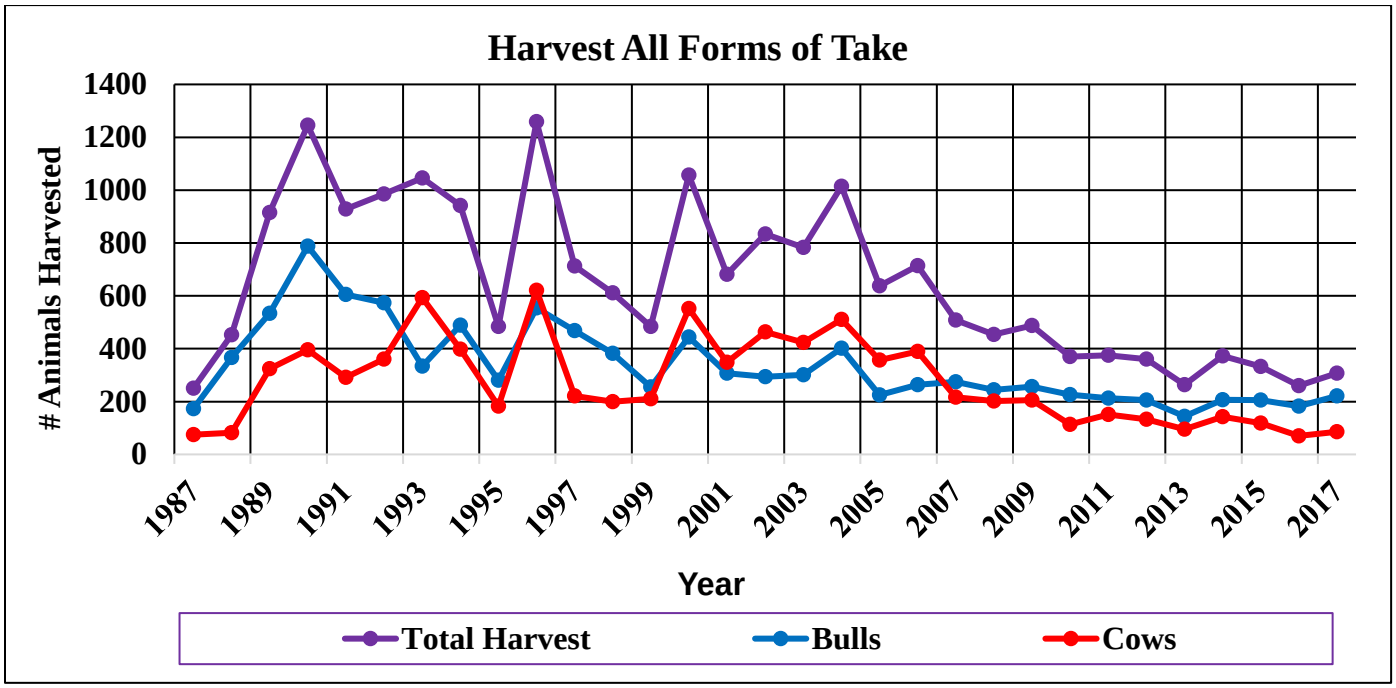

Figure 9. DAU E-26 elk harvest all forms of take.

Hunting Pressure and Success Rates

The number of hunters per year for all seasons was increasing steadily until 2003, reaching 6,861 hunters from 4,045 in 1987. From 2003 to 2008, the number of hunters dropped precipitously to 3,869 hunters. From 2008 to 2017, the number of hunters has remained relatively stable, averaging 3,685 hunters. The highest number of hunters, since 2008, appears to have been occurring during over-the-counter (OTC) seasons, second (average of 1,184 hunters) and third (average of 1,127 hunters) rifle seasons with archery (average of 577 hunters) climbing steadily. The archery season has seen an increase of more than 30% in hunters since 2011, from 463 hunters in 2011 to 685 hunters in 2017. This early increased direct pursuance of the animals, right after the summer recreational period, has the potential of putting a lot more pressure on the elk population, especially during the reproductive "rutting" period.

Success rates during all seasons are largely dependent on hunter effort, elk distribution, and a variety of environmental conditions, including weather conditions. Harvest success often varies by season and method of take. Success typically ranges from 6% - 22% during the early seasons and 8% - 20% during later seasons. Since 2008, the overall success for E-26 has averaged approximately 10%. Over the last ten years,

the highest success has occurred during the first rifle-hunting season, averaging almost 16%, after which the 4th season coming in second, at approximately 9%. Estimating hunter success for OTC seasons is challenging because the number of hunters and the locations in the state that they hunt, is unrestricted. Even with the heightened number of hunters, resulting in increased hunter pressure during the OTC seasons, the average success rates remain relatively low, with archery at approximately 7%, second rifle at 8%, and third rifle at 6%. Depending on the population and sex ratio objectives selected, the number of licenses issued for regular limited season hunts will be adjusted to reach the desired objectives. Since most of E-26 is public land and relatively accessible, elk frequently find refuge in remote areas with thick timber and steep slopes or drainages. Elk have the ability of distancing themselves from roads and motorized vehicles during mild weather in these remote areas.

Economic Impacts

Since DAU E-26 is managed for high hunter opportunity, this strategy contributes to the local economy through the substantial numbers of resident and non-resident hunters whom often purchase goods and services from businesses in the San Luis Valley. Saguache County is the only county within the boundaries of the GMU 68 and 681 and it benefits economically from all hunting and fishing. These benefits are also recognized in neighboring counties such as Alamosa, Rio Grande, and Mineral Counties (Table 2). Hunters have the ability of pursuing elk, mule deer, antelope, bighorn sheep, bear, mountain lion, rabbits, blue grouse, waterfowl and numerous other small game animals in these units.

County	Direct Expenditures ($)	Total Impact ($)	Job Creation
Saguache	2,280,000	3,350,000	23
Alamosa	11,960,000	20,840,000	215
Rio Grande	7,880,000	13,350,000	136
Mineral	2,660,000	4,430,000	51
Total	**24,780,000**	**41,970,000**	**425**

Table 2. Estimated Hunting and Fishing Economic Impacts by County. These figures include trip and equipment expenditures supporting these activities (Colorado Parks and Wildlife, 2008).

CURRENT HERD MANAGEMENT

CURRENT MANAGEMENT STRATEGIES

The 2017 post-hunt population estimate for the Saguache DAU was approximately 3,400 elk. This is slightly below the lower end of the 2008 long-term objectives of 3,500-4,500 elk, which has been perceived by hunters as being too low. The population model shows that the population has been on a downward trend since 1990. The elk herd started leveling out around 2012 through to the present, but this has been closer to the lower end of the 2008 objective range.

The 2008 long-term post-hunt sex ratio objective was set at 18-22 bulls per 100 cows. The average observed sex ratio over the previous five years ad-hoc classification flights has been approximately 20 bulls to 100 cows. The 2016 observed sex ratio was also approximately 20 bulls to 100 cows.

Currently E-26 is managed for a sustainable elk population with high hunter opportunity. Archery either sex, 2nd rifle bull, and 3rd rifle bull licenses are sold over the counter (OTC). All cow licenses, which include muzzleloader, 2nd rifle, 3rd rifle, 4th rifle, Private Land Only (PLO), and late season, are limited. Muzzleloader, 1st rifle, and 4th rifle are limited for bulls. No bull licenses are offered as PLO or late season licenses. Muzzleloader season for bulls requires a low number of preference points to draw with high demand. Cow seasons require a few preference points to draw a license because of the license reductions that have occurred over time with increased demand for these licenses, with the intent of encouraging population growth.

CURRENT MANAGEMENT CONCERNS

Elk Population Levels and Demographics

The major management problem concerning E-26 has been regulating the population to meet herd objective. A balance between the acceptable population range of E-26 from social and biological perspectives is needed. Along with having objectives that are goal-oriented but adaptable to the complex dynamics of a multiple species system, habitat carrying capacity, hunter opportunity for quality experiences, and elk distribution, strategic thresholds needs to predetermined. These would help to assess when the elk population has surpassed objectives and incremental management actions could to be designed to appropriately respond to these changes in the elk population.

Calf to cow ratios are lower than historical numbers. This reduced recruitment may be attributed to several factors such as habitat conditions, cow body condition, population size, competition with other species, etc. CPW has initiated different studies around the state with the goal of attempting to determine the possible reasoning for these decreasing recruitment levels. Future results from these studies will assist in determining the limiting factors affecting recruitment in E-26 and will help managers better sustain a viable elk population.

It is tough to accurately manage towards focused sex ratio objectives in an over-the-counter unit. The bull to cow ratios need to be consistently assessed and understood. These observed ratios fluctuate frequently. Part of the variance likely relates to elk distribution, weather conditions, bull sightability, and migratory movement. A consistent method of inventory that produces unbiased bull to cow ratios is always required. Some Colorado elk populations have random-point surveys in place of traditional ad-hoc surveys for classification flights. Random-point surveys force observers to visit sites they would not normally search while trying to locate elk using the ad-hoc methodology. This approach may produce more stable bull to cow ratios, but comes at a higher cost and results in a smaller sample size.

Human Non-consumptive Recreation

Summer recreation continues to increase in this DAU. The Rio Grande National Forest land receives the majority of use from these recreationists. This same land is where most of the summer range within the DAU is located. The impacts by these various forms of recreation are unknown but are believed to disturb or stress elk to some degree. This could possibly affect distribution of elk and more importantly, reproduction in calving areas.

Off-highway vehicles continue to be a growing concern in the summer months and during fall hunting seasons. Although designed to travel in all but the most rugged terrain, the Rio Grande National Forest laws prohibit the use of OHV's off maintained roads and marked trails. Unfortunately, these laws are sometimes ignored and users go where they please, often damaging the resource and creating new roads. Impacts on

the elk herds during the summer are not known but it is expected that OHV usage off designated roads creates undue stress on animals. This is particularly important to calving or lactating cows and newborn calves. During the hunting season, illegal OHV usage often displaces elk, potentially making them more difficult for hunters to locate, which may decreases harvest resulting in hunter satisfaction. Unfortunately, only one person using an OHV irresponsibly could have major negative impacts to the resource and other recreationists enjoyment. Winter recreation is also believed to be increasing by means of a continued increase in snowmobile usage on winter range. In addition, an increasing number of shed-antler hunters visit GMUs 68 and 681 during the spring months that could disturb the animals, possibly creating differences in distributional movement, affecting important nutritional needs for spring calving, and potentially slowing migration patterns.

Elk Damage

Game damage can be a problem in the harsher winters particularly on private agricultural crops. Additional tools, such as dispersal tags and private land only licenses are being used in attempts to prevent game damage and redistribute these animals away from these areas.

Human Development

Urbanization in E-26 is less of an issue or concern than other parts of the Colorado. The only municipality within E-26 occurs at the junction of State Highway 285 and County Highway 114. There are a few smaller towns such as Villa Grove along State Highway 285 and La Garita along County Rd G. Given the agricultural based economy in the San Luis Valley, development tends to occur slowly which is often focused around current municipalities. However, development of private land that occurs within winter range has the potential of being a problem in the DAU. The threat from low-density residential development depends on the amount and distribution of private and the areas used for more traditional activities like agriculture and ranching. Impacts to the elk population from this development includes loss of important limited habi-tat and quality forage availability as well as the redistribution of animals from historic winter habitat. John-son et al. (2016) analyzed a 40-year relational/correlative study, looking at land use changes from 1970 to 2010 and the impacts on deer populations. Although this analysis was done with deer, the results may have implications for elk management in the area. In GMU's 68 and 681, the proportion of "undeveloped" (0 houses/acre) has decreased from 19% to 1%. The majority of this development has occurred since 2000. Development on rural land (1 house/100 acres) has more than quadrupled since 1970, again the vast majority occurring since 2000 (approximately 104,000 acres), and almost doubling through to 2010 (approximately 188,000 acres). Throughout the area, increase in exurban development (1-20 houses/100 acres) from 1970 to 2010 has more than tripled, from approximately 786 acres to 2,723 acres. Summer range has also been affected with regard to developmental sprawl, with exurban development having more than tripled, though that time from approximately 412 acres (1970) to 1,433 acres (2010). In addition, there as been an increase in recreational use of summer range.

Elk Competition with Other Species

Elk are one of multiple herbivores sharing habitats on the landscape. Since elk are considered herbivory generalists that have adaptive habitat use and forage selection abilities, they can out compete more selective species such as mule deer. However, with many herbivores using the natural resources in E-26, the populations of all these species must be kept to sustainable levels. The deer population in this area is growing, unlike the elk population in E-26. Pronghorn (A-14, Northern San Luis Valley herd) on the other hand appear to have decreased in number over the last ten years. Bighorn sheep (GMUs S-10, Trickle Mountain and S-55, Natural Arch) appear to be stagnant to declining and are likely more vulnerable to competition from elk, particularly on summer range. Domestic cattle are grazed on public land allotments in E-26.

Through partnerships with federal land agencies and permittees, appropriate numbers can be stocked to manage the natural resources.

Chronic Wasting Disease (CWD)

Currently all area in the San Luis Valley, including E-26, are believed to be free of chronic wasting disease. This information is based on an average of only one animal being tested per year in the DAU. However, CWD has been located in deer in the Montrose, CO area. CPW has observed animals from the Gunnison Basin that have mixed with those from Montrose, as well as animals from Saguache County at the upper end of the SLV that have done so with the Gunnison Basin animals. Careful surveillance and monitoring for CWD and any other diseases will continue into the future, by means of opportunistically testing roadkill deer and game damage harvested animals as well as any regular season voluntary harvest.

The Colorado Parks and Wildlife Commission policy is to manage and control CWD as much as possible throughout the state of Colorado (Colorado Commission Policy. 2015). They suggest that 1) CPW develop a system for tracking CWD trends in priority affected deer and elk populations; 2) CPW pursue adaptive management experiments to develop and evaluate management actions to reduce prevalence; and 3) CPW use hunting to achieve management goals. With this policy in place an advisory group has been formed, the Colorado Chronic wasting Disease Advisory Group (CWDAG), which has developed five management objectives (Colorado Chronic Wasting Disease Response Plan, 2018):

1. To reduce or limit CWD prevalence below the management threshold for deer, elk and moose.
2. To prevent CWD prevalence from reaching the management threshold in low prevalence herds.
3. To provide stakeholders with science-based information regarding CWD.
4. To maintain Colorado's robust deer, elk and moose hers to support public hunting and viewing opportunities.
5. To provide guidance of CWD surveillance, monitoring and management in Colorado's herds to further understand prevalence response to prescribed management actions.

Natural Resource Development

Although oil and gas exploration and development has become an issue in wildlife habitat throughout Colorado, until this time, this DAU has had minimal impacts caused by oil and gas exploration. To date, a small degree of exploration has taken place. However, no actual development has occurred. If energy resources are located in the DAU and can be economically extracted then the elk population could be negatively impacted due to disturbances on the limited winter range.

DEVELOPMENT OF ALTERNATIVES

The primary purpose of this HMP is to determine long-term post-hunt population and herd composition objectives. Herd composition is determined by calf to cow and bull to cow ratios. Calf to cow ratios are strongly influenced by environmental factors, most of which wildlife managers have no control. On the other hand, bull to cow ratios could be directly controlled by management actions.

Each alternative suggested includes a brief discussion of management variables that would probably occur for that population level. Generally, the lower the population objective the lower the investment needed in habitat improvements. As the objective population increases, the larger the investment required. Habitat management practices vary in labor intensity, cost, and life expectancy of the project. Individual practices that should be considered include prescribed fires, fertilization, seeding, water developments, fencing, timber management, travel management, range management, and others.

MANAGEMENT STRATEGIES

Game damage is closely correlated with winter severity and elk distribution. Additional elk can occupy healthy landscapes when their distribution minimizes conflict. Managing towards higher population levels of elk could increase hunter satisfaction, increase hunter opportunity in the long run, and could increase the fiscal benefits to the local economy.

Population Objective Alternatives 2008 Objective – 3,500-4,500.

ALTERNATIVE # 1: 3,200 - 3,800 (approximately the same as the current population estimate).
This alternative suggests managing for the lowest post-hunt population estimate, according to the existing updated models. This alternative would require keeping the cow harvest the same for the next few years. Long-term benefits attributed to this objective may include minimal game damage to agricultural lands and crops with minimum impact to the natural habitat. However, in the short-term, it maintains existing opportunity, with the greatest amount of hunting opportunity.

ALTERNATIVE # 2: 3,600 to 4,200 (approximately 10-20% increase in the current population estimate).
Adopting this alternative would allow for a moderate increase in the current population estimate, or keeping it within the current objective. To remain within range of this alternative, antlerless licenses would need to remain conservative and reduced for at least 3-5 years, to allow the population to increase towards the middle of the objective range as long as calf recruitment exceeds harvest rates. Increased impacts to the natural habitat and agricultural lands would be minimal, depending on elk distribution caused by potential sever winter conditions or summer drought conditions. However, CPW does have additional tools in place to address these potential impacts. Harvest potential may improve slightly as the population continues to grow, with improved hunter satisfaction.

ALTERNATIVE # 3: 4,000 to 4,800 (approximately 20-40% increase in the current population estimate) - **Preferred**.
This alternative would allow for an increase in the population estimate, which would be equivalent to the numbers estimated in the late-2000's. Management at this level may have more impact to agricultural interests and to the habitat carrying capacity, depending on elk distribution caused by potential sever winter conditions or summer drought conditions. This alternative would still optimize hunting opportunity for bulls, especially having OTC seasons available. Cow licenses would need to be reduced significantly (more than 90%) for at least four to five years until the population increased to within the objective range. After this, conservative addition of cow licenses would be implemented depending on the growth of the herd, to attempt to maintain the population at the mid-point of the alternative range. This mid-point would still be within the population objective range established in 2008. Re-assessment by CPW staff will occur annually to determine the population status.

Herd Composition Alternatives 2008 Objective 18 to 22 bulls per 100 cows.

EXPECTED BULL RATIO 18 to 22 bulls per 100 cows.
This expected sex ratio is based on the existing season structure, taking into account the average observed sex ratios since the antler point restriction was implemented in 1987 (approximately 18 bulls to 100 cows) and over the previous ten years (approximately 23 bulls to 100 cows). If the season structure were to change then a possible change could be anticipated in the expected bull ratio. These ratios would remain the same as the previous Herd Management Objectives set in 2008, which would continue to allow for ample hunting opportunity in limited seasons, 1st and 4th rifle seasons.

PUBLIC INPUT AND PREFERRED ALTERNATIVE SELECTION

The preferred alternatives for this draft were selected after gathering input from a public meeting held in Saguache. which was well attended by 60 local constituents, an open public survey made available online for 30 days, and additional commentary from the public, the Rio Grande National Forest , the BLM and the HPP Committee after the draft document was made available online for 26 days. In addition, professional input from Colorado Parks and Wildlife personnel has been considered. Biological herd capabilities and other factors mentioned previously were also taken into consideration.

We attempted to solicit as much public feedback/desires as possible with the resources available. From the combination of the public meeting, the online survey, and feedback on the draft document, the consensus was to attempt to increase the elk population from its present estimate. The greater majority of respondents were in agreement with the preferred alternative #3 (4,000 to 4,800 elk), with the present population estimate needing to increase over the next 5-10 years, but still providing hunting opportunity with the bull over-the-counter licenses. Calf recruitment will need to remain relatively high for this slow population increase to take place. The mid-point of this alternative would also remain within the previous (2008) objective range.

CPW is extremely grateful to the Rio Grande National Forest (RGNF), who manages the majority of the DAU, for offering feedback from the initial draft document. They have indicated that they do support an increase in the elk population. They have acknowledged that there has been a significant increase in forage quantity and quality, particularly on summer range, due to a decrease in tree crown canopy cover from the effects of spruce-beetles. The RGNF recognizes that winter range conditions should be a focus for habitat improvement management actions, since this is one of the major limiting factor for elk in the DAU. Habitat carrying capacity should continue to increase as these projects are implemented and completed. Thus, the RGNF has suggested being more cautious with an elk population increase throughout the DAU, suggesting their preference for alternative #2 (3,600 to 4,200 elk). The RGNF agrees with maintaining the expected bull ratios of 18 to 22 bulls per 100 cows. This will provide a balanced opportunity between the recreational experience and harvesting a desired elk bull. For these alternatives to be implemented the RGNF has recognized that habitat improvements and cattle grazing, particularly on winter range, will need to be addressed in collaboration with CPW.

CPW is also extremely grateful to the Bureau of Land Management (BLM), who manage the majority of the land within elk winter range. After the draft document review period, the BLM has indicated that the winter range is in relatively good condition, but browse conditions vary widely, however undocumented. They have expressed concern for increasing the elk herd to numbers that could potentially have detrimental impacts to the habitat, particularly on winter range. CPW has seriously considered these potential impacts and, through extreme cautious evaluation of existing data, determined that an increase of 20-40% in population would still place the elk herd within the previous (2008) population objective. The BLM have suggested a more moderate approach. However, joint habitat improvement management actions between CPW and the BLM would be extremely beneficial to improve the availability of quality forage and limit any land health impacts. These management actions would help to alleviate any adverse effects, if they were to occur, with an increase in the elk population. Working together with the BLM to address vegetation monitoring and elk foraging impacts will help considerably in determining more accurate carrying capacity levels in the future.

The San Luis Valley Habitat Partnership Program (HPP) addressed the draft document on November 13, 2018. This HPP committee gave their support for the population alternative #3 (4,000 to 4,800 elk). The HPP committee suggested that increasing the elk herd by 20-40% would not create significantly increased conflicts on private land and that CPW has resources in place, if conflicts should arise. They also acknowledge that a significant reduction in cow licenses would be needed to achieve the preferred objective. However, an increased population could lead to greater hunting opportunity and satisfaction in the future. The HPP has also acknowledged their support for maintaining the expected sex ratio (18 to 22 bulls per 100 cows) to provide maximum bull-hunting opportunity is appropriate for the area.

All public responses to the draft document were in agreement with the 20-40% population increase, thus alternative #3 (4,000 to 4,800 elk). All respondents were also in agreement with maintaining the expected sex ratios of 18 to 22 bulls per 100 cows. This would still allow continued opportunity to harvest a desired bull.

Thus, for E-26, the **Preferred Population Objective is 4,000 to 4,800 (alternative #3) and sustaining the Expected Sex Ratio range of 18 bulls to 100 cows**. CPW staff will re-evaluate management towards the accepted objectives on an annual basis. Management towards these objectives would take place for the next ten years under current conditions, unless it becomes socially or biologically unacceptable in an earlier time frame, at which time re-assessment and updates could be addressed.

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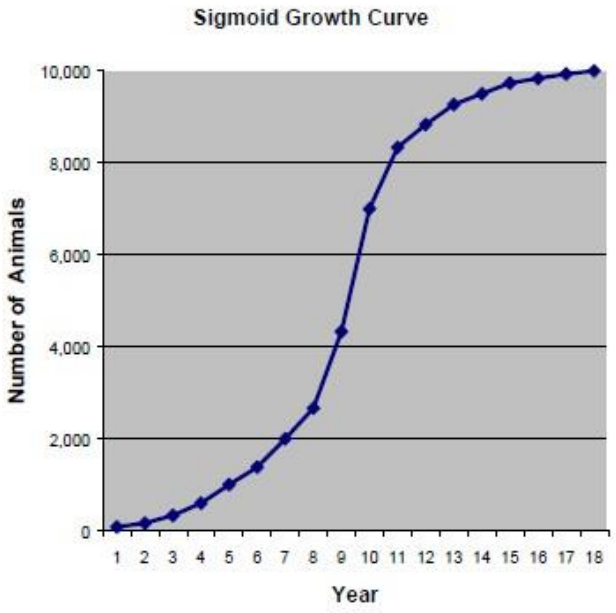
APPENDIX A: Population Dynamics and Managing for Maximum Sustained Yield.

Numerous studies of animal populations, including species such as mice, rabbits and white-tailed deer, have shown that the populations grow in a mathematical relationship referred to as the "sigmoid growth curve" or "S" curve (right). There are three distinct phases to this cycle. The first phase occurs while the population level is still very low and is characterized by a slow growth rate and a high mortality rate. This 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.



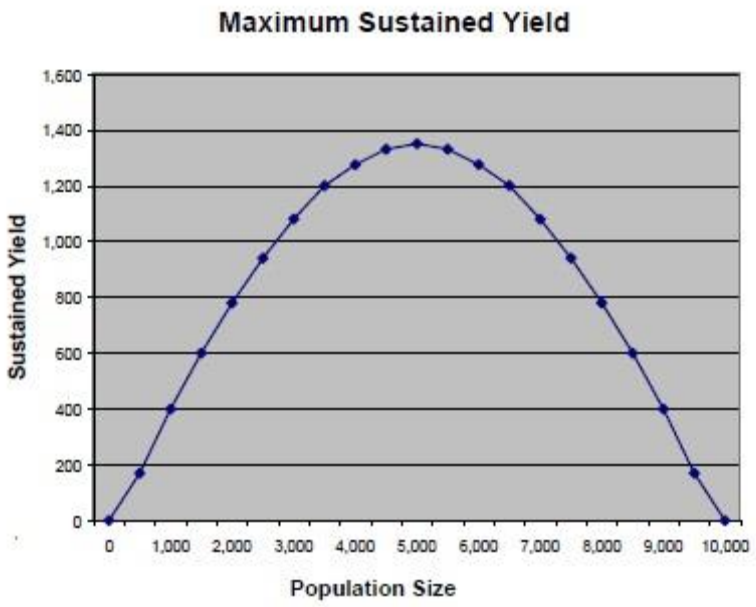
The second phase occurs when the population number is at a moderate level. This phase is characterized by a very high reproductive and survival rate. During this phase, food, cover, water and space (habitat) is not a limiting factor. In addition, during this phase, animals such as white-tailed deer have been known to successfully breed at six months of age and produce a live fawn on their first birthday and older does have been known to produce 3-4 fawns that are very robust and healthy. Survival rates of all the deer (bucks, does and fawns) 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. In addition, during this phase 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 of all deer (bucks, does and fawns) 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 do. 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. At this point, the population reaches an "equilibrium" with the habitat. The number of births each year equals the number of deaths, therefore, to maintain the population at this level would not allow for any "huntable surplus." The animals in the population would be in relatively poor condition and when a severe winter or other catastrophic event occurs, a large die-off is inevitable. A recent example of such a population die-off occurred in the relatively un-hunted Northern Yellowstone elk herd during the severe winter of 1988-89. This winter followed the forest fires of the summer of 1988 that raged in the National Park.

What does all this mean to the management of Colorado's big game herds? It means that if we attempt to manage for healthy big game herds, we should attempt to hold the populations at about the middle of the "sigmoid growth curve." Biologists call this "MSY" or

"maximum sustained yield." At this level, which is exactly half the maximum population size or "K", in this example it would be 5,000 animals, the population should provide the maximum production, survival and available surplus animals for hunter harvest. In addition, 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 (right). Notice that as the population increases from 0 to 5,000 deer, the harvest also increases. However, when thepopulation 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 and resource degradation.



Actually managing deer and elk populations for MSY on a DAU basis is difficult if not impossible due to the amount of detailed information required because of the complex and dynamic nature of the environment. In most cases, we would not desire true MSY management even if possible because the number and quality of bulls and bucks is minimized. However, the concept of MSY is useful for understanding how reducing densities and pushing asymptomatic populations towards the inflection point can stimulate productivity and increase harvest yields. Knowing the exact point of MSY is not necessary if the goal is to conservatively reduce population size to increase yield. Long-term harvest data can be used to gauge the effectiveness of reduced population size on harvest yield.

APPENDIX B: Rio Grande National Forest Response Letter
APPENDIX C: BLM Response Letter
APPENDIX D: HPP Response Letter
APPENDIX E: Saguache Public Meeting Survey Results
APPENDIX F: D-26 and E-26 Open Public Online Survey Results

United States Department of Agriculture
Forest Service
Rio Grande National Forest
1803 West Highway 160
Monte Vista, CO 81144
(719) 852-5941
(719) 852-6271 TTY
http://www.fs.fed.us/r2/riogrande

File Code: 2670
Date: November 28, 2018

Brent Frankland
Terrestrial Biologist
Colorado Parks & Wildlife
0722 South Co Rd 1E
Monte Vista, CO 81144

Dear Mr. Frankland:

Please accept this revised letter that serves to clarify our previous comments submitted on November 15, 2018.

Thank you for the opportunity to comment on Colorado Parks and Wildlife's draft DAU Plans for Elk DAU E-26 and Deer DAU D-26. These DAUs encompass GMUs 68, 681, and 682 and involve basically all the Saguache Ranger District outside of the Sangre de Cristo Mountains. My staff biologists have reviewed the draft plans for these DAUs and provided information for me to offer the following comments for consideration and use as you finalize the plans. Based on previous requests, I also attached supporting information that assesses potential changes to the vegetative conditions within these DAUs due to the current spruce beetle outbreak. A narrative summary of these analyses is included.

The Rio Grande National Forest contains over 1.8 million acres of National Forest System land that are managed for multiple-uses in the San Luis Valley area of south-central Colorado. The DAU Plans are an important aspect of our management because of high public interest in big game species and because I am responsible for managing much of the habitat to support the desired population levels. However, it is also important that populations are maintained within the carrying capacities of the habitat, and that deer and elk population objectives are managed in a manner that minimizes potential conflicts with other program areas. My comments reflect these mutual goals.

As you likely know, both mule deer and Rocky Mountain elk have been managed as Management Indicator Species (MIS) under our 1996 Land and Resource Management Plan (Forest Plan). As such, both population and habitat trends were tracked at the Forest-level in association with Forest Plan direction, including providing the quantity and quality of habitat capable of supporting the population objectives for these species. In the draft Forest Plan Revision under the 2012 Planning Rule, the MIS concept no longer exists. However, deer and elk habitat and population trend considerations remain a key part of the plan components as focal species and both population and habitat trend considerations are included in the draft Monitoring Plan. As such, management of big game habitat will continue to involve evaluations of habitat conditions during project level evaluations and Forest Plan monitoring, but also through other project partnerships such as HPP, Mule Deer Foundation, Rocky Mountain Elk Foundation, and others. I therefore expect to continue to work closely with Colorado Parks and Wildlife to achieve mutually desired habitat conditions for all big game species.

Hunting and other wildlife-related recreation is one of the biggest uses experienced on the Rio Grande National Forest. Although most of this occurs during the rifle season(s) for deer and elk, hunters utilize our public lands from the opening of pronghorn season in mid-August through the late season elk cow

hunts of December. As your draft DAU plan displays, archery hunters are also increasing significantly. This large influx of visitors brings a huge economic boost to the Valley but also comes with challenges such as a large increase in off-road vehicle use, high density of hunter camps, and an increase in law enforcement presence and front office staffing needs. Therefore, management of hunter numbers is also an important issue to me because of its relationship to land and resource management issues associated with increased use of the Forest.

The following are my comments regarding the draft DAU Plans for both deer and elk. As requested, I am also providing an overview and summary of the ecological conditions of the forest vegetation in these DAUs. These conditions are based on queries of our GIS system conducted in early November 2018 and include the following queries: 1) amount of tree mortality based on Insect and Disease flights (2010 to 2017 data); 2) forest canopy closure based on tree cover percent by size class (2018 data); and 3) percent aspen in the forest understory based on 2018 NAIP aerial imagery data.

The spreadsheets for these queries are included with our comments as attachments for your records and so that you can sort and utilize the data as desired. Our comments on the draft DAU Plans follow the vegetative overview provided below.

Overview of Ecological Condition of Forest Vegetation in the DAUs

As of 2017, a majority of the spruce-fir cover type on the Rio Grande National Forest (617,000 acres) has been heavily influenced by the spruce bark beetle. The DAUs involved in this planning effort are no exception. The spruce beetle primarily affects the mature (Size Class 4) Engelmann spruce component although in many cases pole-sized spruce (Size Class 3) are also being affected. The outcome is often extensive mortality of the larger tree component and a decrease in tree crown canopy closure which in turn allows more light to penetrate the forest floor. This can stimulate a considerable increase in understory growth such as shrubs, seedlings, and grasses and forbs utilized as forage for deer and elk.

The information on Spreadsheet 1 tracks insect and disease (I&D) agents from 2010 through 2017. Although affects from some other I&D agents in lower-elevation forest types have also changed in spatial extent during this timeframe, the primary influence has occurred in the upper montane forest zone in association with the spruce beetle outbreak. According to this data, the spatial extent of spruce beetle impacts has impacted over 200,000 acres of the 400,000 acres total in both DAUs since 2010. Through 2018, the data associated with changes in habitat structural stage (Spreadsheet 2) indicate that this has resulted in a 72% decrease in closed canopy conditions in the late successional spruce component (HSS 4C, 70-100 canopy closure) while a 5% decrease in mid-closed canopy closed conditions of the mature spruce tree component (HSS 4B, 40-69% canopy closure). This decrease in canopy closure has resulted in a 78% increase in shrub/seedling habitat classes (HSS 2) as overstory mortality occurs. Habitat Structural Class 2 has a considerable component of small understory trees but also likely contains a significant increase in grass/forb components that will remain available until such time the forest understory grows into closed canopy conditions again.

Likewise, the data also indicates that there has been a 225% increase in mature, open stand conditions (HSS 4A, 0-39% canopy closure) which suggests that the remaining large green tree component has shifted into a more open canopy condition that also is likely to promote more understory release and growth. The reduction in canopy closure is also resulting in a significant release and conversion to aspen with an 84% increase in the understory containing aspen cover of various percentages (Spreadsheet 3, Beetle Aspen Size Cover). Analyses associated with our current Forest Plan revision effort suggest that it may take four to five decades to attain closed canopy conditions again in our spruce-fir cover type.

The various analyses conducted for these DAUs suggest that there will be a significant increase in forage resources for deer and elk. However, the greatest change will occur on summer range in the spruce-fir cover type and likely favor elk due to the stimulation of grasses and forbs.
Expected changes in the lower elevational types associated with winter range and browse plants are likely to be insignificant.

DAU D-26
Mule Deer

Current Conditions: The Rio Grande National Forest has a high degree of responsibility for providing habitat to support the desired mule deer numbers in this DAU with approximately 46% of the land base managed by the Rio Grande National Forest. The majority of this can be considered summer and/or transitional range that is likely in more open canopy condition as described in the vegetative overview above. However, approximately 73,000 acres of deer winter range also occurs on National Forest System (NFS) lands (9% of the total). This lower elevation range has likely not been significantly influenced by changes in ecological condition due to bark beetles or other insect or disease agents. Based on the draft DAU plan, approximately 1% (4,000 acres) of the severe winter range designation also occurs on NFS lands. I recognize that both winter and severe winter range should be a focus for management actions as needed to maintain or improve habitat conditions for mule deer in this DAU and look forward to working cooperatively with CPW and other partners to attain these goals.

I agree that the 2019 population objective of 5,500-6,500 mule deer is realistic for this DAU. As your data display, these numbers appear to be sustainable as they have held over objective the last two years and there are several habitat improvement projects in process. Average fawn to doe ratios appear to have increased to healthy herd levels, and buck to doe ratios have improved. Based on the information provided, it appears that there may be more benefits to this deer herd by managing for numbers at the current population objective.

Recommendations: Based on existing habitat information and other factors, I concur with CPW that Alternative 3 (current population estimate) be implemented as the population objective for DAU D-26. This objective would be set at 5,500 to 6,500 mule deer. I would also recommend that limited entry continue, as this helps to control and better manage potential resource damage from recreational hunter numbers that utilize public lands. I also concur that Alternative 3 (26 to 29 bucks per 100 does) be pursued as a sex ratio objective to provide a balanced opportunity between a higher quality recreational experience to the public and the opportunity to harvest a larger mule deer.

Other General Comments: The draft Plan mentions on-going resource damage from off- highway vehicles (OHVs) as a primary concern in this DAU. OHVs are also mentioned as a potential factor in displacing deer from preferred habitat thereby reducing hunter satisfaction. These types of disturbances are also a concern for the Forest and it is important for us to know about them if they occur on public lands. I am also particularly interested in assessing our Game Retrieval Policy to determine if some of this resource damage might be attributed to this activity. I request the CPW's assistance in monitoring and enforcing our existing authorities to eliminate or minimize resource damage and disturbance from OHVs if we are to be successfully managing this activity for the benefit of the D-26 herd.

DAU E-26
Rocky Mountain Elk

Current Conditions: DAU E-26 overlaps the roughly same area described for DAU D-26. As such, the Rio Grande National Forest has a considerable responsibility for providing habitat to support elk numbers in this DAU of which 87% occurs on public land. This especially pertains to elk summer range 387,000

acres (58%) occur on Forest alone. Based on the draft DAU plan, approximately 15,500 acres (23 % of the total) of winter range and 1% (4,000 acres) of severe winter range designation also occurs on NFS lands. The conditions of summer, winter, and severe winter range on NFS lands is like that mentioned for deer. As such, winter and severe winter range remain a management focus for the Forest. I share CPWs concern that past elk numbers in this DAU were likely too high for the available habitat at that time. I therefore recommend careful consideration in trying to balance an increase in elk numbers with the condition of available habitat. The ecological condition assessment provided for this DAU may assist with these decisions, particularly since the draft Plan suggests that winter range condition and forage availability are limiting factors for elk. This may not be the case on summer range as aspen are succeeding much of the beetle killed stands.

The current population estimate of 3,400 elk is just below 2008 objectives (3,500-4,500) and it is believed that the Forest will host more favorable cover to forage ratios in the near future, thus an increased elk herd maybe more socially and biologically sustainable than in past years, such as the 1990's. The ecological condition assessment associated with our analyses suggests that forage availability on summer range will likely not be a key limiting factor in the future as a significant increase in forage quantity and quality has likely occurred and will continue to occur for at least the life of this DAU Plan. Rather, winter and severe winter range will likely remain key limiting factors regarding elk population objectives.

Recommendations: Based on the information provided in the draft plan, in association with the ecological condition update conducted for this DAU, I recommend Alternative 2 be selected which is more readily attainable population objective for DAU E-26 at this time. This objective would manage the population at 3,600 to 4,200 elk. The Forest Service District Wildlife Biologist associated with this DAU indicated that he supports this increase as he believes habitat carrying capacity will continue to increase as projects are implemented. Several timber sales were recently sold, which will expand summer range forage capacity once implemented. There are other thinning and burning projects that will restore or enhance winter range forage capacity that are expected to be implemented during the life of this DAU plan. Due to the increase in summer forage and ongoing habitat improvement projects, I therefore recommend maintaining the population within the lower end of the Alternative 2 thresholds of the objective until such time that potential effects on winter range can be assessed.

From a recreational opportunity perspective, I concur that the expected bull ratios (18 to 21 bulls per 100 cows) represents a balanced opportunity between achieving the desired elk numbers and a better opportunity to harvest a bull elk. I support the current objective.

Other General Comments: I have heard of more mountain lion hunting public interest and permitted guide activity on the Saguache Ranger District than in recent years. The draft plan for DAU E-26 notes that OHV use is a growing concern during the summer and the elk hunting seasons. The draft plan also notes that OHVs are likely responsible for displacing elk during the hunting season, thereby reducing hunter success rates and satisfaction. The OHV Game Retrieval policy is mentioned as a potential contributing factor to elk displacement. I agree that this is a potential issue and look forward to collaborating with CPW on this policy during our upcoming travel management analysis that will occur after the Forest Plan revision is complete. I would like to offer one correction to the draft DAU Plan for E-26 where it states "domestic … sheep … are grazed on public land allotments in E-26". This is inaccurate as there are no public land allotments permitted for domestic sheep within E-26 geographic area. Finally, the Rio Grande National Forest has substantially invested in several ongoing projects that will restore or enhance habitats to encourage better elk distribution across winter and summer ranges.

Again, I thank Colorado Parks and Wildlife for the opportunity to comment on the Draft DAU Plans for D-26 and E-26. The plans are well-written and informative, and I commend the author and CPW for the time and effort put into these plans. I also thank Colorado Parks and Wildlife for adding economic

information for big game species to the DAU plans (Table 1, pg. 23). Big game populations and wildlife-related recreation are an important use on the Forest and the economic information helps to inform readers about these values. I look forward to continuing our work with Colorado Parks and Wildlife as I cooperatively manage for healthy wildlife habitats and populations in the future.

If you have any questions, please contact Jason Remshardt, Point of Contact for Wildlife and Fisheries Program at 719-852-6243

Sincerely,

DAN S. DALLAS
Forest Supervisor

Enclosures

cc: Rick Basagoitia, Tom Malecek, Tristram Post, Jason Remshardt, Jesse McCarty

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
San Luis Valley Field Office
1313 East Highway 160
Monte Vista, Colorado 81144

In Reply Refer To:
6521 (COF03000, JRL)

30 November, 2018

Rick Basagoitia, Area Wildlife Manager
0722 South Road 1East
Monte Vista, CO 81144

Dear Mr. Basagoitia,

Thank you for the opportunity to comment on the proposed D-26 and E-26 DAU Plans. As the agency providing the majority of critical winter range for big game in the San Luis Valley, we thought it important to provide comments on any changes Colorado Parks and Wildlife may implement. The San Luis Valley Field Office (SLVFO) has a strong commitment to providing quality wildlife habitat as one of our important "multiple uses".

After reviewing the draft D-26 and E-26 plans, we agree with the many current and emerging ecological constraints identified by CPW when considering elk and deer herd objectives for this area, including increasing fragmentation from development, increasing recreation pressure, limited winter range and forage availability, prolonged drought, game damage issues, competition with livestock, and competition with other wild ungulates that are currently not at herd objectives. It appears that increasing herd objectives to any degree would conflict with these ecological constraints. We also believe these constraints will pose additional challenges in managing public lands to meet Land Health Standards under any scenario that increases herd objectives.

In particular, the proposed alternative within the E-26 DAU plan that includes a 20-40% increase is concerning given the ongoing drought and the potential, but undocumented, impacts of reduced quality and availability of winter forage on public lands. We recommend a more moderate approach as identified in either of the other two alternatives until studies are initiated that quantify current condition of the crucial winter range and the carrying capacity of those areas. We are aware that if increases in numbers create land health impacts, CPW can moderate herd sizes with game management tools, but land health impacts area harder to reverse and can take many years to see improvement, especially in times of drought.

Specific to the D-26 plan, we understand the herd objective reflects the current estimated population size, and our observations are that browse condition varies widely depending on the area. While the current population size may prove to be less viable following a harsh winter, the proposed increase of 10-20% appears to be more moderate and would provide an opportunity for monitoring and adjustments to ensure maintenance of healthy lands. Continued habitat

partnership projects between CPW and the BLM will be critical to improve availability of browse to ensure limited land health impacts during severe winters under the new objective.

Lastly, the BLM does not have the capacity to implement a monitoring program specific to wild ungulates. Because of the uncertainties regarding ecological constraints, we believe a program to monitor habitat conditions is critical, particularly if herd objectives are increased. Additionally, the draft DAU Plans list winter range forage availability and quality as the limiting factors to herd size, so we recommend CPW and the BLM work together to address targeted vegetation monitoring on winter range in conjunction with pellet counts to determine impacts from the changing herd objectives and to assist in quantifying carrying capacity.

If you have any questions regarding this matter, please contact me at (719) 239-0494.

Sincerely,

Melissa S. Garcia

Melissa S. Garcia
Field Manager
San Luis Valley Field Office

CC Brent Frankland, Wildlife Biologist
Clayton Bondurant, District Wildlife Manager

November 16, 2018

Brent Frankland
Colorado Parks and Wildlife
0722 S. CO Rd 1 East
Monte Vista, CO 81144

RE: San Luis Valley Habitat Partnership Program Comments - DAU E26

Dear Brent:

One of the initial reasons for creating the Habitat Partnership Program was to provide local landowners and other interests an opportunity to provide input into big game management in their areas. The diverse makeup of local HPP committees (3 livestock growers, Forest Service, BLM, USFWS, CPW and sportsmen representatives) provide a good cross section of local interests to review DAU proposals and respond accordingly for CPW consideration.

The San Luis Valley HPP committee has discussed your presentation and reviewed the draft alternatives for this DAU plan update. The San Luis Valley HPP committee is in agreement with the following comments pertaining to proposals for the population range and sex ratio objectives for the above DAU plan.

The SLVHPP committee supports the draft alternative to increase the number of animals within this DAU and within our committee area by 20-40% (alternative #3). The SLVHPP committee does not believe this increase would create more conflicts and we also believe we have the resources necessary to address conflicts should they occur. We understand that this alternative will require a significant reduction in cow licenses for at least four to five years until the population increased to within the objective range. However, increasing the population objective will ultimately lead to more hunting licenses and sportsmen opportunities in the future.

The SLVHPP also discussed the proposed sex ratio alternative. In general, we believe the sex ratio that provides for maximum hunting opportunity is appropriate for this area. This accommodates sportsmen's desires and maintains local economic benefits. We understand that the sex ratio is determined by the season structure.

Thank you for the presentation and the opportunity to provide these comments.

Sincerely,

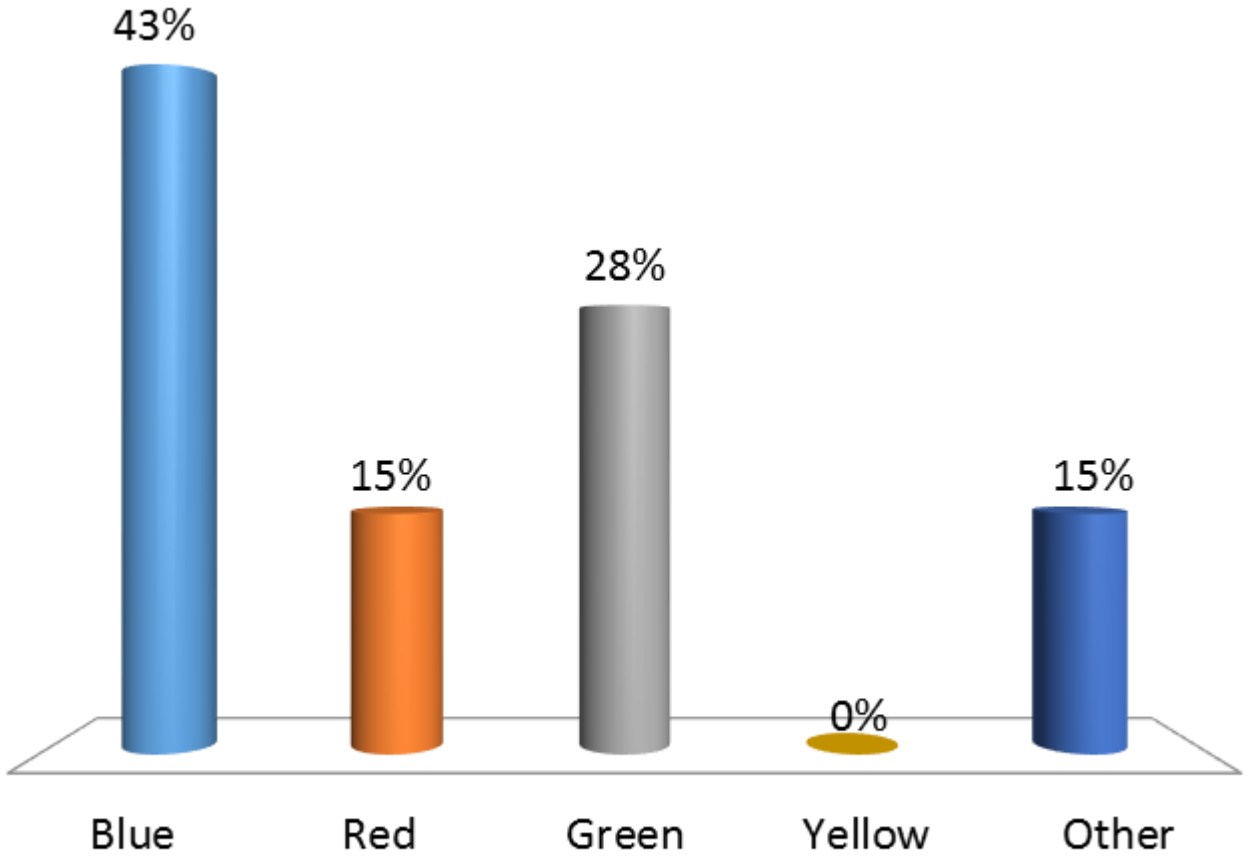
Mick Davis

Mick Davis, Chair
San Luis Valley HPP Committee

YOUR TURN -- DIGITAL POLLING

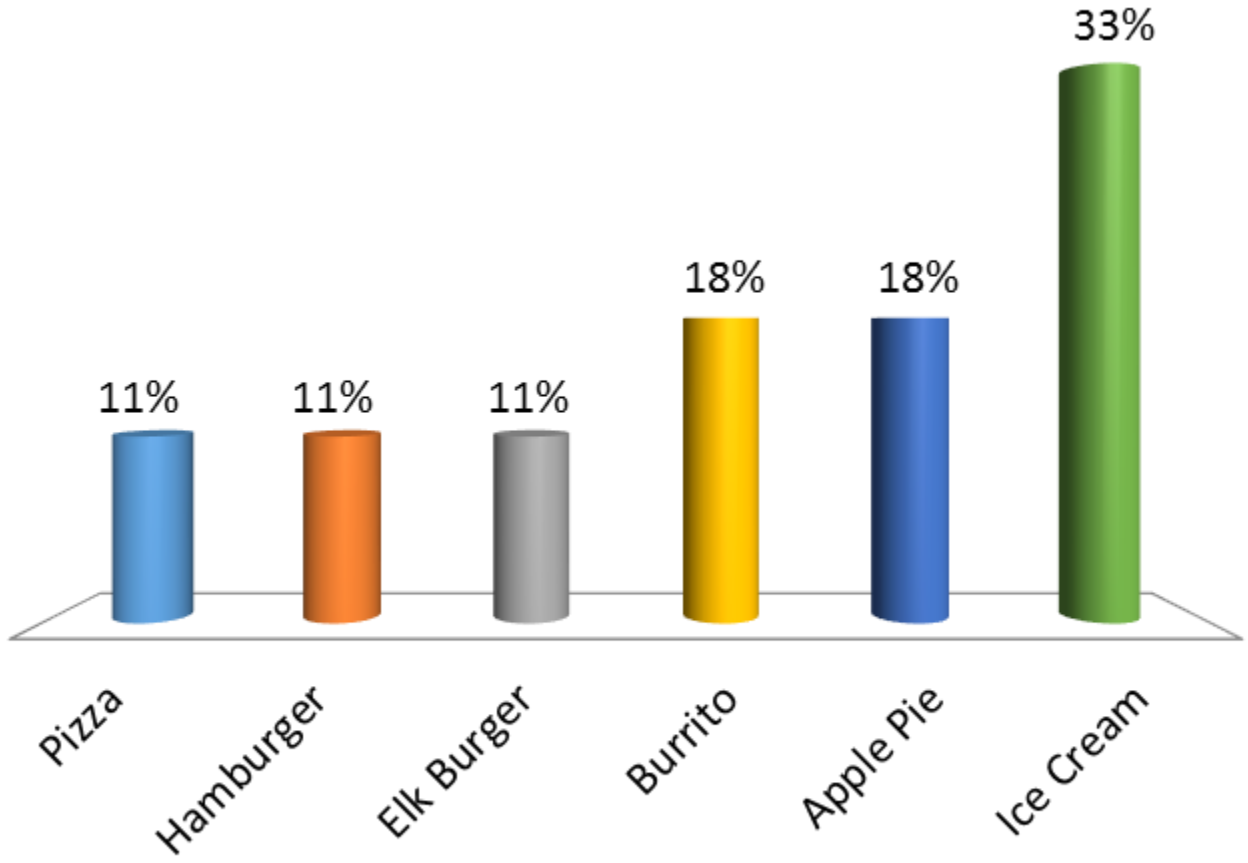
Practice: What is your favorite color? (*Please check one*.)

A. Blue
B. Red
C. Green
D. Yellow
E. Other



What are your top three favorite foods from these options? (*Please select up to three*.)

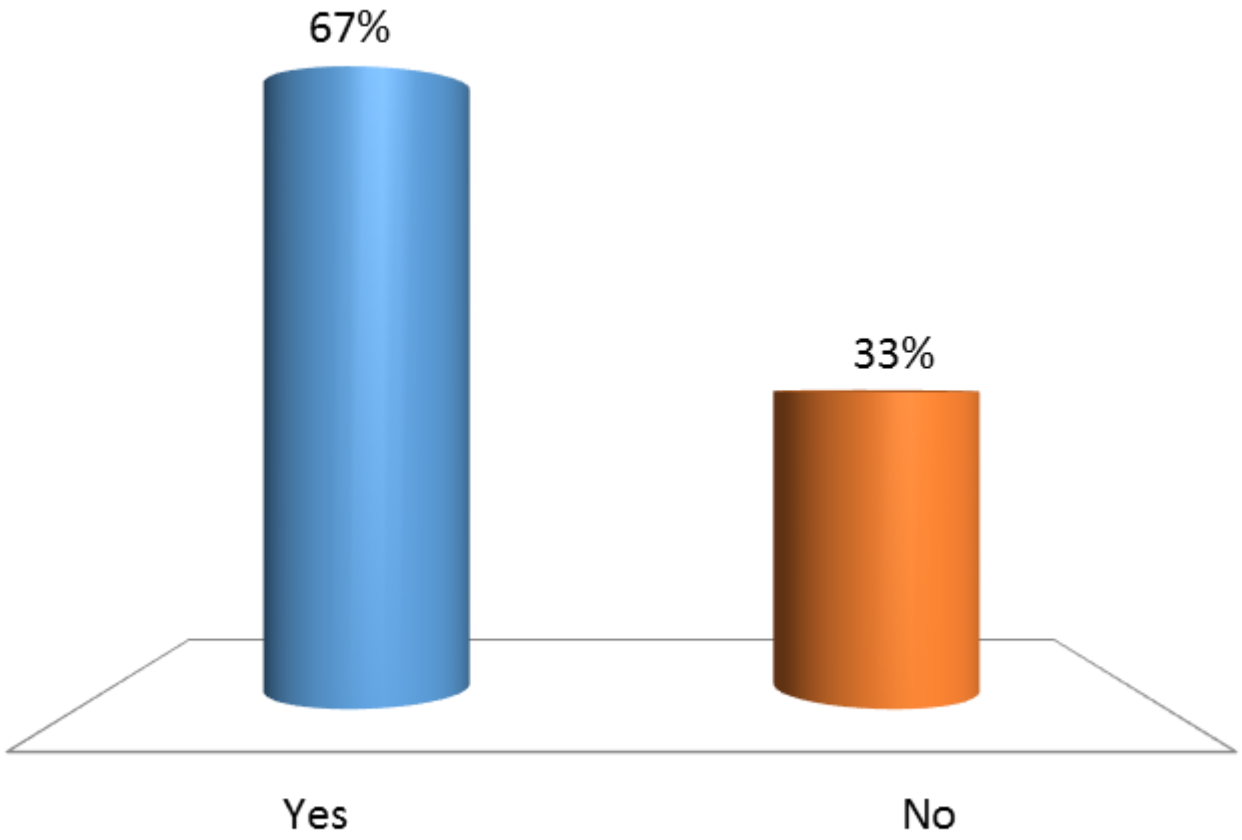
A. Pizza
B. Hamburger
C. Elk Burger
D. Burrito
E. Apple Pie
F. Ice Cream



Do you live in GMU 68, 681 or 682?

0

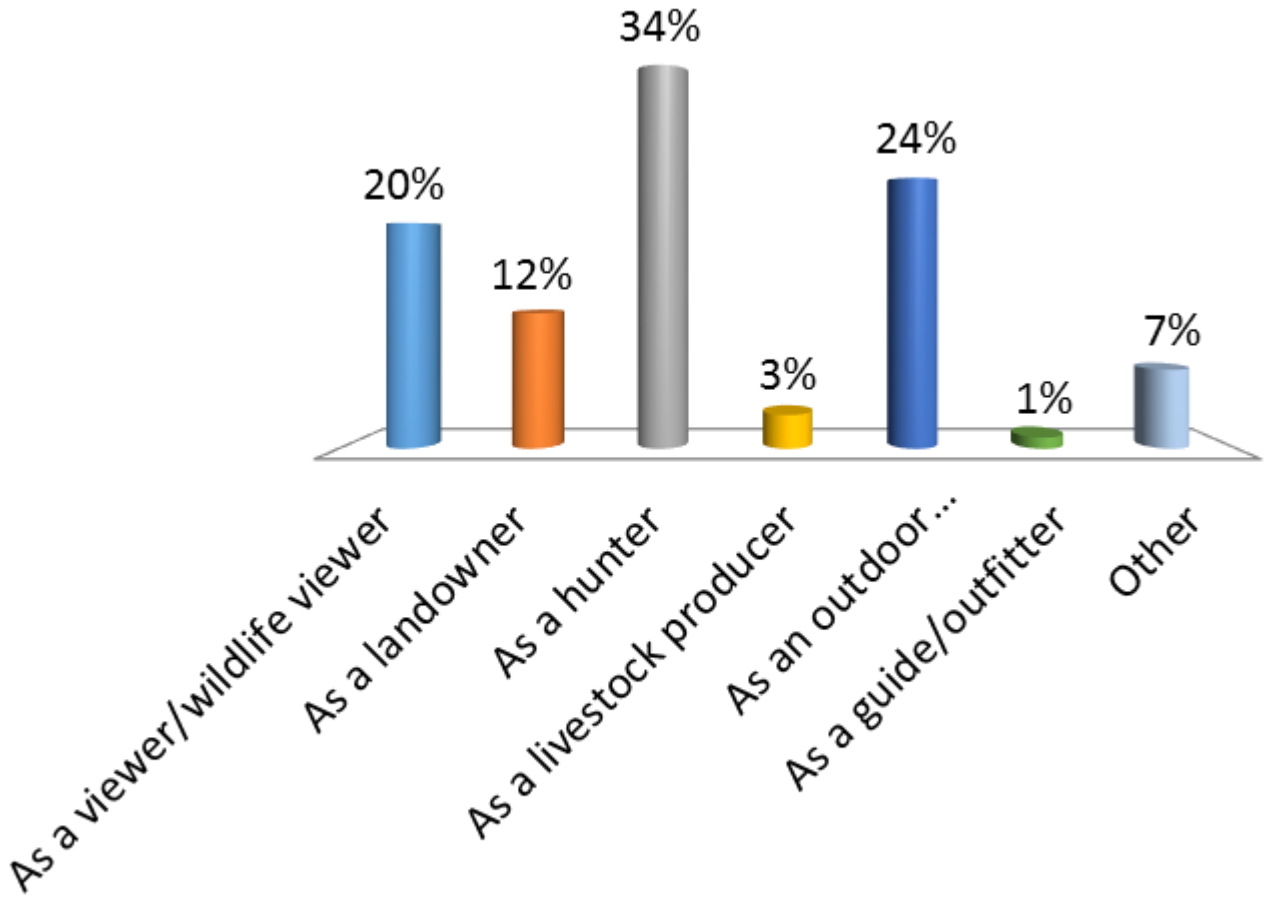
A. Yes
B. No



Which of the following best describes how you interact with elk or deer in GMUs 68, 681 and/or 682? (*Please select up to three.)*

0

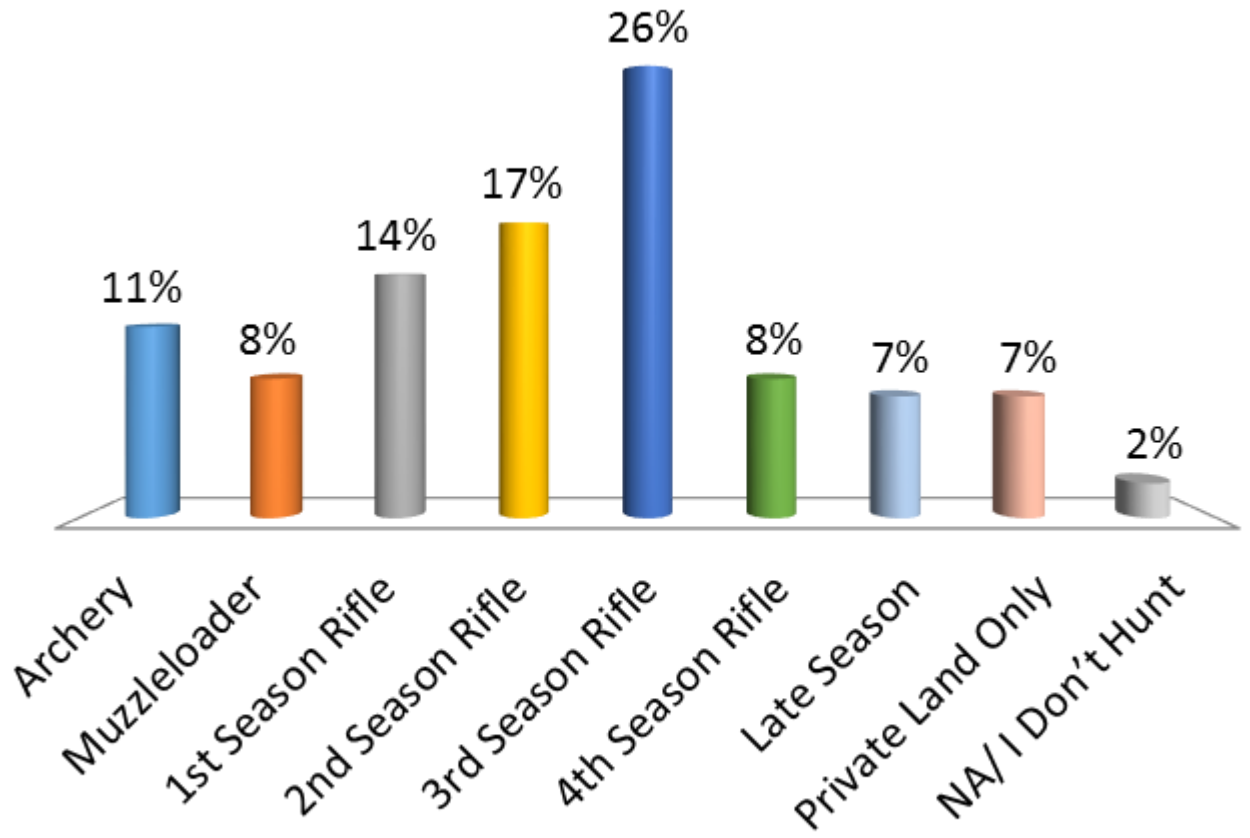
A. As a viewer/wildlife viewer
B. As a landowner
C. As a hunter
D. As a livestock producer
E. As an outdoor recreationist (eg. Hiker, skier, mountain biker, etc.)
F. As a guide/outfitter
G. Other



During which season do you <u>most prefer</u> to hunt in GMUs 68, 681 and/or 682? (*Select up to three.)*

0

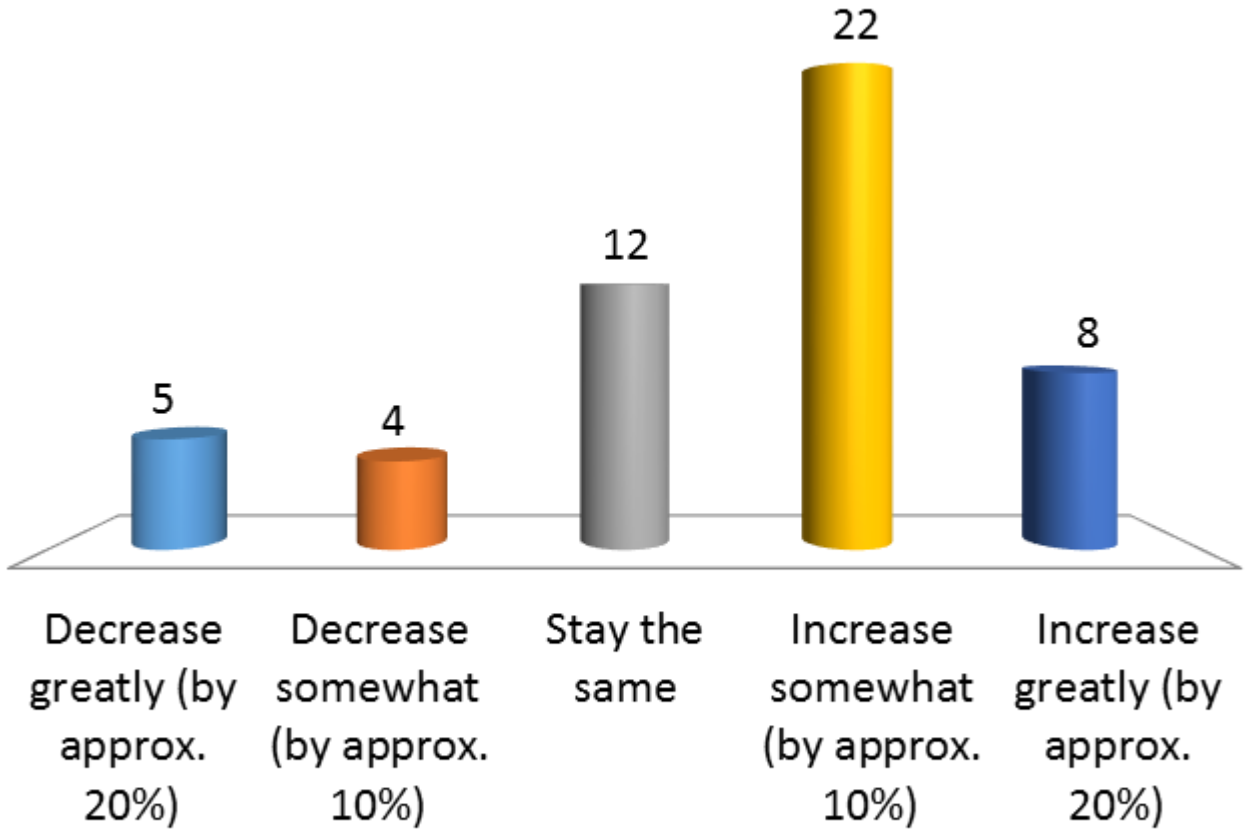
A. Archery
B. Muzzleloader
C. 1st Season Rifle
D. 2nd Season Rifle
E. 3rd Season Rifle
F. 4th Season Rifle
G. Late Season
H. Private Land Only
I. NA/ I Don’t Hunt



Please indicate which option best represents how you would like to see the **DEER** Herd managed in the next 10 years. (*Please select one.)*

0

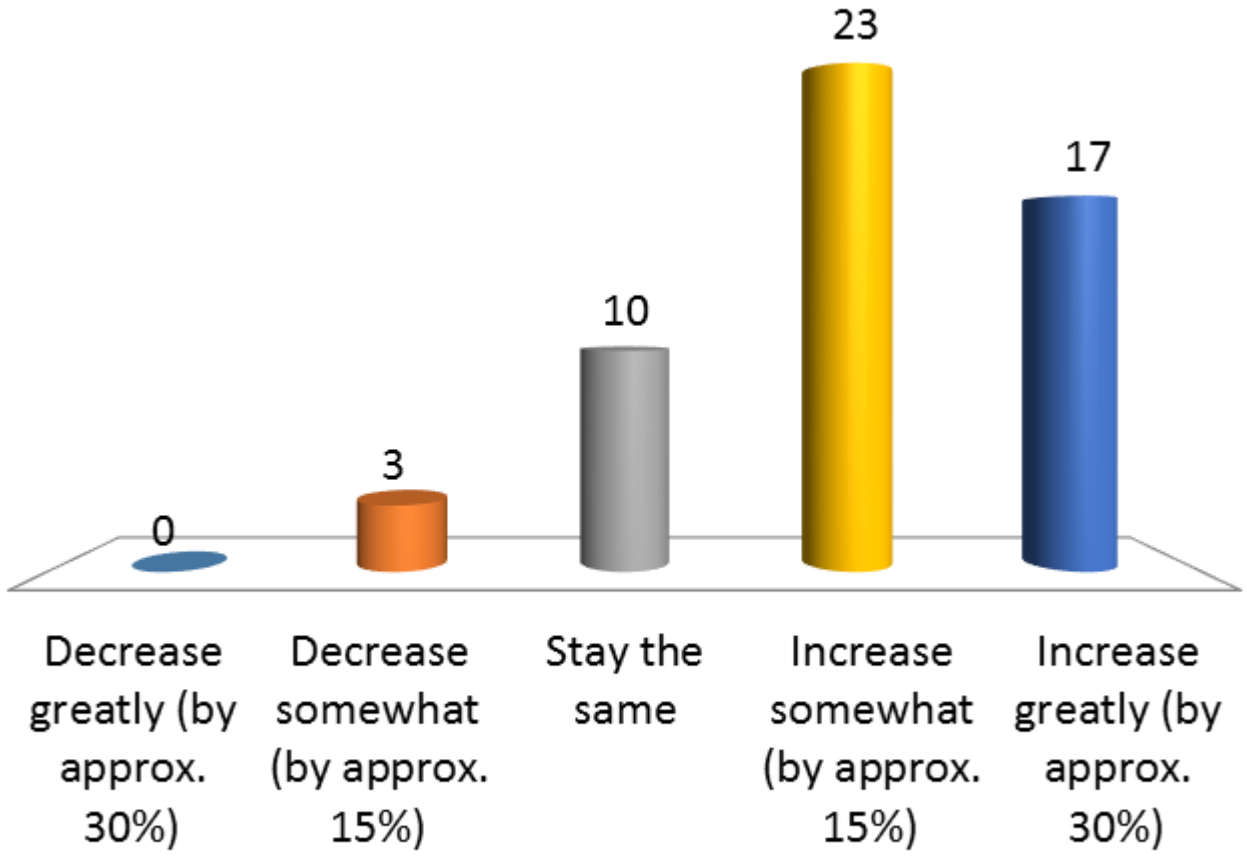
A. Decrease greatly (by approx. 20%)
B. Decrease somewhat (by approx. 10%)
C. Stay the same
D. Increase somewhat (by approx. 10%)
E. Increase greatly (by approx. 20%)



Please indicate which option best represents how you would like to see the **ELK** Herd managed in the next 10 years. (*Please select one.)*

0

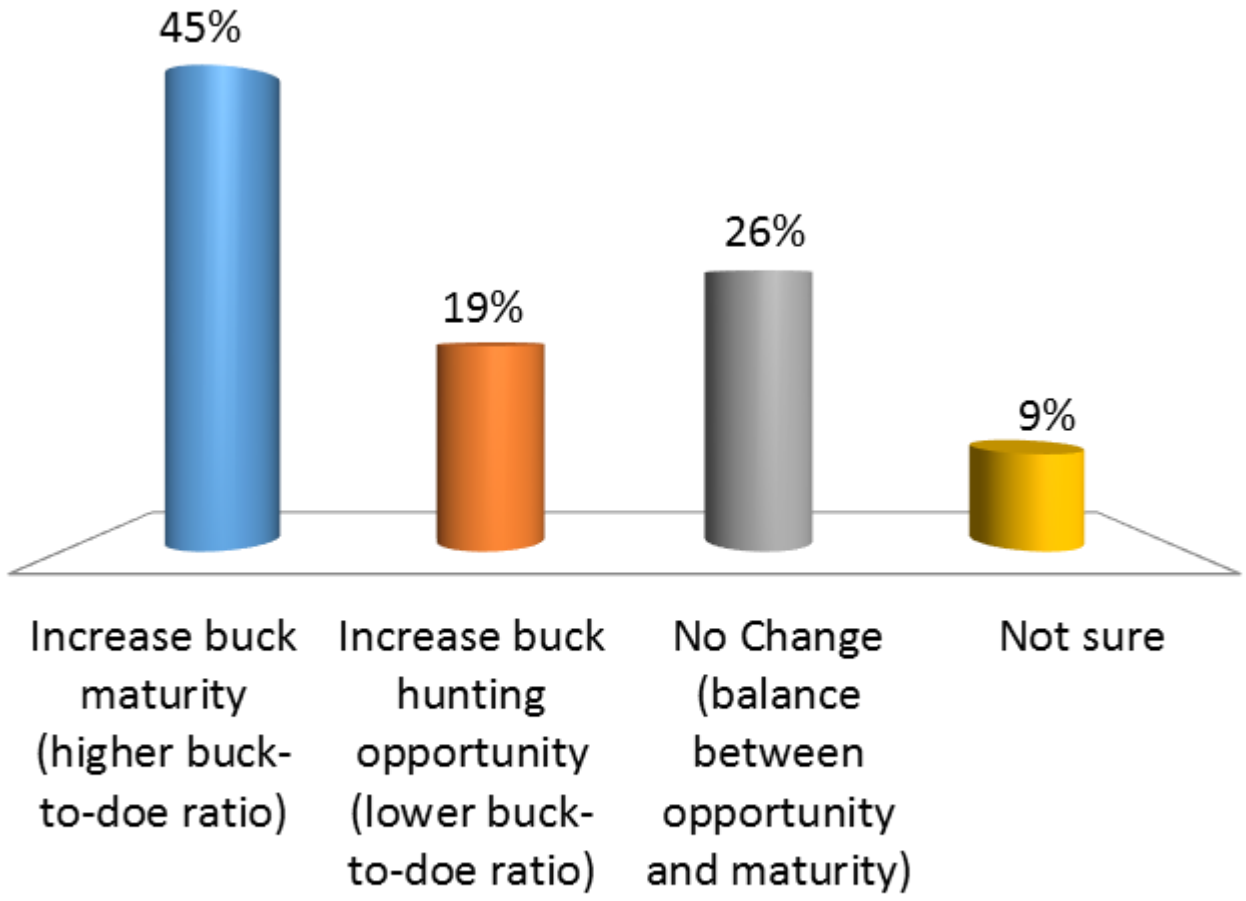
A. Decrease greatly (by approx. 30%)
B. Decrease somewhat (by approx. 15%)
C. Stay the same
D. Increase somewhat (by approx. 15%)
E. Increase greatly (by approx. 30%)



How do you believe the **DEER** Herd should be managed in terms of buck opportunity and maturity? (*Please select one.)*

0

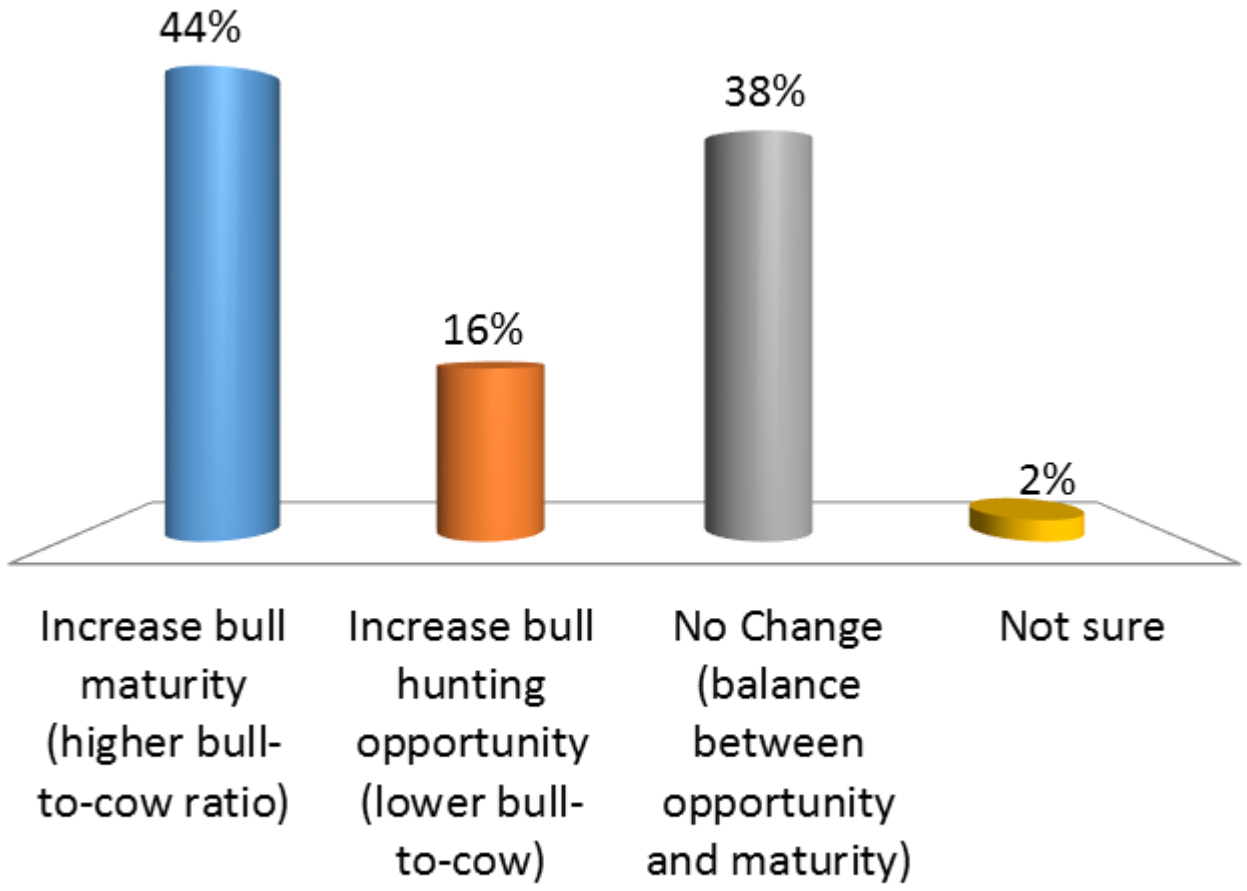
A. Increase buck maturity (higher buck-to-doe ratio)
B. Increase buck hunting opportunity (lower buck-to-doe ratio)
C. No Change (balance between opportunity and maturity)
D. Not sure



How do you believe the **ELK** Herd should be managed in terms of buck opportunity and maturity? (*Please select one.)*

0

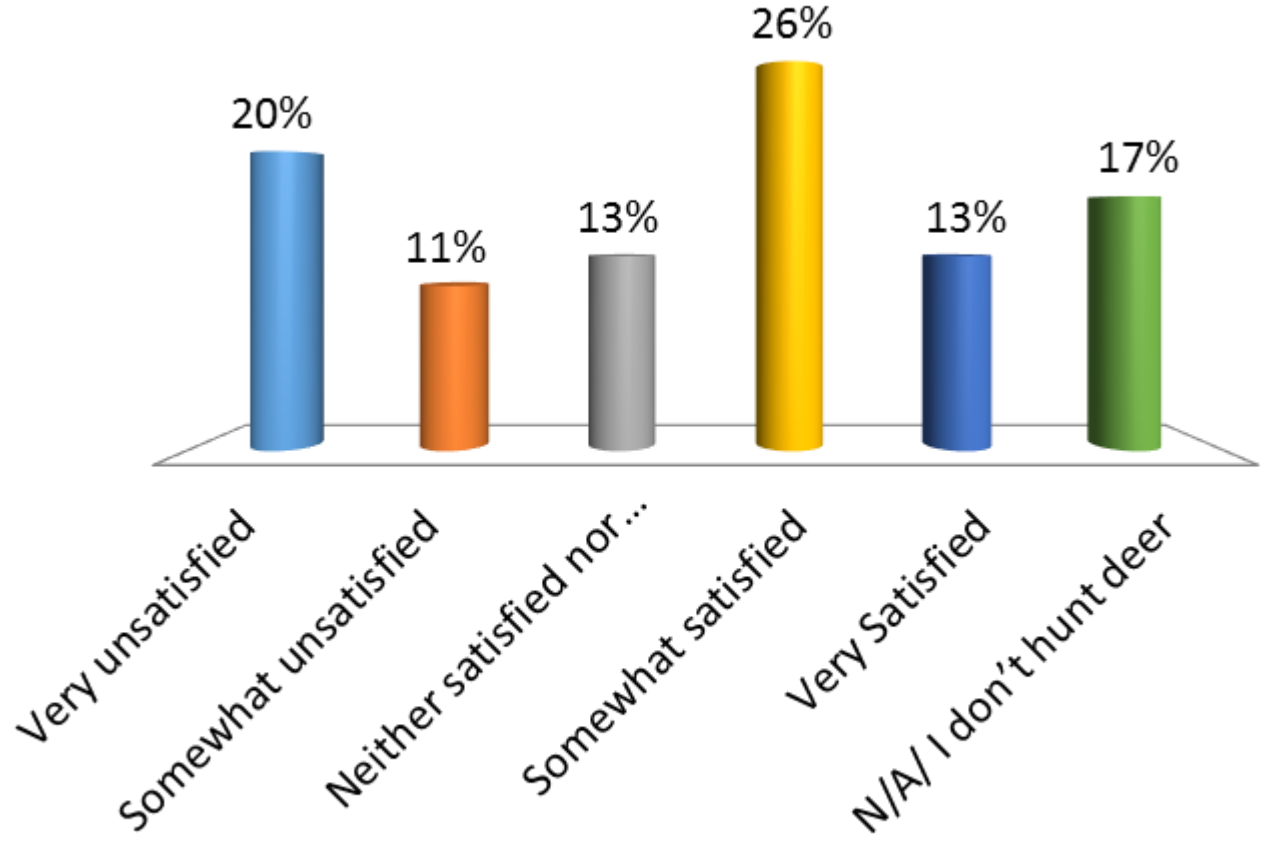
A. Increase bull maturity (higher bull-to-cow ratio)
B. Increase bull hunting opportunity (lower bull-to-cow)
C. No Change (balance between opportunity and maturity)
D. Not sure



Overall how satisfied were you with your **DEER** hunting experience in GMU's 68, 681 and/or 682? (*Please select one.)*

0

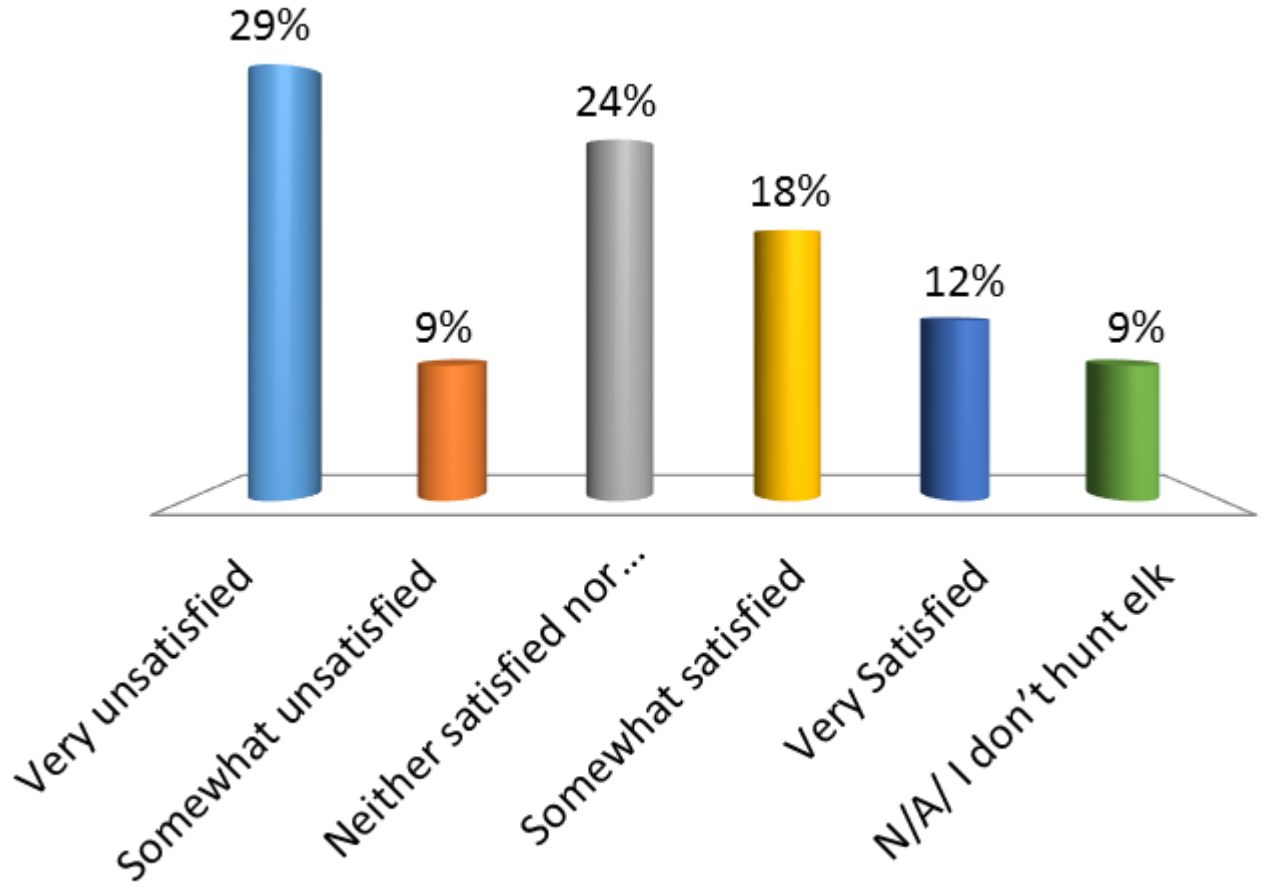
A. Very unsatisfied
B. Somewhat unsatisfied
C. Neither satisfied nor unsatisfied
D. Somewhat satisfied
E. Very Satisfied
F. N/A/ I don't hunt deer



Overall how satisfied were you with your **ELK** hunting experience in GMU's 68, 681? (*Select one.*)

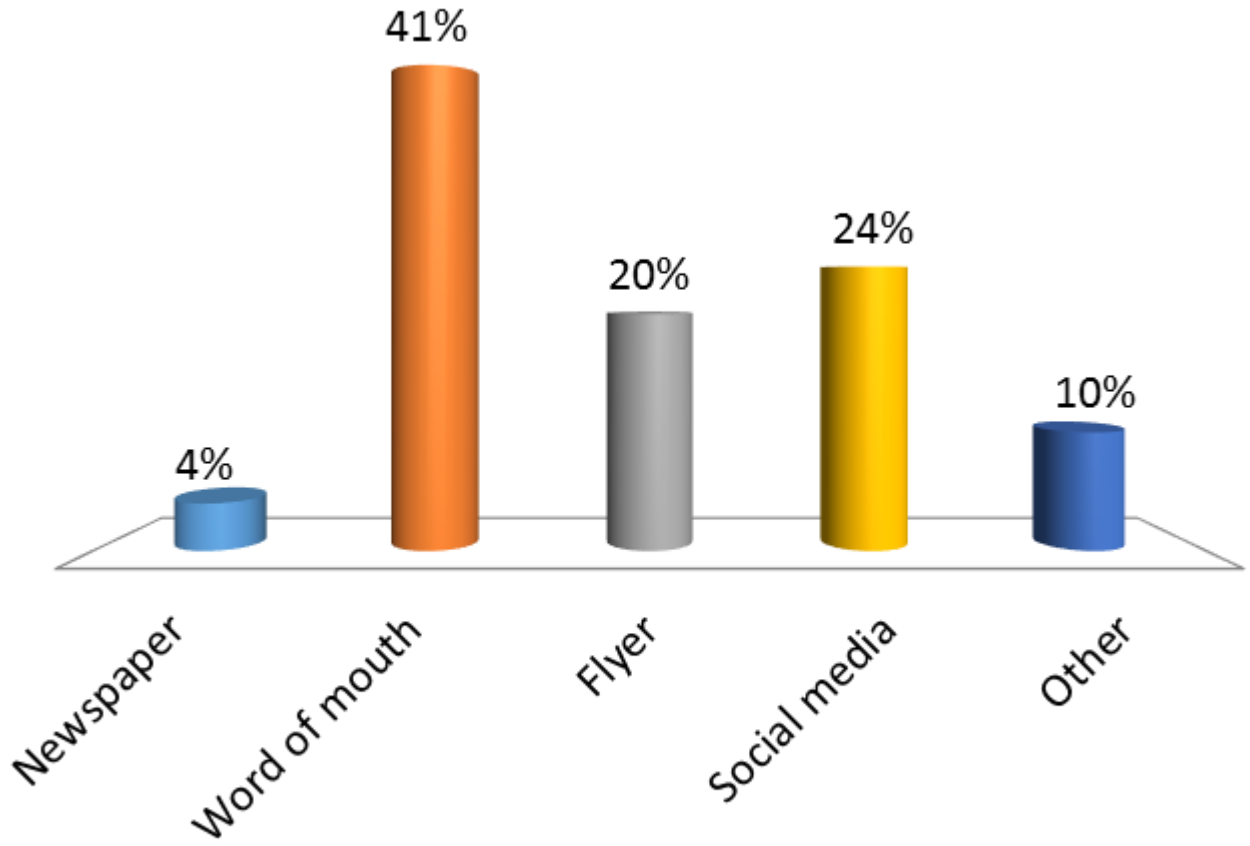
0

A. Very unsatisfied
B. Somewhat unsatisfied
C. Neither satisfied nor unsatisfied
D. Somewhat satisfied
E. Very Satisfied
F. N/A/ I don't hunt elk



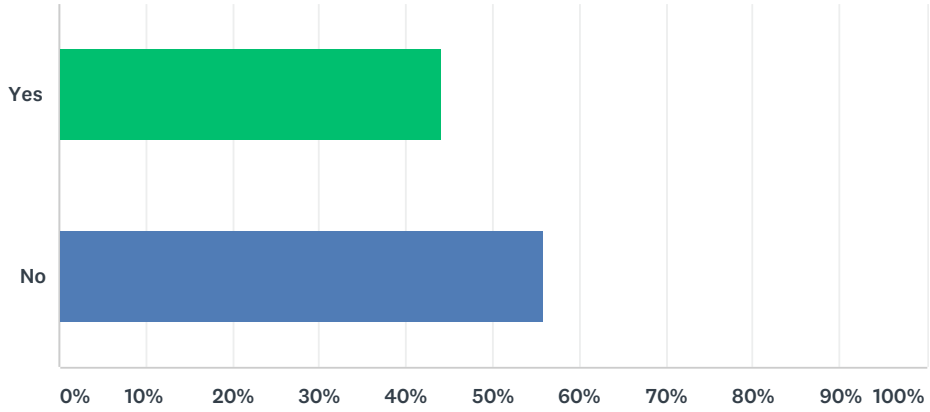
How did you learn about this meeting ? (*Select one.*)

A. Newspaper
B. Word of mouth
C. Flyer
D. Social media
E. Other



Q1 Do you currently live in GMU 68, 681 or 682? (See map below) (Please check one.)

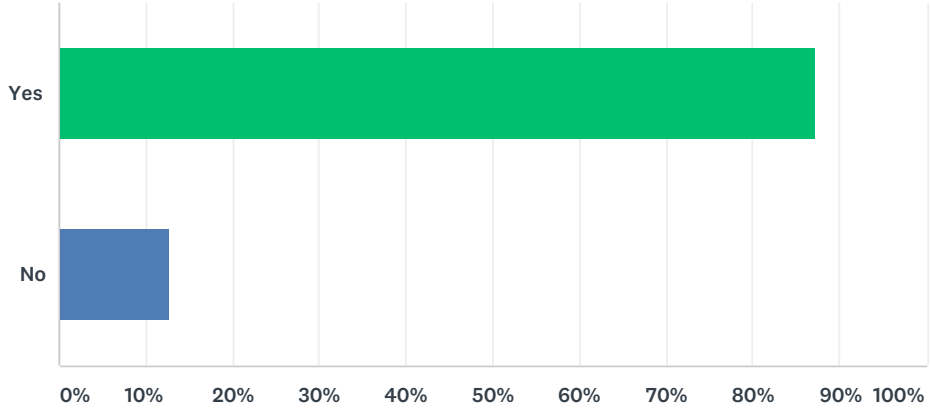
Answered: 59 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	44.07%	26
No	55.93%	33
TOTAL		59

Q2 During the last 12 months, have you participated in any outdoor recreation other than hunting (e.g., camping, snowmobiling, etc.) in GMU 68, 681, OR 682? (Please check one.)

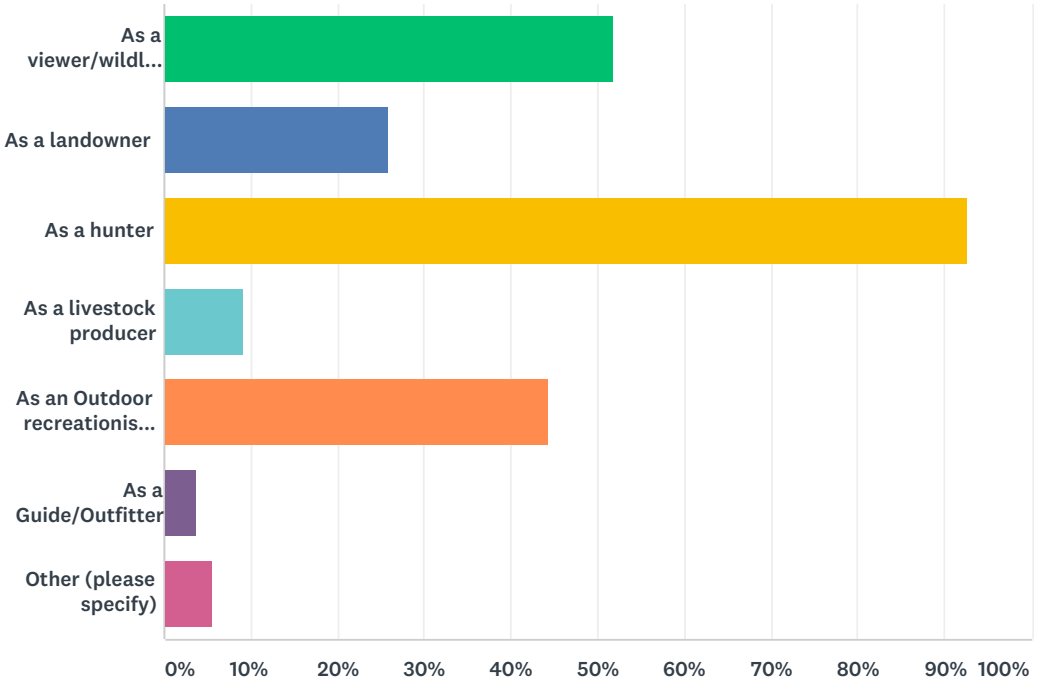
Answered: 55 Skipped: 4



ANSWER CHOICES	RESPONSES	
Yes	87.27%	48
No	12.73%	7
TOTAL		55

Q3 Which of the following best describes how you interact with deer or elk in GMUs 68, 681, & 682? (Please check all that apply.)

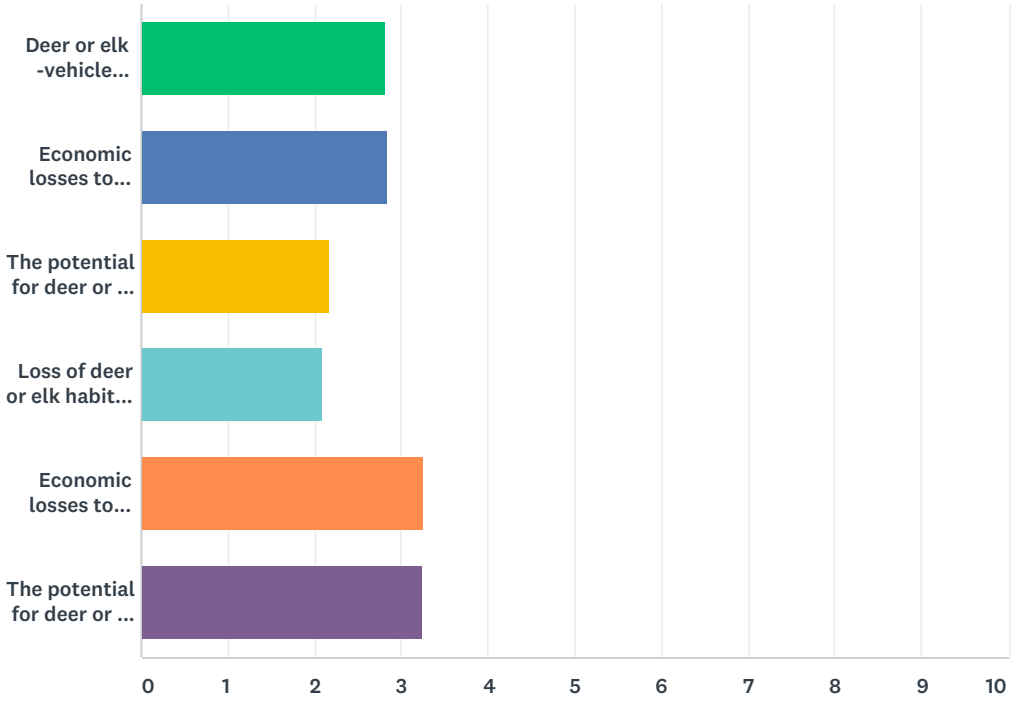
Answered: 54 Skipped: 5



ANSWER CHOICES	RESPONSES	
As a viewer/wildlife watcher	51.85%	28
As a landowner	25.93%	14
As a hunter	92.59%	50
As a livestock producer	9.26%	5
As an Outdoor recreationist (e.g., hiker, skier, mountain biker, etc.)	44.44%	24
As a Guide/Outfitter	3.70%	2
Other (please specify)	5.56%	3
Total Respondents: 54		

Q4 How concerned are you about the following items? (Please check one response for each item.)

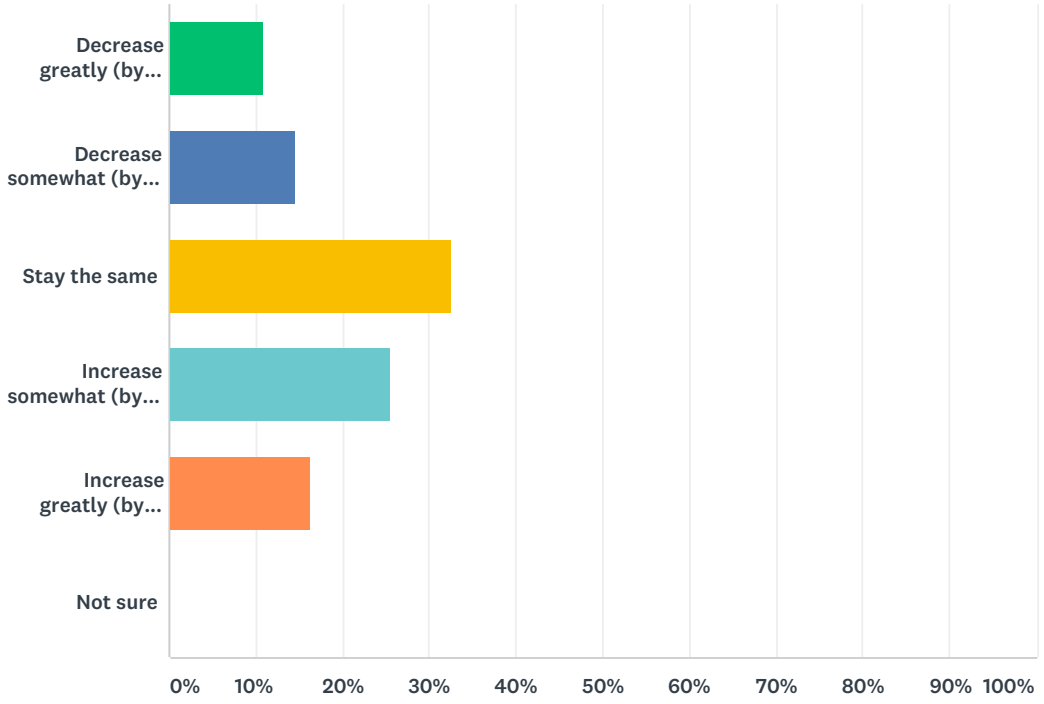
Answered: 54 Skipped: 5



	VERY CONCERNED	MODERATELY CONCERNED	SLIGHTLY CONCERNED	NOT AT ALL CONCERNED	TOTAL	WEIGHTED AVERAGE
Deer or elk -vehicle collisions	11.11% 6	24.07% 13	35.19% 19	29.63% 16	54	2.83
Economic losses to ranchers/farmers due to deer or elk damaging crops, fences, etc.	11.11% 6	24.07% 13	33.33% 18	31.48% 17	54	2.85
The potential for deer or elk to starve during the winter	37.04% 20	24.07% 13	24.07% 13	14.81% 8	54	2.17
Loss of deer or elk habitat due to human population growth and development	44.23% 23	21.15% 11	15.38% 8	19.23% 10	52	2.10
Economic losses to residents due to deer or elk damaging gardens, trees, shrubs	5.56% 3	14.81% 8	27.78% 15	51.85% 28	54	3.26
The potential for deer or elk to spread disease to humans, pets, or livestock	9.26% 5	12.96% 7	22.22% 12	55.56% 30	54	3.24

Q5 Please indicate which option best represents how you would like to see the deer herd managed in the next 10 years. (Please check one.)

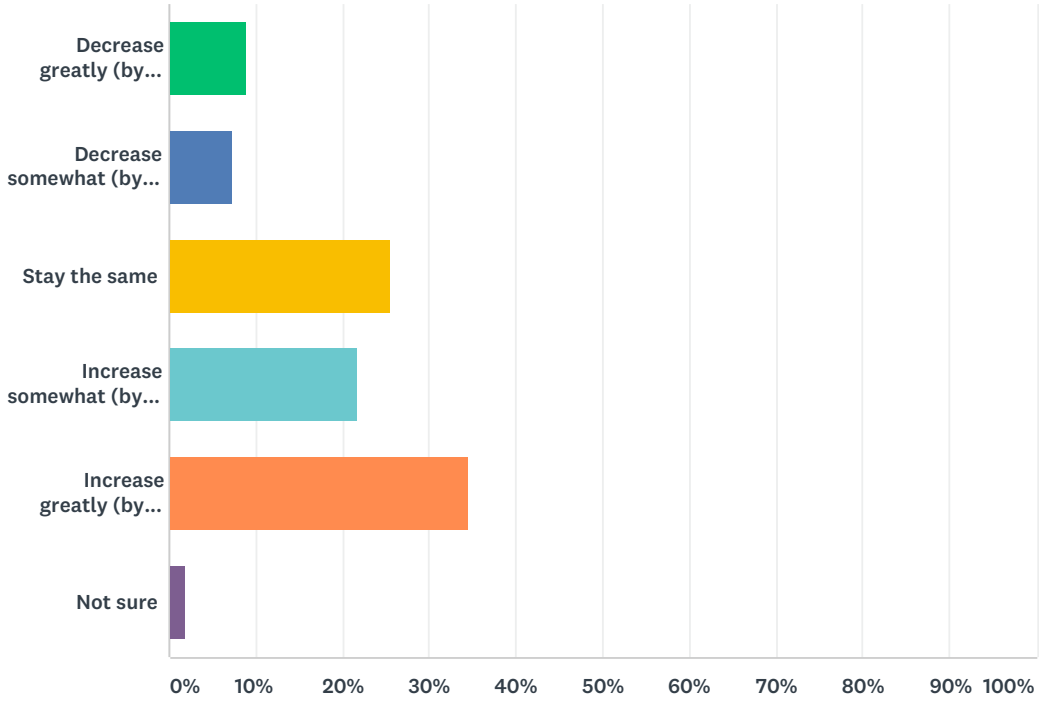
Answered: 55 Skipped: 4



ANSWER CHOICES	RESPONSES	
Decrease greatly (by 20%)	10.91%	6
Decrease somewhat (by 10%)	14.55%	8
Stay the same	32.73%	18
Increase somewhat (by 10%)	25.45%	14
Increase greatly (by 20%)	16.36%	9
Not sure	0.00%	0
TOTAL		55

Q6 Please indicate which option best represents how you would like to see the elk herd managed in the next 10 years. (Please check one.)

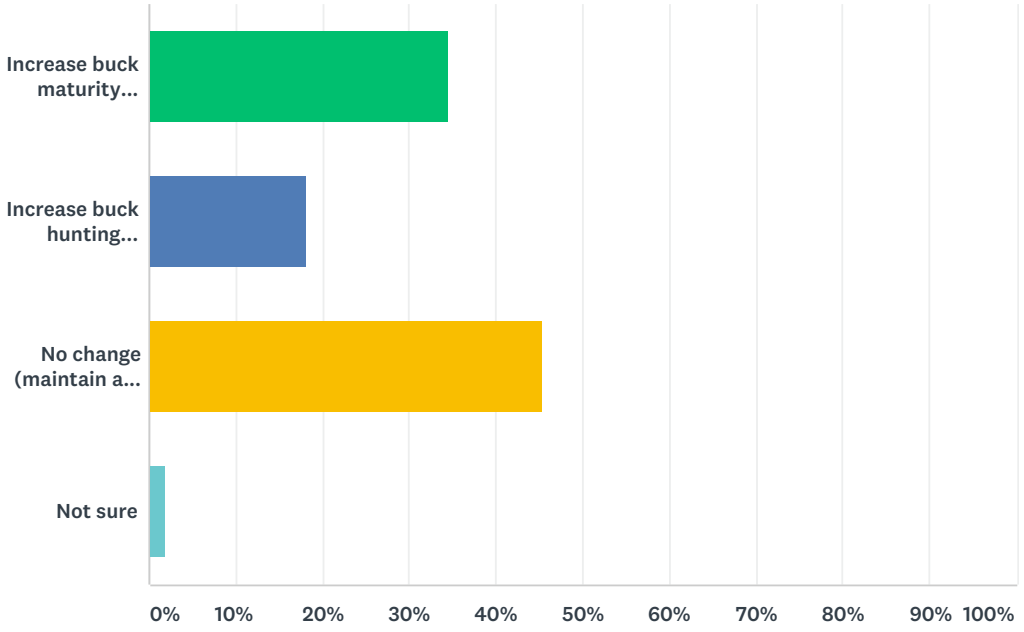
Answered: 55 Skipped: 4



ANSWER CHOICES	RESPONSES	
Decrease greatly (by 30%)	9.09%	5
Decrease somewhat (by 15%)	7.27%	4
Stay the same	25.45%	14
Increase somewhat (by 15%)	21.82%	12
Increase greatly (by 30%)	34.55%	19
Not sure	1.82%	1
TOTAL		55

Q7 How do you believe the deer herd should be managed in terms of buck opportunity and maturity? (Please check one.)

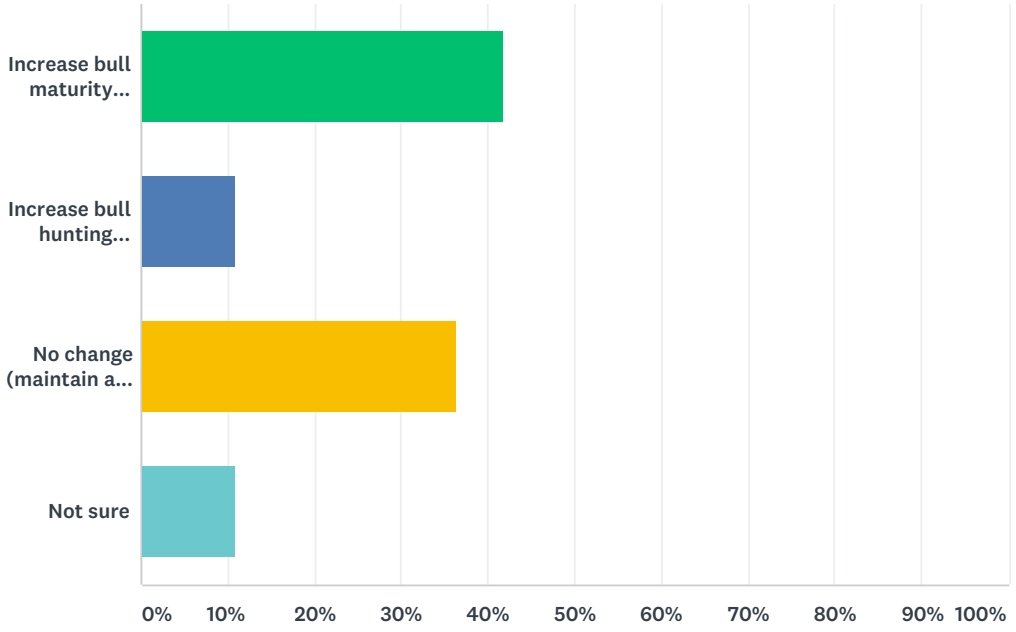
Answered: 55 Skipped: 4



ANSWER CHOICES	RESPONSES	
Increase buck maturity (higher buck-to-doe ratio)	34.55%	19
Increase buck hunting opportunity (lower buck-to-doe ratio) ratio	18.18%	10
No change (maintain a balance between opportunity and maturity)	45.45%	25
Not sure	1.82%	1
TOTAL		55

Q8 How do you believe the elk herd should be managed in terms of buck opportunity and maturity? (Please check one.)

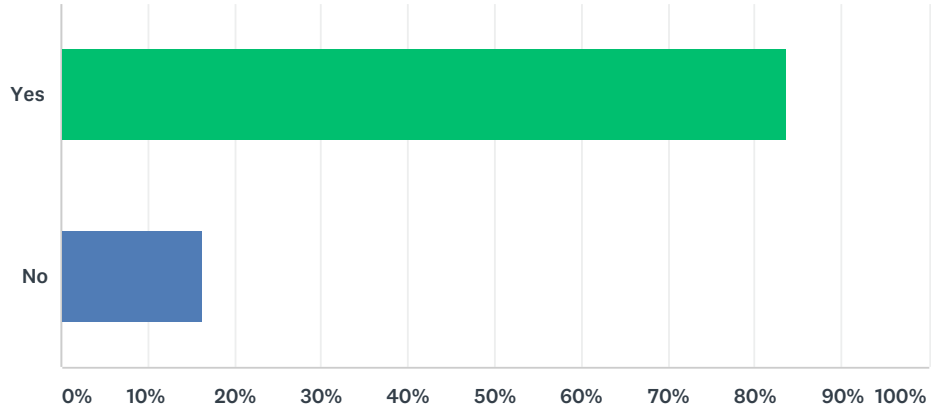
Answered: 55 Skipped: 4



ANSWER CHOICES	RESPONSES	
Increase bull maturity (higher bull-to-cow ratio)	41.82%	23
Increase bull hunting opportunity (lower bull-to-cow) ratio	10.91%	6
No change (maintain a balance between opportunity and maturity)	36.36%	20
Not sure	10.91%	6
TOTAL		55

Q9 Have you ever hunted deer in GMU 68, 681 or 682? (See map below.) (Please check one.)

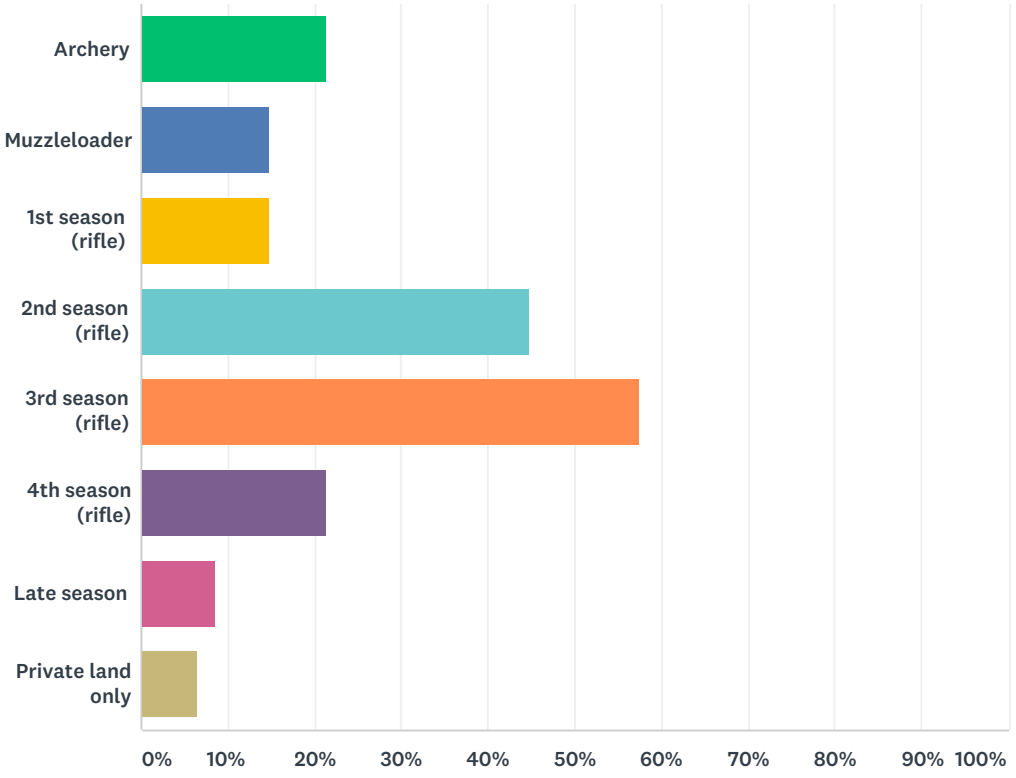
Answered: 55 Skipped: 4



ANSWER CHOICES	RESPONSES	
Yes	83.64%	46
No	16.36%	9
TOTAL		55

Q10 During which of the following seasons have you hunted deer in GMUs 68, 681 or 682? (Please check all that apply.)

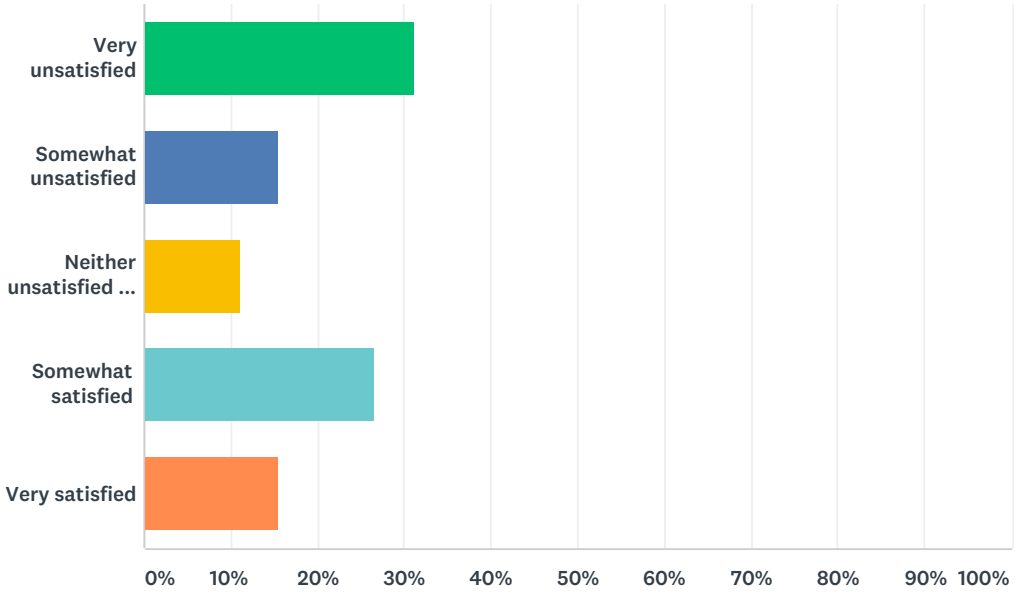
Answered: 47 Skipped: 12



ANSWER CHOICES	RESPONSES	
Archery	21.28%	10
Muzzleloader	14.89%	7
1st season (rifle)	14.89%	7
2nd season (rifle)	44.68%	21
3rd season (rifle)	57.45%	27
4th season (rifle)	21.28%	10
Late season	8.51%	4
Private land only	6.38%	3
Total Respondents: 47		

Q11 Overall, how satisfied were you with your deer hunting experience(s) in GMU 68, 681 or 682? (Please check one.)

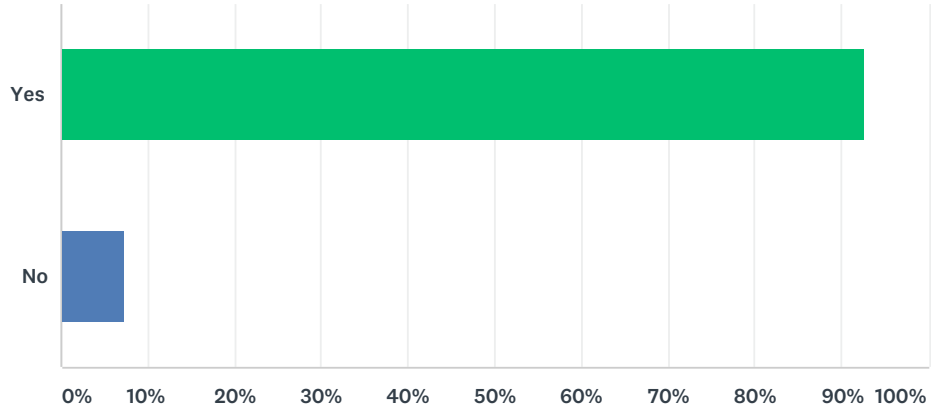
Answered: 45 Skipped: 14



ANSWER CHOICES	RESPONSES	
Very unsatisfied	31.11%	14
Somewhat unsatisfied	15.56%	7
Neither unsatisfied nor satisfied	11.11%	5
Somewhat satisfied	26.67%	12
Very satisfied	15.56%	7
TOTAL		45

Q12 Have you ever hunted elk in GMU 68 or 681? (See map below.) (Please check one.)

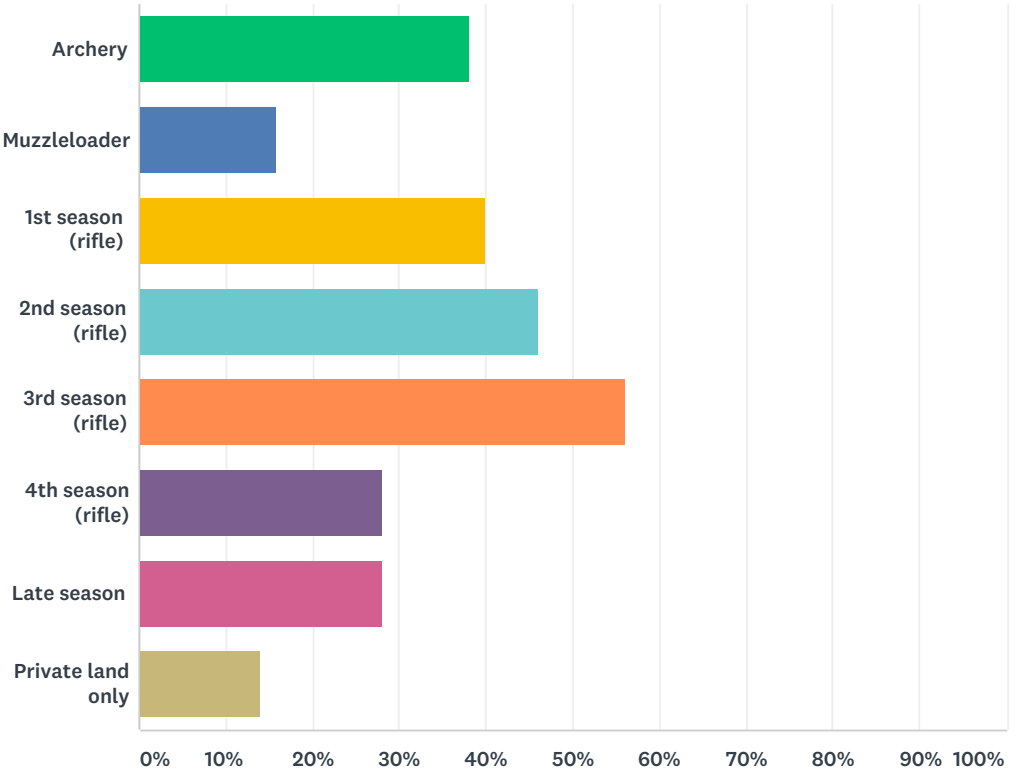
Answered: 54 Skipped: 5



ANSWER CHOICES	RESPONSES	
Yes	92.59%	50
No	7.41%	4
TOTAL		54

Q13 During which of the following seasons have you hunted elk in GMUs 68 or 681? (Please check all that apply.)

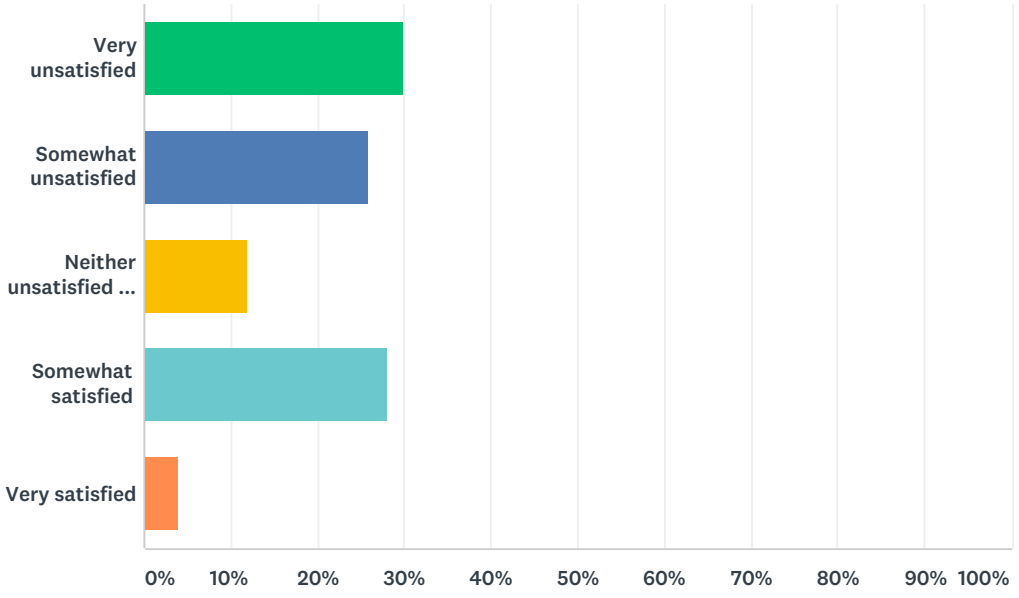
Answered: 50 Skipped: 9



ANSWER CHOICES	RESPONSES	
Archery	38.00%	19
Muzzleloader	16.00%	8
1st season (rifle)	40.00%	20
2nd season (rifle)	46.00%	23
3rd season (rifle)	56.00%	28
4th season (rifle)	28.00%	14
Late season	28.00%	14
Private land only	14.00%	7
Total Respondents: 50		

Q14 Overall, how satisfied were you with your elk hunting experience(s) in GMU 68 or 681? (Please check one.)

Answered: 50 Skipped: 9



ANSWER CHOICES	RESPONSES	
Very unsatisfied	30.00%	15
Somewhat unsatisfied	26.00%	13
Neither unsatisfied nor satisfied	12.00%	6
Somewhat satisfied	28.00%	14
Very satisfied	4.00%	2
TOTAL		50

Q15 In what year were you born? (Please provide four-digit year.)

Answered: 53 Skipped: 6

Q16 In what zip code do you reside for most of the year?

Answered: 53 Skipped: 6

Q17 Please use the space below to describe any other aspects about deer or elk hunting that would improve your hunting experience or to share any additional comments you have about the management of deer or elk herds in GMUs 80 or 81.

Answered: 34 Skipped: 25