

# **BAILEY DEER HERD MANAGEMENT PLAN**

**DATA ANALYSIS UNIT D-17**  
**Game Management Units 39, 391, 46, 461, & 51**

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## DAU D-17 (Bailey) Executive Summary

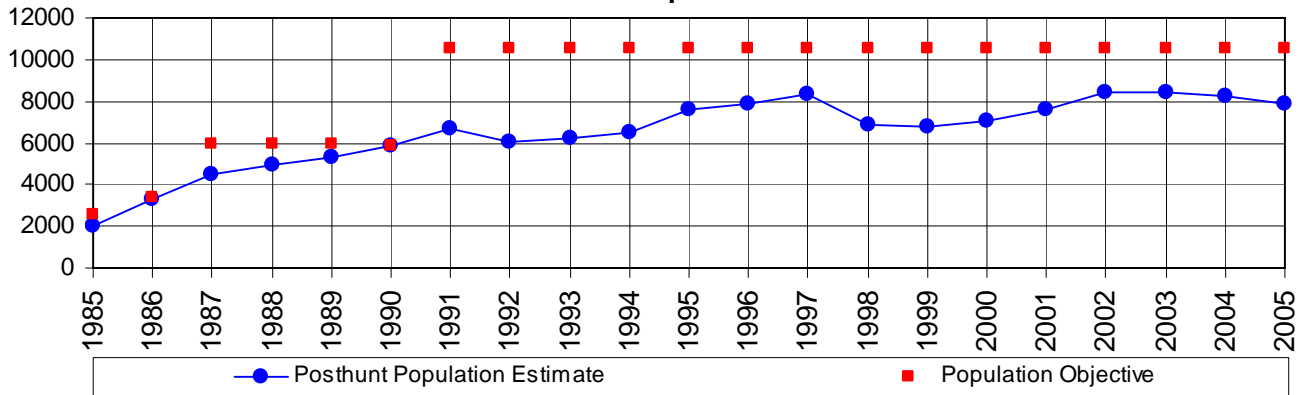
**GMUs:** 39, 46, 51, 391, & 461

**Land ownership:** 50% private, 40% USFS, 3% state, 7% open space/ NGO

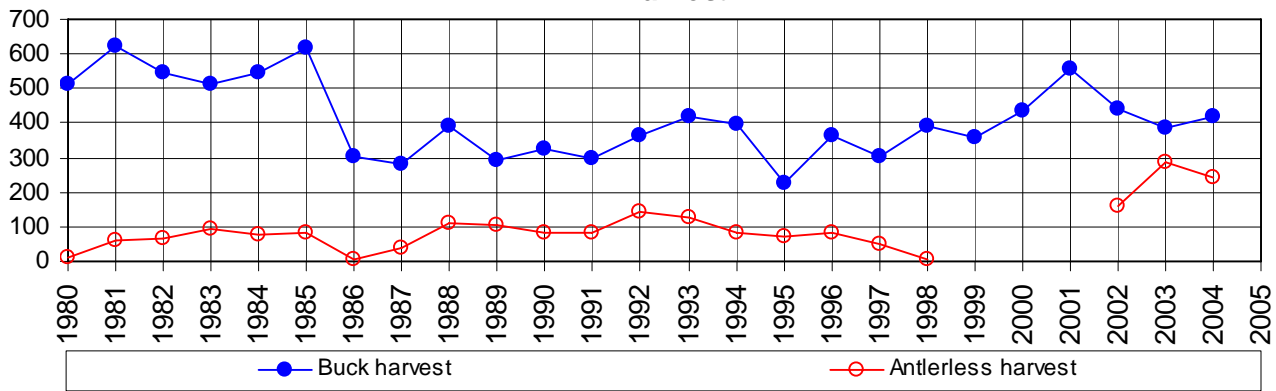
**Posthunt population:** Objective 10,500 2004 estimate 8,012 Current Objective 7,500-8,300

**Posthunt sex ratio:** Objective 25 2004 observed NA 2004 modeled 46 Current Objective 20-30

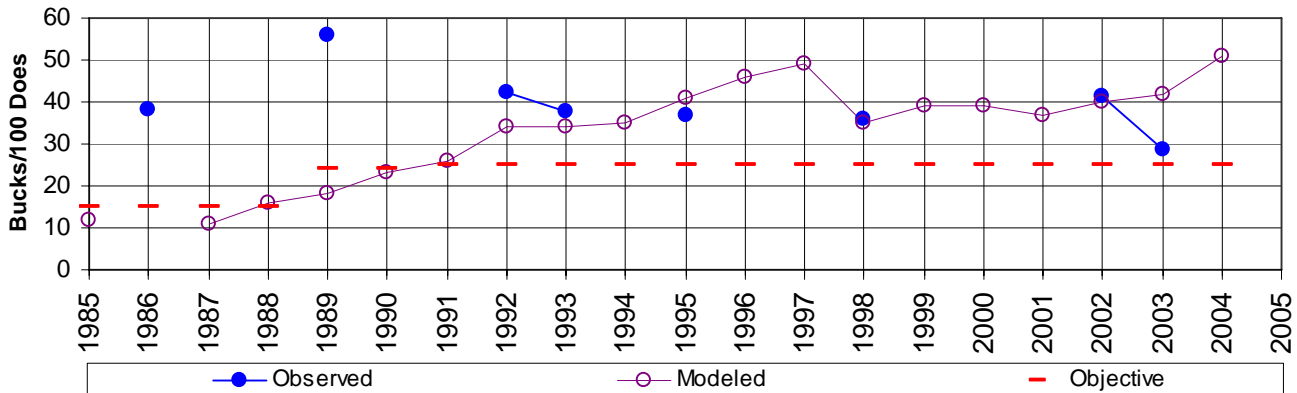
### D-17 Posthunt Population Estimate



### D-17 Harvest



### D-17 Posthunt Bucks/ 100 Does



## **Background**

D-17 is made up of GMUs 39, 391, 46, 461, and 51. It covers the area west of Denver to the continental divide, between I-70 and Highway 285, and south of Denver to the southern border of Douglas County. The diverse habitat in this area ranges from alpine tundra to prairie grasslands. Half of the land in D-17 is privately owned. State and Federal public lands, which are mostly national forests, account for 43%, and the remaining 7% is open space land that is managed by city and county governments or by non-governmental organizations.

The post-hunt population in D-17, based on the current model, is 8,012 deer. The population has increased over the past two decades but population growth has slowed in recent years. The current post-hunt population objective of 10,500 deer was established several years ago. Since that time, habitat has been altered and chronic wasting disease has been detected in this DAU.

The most recent observed sex ratio is 28 bucks:100 does, which is close to the current objective of 25 bucks:100 does. Buck hunting was unlimited in D-17 until 1999, when all deer licenses became limited. Buck hunting success has averaged 30% since 1988. Antlerless licenses have always been limited, and no antlerless licenses were issued between 1998 and 2001. Since that time, antlerless licenses have gradually increased as the population has grown.

## **Significant Issues**

Deer densities are highest in GMUs 391 and 461, where there is little public land open to hunting. GMUs 39, 46, and 51 have more public land that is open to hunting. In order to control hunter crowding and preserve quality hunting opportunities, units 39 and 46 have been managed together under one hunt code for all hunting seasons. Units 391, 461, and 51 were all included in one hunt code until 2003 when 391 and 461 were split into a separate hunt code to redistribute hunting pressure in relation to deer densities.

Land use has changed significantly over time as more land has been developed. This has resulted in loss of habitat and loss of recreational opportunities for hunters. The increasing traffic and number of roads in the area are sources of mortality and possible barriers to deer movement. While housing sprawl and fragmentation of deer habitat presumably has a detrimental effect on deer through direct displacement, it may also have a secondary effect through supplemental feeding, providing high quality forage in ornamental landscape plantings, and a reduction in natural predation rates. Some homeowners illegally feed deer, which inflates carrying capacity and may artificially concentrate high numbers of deer in a small area.

Chronic Wasting Disease (CWD) was first detected in this DAU in September 2002, and has been found in 3 DAUs- 391, 461, and 51. CWD is a consideration in the management of deer in this DAU. Hunting will be the primary means of managing chronic wasting disease in D-17.

## **Management Alternatives**

The preferred alternative for herd composition is 20-30 bucks:100 does which is unchanged from the current objective. This option is agreed upon by Division staff. Public comments were mostly in favor of the current buck:doe ratio, which is higher than this alternative. However, a higher sex ratio could increase the incidence of CWD because bucks are twice as likely to have the disease as does. The third alternative of 10-20 bucks:100 does was not recommended

because lower sex ratio would limit recreational opportunities, would be much lower than the public desires, and might not be realistic considering hunter access issues.

The preferred alternative for the deer population in D-17 is a post-hunt population between 7,500 and 8,300 deer, which is 25% below the current objective. This option was supported by most of the public comments. The former objective of 10,500 deer might be too high, given the changes in habitat that have occurred. Division staff agrees that the preferred alternative is appropriate with respect to recreational opportunities, habitat carrying capacity, disease management, and game damage considerations.

*This plan was approved by the Colorado Wildlife Commission on May 4, 2006.*

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**Data Analysis Unit D-17**  
**Game Management Units 39, 391, 46, 461, & 51**

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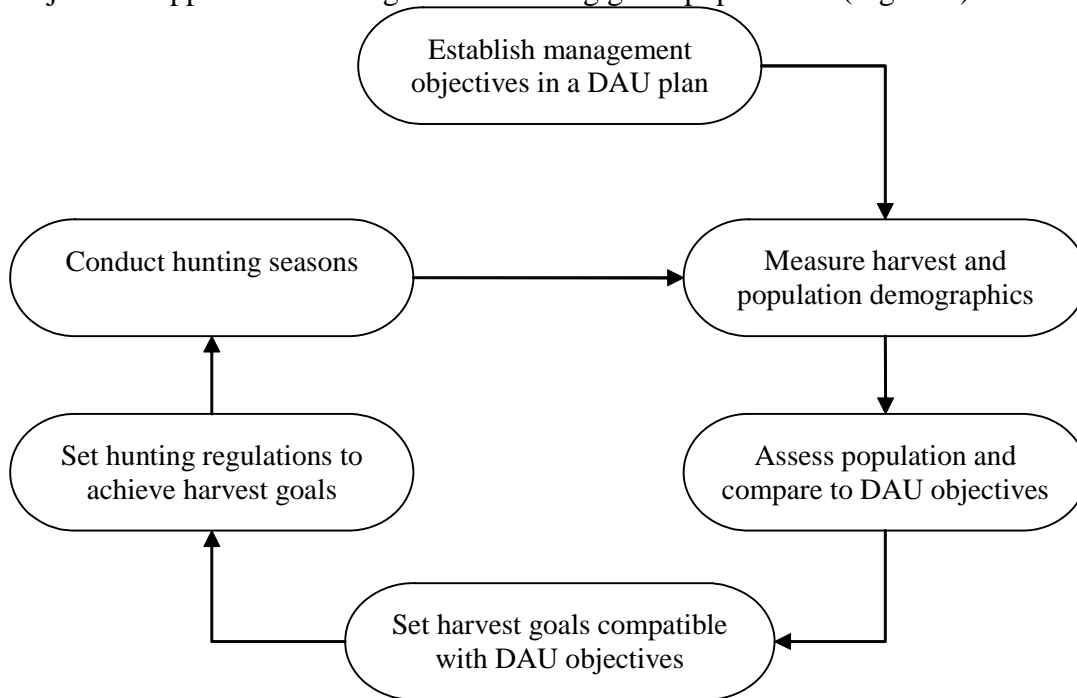
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## INTRODUCTION AND PURPOSE

The Colorado Division of Wildlife (CDOW) manages wildlife for the use, benefit and enjoyment of the people of the state in accordance with the CDOW's Strategic Plan and mandates from the Colorado Wildlife Commission (CWC) and the Colorado Legislature. Colorado's wildlife resources require careful and increasingly intensive management to accommodate the many and varied public demands and growing human impacts. The CDOW uses a "Management by Objective" approach to manage the state's big game populations (Figure 1).



**Figure 1. Management by Objective process used by the Colorado Division of Wildlife to manage big game populations by Data Analysis Unit.**

In this approach, big game populations are managed to achieve population objectives established for a Data Analysis Unit (DAU). A DAU is the geographic area that includes the year-round range of a big game herd. A DAU includes the area where the majority of the animals in a herd is born, live and die. DAU boundaries are delineated to minimize interchange of animals between adjacent DAUs. A DAU may be divided into several game management units (GMUs) in order to distribute hunters and harvest within a DAU.

Management decisions within a DAU are based on a Data Analysis Unit management plan. The primary purpose of a DAU plan is to establish population and herd composition (i.e., the number of males per 100 females) objectives for the DAU. The DAU plan also describes the strategies and techniques that will be used to reach these objectives. During the DAU planning process, public input is solicited and collected by way of questionnaire, public meetings and comments to the CWC. The intentions of the CDOW are integrated with the concerns and ideas of various stakeholders including the U.S. Forest Service, the Bureau of Land Management, hunters, guides and outfitters, private landowners, local chambers of commerce and the general public. In preparing a DAU plan, agency personnel attempt to balance the biological capabilities of the herd

and its habitat with the public's demand for wildlife recreational opportunities. DAU plans are approved by the CWC and are reviewed and updated every 10 years.

The DAU plan then serves as the basis for the annual herd management cycle. In this cycle, the size and composition of the herd is assessed and compared to the objectives defined in the DAU plan. Hunting seasons are then set and licenses are allocated to either maintain or move toward the objectives.

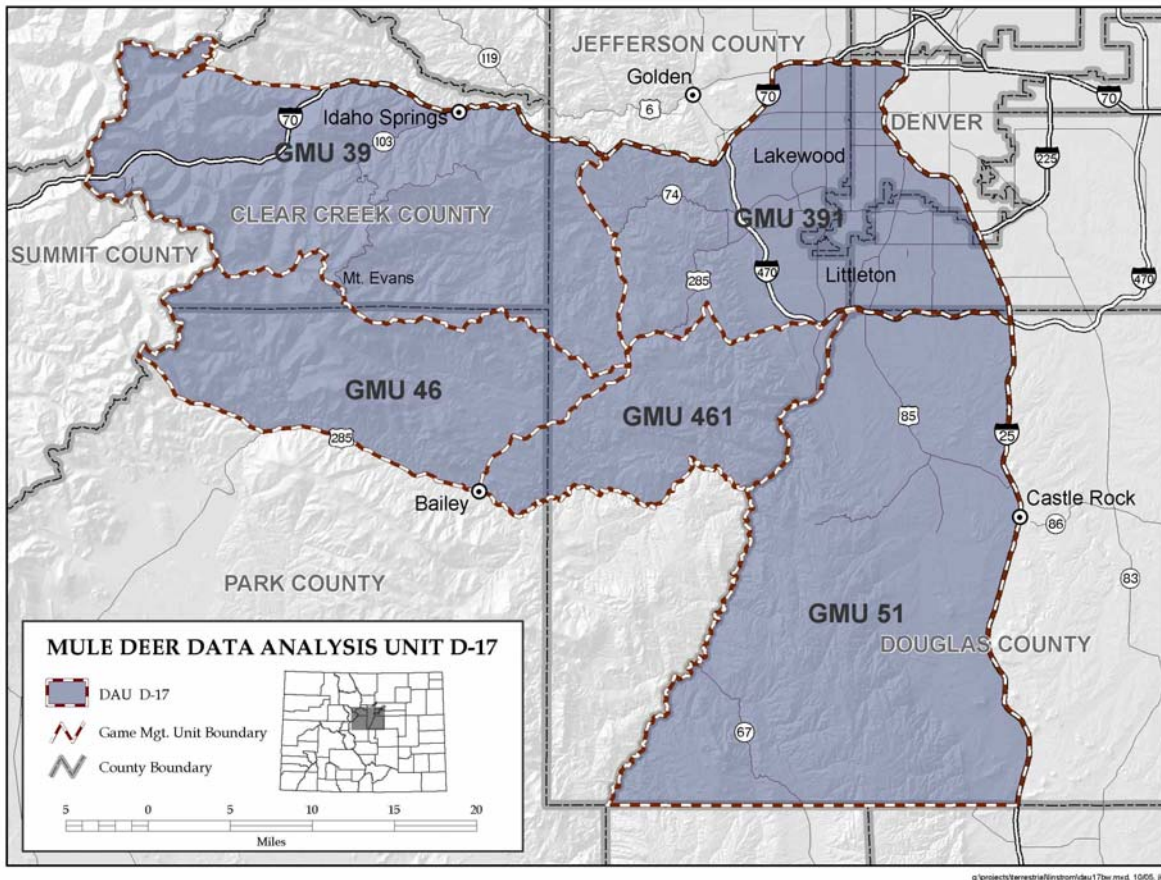


Figure 2. Map of D-17

## DESCRIPTION OF DATA ANALYSIS UNIT D-17

### Location

The Bailey deer DAU is located in central Colorado in portions of Adams, Arapahoe, Clear Creek, Denver, Douglas, Jefferson, and Park counties. The DAU contains GMUs 39, 391, 46, 461, and 51 (Figure 2). The total area of this DAU is approximately 1,505 square miles (Table 1). It is bounded on the west by the Continental Divide, on the north by U.S. Highway 40 and Interstate 70, on the east by Interstate 25 and on the south by the Douglas-El Paso County line, the South Platte River and Highway 285. It includes part of the Denver metropolitan area and contains the urban interface areas west and south of the metro area. Other municipalities include Bailey, Castle Rock, Conifer, Evergreen, Georgetown, Idaho Springs, Larkspur, and Sedalia. Much of the eastern portion of the DAU contains unincorporated subdivisions.

## **Habitat and Land Use**

DAU D-17 ranges in elevation from about 5,100 feet in the east to over 14,000 feet in the west. The western part of the DAU is mountainous and includes many heavily forested areas, high alpine tundra, rocky outcroppings, shrubs, and open grasslands. The southern part is mid-elevation grasslands, shrubs such as scrub-oak and mountain mahogany, and open ponderosa pine forest. Willows are found in riparian areas throughout the DAU. The eastern part of the DAU is urban, including the Denver metropolitan area and surrounding areas. These areas are experiencing increasing residential and commercial development. Several high-speed roads and highways are found within the DAU. These roads are sources of mortality and possible barriers to deer movement.

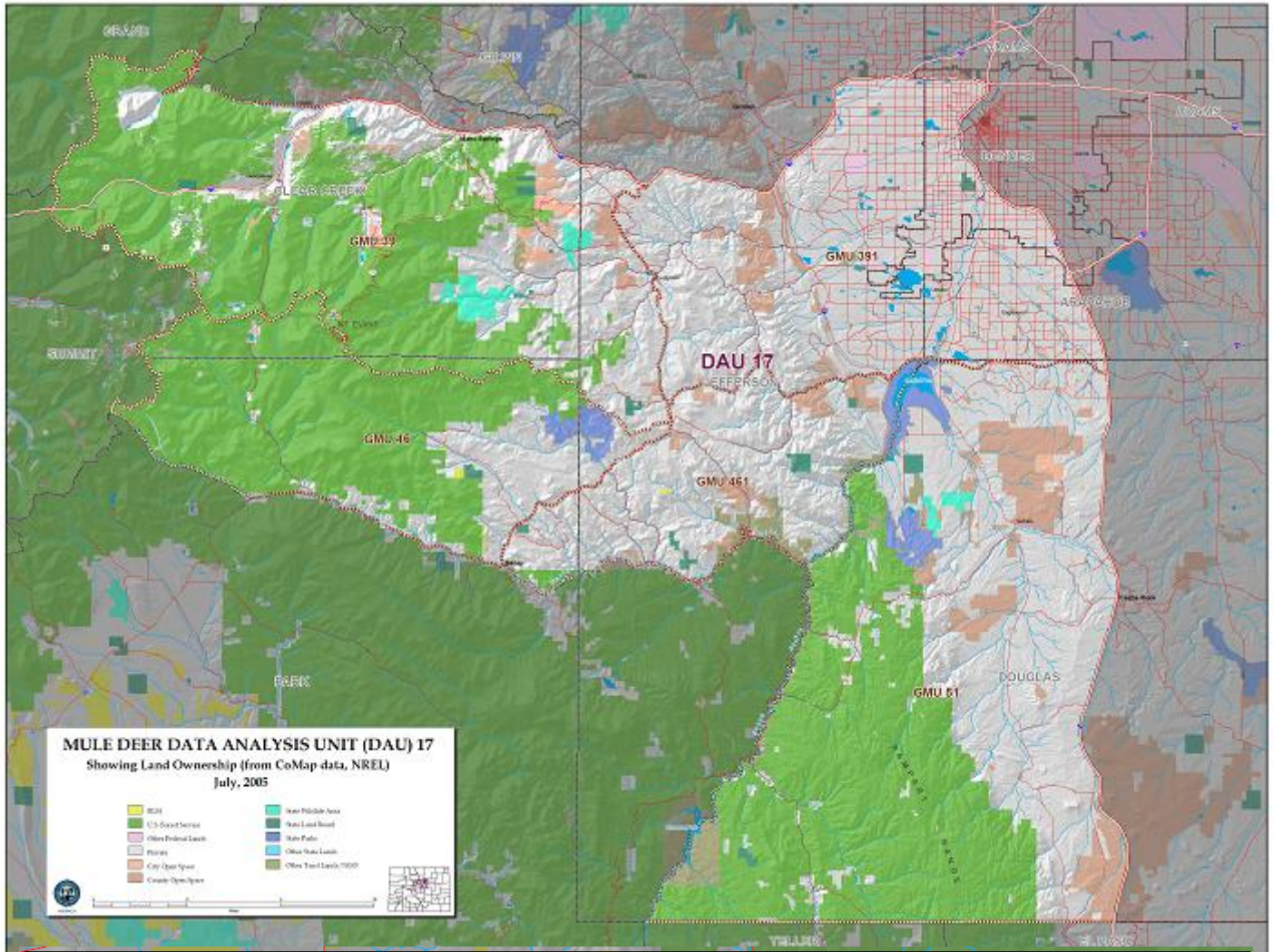
Land ownership in the DAU is 43% state and federal public lands, 50% private land, and 7% open space managed by city, county, or non-governmental organizations (Table 1). D-17 contains parts of the Arapahoe and Roosevelt National Forests and all of the Mount Evans Wilderness Area. These national forests are all heavily used by the public, including hunters, anglers, hikers, off-road vehicles, backpackers, and people who are interested in viewing wildlife.

Plant succession to forested habitats during the last century has caused a decline in the amount and quality of deer forage. However, several wild fires in recent years may have increased the landscape's carrying capacity for deer by returning vegetation to an early successional stage.

Residential development has been the most dramatic influence on deer habitat. While housing sprawl and fragmentation of winter range presumably has a detrimental effect on deer through direct displacement, it may also have a secondary effect through supplemental feeding, providing high quality forage in ornamental landscape plantings, and a reduction in natural predation rates. Some homeowners feed deer, which inflates carrying capacity and may artificially concentrate high numbers of deer in a small area.

Climate varies across the DAU as a function of elevation. Conditions on the eastern edge are standard for the foothills/ short-grass prairie interface, with relatively mild winters, small snow accumulations and hot summers. The higher elevation areas in the west experience a harsher climate, with cold winters, abundant snowfall and mild summers. Deer summer throughout much of D-17, but with the onset of winter temperatures and snows at higher elevations, they usually move to winter ranges below 9,000 feet. Along the D-17 foothills, where a large proportion of deer winter range occurs, temperatures are comparatively mild and winter weather is moderate, punctuated with several snowfall events, followed by quick warming and melting of snow. Weather-related winter deer mortality is not a major factor in D-17.
















## MULE DEER DATA ANALYSIS UNIT (DAU) 17

### Showing Land Ownership (from CoMap data, NREL)

#### July, 2005

- |   |   |
|---|---|
|  BLM                 |  State Wildlife Area   |
|  U.S. Forest Service |  State Land Board      |
|  Other Federal Lands |  State Parks           |
|  Private             |  Other State Lands     |
|  City Open Space     |  Other Trust Lands/NGO |
|  County Open Space   |   |

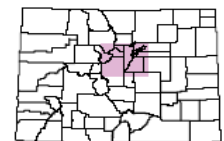


Figure 3. Land ownership map of D-17

**Table 1. Land ownership in D-17**

Summary Table of Area Calculations for DAU D-17			Public Land in D-17	
Land Ownership	Area (SqMiles)	% of DAU D-17	Area (SqMiles)	% of DAU D-17
BLM	0.63	0.04%	federal total	
Forest Service	601.66	39.97%	<b>604.13</b>	<b>40.13%</b>
Other Federal	1.84	0.12%		
State Parks	20.29	1.35%		
State Land Board	8.17	0.54%	state total	
State Wildlife Areas	9.92	0.66%	<b>38.52</b>	<b>2.56%</b>
Other State	0.14	0.01%		
City Open Space	12.45	0.83%	open space total	
County Open Space	68.33	4.54%	<b>80.78</b>	<b>5.37%</b>
Other Trust Land/NGO	22.00	1.46%	total NGO/open space	
Private	759.88	50.48%	<b>102.78</b>	<b>6.83%</b>
<b>Total:</b>	<b>1505.31</b>	<b>100%</b>	<b>826.21</b>	<b>54.89%</b>

## HERD MANAGEMENT HISTORY

### Population Size

Population estimates by DAU were first published in the mid-1980s. Since that time, helicopter quadrat surveys have been conducted and population modeling methods have improved. Population estimates for D-17 are derived from a computer population modeling program using hunter harvest and age ratios as inputs and using sex ratios and quadrat censuses from post-hunt surveys to align on. Quadrat population estimates are expensive and difficult to conduct properly in areas on the Front Range, where we are not allowed to fly close to the increasing numbers of rural and exurban dwellings. They are used periodically to help align the model, but we do not rely on them on an annual basis.

The current population model for D-17 indicates that deer numbers have increased by several thousand over the past 20 years (Figure 4). Deer harvest peaked in the early-1980s and dropped during the late 80s and 1990s to less than 2/3 of the highest harvests in most years. There has been an upward trend in harvest numbers since the mid-1990s (Figure 5). Deer harvest may, at least partially, reflect deer numbers. However, harvest is also influenced by a number of other factors, including changes in license numbers, access to property for hunting, and weather. Hunting success rates can also be an indication of population changes, but like harvest statistics, success rates are not by themselves a reliable predictor of deer populations.

Computer models are used to predict deer populations. The models incorporate estimates of mortality, initial population size, sex ratio at birth, observed age ratios, hunter harvest, and wounding loss. Estimating population numbers of wild animals over large geographic areas is a difficult and approximate science. Numerous attempts have been made to accurately count known numbers of wild animals in large fenced areas. All of these efforts have failed to count 100% of the animals. The CDOW recognizes the difficulties of estimating the size of deer populations as a challenge in managing populations and attempts to maximize the accuracy of these estimates by using the latest technology and inventory methodology available. As better information and techniques become available (e.g. new estimates of survival/mortality, wounding loss, sex ratios, density, or new modeling techniques and software) they are evaluated and used

where appropriate. The population estimate presented in this document should, therefore, not be considered a completely accurate enumeration of the animals in the DAU.

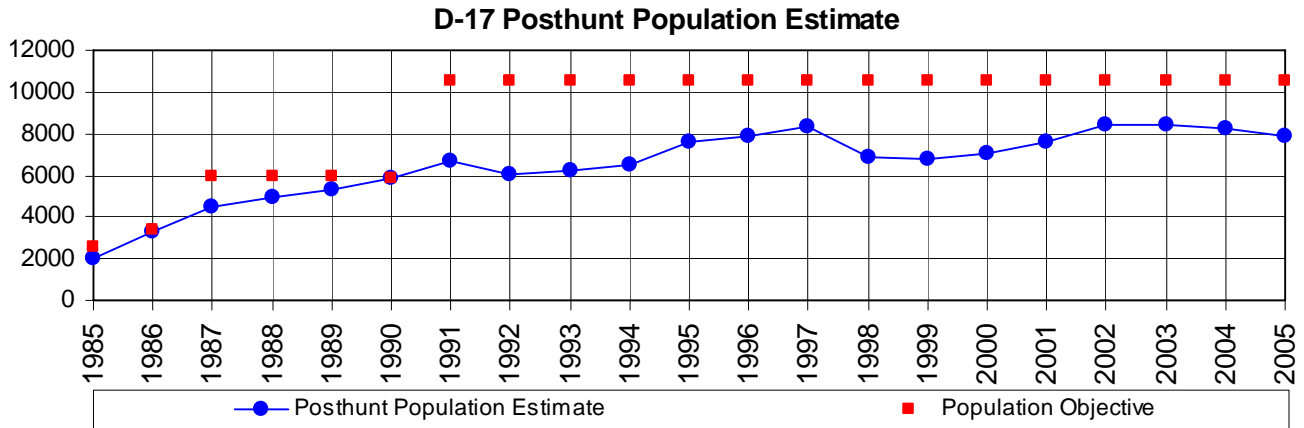


Figure 4. D-17 post-hunt population

### Herd Composition

Herd composition surveys are conducted by helicopter on winter range. The surveys are conducted during the breeding season while bucks are still with does and prior to antler drop, from late November through December. Herd composition flights allow observers to individually categorize each animal as yearling male, male over 2 years of age, female, or juvenile (<1 year old). These surveys are actual field observations and are not the results of computer modeling. Due to budget constraints, weather, and availability of helicopter time, only 6 years of herd composition data have been collected for D-17 since 1992 (Table 2). Herd composition data are given as number of bucks and fawns per 100 females. The mean sex ratio from these data is 32.4 bucks:100 does. The fawn:doe ratio has ranged from 62 in 1992 to 100 in 2003, and the average of fawn:doe ratio is 75 fawns:100 does from 1990-2003.

Table 2. D-17 postseason sex and age ratios

year	D-17 bucks: 100 does		D-17 fawns: 100 does	
	estimate	standard error	estimate	standard error
1986	46.9	10.36	76.6	14.54
1989	34.2	7.09	55.7	8.83
1992	42.15	8.20	61.98	6.11
1993	37.65	4.44	66.12	3.33
1995	36.64	3.68	77.48	4.33
1998	35.79	4.36	65.55	3.55
2002	41.15	7.28	77.43	5.63
2003	28.44	5.37	99.05	7.06

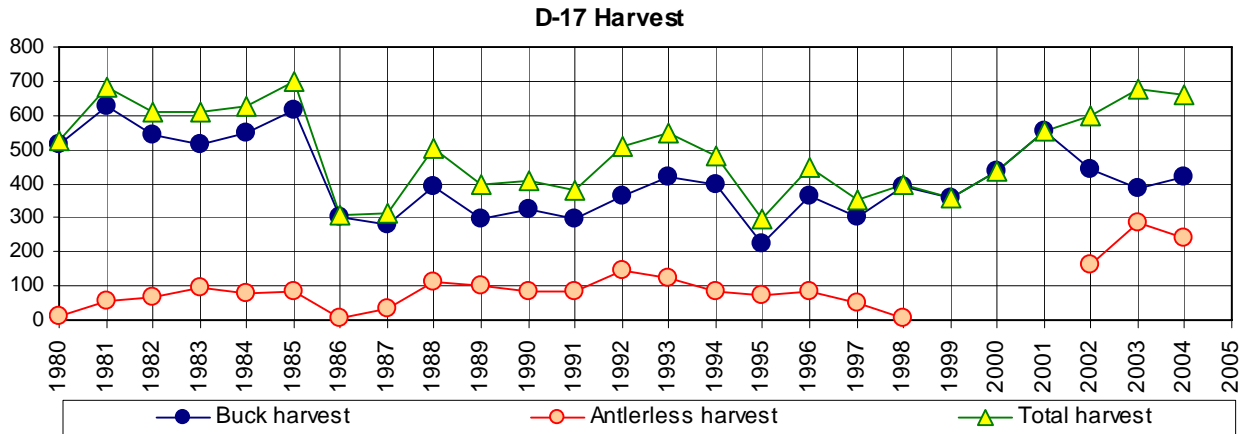


Figure 5. D-17 Harvest

### Harvest History

Deer harvest in D-17 peaked in the early 1980s, when estimated harvests were between 600 and 700 deer per year (Figure 5). Harvest fell to below 400 in the late 1980s and remained relatively low until recently. Since the late 1990s the harvest has increased to almost 700. This is the highest since 1985. The recent increase in harvest is partly due to the addition of antlerless licenses in 2002, in response to an increase in population estimates, and partly due to the detection of chronic wasting disease, which prompted the issuance of special licenses for doe deer. Between 1998 and 2001, only antlered deer licenses were issued. Antlered deer harvest has also been higher than average in recent years, approaching or exceeding 400 deer each year since 2000.

### Hunting Pressure

Hunting pressure has increased in recent years as license quotas have been raised. Over 2,000 people hunted in D-17 in 2003, which is the highest number since 1985. Success rates have increased over the past decade, and are currently above 35 percent (Figure 6). There is a strong upward trend in hunter success in the past decade (Figure 6).

Hunting licenses for doe deer have been limited in number for many years with license numbers controlling hunting pressure in most years, but normally very few licenses were issued. More antlerless hunting licenses have been issued in recent years. Currently all of the GMUs have a month-long archery season, a 9-day muzzleloading season, and 3 regular rifle buck and doe seasons. In addition, a 5-month long private land only doe season is offered in all of the GMUs. In response to chronic wasting disease, special licenses have been issued for disease management purposes. The special licenses are used in areas where the CDOW needs to increase sample size to estimate CWD prevalence, or to remove deer in an attempt to prevent spread of disease.



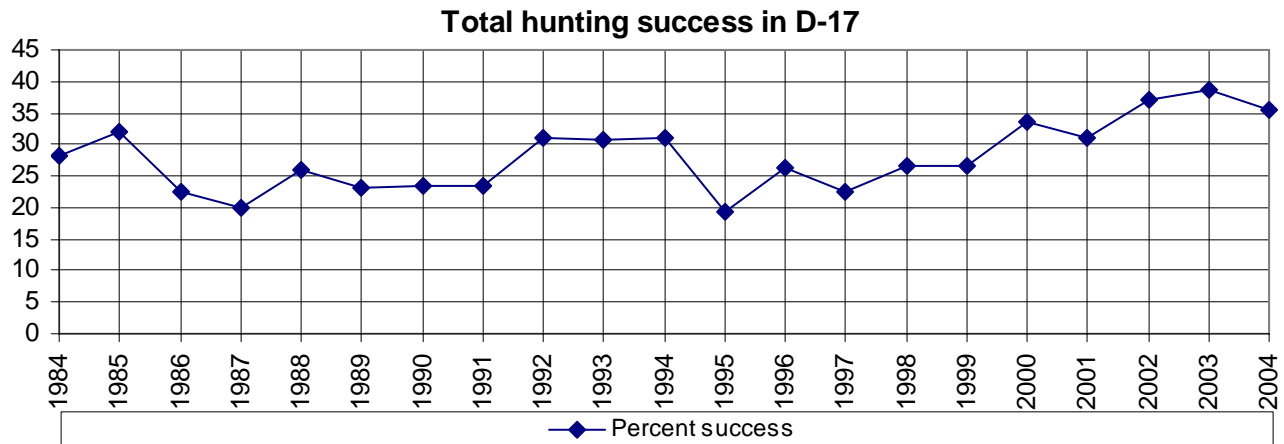


Figure 6. Hunting success in D-17 for all manners of take

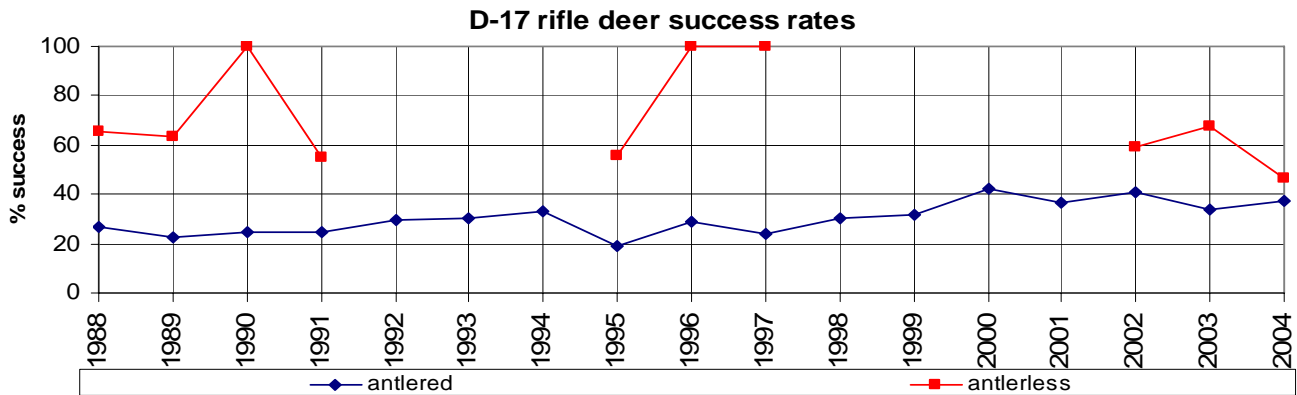


Figure 7. Antlered vs. antlerless success in D-17

### CURRENT HERD MANAGEMENT

The current post season population estimate in D-17 is between 7,500 and 8,300 deer. The herd is being managed at a level below the stated objective of 10,500 animals. There are two reasons for this. The first is that the objective has not been reevaluated in over 15 years. Because of increasing development, habitat loss, and fragmentation, the CDOW staff believes that the old objective is too high. The second reason for not achieving the stated objective is that CWD has been found in several of the GMUs in the area and CDOW is taking a proactive approach to try to limit the spread of the disease and reduce prevalence.

The most recent observed sex ratio was 28 bucks:100 does in 2003. The observed buck ratio is close to the objective of 25 bucks:100 does. Buck license quotas have been conservative in GMUs 39, 46, and 51, which have more public lands than the other DAUs. A new hunt code was created for GMUs 391 and 461 in 2004 in order to increase harvest in these units and to reduce hunter pressure in unit 51. The preferred strategy has been to reduce the sex ratio in GMUs 391 and 461 and to harvest fewer bucks in 39, 46, and 51, where the sex ratio appears to be lower. Evidence of a lower sex ratio in these 3 units is seen in the success rates (Figure 8), and has been suggested in comments from CDOW field personnel and hunters.

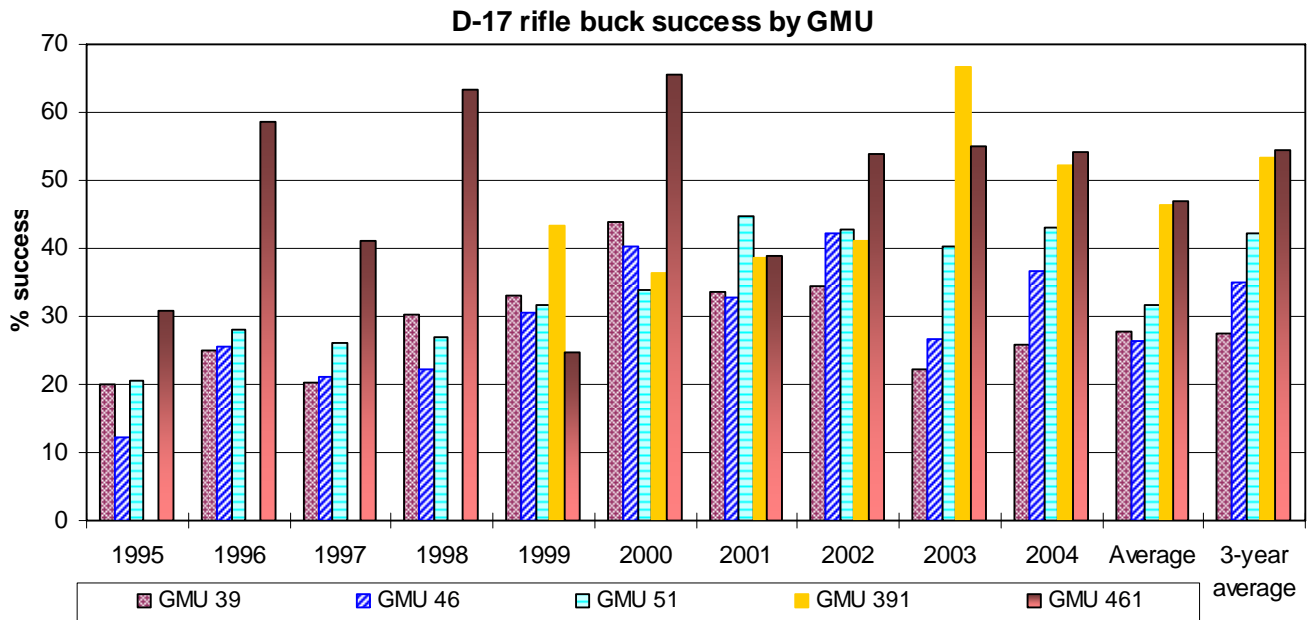


Figure 8. Rifle buck success by GMU

### Game Damage

Complaints of damage related to deer are low in D-17 at this time. Agricultural land continues to be subdivided and there are fewer agricultural operators in the DAU than there were in the past. The deer densities also appear to be appropriate for the available habitat in the DAU.

### ISSUES AND STRATEGIES

The primary purpose of the DAU planning process is to determine objectives for the size and sex ratio of the post-season population. Input for the DAU planning process has been solicited through a public meeting held on July 25<sup>th</sup> at the Ken Caryl Ranch community center. The public meeting was advertised in a press release to newspapers and on the Division of Wildlife web page. The press release also urged people who were unable to attend the meeting to send comments through the mail. Questionnaires were sent to all who signed in at the meeting and 11 people submitted comments.

Public comments were divided, with 7 that agreed or strongly agreed that the current population is appropriate and 4 that strongly disagreed. Of those who said the population is not appropriate, 3 people wanted to reduce the population and 1 wanted to increase the population. The public comments were more in agreement that the current sex ratio is appropriate. Six people agreed or strongly agreed, 2 were neutral, and 3 disagreed.

Public comments also emphasized a desire to encourage hunting on private property and open space. As development of land in D-17 results in fragmentation and loss of habitat, it becomes more difficult for people to find places to hunt. The lack of access to land for hunting seems to be a bigger concern than population or herd composition for those who commented.

### **Chronic Wasting Disease**

Chronic wasting disease (CWD) is a neurological disease of deer and elk in portions of northeastern Colorado. It belongs to a family of diseases known as transmissible spongiform encephalopathies or prion diseases. The disease attacks the brains of infected deer and elk, causing behavioral changes and progressive loss of body condition leading to death (Williams and Young 1992). The causative agent and mode of transmission of CWD remain unknown, although current information suggests that an abnormally folded protein, or prion, is responsible. There are no known treatments or vaccines for CWD.

Although the true origin of CWD is uncertain (Miller et al. 2000), it was first detected in captive research animals housed at CDOW facilities in Fort Collins, during the 1960s. The disease is known to have been present in free ranging mule deer, white-tailed deer, and elk in northeastern Colorado and southeastern Wyoming for many years (Miller et al. 2000). Chronic wasting disease was first detected in D-17 in September 2002, when an archery hunter killed a deer in GMU 461 that tested positive for CWD. Since then, CWD has also been detected in GMUs 51 and 391.

Prevalence rates of CWD have been shown to be higher in urbanized areas such as found in much of D-17 (Farnsworth et al. 2005). Several factors are thought to contribute to this effect of land use on CWD prevalence rates. Lack of hunting may allow infected deer to survive longer and shed infectious agent. The infectious agent that causes CWD has been shown to persist in the environment, and CWD can be transmitted through a contaminated environment (Miller et al. 2004).

### **Management Strategies**

Management strategies for population and herd composition objectives will depend on which alternatives are selected. Strategies for meeting objectives will be discussed in the Alternative Development section of this document.

### **Management strategies related to CWD**

Currently, prevalence is estimated at 0.40 percent in DAU D-17, with a 95% confidence interval of 0.00 to 1.20 percent. The CDOW will continue to encourage cities and counties to allow hunting on their properties whenever it is a realistic option. Hunting is the easiest and least expensive way to manage deer populations and to respond to the presence of CWD in localized areas. If large tracts of land are removed from even moderate hunting pressure, it is possible that CWD prevalence and deer population objectives may not be reached through hunting alone.

The Division of Wildlife currently has a monitoring program in place to provide reliable estimates of CWD distribution and prevalence. The data from the program is used in management decisions, and it supplies information to improve understanding of CWD epidemiology and the development of efficient and reliable techniques for detecting and monitoring CWD.

General models indicate that selective culling has potential to reduce prevalence (Gross and Miller 2001). In addition to scheduled hunting seasons, special hunts may be allowed as needed

to manage CWD. The special hunts will be used to boost harvest in specific areas in order to minimize the likelihood of the disease spreading to uninfected areas.

Management of CWD will have to become an integrated approach combining successful options that are presently available. Unfortunately, many conventional techniques for disease management do not apply to CWD. Vaccines and therapeutics for CWD are presently unavailable (Miller and Kahn 2000). Ongoing research may contribute information that leads to changes in management objectives and methods. CDOW is continuing to explore all options for managing deer in areas with CWD. The cost associated with non-hunting options varies widely, but all will be more costly than management options that employ hunting.



## ALTERNATIVE DEVELOPMENT

### D-17 Population Objective

#### 1. 10,000-11,000 deer post season

This alternative would result in an increase in the deer population in D-17. This option is equal to the old population objective, but current deer population numbers are estimated at approximately 2,300 under objective. This alternative is approximately 33% higher than the current modeled post hunt population. To achieve this population objective, antlerless licenses will have to be significantly reduced. This would result in fewer hunting opportunities for antlerless deer in the short term as the population continues to grow.

If we allow the population to grow too much, then density dependence would affect the productivity of the herd as it approaches carrying capacity. If that happens, competition for food, water, cover and space would limit productivity and survival of the herd. At some point, the population reaches equilibrium at which the number of births each year is equal to the number of deaths. As the population increases and approaches that level, the number of deer available for hunter harvest would actually decrease.

A higher deer population might begin to reach or exceed the level of human tolerance. As deer densities increase, so will conflicts between deer and humans, such as vehicle collisions and damage to ornamental plants.

#### 2. 7,500-8,300 deer post season

This is the current estimated post-season population in D-17. It is about 25% below the current objective of 10,500. Maintaining the population at the current level balances hunting recreation with other issues such as disease management, nuisance complaints, and game damage concerns and ensures a productive herd without density dependence. The carrying capacity of this DAU has been reduced by loss of habitat, so a higher population might not be appropriate.

Impacts on hunting recreation under this alternative will be minimal. Doe hunting has been increasing in recent years as the population has grown. After the population levels out, doe hunting might be reduced slightly to maintain the population at objective. Buck hunting will be partly determined by the herd composition objective, which is chosen independently of the population objective, but is also dependent on the total number of deer in the population. Therefore, buck hunting opportunity is likely to be similar to the current situation under this alternative.

#### 3. 6,200-6,800 deer post season

This option is approximately 38% below the current objective and 18% below the current population estimate. It will require an increase in harvest of both antlered and antlerless deer. It would initially result in more recreational opportunity, but ultimately hunting licenses will have to be reduced to below the current level in order to maintain the population at a lower level.

The biggest challenge to achieving this alternative will be to increase harvest in the eastern portion of the DAU, which is mostly private land or land controlled by entities that do not allow hunting. Without increased harvest on private land or open space, a reduction of the population to this level would likely result in very low deer densities in the western part of the DAU, where

most of the land is public and open to hunting. Deer numbers in the eastern part of the DAU, where most of the land is private and not accessible to hunters, would be more difficult to control. As more land is developed, hunting access to private land seems to be less likely. Some open space properties on the Front Range have been opened to hunting, but traditionally hunting has not been allowed on city- and county- owned land. Private land antlerless licenses have been used, and will continue to be the primary tool to get harvest of deer in units 391 and 461 if this alternative is chosen.

### **D-17 Herd Composition (sex ratio) Objective**

#### 1. 30-40 bucks:100 does

This alternative is slightly lower than the current sex ratio. It will allow for quality buck hunting opportunities. However, evidence suggests that CWD is more prevalent in mature bucks than in other age and sex classes of deer (Miller and Conner 2005). Therefore, there may be a greater risk of increasing prevalence and spread of CWD under this alternative. This objective can be achieved with little change to current management strategies.

#### 2. 10-20 bucks:100 does

This would represent approximately a 50% decrease in the proportion of males relative to females. This option is best for disease management, as it would remove most of the older bucks from the population. Prevalence of CWD-positive deer appears to be highest in 5- and 6-year old males (Miller and Conner, 2005). If the sex ratio is reduced to below 20%, there will be very few older age class bucks in the population. As fewer animals of this class are available to become infected and spread the disease to other animals, CWD is expected to spread more slowly and prevalence is expected to decrease.

To achieve a reduction in the sex ratio of this magnitude would require a substantial increase in buck harvest. This would be difficult to achieve because of the land use patterns and lack of access to hunting in the eastern part of the DAU, where CWD has been detected. Either-sex or antlered PLO licenses can be used to harvest more bucks in GMUs 391 and 461, where deer are most abundant. Quotas for regular licenses will also have to be raised significantly in order to achieve this objective. This would result in more opportunity for hunters, as the chances of drawing a license would be better than they are now. However, quality of hunting would be affected by hunter crowding and lack of mature bucks.

#### 3. 20-30 bucks:100 does

This alternative would offer an intermediate option between the current high buck:doe ratio and the very low option of 10-20 bucks:100 does. It would provide some opportunity for quality buck hunting while guarding against high densities of older bucks that are more susceptible to CWD. This objective could be achieved without as much hunter crowding on public lands as in the second alternative. Antlered license quotas would need to be raised by a moderate amount in GMUs 39, 46, and 51. Buck harvest in units 391 and 461 would need to be significantly higher than present levels. Until now, private land only (PLO) licenses have been issued for antlerless deer. In addition to antlerless PLO licenses, issuance of either-sex or antlered PLO licenses would help achieve this sex ratio objective.

## PREFERRED ALTERNATIVES

### **D-17 Population Objective**

#### Alternative 2: 7,500-8,300 deer post season

This option was supported by some of the public comments, although some supported a higher or lower population. The former objective of 10,500 deer might be too high, given the changes in habitat that have occurred. Division staff agrees that the preferred alternative is appropriate with respect to recreational opportunities, habitat carrying capacity, disease management, and game damage considerations.

### **D-17 Herd Composition Objective**

#### Alternative 3: 20-30 bucks:100 does

This option was supported by some of the public comments and Division staff. A higher sex ratio would be potentially problematic from a disease management standpoint, and a lower sex ratio would limit recreational opportunities and might not be realistic considering hunter access issues. There will still be quality hunting opportunities under this alternative with moderate numbers of bucks on public land. Management of the sex ratio will focus as much as possible on harvesting bucks from the lower-elevation foothills and on private land.

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