San Juan Deer Management Plan
Data Analysis Unit D-30

Game Management Units
75, 751, 77, 771, 78

Amendment to the Plan Approved
by the Colorado Wildlife Commission
August 1996

FINAL DRAFT 8/13/01

San Juan Basin Service Center
Colorado Division of Wildlife
151 E. 16th St.
Durango, CO 81301

Executive Summary
DAU Plan D-30
San Juan Deer Herd

1. This is an amendment to a DAU Plan for this deer herd approved by the Wildlife Commission in 1996.

2. Population Objective

   A. For the 1996 Plan- 23,500 deer, at that time the population was approximately 23,400 deer. The public seemed content with the "current population" and game damage complaints were insignificant. The population had slowly climbed to that level for several years, and had been maintained near 23,500 by annually adjusting antlerless harvest. Since 1996, the population has continued to be been maintained at that level, but the public has grown dissatisfied with the "current population."
   B. The recommendation in the 2001 Plan is a population objective of 27,000, an increase of approximately 15% from current population estimates.

3. Sex Ratio objective

   A. For the 1996 Plan- 16 bucks:100 does post season. At that time buck licenses were unlimited in number, and there was very little opportunity to manage for anything besides "quality" management requiring a significant reduction in buck licenses, or "maximum sustained yield" and unlimited buck licenses. Since that time, the public, hunters, the Division of Wildlife, and the Wildlife Commission have become more concerned about deer populations and buck:doe ratios, and licenses have become limited for all units and all seasons. Hunters have not applied for the number of licenses available, and even though success rates have increased significantly, the buck ratio has also increased significantly to 26:100 does. Buck hunters are very satisfied because of high success rates and better quality bucks, and so far hunters have limited their own numbers and the CDOW has not limited hunter numbers.
   B. The recommendation in the 2001 Plan is a sex ratio objective of 26-30 bucks:100 does, the current observed ratio.

4. Public Involvement and Plan Development- Informal discussions have occurred over the last 1 year with members of organized hunting groups and public hunters. In late May, a survey was mailed to 200 deer hunters that hunted in the San Juan Basin, 200 elk hunters, 200 agricultural producers, and members of the local outfitters chapter. In June, a draft management

plan was prepared and circulated to CDOW Area personnel and Terrestrial Section supervisors. By late July, the survey return rate was very close to 50%, and there was support for increasing the population and sex ratio objectives among each group and all respondents combined. In late July, public meetings (open house format) were conducted in Durango and Pagosa Springs and a "Final" draft management plan was available for public review. Even though these meetings were poorly attended, there was unanimous consent for increasing the objectives. The San Juan Basin Habitat Partnership Program Committee has endorsed the Plan amendment and recommendations. In July and August the BLM and USFS wildlife biologists have been consulted and have given their concurrence. No formal or informal opposition has been found or is expected.

This Plan is an update and amendment to a previous plan prepared in June 1996 and accepted by the Colorado Wildlife Commission in August 1996. Due to different deer management strategies adopted by the Colorado Division of Wildlife (CDOW) and the Wildlife Commission in the interim, and due to changing socio-political environment and deer biology and modeling information, CDOW personnel and some members of the public feel new management objectives are necessary. This document will briefly summarize some of these changes and update information from the 1996 plan, but only supplements the previous plan.

In 1996-1998, the hunting public and CDOW personnel became very aware of a perceived decrease in the mule deer population of western Colorado and most of the western United States. Many management and research studies have been initiated to identify causes and solutions in Idaho, Montana, Utah, and Colorado by state wildlife agencies, universities, and private groups. Several seminars, symposia, and workshops have been conducted on predators and predator management, deer biology/management and inventory methods. In 1999, this controversy entered the political arena in Colorado, and a report to the Colorado legislature was prepared (Declining Mule Deer Populations in Colorado: Reasons and Responses, A Report to the Colorado Legislature, November 1999, prepared by R. Bruce Gill with contributing authors). Possible explanations were: 1) decreases in amounts and quality of critical deer habitats, 2) competition with elk and other grazing livestock, 3) diseases, 4) predators, and 5) hunting. Almost exactly 20 years previous, a similar concern was expressed and reaction occurred resulting in a symposium of western states in Logan, Utah in 1976. In addition to the previous causes of the decline, this raises the possibility of long term cycles in deer populations or long term climatic changes.

Although a great deal of money has been invested in addressing the decline and responding to public critique/criticism, as well as personnel time diverted and safety compromised, we can now benefit from a great deal of current data. Because of evaluations that have occurred, the CDOW should be assured that they are using the best inventory techniques available and incorporating the best models to derive the best population estimates available.

WHY CHANGE THE EXISTING PLAN?

Responses to this attention have precipitated significant changes in Colorado's mule deer management that suggest changes to local deer management plans. Among those changes are:

1) totally limited buck deer licenses- this change occurred in 1999, and was incorporated into a new 5 year hunting season

structure for 2000-2004. Between 1995and 1999, buck licenses were unlimited in number and available statewide for nearly all units and for 2 rifle seasons, the third season was limited in number but still statewide. Prior to 1995, unlimited statewide buck licenses were the general rule, and were the rule in the San Juan deer herd area. The philosophy taken in 1999 for the San Juan deer herd was to keep the number of buck hunters constant because:

   a) the buck:doe ratio was near the established objective of 16:100,
   b) the population was near the objective of 23,500,
   c) there is no indication of a significant decline in this population,
   d) and average hunter success rates were acceptable (31%).

2) deer survival studies were initiated in 3 areas of Colorado, 1 of which is relatively close and in similar habitat (the Uncompahgre Plateau). Results of this particular study, and the other studies in general, should be applicable to the San Juan deer herd and should provide survival estimates to be used in population models.
3) Deer predation studies are being conducted in Idaho and Utah, and causes of death in Colorado's survival studies are being identified when possible. These studies will help to identify which predator (coyote, bear, mountain lion, etc) is responsible for predation throughout various life stages of deer. Decisions would still have to be made whether this predation is suppressing the deer population, whether direct management action is desired, and if so, what action using what tools.
4) Colorado has changed computer modeling practices that now uses "simple" spreadsheet models rather than "sophisticated" stochastic models. The new approach uses the data that are actually collected and "weights" those data based on their precision. Therefore, harvest by sex and age class, winter mortality by 2 age classes (in some cases bucks can be separated from adult does), post-season age and sex ratios from inventories, and wounding loss by age and sex class are the input variables. The more sophisticated model called for data that was not available (sex /age/season specific mortality rates, age specific reproductive rates, etc) and reasonable approximations were used. During the transition from one system to the other, both models are being used.
5) There is strong public support for increasing the deer population, and strong support for a higher proportion of bucks in the population, with a few bucks "escaping" hunting season and developing into quality bucks.

HOW DO THESE CHANGES AFFECT THE POPULATION AND RATIOS?

Totally Limited Buck Licenses – The 5 Game Management Units

(GMU's) in the DAU have had different management strategies. From 1993 to 1996, GMU's 75, 751, and 771 had either sex and/or antlerless licenses and 771 had late Private Land Only (PLO) antlerless licenses, while GMU's 77 and 78 had buck-only hunting. Since 1997, GMU 75 has had only PLO antlerless hunting, GMU's 751 and 771 continued with public/private antlerless, and 77/78 had bucks only. Table 1 shows the average number of antlered and antlerless licenses by GMU and DAU before and after buck licenses became totally limited in 1999 and since 1999. In 1999, the number of antlered deer licenses was kept exactly the same as the 1995-1998 average, then reduced some in subsequent years because of the low demand. The supply still far exceeded the demand. The number of actual buck hunters after licenses became totally limited was 32-53% of the number before. **The current post-hunt buck:doe ratio is 26.2:100 does, as compared to the existing long term objective of 16:100. The buck ratio is projected to continue climbing with current buck hunter numbers and harvest.** The current buck ratio is much more acceptable to hunters and the general public (see following section on survey results) and can be maintained without cutting licenses anymore.

Table 1. Average number of hunters and licenses 1995-1998 and 1999-2001, Data Analysis Unit 30. Antlered licenses were unlimited in number 1996-1998.

		GMU 75	GMU 751	GMU 77/78	GMU 771	Post-season buck:doe ratio
1995-1998	Either Sex	200[1]	200	0	200	
	Antlered Hunters[2]	1260	848	4691	556	17.7 bucks:100 does
	Antlerless	250	175	0	312	
	Total	1710	1223	4691	1068	
1999-2001	Antlered Licenses	1053	716	4030	492	
	Antlered Hunters[3]	404	451	1750	255	25.9 bucks: 100 does[3]
	Antlerless	283	342	0	525	
	Total	687	793	1750	780	

1- GMU 75 had either-sex licenses in 1995-1996
2- Antlered hunters is rifle hunters only
3- Based on 2 years, 1999-2000

Deer Survival/Mortality Studies- Five separate survival studies are being conducted in Colorado, 1 on fawns from birth to 6 months of age, 4 on fawns from 6 moths to 1 year and adults over 1 year old, and 1 study of buck survival. The cause of death of all mortalities is determined whenever possible. The data from these studies are preliminary and have not been fully analyzed and published, therefore it must be treated as preliminary results. Annual fawn survival (0-12 months of age) has varied from 21-42%. Fawn winter survival (6-12 months) has varied from 51-74% on the Uncompahgre, and up to 92% in Middle Park. Adult doe survival has varied from 81-91% on the Uncompahgre and 82-100% elsewhere. Buck survival (with a smaller sample size and shorter period of time) has been 69-100% for yearling bucks and 81% for 2 year-old bucks. Most of these studies have been conducted during relatively mild winters, but survival rates are much higher than a previous study in northwest Colorado in the 1980's found (fawns 5-38% with a mean of 22%+/- 5.6%, adult does 83%+/- 3%). The population studied in northwest Colorado was believed to be close to carrying capacity, possibly accounting for lower survival of fawns through the winter. In addition, that study spanned the winter of 1983-84, a notoriously bad winter in Colorado when only 5% of the fawns survived.

The impact of these studies on population models can be profound, and tends to increase the deer population because survival rates are higher than those previously used. The San Juan DAU deer model incorporated these changes without large changes, but doe hunting has been increased in response to keep the population near the objective. In 1996, fawn survival rates used in the model were about 60% (which is the average used currently) and doe survival was 85-87% (also the range used now). **The current population is approximately 23,400, and projected to be 23,200 after the 2001 hunting season, with the current long term objective of 23,500.**

Causes of Mortality and Predation Studies- Causes of mortality are identified in the current studies whenever possible. On the Uncompahgre Plateau through 4 years of study, 32 does and 157 fawns have died. The list includes roadkills (3), accident/trauma (3), disease/emaciation (41), poached (2), coyote predation (61), feline predation (28), other predation (16), and unknown (35).

Utah and Idaho have been conducting studies to determine whether deer populations increase when coyote, bear, and puma populations are targeted by USDA/Wildlife Services personnel and/or sport harvest. These studies are also on-going and data are not complete, but the patterns appear to be very unclear, with deer populations and fawn:doe ratios increasing with predator control

and without control, and decreasing with predator control and without control.

A summary of predator/prey and predator control studies was recently published (see Ballard 2001). In brief, this summary found that if: 1) predator populations are suppressing prey, 2) prey populations are below carrying capacity, and 3) control work is conducted very intensively in a confined area, then prey populations may be expected to increase. This control work would need to continue indefinitely. Lacking the 3 criteria above, control work has not been effective, even in the short term. Given the predation observed on the Uncompahgre Plateau (and all of the other mortality observed), that deer population has increased in the last 3 years. Predators do not appear to be suppressing the population. If predator control was conducted, the deer saved from the jaws of a predator may succomb to some other mortality factor, as was observed in northwest Colorado in the 1980's. Criteria 2 is being analyzed in a new study on the Uncompahgre Plateau, to try to determine whether food is the limiting factor. Criteria 3 may be the most difficult to handle, politically, biologically, and financially. **Predator control is being argued at the State Legislature and Wildlife Commission level, and therefore is beyond the scope of this DAU Plan.**

Public Support for Increasing the Deer Population- In preparation for this update to the existing DAU Plan, a nonscientific survey was mailed to 200 deer hunters, 200 elk hunters, 200 landowners on a USDA/Natural Resources Conservation Service list, and members of the Southwest Colorado Outfitters Association. The lists of hunters were obtained from limited license holders in 2000 that hunted in these DAU's. The USDA/NRCS list is their newsletter mailing list. The survey was for DAU D-30 (San Juan) and D-52 (Hermosa), and respondents could identify one or both DAU's they were most interested in. Only selected questions are summarized below and in Table 2. Return rate with self addressed stamped envelopes was about 48% (285 valid returns to date). Rather than analyzing the data by the source of the mailing list, they were analyzed on how respondents identified themselves, as in Table 2.

Respondents in all categories wanted an increase in the deer population, ranging from a 7% increase desired by ranchers/farmers and landowners to a 13% increase desired by sportspeople/hunters.

Table 2. Number of responses in survey by self-identified category regarding desired deer population. Totals are greater than 285 responses because more than 1 category could be chosen.

Desired Deer Population	Rancher/Farmer	Landowner	Hunter/ Sportsperson	Total
Large Decrease (down 50%	7	4	6	17
Moderate Decrease (down 30%)	4	3	11	18
Slight Decrease (down 15%)	12	10	10	32
No Change	33	17	48	98
Slight Increase (up 15%)	22	15	37	74
Moderate Increase (up 30%)	26	15	59	100
Large Increase (up 50%)	8	5	21	34
Average Weighted Response	Increase 7%	Increase 7%	Increase 13%	Increase 11%

Respondents indicating a desired increase in the deer population had stronger feelings (between "moderatley important" and "very important") than those indicating no change or a decrease (both between "slightly important" and "moderately important").

When asked how they would like the buck:doe ratio to be in the future as related to where it is currently (26 bucks:100 does), **the majority still wanted a slight increase to something between 25 and 30**. Only 4 respondents wanted a large decrease (15:100), 8 wanted a slight decrease (20:100), 117 no change, 71 wanted a slight increase (30:100), and 45 a large increase (35:100).

Updates of 1996 DAU Plan- Tables 3 and 4 are updated from the 1996 DAU Plan. The buck:doe ratio has been consistent in the 15-20 per 100 doe range until the last 2 years, reflecting the reduced buck harvest in 1999 and 2000. Productivity of this herd has remained quite strong throughout this 20 year period, as reflected in the post-season fawn:doe ratio. This might partially explain why a significant population decline has not been observed while other herds have declined. The total number of deer counted per year has also remained fairly stable (1993-2000) with nearly constant inventory time, further suggesting a stable population.

Table 3. Summary of aerial composition counts, DAU D-30, 1981-2000

YEAR (post-hunt)	Bucks/100 does	Fawns/100 does	bucks/does/fawns counted
1981	21.8	61.7	54/248/153
1982	9.9	50.9	38/383/195
1983	no count	no count	no count
1984	13.0	52.0	39/299/155
1985	21.8	59.2	69/316/187
1986	11.6	56.1	91/786/441
1987	15.6	67.1	116/745/500
1988	14.4	53.5	91/634/339
1989	17.1	57.2	123/719/411
1990	20.8	63.5	121/581/369
1991	15.4	50.3	88/572/288
1992	14.5	77.6	55/380/295
1993	18.8	58.7	217/1152/676
1994	15.9	62.5	149/935/584
1995	17.6	59.0	190/1081/638
1996	14.7	62.2	206/1398/870
1997	19.3	59.4	323/1674/995
1998	19.4	66.8	286/1474/985
1999	25.6	65.4	498/1948/1273
2000	26.2	53.4	409/1563/835
Average	17.5	59.8	

Table 4. Harvest, hunter numbers, and success rate in D-30, 1972-2000.

YEAR	Antlered Harvest	Antlerless Harvest	Total Harvest	Total Hunters	Success Rate (%)
1972	1801	0	1801	4475	40.6
1973	1457	0	1457	5106	28.5
1974	1852	0	1852	5256	35.2
1975	845	0	845	4530	18.7
1976	1151	0	1151	3499	32.9
1977	2243	5	2248	5138	43.8
1978	2106	24	2130	6742	31.6
1979	1100	10	1110	6863	16.2
1980	1000	0	1000	5316	18.8
1981	1903	24	1927	6441	29.9
1982	1669	70	1739	6041	28.8
1983	1757	37	1794	6605	27.2
1984	1991	42	2033	6360	32.0
1985	1678	144	1822	6615	27.5
1986	1686	215	1901	7992	23.8
1987	1777	316	2093	9120	22.9
1988	1827	442	2269	8777	25.9
1989	2170	496	2666	9519	28.0
1990	2666	755	3421	10557	32.4
1991	2018	843	2861	10377	27.6
1992	1797	1225	3022	8562	35.3
1993	2015	774	2789	9487	29.4
1994	2099	673	2772	9308	30.0
1995	2084	711	2795	9927	28.1
1996	2340	802	3142	9434	33.3
1997	2043	693	2736	10458	26.2
1998	1980	405	2385	9252	25.8
1999	1275	539	1814	5024	36.1
2000	1290	608	1898	5054	37.6

ALTERNATIVES FOR FUTURE OBJECTIVES

Population objective-

1. Maintain the population objective at 23,500- no strong support for this alternative has been found

2. Increase the population objective 10%, to 25,800- this is the preferred alternative of ranchers/farmers/landowners in the survey

3. Increase the population objective 15%, to 27,000- This is the preferred alternative of most survey respondents

Buck:doe ratio objective-

1. Maintain the current buck:doe ratio of 16:100 by keeping the license numbers at current levels and selling as leftovers whatever licenses are not taken in the drawing

2. Increase the buck:doe ratio objective to where it currently is, 26:100, by keeping buck hunter numbers slightly higher than they have been the last 2 years. This is the alternative favored by the majority of respondents in the survey.

3. Increase the buck:doe ratio objective to 30:100, by further cutting buck licenses approximately 40% for several more years.

4. Increase the buck:doe ratio objective to 35:100, declare the DAU a "quality management area" within the constraints adopted by the Wildlife Commission in the 5 Year Season Structure Process. This alternative has little public support.

RECOMMENDATION

Population objective of 27,000 will be achieved by a slight reduction in antlerless harvest in GMU's 75 (Private Land Only licenses), 751 (no PLO licenses), and 771 (both PLO and non-PLO). In the future, if additional antlerless harvest becomes necessary to maintain the population near the objective, it is recommended that some limited harvest occur in GMU 78. The 3 GMU's with current antlerless hunting seem to have a good mix of seasons and public-private land restrictions with license numbers that is acceptable to hunters and landowners.

A post-season buck:doe ratio of 26-30:100 will be achieved by maintaining the current buck harvest for several years while the population is allowed to grow slightly. In the near future, this DAU may meet the criteria to have a very limited number of buck licenses in the 4th season.

These licenses and subsequent harvest will be used to help maintain the buck:doe ratio in the 26-30 range.

A fawn:doe ratio of 60-65 is desired, where the average from 1985-2000 was 59.8. Current deer research may provide clues of how to manipulate this ratio where no methods currently exist.

SAN JUAN DEER DATA ANALYSIS UNIT

D-30

MANAGEMENT PLAN

GAME MANAGEMENT UNITS 75,751,77,771,78

DIVISION OF WILDLIFE

151 E. 16th ST.

DURANGO, CO 81301

JUNE 1996

1. DAU PLANS AND WILDLIFE MANAGEMENT BY OBJECTIVES

The growing human demand for a finite wildlife resource dictates wise management of Colorado's resources. The Division of Wildlife employs a management by objectives approach to big game populations. The Division's Strategic Plan provides direction and broad objectives for the Division to meet a system of policies, objectives and management plans such as the Data Analysis Unit Plan, directs the actions the Division takes to meet the legislative and Commission mandates.

Data analysis units (DAUs) are used to manage herds of big game animals. The DAUs are generally geographically discrete and for the most part contain discrete big game populations. The Data Analysis Unit plans are designed to support and accomplish the objective of the Strategic Plan and meet the public's objectives for big game. The DAU plan establishes the short and long term herd objectives. The objective approach is the guiding direction to a long term cycle of information collection, information analysis and decision making. One of the products of this process is hunting seasons for big game.

Figure 1. Colorado's Objective Cycle of Big Game Management and Harvest (Adapted from Conolly in Wallmo 1981. pp.263).

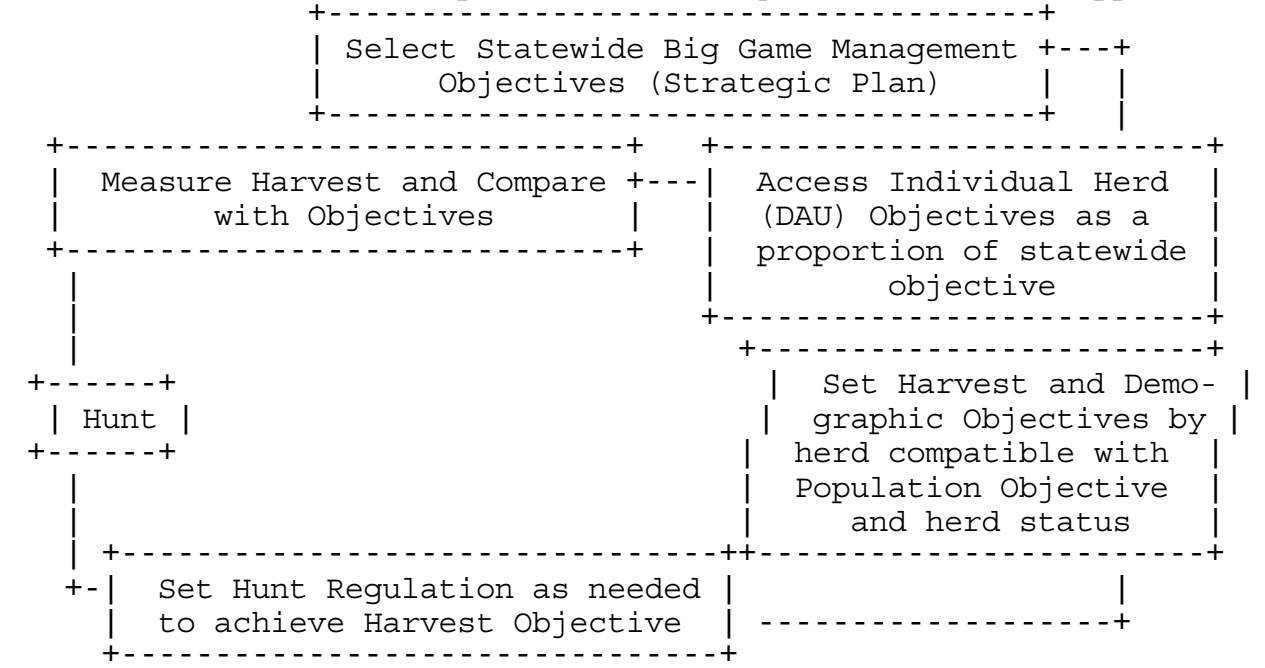

Figure 1 depicts the planning cycle involved in the management of big game populations. The DAU plan process is designed to incorporate public demands, habitat capabilities and herd capabilities into a management scheme for the big game herds the plan covers. The public, sportsmen, federal land use agencies,

landowners and agriculturists are involved in the determination of the plan objectives through goals, public meetings, comments on draft plans and the Colorado Wildlife Commission.

2. DESCRIPTION OF THE DATA ANALYSIS UNIT

Data Analysis Unit (DAU) is located in the southwest corner of the state, and includes the towns of Durango, Bayfield, Ignacio, Pagosa Springs, Allison, and Arboles. The DAU contains Game Management Units 75, 751, 77, 771, and 78. The area encompassed by the DAU is 2795 square miles and includes all of La Plata county east of the Animas River, San Juan, Hinsdale, and Mineral counties south of the Continental Divide, and Archuleta county west of the Continental Divide.

Dominant geographical features are the Continental Divide which forms the DAU north and east boundaries, the Needle Mountains, and the watersheds of the Animas, Los Pinos, Piedra, San Juan, Blanco, and Navajo Rivers (Figure 2).

The climate is what is termed a highland or mountain climate, characterized by cool springs and autumns, warm summers and moderately cold winters. Precipitation in Durango averages 18.1 inches per year, and is well distributed through the year. Snowfall in Durango averages 63 inches per year, October through April. Snowfall increases dramatically moving to the east and toward the Continental Divide, approaching 250-300 inches per year.

Most of the Unit is public land under the control of the U.S.Forest Service (about 55%) and the Bureau of Land Management (2%). The remainder is private land (30%) and Southern Ute Indian Reservation lands (12%), with all other land owners combined beieng less than 1%.

Vegetative types range from high alpine meadow types from 12,000 to over 14,000 feet elevation, spruce/fir stands down to 10,000 feet, oakbrush, serviceberry, and Ponderosa Pine above 7,000 feet, and pinon/juniper/sagebrush and agricultural fields below 7,000 feet.

Deer winter range is mostly below 7700 feet elevation, which includes nearly everything south of US 160, and extends north of Highway 160 a few miles near Pagosa Springs and between Durango and Bayfield (Figure 2). Total area of winter range in this DAU is approximately 1126 square miles, or 40% of the DAU (Table 3).

Severe winter range, where most of the deer are forced to go in severe winters (for example the 92-93 winter), is mostly below 7100 feet elevation (Figure 2). Approximately 751 square miles (27% of the DAU) are classified as severe winter range.

Deer concentrate into several areas during normal winters along US 160 between Durango and Bayfield, near Capote Lake, and in the Willow Draw/Fawn Gulch and Valle Seco/Trujillo areas near Pagosa Springs (Figure 2). These concentration areas include only 84 square miles, or 3% of the DAU.

Movement of deer from summer to winter ranges are initiated by increasing snow cover and dropping temperatures, generally starting in October and continuiing until December, and are generally in a southward direction.

Development of residential subdivisions in the Pagosa Springs area and between Durango and Bayfield have had an impact on deer, and projected growth of the next decade will intensify these impacts. In addition, Figure 5 illustrates that winter concentration areas are near US 160 from Durango to east of Bayfield. Future development will likely be along the highway, and will increase traffic on this main arterial, diminishing the quality of these concentration areas and increasing the possibility of highway accidents.

3. HERD MANAGEMENT HISTORY

3.1 Post-Hunt Population Size

The current herd population model indicates that the post-hunt population has been relatively stable from 1980 to 1986, then grew slightly to around 25,000 deer in 1990, and then has been reduced again to approximately 23,300 presently. The current long term post hunt objective population is 23,500.

3.2 Post-Hunt Herd Composition

Post hunt doe:fawn ratios have averaged 59 fawns:100 does during the period 1981-1994, and have ranged from 50-77 (Table 1). Post hunt fawn-doe ratios in the 55-65:100 range usually reflect a stable population. The fawn-doe ratios in Table 1 show a great deal of year to year variation but no significant upward or downward trend is discernable. The current long term fawn:doe objective is 65:100.

Post hunt buck:doe ratios during the same period have averaged 16.2 bucks:100 does, and have ranged from 9.9 to 21.8:100 (Table 1). This DAU had a restriction on the size of legal bucks (3-pt minimum) for two of the three seasons for the years 1986-1991. The restriction was implemented to protect young bucks in the population in order to increase the number of bucks surviving to

be mature. For the four years before the point restriction with data, the average buck:doe ratio was 16.6:100, then averaged 15.8 for the 6 years with the restriction. In 1992-1994, the point restriction was dropped and replaced by a "three day season" for rifle hunters, resulting in a total of 9 days that bucks were hunted per year. This was done to limit the number of bucks harvested, on the basis that more total bucks in the population would result in more mature bucks eventually. In the long term post hunt buck:doe objective is 22 bucks:100 does.

Table 1. Summary of aerial composition counts, DAU D-30, 1981-1993.

YEAR (post-hunt)	Bucks/100 does	Fawns/100 does	bucks/does/fawns counted
1981	21.8	61.7	54/248/153
1982	9.9	50.9	38/383/195
1983	no count	no count	no count
1984	13.0	52.0	39/299/155
1985	21.8	59.2	69/316/187
1986	11.6	56.1	91/786/441
1987	15.6	67.1	116/745/500
1988	14.4	53.5	91/634/339
1989	17.1	57.2	123/719/411
1990	20.8	63.5	121/581/369
1991	15.4	50.3	88/572/288
1992	14.5	77.6	55/380/295
1993	18.8	58.7	217/1152/676
1994	15.9	62.5	149/935/584
Average	16.2	59.2	

3.3 Harvest

The deer harvest in the DAU has varied from 845 in 1975 to 3421 in 1990, and has averaged 2030 over the 23 year period (Table 2, Figure 4). Buck harvest has varied from 845 in 1975 to 2666 in 1990, and has averaged 1765. The buck harvest continued to increase during the period of point restrictions, decreased in

1992 with the 3-day season, and began climbing again through 1994. Antlerless (doe and fawn combined) harvest began in 1977, and has ranged from 0 to 1225, and has averaged 265. Antlerless harvest has increased greatly since 1985, more to reduce game damage conflicts, but also to reduce the total population. Both efforts were somewhat effective and antlerless licenses for both public and private lands have been reduced somewhat for the 1993 and 94 seasons. Hunter success rates have varied from 16.2% to 43.8%, and has averaged 29.0% (Table 2).

3.4 Hunting Pressure.

From 1972 through 1990, the number of hunters increased from 4475 to 10,557, and has dropped only slightly since 1990 (Table 2, Figure 3). There have been an average of 7073 deer hunters per year in the DAU. Buck licenses have been unlimited in number throughout the period while antlerless licenses have been issued on a limited basis.

4.0 CURRENT HERD STATUS

4.1 Herd size and composition

The 1994 post season herd population estimate was 23,384 deer in the DAU. This is at the long term objective population of 23,500, so on a DAU basis, herd reduction strategies can be stopped, but in specific areas where concentrations of deer may be above desired levels, antlerless licenses may still be issued. The herd size has been reduced by approximately 8% since the mid 1980's when the population was at a maximum of around 25,500 deer.

The long term post-hunt sex ratio objective is 22 bucks per 100 does. In 1994 the ratio was 15.9 bucks per 100 does from the aerial inventory, and has averaged 16.2 bucks per 100 does since 1980. The Colorado Division of Wildlife has tried several strategies to increase buck:doe ratios. Prior to 1986, the season structure entailed seperate deer and elk seasons and one combined season. During this time, buck:doe ratios averaged 16.6 and rifle buck seasons lasted for 12-16 days. From 1986-1991, the season structure was changed to three combined deer and elk seasons, rifle hunters had 26 days to hunt for bucks but were limited to three point or better bucks for two of the three seasons, and the buck:doe ratio in DAU D-30 averaged 15.8/100. In 1992-1994, antler point restrictions were removed and buck season was limited to the first three days of the three combined seasons (9 days), and the buck:doe ratio climbed back up to 16.4/100 (including aerial count data for 1994).

4.2 Current Management Problems

Many of the deer in this DAU move onto private lands sometime

during the hunting seasons where harvest may be reduced by limited access. In addition, many of the deer move onto Southern Ute Indian Reservation lands, where hunting is controlled by the tribal council. Some deer are exposed to higher hunting intensity than others.

Table 2. Harvest, hunter numbers, and success rate in D-30, 1972-1993.

YEAR	Antlered Harvest	Antlerless Harvest	Total Harvest	Total Hunters	Success Rate (%)
1972	1801	0	1801	4475	40.6
1973	1457	0	1457	5106	28.5
1974	1852	0	1852	5256	35.2
1975	845	0	845	4530	18.7
1976	1151	0	1151	3499	32.9
1977	2243	5	2248	5138	43.8
1978	2106	24	2130	6742	31.6
1979	1100	10	1110	6863	16.2
1980	1000	0	1000	5316	18.8
1981	1903	24	1927	6441	29.9
1982	1669	70	1739	6041	28.8
1983	1757	37	1794	6605	27.2
1984	1991	42	2033	6360	32.0
1985	1678	144	1822	6615	27.5
1986	1686	215	1901	7992	23.8
1987	1777	316	2093	9120	22.9
1988	1827	442	2269	8777	25.9
1989	2170	496	2666	9519	28.0
1990	2666	755	3421	10557	32.4
1991	2018	843	2861	10377	27.6
1992	1797	1225	3022	8562	35.3

1993	2015	774	2789	9487	29.4
1994	2099	673	2772	9308	30.0
Average	1765	265	2030	7073	29.0

Generally, current problems are represented more by isolated distribution problems than by DAU-wide problems. One exception, however, is the relationship of US Highway 160 and severe winter range and winter concentration areas (Figures 4 and 5), involving most of the area between Durango and Pagosa Springs. Deer crossing and vehicle-deer accidents are common throughout this area. This is also an area of rapid development, resulting in direct loss of winter range habitat and secondary loss of quality due to harassment, fences, pets, and other problems associated with development. In the future, this development could have significant impacts on the ability of the winter range to support the present number of deer.

5. HABITAT RESOURCES

5.1 Public Lands

The amount of winter and severe winter range is the limiting factor in the DAU. There are 1126 square miles of winter range in the DAU (40% of DAU), and 751 square miles of severe winter range (27%). Fifty-eight percent of the DAU is public land, but only 23% is winter range on public lands, 14% is severe winter range on public lands(Table 3, Figure 5). Figure 8 graphically explains that a great deal of the DAU is on public land, but that most of the winter range and severe winter ranges are on private and Reservation lands. A great deal of habitat improvements on public land winter ranges will only create a certain amount of benefits, the deer will still be wintering on private and Reservation lands.

5.2 Private Lands

A total of 1,177 square miles of the DAU are private lands (42%), and 77% and 86% of the winter range and severe winter range, respectively, are on private lands. The Southern Ute Reservation is the single largest lanowner of private lands, but controls nearly one-quarter of all of the winter range and severe winter

range in the DAU.

TABLE 3. Land ownership and deer winter, winter concenttration, and severe winter range areas in square miles.

		Winter Range	Winter Concentration Range	Severe Winter Range	DAU D-30
	BLM	24 2%	4 5%	10 1%	62 2%
	BOR	2 <1%	0	2 <1%	8 <1%
	CDOW	1 <1%	0	1 <1%	2 <1%
	USFS	231 21%	19 23%	91 12%	1545 55%
Public Access Subtotal		258 23%	23 27%	104 14%	1618 58%
	SUI Res.	239 21%	4 5%	181 24%	320 12%
	Private	623 55%	54 64%	463 62%	849 30%
	State School	6 <1%	3 3%	3 <1%	8 <1%
Private Access Subtotal		868 77%	61 73%	647 86%	1177 42%
TOTAL	DAU D-30	1126 40%	84 3%	751 27%	2795 100%

6. ISSUES AND STRATEGIES

Current issues relating to the San Juan deer herd include the low buck:doe ratio, particularly relating to the mature buck numbers. Now that the total population is near the long term objective, the number of antlerless licenses will be reduced, which will reduce the magnitude of a second problem- the inability to sell sufficient antlerless licenses to reduce the population quickly.

A third problem is damage to private lands caused by deer, but this problem is isolated to a few areas involving a small proportion of the herd, and should be addressed as a distribution problem rather than as a herd management problem.

One final problem is the continuation of development between Durango and Pagosa Springs, and the impacts that has on deer and winter/severe winter range and concentration areas. This development is increasing the traffic on US Highway 160, and because the deer winter ranges straddle the highway, the number of deer crossings and accidents is increasing. This is a concern because of motorist safety as well as deer herd welfare. Summer ranges are typically north of the highway, and most deer winter near or south of the highway, making the number of deer crossings significant, while highway traffic is increasing.

7. ALTERNATIVE DEVELOPMENT

The main purpose of this DAU Plan is to determine the long term post-hunt population and herd composition objectives. Listed below are a few of the many possible alternatives that could be considered to accomplish these objectives.

In general, higher deer populations will require more investment in maintaining and improving the habitat, but will support a higher harvest and more consumptive recreation. Impacts and private farming and ranching operations will likely increase, but the fiscal benefits to the economy of the counties involved will also increase. Based on economic models produced by consultants, resident deer hunters in 1994 contributed approximately $674,676, while nonresident deer hunters contributed approximately $2,349,642 to the economy of the counties in the Data Analysis Unit.. A population objective that involves reducing the number of hunting licenses by 10% will also reduce the economic benefits to the counties involved by approximately 10%.

One other factor that should be considered in determining new long range population objectives is forage production, range condition and trend, and forage allocation between various consumers. Unfortunately, the Bureau of Land Management and the US Forest Service-San Juan National Forest (the two major land management agencies in the DAU) are unable to provide that information.

7.1 Post hunt population size objective

7.1.1 20,000 deer- this represents a 10% decrease from the current population and the existing long term objective. Sufficient limited antlerless licenses will continue to be issued each year to reduce the deer population to the desired level. Once this is achieved, the number of licenses issued will be adjusted to maintain the deer population.

* slightly reduced game damage conflicts
* habitat improvements could be directed at distribution problems and to maintain habitat health and diversity
* negative economic impact on CDOW and counties

7.1.2 23,500 deer- this represents the current population and the existing long term objective. The number of antlerless licenses would be reduced to maintain the herd at present levels and to address distribution problems.

* game damage conflicts would stay near current levels
* habitat improvement projects would be necesaary to maintain habitat health and diversity as well as to address distribution concerns

7.1.3 26,000 deer- this represents a 10% increase from the current population and the existing long term objective. The number of antlerless licenses would be reduced for several years to allow the population to grow slowly to desired levels. Sufficient antlerless licenses could still be issued to address distribution concerns.

* increased conflicts on private lands would need to be addressed through the game damage claim and HPP processes and through education
* habitat improvement projects would be necessary to maintain habitat health and diversity on public and private lands, as well as to address distribution concerns
* positive economic impact on CDOW and counties

7.2 Post hunt herd composition objectives

7.2.1 12 bucks:100 does- This herd composition reflects a decrease from the currently observed ratio of approximately 16:100. This could be achieved with an increase in buck harvest, which would require additional hunting opportunities (more days, two-buck limit, etc.) since buck licenses are currently unlimited in number. Curtailing the antlerless licenses to achieve one of the population objectives above will have the effect of depressing the buck:doe ratio somewhat, but not completely down to 12:100.

7.2.2 16 bucks:100 does- This alternative reflects the status quo, as well as the long term average buck:doe ratio for the DAU. Selecting this alternative would not require any additional regulatory changes or significant adjustments in the

number of licenses issued.

7.2.3 22 bucks:100 does- This alternative reflects the current long term objective. It would require a significant decrease in the buck harvest (limited licenses, season length, etc) to increase the ratio to this objective.

8. ALTERNATIVE SELECTION

The Division of Wildlife's recommended alternative is 23,500 deer with a buck:doe ratio of 16:100. Both of these represent the present situation, and the present population objective. Public comments from the public meetings ranged from one observation of a drastic decline in deer populations in the last five years, to the deer population is too high. The majority of people present favored keeping the existing objective. The San Juan HPP Committee has recommended a population objective of 23,500 and the Bureau of Land Management and US Forest Service supports the DOW recommendation of 23,500 deer.

The previous objective for buck:doe ratio is 22:100, which was probably an unrealistic goal without sharply curtailing the buck harvest. The DOW and public support a realistic objective of 16:100 which will allow the buck harvest to continue near present levels (long term average ratio is 16:100).

One additional issue from the public meetings dealt with predation of deer fawns and the long term impacts on the population. Some people felt predation was a factor controlling the population and was not being addressed by the DOW or the population models. While predation has certainly increased since the time of widespread predator control, research has shown that it is only one of several factors limiting the population, and predation is accounted for in population models in the annual survival function.

The Wildlife Commission decided at their November 1995 meeting in favor of the 23,500 population objective and 16:100 buck:doe ratio.