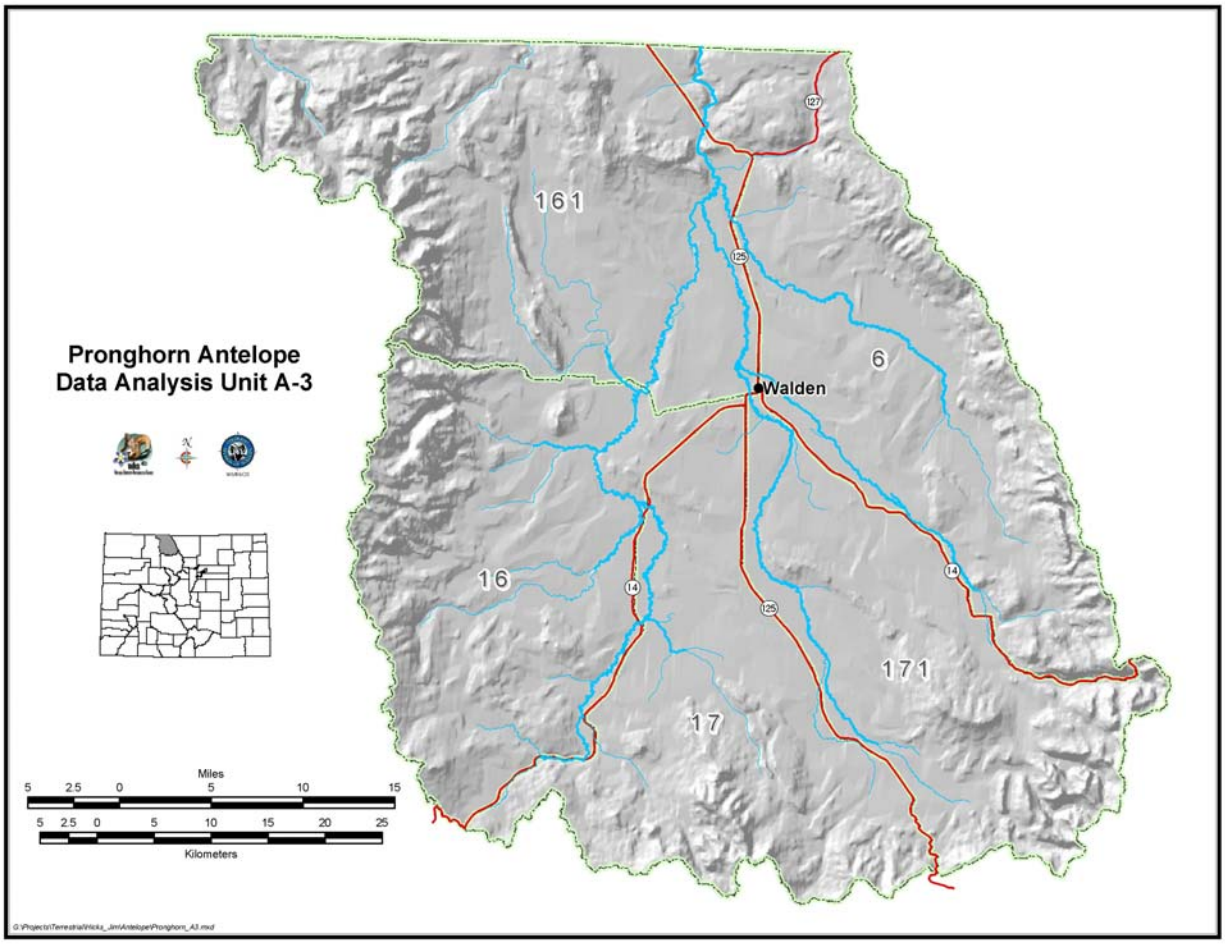
2004

PRONGHORN MANAGEMENT GUIDELINES
PRONGHORN DAU A-3
GAME MANAGEMENT UNITS
6, 16, 161, 17, & 171

Prepared for:
Colorado Division of Wildlife (CDOW)
Northwest Region
By:

Jim Hicks, Terrestrial Wildlife Biologist



DAU A-3 (North Park)
EXECUTIVE SUMMARY

GMU's: 6, 16, 17, 161, 171
Land Ownership: 35.9% Private, 31.9% USFS, 18.2% BLM, 1.7% ANWR, 12% State
Posthunt Population: Objective 1,500-1,600 2004 Estimate 1,500 Recommended 1,500-1,600
Posthunt Sex Ratio (Bucks/100 Does): Objective 30-40 2004 Observed 30 2004 Modeled 32 Recommended 30-40

Table 1. NORTH PARK PRONGHORN POPULATION

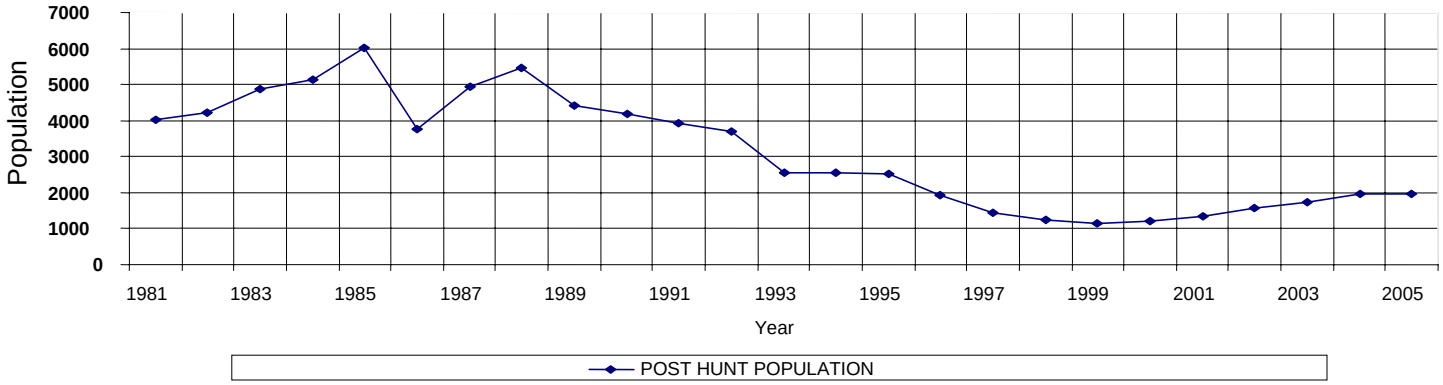


Table 2. A-3 Harvest 1981 - 2003

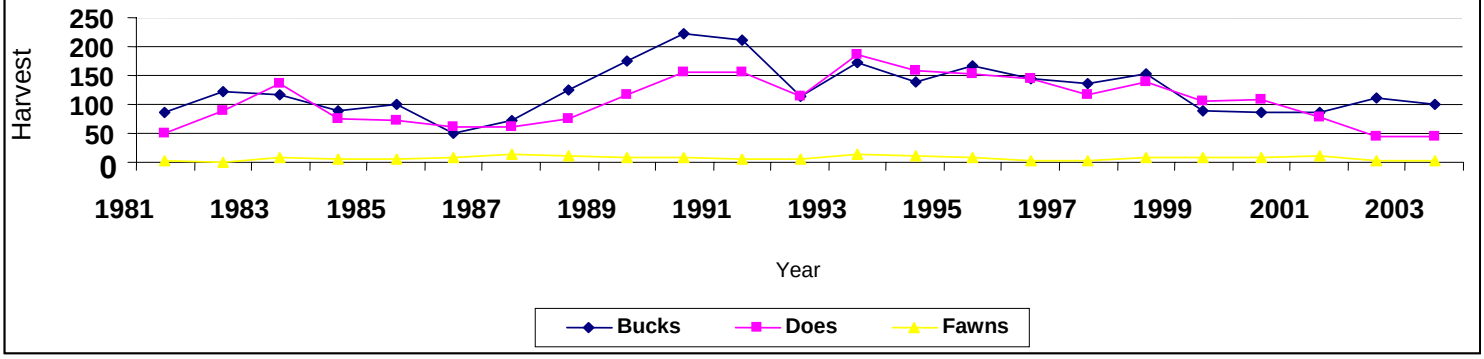
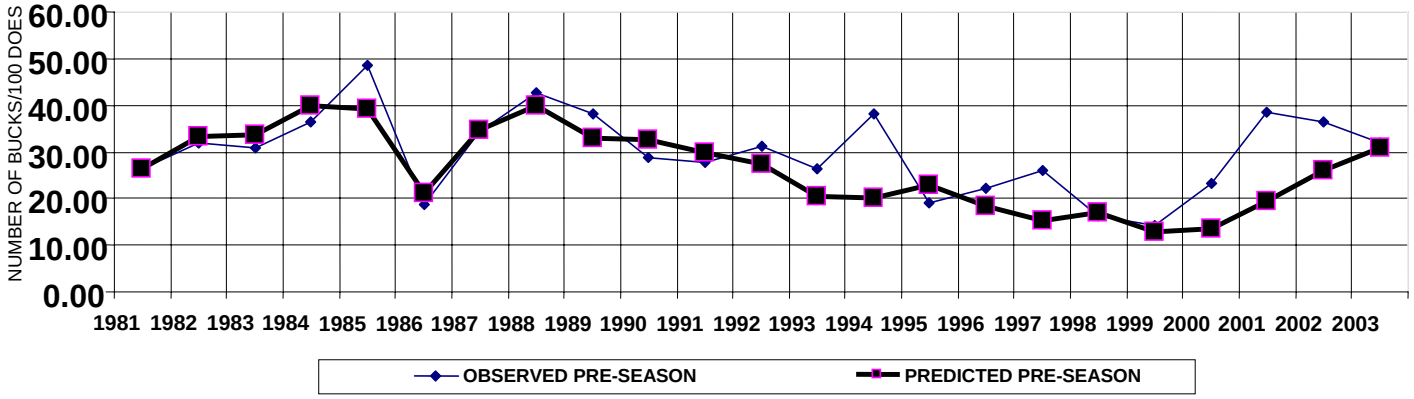


Table 3. NORTH PARK PRONGHORN SEX RATIO



A-3 Background

There is some historical information regarding pronghorn in North Park. Edward Warren in his book, The Mammals of Colorado, Their Habits and Distribution, reported that in 1868 Ute Indians killed 4,400 pronghorn in North Park by "using a surround technique." Warren reports an account of a herd estimated at 5,000 wintering near Walden in 1885. Market hunting started reducing the population and by the early part of the 1900's pronghorn were scarce. By the 1930's they were completely eliminated.

In the mid-1950s pronghorn started appearing again from Wyoming. Annual population counts, by the DOW, were started in the mid-1960s. A limited hunting season was started in 1968. Production counts have been made since 1972. In the mid-1970s the winter pronghorn population was approximately 500 animals. The pronghorn fawn recruitment has been low in North Park in the 1990s.

A-3 Significant Issues

The August 2002 ground classifications was 55.2 fawns per 100 does in North Park. This is higher than it has been since 1988. The recruitment rate has remained above 40 fawns per 100 does since 2001 which has improved the population numbers markedly. The buck/doe ratio increased to 38.6 bucks/100 does in 2001. Some of that increase was due to the mild winters for several years and some was due to reducing the buck harvest. The population structure objective is 25 bucks/100 does. This objective level will promote good reproduction, but not quality bucks. Maximum trophy production would require 50 bucks/ 100 does or less (Hailey 1979).

Fixed-wing aerial classification flights have proven to be unreliable in determining an unbiased buck/doe ratio, due to the behavior of pronghorn bucks (Pronghorn Management Guides 1998). Typically buck to doe ratio confidence intervals are (90%) +/ – 30% while doe to fawn ratios are (90%) +/– 10% on fixed-wing flights (Pronghorn Management Guides 1998). This discrepancy in observed buck/doe ratios is reflected in the spreadsheet model. The difficulty of observing single or small groups of bucks from a fixed-wing aircraft has made the vehicle ground classification a more reliable method for determining the buck/doe ratio.

A-3 Management Alternatives

Population Objective Alternatives

1. *1,500 to 1,600* pronghorn – This alternative is the current population level and the former population objective. This population level would insure that maximum resources would be available for pronghorn and recruitment levels remain high.

2. *1,600 to 1,700* pronghorn – The pronghorn population is doing well at its current level and increasing the population will reduce the amount of resources available and the population will not maintain itself as well.

3. *1,700 to 1,800* pronghorn – This level would allow more pronghorn for harvest but would reduce the resources available to the animals. It is better to keep the population below maximum sustained yield where it can recover faster from setbacks.

Sex Ratio Objective Alternatives (Pre-season Observed)

1. Sex Ratio, *20 to 30 bucks/100 does* - This is the current sex ratio alternative. At this level, adequate bucks would be available to harvest, but there will be only a few mature bucks.

2. Sex Ratio, *30 to 40 bucks/100 does* - This alternative could be maintained at the current harvest rate. Adequate numbers of mature bucks would be in the population.

3. Sex Ratio, *40 to 50 bucks/100 does* - This alternative would take longer to achieve and would require a reduction in buck licenses. This level of males in the population would produce trophy buck hunting.

The Preferred Alternative is a population objective of 1,500 to 1,600 pronghorn. The preferred sex ratio is 30 to 40 bucks per 100 does, observed. The lowest population level of the three alternatives will insure that there are plenty of resources available in all but the most severe winters. This was the population level and sex ratio levels agreed to by the participants at the Walden Public Meeting, in 2000.

This plan was approved by the Colorado Wildlife Commission in 2004

PRONGHORN DATA ANALYSIS UNIT (DAU) A-3

NORTH PARK
TABLE OF CONTENTS

DAU PLAN SUMMARY

North Park Pronghorn DAU A-3 (GMU: 6, 16, 161, 17, 171)

Current Post-season Population Estimate 2004- 1,500 pronghorn

Current Pre-season Sex Ratio 2004: 30.2 bucks/100 does

Current Post-season Population Objective: 1,500 pronghorn

Current Pre-season Sex Ratio Objective: 25 bucks/100 does

Proposed Post-season Population Objective: Pre-season- 1,500 to 1,600 pronghorn

Proposed Pre-season Sex Ratio Objective: 30 to 40 bucks/100 does.

The pronghorn population in North Park is at the current population objective of 1,500 animals. Harvest has been reduced in recent years because of poor recruitment rates, but recruitment has improved and the harvest can be increased.

The most significant limiting factor for the North Park pronghorn population has been low recruitment rates of less then 30 fawns per 100 does (Figure 3). The recruitment rate has increased in recent years, because of mild winters, and the population is increasing in response (Figure 1). All the stackholders at the public meeting in Walden agree that they would like to maintain the 1,500 population level of pronghorn in North Park.

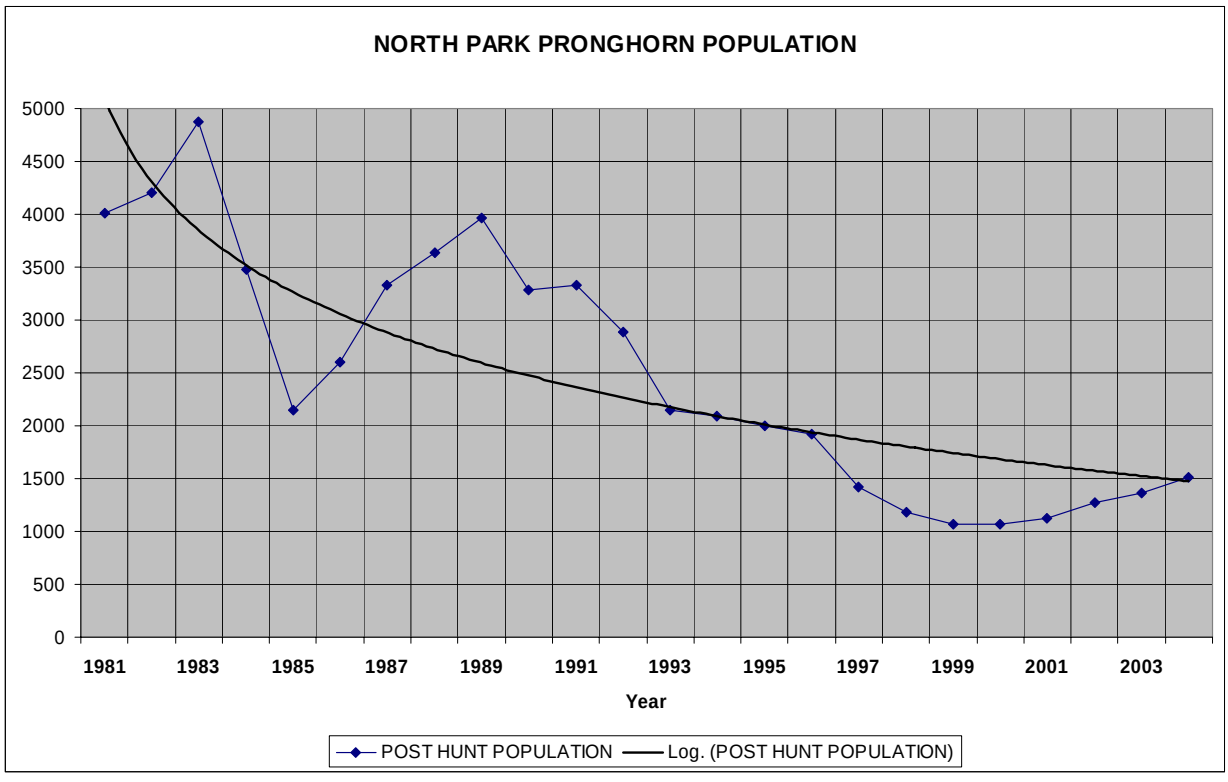


Figure 1

INTRODUCTION AND PURPOSE

The Division of Wildlife (DOW) is responsible for the maintenance of Colorado's big game herds at population levels that are established through a public review process and approved by the Colorado Wildlife Commission.

The Data Analysis Unit (DAU) Plan is a strategic plan that addresses two primary decisions, the number of animals the DAU should contain and the desired sex ratio. The geographic area of each DAU is drawn to encompass the year-round range of the majority of the animals of that species. Normally the DAU encompasses several Game Management Units (GMU) that divide the DAU into workable sub-units, primarily for harvest management. The DAU Plan is also a collection of important management data of a particular wildlife population. This document includes alternate strategies, evaluation of those strategies, and a preferred alternative. The DAU Plan process is designed to examine public desires and balance them with biological capabilities. The population objective is established for a five-year period. The population objective drives the decisions related to annual license numbers that will determine the number of animals that need to be harvested to meet population objectives. Management by objective is a process based on an annual cycle of information collected from sex and age ratio flights, survival studies, and harvest data. Analysis of the data results in recommendation of harvest objectives to meet the population objectives for that DAU. Harvest objective recommendations culminates each year with the Colorado Wildlife Commission adopting the number of limited hunting permits to issue in order to achieve the population objective.

DISCLAIMER FOR POPULATION SIZE ESTIMATES

Estimating population size of wild animals over large geographic areas is an extremely difficult and inexact exercise. In several research projects, attempts have been made to accurately count all the known number of animals in large fenced areas. All of these efforts have failed to consistently count all of the animals. In some cases less than 50% of the animals can be observed and counted. High-tech methods using infrared sensing have also met with limited success. The DOW recognizes this is a serious challenge to our management. The DOW attempts to minimize this problem using the latest technology and inventory methodology available. Most population estimates are derived using computer model simulations that involve estimations for mortality rates, hunter harvest, wounding loss and annual production. These simulations are then adjusted to align on measured post-hunting season age and sex ratio classification counts. The DOW recognizes the limitations of the system and strives to do the best job with the resources available. If better information becomes available, such as new estimates of survival rates, wounding loss, sex ratio at birth, density estimates, or new modeling techniques and programs, the DOW will use this new information and the new techniques. This may result in significant changes in the population size estimates and management strategies. It is recommended that the population estimates presented in this document be used only as an index or as trend data and not as an absolute estimate of the deer population in the DAU.

DESCRIPTION OF THE DATA ANALYSIS UNIT (DAU)

Location

Pronghorn DAU A-3 is in North Central Colorado and comprises all of Jackson County, commonly called North Park. DAU A-3 consists of Game Management Units (GMUs) 6, 16, 161, 17, and 171. North Park is an intermountain park on the east side of the Continental Divide. The North Park watershed is the headwaters of the North Platte River. The major drainages that make-up the North Platte drainage in Colorado are Grizzly Creek, the Illinois River, the Michigan River, the Canadian River, and the North Fork of the North Platte.

The DAU is bounded on the west by the Park Range, on the south by the Rabbit Ears Range, to the east by the Medicine Bow and Never Summer Ranges, and Independence Mountain and the Wyoming border on the north. DAU A-3 encompasses 1.042 million acres or 1,628 square miles.

Physiography

Elevations in North Park range from 7,800 feet at Northgate to 12,951 feet at Clark's Peak. The average elevation of the open, sagebrush-grassland park is 8,000 feet. North Park is a relatively flat, sagebrush grassland with numerous wetlands interspersed with wide, willow dominated drainages. The mountains that surround the park rise rapidly to the alpine zone above timberline. The montane zone is dominated by lodgepole pine stands and to a lesser extent aspen and spruce-fir stands.

Climate

Winters are windy, cold, and snowy. The summers are short, cool, and dry. The average temperature measured at Walden is 37.8 degrees F, with a temperature range between -50 degrees F and 90 degrees F. The growing season averages thirty-three days, mostly in the month of July. The average annual precipitation is ten inches, which includes fifty inches of snowfall that comes in a few large snowstorms. The prevailing winds are to the northeast.

Land Status

Land ownership in DAU A-3 is 36% private land, 12% state land and 52% federal land. The Routt National Forest covers 32% of the DAU and most of the mountainous areas that surround the park. The Bureau of Land Management property, 18.2%, is primarily sagebrush habitat in the center of the park where a majority of the private land is also located. The BLM manages the majority of the sagebrush habitat critical to pronghorn. The Colorado State Forest, 6.8%, is found on the east side of the park. The Arapaho National Wildlife Refuge, 1.7%, manages important antelope habitat in the center of the park. State Trust Lands, 4.9%, are primarily in sagebrush habitat and are critical to pronghorn.

Land Use

Raising cattle and growing hay for cattle are the primary land uses in North Park. This high, cold, semi-desert habitat has a strong agricultural base of irrigated hay meadows and cattle grazing. This habitat also produces some of the most productive wildlife habitat in the state, especially for waterfowl. Timber harvest is still an important land use, although the lumber mill in Walden has closed. Hunting is an important part of the economy. Big game hunting brings in the largest number of hunters, but small game and waterfowl hunting also have a significant impact.

HABITAT CONDITIONS AND CAPABILITY

Pronghorn habitat is the sagebrush grassland in the center of North Park. Pronghorn are dependent on the forb and browse components of the sagebrush plant community. Pronghorn are the only truly native species, having evolved in the grasslands of North America, exclusively, over the last 50 million years. Pronghorn use the wet meadows where forbs are available, but the majority of the pronghorn use drier, sagebrush areas. Sagebrush makes up the majority of pronghorn diet in the winter. Forbs are the most important part of pronghorn diet in the spring and summer. Grass is not important to pronghorn.

The pronghorn overall range in North Park encompasses 485,000 acres, 757 square miles. The sagebrush grasslands used by pronghorn make up 46% of the total land area in North Park. The winter concentration areas for antelope encompass 40,000 acres or only 8 % of the overall range. There is an undetermined number of pronghorn that migrate to Wyoming in some winters.

It is generally agreed that there has been a decline in the productivity of vegetation in the sagebrush-grassland community in the western U.S. (Gill). Three of the wildlife species dependent on the sagebrush community have declined in numbers and productivity. These are mule deer, sage grouse, and pronghorn. Specifically in North Park the capability of the sagebrush habitat has been reduced due to of the lack of disturbances such as fire and the consequential old age of the shrub component. Overly dense and crowded sagebrush stands compete with other vegetation.

Sagebrush is high in protein, equaling alfalfa. Sagebrush is also high in volatile oil, which makes it less palatable to other browsers, but not to antelope. Habitat quality and quantity ultimately limit pronghorn numbers. Disturbances, that set back the seral stage of the vegetation to a younger more vigorous stage, are the only solutions that will ultimately increase the numbers of wildlife species using the sagebrush-grasslands of North Park.

The Bureau of Land Management (BLM) in their HABITAT DATA SUMMARY (1998) stated that forage has been allocated for deer and pronghorn in North Park. The BLM does not anticipate a conflict between pronghorn and livestock. There have not been any damage claims or conflicts attributed to pronghorn.

Habitat Partnership Program

In 1990 the Colorado Division of Wildlife (CDOW) created the Habitat Partnership Program (HPP) to address fence and forage damage conflicts on private and public land caused by big game. The North Park HPP Committee was formed in 1991 and the Wildlife Commission in 1992 approved the Big Game Distribution Management Plan. The CDOW has received very few damage complaints caused by pronghorn.

HPP is now an integral part of big game management efforts in North Park and one of the most successful HPP Committees in the state. The locally run program is funded by 5% of the big game license revenues generated in the DAU.

The North Park HPP Committee has been a leader in holistic range management sponsoring workshops for livestock operators and federal land managers. They are involved in a grazing management system with two landowners and the BLM to improve forage on one of the major winter range areas in North Park.

In 1993 the North Park HPP Committee applied for and received a grant from "Seeking Common Ground." The grant funds were used to form the Owl Mountain Partnership (OMP). OMP is an ecosystem management partnership that involves cooperation among private landowners, and all the government agencies. The OMP has accomplished many on-the-ground projects to improve habitat for both wildlife and livestock. The original boundaries of the OMP were the southeast section of North Park, but in 1997 the OMP Steering Committee expanded the program to include all of Jackson County.

MANAGEMENT HISTORY

There is some historical information regarding pronghorn in North Park. Edward Warren in his book, The Mammals of Colorado, Their Habits and Distribution, reported that in 1868 Ute Indians killed 4,400 pronghorn in North Park by "using a surround technique." Warren reports an account of a herd estimated at 5,000 wintering near Walden in 1885. Market hunting started reducing the population and by the early part of the 1900's pronghorn were scarce. By the 1930's they were completely eliminated.

In the mid-1950s pronghorn started appearing again from Wyoming. Annual population counts, by the DOW, were started in the mid-1960s. A limited hunting season was started in 1968. Production counts have been made since 1972. In the mid-1970s the winter pronghorn population was approximately 500 animals. The pronghorn fawn recruitment has been low in North Park in the 1990s.

CURRENT MANAGEMENT

Population

In DAU A-3, North Park, the current post season population objective is 1,500 pronghorn. The adult sex ratio objective is 25 bucks per100 does, pre-season. The 2004 post-season population estimate is 1,500 pronghorn and the pre-season sex ratio is 30 bucks/100 does. The spreadsheet model can be found in the appendix.

There is a migration of pronghorn north into Wyoming and south to Middle Park in the winter. Pojar's quadrate census of the whole pronghorn population in North Park and Big Creek, Wyoming, indicates 2,607 pronghorn in 1997 and 2,170 in 1998. The quadrate census is the most accurate method of determining total population size. In 1996 post-season the population was 698 in the Big Creek part of the population and 1,909 in the North Park segment. In the 1997 post-season the Wyoming numbers were 750 and the Colorado numbers were 1,420. The population numbers in 1997 and 1998, from Pojar's study, are used as reference points in the spreadsheet population model for this herd. Pojar's flights were done in May before fawning so they can be considered post-hunt estimates. The decline of the fawn recruitment rate to less then 30 fawns/100 does for six years in the 1990s has caused a significant decline in population numbers (Figure1 and 3). The post-season 2000 population was 1075 pronghorn. Since that time period the population has increase significantly to 1,500 pronghorn which is the population objective (Figure 1). The low recruitment performance of the North Park pronghorn population has been the major limiting factor.

The pre-season age and sex ratio classification flights were flown in August. Starting in 2002 the CDOW started using a ground classification by CDOW personnel to obtain the sex and age information. It was felt that the flight classification with a fixed-winged aircraft was missing too many of the younger bucks that were not with the does and fawns.

Adult Sex Ratios

The adult sex ratio remained well below objective until 2001. Due to a reduction in harvest the number of bucks was able to increase to the objective of over 30 bucks per 100 does (Figure 4). Pojar in his antelope research in North Park, comparing different census techniques, did helicopter quadrate counts and fixed-wing aircraft, line-transect counts in North Park. In post-1996 quadrate counts he found 44 bucks/100 does and 15.9 bucks/100 does in post-1997. The buck/doe ratio dropped dramatically in both types of flights between 1996 and 1997 probably due to the severe winter. The harvest rate on this population may have been too high for the low recruitment rate of this population (Figure 2). Typically buck to doe ratio confidence intervals are (90%) +/ – 30% while doe to fawn ratios are (90%) +/– 10% on fixed-wing flights (Pronghorn Management Guides 1998). This means that the CDOW are missing 30% of the bucks in the classification counts and that the buck population is 30 % higher then observed. This discrepancy in observed buck/doe ratios is reflected in the spreadsheet model.

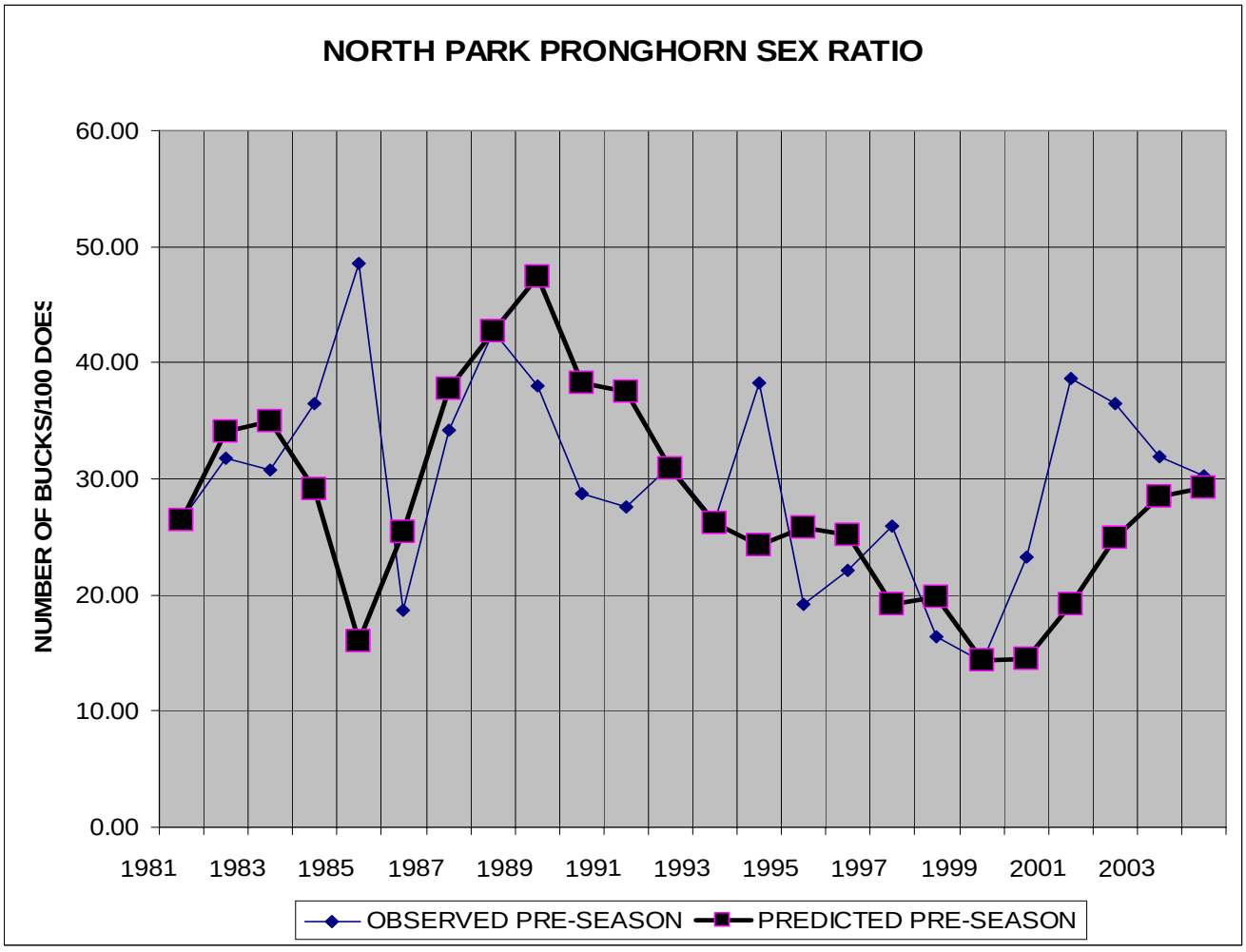


Figure 2

Recruitment

Fawn recruitment has been very poor for most of the 1990s in North Park (Figure 1). Montana considers a recruitment rate of less than 40 fawns per 100 does as very poor. Arizona decreases permit numbers when the recruitment rate falls below 30 and raises permit numbers when it goes above 40. The pre-season, sex and age classification counts have shown many years of fawn recruitment rates less than 30 and 40 fawns per 100 does. The decline of the fawn recruitment rate to less then 30 for six years in the 1990s has caused a significant decline in population numbers (Figure1). The last four years, the pre-season fawn/doe ratio has increased to be over 40 fawns/100 does, so the CDOW should be able to increase pronghorn permit numbers in 2005 (Figure 3).

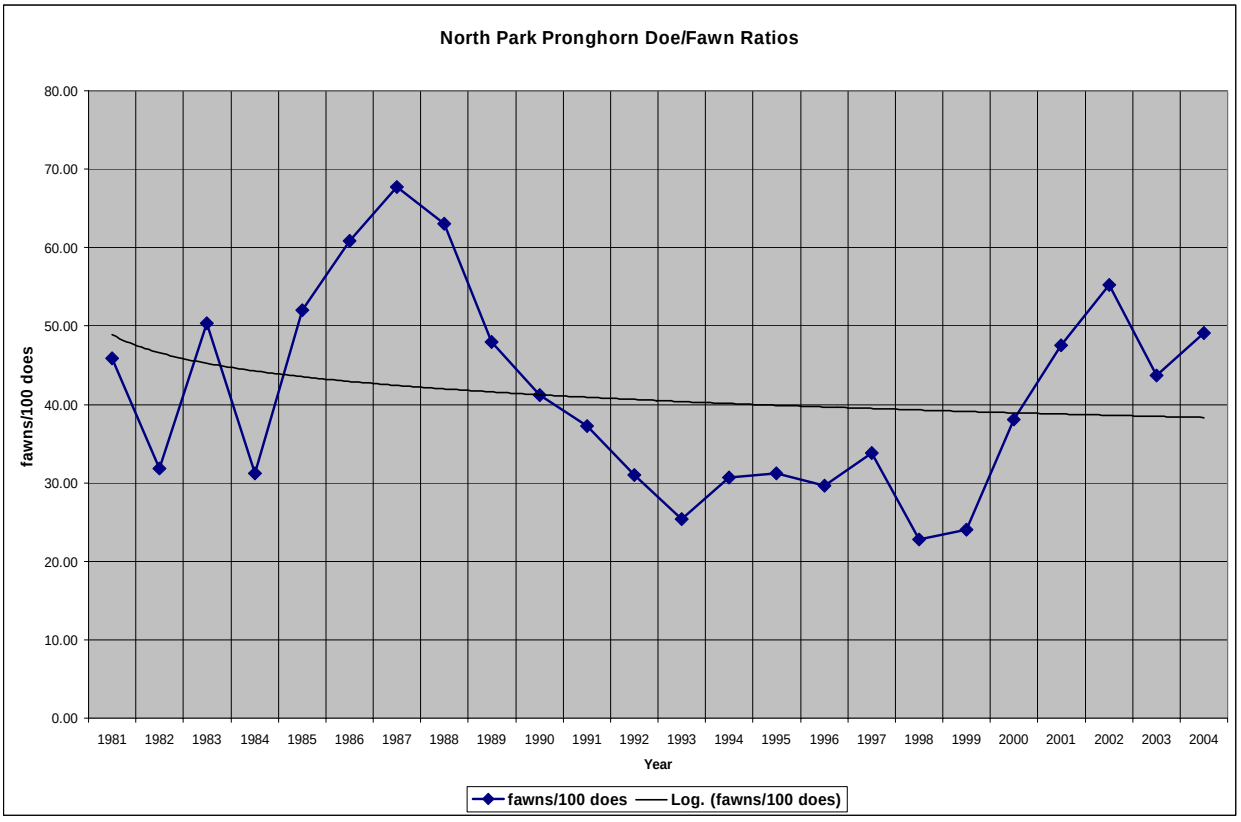


Figure 3

HARVEST

Harvest numbers have remained fairly constant through the 1990's. The harvest did decrease significantly in 1999 without a significant reduction in permits. There was a 5.5% reduction in permit numbers in 1999, with a 33% drop in harvest. Permit numbers in 2000 were reduced significantly (18 %). The harvest should have been reduced starting in the early 1990's (Figure 4).

For harvest purposes permit numbers are allocated in three separate areas in North Park. GMU 161 is separate, GMU 6 is separate and GMU 16, 17, and 171 are allocated together as one hunting unit. GMU 6 has had a serious decline in pronghorn numbers in recent years. Drought has probably had some influence is shifting pronghorn to other areas with more water. GMU 161 has problems with pronghorn moving to private land during the hunting season.

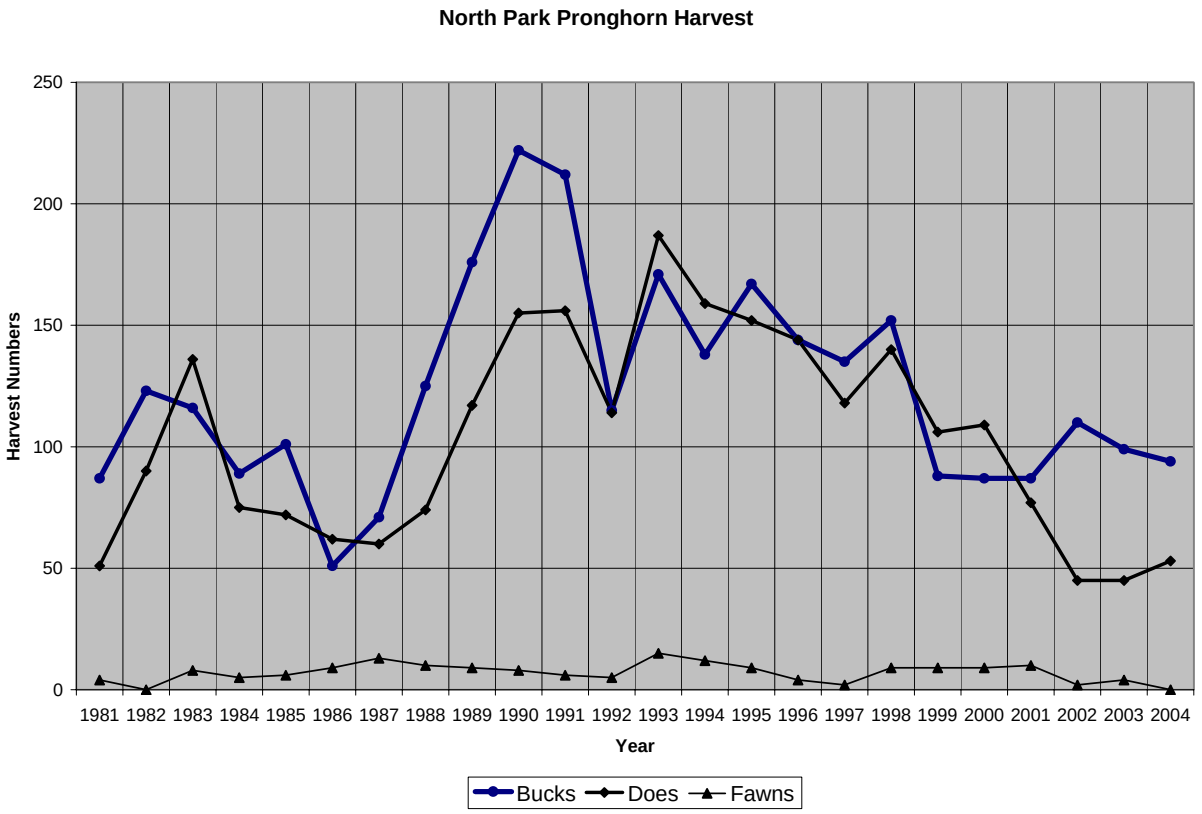


Figure 4

POPULATION SIZE AND HERD STRUCTURE ALTERNATIVES

The August 2002 ground classifications was 55.2 fawns per 100 does in North Park. This is higher than it has been since 1988. The recruitment rate has remained above 40 fawns per 100 does since 2001 which has improved the population numbers markedly. The buck/doe ratio increased to 38.6 bucks/100 does in 2001. Some of that increase was due to the mild winters for several years and some was due to reducing the buck harvest. The population structure objective is 25 bucks/100 does. This objective level will promote good reproduction, but not quality bucks. Maximum trophy production would require 50 bucks/ 100 does or less (Hailey 1979).

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MANAGEMENT ALTERNATIVE

Population Objective Alternatives

1. *1,500 to 1,600* pronghorn – This alternative is the current population level and the former population objective. This population level would insure that maximum resources would be available for pronghorn and recruitment levels remain high.

2. *1,600 to 1,700* pronghorn – The pronghorn population is doing well at its current level and increasing the population will reduce the amount of resources available and the population will not maintain itself as well.

3. *1,700 to 1,800* pronghorn – This level would allow more pronghorn for harvest but would reduce the resources available to the animals. It is better to keep the population below maximum sustained yield where it can recover faster from setbacks.

Sex Ratio Objective Alternatives (Pre-season Observed)

1. Sex Ratio, *20 to 30 bucks/100 does* - This is the current sex ratio alternative. At this level, adequate bucks would be available to harvest, but there will be only a few mature bucks.

2. Sex Ratio, *30 to 40 bucks/100 does* - This alternative could be maintained at the current harvest rate. Adequate numbers of mature bucks would be in the population.

3. Sex Ratio, *40 to 50 bucks/100 does* - This alternative would take longer to achieve and would require a reduction in buck licenses. This level of males in the population would produce trophy buck hunting.

PREFERRED ALTERNATIVE

The Preferred Alternative is a population objective of 1,500 to 1,600 pronghorn. The preferred sex ratio is 30 to 40 bucks per 100 does, observed. The lowest population level of the three alternatives will insure that there are plenty of resources available in all but the most severe winters. This was the population level and sex ratio levels agreed to by the participants at the Walden Public Meeting, in 2000.

MANAGEMENT RECOMMENDATIONS

A ground classification count should replace the fixed-wing aircraft classification. Ground classification counts should be done in July, because fawns are easier to identify and bucks are not as closely tied to fawn-doe groups. The routes should be done by GMU and each GMU assigned to a single CDOW person. That individual can assign other personnel to cover certain potions of his GMU. The classification should be done from one hour after sunrise to 10 AM and from 4 PM to one before sunset. In the middle of the day pronghorn blend into the landscape and are hard to spot. The ground classification method has produced more consistent, reliable results. Pronghorn hunting permits are allocated in three areas of North Park, as discussed earlier. More information should be gathered to determine what percentage of permits should be allocated to each area. Habitat improvement projects need to be planned that will produce more forbs in the sagebrush-grassland community of North Park.

APPENDICES

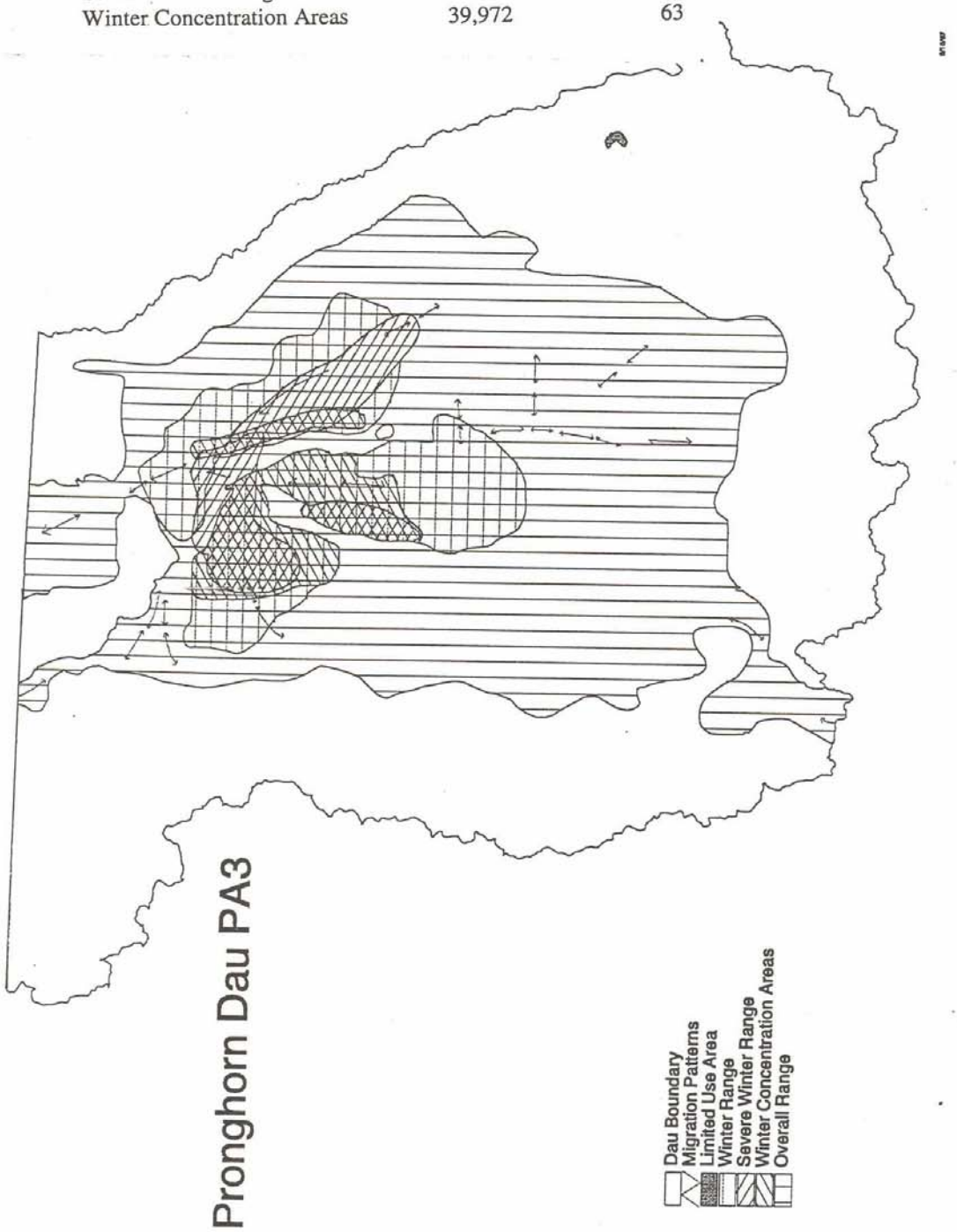
Pronghorn WRIS Map of North Park and Habitat Statistics

Bureau of Land Management Letter

Pojar's Pronghorn Survey of North Park

Population Spreadsheet Model for DAU A-3

Activity area	Acres	Square Miles
PRONGHORN		
Overall Range	484,817	757
Winter Range	99,135	155
Severe Winter Range	40,603	64
Winter Concentration Areas	39,972	63



United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Kremmling Field Office
1116 Park Ave.
P. O. Box 68
Kremmling, Colorado 80459
http://www.co.blm.gov/kra/kraindex.htm

IN REPLY REFER TO:

November 16, 2000

Mr. Jim Hicks, Terrestrial Biologist
Colorado Division of Wildlife
P.O. Box 775777
Steamboat Springs, CO 80477

Dear Jim:

Our office has reviewed the Data Analysis Unit Plans for North Park Antelope (DAU A-3) and North Park Deer (DAU D-3)and offer the following comments.

The proposed population objectives for antelope and deer seem reasonable and should be compatible with habitat conditions on public lands in North Park. The proposed population levels and corresponding sex ratios the Colorado Division of Wildlife has proposed for North Park antelope and mule deer in the plans should continue to offer high quality recreational opportunities and should assure the long term well being of these two important species as well. The population levels proposed for antelope and deer are should be compatible with other uses of public land which are projected to occur in the next five years, the life of the proposed DAU plans.

Both DAU plans indicated a need to address vegetative improvement, primarily on winter ranges, for antelope and deer in North Park. Our office is looking forward to working with the Colorado Division of Wildlife in identifying and completing habitat improvement projects which will improve habitat conditions for antelope and deer in North Park.

Please contact Chuck Cesar, Wildlife Biologist, if you have questions regarding public land management issues related to antelope and deer management in North Park. Thank you for the opportunity to review and comment on your proposed Data Analysis Unit plans for antelope and deer in North Park.

Sincerely,

Linda M. Gross
Field Manager

1998
NORTH PARK/BIG CREEK PRONGHORN SURVEY

T. M. Pojar

July 29, 1998

COOPERATORS: Rich Guenzel, Bob Lanka, and Steve Loose of the Wyoming Game and Fish; Joe Gerrans, Jim Hicks, Jim Olterman, Kirk Snyder, and J Wenum of the Colorado Division of Wildlife; Chuck Cesar, Kremmling BLM
STATISTICAL CONSULTANT: David C. Bowden, Colorado State University, Statistics Department
FIXEDWING CONTRACTOR: Sky Aviation, Worland, Wyoming; Pilot, Bill Cheney
HELICOPTER CONTRACTOR: High Country Helicopters, Montrose, Colorado; Pilot, Tom Fischer
SPONSORS: Colorado Division of Wildlife, Wyoming Game and Fish Department, State HPP Council, North Park HPP Committee, Middle Park HPP Committee, Owl Mt. Partnership, Kremmling BLM

Data collection was completed for the second year of a proposed 3 year study that compares fixed-wing line transect and helicopter random quadrat survey methods. Fixed-wing line transect surveys are time and cost efficient for surveying large areas. Although absolute enumeration of a pronghorn population may not be possible, helicopter quadrat surveys offer the least biased (most accurate) method of estimating pronghorn numbers. Helicopter surveys provide accurate estimates of pronghorn numbers but these surveys are relatively expensive to do, therefore, it is important to measure the difference between fixed-wing line transect and helicopter quadrat surveys to estimate a correction factor for fixed-wing line transect surveys. The correction factor can then be applied to fixed-wing line transect survey results in this and similar habitats to get a more accurate estimate of population size.

The quadrat survey was completed during May 29 and 30, 1998 and the fixed-wing line transect survey was done during June 7-9, 1998. Windy conditions prevailed during both surveys otherwise counting conditions were good. Both the fixed-wing and helicopter pilots were experienced in their respective survey methods and did an excellent job. Navigation for both surveys was by Global Positioning System (GPS) technology . Wyoming G&F personnel and CDOW personnel were observers for the fixed-wing line transect survey on the Wyoming and Colorado portions of the herd unit, respectively. T. Pojar was the primary observer for the entire helicopter survey with Wyoming G&F and CDOW personnel serving as navigator/secondary observer.

From the initial survey in 1997, we obtained a better understanding of the distribution of this pronghorn herd. Because of this, the area surveyed this year (1998) with the line transect method was expanded by 21 mi^2 (14.4%) in Wyoming and by 134 mi^2 (19.6%) in Colorado. The total area surveyed in 1997 was 828 mi^2 (146 mi^2 in Wyoming and 682 mi^2 in Colorado) and this year, 1998, it was 983 mi^2 with 167 mi^2 in Wyoming and 816 mi^2 in Colorado. The area surveyed with the quadrat method was the same for both years; the quadrat survey estimate for the expanded 1998 area was obtained by applying the mean density of the surveyed area to the unsurveyed area. The population size estimate and 90% confidence interval for the NP/BC herd based on the expanded area was: **Line Transect, 2,134 $\pm$ 17.1%** and **Quadrat, 2,736 $\pm$ 32.9%**. Therefore, our best estimate of the NP/BC herd for this year is 2,736 and the adjustment from line to quadrat results is 0.77; last year it was 0.74. With 2 years of data in this habitat type and pronghorn density, we can tentatively conclude that the line transect method should be adjusted upwards by

about 25%, or multiplied by 1.25, to more closely match the helicopter quadrat survey results. If the third year of comparison is as consistent as the first 2 years, we can then feel relatively secure in making this adjustment in line transect results in future years and in similar habitat types.

The following is a more detailed analysis of the comparison of the 2 methods. This is based on the original area (828 mi^2) delineated in 1997. Although a larger area was surveyed this year and is a better reflection of the actual herd size, the original area provides a better comparison of methods. The reason for this is that the area added this year was not surveyed with the quadrat method because of the additional expense that would have been involved and because comparison of the original (1997) area is sufficient for comparing the 2 methods. The expanded 1998 area was surveyed with the line transect method so the data set was "trimmed" for this comparison to fit the 1997 area.

From Table 1 it appears that the population declined from 1997 to 1998. The quadrat data show a decline from 2,607 to 2,170 (-16.7%) and the line transect data show a decline from 1,932 to 1,530 (-20.8%).

Table 1. Comparison of the 1997 and 1998 survey results for fixed-wing line transects and helicopter quadrat surveys for the North Park/Big Creek pronghorn population.

	1997 (May post 96)		1998 (Post 97)	
	Pop. Est.	**±90% C.I.**	**Pop. Est.**	**±90% C.I.**
Quadrat				
Big Creek	698	44	750	45
North Park	1,909	32	1,420	39
TOTAL	**2,607**	**26**	**2,170**	**29**
Line Transect				
Big Creek	670	42	611	39
North Park	1,262	34	919	31
TOTAL	**1,932**	**26**	**1,530**	**24**