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PRELIMINARY
ENVIRONMENTAL ASSESSMENT
for
KAMMA MOUNTAINS/ANTELOPE RANGE
FERTILITY CONTROL RESEARCH PROJECT

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Wild Horse and Burro Specialist
Winnemucca Field Office

ENVIRONMENTAL ASSESSMENT
KAMMA MOUNTAINS/ANTELOPE RANGE
WILD HORSE FERTILITY CONTROL RESEARCH

I. Introduction

A. Background Information

The Kamma Mountains Herd Management Area (HMA) and the Antelope Range Herd Area (HA) are scheduled for a maintenance gather in 1998 to reduce the wild horse population down to the appropriate management level (AML). The AML is 64 wild horses in the Kamma Mountains HMA, with a management range of 48 to 64. The AML was established in the Blue Wing/Seven Troughs Allotment Final Multiple Use Decision issued on December 6, 1994. The Sonoma-Gerlach MFP-III wild horse and burro decision 1.3 established that all wild horses and burros were to be removed from the Antelope Range HA.

The Antelope Range HA was gathered in July 1993. At the completion of the gather there were 39 wild horses released (10 years or older) in the Antelope Range HA in accordance with the selective removal policy. There were also 43 wild horses released in the Kamma Mountains that were relocated from the Trinity Range and Humboldt Range HA's.

The estimated 1997 wild horse population was 189 head, but a census conducted on December 1 and 2, 1997 found 267 head of horses and 3 mules in the proposed research area (see attached map).

B. Purpose and Need

The Kamma Mountains Herd Management Area (HMA) and the Antelope Range Herd Area (HA) have been selected to conduct preliminary population level fertility control research on wild free-roaming horses. The proposed research is to study the effect on population growth rates using two groups of mares. Two different types of controlled release immunocontraceptive vaccines would be used. Each group would receive one type of the vaccine.

The proposed project is a continuation of previous research on fertility control conducted in the Antelope/Antelope Valley HMA's (1992), Nevada Wild Horse Range (1996), and scheduled for the Fish Creek and Clan Alpine HMAs (1998). The immunocontraceptive vaccines that would be used in this project represent a refinement of the vaccine based on data obtained from

previous research. Development of an effective fertility control vaccine may lead to a reduction in the number of wild horses that need to be gathered nationally each year and increase the time period between maintenance gathers of excess wild horses. The results of the proposed research may lead to the development of a vaccine which could provide two to three years of contraceptive protection, with a minimum of disturbance.

C. Reference to Existing Environmental Assessments

This Environmental Assessment (EA) only analyzes the effects of fertility control on wild horses in the Kamma Mountains HMA and Antelope Range HA which have not been analyzed in previous EA's. The environmental impacts associated with selective removal of wild horse in the Kamma Mountains HMA were analyzed in EA No. NV-020-05-05, and the environmental impacts of different gathering techniques were analyzed in EA No. NV-020-7-24. Although not specifically addressed in the Sonoma-Gerlach MFP-III (Land Use Plan), the proposed project is within the intent of the land use plan. These documents are available for review at the Winnemucca Field Office.

D. Proposed Action and Alternatives

1. Proposed Action

The proposed action is to treat all mares in the Kamma Mountains HMA and Antelope Range HA that are 10 years of age and older, approximately 40 to 50, with a revised immunocontraceptive vaccine, porcine zona pellucidae (PZP). If there are not enough mares age 10 and older available in the population to satisfy the study criteria, mares would be taken from the next younger age class until the required number of animals are obtained (e.g. 9 year olds, then 8 year olds, etc.). The immunocontraceptive vaccine would inhibit reproduction in the following breeding season (1999). Wild horses that are 9 years of age and younger would be placed in BLM's Wild Horse and Burro Adoption Program, unless selected for the study. The gather and implementation of the proposed action is tentatively scheduled for February 1998.

The proposed action would test the effectiveness of two different controlled release formulations for the vaccine that would be injected by two different delivery methods. Each formulation would differ in its release pattern. One half of

the mares would be treated with each formulation. The two types of vaccine and their respective delivery method are presented below:

Formulation I. This formulation would consist of a liquid dose of PZP vaccine that contains a second and third booster dose sequestered in biodegradable microspheres. The microspheres are suspended in the liquid and are designed to release the PZP contained in them at several points in time during the first three months after injection. Each microsphere is smaller than a grain of salt. This formulation would be delivered as an intramuscular injection by hand held syringe into the mares in the working chute.

Formulation II. This formulation would be remotely delivered by a CO2 powered dart gun into the rump from 10 to 15 feet away. The mares would be restrained in the working chute during delivery of the dart. The dart would contain a liquid portion of PZP vaccine in its chamber, and a controlled release portion in the form of mini-rods (pellets) in the barrel of the dart needle. Upon dart impact the liquid in the chamber would be propelled into the muscle along with the mini-rods. The mini-rods would release PZP at several points in time during the first 3 months after injection. This delivery method has been previously shown to work.

All treated mares would be freeze branded on the left hip or shoulder with an "F" to enable the researchers to positively identify animals in the research project during the data collection phase. In addition to freeze branding, mares that are treated with formulation II would have their tails squared off.

The effectiveness of both treatments would be determined by counting foals produced in each of the next two years. Observations would be made from the ground utilizing binoculars and spotting scopes. Vehicular travel would be limited to existing roads.

2. Alternatives to the Proposed Action

A. Other forms of fertility control that were considered by the Nevada Wild Horse Pilot Fertility Project Tack Force were selective removal targeting one or the other sex, sterilization, and hormone implants. Selective removals targeting sex were not recommended due to doubts about its effectiveness. Sterilization was not recommended because of the invasive nature of the surgery required, lengthy post surgery recovery time, potential risk of death, and it is non-reversible. The use of hormonal implants was not recommended because of the invasive procedures required for implanting, and a lengthy recovery time prior to release. These alternatives would not meet the goals and objective of the proposed action. For these reasons, further analysis of these alternatives are not explored in this EA.

B. No Action

Excess wild horses would be gathered however implementation of the proposed action would not occur, and research data on the effectiveness of the immunocontraceptive vaccine would not be obtained. Development of an effective fertility control vaccine may be delayed.

II. Affected Environment

The proposed project area (see attached map) is located in a sagebrush-grass vegetative type. Slopes are flat to steep and soils are shallow to moderately deep.

For a more detailed description of the affected environment, please consult the Sonoma-Gerlach Grazing EIS and the Blue Wing Unit Resource Analysis. These documents are available for review at the Winnemucca Field Office.

The following critical elements of the human environment are not present and/or not affected by the proposed action: air quality, areas of critical environmental concern, cultural resources, environmental justice, prime or unique farm land,

flood plains, native American religious concerns, noxious weeds, threatened and endangered species, water quality, wetlands/riparian zones, wild and scenic rivers, or wilderness.

III. Environmental Consequences

A. Proposed Action

1. Wild Horses

Immunocontraception research on wild free-roaming horse herds in Nevada has been conducted on the Antelope/Antelope Valley HMA's (1992) and on the Nevada Wild Horse Range (1996) utilizing PZP injections. The Antelope/Antelope Valley HMA's research found that reproductive success was 4.5% using 2 injections, 20.0% using 1 injection plus microspheres, and 28.6% using 1 injection with no microspheres. Reproductive success for mares treated with a placebo was 55.0% and untreated mares were 53.9%, which was significantly greater than treated mares. The following year, without further treatment, reproductive success was 44.0% for mares treated with 2 injections, and 54.5% for untreated mares. Data from the other groups were insufficent for comparison (Turner et al. 1997).

The Nevada Wild Horse Range field study utilized three formulations of a revised controlled release PZP vaccine, with the mares broken up into three groups. The microspheres were designed for longer delay in release and contained adjuvant. Reproductive success was 12.8% for group 1 (2 injections), 10.6% for group 2 (2 injections) and 11.3% for group 3 (1 injection). The lack of difference in fertility rates indicated that the controlled release component in the 1 injection group provided vaccine exposure equivalent to a second injection of vaccine (Turner et al. 1997).

Results of fertility control research conducted to date indicate that PZP Immunocontraception is highly effective, and that the reproductive success of the mares returns to normal the year following fertility control. There would be no significant increase in stress above that normally associated with the processing and sorting of animals during a gather.

In the fertility control study on Assateague Island National Seashore (1987) the dart delivered PZP vaccine had no apparent effects on pregnancies in progress, the health of the offspring, or the

behavior of treated mares (Turner et al. 1997).

To attempt to predict population dynamics, two computer simulation were ran using the wild horse population model developed by Dr. Stephen Jenkins of University of Nevada, Reno (Jenkins 1996). The first simulation was based on a selective removal of horses 9 years of age and younger, without fertility control. The second simulation was based on a selective removal of horses 9 years of age and younger, with fertility control. Appendix 1 describes the basic assumptions and methodology used to conduct the computer simulation.

This model uses data on survival and reproductive rates of wild horses to predict population growth. The model uses a random process to simulate unpredictable future variation in survival and fecundity, reflecting the fact that future environmental conditions that may affect wild horse populations cannot be known in advance. The model uses a series of trials to project a range of possible population sizes after a given number of years, which is more realistic than predicting a single, specific population size.

The wild horse population model was run for one three year gather cycle (1998 to 2000) for both simulations. The model indicated that there would be a 60.9% decrease in foal production in 1999, but foal production in 2000 would return to normal or increase slightly (Average Age Distribution by Year, Appendix 1). The model indicates that there would be virtually no affect on the total population numbers in 2000 (Age Distibution by year, Initial vs. Final Age Distribution - with and without fertility control). The mean population growth rate per year with fertility control would be 12.1% as compared to 14.7% without fertility control (Average Growth Rate per Year, Appendix 1). The project would not have a significant impact on the sex ratio of the horses. The projected sex ratio in 2000 without fertility control was 46.2% female/53.8% male for the most typical population and, 50.0% female/50.0% for the least typical population. The projected sex ratio with fertility control was 47.8% female/52.2% male for the most typical population and, 49.7% female/50.3% male for the least typical population. The initial projected sex ratio prior to the gather was 49.4% female/50.6% male.

Results from the population modeling indicate that the proposed action would decrease foal production for one year but would not negatively impact the wild horse population in the three year gather cycle.

2. Waste, Hazardous or Solid

Syringes, darts, needles, vaccine containers, etc. used in the administration of the immunocontraceptive vaccine are considered regulated medical waste. Regulated medical waste must be placed in leak proof containers that are contained in a red plastic bag labeled medical waste. Medical waste must be handled and transported separately from other waste to an approved disposal facility.

The amount of regulated medical waste that would be generated by this project would be minimal and not result in any threat to the environment.

B. No Action

The effects of implementing selective removal were analyzed in the Winter 1995 Wild Horse and Burro Removal EA No. NV-020-05-05.

C. Mitigating Measures

All regulated medical waste (i.e. syringe, darts and needles) generated by the project would be placed in approved containers as specified in Nevada Administrative Code 444.662, and disposed of in accordance with Nevada Administrative Code 444.646.

VI. Consultation and Coordination

The following individuals were consulted during the preparation of this document:

Alan Berger	Animal Protection Institute of America
Cathy Barcomb	Nevada Commission for the Preservation of Wild Horses
Karen Sussman	International Society for the Protection of Wild Horses and Burros
Alan Rutberg	Humane Society of the United States
John Turner	Medical College of Ohio
Les Gould	Nevada Environmental Protection Division, Waste Management
Dawn Lappin	Wild Horse Organized Assistance

VII. Literature Cited

Jenkins, S. H. Wildhorse population model users guide version 3.2. Department of Biology, University of Nevada Reno. 1996

Turner, J. W., Jr, I. Liu, and A. Rutberg. Immunocontraception limits foal production in free-roaming feral horses in Nevada. J. Wildl. Manage. 61(3):1997

_____, J. W., Jr, I. Liu, A. Rutberg, and J. Kirkpatrick. Immunocontraception of free-roaming feral horses in Nevada summary of field studies in Antelope/Antelope Valley and Nevada Wild Horse Range. unpublished 1997

_____, J. W., Jr, I. Liu, A. Rutberg, and J. Kirkpatrick. Final report 1992-1996 Nevada Wild Horse Fertility Control Project (BLM cooperative agreement # 1422F950A20002. 1997

Appendix 1.

The basic parameters required by the model are initial population size, age-specific survival rate, age-specific fecundity (reproductive) rates for females, and sex ratio at birth. The initial population size was determined using the age structure from the horses released in the Antelope Range and Kamma Mountains (relocated from the Trinity Range and Humboldt Range HA's) after the 1993 gather, then running the model for a 4 year period to determine a probable age structure in 1997. There were 59 older horses released into the area in 1993. The model's "most typical" result showed a population of 143 in 1997. A census in December 1997 found 267 horses in the project area. The difference between the census and the model results (124 head) were assumed to be immigration and horses missed in the 1993 gather, which were assumed to have a "normal" age structure. The age- and sex-specific percentage of population for yearlings and older, determined from analysis of data from the 1987 and 1993 gathers in the Blue Wing-Seven Troughs and Antelope Range were applied to these horses. Foals were determined by percent by sex from the census result (32 foals). Age-specific survival data are lacking for the Kamma and Antelope horses. The initial survival rates used were those from the Garfield Flat, Nevada area, a long-term study which began in 1992. Foaling rate was determined from an analysis of 1987 and 1993 gather data. In 1987, 482 mares aged 2 years and older produced 270 colts, which is a fecundity rate of .560. In 1993, 98 mares aged 2 and older produced 58 colts, for a fecundity rate of .592. Averaging the two gives .576 which is used in the model. Since age-specific fecundity data for the area is not available, the .576 rate was assigned to all mares aged 2 and older. Sex ratio at birth was determined from gather data and was determined to be 48.2 percent males.

The model uses "coefficients of variation", which are indices of year-to-year variation in adult mortality, foal mortality and foaling rate, to simulate unpredictable variation in environmental conditions. Estimating these coefficients requires long-term demographic data, which are unavailable for the study area. Therefore, the program default values were used.

The model was run under two sets of conditions: one using no fertility control, and the other assuming a one year fertility drug was used that was 95 percent effective. Other initial conditions for the simulation included a 3 year gather cycle, 90 percent of horses are gathered, all horses 0-9 years of age are removed and no horses 10 years or older are removed, and gather when the population reaches 64 (the AML for the area). This ensures a gather will take place the first year. For both simulations, 30 individual trials were run, the default (the program allows 1-50). The model was run for one three year gather cycle only. No attempt was made to speculate as to future conditions beyond this time.

For a detailed description of the model, see the User's Guide (Jenkins 1996).

INITIAL Population Parameters						
Age	**Initial**		**Survival**		**Fecundity**	
	Females	Males	Females	Males		
0	17	15	.976	.917	.000	
1	23	17	.977	.972	.000	
2	18	16	.997	.972	.576	
3	13	15	.976	.991	.576	
4	8	5	.975	.991	.576	
5	7	4	.973	.991	.576	
6	6	4	.972	.991	.576	
7	4	5	.971	.990	.576	
8	4	5	.969	.990	.576	
9	1	3	.967	.987	.576	
10	2	1	.965	.988	.576	
11	0	0	.962	.986	.576	
12	1	1	.959	.984	.576	
13	0	0	.955	.981	.576	
14	9	6	.951	.978	.576	
15	6	4	.950	.973	.576	
16	3	7	.940	.967	.576	
17	4	4	.934	.959	.576	
18	0	7	.927	.948	.576	
19	2	5	.919	.933	.576	
20	3	3	.909	.914	.576	
21	0	0	.898	.889	.576	
22	1	4	.886	.857	.576	
23	0	1	.872	.816	.576	
24	0	3	.856	.764	.576	
25	0	0	.000	.000	.576	
total	132	135	-	-	-	

AGE DISTRIBUTION BY YEAR
(Average of 30 Trials)

	Initial	With Fertility Control			No Fertility Control		
Age/Year	1997	1998	1999	2000	1998	1999	2000
0	32	22	9	28	21	23	26
1	40	3	21	9	4	20	21
2	34	4	3	21	4	3	20
3	28	3	4	3	3	4	3
4	13	3	3	4	3	3	4
5	11	1	2	3	2	3	3
6	10	1	1	2	1	1	3
7	9	1	1	1	1	1	1
8	9	1	1	1	1	1	1
9	4	1	1	1	1	1	1
10	3	1	1	1	1	1	1
11	0	3	1	1	3	1	1
12	2	0	3	1	0	3	1
13	0	2	0	3	2	0	3
14	15	0	2	0	0	2	0
15	10	14	0	2	14	0	2
16	10	10	14	0	9	14	0
17	8	10	9	13	9	9	13
18	7	8	9	9	8	9	8
19	7	7	7	9	7	7	9
20	6	7	6	7	6	6	7
21	0	6	6	6	6	6	6
22	5	0	5	5	0	5	5
23	1	5	0	5	4	0	4
24	3	1	4	0	1	4	0
25	0	2	1	3	2	1	3
TOTAL	267	113	116	135	112	128	146
Range		84 - 127	74 - 138	93 - 175	69 - 127	80 - 152	92 - 175

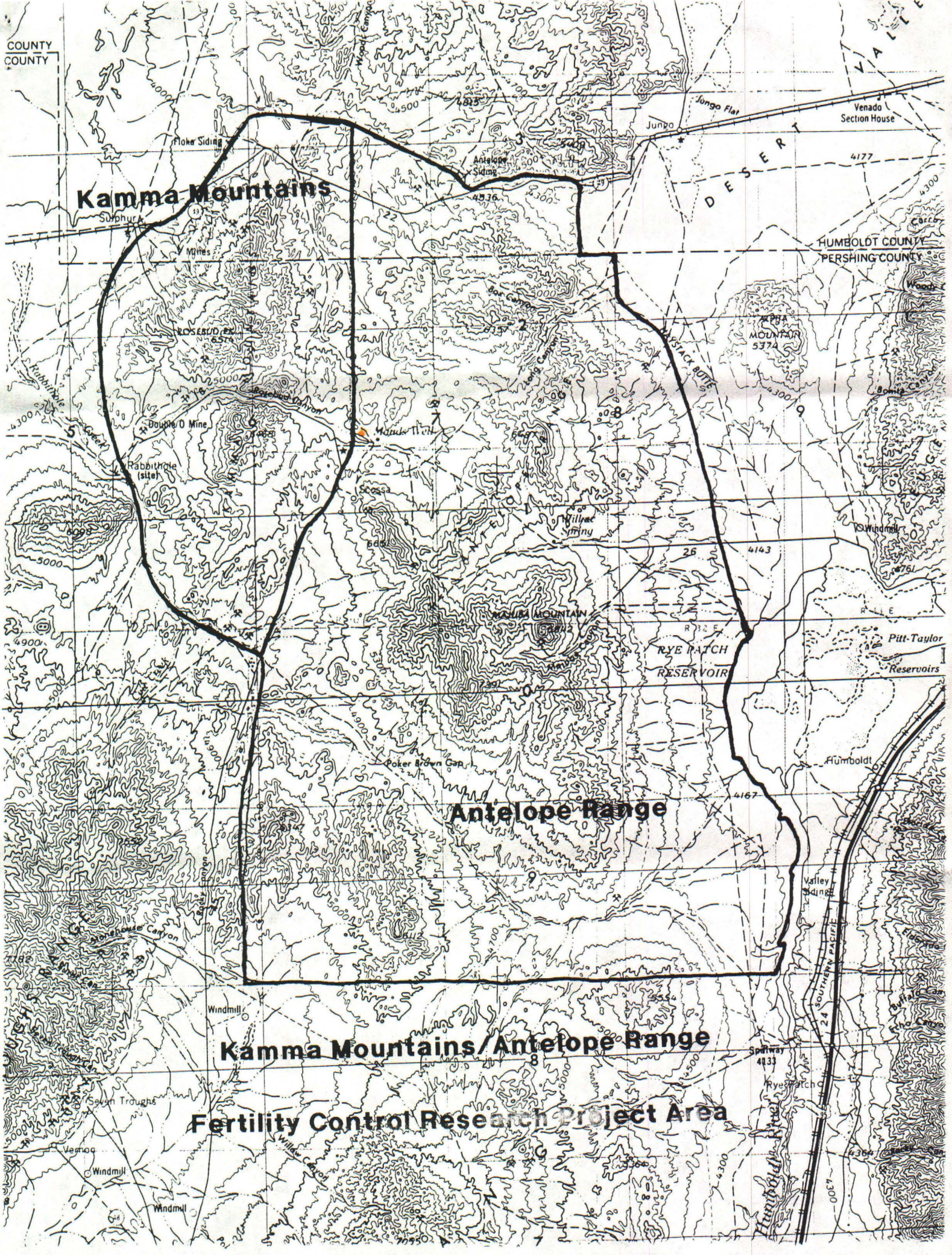
Note: Total is the mean of the totals for the 30 trials, not the sum of the means of the individual age classes.

INITIAL vs. FINAL AGE DISTRIBUTION
(With Fertility Control)

Age	Initial		Most Typical		Least Typical	
	Females	Males	Females	Males	Females	Males
0	17	15	17	12	19	24
1	23	17	3	6	8	3
2	18	16	10	10	19	13
3	13	15	1	0	4	1
4	8	5	3	3	1	2
5	7	4	0	1	0	1
6	6	4	0	1	1	1
7	4	5	1	0	3	1
8	4	5	1	0	1	0
9	1	3	1	1	0	1
10	2	1	0	1	1	2
11	0	0	0	0	1	0
12	1	1	0	0	0	1
13	0	0	1	1	2	1
14	9	6	0	0	0	0
15	6	4	1	1	1	1
16	3	7	0	0	0	0
17	4	4	9	6	8	6
18	0	7	4	4	6	4
19	2	5	3	6	3	6
20	3	3	4	3	3	4
21	0	0	0	6	0	6
22	1	4	2	3	2	4
23	0	1	2	2	3	2
24	0	3	0	0	0	0
25	0	0	1	3	1	4
Total	132	135	64	70	87	88
%	49.4	50.6	47.8	52.2	49.7	50.3

INITIAL vs. FINAL AGE DISTRIBUTION (No Fertility Control)						
Age	**Initial**		**Most Typical**		**Least Typical**	
	Females	Males	Females	Males	Females	Males
0	17	15	13	16	8	9
1	23	17	10	9	13	2
2	18	16	9	10	6	12
3	13	15	3	2	4	2
4	8	5	1	2	4	3
5	7	4	4	3	0	2
6	6	4	0	0	1	1
7	4	5	1	0	0	0
8	4	5	1	0	1	0
9	1	3	0	1	0	0
10	2	1	0	1	0	0
11	0	0	0	0	0	0
12	1	1	0	0	0	2
13	0	0	2	0	2	1
14	9	6	0	0	0	0
15	6	4	1	1	0	1
16	3	7	0	0	0	0
17	4	4	7	6	4	3
18	0	7	5	4	2	2
19	2	5	2	6	1	3
20	3	3	4	4	0	3
21	0	0	0	6	0	0
22	1	4	1	4	0	0
23	0	1	2	2	0	0
24	0	3	0	0	0	0
25	0	0	1	1	0	0
total	132	135	67	78	46	46
%	49.4	50.6	46.2	53.8	50.0	50.0

AVERAGE GROWTH RATE PER YEAR (%)		
Trial	**With Fertility Control**	**No Fertility Control**
1	15.8	15.9
2	6.1	10.3
3	19.2	17.1
4	17.3	13.0
5	13.4	14.7
6	16.8	17.0
7	8.5	17.4
8	8.9	10.4
9	14.1	12.8
10	1.1	14.6
11	20.5	17.2
12	-1.7	11.3
13	20.9	17.3
14	8.6	18.6
15	17.2	14.0
16	12.0	12.8
17	5.2	18.6
18	12.2	0.4
19	12.9	10.2
20	6.0	20.0
21	13.4	15.6
22	14.9	20.6
23	15.1	18.8
24	12.2	17.3
25	5.5	18.2
26	19.6	-2.4
27	19.1	21.7
28	0.4	19.0
29	14.3	18.0
30	13.3	9.3
MEAN	12.1	14.7
MINIMUM	-1.7	-2.4
MAXIMUM	20.9	21.7
LO LIMIT	9.8	12.6 (95% confidence limits)
HI LIMIT	14.4	16.7 (95% confidence limits)


Kamma Mountains
Antelope Range
Kamma Mountains/Antelope Range
Fertility Control Research Project Area
HUMBOLDT COUNTY
PERSHING COUNTY
DESERT VALLEY
Jungo
Jungo Flat
Venado
Section House
Antelope Siding
Floke Siding
Sulphur
Mines
Rabbithole (site)
Double O Mine
Rosebud Canyon
Scossa
Willow Spring
Windmill
Alpha Mountain 5374
Haystack Butte
Long Canyon
Bear Canyon
Rye Patch Reservoir
Pitt-Taylor Reservoirs
Poker Brown Cap
Humboldt
Valley Siding
Spillway 4033
Rye Patch
Seven Troughs
Vernon
Windmill
Windmill
Windmill
Willow Canyon
Stonehouse Canyon
Southern Pacific
Humboldt River

January 15, 1997

Tom Seeley, Wild Horse Specialist
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Winnemucca, NV 89445-2921

RE: Kamma Mountain/Antelope

Dear Tom,

Thank you for the opportunity to review and comment on the Kamma Mountains/Antelope gather and fertility control projects. Some of our observations include:

The AML was established in the Blue Wing/Seven Troughs FMUD 1994. A gather plan was completed in 1994 for a winter gather in 1995.

A model was completed based upon gathers in 1987 and 1993. Files might document an emergency gather rather than the gather plan for 1995.

The latest gather removed 2,800 animals from the 1.5 million acre allotment affecting many HMA's. Records would indicate that the wild horses and burros were miscalculated by 1,000 head; thus many errors in the present AML or carrying capacity is documented.

The model had to assume immigration to confirm the December 1997 census of 267 horses comprised of 225 adults and 32 foals. Recruitment rate of 14% in 1997. In 1993, 59 older (10+) horses were released. Using Winnemucca's assumption of 11% recruitment the 1997 population would be 90 head. Your model assumes over 50% fecundity based upon the observed 98 mares with 58 foals in 1993. I assume that the predicted 143 head without immigration would have been supported by over 50% recruitment per year.

In any event, the District's inability to census horse distribution will causes some concern with the experimental nature of this project. A complete gather will produce age, sex, and production data for 1997. This data should be computed to the predicted model to validate the entire process. However, if immigration continues it may erode any meaningful information in the next three year cycle.

The document goes into greater detail than any thing previously prepared by the District. We greatly appreciate the time and effort you put forth with such a complete document. This can be tested and if monitored it could lead to a statistically validated model.

Sincerely,

CATHERINE BARCOMB
Administrator