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United States Department of the Interior

BUREAU OF LAND MANAGEMENT
ELKO DISTRICT OFFICE
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ELKO, NEVADA 89801

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
4710.4(NV-015)

NOV 25 1992

CPWH&B
c/o Cathy Barcomb
Stewart Facility
5500 Snider Ave.
BLDG-6, Rm 137
Carson City, NV 89710

Dear Ms. Barcomb:

Enclosed is a copy of the Final Antelope Valley Herd Management Area Plan for your information. We are sending it to those individuals who commented on the draft and/or requested the final document.

Thank you for taking the time to review the draft document; the comments we received were informative and useful. We addressed all of the comments and incorporated many in the final plan.

If you have any questions or comments, please contact Bill Baker at (702) 753-0200 or write to the above address.

Sincerely yours,

RODNEY HARRIS
District Manager

Enclosure

1992

Final

ANTELOPE VALLEY WILD HORSE HERD MANAGEMENT AREA PLAN

WELLS RESOURCE AREA

ELKO DISTRICT

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ANTELOPE VALLEY HERD MANAGEMENT AREA PLAN

I. INTRODUCTION

A. Location and Setting

The Antelope Valley Herd Management Area (HMA) is located approximately 105 miles southeast of Elko, Nevada in the southeastern most portion of the Wells Resource Area (RA). Maps 1 and 2 in Appendix 1 show general location of the HMA and the HMA itself. The herd area boundary to the east is the Nevada/Utah State line. The boundary on the north is roughly White Horse Pass and the Ibapah road. The boundary goes northwest through Antelope Valley until it reaches the Nevada Northern rail line. The Elko-White Pine County line is the southern boundary and is also the Ely/Elko Bureau of Land Management (BLM) District boundary. The western boundary follows the Nevada Northern rail line to the northern end of the Dolly Varden mountains. The herd area encompasses a total of 401,500 acres, with 400,000 acres of public land and 1,500 acres of private land which is scattered in small parcels throughout the HMA. The Wells RA has administrative responsibilities for the entire HMA and the HMA is completely contained in the Currie Planning Unit.

The Antelope Valley HMA lies just north of the Antelope HMA (Ely District, Schell Resource Area). Each resource area is responsible for the administration of its own herd area. Therefore, the Antelope Valley Herd Management Area Plan (HMAP) will address only those issues and management objectives related to the wild horses within the Elko District. There is considerable movement of horses between the two herd areas due to seasonal differences in forage and water availability. Therefore, all management actions will be closely coordinated between the districts.

B. Background Information

The Antelope Valley HMAP is designed to manage the wild horse population inhabiting the Antelope Valley HMA in accordance with Washington Office Instruction Memorandum 83-289, Title 43 Code of Federal Regulations (Part 4700), and Nevada State Office Draft Manual Supplement 4730.6. The wild horse population will be managed as a component of the public lands in a manner that maintains or improves the rangeland ecosystem and promotes a thriving natural ecological balance with all other users and resources. The HMAP adheres to the multiple use policy specified in the Wild Free Roaming Horse and Burro Act of 1971 (P.L. 92-195) as amended, and the Federal Land Policy and Management Act of 1976 (FLPMA, P.L. 94-579), while maintaining the free roaming behavior of the wild horses within the HMA.

Preparation of a wild horse herd management plan designed to manage the wild horses within the Antelope Valley HMA, using multiple use principles, was recommended by the Wells Resource Management Plan (RMP, Elko District, Bureau of Land Management, U.S. Department of the Interior, 1983). There are currently no HMAPs for any of the HMAs in the Elko District. The BLM Strategic Plan for the Management of Wild Horses and Burros on Public Lands (June 1992) directs the Wells Resource Area to implement a pilot fertility control project using the HMAP as a framework for this action.

The allotment evaluations and multiple use decisions will set Appropriate Management Levels (AMLs) for wild horses in that portion of the HMA within the Antelope Valley, Badlands, Boone Springs, Currie, Ferber Flat, Spruce, Sugarloaf, Utah-Nevada #1, West Whitehorse and Whitehorse Allotments. The Final Multiple Use Decisions (FMUDs) will also set stocking rates for livestock. Because the allotments identified above do not currently have FMUDs in place, the Wells RA will not remove any wild horses from the range at this time. At such time as final decisions are issued concerning wild horse AMLs, the HMAP will be updated to reflect those decisions.

The Antelope and Antelope Valley HMAs were chosen for a pilot fertility control study in conjunction with a selective removal on the Ely District. Population/fertility control will now be implemented within the State of Nevada on a trial basis due to the significant rate of animal increase and the high cost of having to repeatedly remove the excess wild horses. The Antelope Valley HMAP will direct the use of fertility control methods and will address specific objectives related to fertility control. Because the wild horses within the Elko District's Antelope Valley HMA and the Ely District's Antelope HMA intermix freely without obstruction or impediment, all fertility control methods, census, removals, and other management actions will be closely coordinated between the districts.

C. Resource Information

1. Wild Horse Population Information

a. Wild Horse History

Horses have been a part of the range environment at least since contemporary livestock use began. Often, homesteaders, ranchers, and miners would turn horses out on the range during the winter when they were not needed for work animals. In the spring, horses were rounded up, sorted, and some were kept for use. Those not needed at the time were either released, destroyed or sent to slaughter houses. There were usually quite a few horses that were never captured because they had gone wild. These horses remained free and reproduced, providing a fairly stable

source of horses. Numbers typically did not become excessive due to frequent roundups.

There is some evidence that the Army Remount Service was active in at least part of the area during the early 1900's through 1940. Remount stallions, mostly thoroughbreds and Morgans, were periodically released on the range as breeding stock for desired offspring. A few draft horses were also introduced to provide sturdier horses for pulling supply wagons and heavy artillery. Existing, undesirable stallions were often shot to give the remount stallions breeding dominance.

In 1971, the Wild Free-Roaming Horse and Burro Act was passed protecting wild horses. Prior to the passage of the Act, populations were kept under control by ranchers and others who would remove horses for use or to sell to slaughter houses. As a result of protection, the population in the Antelope Valley HMA has increased dramatically and conflicts with other users are intense. The BLM has removed horses to keep population levels in check but the Antelope Valley HMA continues to show a high rate of population increase. There is much seasonal movement between the Ely and Elko HMAs. Management efforts have been and will continue to be coordinated between districts.

Wild horse population levels were not documented prior to the first aerial census conducted in 1975. Several censuses have been conducted since that time and numbers counted are shown in Table 1. The latest census map is located in Appendix 1, Map 3.

Table 1. Census Data for Antelope HMA (Ely) and Antelope Valley HMA (Elko).

Date	Antelope	Antelope Valley	Total
3/75	275	408	683
78	149	449	598[c]
3/79	425	122[a]	547
2/80	167	191	358[b]
5/81	288	164	452
5/83	303	249	552
6/85	451	267	718
2/87	782	366	1,148[b]
2/88	528	no census	528[b]
7/88	no census	131	131[b]
3/90	753	418	1,171
10/90	574	no census	574[b]
2/91	331	366	697[b]
2/92	468	545	1,013

[a]Incomplete census in Elko District
[b]Post removal census
[c]Claimed trespass horses were removed from Antelope Valley/Antelope HMAs during 1974-1978

Periodic removals have occurred in the Antelope and Antelope Valley HMAs. Table 2 shows numbers of wild horses removed from each area.

Table 2. Wild Horse Removals in the Antelope HMA (Ely) and the Antelope Valley HMA (Elko).

Date	Antelope	Antelope Valley	Total
8/78	41	0	41
1/80	340	361	701
9/86	107	0	107
2/87	58	340	398
1/88	526	118	644
7/88	0	175	175
9/90	412	0	412
2/91	225	0	225

b. Present Situation

i. Wild Horse Habitat and Use Areas

Wild horse habitat in the Antelope Valley HMA is currently being analyzed using the procedures set forth in the Nevada Rangeland Monitoring Handbook (Sept. 1984). Preliminary results from the analysis indicate that competition for winter forage in the winter use areas is the most limiting factor in the Antelope Valley HMA. Water, cover, and space seem to be less restrictive than forage availability in terms of supporting the wild horse population. However, limited water during certain times of the year causes high numbers of horses to move out of the HMA.

Detailed information concerning rangeland monitoring data within the HMA, can be found in the allotment monitoring files located in the Elko District Office.

Wild horse use areas and seasons of use are shown in Map 4, Appendix 1. There are seven broad use areas in the HMA: the Dolly Varden Mountains, the Currie Hills, the Boone Canyon area of the Antelope Range, Antelope Valley, Ferber Flat, Kingsley Draw and Steptoe Valley. The mountain ranges are generally used in the summer months and the valleys are used more in the winter months, although, depending on weather conditions, small numbers of horses can be found year round in all areas. The Currie Hills are used year round as they are low and rolling.

Horses will usually stay in the Antelope Valley HMA during the winter months if snow is available. Water is more of a limiting factor in the Antelope Valley HMA; thus, some horses tend to emigrate to the Ely District during the dry summer months and return when snow becomes available in winter. Forage availability is more limiting in the Antelope HMA and some animals from the Ely District will move into the Antelope Valley HMA during winter months.

ii. Population Demographics

Demographic data on the wild horses of the Antelope Valley HMA is in short supply due to the fact that the Antelope Valley removal data has been incorporated in the Antelope HMA (Ely District) removal data by the BLM's wild horse processing center, Palomino Valley Center (PVC). The Elko District has determined that using the demographic data collected throughout Nevada will provide better data because of the large sample size (33,930 horses). Age structure, age specific sex ratios, survival rates, and rates of increase are all calculable from removal data. Figure 1 shows the average age structure based on removals throughout the state from 10/1/86 to 8/20/91.

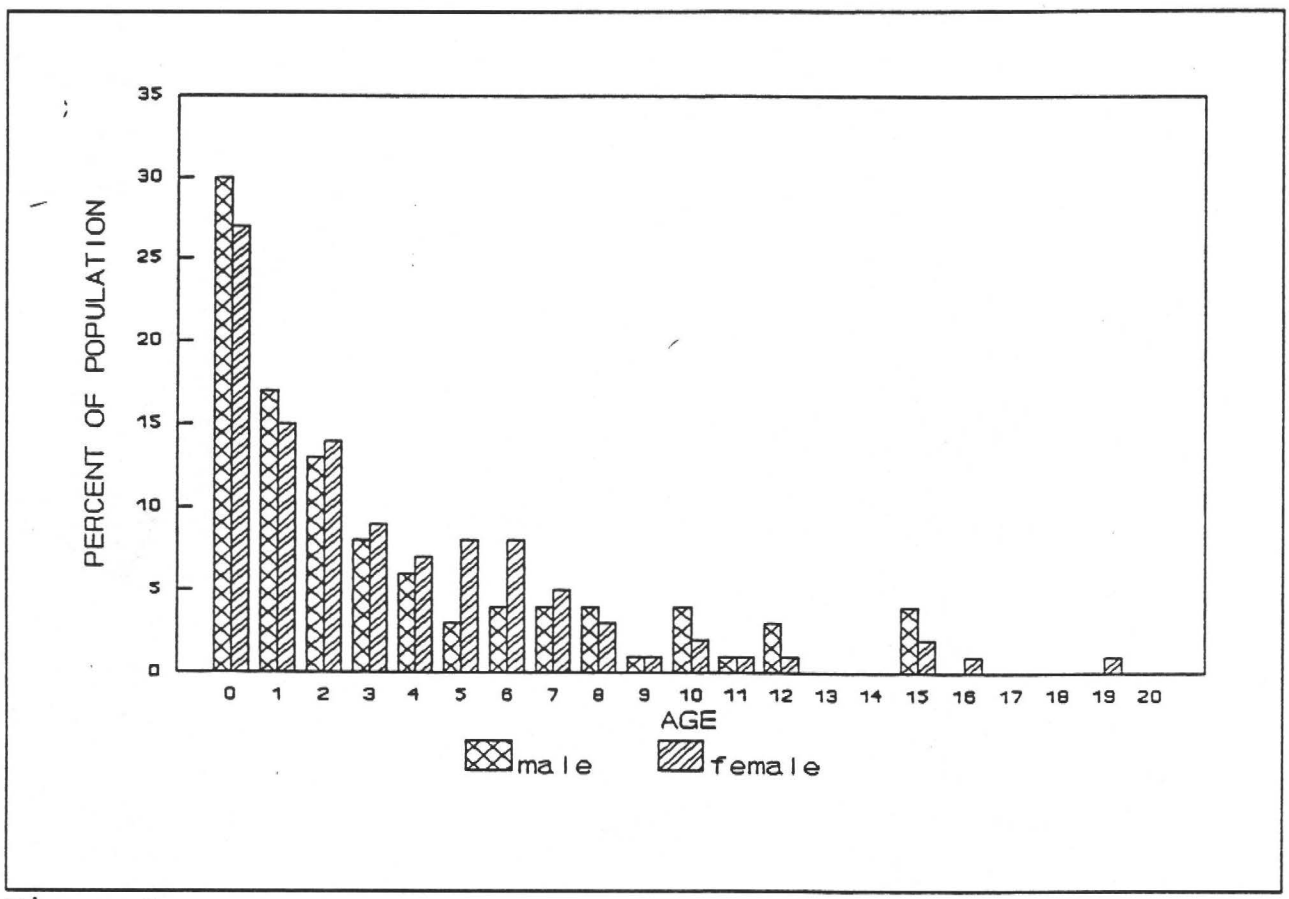

Figure 1. Age Structure of the Wild Horses in Nevada.

Age structure is useful in determining the direction a population is headed. For example, a population with many young animals is an increasing population and a population with many older animals is usually decreasing. The wild horse population in the Antelope Valley HMA is increasing fairly dramatically as shown by the fact that approximately 64.6% of the population is four years old and younger (based on data collected throughout Nevada and data collected from the 1988 Elko-Ely horse removal). The life-span of wild horses is believed to average 20-25 years, thus those horses that were being recruited to the population in 1971 (year the Act was passed), are just now reaching old age. One reason the older age classes are so small is because with the smaller population in the early 70's, the number of young born each year was smaller giving us fewer 15-20 year olds in the early 90's.

Survival rates and rates of reproduction are factors of population demographics which give insight into the health and vigor of a population. Several computer models exist which provide these data using representative samples of a population, in this case using data from removals. Dr. Walt Conley, from New Mexico State University has developed models which can be used for wild horse population analysis. These models are currently being revised since statistics derived from them are not totally accurate reflections of wild horse populations in Nevada. When the models are revised, new calculations will be made using herd specific data.

The data from horses removed throughout Nevada was input to the models and age specific survival rates (and inversely, mortality rates) as well as annual rate of increase were calculated. The annual rate of increase derived from the model was 18%. However, when a reproductive rate is calculated using actual data from the 1988 Antelope Valley HMA removal using the following formula from the BLM Manual Supplement 4730, an annual reproductive rate of 25% is shown.

$$\text{REPRODUCTIVE RATE} = \frac{\text{NUMBER OF ANIMALS 0-1 YEAR OF AGE}}{\text{NUMBER OF ANIMALS 1 YEAR AND OLDER.}}$$

This rate is quite high and probably not reliable due to the small sample size. The 18% reproductive rate will be used when projecting the Antelope Valley HMA herd size.

Figure 2 shows calculated age specific survival rates for both males and females.

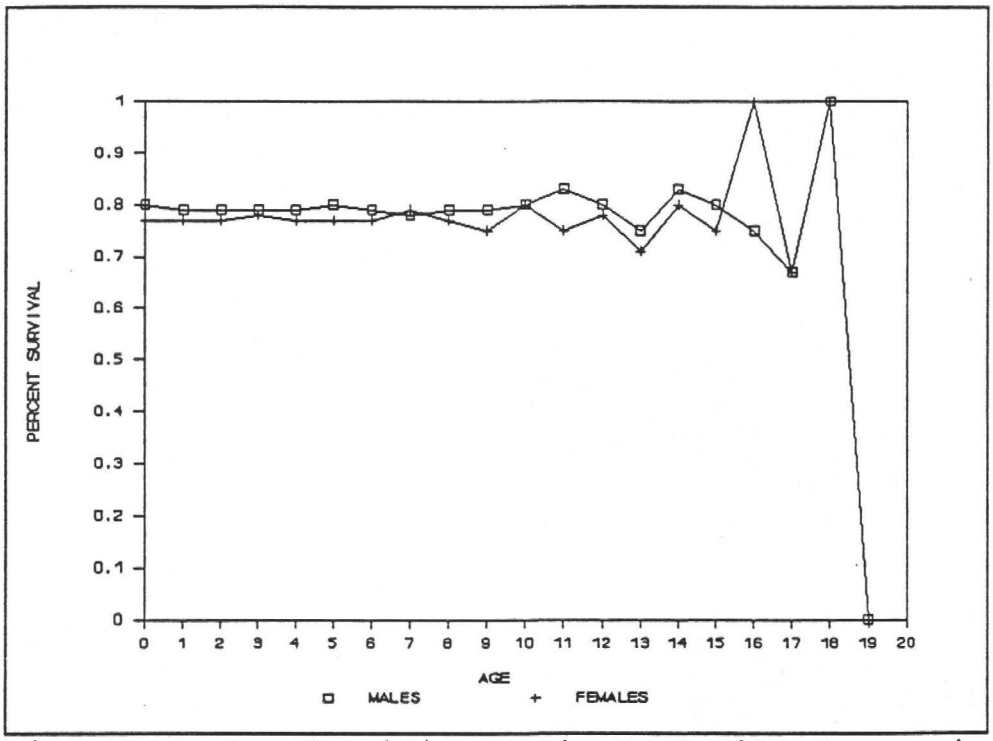

Figure 2. Age Specific Survival of Wild Horses in Nevada.

To date, there have been no genetic studies conducted on the horses in the Antelope Valley or Antelope HMA. Overt characters, such as coloration and conformation are evident from animals removed from the range, but the Elko District has no individual data from the 1988 or prior removals as all removal data was combined with Ely District removals. There is much intermixing of the horses and therefore genetic mixing between the herds, so this HMAP will use the combined data derived from the Elko/Ely District removals and the Ely District removal data.

At least one partial albino was noted during the 1990 removal as well as some potentially primitive bloodlines. Table 3 shows percentages of each color variation found in the HMA.

Band structure within the HMA is derived from census data and field observations. Band size ranges from 1 to 10 animals but varies depending on the total population size. When the population is large, band sizes increase and conversely when the population is smaller, band sizes decrease.

Bands typically have one stallion and several mares. Data is sketchy concerning average numbers of each sex per band because it is not practical to sex the animals during aerial census. Sexing animals in the field is rarely possible due to distance of the animals and the fact that animals are usually running from the observer.

Table 3. Percentage of Color Variations in the Antelope/Antelope Valley HMA.	
Color	Percentage
Sorrel	38
Bay	26
Brown	13
Black	8
Strawberry Roan	3
Buckskin	3
Dun	3
Red Roan	2
Palomino	1
Grulla	1
Blue Roan, Pinto, White, Gray, Appaloosa	2

A few horses, classified as duns, show the primitive characteristics of the "Spanish Barb". These traits include a general buckskin color with a dark dorsal stripe down the back, black zebra stripes on the legs and a black mane and tail with blonde mixed in. There is controversy over whether these characteristics are primitive or not and the purity of the bloodlines is questionable. However, any horses exhibiting these traits will be excluded from fertility control measures and removals.

Overall, the condition of the horses is fair at this point. However in the late 80's and early 90's, when population levels were excessive, many horses that were removed were in poor condition and exhibited stunted growth. The removals from 1986-1991 eased competition for forage in both HMAs.

2. Reference to the Resource Management Plan

Final Multiple Use Decisions (FMUDs) will be issued in the future resulting from the Wells Resource Management Plan (RMP). These decisions will be the final step in the Allotment Evaluation process which is directed by Washington Office Instruction Memorandum No. 86-706 and NV Instruction Memorandum No. 87-270. Multiple use decisions are done on a grazing allotment in conformance with the RMP. Wild horse herd management areas may

cover several allotments but it would be impossible to allocate forage for all users on an HMA basis. Therefore, all allocations of forage are being made through the allotment evaluation process.

A map of the ten allotments in relation to the Antelope Valley HMA is found in Appendix 1, Map 5. The ten allotments make up approximately 100% of the HMA. The pending FMUDs on these allotments will make forage allocations for all users including setting AML's for wild horses. Once AML's have been established for all allotments, a total AML will be equal to the sum of the AML's for each allotment. Wild horses will not be restricted to the exact number in each allotment but will be kept at or near the total AML for the HMA. The specifics of how the allocations will be made, the rationale for the allocations, use areas, seasons of use for livestock, evaluation data, etc. will be provided through the allotment evaluation and multiple use decision process.

3. Other Resources and Uses

Livestock grazing is the most significant consumptive use within the HMA and conflicts with wild horses have been severe. However, the RMP which directs grazing management has established a framework to reduce competition and increase forage for all users. This will be finalized in more detail through the allotment evaluation and multiple use decision process. See Appendix 2 for more information on livestock, wildlife and other uses within the HMA.

II. OBJECTIVES

A. RMP Objectives

The Wells Resource Area Management Decisions Summary and Record of Decision (ROD, RMP, BLM, 1985) outlined four objectives for wild horse management in the resource area:

> Continue to monitor wild horse populations and habitat conditions. Develop Herd Management Area Plans in the following sequence: Maverick-Medicine, Goshute, Antelope Valley, Cherry Creek, Spruce-Pequop and Toano.
>
> Conduct wild horse gatherings as necessary and maintain populations within a range from 550 to 700 animals. The Toano Herd would be maintained at 20 animals.*
>
> Construct six water development projects (catchment types) with storage tanks and troughs. Two have already been constructed leaving four. One to four

water developments will be constructed in Antelope Valley.

Remove wild horses from private lands if required.

* Note: IBLA decisions 88-591, 88-638, 88-648, 88-679, dated June 7, 1989, stated that initial stocking levels given in land use plans were not to be used as AMLs but that AMLs must be based on monitoring data. AML will be determined through the allotment evaluation process and will be based on the analysis of monitoring data.

In 1986, the Wells Rangeland Program Summary (RPS) outlined six grazing management objectives for the resource area. The Antelope Valley HMA is subject to those objectives which are as follows:

Improve and maintain a sufficient quantity, quality and diversity of habitat and forage for livestock, wildlife and wild horses through natural regeneration and/or artificial methods.

Improve the vegetation resource by providing for the physiological needs of key management species.

Reduce soil erosion and enhance watershed values by increasing ground cover, density of vegetation, litter and stabilizing riparian vegetation.

Improve and maintain the condition of aquatic and riparian habitat.

Improve the health and productivity of wild horses by maintaining a thriving natural ecological balance of wild horses on public lands.

Improve rangeland habitat to attain reasonable numbers of big game.

B. Habitat Objectives

The BLM Strategic Plan for Management of Wild Horses and Burros on Public Lands (1992) states that there will be increased program emphasis on wild horse habitat management. Specific wild horse habitat objectives for the Antelope Valley HMA include the following:

1. Vegetation

Manage for the most appropriate seral stages to provide for desired quantity, quality, and density of forage in order to meet the requirements of the wild horses and other foraging animals.

In general, utilization levels will be maintained at approximately 45% on shrubs and 55% on grasses which is in accordance with the recommended utilization levels in the Nevada Rangeland Monitoring Handbook (1984).

2. Distribution and Water Availability

Improve distribution and provide water yearlong for wild horses throughout the HMA where possible.

C. Wild Horse Objectives

1. Multiple Use

The objective in the Antelope Valley HMA is to maintain a healthy, viable population of wild horses in a thriving natural ecological balance with all other resources and users.

2. Appropriate Management Level (AML)

When the allotment evaluations are complete (prior to 1994), a total AML for the HMA will be determined. The number of horses will be maintained within a range of ± 15% of AML.

AML will be maintained using one or more of the following options: periodic removals with no selectivity, selective removals targeting specific age groups, or fertility control. The objective of the selective removals and fertility control is to decrease the reproductive rate in the wild horse population so removals are not necessary more than once every four years. The reproductive rate is now at least 18% annually; the objective is to reduce the rate by at least 10%.

3. Free-Roaming Characteristics

The wild horses within the Antelope Valley HMA will be managed in a manner that maintains their wild free-roaming characteristics.

4. Coloration and Conformation

The wild horses within the Antelope Valley HMA which exhibit the "Spanish Barb" characteristics will be maintained within the population. Fertility control treatments and or removals in the future will exclude those horses that obviously exhibit those traits. No other characteristics or conformations will be selected. Only those animals with gross deformities or disease will be eliminated from the herd.

III. MANAGEMENT METHODS

A. Habitat Management

1. Vegetation

Managing for the most appropriate seral stages to provide forage needed for grazing animals will be accomplished by maintaining the wild horse population at AML as determined through monitoring (see Management Methods for wild horse populations). Management of livestock through the allotment evaluation and decision process is also necessary to attain vegetation objectives. Fertility control and future selective removals of wild horses will have a direct impact on seral stage condition by reducing the forage utilization in critical areas. By reducing the rate of increase in wild horses, it will be easier to manage and maintain reasonable population levels which will help achieve appropriate seral stages.

Monitoring data to be collected in conjunction with the range and wildlife programs include the following:

a. Trend. Trend is defined as the direction of change in rangeland condition or ecological status. The Nevada Rangeland Monitoring Handbook (1984) recommends the use of frequency sampling to determine trend. Trend studies will be used to evaluate whether seral stage objectives are being met at each key area. The frequency sampling method described by Tueller et al., (1972) will be used to determine trend.

b. Utilization. Utilization is defined as the proportion of current year's forage production that is consumed or destroyed by animals (including insects). The Key Forage Plant Utilization Method will be used to determine utilization levels as described in the Nevada Rangeland Monitoring Handbook as well as the BLM Technical Reference 4400-3, Section 5.23. Utilization levels will be determined at key management areas and through use pattern mapping when possible.

c. Ecological Site Inventory (ESI). ESI is defined as the present state of vegetation of a range site in relation to the climax (natural potential) plant community for that site. It is an expression of the relative degree to which the kinds, proportions and amounts of plants in the present plant community resemble that of the climax plant community for the site. ESI data is currently being collected for the resource area using methods described in the Nevada Rangeland Monitoring Handbook.

d. Precipitation. Precipitation data is collected four times per year from weather data stations in Elko, Ely, Wells and Wendover, Nevada and Ibapah, Utah.

Wild horse habitat studies will be established in areas where none exist to determine the impact of grazing animals on the HMA. Existing studies for wild horses, livestock and wildlife will continue to be read. These include utilization, trend, precipitation, wild horse population estimates and seasonal distribution inventories. Many of the key areas in the HMA are set up to monitor utilization and trend for both livestock and wild horse use. All vegetative studies will be coordinated with the Wells Resource Area wildlife biologist and range conservationist in charge of each grazing allotment and all other interested parties. See the Evaluation and Revision section for a description of the vegetation studies.

2. Distribution and Water Availability

Yearlong water for wild horses will be provided and water distribution and availability will be improved through spring developments, and development of catchment reservoirs. Many areas of the HMA receive very little use due to the lack of water. Improved water distribution will relieve many areas of the heavy use they presently receive as a result of better distribution of grazing animals. In the original Wells RMP, six water developments were proposed for wild horses; two were completed. The Wells RMP Draft Wild Horse Amendment (June 1992) identifies four additional water developments for a total of eight new water sources for wild horses. The four additional water developments are contingent on the Final Wells RMP Wild Horse Amendment. All water development projects will be in conformance with the land use plans. Development of new water sources in the Antelope Valley HMA should help alleviate the problem of large numbers of horses moving onto the Ely District in the dry months.

B. Animal Management Methods

1. Multiple Use

Wild horse forage allocations will be established and determined through the analysis of monitoring data in conjunction with both livestock and wildlife through the allotment evaluation process. Wild horse management activities will be coordinated with all other BLM programs.

2. Appropriate Management Level

a. AML

Once AML is established for all allotments within the HMA, monitoring will continue and AML will be revised if monitoring data shows a change is needed to meet RMP objectives.

If monitoring data shows reductions in animal numbers are necessary, reductions will be made in the following manner:

Where a kind of foraging animal can be identified as the primary cause of forage resource damage in a specific area, adjustments will be made from the base levels for that particular kind of animal (active preference for livestock, AML for wild horses, and reasonable numbers for wildlife). The foraging animal will be determined from monitoring studies, utilization, actual use, sightings, counts, etc.

Where a single kind of foraging animal cannot be identified as the primary cause of forage resource damage, adjustments will be made proportionately between livestock and wild horses based on the percentage of use each is making at the time resource damage is occurring. Adjustments will be made to active preference for livestock and AML for wild horses.

If additional forage is available after meeting livestock number objectives, AML for wild horses, and reasonable numbers for wildlife, additional forage may be divided proportionately among all foraging animals.

b. Maintaining AML - Discussion of Options

Once an AML is established, maintaining wild horse AML will be accomplished by one or a combination of the following: removals with no selectivity, removals with selectivity based on age or sex, and fertility control. All capture operations, whether for removal or treatment, will follow the Capture Plan for the Antelope Valley HMA, in Appendix 3.

i. Removals With No Selectivity

Removals may be conducted with no selectivity other than removing only adoptable animals. Adoptable animals are generally any animal under 10 years of age. In the past the removals with no selectivity have been unsuccessful at keeping wild horse populations under control and have resulted in saturation of the adoption market. Unadopted horses have been placed in private sanctuaries which is not cost efficient.

ii. Selective Removals

Selective removals can target specific age groups or a specific sex to be removed. Altering the age structure of the herd is aimed at reducing the number of horses in the primary breeding age groups. The age structure of the wild horses in the Antelope Valley HMA is weighted heavily toward younger animals. Data collected from removals indicate that approximately 65% of the population is from under one year to four years old. Wild horse mares are first able to conceive at age 2 and continue until

death. Peak fertility is realized during ages three to nine. After that, mare cycling becomes less regular and more dependent on fluctuating environmental factors which serve to restrict reproduction. Males are able to first copulate at age 1 but are usually unsuccessful in breeding until they acquire a harem of mares; normally this occurs between the ages of 3 and 5. After this point, males copulate regularly and will continue to do so until death or preclusion through social interactions within the herd. Peak reproductive years for males are between age 4 through 9. After that, physical decline and loss of social dominance reduce participation in reproduction.

An age specific removal program would target removing approximately 90% of the 1 to 4 year old animals with repeated removals every 3 to 4 years. Population modeling, using data from removals throughout Nevada, indicates that repeated treatments may be able to slow foal recruitment from 18% of the total population down to 10%. Normal age distribution would be achieved after approximately 12 years, following initial treatment. Altering the age structure of the population could impact herd behavior. As the population ages and fewer animals are available to fill dominant roles in the social structure, older animals would continue to dominate and reduced competition for dominance could result in bands containing larger numbers of animals.

Sex specific removals would target mares in order to decrease the number of breeding females. Removing males is not effective because one male would merely acquire larger harems due to a lack of competitive dominance. Population modeling has shown that a ratio of 70 males to 30 females may be able to slow foal recruitment from 18% of the total population down to 12%. A program to alter sex ratios could target mares aged 1 through 6 with male populations remaining intact.

Each of the selective removal strategies would be reversible over time. The time required to re-establish a normal age structure or sex ratio would be dependent on the size of the population and number of treatments administered prior to termination. Selective removals would require little additional stress and handling to the animals over current removal procedures.

iii. Fertility Control: Immuno-Contraception

Immuno-contraception represents one of the most recent advances in fertility control methodology. The biological principles involved are very technical and cannot be explained easily in the HMAP. Refer to Appendix 4 for a complete discussion of immuno-contraception.

Field studies on immuno-contraception in wild horses have shown over 90% success in preventing pregnancy. The drug used in

immuno-contraception has been shown to be reversible in only a short time frame. No side effects or environmental hazards have been identified. Some animals may experience allergic reactions to the agent; however, no problems have been identified in previous wild horse studies.

Additional research in the field of immuno-contraception is currently being conducted at the University of Virginia. The research has not been administered to wild horses in a field trial and no publications addressing the results of the treatment on other animals is available.

c. Population Control in the Antelope/Antelope Valley HMAs

i. Selected Options for Antelope/Antelope Valley HMAs

The Antelope HMA (Ely) and the adjacent Antelope Valley HMA (Elko) have been identified as herd areas where a pilot project for fertility control will be implemented in late 1992. The method to be used in the Antelope HMA will be a combination of a selective removal to attain AML, and the use of immuno-contraception to maintain AML over a longer period of time if the pilot fertility control project proves to be successful. The Elko District will not be doing any animal removals at this time due to the lack of set AML and will only be participating in the pilot fertility control research study.

The selective removal and capturing of horses for immuno-contraception in Ely and Elko is scheduled to begin in late November or early December 1992.

In February 1992, a total of 545 wild horses were counted in the Antelope Valley HMA. An estimated colt crop of 18% (derived from population models) in the spring of 1992, would give a population size of 643 animals. Assuming that 53% of the population is female (based on studies and information collected from statewide removals) and utilizing the parameters from the statewide data base and applying them to the most current census, the Antelope Valley HMA female horse population would have the following age structure in the Fall of 1992:

AGE	% OF POP.	# OF FEMALES	# OF FEMALES AVAILABLE FOR TREATMENT
0	10.5	69	0
01	7.8	50	0
02	6.7	43	0
03	5.1	33	0
04	4.0	26	0
5 - 9	12.4	79	79
10 +	6.4	41	0
Totals	52.9	341	79

Table 4. Age structure of females in Antelope Valley HMA

Only healthy mares in the 5-9 age group will be considered for treatment. There is no set number of mares to treat with the immuno-contraception drug as it is impossible to determine how many mares in the target age group will actually be caught. At most, approximately 80 mares may be treated. Refer to Appendix 4, pages 11 and 12 for more information on the study population size.

All methodology concerning immuno-contraception is explained in detail in Appendix 4; however, there is one point that needs discussion here. Some or perhaps all the mares used in the fertility control study will have to be held in temporary corrals for a three week period, but without additional handling. Grass hay will be provided for all animals held for the three week period to alleviate problems which can arise when wild horses switch from native vegetation to high protein alfalfa hay. All animals held will be injected with a broad spectrum antibiotic to help prevent illness. Also, dust control will be strictly enforced throughout the confinement period. If dust is a persistent problem, pea size gravel will be spread in the holding pens, along with continuous watering of the pens. Due to the late time of year that the study is to be conducted, dust should not be a major problem.

The advantages to the fertility control option are identified as, a) the basic gene pool of each herd will remain intact; b) displacement of older animals minimized; c) capability for selection and upgrading herd through sterilization of animals with undesirable qualities, or physical debilitation; d)

opportunities to reverse or continue contraception; e) and reduced rates of population growth.

ii. Methodology

Methods which are common to all capture/removal/treatment operations are as follows:

Capture animals following current Nevada capture policies and procedures using either helicopter or bait/water trapping (see Appendix 3).

Animals will be sorted by sex and age.

Move animals to be released onsite into holding facilities with separate pens for males and females with foals. Holding facilities may or may not be required depending on the number of trap sites to be used, number of animals to be removed and the distribution of animals throughout the gather area.

Animals placed in holding facilities servicing more than one trap site should be marked according to capture site and if possible according to band so that band integrity can be maintained upon release. Animals should be released in the general area where they were captured with the horses they were captured with.

Excess animals (Ely District only) should be shipped as soon as possible to avoid stress and the possibility of contracting diseases associated with confinement.

Release animals as each trap site operation is completed or upon completion of all gather operations. Holding time for all animals should be minimized.

Captures and treatments will not occur during the peak foaling season; March 1 through June 30.

Methodology for implementing immuno-contraception in mares is described in Appendix 4.

iii. Tracking Animals

Selective Removals (Ely District)

Animals removed from the trap-site will be marked to ensure that they are returned back to the site where they were captured. This will be done through temporary marks (i.e. grease pencil, paint, etc.). Type of mark will depend on the anticipated length of stay in a holding facility.

Fertility Control

Temporary Marking - Animals that are to be returned to the HMA with no treatment will be marked to ensure that they are returned to the same site where they were captured. This will be done through temporary marking (i.e. grease pencil, paint, etc.). Type of marking will depend on the anticipated length of stay in the holding facility.

Permanent Marking - Any animal that is involved in the fertility control study will be marked with a freezebrand. The freezebrand will consist of a unique mark identifying each individual animal; the freezebrand will be placed in such a location and be large enough to facilitate detection from the air. Each animal receiving a freezebrand will be described and recorded in permanent BLM records.

iv. Monitoring

Population data, including total numbers, seasonal movements, home ranges, age structure, sex ratio, survival rates, mortality, and proportion of breeding females in each age class will continue to be collected and analyzed. Total number, seasonal movements and possibly home ranges will be determined through periodic censuses to be conducted at least once each season if possible. Population demographics will be determined through data collected during captures or removals. Animals involved in the pilot fertility control project will be monitored for pregnancy through fecal and urine collection. See Appendix 4 for more detail. Collected data will be input to computer models which calculate rates of increase, survival rates, mortality rates, etc. Rates of increase will also be calculated using simple mathematics. Individual animal condition will be documented through observations during removals or captures as well as routine ground observations.

Baseline data elements are shown in Table 6. Page numbers reference the existing data in this document.

Table 5. Data Elements and Location in This Document.

Data Element	Page Number(s)
Census	4
Recruitment (rate of increase)	7
Age Structure of Population	6 - 8
Foaling Rate	7

Table 5. Data Elements and Location in This Document.	
Data Element	Page Number(s)
Survival Rate (and Death Rate)	7 - 8
Individual Animal Condition	9
Band Structure	8
Grazing Habits	5 - 6
Seasonal Movement Patterns	5 - 6

Short Term Monitoring - For animals which are to be released back to the HMA, minimum standards will be to monitor the horses' condition by ground and/or air within 24 hours of their release. A flight should be scheduled within 72 hours after release to assure no animals are trapped behind a fence or other obstacle which would keep them from food or water. Subsequent flights should be conducted with ground checks following up the aerial observations, if needed. After a period of three weeks, monitoring will return to the normal schedule. Some of the data collected during these short-term monitoring flights will be used for a comparison to the baseline data elements.

Each district must conduct advance coordination with the appropriate military flight control centers when wild horse flights are to be conducted within military operating areas or restricted areas. Monitoring flights may be prohibited by military activity for a few hours or a few days but flights will resume as soon as the military clears the area. Ground observations will substitute for aerial observations if necessary.

Long Term Monitoring - On a year long basis, monitoring data will be collected concerning the baseline data elements. A flight will be conducted after each foaling season to collect population, recruitment data, proportions of adults to yearlings to foals, seasonal movement patterns, and grazing habits. Other data may be collected if determined to be necessary.

Evaluation of the effectiveness of the selective removals and/or the fertility control measures will be discussed under the Evaluation section of this document.

3. Free-Roaming Characteristics

The wild free-roaming nature of the wild horses will be ensured through the following:

A. All projects proposed for the Antelope Valley HMA will be analyzed in depth through the environmental assessment (EA) process to determine if the project will impact the wild free-roaming characteristics of wild horses. Wild horse distribution, seasonal movements, daily movements, and home ranges will also be preserved in accordance with NSO Manual Supplement 4730, Release NV 4-6.

New fencing for livestock control and management will be minimized in the HMA. Use of herding and salting will be emphasized. If fences are necessary for livestock control, they will be designed with wild horses in mind, in accordance with NSO Manual Supplement 4730. Fencing will typically be open-end allotment boundary and pasture drift fences across the valley bottoms, and gap fences across narrow canyons. In either case, horses will have access around the ends. Gates will be opened by the livestock permittee, the Wells RA wild horse specialist, or the Wells RA range conservationists when livestock are not authorized in the area, except on those fences designed to protect vegetation treatments and riparian areas. New fences will be flagged to increase visibility to wild horses.

B. Resource uses involving an increase in human activity in the HMA (eg. mining, recreation, etc.) will be evaluated closely. These types of activities may impact the free-roaming characteristics of the horses. Each activity or project will be handled on an individual basis. In analyzing the impacts, the overall and cumulative impact will also be analyzed.

At the present time, the fences proposed in the Antelope Valley HMA, when constructed, will be designed to preserve the normal distribution and movement patterns for the majority of animals in accordance with NSO Manual Supplement 4730, Release NV 4-6.

4. Coloration and Conformation

Characteristics of the "Spanish Barb" traits will be preserved in the population by exclusion of those animals from removals and/or fertility treatments.

IV. EVALUATION AND REVISION

The effectiveness of the management actions in reaching the objectives stated in this plan will be evaluated as follows:

A. Effectiveness in Meeting Land Use Plan Objectives

Land Use Plan objectives are general and all other objectives conform to them. Reaching the habitat and wild horse objectives will help meet the land use plan objectives.

B. Effectiveness in Meeting Habitat Objectives

1. Vegetation

Vegetation objective attainment will be evaluated through the multiple use rangeland monitoring program. Data will be collected, in conjunction with the range and wildlife programs, on utilization, condition, trend, and precipitation. The data will be analyzed to determine if utilization, condition and trend objectives are being met. If objectives are not met through the implementation of this plan and the livestock management program, numbers of all grazing animals will be re-evaluated.

2. Water and Distribution

The attainment of water and distribution objectives will be evaluated by periodic inventories of important water sources to determine if sufficient water is available to support the wild horse population.

C. Effectiveness in Meeting Wild Horse Objectives

1. Multiple Use

Evaluation will consist of ongoing multiple use evaluations and decisions.

2. Appropriate Management Levels

a. AML

AMLs will be calculated for the entire HMA by 1994. The multiple use evaluation process will continually re-examine AMLs and adjustments will be made if monitoring data suggests it is necessary.

b. Maintaining AML

To evaluate the effectiveness of selective removals and/or fertility control in maintaining AML, comparisons will be made between all baseline data presented in Table 6 before and after implementation.

An attempt will be made to determine if environmental factors affected the results of the selective removals and/or fertility control measures. Comparisons will be made between vegetation

VI. SIGNATURES

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Wild Horse and Burro Specialist
Wells Resource Area

Date

Recommended By:

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Rodney Harris
District Manager
Elko District Office

Date

Recommended By:

Billy R. Templeton — 10/14/92

Billy R. Templeton
State Director, Nevada

Date

Recommended By:

Cy Jamison — 10/15/92

Cy Jamison
Director, Bureau of Land Management

Date

Approved By:

David C. O'Neal

David C. O'Neal
Assistant Secretary, Land and Minerals Management

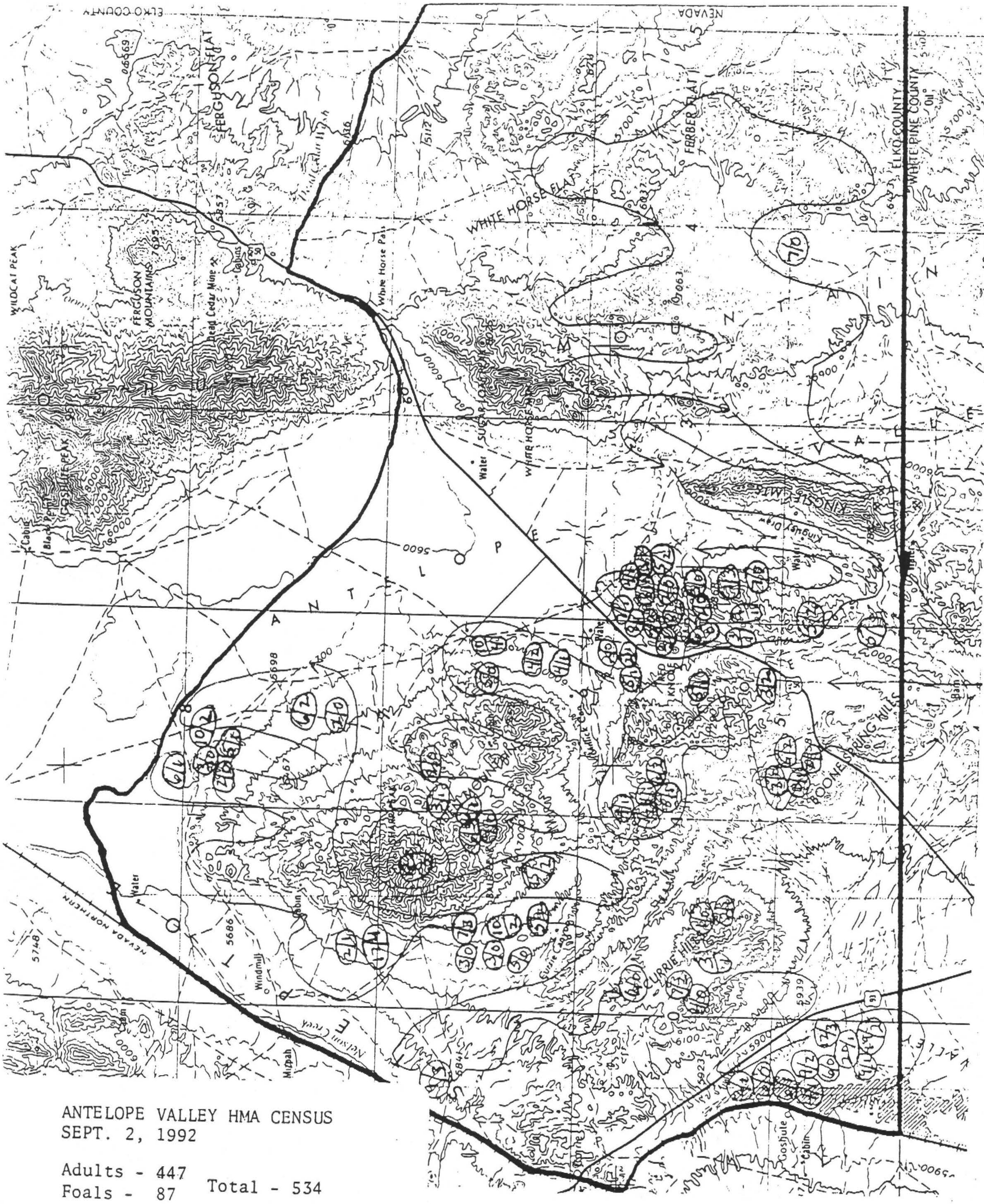
Date

ADDENDUM TO ANTELOPE VALLEY HMAP

Two aerial censuses have been conducted by the Ely and Elko Districts since the Draft HMAP was developed.

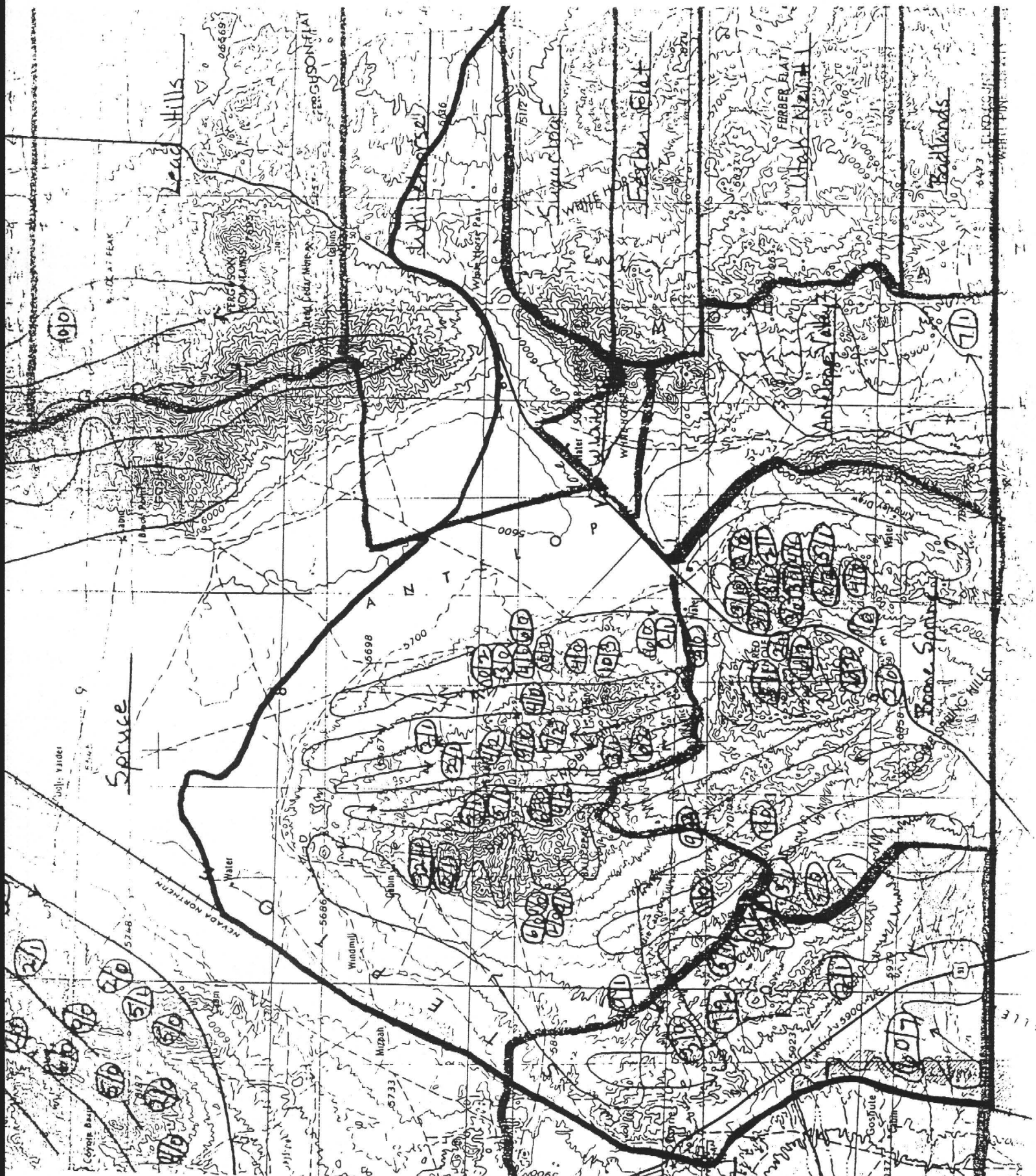
The data provided by the censuses confirmed the seasonal migration patterns and rates of population increase given in the Draft HMAP, thus the horse numbers predicted in the HMAP should be fairly accurate.

The distribution maps from the last two censuses are provided.



ANTELOPE VALLEY HMA CENSUS
SEPT. 2, 1992

Adults - 447
Foals - 87
Total - 534



ANTELOPE VALLEY CENSUS
MAY 30, 1992

Adults - 380
Foals - 66

Total = 446

ADDENDUM TO ANTELOPE/ANTELOPE VALLEY HMAPs (Age Classes)

Two slight modifications to age classes are necessary to accomplish the objectives in these Herd Management Area Plans (HMAPs). These are:

1. Treated animals (those receiving the immunocontraceptives/placebos) will be changed from age classes 5 to 9 year olds to 5 to 12 year olds. This change is required to accommodate the research design.

2. Selective removal in the Ely District will target 1 to 5 year olds instead of 1 to 4 year olds. This change will ensure achieving the appropriate management level.

Both modifications are within the scope and intent of these HMAPs; the objectives remain the same.

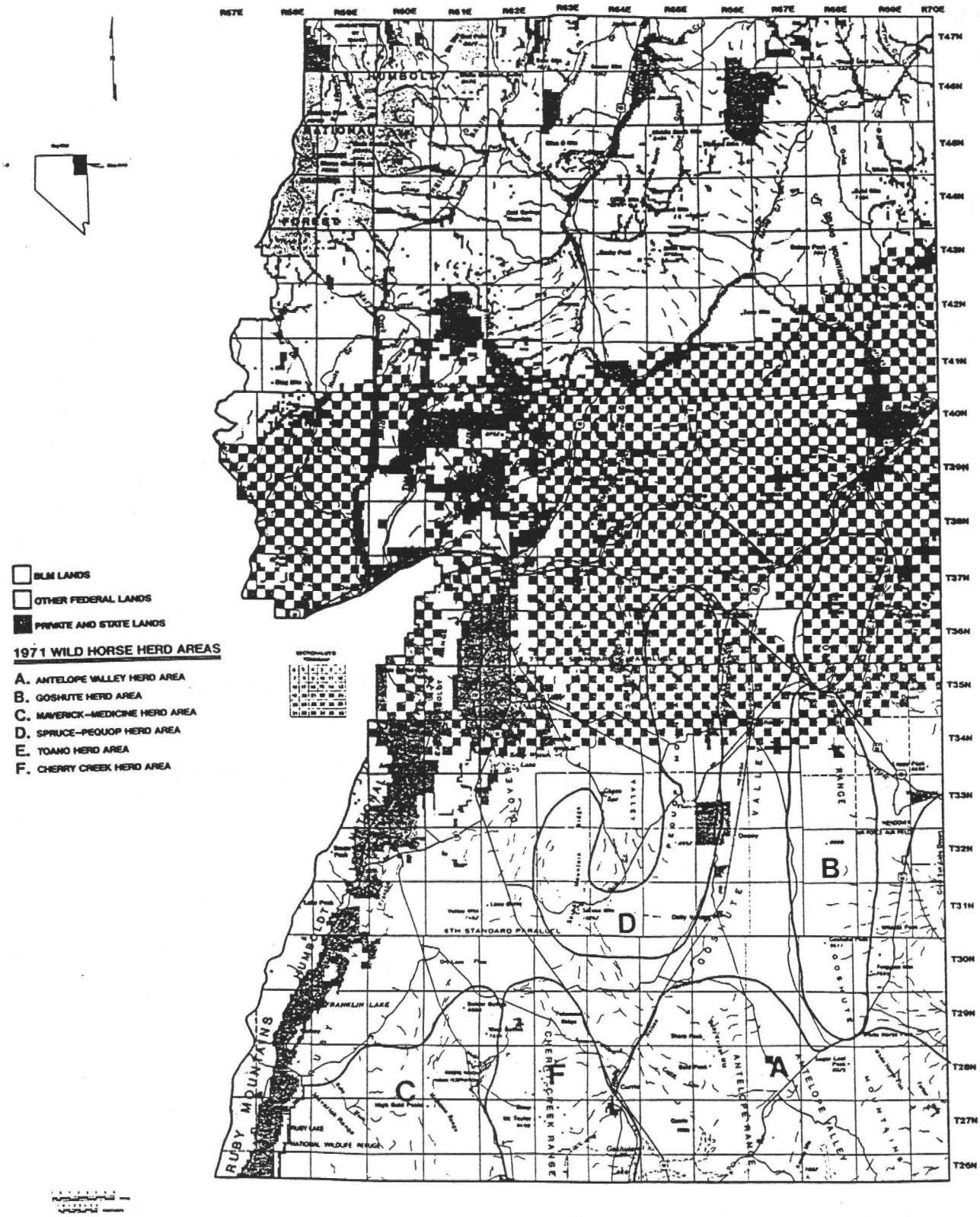
CONCUR:

Deputy Assistant Secretary, Land and Minerals Management

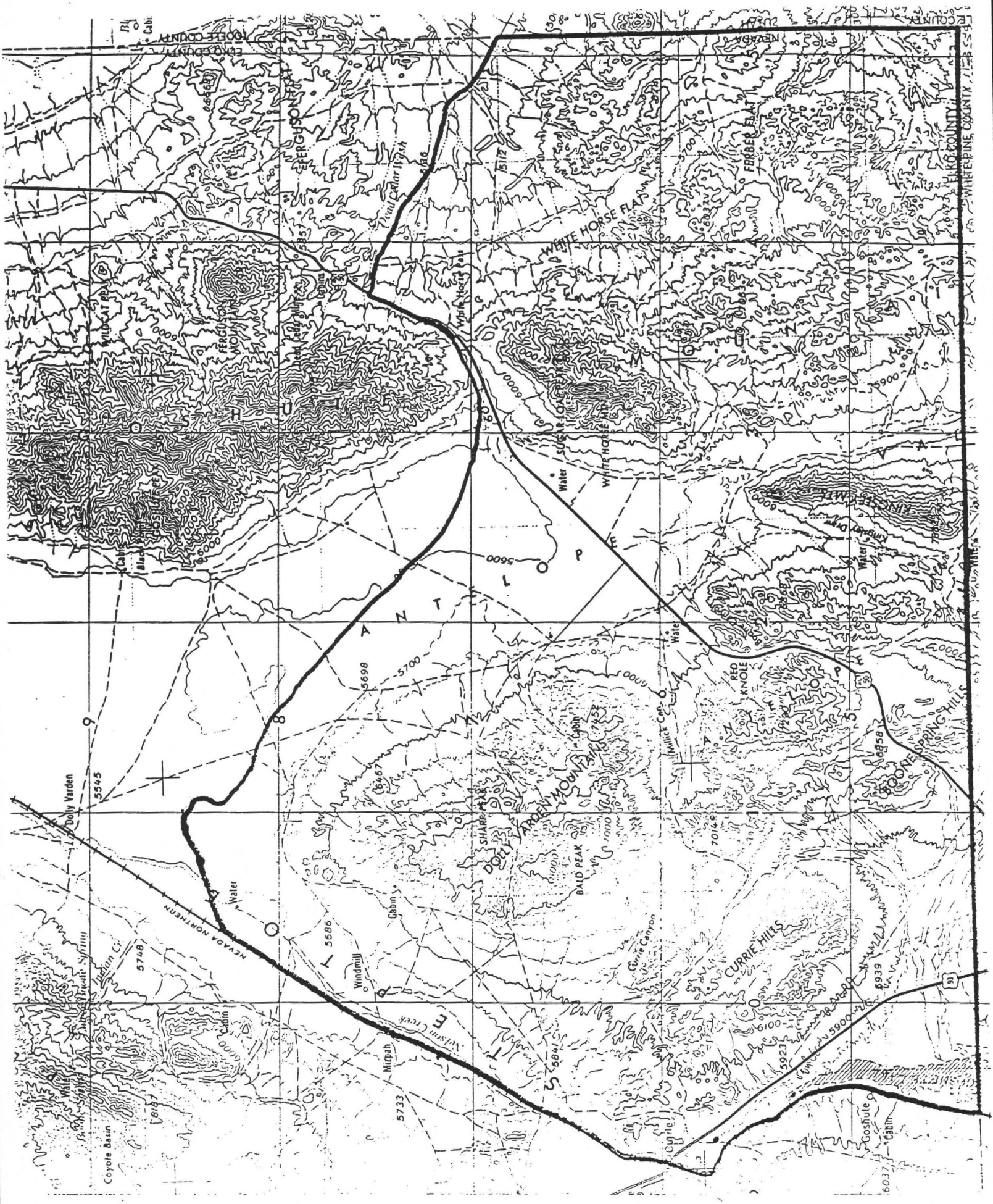
APPENDIX 1

MAPS

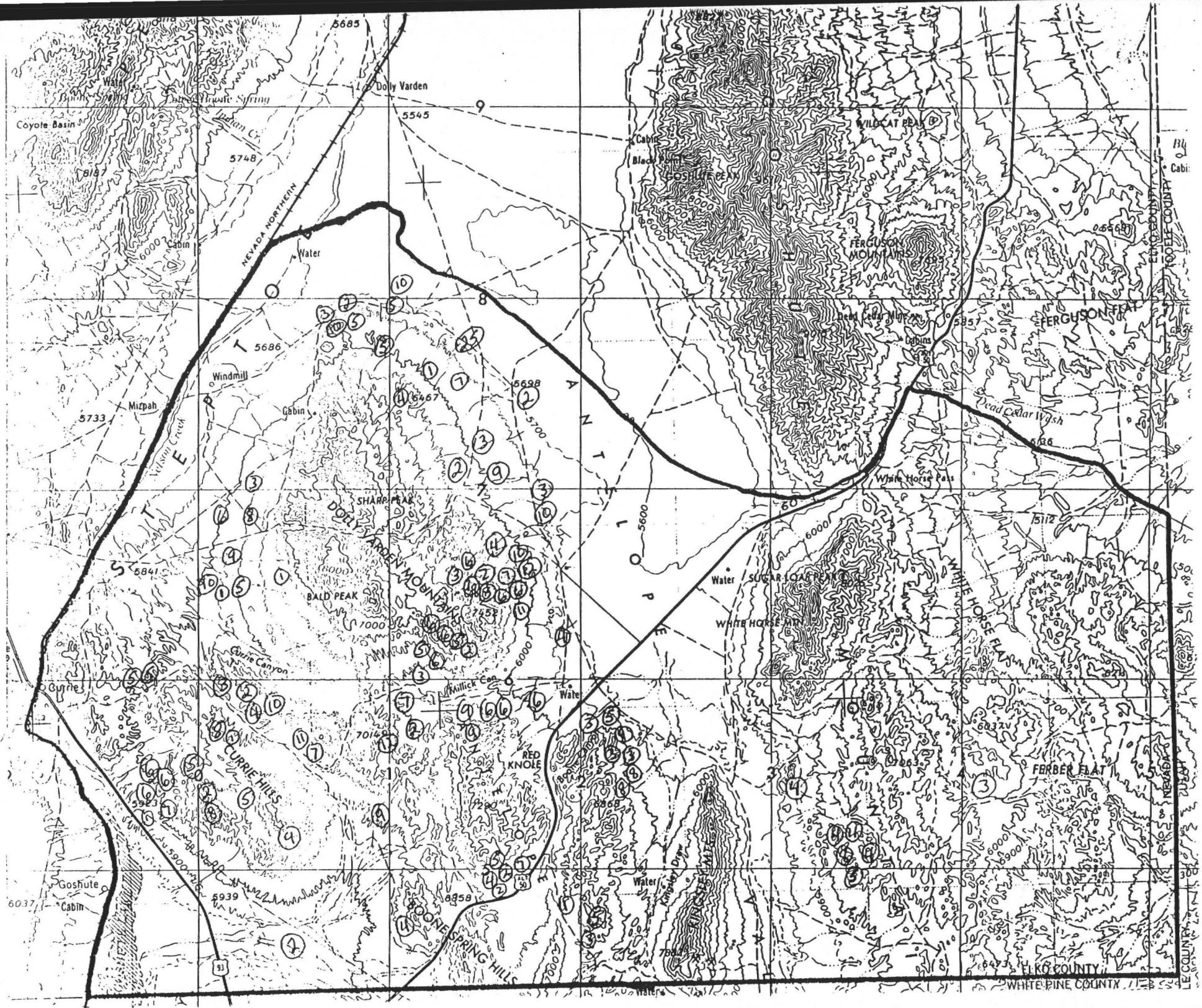
Map 1 - General Location
Map 2 - Antelope Valley HMA
Map 3 - Latest Census Map (2/92)
Map 4 - Use Areas and Seasonal Use
Map 5 - Allotments Within Antelope Valley HMA



Map 1 – General Location



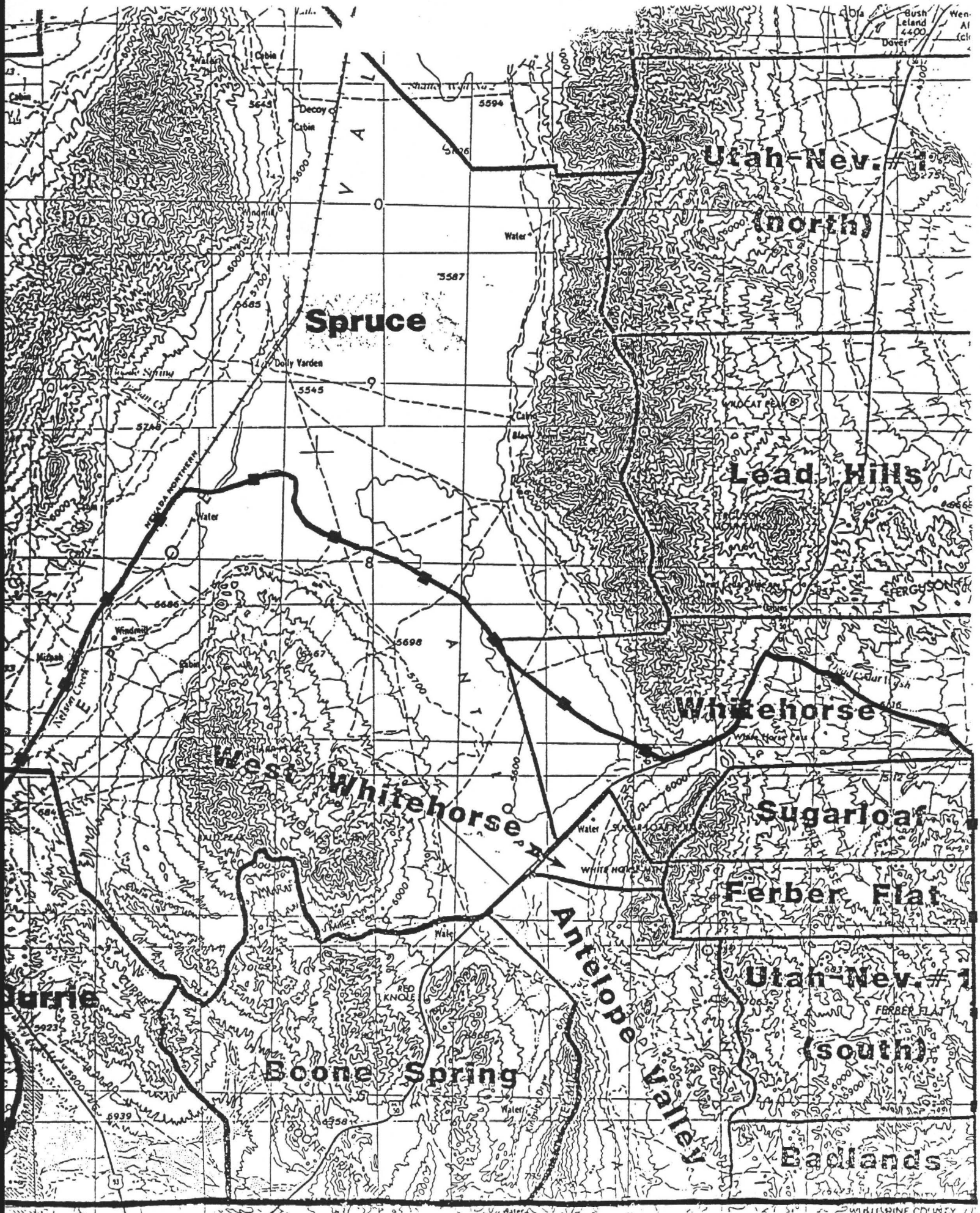
Map 2 – Antelope Valley HMA



Map 3 – Latest Census Map (2/92)

Map 4 – Use Areas and Seasonal Use

Scale 1:250,000



Map 5 – Allotments Within Antelope Valley HMA

HMA Boundary

APPENDIX 2

OTHER RESOURCES AND USES WITHIN THE ANTELOPE VALLEY HMA

Appendix 2. Other Resources and Uses Within the Antelope Valley Herd Management Area (HMA).

1. Vegetation

The Wells Resource Area (RA) supports vegetation typical of the Great Basin region. The extremes of climate, elevation, exposure, and soil type all combine to produce a diverse environment for a variety of vegetation types. Important vegetation types are listed below.

Sagebrush-rabbitbrush is the dominant vegetation type, covering almost two-thirds of the resource area. The pinyon pine-juniper vegetation type is the next most prevalent, covering almost one-fifth of the area. Other common vegetation types include saltbush, greasewood, and grassland.

Riparian vegetation is important in the Wells RA because it provides quality forage and cover for wildlife, livestock, fisheries, and wild horses. Riparian areas are dominated by plants which include willow, cottonwood, aspen, wild rose, currant and a variety of grasses and sedges. This type of vegetation represents less than two-tenths of one percent (0.2%) of the total resource area acreage.

Wetland vegetation in the Wells RA is very productive, heavily used by livestock, and mostly in poor ecologic condition. Wetland vegetation is characterized by meadow areas (included in the meadow vegetation type) dominated by inland saltgrass, rushes and sedges and surrounded by greasewood or rabbitbrush. There is an estimated 13,000 acres of wetland vegetation in the Wells RA. Most of the wetland vegetation is in the north half of the Wells RA and no wild horses are found in this area.

a. Condition

Estimates of ecologic condition are based on the comparison of what the site is producing now to what that site is naturally capable of producing. The present condition, in many cases in the Wells RA, is a result of overgrazing practices which occurred many years ago. These practices resulted in the change of the plant composition from desirable to undesirable species. In some areas present grazing practices are producing an improvement in range condition. However, the improvement in condition is very slow. Without treatments, present range conditions would not be expected to improve substantially within a realistic time frame. On areas under allotment management plans (AMPs) and grazing systems designed to allow for periodic food storage, seed production, and seedling establishment of desirable plants, ecologic range condition improves relatively quickly.

b. Threatened and Endangered Species

No Federal threatened, endangered, or candidate species are known to occur within or near the Antelope Valley HMA.

c. Poisonous Plants

The most common poisonous plants found within the Wells RA are greasewood and halogeton. Greasewood occurs in dense stands in alkaline flats, valley bottoms, and along washes where the soils tend to be saline. Greasewood is toxic to sheep when it is eaten with little or no other forage. Halogeton occupies disturbed communities at lower elevations and is toxic to sheep and cattle. Other poisonous plants exist in the Wells RA in lesser abundance and do not have as great an impact on grazing livestock.

2. Water

The Wells RA generally consists of enclosed drainage basins. Surface waters flow into the lowest valley areas and evaporate or infiltrate into the soil. Most streams in the resource area are intermittent and flow only during the spring and early summer. The perennial streams that do occur generally drain mountain watersheds. When the streams flow onto upper alluvial fans, their flows break up into numerous channels and are lost due to infiltration, evaporation, and transpiration. The perennial tributaries of the Snake River in the northern part of the resource area are an exception to this drainage pattern.

The Antelope Valley HMA is not well watered. In parts of the plan area water is not well distributed or is lacking. Available water is provided via streams, springs, seeps, reservoirs, and wells. Where water currently exists, there appears to be little conflict in consumption needs between foraging animals. Problems center around poor water distribution in Currie Hills, Antelope Valley, and Ferber Flats. Problems also arise from the competition for space near isolated waters, seasonal availability of well water and vegetation associated with the water.

Poor water distribution is a problem which results in uneven use of available forage. The availability of water needs to be increased, and yearlong water should be made available at all water sources for horse use, wherever possible.

3. Livestock

Livestock grazing is an important resource use within the HMA. Competition for existing forage in the past was extreme, but in recent years voluntary reductions in numbers by livestock

permittees has helped to reduce this competition between horses and domestic livestock in some areas of the HMA.

The HMA encompasses portions of ten allotments in the Wells RA: Antelope Valley, Badlands, Boone Spring, Currie, Ferber Flat, Spruce, Sugarloaf, Utah-Nevada #1, West Whitehorse, and Whitehorse. West Whitehorse has little or no use by the Antelope Valley HMA wild horses. Table 2a shows the livestock animal unit months (AUM's), season of use, and class of livestock for each allotment within the HMA.

Table 2a. Livestock Operations in the Antelope Valley HMA.

Allotment	AUMs Active Preference	Season of Use	Class of Livestock
Antelope Valley	5072[1]	11/1-5/31	cattle/sheep
Badlands	2647	11/1-3/31	sheep
Boone Spring	3244	11/1-2/28	sheep
Currie	5369[2]	3/1-2/28	cattle
Ferber Flat	2735	11/20-4/20	sheep
Spruce	34245[3]	3/1-2/28	cattle
Sugarloaf	3105	11/1-3/31	sheep
Utah-Nevada #1	13766[4]	11/10-3/31	sheep
West Whitehorse	670[5]	12/15-3/31	sheep
Whitehorse	7500	11/15-3/31	sheep
Total	77443		

[1]Total preference is 5202 AUMs with 130 suspended AUMs.
[2]Total preference is 6747 AUMs with 1378 suspended AUMs.
[3]Total preference is 34766 AUMs with 521 suspended AUMs.
[4]Total preference is 18214 AUMs with 4448 suspended AUMs.
[5]Total preference is 1000 AUMs with 330 suspended AUMs.

4. Wildlife

About 363 species of wildlife occur in the Antelope Valley HMA. This includes 75 species of mammals, 247 species of birds, 11 amphibians, and 28 reptiles. (A complete listing of species can be found in Wells URA-1 available in the Elko District Office).

Several species of wildlife occurring in the area are quite important. Mule deer, pronghorn antelope, mountain lions, coyotes, bobcats and kit foxes provide the main game and furbearer species.

Sage grouse, chukar, mourning doves, and cottontail rabbits constitute the major upland game species.

Two species within this plan area are listed as Federally threatened or endangered species. Bald eagles, endangered, commonly winter in North Spring and Antelope Valleys.
Peregrine falcons, endangered, have been known to migrate through this area. No nests are known to occur.

Two Federal candidate species are known to occur within the plan area: Spotted bats, category 2 - the plan area is well within its' range of occurrence; Ferruginous hawks, category 2 - known nesting sites within the plan area

5. Minerals

Mining activity began in portions of the plan area in the late 1880s. Six mining districts have been established within the area with numerous isolated prospect pits scattered throughout the area. There is currently some exploration activity occurring in the Kingsley and Dolly Varden Districts and mining activity could pick up in other areas as demand and technology change. (See USGS Open-file Report 1976-56, Mineral Resources of Elko County, Nevada, for a detailed description of mining districts, ore bodies and production potential.)

6. Recreation

Recreation in the area is limited, with hunting, trapping and off-road vehicle use being the major recreational activities. Very little sightseeing or recreational horse viewing has been noted, probably due to the remoteness of the area. Some post and woodcutting takes place, particularly in the Antelope Range. An area on the north end of the Antelope Range has been set up as a commercial woodcut area. However, recreation and woodcutting presently cause no major disturbance to wild horses.

APPENDIX 3

CAPTURE PLAN FOR THE ANTELOPE VALLEY HERD MANAGEMENT AREA

Wells Resource Area
Elko District

Purpose

The proposed action is to capture wild horses from the Antelope Valley Herd Management Area (HMA) for the purpose of implementing fertility control measures. Fertility control will reduce rates of increase among wild horses in the Antelope Valley HMA without the use of a selective removal of excess animals. When final multiple-use decisions are made and appropriate management level's (AML's) are set for wild horses, fertility control in combination with selective removals will help maintain AML's without the necessity for as many removals in the future.

Wild horses will be captured using helicopters and temporary traps. This document outlines the procedures and methodology for capturing, holding, marking and releasing wild horses in the Antelope Valley HMA. Also outlined are the Bureau of Land Management (BLM) personnel involved with the roundup, the Contracting Officer's Representative (COR) and Project Inspectors (PI's), the delegation of authority, the briefing of the contractor(s), and the precapture evaluation held prior to gathering operations.

Area of Concern

The Antelope Valley HMA is located approximately 105 miles southeast of Elko in southern Elko County, Nevada, in the BLM Elko District, Wells Resource Area. Maps of the HMA are located in Appendix 1 of the Herd Management Area Plan (HMAP).

The proposed action is in conformance with the Wells Resource Management Plan (RMP) and Record of Decision (ROD). This action is considered a part of long term management.

All fertility control measures will be monitored as outlined in the HMAP and in Appendix 4.

Method of Capture

Captures will take place through issuance of capture contracts.

Under no circumstances will gathering be allowed during the foaling season (March 1 to July 1).

The method of capture to be used will be a helicopter to bring the horses to trap sites. A parada horse will be released as horses enter the trap wings to lead horses into the trap. Roping will be allowed at the discretion of the COR. The temporary traps and corrals will be constructed from portable pipe panels. A temporary holding corral will be constructed in the area to hold horses after capture. A loading chute at the holding corral will be equipped with plywood sides or similar material so horses' legs won't get caught in the panels. Trap wings will be

constructed of portable panels, jute netting, or other materials determined to be nonharmful to the horses. Barbed wire or other harmful materials will not be allowed for wing construction. All trap, corral, and wing construction will be approved by the COR.

Other methods of capture are not being considered for various reasons. Water trapping wild horses, though easier on the animal, is not feasible due to the numerous water sources available to horses in the proposed gathering area and the time of year the gather is to occur (late November, early December when horses can use snow for their water supply). Trapping horses by running them on horseback is not feasible because it is too easy to lose the horses after starting them towards the trap; injuries to both people and horses are more likely and the cost factor shown from previous roundups using this method indicates that the costs are prohibitive.

Each trap site will be selected by the COR after determining the habits of the animals and observing the topography of the area. Specific locations may be selected by the contractor with the COR's approval within this general pre-selected area. Trap sites will be located to cause as little injury to horses and as little damage to the natural resources of the area as possible. Sites will be located on or near existing roads and will receive cultural and threatened/endangered plant and animal clearances prior to construction.

Due to the many variables such as weather, time of year, location of horses, and suitable trap sites, it is not possible to identify specific locations at this time. They will be determined at the time of the proposed action.

The terrain in the removal area varies from flat valley bottoms to steep, rugged mountains; the horses could be located at all elevations during the time the gather is scheduled depending on snow conditions. There are few physical barriers and fences in the area and the contractor will be instructed to avoid them.

Administration of the Contract

BLM will be responsible, through a contract, for all capture, care, fertility treatments, and temporary holding until release.

Within two weeks prior to the start of the operation, BLM will provide for a precapture evaluation of existing conditions in the gather area. The evaluation will include animal condition, prevailing temperatures, drought conditions, soil conditions, topography, road conditions, locations of fences and other physical barriers, and animal distribution. The evaluation will also arrive at a conclusion as to whether the level of activity is likely to cause undue stress to the animals, and whether such stress would be acceptable to the animals if veterinarian

expertise were present, or whether a delay in the capture activity is warranted. If it is determined that the capture can proceed with a veterinarian present, the services of a veterinarian will be obtained before the capture will proceed.

At least one authorized BLM employee will be present at the site of capture. Either a COR or a PI and preferably both will be on site. The COR will be directly responsible for conducting the capture and can appoint other BLM personnel to assist with the operation as necessary.

Other BLM personnel may be needed to help and include an archaeologist or a district archaeological technician to survey sites for cultural resources, Wells Resource Area personnel as the need arises, and a BLM law enforcement agent to protect BLM personnel and property from unlawful activities.

The COR is directly responsible for the conduct of the gathering operation and for reporting progress to the Elko District Manager, and the Nevada State Office.

The District Manager is responsible for maintaining and protecting the health and welfare of the wild horses. To ensure the contractor's compliance with the contract stipulations, the COR and/or PI will be on site. However, the Wells Resource Area Manager and the Elko District Manager are very involved with guidance and input into this gather plan and with contract monitoring. The health and welfare of the animals is the overriding concern of the District Manager, Area Manager, COR and PI.

The COR and/or PI will constantly, through observation, evaluate the contractor's ability to perform the required work in accordance with the contract stipulations. Compliance with the contract stipulations will be through issuance of written instructions to the contractor, stop work orders and default procedures should the contractor not perform work according to the stipulations.

To assist the COR in administering the contract, BLM may have a helicopter available at the capture site. This helicopter will be used with discretion to minimize disturbance of horses that would make gathering more difficult. However, it will be used as needed to assure that the contractor is complying with the specifications of the contract and to ensure the humane capture of animals.

If the contractor fails to perform in an appropriate manner at any time, the contract will not be allowed to continue until problems encountered are corrected to the satisfaction of the COR. All publicity, formal public contact, and inquiries will be handled through the Wells Resource Area Manager.

Contractor's Briefing

The contractor, after award of the contract, will be briefed on his duties and responsibilities before the notice to proceed is issued to him. There will also be an inspection of the contractor's equipment at this time to assure that it meets specifications and is adequate for the job. Any equipment that does not meet specifications must be replaced within 36 hours. The contractor will also be informed of the terrain involved, the condition of the animals, the condition of the roads, potential trap locations, and the presence of fences and other dangerous barriers.

Branded and Claimed Animals

A notice of intent to impound and a 28-day notice to gather wild horses will be issued concurrently by the BLM prior to any gathering operations in this area.

The Nevada Department of Agriculture and the District 1 and 3 Brand Inspectors will receive copies of these notices, as well as the Notice of Public Sale if issued.

The COR/PI will contact the District Brand Inspector and make arrangements for dates and times when brand inspections will be needed.

When horses are captured, the COR/PI and the District Brand Inspector will jointly inspect all animals at the holding facility in the gathering area. If determined necessary at that time by all parties involved, horses will be sorted into three categories:

a. Branded animals with offspring, including yearlings.

b. Unbranded or claimed animals with offspring, including yearlings with obvious evidence of existing or former private ownership (e.g., geldings, bobbed tails, photo documentation, saddle marks, etc.).

c. Unbranded animals and offspring without obvious evidence of former private ownership.

The COR/PI, after consultation with the District Brand Inspector, will determine if unbranded animals are wild and free-roaming horses. The District Brand Inspector will determine ownership of branded animals and their offspring and, if possible, the ownership of unbranded animals determined not to be wild and free-roaming horses.

Branded horses with offspring and claimed unbranded horses with offspring for which the owners have been identified by the District Brand Inspector will be retained in the custody of the BLM pending notification of the owner or claimant.

A separate holding corral will be set up near the temporary holding corral to house these horses until the owner/claimant or BLM can pick them up.

The animals will remain in the custody of the BLM until settlement in full is made for impoundment and trespass charges, as determined appropriate by the Wells Area Manager in accordance with 43 CFR Subpart 4710.6 and provisions in 43 CFR Subpart 4150. In the event settlement is not made, the horses will be sold at public auction by the BLM.

Branded horses with offspring whose owners cannot be determined, and unclaimed, unbranded horses with offspring having evidence of existing or former private ownership will be released to the Nevada Department of Agriculture (District Brand Inspector) as estrays.

The District Brand Inspector will provide the COR/PI a brand inspection certificate for the shipment of branded or claimed horses where impoundment and trespass charges have not been offered or received, to public auction or another holding facility.

Destruction of Injured or Sick Animals

Any severely injured or seriously sick animal shall be destroyed in accordance with 43 CFR Subpart 4730.1. Animals shall be destroyed only when a definite act of mercy is needed to alleviate pain and suffering. The COR/PI will have the primary responsibility for determining when an animal will be destroyed and will perform the actual destruction. The contractor will be permitted to destroy an animal only in the event the COR/PI are not at the capture site or holding corrals, and there is an immediate need to alleviate pain and suffering of a severely injured animal. When the COR/PI is unsure as to the severity of an injury or sickness, a veterinarian will be called to make a final determination. Destruction shall be done in the most humane method available as per Washington Office Wild Free-Roaming Horse and Burro Program Guidance dated January 1983. A veterinarian can be called from Ely or Elko if necessary to care for any injured horses.

The carcasses of wild horses which die or must be destroyed as a result of any infectious, contagious, or parasitic disease will be disposed of by burial to a depth of at least 3 feet.

The carcasses of wild horses which must be destroyed as a result

of age, injury, lameness, or noncontagious disease or illness will be disposed of by removing them from the capture site or holding corral and placing them in an inconspicuous location to minimize the visual impacts. Carcasses will not be placed in drainages regardless of drainage size or downstream destination.

Temporary Holding Facility

The holding facility shall be on public land unless an agreement is made between the contractor and a private landowner for use of private facilities. When private land is used the contractor must guarantee the BLM and the public, access to the facilities and accept all liability for use of such facilities.

The contractor shall provide all feed, water, labor, and equipment to care for captured horses at the holding facility. BLM will provide transportation of unclaimed and claimed branded horses to an approved facility for release to the claimant or for handling under Nevada State estray laws. All work shall be accomplished in a safe and humane manner and be in accordance with the provisions of 43 CFR Part 4700 and the following specifications and provisions.

All labor, vehicles, helicopters, traps, troughs, feed, temporary holding facilities, and other supplies and equipment including, but not limited to the aforementioned, shall be furnished by the contractor. BLM will furnish contract supervision.

Stipulations and Specifications

A. Motorized Equipment

1. All motorized equipment employed in the transportation of captured animals shall be in compliance with appropriate State and Federal laws and regulations applicable to the humane transportation of animals.

2. Vehicles shall be in good repair, of adequate rated capacity, and operated so as to insure that captured animals are transported without undue risk or injury.

3. Only stocktrailers shall be allowed for transporting animals from traps to temporary holding facilities. Sides or stockracks of transporting vehicles shall be a minimum height of 6 feet 6 inches from vehicle floor. Single deck trucks with trailers 40 feet or longer shall have two partition gates to separate animals. Trailers less than 40 feet shall have at least one partition gate to separate the animals. Each partition shall be a minimum of 6 feet high and shall have a minimum 5 foot wide swinging gate. The use of double

deck trailers is unacceptable and shall not be allowed.

4. Floors of vehicles and the loading chute shall be covered and maintained with a non-skid surface such as sand, mineral soil or wood shavings, to prevent the animals from slipping. This will be confirmed by the COR/PI prior to loading (every load).

5. Animals to be loaded and transported in any vehicle shall be as directed by the COR and may include limitations on numbers according to age, size, sex, temperament, and animal condition. A minimum of 1.4 linear foot per adult animal and .75 linear foot per foal shall be allowed per standard 8 foot wide stocktrailer/truck.

   The BLM employee supervising the loading of the wild horses to be transported from the trap to the temporary holding corral will require separation of small foals and/or weak horses from the rest should he/she feel that they may be injured during the trip. He/She will consider the distance and condition of the road and animals in making this determination.

   The BLM employee supervising the loading will exercise his/her authority to off-load animals should he/she feel there are too many horses on the trailer/truck.

6. The COR shall consider the condition of the animals, weather conditions, type of vehicles, distance to be transported, or other factors when planning for the movement of captured animals. The COR shall provide for any brand and/or inspection services required for the captured animals.

7. If the COR determines that dust conditions are such that the animals could be endangered during transportation, the contractor will be instructed to adjust speed. The maximum distance over which animals may have to be transported on dirt roads is approximately 25 miles per load.

   Periodic checks by BLM employees will be made as the horses are transported along dirt roads. If speed restrictions are placed in effect, then BLM employees will, at times, follow and/or time trips to ensure compliance.

B. Trapping and Care

1. All capture attempts shall be accomplished by the

utilization of a helicopter. A minimum of one saddlehorse shall be immediately available at the trapsite to accomplish roping if necessary. Roping shall be done as determined by the COR. Under no circumstances shall animals be tied down for more than 1 hour.

Roping will be allowed only to capture an orphaned foal or a suspected wet mare.

2. The helicopter shall be used in such a manner that bands or herds will remain together. Foals shall not be left behind.

   The Elko District will use an observation helicopter as the primary means in which to supervise the use of the project helicopter. In the absence of an observation helicopter, the project helicopter or saddle horses may be used to place a BLM observer on a point overlooking the area of the helicopter herding operations.

3. The rate of movement and distance the animals travel shall not exceed limitations set by the COR who will consider terrain, physical barriers, weather, condition of the animals, and other factors.

   BLM will not allow horses to be herded more than 10 miles nor faster than 20 miles per hour. The COR may decrease the rate of travel or distance moved should the route to the trap site pose a danger or cause avoidable stress (steep and/or rocky terrain). Animal condition will also be considered in making distance and speed restrictions.

   Temperature limitations are 10 degrees F. as a minimum and 95 degrees F. as a maximum. Special attention will be given to avoiding physical hazards such as fences.

4. All trap locations and holding facilities must be approved by the COR prior to construction. The contractor may also be required to change or move trap locations as determined by the COR. All traps and holding facilities not located on public land must have prior written approval of the landowner.

   If tentative trap sites are not located near enough to the concentrations of horses, then the trap site will not be approved. The COR will move the general location of the trap closer to the horses. Trap sites will not be approved where barbed-wire fences are used as wings, wing extensions, or to turn the horses, during herding, toward the trap.

5. All traps, wings, and holding facilities shall be constructed, maintained and operated to handle the animals in a safe and humane manner and be in accordance with the following:

   a. Traps and holding facilities shall be constructed of portable panels, the top of which shall not be less than 72 inches high, and the bottom rail of which shall not be more than 12 inches from ground level. All traps and holding facilities shall be oval or round in design.

   b. All loading chute sides shall be fully covered with plywood or like material. The loading chute shall also be a minimum of 6 feet high.

   c. All runways shall be a minimum of 20 feet long and a minimum of 6 feet high and shall be covered with plywood or like material a minimum of 1 foot to 5 feet above ground level.

   d. Wings shall not be constructed out of barbed wire or other materials injurious to animals and must be approved by the COR.

   e. All crowding pens including the gates leading to the runways shall be covered with a material which prevents the animals from seeing out (plywood, burlap, etc.) and shall be covered a minimum of 1 foot to 5 feet above ground level. Eight linear feet of this material shall be capable of being removed or let down to provide a viewing window.

   f. All pens and runways used for the movement and handling of animals shall be connected with hinged self-locking gates.

6. No fence modification will be made without authorization from the COR. The contractor shall be responsible for restoration of any fence modification which he has made.

   If the route the contractor wishes to herd horses passes through a fence, the contractor will be required to roll up the fencing material and pull up the posts to provide at least one-eighth mile of gap. The standing fence on each side of the gap will be well-flagged for a distance of 300 yards from the gap on each side.

7. When dust conditions occur within or adjacent to the

trap or holding facility, the contractor shall be required to wet down the ground with water.

8. Alternate pens, within the holding facility shall be furnished by the contractor to separate mares with small foals, sick and injured animals, and estray animals from the other horses. Animals shall be sorted as to age, number, size, temperament, sex, and condition when in the holding facility so as to minimize, to the extent possible, injury due to fighting and trampling.

   As minimum, studs will be separated from the mares and foals when the animals are held overnight.

9. Animals shall not be held in traps and/or temporary holding facilities on days when there is no work being conducted except as specified by the COR or for the duration of the three week period between fertility control treatments.

10. The Contractor shall provide animals held in the traps and/or holding facilities with a continuous supply of fresh clean water at a minimum rate of 10 gallons per animal per day. Animals held for 10 hours or more in the traps or holding facilities shall be provided good quality hay at the rate of not less than 2 pounds of hay per 100 pounds of estimated body weight per day.

11. It is the responsibility of the contractor to provide security to prevent loss, injury or death of captured animals until delivery to final destination or until released back to the range.

12. The contractor shall restrain sick or injured animals if treatment by the Government is necessary. The COR will determine if injured animals must be destroyed and provide for destruction of such animals. The contractor may be required to dispose of the carcasses as directed by the COR.

C. Helicopter, Pilot, and Communications

1. The contractor must operate in compliance with Federal Aviation Regulations, part 91. Pilots provided by the contractor shall comply with the Contractors Federal Aviation Certificates, applicable regulations of the State of Nevada and shall follow what are recognized as safe flying practices.

2. When refueling, the helicopter shall remain a distance

of at least a 1,000 feet or more from animals, vehicles (other than fuel truck), and personnel not involved in refueling.

3. The COR shall have the means to communicate with the Contractor's pilot and be able to direct the use of the gather helicopter at all times. If communications cannot be established, the Government will take steps as necessary to protect the welfare of the animals. The frequency(s) used for this contract will be assigned by the COR when the government furnished "slip-in" VHF/FM portable radio is used. When a VHF/AM radio is used, the frequency will be 122.925 MHz.

4. The contractor shall obtain the necessary FCC licenses for the radio system.

5. The proper operation, service and maintenance of all contractor furnished helicopters is the responsibility of the contractor. The BLM reserves the right to remove from service pilots and helicopters which, in the opinion of the contracting officer or COR violate contract rules, are unsafe or otherwise unsatisfactory. In this event, the contractor will be notified in writing to furnish replacement pilots or helicopters within 48 hours of notification. All such replacements must be approved in advance of operation by the contracting officer or his/her representatives.

D. Contractor-Furnished Property

1. All hay, water, vehicles, saddle horses, helicopters and other equipment shall be provided by the contractor. Other equipment includes, but is not limited to, a minimum of 1,500 linear feet of 72-inch high (minimum height) panels for traps and holding facilities. Separate water troughs shall be provided at each pen where animals are being held.

2. The contractor shall furnish an avionics system that will allow communications between the contractor's helicopter and his fuel truck.

3. The contractor shall furnish a VHF/AM radio transceiver in the contractor's helicopter which has the capability to operate on a frequency of 122.925 MHz.

4. The contractor shall provide a programmable VHF/FM radio transceiver in the contractor's helicopter to accommodate the COR/PI in monitoring the gather operation.

APPENDIX 4

STUDY PROPOSAL FROM THE UNIVERSITY OF NEVADA, RENO

FERAL HORSE AND BURRO FERTILITY CONTROL IN NEVADA: CONTRACEPTIVE VACCINE PILOT PROJECT

A Proposal Submitted to the
United States Department of the Interior
Bureau of Land Management
Nevada State Office

by

Kenneth W. Hunter,Jr.,Sc.D.
Professor of Biology
Associate Vice Preseident for Research
and Dean of the Graduate School
University of Nevada, Reno
Reno, Nevada

1992

The University of Nevada, Reno (UNR) is pleased to submit this proposal for a pilot project to evaluate a novel, single-injection contraceptive vaccine for fertility control in feral horses. Wild horses and burros in Nevada represent a magnificent natural resourse, but a resource that requires better management. We feel that an immunologic approach to fertility control represents a humane and cost effective way to manage wild horse and burro populations on public lands in Nevada and elsewhere.

While a variety of potential population management approaches have been discussed in the scientific community, the use of a zona pellucida-based vaccine in mares is perhaps the approach with the greatest present potential. In this proposed project, UNR will subcontract with the Medical College of Ohio for the services of Dr. John W. Turner and his colleagues Drs. Jay G. Kirkpatrick and Irwin K.M. Liu, acknowledged experts in the preparation and use of zona pellucida-based vaccines for fertility control. UNR will serve an administrative role, and provide oversight on the project through the following faculty committee:

Kenneth W. Hunter, Jr., Sc. D., Professor of Biology, Associate Vice President for Research and Dean of the Graduate School (Committee Chair)

Donald R. Hanks, D.V.M., Professor and Chair, School of Veterinary Medicine

Richard C. Simmonds, D.V.M., M.S., Director, Laboratory Animal Medicine

William G. Kvasnicka, D.V.M., Associate Professor of Veterinary Medicine and Extension Veterinarian

Ronald S. Pardini, Ph. D., Professor of Biochemistry and Associate Director, Nevada Agricultural Experiment Station

Duane L. Garner, Ph. D., Professor of Animal Science

This committee will meet periodically with the research team from the Medical College of Ohio and the Nevada Bureau of Land Management to plan and discuss the progress of the pilot fertility project.

The following section of this proposal outlines the experimental approach for the pilot fertility control project.

INTRODUCTION

Feral horse management on western public lands is currently confined to the removal of excess horses. While we are not convinced that there is an actual overpopulation of horses in many areas, we recognize the need for improved, more effective management of feral horse populations. The removal of horses as the sole management effort, while seemingly effective at the time of removal, does not prevent the subsequent growth of the remaining population and insures that removal must continue year after year. Indeed, there is evidence that the removal of horses actually increases fecundity among those animals remaining behind and accelerates the growth of the population (Kirkpatrick and Turner 1991). In other words, removal alone addresses only the symptom of overpopulation (too many horses) and not the cause (reproduction).

An alternative approach is to limit reproduction, through some form of fertility control (see reviews by Kirkpatrick and Turner 1985, 1991; Turner and Kirkpatrick 1991). Toward that goal we have tested a contraceptive vaccine on feral horses which can limit the number of foals born to free-roaming mares. The major characteristics of this vaccine include (1) great effectiveness (> 95% effective), (2) remote delivery, which permits humane non-capture administration of the vaccine, (3) relative low cost, (4) no effects upon individual or social behavior of the target animals, (5) no effects upon pregnancies already in progress at the time of delivery, (6) reversible contraceptive action, and (7) no passage of the vaccine through the food chain or into the environment. These characteristics have been previously identified as required for successful feral horse contraception (Turner and Kirkpatrick 1986).

The vaccine, known as porcine (pig) zonae pellucidae, or PZP, satisfies these criteria. The zona pellucida is a non-cellular protein membrane which surrounds all mammalian eggs. In order for fertilization to occur, sperm must first bind to this membrane before they can penetrate the egg. The intramuscular injection of PZP into mares causes them to produce antibodies against the pig protein, but these antibodies also bind to the sperm attachment sites on the mares' eggs, thereby preventing sperm attachment and fertilization (for a review of the PZP vaccine see Paterson and Aitken 1990). Because only fertilization has been blocked, there are no hormonal manipulations which cause behavioral changes. Indeed, immunized mares remain together in their social groups, ovulate regularly during the breeding season, and permit mating behavior by the herd stallion, and in general reflect the social behavior of untreated feral horses (Kirkpatrick et al. 1990a).

This vaccine was originally tested on captive feral horses and prevented pregnancies in 13 of 14 treated mares (Liu et al. 1989). Following this, the vaccine was tested on free-roaming feral horses managed by the National Park Service (Kirkpatrick et al. 1990a).

The hallmarks of this first field test were successful remote delivery by means of barbless darts fired from a capture gun, a demonstration of the vaccine's effectiveness (no pregnancies among 26 treated mares vs. a 50% pregnancy rate among control mares), reversibility, and a demonstration of its safety for use in animals already pregnant at the time of inoculation. After four years of treatment over 60 "mare years" (i.e., the number of mares treated annually x the number of years treated) only a single foal has been born. This approach to fertility control in feral horses has been so effective that the National Park Service is already in the process of designing a management program built around this vaccine (personal communication, John Karish, Regional Scientist, Mid-Atlantic region, National Park Service). The effectiveness and safety of this contraceptive vaccine has been well documented and our own research group has tested the vaccine on a variety of other hoofstock, including white-tailed deer (Turner et al. 1992), sika, samabar, axis and muntjac deer and Himalayan tahr (Bronx Zoo), and West Caucasian tur (Toronto Zoo). Other investigators have demonstrated the effectiveness of the vaccine in a wide variety of non-human primates (Paterson and Aitken 1990) and even humans (Sacco 1987). Currently the vaccine is a candidate for development as a human contraceptive (Millar et al. 1989).

The vaccine has one major disadvantage at the present time. During the first year of administration of the vaccine, the mare must be inoculated twice, about three weeks apart. Contraceptive protection for subsequent years requires only a single booster inoculation (Kirkpatrick et al. 1992). Thus, the focus of current research efforts is to develop a one-inoculation vaccine which will permit one to two full years of contraception after a single administration. Basically, this will involve incorporating multiple doses of the PZP vaccine in a single inoculation in such a way that there is an initial release of some of the vaccine after injection and then a small but constant release of the remaining vaccine, similar to the way Contac® cold capsules work. A pilot study has already been carried out which has demonstrated the effectiveness of a continual release of the vaccine. This study, with domestic mares, employed a single injection followed by placement of an implant under the skin, which released the vaccine gradually over four weeks. Antibodies were produced in quantities which cause contraception and indicate that a one-inoculation sustained release system can be effective as a fertility inhibitor (see Figure 1).

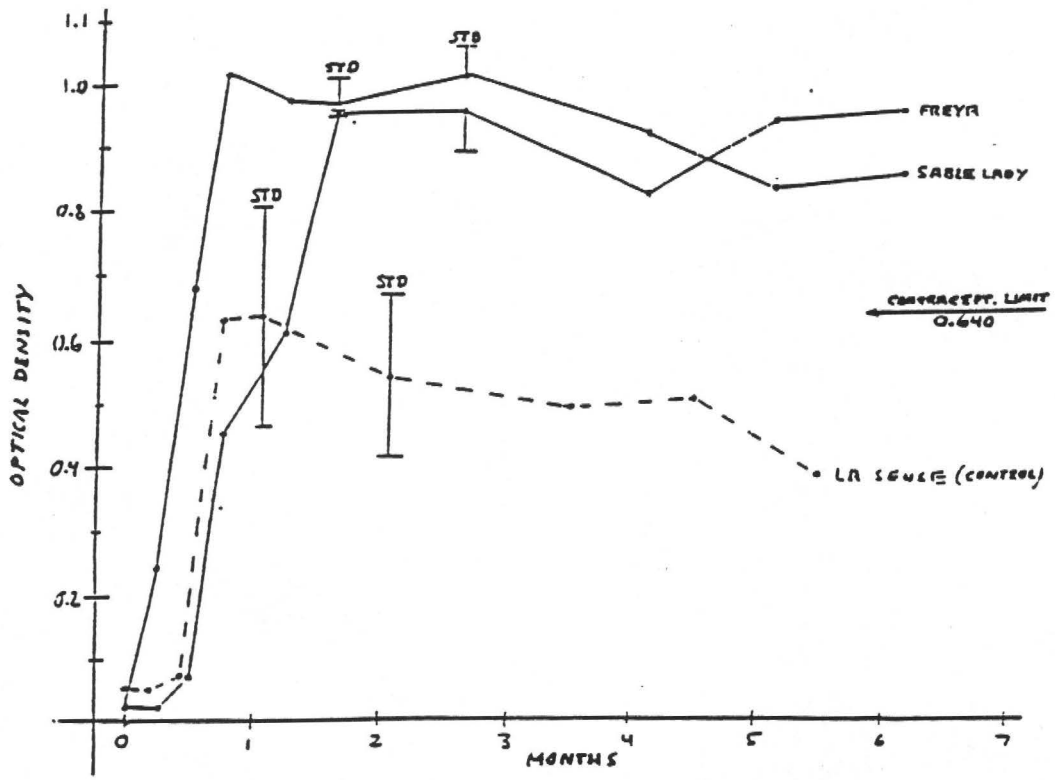


Fig. 1. Effect of sustained-release PZP vaccination in mares (Freya and Sable Lady) on anti-PZP antibody production. Vaccination consisted of bolus injection of 65 μg PZP and Freunds Complete Adjuvant (0.5 cc) followed by sustained PZP release (2.3 μg/day) over 28 days from a subcutaneously implanted osmotic minipump (Alzet, Inc.). Control (LaSense) received bolus PZP and Freund's Complete Adjuvant, but no pump. Plasma antibody titers are measured in optical density units. The lower limit of contraceptive efficiency determined from previous studies is 0.64 O.D.

With these encouraging data we have embarked upon the chemical engineering necessary to give us this same type of release pattern in a single injection. This is a collaborative effort between the Medical College of Ohio, Deaconess Research Institute, the University of California at Davis, and The Humane Society of the U.S.. The prototype timed-release preparation is already underway and we expect to have an initial testing of it in domestic mares completed by Fall of 1992. Additional funds are needed to complete this study, and this is the first of three studies for which we are requesting funding from your organization.

The second study for which we are requesting funding support is the development of a two-year contraceptive capability with a single injection. This will essentially involve an extension of the technology for the annual single-injection vaccine described above. It is obviously more time- and cost-efficient to deliver vaccine every other year instead of annually. The timed-release technology which is currently available must be evaluated for its specific application to the PZP vaccine. This approach involves formulating a single injection which contains the two-dose release sequence for the first year and a single dose released 9-12 months later for contraception during the second year. Long-term timed-release such as this, employing a process called microencapsulation, has been used for other applications (Eldridge et al. 1989). The high potency of the vaccine in small amounts makes it a very good candidate for permitting microencapsulation and still allowing remote delivery.

While the two studies described above will be primarily chemical engineering (with testing of antibody levels in domestic mares), the true test of the vaccine will require a field study. To accomplish this, the vaccine will be tested on free-roaming feral horses in Nevada. This third study, for which we are requesting funding, will be carried out in one or two herd areas mutually agreed upon by our research group and the agency or agencies appointed to make such decisions in Nevada. The field trials will evaluate effectiveness of the vaccine by pregnancy testing and foal counts. While remote delivery of vaccine in the field by darting from helicopter or at water holes is certainly a reasonable eventual goal, the proposed field trial will focus on injection in the chute following gathering. This will permit guarantee of scientific validity in terms of assured injection of vaccine and individual animal identification. Other field trial considerations such as cost, time, humaneness and safety will be monitored. While it is possible that the chemical engineering of the single-injection vaccine will be completed by Fall of 1992, we cannot guarantee this. Therefore, we propose two possible vaccination protocols for the 1992 gathering. If the single-shot vaccine is complete at that time, one half of the mares will be given a single injection and released while the remainder will be injected, retained for 3 weeks, reinjected and released. If the single-shot vaccine is not complete, then our current 2-injection procedure will be used on all mares. The proposed protocol will require maintaining horses in captivity for 3 weeks (without handling), but will permit successful vaccination and maintained flow of the project in the event that the single-injection engineering is delayed in completion. Because the second study (i.e., two-year capability) will probably not be complete by the time the initial field applications are needed the proposed first round of field testing will utilize only the prototype annual single-injection vaccine or current two-injection procedure.

While this proposal is brief and to the point, it is important in outlining crucial steps to enable large scale contraceptive vaccination of feral horses. We feel it is necessary to point out that the alternative available contraceptive technology - steroid

hormone implants - does not represent current technology nor does it satisfy basic criteria for humane treatment of animals. It is not cost-effective, safety for use in pregnant animals is still a question, behavioral effects are unknown, and steroid use is not likely to be permitted by the EPA because of possible environmental and food-chain contamination.

RESEARCH PLAN

Rationale

The purpose of this proposed research is three-fold and includes (1) development of a functional one-inoculation, one-year PZP contraceptive vaccine which can be delivered remotely for the regulation of free-roaming feral horses, (2) extension of that engineering technology to produce a one-inoculation PZP vaccine which will provide two-years of contraceptive protection, and (3) field test of the vaccine on free-roaming feral horses inhabiting public lands in Nevada.

Objectives

The specific objectives of this proposed research include the following:

I. Development of the one-inoculation, one-year vaccine (in the form of MICROSPHERES).

   1. to determine if the PZP protein, or antigen, retains immunological activity during preparation for incorporation into microspheres,

   2. to engineer a sustained-release formulation for a one-inoculation PZP vaccine that will impart a full year of contraceptive protection, i.e., microspheres,

   3. to test the effectiveness of this one-inoculation, one-year vaccine to produce antibodies in domestic horses.

II. Development of a one-inoculation PZP vaccine which imparts two years of contraceptive protection (in the form of MICROCAPSULES).

   1. to determine whether the PZP antigen retains immunological activity during preparation for incorporation into microcapsules,

   2. to engineer a timed-release, pulsed-release formulation for a one-inoculation vaccine which will impart two-years of contraception,

   3. to test the effectiveness of the one inoculation, multiple year PZP vaccine to produce antibodies in domestic horses.

III. Remote field testing of the PZP vaccine in its current 2-injection form or as a single-injection prototype on free-roaming horses in Nevada. Note that additional field trials will be needed to complete PZP vaccine testing, and these will be addressed in a subsequent proposal.

Considerations in the development of a one-inoculation PZP vaccine

At the present time a minimum of two inoculations of the PZP vaccine, given three weeks apart, are necessary for effective contraception in horses. Despite the > 95% contraceptive effectiveness of the vaccine, the need for two inoculations greatly limits the usefulness of this approach for use in free-roaming horses. Thus, the first goal of this proposed research is to develop a method for delivering a single inoculation of PZP vaccine which will result in an immediate release of some of the vaccine antigen, and then a second release of the vaccine, either continuously for a month or so or as a pulsed release about 3 weeks later. Ideally, the one inoculation would also contain a third dose of the vaccine which would be released about one year later, thus resulting in contraceptive protection for two or more years.

There are two existing technologies which can immediately be applied to the PZP vaccine to meet these goals. The first is to bind the PZP antigen within an inert non-toxic polymer which, upon injection, will release the antigen continuously but slowly over some period of time. The chemical particles which contain the antigen are referred to as microspheres. The second technology is microencapsulation of the PZP antigen. This involves coating the antigen with a non-toxic material which, after injection, erodes away and also releases the antigen. Microcapsules differ from microspheres in that they cause a sharp, timed, pulsed release of the antigen rather than a sustained release (Maulding 1987).

The first timed-release approach involves the continuous, controlled release of PZP antigen imbedded within a microsphere matrix of poly (L-lactide) or copolymers of lactide and glycolide. This approach has been used for the delivery of a large number of drugs, including intramuscular and subdermal contraceptive agents, cancer chemotherapeutics and vaccines (Cowsar et al. 1985; Linhardt 1989; Staas et al. 1991). This methodology initially appeared less promising than microencapsulation (see below) because the process causes a continuous release of the antigen rather than pulses, and continuous release might result in tolerance to the antigen rather than production of high concentrations (titers) of antibodies. However, our preliminary study of continuous release of PZP antigen in mares (see page 4, Figure 1) has demonstrated that high titers of antibody, well above the contraceptive threshold, can be obtained by continuous release. These results make this approach very attractive. Microsphere release of a common protein (bovine serum albumin, or BSA) indicates that this process can duplicate the release we achieved with the implant (see Figure 2). The two real critical questions are whether or not the PZP protein will withstand the chemical process required for incorporation into

microspheres and whether microsphered PZP vaccine will work *in vivo*.

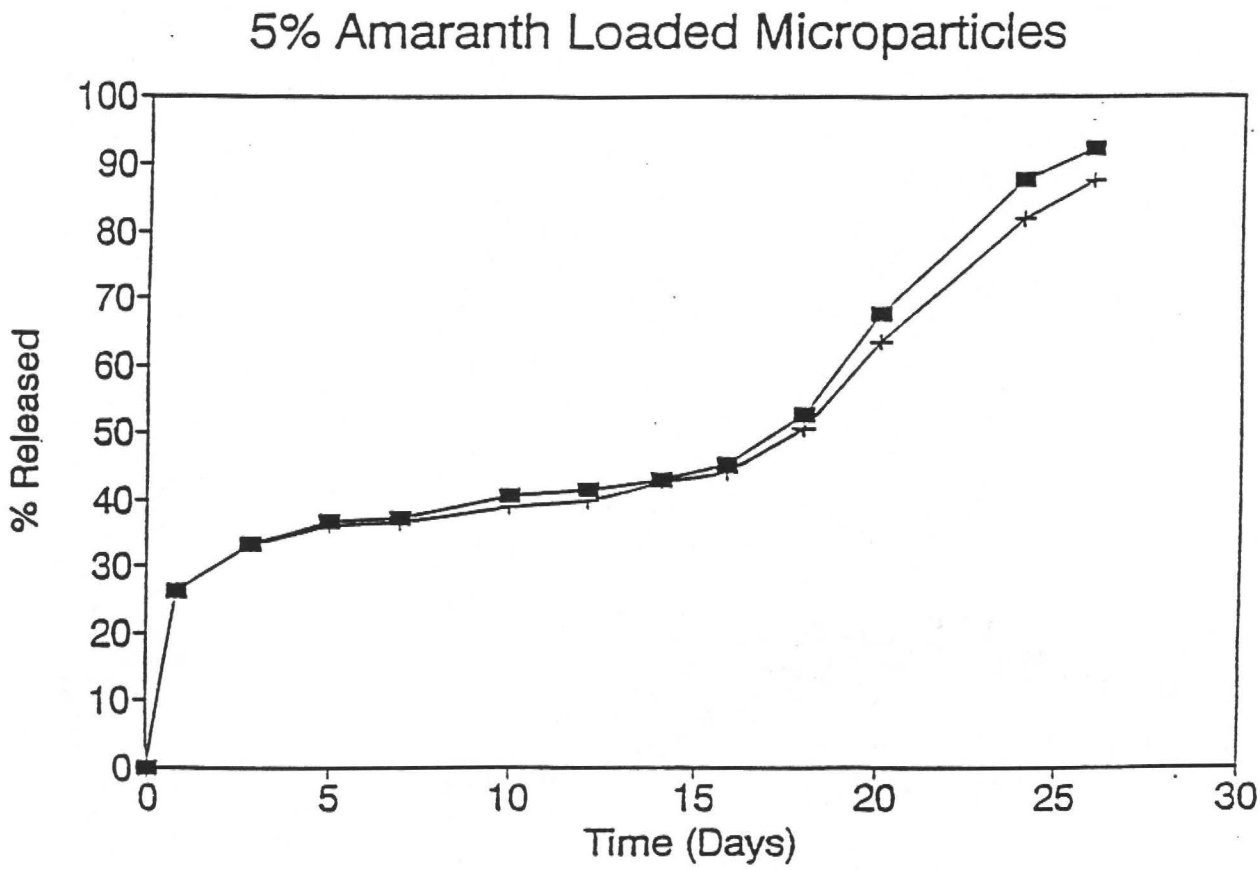


Figure 2. Release rates for bovine serum albumin from lactide pellets.

The technology to produce a one-inoculation PZP vaccine by microencapsulation also already exists. Several protein vaccines have been microencapsulated for oral delivery in humans (Eldridge et al. 1989), and there is a high probability that the same thing can be done for the intramuscular injection of PZP antigen. In the microencapsulation process the protein antigen, PZP in this case, is coated with a non-toxic polymer material, producing small capsules about the size of talcum powder grains. Upon injection into the animal the coating begins to erode. When erosion is complete, the PZP is released. We have previously used this very technique - microencapsulation - to deliver contraceptive steroid hormones to feral horses (see Kirkpatrick et al. 1982; Turner and Kirkpatrick 1982; Turner and Kirkpatrick, 1991). Long-term release rates for vaccines incorporated into microcapsules have been reported to be maintained for up to 2 years (Staas et al., 1991) and we expect that the same sort of sustained release can be achieved with the PZP antigen. Once again, the two critical questions are whether the antigen can withstand the chemical process required for incorporation into microcapsules and whether

the preparation works in vivo.

There are several laboratories which can microencapsulate protein molecules. The most established microencapsulation laboratories in the U.S. are Southern Research Institute (Birmingham, AL), and Medisorb Technologies (Cincinnati, OH). Their approach is to coat the protein antigen with a non-toxic biodegradable coating (D,L-lactide and D,L-lactide co-glycolide) which, on contact with tissue fluids breaks down into harmless products such as carbon dioxide and lactic acid (Redding et al. 1988). When the coating erodes, the protein antigen is released and stimulates the animal to produce antibodies which will bind to its own zonae pellucidae, on its own eggs, and thereby block fertilization.

Considerations for field tests of the one-inoculation vaccine:

Regardless of the success of the chemical engineering necessary to develop the one-inoculation vaccine, the ultimate measure of success in this project will be the effectiveness of inhibiting fertility in PZP-treated free-roaming feral horses in Nevada. Thus, the second major component of this project is to test the one-inoculation vaccine under field conditions. This will involve selection of an appropriate herd area in Nevada, gathering of horses at the appropriate time administration of PZP vaccine or placebo to identified mares in the field and monitoring of these mares for pregnancy and foaling.

METHODS

STUDY 1

PZP Microsphere Development: This work will be performed under subcontract, in the laboratory of R. Linhardt, at the University of Iowa. Approximately 3.0 mg of PZP will be obtained from I.M.K. Liu, at the University of California, Davis. The PZP will be tested for its ability to withstand concentrating, lyophilization, organic solvent exposure, desalting, and heat exposure. These tests are necessary to determine if the PZP antigen can withstand the actual chemical processes necessary for incorporation into microspheres. Retention of the PZP's ability to raise antibodies will be determined by a procedure known as western blot electrophoresis, using PZP anti-horse antibodies already prepared at U.C.-Davis, by M. Bernoco. If the PZP retains its ability to raise antibodies, the next step is to actually incorporate 65 μg doses of PZP, along with an appropriate adjuvant, into microspheres. These microspheres will then be injected into 3 domestic horses, at the Equine Reproduction Laboratory at U.C.-Davis. Periodic blood samples will be collected to determine if the horses are raising antibodies against the microspheres.

Microsphere preparation and in vivo testing: If antibody titers sufficient for contraception are obtained, the most promising formulation will be prepared for injection into a larger number of domestic horses. Preparation will be by R. Linhardt and associates using procedures previously described (Wang et al., 1990, 1991).

PZP release rates will be designed on the basis of previously effective doses in horses, such that 65 μg is released initially and 65-90 μg is released continuously thereafter over one month. Also, Freund's Complete Adjuvant (FCA) will be used based on previous success with this adjuvant in horses. Adjuvants are compounds which, when given with a vaccine, cause the target animals' immune systems to produce very high concentrations of antibodies against the vaccine. A study is already underway which is investigating the possible use of other adjuvants which have minimal side effects and maximum antibody responses. This adjuvant study, conducted by us and funded in part by the American Association of Zoological Parks and Aquariums (AAZPA) will run parallel to our research on a one-inoculation PZP vaccine and will provide valuable information for identifying sound adjuvants for use with the PZP vaccine in horses. The expanded horse study will utilize domestic horses at the Equine Reproduction Laboratory at U.C.-Davis, and will be supervised by Dr. I.K.M. Liu.

Study Design

Group 1 - Free PZP bolus and PZP microspheres + FCA (n=5)

Group 2 - PZP microspheres + FCA (n=5)

Group 3 - Empty (or BSA-loaded) microspheres + FCA (n=5)

Study Schedule

1. Immunization injection 6 weeks prior to onset of breeding is preferred.

2. Blood sample prior to inoculation and monthly post-inoculation for antibody titer measurement.

3. Fecal and/or urine samples prior to inoculation and monthly post-inoculation to determine pregnancy. This will be performed by J. F. Kirkpatrick, Deaconess Research Institute, Billings, MT and will provide information regarding contraceptive efficacy eight months prior to expected foaling time, thereby permitting maximum lead time for designing the next phase of the research.

4. All mares will be placed with fertile stallions and the above schedule of collections and tests will be carried out until antibody titers drop below the contraceptive threshold (previously determined by I.K.M. Liu et al. (1989); all animals will be monitored for general health and physical condition during the study.

Part of Study 1 is already underway as a collaborative effort between The Humane Society of the U.S., the Medical College of Ohio, Deaconess Research Institute, the University of California at Davis, and the University of Iowa.

STUDY 2

Two-year contraceptive vaccine with a single inoculation (microencapsulation): This is primarily a chemical engineering study and will involve subcontracting with one of several companies (Southern Research Institute, Birmingham, AL; Medisorb Technologies, Inc., Cincinnati, OH) to formulate the PZP preparation according to the timed-release schedule we request. Testing of antibody-stimulation characteristics will be performed by I.K.M. Liu. Basically this research will follow the same steps described above for the one-year microsphere inoculation, i.e., (1) testing of the antigen for its ability to withstand the process of microencapsulation, (2) incorporation of PZP antigen into microcapsules designed to give a release one-month, and 10 months after injection, and (3) *in vivo* testing of microcapsules in domestic horses. Depending upon the start-up date, this projected research will permit *in vivo* testing in domestic mares by Fall of 1992.

STUDY 3

Field study of one-inoculation PZP vaccine

Selection of field site: A feral horse herd in Nevada will be identified and agreed upon for field test of the PZP vaccine. Selection will require mutual agreement by our research group, the Bureau of Land Management and the State of Nevada. Selection criteria will include (1) topography suitable for testing, (2) herd size suitable for testing, (3) available background data regarding fertility rates, mortality rates, and population dynamics which will permit reasonable population modelling, and (4) available logistical support (housing, transportation, etc.). The site presently under most serious consideration is the combined herd management areas of Antelope and Antelope Valley in eastern Nevada. All agencies with regulatory authority over the test animals must agree, in writing, that only horse gathers or removals associated with the experimental design of this study will be conducted during the course of these studies.

For the selected feral horse population several population parameters must be established before treatment can begin. First, the desired population effect must be determined. This can be stated as a question; do we wish to achieve negative growth, zero growth, or some predetermined low growth rate? Second, once the desired population effect has been decided upon, we must determine what percentage of sexually mature mares must be treated in order to achieve the population effect, i.e., 60%, 70%, etc. Finally, we suspect that there are differential fecundity rates among mares with foals (yearlings at the time of treatment) and those without foals. Recent evidence from feral horses in California (J. W. Turner, unpublished data) and on a barrier island (Kirkpatrick and Turner 1991) indicate that mares without foals are more likely to be pregnant than those with foals and are less likely to become pregnant the next year. In the herd or herds to be treated in the proposed studies contraceptive treatment efforts will include as

many mares with foals as possible. The determination of the population goals, size of the target treatment population, and which individual animals provide the best opportunity for contraceptive success are the domain of population modelling (we suggest Dr. Walt Conley, New Mexico State University, for this input), and these parameters will be assessed before actual treatment begins. As a first estimate regarding the Antelope (n=468) and Antelope Valley (n=540) HMA's, based on discussion with informed BLM personnel, an "n" of 100-140 mars in the 5-9 year age group may be available for the study. Prior to beginning the field test it must be demonstrated that the herd is in reasonably good nutritional state; 2) the range is in fair to good forage condition with reliable water availability and that adequate gathering/holding capabilities exist to carry out the study.

Treatment Procedures: Gathering by bands is preferred to insure family integrity. However, our experience has been that gathered horses which have been separated from their bands and then released back into their home range area have good probability of relocating and rejoining their original band. Gathered females will be individually identified by freeze-brand marking. Pregnancy can be determined via urine sample testing on site (Roser and Lofstedt 1989) and injection of selected mares can be accomplished by jab-stick in chutes, or blowpipes in the corrals.

PZP antigen for these field tests will be produced by I.K.M. Liu, at U.C.-Davis. The PZP-loaded microspheres and/or microcapsules will be formulated and produced by the appropriate subcontractor (Linhardt, University of Iowa; Southern Research Institute; Medisorb Technologies, Inc.). Delivery of PZP vaccine to horses will be conducted/monitored by members of our research group.

Only healthy mares (as determined by our research team veterinarian) will be used in the study. Treatment of mares will be done in a blind study initiated in fall/winter based on the successful protocol developed in the course of the Assateague Island studies. Pending availability of single-injection vaccine and 140 mares for treatment, the following groups and numbers will be included: 2-injection PZP (55), 2-injection placebo (15), 1-injection PZP (55), 1-injection placebo (15). The 2-injection groups are essential in this study as a reference base with which to compare the 1-injection preparation. As stated in the Introduction section, Introduction section, if the 1-injection prep is not available by the time the treatments must be done, all mares will be given the 2-injection protocol. This will insure a viable field trial of PZP vaccine in 1992. Observations will be made of the horses during the ensuing breeding season in order to document that social structure is intact and to determine if there is any significant change in behavior. Essentially we are interested in whether or not harem groups are intact, whether mares are being attended by the stallions, and whether mares are displaying clinical signs of behavioral estrus. Additionally, a certain number of treated mares with unique identifying markings will be photographed for later identification. This will be important for

determining the duration of contraceptive effects.

Although the initial test will utilize gathered horses and direct injection of vaccine, an important consideration for vaccine delivery in the future is remote darting. Therefore, preliminary evaluation of this issue will be undertaken in the proposed studies. Capture gun technology is designed primarily for immobilizing animals, and not for remote delivery of drugs. Modifications of equipment and techniques of delivery are required to deliver drugs remotely to free-roaming animals and our experience with feral horses on Assateague Island has provided a great deal of experience in this area. There are currently several brands and models of capture guns and self-injecting darts which can be considered candidates for this work. These include the Pax-Arms rifle, Pneu-dart, Inc., and the Teleinject system. Additionally, Dr. Lee Simmons, of the Omaha Zoo, can provide custom capture rifles. Each of these instruments has advantages and disadvantages and it is our intention, in the course of this study, to evaluate all systems and seek appropriate modifications in order to achieve the greatest success. It is important to remember that, even when the one-inoculation vaccine is available, it will do little good if we can't get it into the horses.

Pregnancy diagnosis: At the time of the gather (1992) blood/fecal samples will be collected for pregnancy testing. Mares given 2-injections of PZP will also be blood sampled at the time of 2nd injection for antibody titer testing. Between August and November (1993) following the breeding season urine and/or fecal samples will be collected from a statistically valid sample of the treated and untreated populations. The urine and fecal samples will be collected as described by Kirkpatrick et al. (1988, 1991a), and measured for pregnancy-dependent estrone conjugates and non-specific progesterone metabolites as described by Kirkpatrick et al. (1988, 1990b, 1991b). The establishment of pregnancy rates is important because foaling rates do not always provide accurate pictures of contraceptive effectiveness. Fetal loss and early foal mortality (the latter witnessed by J. W. Turner among California feral horses where foals are subject to lion predation) can confound the measurement of contraceptive effectiveness; early pregnancy determination can provide a more accurate picture. And, while pregnancy detection is important, in keeping with our research group's concern for the safety and humane treatment of horses, remote pregnancy testing is an integral part of a complete hands-off approach to fertility control.

Experimental controls: Previous work with feral horses on Assateague Island national Seashore has documented the lack of contraceptive effects of placebo vaccination upon control animals. However, the validity of the proposed field test will be insured by including placebo controls for each type of treatment. The control preps will consist of an emulsion of phosphate buffer solution and Freund's adjuvant.

Treatment Evaluation: Field studies of contraception can be evaluated and measured for success or failure in different ways.

Our approach is to document the pharmacological success of contraception. This will be accomplished by comparing pregnancy and foaling rates among treated and untreated mares. This is a major focus of the present proposal and will be carried out by our research group. While it will ultimately be necessary to understand what the effects of contraception may be upon the population dynamics, this is beyond the scope of our proposed studies. Nonetheless, the proposed field trial can provide the beginning of a data base for population models to determine to what degree immunocontraception may alter the demographic dynamics and size of a feral horse herd.

Animal care: All research conducted in the course of this project will be subject to review by the appropriate animal research committees of the three institutions involved (Medical College of Ohio, Deaconess Research Institute, and the University of California at Davis), and will be conducted only after approval by these committees. The regulations surrounding animal care standards for wild or free-roaming species are not clear. However, our group will apply the standards for domestic animals to the treatment of all horses in this study, whether domestic or free-roaming.

Education and public relations: Our research group's experience with the highly visible and successful Assateague Island feral horse contraception study has made it extremely clear that a serious attempt must be made to keep the public informed and to provide open and honest dialogue with the media. The Assateague horses are the most visible - and perhaps most adored - feral horses in North America, and embarking upon the immunocontraceptive research project carried with it a certain amount of risk. In order to keep the public informed at each step of the project, the National Park Service conducted an extensive educational program. This involved the print media, local and national network TV, and on-site programs. After six years of research with this highly visible herd, which has some 700,000 visitors come to view it each year, there has been absolutely no public resistance and overwhelming public support, including animal protection groups. The key elements of this successful relationship with the public were careful documentation of each step of the research and willingness and efforts to share this information with the public. It is our intention to do the same thing with this proposed research. An experienced public relations expert will be retained by the research team on a consulting basis, to design an appropriate public relations program and to develop the necessary materials for disseminating information. Our research group has never killed or even seriously injured a horse in the course of 18 years of research; we are as proud of that as we are of our contraceptive success. We feel that the public must be able to view our work and the care we take if this approach to the control of feral animal populations is to become accepted. No information will be released without going through the consultant resource, who must have approval of the research team scientists for any information release.

INVESTIGATOR EXPERIENCE

The three investigators are Dr. John W. Turner, Jr., Department of Physiology and Biophysics, Medical College of Ohio, Toledo, Dr. Jay F. Kirkpatrick, Deaconess Research Institute, Billings, MT, and Dr. Irwin K. M. Liu, University of California, Davis, and the collaborating agency is the Humane Society of the U.S. Drs. Turner and Kirkpatrick have been involved in studies of the biology of feral horses for 18 years. These studies have focused on hormonal contraception and immunocontraception of both stallions and mares and culminated in the successful immunocontraception of the Assateague horses. Funding for these projects have come from a variety of source but primarily from the Department of the Interior, through the Bureau of Land Management (Contract YA-512-CT) and the National Park Service (Contract CA-1600-30005). In addition to contraceptive studies these two investigators have also pioneered non-capture methodologies for detecting pregnancy and monitoring ovarian function among free-roaming feral horses in order to develop a complete "hands-off" technology for the control of feral horse reproduction. Both investigators will personally devote a significant portion of their time to this project. Specifically, Dr. Turner will oversee the chemical engineering of the one-inoculation vaccine and play a significant role in designing and conducting the field testing of the vaccine. Dr. Kirkpatrick will be in charge of remote pregnancy detection, evaluation of vaccine delivery equipment, development of the public relations program and will participate in field tests. Together these investigators are responsible for 28 published scientific articles relating to feral horse biology and contraception, as well as numerous articles in the popular press. Dr. I.M.K. Liu is an equine immunologist in the School of Veterinary Medicine at U.C.-Davis. Dr. Liu was responsible for originally determining that the PZP vaccine is effective in horses and he has extensive experience testing this vaccine with feral horses living on sanctuaries. He will be in charge of vaccine production and antibody testing. All investigators will be present for the gathering and treatment of horses. Academic credentials and qualifications for the three co-investigators are provided in the appendix.

PROJECT EVALUATION

The project will be evaluated periodically at several check points, as well as at the conclusion. The check points, derived from the stated goals include (1) <u>in vivo</u> testing of the microsphere PZP vaccine (evaluation criteria = antibody concentrations and pregnancy rates), (2) <u>in vivo</u> testing of the microcapsule PZP vaccine (evaluation criteria = antibody concentrations and pregnancy rates), (3) effectiveness in the field of the vaccine delivered to feral horses percent of treated vs. control mares which produce foals. All endpoint evaluations are measurable and will result in data which can be tested for significance.

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PROPOSED PROJECT BUDGET

SECTION I. UNIVERSITY OF NEVADA, RENO (UNR) BUDGET

A. Personnel

Principal Investigator (K. Hunter) $5,831
(P.I. commitment to project is 5% of total time, plus 19% fringe benefits)

B. Travel

Travel from university to study site via university vehicle for P.I. and members of oversight committee $500

DIRECT COST TOTAL	$6,331
INDIRECT COST TOTAL*	$11,075
TOTAL UNR COSTS	$17,406

* includes indirect costs on first $25,000 of subcontract to Medical College of Ohio

SECTION II. PROPOSED SUBCONTRACT BUDGET (MEDICAL COLLEGE OF OHIO)

PART I. Chemical Engineering (Microsphere/Microencapsulation) Study

A. Personnel

Principal Investigator (J. Turner) $14,523.00
(P.I. commitment to this project is 20% of full-time effort. Plus 34% fringe benefits)

Co-Principal Investigator (J. Kirkpatrick) $ 6,100.00
(Co-P.I. commitment to this project is 10% of full-time effort. Plus 22% fringe benefits)

Research Associate $18,000.00
(Salary for preparation of PZP. 30% of full-time effort. Plus 34% fringe benefits)

Laboratory/Secretarial Assistance $14,472.00
(Part-time, $9/hr. X 24 hrs/wk (Medical College of Ohio) x 40 wks, plus 34% fringe benefits)

Laboratory Technician $16,080.00
(Part-time, $10/hr. X 30 hrs/wk X 40 wks, plus 34% fringe benefits)

SUBTOTAL $69,175.00

B. **Microsphere and Microcapsule Formulation and Testing**

Viability testing of vaccine for the formulations	$ 5,000.00
Timed-release vaccine preparation	$16,000.00
Vaccine release characteristics testing	$14,000.00
In vivo testing of the timed-release vaccine	$15,000.00
SUBTOTAL	$50,000.00

C. **Equipment**

Dionex Pulsed Electrochemical Detector and electrode for HPLC analysis of urine/feces	$ 7,900.00
Reciprocal shaker for urine/fecal extractions	$ 2,000.00
SUBTOTAL	$ 9,900.00

D. **Supplies**

Supplies for PZP preparation, antibody monitoring, blood collection, horse maintenance	$ 5,800.00

E. **Communications**

Phone, fax, mailing, copying	$ 1,600.00

F. **Consultants**

Public Relations Costs	$ 6,000.00

G. **Travel**

Principal Investigator (J. Turner):	
Toledo to site for microsphere preparation	$ 900.00
Toledo to site for microencapsulation preparation (2 trips)	$ 1,800.00
Toledo to site for timed-release vaccine testing in vivo	$ 900.00
SUBTOTAL	$ 17,000.00

DIRECT SUBCONTRACT COST SUM (PART I)	$146,075.00
MCO Indirect Costs (20% of above)	$ 29,215.00
TOTAL SUBCONTRACT COSTS (PART I)	**$175,290.00**

Part II. Field Trials Study

The costs of field trials will depend on the range site selected. Since conditions and tactical support elements vary

considerable from range to range, it is not possible to make a reliable cost projection. However, there are some aspects of the field trial costs which are fixed and an overall cost estimate can be made, assuming up to 140 mares will be treated.

The following budget is divided into 2 parts. Section A shows costs which will be provided to the Medical College of Ohio, and Section B shows costs which will be covered within the operating budget of the BLM.

Section A. (Costs Provided to MCO)

1. Personnel costs for 2 field technicians (students) to carry out the field monitoring of the PZP-treated and placebo horses, including urine/fecal sample collections for pregnancy testing and behavioral monitoring. Vehicles, fuel, and housing to be provided by BLM.

$8.00/hr X 8 hr/day X 100 days X 2 persons (plus 34% fringe benefits)	$	17,152.00
$15.00/person per diem X 100 days	$	3,000.00
SUBTOTAL	$	20,152.00

2. Equipment

a. Horse identification by videotape has proven superior in our studies, and we recommend that each monitoring person have such capability. Cost for freeze-frame videocamera is about $1,500. Sony TR-101 handycam $1,500 X 2	$	3,000.00
b. Binoculars $200 X 2	$	400.00
c. Spotting scope $300 X 2	$	600.00
SUBTOTAL	$	4,000.00

3. Supplies and communications, i.e., for sample collection and storage, horse monitoring, phone and mailing $ 2,500.00

4. The cost of vaccine will depend on the results of the Microsphere-Microencapsulation study and on the number of horses to be treated. A conservative estimate is $35/horse. If the experimental phase is successful a larger scale PZP preparation system will greatly reduce the cost per horse.
Based on 110 mares treated plus 35 reserve doses.

Estimated Subtotal	$ 5,075.00

5. Cost of pregnancy testing will be approximately $15.00 per sample including shipping and assay and will be based on 140 mares (30 control and 110 experimental)

Estimated Subtotal	$ 2,100.00
SUBTOTAL	$ 9,675.00

6. Travel

Travel by Turner, Kirkpatrick, Liu and assistant to range site to perform vaccinations.	$ 3,000.00
Travel by Dr. Turner or Kirkpatrick to verify foal counts and evaluate horse population in study range.	$ 2,000.00
Travel by 2 field technicians to range site.	$ 2,000.00
SUBTOTAL	$ 7,000.00

Total Direct Costs for Section A.	$40,827.00
MCO Indirect Costs (20%)	$ 8,165.00
Total Costs for Section A.	**$48,992.00**

Section B. (Costs Covered Directly by BLM)

1. All helicopter costs: for initial observations of range, gathers of horses for PZP treatment and post-treatment monitoring (including flyovers for horses identifications and foal counts).

2. All equipment, supplies and personnel costs for gathering of horses and maintenance of captive horses, including corrals, freeze-branding, disease testing, veterinary care, feed, water/feed transport.

3. Provision of 4 X 4 vehicles and fuel for all research activities during the field trial.

PROJECT BUDGET SUMMARY

University of Nevada, Reno Costs	**$17,406**
Subcontract Costs (Medical College of Ohio)	**$224,282**
Total Project Costs	**$241,688**

FINDING OF NO SIGNIFICANT IMPACT
AND
DECISION RECORD
EA-NV-010-92-076

FINDING OF NO SIGNIFICANT IMPACT (FONSI)

The proposed action will not significantly affect the quality of the human environment. Therefore an Environmental Impact Statement is not required.

RECOMMENDATION

The recommended action is to implement the Antelope Valley Herd Management Area Plan (HMAP). The proposed action incorporates standard operating procedures for fertility control in Appendix 4 and capture stipulations in Appendix 3 of the HMAP.

RATIONALE

The environmental assessment has indicated that implementation of the proposed action would result in beneficial impacts to the environment. The gathering and removal of wild horses using standard Bureau techniques is in compliance with the Wells Resource Management Plan (RMP)/Environmental Impact Statement (EIS). Although fertility control is not specifically provided for in the RMP, the HMAP is still consistent with the intent of the RMP. The HMAP is designed to provide the framework for the management of wild horses in the Antelope Valley Herd Management Area (HMA).

DECISION

The proposed action, the implementation of the HMAP, is approved with the above mentioned stipulations.

Rodney Harris, District Manager
Elko District Office

10/9/92
Date

ENVIRONMENTAL ASSESSMENT
EA-NV-010-92-076
ANTELOPE VALLEY HERD MANAGEMENT AREA PLAN

I. INTRODUCTION/PURPOSE AND NEED

In December 1971, President Richard M. Nixon signed into law legislation "To require the protection, management, and control of wild free-roaming horses and burros on public lands". This legislation is known as the Wild Free Roaming Horse and Burro Act of 1971 (P.L. 92-195 as amended). Enactment of the Act provided basic protection for wild horses and burros, and the animals began to thrive on public lands administered by the Bureau of Land Management and U.S. Forest Service. After more than twenty years of protection, there are now areas where excess horses exist and are a contributing factor to deteriorating range conditions.

In the past, control of excess wild horses was confined to removals and subsequent placement of the animals in private care through the Adopt-A-Horse program. This program has been considered successful for the young, adoptable animals. The older animals have been unadoptable due to a lack of adopter interest. These animals have been placed on sanctuaries but as the sanctuaries reach their carrying capacity and continue to need Federal funding, it is no longer an option.

The Bureau of Land Management (BLM) is addressing these issues by implementing pilot fertility control research throughout Nevada. The Wells Resource Management Plan (RMP) identified the need to develop herd management area plans (HMAPs) for all herd management areas (HMAs). The Strategic Plan for Management of Wild Horses and Burros on Public Lands (BLM, June 1992) further directs the Wells RA to develop and implement HMAPs for all HMAs.

The Antelope Valley HMAP is designed to provide the management framework for the pilot fertility control study and selective removals in the Antelope Valley HMA. Though the HMAP addresses selective removals, the Wells Resource Area (RA) will not be removing any horses until such time as final allotment evaluations are available with appropriate management level's (AML's) established.

The HMAP, when updated, will reflect AML's for wild horses developed to achieve a thriving natural ecological balance between the Antelope Valley HMA wild horse populations and all other resources and users.

Although the Wells RA is not currently at a point where it can remove excess wild horses from public lands through selective removals, this EA will analyze the impacts of the HMAP which include fertility control, selective removals, and water developments. This EA will not analyze the major issues and impacts of wild horse gathering, removing, and resulting reduction in wild horse numbers as existing EAs on file at the Elko District Office adequately analyze these issues (EA-NV-010-87-104, EA-NV-010-85-047).

Major Issues

The major issues identified in the HMAP are 1.) the reduction in wild horse numbers through the use of fertility control/selective removals, and 2.) the construction of one to four water developments for wild horses. These management strategies are necessary to control wild horse numbers without the use of excessive removals and to improve existing wild horse habitat.

II. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

A. Proposed Action

1. Implement the HMAP

The Wells RA would implement the Antelope Valley HMAP and begin a pilot fertility control study in November of 1992. Selective removals of wild horses would not take place until allotment evaluations and Final Multiple Use Decisions (FMUDs) are issued.

B. Alternatives to the Proposed Action

1. No action

The HMAP would not be implemented.

III. SPECIAL PROJECT STIPULATIONS

A. Proposed Action

1. Implementation of the HMAP

a. All capturing and handling of wild horses will strictly adhere to the stipulations outlined in the Capture Plan, Appendix 3 of the HMAP.

b. All treatment of wild horses with the

fertility control drug will strictly adhere to the procedures given in the Study Proposal, Appendix 4 of the HMAP.

c. All water developments will be constructed in accordance with Bureau policy.

B. Alternatives to the Proposed Action

1. No action

a. None

IV. AFFECTED ENVIRONMENT

A. Proposed Action

The following list of resources or values are not present or are not affected by the proposed action or alternatives in this EA: Air Quality, Areas of Critical Environmental Concern (ACECs), Farm Lands (prime or unique), Floodplains, Native American Religious Concerns, Hazardous or Solid Wastes, Water Quality (drinking or ground), Wild and Scenic Rivers or Wilderness. These resources or values will not be considered further in this EA.

1. General Setting

The Antelope Valley HMA is located approximately 105 miles southeast of Elko, Nevada in the southeastern most portion of the Wells RA. Maps 1 and 2 in Appendix 1 of the HMAP show general location of the HMA and the HMA itself. The proposed project area encompasses 400,000 acres of public land and 1,500 acres of private land. Refer to the HMAP Introduction, Location and Setting for a complete description of the area.

2. Soils

The proposed project area covers 400,000 acres and many different soil types. Detailed information on soil types is available at the Soil Conservation Service in Elko, Nevada.

3. Vegetation

Affected vegetation is detailed in Appendix 2 of the HMAP.

4. Wildlife

Affected wildlife is detailed in Appendix 2 of the HMAP.

5. Livestock

Affected livestock management considerations are detailed in Appendix 2 of the HMAP.

6. Visual

The proposed project would be occurring on lands designated as Visual Resource Management (VRM) Class II, III, and IV areas. The Red Knoll area near U.S. 93 (alt.) is a Class II area. The proposed project may cause temporary contrast with the basic landscape. The north and west sides of The Dolly Varden mountains are VRM Class III and IV respectively. Construction of holding corrals may dominate the surrounding landscape on a temporary basis.

7. Cultural

Archaeological sites have been recorded in the proposed project area. Because the project area covers 400,000 acres there is a high probability that archaeological sites will be encountered.

8. T/E Species

Affected T/E considerations are detailed in Appendix 2 of the HMAP.

9. Wetlands/Riparian Zones

Affected wetlands/riparian zones are detailed in Appendix 2 of the HMAP.

10. Recreation

The project area receives widely dispersed recreation, primarily primitive camping associated with deer hunting, rock hounding and four-wheeling.

11. Wild Horses

There will be approximately 643 wild horses in the project area at the time of the proposed action. 100% of the horses could possibly be affected by the proposed action (through the capturing, aging, and sorting process). The HMAP details herd

characteristics.

V. ENVIRONMENTAL IMPACTS

This section will present an analytical comparison of the environmental impacts associated with the proposed action and the no action alternative. The impact analysis is directed at those issues identified through the scoping process.

A. Proposed Action - Implement HMAP

The proposed action, implementation of the HMAP with the three components (fertility control, selective removals and water development) would have slightly different impacts on the physical environment beyond what was already analyzed in the EAs for wild horse removals (EA-NV-010-87-104 and EA-NV-010-85-045).

Fertility Control

1. Wild Horses

The implementation of fertility control could affect the wild horse population in the Antelope Valley HMA by reducing reproductive rates. The reduced reproductive rates would have a positive impact on individual wild horses by causing slower population growth which in turn would make removals necessary less often. Fewer removals would mean that individual horses would experience less stress from removal actions. The injection of an immuno-contraceptive drug would cause increased stress levels and potentially could increase mortality on a temporary basis. Increased mortality may be caused by an increase in handling to mark, inject, and hold study animals for a three week period.

There is also the chance of increased stress caused by separating study mares from their bands. Standard Operating Procedures outlined in Appendix 3 and 4 in the HMAP will minimize these potential impacts to wild horses.

2. Vegetation/Soils

Holding approximately 50-80 mares for a three

week period would cause severe vegetation trampling and soil compaction leading to erosion. Every effort shall be made to locate the holding facility on a site that has had previous disturbance such as a gravel pit or halogeton flat. If dust becomes excessive the contractor will be required to implement dust control, either in the form of water or spreading pea sized gravel.

3. Visual Resources

The proposed project activities would result in minimal impacts and these would be temporary. Every effort will be made to reduce visual impacts by locating traps and holding facilities well off commonly traveled roads. The nature of capturing wild horses itself requires that the traps be well hidden.

4. Livestock Management

Livestock could be affected by the temporary trap sites and holding facilities. Trap sites and holding facilities will not be located around springs or wells which may preclude livestock from water. Livestock could be temporarily frightened and scattered by herding activities. Efforts will be made to avoid low level flights over concentrations of livestock.

5. Wetland/Riparian Zones

The amount of wetland/riparian areas in the project area is extremely small and there is very little chance that the proposed action would have any impacts on this resource. Traps and holding facilities shall not be placed on or near wetland/riparian areas.

6. Cultural Resources

The surface disturbance resulting from holding large numbers of horses in a relatively small area could have negative impacts on cultural resources. Therefore, a cultural resources investigation by an archaeologist or district archaeological technician will be conducted prior to any

trap or holding facility construction. If cultural values are discovered, an alternate trap site will be selected.

7. Wildlife/T&E Species

No threatened, endangered or candidate plant or animal species would be impacted by the proposed project. Some small mammals, reptiles, and birds could be temporarily displaced at the trap and holding facilities. A slight possibility exists that non-mobile or site specific animals could be trampled. The likelihood of this would be quite small if the trap and holding sites chosen were already disturbed.

Selective Removals

The selective removal component of the proposed action would have the same environmental impacts as a wild horse gather resulting in fewer horse numbers and a slower recruitment rate. These impacts are analyzed in the Cherry Creek-Goshute-Antelope Valley Wild Horse Gather EA, #EA-NV-010-85-047 and also in the Antelope Valley-Antelope-Goshute Wild Horse Gather EA, #EA-NV-010-87-104 on file at the Elko District Office.

Water Developments

Currently there are no specific sites selected for the location of the proposed water developments. When the HMAP is updated to reflect wild horse AML's, sites would be selected.

Each water development will have a site specific environmental assessment (EA) prepared prior to their approval. Included within the site specific EA will be a cultural resources report and visual contrast rating clearance for each project. The EA will also address threatened or endangered plants and animals.

B. No Action Alternative

Without implementation of the proposed action, the ultimate goals identified in the HMAP would not be achieved. There would be no comprehensive and coordinated plan to act as a management framework.

The benefits to other rangeland resources listed

in this EA as well as EA-NV-010-87-104 and EA-NV-010-85-047 would not be achieved.

C. Cumulative Impacts

If the HMAP is successful in controlling horse numbers (once appropriate management levels are established) and continued monitoring determines that the Antelope Valley wild horse numbers are in thriving natural ecological balance with other resources, then cumulative impacts would be positive to all aspects of the physical environment.

D. Monitoring

Management actions carried out as a result of the implementation of this HMAP would be closely monitored. Bureau personnel will monitor the operation to ensure that all SOPs identified are adhered to. BLM wild horse specialists will continue to monitor the condition of the horses, vegetation and water in the Antelope Valley HMA .

The success or failure of the fertility control project would be determined by the researchers. Monitoring methods to be used to determine success or failure are described in Appendix 4 of the HMAP.

VI. CONSULTATION AND COORDINATION

A. Persons and Agencies Consulted

The following persons and agencies participated in the development of this EA:

Laura Geuser, Fishery Biologist/Environmental Coordinator, BLM
Ray Lister, Wildlife Biologist, BLM
Bruce Thompson, Range Conservationist, BLM
Leticia Gallegos, Range Conservationist, BLM
Tim Murphy, Archaeologist, BLM
David Mermejo, Outdoor Recreation Specialist, BLM
Roy Price, Wildlife Biologist, BLM
Karl Scheetz, Supervisory Range Conservationist, BLM

Bureau of Land Management, Ely District Office
Bureau of Land Management, Nevada State Office

This EA was prepared by Kathy McKinstry, Wild Horse and Burro Specialist, Wells RA, Elko District Office.

2/25/87

IN REPLY REFER TO:
4700
(NV-043)

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Ely District Office
Star Route 5, Box 1
Ely, Nevada 89301

FEB 25 1987

Mrs. Dawn Y. Lappin, Director
Wild Horse Organized Assistance, Inc.
P.O. Box 555
Reno, NV 89504

Dear Mrs. Lappin:

In your letter dated February 13, 1987, you expressed concern with the number of horses removed under the Cherry Creek/Goshute/Antelope Wild Horse Removal contract.

Two of the three herds gathered - Cherry Creek and Antelope - contain horses both within the Ely and Elko Districts and are jointly administered by the two BLM districts. The Goshute herd is managed exclusively by the Elko District.

The Ely District conducted a pre-gather census in June 1985 for both the Antelope and Cherry Creek herds. The number of horses to be gathered under this contract was based on this census which was conducted simultaneously with the census flown by the Elko District. The Ely and Elko District's wild horse specialists, Bob Brown and Bruce Portwood, closely coordinated their census by flying at the same time to ensure that double-counting would not occur between districts. No horses were counted on Ely's Cherry Creek herd, and 451 horses were censused on Ely's Antelope herd.

Based on the results of this census, the Ely District intended to remove 148 horses from our side of the Antelope herd and none from our side of the Cherry Creek herd. The appropriate management levels (AMLs) established for the Ely District in the Egan RMP and Schell MFP is 11 horses on Cherry Creek and 303 horses for the Antelope Herd.

The Cherry Creek removal was conducted entirely on the Elko District. A total of 48 horses were removed. A post-gather census was conducted and 16 horses were counted on the Ely District side. This is 5 horses above the AML established in the Ely RMP.

There were 107 horses removed from Ely's Antelope herd under the Tom Warr contract in September 1986. As you are aware, this contract was terminated due to problems with the contractor. Dave Catoor completed the contract this month. He removed an additional 58 horses from Ely's Antelope herd under the contract. This brought the total number removed from the Ely Antelope herd to 165. A post-gather census was conducted simultaneously with the Elko District to again prevent double-counting. There were 782 horses counted on Ely's Antelope herd which is 479 horses in excess of our AML.

The remainder of the horses removed under this contract were from Elko's Antelope and Goshute herds. The Elko District will provide you with the status of their herds based on the post-gather census conducted there.

As you can see, we left a sufficient number of horses after the contract completion. We are still above AMLs on both of our herd areas.

We assume that the large discrepancy in our Antelope herd 1985 census and 1987 census is due to several factors:

1. The Antelope herd horses can move freely between Utah and Nevada along the east herd boundary. The stateline is not fenced. The Utah side of the line is not a herd area. We do not census east of the stateline and it is assumed that large number of horses may have been in Utah during our 1985 census, but had moved into the Antelope herd area during our 1987 census.

2. Both 1985 and 1986 were mild winters in the area, and we feel that the colt crop was up and winter death losses were minimal.

3. The horses were more visible during the 1987 winter count by being down lower in the open valleys. More horses were shaded up (pinyon-juniper cover) during the 1985 summer census and were missed.

4. More time was spent on the census in 1987 (approximately 12 hours) than on the 1985 census (approximately 8.5 hours).

Hopefully, the above information answers all of your concerns. But, if you need any further information please let us know and we will be glad to assist you.

Sincerely,

Kenneth G. Walker

Kenneth G. Walker
District Manager

cc: Nevada State Director (NV-931.3)
Elko District Office