CALIENTE ENVIRONMENTAL STATEMENT

MOL.20010730.0394

FINAL

PROPOSED DOMESTIC LIVESTOCK GRAZING MANAGEMENT PROGRAM

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

8.50

SUMMARY

( ) Draft (X) Final Environmental Statement

U.S. Department of the Interior, Bureau of Land Management, Las Vegas District, Nevada

1. Type of Action: (X) Administrative ( ) Legislative

2. Brief Description of Action: To fully implement within 20 years intensive grazing management systems on 27 proposed Allotment Management Plan (AMP) areas (65 allotments, 3,051,078 acres), to have 12 non-AMP allotments (339,725 acres), and to have no grazing on nine allotments (105,002 acres). By allotment, the following would be established: (1) period-of-use for each class of livestock, (2) proper livestock grazing capacity, (3) allocation of sufficient forage to meet management goals for wildlife and wild horses (15,104 and 5,956 AUMs, respectively), (4) proper grazing treatment for each allotment, and (5) necessary range improvements needed to fully implement the grazing systems. When the AMPs are developed, they would be subject to further analysis including environmental assessment and cost benefit procedures. Only those AMPs which are determined to be feasible would be implemented.

The purposes of the proposed action are to: (1) protect and enhance the vegetative resource; (2) increase vegetal production within each allotment so that within 35 years the optimum number of livestock AUMs (162,336 AUMs) can be provided; (3) provide 15,104 AUMs of forage for wildlife to maintain the desired population; (4) provide 5,956 AUMs of forage to maintain a total of 496 wild horses; and (5) decrease soil erosion from approximately 2.2 million tons/year to approximately 1.7 million tons/year.

3. Summary of Environmental Impacts of the Proposed Action: Long-term cumulative impacts expected to occur as a result of the proposed intensive grazing management, summarized by resource element, include: Soils - Reduce levels of soil erosion by 19 percent ; soil compaction would increase around new water developments. Vegetation - Vegetal production (109,000 to 162,000 AUMs), composition and plant vigor should increase. Water - Sediment yield should decline. Wildlife - Populations of most wildlife species should increase; fences could restrict movement and cause injury; new water sources and vegetation treatment would enhance wildlife habitat. Wild horses and burros - Fences would restrict movement and existing populations would be reduced (1,072 to 496). Cultural resources - Displacement and loss of artifacts could occur as a result of livestock trampling and construction of range improvements. Livestock Grazing - Short-term reduction in available forage would be offset by significant increases in available forage by 2015. Economics - The initial allocation would impact ranch income, but the additional forage by year 2015 would increase ranching income. Social - The proposed action would impact lifestyles and community values.

4. Alternatives Considered:

1. Continuation of present management (no action).
2. Elimination of livestock and wild horse and burro grazing (no grazing).
3. Minimum constraints on wild horses and burros.
4. Restricted periods-of-use (no spring grazing).
5. Reduced levels of livestock grazing.
6. Reduced management intensity.
7. Locally suggested vegetation allocation program.

5. Comments Requested from the Following: See list in Chapter 9.

6. Date Statement Made Available to EPA and the Public:

Draft: May 25, 1979
Final: SEP 21 1979

DEPARTMENT OF THE INTERIOR

FINAL

ENVIRONMENTAL STATEMENT

PROPOSED DOMESTIC LIVESTOCK GRAZING MANAGEMENT PROGRAM FOR THE CALIENTE AREA

Prepared by

BUREAU OF LAND MANAGEMENT

DEPARTMENT OF THE INTERIOR

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INT FES 79-44

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Errata

The following changes should be made on the maps in the Caliente ES.

A) Range Management Intensity Map, Chapter 1

The striped areas located in the upper left corner of the map (Penoyer Valley) and in the lower right corner (near East Morman Mountains) should have been printed over a white background, indicating dual use areas.

B) Wild Horse Management Areas Map, Chapter 1

In the upper right-hand corner of the map, by Crestline, the portion covered by allotment 66 (Uvada) should have been printed in pink indicating it is a Wild Horse and Burro Removal Area. (See the Grazing Allotments Map in Chapter 1 to locate allotments.)

C) Big Game Areas Map, Chapter 2

The Cedar Range located in the upper right-hand corner of the map, should be designated as DC-4, rather than DS-4.

The DS-1 area in the center of the map should be shown in pink stripes to indicate that it is a yearlong use area for bighorn sheep.

D) Wild Horse and Burro Map, Chapter 2

In the upper right-hand corner of the map, by Crestline, the portion covered by allotment 66 (Uvada) should have been printed in yellow indicating it is a Wild Horse and Burro Area. (See the Grazing Allotments Map in Chapter 1 to locate allotments.)

1

DESCRIPTION OF THE PROPOSED ACTION

CHAPTER 1

DESCRIPTION OF THE PROPOSED ACTION

THE PROPOSED ACTION

The Las Vegas District of the Bureau of Land Management is proposing to allocate available vegetation to domestic livestock, mule deer, antelope, bighorn sheep, and wild horses in the Caliente Environmental Statement (ES) area over a period of 35 years. The proposed action was developed in conjunction with Management Framework Plan (MFP) recommendations which allocate available vegetation within the Caliente ES area. (Appendix B explains the MFP's place in the planning system.) This proposal also includes an identification of: (a) management intensity (Allotment Management Plan, non-Allotment Management Plan, and no grazing), (b) specific period-of-use by allotment, (c) numbers and kind of livestock to be grazed, (d) rangeland classification (perennial, ephemeral, and perennial-ephemeral), and (e) range improvements. (See the glossary for definition of those terms and for terms in other sections of this ES.) The overall analysis is directed toward a major federal action which is determining the level of grazing, by allotment, that would be sustained within the ES area and the allocation of the vegetation resource to competing grazing ungulates.

The MFP was utilized to analyze the wide variety of resource use conflicts found in the Caliente ES area. Forage production was determined from the 1976-77 range survey. This production was then analyzed based upon various laws and policies and ES area conditions to determine the vegetation allocations to the various uses. Table 1-1 identifies the present forage capacity for the Caliente ES area. Table 1-2 gives possible future use levels for 1980, 1990, 2000, and 2015. Figure 1-1 illustrates the proposed allocation to all of the considered species. Specific future allocations would be made through the Bureau of Land Management planning system. Table 1-3 located at the end of this chapter gives a detailed description of the proposed allocation on an allotment basis.

Table 1-4 found at the end of this chapter shows the individual activity recommendations developed in the MFP, Step 1, as they affect grazing animals. Conflicting activity recommendations are shown in column two. The multiple use recommendations resolved in the second step of the MFP form the basis for the proposed actions shown in column three. Column four presents part of the rationale used in selecting the multiple use recommendations and the major resource values foregone or reduced in order to resolve conflicts between activity recommendations.

TABLE 1-1

PRESENT FORAGE CAPACITY (1976-77)

1976-77 (Range Survey)	Livestock & Wild Horses (AUMs)	Wildlife (AUMs)
Presently Suitable a/	82,211	44,179
Suitable with Water	27,703	
Total	109,914	44,179

a/ Appendix A defines the Las Vegas District's rangeland suitability criteria.

Note: See glossary for definition of an Animal Unit Month.

PURPOSE AND OBJECTIVES

The purpose of the proposed action is to manage the rangeland resources for stabilization of the basic soils resource and vegetative resources.

The objective of the proposed action is to achieve vegetation allocation among competing uses of the public land. It is assumed the following actions would be achieved within the term of the proposed action (35 years):

1. Adjust livestock grazing, by allotment, to levels indicated in Table 1-3 within three years.

2. Intensify management and adjust wild horse numbers to reduce resource conflict (i.e., forage, water, space, etc.) within three years. See the Wild Horse Management Areas Map and Table 1-5.

TABLE 1-2

POSSIBLE FUTURE VEGETATION ALLOCATION a/

Year	Livestock	Wild Horses	Wildlife
1980 b/	74,293 c/	5,956	15,104 d/
1990	99,399 e/	5,956	15,104
2000 f/	135,511	8,363	16,709
2015 g/	146,001	9,042	16,862

a/ All possible future vegetation allocations (years 1990, 2000, 2015) are based on estimates. The future allocation would be based on future needs and studies, and what is actually available for allocation through future planning processes.

b/ Allocations for 1980 are presently suitable livestock Animal Unit Months (AUMs) minus the competitive AUMs allocated to wild horses and wildlife. This includes some potentially suitable livestock AUMs with water development to meet the forage demands for wild horses and wildlife. See Appendix A for an explanation of suitability.

c/ Suitable livestock AUMs after deductions for wild horses and burros and wildlife.

d/ Wildlife AUMs are a combination of competitive livestock AUMs and wildlife AUMs. (A total of 29,075 wildlife AUMs ES areawide were not needed to meet reasonable numbers demand; however, five specific habitat areas lack the wildlife forage production to meet reasonable numbers demand.) See Appendix F for an explanation of the derivation of reasonable numbers.

e/ Allocations for 1990 are a combination of presently suitable livestock AUMs and potentially suitable AUMs (with water development) after deductions for wild horses and wildlife.

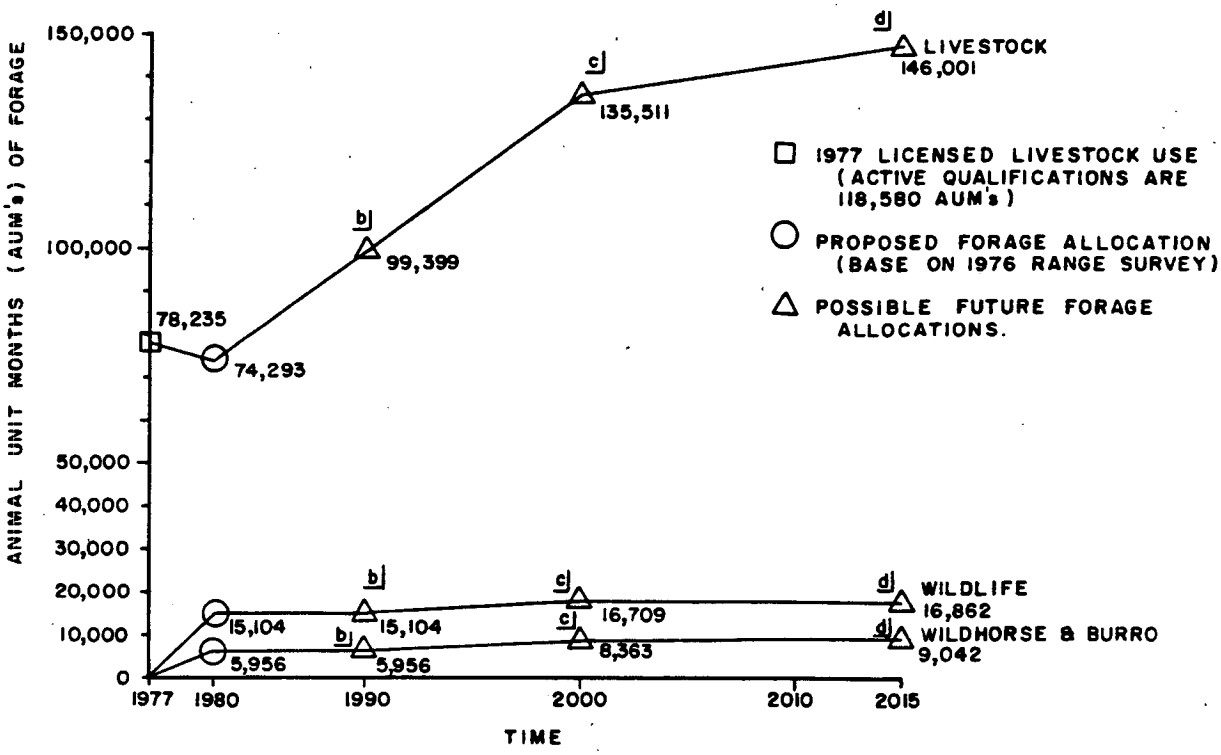
f/ Allocations for the year 2000 were determined by prorating the additional 40,124 AUMs potentially available by vegetation manipulations to wildlife, wild horses and livestock.

g/ Allocations for the year 2015 are the total of the previous AUMs (year 2000) with additional AUMs expected with increased management (Allotment Management Plans). It is prorated as stated above in e/.

FIGURE 1-1

PROPOSED ACTION

1980 AND POSSIBLE FUTURE ALLOCATIONS (1990-2015) TO LIVESTOCK, WILD HORSES AND WILDLIFE IN CALIENTE ES AREA a/



a/ Livestock and wild horse AUMs are interchangeable with each other but not always with wildlife AUMs.

b/ Forage increases with water authorization or development. (See the Caliente MFP, Step 2.)

c/ Estimate of forage increases because of vegetation treatment. Increases were prorated at same proportion as MFP 2 allocation.

d/ Estimate of increased forage production due to intensive grazing management. Increased forage was prorated at the same proportion as the MFP 2 allocation.

NOTE: Possible future vegetation allocations are estimates only and are based on a series of assumptions within a framework of feasible alternatives. Heavy dependence on professional judgements and probabilities are used. The vegetation allocation scenario should not be considered as a prediction or forecast.

TABLE 1-5

PRESENT VS. PROPOSED WILD HORSE AND BURRO NUMBERS

	Numbers	AUMs
1977 (Present)	1,052	12,624
1980 (Proposed)	497	5,956
Net Change	- 53%	- 6,668

3. Intensify grazing management throughout the ES area by the following means:

a. Develop and implement 27 Allotment Management Plans (AMPs) by 1990. (Sixty-one allotments are within the 27 AMP areas.) See Tables 1-3, 1-8, and Range Management Intensity Map.

b. Increase use supervision.

c. Implement actual use, condition, trend, and utilization studies.

d. Improve working relationships with livestock operators.

e. Establish proper period-of-use (no grazing from April 1 to May 30 except areas with implemented AMPs), numbers, and kind of livestock.

4. Provide required forage, when possible, to satisfy management levels (reasonable numbers) for wildlife. (See Table 1-3.) Appendix F discusses the methodology by which reasonable numbers is determined. A total of 17,956 AUMs would satisfy wildlife as follows: mule deer, 15,391 AUMs; bighorn sheep, 2,517 AUMs; antelope, 48 AUMs. Further discussion of wildlife is in Chapter 2.

5. Increase forage production and diversity for wildlife, wild horses, and livestock through management and range improvement projects by the year 2000. Approximately 401,000 acres of vegetation would be evaluated for treatment to provide for an additional 40,000 AUMs of forage.

6. Utilization on all forage species would not exceed 50 percent of current year's growth for any period-of-use.

The Caliente Environmental Statement area is subdivided into seven grazing units. The seven grazing units are: Sand Springs, Panaca, Clover Mountain, Delamar, Kane Spring, Pahranagat, and Tule. (See the Caliente ES Area Map.) Range surveys and the resultant adjudication occurred at various times between 1960 and 1974 in six of the seven areas. The Tule grazing unit was not range surveyed, but adjudicated by agreement. During the 1960-74 period, livestock active preferences were adjusted to 187,327 Animal Unit Months (Class I) of which 118,580 were preference AUMs, the balance were placed in suspended non-use. The 1977 permitted use was 78,235 AUMs. Based on range use supervision and trespass records, permitted use is assumed to be within ± 2 percent of actual use within the area. Bureau of Land Management records do not indicate specific allocations to wildlife. Wild horses were not the responsibility of BLM until the passage of the Wild Horse and Burro Act (1971).

Location

The Caliente Environmental Statement (ES) area is located in the southern portion of Lincoln County, Nevada. It is bounded by the Nevada-Utah state line on the east; the Clark-Lincoln County line on the south; the Desert National Wildlife Range, the Nellis Air Force Bombing Range, the Department of Energy (DOE) Nevada Test Site, and the Bureau of Land Management (BLM) Battle Mountain District on the west. The northern boundary of the planning or ES area is the BLM Las Vegas District and the BLM Ely District boundary. (See the Caliente ES Area Map for the location within the State).

The area is irregularly shaped, measuring about 102 miles east to west and 78 miles north to south at its widest point. Major roads traversing the area include U.S. Highway 93 (north-south) and State Highway 25 (east-west).

Land ownership in the Caliente ES area is shown in Table 1-6 and portrayed on the Land Status Map.

TABLE 1-6

CALIENTE LAND STATUS, 1978

Status	Acreage	Percent of Total
BLM administered public land	3,434,478	98.0
Other Federal agencies land	5,828	0.2
State land	18,175	0.5
Private land	45,624	1.3
Total	3,504,105	100.0

Source: U.S. Department of the Interior, Bureau of Land Management, Las Vegas District, Master Title Plats, 1978.

IMPLEMENTING THE PROPOSED ACTION

Livestock Adjustments

The proposed levels of livestock use were determined by a ocular reconnaissance range survey completed in 1976-77. (See Appendix E-3 for methodology.) The proposed action (1980-1990) would have the effects shown on Table 1-7 on the 86 allotments within the ES area. The Grazing Allotments Map visually displays the allotments.

General Implementation Schedule

Adjustments in livestock numbers (including exclusions of use) would be initiated in 1980 to be fully implemented within three years of the final decision after the final ES is filed. Twenty-seven detailed livestock grazing plans, or Allotment

TABLE 1-7

PROPOSED 1980 LIVESTOCK ALLOCATION

	Number of Allotments	1977 Permitted Use[a]	1980 Proposed Use	Average Percent Change	Total BLM Acres
Increase Use	19	28,034	44,987	+59%	1,111,945
Decrease Use	33	48,585	24,908	-49%	1,882,172
No Change	5	967	976	--	66,061
No Use in 1977	20	0	3,422	--	330,625
No Livestock Grazing	9	649	0	-100%	105,002
Total	86	78,235	74,293	-6%	3,495,805

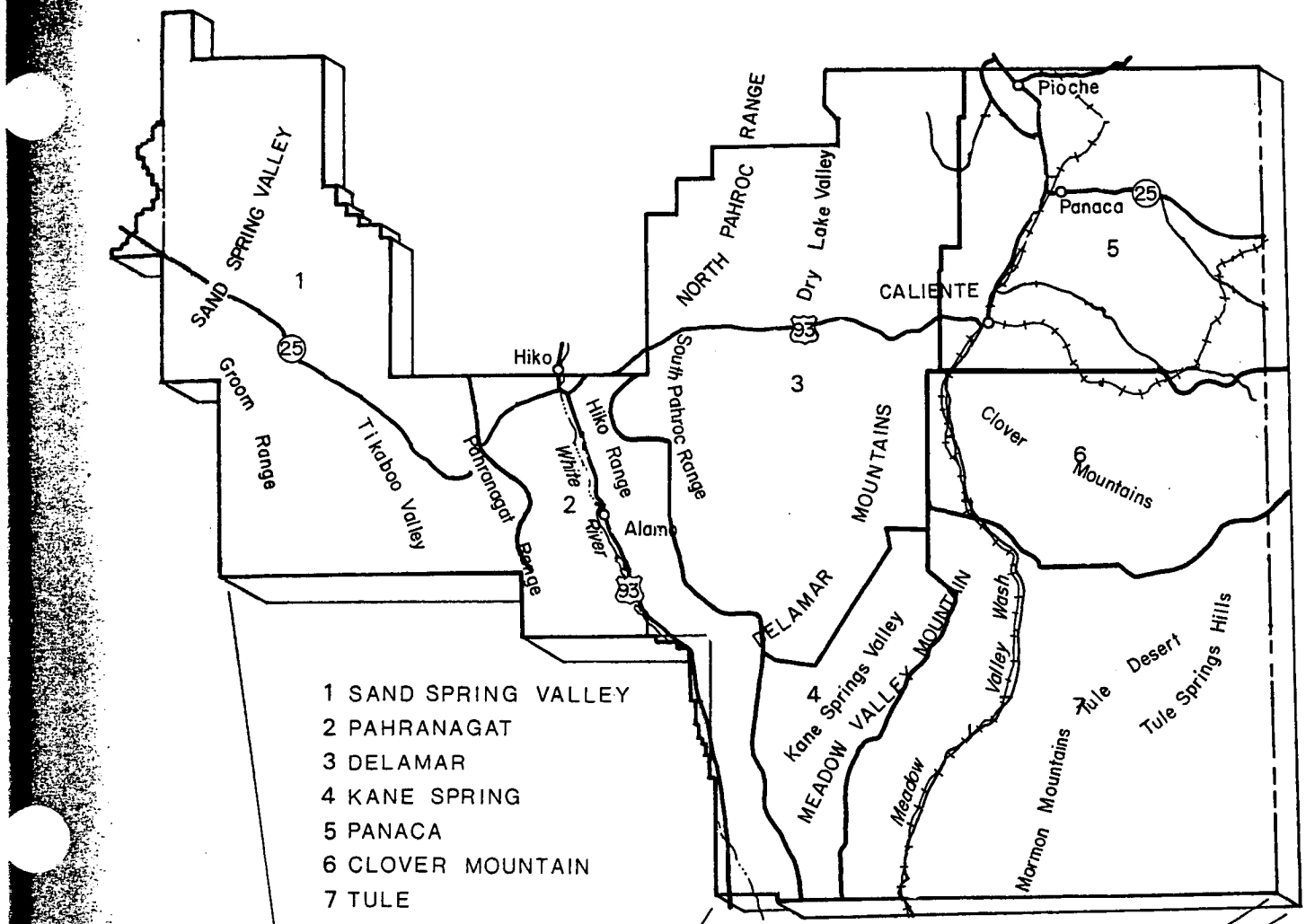
POSSIBLE 1990 LIVESTOCK ALLOCATION

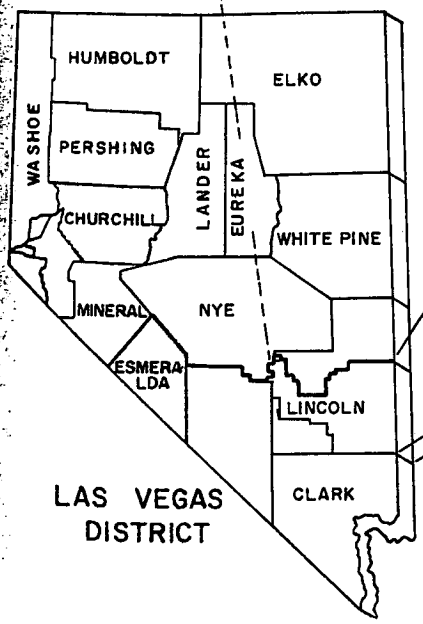
	Number of Allotments	1977 Permitted Use[a]	1990 Proposed Use	Average Percent Change	Total BLM Acres
Increase Use	28	33,169[b]	60,605[b]	+84%	1,495,014
Decrease Use	24	43,450[b]	29,913[b]	-30%	1,499,103
No Change	5	967	976	--	66,061
No Use in 1977	20	0	7,905	--	330,625
No Livestock Grazing	9	649	0	-100%	105,002
Total	86	78,235	99,399	+26%	3,495,805

[a] Permitted use is considered to be within ±2 percent of actual use.

[b] Changes are due to larger or smaller number of allotments receiving increases or decreases.

Source: Table 1-3.





CALIENTE ENVIRONMENTAL STATEMENT

LAS VEGAS DISTRICT

NEVADA

SECTIONALIZED TOWNSHIP

ALLOTMENTS

1. Red Bluff
2. Sand Springs AMP
3. McCutcheon Spring
4. Shadow Well
5. Crescent
6. Naquinta Spring
7. Bald Mountain
8. Pine Cone
9. Crystal Springs
10. Pahranagat West
11. Pahranagat East
12. Six Mile
13. Lower Lake
14. Buckhorn
15. Pahroc
16. Rattlesnake
17. Mustang AMP
18. Oak Springs AMP
19. Delamar
20. Grapevine
21. Breedlove
22. Rox
23. Mormon Peak
24. Henrie
25. Morrison - Wengert
26. Boulder Spring
27. Elgin
28. Schlarman
29. Ash Flat
30. Meadow Valley
31. Pennsylvania
32. Applewhite
33. Sawmill
34. Mustang Flat
35. Clover Creek
36. Little Mtn
37. Cove
38. Caliente
39. Highway
40. Bennett Spring
41. Cliff Spring
42. Klondike
43. Black Canyon
44. Ely Spring AMP
45. Simpson
46. Ely Spring Sheep
47. Pioche
48. Highland Peak
49. Comet
50. Rocky Hill
51. Peck
52. Panaca Cattle
53. White Hills
54. Roadside
55. Warm Spring
56. Black Hills
57. Condor Canyon
58. N-4
59. Deer Lodge
60. Mahogany Peak
61. McGuffy Spring
62. Panaca SCS
63. Rabbit Spring
64. Buckboard Spring
65. Sheep Spring
66. Uvada
67. Crestline
68. Oak Wells
69. Crossroads
70. Enterprise G.S.
71. Haypress
72. Barclay AMP
73. Sheep Flat
74. Cottonwood
75. Garden Springs
76. White Rock
77. Gourd Spring
78. Beacon
79. Flat Top Mesa
80. Pulsipher Wash
81. Jackrabbit
82. Sand Hollow
83. Summit Spring
84. Snow Springs
85. Terry
86. Lime Mountain

5 0 5 10 STATUTE MILES
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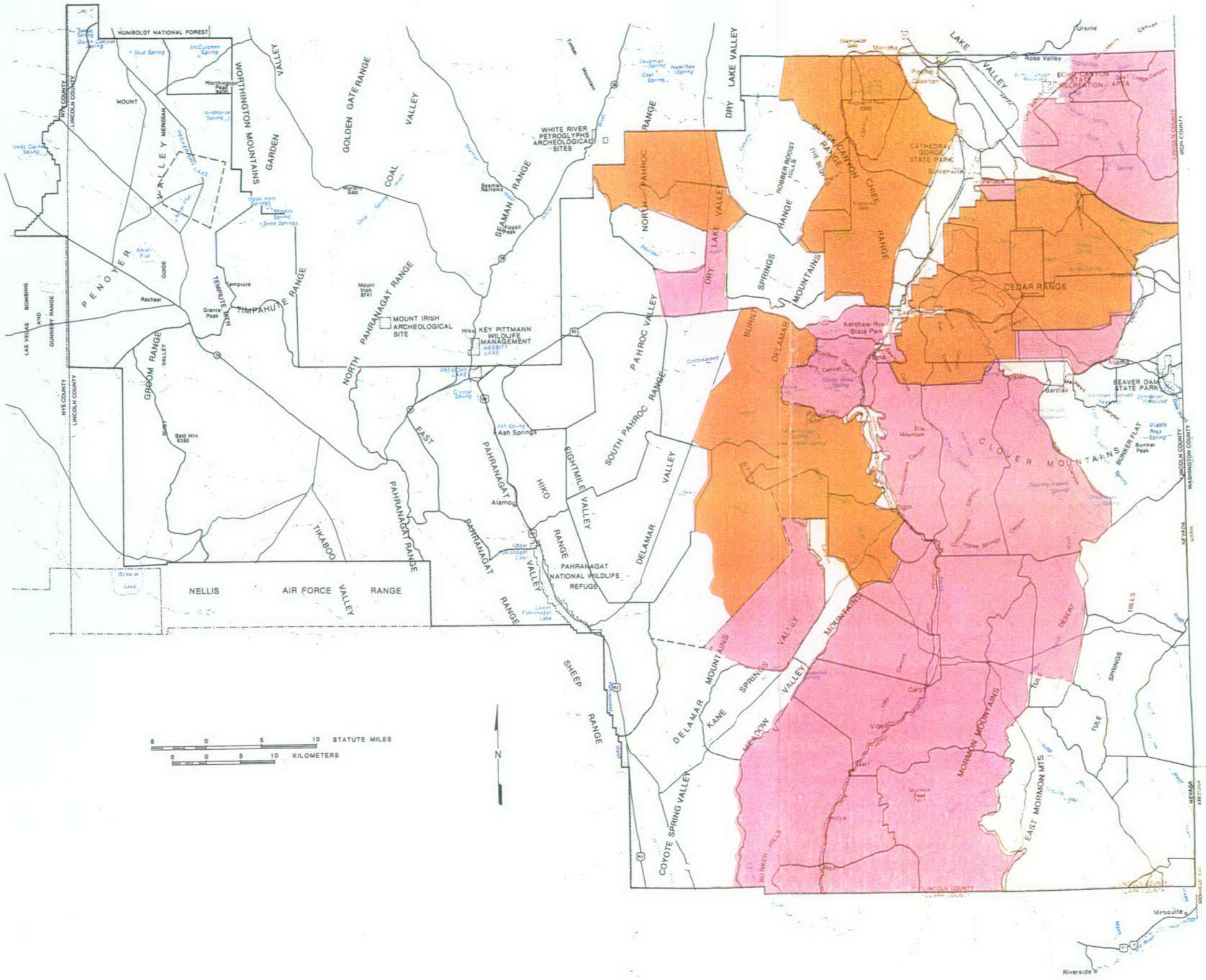
CALIENTE ENVIRONMENTAL STATEMENT

GRAZING ALLOTMENTS

1978



WILD HORSE AND BURRO REMOVAL AREA

HERD MANAGEMENT AREA

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CALIENTE ENVIRONMENTAL STATEMENT

WILD HORSE MANAGEMENT AREAS

1978

Management Plans (AMPs), are proposed to be prepared and implemented by 1990 with associated range improvements and vegetation manipulation to be completed within 10 years of AMP completion (by year 2000), subject to manpower and budget limitations. The five allotments currently operating under AMPs (Ely Springs Cattle, Mustang, Sand Springs, Barclay, Oak Springs) and two allotments with grazing systems (Delamar, Enterprise) would continue under present operation, with required adjustments in stocking levels, until necessary revisions were completed. The two allotments with implemented grazing systems would be converted to AMPs. The vegetation, wildlife, and wild horse monitoring systems are ongoing. Additional studies and inventories would be required to fully implement the management plans. (Note: The Las Vegas District of the BLM would like to implement the intensive grazing management plans (AMPs) much sooner than 10 years. A three to seven year timeframe is desirable. However, past experience has shown that the Bureau success in achieving funding and positions would not allow the accelerated schedule to be feasible or realistic; therefore, the ten year timeframe will be used for analysis purposes in this ES.)

General Reasons for Implementing AMPs

Specific grazing systems, by allotment -- except for the five existing AMPs and two grazing systems -- have not been developed. However, AMPs have been recommended on a variety of allotments to alleviate several grazing-associated resource problems and to improve the existing resource conditions. The reason for establishing systems are:

--To improve utilization of livestock grazing by distributing use to areas potentially suitable due to lack of water. Presently, livestock are congregating in valley bottoms, level areas, and riparian zones. Areas farther from water are utilized less (491,769 acres). The AMPs would be designed to distribute livestock more evenly throughout the ES area during specific grazing periods.

--To provide for livestock grazing during specified seasons that are tuned to the key forage species phenology. No livestock grazing during the spring months of April and May would apply until AMPs are implemented. Period-of-use for AMPs would be based on key forage species phenology and AMP objectives. Therefore, when AMPs are implemented the April and May restriction may not apply.

--To provide for periods of "no livestock grazing" by pasture to allow key forage species to increase in density, composition, vigor, and production.

—To reduce conflicts between livestock and other ungulates (bighorn sheep, mule deer, and wild horses) as identified in the MFP.

The following grazing treatments have been determined to have the greatest potential within the ES area. Table 1-8 shows the possible application of these treatments to the proposed AMP and non-AMP allotments.

Treatment 1: Provide rest February 1-July 15 twice consecutively every five years to provide for increases in seed production, litter, and vigor. This treatment benefits the following key forage species: galleta, winterfat, bud sagebrush, shadscale, big galleta, Indian ricegrass, squirreltail, green jointfir, and Nevada jointfir.

Treatment 2: Provide 16 months rest (March 15-July 15) once every five years to allow for seed production and crucial summer-fall rest for cliffrose and bitterbrush. This treatment would provide rest during the two years required by these species to set seed.

Treatment 3: Provide rest February 1-July 15 twice every three years to provide for increases in range condition on allotments with poor range condition. This treatment would encourage faster vegetative responses than provided for under Treatment 1.

Treatment 4: Provide livestock grazing from July 16-August 31 once every three years for seed dispersal and trampling. Rest from September 1 (following grazing) through July 15 of the following year to provide for seedling establishment.

Treatment 5: Provide rest March 1-April 30 and limit use of willows to 10 percent. This treatment is proposed to protect fishery habitat by allowing riparian vegetation to improve and by restricting livestock use during crucial fish spawning and growth periods.

Treatment 6: Provide rest April 1-May 31 on non-AMP areas to provide for increases in seed production, litter, and vigor.

TABLE 1-8

POSSIBLE GRAZING TREATMENTS
FOR THE PROPOSED AMPs AND NON-AMPs WITH GRAZING

CALIENTE ES AREA

AMP Allotments	Grazing Treatments 1	2	3	4	5	6
1. Oak Springs Cliff Springs	X	X	X	X		
2. Ely Springs Cattle Ely Springs Sheep	X	X	X	X		
3. Buckhorn Lower Lake	X	X	X	X		
4. Pahroc Six Mile	X	X	X	X		
5. Sheep Flat Garden Springs Gourd Springs Summit Spring White Rock Oak Wells	X	X	X	X		
6. Delamar	X	X	X	X		
7. Barclay Lime Mountain	X	X	X	X		
8. Enterprise Snow Spring Terry	X	X	X	X		
9. Bald Mountain Naquinta Spring	X	X	X	X		
10. Bennett Spring Black Canyon Highway Klondike Caliente Rocky Hills	X	X	X	X		
11. Black Hills Condor Canyon N-4 Deerlodge Panaca SCS	X	X		X	X	
12. McGuffy Spring Mahogany Peak	X	X		X		

TABLE 1-8 (continued)

AMP Allotments	Grazing Treatments 1	2	3	4	5	6
13. Boulder Spring	X		X	X		
Elgin						
Grapevine						
Schlarman						
14. Sheep Spring	X	X	X	X		
15. Rattlesnake	X		X	X		
16. Buckboard	X	X	X	X		
Panaca Cattle						
Roadside						
White Hills						
17. Crossroads	X	X	X	X		
Sand Hollow						
Beacon						
18. Highland Peak	X	X	X	X		
19. McCutcheon Springs	X	X	X	X		
20. Simpson	X	X		X		
21. Pioche	X	X		X		
22. Uvada	X	X		X		
23. Crystal Spring	X			X		
24. Breedlove	X	X	X	X	X	
Cottonwood						
Henrie						
Morrison-Wengert						
25. Rabbit Springs	X	X	X	X		
26. Crestline	X			X		
27. Mormon Peak	X			X		
Non-AMP Allotments						
Crescent						X
Haypress						X
Pahranagat West						X
Pahranagat East						X
Pennsylvania						X
Pine Cone						X
Comet						X
Red Bluff						X

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Many of the allotments in Table 1-8 have several possible treatments shown, because of common key forage species. These grazing treatments are "building blocks" of the allotment-specific grazing systems which would be formulated for each proposed AMP. They are designed to meet the objectives of management by manipulating livestock to obtain or maintain vegetation in a desired condition, composition, density, or degree of use. They are proposed for the allotments shown based upon phenology of the key forage species, vegetation types, range conditions, and presence of perennial streams within the allotments. These treatments may not, upon more detailed examination, be the best treatments for all of the listed allotments because of factors not considered here (eg. terrain restrictions, operator objectives, allotment size). Those determinations must necessarily await detailed AMP planning which would not take place until these area wide allocations are made.

The recommended combinations were analyzed to determine the feasibility of the combinations and the ease of implementation. The following criteria was used: a. number of currently suitable AUMs; b. number of AUMs suitable with water development; c. present management facilities (fences, water, etc.); d. potential for vegetation manipulation to increase forage production; and e. degree of resource conflicts present. It is probable that after in-depth analysis, several of the proposed AMPs would not be feasible due to terrain, benefit-cost or resource conflicts. Again, such changes would be made as necessary during allotment planning.

It should be recognized that accomplishment of the AMPs may not follow the order in Table 1-8 due to analysis of need by the managers at a future date.

Support Requirements

Range Improvements

A variety of possible range improvements and vegetation treatments have been identified throughout the ES area. The improvements were not developed in conjunction with detailed AMPs and are an estimate based upon professional judgment and analysis. The following standard operating procedures and general description of treatments would be utilized in implementing the proposed action.

Standard Operating Procedures. The procedures listed below would be adhered to in the construction of the proposed range improvements.

(1) When possible, specific projects would not be implemented prior to AMP development to ensure meeting the

objectives of each AMP.

(2) An Environmental Assessment would be written prior to any project implementation.

(3) Detailed (site-specific) soils inventories would be accomplished prior to project planning, i.e., vegetation treatments, to ensure that the potential for successful treatment exists.

(4) Livestock use on vegetation manipulation areas (see the following section) would be deferred for a minimum of two years following each project to assure adequate opportunity for vegetation establishment.

(5) Benefit-cost analysis would be completed on all AMPs and their associated improvements.

(6) Permanent roads or trails would not normally be constructed to project sites. Existing access and overland travel would be used where needed.

(7) The wilderness inventory, in accordance with Section 603(a) of the Federal Land Policy and Management Act (FLPMA), has not been completed on the public lands that would be impacted by the proposal. Before implementation of any action that could impair an area's wilderness potential, the areas would have to be inventoried and impacts on potential or existing wilderness assessed.

Until Congress acts on an area that has been designated for wilderness study, existing multiple-use activities, including grazing, would continue. New uses or expanded existing uses could be allowed if the impacts would not impair the area's wilderness possibilities.

(8) An endangered species clearance would be required before any part of the proposal was implemented which might affect an endangered species or its habitat. (See Appendix C for initial consultation with U.S. Fish and Wildlife Service.) Formal consultation with the Fish and Wildlife Service would be initiated. If any part of the proposal would impact an endangered species or its habitat, the project would be relocated or abandoned.

(9) In accordance with BLM policy, cultural resource clearance would be required for all project sites or actions prior to implementation. Intensive surveys would be conducted to locate any cultural or paleontological remains present. If such remains are discovered, the project would be relocated or redesigned. If

the project could not be moved, a mitigative data recovery or salvage program would be completed. The BLM, in consultation with the Nevada State Historical Preservation Officer, would be the final authority on deciding the disposition of the project.

(10) BLM Visual Resource Management design procedures would be utilized.

(11) Fence construction in identified wildlife use areas would follow guidelines set forth in BLM Manual 1737 (i.e. wire spacing, height, etc.). Fences constructed in wild horse use areas should have enough contrast with the surrounding environment so as to make them visible to wild horses, and gates should be installed at least every mile and in corners. Lay-down fences would be built in wild horse and wildlife areas wherever the need is identified and construction is feasible.

(12) Vegetative clearing of project sites would be held to the minimum, as stated in the specific project Environmental Assessment to include islands of vegetation for wildlife habitat.

(13) All disturbed areas, which have the capability of producing vegetation, may be reseeded with a mixture of native and/or introduced species as soon as possible in order to replace ground cover on the sites.

(14) Areas of soil disturbance would be landscaped to blend into the surrounding soil surface.

(15) Livestock watering facilities would be provided in allotments and rested pastures during determined periods of need for wildlife and wild horses.

(16) Bird ramps in watering troughs, lateral watering sites off pipelines, overflows at troughs, and protected seep areas would be established for wildlife use where the need is identified on new water improvements.

(17) Spring developments would be fenced to prevent trampling and overgrazing of the adjacent vegetation.

(18) When the need is identified, water gaps and crossings would be constructed in fences providing protection to stream bottoms to allow livestock and wild horses access to water.

(19) Excess wild horses and burros would be relocated on public lands or placed in the custody of private persons, organizations, or other governmental agencies. There would be no destruction of animals without the prior approval of the Secretary of the Interior, except for sick or lame animals for humane

reasons.

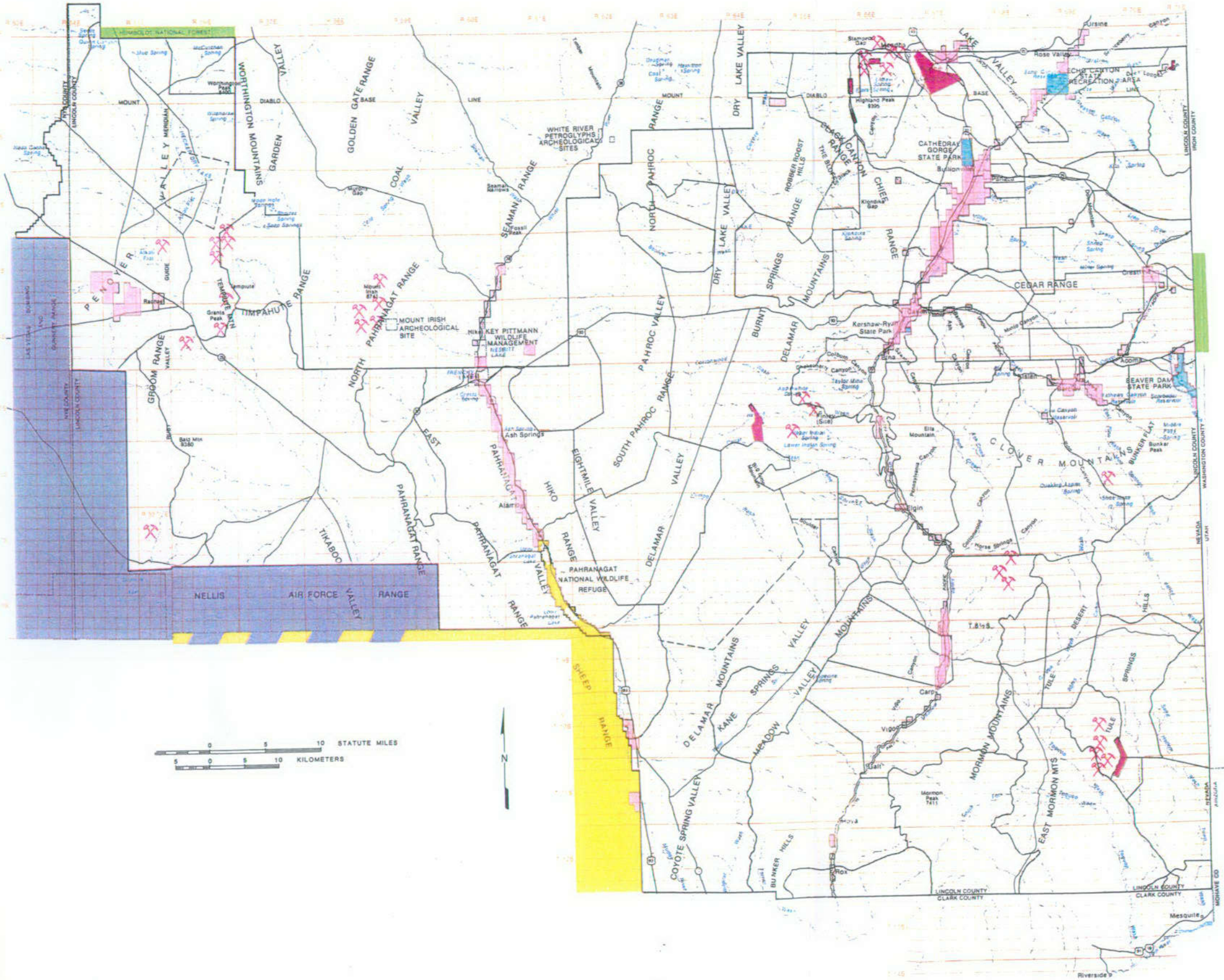
Vegetation Manipulation. The following describes proposed vegetation manipulation treatments. See Table 1-9 and the Range Vegetation Treatment Areas Map.

Mechanical Treatment. Approximately 233,641 acres of pinyon-juniper and sagebrush would be evaluated for vegetative manipulation either by chaining, plowing, or brush beating. All operations would involve heavy equipment moving across the selected areas and either uprooting, plowing, or cutting the vegetation in its path. The area would then be seeded (either aerial or drill) with a mixture of grasses, forbs, or shrubs. Exact species to be planted would be determined by site location. Affected areas would be fenced and provided at least a two year rest to allow for seedling establishment.

Chemical Treatment. Approximately 58,560 acres of sagebrush would be evaluated for treatment with the chemical herbicide 2-4-D to reduce sagebrush. The chemicals would be applied by aircraft (fixed wing or helicopter). Application would be in accordance with established BLM procedures. No chemicals would be applied within one-half mile of perennial waters. Aerial application would not be completed if winds exceed five miles per hour. After application the area would be seeded with desirable species using a rangeland drill if sufficient perennial grasses are not available. Appendix H gives additional guidance (policy, laws, etc.) which would be followed when using chemicals (2-4-D) on public lands.

Burning. Approximately 108,960 acres of blackbrush, sagebrush, and pinyon-juniper would be evaluated for prescribed burn. Fire breaks would be established around natural barriers or through the construction of fuel breaks by clearing or use of retardants. After establishment of the fire breaks, and during proper weather conditions, fires would be set to burn out the remaining areas. If a sufficient natural seed source is not available, then the area would be seeded (either aerial or rangeland drill) with a mixture of desirable species. Firefighting equipment would be available at the site to minimize danger of fire escaping.

Table 1-10 presents estimates of the cost of possible range improvements and vegetation treatments in the ES area. These figures are based on 1979 costs and may need to be adjusted when implementation actually occurs.



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CALIENTE ENVIRONMENTAL STATEMENT

LAND STATUS

1978

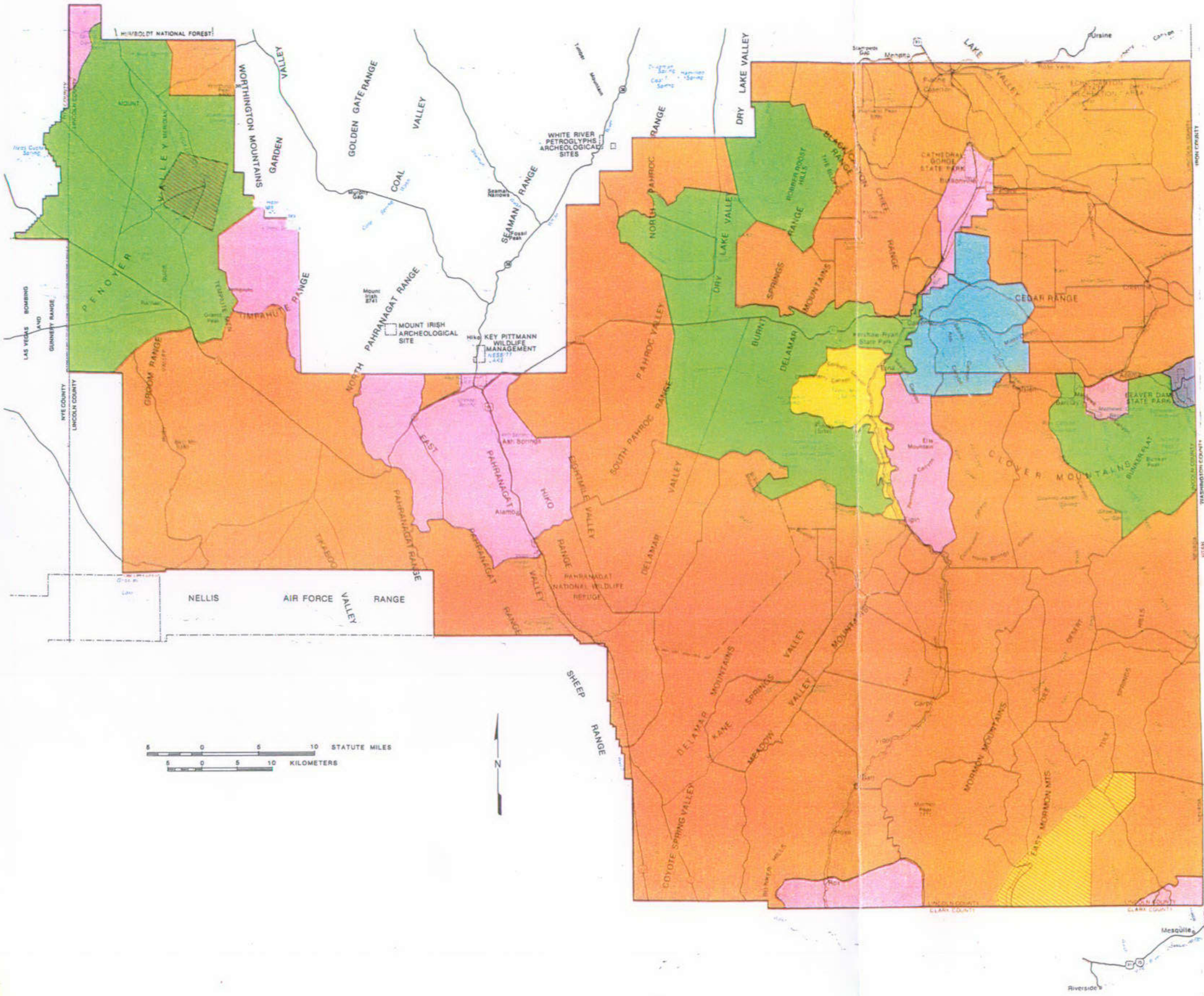
TABLE 1-9

POSSIBLE ALLOTMENT MANAGEMENT PLANS, RANGE IMPROVEMENT, AND VEGETATION MANIPULATION
CALIENTE ES AREA

Allotment [a]	Fencing (Miles)	Spring Developments	Water Pipelines (Miles)	Water Troughs	Reservoirs	Wells	Mechanical Treatment (Acres)	Chemical Treatment (Acres)	Burning (Acres)
1. Oak Springs Cliff Springs	20	4	20	10	-	-	18,880	4,800	8,480
2. Ely Springs Cattle Ely Springs Sheep	12	3	10	5	-	-	5,120	7,680	-
3. Buckhorn Lower Lake	40	-	25	10		3	-	-	-
4. Pahroc Six Mile	6	-	12	6	-	-	5,160	-	-
5. Sheep Flat Garden Springs Gourd Springs Summit Spring White Rock Oak Wells	35	3	28	16	-	2	32,640	-	12,800
6. Delamar	25	-	30	15	5	2	5,120	-	14,080
7. Barclay Lime Mountain	18	7	30	15	3	1	14,720	3,840	21,760
8. Enterprise Snow Spring Terry	15	-	10	5	2	-	2,880	640	4,480

TABLE 1-9 -- Continued

Allotment [a/]	Fencing (Miles)	Spring Developments	Water Pipelines (Miles)	Water Troughs	Reservoirs	Wells	Mechanical Treatment (Acres)	Chemical Treatment (Acres)	Burning (Acres)
9. Bald Mountain Naquinta Spring	45	2	15	7	13	1	12,160	8,960	6,080
10. Bennett Spring Black Canyon Highway Klondike Caliente Rocky Hills	15	4	15	7	-	1	7,040	17,600	-
11. Black Hills Condor Canyon N-4 Deerlodge Panaca SCS	31	2	20	10	-	3	14,720	-	2,560
12. McGuffy Spring Mahogany Peak	15	-	-	-	-	-	21,981	-	5,760
13. Boulder Spring Elgin Grapevine Schlarman	4	-	6	3	-	-		2,240	2,560
14. Sheep Spring	6	-	6	3	-	-	17,280	-	1,920
15. Rattlesnake	2	1	2				11,520	-	-
16. Buckboard Panaca Cattle Roadside White Hills	12	-	6	3	-	1	4,800	-	-
17. Crossroads Sand Hollow Beacon	8		11	3		2	12,800	-	640



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CALIENTE ENVIRONMENTAL STATEMENT

RANGE MANAGEMENT INTENSITY

1978

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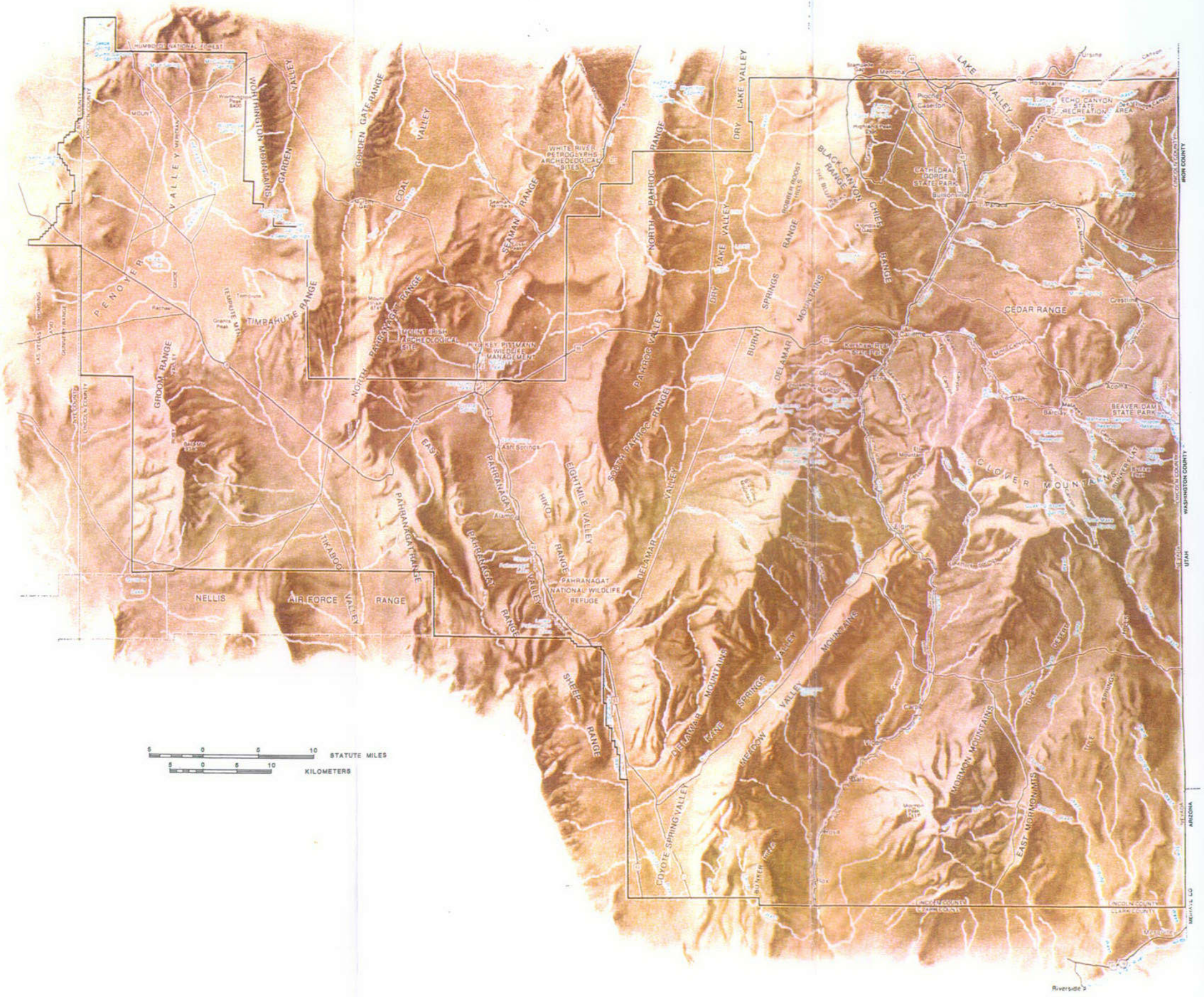

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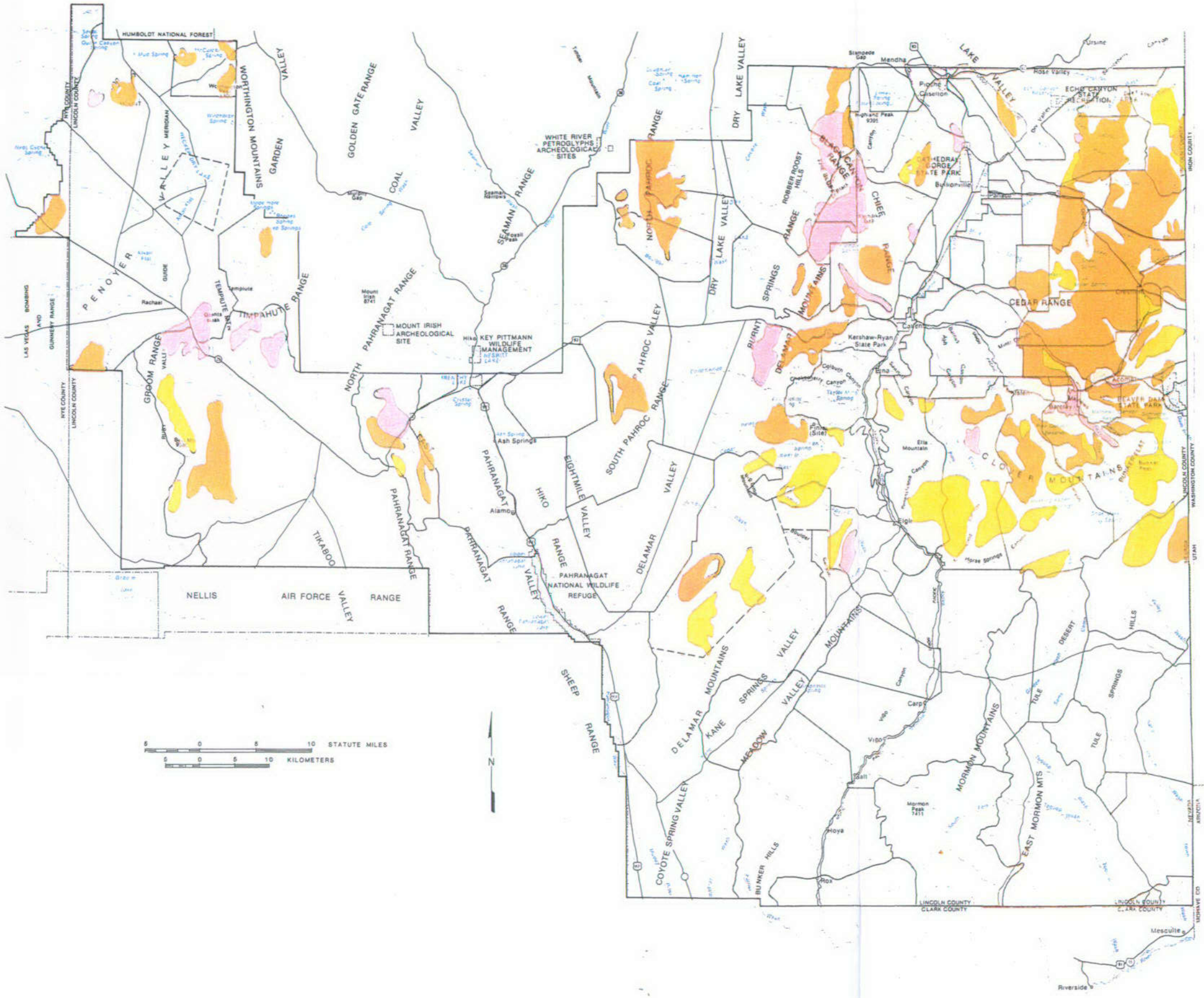
CALIENTE-ENVIRONMENTAL STATEMENT

STUDY AREA

1978



VEGETATION MANPULATION

- BURNING
- MECHANICAL
- CHEMICAL

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CALIENTE ENVIRONMENTAL STATEMENT

RANGE VEGETATION TREATMENT AREAS

1978

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TABLE 1-9 -- Continued

Allotment [a/]	Fencing (Miles)	Spring Developments	Water Pipelines (Miles)	Water Troughs	Reservoirs	Wells	Mechanical Treatment (Acres)	Chemical Treatment (Acres)	Burning (Acres)
18. Highland Peak	20	3	20	10	-	1	2,560	1,280	1,280
19. McCutcheon Springs	5	-	3	2	-	-	4,160	-	-
20. Simpson	4	-	-	-	-	-	-	-	-
21. Pioche	6	3	2	3	-	-	-	-	-
22. Uvada	-	-	1	1	-	-	7,040	-	-
23. Crystal Spring	3	-	-	-	-	1	-	-	-
24. Breedlove Cottonwood Henrie Morrison-Wengert	30	2	25	12	10	-	2,880	1,280	15,360
25. Rabbit Springs	4	-	2	3	-	-	6,400	-	-
26. Crestline	3	-	-	-	-	-	960	-	1,600
27. Morman Peak	10	-	20	10	-	-	-	-	-
Mustang	-	-	-	-	-	-	2,560	-	-
Sand Springs	46	-	-	-	-	-	8,900	4,800	-
Non-AMP Areas									
Crescent	-	-	-	-	-	-	1,760	-	-
Haypress	-	-	-	-	-	-	2,560	-	-
Pahranagat West	14	-	-	-	-	-	1,280	2,560	-

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TABLE 1-9 -- Continued

Allotment [a/]	Fencing (Miles)	Spring Developments	Water Pipelines (Miles)	Water Troughs	Reservoirs	Wells	Mechanical Treatment (Acres)	Chemical Treatment (Acres)	Burning (Acres)
Pennsylvania	5	-	-	-	-	-	-	-	8,640
Pine Cone	22	-	-	-	-	-	5,760	2,880	960
Pahranagat East	11	-	-	-	-	-	-	-	-
Total	492	34	319	159	33	18	233,641	58,560	108,960

[a/] Allotments are numbered in priority order; however, accomplishment of the AMPs may not follow the order established due to an analysis of need by the managers at some future date.

NOTES: The above range improvements, proposed AMP combinations, and vegetation manipulations were developed without completion of the actual AMPs. These figures represent a development scenario of the needed facilities based upon a professional analysis of: a) existing improvements, b) topography, c) vegetation types, and d) potential for improvement. Upon actual development of the detailed AMPs it is expected that the estimates above could change significantly due to conditions not identified in this limited analysis. Three allotments with existing Allotment Management Plans (AMPs) have not been listed as they are not proposed to be combined for an AMP. Allotments with AMPs are: Barclay, Ely Springs Cattle, Mustang, Oak Springs, and Sand Springs. (The latter includes the Shadow Well allotment.) Two allotments have implemented grazing systems (Enterprise, Delamar).

TABLE 1-10

PROPOSED RANGE IMPROVEMENT AND COST ESTIMATE

Project	Units	Cost/Unit	Total Cost (1979 Estimates)
Fencing	492 miles	$ 2,300	$1,131,600
Spring Developments	34 each	2,300	78,200
Water Pipelines	319 miles	4,200	1,339,800
Water Troughs	159 each	300	47,700
Reservoirs	33 each	5,000	165,000
Wells	18 each	19,500	351,000
Mechanical Treatment a/	223,641 acres	17	3,971,897
Chemical Treatment a/	58,560 acres	19	1,112,640
Burning a/	108,960 acres	13	1,416,480
		Total	$9,614,317

a/ Cost estimates based on assumption that seeding would be required.

Evaluation and Modification

The proposed action includes an evaluation and monitoring system to determine the effectiveness of current management and proposed management. These studies would be implemented in 1980 to be conducted at prescribed intervals as established in appropriate BLM manual sections. Studies would monitor changes in plant composition and ground cover. Four primary studies are basic to this evaluation: actual grazing use, vegetation utilization, range condition and trend, and climate analysis (BLM manual section 4413.3). In addition, collection of data to include utilization, condition, and trend, on wildlife habitat, riparian vegetation, aquatic habitat, and watershed is proposed if pertinent to the resource values of the allotment.

Data from these studies would be evaluated to determine the effectiveness of current management and to assist in making appropriate adjustments.

If evaluation procedures determine that the specific management objectives are not being achieved, modification of the proposed action would occur. Such modifications could include changes in the grazing system, management intensity, livestock numbers, period-of-use, or any combination of revisions in order to attain management objectives. Significant modification would require completion of an Environmental Assessment before the change could be effected. In addition, the BLM Area Manager could make adjustments in the grazing use during periods of drought or other emergencies when such adjustments would be in the interest of accomplishing management objectives (43 Code of Federal Regulations 4110.3-2A).

Administration

Each range user would be issued term grazing permits through the BLM District Office. The permit would specify allotment, period-of-use, number, and kind of livestock.

Livestock grazing use would be supervised throughout the year. Changes in use requested by the livestock operator, which were outside the limits of the proposed action and were consistent with management objectives, would be requested in writing and must be approved in advance of the grazing period. Grazing use outside the limits of the proposal would be considered trespass. If trespass should occur, action would be taken by BLM to assure it is eliminated in accordance with regulations in 43 CFR 4150.

In addition, marking of livestock would be implemented, as required, to control numbers and movement of livestock while insuring proper use of forage. The preferred method of marking

livestock is ear tagging.

The proposed wild horse management level represents population reductions of at least 574 animals, plus any population increases which may occur by 1983 when the management level is to be reached.

Further reductions of livestock use would be necessary after 1983 if the wild horse and burro population levels are not reduced to the management level of 498 animals. This possible reduction of livestock forage use would be necessary to balance the grazing use with the forage capacity. (BLM Manual 1725 and Section 102(a) 7 and 8 of the Federal Land Policy and Management Act of 1976).

For the purpose of this analysis, it is assumed that the wild horse management level of 498 would be effected by 1983.

INTERRELATIONSHIPS

This section describes how the proposed action interrelates with existing or proposed national, state, and local government plans and policies, and private projects. The administration of the public lands involves a complex interdependence between lands of different ownership, user capabilities, and needs. The complex interdependency of lands has developed not only in the Caliente ES area, Lincoln and Nye Counties, but throughout the western United States. Besides providing forage, the growing demands for energy, food, fiber, water, minerals, recreational opportunities, and wildlife have given public lands an even greater value (CAST, 1974).

Federal Program

Nevada BLM

The land allocations supporting the proposed action were developed through the Bureau of Land Management's planning system. Appendix B details that process. Table 1-4 summarizes Management Framework Plan multiple-use recommendations that interact with the Caliente ES proposed action.

Forest Service

Eleven Caliente BLM permittees have livestock operations in the adjacent Dixie and Humboldt National Forests in Utah and Nevada. Generally, these permittees use the National Forest ranges from June 1 through the end of September or middle of October. The permittees utilize BLM and privately controlled ranges for the rest of the year. The range program on the Dixie National Forest is established since allotments have been adjudicated and grazing

management plans have been implemented. Although the Forest Service and BLM maintain separate range management programs, close coordination between the permittees is practiced.

Fish and Wildlife Service

Coordination with the Fish and Wildlife Service for clearance on the proposed action relating to threatened or endangered plant and animal species is required. Preliminary contacts with the Fish and Wildlife Service has occurred. (See memorandums concerning preliminary consultation, Appendix C.) The Caliente ES area is adjacent to the Desert National Wildlife Range; at present the common boundary is not fenced and livestock are not licensed on the Desert National Wildlife Range. The Caliente ES area includes the Pahranagat National Wildlife Refuge on which one operator is permitted to graze livestock until 1981.

State of Nevada

Under current State law the Office of the State Water Engineer controls the allocation of water resources within the State of Nevada. Because availability of water is critical to the allocation of available forage, close coordination must be maintained between BLM and the Office of the State Water Engineer to assure the reliability and availability of water supplies. The recent filing of the Cary Act and Desert Land Entry applications for public land could significantly change the present grazing operations. The State Water Engineer would determine water basins which are available for water filing and the potential entry for agricultural purposes. The Delamar and Dry Lake Valleys have been initially identified for additional water allocations.

The Nevada Department of Fish and Game is responsible for the protection, management, and conservation of wildlife populations within the ES area. BLM manages the wildlife habitat on public lands. The Nevada Department of Fish and Game has provided BLM with "reasonable numbers" (see Appendix F) for the wildlife population (antelope, mule deer, and bighorn sheep) from which the BLM forage allocation to wildlife is determined.

Private Ranching Operations

The interdependency of federal, private, and other lands in a range livestock operation must be viewed from the aspect of yearlong forage supplies. The private holdings of many ranch units cannot supply the necessary forage for all seasons of the year. They must combine grazing of public land with forage produced on other land to obtain a yearlong supply of feed (CAST, 1974). An average of 47 percent of the forage presently consumed in the ES area is being produced from private land. This figure

varies from operator to operator.

Private lands in the Caliente ES area are generally located along the major drainages and are used primarily for agricultural production in relation to the range operations.

TABLE 1-3
CALIENTE ES AREA 1978 PRESENT AND PROPOSED VEGETATION ALLOCATIONS
BY ALLOTMENT AND GRAZING TREATMENT
PROPOSED ACTION

Present							Proposed										
Allotment	Land Ownership Status[1]		Total Forage Capacity (AUMs)		Present Authorized Livestock Use & Range Class (AUMs)[4]	Season-of-use[5]	1977 Licensed Use	Proposed Forage Allocations (AUMs)					Future[9] AUMs (2015)	Percent Change[10] Present vs. Proposed Licensed Use (1977) (AUMs)		Proposed Season-of-Use	Proposed Management Intensity	Proposed Range Class
	Public Land (acres)	Other Land (acres)	Livestock AUMs[2]	Wildlife AUMs[3]				Livestock 1980[7]	Livestock 1980-90[8]	Deer	Bighorn Sheep	Wild Horses		1980	1980-90			
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r
Applewhite	28,448	300	2	244	562 (C) Perennial	YL	527	0	0	189	---	---	2	-100%	-100%	---	No Grazing	---
Ash Flat	3,247	---	43	0	74 (C) Perennial	5/1-3/24	74	0	0	0	---	---	44	-100%	-100%	---	No Grazing	---
Bald Mountain	269,723	5	5,332	1,096	5,811 (C) Perennial	YL	5,811	5,024	5,319	370	---	---	9,118	- 14%	- 8%	6/1-3/30	AMP	Perennial
Barclay	79,621	2,350	2,690	2,214	1,791 (C) Perennial	5/16-9/30 AMP	2,049	2,527	2,601	766	---	---	5,839	+ 23%	+ 27%	5/16-9/30	AMP (existing)	Perennial
Bennett Springs	48,264	120	3,869	578	3,498 (S) Perennial	10/16-4/30	474	993	3,360	293	---	170	5,576	+ 96%	+609%	10/16-3/30	AMP	Perennial
Beacon	5,682	---	0	---	2,095 (S) Perennial	2/1-4/30	506	0	0	---	---	---	0	-100%	-100%	---	AMP	Ephemeral
Black Canyon	8,438	---	704	154	1,005 (S) Perennial	10/16-4/30	95	613	613	64	---	35	1,382	+545%	+545%	10/16-3/30	AMP	Perennial
Black Hills	3,610	---	126	---	156 (C) Perennial	YL	156	126	126	---	---	---	171	- 19%	- 19%	7/1-3/30	AMP	Perennial
Boulder Spring	13,537	---	416	---	416 (C) Perennial	10/1-3/30	416	416	416	---	---	---	416	0	0	10/1-3/30	AMP	Ephemeral-Perennial
Breedlove	112,755	---	60	1,007	864 (C) Perennial	YL	864	0	40	4	296	---	66	-100%	- 95%	11/1-3/30	AMP	Ephemeral-Perennial
Buckboard	10,842	---	427	191	263 (C) Perennial	YL	264	0	270	56	---	120	886	-100%	+ 2%	9/1-2/28	AMP	Perennial
Buckhorn	82,968	---	5,687	---	4,010 (C) Perennial	YL	830	5,065	5,687	---	---	---	6,824	+486%	+558%	6/1-3/30	AMP	Perennial
Caliente	2,008	---	59	14	40 (C) Perennial	YL	0	0	58	4	---	---	65	---	---	6/1-3/30	AMP	Perennial
Cliff Springs	35,821	---	2,291	161	2,043 (C) Perennial	YL	2,043	2,179	2,291	77	---	---	3,037	+ 7%	+ 12%	6/1-3/30	AMP	Perennial
Clover Creek	22,876	158	368	294	613 (C) Perennial	11/1-4/30	0	0	0	216	---	302	350	-100%	-100%	---	No Grazing	Wild Horses
Comet	9,146	600	216	---	214 (C) Perennial	YL	0	216	216	---	---	---	227	---	---	6/1-3/30	Non-AMP	Perennial
Condor Canyon	44,035	---	1,636	532	676 (C) Perennial	YL	0	0	1,402	431	---	---	2,952	---	---	7/1-2/28	AMP	Perennial
Cottonwood	62,145	---	441	1,812	1,296 (C) Perennial	5/1-10/31	1,296	55	366	954	---	---	2,437	- 98%	- 72%	6/1-10/31	AMP	Perennial
Cove	5,023	---	214	---	131 (C) Perennial	YL	0	--	---	---	---	214	218	-100%	-100%	YL	---	Wild Horses
Crescent	84,526	80	2,828	268	1,540 (S) Perennial	11/1-4/30	1,173	2,181	2,673	268	---	---	3,061	+ 83%	+128%	11/1-3/30	Non-AMP	Perennial
Crestline	2,415	1,300	96	34	55 (C) Perennial	YL	0	87	87	20	---	---	362	---	---	6/1-3/30	AMP	Perennial
Crossroads	19,201	---	413	350	689 (C) Perennial	5/1-10/31	690	379	379	162	---	---	1,798	- 45%	- 45%	6/1-10/15	AMP	Perennial
Crystal Springs	7,596	---	376	---	437 (C) Perennial	Winter	347	376	376	---.	---	---	414	+ 8%	+ 8%	11/1-3/30	AMP	Perennial
Deer Lodge	6,880	40	319	108	167 (C) Perennial	YL	0	291	291	108	---	---	511	---	---	7/1-2/28	AMP	Perennial
Delamar	240,755	---	6,148	5,134	4,858 (C) Perennial	YL (GS)	5,573	806	5,219	632	84	684	8,683	- 14%	- 6%	YL (Grazing System)	AMP	Ephemeral-Perennial
Elgin	26,602	160	1,401	1,083	2,073 (C) Perennial	10/1-4/30	1,760	725	1,243	---	22	144	2,021	- 41%	- 29%	10/16-3/30	AMP	Ephemeral-Perennial

TABLE 1-3 -- Continued

Allotment	Present							Proposed											
	Land Ownership Status[1]		Total Forage Capacity (AUMs)		Present Authorized Livestock Use & Range Class (AUMs)[4]	Season-of-use[5]	1977 Licensed Use	Proposed Forage Allocations (AUMs)					Future[9] AUMs (2015)	Percent Change[10] Present vs. Proposed Licensed Use (1977) (AUMs)		Proposed Season-of-Use	Proposed Management Intensity	Proposed Range Class
								Livestock 1980[7]	Livestock 1980-90[8]	Deer	Bighorn Sheep	Wild Horses		1980	1980-90			
	Public Land (acres)	Other Land (acres)	Livestock AUMs[2]	Wildlife AUMs[3]														
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r
Ely Spring (Sheep)	22,927	849	1,136	325	1,802 (S) Perennial	10/16-5/15	0	938	1,054	73	---	76	2,209	---	---	10/16-3/30	AMP	Perennial
Ely Spring (Cattle)	55,168	960	4,878	7	4,248 (C) Perennial	YL (AMP)	3,980	4,265	4,878	4	---	---	6,174	+ 7%	+ 23%	YL (AMP)	AMP	Perennial
Enterprise	21,585	160	2,152	690	1,261 (C) Perennial	5/1-10/31 (GS)	1,927	2,004	2,004	170	---	---	3,167	+ 4%	+ 4%	5/1-10/30	AMP	Perennial
Flat Top Mesa	6,033	---	0	0	--- (C) Ephemeral	---	6/	0	0	---	---	---	---	---	---	---	Non-AMP	Ephemeral
Garden Springs	38,823	---	2,150	390	2,809 (C) Perennial	10/16-5/15	2,629	1,871	1,902	373	---	---	2,365	- 29%	- 28%	10/1-3/30	AMP	Ephemeral-Perennial
Gourd Springs	101,125	---	1,406	362	3,458 (C) Perennial	10/16-5/15	2,233	829	1,398	1	19	---	1,547	- 63%	- 57%	10/1-3/30	AMP	Ephemeral-Perennial
Grapevine	33,328	---	560	---	560 (C) Perennial	10/1-3/30	551	560	560	---	---	---	560	0	0	10/1-3/30	AMP	Ephemeral-Perennial
Haypress	7,843	110	43	61	154 (H) Perennial	5/1-10/1	0	43	43	56	---	---	301	---	---	7/1-10/15	Non-AMP	Perennial
Henrie	131,796	---	3,127	2,593	2,400 (C) Perennial	11/1-4/30	2,400	0	2,879	408	487	---	3,440	-100%	+ 20%	10/1-3/30	AMP	Ephemeral-Perennial
Highland Peak	45,542	1,960	2,371	263	3,704 (S) Perennial	10/16-5/15	160	829	2,171	157	---	135	3,120	+418%	+1257%	6/1-3/30	AMP	Perennial
Highway	4,251	40	219	63	118 (C) Perennial	YL	0	0	216	19	---	---	241	---	---	6/1-3/30	AMP	Perennial
Jack Rabbit	9,755	---	0	0	0 (C) Ephemeral	---	6/	0	0	---	---	---	---	0	0	---	Non-AMP	Ephemeral
Klondike	7,072	---	416	120	678 (S) Perennial	10/16-5/15	378	0	381	48	---	25	1,002	-100%	+ 1%	10/16-3/30	AMP	Perennial
Lime Mountain	67,144	---	3,830	2,814	6,754 (C) Perennial	10/1-5/15	3,580	2,419	3,191	840	---	---	5,365	-32%	- 11%	10/16-3/30	AMP	Ephemeral-Perennial
Little Mountain	18,575	---	671	87	1,422 (WH) Perennial	YL	---	---	---	87	---	638	705	---	---	YL	---	Wild Horses
Lower Lake	107,317	---	1,145	9	1,247 (C) Perennial	YL	100	94	1,145	9	---	---	1,256	- 6%	+1045%	6/1-3/30	AMP	Ephemeral-Perennial
McCutcheon Spring	18,276	40	583	302	446 (C) Perennial	YL	0	0	547	89	---	---	1,057	---	---	6/1-3/30	AMP	Perennial
McGuffy Spring	22,115	---	325	246	298 (C) Perennial	YL	0	302	302	246	---	---	1,724	---	---	6/1-3/30	AMP	Perennial
Mahogany Peak	28,441	1,360	1,311	473	617 (C) Perennial	YL	326	1,053	1,053	473	---	---	2,850	+223%	+223%	6/1-3/30	AMP	Perennial
Meadow Valley	3,971	240	0	---	56 (C) Perennial	11/1-4/30	48	0	0	---	---	---	---	-100%	-100%	---	No Grazing	---
Mormon Peak	82,296	---	1,855	4,703	Undetermined (C) Perennial	Winter	328	725	1,530	116	1,081	---	1,892	+101%	+376%	10/15-3/30	AMP	Ephemeral-Perennial
Morrison-Wengert	33,264	1,200	1,043	1,387	1,760 (C) Perennial	YL	1,760	229	928	238	180	---	1,147	- 87%	- 47%	10/1-3/30	AMP	Ephemeral-Perennial
Mustang	23,877	---	444	161	1,260 (C) Perennial	YL (AMP)	987	444	444	105	---	---	744	- 55%	- 55%	YL (AMP)	AMP	Perennial
Mustang Flat	5,987	---	90	218	147 (C) Perennial	5/1-10/31	0	0	0	86	---	82	92	-100%	-100%	---	No Grazing	Wild Horses
Naquinta Spring	52,425	140	1,058	575	Unalloted Perennial	YL	---	0	1,058	237	---	---	1,164	---	---	6/1-3/30	AMP	Perennial

TABLE 1-3 -- Continued

Allotment	Present: Land Ownership Status[1]		Present: Total Forage Capacity (AUMs)		Present: Present Authorized Livestock Use & Range Class (AUMs)[4]	Present: Season-of-use[5]	Present: 1977 Licensed Use	Proposed: Proposed Forage Allocations (AUMs)					Proposed: Future[9] AUMs (2015)	Proposed: Percent Change[10] Present vs. Proposed Licensed Use (1977) (AUMs)		Proposed: Proposed Season-of-Use	Proposed: Proposed Management Intensity	Proposed: Proposed Range Class
	Public Land (acres)	Other Land (acres)	Livestock AUMs[2]	Wildlife AUMs[3]				Livestock 1980[7]	Livestock 1980-90[8]	Deer	Bighorn Sheep	Wild Horses		1980	1980-90			
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r
N-4	43,500	5,380	396	51	824 (C) Perennial	3/1-10/1	6/	0	386	43	---	---	692	---	---	7/1-2/28	AMP	Perennial
Oak Spring	193,609	1,440	10,570	3,338	9,268 (C) Perennial	YL (AMP)	7,793	8,831	8,922	889	67	1,452	14,555	+ 13%	+ 14%	YL (AMP)	AMP	Perennial
Oak Wells	29,139	40	542	476	511 (C) Perennial	YL	0	278	302	247	---	240	2,708	---	---	6/1-2/28	AMP	Perennial
Pahranagat East	34,146	---	565	---	511 (C) Perennial	8/1-5/30	289	0	565	---	---	---	593	-100%	+ 96%	10/1-3/30	Non-AMP	Perennial
Pahranagat West	70,138	---	1,289	75	2,144 (C) Perennial	8/1-5/31	1,351	0	1,289	14	---	---	1,737	-100%	- 5%	10/1-3/30	Non-AMP	Perennial
Pahroc	117,443	---	3,917	1,183	4,783 (C) Perennial	YL	4,604	3,568	3,891	266	---	---	4,825	- 23%	- 15%	6/1-3/30	AMP	Perennial
Panaca Cattle	16,275	---	596	116	453 (C) Perennial	YL	72	0	469	11	---	120	779	-100%	+551%	10/1-3/30	AMP	Perennial
Panaca SCS	4,242	---	162	15	Unalloted (C & S) Perennial	---	---	160	160	7	---	---	306	---	---	10/1-3/30	AMP	Perennial
Peck	7,698	---	190	---	268 (C) Perennial	YL	0	---	---	---	---	190	180	-100%	-100%	YL	---	Wild Horses Perennial
Pennsylvania	42,556	320	156	1,472	817 (C) Perennial	5/1-10/31	439	84	131	606	---	---	1,028	- 81%	- 70%	6/1-10/31	Non-AMP	Perennial
Pine Cone	28,265	---	627	135	1,205 (C) Perennial	10/1-6/15	208	0	603	32	---	---	1,618	-100%	+190%	10/1-3/30	Non-AMP	Perennial
Pioche	13,440	---	354	77	402 (C) Perennial	YL	155	0	315	36	---	39	389	-100%	+103%	6/1-3/30	AMP	Perennial
Pulsipher Wash	3,408	---	0	0	--- (C) Ephemeral	---	0	0	0	---	---	---	---	---	---	---	Non-AMP	Ephemeral
Rabbit Spring	20,975	40	720	119	1,122 (S) Perennial	10/16-4/15	0	242	430	77	---	240	1,432	---	---	10/1-3/30	AMP	Perennial
Rattlesnake	28,426	---	1,172	266	1,182 (C) Perennial	10/16-5/31	1,183	841	932	203	---	240	2,441	- 29%	- 21%	6/1-3/30	AMP	Perennial
Red Bluff	18,039	---	98	---	34 (C) Perennial	10/1-4/15	34	98	98	---	---	---	100	+188%	+188%	7/1-3/30	Non-AMP	Perennial
Roadside	1,123	---	48	---	32 (C) Perennial	12/1-2/28	0	0	48	---	---	---	53	---	---	12/1-2/28	AMP	Perennial
Rocky Hill	4,092	---	238	29	308 (C) Perennial	10/16-5/15	0	0	236	11	---	---	262	---	---	6/1-3/30	AMP	Perennial
Rox	25,870	120	0	21	756 (C) Perennial	YL	372	0	0	---	13	---	---	-100%	-100%	---	Non-AMP	Ephemeral
Sand Hollow	35,174	---	582	---	2,430 (C) Perennial	10/1-5/15	1,118	311	582	---	---	---	698	- 72%	- 48%	10/1-3/30	AMP	Ephemeral-Perennial
Sand Springs	249,685	5,200	11,019	1,303	6,091 (C) Perennial	YL (AMP)	4,918	10,313	10,993	133	---	---	13,491	+110%	+124%	YL	AMP	Perennial
Sawmill Canyon	9,177	---	97	159	181 (C) Perennial	YL	0	0	0	78	---	90	92	-100%	-100%	---	No Grazing	Wild Horses
Schlarman	5,345	---	390	464	240 (C) Perennial	11/1-4/30	214	376	376	1	21	---	429	+ 76%	+ 76%	10/1-3/30	AMP	Ephemeral-Perennial
Shadow Well	17,862	---	1,151	---	577 (S) Perennial	11/1-4/30	440	1,151	1,151	---	---	---	1,381	+162%	+162%	10/1-12/30	AMP	Perennial
Sheep Spring	31,077	---	1,815	629	409 (C) Perennial	YL	0	840	939	262	---	720	3,917	---	---	7/1-2/28	AMP	Perennial
Sheep Flat	74,171	720	521	1,350	1,977 (C) Perennial	5/16-9/15	1,979	521	521	738	---	---	3,005	- 74%	- 74%	7/1-10/15	AMP	Perennial
Simpson	8,379	---	414	---	747 (C) Perennial	12/1-4/30	750	414	414	---	---	---	496	- 65%	- 45%	12/1-3/30	AMP	Perennial
Six Mile	34,531	---	896	125	674 (C) Perennial	YL	674	887	887	125	---	---	986 •	+ 32%	+ 32%	6/1-3/30	AMP	Perennial

TABLE 1-3 -- Continued

Present								Proposed										
Allotment	Land Ownership Status[1]		Total Forage Capacity (AUMs)		Present Authorized Livestock Use & Range Class (AUMs)[2]	Season-of-use[5]	1977 Licensed Use	Proposed Forage Allocations (AUMs)					Future[9] AUMs (2015)	Percent Change[10] Present vs. Proposed Licensed Use (1977) (AUMs)		Proposed Season-of-Use	Proposed Management Intensity	Proposed Range Class
								Livestock										
	Public Land (acres)	Other Land (acres)	Livestock AUMs[3]	Wildlife AUMs[3]				1980[7]	1980-90[8]	Deer	Bighorn Sheep	Wild Horses		1980	1980-90			
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r
Snow Spring	44,042	---	1,530	1,015	3,567 (C) Perennial	10/1-5/15	1,650	1,207	1,207	397	---	---	1,683	- 27%	- 27%	11/1-3/30	AMP	Ephemeral-Perennial
Summit Spring	18,035	---	149	---	715 (C) Perennial	10/16-5/15	715	149	149	---	---	---	164	- 79%	- 79%	11/1-3/30	AMP	Ephemeral-Perennial
Terry	30,163	---	242	---	2,366 (C) Perennial	10/1-5/15	1,444	105	242	---	---	---	266	- 93%	- 83%	10/1-3/30	AMP	Ephemeral-Perennial
Uvada	13,608	10	554	205	355 (C) Perennial	YL	229	521	521	95	---	---	1,313	+142%	+142%	6/1-3/30	AMP	Perennial
Warm Spring	1,401	---	25	---	74 (C) Perennial	11/16-4/15	0	25	25	---	---	---	28	---	---	7/1-3/30	AMP	Perennial
White Hills	2,755	---	105	---	101 (C) Perennial	12/1-2/28	0	0	105	---	---	---	116	---	---	6/1-3/30	AMP	Perennial
White Rock	32,916	---	1,810	433	2,880 (C) Perennial	9/16-5/15	1,269	707	1,793	28	38	---	1,991	- 55%	+ 41%	9/16-3/30	AMP	Ephemeral-Perennial
Total	3,495,805	25,442	109,914	44,179	118,580		78,235	74,293	99,399	12,748	2,308	5,956	162,336	- 6%	+ 26%			

1 Land ownership includes some acreage outside the ES area boundary in the Ely and Las Vegas districts.
2 Suitable and potentially suitable Animal Unit Months (AUMs) include those AUMs which meet the Bureau of Land Management's production and slope criteria.
3 Wildlife AUMs include all competitive and non-competitive AUMs determined from the range survey.
4 (C) cattle (S) domestic sheep (H) domestic horses (WH) wild horses. Authorized use determined from previous range survey or by agreement.
5 (YL) yearlong (AMP) existing Allotment Management Plan (GS) grazing system
6 Permitted use occurred on these allotments, but the number of AUMs used in the ES area could not be determined because the allotment boundaries extend outside the ES area.
7 Presently suitable livestock AUMs.
8 Total of presently suitable and potentially suitable (with water development) livestock AUMs.
9 Possible future forage includes those AUMs available through vegetative manipulation and through intensive management of the resource.
10 Column n is Column h - g ÷ g
Column o is Column i - g ÷ g

Notes: See glossary for definitions of: ephemeral, ephemeral-perennial, perennial, suitable AUM, season-of-use (period-of-use), competitive forage, non-competitive forage, AMP, Non-AMP, and no grazing.

Forty-eight AUMs were allocated to antelope on the Sand Springs Allotment.

Source: U. S. Department of the Interior, Bureau of Land Management, Las Vegas District, Caliente Unit Resource Analysis and Management Framework Plan, 1978.

TABLE 1-4

DEVELOPMENT OF THE PROPOSED ACTION THROUGH MULTIPLE USE ANALYSIS

MFP 1 RECOMMENDATIONS	OTHER MFP 1 RESOURCES RECOMMENDATIONS THAT CONFLICT	MFP 2 RECOMMENDATIONS	RESOURCE TRADE-OFFS
Livestock Grazing			
1. Establish periods-of-use for each allotment in the Caliente planning area.	Wildlife recommends no grazing between March 1 and June 30 on crucial deer winter range. Livestock operators to use other forage source for 2 months while plants rest in early spring (April 1 - May 30).	Allotments with crucial deer winter range should be modified, otherwise recommendations accepted with the provision for no grazing from April 1 - May 30.	No livestock grazing from March 1 to June 30 on crucial deer winter range. No grazing by livestock from April 1 to May 30 unless AMP is implemented.
2. Graze the proposed allotments at the maximum livestock carrying capacity consistent with proper management of forage species. 82,211 AUMs.	Wildlife and Wild Horses and Burros need forage to meet demand for those animals.	Accept livestock grazing recommendations, with modification to allocate forage to wildlife and wild horses.	4,312 AUMS of forage to wildlife. 5,956 AUMs of forage to wild horses. Allocate 74,293 AUMs to domestic livestock.
3. Develop AMPs on 27 allotments or combinations thereof; revise 5 existing AMPs to meet Bureau standards and upgrade grazing systems on Enterprise and Delamar allotments to AMPs; don't develop AMPs on 17 allotments; no livestock grazing on Ash Flat and Meadow Valley allotments.	No conflicts identified, but recommend that wild horses be removed from Ash Flat and Meadow Valley allotments.	Develop AMPs on 27 allotments. Authorize change in kind of livestock on 6 allotments. Leave 13 allotments without AMPs. Withdraw 9 allotments from grazing by domestic livestock.	Loss of livestock grazing on 9 allotments.
4. Increase forage production by 31,880 AUMs through mechanical treatments, burnings, and use of herbicides on 654,900 acres.	Conflicts with recommendation varies widely in planning area (wilderness, soils, etc.).	Require detailed soil inventory, vegetative analysis, and environmental assessment. AMP to be developed on vegetative treatment areas.	Numerous short-term environmental impacts. Long-term increased forage production should be positive. Acreage reduced to 401,000.

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TABLE 1-4 -- Continued

MFP 1 RECOMMENDATIONS	OTHER MFP 1 RESOURCES RECOMMENDATIONS THAT CONFLICT	MFP 2 RECOMMENDATIONS	RESOURCE TRADE-OFFS
Wild Horses and Burros (WH/B)			
1. Designate 8 areas as herd management areas (HMAs).	Numerous conflicts were identified for each herd management areas.	Designate and prepare Herd Management Plans on 6 areas and allocate vegetation.	Removal of 560 horses will be required. 5,956 AUMs of livestock forage to wild horses. Do not maintain horses on all area.
2. Remove WH/B from 4 allotments and anywhere else they occur outside HMAs; reserve forage for maximum number of WH/B to be maintained in each HMA.	No conflicts were identified in regards to WH/B removal in the 4 allotments and areas outside HMAs. Numerous conflicts were identified by herd management area for the other recommendations.	Herd Management Plans to be prepared; modify removal areas to include all areas not recommended for intensive management.	Loss of 560 horses.
3. Manipulate vegetation in HMAs to increase forage and improve habitat.	Watershed, Recreation, and Wildlife all conflicted on restrictions on such activities as construction, chaining, and clear-cutting.	Manipulate vegetation in HMAs to increase WH/B forage. Environmental assessments and management plans are needed before projects implemented.	Short-term environmental impacts would be outweighed by long-term production of forage. Additional forage production and diversity for wild horses.
4. Develop water on 24 allotments to increase AUMs by 4,398.	Conflicts with bighorn sheep range and identification of wilderness characteristics.	Livestock, wild horses and burros and wildlife should not be excluded from water use. Spring sources should be protected, annual inspections should be made, and management plans should be evaluated on a recurring bases.	Some disturbance would occur to vegetation and to land surface at water sites. Additional water sources available for wild horses.
Recreation			
1. Restrict chainings and clear-cutting to Management Class III & IV areas; inventory existing chainings and coordinate planning efforts to minimize visual impacts on recreational areas (potential and existing) particularly near Beaver Dam State Park and Beaver Dam Road.	Conflicts dealing with vegetative manipulation were identified in WH/B, Watershed, Wildlife, Range Management, and Forestry.	Visual Resource Management guidelines should be utilized on all future projects.	Forage for animals may not be as great as possible due to visual requirements.

TABLE 1-4 -- Continued

MFP 1 RECOMMENDATIONS	OTHER MFP 1 RESOURCES RECOMMENDATIONS THAT CONFLICT	MFP 2 RECOMMENDATIONS	RESOURCE TRADE-OFFS
Wildlife			
1. Introduce native trout to Ash Creek and Cottonwood Creek drainages; improve and maintain aquatic habitat in Clover Creek drainage.	Introductions conflict with the range program.	Habitat management plans and environmental assessment plans should be made of aquatic and riparian zones.	Livestock forage reduction could result from the measures taken to protect and improve riparian vegetation and streams banks.
2. Improve 6,400 acres of bighorn sheep habitat in Morman Mountains; improve 88,200 acres of mule deer habitat in the Clover and Delamar Mountain through vegetation manipulation.	In the Morman Mountain area, conflicts occur in Recreation because of the presence of quality scenery, cactus, and unusual recreational values. Habitat improvement to benefit deer conflicts in some areas with Watershed, Recreation, Lands, and Forestry.	Recommend that bighorn sheep habitat improvement be dropped. Mule deer habitat improvement projects should include Habitat Management Plans and environmental assessments.	Short-term impacts to the areas should be off-set by increased food supply and more diversity in food available.
3. Exclude livestock, WH/B from existing or developed waters for wildlife by fencing; develop and fence 95 new waters on 9 ranges; fence 33 spring/riparian areas; fence out livestock and WH/B on 7 miles of Rainbow Canyon; provide minimum of 2 escape devices for birds/rodents in all troughs/tanks.	Conflicts occur in Wildlife and Recreation since bighorn sheep road or trail construction is restricted and because of possible disturbance of wilderness characteristics. Exclusion of wild horses and livestock could be major problem.	Maintain multiple use values when possible for livestock, WH/B, or wildlife. Protect spring sources and maintain water-related projects. Evaluate management plans regularly. Allow no grazing in Rainbow Canyon.	Continued conflicts for water could occur unless proper development of water sources is undertaken. Riparian zones will be protected through proper management.
4. Provide forage for the following: a. Bighorn Sheep--2,308 AUMs on 4 ranges. b. Mule Deer--12,748 AUMs on existing use areas. c. Antelope--48 AUMs in 1 allotment.	Wildlife forage conflicts with livestock and WH/B requests for forage allocation.	Accept the MFP 1 recommendation.	4,312 AUMs of suitable livestock forage will not be available to livestock. Cannot meet requested forage on 4 wildlife habitat areas.
5. Terminate WH/B and livestock use on 3 bighorn sheep ranges; eliminate WH/B use in deer crucial areas; intensify WH/B management on remaining deer ranges.	Termination of use conflicts with livestock and WH/B activities. Elimination of WH/B use in crucial areas and intensification of management conflicts with WH/B program's herd management plan.	Habitat Management Plan preparation, including exclusion of multiple-use values, to be developed for 3 sheep ranges. Deer crucial areas must have proper forage allocation, and management plan should consider wildlife values.	Continued conflict can occur in the areas. Plans should consider the problems and additional recommendations made.
Lands			
1. Limit transfer of public land to agricultural development to 3,000 acres in 2 valleys; classify 80 acres for competitive public sale; classify 20 acres for noncompetitive sale.	Numerous conflicts exist with the land transfer and with the land identified for public sale. Conflicts range from oil, gas, and geothermal development; use of sand and gravel; use by WH/B; and use by ORVs to bans on use to protect fragile soils or to protect scenic quality.	After procedures available, environmental assessment, management plan and feasibility studies complete, sell acreage in economic units, place priority on sale of lands by competitive or noncompetitive means.	Loss of wildlife habitat, livestock forage and open space could occur.

Source: U.S. Department of the Interior, Bureau of Land Management, Las Vegas District, Caliente Management Framework Plan, 1978.

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DESCRIPTION OF THE ENVIRONMENT

CHAPTER 2

DESCRIPTION OF THE ENVIRONMENT

EXISTING ENVIRONMENT

Climate

Precipitation

Precipitation records in the Caliente Environmental Statement (ES) area are limited to several reporting stations (Caliente Pioche, Alamo, Elgin). Precipitation in the area is low (i.e., Alamo receiving 4.35" average annual precipitation). Moisture falls as snow at the higher elevations such as in the Clover Mountains, Highland Peak, the Delamars, and Cedar Range from December through February, and as rain at the lower elevations. In the late summer (July through September) short-duration, high intensity thunderstorms are common throughout the ES area. Average monthly and annual precipitation amounts are shown in Table 2-1.

The number of days per month and year that precipitation amounts equal to or greater than .01", .10", .25", .50", and 1.00" may be expected within a 24-hour period maybe obtained in the Nevada Watershed Studies Annual Report, 1978 (BLM).

The percent probabilities of receiving given amounts of precipitation within three-week periods at Caliente are available in Probability of Selected Precipitation Amounts in the Western Region of the United States (1967).

For average annual precipitation within the ES area, see the Average Annual Precipitation Map.

The tendency of monthly and annual precipitation amounts to change with respect to their long-term means is high because the annual precipitation is low and storms are relatively infrequent.

Precipitation deficiency, a measure of the degree of precipitation shortage, ranges from moderate at the higher elevations to

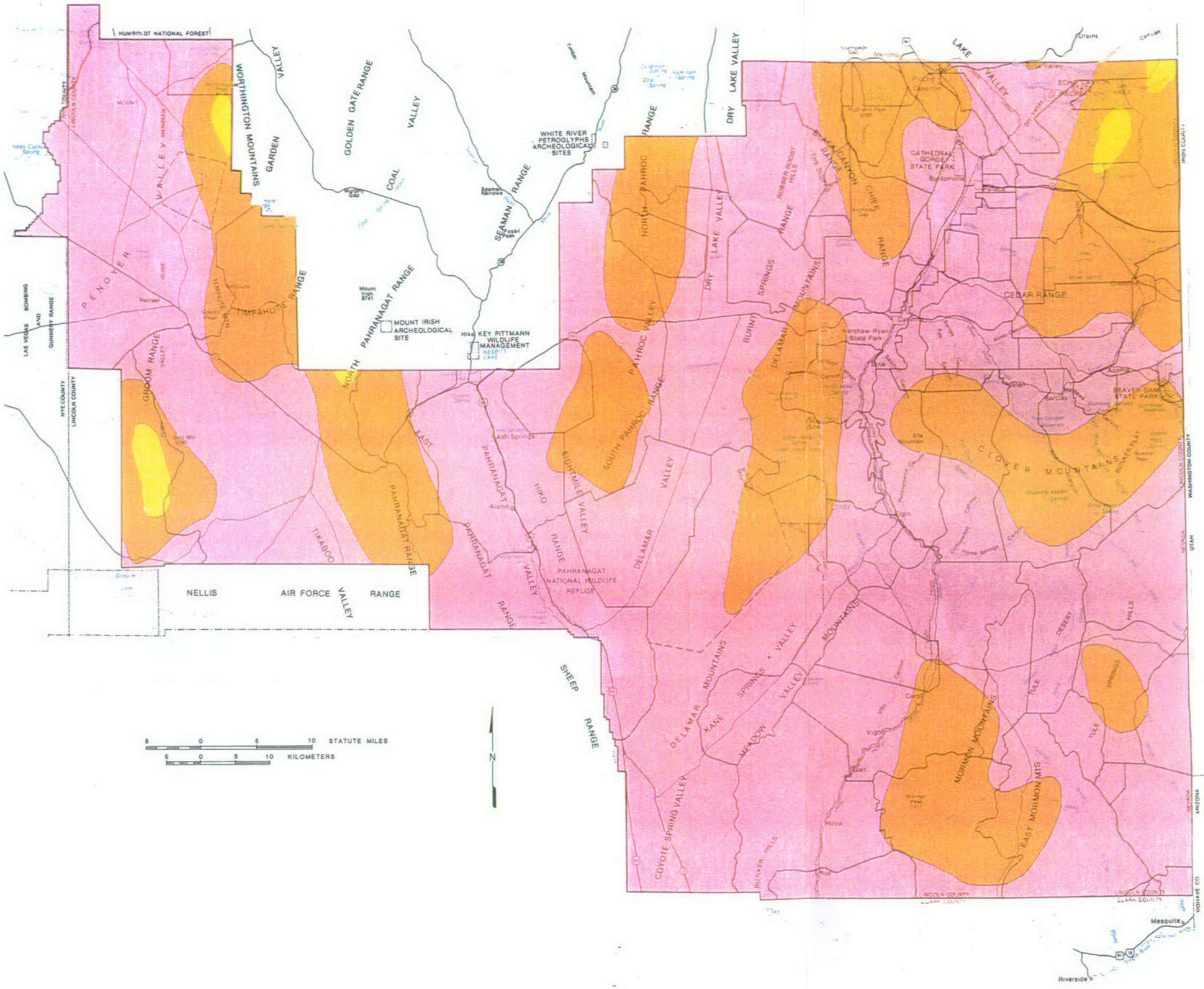
TABLE 2-1
MONTHLY AVERAGE PRECIPITATION
CALIENTE ES AREA

Station	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Pioche[a]/	1.47	1.24	1.37	1.29	0.73	0.40	1.14	1.25	0.64	0.95	1.19	1.17	13.37
Caliente[a]/	0.74	0.72	0.94	0.83	0.48	0.35	0.73	0.91	0.56	0.88	0.74	0.83	8.71
Pine Canyon Can #3 [b]/	1.92	1.73	1.65	1.23	0.75	0.40	1.60	1.80	1.34	1.23	1.54	1.79	16.98
Mathews Canyon Can #9 [b]/	1.31	1.19	1.14	0.86	0.52	0.28	1.41	1.59	1.13	0.86	1.07	1.23	12.59

[a]/ Source: National Oceanic and Atmospheric Administration Climatological Summaries. Period of record for Pioche: 1941-1970; Caliente: 1936-1965.

[b]/ Source: Calculated long-term means simulating 30 years of record are from the Nevada Watershed Studies Annual Report, 1978, produced by the Bureau of Land Management, Nevada State Office.

NOTE: Caliente is 4,402' above sea level; Pioche, 6,102'; Pine Canyon, 6,320'; Mathews Canyon, 5,700'.



PRECIPITATION

- 4 TO 8 INCHES
- 8 TO 16 INCHES
- MORE THAN 16 INCHES

SOURCE: Nevada's Weather and Climate by Houghton, Sakamoto, and Gifford.

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extremely high in the lower deserts of the ES area (BLM, Nevada State Office, Nevada Watershed Studies Annual Report, 1978).

Air Movement Patterns

Air movement patterns vary according to season of the year. Topographic features alter local wind conditions. Northerly winds of moderate velocity occur during winter months. High velocity southerly or southwesterly winds commonly occur in the spring. Winds are variable during the summer, but generally blow from a southerly direction because of high temperatures. During the fall, light and variable winds blow from the south.

Temperatures

Daily and seasonal temperatures vary greatly within the ES area. A daily temperature variation (daytime to nighttime) averages 20 to 30 degrees in the winter and 30 to 40 degrees in the summer. The mean maximum temperature of approximately 100° usually occurs in July.

The mean monthly temperatures over 30 years of record are shown for Caliente and Pioche in Table 2-2.

TABLE 2-2

MEAN MONTHLY TEMPERATURES (FAHRENHEIT)

CALIENTE AND PIOCHE

Location	Period of Record	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Caliente	1936-65	31	37	43	52	60	69	76	74	66	55	43	35
Pioche	1941-70	31	35	39	48	57	66	74	72	64	53	40	33

Source: National Oceanic and Atmospheric Administration Climatological Summaries.

NOTE: Caliente is 4,402' above sea level; Pioche, 6,102'.

Frost-Free Periods

The ES area has between 100 and 200 frost-free days annually. Table 2-3 depicts the average number of frost-free days.

TABLE 2-3

FROST-FREE PERIODS

CALIENTE ES AREA

Station	Average Last Date (32°F. or below)	Average First Date (32°F. or below)	Approx. No. of Frost-Free Days	Elevation (feet)
Caliente	5-20	9-28	130	4402
Pioche	5-25	10-18	145	6102
Tempiute	5-21	10-21	144	
Elgin	5-20	10-18	150	3300
Alamo	5-01	10-14	166	3500

Source: Department of the Interior, Bureau of Land Management, Las Vegas District, Unit Resource Analysis, 1978.

Air Quality

Air quality is good throughout the Caliente Environmental Statement (ES) area. However, fugitive dust may occasionally be a problem (during high winds), and pollutants are produced from occasional agricultural burnings and mining operations.
Several minor inversion areas exist, including the canyon in which Caliente is located. There are no pollution sources of any importance in these areas.

The entire ES area has been designated as a Class 2 Attainment Area by the State of Nevada. The Nevada Division of Environmental Protection plans to study only two valleys within the area, Panaca Valley and Sand Springs (Penoyer Valley), to determine what portion of the Class 2 air quality increment has been utilized. The Division speculates that the remaining portions of Lincoln County have the entire Class 2 increment available, and therefore will not be analyzed.

Geologic Setting

The geologic structure of the Caliente Environmental Statement (ES) area is complex. Sedimentary rocks, volcanics, and faulting obscure many early geologic structures. Dispersed throughout the ES area, approximately one-third of the ES area is sedimentary; one-third is volcanic; and the remaining third is igneous, sedimentary, and metamorphic rocks. For geologic setting, refer to the Geology Map. Detailed data and maps are available from the Nevada Bureau of Mines and Geology, Bulletin 73 - Lincoln County.

Topography

The Caliente Environmental Statement (ES) area is situated within the Basin and Range Physiographic Province. Mountain ranges trend north-south and are narrow respective to the broad valleys separating them. The valleys sometimes have cliffs because of their block-fault origin.

There are two integrated outside drainage systems within the ES area: Meadow Valley Wash and the White River-Muddy River. These rivers, both tributaries of the Colorado River, have removed great quantities of unconsolidated sediments and have cut canyons through bedrock. A smaller outside drainage, Beaver Dam Wash, drains into the Virgin River, a tributary of the Colorado River system.

Other drainages flow into interior basins which have playas at their centers. Runoff flows from the mountain flanks carry sediments, which form alluvial fans, and silts and dissolved salts

which are deposited in the playas.

Elevations vary from 2,000 feet above mean sea level at the southern edge of the Tule Desert to 9,395 feet at Highland Peak. Basin floors average 4,500 feet. Ranges commonly reach 5,000 to 6,500 feet above mean sea level.

Soils

The grouping of soils as presented in this Environmental Statement (ES) reflects the history of their formation as well as their physical characteristics.

Five soil surveys prepared by the U.S. Department of Agriculture's Soil Conservation Service formed the data base for the Soils Map in this ES. Published survey No. 611 (275,684 acres) and survey No. 613 (899,840 acres) were conducted at the third order. Unpublished surveys 754 (order four), 787 (orders three and four), and 784 (order three) also contributed to the data base. Data for areas not included in SCS soil surveys (57,838 acres) came from Bureau of Land Management (BLM) watershed studies and from BLM soils science field work. (See Section 1 Appendix D.)

The color separations of soils on the Soils Map were based upon differences in parent material and upon topographic position. The blue areas on the map delineate soils formed from sedimentary rocks; the red areas reflect soils formed primarily from igneous parent materials. Both of these areas are confined mostly to mountains and foothills. They contain large amounts of exposed bedrock and shallow or moderately deep soils underlain by hard bedrock. Green areas depict soils formed on coalescing alluvial terraces and fans. Yellow areas represent soils formed in floodplains which have a topographic position lower than most of the adjacent areas; brown areas are playas. (See Table 2-4 for a listing of soils which corresponds to the map.)

The separation of numbered units within each color was based on temperature and soil classification as set forth in USDA Agriculture Handbook No. 436, 1975.

Soil taxonomy separates soils into Orders, Sub-orders, Great Groups, Sub-groups, Families, and Series. Orders are the most general and Series are the most specific. The numbered units depicted on the Soils Map are Great Groups or combinations of Great Groups.

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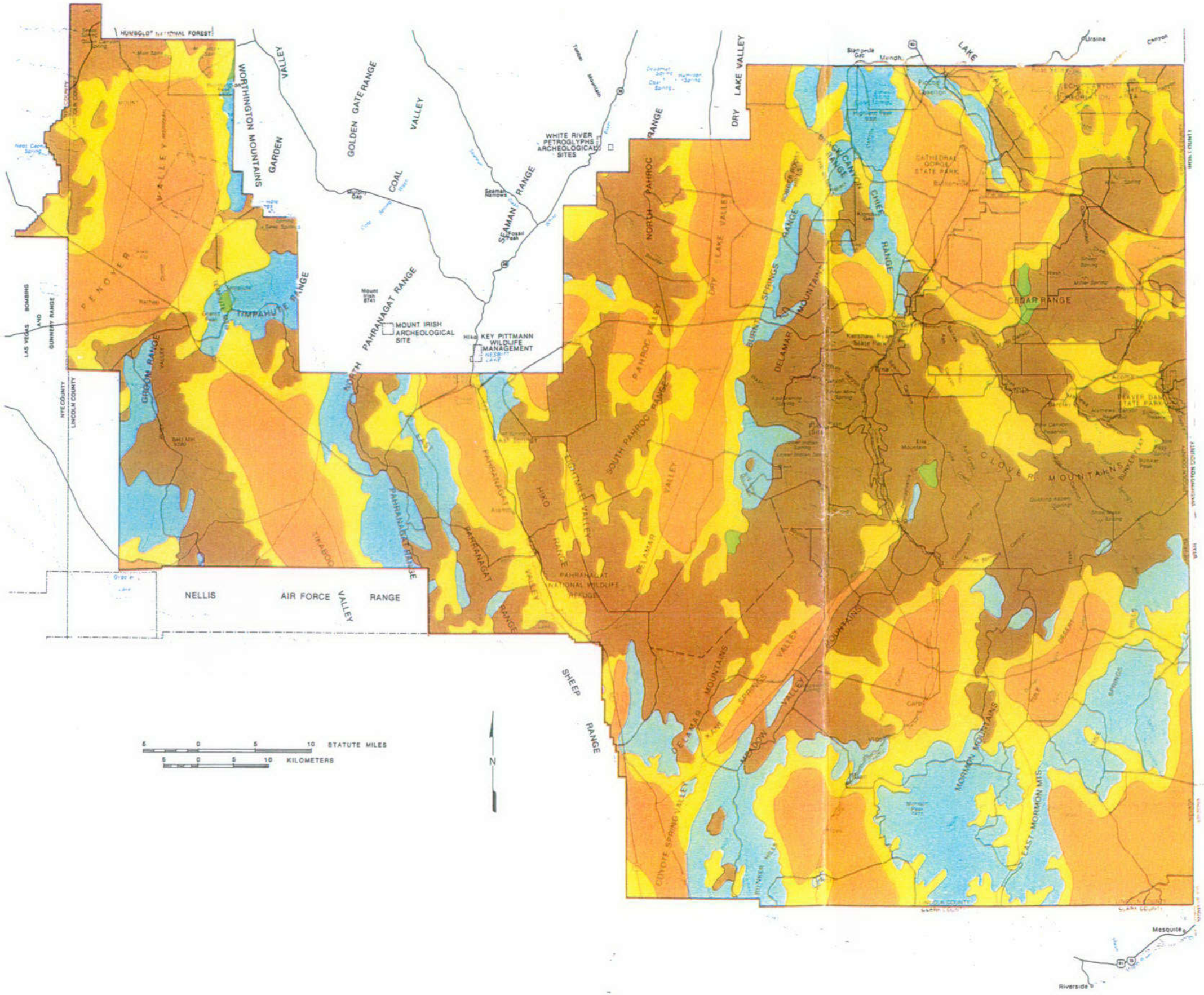

SHALLOW COVER
YOUNG MATERIALS, BELIEVED TO BE LESS THAN 1,000 THICK, OVERLYING OLDER BEDROCK, MOSTLY VALLEY-FILL GRAVELS, AND OTHER SEDIMENTS, BUT AREAS OF QUATERNARY BASALT FLOWS AND TERTIARY LAKE BEDS ARE INCLUDED.

DEEP COVER
YOUNG MATERIALS BELIEVED TO BE MORE THAN 1,000 FEET THICK OVERLYING OLDER BEDROCK, MOSTLY VALLEY-FILL GRAVELS, WITH MINOR INTERBEDDED LAVA FLOWS AND TUFF BEDS

TERTIARY VOLCANIC ROCKS
LAVA FLOWS AND TUFFS, MOSTLY OF LATE TERTIARY AGE

PRE-TERTIARY NON-INTRUSIVE ROCKS
PRECAMBRIAN, PALEOZOIC AND MESOZOIC SEDIMENTARY AND VOLCANIC ROCKS

INTRUSIVE ROCKS
MOSTLY MESOZOIC OR EARLY TERTIARY INTRUSIVES.

SOURCE: Modified Geologic Map of Nevada Map 5 , Water for Nevada-Mineral Projections. Map 44 by Nevada Bureau of Mines and Geology, University of Nevada, Reno

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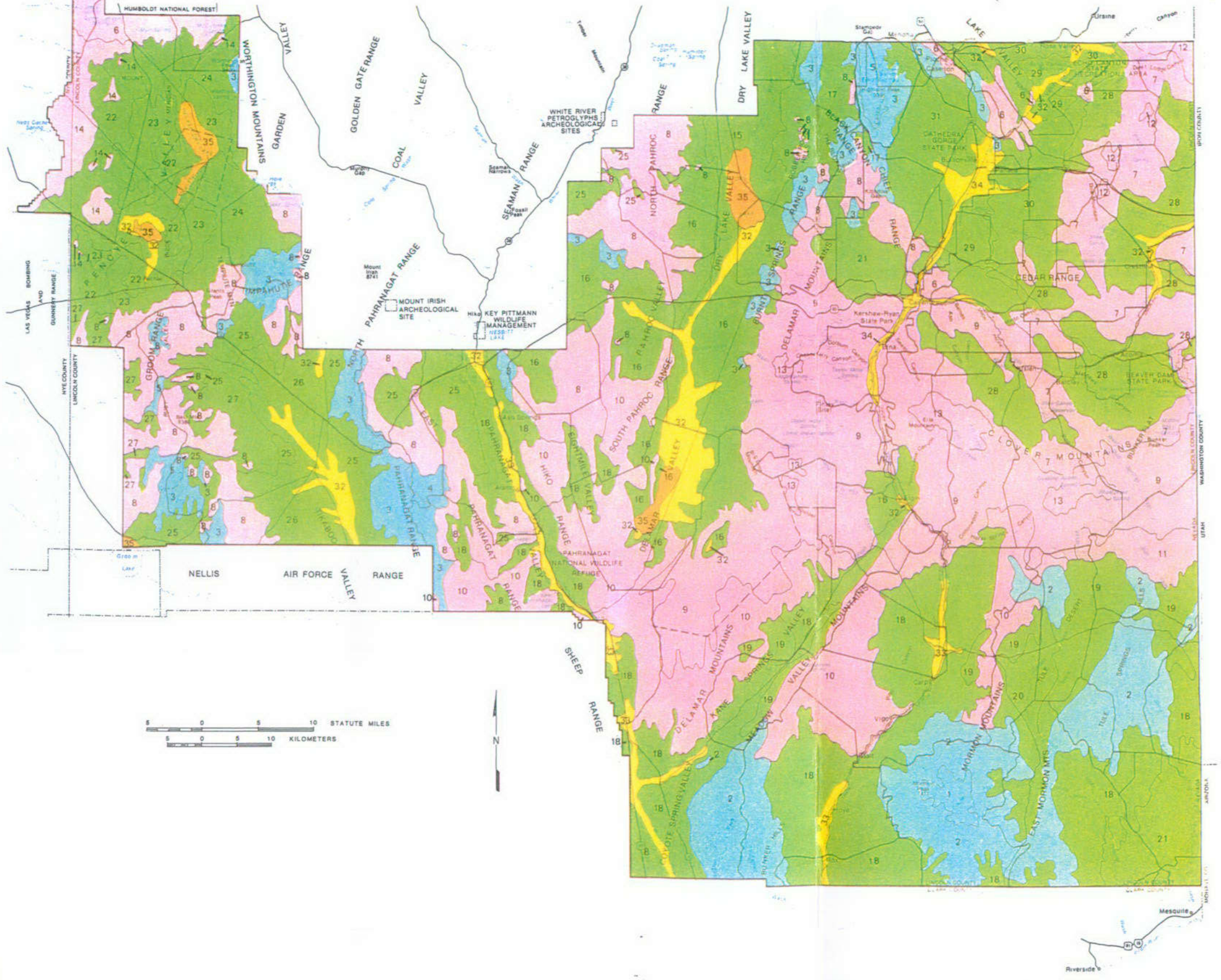
TABLE 2-4
SOILS IN THE CALIENTE ES AREA

Soil Map Unit[a]	Taxonomic Name of Great Groups Included[b]	Temperature Regime[c]	Depth[d]	Slopes	Erosion Potential[e]	Percent of ES Area
Blue 1	Camborthids (loamy-skeletal)	Mesic	Lithic	Steep	Moderate and Severe	<1%
Blue 2	Torriorthents (stony and extremely stony)	Thermic	10 to 50 inches	15 to 75%	Slight and Moderate depending on slope	5%
Blue 3	Torriorthents (extremely stony and very cobbly)	Mesic	Lithic	15 to 100%	Moderate and Severe	3%
Blue 4	Torriorthents and Haploxerolls	Mesic and Frigid	Lithic	15 to 75%	Moderate and Severe	1%
Blue 5	Haploxerolls (very stony and extremely stony)	Frigid	Shallow to Very Deep	30 to 75%	Moderate and Severe with a few inclusions that have a slight erosion potential	<1%
Red 6	Durargids Haploxerolls Durorthids (stony loam and gravelly loam)	Mesic or Frigid	Lithic or Shallow	2 to 50%	Slight or Moderate depending on slope	1%
Red 7	Argixerolls Haploxerolls (formed in residuum)	Mesic or Frigid	Very Shallow to Moderately Deep	2 to 30%	Slight or Moderate depending on slope	5%
Red 8	Torriorthents and Camborthids (formed in alluvium and residuum from volcanics)		<20" to >60"	4 to 50%	Ranges from Slight to Severe	13%
Red 9	Argixerolls (stony and very cobbly clay loam) and Haplargids (gravelly and cobbly loam)		Shallow and Moderately Deep	15 to 75%	Slight and Moderate	12%
Red 10	Haplargids (stony clay loam and bouldery loam) and Torriorthents (stony sandy loam) Rock Outcrop	Mesic and Thermic	Lithic and Shallow	15 to 75% with a few <15% or over 75%	Slight to Severe depending on slope and texture	8%

TABLE 2-4 -- Continued

Soil Map Unit[a]/	Taxonomic Name of Great Groups Included[b]/	Temperature Regime[c]/	Depth[d]/	Slopes	Erosion Potential[e]/	Percent of ES Area
Red 11	Haplargids (cobbly clay loam and gravelly loam)	Thermic	Deep over bedrock	8 to 30%	Slight	1%
Red 12	Cryoborolls (very stony clay-skeletal)	Frigid	Lithic	15 to 50%	Severe (if disturbed) and Moderate	4%
Red 13	Argixerolls (stony loam) Haploxerolls (very gravelly loam)	Frigid	<20" to >60"	15 to 75%	Moderate and Severe	1%
Red 14	Rockland (Misc. Land Class) in complex with Durargids (extremely stony very fine sandy loam)	Mesic	Lithic or Shallow	8 to 12%	Moderate	1%
Green 15	Torriorthents (fine sandy loam) Camborthids (silt loam)	Mesic	Very Deep	0 to 4%	Slight and Moderate	1%
Green 16	Durorthids Durargids Haplargids Torriorthents	Mesic	Shallow and Moderately Deep	2 to 8%	Slight and Moderate	6%
Green 18	Durorthids and Paleorthids (Differs from Green 17 in the ratio of the 2 major soils) Also included are: Torriorthents, Paleorthids, Calciorthids, Camborthids	Thermic	Shallow to Moderately Deep	2 to 15%	Slight, except on steep slopes where it is Moderate	10%
Green 19	Paleargids (very gravelly loam) Haplargids (loam)		Mostly Shallow Some Deep	2 to 15%	Slight or Moderate	2%
Green 20	Paleorthids Durargids Paleargids	Thermic	Shallow to Moderately Deep	0 to 4%	Slight	1%



BARREN PLAYA AND ADJOINING FLOOD PLAINS

SOILS IN VALLEY BOTTOMS AND ON FLOOD PLAINS

SOILS ON SEMI-ARID TERRACES AND FANS

SOILS ON MOUNTAINS FROM SEDIMENTARY ROCKS

SOILS ON MOUNTAINS FROM IGNEOUS ROCKS

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TABLE 2-4 -- Continued

Soil Map Unit[a]/	Taxonomic Name of Great Groups Included[b]/	Temperature Regime[c]/	Depth[d]/	Slopes	Erosion Potential[e]/	Percent of ES Area
Green 21 Complex	Torriorthents Calciorthids Paleargids Torrifluvents Torripsamments		Moderately Deep to Deep (few shallow)	2 to 8% (Few over 8%)	Slight or Moderate	1%
Green 22	Nadurargids (90%) Torriorthents Haplargids Natrargids	Mesic	Moderately Deep to Very Deep	0 to 12%	Slight (However, if disturbed these fine textured soils have a severe wind erosion hazard)	3%
Green 23	Argixerolls Haploxerolls Rock Outcrop	Mesic	Lithic	0 to 50%	Slight to Severe	2%
Green 24	Durargids Paleorthids Torriorthents		Shallow to Moderately Deep	2 to 15%	Moderate	1%
Green 25	Durorthids Durargids Torriorthents (15% Paleorthids & Camborthids)	Mesic	Ranges from Shallow or Lithic to Deep	2 to 15%	Slight and Moderate	3%
Green 26	Camborthids Durorthids (very gravelly loamy-skeletal)	Mesic	Shallow or Moderately Deep	2 to 8%	Moderate	2%
Green 27	Durargids (very stony or gravelly surfaces) Durorthids (loamy-skeletal)	Mesic	Shallow to Moderately Deep	4 to 30%	Moderate except fine textured soils on steep slopes have a severe hazard	2%
Green 28	Durixerolls Durargids Argixerolls	Mesic or Frigid	Shallow to Moderately Deep	2 to 30%	Slight or Moderate	5%

TABLE 2-4 -- Continued

Soil Map Unit[a]	Taxonomic Name of Great Groups Included[b]	Temperature Regime[c]	Depth[d]	Slopes	Erosion Potential[e]	Percent of ES Area
Green 29	Torriorthents Durargids Badlands		Shallow to Moderately Deep	2 to 30% Badlands slopes 30 to 99%	Slight to Moderate except fine textured soils on steep slopes have a severe hazard	1%
Green 30	Durargids Durixerolls and some Badlands		Shallow	2 to 8% Badlands up to 99%	Slight to Severe	2%
Green 31	Duriorthids Paleorthids (gravelly loam)		Mostly Shallow	4 to 30%	Slight to Severe	2%
Yellow 32	Torriorthents Haplargids Camborthids (Used mostly for crop production)	Mesic	Moderately Deep to Very Deep	Level to very gently sloping	If not under irrigation, wind erosion is the major hazard	2%
Yellow 33	Torriorthents Torrifluvents Soils located in the washes	Thermic	Moderately Deep to Very Deep	0 to 8%	Slight	<1%
Yellow 34	Torriorthents (sandy loam) (Area almost entirely under cultivation)		Deep	Gentle	Limited by irrigation and farming management	1%
Brown 35	Playas and adjoining floodplains					1%

The land type playas - the level beds of intermittent lakes - are generally flat deposits of silty clay materials. These deposits are periodically covered with water, and they are strongly affected by salts and alkali in the upper 6 inches (Soil Conservation Service, Pahranagat-Penoyer Survey, 1968). This land type is essentially bare, drainage is poor, and there is little or no water erosion hazard; if, however, the soil crust is disturbed, wind erosion is a hazard.

TABLE 2-4 -- Continued

Footnotes

a/ These units correspond to colors and numbered units on the Soils Map.

b/ Descriptive names of Great Groups of soils as defined in Soil Taxonomy (Agriculture Handbook No. 436, Soil Conservation Service, 1975), Chapters 5, 9, 12, and 13.

c/ These are soil temperature classes. The Celsius (centigrade) scale is the standard; approximate Fahrenheit equivalents are indicated parenthetically. It is assumed the temperature is that of a soil not being irrigated. Information is for soils in which the difference is 5°C or more between mean summer (June, July, August) and mean winter (December, January, February), and taken at a depth of 50 cm (20 inches) or lithic or paralithic contact, whichever is shallower. Terms used are as follows:

Frigid - Below 8°C (47°F).
Mesic - From 8°C to 15°C (47° to 59°F).
Thermic - From 15°C to 22°C (59° to 72°F).

d/ Depth is given in inches, where practicable. Definitions of other terms are:

Shallow - less than 20 inches to a hardpan.
Lithic - less than 20 inches to hard bedrock.
Moderately Deep - 20 to 36 inches.
Deep - More than 36 inches.
Very Deep - More the 60 inches deep.

e/ Erosion potentials as presented here are based on observations and interpretations by Soil Conservation Service soil scientists.

From Soil Survey Manual, U.S. Department of Agriculture Handbook No. 18, 1951.

Watershed and Erosion

The Caliente ES area is divided into 64 watershed areas. Boundaries for the watersheds were established to conform to existing grazing allotments, where practicable, and some small grazing allotments were combined with others to provide large enough areas for reasonably accurate mapping and study. (BLM Las Vegas, Caliente URA, Watershed, 1978.) These watersheds are displayed on the Watershed and Erosion Map.

A watershed conservation and development inventory of the Caliente ES area was made in 1968, 1973, and 1974 using procedures in the Bureau of Land Management Manual 7322. This inventory uses a verbal descriptive rating to assign erosion condition classes to each area thought to be representative. At each location the erosion condition class was rated, average depth of the majority of the plant roots was determined, and soil textures were noted at the zero to four inch level and again between four inches and the effective root depth. The ratings are based on the severity of visible soil movement, surface litter, surface rock, pedestalling of rocks and plants, flow patterns, rills and gullies.

Erosion condition classes represent the present status of the soil surface. This is in contrast to erosion potential which is an estimate of erodibility based upon physical properties of the soil.

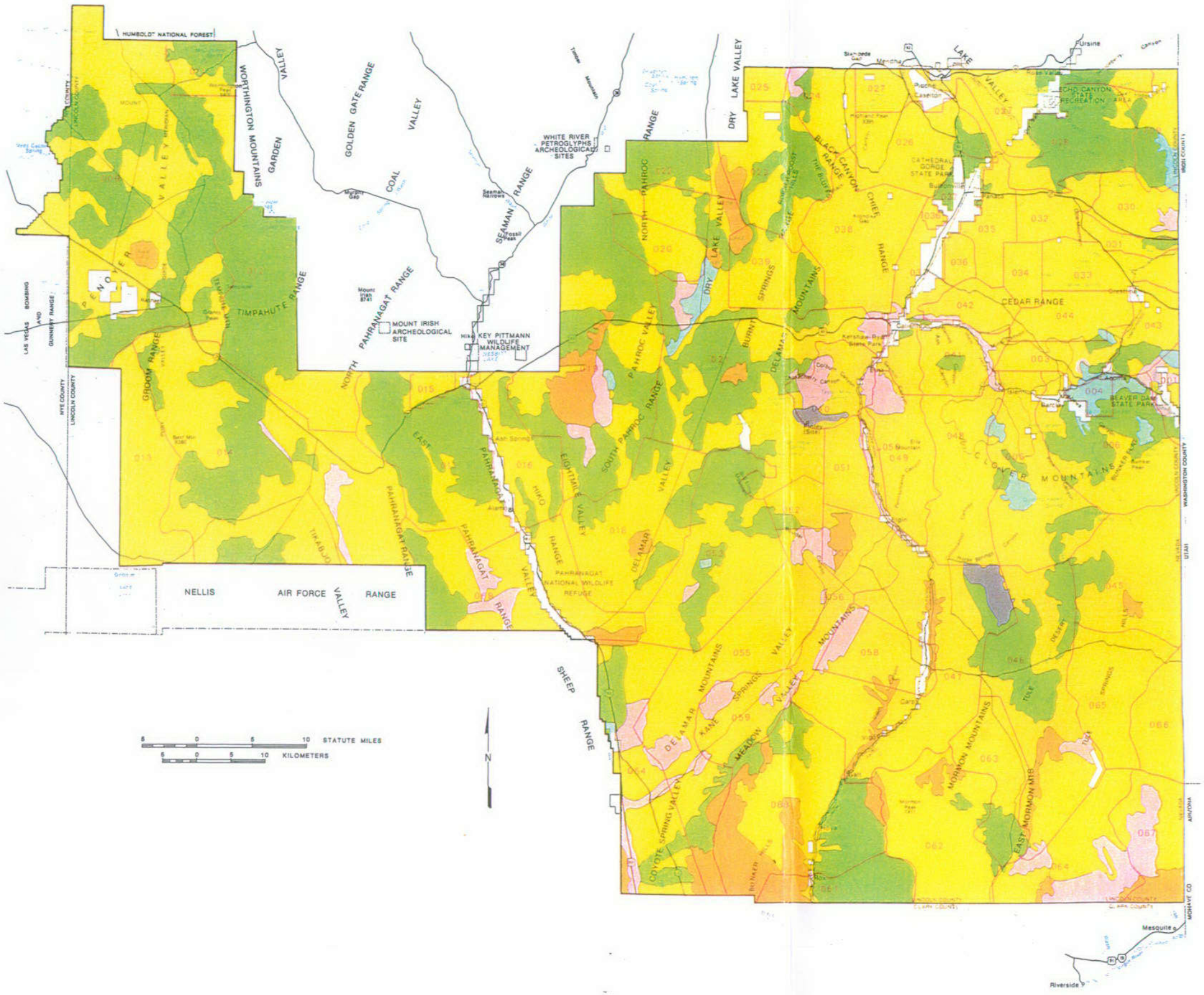
The most common naturally occurring soil problems include wind and water erosion. Wind erosion throughout Nevada is a problem. (Guides, Erosion-Sediment Control, Nevada, USDA-SCS, 1976.) There is not sufficient data available at this time to accurately quantify soil loss by winds. However, field observations indicate that wind erosion is accelerated on disturbed areas (e.g., vehicle tracks or cattle tracks) on fine textured soils.

Erosion due to water action in the ES area must be considered a lesser influence than wind erosion because annual surface runoff values are low and soils eroded by water action may not be lost to the watershed but merely transported downslope to depositional areas (Guides, Erosion-Sediment Control, Nevada, USDA-SCS, 1976.)

Presently, only three watersheds (001, 040, 049, Table 2-6) are exceeding a loss of one ton/acre, which is the tolerable soil loss for Nevada as established by the Soil Conservation Service (USDA, Soils Advisory #6, 1973).

Watershed studies by the BLM specialists give estimates of present erosion conditions (See Appendix D).

Erosion condition classes and present annual sediment yield by



PRESENT SITUATION EROSION CONDITION AND TREND

- WATERSHED ALLOTMENTS
- STABLE
- SLIGHT
- MODERATE
- CRITICAL
- SEVERE
- UNCLASSIFIED

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WATERSHED AND EROSION

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watershed are portrayed quantitatively on Tables 2-5 and 2-6.

TABLE 2-5

SUMMARY OF EROSION CONDITION CLASSES

Condition Class	Percent	Acres
Stable	0.95	33,289
Slight	25.86	906,161
Moderate	64.28	2,252,438
Critical	4,82	168,898
Severe	0.32	11,213
Barren and/or unclassified (not an erosion class)	3.77	132,105

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TABLE 2-6

ESTIMATED ANNUAL SEDIMENT YIELD BY WATERSHED

CALIENTE ES AREA

Watershed Area	Acres	Average Tons/Acre/Year	Tons of Sediment Per Year
001	12,334	1.19	14,677
003	21,223	0.59	12,522
004	6,261	0.44	2,755
005	73,489	0.75	55,177
006	75,087	0.72	54,063
009	266,030	0.59	156,958
011	18,752	0.34	6,376
012	85,097	0.44	37,443
013	49,323	0.59	29,101
014	220,338	0.72	158,643
015	6,075	0.66	4,010
016	42,409	0.72	30,534
017	91,664	0.53	48,582
018	82,066	0.78	64,011
019	145,776	0.47	68,515
020	22,894	0.44	10,073
021	177,481	0.47	83,416
022	31,698	0.47	14,898
023	57,080	0.44	25,115
024	25,553	0.78	19,932
025	7,034	0.53	3,728
026	49,570	0.56	27,769
027	57,758	0.66	38,120
028	57,866	0.47	27,197
029	28,872	0.41	11,838
030	24,538	0.59	14,477
031	11,384	0.50	5,692
032	22,869	0.53	12,120
033	29,906	0.59	17,644
034	12,828	0.59	7,568
035	22,796	0.59	13,450
036	11,129	0.47	5,231
037	50,102	0.59	29,560
038	65,081	0.53	34,493
039	36,675	0.44	16,137
040	30,684	1.22	37,434
041	29,892	0.41	12,256
042	19,298	0.50	9,649

TABLE 2-6 (continued)

Watershed Area	Acres	Average Tons/Acre/Year	Tons of Sediment Per Year
043	24,802	0.47	11,657
044	28,434	0.53	15,070
045	69,494	0.75	52,120
046	106,684	0.56	59,743
047	130,055	0.81	105,344
048	60,698	0.94	57,056
049	40,093	1.13	45,305
050	7,037	0.81	5,700
051	21,666	0.72	15,599
052	13,467	0.47	6,329
053	87,438	0.59	51,588
054	71,691	0.88	63,088
055	111,620	0.59	65,856
056	18,801	0.66	12,409
057	28,156	0.75	21,117
058	36,907	0.53	19,561
059	33,173	0.63	20,899
060	116,259	0.41	47,666
061	27,466	0.38	10,437
062	74,949	0.75	56,212
063	38,553	0.44	16,963
064	56,024	0.72	40,337
065	49,210	0.56	27,558
066	32,195	0.53	17,063
067	43,698	0.75	32,774
068	96,611	0.69	66,662
Totals	3,504,104	0.61	2,165,276

Source: U.S. Department of the Interior, Bureau of Land Management, Las Vegas District, Caliente Unit Resource Analysis, 1978.

Water Resources

The Caliente Environment Statement (ES) Area includes portions of three hydrographic regions: the Central Region, the Colorado River Basin, and the Escalante Desert Basin. Within the ES area, the Central Region has large, mostly isolated valleys that range from 4,000 to 9,300 feet in altitude. The Colorado River Basin has small-to-moderate sized valleys ranging from 2,000 to 9,300 feet which drain into the Colorado River System. Only a small portion of the ES area (106 square miles) is situated within the Escalante Desert Basin, which has an average elevation of 6,000 to 7,000 feet and drains into Utah.

The major drainages are: (1) Sand Springs (Penoyer) Valley (a closed basin), (2) Pahranagat Valley (drained by the White River), (3) Delamar Valley and Dry Lake (which combine to form a closed system), and (4) the Meadow Valley Wash.

Surface Water

Lakes and Reservoirs. The lakes and reservoirs within the ES area are listed in Table 2-7. Only Upper Pahranagat Lake, Lower Pahranagat Lake, and Echo Reservoir have mean annual carryover water supplies. Frenchy Lake collects runoff from the Hiko Range. Mathews and Pine Canyon Reservoirs are flood control projects designed to drain within an estimated 96 hours to protect against floods along Clover Creek, Meadow Valley Wash, and the lower Muddy River.

Surface Water Supply. The surface water annual yield for each hydrographic area wholly or partially within the ES area is available in the Caliente Unit Resource Analysis, Step 2, Tables .35-9 and .35-11, 1978.

Springs. Spring locations are shown on the Waters Map. Hot springs include Alamo, Caliente, Crystal, and Ash Springs.

Water Quality. Water quality is highly variable from location to location. For water quality analyses on surface waters within the ES area, refer to the Caliente Unit Resource Analysis, Step 2, Tables .35-4 and .35-5 (BLM, Las Vegas District, 1978). Some chemical quality and water temperature data is available for a gaging station in the Meadow Valley Wash (six miles downstream from Clover Creek) in the U.S. Geological Survey Water-Data Report series, prepared annually.

SECTIONALIZED TOWNSHIP

PIPELINE
WELL
WINDMILL
SPRING
IMPROVED SPRING
WATER TROUGH
WATER STORAGE
BLM GUZZLER
OTHER GUZZLER
EARTH TANK OR CHARCO
RESERVOIR
SOIL CONSERVATION SERVICE SNOW SURVEY COURSES

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TABLE 2-7
LAKE AND RESERVOIR WATER SUPPLY

Name	Size Surface Acres	Total Capacity Ac/Ft*	Evaporation Ac/Ft	Minimum Pool Ac/Ft	Usable Storage Ac/Ft	Mean Annual Drawdown Ac/Ft	Mean Annual Carryover Ac/Ft
Echo State Park Reservoir	64	1,400	277	1,123	1,123	0	1,123
Frenchy Lake	74	150	150	0	0	0	0
Lower Pahranagat Lake	583	1,000	---	---	1,000	0	1,000
Mathews Canyon Reservoir	420	12,420	1,925	0	0	0	0
Pine Canyon Reservoir	354	12,470	1,623	0	0	0	0
Upper Pahranagat Lake	370	3,580	1,819	---	1,761	0	1,761
Totals	1,865	31,020	5,794	1,123	3,884	0	3,884

*acre-feet

Source: U.S. Department of the Interior, Bureau of Land Management, Las Vegas District, Caliente Unit Resource Analysis, Step 2, Table .35-1, 1978.

Water Use

Water use consists of industrial use, public supply, irrigation, other rural consumptive uses, recreation, and animal consumptive requirements. Table 2-8 which follows shows animal consumptive uses.

TABLE 2-8
ESTIMATED CONSUMPTIVE WATER REQUIREMENTS FOR LIVESTOCK, WILD HORSES, BURROS, AND WILDLIFE ON PUBLIC LANDS IN CALIENTE ES AREA

Animal	Number of Animals	Gallons Per Animal/Day	Gallons Per Year	Acre-feet Per Year
Cattle	6,251 a/	10	22,816,150	70.0
Domestic Sheep	1,345 a/	2	981,850	3.0
Wild Horses, Burros, Mules	1,072	10	3,912,800	12.0
Bighorn Sheep	763	2	556,990	1.7
Mule Deer	4,249	4	6,203,540	19.0
Total Present Consumption Per Year			34,471,330	105.7

a/ Based on 1977 licensed active AUMs use, cattle and sheep numbers have been prorated for the length of time they are grazed annually on public lands.

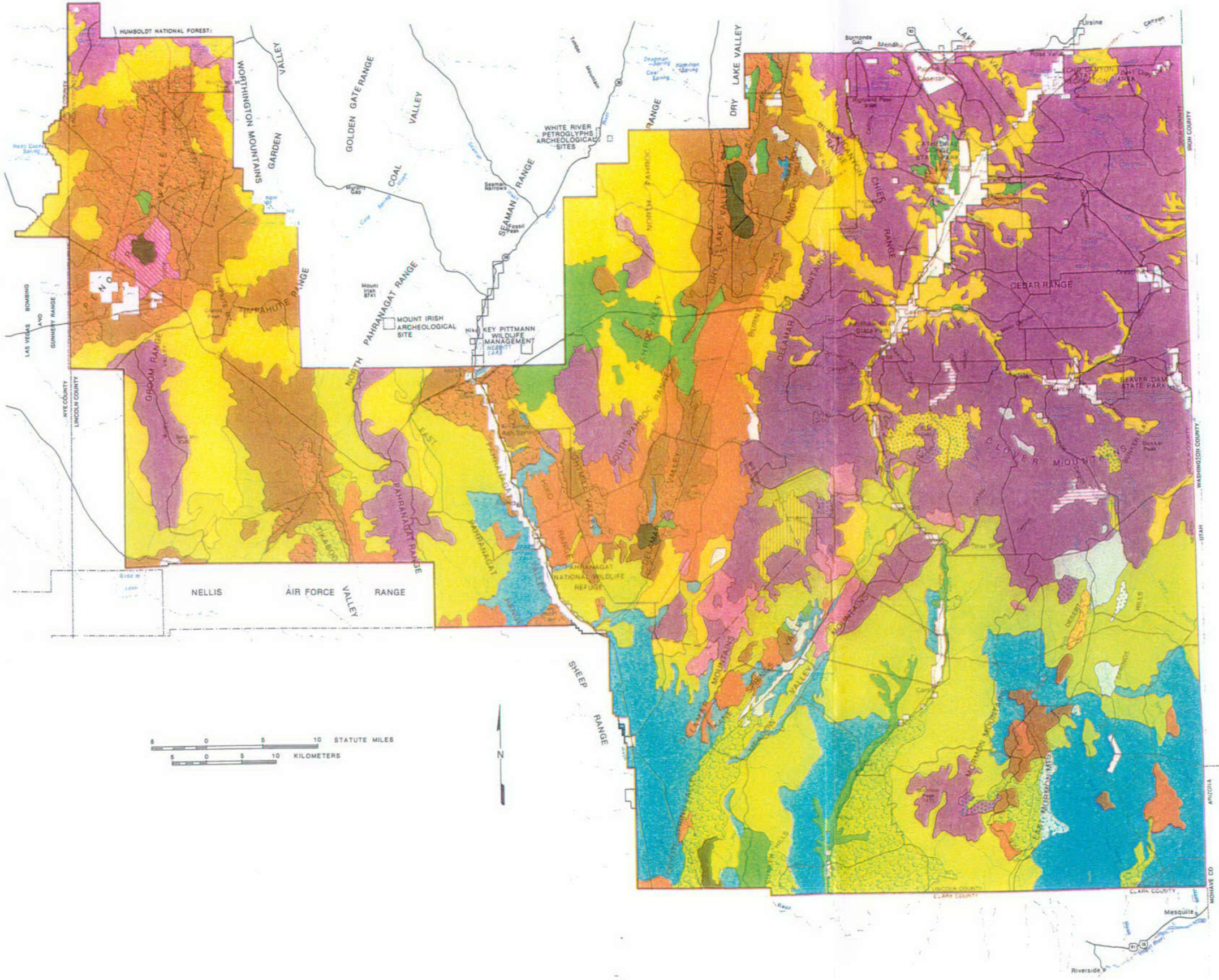
Note: Mule deer are assumed to be at reasonable numbers.

Source of water consumption figures for cattle, domestic sheep, and horses: Laurence A. Stoddard, et al., 1975.

Source of water consumption figure for bighorn sheep: Desert Bighorn Sheep Council.

Water Ownership

Water filings on public lands in the ES area are recorded with the State of Nevada. Current legal guidance states that BLM must file on waters it needs for uses on public lands.



- 012 MID-GRASS BUNCH
- 031 PERENNIAL FORBS
- 041 & 043 SAGEBRUSH
- 045 RABBITBRUSH
- 052 MANZANITA
- 054 & 058 OAK BRUSH
- 059 OTHER MOUNTAIN SHRUB
- 062 PONDEROSA PINE
- 064 SPRUCE FIR
- 081, 082 & 084 WASTE AREA
- 091, 092 & 093 PINYON/JUNIPER
- 111 CREOSOTE BUSH
- 131 & 134 SALTBUSH
- 141 BLACK GREASEWOOD
- 151 WINTER FAT
- 161 BLACKBRUSH
- 163 JOSHUA TREE
- 164 OTHER DESERT SHRUBS
- 167 BURSAGE FRDE-FRDU)
- 171 SNAKEWEED
- 181 & 182 ANNUAL GRASSES
- 183 ANNUAL FORBS
- (SEE LAND STATUS MAP)

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CALIENTE ENVIRONMENTAL STATEMENT

VEGETATION

1978

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Water Developments

Present water availability is inadequate for optimum distribution of livestock, wildlife, wild horses, and burros. Many of the reservoirs in the ES area are not reliable water sources because of high evaporation losses, flood damage, seepage, and silting-in processes. In addition to reservoirs, other improvements include wells, pipelines, spring developments, and guzzlers. Wildlife needs have not been satisfied because most of the pipeline troughs are turned off when livestock are not using them. Water catchments and guzzlers are beneficial to wildlife. Refer to the Waters Map for locations of water developments and live waters.

Vegetation

Vegetative Types

The land surface of the Caliente Environmental Statement (ES) area supports a wide variety of plant species. This variety is due to soil types, elevation, exposure, temperature, precipitation, and existing and past use. An area that supports vegetation and has one or more dominant or co-dominant species is identified as a vegetative type, usually named after the dominant or most abundant species. Vegetative types vary greatly in the number of species and in the percentage of each species in the total composition. For instance, a sagebrush vegetative type could be composed of as much as 100 percent sagebrush or as little as 10 percent, as long as it is the dominant species in terms of overall "aspect". For the purpose of this discussion all vegetative types have been placed into one of the following vegetative communities (Shantz in Tidestrom, 1925): southern desert shrub, salt desert shrub, northern desert shrub, pinyon-juniper, chaparral, conifer forest, and other types. Each of the communities is made up of several vegetative types. The Vegetation Map depicts most of the vegetative subtypes found in the ES area.

Vegetative Communities

Southern Desert Shrub. This community is found in areas where temperatures are high, often rising to 120° Fahrenheit (F), and rarely falling below 20 to 25°F. Because of intense heat and rapid evaporation, the conditions for plant growth are more extreme in this community than in areas typical of the northern desert community. In many parts of the area, however, the wide spacing of plants, plant water storage capabilities, and the pervious nature of the soil combine to supply a quantity of available water sufficient to enable these desert shrubs to continue growing through the extremely long periods of drought, which sometimes last a year or more. Rainfall is between two and ten inches a year.

Vegetative types representing the southern desert shrub community are creosote bush, shadscale, Joshua tree, other desert shrub, and bursage. Creosote bush is characteristic of the southern desert shrub. Joshua tree is characteristic of the Mohave Desert. Other desert shrubs consists of species such as spiny hopsage (Grayia spinosa), Anderson thornbush (Lycium andersonii), and Fremont dalea (Dalea fremontii). All of these types are found in valley bottoms.

Salt Desert Shrub. The main difference between the southern desert shrub and the salt desert shrub communities is the amount of soil alkalinity. Drainage water passes into low valleys from

adjacent hills and mountains and is evaporated there, leaving behind an accumulation of soluble salts. As a rule the water supply is adequate, and may be only 30 to 60 inches below the soil surface. Black greasewood is the only type found exclusively in the salt desert shrub type. Blackbrush, other desert shrubs, perennial forbs, and shadscale may also be found in this community, but are discussed in other sections.

Northern Desert Shrub. This formation, sometimes known as the sagebrush formation, is characterized by a scattered growth of deciduous shrubs, usually with small leaves of a light or silvery color. The plants are woody, often very uniform in size, and seldom exceed 50 years of age. In the denser stands they almost cover the ground. In more typical areas they stand far apart and, except during the growth of annuals, the soil surface is visible except when the landscape is viewed from a distance.

The rainfall is 10 to 15 inches and comes largely during the long, winter rest period. On the more pervious lands, such as the alluvial fans where water penetrates to great depth, the deep-rooted sagebrush occurs. Where rainfall is light or soil impervious, i.e., only wetted at the surface, other desert shrubs enter. The frost-free period is 90 to 130 days, but the growth period is usually greatly shortened by drought.

Representatives of this community found in the Caliente ES area are mid-grass (crested wheat grass and tobossa), big sagebrush, black sagebrush, rabbitbrush, shadscale, winterfat, blackbrush, and snakeweed. The sagebrush types are more important in the northern part of the ES area. They occupy the higher, well-drained soils. Shadscale occurs along the lower edge of the sagebrush. Rainfall is less and soil usually heavier and relatively impervious as compared with sagebrush areas. Shadscale is equally at home in the southern desert shrub and, to a lesser extent, the salt desert shrub areas. Where shadscale has been killed, winterfat often becomes dominant. The blackbrush forms a broad, imbricating (overlapping) belt between northern and southern desert areas. Soils under blackbrush are usually free from harmful amounts of alkali. Some large areas of blackbrush have been burned off and replaced by the mid-grass type (Aristida species) in the Tule Desert. Snakeweed may occur on disturbed areas throughout the northern desert shrub area.

Pinyon-Juniper. This community lies between 5,000 and 7,000 feet and receives between 10 to 18 inches of precipitation a year. The community forms a belt between the desert below and the true forest above. Precipitation is the first and soil shallowness is the second limiting factor. The lower edge of the belt is occupied by juniper, but at higher elevations, pinyon and juniper intermix. At the upper edge of the belt, pinyon becomes

prevalent. Burned areas may be occupied by sagebrush types or other mountain shrub type. Mid-grass bunch occurs in the pinyon-juniper belt in the form of crested-wheatgrass areas in planted chainings.

Chaparral. H. L. Shantz, in Tidestrom's Flora of Utah and Nevada, calls the brush sites "chaparral". Later in the same book A. W. Sampson appears to talk about this area as an "oakbrush zone". The type occurs mostly on the southern slopes of the Clover Mountains in the ES area. Types include chamise (fourwing saltbush), manzanita, and oakbrush. Precipitation and elevation are similar to the pinyon-juniper belt. Soil differences and soil moisture, as affected by slope and aspect, probably account for the chaparral occurrence. Outside of the Clover Mountain area, chaparral may be a result of fire or "micro site" conditions.

Conifer Forest. The conifer forest community is represented by ponderosa pine and spruce-fir (represented by white fir). Soil is deeper and precipitation may be above 20 inches per year in this area. Elevation is usually above 7,000 feet. Ponderosa pine does occur at lower elevations but only in valleys where more mesic conditions exist. The only spruce-fir zone is on Bald Mountain.

Other Types. Several types do not lend themselves well to classification. These include cottonwood, cheatgrass, other annual grasses, annual forbs, and perennial forbs. Red brome in most cases represents this type. These types on the Vegetation Map occur on disturbed sites in the lower elevations. Cheatgrass replaces red brome on disturbed sites at higher elevations. Annual and perennial forb types are found in several locations in the ES area, mainly on disturbed sites. Cottonwoods are found along perennial streams or areas with subsurface water present year-round.

Appendix E, Section 1, Table E-1, gives the acres/vegetation type by allotment; Appendix E, Section 2, Table E-2 gives a brief description of species generally found in each vegetation type.

Information on vegetation in the Caliente ES area was obtained from an ocular reconnaissance survey conducted by the Bureau of Land Management in 1976 and 1977. This information is available in the Las Vegas District office files. A summary of the methodology for determining condition, trend, forage production, and survey procedures is outlined in Appendix E, Section 3.

Vegetative Production

There are 173,682 Animal Unit Months (AUMs) of forage presently being produced in the Caliente ES area. This number is the total

number of AUMs found by the range survey and includes suitable AUMs, wildlife AUMs, AUMs in areas unsuitable due to low production, and some AUMs in areas over 50 percent slope.

Range Condition and Trend

Range condition was determined in conjunction with the 1976 forage surveys. Range condition, does not refer to ecological condition but refers only to quality of forage (livestock forage condition) of each vegetative type for the kind and class of livestock authorized to graze on each allotment, and not to productivity. Condition class was determined from the percentage of plants in each of three classes (desirable, intermediate, or undesirable for livestock) which make up the total composition of all plants in the vegetative type. Therefore, using this system an area may only have sparse plant density but still be considered in good condition if the plants present are either in the desirable or intermediate classification. This information was compiled from data collected during the range survey. (See Appendix E, Section 3.) Table 2-9 gives a summary of condition in the ES area, and Appendix E, Table E-3 expands on the present range conditions. (Whenever "range condition" is referred to throughout this ES, it should be considered synonymous with livestock forage condition.) The Livestock Forage Condition Map visually portrays condition.

TABLE 2-9
LIVESTOCK FORAGE CONDITION (CATTLE)
PRESENT SITUATION

Condition (in Acres)			
Suitable			Unclassified
Good	Fair	Poor	
688,751	1,374,539	512,351	665,691

Source: U.S. Department of the Interior, Bureau of Land Management, Caliente Unit Resource Analysis, 1978.

Trend in Condition. Specific or apparent trend was not determined by allotment in the ES area. Sufficient data does not exist to determine trend.

Phenology

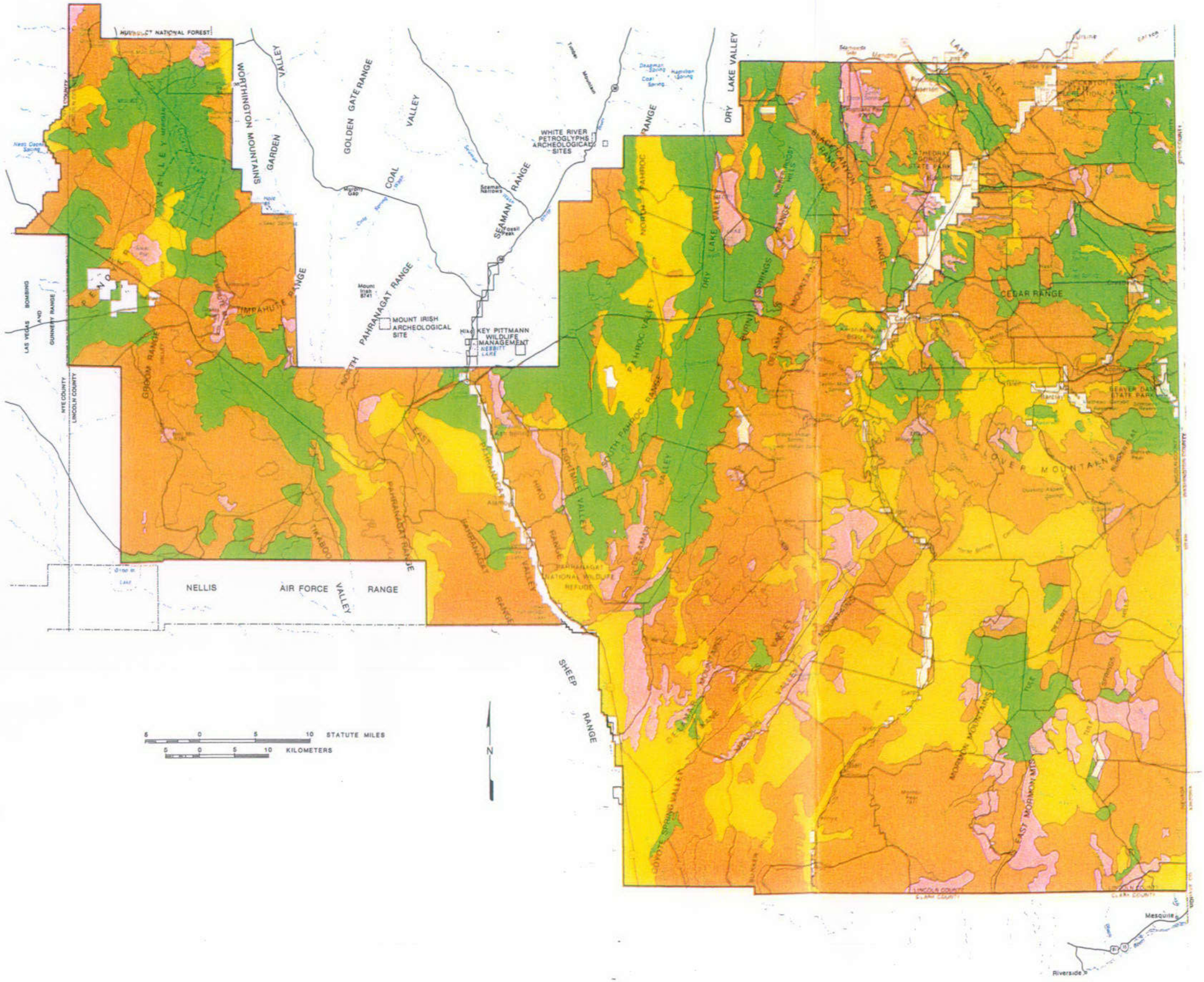
In the spring of 1976 an ongoing phenological study was started in the Caliente ES area. This study is being conducted in the field by BLM personnel and is being compiled by Natural Resource Consultants, Inc., Reno, Nevada. The study is based mainly on representative plant species for the area. In order for any direct conclusions to be made, several more years of data need to be collected, taking into account yearly variations in time of precipitation, drought years and high moisture years as well as elevation. Also due to the extreme nature of the environment in this ES area, phenological stages are especially dependent upon rainfall and may vary from year to year or even month to month. The two years (1976 and 1977) of phenological data which have been compiled are available in the Las Vegas District files. A brief summary of the data compiled by NRC, Inc. is found in Table 2-10.

Ephemeral Range

Ephemeral range can be defined as rangeland which does not consistently produce perennial forage, but periodically provides annual vegetation suitable for livestock grazing.

In years of abundant moisture and other favorable climate conditions, a large amount of forage may be produced. Favorable years are highly unpredictable and the growing season for ephemeral vegetation is usually short lived. A minor percentage of the total plant composition is made up of desirable perennial forage plants, and potential to improve range condition and produce a dependable supply of forage by applying intensive management practices is lacking.

An ongoing study was started in 1978 in the Caliente ES area, to determine ephemeral forage production. This study is being conducted by BLM personnel. Data to date have only been collected in the Kane Springs Valley. The results of this study for 1978 shows a range of production of ephemeral species from 0 to 2,350 lbs/acre. Precipitation data collected at the nearest station for the period from January through March showed 20 inches of precipitation. This is several inches above the area's normal precipitation. The time of year that precipitation falls can make a significant difference in ephemeral production. This information is brought out simply as an example of what ephemeral range can produce under favorable conditions. More specific information can be found in the Las Vegas BLM District Office files.



PRESENT SITUATION

GOOD CONDITION

FAIR CONDITION

POOR CONDITION

UNCLASSIFIED

OTHER THAN BLM LAND

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CALIENTE ENVIRONMENTAL STATEMENT

LIVESTOCK FORAGE CONDITION

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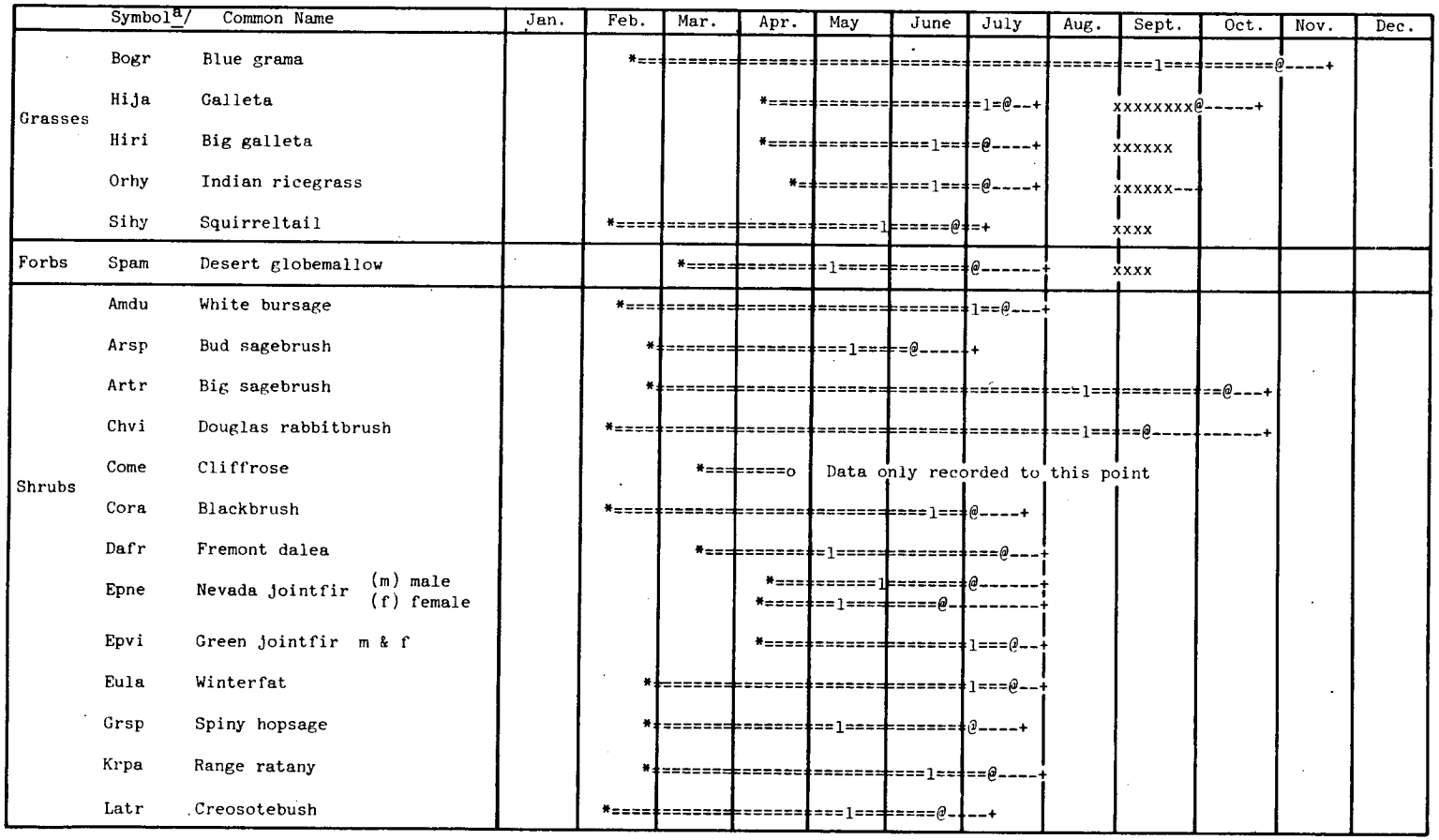
TABLE 2-10
SUMMARY
PLANT PHENOLOGY, CALIENTE ES AREA



Start Growth *

Green Period
Partial ------
Fully ======

Full Bloom (75% or more) 1

Seed Ripe @

Seed Dissemination +

Fall Green Up x

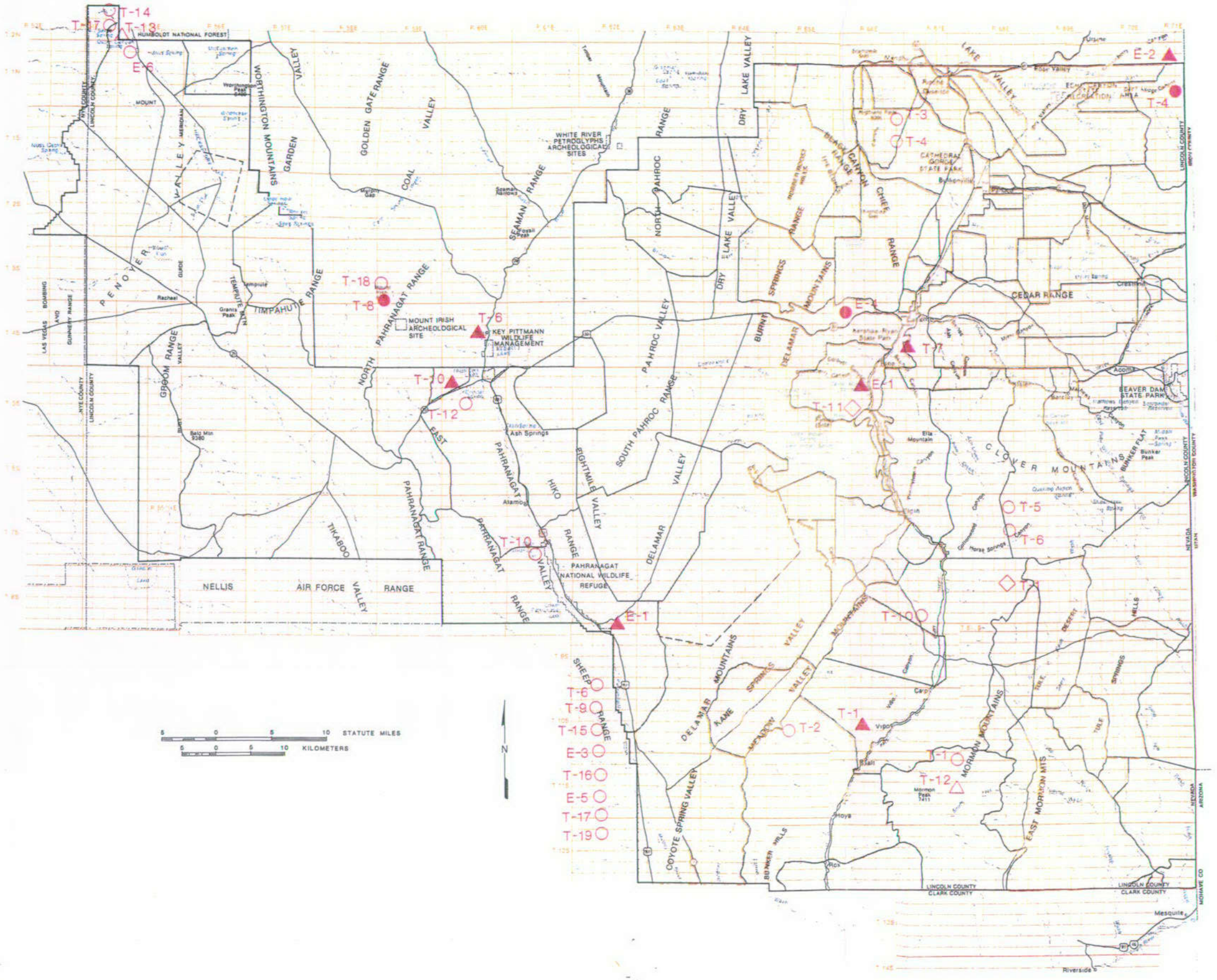
[a]/ Scientific abbreviation for genus and species.

Riparian Vegetation

Within the ES area there are approximately 57 miles of perennial streams on public lands. (See Wildlife Habitat Areas Map for locations of perennial streams.) Most perennial water supports riparian vegetation. Riparian vegetation is considered to be vegetation that is associated with permanent water sources. This type of vegetation usually occurs along stream banks, by bodies of water, and around moist areas such as seeps and springs. Some of the major plant species which are typical of riparian vegetation in the Caliente ES area are: shrubs including willows (Salix sp.), salt cedar (Tamarix sp.), arrowweed (Pluchea sp.), and seepwillow (Baccharis sp.); grass-like plants including rushes (Juncas sp.) and sedges (Carex sp.); and aquatics, like water cress (Nasturtium sp.) and cattails (Typha sp.). Location and abundance of water cause differences in species composition and ground cover.

Threatened or Endangered Flora

There have been no on-the-ground surveys for threatened or endangered flora in the ES area, although herbaria and literature searches have been conducted by the BLM Nevada State Office, the U.S. Fish and Wildlife Service, and Arthur H. Holmgren, et al., of the Intermountain Herbarium at Utah State University. A summary of the proposed threatened or endangered species (Federal Register, June 1976) determined from these sources to possibly exist within the ES area is shown in Table C-1, Appendix C. Additional information can be found in Holmgren, et al. (1977). The Threatened and Endangered Flora Map shows their possible locations within the ES area.



SECTIONALIZED TOWNSHIP

6	5	4	3	2	1	
7	8	9	10	11	12	
18	17	16	15	14	13	
19	20	21	22	23	24	
30	29	28	27	26	25	
31	32	33	34	35	36	

○ Literature Reference - General Area

● Literature Reference - Specific Area

△ Herbarium Reference - General Area

▲ Herbarium Reference - Specific Area

◇ Verified in Field

PROPOSED THREATENED SPECIES

T-1 Agave utahensis var. eborispina
T-2 Arenaria stenomeres
T-3 Astragalus convallarius var. finitimus
T-4 Astragalus oophorus var. lonchocalyx
T-5 Castilleja linoides
T-6 Coryphantha vivipara var. rosea
T-7 Draba crassifolia var. nevadensis
T-8 Erigeron ovinus.
T-9 Gilia ripleyi
T-10 Mirabilis pudica
T-11 Phacelia aneisonii
T-12 Phlox gladiformis
T-13 Erigeron unicialis var. conjugans
T-14 Lewisia maguirei
T-15 Arabis shockleyi
T-16 Haplopappus brickelloides
T-17 Lesquerella hitchcockii
T-18 Machaeranthera grindeloides var.depressa
T-19 Townsendia jonesii var. tumulosa

PROPOSED ENDANGERED SPECIES

E-1 Mentzelia leucophylla
E-2 Penstemon decurvus
E-3 Arctomecon merriamii
E-4 Machaeranthera leucanthemifolia
E-5 Forsellesia pungens
E-6 Primula nevadensis

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CALIENTE ENVIRONMENTAL STATEMENT

THREATENED AND ENDANGERED FLORA

1978

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Wildlife

Since there is such a wide variety of wildlife species in the Caliente Environmental Statement (ES) area only those which would be significantly impacted by the proposed action will be addressed in detail. For more information, a complete list (125 pages) of wildlife species, their habitat, and distribution can be found in the Caliente Unit Resource Analysis (URA) Step 2, Animals section (BLM, Las Vegas, 1978).

Big Game

Mule deer, desert bighorn sheep, and pronghorn antelope ranges were delineated by the Nevada Department of Fish and Game (NDFG) and assigned "reasonable numbers". For an explanation of reasonable numbers see Appendix F. Big game acreages and periods-of-use are indicated in Table 2-11. Big game ranges as delineated by NDFG are indicated on the Big Game Areas Map.

Desert Bighorn Sheep (*Ovis canadensis nelsoni*).

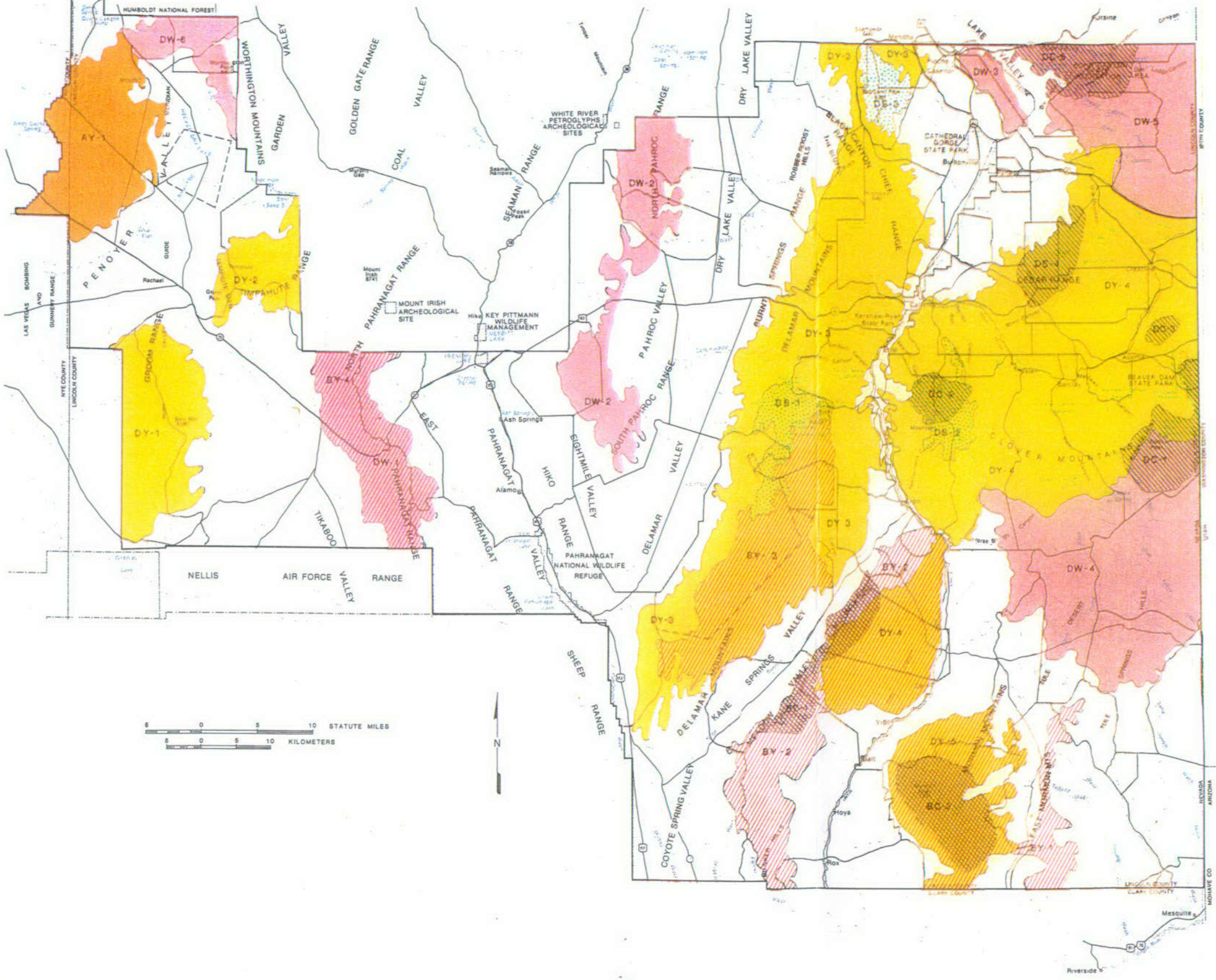
Populations. Historically, bighorn sheep were present in most of the mountain ranges in the Caliente ES area (McQuivey, 1978). Presently, known bighorn sheep populations are concentrated in the Morman Mountains, Meadow Valley Mountains, and the Pahranagat Range. The Southern Delamar Mountains have a migratory population which moves across from the Sheep Range (Desert National Wildlife Range) and perhaps the Meadow Valley Mountains. Table 2-12 indicates NDFG 1977 bighorn population estimates.

Food and Cover. There is no information available on present condition and trend of habitat as it relates to bighorn sheep in the Caliente ES area. Results of fecal analysis of bighorn pellets collected in the Meadow Valley Mountains suggest forbs may be an important component of the diet, at least seasonally. Summarization of data from this study is found in the Caliente URA, section .44A4c(7), Wild Horse and Burros, and Table 2-18 of this document. Other studies of bighorn diets in southern Nevada show grasses as the major component of diets. Yoakum (1964), using rumen analysis of bighorns in the Silver Peak Range and Desert National Wildlife Range, found an average diet of 68 percent grass, 18 percent forbs, and 14 percent browse. Studies conducted by the NDFG show similar results for bighorn populations in southern Nevada (McQuivey, 1978).

Vegtation allocations to meet bighorn sheep reasonable numbers provided by NDFG can be met in all bighorn sheep ranges except BY-1 which is short 209 AUMs.

TABLE 2-11
BIG GAME HABITAT RANGE SUMMARY a/
CALIENTE ES AREA

Map Designation	Ranges and Crucial Areas b/	Habitat Acres	ES Area (Percent)	Reasonable Number of Animals Desired
	Bighorn Sheep (Yearlong)			
BY-1	Mormon Mts.	93,415		426
BY-2	Meadow Valley Mts.	139,860		325
BY-3	Delamar Mts.	87,319		63
BY-4	Pahranagat	55,461		50
	Total	376,055	12	874
	Crucial Area (Yearlong)			
BC-1	Meadow Valley Mts.	14,080		
BC-2	Mormon Mts.	35,840		
	Total	49,920	1	
	Mule Deer (Winter)			
DW-4	Tule Desert	158,380		1,893
DW-2	Pahroc	59,164		576
DW-1	Pahranagat	54,870		150
DW-6	Worthington/Quinn	16,832		135
DW-5	Cedar Range	69,804		2,843
DW-3	Rose Valley	53,983		26
	Total	413,033	12	5,623
	Crucial Areas (Winter)			
DC-1	Bunker Peak/ Middle Pass	26,240		
DC-4	Cedar Range	20,480		
DC-5	Pioche-Dry Valley	26,880		
	Total	73,600	2	
	Mule Deer (Yearlong)			
DY-5	Mormon Mts.	83,455		48



BIGHORN SHEEP

YEARLONG USE

DEER

YEARLONG USE

WINTER USE

SUMMER USE

BIGHORN SHEEP AND DEER

CRUCIAL AREA

ANTELOPE

YEARLONG USE

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BIG GAME AREAS

1978

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TABLE 2-11 -- Continued

Map Designation	Ranges and Crucial Areas b/	Habitat Acres	ES Area (Percent)	Reasonable Number of Animals Desired
DY-3	Delamar Mts.	192,219		636
DY-1	Groom Range	46,082		139
DY-4	Clover Mts.	430,412		1,258
DY-2	Tempiute	36,954		132
	Total	789,122	23	2,213
	Crucial Area (Yearlong)			
DC-3	Staheli Chaining-Seeding	2,560	Trace	
	Mule Deer (Summer)			
DS-1	Delamar Mt.	19,503		387
DS-3	Highland Peak	1,825		101
DS-2	Ella Mt.	18,039		504
	Total	39,367	1	983
	Crucial Area (Summer)			
DC-2	Ella Mt.	8,320	Trace	
	Antelope (Yearlong)			
AY-1	Sand Springs/Tikaboo	92,217	6.6	20

a/ The BLM administers 90 percent or more of the land designated as big game ranges listed in the above table.

b/ "Crucial" areas were delineated by the Nevada Department of Fish and Game, and are described in further detail in the bighorn sheep and deer portions of Chapter 2.

TABLE 2-12

1977 DESERT BIGHORN SHEEP POPULATION ESTIMATES a/

CALIENTE ES AREA

Mountain Range	Number Rams	Number Ewes	Number Lambs	Total Estimate
Mormon Mountains	160	176	68	404
Meadow Valley	46	85	24	155
Arrow Canyon b/	32	54	18	104
Delamar Range	15	25	10	50
Pahranagat Range	15	25	10	50
				763

a/ 1977 population estimates of desert bighorn sheep in the Caliente ES area provided by the Nevada Department of Fish and Game are November 1977, estimates and reflect the greatest area distribution as a result of the seasonal availability of water.

b/ Arrow Canyon Range population estimates are included since those sheep use the northern half of the summer range in the Meadow Valley Mountains. It is suspected that sheep do not summer in the Delamar Range, but move back into the Sheep Range.

Bighorn sheep in the ES area occupy steep and rocky mountainous areas which provide escape routes from enemies and shelter from adverse weather conditions. Shelters are usually rock overhangs, shelves, or caves. Therefore, in areas occupied by sheep, the quantity and quality of existing cover is believed to be adequate.

Water. Water availability is the most important factor limiting distribution and habitat use. During the summer season, the only sources of dependable water are from perennial springs and seeps or from man-made storage catchments. Summer rainstorms may provide temporary water, allowing sheep to move from concentration areas for brief periods. Generally, sheep stay within a two-mile radius of permanent water 80 to 90 percent of the time during summer periods (NDFG, 1977). The most severe conflicts with livestock occur during the summer around waters.

With the onset of cooler temperatures, the increase in succulent forage, and the occasional availability of snow, the demand for

free water by sheep is reduced, resulting in increased distribution of the population into areas considered winter range.

The average water consumption of adult sheep is about two gallons per day (Desert Bighorn Council, 1971). This is quite variable and is dependent on age, sex, and length of stay away from water. It is also dependent on temperature and other physical factors.

Crucial and Important Use Areas. Areas BC-1 and BC-2 (Big Game Areas Map) are crucial summer concentration areas because of water availability. The most important use areas are within a two-mile radius of water (NDFG, 1977).

Specific lambing areas have not been delineated. Lambing is known to occur in the most precipitous terrain available. Although lambing is associated directly with the most rugged areas available, these areas may vary from year to year depending upon forage and water conditions (BLM, Las Vegas, Caliente URA, 1978).

Existing Conflicts. Existing conflicts revolve around competition among bighorn sheep, domestic livestock, and wild horses and burros for forage, water, and space. Competition with cattle occurs in the southern portion of the Delamar Mountains (BY-3), in the eastern portion of the Meadow Valley Mountains (BY-2), and in the eastern portion of the Mormon Mountains (BY-1). In the East Mormon Range (BY-1), competition for forage occurs between domestic sheep and native bighorns during the winter use period. In the southern and eastern portions of the Meadow Valley Mountains (BY-2) and in the Mormon Mountains (BY-1), bighorn sheep experience competition with wild horses and burros during the late fall, winter, and early spring use period (BLM, Las Vegas, Caliente URA, 1978).

In developing springs for livestock waters, the provision of wildlife waters at the source has often been neglected.

Mule Deer (Odocoileus hemionus).

Populations. Mule deer populations in Nevada are believed to have been relatively low prior to the turn of the century. Unregulated livestock grazing prior to 1934 may have resulted in the transition of grassland communities to mountain shrub communities. The increase in browse type plants is believed to have favored deer populations which reportedly peaked during the 1950s and early 1960s. The peaking was followed by a large scale "die-off" in 1963 and 1964, followed by a continual decline in population to a record low in 1967. The present population trend is believed to be static or slightly increasing. Peak populations occur in the ES area during the late fall, winter, and early spring seasons when deer migrate into the area from adjacent

areas in Utah (BLM, Las Vegas, Caliente URA, 1978).

Food and Cover. Existing forage condition and trend data for the Caliente ES area, as it applies to mule deer, is not available. However, the increase of pinyon-juniper (PJ) is believed to be reducing the amount of available preferred forage. Cursory inspection of areas of high PJ density indicates there is limited to nonexistent vegetative production in PJ understories (BLM, Las Vegas, Caliente URA, 1978).

Forbs and grasses are an integral part of the mule deer diet during the spring and fall growth seasons when succulence is greatest. Shrubs are utilized more heavily during dry summer periods (for succulence) and winter periods (availability). However, the most important factors influencing a mule deer's diet are composition and density of existing vegetation. Deer as well as other herbivores will eat what is available, utilizing preferred species first (BLM, Las Vegas, Caliente URA, 1978).

Vegetation allocations to meet mule deer reasonable numbers provided by NDFG, can be met in all but four deer ranges in the ES area. Available wildlife forage is lacking in four areas. The reasonable numbers and shortages in AUMs are presented by deer areas in the following table:

TABLE 2-13

DEER RANGES WITH AUM[a]/ SHORTAGES

CALIENTE ES AREA

1978

Range	Designation	Reasonable Nos. AUMs	Shortage AUMs
Delamar Mountains	DS-1	662	291
Tule Desert	DW-4	2366	48
Cedar Range	DW-5	3,554	2,286
Tempiute Range	DY-2	396	18
		Total	2,613

[a]/ See glossary for Animal Unit Month (AUM) definition.

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No information is available to identify the quantity or quality of existing cover, as it relates to mule deer use, in the Caliente ES area.

Water. The present distribution of water approximates historical distribution in deer summer-use areas. The quantity of water available in these areas is not adequate to meet existing demands when livestock, wildlife, and wild horse and burro needs are considered (BLM, Las Vegas, Caliente URA, 1978).

Crucial and Important Use Areas. Crucial areas of concern for mule deer as described by NDFG, are as follows:

DC-1, 26,240 + acres: Bunker Peak-Middle Pass is a winter concentration area which supports both a resident herd and a migratory herd which summers in Utah.

DC-2, 8,320 + acres: The Ella Mountain burn is considered crucial summer range.

DC-3, 2,560 + acres: The Staheli chaining-seeding is considered crucial yearlong range. It is extensively used by mule deer because of the good mixture of grasses, shrubs, and forbs.

DC-4, 20,480 + acres: The west facing slopes of Cedar Mountain are winter concentration areas with an apparent source of browse forage.

DC-5, 26,880 + acres: The Pioche and Dry Valley area is considered to be a winter concentration area. These crucial areas are indicated on the Big Game Areas Map.

Other areas in the Caliente ES area may be crucial to mule deer but have not been identified. Little information is available regarding the mule deer-habitat relationship from the Pahroc Range west.

The autumn movement into the Pahroc Ranges and the movement from Utah summer ranges onto the south-facing slopes of the Clover Mountains in the winter are the most noticeable migrations. Winter drift occurs from the northern ranges outside the ES area boundary to the south.

Conflict. Known conflicts occurring in the ES area include agricultural depredation by deer, particularly in the Rose Valley area of the DC-5 crucial area, and competition for available forage and water among deer, domestic livestock, and wild horses and burros. Principal forage competition is for grasses, forbs, and shrubs (such as cliffrose and bitterbrush) where they occur on dual use ranges, particularly riparian areas.

Certain developed livestock waters have resulted in the elimination of a water source from existing deer habitat by boxing spring heads and by piping water down country away from deer use areas. In some instances, installing a spring box has eliminated the riparian vegetation, a succulent forage source during summer months (BLM, Las Vegas, Caliente URA, 1978).

Antelope (Antilocapra americana).

Historically, antelope probably ranged throughout the Delamar, Pahranagat, Tikaboo, and Sand Springs (Penoyer) Valleys. Presently antelope drift in and out of Tikaboo and Sand Springs (Penoyer) Valleys from the northeastern end of the Air Force Bombing Range and from Garden and Railroad Valleys outside of the ES area. An area of 92,217 acres (see the Big Game Areas Map) has been identified as an antelope use area (BLM, Las Vegas, Caliente URA, 1978).

No information is available on the condition of forage as it relates to antelope use in the ES area. Competition with livestock for forage has been cited as one reason for declining antelope populations (Yoakum, 1972). Food habits and livestock competition information is lacking for the ES area.

Water availability may be an important factor affecting antelope distribution in the ES area.

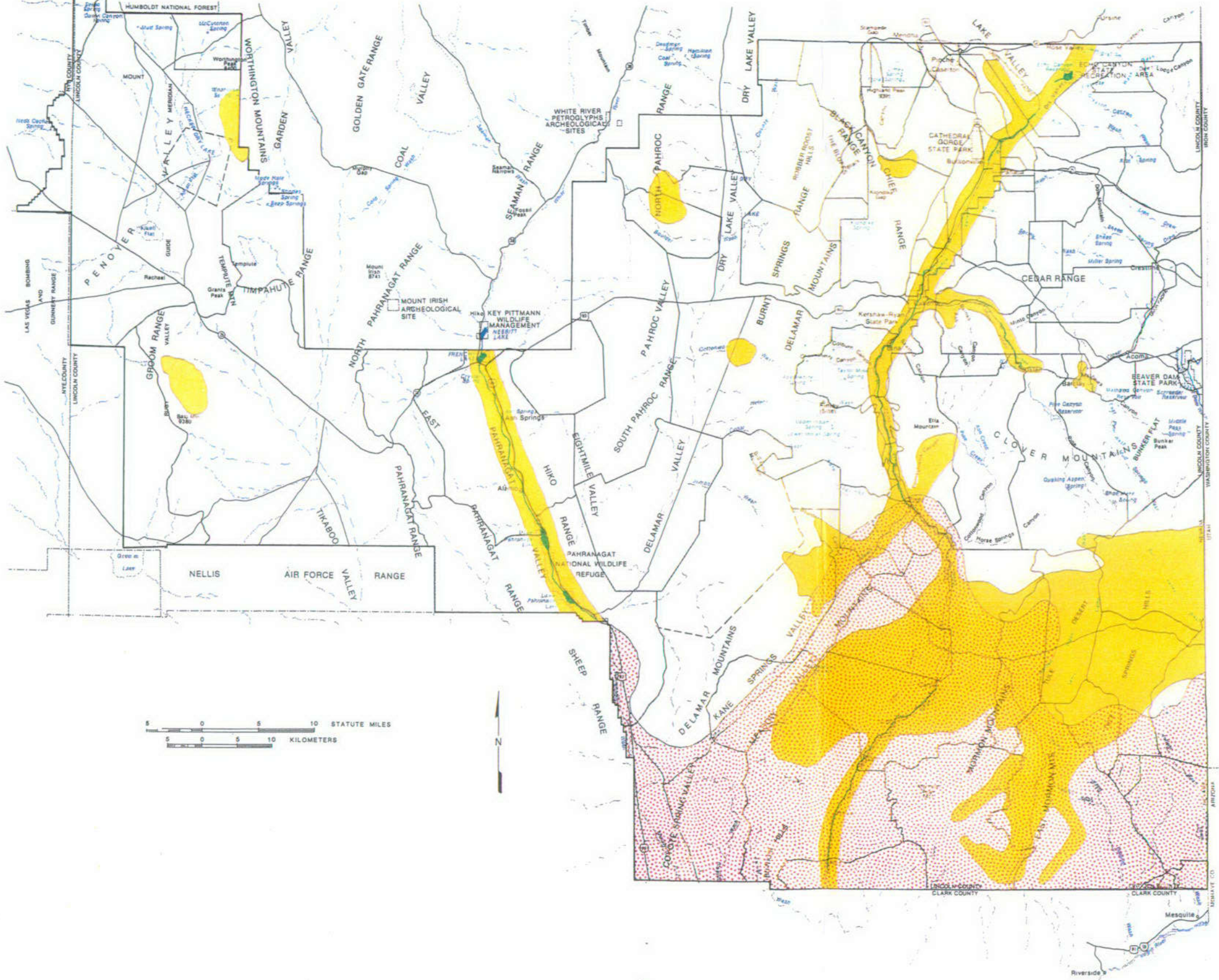
Other Mammals

Common mammals other than big game occurring in the Caliente ES area include jackrabbits, cottontails, rodents (kangaroo rats, mice, and deer mice), and predators (mountain lions, coyotes, badgers, gray foxes). These animals can be found in many vegetative types. However, riparian areas are the most important vegetative type. Increased plant variety, more succulent food, and the presence of water make riparian areas desirable to most wildlife. Several conflicts involving livestock water developments, and the loss of prime riparian areas and wildlife watering sources have been documented in Table .46-21 Caliente URA, Wildlife Water Inventory (BLM, Las Vegas, 1978).

The spotted bat (Euderma maculata) is classified as rare by the State of Nevada. No intensive inventories have been done to adequately describe the present situation of this species in the Caliente ES area.

Gambel's Quail (Lophortyx gambelii).

The Gambel's quail is the most abundant upland game bird existing in the ES area. The overall quail population in recent years is



GAMBEL'S QUAIL
GENERAL RANGE

DESERT TORTOISE
GENERAL RANGE

FISH
PRODUCING AREAS

UNITED STATES
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CALIENTE ENVIRONMENTAL STATEMENT

WILDLIFE HABITAT AREAS

1978

believed to be greater than historically because of increased available waters in habitat not previously occupied (NDFG). Principal areas occupied by quail are indicated on the Wildlife Habitat Areas Map.

An area of a quarter mile radius around all existing springs, seeps, and stock watering developments within designated quail areas is classified as crucial area for quail; this totals approximately 15,000 acres.

During periods of water stress, birds become dependent not only on available drinking water but also on availability of succulent plants occurring around water sources. It has been shown that insects are an important component of the diet of juvenile gallinaceous birds (Trippensee, 1948). The greater abundance of insects around water sources may be a vital protein source for juvenile birds.

Conflicts occur between livestock use and quail when riparian vegetation around water sources is overgrazed. This is a common occurrence in the ES area, since livestock grazing is concentrated around available water sources (BLM, Las Vegas, Caliente URA, 1978).

Mourning Dove (Zenaidura macroura)

The mourning dove is a migratory bird found throughout the ES area. The majority of the dove population resides in the ES area from April to September, but low populations of birds may be found in March, October, and November.

Doves depend on the available water and generally come to drink three or four times a day. Distribution is considered to be better than in historical times because of increased livestock water developments (BLM, Las Vegas, Caliente URA, 1978). Existing conflicts now occurring in the ES area have not been identified for particular areas. However, the assumption is that competition exists for forage between dove and other wild and domestic users, particularly in riparian areas (BLM, Las Vegas, Caliente URA, 1978).

Waterfowl

Table 2-14 indicates primary waterfowl use areas in the ES area. Of the areas indicated, only parts of Meadow Valley Wash and Clover Creek are under BLM administration. Public land comprises 40 percent of the portions of Meadow Valley Wash and 62 percent of Clover Creek that are considered waterfowl habitat. In addition to the area shown in Table 2-14, stock ponds and larger circular troughs are occasionally used as resting and feeding stops.

Occasional flooding and overuse of riparian stream vegetation in parts of Meadow Valley Wash has reduced nesting cover and limited duck reproduction. The Clover Creek drainage may be experiencing the same problem (BLM, Las Vegas, Caliente URA, 1978).

TABLE 2-14

WATERFOWL WETLAND INVENTORY

CALIENTE ES AREA

Name	Location	Use Period a/	Function
Key Pittman Wildlife Management Area	R.60E, T.4S. Sec. 24; R.60E, T.5S. Sec.2	F,W,Sp,S	Resting Feeding Brooding Dabblers Divers Geese
Crystal Springs Creek	Starts R.60E, T.5S. Sec. 2; Ends R.62E., T.8S Sec. 31	F,W,Sp.S	Same as above
Pahranagat National Wildlife Refuge	Starts R.61E, T.7S. Secs. 27 & 34; Ends R.61E, T.8S. Sec. 31	F,W,Sp,	Same as above
Echo Canyon Reservoir	R.69E., T.1N. Sec. 32	F,Sp	Resting Feeding Dabblers
Meadow Valley Wash	From Rose Valley to Carp	F,W,Sp,S	Resting Feeding Brooding Dabblers
Clover Creek	Start at Barclay to Caliente	F,W,Sp,S	Feeding Brooding Dabblers

a/ F = Fall; W = Winter; Sp = Spring; S = Summer

Source: Nevada Department of Fish and Game, 1976

Nongame Birds and Raptors

Table 2-15 shows raptor distribution and relative abundance in the ES area.

Meadow Valley Wash is considered to be one of the most important bird use areas in Nevada (BLM, Las Vegas, Caliente URA, 1978). This is presently impacted by livestock grazing and human activities that have resulted in a loss of riparian vegetation and cottonwood trees, important to many nongame birds (BLM, Las Vegas, Caliente URA, 1978).

Desert Tortoise (Gopherus agassizi).

Desert tortoise is considered a rare species by the State of Nevada. (See Wildlife Habitat Areas Map.) Although information on the tortoise population in the Caliente ES area is lacking, a study (Coombs, 1974) in an adjacent area in Utah suggests the present population is much lower than historically, and the present population trend is down. Assuming the impacts to tortoise habitat by past grazing are similar to Coombs' study area, it can be expected that the population in the Caliente ES area is experiencing the same problems (Kristin Berry, BLM, personal communication, Oct. 1978).

Bajadas with cresote or cresote and blackbrush vegetation are considered key habitats. Within these key habitats, washes are important denning areas (Paul Lucas, NDFG, personal communication, 1978).

Seasonal habits of tortoises in the Caliente ES area are unknown. Studies on a population south of Las Vegas, Nevada, found that tortoises hibernate from about the end of October through February (Burge, 1977). Similar patterns can be assumed for desert tortoise in the Caliente ES area, with hibernation perhaps beginning earlier and lasting longer because of higher elevation and more northerly location.

The desert tortoise is a vegetarian. Studies in Utah by Woodbury and Hardy in 1948 indicated perennial grasses--especially bush muhly (Muhlenbergia porteri)--are primary forage. In 1974 in the same area studied by Woodbury and Hardy, Coombs found annual grasses and forbs to be principal components of tortoise diet. This change from perennials to annuals is probably due to

TABLE 2-15

GENERAL RAPTOR DISTRIBUTION -- RELATIVE ABUNDANCE

CALIENTE ES AREA

Raptor Species	Nest Territory or Observation Location	Relative Abundance [a]/
Prairie Falcon	Throughout ES area	C
Peregrine	?	R
Goshawk	Delamar and Clover Ranges (possible other areas)	UC
Cooper's Hawk	Delamar and Clover Ranges (possible other areas)	UC
Sharpshinned Hawk	Delamar and Clover Ranges (possible other areas)	UC
Redtailed Hawk	Throughout ES area	C
Marsh Hawk	Throughout ES area	C
Swainson's Hawk	?	?
Ferruginous Hawk	?	?
Kestrel	Throughout ES area	C
Golden Eagle	Throughout ES area	C
Bald Eagle	Winters in Pahranagat Valley	C
	Winters in Eagle Valley Res. (and probably other areas)	UC
Osprey	?	R

[a]/ Legend: C, common; R, rare; UC, uncommon.

Source: U.S. Department of Interior, Bureau of Land Management, Las Vegas District, Caliente Unit Resource Analysis, Step 3, Wildlife Section, 1978.

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availability. Coombs indicated livestock grazing had greatly reduced the density of perennials, forcing the tortoise to change its diet to annuals. Annual forage production varies greatly from year-to-year and is not as consistent a food source as perennial forage. Presently, the unavailability of perennials is considered to be one of the factors contributing to tortoise population decline in Utah (Coombs, 1977). This may also be the case within the Caliente ES area.

Conflicts noted in other areas include trampling of young tortoises and tortoise burrows by livestock (Berry, 1978).

Other Reptiles

There is a lack of intensive inventories relating to population and distribution of reptiles as well as to their location and use of habitat types in the Caliente ES area. Therefore, the present situation cannot be described. This includes the Gila monster (Heloderma suspectum) which is classified rare by the State of Nevada.

Aquatic Species

Table 2-16 lists fish producing areas, ownership, and aquatic species present in the Caliente ES area. The Wildlife Habitat Map indicates the location of these fish producing areas.

Ash Creek and Pine Creek are two streams that presently do not contain fish. However, under proper management these two streams could possibly support a limited fishery of Big Spring spinedace, cutthroat trout or brook trout.

Occasional flooding and ungulate grazing has reduced riparian stream bank cover resulting in higher stream temperatures, degraded stream banks, and increased siltation. As a result of the siltation process pool areas have been reduced in quality. To some extent these processes are affecting fish production in Clover Creek, Beaver Creek, Headwaters Creek, and Meadow Valley Wash. These same processes to a greater extent are prohibiting fish production in Ash Creek and Pine Creek (BLM, Las Vegas, Caliente URA, 1978).

TABLE 2-16
FISH PRODUCING AREAS
CALIENTE ES AREA

	Approx. Miles	Status (Percent) Federal	State	Private	Species Present
Streams					
Beaver Dam Creek	9.0	BLM 20	NSP 60	40	Rainbow Trout Salmo gairdneri Desert Sucker Catostomus clarki Speckled Dace Rhinichthys osculus a/ Virgin River Spinedace Lepidomeda mollispinus mollispinus
Clover Creek	Fishable 4 Total 18	BLM 100 BLM 73		27	Rainbow Trout, Desert Sucker, Speckled Dace
Meadow Valley Wash (including Panaca Big Spring)	45	BLM 60		40	Desert Sucker, Speckled Dace a/ Big Spring Spinedace Lepidomeda mollispinis Aquarium Fish
White River (from Crystal Spring to Alamo including Ash Springs)	12	<1 BLM		99	a/ White River Killifish Creniethys baileyi Common Carp Cyprinus carpio b/ Pahranagat Rountail Chub Gila robusta jordani Aquarium Fish
Headwaters Creek	3	BLM 66	NSP 20	14	Rainbow Trout, Speckled Dace

TABLE 2-16 -- Continued

Status (Percent)

	Approx. Miles	Federal	State	Private	Species Present
Ash Creek	4	BLM 100			No fish present at this time, but has potential to sustain a fishery
Pine Creek	9	BLM 100			No fish present at this time, but has potential to sustain a fishery
	Approx. Acres	**Federal**	**State**	**Private**	**Species Present**
Impoundments					
Echo Canyon Reservoir	240		NSP 100		White Crappie Promoxis annularis Largemouth Bass Micropterus salmoides floridamus Golden Shiner Notemigonus crysoleucas Rainbow Trout
Shroeder Reservoir	80		NSP 100		Rainbow Trout, Speckled Dace
Upper Pahranagat Lake	640	F&WS 100			Common Carp

a/ State Classified Rare
b/ Federally Classified Endangered
Legend: BLM - Bureau of Land Management
F&WS - Fish and Wildlife Service
NSP - Nevada State Parks

Source: U.S. Department of Interior, Bureau of Land Management, Las Vegas District, Caliente Unit Resource Analysis, Step 3 Wildlife Section, 1978.

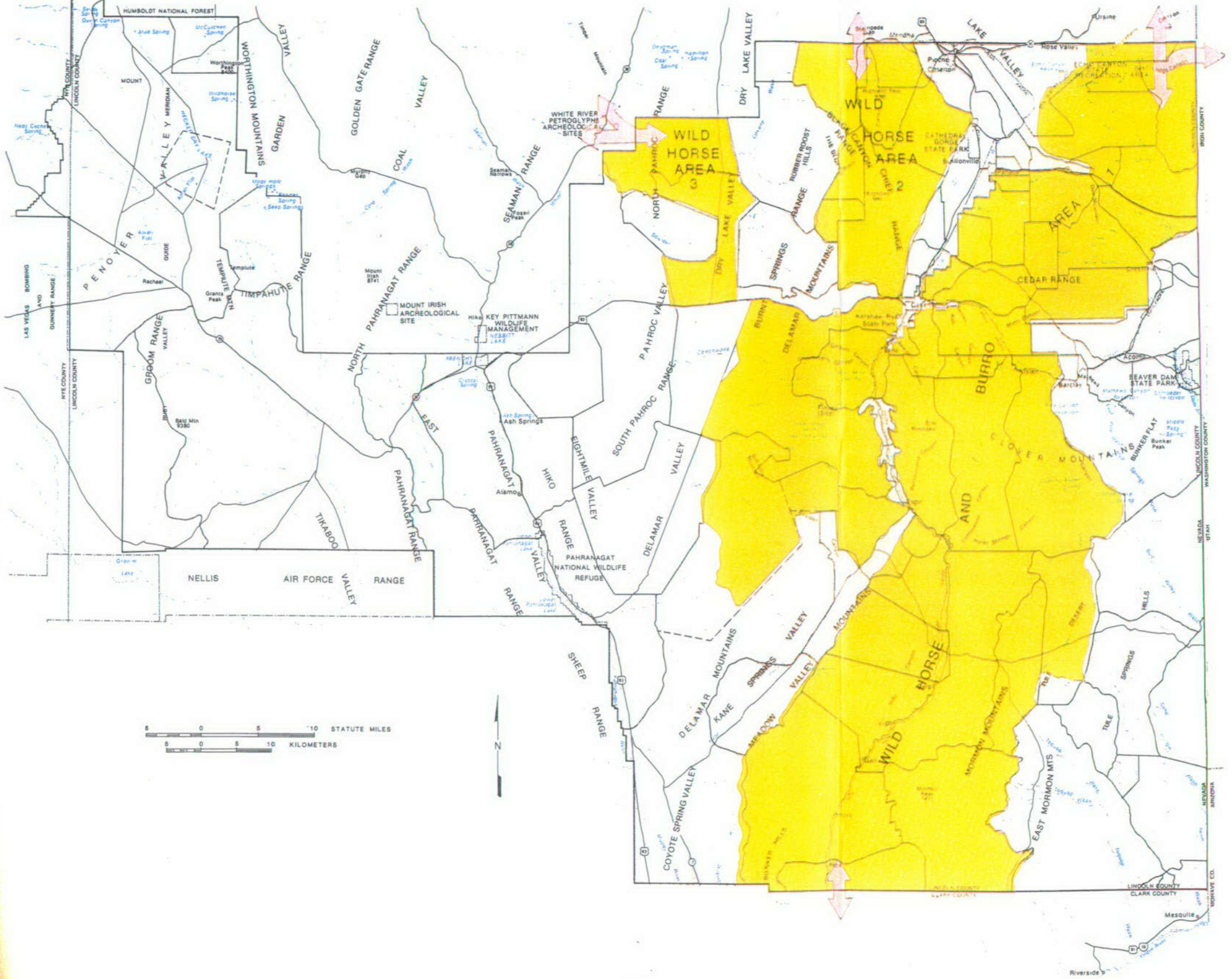
Wild Horses and Burros

Wild horses and burros are found generally in the eastern half of the Caliente Environmental Statement (ES) area, with major concentrations observed in the pinyon-juniper areas of the Meadow Valley Wash watershed (see the Wild Horse and Burro Map). The National Mustang Association recently paid the operators of the Little Mountain allotment to relinquish their grazing preferences to the BLM. This action was taken with the expectation that the BLM would create a wild horse sanctuary in the allotment.

Prior to passage of the Wild and Free-Roaming Horse and Burro Act of 1971, wild horses and burros were considered property of the State of Nevada. The horses were under jurisdiction of each county's commissioners. An active horse removal program was permitted by the Lincoln County Commissioners just before 1972 in the Clover Mountains southeast of Caliente. Roundups were conducted primarily by local ranchers, with assistance from the National Mustang Association. No roundups have been authorized in the ES area since the BLM was delegated responsibility for managing wild horses and burros in 1971. Some unauthorized roundups have been reported to the Las Vegas District Office, but none have been confirmed (BLM, Las Vegas, Caliente URA, 1972).

The ES area in 1977 supported an estimated 1,011 wild horses, 30 wild burros, and 11 wild mules within two Wild Horse Areas and one Wild Horse and Burro Area (see the Wild Horse and Burro Map). A Wild Horse or Burro Area is defined, as "the maximum geographic limits used by wild horses or burros as their yearlong habitat as of 12/15/71" (BLM Draft Manual 4700.05D). These areas contain 1,396,000 acres or 39 percent of the ES area. Nineteen allotments (936,266 acres or 27 percent of ES area) are presently receiving a total grazing use by livestock and wild horses and burros of 12,972 AUMs above their combined forage capacities (See Table 1-3).

Direct count inventories were conducted by the Las Vegas BLM District by helicopter in 1973, 1974, 1975, and 1977. Table 2-17 displays the actual counts made during each inventory for each Wild Horse and Burro Area, with population estimates derived from each count. The actual count numbers of burros are considered to represent about 50 percent of the population, based upon an estimate by Dr. Robert D. Ohmart, Associate Professor of Zoology at Arizona State University, for a similar burro inventory of the Alamo Lake area near Phoenix, Arizona (personal letter from Robert D. Ohmart to Dean Durfee, Lower Gila Resource Area Manager, August 23, 1977). Inventory observers who participated in the 1977 inventory believe that actual counts are generally closer to the population for wild horses than for burros. An assumption was made that the actual counts of wild horses could range from about



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

CALIENTE ENVIRONMENTAL STATEMENT

WILD HORSE AND BURRO

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50 percent of the population to 100 percent of the population, and that the general average for that range is 75 percent. Therefore, all population estimates of wild horses were determined by the equation:

$$PE = AC/.75$$

where PE is the population estimate and AC is the actual count.

TABLE 2-17

ACTUAL COUNTS AND POPULATION ESTIMATES
OF WILD HORSES, BURROS, AND MULES
FOR EACH INVENTORY DATE
(1973, 1974, 1975, 1977)

CALIENTE ES AREA

Year of Inventory	Wild Horse and Burro Area 1						Wild Horse Area 2		Wild Horse Area 3	
	Horses		Burros		Mules		Horse		Horses	
	AC a/	PE b/	AC	PE	AC	PE	AC	PE	AC	PE
1973	503	671	1	2	3	4	19	25	6	8
1974	509	679	-	-	5	6	20	27	2	3
1975	299	399	-	-	-	-	--	--	38	51
1977	702	936	15	30	8	11	24	32	32	43

a/ Actual Count

b/ Population Estimate, PE = AC/.75

NOTE: An estimated 20 wild horses also occur within the ES area outside of these Wild Horse and Burro Areas.

Source: U.S. Department of the Interior, Bureau of Land Management, Las Vegas District, Caliente Unit Resource Analysis, Step 3; Tables .44-5 and .44-7, 1978.

Actual counts (Table 2-17) represent an annual rate of population increase of about 10 percent. This rate was used in estimating

the present and future populations.

Some wild horse movement may occur between Wild Horse Areas 1, 2, and 3, and the Ely BLM District which borders the ES area on the north. Wild horse movement probably occurs between Wild Horse and Burro Area 1 and the Cedar City BLM District which borders the ES area on the east. These possible movement patterns are shown by arrows on the Wild Horse and Burro Map.

The higher elevations most likely receive heavier horse use during the summer months, while the lower valleys receive heavier use during the winter months. Snowpack in the higher mountains, along with seasonal changes in forage availability, would account for this use pattern. Areas which are partially inaccessible during winters of heavy snow accumulation are Highland Peak, Mahogany Peak, and the higher elevations in the Cedar Range, Clover, and Delamar Mountains.

A fecal analysis study was conducted by Colorado State University for the May to August 1977, period. Table 2-18 shows the average diet percentages of three vegetative classes determined from fecal samples of horses, cattle, mule deer, and bighorn sheep within the study areas.

TABLE 2-18

DIET PERCENTAGES, BY VEGETATIVE CLASS,
FOR WILD HORSES, CATTLE, MULE DEER, AND BIGHORN SHEEP

CALIENTE ES AREA

MAY - AUGUST 1977

	Vegetative Class		
	Grasses	Forbs	Trees and Shrubs
Wild Horses	89	3	8
Cattle	37	10	53
Mule Deer a/	1	8	91
Bighorn Sheep a/	32	52	16

a/ Feces from mule deer and bighorn sheep were not always found in fresh condition, thus their diet percentages shown may reflect somewhat different time periods.

Source: U.S. Department of the Interior, Bureau of Land Management, Las Vegas District, Caliente Unit Resource Analysis, Step 3; Table .44-16, 1978.

Although these figures apply only to the above mentioned time period, it appears that wild horse diets are closer to cattle diets than to mule deer diets. A similarity index was used to determine dietary overlap according to species observed. This overlap ranged from 19 percent to 69 percent for horses and cattle during the study period (BLM, Las Vegas, Caliente URA, 1978).

Lack of adequate watering facilities is a problem for some of the wild horses and burros. None of the springs located within the wild horse and burro areas are owned by the Federal government, thus, the BLM cannot assure yearlong wild horse and burro use from these waters. Examples of this situation occur in the Rattlesnake and Oak Springs allotments where 100 percent and about 90 percent of the watering sources, respectively, are privately owned.

Visual Resources

The visual setting of the Caliente Environmental Statement (ES) area is typical of the basin and range valley and mountain areas. Minor intrusions occur throughout the area and are the common types of structures found in rangeland country. These structures include power and telephone lines, mines, railroad tracks, microwave sites, fences, roads, and water developments.

For descriptions of specific areas and their scenic quality ratings, refer to the Caliente Unit Resource Analysis, steps 3 and 4 (BLM, Las Vegas, 1978).

Visual management classes have been established within the ES area. For a description of these classes and the areas designated to be in specified classes, refer to the Caliente Management Framework Plan, steps 1 and 2 (BLM, Las Vegas, 1978).

Cultural Resources

Presently, 147 archaeological sites are known to exist in the Caliente Environmental Statement (ES) area. Site locations are available in the Caliente Unit Resource Analysis (URA). Each site has been rated as to authenticity, frequency of occurrence, extent, preservation, and representative type, the results of which are contained in the Caliente URA (BLM, Las Vegas, 1978). Typical sites include 25 rock shelter sites, 22 rock art sites (pictographs and petroglyphs), 48 flake scatters, 11 temporary campsites, Agave roasting pits, village sites, and aboriginal sites containing mounds, stone walls, and hearths.

An additional 160 historical sites have also been inventoried within the Caliente ES area (refer to the Caliente URA for their location).

Of the 307 known sites, 104 archaeological and 61 historical sites are located within approximately one mile of a surface water source (i.e., reservoir, spring, stream, water trough).

A Class I existing data review has been completed for Lincoln County entitled An Overview of the History of Lincoln County (September 1978) by Ralph J. Roske.

Because historical and archaeological sites are situated on or just below the ground surface, they are susceptible to disturbance or destruction by on-going erosional and weathering processes.

Paleontological Resources

Paleontological resources in the Caliente Environmental Statement

(ES) area consist primarily of commonplace invertebrate fossils found in sedimentary rocks of Paleozoic and Mesozoic eras. Typical invertebrates include: brachiopods, gastropods, corals, and trilobites. Fossil plants are common. For a discussion of paleontological fauna and flora within the area, refer to Geology and Mineral Deposits of Lincoln County, Nevada (Tschanz and Pampeyan, 1970).

Three vertebrate paleontological sites have been found in Tertiary or younger sedimentary rocks. A faunal assemblage and a mammalian assemblage were found at T.25, R.62E. in the area of the North Pahroc Range. A faunal assemblage was also found several miles southeast of Panaca.

Land Uses

Recreation Resources

Recreation in the Caliente Environmental Statement (ES) area consists primarily of hunting, fishing, camping, sightseeing and off-road vehicle use. The Beaver Dam, Echo Canyon, Kershaw Ryan, and Cathedral Gorge State Parks are intensively used.

The number of deer hunters in 1977 within Nevada Department of Fish and Game's (NDFG) management units 133, 222, 223, 231, 241, and 242 (which best conform to Lincoln County boundaries) totaled 722. Deer hunter days totaled 3,956.

Bighorn sheep hunters totaled six in the Meadow Valley Range with 37 hunter days in 1976, while the Mormon Mountains had eight hunters with 80 hunter days.

The number of fishermen in Lincoln County in 1977 totaled 6,845, and fisherman-days totaled 37,658 (NDFG, 1978).

Dove hunters in Lincoln County during 1976 totaled 1,301 (4,513 hunter days); rabbit hunters totaled 1,091 (4,511 hunter days); and quail hunters numbered 1,604 (5,668 hunter days).

Livestock Grazing

Presently there are 86 grazing allotments in the Caliente Environmental Statement (ES) area. On 21 of these allotments there are a range of two to eight users with preference in the same allotment usually during the same period-of-use. There are 34 permittees who have grazing preference on two or more allotments in the ES area. Periods-of-use vary on the allotments used by these operators, but usually the differences allow the operator grazing preference for the majority of the year by moving their livestock from one allotment to another. Thirty-nine permittees have grazing preference on only one allotment each in the ES area. Currently there are two allotments which are unalloted. Twelve of the operators in the Caliente ES area have grazing preference on Forest Service lands in Utah. Twenty-six operators have preference on other BLM-administered lands in Utah, Arizona, or Nevada. Several ranches have permits under more than one name, usually within their families.

Two major types of livestock operations occur within the ES area: cow-calf and ewe-lamb. The majority of the cattle permits are part of cow-calf operations, consisting of a base breeding herd of cows and bulls. The cows produce a calf crop each year, and some heifer calves are retained from each calf crop for breeding herd replacements. The balance of the calf crop is marketed along with old or nonproductive cows and bulls. Calves are usually sold when they reach market size (usually between six to fourteen months). Most operators do not establish a breeding season; bulls and cows are together yearlong. Birth and weaning of calves may occur at all times of the year, but most calves are born during the spring.

There are five sheep operators who have active permits and four have been taking non-use on their permits for approximately the last four to five years. Most of these operators are based in Cedar City, Utah, and run ewe-lamb operations. All of the sheep operators use their allotments in late winter and early spring, and the sheep are herded back to private land for lambing and shearing in the late spring. Lambs are sold in the fall.

There are 36 allotments in the ES area which have permits to graze livestock yearlong. The remaining allotments are grazed during a specified period of time when forage is available. These periods-of-use vary from allotment to allotment because of these criteria.

Suitability for Livestock Grazing. During the vegetation inventory, a suitability rating was given to all public lands. The suitability of an area was based on steepness of slope, availability of water and forage productivity of the vegetation Table 2-19 gives a summary of the acres and AUMs associated with

each suitability classification. Refer to Appendix A for specific criteria used in determining suitability.

Information by allotment and suitability class is available in the range survey located in the BLM Las Vegas District office files.

TABLE 2-19
SUITABILITY SUMMARY

Unsuitable	Suitable		Potentially Suitable		Low Production a/	
Over 50% Slope (Acres)	(Acres)	(AUMs)	Lack of Water (Acres)	(AUMs)	(Acres)	(AUMs)
661,677	1,208,195	82,212	491,769	27,703	1,013,832	19,588

a/ Forage would not be allocated from the low production areas, but livestock would not be excluded from these areas.

Allotment Management Plans. Five of the allotments in the ES area have implemented Allotment Management Plans (AMPs); and two allotments have implemented grazing systems. AMPs in effect are listed in Table 2-20.

TABLE 2-20
SUMMARY OF AMPs
CALIENTE ES AREA a/

Allotment	Grazing Systems	Season b/	Date Implemented
AMPs			
Sand Springs	3 pasture rest-rotation	YL	1966
Ely Springs	4 pasture rest-rotation	YL	1968
Mustang	5 pasture rest-rotation	YL	1967
Barclay	3 pasture rest-rotation	5-1/10-31	1969
	1 pasture, spring-summer		
Oak Spring	5 pasture rest-rotation	YL	1968

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TABLE 2-20 (continued)

Allotment	Grazing Systems	Season[b]/	Date Implemented
Grazing Systems in Effect			
Enterprise	3 pasture rest-rotation	5-1/10-31	1971
Delamar	4 pasture rotation	YL	1976

a/ See Chapter 1 for more complete description of AMPs.

b/ YL = Yearlong

The implemented AMPs have been less effective than expected. The grazing systems are either so complex in design as to be almost impossible to follow, have been changed several times without documentation, or allow too much flexibility in livestock numbers or rotation times. Programmed management facilities, accomplished through both private or cooperative agreements, have not been developed within scheduled time frames. The Barclay, Sand Springs, and Ely Springs allotments have insufficient water to allow uniform distributions of livestock throughout each allotment or each pasture (BLM, Las Vegas, Caliente URA, Steps 3, 4, 1978).

"Permittees are reluctant to invest money in an AMP. Most of the permittees will furnish labor, but cite 'lack of tenure on the Federal range' as a reason for not constructing 'private' management facilities." (BLM, Las Vegas, Caliente URA, 1978.)

Agriculture

Sixty-one percent of Lincoln County lies within the Caliente Environmental Statement (ES) area. Figures in the 1974 Census of Agriculture for Lincoln County identify 58,320 acres of farmland, including cropland, pasture, woodland pasture, and private rangeland. Harvested cropland accounts for 12,817 acres, 98 percent of which is in hay. Of the remaining 45,503 acres of private agricultural land, 90 percent is in pasture and rangeland. The agricultural land currently in production is located primarily in the Pahranagat Valley and the Meadow Valley Wash.

Mineral Resources

Minerals found in the Caliente Environmental Statement (ES) area

include gold, silver, lead, zinc, perlite, and tungsten mined from shales, sandstones, and limestones altered by intrusions of igneous rocks.

Tungsten and zinc are being mined at Tempiute. Perlite is produced from the South Pahroc Range. Lime production began at Pioche in 1978. An iron-sulphur operation at Pioche processes mine tailings. Sand and gravel reserves are being worked at Alamo, Pioche, and Tempiute. No leasable minerals are now being produced, but there is considerable interest in oil and gas leasing.

Forest Resources

All forested areas in the Caliente ES area are identified as non-commercial forest lands.

Approximate acreage of types is as follows: 835,800 acres, pinyon-juniper; 3,200 acres, ponderosa pine; 200 acres, bristlecone pine; and 4,900 acres, broadleaf trees (primarily oak and willow) (BLM, Las Vegas, Caliente URA, 1978).

In 1977, authorized harvest of forest products on public land in the ES area was 3,330 fence posts, 664 cords of firewood, 6,033 Christmas trees, and 600 pounds of pine nuts. (BLM, Las Vegas, Caliente URA, 1978).

Christmas tree sales currently constitute the major harvest impact on the forest resource. Chained or burned areas are valuable for the production of Christmas trees. An estimated 80 percent of all Christmas trees harvested in the ES area are removed from pinyon-juniper chainings.

Wilderness

The BLM as of September 1978, has policy and procedures in effect for conducting wilderness inventories on public lands. No wilderness inventories have yet been completed specifically for the Caliente ES area. However, wilderness inventories have been completed for the Intermountain Power Project which identify the southern portion of the Delamar Mountains as a potential wilderness study area.

Land Use Controls and Constraints

Lincoln County published a master plan in 1975 which describes land use problems and potentials. None of the land outside any city limits is presently zoned.

The U.S. Fish and Wildlife Service has a pending withdrawal

application for 14,500 acres within the ES area between U.S. 93 and the eastern boundary of the Desert National Wildlife Range.

The State of Nevada, Division of State Parks, has identified a need for public land adjacent to Echo Canyon Dam Recreation Area, Kershaw-Ryan State Park, and Cathedral Gorge State Park in pending Recreation and Public Purposes applications to the BLM. The State Park System also wishes to enlarge the Beaver Dam State Park and possibly the Mathews Canyon Dam area.

For delineation of land status (private and public lands, withdrawals, and rights-of-way) refer to the Caliente Unit Resource Analysis (BLM, 1978).

Social Economics

Although the Caliente Environmental Statement (ES) area is limited to the southern part of Lincoln County, Nevada, some analysis in this section includes the region which consists of all of Lincoln and Clark Counties in Nevada and Iron and Washington Counties in Utah (see Social Economic Impact Region Map). Livestock grazing in the ES area influences social economic conditions in all of the counties, not only because the ranchers who operate in the ES area live throughout the region, but also because the communities in the ES area have strong social and economic linkages to communities in the rest of the region.

Ranch Economics

As Table 2-21 indicates, 74 ranchers had grazing preferences in the ES area. Their permits totalled 78,235 AUMs. Fifteen of the ranchers did not use any of their grazing preferences. Of those that did use their preferences 33 had small cattle ranches (less than 350 head), 13 had medium cattle ranches (350 to 800 head), two had large cattle ranches (over 800 head), and five had sheep ranches (2,426 head average). This section contains an analysis of each type of ranch.

The analyses contain budgets for "typical" ranches in each category. Although the word "typical" is used, there is no typical ranch as each ranch has its own unique characteristics. Ranches were placed in categories because limited data precluded the analysis of each ranch individually. The budgets were primarily developed at a workshop in May 1978, with a panel of local ranchers in each size category. Also present were representatives of the Cooperative Extension Service and the Department of Agricultural and Resource Economics at the University of Nevada, Reno. The ranchers were asked to develop a detailed description of a typical ranch in their size class.

Linear programming models were developed with the budgets for small and medium sized cattle ranches. These models maximize the ranchers income subject to constraints such as the availability of cattle feed by season. For a description of the models and how they work refer to Appendix G, Section 2.

Although budgets were developed for large cattle ranches and sheep ranches, limited data and the small number of ranches involved precluded the development of linear programming models for these two ranch classifications.

TABLE 2-21

AUMs AUTHORIZED BY PERMIT BY LOCATION OF OPERATOR, 1977

	Total	Lincoln County Nevada	Clark County Nevada	Southwestern Utah	Other
Number of Operators	74	25	11	32	6
Percent of Total	100%	34%	15%	43%	8%
AUMs Authorized by Permit	78,235	26,099	25,516	24,753	1867
Percent of Total	100%	33%	33%	31%	2%

Source: Bureau of Land Management, Las Vegas, operator files.

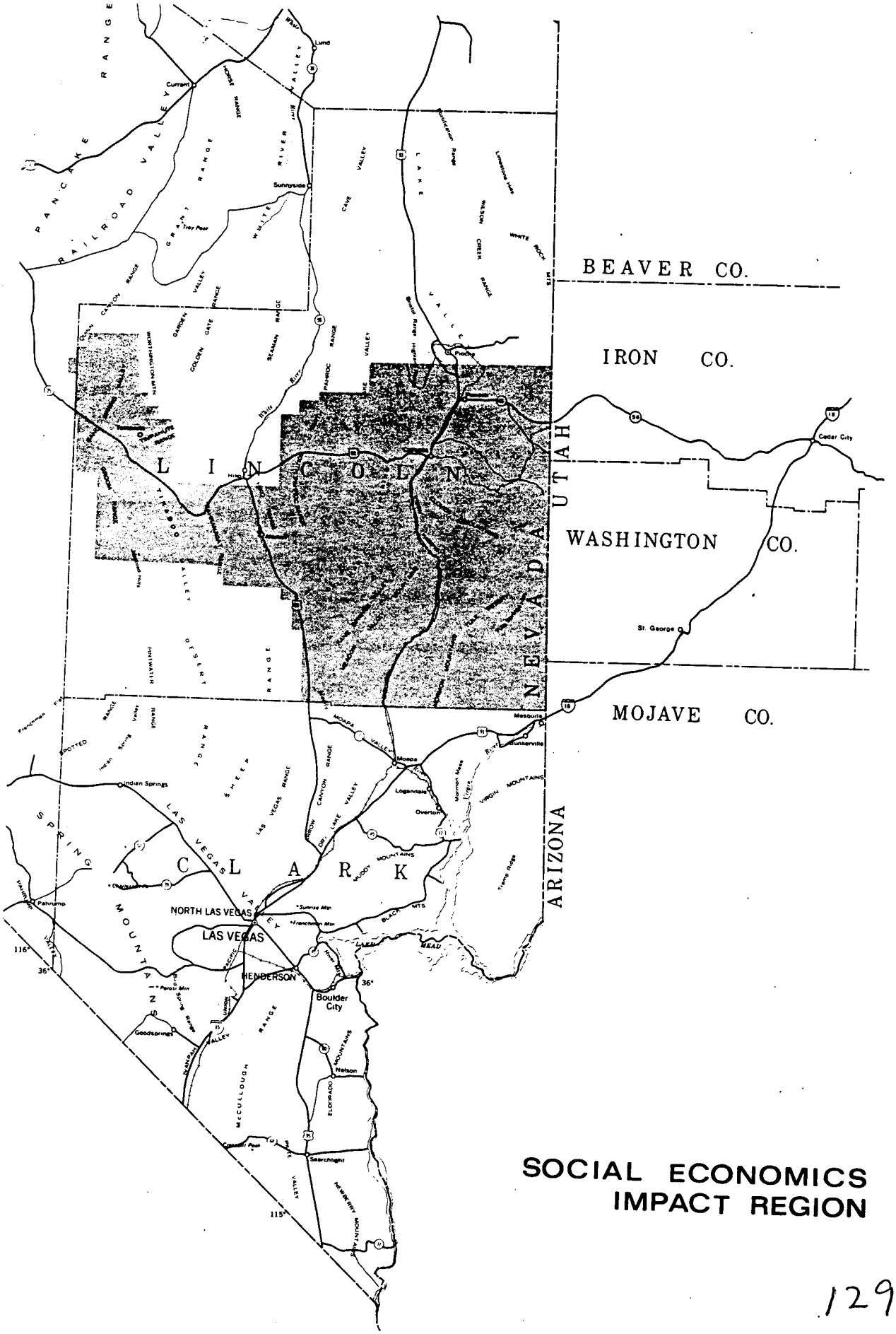
Small Cattle Ranches. Thirty-three cattle ranchers with less than 350 head used public rangeland forage in the ES area during the 1977 grazing year. Most of them were from Lincoln County and Southwestern Utah.

The majority of these ranchers had full-time, off-ranch jobs. They worked on their ranches in the evenings and on weekends. Others had additional income from investments or retirement pay. Ranch inputs such as feed supplements, machinery, gasoline, etc., were purchased primarily in Lincoln County and Southwestern Utah. Cattle were sold at auctions in Cedar City, Utah, and Bakersfield, California, although some calves were purchased directly from the ranches by buyers for feedlots throughout the West.

As Table 2-22 indicates, a typical small cattle ranch [188 animal units (AUs)] used 744 AUMs of public land forage in the ES area. Yearlong dependency on ES area public land forage was 33 percent. There was very little variation in dependency by season.

The budget in Table 2-23 indicates that a typical ranch in this category lost $6,560 in 1977. Perhaps the most significant cost was $7,817 of interest expenses. With this interest burden it would have been difficult to avoid losses even in good years. The only way that most small ranchers have been able to remain in the cattle business is by having outside sources of income.

Medium Cattle Ranches. Thirteen cattle ranchers with between 350 and 800 AUs used public rangeland forage in the ES area during the 1977 grazing year. Six of them were from Lincoln County, five



SOCIAL ECONOMICS IMPACT REGION

were from Southwestern Utah, and two were from Clark County.

The majority of these ranchers worked on their ranches full-time. Additional labor was obtained by hiring part-time workers.

Most of the ranches were cow-calf operations. Ranch inputs were purchased throughout the region, but primarily in Lincoln County and Southwestern Utah. Cattle were sold in Cedar City, Utah, and Bakersfield, California. A greater proportion of their calves were sold directly from the ranch than were calves from small ranches.

A typical medium-sized cattle ranch had 523 AUs. It used 2,692 AUMs of public land forage in the ES area (Table 2-22). Overall dependency on ES area public land forage, at 43 percent, was greater than for small ranches. Dependency was highest in the spring at 53 percent and lowest in the summer at 33 percent.

As Table 2-24 indicates, a typical ranch in this category made $7,939 in 1977. Costs per AU were $28 lower than for small ranches, indicating economies of scale. A study done in Southern Nevada for 1972 (Garrett and Mitchell) found a similar relationship. In that study, costs for medium ranches were $24 lower than for small ranches. Returns for medium ranches in the 1972 study were $3,788 per ranch. Most of the difference between the 1972 and 1977 incomes can be attributed to inflation, although labor costs were lower in 1977.

Large Cattle Ranches. Only two cattle ranches with over 800 head used public rangeland forage in the ES area in 1977. One of these ranches grazed about 99 percent of its cattle in the Battle Mountain District, northwest of the ES area. Because of the extremely low dependency of this ranch on public land forage in the ES area the analysis in this section will be limited to the other large cattle ranch.

In 1977 the latter had about 3,500 head of which 1,500 grazed on public lands year round. The other 2,000 head grazed primarily on private lands in Clark County. The ranch sold a combination of calves, yearlings, cull cows, and bulls for breeding. The primary market for calves, yearlings, and cull cows was in California. Bulls were sold throughout the West. Inputs were purchased primarily in Clark County.

The ranch used a total of 15,409 AUMs of public land forage in the ES area. This represents about 20 percent of the total forage used by all ranches in the ES area.

The ranch was dependent on public lands in the ES area for about 36 percent of the total feed requirements. As Table 2-22 indicates there was little variation in its dependency by season.

The ranch lost about $67,000 in 1977 (Table 2-25). Low cattle prices undoubtedly contributed to the loss.

TABLE 2-22

ES AREA RANCH FEED SOURCES (AUMs) for 1977

	Total	Spring	Summer	Fall	Winter
Small Cattle Ranches					
ES Area Public Land Forage	744	203	165	189	187
Percent of Total	33%	35%	29%	32%	37%
Other Public Land Forage	156	45	26	34	51
Percent of Total	7%	8%	5%	6%	10%
Forest Service Forage	67	0	49	18	0
Percent of Total	3%	-	9%	3%	-
Private Feed Sources	1292	330	335	353	274
Percent of Total	57%	57%	58%	59%	54%
Medium Cattle Ranches					
ES Area Public Land Forage	2692	849	519	631	693
Percent of Total	43%	53%	33%	39%	47%
Other Public Land Forage	1230	317	328	279	306
Percent of Total	20%	20%	21%	17%	21%
Forest Service Forage	186	0	136	50	0
Percent of Total	3%	-	9%	3%	-
Private Feed Sources	2161	429	607	664	461
Percent of Total	34%	27%	38%	41%	32%
Large Cattle Ranches					
ES Area Public Land Forage	15,409	3720	3859	4017	3813
Percent of Total	37%	35%	37%	38%	36%
Other Public Land Forage	3239	1290	0	640	1309
Percent of Total	8%	12%	-	6%	12%
Forest Service Forage	0	0	0	0	0
Percent of Total	-	-	-	-	-
Private Feed Sources	23,352	5490	6641	5843	5378
Percent of Total	56%	52%	63%	56%	51%
Sheep Ranches					
ES Area Public Land Forage	646	411	0	0	235
Percent of Total	11%	28%	-	-	16%
Other Public Land Forage	2295	845	731	93	626
Percent of Total	39%	58%	50%	6%	43%
Forest Service Forage	124	0	124	0	0
Percent of Total	2%	-	9%	-	-
Private Feed Sources	2759	200	601	1,363	595
Percent of Total	47%	14%	41%	94%	41%

TABLE 2-23

BUDGET FOR SMALL RANCH (less than 350 head)

Expenses	Total	Per Animal Unit (188 AUs) a/
Livestock Purchases	$ 615	$ 3.27
Repairs and Maintenance	846	4.50
Depreciation	4,542	24.16
Interest		
Operating Capital	1,089	5.79
Real Estate	6,728	35.79
Gas and Lubricants	1,372	7.30
Supplements	399	2.12
Taxes		
Livestock	528	2.81
Real Estate	460	2.45
Custom Work	2,187	11.63
Insurance	700	3.72
Grazing Fees		
Caliente BLM	1,123	5.98
Other BLM	236	1.25
Forest Service	107	.57
Utilities	315	1.68
Alfalfa and Grass Hay Expenses	339	1.80
Marketing Costs	596	3.17
Veterinary Costs	205	1.09
Miscellaneous	564	3.00
Total	$22,951	$122.08
Receipts b/		
Heifer Calves	$ 4,767	$25.36
Steer Calves	8,838	47.01
Cull Cows	2,157	11.47
Cull Bulls	629	3.34
Total	$16,391	$87.19
Income	-$6,560	-$34.89

a/ An animal unit is equal to one cow without calf.

b/ Receipts were adjusted to account for fluctuations in livestock prices by using a three year average (1976 and 1977, yearly average prices; 1978, July prices only).

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TABLE 2-24

BUDGET FOR MEDIUM RANCH (350-800 Head)

Expenses	Total	Per Animal Unit (523 AUs) a/
Labor	$ 1,704	$ 3.26
Livestock Purchases	3,248	6.21
Repairs and Maintenance	3,039	5.81
Depreciation	8,544	16.34
Interest		
Operating Capital	3,781	7.23
Real Estate	8,723	16.68
Gas and Lubricants	2,882	5.51
Supplements	973	1.86
Pasture Rent	800	1.53
Taxes		
Livestock	1,417	2.71
Real Estate	1,143	2.19
Insurance	1,300	2.49
Grazing Fees		
Caliente BLM	4,065	7.77
Other BLM	1,857	3.55
Forest Service	298	.57
Utilities	1,000	1.91
Alfalfa and Grass Hay Expenses	938	1.79
Marketing Costs	1,836	3.51
Veterinary Expenses	465	.89
Miscellaneous	952	1.82
Total	$48,965	$93.62

Receipts b/	Total	Per Animal Unit
Heifer Calves	$17,522	$ 33.50
Steer Calves	30,926	59.13
Cull Cows	6,336	12.11
Cull Bulls	2,120	4.05
Total	$56,904	$108.80
Income	7,939	15.18

a/ An animal unit is equal to one cow without calf.

b/ Receipts were adjusted to account for fluctuations in livestock prices by using a three year average (1976 and 1977 yearly average prices; 1978, July prices only).

TABLE 2-25

BUDGET FOR LARGE RANCH (over 800 Head)

Expenses	Total	Per Animal Unit (3,500 AUs) a/
Labor	$ 98,000	$ 28.00
Repairs and Maintenance	25,535	7.30
Depreciation	123,584	5.31
Gas and Lubricants	19,053	5.44
Feed and Supplements	60,177	17.19
Taxes	16,386	4.68
Insurance	3,329	.95
Grazing Fees		
Caliente BLM	23,367	6.68
Other BLM	4,961	1.42
Utilities	12,224	3.49
Alfalfa and Grass Hay Expenses	13,920	.98
Livestock Transportation	6,647	1.90
Veterinary Expenses	1,652	.47
Miscellaneous	11,608	3.32
Total	$420,443	$120.13
Receipts from Livestock Sales	$353,012	$100.86
Income	-$67,431	-$19.21

a/ An animal unit is equal to one cow without calf.

b/ Receipts were adjusted to account for fluctuations in livestock prices by using a three year average (1976 and 1977, yearly average prices; 1978, July prices only).

Sheep Ranches. All five sheep ranches operating in the ES area during the 1977 grazing year were based outside of the area, four in Cedar City, Utah, and one in White Pine County, Nevada.

Sheep ranching requires much labor. The ranchers all worked on their ranches more than 40 hours per week, year round. They had additional help from family members and hired workers. Qualified laborers are becoming scarce. As a result, use of forage by sheep ranchers in the ES area has been declining. There has been a trend towards increased purchase of private land, particularly in the Cedar City area because less labor is required to keep the flocks near the base lands than to herd them to the ES area.

Sheep ranches used 3,227 AUMs of public rangeland forage in the ES area during 1977. This represents only four percent of the total forage used by all ranches in the ES area. As Table 2-22 indicates, the use of ES area forage is highly seasonal. Although overall dependency was only 11 percent, in the spring it reached 28 percent.

A typical sheep ranch is estimated to have made $14,806 in 1977 (Table 2-26). A study of sheep ranches in the same area for 1972 (Goodsell and Belfield, 1973) estimated that a similar sized ranch (2,454 head) made $10,849. The higher returns for 1977 can primarily be attributed to the fact that sheep and lamb prices have increased steadily, keeping well above the rate of inflation. Lamb prices increased from $28.10 per hundredweight in 1972 to an average of $50.00 for the years 1976 to 1978, a 79 percent increase. Sheep prices increased 98 percent. During the same period the consumer price index increased 46 percent (NESD, 1977).

TABLE 2-26

BUDGET FOR SHEEP RANCH (2,426 head)

Expenses	Total	Per Sheep (2,426 sheep)
Labor and Supplies	$ 16,650	$ 6.86
Livestock Purchases	2,269	.94
Depreciation	8,588	3.54
Interest		
Operating Capital	1,964	.81
Real Estate	2,783	1.15

Gas, Lubricants, Repairs	13,549	5.59
Feed and Supplement Purchases	18,328	7.55
Pasture Rent	11,269	4.65
Taxes	8,615	3.55
Shearing	3,154	1.30
Insurance	1,964	.81
Grazing Fees		
Caliente BLM	974	.40
Other BLM	3,465	1.43
Forest Service	187	.08
Utilities	4,855	2.00
Miscellaneous	4,983	2.05
Total	$103,597	$42.70
Receipts a/		
Lambs	98,097	40.44
Ewes	4,052	1.67
Wool (including incentives)	16,254	6.70
Total	$118,403	$48.81
Income	14,806	6.10

a/ Receipts were adjusted to account for fluctuations in livestock prices by using a three year average (1976 and 1977, yearly average prices; 1978, July prices only).

Other Ranches. Twenty-one other ranchers had grazing preferences in the ES area. Seventeen of them elected not to use their grazing preferences in 1977. There were a variety of reasons for their non-use including: lack of cattle forage on their allotments; poor health of the operator; poor financial conditions; and for sheep ranchers, a lack of qualified laborers.

The other four ranchers only had preferences in allotments that were mainly located outside of the ES area. Their permitted use in the ES area could not be determined. Two of these ranchers had preferences in an ephemeral allotment. In an ephemeral allotment the amount of livestock grazing is determined on a year-to-year basis depending on the availability of forage. The other two had preferences only in an allotment with over 98 percent of its authorized AUMs in the Ely District. Since neither of these operators used more than 98 percent of their preferences the only impact that could be expected is a change in the resale value of their grazing preferences. Since this is exactly the same impact that ranchers with non-use would receive, for the purpose of

analysis, these ranchers are included in the same category as ranchers with non-use.

Rancher Wealth

The Bureau of Land Management does not recognize a capitalized value for grazing preferences because they are a revocable privilege, not a right. However, grazing preferences contribute to the wealth of the ranchers who use them because they have a value in the marketplace (McConnen, 1976) (Stubblefield and Robertson, n.d.) (Nielson and Workman, 1971).

According to local ranchers, public land grazing preferences in the ES area could be sold for about $25 per AUM in 1977. Although this is consistent with findings in a number of published reports (Stevens, 1975) (Nielson and Workman, 1971) (Gray, 1970), it is lower than reported prices in Northern Nevada (Robison, 1979). It is possible that low BLM AUM prices in the ES area are due to the fact that many ranchers have not been obtaining licensed permits on all of their grazing preferences (using the total number of available AUMs). Buyers of grazing preferences would pay lower prices if they suspected that not enough forage was available for them to run at the available capacity of the grazing preferences.

Although local ranchers and real estate agents interviewed indicate the ranches in the ES area are sold at the level of active preference AUMs, in some cases credit agencies estimate the value of a ranch based on the number of AUMs determined by both preference (available AUMs) and permit (actual use AUMs) levels. Each ranch is evaluated on a case-by-case basis in order to determine the weight given to preference and permit AUMs levels. Since no data were obtained on a case-by-case basis for this analysis an estimate of the exact level of AUMs that would be used by some credit agencies in determining the value of ES area grazing preferences cannot be made. However, a range of relevant values can be obtained by estimating values of both preference and permit AUM levels. The preference level of 118,580 AUMs (Table 1-3) would give an upper limit of $2,964,500 that ES area grazing preferences contribute to the ranchers' wealth. The permit level of 78,235 AUMs (Table 1-3) would give a lower limit of $1,955,900. It should be noted that if preferences were actually sold at the permit level, the price per AUM would probably be higher than $25 as described in previous paragraph.

Summary. As Table 2-27 indicates overall ranch income amounted to $96,728. Although proprietors income was a negative $106,674, laborers income was high enough to make overall income positive. It should be noted that ranch income is subject to wide fluctuation from year-to-year generally following the cyclical variations that are characteristic of livestock prices.

TABLE 2-27

SUMMARY OF RANCH INCOME (1977)

	Proprietors Income	Labor Income	Total Income
Small Cattle (33 ranches)	$-216,480	--	$-216,480
Medium Cattle (13 ranches)	103,207	$ 22,152	125,359
Large Cattle (1 ranch)	- 67,431	98,000	30,569
Sheep (5 ranches)	74,030	83,250	157,280
Total	-106,674	203,402	96,728

Regional Characteristics

This section contains an analysis of the four counties impact region. It focuses primarily on Lincoln County, Nevada and its linkages with the other counties in the impact region.

Income

Per capita income in Lincoln County for 1977 was much lower than in the State of Nevada and has been declining as a percentage of the State (see Table 2-28).

TABLE 2-28
PER CAPITA INCOME
LINCOLN COUNTY AND NEVADA

	1970	1971	1972	1973	1974	1975	1976	1977
Lincoln County	2556	3154	3430	3663	4006	4150	4153	4686
State of Nevada	3570	4825	5155	5493	5861	6454	6901	7637
Lincoln County as a percent of the State	72%	65%	67%	67%	68%	64%	60%	61%

Sources: Per Capita Income = Income ÷ Population. Income for 1970 from Bureau of the Census, 1972. Income for 1971-1977 from Bureau of Economic Analysis (BEA), Regional Economics Information System, 1978. Income for 1977 in Lincoln County from Table 2-30 which follows. Population figures from Bureau of Business and Economic Research (BBER), University of Nevada, Reno, 1978.

Employment. Total employment in Lincoln County grew 35 percent from 1970 to 1977. Although this was a substantial increase in employment, it did not keep pace with the State's employment which grew 45 percent during the same period. The unemployment rate in Lincoln County for 1977 was 5.8 percent, lower than the State's 7 percent. However, there is no historical relationship between the two unemployment rates. Unemployment in Lincoln County (see Table 2-29) is strongly influenced by fluctuations in the mining industry while unemployment in the State of Nevada is influenced by the health of the gaming industry.

TABLE 2-29
UNEMPLOYMENT RATES
LINCOLN COUNTY/STATE OF NEVADA

	1970	1971	1972	1973	1974	1975	1976	1977
Lincoln County	10.7	6.8	9.8	12.1	8.3	7.7	8.7	5.8
State of Nevada	5.9	7.0	7.0	6.1	7.7	9.6	8.9	7.2

Source: Nevada Employment Security Department, Labor Force Summaries and Establishment Based Industrial Employment, data sheets, 1970-1978.

Structure. Over the last eight years (1970-1977) the largest sector of the Lincoln County economy has been government. In 1977 government employed 380 workers; this accounted for about 30 percent of the total county employment. In terms of income, government accounted for $4.4 million in 1977 or about 28 percent of the total county income of $15.9 million (Table 2-30).

TABLE 2-30
LINCOLN COUNTY INCOME AND EMPLOYMENT
1977

Sector	Employment a/	Income e/
Agriculture	90	$ 810,000 f/
Mining	330	2,290,000
Construction	10	126,000 b/
Manufacturing	10	176,000 b/
Transportation and Public Utilities	90	1,325,000
Trade	160	1,371,000
Finance, Insurance and Real Estate	10	142,000
Services	90	1,328,000 b/
Government	380	4,825,000
Other	100 c/	3,945,000 d/
Total	1,270	15,975,000

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a/ Nevada Employment Security Department (NESD), 1978, except figures for mining from Nevada Industrial Commission, 1978.

b/ Estimates calculated by BLM, Las Vegas. Methodology: Income employment ratios from previous years from NESD, 1978, and Bureau of Economic Analysis, Regional Economics Information System, 1978, were multiplied by the above employment figures and adjusted for inflation.

c/ Includes adjustments to reflect employment by place of residence and to discount multiple jobholders.

d/ Includes transfer payments, dividends, interest, rent, and residence adjustment.

e/ Bureau of Economic Analysis, Regional Economics Information System, 1979.

f/ Labor and proprietors income.

The State of Nevada supports much of the government sector. The Nevada Girls Training Center in Caliente employs over 50 workers. Other State operations include four units of the Nevada State Park System and the State Highway Department.

As Table 2-30 indicates, in 1977 the mining industry was second to government in terms of income and employment. The mining industry has been subject to wide fluctuations from year-to-year. The year 1977 can best be characterized as the latest in a long line of mining booms and busts. Most of the mining activity has been centered around Pioche. The latest major mining operation there (Bunker Hill) produced silver, lead, and zinc until March 1978, when low zinc prices forced it to close. One hundred ten workers with a payroll of $150,000 a month were laid off. The largest mining operation in recent years has been a tungsten mine at Tempiute which currently employs about 185 workers. The reopening of this mine in 1977 had two major effects: the creation of boom town conditions in Alamo and the creation of Nevada's newest town, Rachael.

Agriculture, with 90 workers, accounted for seven percent of total county employment in 1977. Although employment in this sector has remained relatively stable in recent years, agricultural income has been subject to wide fluctuations (Table 2-31).

TABLE 2-31
LINCOLN COUNTY FARM PROPRIETORS INCOME
($1,000)

1972	1973	1974	1975	1976	1977
$48	$252	$-474	$-6	$93	$78

Source: Bureau of Economic Analysis, Regional Economics Information System, 1979.

According to the 1974 Census of Agriculture there were 75 farm proprietors in Lincoln County. They made more than $380,000 from off-farm sources, compared to a loss of $474,000 from agricultural sources (Table 2-30). Total agricultural sales were about $2.1 million. Of this total, $1.7 million, or 83 percent, was derived from livestock ranching. Hay sales accounted for most of the other 17 percent. Low incomes for farm proprietors in the last few years can largely be attributed to low cattle prices.

Population. Seventy-six percent of the 3,509 Lincoln County residents (Chu, 1978) are concentrated in the four communities of Alamo (210 residents); Caliente (900 residents); Panaca (530 residents); and Pioche (640 residents) (Willie, 1975). Alamo and Pioche have a population density of approximately three persons per acre while Caliente and Panaca have approximately one person per acre. The county population density has been consistently low at .25 persons per square mile as compared to the State average of 4.5 persons per square mile (Greater Nevada Health Systems Agency, 1978). The population of all townships in the county declined steadily from the 1940s to the early 1960s with an overall 41 percent population decline. From 1960 to 1977, the population has increased at an annual rate of 5.07 percent per year (Bureau of Census, 1972 and Bureau of Business and Economic Research, 1978). This lower rate of growth has tended to make the county less cosmopolitan and less influenced by new or different attitudes or lifestyles than has been the case in the more rapidly expanding counties in the State.

Economic Linkages. The economic structure of Lincoln County is too small to support a wide variety of businesses; therefore, businesses and residents must rely on other counties for a large portion of the products they require. Lincoln County specializes in raw natural resources such as public rangeland forage for livestock. Businesses and residents of other counties obtain such resources in Lincoln County.

The Pahranagat Valley area of Lincoln County is strongly linked to Clark County. Residents make one or two trips a month to Las Vegas to purchase goods and services unavailable in Lincoln County. In addition, businesses in the Pahranagat Valley obtain many of their inputs in Clark County. For example, cattle ranchers purchase most of their machinery there. An example of linkages in the other direction is that cattle ranchers in Clark County in 1977 purchased 25,516 AUMs of public rangeland forage in the ES area of Lincoln County (Table 2-21). This represents 33 percent of the total AUMs licensed in the ES area in 1977.

Although these linkages are important to Lincoln County they have a minute impact on the economy of Clark County, which is dominated by the gaming industry. The total employment in Lincoln County (1,270) was less than one percent of Clark County's 160,000 employees (NESD, 1978).

The Caliente-Panaca-Pioche area of Lincoln County is strongly linked to Iron and Washington Counties in Southwestern Utah. Cedar City in Iron County and St. George in Washington County are regional trade centers where businesses and residents of Caliente, Panaca, and Pioche obtain goods and services unavailable in Lincoln County. Cattle ranchers obtain financing and purchase machinery, livestock, supplements, and fertilizers in Cedar City and St. George. Most of their calf sales are to Utah buyers. On the other hand, cattle ranchers from Southwestern Utah purchased 24,753 AUMs of public rangeland forage in the ES area of Lincoln County in 1977 (Table 2-21). This represents 31 percent of the total number of public rangeland AUMs permitted in the ES area.

These linkages are important to Washington and Iron Counties as well as to Lincoln County. They contribute to the agriculture, trade and services sectors of the economies of those counties.

The largest private sector in both Washington and Iron Counties in 1977 was trade (Table 2-32). This reflects the fact that St. George and Cedar City are regional trade centers. Both counties received a significant portion of their total income from the "other" category. This includes transfer payments such as social security and indicates large numbers of retired persons moving into the area, particularly into St. George.

TABLE 2-32

INCOME AND EMPLOYMENT

SOUTHWESTERN UTAH

1977

	Washington County		Iron County	
	Employment a/	Income b/ ($1,000)	Employment a/	Income b/ ($1,000)
Agriculture	479	2,351	438	958
Mining	16	394	259	4,025
Construction	459	5,511	313	4,524
Manufacturing	511	5,390	346	3,709
Transportation and Public Utilities	118	2,455	386	5,695
Finance, Insurance and Real Estate	199	2,092	236	2,200
Trade	1,620	12,753	1,398	10,704
Services	812	7,228	615	6,138
Government	1,334	11,422	1,784	15,946
Other c/	--	35,853	--	18,008
Total	5,548	85,449	5,777	71,907

a/ Utah Department of Employment Security (UDES), 1978.

b/ Bureau of Economic Analysis, Regional Economics Information System, 1979.

c/ Includes transfer payments, dividends, and interest, rent, and residence adjustment.

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Farm proprietors have contributed to a significant portion of the income of both counties in the past, but as Table 2-33 indicates, their income has been stagnating since 1973.

TABLE 2-33
FARM PROPRIETORS INCOME FOR WASHINGTON AND IRON COUNTIES, UTAH
(In Thousands of Dollars)

	1972	1973	1974	1975	1976	1977
Washington	1,499	2,668	1,717	1,456	1,527	1,877
Iron	2,270	3,754	2,644	351	698	-23

Source: Bureau of Economic Analysis, Regional Economics Information System, 1979.

Summary. The four county impact region had a total income of about $ 3 billion in 1977. The vast majority of this income was earned in Clark County (2.8 billion) primarily in industries associated with gaming in Las Vegas. Total employment in the region was about 170,000.

Livestock ranching in the ES area accounted for much less than one percent of regional income.

Public Attitudes

This analysis is based on various reports and publications including a 1976 Lincoln County Value Survey conducted under a Bureau of Land Management contract by Dr.'s Loren Richart and James Frey, Department of Sociology, University of Nevada, Las Vegas. For complete details of the research methodology of the Richart and Frey report, see Social Economic Profile (SEP), Lincoln County, Nevada, 1976, Appendix A (BLM, Las Vegas District Office). The following analysis reflects, in a general sense, the value and lifestyles of county residents which, together with economic activities and supporting public services, give both shape and force to the community's character.

Social and political attitudes and expectations among county residents are generally conservative and modest. County residents typically appear to view each other as equals and in general do not discuss other residents in terms of social rank, racial, or ethnic origins. However, on an individual basis, those values having to do with origins, kinship, and religion are the common bond around which political and social influences coalesce.

The positive value placed on the small size of local communities; the positive aspects of a rural atmosphere; the appeal of clean air, and moderate weather; the easy access to outdoor recreation; the feeling of friendliness and sociability; the opportunities afforded of doing things "as a family"; and the belief in the natural order of things (particularly the belief that change will proceed modestly and gradually without altering the county's rural character) are the values that seem to be consistently articulated by county residents. The optimistic attitude of area residents toward the historical peak and valley employment patterns of the mining industry is generally expressed in terms of "the future will be pretty much like the past."

Businessmen are politically oriented toward change, while ranchers are politically oriented toward preserving the status quo. Change is a value seldom expressed by the general public. Even among those in the county who favor change, i.e., businessmen, professionals and influential community members, change is often qualified in terms of "progress" that will preserve, or at least not upset, the natural order.

Aside from a modest tourist industry, the re-opening of the Tempiute Mine, and the Nevada Training Center, there is no basis for an influx of outsiders to contest the predominance and near universality of the rural, small-town way of life. However, the opening of the Tempiute Mine may in the future bring a substantial number of newcomers with different outlooks into the Alamo area.

Ranching Community Attitudes

This subsection is based on informal discussions between a Bureau of Land Management Social Scientist in the Environmental Statement (ES) area and local government officials, representative citizens, and 16 of 74 ranchers holding public land grazing permits in the Caliente ES area during 1977.

The ES area ranching community appears to cohesively exist as a single community that transcends the Nevada-Utah border. In addition to the economic ties, two additional factors appear to enhance the sense of community. First, 32 of the 74 ranchers who have grazing perferences in the ES area reside in three Utah counties adjacent to the Nevada-Utah border, i.e. Beaver, Iron, and Washington Counties. (See Table 2-21.) The adjacent Caliente ES area has 25 resident ranchers who have grazing preferences. Thus, 77 percent of the impacted ranching population resides in these four adjacent counties. Second, the ES area is strongly influenced by the Church of Jesus Christ of Latter Day Saints, also known as the Mormon Church. Three of the four Mormon Church Wards in Lincoln County are under the jurisdiction of the Stake in Enterprise, Utah. Stake sponsored social, recreational or religious activities draw church members from the Lincoln Conty communities of Caliente, Panaca, and Pioche. Alamo is under the jurisdiction of the Stake in Logandale, Utah. Additionally, chuch members who reside in the ES area would normally travel to St. George, Utah, in order to participate in Temple religious activities. The Lincoln County communities of Alamo, Hiko, Caliente, Panaca and Pioche are within the St. George, Utah, Mormon Church Temple District.

According to data gathered through informal discussions by a BLM Social Scientist with a group of ranchers representing a 22 percent sample of the impacted ranching population, certain indications of the attitudes and expectations of the group were defined. Contacts were made with ranchers who had operated in the area for as few as 17 years to as many as 60 plus years. The average age of ranchers contacted was 51.07; he or she had lived in the area approximately 48 years, with the majority of the group (60 percent) having been involved with ranching "since birth." Eighty-seven percent of those interviewed were generationally linked to the ranching industry by having one or more of their relatives involved in the industry either currently or in the past. In addition to their ranching responsibilities, 27 percent of those interviewed held part-time jobs; 40 percent held full-time jobs (approximately 40 hours per week) and 33 percent were self-employed as ranchers on a full-time basis.

and can effectively accommodate a generational division of labor. All of the persons contacted saw ranching as one of the few remaining ways of carrying on a family tradition where family members can have meaningful work and responsiblity. Ranching is perceived by its members as a way of life that provides: (a) security and family stability; (b) the opportunity to be self-sufficient; (c) the opportunity to work out-of-doors; and (d) the opportunity to be relatively free of outside supervision in their isolated work environment. Seventy-three percent of those contacted expected one or more of their children to take over the ranch, although 27 percent of this group are not actively encouraging their children to do so because it is "no longer profitable to be in the business." However, 53 percent of those contacted felt that ranching still provides the opportunity to make a good profit. The strong tie to and value orientation toward ranching as a preferred way of life--even if the monetary rewards are minimal--is further underscored by the fact that 87 percent of those contacted indicated they would remain in ranching even though the ranch provided only enough income to meet expenses and provided no "large" return on their investment. (The word "large" was used in conversation without quantification.)

All of the ranchers appeared to resent the nationwide environmental trends that induced the Federal government to reassess public land policy which resulted in the passage of the Federal Land Policy and Management Act of 1976 and other "equally restricting legislation." Those concepts are not perceived by the ranchers as being sufficiently elastic to permit management adaptations in response to various types of local conditions. None of the ranchers contacted felt they could influence local BLM District Office planning decisions, since they feel interpretation of the law and planning decision guidance is provided by the Washington BLM staff without regard to local conditions or local input.

In the ranchers perspective, market prices for ranches in the ES area are related to the relative mix of public and private lands of which a ranch is composed and any withdrawal of preferences on public lands from that mix can have immediate and serious implications for both the ranching community and the financial institutions which stand behind that community. All of the ranchers expressed the feeling that the ranching industry has been severely limited in recent years by ever-increasing governmental intervention, drought, and tight cost-price ratios in the national cattle market. In the national cattle market arena, they view themselves as "price takers" rather than "price setters." They also felt, with varying degrees of intensity, that the "consistent lack of continuity" of personnel in the BLM District Office has a deleterious effect on BLM land management efforts. In an industry where long-term planning is perceived as a must they feel the constant changeover in BLM personnel deprives the ranching

All of the persons contacted felt very strongly that ranching offers the opportunity for combining the roles of owner, manager, and laborer. These are ranching roles that not only encourage generational linkage to the lands but are also roles that encourage and can effectively accommodate a generational division of labor. All of the persons contacted saw ranching as one of the few remaining ways of carrying on a family tradition where family members can have meaningful work and responsiblity. Ranching is perceived by its members as a way of life that provides: (a) security and family stability; (b) the opportunity to be self-sufficient; (c) the opportunity to work out-of-doors; and (d)the opportunity to be relatively free of outside supervision intheir isolated work environment. Seventy-three percent of thosecontacted expected one or more of their children to take over the ranch, although 27 percent of this group are not actively encouraging their children to do so because it is "no longer profitable to be in the business." However, 53 percent of those contacted felt that ranching still provides the opportunity to make a good profit. The strong tie to and value orientation toward ranching as a preferred way of life--even if the monetary rewards are minimal--is further underscored by the fact that 87 percent of those contacted indicated they would remain in ranching even though the ranch provided only enough income to meet expenses and provided no "large" return on their investment. (The word "large" was used in conversation without quantification.)

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lack of continuity" of personnel in the BLM District Office has a deleterious effect on BLM land management efforts. In an industry where long-term planning is perceived as a must they feel the constant changeover in BLM personnel deprives the ranching community of consistency in interpretation and applications of various Bureau rules, regulations and policies as those rules, regulations and policies are related to specific ranchers and programs in the ES area.

This, coupled with the ranching community's philosophical opposition to both government intervention in the industry and continued federal ownership of "Nevada lands", tends to increase the potential for conflict between the Bureau and the community.

3

ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

ASSUMPTIONS AND ANALYSIS GUIDELINES

Certain assumptions on various environmental elements have been made in the analysis of the proposed action impacts which follow. The following general assumptions apply to all analysis herein; specific assumptions for individual resources are included in the respective sections.

1. The Allotment Management Plans would be prepared and implemented over a ten-year period (1980-1990) following completion of the Final Environmental Statement.

2. When Allotment Management Plans are prepared, an Environmental Analysis would be completed to assess the impacts of the grazing treatments and site-specific impacts of range improvements and vegetation manipulations.

3. The Bureau of Land Management would be funded and would obtain necessary manpower to implement the proposed action within established time frames.

4. Wild horse removal plans would be prepared within three years to meet the management levels in the proposed action. An Environmental Assessment would be prepared on these removal plans. In addition, Wild Horse Management Plans would be prepared and Environmental Assessments completed on these plans.

5. All increased forage production in the long-term (35 years) would be allocated to livestock, wildlife, and wild horses, as appropriate.

IMPACT ANALYSIS

Impacts are analyzed for those environmental elements predicted to be significantly impacted by implementation of the proposed action. Based on the analysis, no significant impacts are predicted to occur on the following environmental elements: climate; air quality; geological setting; topography; visual resources; paleontological resources; land use, including

recreation resources, wilderness values, mineral resources, and land use constraints.

Impacts on Soils

After the proposed action is implemented, the density of vegetation (one-half meter in height or less), should increase (see Vegetation, this chapter). Since any increase in low-growing vegetation reduces raindrop impact and runoff, erosion would be reduced (USDA Soil Survey manual, Handbook #18, 1962). This should be most noticeable on the 27 allotments (1990) where livestock grazing is removed or reduced, and affects 1,526,650 acres. Table 3-1 portrays estimated sediment reduction, by watershed, throughout the Environmental Statement (ES) area. In total tons this would be a reduction of 414,559 tons/year, or 19 percent less sediment production. (See Appendix D for methodology.)

Soil compaction (increase in soil bulk density) reduces the ability of the soil to absorb and hold water. Soil compaction occurs most readily on wet soils (Brady, 1974), such as around water troughs and reservoirs. Implementation of Allotment Management Plans (AMPs) with rest-rotation or deferred grazing systems, which prevent livestock from yearlong congregation near water sources, would help reduce soil compaction.

With 159 new water troughs to be installed, compaction of approximately 159 acres can be expected. Water reservoirs also tend to be areas where cattle congregate; so 33 new reservoirs would affect approximately 2,380 acres (0.07 percent of the ES area). There may be additional compaction from new water sources; however, improved distribution, reduction in numbers of wild horses, no grazing from 4/1 to 5/30, and elimination of grazing on 117,979 acres would reduce the amount of compaction overall.

Areas beneath pinyon and juniper trees (and some sagebrush) have zones of no vegetation and a build-up of decomposing litter. When disturbed by mechanical treatments, 233,641 acres would be more susceptible to erosion for a period of two to three years. Revegetation by grasses would have the long-term effect of reducing erosion on these areas (Arnold et al., 1964), and the present average erosion of 1.15 tons/acre should be reduced to an estimated 0.79 tons/acre by the year 2015 for a total reduction of 84,111 tons/year. Sagebrush destroyed by chemicals would remain standing, and soil beneath the dead plants would not be disturbed. The existing organic matter (duff) would continue to break down and release nutrients to the soil for increased seedling survival. Chemical treatments of 58,560 acres would reduce erosion from the present level of 0.63 tons/acre to 0.41 tons/acre by the year 2015 for a net reduction of 12,297 tons/year. Proper burning

TABLE 3-1
ESTIMATED ANNUAL SEDIMENT YIELD, PROPOSED ACTION
CALIENTE ES AREA

Watershed	Acres	Average Tons/Acre/Year	Estimated Sediment Tons/Year	Difference From Present Tons/Year
001	12,334	1.05	12,951	1,726
003	21,223	.50	10,612	1,910
004	6,261	.32	2,004	751
005	73,489	.66	48,503	6,674
006	75,087	.57	42,800	11,263
009	266,030	.43	114,393	42,565
011	18,752	.24	4,500	1,876
012	85,097	.33	28,082	9,361
013	49,323	.38	18,743	10,358
014	220,338	.52	116,779	41,864
015	6,075	.56	3,402	608
016	42,409	.61	25,869	4,665
017	91,664	.40	36,666	11,916
018	82,066	.66	54,164	9,847
019	145,776	.40	58,310	10,205
020	22,894	.37	8,471	1,602
021	177,481	.29	51,470	31,946
022	31,698	.40	12,679	2,219
023	57,080	.37	21,120	3,995
024	25,553	.53	13,543	6,389
025	7,034	.45	3,165	563
026	49,570	.44	21,811	5,958
027	57,758	.62	35,810	2,310
028	57,866	.42	24,304	2,893
029	28,872	.34	9,816	2,022
030	24,538	.35	8,588	5,889
031	11,384	.21	2,391	3,301
032	22,869	.43	9,834	2,286
033	29,906	.36	10,766	6,878
034	12,828	.51	6,542	1,026
035	22,796	.37	8,434	5,016
036	11,129	.40	4,452	779
037	50,102	.41	20,541	9,019
038	65,081	.46	29,937	4,556
039	36,675	.37	13,570	2,567
040	30,684	1.22	37,434	0
041	29,892	.41	12,255	0
042	19,298	.42	8,105	1,544
043	24,802	.41	10,169	1,488
044	28,434	.48	13,648	1,422
045	69,494	.52	36,137	15,983
046	106,684	.48	51,208	8,535
047	130,055	.69	89,738	15,606
048	60,698	.88	53,414	3,642
049	40,093	.94	37,687	7,618
050	7,037	.69	4,856	844
051	21,666	.65	14,083	1,516
052	13,467	.38	5,117	1,212
053	87,438	.48	41,970	9,618
054	71,691	.75	53,768	9,320
055	111,620	.50	55,180	10,676
056	18,801	.56	10,528	1,881
057	28,156	.63	17,738	3,379
058	36,907	.45	16,608	2,953
059	33,173	.54	17,913	2,986
060	116,259	.35	40,691	6,975
061	27,466	.29	7,965	2,472
062	74,949	.64	47,967	8,245
063	38,553	.37	14,265	2,698
064	56,024	.61	34,175	6,162
065	49,210	.48	23,621	3,937
066	32,195	.45	14,488	2,575
067	43,698	.64	27,967	4,807
068	96,611	.59	57,000	9,662
Totals	3,504,104		1,750,717	414,559

would seek to achieve a rapidly moving fire. Such a fire should have no adverse permanent effect on the soils. A hot, slow travelling fire may destroy organic matter and increase the water repellancy of the soil. The 108,960 acres proposed for burning would need site-specific soils information (such as soil moisture) to allow proper planning for prescribed burning. Revegetation by low-growing plants within the burn areas would reduce erosion from the present levels of 0.61 tons/acre to approximately 0.51 tons/acre for a net reduction of 11,985 tons/year.

The building of 492 miles of fences could disturb vegetation and increase the possibility of erosion on approximately 197 acres. These areas would probably remain adversely impacted since ungulates follow or trail fence lines. The data is not readily available and it is impractical to calculate erosion over narrow corridors impacted by fence building, but it can be assumed erosion would not be a major problem, except possibly on a few isolated slopes. Proposed wells and development of springs and pipelines also fit into the above category and only affect a small portion (228 acres) of the ES area. The total acres affected by fences, pipelines, wells, and springs (425 acres) represents 0.006 percent of the ES area and is considered insignificant for the total area. Locally, improvements may have severe impacts on the soil resource.

The present erosion condition classes were not considered in the suitability criteria (see Appendix A) for vegetation allocation. Livestock and wild horses may use some areas (45,720 acres, 1.3 percent of the ES area) in critical or severe erosion condition classes. (See Appendix Table D-1 for acres by erosion condition class.) Table 3-2 presents the acres in the 15 watersheds involved which may possibly be affected. Since these soils are quite susceptible to erosion, and surface disturbance is undesirable; the impact of grazing animals would result in the increase of sediment yield, the loss of topsoil, and a consequential reduction in productivity. Without proper control -- i.e., fencing -- grazing animals could disturb these 45,720 acres, increasing erosion by approximately 23 percent from the present estimated 30,989 tons/year (one percent of total erosion in the ES area) to 38,254 tons/year by 2015 (two percent of future erosion in the ES area).

Watersheds 001, 040, and 049 are presently eroding in excess of the tolerable level of one ton/acre. Watershed 001 would be reduced from 1.19 to 1.05 tons/acre, a reduction of 1,727 tons/year. Watershed 040 would remain unchanged at 1.22 tons/acre (37,434 tons/year) and watershed 049 would be reduced from 1.13 tons/acre to 0.94 tons/acre, a reduction of 7,618 tons/year. These three watersheds are producing 97,417 tons/year, 4.5 percent of the present erosion. It is predicted they will produce 88,073

TABLE 3-2
WATERSHEDS WITH POSSIBLE FORAGE ALLOCATION ON
CRITICAL OR SEVERE CONDITION SOILS
Caliente ES Area

Watershed Number a/	Acres (Approx.) Involved and Erosion Class b/		Allotments
001	3,520	Critical	Barclay Enterprise
014	4,480	Critical	Bald Mountain
019	4,480	Critical	Six Mile Pahroc
021	2,963	Critical	Mustang Oak Springs
024	960	Critical	Ely Springs Sheep
030	1,920	Critical	McGuffy Springs
037	320	Critical	Caliente
038	557	Critical	Oak Springs
042	1,280	Critical	Little Mountain
047-048	6,720	Critical	Henrie
047-048	6,400	Severe	Henrie White Rock
049	1,600	Critical	Pennsylvania
058	1,920	Critical	Morrison-Wengert
064	3,840	Critical	Gourd Springs
067	5,120	Critical	Sand Hollow
Total	45,720		

a/ Watershed numbers: Refer to the Watershed and Erosion Map.
b/ These are not the total acres in the noted "Critical" erosion condition class (see Appendix D, D-1), but only those areas that may have had AUMs allocated.

Source: U.S. Department of the Interior, Bureau of Land Management, Las Vegas District, Caliente Unit Resource Analysis, Watershed Overlay and Range Forage Inventory Summary Sheet, 1978.

TABLE 3-3
SUMMARY OF IMPACTS TO SOILS
CALIENTE ES AREA

Treatments, Projects Under Proposed Action	Portion of ES Area		Present (1980) Erosion		Future (2015) Erosion		Percent Change - Present to Future
	Acres	Percent	Tons/Acres	Tons/Year	Tons/Acres Estimate	Tons/Year Estimate	
Compaction Around Water Sources	2,380	0.07	0.61	1,452	0.61	1,452	0
Burning	108,960	3.1	0.62	67,555	0.51	55,570	-18
Mechanical Treatments	233,641	6.7	1.15	268,867	0.79	184,576	-31
Chemical Treatments	58,560	1.7	0.63	36,307	0.41	24,010	-34
Fences, Springs & Pipelines	228	0.006	-	-	-	-	-

tons/year, 5.03 percent of the predicted erosion. These watersheds are 2.37 percent of the ES area.

Conclusion

In general, the proposed action would benefit the ES area soils by stabilizing their surfaces, reducing erosion and sediment yield by 19 percent (414,559 tons/year) of the present condition, and by reducing the associated loss of organic matter and plant nutrients. This would have the long-term benefit of increasing site productivity. The relatively small number of areas, 46,145 acres, where soil erosion may increase (because of new water sources, fence lines and critical or severe erosion areas) would be offset by the overall expected reduction in sediment yield. (Table 3-3 summarizes the impacts to soils.) Two watersheds (001 and 040) would continue to produce sediments in excess of tolerable soil loss standards (Soil Conservation Service). These watersheds would not be grazed in the proposed action.

Impacts on Water Resources

Impact on Water Quantity

Annual water consumption by grazing animals under the proposed action (see Table 3-4) would be a minute fraction of the perennial yield within the Caliente Environmental Statement (ES) area, and would, therefore, have an insignificant impact on water quantity. The perennial yield from hydrographic basins which are wholly or partially within the ES area is approximately 110,000 acre-feet. (Nevada State Engineer's Office, Report 3, 1971).

Annual water consumption from grazing use could decrease from 105.7 acre-feet in 1977 (see Table 2-8) to 96.1 acre-feet by 1980. This 1980 usage would amount to 0.09 percent of the perennial yield. By 2015, consumption could increase to 182.7 acre-feet, which would be 0.17 percent of the perennial yield.

Groundwater levels would not likely be affected by additional grazing by ungulates. This is because the perennial yield is so large (110,000 acre-feet) within the ES area that usage of 9.6 acre-feet less in 1980 and an additional 77.0 acre-feet in 2015 over the 1977 usage of 105.7 acre-feet would be unnoticeable. Local changes in vegetative cover (i.e., vegetation treatment, Allotment Management Plans, etc.) would not alter the area's perennial yield by any significant amount.

The flows of Clover Creek, Meadow Valley Wash, Pine Creek, and Ash Creek would likely decrease by small, unquantifiable amounts because riparian vegetation would increase in vigor and abundance, thereby increasing evapotranspiration rates.

Impact on Water Quality

Water quality data is insufficient at present within the ES area to allow for quantification of water quality impacts. Only public water supplies are monitored at regular intervals.

The proposed action would not have a measurable effect on the concentration of dissolved solids. This is because water from undeveloped areas has chemical concentrations that are dependent on the geologic material over and through which the water flows and on the amount of time water is in contact with soluble salts. No changes in dissolved solids' concentrations would result from chemical treatments because treatments would be excluded from areas which have surface water flow.

TABLE 3-4
ESTIMATED CONSUMPTIVE WATER USE FOR LIVESTOCK, WILD HORSES, BURROS, AND WILDLIFE UNDER THE PROPOSED ACTION
CALIENTE ES AREA

Animal	Year	Number of Animals a/	Gallons/ Animal/Day	Gallons/ Year	Acre-Feet/ Year
Cattle	1980	5,606	10	20,461,900	62.8
	2015	11,860		43,289,000	132.8
Domestic Sheep	1980	2,928	2	2,137,440	6.6
	2015	8,048		5,875,040	18.0
Wild Horses,	1980	497	10	1,814,050	5.6
Burros, Mules	2015	754		2,752,100	8.4
Bighorn Sheep	1980	962	2	702,260	2.2
	2015	1,297		946,810	2.9
Mule Deer	1980	4,249 b/	4	6,203,540	19.0
	2015	4,583 c/		6,691,180	20.5
Total Consumption/Year in 1980				31,319,190	96.1
Total Consumption/Year in 2015				59,554,130	182.7

a/ Animal numbers are based on AUMs that could be available. Cattle and domestic sheep numbers have been prorated for the length of time livestock would be grazed annually on public lands.
b/ Reasonable number of deer was used to portray demand.
c/ Increase was due to the availability of future forage (see Proposed Action, Chapter 1).

Suspended sediment concentrations in streams would be decreased where grazing is to be eliminated or reduced. (See Wildlife Table 3-8.) Livestock and wild horses tend to concentrate in spring areas and along stream banks which increases sloughing of bank material and reduces stream side vegetation due to trampling. Eliminating or restricting grazing in riparian areas would increase stream bank vegetation. This would reduce suspended sediment concentrations caused by stream bank sloughing. Ten miles of stream within the Meadow Valley and Ash Flat allotments would be removed from grazing.

Sixty-one allotments [27 Allotment Management Plan (AMP) areas] have been identified in the proposed action for management under intensive grazing systems. Details for resting pastures from grazing would be developed when AMPs are formulated. Surface waters flowing through rest pastures would have less suspended sediment because soils would not be disturbed by livestock, and vegetative cover would be improved. Erosion rates would, therefore, be reduced (see Chapter 3, Soils, for quantification of erosion rates), reducing sediment yields correspondingly. The lower sediment yields resulting from both grazing management and vegetative treatments would, by 2015, reduce those portions of suspended sediment loads in surface waters that are attributable to livestock grazing, thereby improving water quality.

Fecal coliform bacteria levels would be reduced by unquantifiable amounts in streams within the Meadow Valley and Ash Flat allotments where it is proposed that grazing be eliminated along ten miles of stream. This contamination would also be reduced in streams within pastures rested from grazing use.

Conclusion

Water consumption by ungulates would be minimal when compared to annual water yield of the ES area. Therefore, water quantity would not be affected to the point at which water tables would be lowered or surface water supplies diminished. In areas where riparian vegetation would be enhanced by grazing management practices, stream flows would decrease by small, unquantifiable amounts due to increased evapotranspiration rates.

Water quality would benefit by the proposed action. Suspended sediment loads and fecal coliform bacteria concentrations would be reduced through implementation of intensive grazing systems and vegetative treatments. The amount of change is unquantifiable at this time.

Impacts on Vegetation

Estimations of vegetative impacts are based on professional judgement and cited studies which, although not conducted within the Environmental Statement (ES) area, are believed applicable to the area since the findings discuss the result of meeting basic plant needs. Providing for plant reproductive needs and establishment should result in generally similar responses regardless of location (Martin, 1975).

This section discusses the impacts to vegetation by grazing during the different periods-of-use. To relate these impacts to individual allotments according to their periods-of-use refer to Table 1-3 in Chapter 1.

Grazing from 3/15 to 6/15 would subject plants to grazing during critical growing periods. Therefore, short-term impacts under these treatments would result in decreased plant vigor, reproduction, litter accumulation, and seedling establishment (Hormay, 1970). The short-term impacts are offset by the recommended grazing treatments (see Chapter 1) in that each pasture would be rested for one to two growing seasons following each grazing cycle. These impacts would only occur on the allotments which the proposed action recommends for Allotment Management Plan (AMP) development (27 AMP areas on 2,515,301 acres) and the five existing AMPs (595,386 acres).

Fall and winter (11/1-3/1) grazing are considered to be the least harmful periods of grazing use. Garrison (1972, p. 278) found that fall and winter use of selected species is the least damaging to carbohydrate reserves. Defoliation of up to 50 to 60 percent of a current year's growth is less harmful in the fall, early or late winter, and early spring than in late spring or early summer (Cook et al., 1970, p. 51). Grazing management employing these periods-of-use allows for increased reproduction, seed trampling, and vigor (Hormay, 1970, p. 18). This type of treatment is recommended on the majority of the allotments (see Table 1-3) in the ES area with the exception of the four allotments which would be classified as ephemeral.

Repeated grazing treatments during late spring and early summer (3/30-6/15) or early fall (10/1-11/15) tend to defoliate the desirable plants and prevent them from producing adequate leaves and photosynthetic tissue. Under these conditions the plants are unable to produce seed and reproduction is reduced or eliminated. Therefore, the ten allotments proposed for seasonal grazing (non-AMP) where spring and fall grazing (10/1-3/30) are employed every year (294,628 acres) would experience reduced vigor, a decrease in crown cover, a slow down or reversal of preferred species establishment, and an increase in less preferred plant distribution. On all ten allotments the proposed period-of-use requires that a rest be provided from 4/1 to 10/30. Therefore, the adverse effects on vegetation should be lessened.

Grazing animals tend to congregate in areas where desirable forage and water is readily available (approximately 1,208,195 acres). They stay in these areas until desirable vegetation or water is depleted; then they begin using forage in areas of more difficult accessibility and also utilize plants of low palatability. They also travel greater distances to water. If grazing animals are allowed to concentrate in the same areas year after year, they would eventually cause the removal of desirable perennial vegetation and promote the establishment of undesirable annual vegetation or shrub species. Providing additional water on 491,769 acres would help reduce concentrations of animals at

present water sources resulting in better utilization of available forage.

The most serious impacts resulting from poor distribution of livestock, wild horses, and burros occur in riparian areas (approximately 5,000 acres). These animals tend to remain in the riparian areas until the palatable forage is depleted. In so doing, they may cause adverse impacts to the vegetation by trampling it. This tends to remove the majority of the ground cover which results in increased erosion and degradation of the site. Reducing the number of animals in a given area tends to reduce the grazing pressure in less desirable areas such as steep slopes and areas distant from water. However, grazing pressure remains relatively uniform within the riparian areas. The lower number of animals simply remain in the riparian areas and are not forced to utilize less desirable areas.

Ash Flat and Meadow Valley allotments would have no livestock or wild horse grazing. Approximately 10 miles of riparian area within these allotments should improve.

Wild horse use on approximately five miles of riparian areas (Clover Creek) would continue to occur year-round. Therefore, these areas would probably tend to deteriorate in the long-term (35 years).

The remaining 42 miles (approximately) of riparian areas, on public land, would have wild horses removed and livestock would be managed under AMPs, i.e., fencing, alternate water sources, periodic rest, so that riparian vegetation should be benefitted.

There would be approximately 401,161 acres of the Caliente ES area disturbed by vegetation manipulations under the proposed action. Average time for maximum livestock forage production to occur should be from three to five years after completion of the treatment.

The impact of mechanical treatment on 233,641 acres should be a change in species composition from shrubs or trees to more desirable forage species including grasses, shrubs, and forbs, for wildlife, wild horses, and livestock. The long-term (35 years) impact should be an increase in preferred forage production. Livestock forage condition on these areas could be expected to improve. About 23,365 additional Animal Unit Months (AUMs) should be provided from mechanical projects. (See Appendix E, Section 6, for estimated AUMs technique.)

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The objective of chemical treatment on 58,560 acres would be to remove or reduce shrub species (i.e., sagebrush and blackbrush) which should result in a change in species composition toward forage species including grasses, shrubs, and forbs utilized by wildlife, wild horses, and livestock. There should be an increase in forage production. Livestock forage condition could be expected to improve in the long-term (35 years). About 5,859 additional AUMs should be provided from chemical treatment projects. (See Appendix E, Section 6, for estimated AUMs technique.)

Burning would have the short-term impact of removing vegetative cover the first growing season of the burn (108,960 acres). Long-term impacts would include a change in species composition toward more grasses and forbs and an expected increase in forage production. Range condition should improve on the acreage receiving the treatment in the long-term (35 years). About 10,900 additional AUMs would be provided from burning projects.

The fences recommended in the proposed action would permanently remove approximately 197 acres from vegetative production. Water developments (spring developments, water pipelines, troughs, reservoirs and wells) would initially disturb approximately 227 acres and permanently remove about 2,542 acres from vegetative production due to increased use and trampling associated with these types of improvements. These water developments would permit grazing in areas now potentially suitable (due to lack of water) and would result in additional concentrated use areas of about 2,542 acres around the new developments.

The proposed action would reclassify areas presently classed as potentially suitable for grazing to a suitable classification through development of water sources providing an additional 25,106 AUMs. Vegetative manipulations could also result in an unsuitable type changing to suitable through increased productivity on the site, and increased densities of preferred forage species for wildlife, wild horses, and livestock. This change would make an additional 40,124 AUMs available for allocation in 35 years.

The major impacts to vegetation as a result of the proposed action should be an increase in the acreage of good condition range. It is estimated that at the end of 35 years the amount of good condition range with vegetative treatment would go from 688,751 acres to 1,726,640 acres; fair condition range would go from 1,374,539 acres to 354,881 acres; and poor condition range would go from 512,351 acres to 512,012 acres. For specific projections regarding vegetative condition by allotment see Appendix E, Table

E-3. Table 3-5 summarizes condition. See Appendix E, Section 5 for methodology in predicting changes in range condition.

The expected changes in livestock forage condition can be attributed to the improvement in condition of 401,161 acres (12 percent of the ES area) through vegetation manipulations, along with the additional intensive grazing management proposed on 2,513,301 acres (72 percent of the ES area), which would provide a systematic rest period for each of the forage species as discussed in Chapter 1 under General Reasons for Implementing AMPs. The number of wild horses grazing yearlong will be reduced by 53 percent under the proposed action, livestock use will be reduced by 30 percent on 24 allotments (1,499,103 acres) along with rest provided for forage plants from April 1 to May 30 on all allotments until AMPs are developed. Also utilization of only a maximum of 50 percent of the current year's growth of the forage plants will be allowed, enabling the plants to remain in fairly high vigor and produce more seed or reproduce vegetatively. Therefore, it is assumed that thereshould be an improvement in livestock forage condition. The change specified in Table 3-5 would be gradual over the 35 year period and would be very slow at first until the AMPs were implemented. The amount of change could also be effected by frequent drought in the ES area, which is common in the desert environment.

The vegetation on most of the ES area would be held below or maintained at below its ecological climax community since the proposed action is managing for forage species which benefit wildlife, wild horses, and livestock.

The livestock forage condition on areas presently in poor condition would show very little improvement over the 35 year period through management alone because these types would have no (or very few) desirable or intermediate forage plants, and without a seed source densities of these plants could not increase.

The 28 allotments which will have increased use by 1990 would all be under intensive grazing management. These increases are due to the development of additional water sources on 491,769 acres which would allow better distribution of livestock over the ES area and reduce the concentrated use areas around existing water sources as well as allowing the individual plants which previously were grazed over and over to be grazed less often or not at all. The forage plants in these areas would probably increase in density and therefore, livestock forage condition should improve.

TABLE 3-5
SUMMARY
ESTIMATED LIVESTOCK FORAGE CONDITION a/
AFTER 35 YEARS UNDER PROPOSED ACTION

	Acres Good	Acres Fair	Acres Poor
Present	688,751	1,374,539	512,351
Future	1,726,640	354,881	512,012

a/ See Appendix E, Table E-4 for acreage by allotment.

Conclusion

In spite of some individual and short-term adverse impacts as discussed above, beneficial effects should be obtained through the implementation of improved grazing managment under the proposed action.

Reduced levels of grazing (by 1980) on 24 allotments (from 43,450 AUMs to 29,913 AUMs) coupled with grazing management systems that provide a systematic rest or deferment from spring grazing and a shift away from concentrated use areas should result in an increase in total ground cover (two percent) by live vegetation and litter. Livestock forage condition also should improve. Livestock forage production should increase from 109,914 AUMs to 162,336 AUMs by the year 2015.

Impact on Threatened or Endangered Flora

Eleven of the 27 species proposed as threatened or endangered flora (Appendix C) could be affected by the proposed vegetation allocation, since these 11 species possibly occur in areas readily accessible to livestock, wildlife, and wild horses and burros. These 11 species are not considered especially palatable and, except for occasional sampling by grazing animals, they would probably remain ungrazed. Table 3-6 shows these species by location and proposed status.

TABLE 3-6
ELEVEN PROPOSED THREATENED OR ENDANGERED FLORA
POSSIBLY AFFECTED BY THE PROPOSED ACTION

Locations	Species Affected	
A. Creosotebush Zone (<4,000'elevation)	Machaeranthera leucanthemifolia	E a/
	Mirabilis pudica	T a/
B. Shadscale Zone (4,500'-5,000' elevation)	Arctomecon merriamii	E
	Haplopappus brickellioides	T
C. Sagebrush Zone (5,000'-6,000' elevation)	Astragalus oophorus var. lonchocalyx	T
	Castilleja linoides	T
	Machaeranthera leucanthemifolia	E
D. Pinyon-Juniper Zone (6,000'-8,000' elevation)	Astragalus convallarius var. finitimus	T
	Astragalus oophorus var. lonchocalyx	T
	Castilleja linoides	T
	Machaeranthera grindeloides var. depressa	T
	Townsendia jonesii var. tumulosa	T
E. Volcanic Soils, Washes	Arctomecon merriamii	E
	Mirabilis pudica	T
	Phacelia anelsonii	T
	Phacelia beatleyae	E

a/ T = Threatened E = Endangered

Source: The above list is derived from Appendix C of this Environmental Statement; Area Manager, Sacramento, U.S. Fish and Wildlife Service, Memorandum to District Manager, Bureau of Land Management, Las Vegas, on informal consultation on proposed Threatened/Endangered Plants, Caliente Planning District (#1-1-78-1-3), January 23, 1979.

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Although these species are not preferred by grazing ungulates, the increased livestock densities associated with AMPs might cause heavier utilization and certainly a greater loss of plants because of trampling.

Proposed threatened or endangered populations located in areas proposed for vegetative manipulation (mechanical, chemical, or burning--401,161 acres) could be harmed in those areas even if inventories are completed (see Chapter 1). Most of the areas proposed for vegetative manipulation are located in pinyon-juniper and sagebrush vegetation types (Areas C and D, Table 3-6).

All of the other range improvement projects shown in Table 1-9 have less potential for significantly impacting proposed threatened or endangered flora populations; however, they may cause the loss of numerous individual plants. Most of these projects are proposed for areas mainly in pinyon-juniper and sagebrush vegetation (Areas C and D, Table 3-6). Fewer projects would be implemented in the shadscale zone and along washes (i.e., water pipelines), with the least amount of projects to be implemented in the creosote bush zone.

Conclusions. If projects were not modified to protect threatened or endangered flora, vegetative manipulations are the most probable components of the proposed action for adversely affecting flora. Intensive livestock use, resulting from AMPs or increased use on non-AMP areas by livestock would also be harmful to these species, mainly because of trampling. Other range improvement projects would impact the species more intensely, but in localized areas of relatively small acreage. The planned protection of these flora areas from project development and the already current exposure of some areas to existing grazing indicates that only marginal impacts, if any, are likely from the proposed action.

Impacts on Wildlife

Impact on Bighorn Sheep

Present competition for space, water, and forage -- particularly forage around crucial water -- occurs between bighorn sheep and domestic livestock on bighorn ranges BY-1, BY-2, and BY-3 (see the Big Game Areas Map in Chapter 2). The amount of livestock use in 1980-1990 under the proposed action affecting bighorn sheep populations is indicated in Table 3-7.

Bighorn sheep are extremely sensitive to any competition from other ungulates. Studies done in southern Utah by Wilson in 1968, indicate severe competition for space between bighorn sheep and livestock. Wilson found in Red Canyon that no bighorn sheep use

TABLE 3-7
PROPOSED LIVESTOCK USE ON BIGHORN RANGES

Sheep Range	Allotment	1977 Licensed Livestock Use (AUMS) on Bighorn Range a/	1980-1990 Proposed Livestock Use (AUMS) on Bighorn Range a/	Difference Between Present and Proposed Use	Approximate Acres of Habitat in Allotment	Present Numbers of Bighorn Sheep in Entire Range	Anticipated Population of Bighorn Sheep Resulting from Vegetation Allocation (2015)
BY-1	Morman Peak	259	1,209	+950	64,619	404	200
	Gourd Springs	313	196	-117	13,697		
	Henrie	240	288	+ 48	12,848		
	White Rock	89	126	+ 37	2,251		
	Totals	901	1,819	+918	93,415		
BY-2	Breedlove	397	18	-379	51,561	259	335
	Henrie	864	1,036	+172	47,218		
	Morrison-Wengert	1,654	872	-782	31,315		
	Schlarman	148	259	+111	3,703		
	Elgin	246	174	- 72	3,788		
	Rox	33	0	- 33	2,275		
	Totals	3,342	2,359	-983	139,860		
BY-3	Delamar	1,115	1,044	- 71	48,610	50	50
	Oak Springs	1,559	1,784	+225	38,709		
	Totals	2,674	2,828	+154	87,319		
BY-4	Pine Cone	69	199	+130	9,384	50	50
	Bald Mountain	872	798	- 74	39,222		
	Pahranagat West	81	77	- 4	4,260		
	Lower Lake	2	23	+ 21	2,595		
	Totals	1,024	1,097	+ 73	55,461		
	Grand Totals	7,941	8,103	+162	376,055	763	635

a/ These figures were derived by using a weighted average of the total use on each allotment based upon the acres of habitat occurring on each allotment.

had been evidenced since the introduction of 25 to 30 head of cattle in 1887. Cattle were removed and within six months bighorn sheep reoccupied the canyon. Another study area considered as a home range for a band of bighorns had no livestock use. Thirty heifers were introduced to the area for two weeks. The band of sheep left the area and did not return for eight months. Because of this competition for space, the quantity of forage and water present in an area is not the only consideration when meeting bighorn needs.

Livestock use would double on bighorn range BY-1 as a result of the proposed action. Allocation of forage for bighorn on this same range is short 209 AUMs. The exact impact to the bighorn population cannot be calculated, but based on professional judgement and the effects on bighorn populations documented in studies like those discussed in the previous paragraph, it is estimated that the population in BY-1 would decrease at least by half to a population of 200 animals within five years. In area BY-2, livestock use is decreased by one-third. It is expected that the bighorn sheep population in this area would increase to Nevada Department of Fish and Game's reasonable numbers of 335 animals. Populations in areas BY-3 and BY-4 are not expected to change. Overall the population of bighorn sheep in the ES area would decrease by 128 animals (year 2015).

Conclusion. The proposed action would reduce the existing bighorn sheep population by approximately 128 animals because of increased competition for space, water, and forage immediately adjacent to waters. The effect would be greatest in BY-1. Reasonable numbers (874) for bighorn sheep would not be achieved by 2015 under the allocation as proposed.

Impact on Mule Deer

For this analysis, it is assumed the present population of mule deer is below the "reasonable numbers" estimated by the State as desirable (see Chapter 1). Under the proposed action, vegetation allocation (1980-1990) would meet reasonable numbers for all deer ranges except DS-1, DW-4, DW-5, DY-2 (see the Big Game Areas Map in Chapter 2). A total of 2,643 AUMs (17 percent) would not be met because forage is unavailable (see Table 2-13).

Deer do not travel more than about 1.5 miles to water (Hanson and McCulloch, 1955). Approximately 140 proposed water developments (troughs, wells, reservoirs), along with 257 miles of pipeline which could supply lateral watering devices would be constructed on allotments containing deer range. New water developments in areas that have sufficient forage may open additional areas for deer utilization.

Approximately 300 miles of fence are proposed for allotments containing mule deer range. The proposed action mitigates the impacts of fences by specifying that fences would be constructed to allow wildlife access. However, an undeterminable amount of entanglement leading to death or injuries will occur as long as fences exist.

Pinyon-juniper and big sagebrush have been steadily expanding into new areas over the past 20 years (BLM, Las Vegas, Caliente URA Step 3, Range Management 1978). This is undesirable for mule deer because pinyon-juniper and big sagebrush are better competitors for nutrients and water and eventually eliminate other plants in the understory that provides deer forage. Approximately 835,800 acres of pinyon-juniper (24 percent) and 271,044 acres of big sagebrush (eight percent) exist in the ES area.

During the period between 1980 and 2000, approximately 401,161 acres are proposed for vegetative manipulation. Most of the manipulations would occur in pinyon-juniper or big sagebrush vegetation types. Approximately 324,121 acres would be manipulated on deer ranges including ranges where deer forage shortages occur. Where determined necessary, vegetative manipulations would be seeded with a mixture of grasses, forbs, and shrubs to increase forage for deer and other wildlife. In addition, the manipulations would follow BLM visual resource guidelines to create a natural appearance. This should maximize ecotone areas which would provide necessary escape cover for deer.

Conclusion. Mule deer should benefit due to the availability of forage in the future from vegetation manipulation, from additional water sources, and from the allocation of forage both in 1980 and the future. The reasonable numbers (8,819) desired for mule deer should be achieved and could potentially be exceeded by the year 2015.

Impact on Desert Tortoise

The desert tortoise population is declining in an adjacent Utah area (BLM, Hot Desert Grazing ES, 1978). Grazing is considered to be one of the contributing factors for the decline (Coombs, 1977). No studies have been conducted to verify the status of desert tortoise in the Caliente ES area, but the population may be experiencing similar declines.

By 1990 with the proposed action, livestock and wild horse grazing would be reduced approximately 5,079 AUMs (37 percent) of present use on desert tortoise habitat. The period-of-use on all allotments in desert tortoise habitat would be changed to eliminate grazing after March 30, through the summer of each year. This should minimize competition from livestock to the tortoise.

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Reduced trampling of tortoise burrows and tortoises would also occur.

Tortoises reach sexual maturity only after they are 15 to 20 years old (Berry 1978). If the population in Caliente is in fair shape, with a substantial segment being reproducing females, a relatively fast increase in desert tortoise may occur. Should the populations be depressed, with very few reproducing females, a sizeable increase may not occur for several years.

Conclusion. The reductions in grazing (livestock and wild horses), combined with the removal of livestock during the spring and summer (4/1-9/16), should have positive effects on the desert tortoise population. However, these effects would probably not be noticeable for many years because of the length of time required for tortoises to reach sexual maturity. Specific studies on the populations in the Caliente ES area would be necessary to provide any further quantitative dimensions to these estimates.

Impact on Threatened or Endangered Wildlife

No impacts to federally listed threatened or endangered wildlife are anticipated with the proposed action.

Impact on Other Wildlife

Water is the major factor limiting most wildlife species in the Caliente ES area. Approximately 210 new waters (159 troughs, 33 reservoirs, 18 wells) are proposed. This does not include lateral wildlife watering sites which could be supplied by 319 miles of pipeline. Assuming one lateral watering site for each five miles of pipeline would be constructed, 64 additional waters for a total of 274 new watering sites would be created for wildlife use. Expansion into new habitat previously limited by a lack of water could be expected by Gambel's quail, mourning dove, small mammals, predatory mammals, and some nongame birds.

Most of the perennial streams on public land in the ES area are noted to be lacking streamside vegetation in whole or part. Stream bank degradation has also been documented on some streams. Livestock and wild horse use is considered to be one of the factors contributing to the degradation process. Table 3-8 indicates that 53 miles of the perennial stream occuring in the ES area would receive a 58 percent reduction in grazing by wild horses and domestic livestock. Table 3-8 does not show Beaver Dam Creek (2 miles on public land) and Headwaters Creek (two miles on public land) because these two streams are presently fenced for to prevent livestock and wild horse grazing for watershed protection

purposes. This elimination of grazing would continue to occur with the proposed action.

TABLE 3-8
PROPOSED GRAZING USE ON PERENNIAL STREAMS
CALIENTE ES AREA

Streams	Miles of Stream on Public Land in ES Area	Miles of Stream Where Grazing to be Reduced (1980-1990)	Percent Decrease in Grazing Use Level to Occur
Clover Creek	13	13	9
Meadow Valley Wash	27	27	74
Pine Creek	4	4	72
Ash Creek	9	9	72
Totals	53 a/	53	58

a/ Does not include four miles of fenced stream; see p. 3-19.

A 58 percent decrease in grazing should promote an increase in riparian vegetation along perennial streams in the ES area. Sloughing of stream banks caused by grazing animals should also be reduced. Presently, fish production is felt to be limited by high water temperatures, siltation of pool areas, and lack of cover by overhanging banks. An increase in riparian vegetation would shade streams and reduce water temperatures. Stream banks should recover and overhangs should develop. In addition, siltation of pool areas should be reduced. These factors would promote an increase in fish populations including the Big Spring spinedace (State classified rare). Other wildlife populations should increase. This includes waterfowl, Gambel's quail, mourning dove, cottontail rabbits, and some nongame birds which use riparian areas for cover and food.

The lack of plant diversity in pinyon-juniper and big sagebrush vegetation types, as discussed in the mule deer portion of this chapter, affects other wildlife species as well. The proposed vegetation manipulations (401,161 acres) would create greater plant diversity and increase ecotone areas. In response to increased plant diversity and ecotone areas, wildlife diversity and wildlife biomass would increase. More wildlife species and greater numbers of each species could be supported.

A short-term impact resulting from vegetation manipulation would be displacement or elimination of some of the animals living in the manipulated area.

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Conclusion. Fish populations, upland game birds, nongame birds, and small mammals should benefit from the proposed action because of a 58 percent reduction in grazing by livestock and wild horses on 53 miles of perennial stream, increased ecotone and plant diversity from 401,161 acres of vegetation manipulation, and increased habitat expansion resulting from the construction of 274 possible new watering sites.

Summary of Impacts to Wildlife

Overall, most wildlife species except bighorn sheep should benefit from the proposed action. Mule deer should reach or exceed reasonable numbers (8,819 animals); desert tortoise populations could increase providing there is a viable breeding population; fish and bird populations dependent on riparian vegetation should increase; and more wildlife should occupy the area because of increases in ecotone, plant diversity and water. Bighorn sheep, on the other hand, should decrease in population by 128 animals. No impacts to threatened or endangered species are anticipated.

Impacts on Wild Horses and Burros

The proposed action allocates vegetation for six Wild Horse Management Areas totaling 605,562 acres (44 percent) of the Wild Horse and Burro Areas (see the Wild Horse Management Areas Map). Allocation of vegetation to 126 wild horses within the Clover Creek, Cove, Little Mountain, Mustang Flat, Peck, and Sawmill Canyon allotments (1,516 AUMs or 25 percent of the AUMs proposed for allocation to wild horses) would have a beneficial impact upon those horses. These allotments contain 69,336 acres or 11 percent of the acres within the Wild Horse Management Areas. Competition for forage with livestock would be reduced and competition among the horses themselves would be controlled by periodic removal of excess horses.

In the remaining 15 allotments within the Wild Horse Management Areas, vegetation would be allocated for 370 wild horses (4,440 AUMs) on 536,226 acres (89 percent). Horses would be managed with emphasis on small, healthy herds (between 38 and 170 animals) rather than allowing them to increase in numbers greater than the capacity of the resource.

In the recommended removal areas, those horses and burros removed (556 or 53 percent of 1977 level) would be adversely impacted because of separation from their native environment. All wild horses and burros outside of recognized Wild Horse and Burro Areas will also be removed. Separation of mares from their colts and stallions from their harems may also result from these removals. This would cause distress to those animals affected.

Intensive livestock grazing systems on the above 15 allotments within proposed Wild Horse Management Areas would increase the competition for forage among wild horses and livestock in pastures being grazed. This would result from increased confinement leading to more thorough foraging by livestock within the pastures being grazed. Increased forage competition with livestock could cause some wild horses to move out of traditional areas of use; however, the magnitude of this reaction is presently unmeasurable. Horses should also benefit from additional forage as the range production increases as a result of these systems and deferment of livestock grazing during April and May.

If wild horse winter use areas in allotments with intensive grazing systems are grazed in the spring, summer, and fall (2/1-11/30), forage may be unavailable due to snow in the rested pasture during the winter. This would be a problem in the Buckboard Spring, Delamar, Highland Peak, Oak Spring, Oak Wells, Pioche, Rabbit Spring, Rattlesnake, and Sheep Spring allotments (64 percent of the acres within the Wild Horse Management Areas).

Proposed fences and watering developments would also affect wild horses. The construction of additional fences within allotments would restrict free movement of wild horses and could cause injuries from collisions or entanglements. Fences would confine them during the livestock grazing season and may also prevent their movement into historic wintering areas (see above for those allotments with presumed wintering areas).

Wild horses would benefit since the 61 additional watering sources would, in some areas, reduce traveling distances to water. Other areas presently ungrazable because of distance from water might be made available with the additional sources. The forage from these areas would also be made available to livestock and the net benefit to wild horses would be dependent upon the terrain and distances involved. Horses in those allotments with privately controlled waters could be forced out of those areas if the waters are turned off by the owners.

Additional forage resulting from vegetation manipulations would be used by livestock and wild horses. This additional forage should reduce competition for forage among these range users.

Wild horses would also benefit from the 3,086 additional AUMs which are projected to be available to them by the year 2015 (see Table 1-3). The additional forage should reduce competition with livestock and increase wild horse distribution.

Conclusions

Horses dependent upon wintering areas within the Wild Horse Management Areas (15 proposed AMPs) would probably be more adversely affected than horses in non-AMP and no grazing areas. Those 15 allotments are also proposed to receive about 61 additional water sources and 86,253 acres of vegetation manipulation (Table 1-9). The greater distribution and additional forage from these projects should minimize the adverse effects associated with those allotments' AMPs.

The 126 wild horses (25 percent of the proposed population level) retained in the six allotments proposed for horse-only use would be beneficially affected. There would be a 53 percent reduction (from 1,072 to 497 animals) by 1983 which would adversely affect them.

Impacts on Cultural Resources

Cultural resources are finite, fragile, and non-renewable. Grazing practices which disturb the soil surface could damage the cultural integrity of the known 147 archeological sites and 160 historical sites in the Caliente Environmental Statement (ES) area. (The Caliente Unit Resource Analysis can be consulted for site locations.) Trampling by grazing animals could crush or scatter any artifacts remaining on the soil surface at a cultural site. Trampling would continue to have a potential impact under the proposed action.

Those sites located within one mile of a surface water source would be more likely to sustain damage caused by trampling because animals traverse areas surrounding water more frequently. Of the 104 archaeological sites within approximately one mile of water, 82 would be subject to trampling effects because they contain materials on the ground surface: chipped or ground stone, mounds, roasting pits, ceramics, etc. Rock art (petroglyphs and pictographs) comprise 22 of the 104 archaeological sites and would not likely be impacted because they are located on rock walls and boulders. Sixty-one historical sites are located within one mile of water and could suffer damage from trampling. A total of 143 archaeological and historical sites (the 22 rock art sites are not included) would be more heavily trampled.

Cultural resource site salvage determinations are to be made as stated in Chapter 1, Standard Operating Procedures, Part 9. Salvage would result in an impact to the site. If all cultural materials are removed from an original setting, the find ceases to be a site and is unavailable for future research.

Any impacts to cultural resources caused by weathering would continue at present rates, unaffected by the proposed action.

Impacts to sites because of erosion would continue at slightly lesser rates (see Chapter 3, Soils, for changes in erosion rates) in areas where erosion rates would decrease as a result of the proposed action.

Impacts on Land Use

Impact on Livestock Grazing

It is anticipated that the proposed intensive grazing management, as well as changes in periods-of-use, should increase vigor and production of preferred forage species. The expected improvement in livestock forage should be reflected in improved livestock conditions. Initial reductions (1980) in Animal Unit Months (AUMs) (48,585 to 24,908 AUMs) on 33 allotments would result in the short-term in order to make allowances for wildlife, wild horses, and the lack of suitable livestock forage. Impacts to livestock operators concerning adjustment in AUMs are displayed and discussed in the Social Economics section of this chapter. Nineteen allotments would receive increases (1980) from 28,034 AUMs to 44,987 AUMs (Table 1-7).

The impacts obtained from the proposed periods-of-use should be reflected in the change in percent plant composition as physiological rest periods are provided for forage plants. The change in periods-of-use and intensive grazing management can favor cool season or warm season plants, as well as some shrub species, depending upon the periods-of-non-use. (For further discussion on impacts of changes in periods-of-use see the Social Economic section of this chapter.) Because of this, there would be an increase of approximately 10,490 AUMs ES areawide. Vegetative manipulation projects would provide an additional 36,112 AUMs within the ES area. (See Table 1-2 for figures on estimated future AUMs.)

Changes in periods-of-use which require livestock to be removed during times when calving would normally occur or prior to calving could result in increased calf loss because of abortion and stress to the cow and/or calf.

Over the long-term (35 years) the livestock grazing capacity of the area would be expanded to 146,001 AUMs and increased livestock stocking would be possible. The short-term losses in permitted use should be reversed and an 87 percent gain over present levels should be achieved.

Conclusion. After 35 years under the proposed action forage production should increase by approximately 46,602 AUMs through management and vegetative manipulation. (See Appendix E, Section 6 for methodology for estimating future AUMs.) Increased forage could be allocated to livestock. At the time additional forage is determined available for grazing use, an allocation would be made to grazing animals through the BLM planning system. In spite of some individual and short-term adverse impacts, it appears that the overall net impact of the proposed action on livestock should be beneficial.

Impact on Agriculture

Agricultural production may be affected in Lincoln County if any livestock operators go out of the livestock business or are severely curtailed because of changes in vegetation allocation resulting from the proposed action. Some private land holdings may be sold or put into crop production (i.e., alfalfa, barley, potatoes). Other holdings may be subdivided into "ranchettes."

Impact on Forest Resources

No significant impacts to forest resources are anticipated except in areas where vegetation manipulation involving pinyon-juniper as a target species occurs. Where pinyon-juniper is chained or burned, the trees removed would add to down and dead materials that could be used for firewood. After a chaining or burning occurs, invading young trees would help supply a growing demand for Christmas trees.

Impact on Wilderness

The Bureau of Land Management is required by Section 603 of the Federal Land Policy and Management Act of 1976 to protect potential wilderness areas from actions that could affect the natural character of the land. Areas which have the potential of being designated wilderness study areas at a later date (i.e., the southern Delamar Mountains) would not be impacted by the proposed action. See Chapter 1, Standard Operating Procedures, Part 7.

Impacts on Economics

This section deals with the impacts of the proposed action on the income, employment, ranch values, ranch production characteristics, and tax revenues of the Environmental Statement (ES) area and its surrounding communities in Lincoln and Clark Counties, Nevada. Impacts stem from construction of range improvements (Table 1-9) and from the change in allowable livestock use (preferences) from the 1977 level of 118,580 Animal Unit Months (AUMs) to 74,293 AUMs in 1980. Since the ranchers in

the ES area had permits for 78,236 AUMs in 1977--66 percent of their allowable use--and, based on past trends there is no reason to expect them to seek permits for all of their future allowable use; it is estimated that their permits under the 1980 allocation would be 61,802 AUMs. Relevant methodologies and calculations not contained in this section can be found in Appendix G. All estimates are based on 1977 dollars.

Impact on Income

Ranchers who use public land forage in the ES area are estimated to have made low incomes in 1977. Ranchers with small cattle operations (less than 350 head) are estimated to have lost $6,560 each; ranchers with medium sized cattle ranches (350-800 head) are estimated to have earned $7,939 each; ranchers with large cattle ranches (over 800 head) are estimated to have lost $67,431; and sheep ranchers are estimated to have made $14,806 each.

The proposed action would cause a decline in ranch income of $62,781 (Table 3-9) per year in 1980 from the 1977 level of $96,728. The effect on different ranch categories follows. First, small cattle ranches would lose an additional $1,149 each per year. Since most of these ranchers have off-ranch sources of income and have operated with losses in the past it is expected that although the proposed action would lower their standard of living it would probably not force them out of the livestock business. Second, medium sized cattle ranches would have a decrease of $873 each from their 1977 income. This represents 11 percent of their ranch income for that year. Third, large cattle ranches would cut their substantial yearly losses by $1,269 - a change of two percent. Fourth, sheep ranches would lose $1,566 per year from their 1977 level. This is an 11 percent decrease in income. (Refer to the budgets in Tables 3-10 to 3-13).

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TABLE 3-9
SUMMARY OF RANCH INCOME IMPACTS IN CALIENTE ES AREA

Ranch Categories	Change in Proprietor's Income		Change in Labor Income		Change in Total Income	
	Proposed Action (1980)	Long-Term (2015)	Proposed Action (1980)	Long-Term (2015)	Proposed Action (1980)	Long-Term (2015)
Small Cattle (33 ranches)	$-37,917	$+ 7,656	$ 0	$ 0	$-37,917	$+ 7,656
Medium Cattle (13 ranches)	-11,349	+70,915	-5,226	+23,179	-16,575	+94,094
Large Cattle (1 ranch)	+ 1,269	+30,749	+ 952	+25,564	+ 2,221	+56,313
Sheep (5 ranches)	- 7,830	- 5,220	-2,680	-1,480	-10,510	- 6,700
Total	-55,827	+104,100	-6,954	+47,263	-62,781	+151,363

Over the long-term the availability of livestock forage is expected to increase significantly. As a result, it is estimated that use authorized by permit may reach a level of 115,414 AUMs in 2015. (See Appendix G.) This is an increase of 37,179 AUMs over their 1977 use level. This may cause an increase in the ranchers' yearly income of $151,363 above the 1977 level of $96,728. Small cattle ranchers would lose $232 less than in 1977, but would still have net losses of $6,328 per year. Medium and large sized cattle ranches would have significant increases in yearly income, $5,455 and $30,749, respectively. However, the large cattle rancher would still have net losses ($36,682). Sheep ranchers would have lower incomes than in 1977 ($1,044). Refer to Tables 3-10 through 3-13.

If all AMPs are determined to be feasible and manpower and funding is available, implementation of the proposed action would involve substantial expenditures for range improvements. Over a 20-year period (1980-2000) it is estimated that $9.6 million would be spent. For each dollar expended in new construction in Southern Nevada, 41 cents goes to households as direct income (State Engineers Office, 1974). At this rate the total direct income from range improvements would be $3.9 million. If the range improvement expenditures are spread evenly over 20 years then yearly direct construction income would be $197,000. This represents less than one percent of the construction income in the

Table 3-10
BUDGET FOR SMALL RANCH

Expenses	Proposed Action (1980) (156 AUs)	Long-Term (2015) (199 AUs)
Livestock Purchases	$ 510	$ 651
Repairs & Maintenance	702	895
Depreciation	4,542	4,542
Interest		
Operating Capital	903	1,152
Real Estate	6,728	6,728
Gas & Lubricants	1,139	1,453
Supplements	331	422
Taxes		
Livestock	438	559
Real Estate	460	460
Custom Work	2,187	2,187
Insurance	700	700
Grazing Fees		
Caliente BLM	539	1,247
Other BLM	236	236
Forest Service	107	107
Utilities	315	315
Alfalfa & Grass Hay Expenses	339	339
Marketing Costs	495	631
Veterinary Costs	170	217
Miscellaneous	468	597
Pasture Rent		240
Total	21,309	23,678
Receipts		
Heifer Calves	3,956	5,047
Steer Calves	7,334	9,355
Cull Cows	1,789	2,283
Cull Bulls	521	665
Total	13,600	17,350
Income	- 7,709	- 6,328
Change from 1977	- 1,149	+ 232

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Table 3-11
BUDGET FOR MEDIUM RANCH

Expenses	Proposed Action (1980) (496 AUs)	Long-Term (2015) (652 AUs)
Labor	$ 1,302	$ 3,487
Livestock Purchases	3,080	4,049
Repairs & Maintenance	2,882	3,788
Depreciation	8,544	8,544
Interest		
Operating Capital	3,586	4,714
Real Estate	8,723	8,723
Gas & Lubricants	2,733	3,593
Supplements	923	1,213
Pasture Rent	500	595
Taxes		
Livestock	1,344	1,767
Real Estate	1,143	1,143
Insurance	1,300	1,300
Grazing Fees		
Caliente BLM	3,656	6,473
Other BLM	1,857	1,857
Forest Service	298	298
Utilities	1,000	1,000
Alfalfa & Grass Hay Expenses	938	938
Marketing Costs	1,741	2,289
Veterinary Expenses	441	580
Miscellaneous	903	1,187
Total	46,894	57,538
Receipts		
Heifer Calves	16,616	21,842
Steer Calves	29,328	38,553
Cull Cows	6,007	7,896
Cull Bulls	2,009	2,641
Total	53,960	70,932
Income	7,066	13,394
Change from 1977	- 873	+ 5,455

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Table 3-12
BUDGET FOR LARGE RANCH

Expenses	Proposed Action (1980) (3,534 AUs)	Long-Term (2015) (4,691 AUs)
Labor	$98,952	$123,564
Repairs & Maintenance	25,789	32,215
Depreciation	123,584	123,584
Gas & Lubricants	19,225	24,007
Feed & Supplements	60,177	60,177
Taxes	16,444	18,860
Insurance	3,329	3,329
Grazing Fees		
Caliente BLM	23,887	39,826
Other BLM	4,961	4,961
Utilities	12,224	12,224
Alfalfa & Grass Hay Expenses	13,920	13,920
Livestock Transportation	6,715	8,385
Veterinary Expenses	1,661	2,074
Miscellaneous	11,733	14,651
Total	422,601	481,777
Receipts from Livestock Sales	356,439	445,095
Income	- 66,162	- 36,682
Change from 1977	+ 1,269	+ 30,749

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Table 3-13
BUDGET FOR SHEEP RANCH

Expenses	Proposed Action (1980) (2,349 Sheep)	Long-Term (2015) (2,384 Sheep)
Labor & Supplies	$16,114	$16,354
Livestock Purchases	2,208	2,241
Depreciation	8,588	8,588
Interest		
Operating Capital	1,903	1,931
Real Estate	2,783	2,783
Gas, Lubricants, Repairs	13,131	13,327
Feed & Supplement Purchases	18,328	18,328
Pasture Rent	10,923	11,269
Taxes	8,405	8,501
Shearing	3,053	3,099
Insurance	1,964	1,964
Grazing Fees		
Caliente BLM	693	821
Other BLM	3,465	3,465
Forest Service	187	187
Utilities	4,855	4,855
Miscellaneous	4,815	4,887
Total	101,415	102,600
Receipts		
Lambs	94,994	96,409
Ewes	3,923	3,981
Wool (inc. incentives)	15,738	15,972
Total	114,655	116,362
Income	13,240	13,762
Change from 1977	- 1,566	- 1,044

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four county impact region. If past trends continue, 50 percent of the contracts would be awarded to Lincoln County residents. If contracts are of equal value, then it can be estimated that yearly direct construction income in Lincoln County would increase by $99,000. This represents a 98 percent increase over the 1977 construction industry level; however, it represents less than a one percent increase of total yearly county income.

Indirect income impacts (Appendix G, Section 1) would occur as the changes in 1980 direct income in the livestock and construction industries are filtered through the regional economy by the interdependence of these industries with other sectors of the economy. Overall, direct and indirect income would increase by $181,000 per year over 1977. This is less than one percent of the region's income.

In the long-term, possible increases in big game populations may cause an increase in Lincoln County's hunting-related businesses. This may amount to $170,000 by the year 2015 (Appendix G, Section 1). Although construction of new range improvements would end by the year 2000, maintenance expenditures may cause an increase of about $30,000 per year in direct income to the regional economy. Total direct and indirect income associated with livestock, hunting, and maintenance may total $542,000. This is less than one percent of the region's income.

Conclusion. In 1980 ranch income may decline by about $63,000 per year below 1977 levels. Regional income may increase by about $181,000 per year because of expenditures for construction of range improvements.

In the long-term, regional income may increase by $542,000 over 1977 because of increases in livestock production, range improvement maintenance and big game hunting.

Impact on Employment

Ranch workers' income would decline by $6,954 (Table 3-9). This would cause a decrease of about one full-time equivalent job at $2.35 per hour. No estimated changes in self-employment by ranchers could be made because many ranchers are currently operating at a loss and it would be impossible to predict when they might choose to go out of business.

Construction projects associated with range improvements would cause an increase in employment in the region's construction industry of 13 full-time equivalent jobs.

Indirect employment impacts (Appendix G, Section 1) would occur through the interdependence of the livestock and construction

industries with the rest of the region's economy. This would be limited to an increase of four jobs. Overall direct and indirect employment would increase by 17 jobs over 1977 levels.

In the long-term (2015) the overall increase may be about 49 jobs. Ten of these would be direct employment on livestock ranches associated with expected future increases in livestock forage production. Employment in hunting-related industries may increase 30 jobs (Appendix G, Section 7) due to increases in big game hunting. Although new construction of range improvement projects would end, maintenance of these projects may generate two additional jobs. The other seven jobs would be indirectly associated with the proposed action.

Conclusion. Changes in employment may amount to an increase of 17 jobs in 1980 and 49 jobs in 2015.

Impact on Tax Revenues

Livestock tax revenues in 1980 would decline slighty in Lincoln County due to a decrease in livestock numbers and a decrease in the amount of time the livestock would be grazed in the county. Little or no change in the tax revenues in the other counties in the region would occur. Less livestock would be grazed in those counties but they would be grazed for a longer time period. Livestock tax revenues are based on both the number of livestock and the amount of time they are grazed in a county. In 1980 Lincoln County tax revenues would decrease by $4,911. This represents 0.1 percent of the $4.1 million of funds required for local government in the county (Nevada State Department of Taxation, 1977).

This would be a short-term impact because the personal property tax on livestock will be eliminated by 1983.

Conclusion. Changes in tax revenues would be limited to a decrease of about $5,000 in 1980.

Impact on Ranchers' Wealth

Although the Bureau of Land Management does not recognize a capital value for grazing preferences, they do contribute to the wealth of ES area ranchers because they can be sold (McCannen, 1976) (Stubblefield and Robertson, n.d.) (Nielson and Workman, 1971). Changes in the number of AUMs of grazing preferences would cause a decline in the capital position (wealth) of the ranchers. Although this impact would occur immediately, actual dollar losses would not accrue to ranchers until the preferences were sold.

In 1980 the total decrease in grazing preferences would be 44,287 AUMs (118,580 for 1977 to 74,293 for 1980). At the market price

of about $25 per AUM (see Chapter 2, Ranchers' Wealth) the total decline in the capital position of the ranchers would be about $1.1 million - a 37 percent decrease in the value that ES area grazing preferences contribute to the ranchers' wealth. The market price of $25 per AUM is lower than prices in other areas. This probably reflects the fact that ranchers have not been licensing permits on all of their grazing preferences (stocking their allotments to allowable capacity). Buyers would pay less per AUM if they felt this was an indication that there was no forage above the level of licensed permits.

It should be noted that a portion of the loss in value represents the capitalized flow of the change in annual income.

The decrease in the ranchers' capital position when combined with the impact of lower incomes would affect many ranchers; abilities to obtain loans. Since many small and medium sized ranches rely heavily on borrowed funds, they would be the most affected. For some of these ranchers, borrowed funds may be the most critical factor in determining their ability to remain in the livestock business.

If the values of grazing preferences were based on the number of AUMs licensed under permit rather than on the number of total active AUMs of grazing preferences, and the change in value could be determined by comparing the change from current licensed permit AUMs to future total active preference AUMs, then this impact would be shown as much less negative. The change in the number of AUMs would be from 78,235 (1977 permit use) to 74,293 (proposed 1980 active preference) - a total of 3,942 AUMs. At $25 per AUM this would amount to about $100,000.

In the long-term (2015), the estimated active preference (allowable) AUM level would be 146,001 -- an increase of 27,421 AUMs over the 1977 levels of 118,580 AUMs. At $25 per AUM this may increase the value that ES area grazing preferences contribute to the ranches by about $700,000 - a 25 percent increase. If this impact could be estimated by comparing current AUMs licensed under permit (78,235) with future active preference AUMs (146,001) then a much more positive impact would be shown - an increase of $1.7 million (87 percent).

Impact on Seasonal Production Characteristics

Seasonal dependencies on public and private feed sources for each ranch category are summarized in Table 3-14. The most significant changes in seasonal dependency on ES area public land forage would occur on small and medium sized cattle ranchers during the spring.

Table 3-14
ES AREA RANCH FEED SOURCES (AUMs)

	Proposed Action (1980)					Long-Term (2015)				
	Total	Spring	Summer	Fall	Winter	Total	Spring	Summer	Fall	Winter
Small Cattle Ranches										
ES Area Public Land Forage	357	53	82	109	113	826	110	213	266	237
Percent of Total	19%	11%	17%	22%	27%	35%	18%	35%	42%	44%
Other Public Land Forage	156	45	26	34	51	156	45	26	34	51
Percent of Total	8%	9%	5%	7%	12%	7%	7%	4%	5%	9%
Forest Service Forage	67	0	49	18	0	67	0	49	18	0
Percent of Total	4%	-	10%	4%	-	3%	-	8%	3%	-
Private Feed Sources	1,293	381	326	332	260	1,342	457	321	311	253
Percent of Total	69%	80%	67%	67%	61%	56%	75%	55%	49%	47%
Medium Cattle Ranches										
ES Area Public Land Forage	2,421	447	612	646	716	4,287	724	1,069	1,187	1,307
Percent of Total	41%	30%	41%	42%	52%	59%	36%	54%	58%	72%
Other Public Land Forage	1,230	317	328	279	306	1,230	317	328	279	306
Percent of Total	21%	21%	22%	18%	22%	16%	16%	17%	14%	17%
Forest Service Forage	194	0	136	58	0	194	0	136	58	0
Percent of Total	3%	-	9%	4%	-	2%	-	7%	3%	-
Private Feed Sources	2,104	748	431	563	362	2,116	948	450	511	207
Percent of Total	35%	49%	27%	36%	26%	27%	48%	23%	25%	11%
Large Cattle Ranches										
ES Area Public Land Forage	15,920	3,638	4,094	4,094	4,094	26,379	6,139	6,747	6,747	6,747
Percent of Total	38%	34%	39%	39%	39%	50%	46%	51%	51%	51%
Other Public Land Forage	3,239	1,290	0	640	1,309	3,239	1,290	0	640	1,309
Percent of Total	8%	12%	-	6%	12%	6%	10%	-	5%	10%
Forest Service Forage	0	0	0	0	0	0	0	0	0	0
Percent of Total	-	-	-	-	-	-	-	-	-	-
Private Feed Sources	23,249	5,674	6,508	5,868	5,199	23,352	5,815	6,492	5,852	5,185
Percent of Total	55%	54%	61%	55%	55%	44%	44%	49%	44%	39%

TABLE 3-14 -- Continued

	Proposed Action (1980)					Long-Term (2015)				
	Total	Spring	Summer	Fall	Winter	Total	Spring	Summer	Fall	Winter
Sheep Ranches										
ES Area Public Land Forage	459	224	0	0	235	544	309	0	0	235
Percent of Total	8%	16%	-	-	17%	10%	22%	-	-	17%
Other Public Land Forage	2,295	845	731	93	626	2,295	845	731	93	626
Percent of Total	41%	60%	52%	7%	44%	41%	60%	52%	7%	44%
Forest Service Forage	124	6	124	0	0	124	0	124	0	0
Percent of Total	2%	-	9%	-	-	2%	-	9	-	-
Private Feed Sources	2,762	341	555	1,317	549	2,673	255	554	1,316	548
Percent of Total	49%	24%	39%	93%	39%	47%	18%	39%	93%	39%

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Small cattle ranches would have a decrease in spring dependency from 35 percent of their feed to 30 percent. These decrease would be compensated for by increased dependency on public land forage for winter feed requirements. This may enable the ranchers to shift a large portion of their hay feeding from winter to spring. This seasonal feeding pattern may be less efficient that the pattern currently used because the quality of the hay decreases between winter and spring.

Other impacts associated with decreases in spring grazing include the following: 1) Ranchers who must transport cattle in order to obtain alternative feed would incur additional transportation costs; 2) since spring is calving season, death losses may increase if cattle are transported; 3) the base property of some ranches may not be productive during this period; 4) additional labor costs would be incurred if cattle are transported; and 5) additional movement of cattle may cause slower weight gains.

Conclusion. Many ranchers may have difficulties obtaining sufficient feed at comparable costs during the spring - particularly those with limited acreage in private land, those with yearlong operations on public land, and those with private property located long distances from their allotments.

Summary

The proposed action would not cause significant impacts to the regional economy in 1980. The strongest impacts would be caused by range improvement construction. Although the construction industry in Lincoln County would have a 78 percent increase in income over 1977 levels, on a regional basis this would amount to less than a one percent increase.

The proposed action should have limited overall impacts on most cattle ranchers, although some individuals may be strongly impacted. The projected decrease of $62,781 of income in the livestock industry below the 1977 level of $96,728 is not expected to cause significant numbers of ranchers to go out of business. However, some ranchers may have trouble adjusting to the proposed periods-of-use.

A sharp decline in the ranchers' wealth should occur but it would be for a limited time period. In the long-term ranchers' wealth would increase by about 25 percent. If this impact could be estimated by comparing current AUMs permitted with future AUMs of active preference, then a much more positive impact could be shown (+87 percent).

By the year 2015 the construction of range projects would have ended, cutting off the increases in income and employment in the

construction industry, but future increases in livestock forage production would cause substantial increases in livestock related income and employment. In addition, large increases in big game populations would cause significant increases in hunting related income and employment.

Impacts on Social Values

Since 98 percent of Lincoln County is federally owned and administered, the community perception that exists is that local control over the area's future is precluded by continued federal ownership of those lands. On a more personal basis, the majority of the ranchers interviewed believe the large federal land holdings in the area severely restrict, if not negate, their day-to-day management options in the operation of their ranching enterprise. It also appears that a strong belief exists within the ranching community that much of the uncertainty and frustration that exists in the ES area livestock industry would be reduced considerably if ownership of public grazing lands passed from federal to State or private ownership. These perceptions tend to sustain a feeling of resentment which is likely to persist and even increase as long as the federal government remains the predominate landowner in the area. Implementation of the proposed action would very likely reenforce that resentment. (See Appendix G, Section 5, for further detail on values, attitudes, and lifestyles.)

Several of the ranchers who had recently incurred large debts in order to expand their ranching operation felt their only alternative in response to the reductions for which they are scheduled under the proposed action would be to sell their cattle now while prices are high. This would allow them to liquidate their outstanding debts and retain their private ranch holdings which had been offered as collateral to secure loans. Should these ranchers elect this alternative it seems likely they would attempt to rebuild their operation but on a much smaller scale.

A number of small ranchers felt that they would be the most severely impacted. Many of these ranchers now hold full- or part-time jobs in addition to their ranching responsibilities. Several indicated they would have to seek a second job to maintain the style of life they now enjoy if the proposed action were implemented. However, second job opportunities appear to be very limited in the area. If a person believes he or she has to seek a higher paying job in order to maintain the style of living they now enjoy, it seems likely that he or she would have to relocate out of the area. Should these individuals locate acceptable employment out of the area, they may well find that to succeed economically is to fail socially, for in succeeding economically they may have to give up many of the rural values that are important to them. Adjusting to an urban environment may also cause a variety of social adjustment problems for the ranchers and his or her family.

Several ranchers indicated they may elect to sell bits and pieces of their private properties in order to maintain their current

standard of living if the proposed action is implemented. Should this occur, it is likely that the influx of retired newcomers would accelerate. In time, this may place additional demands on the community for expanded social services to meet the needs of this growing segment of the county population.

An unquantifiable impact of the proposed action is its contribution to an existing, and apparently intensifying, alienation and distrust of government. Implementation of the proposed action would probably confirm the ranchers' perception that the proposed action was the result of insensitive decision making by distant authorities who lack knowledge and understanding of local conditions and the efforts of local citizens to explain them.

If AUM increases are implemented as expected under the long-term proposed action, ranchers would feel more secure about their future and the future of the ES area livestock industry. Should this occur, it could be expected that the overall quality of life would be enhanced for many ranching community members. However, a great deal of skepticism is evident when discussing long-term, projected AUM increases. As one rancher explained, "We've been down that road before and none of the projections have ever materialized."

In view of the ranchers' strong attachment to the lands, the area, and the belief that ranching is both a desirable and preferred way of life, it seems unlikely that many, if any, of the ranchers would sell and move away as a direct result of the proposed action.

Conclusion

Implementation of the proposed action would further alienate members of the ranching community. Some ranchers who have recently incurred large debts may have to sell their cattle while prices are high to liquidate outstanding debts and retain their private ranch holdings which were offered as loan collateral. Some ranchers may have to seek second jobs to sustain their standard of living. However, second job opportunities are limited in the ES area. Other ranchers may elect to sell portions of their properties to maintain their current style of living. Should this occur, the influx of retired persons into the community could accelerate. In time, this could alter both the social and political structure of the ES area. However, given the strong attachment of ranchers to the lands, the area, and ranching as a desirable and preferred way of life, it seems unlikely that many, if any, would sell and leave the area as a direct result of the proposed action.

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4

MITIGATING MEASURES

CHAPTER 4

MITIGATING MEASURES

MITIGATING MEASURES NOT INCLUDED IN THE PROPOSED ACTION

It is assumed the standard operating procedures as outlined in Chapter 1, will be incorporated and followed. The Bureau of Land Management (BLM) would also be committed to the measures which follow if the proposed action were implemented. These measures are designed to eliminate or reduce the adverse impacts identified in Chapter 3. The mitigating measures are addressed by environmental component (i.e., soils, vegetation, etc.) and are in a numerical sequence. A tabular summary (Table 4-1) located at the end of this chapter shows impacts (Chapter 3) by resource, mitigating measures, and the estimated degree of reductions of each impact.

Soils

1. Impact - Livestock and wild horses would utilize areas in severe or critical erosion condition [45,720 acres--1.3 percent of Environmental Statement (ES) area] within the following allotments: Barclay, Enterprise, Bald Mountain, Six Mile, Pahroc, Mustang, Oak Springs, Ely Springs Sheep, McGuffy Springs, Caliente, Little Mountain, Henrie, White Rock, Pennsylvania, Morrison-Wengert, Gourd Springs, and Sand Hollow.

Measure - In the 15 watersheds where grazing use may be allowed on soils of critical or severe erosion condition class, there will be an individual on-the-ground analysis completed to determine if fencing, or some other measure, can be installed to prevent livestock from passage or grazing, and to reduce soil erosion.

Effectiveness - Soil loss could be reduced in the areas if measures are implemented due to less soil disturbance and compaction. Vegetation that exists in the area should improve in vigor and density which would contribute to the reduction in soil loss. This measure may not reverse or totally stabilize the affected area. Additional improvements (dams, seeding, etc.) may be needed to reduce the erosion to tolerable levels.

Vegetation

2. Impact - Eleven of the 27 plant species proposed as threatened or endangered flora could be affected by the proposed action since these species possibly occur in areas readily accessible to wildlife, livestock, and wild horses.

Measure - Immediate long-range field studies will be started in 1980 to determine: (1) the actual abundance and range of the endangered and threatened plants in the ES area, and (2) the impact that grazing has on the endangered plants. These studies will be completed on all plants listed in Appendix C. Special emphasis may be placed on the 11 species identified in Chapter 3. Grazing management practices would be altered if impacts are specifically occurring to the above listed species.

Effectiveness - The potential impacts by grazing could still occur pending completion of inventories and analysis of findings. Modification, based upon the above measure, should provide the necessary protection to the listed species.

3. Impact - Five miles of riparian vegetation along Clover Creek would be adversely impacted by yearlong grazing of wild horses. This would also affect the fisheries of the area due to degradation of stream banks, siltation, etc.

Measure - The five miles of riparian vegetation along Clover Creek will be fenced and alternate water sources will be provided to wild horses.

Effectiveness - The removal of wild horses from stream areas should allow the riparian vegetation to improve in vigor, density, and composition. Stream bank sloughing should be slowed and fisheries should improve.

Wildlife

4. Impact - Bighorn sheep numbers in the Morman Mountains (BY-1) would be reduced by 50 percent (404 bighorn sheep to 200 bighorn sheep by 1985) due to increased competition for space by domestic livestock.

Measure - Retain livestock forage allocation at the 1977 level (328 AUMs) pending completion of a Habitat Management Plan and an Allotment Management Plan for the Mormon Peak allotment. Increase the forage allocation only if the detailed activity plans determine that detrimental effects will not occur to bighorn sheep.

Effectiveness - The maintenance of the forage allocation at the 1977 level should ensure that increased competition for space and water by bighorn sheep does not occur. Reasonable numbers of bighorn sheep should be achieved by the year 2015.

5. Impact - Forage allocation to meet total mule deer reasonable number demands would not be achieved until the year 2000 when vegetation treatments are completed on the areas where shortages exist (see Chapter 2, Wildlife).

Measure - Develop and implement the required Herd Management Plans (vegetation treatments, etc.) and Allotment Management Plans (areas No. 11 and 12 on Table 1-8) on the Deer Winter Range 5 areas where sufficient forage does not presently exist to meet the desired management levels as established by the Nevada Department of Fish and Game. Complete these treatments and plans by 1985.

Effectiveness - The manipulation of vegetation on this habitat area where the shortages exist, combined with management plans, should provide the necessary forage to meet and possibly exceed the recommended levels as established by the Nevada Department of Fish and Game.

Economics

6. Impacts - Twenty-three operators would be adversely affected by the change in base operation from yearlong grazing to the required two months of rest (April 1 - May 30).

Measure - Provide for a three-year period to phase into the change in livestock operations as recommended in the proposed action. The phase-in of this new period-of-use would be completed, as appropriate, by management decision.

Effectiveness - The three-year period would provide time for the livestock operator to adjust his base operation to the new BLM requirements. It would lessen the economic impacts but would not completely remove the impacts caused by the mandatory two months rest.

TABLE 4-1
MITIGATION TABULAR SUMMARY

Impacts	Mitigating Measure	Impact Reduction Due to Mitigation
Livestock will utilize areas of severe or critical erosion condition in several allotments causing additional problems.	1. In affected areas an individual on-the-ground analysis will be completed to determine if fencing or some other measure can prevent the impact. After determination the measure may be implemented.	Soil erosion loss should be reduced in these areas due to less soil disturbance and compaction along with increased vegetation production; however actual reduction is unknown.
Plant species proposed as threatened or endangered could be grazed.	2. If it is determined through inventories that proposed threatened or endangered flora would be detrimentally effected, livestock numbers and periods-of-use may be changed.	Flora would be maintained at levels necessary to continue reproduction.
Five miles of riparian vegetation along Clover Creek will be adversely impacted by yearlong grazing of wild horses. This reduction in vegetation will adversely affect fish habitat.	3. The riparian vegetation would be protected by fencing and by providing alternate water sources to wild horses.	The riparian areas should improve in vigor, density, and composition, thereby conserving and enhancing fish habitat.

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TABLE 4-1 -- Continued

Impacts	Mitigating Measure	Impact Reduction Due to Mitigation
Bighorn sheep numbers in the Mormon Mountains will be reduced by 50 percent (about 200 animals) due to increased grazing pressure by domestic livestock.	4. Retain livestock allocation at the 1977 level pending completion of a Habitat Management Plan (HMP) and an Allotment Management Plan.	Detrimental effects (reduction in numbers) will not occur to bighorn sheep. Reasonable numbers would be achieved by 2015.
Forage allocation to mule deer in DW-5 does not meet reasonable numbers.	5. Develop a HMP and utilize mechanical vegetation treatment to modify vegetation and provide the necessary forage for mule deer.	Measures taken should allow the management levels for mule deer to be achieved in DW-5.
Twenty-three allotments would be adversely affected by period-of-use changes.	6. Provide for a three year period to phase into period-of-use changes.	Measure would lessen economic impacts, but not completely remove them.

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5

UNAVOIDABLE ADVERSE IMPACTS

CHAPTER 5

UNAVOIDABLE ADVERSE IMPACTS

The following sections summarize the unmitigated adverse impacts which would remain if the proposed action were implemented and the mitigating measures delineated in Chapter 4 were applied. This chapter dicusses the relative values of the unmitigated impacts and the significance placed upon them.

SOILS

The compaction resulting from the building and maintenance of fences, pipelines, and water troughs would remain under the proposed action. Erosion resulting from runoff on compacted soils would be an unavoidable impact. Soil particles less than 0.84 millimeters (that size blown by winds) disturbed in the construction of range improvements on 425 acres might be blown away as dust.

VEGETATION

Unavoidable adverse impacts to vegetation would continue because of continuous early spring and fall use in allotments not proposed for intensive grazing management. This would result in reduced vigor, decreased ground cover, a slow down or reversal of preferred species establishment and an increase in less preferred plant distribution.

Use by grazing animals would continue to adversely impact riparian and perennial stream bank vegetation. Vegetative cover on stream banks would continue to be reduced, and some forage species would be lost or eliminated -- but to a lesser degree than at present.

Threatened or Endangered Flora

Eleven of the 27 species proposed as threatened or endangered flora could be harmed by the trampling and increased herbage removal by livestock and wild horses and burros.

WILDLIFE

Desert tortoises and tortoise burrows would be trampled as long as grazing by livestock is allowed; however, this would be reduced

from what is presently occurring.

Fences could cause the death of some big game animals. Even though fences constructed (approximately 300 miles) would be built to allow wildlife access, an undeterminable amount of entanglement leading to death or injuries will occur as long as a fence exists.

Some wildlife species would be displaced or eliminated as a result of vegetation manipulation and other projects.

WILD HORSES AND BURROS

The estimated 1,072 wild horses and burros would be reduced to 497 (a 53 percent reduction). Those horses and burros removed would be adversely affected because of separation from their native environment. Horses in areas proposed for additional fences could be restricted in their movement patterns, and could suffer injuries from collisions or entanglements. Wild horses could also be affected by increased forage competition in proposed Allotment Management Plan allotments, causing them to move out of traditional areas of use.

CULTURAL RESOURCES

There are 307 known cultural resource sites which are unique and vulnerable to all levels of ground-disturbing activites, including trampling by livestock and streambank and gully erosion. Damage to unknown sites and subsurface sites not discovered during project surveillance would be almost certain to occur. In cases where salvage mitigation is required, impacts would not be fully mitigated. Salvage of cultural resources is an unavoidable adverse impact. Once excavated, a site is effectively destroyed and removed from future research consideration which may utilize new techniques. Salvage is rarely as effective as non-salvage research programs.

LAND USES

Livestock Grazing

Thirty-three allotments would receive permits for 23,677 AUMs less forage in the short-term (1980). Three allotments which had use in 1977 would have no livestock grazing authorized in 2015. Therefore, operators would have to obtain forage elsewhere to maintain present herd sizes.

There would be an overall reduction of 3,942 AUMs in 1980 until additional forage is produced from better management established in the ES area.

TABLE 5-1

SUMMARY OF LIVESTOCK FORAGE ALLOCATION
(1977, 1980, 2015)

CALIENTE ES AREA

Present Use (1977 licensed use)	78,235 AUMs
Proposed Use (1980)	74,293 AUMs
Proposed Use (2015)	146,001 AUMs

SOCIAL ECONOMICS

Total income loss to livestock ranches would be $62,781 in 1980 in the Caliente ES area as a result of the proposed action. This would occur annually until additional forage is available from new waters being authorized or developed and from the better grazing management being established in the area.

A sharp decline in ranch value ($1,107,177) would occur in 1980. It would last until additional forage becomes available for authorization. Ranches in allotments without implemented Allotment Management Plans would have to adjust to new periods-of-use, particularly a significant decrease in spring grazing.

Public Values and Attitudes

Ranching families do not want to change their life styles. The possibility of having to sell their ranch property is unsettling. Alienation and distrust of the Federal government would intensify.

6

RELATIONSHIP BETWEEN LOCAL SHORT - TERM USES OF MAN'S ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG - TERM PRODUCTIVITY

CHAPTER 6

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The proposed action would be a short-term reversible commitment of resources. Short-term is defined as the period required to achieve the stated objectives of the proposal or until the year 2015 (35 years). Long-term is the future after year 2015.

SOILS

In general, the proposed action would benefit the Environmental Statement (ES) area soils by stabilizing their surfaces, reducing erosion and sediment yield by 19 percent over the present condition, and by lessening the associated loss of organic matter and plant nutrients. This would have the long-term benefit of increasing site productivity. The relatively small areas (46,145 acres) where soil erosion may increase (because of new water sources, fence lines, and critical or severe erosion areas) would be offset by the overall expected reduction in sediment yield.

Erosion in vegetation manipulation and range improvement areas would increase in local areas until stabilization takes place. Stabilization and increases in vegetation cover over the short-term would cause a reduction of 414,559 tons of soil loss through erosion. Improvement would continue through the long-term, but not necessarily at the same rate as improvement during the life of the proposal.

VEGETATION

The proposed intensive management and the construction of the range improvements would cause a loss of 2,739 acres from vegetation production for the short- and long-terms. Vegetation manipulation on 401,161 acres would result in disturbance of vegetation and soils during the treatment and for a short time afterwards but would result in increased vegetation density, better range conditions, and production increases for the short- and long-terms.

WILDLIFE

Short- and long-term productivity (numbers) of mule deer would be increased by the improvements as more water is provided, thus opening more -- or improving -- usable deer habitat. With the proposed vegetation allocations, water developments, and vegetation manipulations most wildlife species would benefit from the proposed action in the short- and long-terms. Mule deer would reach or exceed reasonable numbers; desert tortoise populations could increase providing there is a viable breeding population. Fish and bird populations dependent on riparian vegetation would increase and more wildlife would occupy the area because of greater ecotone and plant diversity. No impacts would occur to threatened or endangered species. Bighorn sheep should also reach reasonable numbers.

Unfenced riparian areas (i.e., springs, seeps, etc.) would continue to be overused by livestock. Nongame wildlife populations would remain below that which would result from decreased or eliminated livestock use. Water developments would produce beneficial impacts to wildlife.

Aquatic habitat would improve in the short-term. Resident fish populations would increase slightly as a result of the proposed action. These impacts would continue in the long-term.

WILD HORSES AND BURROS

Herd management areas would inhibit the wild and free roaming nature of wild horses in the present and in the long-term. Horses would be managed in herd sizes which would be proportionate to the forage available. Therefore, managed animals would be healthier in the short- and long-terms. The proposed development of additional watering sources would be beneficial to wild horses in the short- and long-term.

LAND USES

Livestock Grazing

The initial impacts from the proposed action would be a reduction in authorized Animal Unit Months (AUMs) on public lands of six percent in 1980. The short-term impact would be an increase in available livestock forage production of 71,708 AUMs from 1980 to 2015, an increase from 74,293 AUMs to a possible 146,001 AUMs. Allocation to grazing ungulates would be made at the time these increases would be significant in quantity. These allocations would be made by updating the Bureau of Land Management planning system for the Caliente ES area.

ECONOMICS

Income

In the short-term, overall direct and indirect income would increase by $181,000 per year in 1980. Decreases in livestock grazing income would be more than offset by increases in construction income. In the long-term (2015) overall direct and indirect income would be $542,000 greater than in 1977. The stimulus to the region's economy from construction of new range improvements would end, but increased levels of livestock use, big game hunting, and maintenance of range improvements would provide a continuing beneficial impact.

7

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

CHAPTER 7

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The major emphasis of this chapter on irreversible and irretrievable commitment of resources is to consider and quantify, where possible, the use of all materials, fuel, resources, etc., consumed by the proposed action's implementation, operation, and maintenance. Two major terms employed in this chapter are "irreversible" and "irretrievable". They are defined as: (1) Irreversible - incapable of being reversed; once initiated, use, direction, or condition would continue; and (2) Irretrievable - essentially irrecoverable; not reasonably retrievable; once used, not readily replaceable.

SOILS

Soil displaced by erosion as a direct result of the proposed action is irretrievable. Soils eroded under the proposed action are estimated to be about 1,750,717 tons annually.

VEGETATION

Construction of improvements and vegetation treatments would remove approximatly 2,740 acres from current production for the life of the improvements or treatments.

CULTURAL RESOURCES

Proposed livestock grazing and development of facilities could disturb certain cultural resources. Once disturbed, historical and archaeological sites, as well as artifacts, are no longer available for future study. This can result in a data gap in an area's history and would be considered an irretrievable commitment.

LOSS OF POWER AND MATERIALS USED IN DEVELOPMENT

Fuel and materials consumed in support of the proposed action would be expended over the project life and are considered to be an irretrievable commitment.

Human resources used in implementing this proposal are considered irreversible and irretrievable. Monies, fuel, and materials used

to develop the proposal are considered to be irretrievable.

Except as noted above all other resources involved in this proposal are retrievable and/or reversible. These include such resources as livestock, wildlife, and wild horses and burros.

8

ALTERNATIVES TO THE PROPOSED ACTION

CHAPTER 8
ALTERNATIVES TO THE PROPOSED ACTION

INTRODUCTION

Six alternative possible vegetation allocations are addressed in this chapter. The estimates are based on a series of assumptions and plans that could achieve alternate objectives to those set forth in the proposal. The alternatives identify certain assumptions within a framework of magnitudes, locations, and time frames for various actions. Professional judgements and estimated probabilities are used when actual data are unavailable. The assumed allocation schemes represent conditional and qualified examples of possible vegetation allocations.

The six alternative vegetation allocation scenarios are: 1) continuation of present management (no action); 2) elimination of livestock, wild horse and burro grazing; 3) minimum constraints on wild horses and burros; 4) restricted periods of use by livestock (no spring grazing); 5) reduced levels of livestock grazing; and 6) reduced management intensity. Table 8-1 presents the possible allocation levels for livestock, wild horses and burros, and wildlife for the proposal and for each alternative.

The grazing treatments applicable for the various alternatives are the same as identified and described in the proposed action, Chapter 1. Construction methods, standards, and standard operation procedures for range improvements and vegetation manipulations are as described in Chapter 1. Other resource management functions would continue to operate within the Caliente ES area according to approved Las Vegas District programs. The five Allotment Management Plans (AMPs) would continue to operate as described in Chapter 1 with the exception of the vegetation allocation which would vary depending upon the alternative.

Only the more significant impacts for each resource value affected are analyzed. Where the impacts are the same as would occur under the proposed action, these impacts are referenced rather then repeated in this chapter. The analysis of impacts for each alternative is based on the same long-term time frame (35 years) as the proposed action. A summary table (Table 8-55) listing the impacts for the proposed action and each alternative, is located at the end of this chapter.

TABLE 8-1
SUMMARY OF PROPOSAL AND ALTERNATIVE ALLOCATION LEVELS a/

ALLOCATION LEVELS (AUMS)

Proposed Action and Alternatives	Livestock					Wild Horses and Burros					Wildlife				
	1977	1980	1990	2000	2015	1977	1980	1990	2000	2015	1977	1980	1990	2000	2015
Proposed Action	78,235	74,293	99,399	135,511	146,001	0	5,956	5,956	8,363	9,042	0	15,104	15,104	16,709	16,862
Alternatives:															
1) Continuation of Present Management	78,235	----------	----------	----------	78,235	12,864	b/----------	----------	----------	12,864	17,926	b/----------	----------	----------	17,926
2) Elimination of Livestock and Wild Horse & Burro Grazing	78,235	0	----------	----------	0	0	----------	----------	----------	0	44,179	----------	----------	----------	44,179
3) Minimum Constraints on Wild Horses & Burros	78,235	54,188	67,225	----------	96,870	0	34,361	----------	----------	34,361	0	15,104	15,104	--------	15,104
4) Restricted Periods-of-Use by Livestock	78,235	59,387	----------	----------	113,658	0	5,956	5,956	8,363	9,042	0	15,104	15,104	16,709	16,862
5) Reduced Levels of Livestock Grazing	78,235	37,147	----------	----------	37,147	0	5,956	----------	----------	5,956	0	15,104	----------	----------	15,104
6) Reduced Management Intensity	78,235	74,293	----------	----------	115,087	0	5,956	----------	----------	7,002	0	15,104	----------	----------	15,801

a/ Livestock and wild horse and burro Animal Unit Months are interchangeable with each other, but not always with wildlife AUMs because of dietary preference.

b/ Wild horse and burro and wildlife AUM numbers for Alternative One indicates demand; it is not an allocation.

CONTINUATION OF PRESENT MANAGEMENT
ALTERNATIVE ONE - NO ACTION

Description

This alternative assumes actual use is at the level of 1977 permitted use, with present allotment boundaries, kind of livestock, and period-of-use. Range improvements would be limited to those deemed necessary by the Bureau of Land Management (BLM) Las Vegas District manager; however, existing range improvements would continue to be maintained in a usable condition. The assumption is that the range improvements and vegetation treatments stated in the proposed action would not be implemented. The five implemented Allotment Management Plans (AMPs) would be completed as programmed. The three allotments currently classified as ephemeral range would continue to be managed under BLM manual directives for ephemeral rangelands. It is assumed livestock use would continue at 78,235 AUMs from 1980 to 2015.

Wild horse and burro numbers would be controlled to maintain an average of 1,072, the estimated population size in the ES area during 1977. Excess numbers would be gathered as necessary. The numbers by wild horse and burro area are shown in Table 2-17. No vegetation would be allocated to wild horses or burros, but it is assumed their levels of use would be maintained at 12,864 AUMs of demand from the present through 2015.

Since wildlife numbers are not under BLM control, it is expected they would fluctuate according to population dynamics and habitat condition. An allocation of vegetation to wildlife has not occurred in the past, so no vegetation would be allocated. However, for purposes of analysis the reasonable numbers forage demand would be 17,926 AUMs. (Table 8-2 details allocations under Alternative One, by allotment.)

Summary

In summary, this alternative assumes: 1) livestock use would remain stable at 78,235 Animal Unit Months (AUMs) from 1980 to 2015; 2) wild horse and burro numbers would be controlled at 1,072 and require a stable 12,864 AUM demand through the year 2015; and 3) the wildlife AUM reasonable numbers (17,926) would be utilized to represent demand through the analysis period. (See Figure 8-1 and Table 8-2 for a detailed look at Alternative One. Table 8-3 presents a summary of livestock forage demand.)

TABLE 8-2
PRESENT AND PROPOSED VEGETATION ALLOCATIONS BY ALLOTMENT AND GRAZING TREATMENT ALTERNATIVE ONE

Allotment	Present							Proposed				
	Land Ownership Status[1]		Total Forage Capacity (AUMs)		Present Authorized Livestock Use & Range Class (AUMs)[4]	Season-of-use[5]	1977 Licensed Use	Proposed Forage Allocations (AUMs)[7]				(2015) Future Forage Capacity Livestock
	Public Land (acres)	Other Land (acres)	Livestock AUMs[2]	Wildlife AUMs[3]				Livestock 1980	Deer	Bighorn Sheep	Wild Horses	
	a	b	c	d	e	f	g	h	i	j	k	1
Applewhite	28,448	300	2	244	562 (C) Perennial	YL	527	527	189	---	348	0
Ash Flat	3,247	---	43	0	74 (C) Perennial	5/1-3/24	74	74	0	---	60	11
Bald Mountain	269,723	5	5,332	1,096	5,811 (C) Perennial	YL	5,811	5,811	383	---	---	5,101
Barclay	79,621	2,350	2,690	2,214	1,791 (C) Perennial	5/16-9/30 AMP	2,049	2,049	766	---	---	2,959
Bennett Springs	48,264	120	3,869	578	3,498 (S) Perennial	10/16-4/30	474	474	293	---	84	4,062
Beacon	5,682	---	0	---	2,095 (S) Perennial	2/1-4/30	506	506	---	---	---	0
Black Canyon	8,438	---	704	154	1,005 (S) Perennial	10/16-4/30	95	95	64	---	36	739
Black Hills	3,610	---	126	---	156 (C) Perennial	YL	156	156	---	---	---	113
Boulder Spring	13,537	---	416	---	416 (C) Perennial	10/1-3/30	416	416	---	---	---	416
Breedlove	112,755	---	60	1,007	864 (C) Perennial	YL	864	854	4	296	588	15
Buckboard	10,842	---	427	191	263 (C) Perennial	YL	264	264	56	---	156	384
Buckhorn	82,968	---	5,687	---	4,010 (C) Perennial	YL	830	830	---	---	---	5,971
Caliente	2,008	---	59	14	40 (C) Perennial	YL	0	0	4	---	---	62
Cliff Springs	35,821	---	2,291	161	2,043 (C) Perennial	YL	2,043	2,043	77	---	---	2,520
Clover Creek	22,876	158	368	294	613 (C) Perennial	11/1-4/30	0	0	216	---	672	184
Comet	9,146	600	216	---	214 (C) Perennial	YL	0	0	---	---	---	226
Condor Canyon	44,035	---	1,636	532	676 (C) Perennial	YL	0	0	1,086	---	48	1,718
Cottonwood	62,145	---	441	1,812	1,296 (C) Perennial	5/1-10/31	1,296	1,296	954	---	912	110
Cove	5,023	---	214	---	131 (C) Perennial	YL	0	0	---	---	144	218
Crescent	84,526	80	2,828	268	1,540 (S) Perennial	11/1-4/30	1,173	1,173	268	---	---	2,969
Crestline	2,415	1,300	96	34	55 (C) Perennial	YL	0	0	20	---	---	101
Crossroads	19,201	---	413	350	689 (C) Perennial	5/1-10/31	690	690	162	---	144	206
Crystal Springs	7,596	---	376	---	437 (C) Perennial	Winter	347	347	---	---	---	384
Deer Lodge	6,880	40	319	108	167 (C) Perennial	YL	0	0	242	---	48	335
Delamar	240,755	---	6,148	5,134	4,858 (C) Perennial	YL	5,573	5,573	692	84	660	6,270
Elgin	26,602	160	1,401	1,083	2,073 (C) Perennial	10/1-4/30	1,760	1,760	---	22	636	700

TABLE 8-2 -- Continued

Allotment	Present							Proposed				
	Land Ownership Status[1]		Total Forage Capacity (AUMs)		Present Authorized Livestock Use & Range Class (AUMs)[4]	Season-of-use[5]	1977 Licensed Use	Proposed Forage Allocations (AUMs)[7]				(2015) Future Forage Capacity Livestock
	Public Land (acres)	Other Land (acres)	Livestock AUMs[2]	Wildlife AUMs[3]				Livestock 1980	Deer	Bighorn Sheep	Wild Horses	
	a	b	c	d	e	f	g	h	i	j	k	l
Ely Spring (Sheep)	22,927	849	1,135	325	1,802 (S) Perennial	10/16-5/15	0	0	73	---	132	1,192
Ely Spring (Cattle)	55,168	960	4,878	7	4,248 (C) Perennial	YL (AMP)	3,980	3,980	4	---	---	5,853
Enterprise	21,585	160	2,152	690	1,261 (C) Perennial	5/1-10/31	1,927	1,927	170	---	---	2,195
Flat Top Mesa	6,033	---	0	0	--- (C) Ephemeral	---	6/	---	---	---	---	0
Garden Springs	38,823	---	2,150	390	2,809 (C) Perennial	10/16-5/15	2,629	2,629	373	---	96	1,613
Gourd Springs	101,125	---	1,406	362	3,458 (C) Perennial	10/16-5/15	2,233	2,233	1	228	---	703
Grapevine	33,328	---	560	---	560 (C) Perennial	10/1-3/30	551	551	---	---	---	571
Haypress	7,843	110	43	61	154 (H) Perennial	5/1-10/1	0	0	56	---	---	45
Henrie	131,796	---	3,127	2,593	2,400 (C) Perennial	11/1-4/30	2,400	2,400	408	487	936	2,345
Highland Peak	45,542	1,960	2,371	263	3,704 (S) Perennial	10/16-5/15	160	160	157	---	84	2,490
Highway	4,251	40	219	63	118 (C) Perennial	YL	0	0	19	---	---	230
Jack Rabbit	9,755	---	0	0	0 (C) Ephemeral	---	6/	---	---	---	---	0
Klondike	7,072	---	416	120	678 (S) Perennial	10/16-5/15	378	378	48	---	36	437
Lime Mountain	67,144	---	3,830	2,814	6,754 (C) Perennial	10/1-5/15	3,580	3,580	840	---	---	3,638
Little Mountain	18,575	---	671	87	1,422 (WH) Perennial	YL	---	0	87	---	960	537
Lower Lake	107,317	---	1,145	9	1,247 (C) Perennial	YL	100	100	9	---	---	1,202
McCutcheon Spring	18,276	40	583	302	446 (C) Perennial	YL	0	0	89	---	---	612
McGuffy Spring	22,115	---	325	246	298 (C) Perennial	YL	0	0	800	---	108	341
Mahogany Peak	28,441	1,360	1,311	473	617 (C) Perennial	YL	326	326	995	---	156	1,377
Meadow Valley	3,971	240	0	---	56 (C) Perennial	11/1-4/30	48	48	---	---	60	0
Mormon Peak	82,296	---	1,855	4,703	Undetermined (C) Perennial	Winter	328	328	116	1,081	204	1,947
Morrison-Wengert	33,264	1,200	1,043	1,387	1,760 (C) Perennial	YL	1,760	1,760	238	180	48	521
Mustang	23,877	---	444	161	1,260 (C) Perennial	YL (AMP)	987	987	105	---	---	488
Mustang Flat	5,987	---	90	218	147 (C) Perennial	5/1-10/31	0	0	86	---	60	92

TABLE 8-2 -- Continued

Allotment	Present: Land Ownership Status[1] Public Land (acres) a	Present: Land Ownership Status[1] Other Land (acres) b	Present: Total Forage Capacity (AUMs) Livestock AUMs[2] c	Present: Total Forage Capacity (AUMs) Wildlife AUMs[3] d	Present: Present Authorized Livestock Use & Range Class (AUMs)[4] e	Present: Season-of-use[5] f	Present: 1977 Licensed Use g	Proposed: Proposed Forage Allocations (AUMs)[7] Livestock 1980 h	Proposed: Deer i	Proposed: Bighorn Sheep j	Proposed: Wild Horses k	Proposed: (2015) Future Forage Capacity Livestock l
Naquinta Spring	52,425	140	1,058	575	Unalloted Perennial	YL	---	---	237	---	---	---
N-4	43,500	5,380	396	51	824 (C) Perennial	3/1-10/1	6/	---	464	---	36	416
Oak Spring	193,609	1,440	10,570	3,338	9,268 (C) Perennial	YL (AMP)	7,793	7,793	1,120	67	1,584	11,627
Oak Wells	29,139	40	542	476	511 (C) Perennial	YL	0	0	247	---	276	569
Pahranagat East	34,146	---	565	---	511 (C) Perennial	8/1-5/30	289	289	---	---	---	576
Pahranagat West	70,138	---	1,289	75	2,144 (C) Perennial	8/1-5/31	1,351	1,351	14	---	---	1,160
Pahroc	117,443	---	3,917	1,183	4,783 (C) Perennial	YL	4,604	4,604	266	---	---	3,525
Panaca Cattle	16,275	---	596	116	453 (C) Perennial	YL	72	72	11	---	12	537
Panaca SCS	4,242	---	162	15	Unalloted (C & S) Perennial	---	---	---	7	---	---	---
Peck	7,698	---	190	---	268 (C) Perennial	YL	0	0	---	---	48	199
Pennsylvania	42,556	320	156	1,472	817 (C) Perennial	5/1-10/31	439	439	606	---	564	78
Pine Cone	28,265	---	627	135	1,205 (C) Perennial	10/1-6/15	208	208	32	---	---	658
Pioche	13,440	---	354	77	402 (C) Perennial	YL	155	155	36	---	36	372
Pulsipher Wash	3,408	---	0	0	--- (C) Ephemeral	---	0	---	---	---	---	---
Rabbit Spring	20,975	40	720	119	1,122 (S) Perennial	10/16-4/15	0	0	77	---	156	756
Rattlesnake	28,426	---	1,172	266	1,182 (C) Perennial	10/16-5/31	1,183	1,183	203	---	384	1,195
Red Bluff	18,039	---	98	---	34 (C) Perennial	10/1-4/15	34	34	---	---	---	103
Roadside	1,123	---	48	---	32 (C) Perennial	12/1-2/28	0	0	---	---	48	50
Rocky Hill	4,092	---	238	29	308 (C) Perennial	10/16-5/15	0	0	11	---	---	250
Rox	25,870	120	0	21	756 (C) Perennial	YL	372	372	---	13	48	0
Sand Hollow	35,174	---	582	---	2,430 (C) Perennial	10/1-5/15	1,118	1,118	---	---	---	582
Sand Springs	249,685	5,200	11,019	1,303	6,091 (C) Perennial	YL (AMP)	4,918	4,918	138	---	---	13,223
Sawmill Canyon	9,177	---	97	159	181 (C) Perennial	YL	0	0	78	---	240	24
Schlarman	5,345	---	390	464	240 (C) Perennial	11/1-4/30	214	214	1	21	48	398
Shadow Well	17,862	---	1,151	---	577 (S) Perennial	11/1-4/30	440	440	---	---	---	1,209
Sheep Spring	31,077	---	1,815	629	409 (C) Perennial	YL	0	0	939	---	660	1,905

TABLE 8-2 -- Continued

Allotment	Present: Land Ownership Status[1]		Present: Total Forage Capacity (AUMs)		Present: Present Authorized Livestock Use & Range Class (AUMs)[4]	Present: Season-of-use[5]	Present: 1977 Licensed Use	Proposed: Proposed Forage Allocations (AUMs)[7]				Proposed: (2015) Future Forage Capacity Livestock
	Public Land (acres)	Other Land (acres)	Livestock AUMs[2]	Wildlife AUMs[3]				Livestock 1980	Deer	Bighorn Sheep	Wild Horses	
	a	b	c	d	e	f	g	h	i	j	k	l
Sheep Flat	74,171	720	521	1,350	1,977 (C) Perennial	5/16-9/15	1,979	1,979	738	---	468	130
Simpson	8,379	---	414	---	747 (C) Perennial	12/1-4/30	750	750	---	---	---	414
Six Mile	34,531	---	896	125	674 (C) Perennial	YL	674	674	125	---	---	914
Snow Spring	44,042	---	1,530	1,015	3,567 (C) Perennial	10/1-5/15	1,650	1,650	397	---	---	1,147
Summit Spring	18,035	---	159	---	715 (C) Perennial	10/16-5/15	715	715	---	---	---	37
Terry	30,163	---	242	---	2,366 (C) Perennial	10/1-5/15	1,444	1,444	---	---	---	121
Uvada	13,608	10	554	205	355 (C) Perennial	YL	229	229	95	---	732	277
Warm Spring	1,401	---	25	---	74 (C) Perennial	11/16-4/15	0	0	---	---	---	26
White Hills	2,755	---	105	---	101 (C) Perennial	12/1-2/28	0	0	---	---	48	110
White Rock	32,916	---	1,810	433	2,880 (C) Perennial	9/16-5/15	1,269	1,269	76	38	60	1,901
Total	3,495,805	25,442	109,914	44,179	118,580		78,235	78,235	15,391	2,517	12,864	108,701

1 Land ownership includes some acreage outside the ES area boundary in the Ely and Las Vegas districts.
2 Suitable Animal Unit Months (AUMs) include those AUMs which meet the Bureau of Land Management's production and slope criteria.
3 Wildlife AUMs include all competitive and non-competitive AUMs determined from the range survey.
4 (C) cattle (S) domestic sheep (H) domestic horses (WH) wild horses. Authorized use determined from previous range survey or by agreement.
5 (YL) yearlong (AMP) existing Allotment Management Plan
6 Permitted use occurred on these allotments, but the number of AUMs used in the ES area could not be determined because the allotment boundaries extend outside the ES area.
7 Wildlife and wild horse AUMs are not specifically allocated but are presented for analysis based on demand by reasonable numbers.

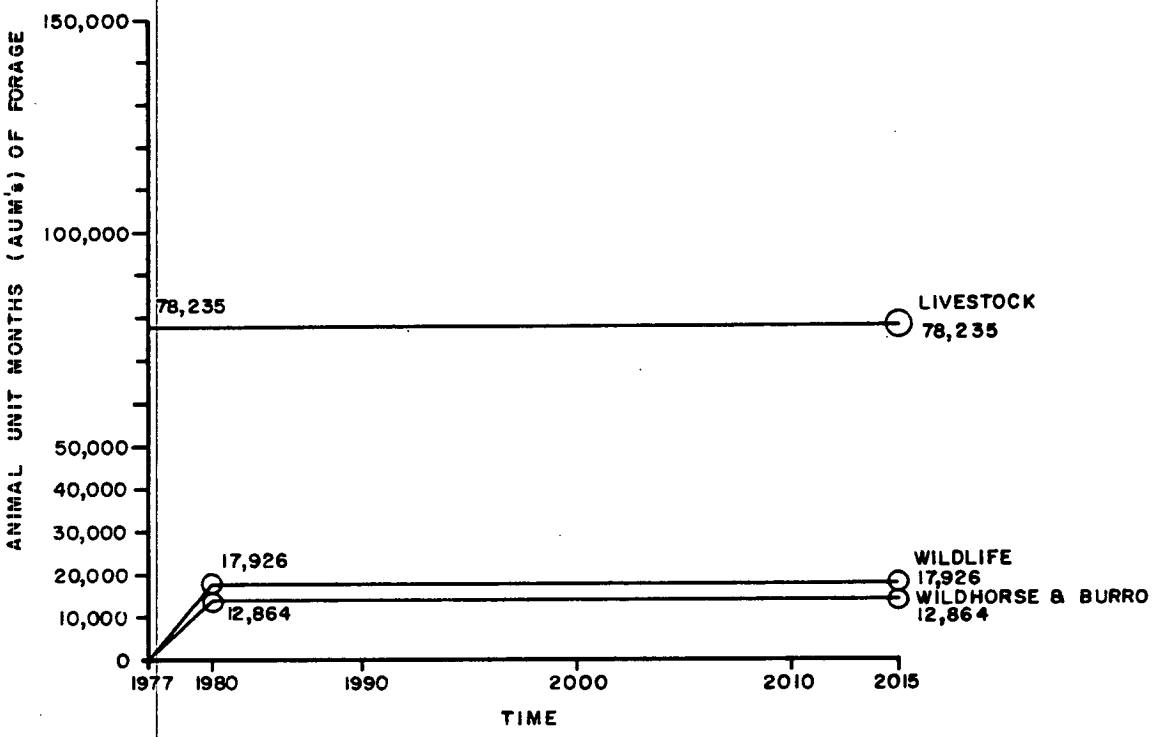
Note: Forty-eight AUMs go to antelope in the Sand Springs Allotment.

See glossary for definition of: ephemeral, perennial, ephemeral-perennial, suitable AUM, season-of-use (period-of-use), competitive forage, non-competitive forage, AMP.

Source: U.S. Department of the Interior, Bureau of Land Management, Las Vegas District, Caliente Unit Resource Analysis and Management Framework Plan, 1978.

FIGURE 8-1
CONTINUATION OF PRESENT MANAGEMENT
(ALTERNATIVE ONE)

1980 AND POSSIBLE FUTURE ALLOCATIONS (1990-2015) TO LIVESTOCK, WILD HORSES AND BURROS AND WILDLIFE IN CALIENTE ES AREA a/



a/ Livestock and wild horse AUMs are interchangeable with each other but not always with wildlife AUMs because of dietary preference.

NOTE: Possible future vegetation allocations are estimates only and are based on a series of assumptions within a framework of feasible alternatives. Heavy dependence on professional judgements and probabilities are used. The vegetation allocation scenario should not be considered as a prediction or forecast.

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TABLE 8-3
SUMMARY OF LIVESTOCK FORAGE DEMAND
ALTERNATIVE ONE - NO ACTION

	(AUMs)
Livestock Use 1977	78,235
Wild Horse and Burro Use 1977	12,862
Wildlife (Reasonable Numbers)	4,312 a/
Total	95,409

a/ These are wildlife AUMs demand converted to competitive livestock AUMs.

Impacts on Soils

With no change in management, it is expected there would be no appreciable change in soils from that described in Chapter 2.

Erosion could be expected to continue at the present levels of 0.61 tons/acre/year, producing 2,165,276 tons of sediment annually.

On the three watersheds where erosion exceeds the tolerable (acceptable) level of soil loss (001, partly within the Barclay and Enterprises allotments; 040, corresponding to Applewhite allotment; and 049, partly within Pennsylvania allotment), continued overuse would result in continuing deterioration of the resource. (See Table 2-6 for sediment yield and the Soils Map in Chapter 2 for specific areas discussed here.)

In watershed 040, presently eroding at 1.22 tons/acre (15,047 tons/year, 0.7 percent of the ES area), overgrazing by wild horses and livestock could result in increased sediment loss. In watershed 049, 1.13 tons/acre are presently being lost. That watershed would continue to lose 45,305 tons/year or 2.1 percent of the total erosion in the ES area.

Watershed 001 has been fenced to prevent cattle from drifting onto slopes where the most severe erosion has occurred in the past. This watershed presently contributes 14,677 tons of sediment annually, 0.68 percent of the total erosion yield. Under this alternative, not changing the present AUM levels of use would result in the three mentioned watersheds contributing 97,416 tons/year in sediments, or 4.5 percent of the total sediments produced in the ES area.

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Conclusion

Under this alternative, 2,165,276 tons of sediment per year would be produced. Watersheds needing soil conservation measures (001, 040, and 049) would produce 4.5 percent of the total sediment yield from only 2.3 percent of the total land within the ES area.

Impacts on Water Resources

Impact on Water Quantity

Under continuation of present management, water consumption by grazing animals would remain the same as for the existing situation (see Table 2-8) through the analysis period. Estimated annual water usage of 105.7 acre-feet from 1980 to 2015 is only 0.10 percent of the approximate perennial yield of 110,000 acre-feet.

Because riparian vegetation would continue to decrease as a result of overgrazing along 53 miles of streams, stream flows would be expected to increase by small, unquantifiable amounts. Reduced evapotranspiration rates would allow more water to move through the soil and into stream channels.

Impact on Water Quality

Overall, sediment yield processes do not presently pose a problem or deliver much sediment to streams within the Caliente Environmental Statement (ES) area (Ed Naphan, Soil Conservation Service, personal communication, December 1978). Therefore, suspended sediment concentrations attributable to sediment yield are not high in waters of the ES area and would not be expected to change from the existing situation under the continuation of present management. Suspended sediment concentrations caused by stream bank sloughing would continue at accelerated rates because of deterioration of stream side vegetation along 53 miles of streams.

Conclusion

Annual water consumption by grazing animals, a fraction of one percent of the perennial yield, would remain the same as at present. Stream flows might increase by small, unquantifiable amounts as a result of decreased riparian vegetation along 53 miles of stream. Suspended sediment concentrations from sediment yield are not presently a problem and would not change from the existing situation, but suspended sediment concentrations caused by stream bank sloughing would increase because of reduced stream-side vegetation.

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Impacts on Vegetation

This alternative continues present management practices. Forage production and livestock forage condition for the present versus 35 years in the future are displayed on Table 8-2. Under this alternative 30 allotments would be allocated an average of 576 AUMs more than their present forage capacity. On these 30 allotments (1,433,744 acres) forage is being over-utilized because wild horses, livestock, and wildlife are all utilizing forage. (As a result there are 45,416 AUMs of use with 27,650 AUMs as the present forage capacity. By the year 2015, the vegetation on these 30 allotments would be mostly in a downward trend in condition, vigor, and seed production.) Densities of forage plants would be reduced and several vegetation types would become unsuitable for livestock grazing due to low production. The above factors would result in only 22,059 AUMs being available (a reduction of 2,591 AUMs) on these 30 allotments in 2015.

Fifty-one allotments (1,647,079 acres) would be allocated an average of 734 AUMs less than their forage capacity, and five allotments (36,975 acres) would be allocated 976 AUMs of vegetation at their capacity. The vegetation on these 56 allotments is being under-utilized since forage use is 36,721 AUMs and forage capacity is 75,652 AUMs. There should be approximately 80,619 AUMs of production in the year 2015. Condition, vigor, and seed production should increase. Trend in condition should be mostly upward.

All other vegetative conditions should be similar to that described in Chapter 2, Vegetation. All projections are based on conditions as they should occur after 35 years under present management. (See Table 8-4.)

Conclusion. Vegetative conditions on 30 allotments would probably decline due to over utilization; on 51 allotments conditions and production should improve by 80,619 AUMs. A summary of changes in condition is shown in Table 8-4.

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TABLE 8-4
SUMMARY, LIVESTOCK FORAGE CONDITION

	CONDITION (Acres) a/	
	Present	Future
Good	688,751	614,084
Fair	1,374,539	1,336,088
Poor	512,351	625,469

a/ Unsuitable acres not included.

Impact on Threatened or Endangered Flora

Allotment Management Plans would not be developed, and grazing levels on 56 of the 86 allotments would be within forage capacities. The 11 species identified in Table 3-6 could be harmed by this alternative in the 30 allotments which would be over allocated. The continued over-utilization and loss of plants from trampling could occur as stated in Chapter 3, except under this alternative adverse impacts would occur faster on these 30 allotments. Limited livestock distribution could benefit some sensitive plant species located in areas not readily accessible to livestock and wild horses and burros.

In the remaining 56 allotments, forage would continue to be utilized by livestock, wildlife or wild horses and burros at or below the allotment forage capacities. The adverse effects to the 11 proposed species identified in Table 3-6 would occur mainly on the easily accessible terrain and especially around water sources. The steeper areas and locations outside water service areas would be less severely impacted.

Conclusion. Most of the proposed threatened or endangered species located in relatively inaccessible types of habitat should not be severely impacted. The 11 species shown in Table 3-6 could be affected in present areas of heavy forage utilization.

Impacts on Wildlife

Impact on Bighorn Sheep

Table 8-5 shows current livestock use and present livestock carrying capacity on bighorn sheep ranges in the Caliente ES area.

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TABLE 8-5

LIVESTOCK USE, CAPACITY ON BIGHORN SHEEP RANGES
CALIENTE ENVIRONMENTAL STATEMENT AREA

Sheep Range	1977 Permitted Livestock Use (AUMs) on Bighorn Sheep Ranges	Present Livestock Forage Capacity (AUMs) on Bighorn Sheep Ranges
BY-1	901	738
BY-2	3,342	576
BY-3	2,674	2,727
BY-4	1,024	756

Livestock use above the present forage capacity is occurring in three of the four bighorn sheep ranges in the ES area. Grazing above carrying capacity reduces the amount of forage, particularly around crucial waters important to bighorn sheep.

Conclusion. Under this alternative bighorn sheep populations in three of the four bighorn ranges in the Caliente ES area would probably decline by the year 2015.

Impact on Mule Deer

Presently, forage is not available to meet mule deer reasonable numbers by 2,643 AUMs on four deer ranges, DY-2, DW-4, DW-5, DS-1 (see the Big Game Areas Map in Chapter 2). Without some vegetative change, either by vegetation manipulation or natural occurrence (fire), no increases of forage for mule deer could be expected.

Livestock and wild horse use is above forage capacity on the mule deer ranges identified in Table 8-6.

TABLE 8-6
LIVESTOCK, WILD HORSE USE ON MULE DEER RANGE

Deer Range	Present Wild Horse and Livestock Use (AUMs) Above Forage Capacity
DW-2	585
DW-4	825
DS-2	425
DY-4	2,767

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Allowing wild horses and livestock to use these areas above forage capacity forces utilization of forage that is important to mule deer.

Conclusion. Mule deer would not attain reasonable numbers on four deer ranges because forage is not available. On four other ranges, population declines may result if livestock and wild horses are allowed to graze above forage capacity. Deer populations in the remaining ranges would probably stay at about present levels or increase slightly. The total mule deer population with this alternative would be less than 7,320 animals (approximately 1,500 fewer animals than reasonable numbers) by the year 2015.

Impact on Desert Tortoise

Currently, livestock and wild horse use on desert tortoise range is approximately 5,079 AUMs (37 percent) over forage capacity. Overuse eliminates perennial forage needed to sustain a viable desert tortoise population. An adjacent population of tortoise in Utah is declining (BLM, Hot Desert ES, 1978).

Conclusion. If overuse continues, the desert tortoise population in the Caliente ES area would probably also decline.

Impact on Threatened or Endangered Wildlife

No impacts to federally-listed threatened or endangered wildlife are anticipated under this alternative.

Impact on Other Wildlife

Presently, 53 of 57 miles of perennial stream in the Caliente ES area are being over used. An approximate 58 percent reduction (see Table 3-8) would be needed to prevent over-utilization. Livestock and wild horses congregate in riparian areas. This reduces cover and food sources that support Gambel's quail, mourning dove, cottontail rabbits, and many nongame birds. Vegetation is eliminated that is necessary to shade a stream and to keep stream temperature within tolerable limits for fish.

Conclusion. Under present management, streamside vegetation can be expected to continue to deteriorate and adversely impact those wildlife species discussed previously.

Summary of Impacts to Wildlife

Under present management mule deer would not reach reasonable numbers (8,820). Bighorn sheep might decline from present population estimates (874). Desert tortoise populations could be expected to decline possibly to the point of becoming endangered.

Fish and other animals would be adversely impacted by continued over-grazing on 93 percent of the perennial streams in the ES area. Federally threatened or endangered wildlife would not be impacted.

Impacts on Wild Horses and Burros

Continuation of 1977 livestock use levels through 2015 would have the greatest effect upon the 713 horses currently located in overused allotments. Of the 44 allotments which presently contain wild horses or burros, 19 (or 43 percent) would be over- utilized by an average of 683 AUMs in 1980, and with the projected decreases in forage capacity this over-utilization could reach an average of 850 AUMs by the year 2015. (See Table 8-2.) As mentioned in Vegetation, Chapter 3, wild horses and burros would tend to move out of areas of over utilization in order to meet their forage requirements. Thus, they could possibly migrate out of traditional areas of use into less desirable areas (i.e., less seclusion, decreased forage availability, greater distances to water). Any horses confined by fences or natural barriers in the above allotments could suffer malnutrition, disease, or even starvation as a result of decreased forage availability.

The 359 horses located in the 25 allotments presently grazed below forage capacity would benefit from continued present management. These allotments would produce an average 655 AUMs of unused forage in 1980, and with the projected increases in forage capacity the unused forage could reach an average 733 AUMs by the year 2015. Horses in these allotments would benefit from the additional forage since their forage requirements could be met by grazing smaller areas.

Conclusion

The majority of the 1,072 wild horses and burros (713 or 67 percent) would be adversely affected by the overuse associated with this alternative. These horses could be forced into areas not presently used, while horses confined by fences or barriers could suffer from decreased forage availability.

Impacts on Cultural Resources

Under the continuation of present management, any cultural resources site disturbance caused by livestock, wild horses, or wildlife trampling would continue as at present.

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Impacts on Land Uses

Impacts on Livestock Grazing

During 35 years (1980-2015) under this alternative livestock grazing would continue at the same level as present (78,235 AUMs). After 35 years the 30 allotments which are over-allocated would probably have 15,090 AUMs fewer (from 1977 permitted use). Thus, their available livestock forage would be only 22,059 AUMs compared to 37,149 AUMs in 1980. [The 51 allotments which are under-allocated would have an additional 40,639 AUMs available for allocation (over 1977 permitted use). These future AUMs would be allocated through use of the Bureau's planning system.] Livestock on the 30 over-allocated allotments would probably begin to show weight losses and animals would begin to use less desirable areas and eat plants of low palatability. Five allotments (36,975 acres) would have no change from their present allocation under this alternative.

Conclusion. The alternative would reduce the available future AUMs by 1,213 (one percent less than the present forage capacity). However, the 30 allotments being over-utilized would have 59 percent fewer livestock AUMs by the year 2015 if grazing were continued as at present.

Impact on Agriculture

No changes in present use would occur with the continuation of present management.

Impacts on Economics

No changes in income or employment would occur under this alternative.

Impact on Ranchers' Wealth

Although the Bureau of Land Management does not recognize a capitalized value for grazing preferences, they do contribute to the capital position (wealth) of the ranchers to which they are allotted (McConnen, 1976) (Stubblefield and Robertson, n.d.) (Nielson and Workman, 1971). Impacts associated with changes in ranch value would occur immediately, but actual dollar losses would not accrue to the ranchers until the preferences are sold, transferred, or used as collateral for a loan.

The most significant economic impact of this alternative would be caused by the reduction in grazing preferences from 118,580 AUMs to 78,236 AUMs. Since this would reduce the allowable grazing capacity of the ranches, their value would decline. At $25 per AUM, the reduction of 40,344 AUMs would decrease the ranch values

by $1 million; this represents 34 percent of the value that ES area grazing preferences contributed to the ranchers' wealth in 1977.

Ranchers who are highly dependent on borrowed funds might decide to sell their ranches because the decrease in the value of their ranches would affect their ability to obtain loans.

If the change in the value of grazing preferences could be determined by comparing the number of AUMs currently licensed by permit (78,235 AUMs) with the number of future active preference AUMs, then implementation of this alternative would have no effect on the ranchers' capital position.

Conclusion

Economic impacts of this alternative would be limited to an overall decrease in the ranchers' wealth of $1 million; this represents a 34 percent decrease in the value that ES area grazing preferences contribute to the ranchers' wealth.

Impacts on Social Values

A general sense of temporary relief may occur as a consequence of implementing the "no action" alternative. However, in an area where 98 percent of the land is federally administered, that sense of relief tends to be transitory. Environmentalists, wildlife, wild horse and burro, and wilderness interest groups, to name a few, also have concerns about federally managed ES area resources. The political and public pressure these groups may exert at any point in time, as well as any national or state legislative interest or concern, could possibly require a reassessment and subsequent redirection of Bureau programs in the ES area. This creates a continuing sense of uncertainty about the permanence of federally administered land management programs. This sense of uncertainty tends to sustain a rather widespread feeling of apprehension and uneasiness within the ranching community toward the federally administered land management process. The implementation of this alternative would not significantly alter this perception.

Some ranchers may view this alternative negatively as far as continued use of forage by wild horses and burros is concerned. However, the provision in the alternative to remove those wild horses and burros in excess of the 1977 estimated population would probably soften this negative viewpoint. The majority of the ranchers interviewed in the ES area expressed the view that they wanted to see wild horses and burros preserved, but that control was needed to preclude further damage to the range. Since this

alternative accommodates a specific number of wild horses and burros in specific areas, it would probably be viewed positively by most wild horse and burro interest groups.

Conclusion

A sense of temporary relief may occur as a consequence of implementing the "no action" alternative. Heightened uncertainty would influence operators' plans for the future in unpredictable fashion and degree. Interested environmental and wild horse groups based outside the ES area would probably react to a no action alternative with outrage. Community growth would probably continue much as it has in the past.

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ELIMINATION OF LIVESTOCK, WILD HORSE AND BURRO GRAZING

ALTERNATIVE TWO

Description

All livestock, wild horses, and burros would be removed from the Environmental Statement (ES) area under this alternative. This would allow maximum vegetative utilization by wildlife. Essentially all vegetation would be available for wildlife, watershed protection, and recreation use. The five Allotment Management Plans (AMPs) on Bureau of Land Management (BLM) land would be terminated. Domestic livestock trailing permits would be issued as necessary to allow livestock movement to or from National Forest lands, private lands, State-owned lands, and other BLM-administered lands.

Range improvements would not be maintained or constructed unless necessary for other programs such as the wildlife program. Any range improvements which would conflict with other resources (for example, fences restricting wildlife movement) would be removed or modified. There would be a continuation of other management functions in the area, guided by the Management Framework Plan. Supervision by BLM would be necessary to assure operators adhere to conditions of trailing permits and that trespass does not occur. Administrative actions related to unauthorized uses and trespass would be taken in accordance with appropriate BLM Manual provisions.

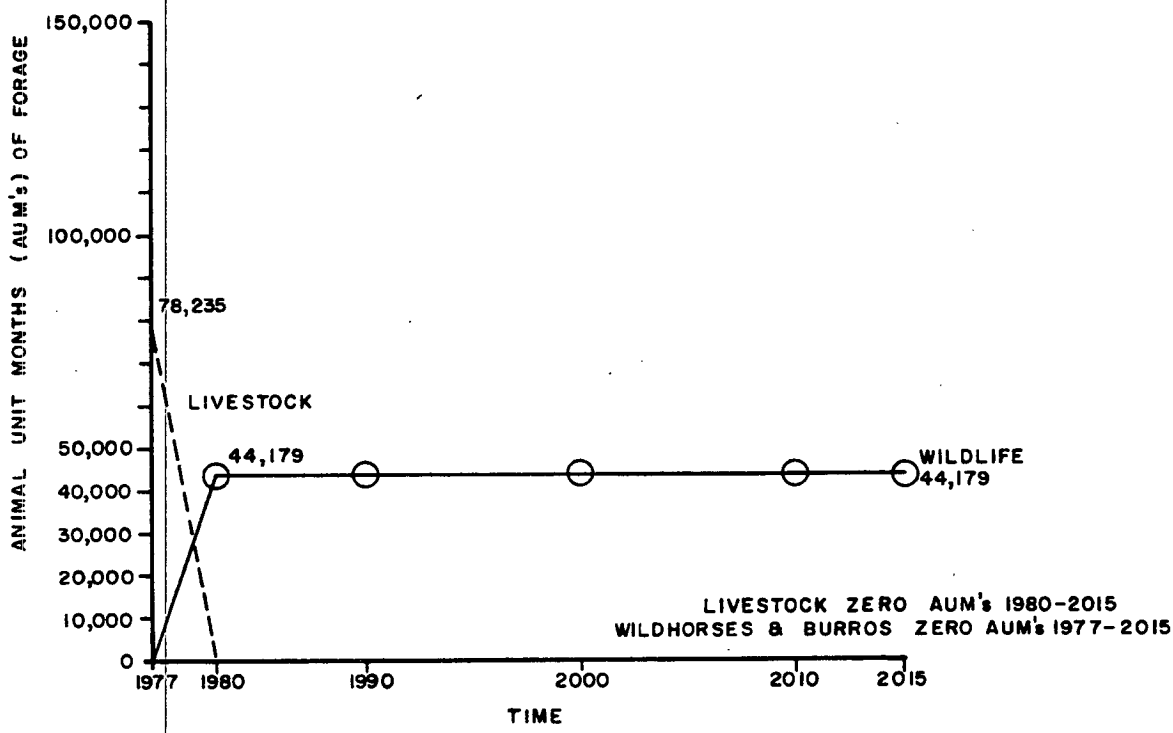
This alternative assumes there would be no habitat expansion, no reintroductions of wildlife, and no changes in existing wildlife use areas. Based on the above description and assumptions, the allocation of wildlife forage would be maximized at an Animal Unit Month (AUM) figure equal to the total wildlife forage capacity of 44,179. It is assumed wildlife populations would increase to the level of the wildlife forage capacity and remain stable through the 35-year analysis period (see Figure 8-2).

Impacts on Soils

The present soils condition is fairly stable and the erosion rate is categorized as low (average of less than one ton/acre/year). Soil erosion would be expected to be reduced to an average loss of 0.57 tons/acre (2,002,769 tons/year) throughout the ES area. However, in areas where critical (168,898 acres; 4.82 percent of ES area) and severe (11,213 acres; 0.32 percent of area) condition classed soils exist (see Table 2-5) the process of erosion could continue to reduce site productivity since there would be no specific soil conservation measures implemented. Some of the

FIGURE 8-2
ELIMINATION OF LIVESTOCK AND WILD HORSE GRAZING
(ALTERNATIVE TWO)

1980 AND POSSIBLE FUTURE ALLOCATIONS (1990-2015) TO LIVESTOCK, WILD HORSES AND BURROS AND WILDLIFE IN CALIENTE ES AREA a/



a/ Livestock and wild horse AUMs are interchangeable with each other but not always with wildlife AUMs because of dietary preference.

NOTE: Possible future vegetation allocations are estimates only and are based on a series of assumptions within a framework of feasible alternatives. Heavy dependence on professional judgements and probabilities are used. The vegetation allocation scenario should not be considered as a prediction or forecast.

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continuing damage could occur where overuse has taken place in the past and plant cover is not expected to improve greatly.

Conclusion

Overall, soil erosion is close to geologic erosion levels and would probably be reduced to 0.57 tons/acre/year. However, where present erosion is critical or severe (5.14 percent of the ES area) and in some areas of overuse and reduced plant cover, the soil resource would continue to be degraded.

Impacts on Water Resources

Impact on Water Quantity

Annual water consumption by ungulates would be reduced by approximately 85 acre-feet per year. Perennial yield would not be expected to change measurably because groundwater reservoir recharge (which largely determines perennial yield) is strongly linked to precipitation received.

Flows of Clover, Ash, Headwaters, Pine, and Beaver Dam Creeks, and Meadow Valley Wash would decrease by small unquantifiable amounts in the 57 miles of streams.

Impact on Water Quality

Suspended sediment concentrations would be reduced by unquantifiable amounts in 57 miles of streams. Reduction of stream bank trampling would decrease soil disturbance at stream locations and reduce bank sloughing and the resulting suspended sediment concentrations. Also, suspended sediment would decrease because of increased riparian vegetation which reduces delivery of sediment to perennial streams. (See Chapter 3, Water Quality.)

Fecal coliform bacteria levels would be reduced by an unquantifiable amount in 57 miles of streams because fewer animals would be using the waters.

Conclusions

Annual water consumption would essentially remain the same as for the proposed action. Stream flows would decrease by small amounts because of increased riparian vegetation, resulting in higher evapotranspiration rates, allowing less water to pass through the soil and into streams.

Water quality would improve. Suspended sediment concentrations would decrease because of reduced stream bank sloughing and increased riparian vegetation. Fecal coliform levels would also decrease.

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Impacts on Vegetation

The implementation of this alternative would result in discontinuance of grazing by livestock, wild horses, and burros. The vegetation presently providing forage for these animals would have an opportunity to complete its life cycle without grazing pressure. Livestock forage production would probably improve from 109,914 AUMs to approximately 115,400 AUMs in 35 years of no livestock grazing. This change could be attributed to the total rest of most forage species and to initial improvements in vigor and seed production. Based on a study completed by McClean and Tisdale (1972), with adjustments made through professional judgement for this area, approximately 50 percent of the acres presently in fair livestock forage condition should improve to good condition in 35 years; however, areas in poor condition would tend to remain in that condition. This can be attributed to the fact that most areas in poor condition would not have dense enough stands of desirable forage species to increase enough in density to improve one condition class in 35 years. Those areas in existing chaining and seeding projects in good or fair condition would probably drop one condition class since they would no longer be maintained, thus reinvasion of undesirable forage plants would occur. Chainings and seedings observed in the Las Vegas District indicate that pinyon-juniper and sagebrush will totally negate a chaining in approximately 18-25 years. There are approximately 2,000 acres of chainings and seedings in good condition and about 6,000 acres in fair condition. These acres would drop one condition class in 35 years. Table 8-7 gives a summary of condition as it should occur after 35 years under this alternative.

TABLE 8-7
SUMMARY
LIVESTOCK FORAGE CONDITION AFTER 35 YEARS
ALTERNATIVE TWO

	Acres Good	Acres Fair	Acres Poor
Present	688,751	1,374,539	512,351
Future	1,374,020	681,270	518,351

Vegetation communitites would probably proceed towards climax or remain in edaphic climaxes (i.e., creosote bush, blackbrush, sagebrush types). Grass species would probably show a slight increase in density (two to five percent) because of removal of grazing domestic livestock, wild horses, and burros.

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Use of riparian and perennial streambank vegetation (approximately 5,000 acres) by wildlife should increase since wildlife have a tendency to congregate in these types of areas. However, with the elimination of livestock, wild horse and burro grazing in the areas, adverse effects on vegetation would not be as severe.

Conclusion. After 35 years under this alternative, vegetative production should improve from 109,914 AUMs to approximately 115,400 AUMs. Livestock forage condition should improve from the present: good condition should go from 688,751 acres to 1,374,020 acres; fair condition should go from 1,374,539 acres to 681,270; and poor condition would go from 512,351 acres to 518,351 acres. Grass species should show a slight increase (two to five percent) in density.

Impact on Threatened or Endangered Flora

Removal of all livestock and wild horses and burros would have a beneficial impact upon proposed threatened and endangered plant species (see Appendix C, Table C-1). However, if wildlife numbers were to greatly increase some species could be adversely affected.

Conclusion. Removal of all livestock and wild horses and burros should have a beneficial impact upon proposed threatened and endangered plants (see Appendix C, Table C-1) by eliminating trampling and grazing by these herbivores. Increases in deer and bighorn sheep numbers should not affect any of these plant populations, since they have historically maintained their existence in association with these animals.

Impacts on Wildlife

This alternative would eliminate present or potential conflicts from livestock and wild horses to wildlife on Caliente ES area public lands. The quality of riparian habitat important to many wildlife species in the ES area would improve. Benefitting species would include: mule deer, bighorn sheep, Gambel's quail, mourning dove, nongame birds, amphibians, and fish.

The elimination of grazing by livestock and wild horses would increase the amount of forage, particularly perennial grasses, available to wildlife. This would benefit herbivores such as bighorn sheep and desert tortoise because their diets are composed mainly of grasses when available. It could be expected that some increases in certain wildlife species would occur. However, large increases may not occur because other factors, primarily water availability, would limit populations, and excess forage would go unused by wildlife.

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Bighorn sheep are expected to reach or exceed reasonable numbers because competition from livestock, wild horses, and burros for space, water, and forage around crucial waters would not occur.

Presently, forage is not available to meet mule deer reasonable numbers by 2,643 AUMs on four deer ranges, DY-2, DW-4, DW-5, DS-1 (see the Big Game Areas Map in Chapter 2). Without some vegetative change, either by vegetation manipulation or natural occurrence (fire), no increases of forage for mule deer on these ranges can be expected. Mule deer would probably reach or exceed reasonable numbers on all other deer ranges in the ES area.

Trampling of desert tortoises and tortoise burrows by livestock and wild horses would not occur with this alternative.

Conclusion

Most wildlife species would benefit from this alternative because competition from livestock, wild horses, and burros for space, water, and forage would be eliminated. Riparian areas important to many wildlife species would improve. All negative impacts to desert tortoise from grazing by livestock and wild horses would be eliminated. Bighorn sheep would be expected to reach or exceed reasonable numbers with the elimination of competition. Mule deer could be expected to reach or exceed reasonable numbers in all ranges except the four ranges where forage shortages exist.

Impacts on Wild Horses and Burros

Removal of the estimated 1,072 wild horses and burros from the Caliente ES area would deny them use of habitat which they have historically occupied.

If some of the wild horses and burros could not be placed in the custody of private persons, organizations, or other governmental agencies, they could be destroyed.

Impacts on Cultural Resources

Elimination of livestock, wild horse, and burro grazing would greatly reduce chances of cultural resources site disturbance attributable to trampling by grazing animals.

Impacts on Land Uses

Impact on Livestock Grazing

The typical livestock operation in the Caliente ES area depends upon BLM-administered public lands for approximately 34 percent of its yearlong forage. Discontinuance of all livestock grazing on

public lands would require livestock operators to buy, lease, or develop forage to compensate for the loss of 78,235 AUMs. Since there is a wide variation (0 to 100 percent) in the percentage that public land (BLM) grazing represents in individual livestock operations, there would be a correspondingly wide variation in impacts. Some individuals could not or would not adjust to the change and could choose to sell or lease their ranches. Other operations would probably cut back the size of their breeding herd until a modified yearlong operation could be developed on private land or other public lands. Specific impacts to the different operations are discussed in the Social Economic section of this alternative.

Conclusion. Most operators with grazing preferences in the Caliente ES area would be adversely impacted under this alternative. There is a wide variation in the percentage (0-100 percent) that public land grazing represents in individual livestock grazing operations. There would be a corresponding wide variation in the degree of impacts.

Impact on Agriculture

Potential changes in agricultural production patterns would be the same as under the proposed action, except that all livestock operators would be affected under this alternative.

Impacts on Economics

Impact on Income

As the budgets in Tables 8-8 through 8-11 indicate, all of the ranchers would have reduced incomes if Alternative Two were implemented. All ranchers except sheep ranchers would have net losses. Small cattle ranchers would lose an additional $2,234 per year. Many small cattle ranchers have remained in the livestock business despite net losses in the past; therefore, no estimate of the number of ranchers expected to go out of business can be made. Medium sized cattle ranches would have a decrease from $7,939 per year to $-2,703 per year -- a loss of $10,642 per year. These ranchers would have to have additional income sources to remain in the cattle business. The large cattle ranch would lose an additional $-43,052. The response to this impact is impossible to predict because this ranch has operated with net losses in the past. Sheep ranchers would not be as negatively affected as the other ranchers. Their incomes would decrease by $6,704 per year each, but they would still have a positive income ($8,102). Overall losses in yearly income would total $-356,008 (Table 8-12) below the 1977 level of $96,728.

TABLE 8-8
BUDGET FOR SMALL RANCH

Expenses	Alternative Two No Grazing (126 AUs)
Livestock Purchases	$ 412
Repairs & Maintenance	567
Depreciation	4,542
Interest	
Operating Capital	730
Real Estate	6,728
Gas & Lubricants	920
Supplements	267
Taxes	
Livestock	354
Real Estate	460
Custom Work	2,187
Insurance	700
Grazing Fees	
Caliente BLM	0
Other BLM	236
Forest Service	107
Utilities	315
Alfalfa & Grass Hay Expenses	339
Marketing Costs	399
Veterinary Costs	137
Miscellaneous	378
Total	19,777
Receipts	
Heifer Calves	3,195
Steer Calves	5,923
Cull Cows	1,445
Cull Bulls	421
Total	10,984
Income	-8,793
Change from 1977	-2,234

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TABLE 8-9
BUDGET FOR MEDIUM RANCH

Expenses	Alternative Two No Grazing (295 AUs)
Labor	0
Livestock Purchases	1,832
Repairs & Maintenance	1,714
Depreciation	8,544
Interest	
Operating Capital	2,133
Real Estate	8,723
Gas & Lubricants	1,625
Supplements	549
Pasture Rent	505
Taxes	
Livestock	799
Real Estate	1,143
Insurance	1,300
Grazing Fees	
Caliente BLM	0
Other BLM	1,857
Forest Service	298
Utilities	1,000
Alfalfa & Grass Hay Expenses	938
Marketing Costs	1,035
Veterinary Expenses	263
Miscellaneous	537
Total	34,796
Receipts	
Heifer Calves	9,883
Steer Calves	17,443
Cull Cows	3,572
Cull Bulls	1,195
Total	32,093
Income	- 2,703
Change from 1977	- 10,642

TABLE 8-10
BUDGET FOR LARGE RANCH

Expenses	Alternative Two No Grazing (2,216 AUs)
Labor	$ 62,048
Repairs & Maintenance	16,176
Depreciation	123,584
Gas & Lubricants	12,055
Feed & Supplements	60,177
Taxes	12,906
Insurance	3,329
Grazing Fees	
Caliente BLM	0
Other BLM	4,961
Utilities	12,224
Alfalfa & Grass Hay Expenses	13,920
Livestock Transportation	4,210
Veterinary Expenses	1,042
Miscellaneous	7,357
Total	333,989
Receipts from Livestock Sales	223,507
Income	-110,482
Change from 1977	- 43,051

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TABLE 8-11
BUDGET FOR SHEEP RANCH

Expenses	Alternative Two No Grazing (2,157 head)
Labor & Supplies	$14,797
Livestock Purchases	2,028
Depreciation	8,588
Interest	
Operating Capital	1,747
Real Estate	2,783
Gas, Lubricants, Repairs	12,058
Feed & Supplement Purchases	18,328
Pasture Rent	11,269
Taxes	7,886
Shearing	2,804
Insurance	1,964
Grazing Fees	
Caliente BLM	0
Other BLM	3,465
Forest Service	187
Utilities	4,855
Miscellaneous	4,422
Total	97,181
Receipts	
Lambs	87,229
Ewes	3,602
Wool (inc. incentives)	14,452
Total	105,283
Income	8,102
Change from 1977	-6,704

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TABLE 8-12

SUMMARY OF RANCH INCOME IMPACTS
ALTERNATIVE TWO

	Change in Proprietor's Income	Change in Labor Income	Change in Total Income
Small Cattle (33 ranches)	$- 73,722	$ --	$- 73,722
Medium Cattle (13 ranches)	-138,346	-22,152	-160,498
Large Cattle (1 ranch)	- 43,051	-35,952	- 79,003
Sheep (5 ranches)	- 33,520	- 9,265	- 42,785
Total	-288,639	-67,369	-356,008

Annual indirect income impacts stemming from the decreases in the livestock industry would total $-170,000. Total direct and indirect income would decrease by $534,000 per year. This represents less than one percent of regional income. This is not significant on a regional basis, but it would probably have significant impacts in some of the smaller communities.

Possible long-term increases in big game populations may result in an increase in long-term incomes in Lincoln County's hunting-related businesses. This could amount to about $170,000 (see Appendix G, Section 7). This represents a 65 percent increase in big game-related income in Lincoln County, but less than one percent of the regional income.

Long-term direct and indirect income impacts would amount to a loss of about $347,000.

Impact on Employment

The total labor income from livestock ranching would decline by $67,369 per year. At $2.35 per hour this would be equivalent to a loss of 14 full-time jobs; this would be a 33 percent decrease from 1977 levels.

Indirect employment would decline by 6 jobs. The overall direct and indirect changes in employment would be a loss of 26 jobs. Again, the overall impact of this alternative on regional employment would be insignificant, but smaller communities in the area may be strongly affected.

Possible long-term increases in wildlife populations may result in an increase in long-term employment in Lincoln County's hunting-related business. This could amount to about 20 full-time equivalent jobs by the year 2015 (see Appendix G, Section 7). This represents a 65 percent increase in big game-related employment in Lincoln County, but less than one percent of regional employment.

Long-term direct and indirect employment impacts would amount to an increase of two jobs.

Impact on Ranchers' Wealth

Although the Bureau of Land Management does not recognize a capitalized value for grazing preferences, the preferences do contribute to the capital position (wealth) of the ranchers to whom they are allotted (McCannen, 1976) (Stubblefield and Robertson, n.d.) (Nielson and Workman, 1971). Impacts associated with changes in ranch value would occur immediately but actual dollar losses would not accrue to the ranchers until the

preferences are sold, transferred, or used as collateral for loans.

The wealth of the ranchers would decline as a result of the elimination of 118,580 AUMs of grazing preferences. This would reduce the allowable grazing capacity of the ranches. At $25 per AUM the total decline in the value of the ranches would be $3 million or 100 percent of the value that ES area grazing preferences contribute to the ranchers' wealth. This impact would not be translated into actual dollars until the preferences are sold.

If the change in the value of grazing preferences was determined by comparing current AUMs licensed under permit (78,235) with future AUMs of active preference, then a much less negative impact could be shown -- a decrease of $1.9 million.

Impact on Tax Revenues

Livestock tax revenues in Lincoln County would decline by $20,901 per year. This represents 0.5 percent of the fund requirements for local government in Lincoln County.

Impact on Seasonal Production Characteristics

The elimination of livestock grazing on public lands in the ES area would cause an increase in the dependence on other feed sources -- private lands, Forest Service lands, and public lands in the other areas. Many ranchers would find it difficult to adjust their yearlong operations to grazing without public land forage in the ES area. One problem which may have serious impacts on many ranches is that the increase in dependency on private lands may lead to livestock mineral poisoning, particularly in some of the valley bottoms. Vaccinations to offset this poisoning would cost about $2.00 per head (Marble, 1978).

Conclusion

Implementation of this alternative would have strong negative impacts to ES area ranchers. Their losses below their 1977 income of $96,728 would total $356,008 per year. Although many have been operating with net losses in the past, it is doubtful many would be able to remain in the livestock business.

The ranchers who do sell their ranches would obtain much lower prices. The overall loss in ranch values would total $3 million -- 100 percent of the value that grazing privileges contribute to the ranchers' wealth.

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Impacts on Social Values

The removal of all livestock from the public lands of the Caliente ES area would probably force a number of ranchers out of the livestock industry. Some ranchers may elect to sell and relocate elsewhere, while others may attempt to stay in business if their private ranch holdings can support a greatly reduced year-round operation. If, as a result of implementing the no grazing alternative, ranchers elect to sell ranchlands to subdividers, the influx of retired persons into the ES area may accelerate. Should this occur, some ranching community members would be faced with a painful dilemma--either sell and relocate elsewhere (disrupting long-standing friendship ties in the community) or remain and see "their community" altered to the point where, over time, they are virtually "strangers in their own town". The probable long-term effect would be to force the sale of some ranches, thus increasing the trend to smaller numbers of family-owned ranches.

Elimination of wild horse grazing would take away the aesthetic value that many persons place on viewing wild horses in their natural habitat. It could be expected these individuals would carry this issue to the public-at-large in an attempt to modify this alternative. Trends and impacts described under the proposed action would be intensified and accelerated by the no grazing alternative.

Conclusion

Most livestock operators who depend on BLM grazing preferences would probably be forced out of business under the no grazing alternative. Some ranchers may elect to sell to subdivision developers. An indeterminable number of ranchers would migrate out of the area and attempt to rebuild their lives with the proceeds of their property sales. Community development may proceed faster under this alternative than under any other. Trends and impacts described under the proposed action would be intensified and accelerated by the no grazing alternative.

MINIMUM CONSTRAINTS ON WILD HORSES AND BURROS
ALTERNATIVE THREE

Description

This alternative maximizes the wild horse and burro populations within the capability of existing forage. The allocation levels for this alternative are shown in Table 8-13. Under this alternative, all available forage within the present wild horse and burro use areas [suitable and potentially suitable with water development, excluding competitive wildlife Animal Unit Months (AUMs)] would be allocated to wild horses and burros. In those allotments which receive excessive horse use above their forage capacities, some animals may be relocated to other wild horse use allotments which produce the required forage amounts. This practice would continue until all wild horse use allotments are being used at their 1980 forage capacities (34,361 AUMs or 2,863 animals). Periodic removals would be required thereafter. The allocation of vegetation on those allotments which do not have forage demands by wild horses and burros would be allocated as outlined in the proposed action. This alternative assumes there would be no expansion of present habitat for wild horses and burros.

Allotment Management Plans (AMPs) would be developed only on those allotments specified in Tables 8-13 and 8-14. Range improvement projects would be constructed in the allotments which are recommended for AMPs as shown in Table 8-14. (Table 8-15 gives the estimated cost of development.) Water projects associated

TABLE 8-15
RANGE IMPROVEMENT COST SCHEDULE
MINIMUM CONSTRAINTS ON WILD HORSES AND BURROS
ALTERNATIVE THREE

Project	Units	Cost/Unit	Total Cost
Fencing	326 miles	$ 2,300	$ 749,800
Spring Developments	20 each	2,300	46,000
Water Pipelines	196 miles	4,200	823,200
Water Troughs	93 each	300	27,900
Reservoirs	23 each	5,000	115,000
Wells	12 each	19,500	234,000
Mechanical Treatment	102,220 acres	17	1,737,740
Chemical Treatment	35,200 acres	19	668,800
Burning	61,920 acres	13	804,960
		Total	$5,207,400

TABLE 8-13
CALIENTE ES AREA 1978 PRESENT AND PROPOSED VEGETATION ALLOCATIONS BY ALLOTMENT AND GRAZING TREATMENT ALTERNATIVE THREE

	Present							Proposed										
Allotment	Land Ownership Status[1]		Total Forage Capacity (AUMs)		Present Authorized Livestock Use & Range Class (AUMs)[4]	Season-of-use[5]	1977 Licensed Use	Proposed Forage Allocations (AUMs)					Future[9] AUMs (2015)	Percent Change[10] Present vs. Proposed Licensed Use (1977) (AUMs)		Proposed Season-of-Use	Proposed Management Intensity	Proposed Range Class
	Public Land (acres)	Other Land (acres)	Livestock AUMs[2]	Wildlife AUMs[3]				Livestock 1980[7]	Livestock 1980-90[8]	Deer	Bighorn Sheep	Wild Horses		1980	1980-90			
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r
Applewhite	28,448	300	2	244	562 (C) Perennial	YL	527	0	0	189	---	---	2	-100%	-100%	---	No Grazing	---
Ash Flat	3,247	---	43	0	74 (C) Perennial	5/1-3/24	74	0	0	0	---	---	44	-100%	-100%	---	No Grazing	---
Bald Mountain	269,723	5	5,332	1,096	5,811 (C) Perennial	YL	5,811	5,024	5,319	370	---	---	9,118	- 14%	- 8%	6/1-3/30	AMP	Perennial
Barclay	79,621	2,350	2,690	2,214	1,791 (C) Perennial	5/16-9/30 AMP	2,049	2,527	2,601	766	---	---	5,839	+ 23%	+ 27%	5/16-9/30	AMP (existing)	Perennial
Bennett Springs	48,264	120	3,869	578	3,498 (S) Perennial	10/16-4/30	474	0	0	293	---	1,503	3,676	-100%	-100%	YL	No Grazing	Wild Horses
Beacon	5,682	---	0	---	2,095 (S) Perennial	2/1-4/30	506	0	0	---	---	---	0	-100%	-100%	---	AMP	Ephemeral
Black Canyon	8,438	---	704	154	1,005 (S) Perennial	10/16-4/30	95	0	0	64	---	329	669	-100%	-100%	YL	No Grazing	Wild Horses
Black Hills	3,610	---	126	---	156 (C) Perennial	YL	156	126	126	---	---	---	171	- 19%	- 19%	7/1-3/30	AMP	Perennial
Boulder Spring	13,537	---	416	---	416 (C) Perennial	10/1-3/30	416	416	416	---	---	---	416	0	0	10/16-4/30	Non-AMP	Ephemeral-Perennial
Breedlove	112,755	---	60	1,007	864 (C) Perennial	YL	864	0	0	4	296	40	57	-100%	-100%	YL	No Grazing	Wild Horses
Buckboard	10,842	---	427	191	263 (C) Perennial	YL	264	0	0	56	---	390	406	-100%	-100%	YL	No Grazing	Perennial
Buckhorn	82,968	---	5,687	---	4,010 (C) Perennial	YL	830	5,065	5,687	---	---	---	6,824	+486%	+558%	6/1-3/30	AMP	Perennial
Caliente	2,008	---	59	14	40 (C) Perennial	YL	0	0	58	4	---	---	65	---	---	6/1-3/30	Non-AMP	Perennial
Cliff Springs	35, 21	---	2,291	161	2,043 (C) Perennial	YL	2,043	2,179	2,291	77	---	---	3,037	+ 7%	+ 12%	6/1-3/30	AMP	Perennial
Clover Creek	22,876	158	368	294	613 (C) Perennial	11/1-4/30	0	0	0	216	---	302	350	---	---	YL	No Grazing	Wild Horses
Comet	9,146	600	216	---	214 (C) Perennial	YL	0	216	216	---	---	---	227	---	---	6/1-3/30	Non-AMP	Perennial
Condor Canyon	44,035	---	1,636	532	676 (C) Perennial	YL	0	0	193	431	---	1,209	1,554	---	---	7/1-2/28	Non-AMP	Perennial
Cottonwood	62,145	---	441	1,812	1,296 (C) Perennial	5/1-10/31	1,296	0	0	954	---	366	2,437	-100%	-100%	YL	No Grazing	Perennial
Cove	5,023	---	214	---	131 (C) Perennial	YL	0	---	---	---	---	214	218	-100%	-100%	YL	---	Perennial
Crescent	84,526	80	2,828	268	1,540 (S) Perennial	11/1-4/30	1,173	2,181	2,673	268	---	---	3,061	+ 83%	+128%	11/1-3/30	Non-AMP	Perennial
Crestline	2,415	1,300	96	34	55 (C) Perennial	YL	0	87	87	20	---	---	362	---	---	6/1-3/30	AMP	Perennial
Crossroads	19,201	---	413	350	689 (C) Perennial	5/1-10/31	690	379	379	162	---	---	1,798	- 45%	- 45%	6/1-10/15	AMP	Perennial
Crystal Springs	7,596	---	376	---	437 (C) Perennial	Winter	347	376	376	---	---	---	414	+ 8%	+ 8%	11/1-4/30	AMP	Perennial
Deer Lodge	6,880	40	319	108	167 (C) Perennial	YL	0	0	0	108	---	291	303	-100%	-100%	YL	No Grazing	Wild Horses

TABLE 8-13 -- Continued

Allotment	Present: Land Ownership Status[1]		Present: Total Forage Capacity (AUMs)		Present: Present Authorized Livestock Use & Range Class (AUMs)[4]	Present: Season-of-use[5]	Present: 1977 Licensed Use	Proposed: Proposed Forage Allocations (AUMs)					Proposed: Future[9] AUMs (2015)	Proposed: Percent Change[10] Present vs. Proposed Licensed Use (1977) (AUMs)		Proposed: Proposed Season-of-Use	Proposed: Proposed Management Intensity	Proposed: Proposed Range Class
	Public Land (acres)	Other Land (acres)	Livestock AUMs[2]	Wildlife AUMs[3]				1980[7] Livestock	1980-90[8] Livestock	Deer	Bighorn Sheep	Wild Horses		1980	1980-90			
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r
Delamar	240,755	---	6,148	5,134	4,858 (C) Perennial	YL	5,573	2,055	2,468	632	84	3,435	5,841	- 63%	- 56%	YL	AMP	Ephemeral-Perennial
Elgin	26,602	160	1,401	1,083	2,073 (C) Perennial	10/1-4/30	1,760	262	780	---	22	607	1,331	- 85%	- 56%	10/16-3/30	AMP	Ephemeral-Perennial
Ely Spring (Sheep)	22,927	849	1,135	325	1,802 (S) Perennial	10/16-5/15	0	0	0	73	---	1,130	1,078	---	---	YL	No Grazing	Wild Horses
Ely Spring (Cattle)	55,168	960	4,878	7	4,248 (C) Perennial	YL (AMP)	3,980	4,265	4,878	4	---	---	6,174	+ 7%	+ 23%	YL (AMP)	AMP	Perennial
Enterprise	21,585	160	2,152	690	1,261 (C) Perennial	5/1-10/31	1,927	2,004	2,004	170	---	---	3,167	+ 4%	+ 4%	5/1-10/30	AMP	Perennial
Flat Top Mesa	6,033	---	0	0	--- (C) Ephemeral	---	6/	0	0	---	---	---	---	---	---	---	Non-AMP	Ephemeral
Garden Springs	38,823	---	2,150	390	2,809 (C) Perennial	10/16-5/15	2,629	231	262	373	---	1,640	2,042	- 91%	- 90%	10/1-3/30	Non-AMP	Ephemeral-Perennial
Gourd Springs	101,125	---	1,406	362	3,458 (C) Perennial	10/16-5/15	2,233	829	1,398	1	19	---	1,547	- 63%	- 57%	10/1-3/30	AMP	Ephemeral-Perennial
Grapevine	33,328	---	560	---	560 (C) Perennial	10/1-3/30	551	560	560	---	---	---	560	+ 2%	+ 2%	10/16-3/30	AMP	Ephemeral-Perennial
Haypress	7,843	110	43	61	154 (H) Perennial	5/1-10/1	0	43	43	56	---	---	301	---	---	7/1-10/15	Non-AMP	Perennial
Henrie	131,796	---	3,127	2,593	2,400 (C) Perennial	11/1-4/30	2,400	0	0	408	487	2,879	2,971	-100%	-100%	YL	No Grazing	Wild Horses
Highland Peak	45,542	1,960	2,371	263	3,704 (S) Perennial	10/16-5/15	160	0	994	157	---	614	2,252	-100%	+621%	6/1-3/30	AMP	Perennial
Highway	4,251	40	219	63	118 (C) Perennial	YL	0	0	216	19	---	---	241	---	---	6/1-3/30	Non-AMP	Perennial
Jack Rabbit	9,755	---	0	0	0 (C) Ephemeral	---	6/	0	0	---	---	---	---	0	0	---	Non-AMP	Ephemeral
Klondike	7,072	---	416	120	678 (S) Perennial	10/16-5/15	378	0	0	48	---	445	395	-100%	-100%	YL	No Grazing	Wild Horses
Lime Mountain	67,144	---	3,830	2,814	6,754 (C) Perennial	10/1-5/15	3,580	2,419	3,191	840	---	---	5,365	- 40%	- 11%	10/16-3/30	AMP	Ephemeral-Perennial
Little Mountain	18,575	---	671	87	1,422 (WH) Perennial	YL	---	0	0	87	---	638	637	---	---	YL	No Grazing	Wild Horses
Lower Lake	107,317	---	1,145	9	1,247 (C) Perennial	YL	100	94	1,145	9	---	---	1,256	- 6%	+1045%	6/1-3/30	AMP	Ephemeral-Perennial
McCutcheon Spring	18,276	40	583	302	446 (C) Perennial	YL	0	0	547	89	---	---	1,057	---	---	6/1-3/30	AMP	Perennial
McGuffy Spring	22,115	---	325	246	298 (C) Perennial	YL	0	0	0	246	---	302	309	---	---	YL	No Grazing	Wild Horses
Mahogany Peak	28,341	1,360	1,311	473	617 (C) Perennial	YL	326	0	0	473	---	1,053	1,245	-100%	-100%	YL	No Grazing	Wild Horses
Meadow Valley	3,971	240	0	---	56 (C) Perennial	11/1-4/30	48	0	0	---	---	---	---	-100%	-100%	---	No Grazing	---

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TABLE 8-13 -- Continued

Present								Proposed											
Allotment	Land Ownership Status[1]		Total Forage Capacity (AUMs)		Present Authorized Livestock Use & Range Class (AUMs)[2]	Season-of-use[5]	1977 Licensed Use	Proposed Forage Allocations (AUMs)					Future[9] AUMs (2015)	Percent Change[10] Present vs. Proposed Licensed Use (1977) (AUMs)		Proposed Season-of-Use	Proposed Management Intensity	Proposed Range Class
								Livestock											
	Public Land (acres)	Other Land (acres)	Livestock AUMs[3]	Wildlife AUMs[4]				1980[7]	1980-90[8]	Deer	Bighorn Sheep	Wild Horses		1980	1980-90			
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r
Mormon Peak	82,296	---	1,855	4,703	Undetermined (C) Perennial	Winter	328	0	0	116	1,081	1,530	1,762	-100%	-100%	YL	No Grazing	Wild Horses
Morrison-Wengert	33,264	1,200	1,043	1,387	1,760 (C) Perennial	YL	1,760	0	0	238	180	928	991	-100%	-100%	YL	No Grazing	Wild Horses
Mustang	23,877	---	444	161	1,260 (C) Perennial	YL (AMP)	987	444	444	105	---	---	744	- 55%	- 55%	YL (AMP)	AMP	Perennial
Mustang Flat	5,987	---	90	218	147 (C) Perennial	5/1-10/31	0	0	0	86	---	82	86	---	---	YL	No Grazing	Wild Horses
Nequinta Spring	52,425	140	1,058	575	Unalloted Perennial	YL	---	0	1,058	237	---	---	1,164	---	---	6/1-3/30	AMP	Perennial
N-4	43,500	5,380	396	51	824 (C) Perennial	3/1-10/1	6/	0	0	43	---	386	376	---	---	YL	No Grazing	Wild Horses
Oak Spring	193,609	1,440	10,570	3,338	9,268 (C) Perennial	YL (AMP)	7,793	3,747	3,838	889	67	6,536	10,042	- 52%	- 51%	YL (AMP)	AMP	Perennial
Oak Wells	29,139	40	542	476	511 (C) Perennial	YL	0	0	0	247	---	302	515	---	---	YL	No Grazing	Wild Horses
Pahranagat East	34,146	---	565	---	511 (C) Perennial	8/1-5/30	289	0	565	---	---	---	593	-100%	+ 96%	10/1-3/30	Non-AMP	Perennial
Pahranagat West	70,138	---	1,289	75	2,144 (C) Perennial	8/1-5/31	1,351	0	1,289	14	---	---	1,737	-100%	- 5%	10/1-3/30	Non-AMP	Perennial
Pahroc	117,443	---	3,917	1,183	4,783 (C) Perennial	YL	4,604	3,568	3,891	266	---	---	4,825	- 23%	- 15%	6/1-3/30	AMP	Perennial
Panaca Cattle	16,275	---	596	116	453 (C) Perennial	YL	72	0	0	11	---	469	566	-100%	-100%	YL	No Grazing	Wild Horses
Panaca SCS	4,242	---	162	15	Unalloted (C & S) Perennial	---	---	160	160	7	---	---	306	---	---	10/1-3/30	Non-AMP	Perennial
Peck	7,698	---	190	---	268 (C) Perennial	YL	0	0	0	---	---	190	180	---	---	YL	No Grazing	Wild Horses
Pennsylvania	42,556	320	156	1,472	817 (C) Perennial	5/1-10/31	439	0	0	606	---	131	148	-100%	-100%	YL	No Grazing	Wild Horses
Pine Cone	28,265	---	627	135	1,205 (C) Perennial	10/1-6/15	208	0	603	32	---	---	1,618	-100%	+190%	10/1-3/30	Non-AMP	Perennial
Pioche	13,440	---	354	77	402 (C) Perennial	YL	155	0	0	36	---	315	336	-100%	-100%	YL	No Grazing	Wild Horses
Pulsipher Wash	3,408	---	0	0	--- (C) Ephemeral	---	0	0	0	---	---	---	---	--	--	---	Non-AMP	Ephemeral
Rabbit Spring	20,975	40	720	119	1,122 (S) Perennial	10/16-4/15	0	0	115	77	---	430	684	---	---	10/1-3/30	Non-AMP	Perennial
Rattlesnake	28,426	---	1,172	266	1,182 (C) Perennial	10/16-5/31	1,183	0	0	203	---	932	1,113	-100%	-100%	YL	No Grazing	Wild Horses
Red Bluff	18,039	---	98	---	34 (C) Perennial	10/1-4/15	34	98	98	---	---	---	100	+188%	+188%	7/1-3/30	Non-AMP	Perennial
Roadside	1,123	---	48	---	32 (C) Perennial	12/1-2/28	0	0	0	---	---	48	46	---	---	YL	No Grazing	Wild Horses
Rocky Hill	4,092	---	238	29	308 (C) Perennial	10/16-5/15	0	0	236	11	---	---	262	---	---	6/1-3/30	Non-AMP	Perennial
Rox	25,870	120	0	21	756 (C) Perennial	YL	372	0	0	---	13	---	---	-100%	-100%	---	Non-AMP	Ephemeral
Sand Hollow	35,174	---	582	---	2,430 (C) Perennial	10/1-5/15	1,118	311	582	---	---	---	698	- 72%	- 48%	10/1-3/30	AMP	Ephemeral-Perennial

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TABLE 8-13 -- Continued

Allotment	Present: Land Ownership Status[1] Public Land (acres) a	Present: Land Ownership Status[1] Other Land (acres) b	Present: Total Forage Capacity (AUMs) Livestock AUMs[2] c	Present: Total Forage Capacity (AUMs) Wildlife AUMs[3] d	Present: Present Authorized Livestock Use & Range Class (AUMs)[4]	Present: Season-of-use[5] f	Present: 1977 Licensed Use g	Proposed: Proposed Forage Allocations (AUMs) Livestock 1980[7] h	Proposed: Proposed Forage Allocations (AUMs) Livestock 1980-90[8] i	Proposed: Proposed Forage Allocations (AUMs) Deer j	Proposed: Proposed Forage Allocations (AUMs) Bighorn Sheep k	Proposed: Proposed Forage Allocations (AUMs) Wild Horses l	Proposed: Future[9] AUMs (2015) m	Proposed: Percent Change[10] Present vs. Proposed Licensed Use (1977) (AUMs) 1980 n	Proposed: Percent Change[10] Present vs. Proposed Licensed Use (1977) (AUMs) 1980-90 o	Proposed: Proposed Season-of-Use p	Proposed: Proposed Management Intensity q	Proposed: Proposed Range Class r
Sand Springs	249,685	5,200	11,019	1,303	6,091 (C) Perennial	YL (AMP)	4,918	10,313	10,993	133	---	---	13,491	+110%	+124%	YL	AMP	Perennial
Sawmill Canyon	9,177	---	97	159	181 (C) Perennial	YL	0	0	0	78	---	90	92	---	---	YL	No Grazing	Wild Horses
Schlarman	5,345	---	390	464	240 (C) Perennial	11/1-4/30	214	0	0	1	21	376	370	-100%	-100%	YL	No Grazing	Wild Horses
Shadow Well	17,862	---	1,151	---	577 (S) Perennial	11/1-4/30	440	1,151	1,151	---	---	---	1,381	+162%	+162%	10/1-12/30	AMP	Perennial
Sheep Spring	31,077	---	1,815	629	409 (C) Perennial	YL	0	271	370	262	---	1,289	1,724	---	---	7/1-2/28	Non-AMP	Perennial
Sheep Flat	74,171	720	521	1,350	1,977 (C) Perennial	5/16-9/15	1,979	0	0	738	---	521	495	-100%	-100%	YL	No Grazing	Wild Horses
Simpson	8,379	---	414	---	747 (C) Perennial	12/1-4/30	750	414	414	---	---	---	496	- 45%	- 45%	12/1-3/30	AMP	Perennial
Six Mile	34,531	---	896	125	674 (C) Perennial	YL	674	887	887	125	---	---	986	+ 32%	+ 32%	6/1-3/30	AMP	Perennial
Snow Spring	44,042	---	1,530	1,015	3,567 (C) Perennial	10/1-5/15	1,650	1,207	1,207	397	---	---	1,683	- 27%	- 27%	11/1-3/30	AMP	Ephemeral-Perennial
Summit Spring	18,035	---	149	---	715 (C) Perennial	10/16-5/15	715	149	149	---	---	---	164	- 79%	- 79%	11/1-3/30	AMP	Ephemeral-Perennial
Terry	30,163	---	242	---	2,366 (C) Perennial	10/1-5/15	1,444	105	242	---	---	---	266	- 83%	- 83%	10/1-3/30	AMP	Ephemeral-Perennial
Twada	13,608	10	554	205	355 (C) Perennial	YL	229	0	0	95	---	521	526	-100%	-100%	YL	No Grazing	Wild Horses
Warm Spring	1,401	---	25	---	74 (C) Perennial	11/16-4/15	0	25	25	---	---	---	28	---	---	7/1-3/30	AMP	Perennial
White Hills	2,755	---	105	---	101 (C) Perennial	12/1-2/28	0	0	0	---	---	105	100	---	---	YL	No Grazing	Wild Horses
White Rock	32,916	---	1,810	533	2,880 (C) Perennial	9/16-5/15	1,269	0	0	28	38	1,793	1,720	-100%	-100%	YL	No Grazing	Wild Horses
Total	3,495,805	25,442	109,914	44,179	118,580		78,235	54,188	67,225	12,748	2,308	34,361	131,231					

1 Land ownership includes some acreage outside the ES area boundary in the Ely and Las Vegas districts.
2 Suitable Animal Unit Months (AUMs) include those AUMs which meet the Bureau of Land Management's production and slope criteria.
3 Wildlife AUMs include all competitive and non-competitive AUMs determined from the range survey.
4 (C) cattle (S) domestic sheep (H) domestic horses (WH) wild horses. Authorized use determined from previous range survey or by agreement.
5 (YL) yearling (AMP) existing Allotment Management Plan
6 Permitted use occurred on these allotments, but the number of AUMs used in the ES area could not be determined because the allotment boundaries extend outside the ES area.
7 Presently suitable livestock AUMs.
8 Total of presently suitable and potentially suitable (with water development) livestock AUMs.
9 Possible future forage includes those AUMs available through vegetative manipulation and through intensive management of the resource.
10 Column n is Column h - g ÷ g.
Column o is Column l - g ÷ g.

Notes: See glossary for definitions of: ephemeral, ephemeral-perennial, perennial, suitable AUM, season-of-use (period-of-use), competitive forage, non-competitive forage, AMP, Non-AMP, and no grazing.

Forty-eight AUMs were allocated to antelope on the Sand Springs Allotment.

Source: U. S. Department of the Interior, Bureau of Land Management, Las Vegas District, Caliente Unit Resource Analysis and Management Framework Plan, 1978.

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TABLE 8-14
PROPOSED ALLOTMENT MANAGEMENT PLANS, RANGE IMPROVEMENT, AND VEGETATION MANIPULATION
MINIMUM CONSTRAINTS ON WILD HORSES AND BURROS (ALTERNATIVE THREE)
CALIENTE ES AREA

Allotment	Fencing (Miles)	Spring Developments	Water Pipelines (Miles)	Water Troughs	Reservoirs	Wells	Mechanical Treatment (Acres)	Chemical Treatment (Acres)	Burning (Acres)
1. Oak Springs Cliff Springs	20	4	20	10	--	--	18,880	4,800	8,480
2. Buckhorn Lower Lake	40	--	25	10	--	3	--	--	--
3. Pahroc Six Mile	6	--	12	6	--	--	5,160	--	--
4. Gourd Springs Summit Spring	12	3	10	5	--	1	--	--	--
5. Delamar	25	--	30	15	5	2	5,120	14,080	
6. Barclay Lime Mountain	18	7	30	15	3	1	14,720	3,840	21,760
7. Enterprise Snow Spring Terry	15	--	10	5	2	--	2,880	640	4,480
8. Bald Mountain Naquinta Spring	45	2	15	7	13	1	12,160	8,960	6,080
9. Boulder Spring Elgin Grapevine	3	--	5	2	--	--	--	2,240	2,560
10. Crossroads Sand Hollow Beacon	8	--	11	3	--	2	12,800	--	640
11. Highland Peak	20	3	20	10	--	1	2,560	1,280	1,280
12. McCutcheon Spring	5	--	3	2	--	--	4,160	--	--
13. Simpson	4	--	--	--	--	--	--	--	--

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TABLE 8-14 -- Continued

Allotment	Fencing (Miles)	Spring Developments	Water Pipelines (Miles)	Water Troughs	Reservoirs	Wells	Mechanical Treatment (Acres)	Chemical Treatment (Acres)	Burning (Acres)
14. Crystal Spring	3	--	--	--	--	1	--	--	--
15. Crestline	3	--	--	--	--	--	960	--	1,600
Ely Springs Cattle (existing AMP)	6	1	5	3	--	--	--	3,200	--
Mustang (existing AMP)	--	--	--	--	--	--	2,560	--	--
Sand Spring (existing AMP)	46	--	--	--	--	--	8,900	4,800	--
Non-AMPs									
Crescent	--	--	--	--	--	--	1,760	--	--
Haypress	--	--	--	--	--	--	2,560	--	--
Pahranagat West	14	--	--	--	--	--	1,280	2,560	--
Pine Cone	22	--	--	--	--	--	5,760	2,880	960
Pahranagat East	11	--	--	--	--	--	--	--	--
Totals	326	20	196	93	23	12	102,220	35,200	61,920

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with allotments originally proposed for AMPs in the proposed action and which occur within Wild Horse and Burro Areas would also be constructed to allow utilization of the potentially suitable AUMs (see Tables 8-16 and 8-17 for water developments and cost of waters for wild horses). Existing water projects in those allotments proposed for total vegetation allocation to wild horses and burros would be purchased and maintained by the Bureau of Land Management (BLM). The Oak Springs allotment (existing AMP) would continue to operate as in the proposed action but at reduced AUM levels due to the allocation to wild horses. The remaining four existing AMPs would continue as in the proposed action. Table 8-18 and Figure 8-3 give a summary of the AUMs allocated under this alternative.

TABLE 8-17
WILD HORSE AND BURRO IMPROVEMENT COST SCHEDULE

MINIMUM CONSTRAINTS ON WILD HORSES AND BURROS
ALTERNATIVE THREE

Project	Units	Cost/Unit	Total Cost
Spring Developments	13 each	$2,300	$ 29,900
Water Pipelines	112 miles	4,200	470,400
Water Toughs	59 each	300	17,700
Reservoirs	10 each	5,000	50,000
Wells	5 each	19,500	97,500
		Total	$665,500

TABLE 8-18
POSSIBLE FORAGE ALLOCATION FOR ALTERNATIVE THREE

	1980	1990	2015
Wild Horses and Burros	34,361	34,361	34,361
Livestock	54,188	67,225	96,870
Wildlife	15,104	15,104	15,104

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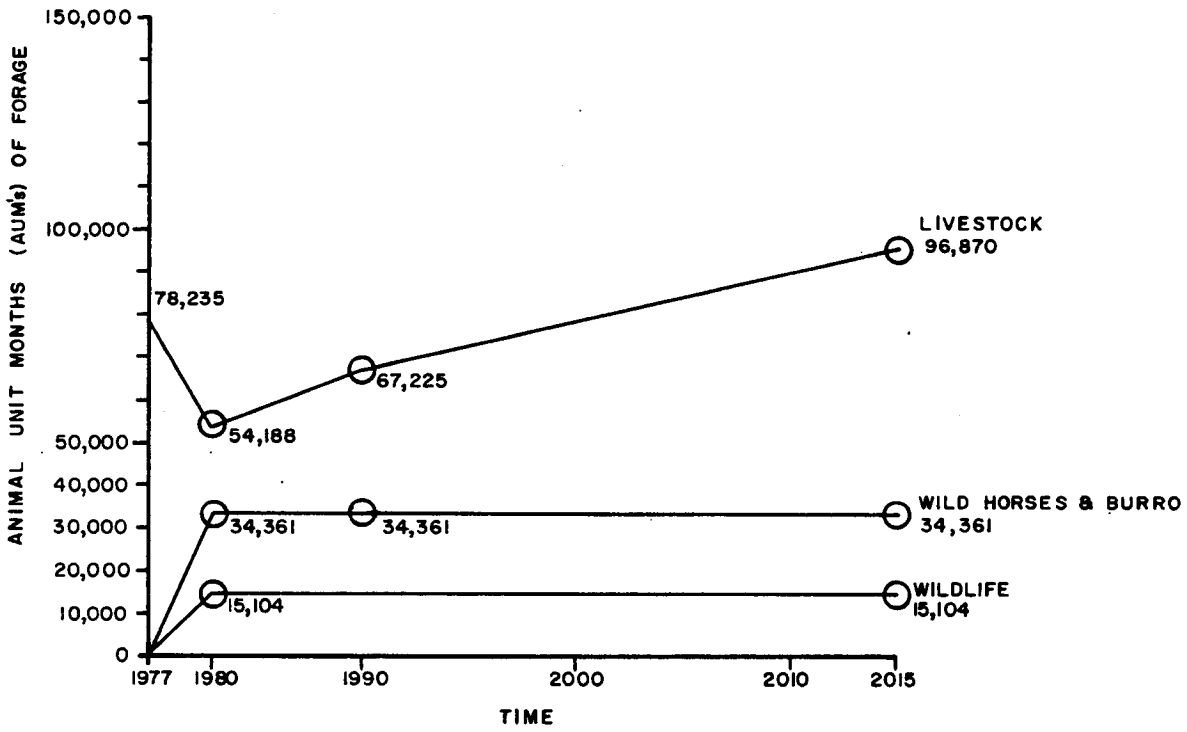
TABLE 8-16
WATER DEVELOPMENTS WITHIN WILD HORSE AND BURRO AREAS
ALTERNATIVE THREE

	Spring Developments	Water Pipelines (miles)	Water Troughs	Reservoirs	Wells
1. Ely Springs Sheep	2	5	2	--	--
2. Sheep Flat	--	18	11	--	1
Garden Springs					
White Rock					
Oak Wells					
3. Bennett Spring	4	15	7	--	1
Black Canyon					Klondike
4. Condor Canyon	1	10	5	--	2
Deerlodge					
5. Schlarman	--	1	1	--	--
6. Sheep Spring	--	6	3	--	--
7. Rattlesnake	1	2	--	--	--
8. Buckboard	--	6	3	--	1
Panaca Cattle					Roadside
White Hills					
9. Pioche	3	2	3	--	--
10. Breedlove	2	25	12	10	--
Cottonwood					Henrie
Morrison-Wengert					
11. Rabbit Springs	--	2	2	--	--
12. Mormon Peak	--	20	10	--	--
Totals	13	112	59	10	5

FIGURE 8-3
MINIMUM CONSTRAINTS ON WILD HORSES AND BURROS
(ALTERNATIVE THREE)

1980 AND POSSIBLE FUTURE ALLOCATIONS (1990-2015) TO LIVESTOCK, WILD HORSES AND BURROS AND WILDLIFE IN CALIENTE ES AREA a/



a/ Livestock and wild horse AUMs are interchangeable with each other but not always with wildlife AUMs because of dietary preference.

NOTE: Possible future vegetation allocations are estimates only and are based on a series of assumptions within a framework of feasible alternatives. Heavy dependence on professional judgements and probabilities are used. The vegetation allocation scenario should not be considered as a prediction or forecast.

Impacts on Soils

To allocate forage in amounts similar to the proposed action would result in impacts to soils being similar to those already described. (See Chapter Three, Soils.)

Mechanical, chemical, and fire treatments would reduce erosion from present levels by approximately 51,354 tons/year of sediment. Construction of fences and building of new water sources would affect 2,672 acres (0.076 percent of ES area) and would not alter erosion or compaction by a significant amount. (See Appendix D for methodology.)

Three watersheds (001, 040, and 049) presently have an erosion rate in excess of the tolerable soil loss. Under this alternative, erosion is expected to continue at present levels on these areas.

Conclusion

Mechanical, chemical, and fire treatments, combined with the Alternative Three level of grazing would reduce sediment yield by 51,354 tons/year, to a yearly loss of 2,113,802 tons/year, a two percent reduction from present.

Impacts on Water Resources

Impact on Water Quantity

With minimum constraints to wild horses and burros, water consumption by grazing animals would continue at less than one percent of the perennial yield for the Environmental Statement (ES) area. These consumptive uses would be an insignificant portion of available water.

Stream flows would likely decrease similarly to the proposed action because riparian vegetation would increase due to reduced (from present situation) grazing pressure. Overall use of riparian vegetation would decrease because grazing use would be decreased by 53 percent from the present. (See Chapter 3, Wildlife.)

Impact on Water Quality

Suspended sediment concentrations would be reduced as a result of lower sediment yields (see Soils, Alternative 3, above). Suspended sediment concentrations would also decrease because riparian vegetation would improve (Chapter 3) which would reduce stream bank sloughing.

Fecal coliform levels would decrease by unquantifiable amounts because of reduced grazing pressure in riparian areas.

Conclusion

Water consumption by ungulates would remain at less than one percent of the perennial yield, and therefore, have an insignificant impact on the amount of water available annually. Stream flows would be expected to decrease by small amounts. Suspended sediment concentrations and fecal coliform bacteria levels would decrease.

Impacts on Vegetation

After 35 years under this alternative livestock forage condition should be the same as displayed in Appendix E, Table E-5.

Livestock grazing would be eliminated on those portions of 31 allotments contained within Wild Horse and Burro areas. Thus, vegetation should benefit and effects would be approximately the same (area wide) as described in Chapter 3. Wild horse numbers would be maintained at a level that would utilize only the suitable forage allocated to them. The 19 allotments which would be used totally by wild horses should have a downward trend in condition by 2015 due to yearlong use by horses. However, the additional water sources developed should offset this. Intensive management (30 allotments) would continue as described in Table 8-13.

The major impacts to vegetation under Alternative Three would be the removal of approximately 130 acres from production by construction of 326 miles of fence. Development of water sources (spring developments, water pipelines, troughs, reservoirs, and wells) would initially disturb 227 acres and permanently remove 2,542 acres from production due to increased use and trampling associated with the improvements. These water developments would permit grazing in areas now potentially suitable due to lack of water and would provide an additional 25,016 AUMs of forage.

There would be approximately 199,340 acres (see Table 8-14) of the Caliente ES area disturbed by vegetation manipulation under this alternative. Average time for maximum production to occur should be from three to five years.

The impact of mechanical treatment on 102,220 acres should be an increase in forage production. Range condition on these areas could be expected to improve in the long-term (35 years). (See Table 8-19). About 10,222 additional AUMs should be provided from mechanical treatment projects. (See Appendix E, Section 7, for estimated AUMs technique, and Table 8-18.)

The impact of chemical treatment on 35,200 acres would be the removal of shrub species (i.e., sagebrush and blackbrush) and should result in a change in species composition toward forage species to include grasses, shrubs, and forbs utilized by wildlife and livestock. Livestock forage condition could be expected to improve in the long-term. About 3,520 additional AUMs should be provided from chemical treatment projects. (See Appendix E, Section 7, for estimated AUMs technique.)

Burning would have the short-term impact of removing vegetative cover the first growing season of the burn (61,920 acres). Long-term impacts would include a change in species composition toward more grasses and forbs and an expected increase in forage production. Range condition should change upward one class on the acreage receiving treatment in the long-term (35 years). About 6,192 additional AUMs would be provided from burning projects.

Table 8-19 gives a summary of condition after 35 years under this alternative.

TABLE 8-19
SUMMARY OF LIVESTOCK FORAGE CONDITION a/ AFTER 35 YEARS
ALTERNATIVE THREE

	Acres Good b/	Acres Fair b/	Acres Poor b/
Present	688,751	1,374,539	512,351
Future	1,746,574	514,353	332,606

a/ See Appendix E, Table E-5 for acreage by allotment.
b/ Acres do not include unsuitable acres.

Note: Includes allotments with wild horse and burro use.

Conclusion. In spite of some individual and short-term adverse impacts, it is estimated beneficial effects to vegetation should be obtained through the implementation of improved grazing

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management and elimination of competition for available forage by wild horses, burros and livestock within Wild Horse and Burro areas. Along with the beneficial effects obtained through intensive grazing management systems that provide a systematic rest or deferment from spring grazing, there would be a shift away from intensive use areas. Therefore, there should be an increase in total ground cover by live vegetation and litter. Livestock forage condition should also improve.

Impact on Threatened or Endangered Flora

Impacts to sensitive plant species would be the same as those described in Chapter 3, except on those allotments within Wild Horse and Burro areas. Allotments within these Wild Horse and Burro areas would not receive vegetation manipulations; thus, impacts to sensitive species (in these allotments) from range projects would occur only from the proposed water and fence developments. The species most likely affected are shown in Table 3-6.

Conclusion. As stated in Chapter 3, intensive livestock use resulting from AMPs or increased use on non-AMP areas (above 1977 use levels) by livestock or wild horses and burros would be harmful to proposed threatened or endangered flora. Vegetation manipulations (outside Wild Horse and Burro areas) could also adversely affect these species, as could water project developments within the Wild Horse and Burro areas.

Impacts on Wildlife

Impact on Bighorn Sheep

Under this alternative, impacts to bighorn sheep would be the same as described in Chapter 3 except yearlong competition from horses and burros would occur instead of seasonal competition from livestock. As a result of yearlong competition, the ES area bighorn sheep population should decrease similar to the proposed action (128 animals). Total bighorn sheep population expected with this alternative would be less than 630 animals (approximately 240 fewer animals than reasonable numbers).

Impact on Mule Deer

The analysis for this alternative is described in Chapter 3.

The number of water developments constructed on mule deer range would remain the same as described in Chapter 3.

Approximately 214 miles of fence would be constructed on mule deer range. Since actual fence locations are not known it is assumed

the impacts would be similar to those described in Chapter 3 but reduced by 33 percent.

Approximately 155,500 acres of vegetation would be manipulated on mule deer range. Vegetation manipulations would not be done on two deer ranges (DW-5 and DS-1) that are presently short 2,577 AUMs (17 percent of the AUMs needed to meet reasonable numbers). Without vegetation manipulations, mule deer would probably not meet reasonable numbers on these two ranges.

Conclusion. With vegetation manipulations and water developments, mule deer should reach or exceed reasonable numbers on all ranges except DW-5 and DS-1. These two areas would not reach reasonable numbers because of significant forage shortages. Total mule deer population expected with this alternative would be approximately 7,320 animals (1,500 fewer animals than reasonable numbers).

Impact on Desert Tortoise

Under this alternative, 5,895 AUMs would be used by wild horses and burros yearlong in the tortoise habitat. Critical spring and summer forage would be subject to competition that could be detrimental to a declining tortoise population. Impacts from approximately 3,000 AUMs of livestock grazing would be similar to those stated in Chapter 3.

Conclusion. This alternative would not benefit the tortoise population because competition for critical spring forage would occur. Overuse which presently occurs would be eliminated but it might not be enough to prevent a declining population of tortoise from further reduction.

Impact on Threatened or Endangered Wildlife

No impacts to federally listed threatened or endangered wildlife are anticipated with this alternative.

Impact on Other Wildlife

With this alternative, the impacts to other wildlife would be the same as identified in Chapter 3 except 199,340 acres of vegetation would be manipulated.

Summary of Impacts to Wildlife

Overall, most wildlife species should benefit from Alternative Three. Mule deer should reach or exceed reasonable numbers except on two ranges. Fish and bird populations dependent on riparian vegetation should increase over the present situation.

More wildlife should occupy the area because of increases in ecotone, plant diversity, and water. Impacts to desert tortoise vary due to increased yearlong wild horse and burro use and reduction in authorized grazing use by domestic livestock. Overall, desert tortoise populations would remain static or continue to decline. Bighorn sheep should decrease in population by approximately 128 animals. No impacts to threatened or endangered species are anticipated.

Impacts on Wild Horses and Burros

The major benefit to wild horses and burros resulting from this alternative would be the additional forage (21,497 AUMs) made available to them by construction of approximately 86 additional watering sources. (Table 8-13, and 8-16.) The additional forage would allow a 167 percent increase in the wild horse and burro population (1,072 to a maximum of 2,863).

Wild horses and burros would also benefit from decreases in forage competition with livestock on 24 allotments which would, under this alternative, receive smaller livestock forage allocations than presently used (1977 levels, Table 8-13). In 19 of these allotments, all livestock forage (14,907 AUMs) would be allocated to wild horses and burros. In the remaining five allotments (Delamar, Elgin, Garden Springs, Highland Peak, and Oak Springs), livestock allocations would be reduced but not eliminated (since forage would be allocated to livestock from portions of those allotments located outside of Wild Horse and Burro Areas). Sixty-one percent of the forage (12,832 AUMs) produced within these five allotments would be allocated to wild horses and burros. However, all five allotments, except for Garden Springs, would be managed under AMPs; thus the benefits from additional forage could be somewhat decreased because of possible movement restrictions from additional fences. Wild horses could possibly be denied traditional winter use areas (as mentioned in Chapter 3) in the Delamar, Highland Peak, and Oak Springs allotments.

When the total forage capacities are reached in all allotments containing wild horses and burros (34,361 AUMs), periodic removals would be necessary to maintain forage productivity. Those horses removed would be adversely impacted by separation from their native environment.

Conclusion

Most wild horses and burros would benefit from the 21,497 additional AUMs made available to them by water project developments, but about one-third of the horses could be adversely affected by AMPs (fences and forage competition) on four allotments.

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Impacts on Cultural Resources

Impacts anticipated under Alternative Three would be identical to those expected under the proposed action. (See Chapter 3.)

Impacts on Land Uses

Impact on Livestock Grazing

The implementation of this alternative would mean that 24 allotments (1,381,423 acres) would have 27,739 AUMs of livestock forage allocated to wild horses and burros. On 19 of the 24 allotments (841,092 acres) all available AUMs (14,907) would be allocated to wild horses and burros. The Elgin, Delamar, Oak Springs, and Garden Springs allotments would have 12,672 AUMs of livestock forge allocated to wild horses and burros in the long-term (35 years). Highland Peak allotment would have no AUMs available in 1980 but would have 994 available by 1990 through development of additional water sources. (See Table 8-13 for allocations by allotment.)

To compensate for reductions in AUMs or loss of grazing on public lands, livestock operators would either have to buy hay, lease pasture, reduce numbers, or rely on grazing privileges on Forest Service or public lands in other Bureau of Land Management districts.

Impacts to the livestock operators concerning adjustment in AUMs used are discussed in the Social Economic section.

After 35 years under this alternative there should be increased production of forage for livestock (54,188 AUMs to 96,870 AUMs), as a result of better management and range treatments.

Conclusion. Livestock use on 24 allotments (1,381,423 acres) would be reduced by 27,739 AUMs. On the 24 allotments which would have reductions or total loss of AUMs, livestock would be severely impacted. The remaining allotments would be allocated as specified in the proposed action (see livestock grazing section Chapter 3). There should be an additional 42,682 AUMs available for allocation in 2015.

Impact on Agriculture

Impacts which could occur are the same as under the proposed action. (See Chapter 3.)

Impacts on Economics

Impact on Income

According to the budgets in Tables 8-20 through 8-23 all categories of ranchers would have reduced incomes if Alternative Three were implemented.

Small cattle ranches would lose $1,541 per year below their 1977 level. Many have operated with net losses in the past so it would be difficult to determine if this additional loss would force them to leave the cattle business. Medium sized cattle ranches would have a decrease of $1,583 per year below their 1977 income. This represents a 20 percent decrease in their income. The large cattle ranch would lose an additional $20,402 per year. The response to this impact is impossible to predict because the ranch has operated with net losses in the past. Sheep ranches would have a decrease of $2,314 below their 1977 income, but would still make $12,492 per year. Total losses in annual income would be $ 133,127 below the 1977 level of $96,728.

If all AMPs are determined to be feasible and manpower and funding is available, implementation of this alternative would involve the expenditure of an estimated $5.9 million for construction of range improvements. Total direct income in the construction industry associated with this expenditure at 41 cents per dollar (see Chapter 3, Economics, Income) would be $2 million. If range improvement expenditures are spread evenly over 20 years, the increase in direct annual income in the construction industry in the impacted region would be $120,000 per year. This represents less than one percent of the construction income in the four county region impacted. In the long-term, construction of range improvements would end and construction income would return to about its 1977 level.

Indirect income impacts would be caused because of the interrelationship of the livestock and construction industries with the rest of the region's economy. Decreases in the industries associated with livestock grazing would be nearly offset by increases in industries associated with construction. Overall direct and indirect income would decrease by $31,500 per year.

By the year 2015 construction projects associated with range improvements would have ended so the stimulus to the region's economy from the construction industry would have ended. Livestock ranches would still have annual overall net losses of $46,675 below their 1977 income of $96,728 (Table 8-24).

Possible long-term increases in big game populations may result in an increase in long-term incomes in Lincoln County's

TABLE 8-20
BUDGET FOR SMALL RANCH
ALTERNATIVE THREE

Expenses	1980 (145 AUs)	2015 (157 AUs)
Livestock Purchases	$ 474	$ 513
Repairs & Maintenance	653	707
Depreciation	4,542	4,542
Interest		
Operating Capital	840	909
Real Estate	6,728	6,728
Gas & Lubricants	1,059	1,146
Supplements	307	333
Taxes		
Livestock	407	441
Real Estate	460	460
Custom Work	2,187	2,187
Insurance	700	700
Grazing Fees		
Caliente BLM	335	551
Other BLM	236	236
Forest Service	107	107
Utilities	315	315
Alfalfa & Grass Hay Expenses	339	339
Marketing Costs	460	498
Veterinary Costs	158	171
Miscellaneous	435	471
Total	20,742	21,354
Receipts		
Heifer Calves	3,677	3,982
Steer Calves	6,817	7,381
Cull Cows	1,663	1,801
Cull Bulls	484	524
Total	12,641	13,688
Income	- 8,101	- 7,666
Change from 1977	- 1,541	- 1,106

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TABLE 8-21
BUDGET FOR MEDIUM RANCH
ALTERNATIVE THREE

Expenses	1980 (478 AUs)	2015 (567 AUs)
Labor	$ 1,088	$ 2,322
Livestock Purchases	2,968	3,521
Repairs & Maintenance	2,777	3,294
Depreciation	8,544	8,544
Interest		
Operating Capital	3,456	4,099
Real Estate	3,456	8,723
Gas & Lubricants	2,634	3,124
Supplements	889	1,055
Pasture Rent	385	320
Taxes		
Livestock	1,295	1,537
Real Estate	1,143	1,143
Insurance	1,300	1,300
Grazing Fees		
Caliente BLM	3,378	5,078
Other BLM	1,857	1,857
Forest Service	298	298
Utilities	1,000	1,000
Alfalfa & Grass Hay Expenses	938	938
Marketing Costs	1,687	1,990
Veterinary Expenses	425	505
Miscellaneous	870	1,032
Total	45,646	51,680
Receipts		
Heifer Calves	16,013	18,995
Steer Calves	28,264	33,527
Cull Cows	5,789	6,866
Cull Bulls	1,936	2,296
Total	52,002	61,684
Income	6,356	10,004
Change from 1977	-1,583	+ 2,065

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TABLE 8-22
BUDGET FOR LARGE RANCH
ALTERNATIVE THREE

Expenses	1980 (2,890 AUs)	2015 (2,934 AUs)
Labor	$ 80,920	$ 82,152
Repairs & Maintenance	21,097	21,418
Depreciation	123,584	123,584
Gas & Lubricants	15,722	15,961
Feed & Supplements	60,177	60,177
Taxes	14,733	14,852
Insurance	3,329	3,329
Grazing Fees		
Caliente BLM	12,207	13,004
Other BLM	4,961	4,961
Utilities	12,224	12,224
Alfalfa & Grass Hay Expenses	13,920	13,920
Livestock Transporation	5,491	5,575
Veterinary Expenses	1,358	1,379
Miscellaneous	9,595	9,741
Total	379,318	382,277
Receipts from Livestock Sales	291,485	295,923
Income	- 87,833	- 86,354
Change from 1977	- 20,402	- 18,923

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TABLE 8-23
BUDGET FOR SHEEP RANCH
ALTERNATIVE THREE

Expenses	1980 (2,292 Sheep)	2015 (2,341 Sheep)
Labor & Supplies	$ 15,723	$16,059
Livestock Purchases	2,145	2,201
Depreciation	8,588	8,588
Interest		
Operating Capital	1,857	1,896
Real Estate	2,783	2,783
Gas, Lubricants, Repairs	12,812	13,086
Feed & Supplement Purchases	17,305	17,675
Pasture Rent	11,269	11,269
Taxes	8,252	8,385
Shearing	2,988	3,043
Insurance	1,969	1,964
Grazing Fees		
Caliente BLM	488	669
Other BLM	3,465	3,465
Forest Service	187	187
Utilities	4,855	4,855
Miscellaneous	4,699	4,799
Total	99,380	100,924
Receipts		
Lambs	92,688	94,670
Ewes	3,828	3,909
Wool (inc. incentives)	15,356	15,685
Total	111,872	114,264
Income	12,492	13,340
Change from 1977	- 2,314	- 1,466

TABLE 8-24
SUMMARY OF RANCH INCOME IMPACTS
ALTERNATIVE THREE

	Proprietors Income		Labor Income		Total Income	
	1980	2015	1980	2015	1980	2015
Small Cattle (33 ranches)	$-50,853	$-36,498	$ --	$ --	$ -50,853	$-36,498
Medium Cattle (13 ranches)	-20,579	+26,845	-8,008	+8,034	-28,587	+34,879
Large Cattle (1 ranch)	-20,402	-18,923	-17,080	-15,848	-37,482	-34,771
Sheep (5 ranches)	-11,570	- 7,330	- 4,635	- 2,955	-16,205	-10,285
Total	-103,404	-35,906	-29,723	-10,769	-133,127	-46,675

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hunting-related businesses. This could amount to about $170,000 (see Appendix G, Section 7). This represents a 65 percent increase in big game-related income in Lincoln County, but less that one percent of the regional income.

Overall direct and indirect income would be $136,500 below 1977 levels. Although insignificant on a regional basis, this alternative would strongly affect many ranchers.

Impact on Employment

In 1980, ranch laborers' income would decline by $29,723. At $2.35 per hour this would mean a loss of six full-time equivalent jobs. Construction projects associated with range improvements would involve eight additional jobs. Indirect employment would amount to four additional jobs. Total direct and indirect employment would increase by four jobs. This would be insignificant on a regional basis.

By 2015 total direct and indirect employment would be 20 full-time equivalent jobs above 1977 levels.

Possible long-term increases in wildlife populations may result in an increase in long-term employment in Lincoln County's hunting-related businesses. This could amount to about 20 full-time equivalent jobs by the year 2015 (see Appendix G, Section 7). This represents a 65 percent increase in big game-related employment in Lincoln County, but less than one percent of regional employment.

In the long-term maintenance of range improvements may generate one additional job.

Impact on Tax Revenues

Livestock tax revenue decreases in 1980 would have slight effects on fund requirements for local government to provide services ($9,047).

Impact on Ranchers' Wealth

Although the Bureau of Land Management does not recognize a capitalized value for grazing preferences, the preferences do contribute to the capital position (wealth) of the ranchers to whom they are allotted (McConnen, 1976) (Stubblefield and Robertson, n.d.) (Nielson and Workman, 1971). Impacts associated with changes in ranch value would occur immediately, but actual dollar losses would not accrue to the ranchers until the preferences are sold, transferred, or used as collateral for a loan.

The wealth of the ranchers dependent on ES area public land for forage would decline as a result of the elimination of 64,392 AUMs of grazing preferences. At $25 per AUM the total decrease in ranch value would be $1.6 million, a 54 percent decrease below the value that ES area grazing preferences contributed to the ranchers wealth in 1977. This would be a short-term impact. In the long-term (2015), an additional 42,682 AUMs of livestock forage may be allocated. However, ranches would still be valued $ 542,750 below current levels.

If the change in value of grazing preferences could be determined by comparing current AUMs licensed under permit (78,235) with future AUMs of active preference (1980 - 54,188, 2015 - 96,870), then a much less negative short-term impact and a much more positive long-term impact could be shown: $-600,000 (-30 percent) in 1980 and $+470,000 (+24 percent) in 2015.

Impact on Seasonal Production Characteristics

The impacts on the seasonal operations of ES area cattle ranchers from the implementation of this alternative would be similar to those identified in Chapter 3. (See Table 8-25.)

TABLE 8-25
SEASONAL DEPENDENCY ON PUBLIC LAND FORAGE
ALTERNATIVE THREE

	(Percent Dependency)				
	Total	Spring	Summer	Fall	Winter
Small Cattle Ranch					
Short-Term	13	8	16	14	14
Long-Term	19	11	21	24	22
Medium Cattle Ranch					
Short-Term	39	29	40	40	47
Long-Term	49	35	51	50	60
Large Cattle Ranch					
Short-Term	23	19	25	25	25
Long-Term	23	19	26	26	26
Sheep Ranch					
Short-Term	6	6	--	--	17
Long-Term	8	15	--	--	17

Conclusion. This alternative would cause overall annual losses ($ 133,127) to livestock ranchers in 1980 below the 1977 level of $96,728. On a regional basis this may nearly be offset by increases in construction associated with range improvements; the net impact may be a decrease of about $31,500 per year. In

addition, ranch values would decline significantly by $ 1,609,800, a 54 percent decrease below the value that ES area grazing preferences contributed to the ranchers' wealth in 1977.

By 2015, the stimulus provided by construction projects would have ended. Ranch income would be $46,675 per year below the 1977 annual level of $96,728. Ranch values would be $735,775 below current levels. Significant increases in big game hunting would provide a continuing long-term benefit.

Impacts on Social Values

For those ranchers holding grazing permits on those allotments for which all AUMs would be allocated to wild horses and burros, the implementation of this alternative would be the same as would the implementation of the no grazing alternative. The impact on the remaining ranchers would be similar to that specified in the proposed action. (See Chapter 3.)

RESTRICTED PERIODS-OF-USE BY LIVESTOCK

ALTERNATIVE FOUR

Description

This alternative would eliminate livestock grazing during the growing season - March 1 through July 15. The purpose of Alternative Four would be to provide low intensity grazing management.

Vegetation allocations would be as specified in Table 8-26 and Figure 8-4. Periods-of-use for this alternative were determined by excluding the March 1 to July 15 period from the periods-of-use in the proposed action. Vegetation allocations to livestock were reduced from the proposed action based on the percentage reduction in the period-of-use between the proposed action and this alternative. The five existing Allotment Management Plans (AMPs) would be managed as specified in the proposed action. No livestock forage on poor condition range would be allocated to livestock or wild horses. No additional range improvements would be implemented except those deemed necessary by the Las Vegas District Manager. The assumption is that range improvements and vegetation treatments in the proposed action would not be implemented.

In summary, this alternative assumes elimination of livestock grazing from the March 1 through July 15 growing season on perennial and ephemeral-perennial ranges. It also assumes no range improvements or vegetation treatments, resulting in an estimated livestock allocation of 113,658 AUMs for the year 2015. Grazing would be allowed on ephemeral forage when it is available. Wildlife and wild horses would be managed and allocated AUMs as specified in the proposed action. This alternative would be a 24 percent reduction in livestock grazing by 1980 from that proposed in Chapter 1.

Impacts on Soils

Since it is generally accepted that grazing moist or wet soils increases compaction (Brady 1974; Orr, 1975), elimination of spring grazing when soils are wet or moist from winter and spring precipitation would have the beneficial effect of reducing compaction and the corresponding reduction of runoff and erosion. This would reduce overall sediment yield by 151,057 tons/year.

With the expected increase (five percent) of vegetative cover (see Vegetation, Alternative Four) a further reduction of 120,287 tons/year could be expected.

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TABLE 8-26
CALIENTE ES AREA 1978 PRESENT AND PROPOSED VEGETATION ALLOCATIONS
BY ALLOTMENT AND GRAZING TREATMENT
ALTERNATIVE FIVE

	Present							Proposed								
Allotment	Land Ownership Status[1]		Total Forage Capacity (AUMs)		Present Authorized Livestock Use & Range Class (AUMs)[4]	Season-of-use[5]	1977 Licensed Use	Proposed Forage Allocations (AUMs)				Future Forage Capacity (Livestock)[10]	Percent Change[11] 1980	Proposed Season-of-Use	Proposed Management Intensity	Proposed Range Class
	Public Land (acres)	Other Land (acres)	Livestock AUMs[2]	Wildlife AUMs[3]				Livestock[7] 1980	Deer[8]	Bighorn[8] Sheep	Wild[9] Horses					
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p
Applewhite	28,448	300	2	244	562 (C) Perennial	YL	527	0	189	---	---	2	-100%	---	No Grazing	---
Ash Flat	3,247	---	43	0	74 (C) Perennial	5/1-3/24	74	0	---	---	---	44	-100%	---	No Grazing	---
Bald Mountain	269,723	5	5,332	1,096	5,811 (C) Perennial	YL	5,811	3,769	370	---	---	6,932	- 35%	7/16-2/28	Non-AMP	Perennial
Barclay	79,621	2,350	2,690	2,214	1,791 (C) Perennial	5/16-9/30 AMP	2,049	2,439	766	---	---	2,690	+ 19%	5/16-9/30	AMP Existing	Perennial
Bennett Springs	48,264	120	3,869	578	3,498 (S) Perennial	10/16-4/30	474	659	293	---	170	5,030	+ 39%	10/16-2/28	Non-AMP	Perennial
Beacon	5,682	---	0	---	2,095 (S) Perennial	2/1-4/30	506	0	---	---	---	0	-100%	---	Non-AMP	Ephemeral
Black Canyon	8,438	---	704	154	1,005 (S) Perennial	10/16-4/30	95	502	64	---	35	915	+428%	10/16-2/28	Non-AMP	Perennial
Black Hills	3,610	---	126	---	156 (C) Perennial	YL	156	105	---	---	---	164	- 33%	7/16-2/28	Non-AMP	Perennial
Boulder Spring	13,537	---	416	---	416 (C) Perennial	10/1-3/30	416	340	---	---	---	416	- 18%	10/16-2/28	Non-AMP	Perennial
Breedlove	112,755	---	60	1,007	864 (C) Perennial	YL	864	0	4	298	---	69	-100%	---	Non-AMP	Ephemeral
Buckboard	10,842	---	427	191	263 (C) Perennial	YL	264	0	56	---	120	555	-100%	---	No Grazing	---
Buckhorn	82,968	---	5,687	---	4,010 (C) Perennial	YL	830	3,783	---	---	---	7,393	+356%	7/16-2/28	Non-AMP	Perennial
Caliente	2,008	---	59	14	40 (C) Perennial	YL	0	0	4	---	---	77	---	---	No Grazing	---
Cliff Springs	35,821	---	2,291	161	2,043 (C) Perennial	YL	2,043	1,634	77	---	---	2,978	- 20%	7/16-2/28	Non-AMP	Perennial
Clover Creek	22,876	158	368	294	613 (C) Perennial	11/1-4/30	0	0	216	---	302	478	---	---	---	Wild Horses
Comet	9,146	600	216	---	214 (C) Perennial	YL	0	162	---	---	---	248	---	7/16-2/28	Non-AMP	Perennial
Condor Canyon	44,035	---	1,636	532	676 (C) Perennial	YL	0	0	431	---	---	2,127	---	---	No Grazing	---
Cottonwood	62,145	---	441	1,812	1,296 (C) Perennial	5/1-10/31	1,296	39	954	---	---	463	- 97%	7/16-10/31	Non-AMP	Perennial
Cove	5,023	---	214	---	131 (C) Perennial	YL	0	0	---	---	214	278	---	---	---	Wild Horses
Crescent	84,526	80	2,828	268	1,540 (S) Perennial	11/1-4/30	1,173	1,745	268	---	---	3,676	+ 49%	11/1-2/28	Non-AMP	Perennial
Crestline	2,415	1,300	96	34	55 (C) Perennial	YL	0	65	20	---	---	125	---	7/16-2/28	Non-AMP	Perennial
Crossroads	19,201	---	413	350	689 (C) Perennial	5/1-10/31	690	237	162	---	---	537	- 66%	7/16-2/28	Non-AMP	Perennial
Crystal Springs	7,596	---	376	---	437 (C) Perennial	Winter	347	301	---	---	---	489	- 13%	11/1-2/28	Non-AMP	Perennial
Deer Lodge	6,880	40	319	108	167 (C) Perennial	YL	0	273	108	---	---	415	---	7/16-2/28	Non-AMP	Perennial
Delamar	240,755	---	6,148	5,134	4,858 (C) Perennial	YL	5,573	2,933	832	84	684	7,992	- 16%	7/16-2/28	Non-AMP	Ephemeral-Perennial

TABLE 8-26 -- Continued

Present								Proposed								
Allotment	Land Ownership Status[1]		Total Forage Capacity (AUMs)		Present Authorized Livestock Use & Range Class (AUMs)[4]	Season-of-use[5]	1977 Licensed Use	Proposed Forage Allocations (AUMs)				Future Forage[10] Capacity (Livestock)	Percent Change[11] 1980	Proposed Season-of-Use	Proposed Management Intensity	Proposed Range Class
	Public Land (acres)	Other Land (acres)	Livestock AUMs[6]	Wildlife AUMs[7]				Livestock[7] 1980	Deer[8]	Bighorn[8] Sheep	Wild[9] Horses					
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p
Elgin	26,602	160	1,401	1,083	2,073 (C) Perennial	10/1-4/30	1,760	401	---	22	144	1,611	- 77%	10/16-2/28	Non-AMP	Ephemeral-Perennial
Ely Spring (Sheep)	22,927	849	1,135	325	1,802 (S) Perennial	10/16-5/15	0	767	73	---	76	1,476	---	10/16-2/28	Non-AMP	Perennial
Ely Spring (Cattle)	55,168	960	4,878	7	4,248 (C) Perennial	YL (AMP)	3,980	4,265	4	---	---	4,878	+ 7%	YL	AMP Existing	Perennial
Enterprise	21,585	160	2,152	690	1,261 (C) Perennial	5/1-10/31	1,927	1,058	170	---	---	2,475	- 45%	7/16-10/30	Non-AMP	Perennial
Flat Top Mesa	6,031	---	0	0	--- (C) Ephemeral	---	6/	0	---	---	---	0	---	---	Non-AMP	Ephemeral
Garden Springs	38,823	---	2,150	390	2,809 (C) Perennial	10/16-5/15	2,629	890	370	---	---	2,558	- 66%	10/1-2/28	Non-AMP	Ephemeral-Perennial
Gourd Springs	101,125	---	1,406	362	3,458 (C) Perennial	10/16-5/15	2,233	532	1	19	---	1,617	- 76%	10/1-2/28	Non-AMP	Ephemeral-Perennial
Grapevine	33,328	---	560	---	560 (C) Perennial	10/1-3/30	551	458	---	---	---	560	- 17%	10/16-2/28	Non-AMP	Ephemeral-Perennial
Haypress	7,843	110	43	61	154 (H) Perennial	5/1-10/1	0	15	56	---	---	56	---	7/16-10/15	Non-AMP	Perennial
Henrie	131,796	---	3,127	2,593	2,400 (C) Perennial	11/1-4/30	2,400	0	408	487	---	3,190	-100%	---	Non-AMP	Ephemeral
Highland Peak	45,542	1,960	2,371	263	3,704 (S) Perennial	10/16-5/15	160	584	157	---	135	2,082	+265%	7/16-2/28	Non-AMP	Perennial
Highway	4,251	40	219	63	118 (C) Perennial	YL	0	0	19	---	---	285	---	---	No Grazing	---
Jack Rabbit	9,755	---	0	0	0 (C) Ephemeral	---	6/	0	---	---	---	0	---	---	Non-AMP	Ephemeral
Klondike	7,072	---	416	120	678 (S) Perennial	10/16-5/15	378	0	48	---	25	478	-100%	---	No Grazing	---
Lime Mountain	67,144	---	3,830	2,814	6,754 (C) Perennial	10/1-5/15	3,580	271	840	---	---	3,907	- 92%	10/16-2/28	Non-AMP	Ephemeral-Perennial
Little Mountain	18,575	---	671	87	1,422 (WH) Perennial	YL	---	0	87	---	638	872	---	---	---	Wild Horses
Lower Lake	107,317	---	1,145	9	1,247 (C) Perennial	YL	100	24	9	---	---	1,317	- 76%	7/16-2/28	Non-AMP	Ephemeral-Perennial
McCutcheon Spring	18,276	40	583	302	446 (C) Perennial	YL	0	0	89	---	---	670	---	---	No Grazing	---
McGuffy Spring	22,115	---	325	246	298 (C) Perennial	YL	0	227	246	---	---	423	---	7/16-2/28	Non-AMP	Perennial
Mahogany Peak	28,441	1,360	1,311	473	617 (C) Perennial	YL	326	790	473	---	---	1,704	+142%	7/16-2/28	Non-AMP	Perennial
Meadow Valley	1,971	240	0	---	56 (C) Perennial	11/1-4/30	48	0	---	---	---	0	-100%	---	No Grazing	---
Mormon Peak	82,296	---	1,855	4,703	Undetermined (C) Perennial	Winter	328	593	116	1,081	---	2,412	+ 81%	10/15-2/28	Non-AMP	Ephemeral-Perennial

TABLE 8-26 -- Continued

Allotment	Present: Land Ownership Status[1] Public Land (acres) a	Present: Land Ownership Status[1] Other Land (acres) b	Present: Total Forage Capacity (AUMs) Livestock AUMs c	Present: Total Forage Capacity (AUMs) Wildlife AUMs[2] d	Present: Present Authorized Livestock Use & Range Class (AUMs)[4] e	Present: Season-of-use[5] f	Present: 1977 Licensed Use g	Proposed: Proposed Forage Allocations (AUMs) Livestock[7] 1980 h	Proposed: Proposed Forage Allocations (AUMs) Deer[8] i	Proposed: Proposed Forage Allocations (AUMs) Bighorn[8] Sheep j	Proposed: Proposed Forage Allocations (AUMs) Wild[9] Horses k	Proposed: Future Forage[10] Capacity (Livestock) l	Proposed: Percent Change[11] 1980 m	Proposed: Proposed Season-of-Use n	Proposed: Proposed Management Intensity o	Proposed: Proposed Range Class p
Morrison-Kengett	11,261	1,200	1,043	1,187	1,760 (C) Perennial	YL	1,760	0	238	180	---	1,456	-100%	---	Non-AMP	Ephemeral
Mustang	23,847	---	444	161	1,260 (C) Perennial	YL (AMP)	987	777	105	---	---	444	- 56%	YL	AMP Existing	Perennial
Mustang Flat	3,987	---	90	218	147 (C) Perennial	5/1-10/31	0	0	86	---	82	117	---	---	---	Wild Horses
Napoleon Spring	52,125	160	1,058	575	Unallotted Perennial	YL	---	0	237	---	---	1,175	---	---	No Grazing	---
Nye	41,500	5,380	996	91	824 (C) Perennial	3/1-10/1	62	0	53	---	---	515	---	---	No Grazing	---
Oak Spring	191,609	1,440	10,440	1,138	9,268 (C) Perennial	YL (AMP)	7,793	8,176	889	67	1,557	10,570	+ 5%	YL	AMP Existing	Perennial
Oak Wells	29,139	40	542	526	511 (C) Perennial	YL	0	218	257	---	240	705	---	7/16-2/28	Non-AMP	Perennial
Pahranagat East	11,140	---	965	---	511 (C) Perennial	8/1-5/30	289	0	---	---	---	715	-100%	---	No Grazing	---
Pahranagat West	20,138	---	1,289	75	2,133 (C) Perennial	8/1-5/31	1,151	0	15	---	---	1,582	-100%	---	No Grazing	---
Pahroc	117,441	---	4,917	1,181	5,781 (C) Perennial	YL	5,605	2,676	266	---	---	5,092	- 42%	7/16-2/28	Non-AMP	Perennial
Pahute Cattle	16,274	---	596	116	651 (C) Perennial	YL	72	0	11	---	120	775	---	---	No Grazing	---
Pahute SUS	4,252	---	162	15	Unallotted (C & S) Perennial	---	---	133	7	---	---	211	---	10/1-2/28	Non-AMP	Perennial
Peck	7,698	---	190	---	268 (C) Perennial	YL	0	0	---	---	190	219	---	---	---	Wild Horses
Pennsylvania	42,490	320	1,146	1,472	817 (C) Perennial	5/1-10/31	549	45	606	---	---	201	- 90%	7/16-10/31	Non-AMP	Perennial
Pine Cone	28,263	---	627	135	1,205 (C) Perennial	10/1-6/15	208	0	32	---	---	658	-100%	---	No Grazing	---
Pioche	11,440	---	554	77	402 (C) Perennial	YL	155	0	36	---	39	460	-100%	---	No Grazing	---
Pohsipher Wash	4,408	---	0	0	--- (C) Ephemeral	---	0	0	---	---	---	0	---	---	Non-AMP	Ephemeral
Rabbit Spring	20,975	40	720	119	1,122 (S) Perennial	10/16-3/15	0	144	77	---	250	936	---	10/1-2/28	Non-AMP	Perennial
Rattlesnake	28,420	---	1,172	266	1,182 (C) Perennial	10/16-5/31	1,183	631	201	---	250	1,468	- 47%	7/16-2/28	Non-AMP	Perennial
Red Blair	18,039	---	98	---	34 (C) Perennial	10/1-7/15	15	74	---	---	---	127	+1186%	7/16-2/28	Non-AMP	Perennial
Roadside	1,121	---	48	---	42 (C) Perennial	12/1-2/28	0	0	---	---	---	62	---	---	No Grazing	---
Rocky Hill	4,092	---	238	29	108 (C) Perennial	10/16-5/15	0	0	12	---	---	274	---	---	No Grazing	---
Rox	25,860	120	0	21	756 (C) Perennial	YL	472	0	---	13	---	0	-100%	---	Non-AMP	Ephemeral
Sand Hollow	35,174	---	582	---	2,430 (C) Perennial	10/1-5/15	1,118	259	---	---	---	757	- 77%	10/1-2/28	Non-AMP	Ephemeral-Perennial

TABLE 8-26 -- Continued

Allotment	Present: Land Ownership Status[1] Public Land (acres) a	Present: Land Ownership Status[1] Other Land (acres) b	Present: Total Forage Capacity (AUMs) Livestock AUMs[2] c	Present: Total Forage Capacity (AUMs) Wildlife AUMs[3] d	Present: Present Authorized Livestock Use & Range Class (AUMs)[4] e	Present: Season-of-use[5] f	Present: 1977 Licensed Use[6] g	Proposed: Proposed Forage Allocations (AUMs) Livestock[7] 1980 h	Proposed: Proposed Forage Allocations (AUMs) Deer[8] i	Proposed: Proposed Forage Allocations (AUMs) Bighorn[8] Sheep j	Proposed: Proposed Forage Allocations (AUMs) Wild[9] Horses k	Proposed: Future Forage[10] Capacity (Livestock) l	Proposed: Percent Change[11] 1980 m	Proposed: Proposed Season-of-Use n	Proposed: Proposed Management Intensity o	Proposed: Proposed Range Class p
Sand Springs	249,685	5,200	11,019	1,303	6,091 (C) Perennial	YL (AMP)	4,918	10,313	133	---	---	11,019	+110%	YL	AMP Existing	Perennial
Sawmill Canyon	9,177	---	97	159	181 (C) Perennial	YL	0	0	78	---	90	102	---	---	---	Wild Horses
Schlarman	5,343	---	390	464	240 (C) Perennial	11/1-4/30	214	239	1	21	---*	449	+ 12%	10/1-2/28	Non-AMP	Ephemeral-Perennial
Shadow Well	17,862	---	1,151	---	377 (S) Perennial	11/1-4/30	440	1,151	---	---	---	1,496	+162%	10/1-12/30	Non-AMP	Perennial
Sheep Spring	31,077	---	1,815	629	409 (C) Perennial	YL	0	746	939	---	720	2,360	---	7/16-2/28	Non-AMP	Perennial
Sheep Flat	74,171	720	521	1,350	1,977 (C) Perennial	5/16-9/15	1,979	370	738	---	---	531	- 81%	7/16-10/15	Non-AMP	Perennial
Simpson	8,379	---	414	---	747 (C) Perennial	12/1-4/30	750	310	---	---	---	538	- 59%	12/1-2/28	Non-AMP	Perennial
Six Mile	34,531	---	896	125	674 (C) Perennial	YL	674	665	121	---	---	1,165	- 1%	7/16-2/28	Non-AMP	Perennial
Snow Spring	44,042	---	1,530	1,015	3,567 (C) Perennial	10/1-5/15	1,650	10	397	---	---	1,561	- 99%	11/1-2/28	Non-AMP	Ephemeral-Perennial
Summit Spring	18,035	---	149	---	715 (C) Perennial	10/16-5/15	715	114	---	---	---	152	- 84%	11/1-2/28	Non-AMP	Ephemeral-Perennial
Terry	30,163	---	242	---	2,366 (C) Perennial	10/1-5/15	1,444	87	---	---	---	315	- 96%	10/1-2/28	Non-AMP	Ephemeral-Perennial
Uvada	13,608	10	554	205	355 (C) Perennial	YL	229	391	95	---	---	720	+719%	7/16-2/28	Non-AMP	Perennial
Warm Spring	1,401	---	25	---	74 (C) Perennial	11/16-4/15	0	21	---	---	---	29	---	7/16-2/28	Non-AMP	Perennial
White Hills	2,755	---	105	---	101 (C) Perennial	12/1-2/28	0	0	---	---	---	137	---	---	No Grazing	---
White Rock	32,916	---	1,810	433	2,880 (C) Perennial	9/16-5/15	1,269	545	28	38	---	2,353	- 57%	9/16-2/28	Non-AMP	Ephemeral-Perennial
Total	3,495,805	25,442	109,914	44,179	118,580		78,235	59,387	12,748	2,308	5,956	128,012	- 24%			

1 Land ownership includes some acreage outside the ES area boundary in the Ely and Las Vegas districts.
2 Suitable Animal Unit Months (AUMs) include those AUMs which meet the Bureau of Land Management's production and slope criteria.
3 Wildlife AUMs include all competitive and non-competitive AUMs determined from the range survey.
4 (C) cattle (S) domestic sheep (H) domestic horses (WH) wild horses. Authorized use determined from previous range survey or by agreement.
5 (YL) yearlong (AMP) existing Allotment Management Plan
6 Permitted use occurred on these allotments, but the number of AUMs used in the ES area could not be determined because the allotment boundaries extend outside the ES area.
7 These vegetation allocations were based on the proposed action with the following modifications: They were reduced from the proposed action by the percentage reduction in the periods-of-use between the proposed action and the alternative. The five existing AMPs would be managed as specified in the proposed action. Vegetation allocations on poor condition range were eliminated.
8 Allocated to meet reasonable numbers as specified in the proposed action.
9 Allocated as specified in the proposed action.
10 Expected forage capacity after 35 years.
11 This column represents the percent change between 1977 permitted use and the 1980 allocation. (Column m = g + g.)

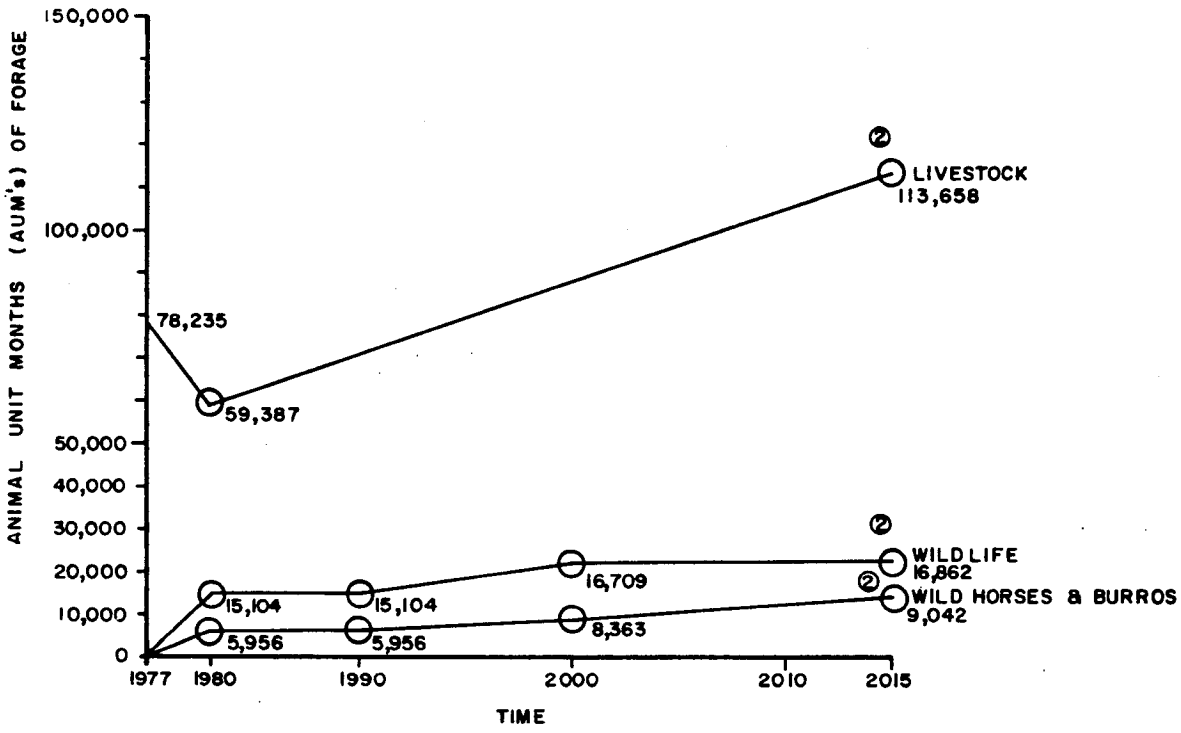
Notes: See glossary for definitions of: ephemeral, ephemeral-perennial, perennial, suitable AUM, season-of-use (period-of-use), competitive forage, non-competitive forage, AMP, Non-AMP, and no grazing.

Forty-eight AUMs were allocated to antelope on the Sand Springs Allotment.

Source: U. S. Department of the Interior, Bureau of Land Management, Las Vegas District, Caliente Unit Resource Analysis and Management Framework Plan, 1978.

FIGURE 8-4
RESTRICTED PERIODS OF USE BY LIVESTOCK
(ALTERNATIVE FOUR)

1980 AND POSSIBLE FUTURE ALLOCATIONS (2015) TO LIVESTOCK, WILD HORSES AND BURROS AND WILDLIFE IN CALIENTE ES AREA 1/



1/ Livestock and wild horse AUMs are interchangeable with each other but not always with wildlife AUMs because of dietary preference.

2/ Estimate of increased forage production. Increased forage was prorated at the same proportion as MFP 2 allocation.

NOTE: Possible future vegetation allocations are estimates only and are based on a series of assumptions within a framework of feasible alternatives. Heavy dependence on professional judgements and probabilities are used. The vegetation allocation scenario should not be considered as a prediction or forecast.

Conclusion

The elimination of spring grazing, reduced compaction and increased vegetative cover would result in an annual sediment yield of 1,893,812 tons, a reduction of 271,344 tons/year, or a 12.5 reduction from the present.

Impacts on Water Resources

Impact on Water Quantity

With restricted livestock grazing, annual water consumption by ungulates would remain at less than one percent of the perennial yield throughout the analysis period. This usage would require an insignificant portion of the available water.

Riparian vegetation would be expected to increase somewhat because grazing would be eliminated during the growing season. Therefore, stream flows would decrease slightly. (See Chapter 3.)

Impact on Water Quality

Suspended sediment concentrations would be reduced because sediment yields would decrease during the 35 year period (see Soils, Alternative Four). Suspended sediment concentrations would also decrease by unquantifiable amounts because improved riparian vegetation would reduce stream bank sloughing.

Fecal coliform bacteria levels would decrease in the spring when livestock would not be using public lands waters.

Conclusion

Annual water consumption of less than one percent of perennial yield by ungulates would have an insignificant impact on available water. Stream flows would decrease slightly due to increased evapotranspiration in riparian areas. Suspended sediment concentrations would decrease because of reduced stream bank sloughing and lower sediment yields. Fecal coliform would decrease in streams on public lands in the spring.

Impacts on Vegetation

Table 8-26 shows the proposed changes in periods-of-use and vegetation allocation by allotment. Range conditions under this alternative should be similar to those estimated for the proposed action (see Appendix E, Table E-5 for specific projections by allotment). This is because grazing use would be reduced considerably during the critical growing period (3/1-7/16), and

vegetation in poor livestock forage condition would not be allocated.

Generally, this treatment favors an increase in both warm and cool season grasses, although cool season grasses should benefit most. Annuals, forbs, and browse species probably would receive more competition from grasses. Warm season grasses may decrease in areas where grazing continues from July 15 to October 15 (25 allotments on 1,115,143 acres). This alternative should allow the bunch grasses and rhizomatous grasses a chance to fully produce seed, shoots, roots, and food reserves before grazing begins. Grazing after the food storage cycle has been completed and seed has ripened has the least detrimental effect (Stoddart, Smith and Box, 1975) and produces the maximum forage (Vogel and Bjugstad, 1968) for grasses.

Providing rest from livestock grazing until seed ripe should enable the various species to propagate themselves more effectively, increase their percent composition, and in some cases increase the percent vegetal cover perhaps by as much as five percent. Under this alternative, most vegetation species rested until seed ripe tend to fill in the open spaces and produce shoot, root, and food reserves. Since this alternative restricts the stocking level of wild horses to the amount of forage they could properly utilize, vegetation should not be adversely affected by their yearlong use except in excessive use areas around water sources and along perennial streams as identified in Chapter 3, Vegetation. At the end of 35 years under this alternative there should be approximately 128,012 AUMs available for allocation. (See Table 8-26.) Table 8-27 gives an estimated summary of expected condition after 35 years under this alternative.

TABLE 8-27

ESTIMATED LIVESTOCK FORAGE CONDITION AFTER 35 YEARS
ALTERNATIVE FOUR

	Acres Good	Acres Fair	Acres Poor
Present	688,751	1,374,539	512,351
Future	1,726,640	354,881	512,012

Conclusion. Reduced levels of grazing, providing a systematic rest from grazing during the critical growth periods, as well as the grazing management systems in the five existing Allotment Management Plans (AMPs) should provide an increase in

forage production to 128,012 AUMs by 2015. Therefore, livestock forage condition should also improve.

Impact on Threatened or Endangered Flora

The plant species shown in Appendix C should benefit (as would livestock forage species) from elimination of grazing from 3/1 to 7/15 in 81 of the allotments. This period of rest, plus adjustments in livestock and wild horse numbers to prevent over utilization, should reduce the foraging and trampling of all proposed threatened or endangered flora.

The five existing AMPs may continue to adversely affect some species for those reasons stated in Chapter 3.

Impacts on Wildlife

Impact on Bighorn Sheep

Table 8-28 shows the livestock use that would occur on bighorn sheep ranges with Alternative Four. Livestock use would be reduced on all bighorn sheep ranges. Livestock grazing would not be allowed on all allotments from March 1 through July 15. This would reduce competition to bighorn sheep during the majority of the lambing period, February 15 to July 1.

Therefore, it is expected with this alternative bighorn sheep would reach reasonable numbers (874 animals).

Impact on Mule Deer

Under Alternative Four competition from livestock during the fawning period, April 20 to July 30, would be reduced. Forage is currently not available to meet reasonable numbers on deer ranges DS-1, DW-4, DW-5, and DY-2. (See the Big Game Areas Map in Chapter 2.) A total of 2,643 AUMs (17 percent) of the amount of forage needed to meet reasonable numbers does not presently exist.

Without vegetation manipulations or water developments to open new areas, mule deer probably would not attain reasonable numbers in the ranges where forage shortages occur. Sufficient forage exists on the remaining ranges, and mule deer should reach reasonable numbers in these areas unless other factors (disease, water availability) limits the population. Total mule deer population expected with this alternative would be about 7,320 animals (1,500 fewer animals than reasonable numbers).

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TABLE 8-28
LIVESTOCK USE ON BIGHORN SHEEP RANGES
ALTERNATIVE FOUR

Sheep Range	1977 Livestock Use (AUMs) on Bighorn Range a/	Alt. 4 Proposed Use (AUMs) on Bighorn Range a/	Difference Between Present and Proposed Use	Approx. Acres of of Habitat	Present Number of Bighorn Sheep in Entire Range	Anticipated Population of Bighorn Sheep with Alt. 4
BY-1	901	581	-320	93,415	404	426
BY-2	3,342	221	-3,121	139,860	259	335
BY-3	2,674	2,576	- 98	87,319	50	63
BY-4	1,024	568	- 456	55,461	50	50
Total	7,941	3,946	-3,995	376,055	763	874

a/ These figures were derived by summing the weighted average of the total use on the allotments within a bighorn range based upon the acres of habitat that occurred in each allotment.

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Impact on Desert Tortoise

With this alternative livestock use would not be allowed from March 1 through September 16 each year on allotments in desert tortoise range. Grazing use would decrease from the 13,755 AUMs presently used to 3,876 AUMs (72 percent reduction). The impacts on desert tortoise would be the same as described in Chapter 3.

Impact on Threatened or Endangered Wildlife

No impacts to federally listed threatened or endangered wildlife are anticipated with this alternative.

Impact on Other Wildlife

Table 8-29 shows the amount of grazing by wild horses and domestic livestock that would occur with this alternative on perennial streams located on public land in the ES area. Fifty-three miles of stream would receive an overall decrease of 84 percent in grazing. The reduction in grazing would increase riparian vegetation, thus benefiting Gambel's quail, mourning dove, cottontail rabbits, nongame birds, and fish.

Under this alternative, livestock grazing would be eliminated from March 1 to July 15; this should promote an increase in vegetation that would favor the overall wildlife population. In addition, competition with livestock would be eliminated at a critical time of the year when demands upon most wildlife species due to producing and providing for young are highest.

Conclusion

Mule deer are not expected to reach reasonable numbers (8,820 animals) because forage is not available in some ranges. Competition for bighorn sheep would decrease, allowing these animals to attain reasonable numbers (874 animals). Competition for desert tortoise would be minimized. Riparian habitat important to many wildlife species could be expected to improve. No impacts to threatened or endangered species would be anticipated. Competition from livestock, for most animals, would be eliminated during the important spring period.

Impacts on Wild Horses and Burros

Elimination of livestock grazing from 3/1 to 7/15 would benefit the area's wild horses and burros, since their only competition for forage during this season would be with wildlife. Desert forage is generally most nutritious in the spring (Cook, 1977), thus this alternative would be especially beneficial to lactating

TABLE 8-29
GRAZING USE ON PERENNIAL STREAMS
ALTERNATIVE FOUR
CALIENTE ES AREA

Streams	Miles of Stream on Public Land in ES Area	Miles of Stream Where Grazing to be Reduced	Percent Decrease in Grazing Use Level to Occur
Clover Creek	13	13	33
Meadow Valley Wash	27	27	100
Pine Creek	4	4	100
Ash Creek	9	9	100
Totals	53 a/	53	84

a/ Does not include four miles of fenced stream; see p. 3-19.

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mares since their nutritional requirements are greatest during this period (National Research Council, 1961).

A decrease of 552 livestock AUMs in the Rattlesnake allotment from the shortened period-of-use would also benefit the wild horses in that allotment by decreasing their competition for forage with livestock.

Impacts to wild horses and burros from removals and future forage production would be the same as described in Chapter 3.

Conclusion

The wild horses which are retained should benefit because of reduced competition from livestock. The removal of the remaining horses and burros would have a negative impact on those animals that are moved, since it would mean a loss of their native range.

Impacts on Cultural Resources

With restricted livestock grazing, potential impacts to cultural resources sites would be similar to those under the proposed action (see Chapter 3, Cultural Resources) except that sites would not be impacted by salvage procedures.

Impacts on Land Uses

Impact on Livestock Grazing

With the removal of livestock grazing from public land during the growing season (March 1 to July 15), livestock would be reduced on 37 allotments (1,881,694 acres) from 51,642 AUMs (1977 permitted use) to 20,912 AUMs (1980 allocation) or about a 41 percent reduction. Fourteen allotments (967,870 acres) would have an increase from 22,843 AUMs (1977 permitted use) to 35,120 AUMs (1980 allocation) or a 35 percent increase. Eight additional allotments (328,563 acres) would be classified as ephemeral range and use of 3,502 AUMs (1977 permitted use) of forage would not be authorized, but the effect of this reduction would be reduced by allocating ephemeral forage when available. Twenty-two allotments (281,219 acres) took non-use in 1977 so effects to livestock cannot be analyzed. (See Table 8-26 for allocation and period-of-use by allotment.) The five existing AMPs would continue to operate as stated in the proposed action.

The Social Economic section displays and discusses effects to operators due to changes in periods-of-use, AUM reductions, and increases.

By the year 2015 under this alternative there should be an additional 35,423 AUMs (above 1977 use) available for allocation. At the time additional forage is determined available for grazing use, an allocation could be made to grazing animals through the BLM planning system.

Conclusion. In 1980 there would be a 24 percent overall reduction in livestock use from 1977 levels. The majority of this reduction would be on 37 allotments which would have a net reduction of 41 percent from 1977 use. By 2015 livestock should benefit by this alternative since there should be a 31 percent increase in available AUMs (78,235 AUMs, 1977 use to 113,658 AUMs, 2015).

Impact on Agriculture

Potential impacts on agricultural production would be similar to those under the proposed action (see Chapter 3, Agriculture).

Impacts on Economics

Impact on Income

As the budgets in Tables 8-30 through 8-33 indicate, in 1980 all categories of ranchers would have reduced incomes if the alternative were implemented. Small cattle ranches would lose an additional $1,884 per year below their 1977 income. Many have operated with net losses in the past so it would be impossible to determine if this additional loss would force them to leave the cattle business. Medium sized cattle ranches would lose $2,256 below their 1977 level -- a 28 percent income decrease. This would decrease their standard of living, but would probably not force them from the cattle business. The large cattle ranch would lose an additional $7,105 per year. The response to this impact is difficult to predict because the ranch has operated with net losses in the past. Sheep ranches would have a decrease of $2,509 below their 1977 income, but would still make $12,297 per year. Total losses in annual ranch income would be $ 131,069 per year (Table 8-34) below the 1977 level of $96,728.

Additional income losses would occur indirectly through the interrelationship of the livestock industry with the rest of the regional economy. Total direct and indirect income would be $196,500 per year below 1977 levels, insignificant on a regional basis.

By 2015 increasing livestock forage would result in an increase in ranch income of $29,513 per year above the 1977 levels of $96,728. An total of $232,000 per year in direct indirect income would occur --insignificant on a regional basis.

TABLE 8-30
BUDGET FOR SMALL RANCH
ALTERNATIVE FOUR

Expenses	1980 (144 AUs)	2015 (182 AUs)
Livestock Purchases	$ 471	$ 595
Repairs & Maintenance	648	819
Depreciation	4,542	4,542
Interest		
Operating Capital	834	1,054
Real Estate	6,728	6,728
Gas & Lubricants	1,051	1,329
Supplements	305	386
Taxes		
Livestock	405	511
Real Estate	460	460
Custom Work	2,187	2,187
Insurance	700	700
Grazing Fees		
Caliente BLM	325	891
Other BLM	236	236
Forest Service	107	78
Utilities	315	315
Alfalfa & Grass Hay Expenses	339	339
Marketing Costs	456	577
Veterinary Costs	157	198
Miscellaneous	432	546
Pasture Rent		480
Total	20,698	22,971
Receipts		
Heifer Calves	3,652	4,616
Steer Calves	6,769	8,556
Cull Cows	1,652	2,088
Cull Bulls	481	608
Total	12,554	15,868
Income	-8,444	-7,103
Change from 1977	- 1,884	- 543

TABLE 8-31
BUDGET FOR MEDIUM RANCH
ALTERNATIVE FOUR

Expenses	1980 (465 AUs)	2015 (550 AUs)
Labor	$ 905	$ 2,080
Livestock Purchases	2,888	3,416
Repairs & Maintenance	2,702	3,196
Depreciation	8,544	8,544
Interest		
Operating Capital	3,362	3,977
Real Estate	8,723	8,723
Gas & Lubricants	2,562	3,031
Supplements	865	1,023
Pasture Rent	585	480
Taxes		
Livestock	1,260	1,491
Real Estate	1,143	1,143
Insurance	1,300	1,300
Grazing Fees		
Caliente BLM	3,080	4,761
Other BLM	1,857	1,857
Forest Service	298	218
Utilities	1,000	1,000
Alfalfa & Grass Hay Expenses	938	938
Marketing Costs	1,632	1,931
Veterinary Expenses	414	490
Miscellaneous	846	1,001
Total	44,904	50,600
Receipts		
Heifer Calves	15,578	18,425
Steer Calves	27,495	32,522
Cull Cows	5,631	6,661
Cull Bulls	1,883	2,228
Total	50,587	59,836
Income	5,683	9,236
Change from 1977	-2,256	+ 1,297

TABLE 8-32
BUDGET FOR LARGE RANCH
ALTERNATIVE FOUR

Expenses	1980 (3,285 AUs)	2015 (4,023 AUs)
Labor	$ 91,968	$112,644
Repairs & Maintenance	23,977	29,368
Depreciation	123,584	123,584
Gas & Lubricants	17,868	21,885
Feed & Supplements	60,177	60,177
Taxes	15,802	17,803
Insurance	3,329	3,329
Grazing Fees		
Caliente BLM	19,360	32,666
Other BLM	4,961	4,961
Utilities	12,224	12,224
Alfalfa & Grass Hay Expenses	13,920	13,920
Livestock Transporation	6,241	7,644
Veterinary Expenses	1,544	1,871
Miscellaneous	10,906	13,356
Total	405,861	455,452
Receipts from Livestock Sales	331,325	405,760
Income	- 74,536	- 49,692
Change from 1977	- 7,105	+ 17,739

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TABLE 8-33
BUDGET FOR SHEEP RANCH
ALTERNATIVE FOUR

Expenses	1980 (2,325 Sheep)	2015 (2,384 Sheep)
Labor & Supplies	$ 15,950	$ 16,354
Livestock Purchases	2,186	2,111
Depreciation	8,588	8,588
Interest		
Operating Capital	1,883	1,931
Real Estate	2,783	2,783
Gas, Lubricants, Repairs	12,997	13,327
Feed & Supplement Purchases	18,328	18,328
Pasture Rent	11,269	11,269
Taxes	8,342	8,501
Shearing	3,023	3,099
Insurance	1,964	1,964
Grazing Fees		
Caliente BLM	601	821
Other BLM	3,465	3,465
Forest Service	187	187
Utilities	4,855	4,855
Miscellaneous	4,766	4,887
Total	101,187	102,600
Receipts		
Lambs	94,023	96,409
Ewes	3,883	3,981
Wool (inc. incentives)	15,578	15,972
Total	113,484	116,362
Income	12,297	13,762
Change from 1977	- 2,509	- 1,044

TABLE 8-34
SUMMARY OF RANGE INCOME IMPACTS
ALTERNATIVE FOUR

	Proprietors Income		Labor Income		Total Income	
	1980	2015	1980	2015	1980	2015
Small Cattle (33 ranches)	$ -62,172	$-17,919	$ --	$ --	$ -62,172	$ -17,919
Medium Cattle (13 ranches)	-29,328	+16,861	-10,387	+4,888	-39,715	+21,749
Large Cattle (1 ranch)	- 7,105	+17,739	- 6,032	+14,644	-13,137	+32,383
Sheep (5 ranches)	-12,545	- 5,220	- 3,500	- 1,480	-16,045	- 6,700
Total	-111,150	+11,461	-19,919	+18,052	-131,069	+29,513

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Possible long-term increases in big game populations may cause an increase in long-term income in Lincoln County's hunting-related businesses. This could amount to about $170,000 (see Appendix G, Section 7). This represents a 65 percent increase in big game related employment in Lincoln County but less than one percent of regional employment.

Impact on Employment

Laborers' income would decline by $19,919 per year in 1980. At $2.35 per hour this represents a loss of four full-time equivalent jobs. One additional job associated with indirect employment would be lost for a total of five full-time equivalent jobs below 1977 levels.

By 2015 increasing livestock forage would result in an increase of five full-time equivalent jobs above 1977 levels from direct and indirect impacts, an insignificant change.

Possible long-term increases in wildlife populations may result in an increase in long-term employment in Lincoln County's hunting-related businesses. This could amount to about 20 full-time equivalent jobs by the year 2015 (see Appendix G, Section 7). This represents a 65 percent increase in big game - related employment in Lincoln County, but less than one percent of regional employment.

Impact on Tax Revenues

By 1980 annual livestock tax revenues in Lincoln County would decline by $8,049 below their 1977 levels. This represents an insignificant portion of the fund requirements for local government in the county (0.2 percent).

Impact on Ranchers' Wealth

Although the Bureau of Land Management does not recognize a capitalized value for grazing preferences, the preferences do contribute to the capital position (wealth) of the ranchers to whom they are allotted (McConnen, 1976) (Stubblefield and Robertson, n.d.) (Nielson and Workman, 1971). Impacts associated with changes in ranch value would occur immediately but actual dollar losses would not accrue to the ranchers until the preferences are sold, transferred, or used as collateral for a loan.

The wealth of the ranchers using ES area public land forage would decline as a result of the elimination of 59,193 AUMs of authorized grazing preferences from 1977 to 1980. At $25 per AUM this would total $1,479,825 a 50 percent decrease in the value that ES area grazing preferences contribute to the ranchers' wealth. This impact would be for the short-term. By 2015

additional livestock forage might become available, but the total livestock allocation would still be 4,922 AUMs below the 1977 grazing preferences. Ranches' value would be $123,050 below the 1977 level.

If the change in the value of grazing preferences could be determined by comparing current AUMs licensed under permit (78,235) with future AUMs of active preference (1980 - 59,387, 2015 - 113,658), then a much less negative short-term impact and a much more positive long-term impact could be shown: $-470,000 (-24 percent) in 1980 and $+890,000 (-40 percent) in 2015.

Impact on Seasonal Production Characteristics

The most significant impacts to the seasonal grazing operations of livestock ranches would occur during the spring -- particularly on small cattle ranches and sheep ranches. The dependency on public land forage for livestock feed during the spring on small cattle ranches would decline from 35 percent of total feed requirements to one percent. On sheep ranches it would decline from 28 percent to 0 percent. (Table 8-35.) These decreases would be compensated for by increased dependency on private feed sources and by cutting back herd sizes. This would have a significant overall impact, particularly for ranches with limited privately owned acreage and yearlong operations on public lands.

Conclusion. In the short-term (1980) significant annual losses of $-131,069 below the 1977 level of $96,728 would be incurred by livestock ranchers. Many ranchers, especially those with limited private acreage and yearlong grazing on public lands, would find it difficult to adjust to the reduction in spring grazing. However, on a regional basis this alternative would not have significant impacts.

By 2015 increased livestock forage production would result in an increased ranch income of $29,513 per year above the 1977 level of $96,728. This would not be significant on a regional basis.

In addition, significant increases in big game hunting would cause a continuous positive impact.

TABLE 8-35
SEASONAL DEPENDENCY ON PUBLIC LAND FORAGE
ALTERNATIVE FOUR

	(Percent Dependency)				
	Total	Spring	Summer	Fall	Winter
Small Cattle Ranch					
Short-Term	28	1	17	39	56
Long-Term	12	1	12	18	20
Medium Cattle Ranch					
Short-Term	47	19	38	57	78
Long-Term	37	21	36	42	49
Large Cattle Ranch					
Short-Term	45	22	40	59	59
Long-Term	21	21	30	40	40
Sheep Ranch					
Short-Term	10	0	0	0	38
Long-Term	7	0	0	0	29

Impacts on Social Values

This alternative would have the same impacts as the proposed action. The only difference is in intensity which is difficult to quantify.

REDUCED LEVELS OF LIVESTOCK GRAZING
ALTERNATIVE FIVE

Description

For the purpose of analysis, under this alternative livestock grazing use would be permitted at 50 percent of the proposed 1980 vegetation allocation indicated in Chapter 1. Livestock use would remain at this level throughout the analysis period until 2015. Table 8-36 and Figure 8-5 show the vegetation allocation that would occur with Alternative Five. Periods-of-use would remain the same as in the proposed action. No additional range improvements would be implemented except those deemed necessary by the Las Vegas District Manager. The assumption is that range improvements and vegetative treatments in the proposed action would not be implemented. Wildlife, wild horses, and burros would be managed and AUMs allocated as specified in the proposed action.

Impacts on Soils

Implementation of this alternative should reduce soil loss to erosion by approximately seven percent (154,023 tons/year) from the present situation to an approximate soil loss of 2,002,253 tons/year (0.57 tons/acre/year). This is because a reduction in the amount of livestock grazing should improve the vigor and density of vegetative cover within the Environmental Statement (ES) area. Acres in critical or severe erosion condition (45,720) could be grazed under this alternative. The impacts would be similar to those described in Chapter 3, Soils.

Conclusion

Overall, implementation of this alternative should reduce soil loss to erosion by approximately seven percent (154,023 tons/year) because of the increased plant density which protects the soil from erosion.

Impacts on Water Resources

Impact on Water Quantity

Water consumption by ungulates on public lands would be approximately 62 acre-feet annually from 1980 to 2015. This usage would amount to less than one percent of the region's perennial yield.

Livestock and wild horse use would continue in most riparian zones but at a reduced intensity than at present. Therefore, riparian vegetation would improve in portions of the riparian areas, and

TABLE 8-36
CALIENTE ES AREA 1978 PRESENT AND PROPOSED VEGETATION ALLOCATIONS BY ALLOTMENT AND GRAZING TREATMENTS ALTERNATIVE FIVE

	Present							Proposed				
Allotment	Land Ownership Status[1]		Total Forage Capacity (AUMs)		Present Authorized Livestock Use & Range Class (AUMs)[4]	Season-of-use[5]	1977 Licensed Use	Proposed Forage Allocations (AUMs)				(2015) Future Forage Capacity Livestock
	Public Land (acres)	Other Land (acres)	Livestock AUMs[2]	Wildlife AUMs[3]				Livestock 1980	Deer	Bighorn Sheep	Wild Horses	
	a	b	c	d	e	f	g	h	i	j	k	l
Applewhite	28,448	300	2	244	562 (C) Perennial	YL	527	0	189	---	---	2
Ash Flat	3,247	---	43	0	74 (C) Perennial	5/1-3/24	74	0	0	---	---	44
Bald Mountain	269,723	5	5,332	1,096	5,811 (C) Perennial	YL	5,811	2,512	370	---	---	6,932
Barclay	79,621	2,350	2,690	2,214	1,791 (C) Perennial	5/16-9/30 AMP	2,049	1,264	766	---	---	2,690
Bennett Springs	48,264	120	3,869	578	3,498 (S) Perennial	10/16-4/30	474	497	293	---	170	5,030
Beacon	5,682	---	0	---	2,095 (S) Perennial	2/1-4/30	506	0	---	---	---	0
Black Canyon	8,438	---	704	154	1,005 (S) Perennial	10/16-4/30	95	307	64	---	35	915
Black Hills	3,610	---	126	---	156 (C) Perennial	YL	156	63	---	---	---	164
Boulder Spring	13,537	---	416	---	416 (C) Perennial	10/1-3/30	416	208	---	---	---	416
Breedlove	112,755	---	60	1,007	864 (C) Perennial	YL	864	0	4	296	---	69
Buckboard	10,842	---	427	191	263 (C) Perennial	YL	264	0	56	---	120	555
Buckhorn	82,968	---	5,687	---	4,010 (C) Perennial	YL	830	2,533	---	---	---	7,393
Caliente	2,008	---	59	14	40 (C) Perennial	YL	0	0	4	---	---	77
Cliff Springs	35,821	---	2,291	161	2,043 (C) Perennial	YL	2,043	1,090	77	---	---	2,978
Clover Creek	22,876	158	368	294	613 (C) Perennial	11/1-4/30	0	0	216	---	302	478
Comet	9,146	600	216	---	214 (C) Perennial	YL	0	108	---	---	---	248
Condor Canyon	44,035	---	1,636	532	676 (C) Perennial	YL	0	0	431	---	---	2,127
Cottonwood	62,145	---	441	1,812	1,296 (C) Perennial	5/1-10/31	1,296	28	954	---	---	463
Cove	5,023	---	214	---	131 (C) Perennial	YL	0	---	---	---	214	278
Crescent	84,526	80	2,828	268	1,540 (S) Perennial	11/1-4/30	1,173	1,091	268	---	---	3,676
Crestline	2,415	1,300	96	34	55 (C) Perennial	YL	0	44	20	---	---	125
Crossroads	19,201	---	413	350	689 (C) Perennial	5/1-10/31	690	190	162	---	---	537
Crystal Springs	7,596	---	376	---	437 (C) Perennial	Winter	347	188	---	---	---	489
Deer Lodge	6,880	40	319	108	167 (C) Perennial	YL	0	146	108	---	---	415
Delamar	240,755	---	6,148	5,134	4,858 (C) Perennial	YL (GS)	5,573	2,403	632	84	684	7,992
Elgin	26,602	160	1,401	1,083	2,073 (C) Perennial	10/1-4/30	1,760	363	---	22	144	1,611

TABLE 8-36 -- Continued

Allotment	Present							Proposed				
	Land Ownership Status[1]		Total Forage Capacity (AUMs)		Present Authorized Livestock Use & Range Class (AUMs)[4]	Season-of-use[5]	1977 Licensed Use	Proposed Forage Allocations (AUMs)				(2015) Future Forage Capacity Livestock
	Public Land (acres)	Other Land (acres)	Livestock AUMs[2]	Wildlife AUMs[3]				Livestock 1980	Deer	Bighorn Sheep	Wild Horses	
	a	b	c	d	e	f	g	h	i	j	k	l
Ely Spring (Sheep)	22,927	849	1,135	325	1,802 (S) Perennial	10/16-5/15	0	469	73	---	76	1,476
Ely Spring (Cattle)	55,168	960	4,878	7	4,248 (C) Perennial	YL (AMP)	3,980	2,133	4	---	---	4,878
Enterprise	21,585	160	2,152	690	1,261 (C) Perennial	5/1-10/31 (CS)	1,927	1,002	170	---	---	2,475
Flat Top Mesa	6,033	---	0	0	--- (C) Ephemeral	---	6/	0	---	---	---	0
Garden Springs	38,823	---	2,150	390	2,809 (C) Perennial	10/16-5/15	2,629	936	373	---	---	2,558
Gourd Springs	101,125	---	1,406	362	3,458 (C) Perennial	10/16-5/15	2,233	415	1	19	---	1,617
Grapevine	33,328	---	560	---	560 (C) Perennial	10/1-3/30	551	280	---	---	---	560
Haypress	7,843	110	43	61	154 (H) Perennial	5/1-10/1	0	22	56	---	---	56
Henrie	131,796	---	3,127	2,593	2,400 (C) Perennial	11/1-4/30	2,400	0	408	487	---	3,190
Highland Peak	45,542	1,960	2,371	263	3,704 (S) Perennial	10/16-5/15	160	415	157	---	135	2,082
Highway	4,251	40	219	63	118 (C) Perennial	YL	0	0	19	---	---	285
Jack Rabbit	9,755	---	0	0	0 (C) Ephemeral	---	6/	0	---	---	---	0
Klondike	7,072	---	416	20	678 (S) Perennial	10/16-5/15	378	0	48	---	25	478
Lime Mountain	67,144	---	3,830	2,814	6,754 (C) Perennial	10/1-5/15	3,580	1,210	840	---	---	3,907
Little Mountain	18,575	---	671	87	1,422 (WH) Perennial	YL	---	---	87	---	638	872
Lower Lake	107,317	---	1,145	9	1,247 (C) Perennial	YL	100	47	9	---	---	1,317
McCutcheon Spring	18,276	40	583	302	446 (C) Perennial	YL	0	0	89	---	---	670
McGuffy Spring	22,115	---	325	246	298 (C) Perennial	YL	0	151	246	---	---	423
Mahogany Peak	28,441	1,360	1,311	473	617 (C) Perennial	YL	326	527	473	---	---	1,704
Meadow Valley	3,971	240	0	---	56 (C) Perennial	11/1-4/30	48	0	---	---	---	0
Mormon Peak	82,296	---	1,855	4,703	Undetermined (C) Perennial	Winter	328	363	116	1,081	---	2,412
Morrison-Wengert	33,264	1,200	1,043	1,387	1,760 (C) Perennial	YL	1,760	115	238	180	---	1,356
Mustang	23,877	---	444	161	1,260 (C) Perennial	YL (AMP)	987	222	105	---	---	444
Mustang Flat	5,987	---	90	218	147 (C) Perennial	5/1-10/31	0	0	86	---	82	117

TABLE 8-36 -- Continued

Allotment	Present							Proposed					(2015) Future Forage Capacity Livestock
	Land Ownership Status[1]		Total Forage Capacity (AUMs)		Present Authorized Livestock Use & Range Class (AUMs)[4]	Season-of-use[5]	1977 Licensed Use	Proposed Forage Allocations (AUMs)					
	Public Land (acres)	Other Land (acres)	Livestock AUMs[2]	Wildlife AUMs[3]				Livestock 1980	Deer	Bighorn Sheep	Wild Horses		
	a	b	c	d	e	f	g	h	i	j	k		l
Naquinta Spring	52,425	140	1,058	575	Unallotted Perennial	YL	---	0	237	---	---		1,375
N-4	43,500	5,380	396	51	824 (C) Perennial	3/1-10/1	6/	0	43	---	---		515
Oak Spring	193,609	1,440	10,570	3,338	9,268 (C) Perennial	YL (AMP)	7,793	4,416	889	67	1,452		10,540
Oak Wells	29,139	40	542	476	511 (C) Perennial	YL	0	139	247	---	240		705
Pahranagat East	34,146	---	565	---	511 (C) Perennial	8/1-5/30	289	0	---	---	---		735
Pahranagat West	70,138	---	1,289	75	2,144 (C) Perennial	8/1-5/31	1,351	0	14	---	---		1,482
Pahroc	117,443	---	3,917	1,183	4,783 (C) Perennial	YL	4,604	1,784	266	---	---		5,092
Panaca Cattle	16,275	---	596	116	453 (C) Perennial	YL	72	0	11	---	120		772
Panaca SCS	4,242	---	162	15	Unallotted (C & S) Perennial	---	---	80	7	---	---		211
Peck	7,698	---	190	---	268 (C) Perennial	YL	0	---	---	---	190		219
Pennsylvania	42,556	320	156	1,472	817 (C) Perennial	5/1-10/31	439	42	606	---	---		203
Pine Cone	28,265	---	627	135	1,205 (C) Perennial	10/1-6/15	208	0	32	---	---		658
Pioche	13,440	---	354	77	402 (C) Perennial	YL	155	0	36	---	39		460
Pulsipher Wash	3,408	---	0	0	--- (C) Ephemeral	---	0	0	---	---	---		0
Rabbit Spring	20,975	40	720	119	1,122 (S) Perennial	10/16-4/15	0	121	77	---	240		936
Rattlesnake	28,426	---	1,172	266	1,182 (C) Perennial	10/16-5/31	1,183	421	203	---	240		1,348
Red Bluff	18,039	---	98	---	34 (C) Perennial	10/1-4/15	34	49	---	---	---		127
Roadside	1,123	---	48	---	32 (C) Perennial	12/1-2/28	0	0	---	---	---		62
Rocky Hill	4,092	---	238	29	308 (C) Perennial	10/16-5/15	0	0	11	---	---		274
Rox	25,870	120	0	21	756 (C) Perennial	YL	372	0	---	13	---		0
Sand Hollow	35,174	---	582	---	2,430 (C) Perennial	10/1-5/15	1,118	156	---	---	---		757
Sand Springs	249,685	5,200	11,019	1,303	6,091 (C) Perennial	YL (AMP)	4,918	5,157	133	---	8		11,019
Sawmill Canyon	9,177	---	97	159	181 (C) Perennial	YL	0	0	78	---	90		102
Schlarman	5,345	---	390	464	240 (C) Perennial	11/1-4/30	214	188	1	21	---		449
Shadow Well	17,862	---	1,151	---	577 (S) Perennial	11/1-4/30	440	576	---	---	---		1,496
Sheep Spring	31,077	---	1,815	629	409 (C) Perennial	YL	0	420	262	---	720		2,360

TABLE 8-36 -- Continued

Allotment	Present: Land Ownership Status[1]		Present: Total Forage Capacity (AUMs)		Present: Present Authorized Livestock Use & Range Class (AUMs)[4]	Present: Season-of-use[5]	Present: 1977 Licensed Use	Proposed: Proposed Forage Allocations (AUMs)				Proposed: (2015) Future Forage Capacity Livestock
	Public Land (acres)	Other Land (acres)	Livestock AUMs[2]	Wildlife AUMs[3]				Livestock 1980	Deer	Bighorn Sheep	Wild Horses	
	a	b	c	d	e	f	g	h	i	j	k	l
Sheep Flat	74,171	720	521	1,350	1,977 (C) Perennial	5/16-9/15	1,979	261	738	---	---	531
Simpson	8,379	---	414	---	747 (C) Perennial	12/1-4/30	750	207	---	---	---	538
Six Mile	34,531	---	896	125	674 (C) Perennial	YL	674	444	125	---	---	1,165
Snow Spring	44,042	---	1,530	1,015	3,567 (C) Perennial	10/1-5/15	1,650	604	397	---	---	1,561
Summit Spring	18,035	---	149	---	715 (C) Perennial	10/16-5/15	715	75	---	---	---	152
Terry	30,163	---	242	---	2,366 (C) Perennial	10/1-5/15	1,444	53	---	---	---	315
Uvada	13,608	10	554	203	355 (C) Perennial	YL	229	261	95	---	---	720
Warm Spring	1,401	---	25	---	74 (C) Perennial	11/16-4/15	0	13	---	---	---	29
White Hills	2,755	---	105	---	101 (C) Perennial	12/1-2/28	0	0	---	---	---	137
White Rock	32,916	---	1,810	433	2,880 (C) Perennial	9/16-5/15	1,269	354	28	38	---	2,353
Total	3,495,805	25,442	109,914	44,179	118,580		78,235	37,163	12,784	2,308	5,956	128,012

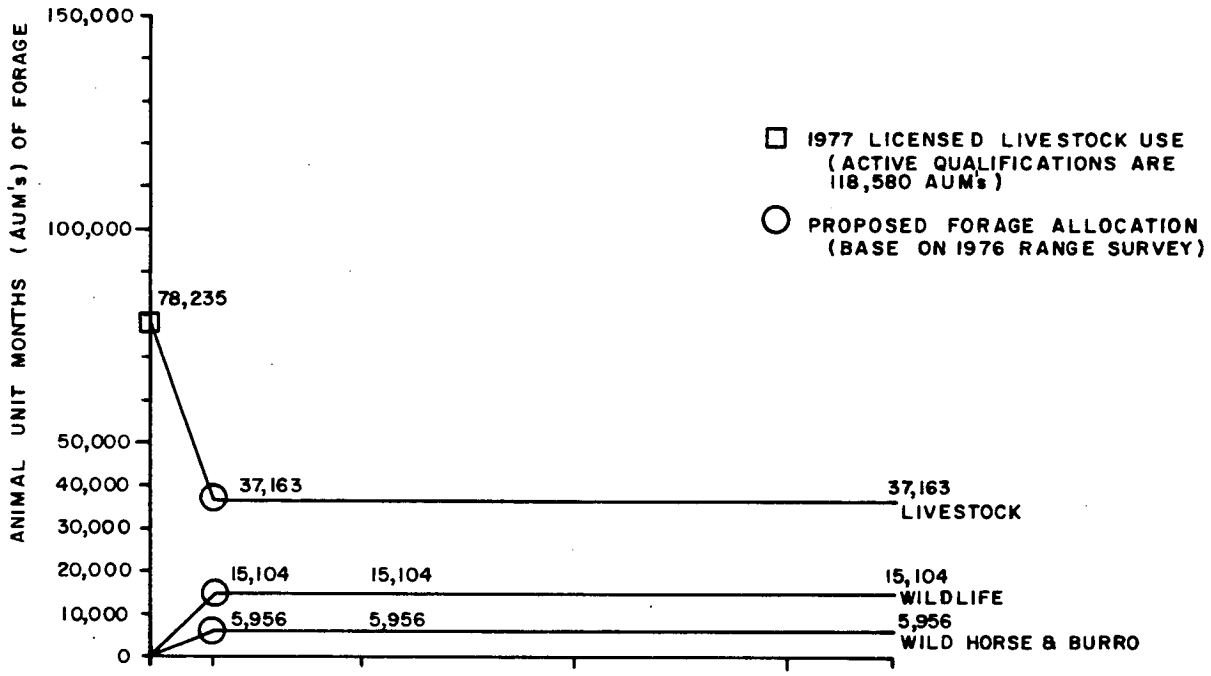
1 Land ownership includes some acreage outside the ES area boundary in the Ely and Las Vegas districts.
2 Suitable Animal Unit Months (AUMs) include those AUMs which meet the Bureau of Land Management's production and slope criteria.
3 Wildlife AUMs include all competitive and non-competitive AUMs determined from the range survey.
4 (C) cattle (S) domestic sheep (H) domestic horses (WH) wild horses. Authorized use determined from previous range survey or by agreement.
5 (YL) yearlong (AMP) existing Allotment Management Plan (GS) grazing system
6 Permitted use occurred on these allotments, but the number of AUMs used in the ES area could not be determined because the allotment boundaries extend outside the ES area.

Note: Forty-eight AUMs go to antelope in the Sand Springs Allotment.

See glossary for definition of: ephemeral, perennial, ephemeral-perennial, suitable AUM, season-of-use (period-of-use), competitive forage, non-competitive forage, AMP.

Source: U. S. Department of the Interior, Bureau of Land Management, Las Vegas District, Caliente Unit Resource Analysis and Management Framework Plan, 1978.

FIGURE 8-5
REDUCED LEVEL OF LIVESTOCK GRAZING
ALTERNATIVE FIVE
1980 AND POSSIBLE FUTURE ALLOCATIONS (2015) TO
LIVESTOCK, WILD HORSES, AND WILDLIFE IN CALIENTE ES AREA



NOTE: Allocations under this alternative are assumed to remain constant through the analysis period (35 years).

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with a somewhat increased evapotranspiration rate, stream flows would likely decrease by small, unquantifiable amounts.

Impact on Water Quality

Water quality should improve. Suspended sediment concentrations would decrease by small, unquantifiable amounts for two reasons: 1) sediment yields would be expected to decrease due to an anticipated seven percent reduction in soil loss, and 2) stream bank sloughing would decrease because of a reduction in livestock trampling (a result of fewer livestock). Fecal coliform bacteria levels should decrease by small, unquantifiable amounts because fewer livestock would be using the perennial waters on public lands.

Conclusion

Annual water consumption by ungulates would amount to less than one percent of the region's perennial yield. Stream flows could decrease by small, unquantifiable amounts because of increased riparian vegetation in some portions of the riparian zones.

Suspended sediment concentrations would decrease slightly because of reduced sediment yields and reduced stream bank sloughing in some riparian areas. Fecal coliform levels would also be somewhat reduced.

Impacts on Vegetation

Table 1-3 and 8-36 shows the proposed changes in periods-of-use and the vegetation allocation by allotment.

Grazing anytime during the green period of plants reduces the amount of food made and stored by plants. This reduction, in turn, decreases the plants' capacity to produce both shoot and root growth the following growing season (Hormay, 1970). This green period varies from plant species to plant species. In the ES area the green period usually begins in mid-February and continues into September (refer to Table 2-10). Hormay (1970, p. 14) indicates that defoliation is most harmful when food reserves are lowest, which occurs in the spring or early summer when the plant is growing most rapidly or at any time until food storage is completed. Therefore, vegetation should benefit since this alternative specifies a rest period from April 1 to May 30.

Specific impacts to vegetation related to each of the periods-of-use should be approximately the same as those discussed in Chapter 3, Vegetation. Adverse impacts to vegetation related to the periods-of-use should be reduced when compared to the 50 percent reduction in livestock use. Livestock forage production

could be expected to improve to approximately 128,000 AUMs in 35 years. Excessive use areas around existing water sources would continue to occur because no new water sources would be constructed under this alternative to improve the distribution of livestock throughout the area.

Grazing animals tend to congregate in areas where desirable forage and water is readily available (approximately 1,208,195 acres). They stay in these areas until desirable vegetation or water is depleted; then they begin using forage in areas of difficult accessibility and plants of low palatability. They also travel greater distances to water. If grazing animals are allowed to concentrate in the same areas year after year, they would eventually cause the removal of desirable perennial vegetation and promote the establishment of undesirable annual vegetation or shrub species. By reducing the levels of livestock grazing use by 52 percent of 1977 levels, excessive use would continue to occur, but the area impacted should be reduced in size.

The most serious impacts resulting from poor distribution of livestock, wildlife, wild horses, and burros occur in riparian areas (approximately 5,000 acres). These animals tend to remain in the riparian areas until the palatable forage is depleted. In so doing, they may cause adverse impacts to the vegetation by trampling. This tends to remove the majority of the ground cover which results in increased erosion and degradation of the site. Reducing the number of animals in a given area tends to reduce the grazing pressure in less desirable areas such as steep slopes and areas distant from water. However, grazing pressure remains relatively uniform within the riparian areas. The lower number of animals simply remain in the riparian areas and are not forced to utilize less desirable areas.

Ash Flat and Meadow Valley allotments would have no livestock or wild horse grazing. Approximately 10 miles of riparian area within these allotments should improve.

Wild horse use on approximately five miles of riparian areas would continue to occur year-round. Therefore, these areas would probably tend to deteriorate in the long-term (35 years).

The remaining 42 miles (approximately) of riparian areas, on public land, would have wild horses removed and livestock numbers would be reduced by 52 percent of 1977 levels on these areas. Therefore, the vegetation on these areas should benefit.

An improvement in livestock forage condition is expected under this alternative, based on professional judgement and on a study by McLean and Tisdale (1972). This study found that with no livestock grazing it took 40 years for a vegetation type in poor

condition to improve two condition classes to good condition and 20 years for areas in fair condition to improve to good condition. Therefore, taking into consideration the differences in climatic factors and the level of livestock use from the study area and the Caliente ES area, present acres in good condition should improve from 688,751 acres to 863,320 acres. Present acres of fair condition should go from 1,374,539 acres to 1,199,970 acres in 35 years. Some improvement could be expected in areas in poor livestock forage condition, but the 35 year time frame under this alternative would not be long enough for a one condition class improvement in these areas. This is partially due to the level of livestock use occurring under this alternative and the extreme nature of the environment (i.e., low rainfall, frequent drought, high summer temperatures) as compared to the cited study. Table 8-37 gives a summary of estimated livestock forage condition as it should occur in 35 years.

TABLE 8-37
SUMMARY OF ESTIMATED LIVESTOCK FORAGE CONDITION a/

	Acres Good	Acres Fair	Acres Poor
Present	688,751	1,374,539	512,351
Future	863,320	1,199,970	512,351

a/ Unsuitable acres not included.

Conclusion. After 35 years under this alternative livestock forage production should increase to approximately 128,000 AUMs. Livestock forage condition is expected to improve (see Table 8-37). Reduced levels of grazing along with providing a rest period from April 1 to May 30 during the critical growing period should result in an increase in total ground cover by live vegetation and litter. Therefore, it is assumed that beneficial effects to vegetation should be obtained.

Impact on Threatened or Endangered Flora

The plant species shown in Appendix C should benefit from reduced livestock use. Grazing adjustments, plus the proposed reductions in the wild horse and burro populations, should reduce foraging and trampling of all proposed threatened or endangered flora.

The five existing AMPs may continue to adversely affect some species due to livestock trampling and for those reasons stated in Chapter 3.

Conclusion. Reductions of livestock and wild horses and burros should benefit all of the sensitive plant species. Populations within existing AMPs may continue to be adversely affected.

Impacts on Wildlife

Impact on Bighorn Sheep

Table 8-38 shows the livestock use which would occur on bighorn sheep ranges with Alternative Five. Total livestock use on all bighorn ranges would be reduced 5,540 AUMs (70 percent) from the present level. This should almost eliminate competition from livestock that presently occurs. Bighorn sheep populations would probably reach or exceed reasonable numbers (874 animals) by the year 2015 under this alternative.

Impact on Mule Deer

Forage is currently not available to meet reasonable numbers on deer ranges DS-1, DW-4, DW-5, and DY-2 (see the Big Game Areas Map in Chapter 2). A total of 2,643 AUMs (17 percent) of the amount of forage needed to meet reasonable numbers does not presently exist. Mule deer probably would not attain reasonable numbers in the ranges where forage shortages occur. Sufficient forage exists on the remaining ranges so mule deer should reach reasonable numbers in these areas unless other factors (disease, water availability, etc.) limit the population. Total mule deer population expected with this alternative would be about 7,320 animals (1,500 fewer animals than reasonable numbers) by the year 2015.

Impact on Desert Tortoise

With this alternative livestock and wild horse use on desert tortoise range would decrease from the approximately 13,755 AUMs presently used to approximately 1,829 AUMs (87 percent reduction). The period-of-use by livestock would be the same as the proposed action. The impacts from reduced grazing and period-of-use to desert tortoise would be similar to those described in Chapter 3.

Impact on Threatened or Endangered Wildlife

No impacts to federally listed threatened or endangered wildlife are anticipated with this alternative.

Impact on Other Wildlife

Table 8-39 shows the amount of grazing by livestock and wild horses that would occur under this alternative on perennial

TABLE 8-38
ESTIMATED LIVESTOCK USE ON BIGHORN SHEEP RANGES
ALTERNATIVE FIVE

Sheep Range	1977 Livestock Use (AUMs) on Bighorn Range a/	Alt. 5 Proposed Use (AUMs) on Bighorn Range a/	Difference Between Present and Proposed Use	Approx. Acres of of Habitat	Present Number of Bighorn Sheep in Entire Range	Anticipated Population of Bighorn Sheep with Alt. 5 (2015)
BY-1	901	370	- 531	93,415	404	426
BY-2	3,342	289	-3,053	139,860	259	335
BY-3	2,674	1,364	-1,310	87,319	50	63
BY-4	1,024	378	- 646	55,461	50	50
Total	7,941	2,401	-5,540	376,055	763	874

a/ These figures were derived by summing the weighted average of the total use on the allotments within a bighorn range based upon the acres of habitat that occurred in each allotment.

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streams located on public land in the ES area. Fifty-three miles of stream would receive an overall decrease of 80 percent in grazing. The reduction in grazing would increase riparian vegetation benefiting Gambel's quail, mourning dove, cottontail rabbits, nongame birds, and fish.

Conclusion

Mule deer are not expected to reach reasonable numbers (8,820 animals) because forage is not available on some ranges. Competition to bighorn sheep would decrease allowing these animals to attain reasonable numbers (874 animals). Competition to desert tortoise would be minimized. Riparian habitat important to many wildlife species could be expected to improve. No impacts to federally listed threatened or endangered species are anticipated.

Impacts on Wild Horses and Burros

About 345 wild horses would benefit from reduced forage allocations to livestock in the 11 allotments proposed for both livestock and wild horse use (Table 8-36). The reduced livestock levels would result in less forage competition between livestock and wild horses. Elimination of livestock grazing from April 1 to May 30 would also benefit wild horses since their only competition for forage during this period would be with wildlife.

An additional 152 wild horses would be allocated vegetation in 10 allotments with no vegetation allocation to livestock. In these allotments, wild horses would benefit from the elimination of forage competition with livestock.

Impacts to wild horses and burros from reductions in their numbers and from future forage production would be the same as described in Chapter 3.

Conclusion

Within Wild Horse Management Areas, wild horses would benefit from reduced forage competition with livestock in 11 allotments, and from the elimination of forage competition with livestock in 10 allotments.

Impacts on Cultural Resources

Cultural resources site disturbance caused by livestock, wild horses, or wildlife trampling would continue to occur. Eighty-two archaeological sites containing materials at the ground surface, and therefore, susceptible to trampling effects, are located within one mile of water, as are 61 historical sites. These 143 sites may be subject to trampling with less frequency than at

TABLE 8-39
ESTIMATED GRAZING USE ON PERENNIAL STREAMS
ALTERNATIVE FIVE
CALIENTE ES AREA

Streams	Miles of Stream on Public Land in ES Area	Miles of Stream Where Grazing to be Reduced (1980)	Percent Decrease in Grazing Use Level to Occur
Clover Creek	13	13	9
Meadow Valley Wash	27	27	100
Pine Creek	4	4	99
Ash Creek	9	9	99
Totals	53 a/	53	80

a/ Does not include four miles of fenced stream; see p. 3-19.

present because of fewer livestock on the range. Fewer cultural sites should be disturbed, or those which are should be disturbed less frequently.

Conclusion

The 143 sites would continue to be disturbed, but at a reduced level.

Impacts on Land Uses

Impact on Livestock Grazing

The implementation of this alternative would mean an increase of 57 percent from 1977 use (7,834 AUMs to 12,318 AUMs) on 20 allotments (749,061 acres); therefore, livestock grazing should benefit on these allotments. The Naquinta Spring and Panaca SCS allotments (56,667 acres) are unallotted so they would not be affected by this alternative.

No livestock grazing would be allowed on 10 allotments (215,844 acres) which had grazing preferences in 1977; this would mean that 3,366 AUMs of forage would not be allocated to livestock on these allotments, and livestock would be severely impacted. Fourteen additional allotments (189,376 acres) would have no livestock grazing in 1980, but since no use was taken on these allotments in 1977 no projected impacts should occur to livestock. Livestock use on 33 allotments (1,989,558 acres) would be reduced by 61 percent from 62,893 AUMs in 1977 to 24,765 AUMs in 1980 under this alternative. Livestock grazing would be significantly reduced on these allotments and would be severely impacted. Four allotments (276,103 acres) would be reclassified to ephemeral range, meaning 4,142 AUMs of perennial forage would not be allocated to livestock in 1980. Adverse impacts should be lessened since ephemeral forage would be allocated when it was available. Three allotments (19,196 acres) would continue to operate under an ephemeral classification so they should not be affected by this alternative.

Impacts to livestock operators concerning adjustment in AUMs and periods-of-use are discussed in the Social Economic section of this alternative.

It is anticipated that the proposed 52 percent reduction from 1977, in livestock use and changes in periods-of-use, should increase vigor and production of preferred forage species. This should result in an increase of approximately 18,000 AUMs in 35 years (109,914 to 128,000). This vegetation improvement should be reflected in improved conditions of livestock.

Conclusion. Livestock forage production should improve by 18,000 AUMs in 35 years. Twenty allotments would have 57 percent increases in livestock use over 1977 use; 33 allotments would have livestock grazing reduced by 61 percent. Twenty-three allotments would have no livestock grazing. Livestock grazing on seven allotments would only be allowed when ephemeral forage is available. Therefore, livestock grazing under this alternative would be severely impacted.

Impacts on Economics

Impact on Income

According to the budgets in Tables 8-40 through 8-43 in 1980 all categories of ranchers would have reduced incomes if Alternative Five were implemented.

Small cattle ranches would lose about $1,621 per year below their 1977 income. Many have operated with net losses in the past so it would be difficult to determine if this additional loss would force them out of the cattle business. Medium sized cattle ranches would have a decrease of $5,365 per year below their 1977 income. The large cattle ranch would lose an additional $20,402 per year. Sheep ranches would have a decrease of $2,988 below their 1977 income, but would still make $11,818 per year. Total decreases in annual income would be $199,263 (Table 8-44) below the 1977 level of $96,728.

TABLE 8-44
SUMMARY OF RANCH INCOME IMPACTS
ALTERNATIVE FIVE

	Change in Proprietor's Income	Change in Labor Income	Change in Total Income
Small Cattle (33 ranches)	$- 53,493	$ --	$- 53,493
Medium Cattle (13 ranches)	- 69,745	-18,759	- 88,504
Large Cattle (1 ranch)	- 20,783	-17,388	- 38,171
Sheep (5 ranches)	- 14,940	- 4,155	- 19,095
Total	-158,961	-40,302	-199,263

TABLE 8-40
BUDGET FOR SMALL RANCH

Expenses	Alternative Five (143 AUs)
Livestock Purchases	$ 468
Repairs & Maintenance	647
Depreciation	4,542
Interest	
Operating Capital	832
Real Estate	6,728
Gas & Lubricants	1,049
Supplements	304
Taxes	
Livestock	402
Real Estate	460
Custom Work	2,187
Insurance	700
Grazing Fees	
Caliente BLM	307
Other BLM	236
Forest Service	107
Utilities	315
Alfalfa & Grass Hay Expenses	339
Marketing Costs	454
Veterinary Costs	156
Miscellaneous	429
Total	20,662
Receipts	
Heifer Calves	3,630
Steer Calves	6,731
Cull Cows	1,642
Cull Bulls	478
Total	12,481
Income	-8,181
Change from 1977	-1,621

TABLE 8-41
BUDGET FOR MEDIUM RANCH

Expenses	Alternative Five (397 AUs)
Labor	$ 261
Livestock Purchases	2,465
Repairs & Maintenance	2,306
Depreciation	8,544
Interest	
Operating Capital	2,870
Real Estate	8,723
Gas & Lubricants	2,187
Supplements	738
Pasture Rent	525
Taxes	
Livestock	1,076
Real Estate	1,143
Insurance	1,300
Grazing Fees	
Caliente BLM	1,847
Other BLM	1,857
Forest Service	298
Utilities	1,000
Alfalfa & Grass Hay Expenses	938
Marketing Costs	1,393
Veterinary Expenses	353
Miscellaneous	723
Total	40,547
Receipts	
Heifer Calves	13,230
Steer Calves	23,475
Cull Cows	4,808
Cull Bulls	1,608
Total	43,121
Income	2,574
Change from 1977	- 5,365

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TABLE 8-42
BUDGET FOR LARGE RANCH

Expenses	Alternative Five (2,879 AUs)
Labor	$ 80,612
Repairs & Maintenance	21,017
Depreciation	123,584
Gas & Lubricants	15,662
Feed & Supplements	60,177
Taxes	14,703
Insurance	3,329
Grazing Fees	
Caliente BLM	12,020
Other BLM	4,961
Utilities	12,224
Alfalfa & Grass Hay Expenses	13,920
Livestock Transporation	5,470
Veterinary Expenses	1,353
Miscellaneous	9,558
Total	378,590
Receipts from Livestock Sales	290,376
Income	- 88,214
Change from 1977	- 20,783

TABLE 8-43
BUDGET FOR SHEEP RANCH

Expenses	Alternative Five (2,306 Sheep)
Labor & Supplies	$15,819
Livestock Purchases	2,168
Depreciation	8,588
Interest	
Operating Capital	1,868
Real Estate	2,783
Gas, Lubricants, Repairs	12,891
Feed & Supplement Purchases	18,328
Pasture Rent	11,269
Taxes	8,290
Shearing	2,998
Insurance	1,964
Grazing Fees	
Caliente BLM	538
Other BLM	3,465
Forest Service	187
Utilities	4,855
Miscellaneous	4,727
Total	100,738
Receipts	
Lambs	93,255
Ewes	3,851
Wool (inc. incentives)	15,450
Total	112,556
Income	11,818
Change from 1977	- 2,988

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Indirect income impacts would be caused because of the interrelationship of the livestock industry with other industries in the region's economy. Overall direct and indirect impacts would total about $258,500 per year. This impact would continue through the year 2015. Although this accounts for less than one percent of the region's 1977 income, this alternative would strongly affect many ranchers.

Possible long-term increases in big game populations may cause an increase in long-term income in Lincoln County's hunting-related businesses. This would amount to about $170,000 (see Appendix G, Section 7). This represents a 65 percent increase in big game-related income in Lincoln County, but less than one percent of the regional income.

In the long-term, maintenance of range improvements may contribute about $30,000 in direct income to the regional economy.

Impact on Employment

In 1980, ranch laborers' income would decline by $40,302 (Table 8-44). At $2.35 per hour (1977) this would mean a loss of eight full-time jobs. An additional three jobs in indirect employment would be lost.

Possible long-term increases in wildlife populations may result in an increase in long-term employment in Lincoln County's hunting-related businesses. This could amount to about 20 full-time equivalent jobs by the year 2015 (see Appendix G, Section 7). This represents a 65 percent increase in big game-related employment in Lincoln County, but less than one percent of regional employment.

In the long-term, maintenance of range improvements may generate two additional jobs.

Impact on Tax Revenues

Livestock tax revenues in Lincoln County would decline by $11,899 below 1977 levels. This represents less than one percent of the fund requirements for local government in the county.

Impact on Ranchers' Wealth

Although the Bureau of Land Management does not recognize a capitalized value for grazing preferences, the preferences do contribute to the capital position (wealth) of the ranchers to whom they are allotted. (McConnen, 1976) (Stubblefield and Robertson, n.d.) (Nielson and Workman, 1971). Impacts associated with changes in ranch value would occur immediately; however, actual dollar losses would not accrue to the ranchers until the preferences are sold.

The value that ES area grazing preferences contribute to the ranchers' wealth would decline as a result of the elimination of 81,417 AUMs of grazing preferences. At $25 per AUM the total decrease would be about $2 million. This represents a 69 percent decrease below the value that the grazing preferences contributed to the ranchers wealth in 1977.

Assuming that the change in the value of grazing preferences could be estimated by comparing current AUMs licensed by permit (78,235) with future AUMs of active preference (37,163), the impact could be shown to be much less negative, $1 million (-52 percent).

Impact on Seasonal Production Characteristics

The impacts on the seasonal operations of ES area cattle ranchers from the implementation of this alternative would be similar in type to those identified in Chapter 3 but would be greater in intensity. (See Table 8-45.)

If the change in the value of grazing preferences could be determined by comparing current AUMs licensed under permit with future AUMs of active preference, then a much less negative impact could be shown -- a decrease of about $1 million.

TABLE 8-45
SEASONAL DEPENDENCY ON PUBLIC LAND FORAGE
ALTERNATIVE FIVE

	(Percent Dependency)				
	Total	Spring	Summer	Fall	Winter
Small Cattle Ranch	11	7	11	14	16
Medium Cattle Ranch	24	19	25	26	33
Large Cattle Ranch	23	21	24	26	24
Sheep Ranch	6	13	--	--	13

Conclusion

This alternative would cause overall annual losses of $199,263 to livestock ranchers below the 1977 level of $96,728. Direct and indirect income impacts would total $259,000 per year below 1977 levels. Although this represents less than one percent of regional income it would strongly affect many ranchers.

The value that ES area grazing preferences contribute to the ranchers' wealth would decline by 69 percent below the 1977 levels.

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Impacts on Social Values

The impacts of this alternative would be similar to those under the proposed action. The difference would be in intensity, and that is difficult to quantify.

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REDUCED MANAGEMENT INTENSITY
ALTERNATIVE SIX

Description

This alternative would reduce the number of proposed Allotment Management Plans (AMPs) to 16. In addition, projects associated with the proposed intensive grazing management system would be reduced. (See Tables 8-46 and 8-47 for a list of proposed AMPs, projects needed for development, and the cost of proposed improvements.) Figure 8-6 illustrates the levels of allocations to various species under Alternative Six.

TABLE 8-47
PROPOSED RANGE IMPROVEMENT COST SCHEDULE
REDUCED MANAGEMENT INTENSITY
ALTERNATIVE SIX

Project	Units	Cost/Unit	Total Cost
Fencing	190 miles	$ 2,300	$ 437,000
Spring Developments	20 each	2,300	46,000
Water Pipelines	163 miles	4,200	684,600
Water Troughs	80 each	300	24,000
Reservoirs	26 each	5,000	130,000
Wells	10 each	19,500	195,000
Mechanical Treatment	26,540 acres	17	451,180
Burning	48,840 acres	13	634,920
		Total	$2,602,700

Forage allocations and periods-of-use would be the same as in the proposed action (Table 1-3), but the time frame for implementation of this alternative would be accelerated. All proposed AMPs would be analyzed to determine feasibility (benefit-cost, resource conflict, etc.) within three years (1983). Those AMPs found to be feasible would be written and implemented by 1983 with associated improvements to be completed by 1987. The five existing AMPs would be managed as specified in the proposed action, with necessary revisions.

In summary, this alternative would allocate forage as described in the proposed action. Period-of-use would be as outlined in the proposed action. Management intensity would be reduced (27 AMPs in the proposed action versus 16 AMPs in Alternative Six). Range improvement projects would be completed but at a greatly reduced

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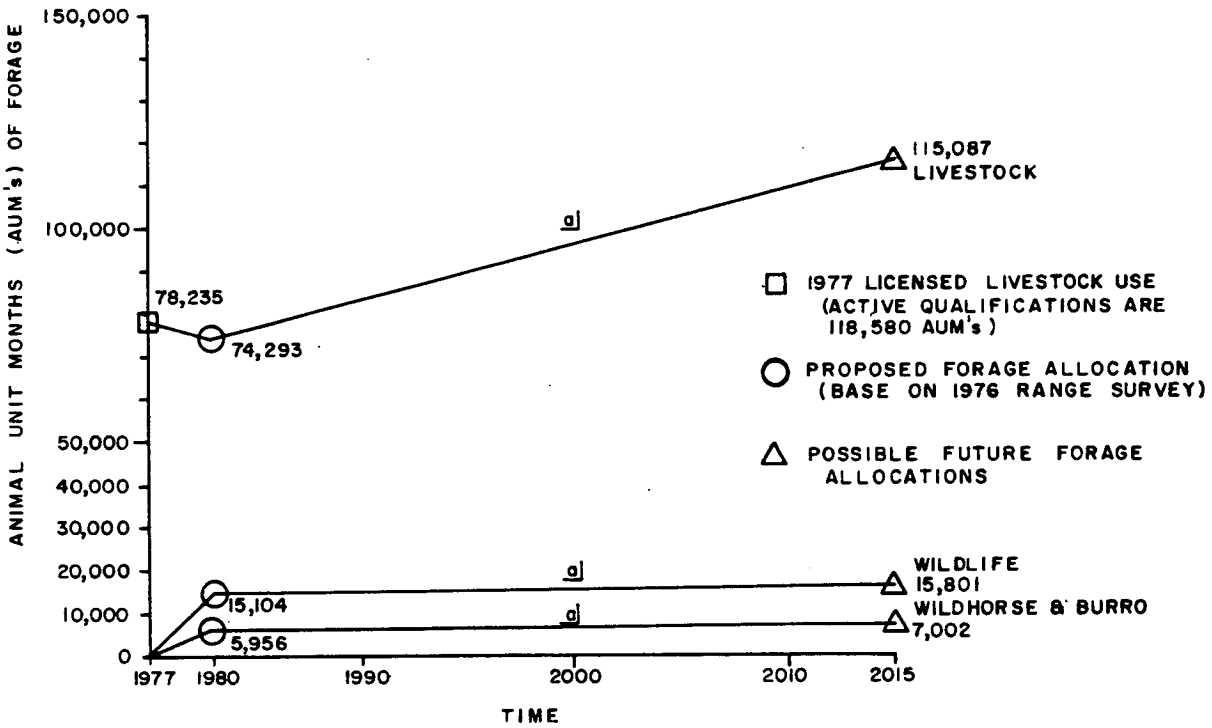
TABLE 8-46
PROPOSED ALLOTMENT MANAGEMENT PLANS, RANGE IMPROVEMENT, AND VEGETATION MANIPULATION
REDUCED MANAGEMENT INTENSITY
ALTERNATIVE SIX

Allotment	Fencing (Miles)	Spring Developments	Water Pipelines (Miles)	Water Troughs	Reservoirs	Wells	Mechanical Treatment (Acres)	Burning (Acres)
1. Condor Canyon N-4 Panaca SCS	20	—	10	5	—	2	2,600	—
2. Buckboard Panaca Cattle Roadside White Hills McGuffy Spring	12	—	6	3	—	1	2,000	—
3. Sheep Flat Summit Spring Oak Wells White Rock Garden Springs	13	—	10	5	—	1	8,500	12,800
4. Crossroads Sand Hollow Beacon	8	—	11	3	—	2	2,000	—
5. Gourd Springs	13	3	12	6	—	1	—	—
6. Cottonwood Henrie Morrison-Wengert	15	2	10	6	10	—	2,240	15,360
7. Elgin Pennsylvania	4	—	6	3	—	—	—	—
8. Pahroc Six Mile	6	—	9	5	—	—	—	—
9. Barclay Lime Mountain	9	5	15	7	3	1	6,000	15,680
10. Bald Mountain Naquinta Spring	45	2	15	7	13	1	—	—
11. Rattlesnake	—	1	2	2	—	—	—	—

TABLE 8-46 -- Continued

Allotment	Fencing (Miles)	Spring Developments	Water Pipelines (Miles)	Water Troughs	Reservoirs	Wells	Mechanical Treatment (Acres)	Burning (Acres)
12. Delamar	17	--	15	7	--	1	--	--
13. Ely Springs Cattle	12	3	10	5	--	--	--	--
Ely Springs Sheep								
14. Morman Peak	10	--	10	5	--	--	--	--
15. Oak Springs	2	4	20	8	--	--	--	--
Cliff Springs								
16. Rabbit Springs	4	--	2	3	--	--	3,200	--
Totals	190	20	163	80	26	10	26,540	48,840

FIGURE 8-6
REDUCED MANAGEMENT INTENSITY
ALTERNATIVE SIX
1980 AND POSSIBLE FUTURE ALLOCATION (2015) TO
LIVESTOCK, WILD HORSES AND WILDLIFE IN CALIENTE ES AREA



a/ Possible future forage (vegetation manipulation and intensive management) was prorated at the same ratio as in the Caliente Management Framework Plan. Possible future forage would be allocated through the Bureau's planning system.

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level. Implementation of intensive management systems would be completed on an accelerated schedule.

Impacts on Soils

Change in the period-of-use, no grazing from April 1 to May 30 and implementation of Allotment Management Plans should benefit the soil resource. A reduction from the present situation of 185,049 tons/year (nine percent) of soil lost to erosion should occur. If this alternative is implemented this should yield a total annual soil loss of 1,980,227 tons/year (an average loss of 0.56 tons/acre/year) over the ES area.

The mechanical treatment of 26,540 acres should increase soil loss on these areas for a short time (two to three years), but the revegetation of these areas should reduce the amount of soil loss from the present average loss of 0.67 tons/acre/year to a soil loss of 0.47 tons/acre/year. This should be a reduction from 17,887 tons/year to 12,372 tons/year (30 percent). The treatment of 48,840 acres with fire should cause an initial short-term increase in the amount of soil lost to erosion. This should last for two to three years, after which time revegetation of burn areas with low growing vegetation should reduce soil loss from these areas from 0.77 tons/acre/year to 0.48 tons/acre/year. This should be a reduction from 37,678 tons/year to 23,456 tons/year (38 percent).

Certain local areas may receive adverse impacts because of the development of range improvements. Construction of 190 miles of fence may increase erosion on 76 acres. Development of springs, pipelines, troughs, wells and reservoirs may disturb 145 acres. Since livestock tend to concentrate around water sources, increased soil compaction may occur on sites adjoining these new developments. This may affect 1,954 acres, which is less than 0.1 percent of the ES area.

Conclusion

The implementation of this alternative should reduce soil loss to erosion by 185,049 tons/year (nine percent) to a total soil loss of 1,980,227 tons/year.

Impacts on Water Resources

Impact on Water Quantity and Water Quality

Annual water consumption by ungulates would amount to less than 0.10 percent of the region's perennial yield (110,000 acre-feet). With a reduction in management intensity from the proposed action, range improvement projects on the proposed 16 Allotment Management

Plans would, nevertheless, be developed to provide additional water sources which would more evenly distribute livestock than at present. Therefore, impacts under this alternative would be the same as those under the proposed action: increased riparian vegetation, with the associated slight decrease in stream flows, and a slight, but unquantifiable improvement in stream water quality. These beneficial impacts would occur sooner because of earlier implementation of the intensive management systems and earlier project development. See Chapter 3, Impacts on Water Resources.

Conclusion

The beneficial impacts to riparian vegetation and water quality would be the same as under the proposed action but would occur at an earlier date because of accelerated implementation of the intensive management systems and because of earlier project development.

Impacts on Vegetation

This section discusses the impacts to vegetation by grazing during the different periods-of-use. To relate these impacts to individual allotments according to their periods-of-use refer to Table 1-3 in Chapter 1. Only impacts which differ from Chapter 3 are discussed.

Grazing from March 15 to June 15 would subject plants to grazing during critical growing periods. Therefore, short-term impacts under these treatments would result in decreased plant vigor, reproduction, litter accumulation, and seedling establishment (Hormay, 1970). The short-term impacts are offset by the recommended grazing treatments (see Chapter 1) in that each pasture would be rested for one to two growing seasons following each grazing cycle. These impacts would only occur on the allotments which Alternative Six recommends for Allotment Management Plan (AMP) development (16 AMP areas on 1,855,605 acres) and on two out of the five existing AMPs (273,562 acres) which were not combined into one of the above 16 areas.

Repeated grazing treatments during late spring and early summer (3/30-6/15) or early fall (10/1-11/15) tend to defoliate the desirable plants and prevent them from producing adequate leaves and photosynthetic tissue. Under these conditions the plants are unable to produce seed and reproduction is reduced or eliminated. Therefore, the ten allotments proposed for seasonal grazing (non-AMP) where spring and fall grazing (10/1-3/30) are employed every year (278,696 acres) would be impacted by reduced vigor, a decrease in crown cover, a slowdown or reversal of preferred species establishment, and a slight increase in less preferred

plant distribution. On all ten allotments the proposed period-of-use requires that a rest be provided from May 1 to September 30. Therefore, the effects described above on vegetation should be minimized by the rest provided during the critical growing period.

There would be approximately 75,380 acres of the Caliente ES area disturbed by vegetation manipulations under Alternative Six. Average time for maximum livestock forage production to occur should be from three to five years after completion of the treatment.

The impact of mechanical treatment on 26,540 acres should be a change in species composition from shrubs or trees to more desirable forage species (including grasses, shrubs, and forbs) for wildlife, wild horses, and livestock. The long-term (35 years) impact should be an increase in preferred forage production. Livestock forage condition on these areas could be expected to improve, in the long-term (35 years). About 2,654 additional Animal Unit Months (AUMs) should be provided from mechanical projects. (See Appendix E, Section 6, for estimated AUMs technique.)

Burning would have the short-term impact of removing vegetative cover the first growing season of the burn (48,840 acres). Long-term impacts would include a change in species composition toward more grasses and forbs and an expected increase in forage production. Range condition should improve on the acreage receiving the treatment in the long-term (35 years). About 4,884 additional AUMs would be provided from burning projects. (See Appendix E, Section 6, for estimated AUMs technique.)

The fences recommended in Alternative Six would permanently remove approximately 76 acres from vegetative production. Water developments (spring developments, water pipelines, troughs, reservoirs, and wells) would initially disturb approximately 145 acres and permanently remove about 1,954 acres from vegetative production due to increased use and trampling associated with these types of improvements. These water developments would permit grazing in areas now potentially suitable (due to lack of water) and would result in additional concentrated use areas of about 1,954 acres around the new developments.

This alternative would reclassify areas presently classed as potentially suitable for grazing to a suitable classification through development of water sources providing an additional 25,106 AUMs. Vegetative manipulations could also result in an unsuitable type changing to suitable through increased

productivity on the site and through increased densities of preferred forage species for wildlife, wild horses, and livestock. This change would make an additional 7,538 AUMs available for allocation in 35 years.

The major impacts to vegetation as a result of this alternative should be an increase in the acreage of good condition range. It is estimated that at the end of 35 years (with vegetative treatment) the amount of good condition range would go from 688,751 acres to 1,121,720 acres; fair condition range would go from 1,374,539 acres to 1,009,745 acres; and poor condition range would go from 512,351 acres to 444,176 acres. See Appendix E, Section 5 for methodology in predicting changes in range condition.

TABLE 8-48
SUMMARY
ESTIMATED LIVESTOCK FORAGE CONDITION
AFTER 35 YEARS UNDER PROPOSED ACTION a/

	Acres Good	Acres Fair	Acres Poor
Present	688,751	1,374,539	512,351
Future	1,121,720	1,009,745	444,176

a/ Unsuitable acres not included.

Conclusion. In spite of some individual and short-term adverse impacts as discussed above, beneficial effects should be obtained through the implementation of improved grazing management under this alternative.

Reduced levels of grazing (by 1980) on 24 allotments (from 43,450 AUMs to 29,913 AUMs) coupled with grazing management systems that provide a systematic rest or deferment from spring grazing and a shift away from concentrated use areas should result in a two percent increase in total ground cover of live vegetation and litter. Livestock forage condition also should improve. Livestock forage production should increase from 109,914 AUMs to approximately 127,000 AUMs by the year 2015. (See Appendix E, Section 11, Table E-5 for estimated future production.)

Impacts on Threatened or Endangered Flora

Impacts to the sensitive plant species identified in Appendix C would be the same as described in Chapter 3, except that under this alternative only 75,380 acres would be disturbed by vegetation manipulation (mechanical or burning). Sensitive plant populations could be harmed in areas proposed for manipulation even if inventories are completed (see Chapter 1).

All of the other range improvement projects shown in Table 8-46 have less potential for significantly impacting proposed threatened or endangered flora populations; however, they may cause the loss of numerous individual plants.

Conclusions. Vegetation manipulations are the components of this alternative with the most potential for adversely affecting threatened or endangered flora. Intensive livestock use, resulting from AMPs or increased use on non-AMP areas by livestock, could also be harmful to these species, mainly because of trampling. Other range improvement projects could impact the species more intensely, but in localized areas of relatively small acreage.

Impacts on Wildlife

Impact on Bighorn Sheep

The impacts to bighorn sheep under Alternative Six would be the same as identified in Chapter 3. The existing bighorn sheep population (763 animals) could be reduced by approximately 128 animals because of increased competition for space, water, and forage immediately adjacent to waters. The effect would be greatest in bighorn range BY-1 (see Big Game Areas Map). Reasonable numbers (874 animals) would not be achieved by 2015 due to increased livestock use proposed with this alternative.

Impact on Mule Deer

The analysis of this alternative is described in Chapter 3.

Approximately 75 water developments would be constructed on mule deer range under this alternative. New water developments in areas that have sufficient forage may open additional areas for deer utilization.

Approximately 112 miles of fence would be constructed on mule deer range. The impacts from fences would be mitigated to allow wildlife access. However, an undeterminable amount of entanglement leading to death or injuries will occur as long as fences exist.

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Approximately 70,180 acres of vegetation would be manipulated on mule deer ranges including two ranges (DW-5, DW-4) that presently do not have enough forage to meet reasonable numbers (8,820 animals).

Mule deer should benefit from the allocation of existing forage, from future forage increases from vegetation manipulations and grazing management, and from increased habitat utilization made possible by the construction of new waters. Reasonable numbers (8,820 animals) are expected to be achieved or exceeded by the year 2015 with this alternative.

Impact on Desert Tortoise

The impact on desert tortoise with Alternative Six would be the same as identified in Chapter 3. A 37 percent reduction in grazing (livestock and wild horses) on tortoise habitat, combined with the removal of livestock during the spring and summer (4/1-9/16) on these areas, should have positive effects on the tortoise population.

Impact on Threatened or Endangered Wildlife

No impacts on federally listed threatened or endangered wildlife are anticipated under this alternative.

Impact on Other Wildlife

The impact to other wildlife species would be the same as indicated in Chapter 3 -- except only 75,380 acres of vegetation would be manipulated, and only 116 new water sites and 163 miles of pipeline to supply 33 lateral watering devices would be constructed. Fish populations, upland game birds, nongame birds, and small mammals should benefit from this alternative because of: 1) a 58 percent reduction in grazing by livestock and wild horses on 53 miles of perennial stream, 2) increased ecotone and plant diversity from 75,380 acres of vegetation manipulation, and 3) increased habitat expansion resulting from the construction of 149 possible new watering sites.

Conclusion

Overall, most wildlife species except bighorn sheep should benefit from this alternative. Mule deer should reach or exceed reasonable numbers (8,820 animals); desert tortoise populations could increase, providing there is a viable breeding population; fish and bird populations dependent on riparian vegetation should increase; and more wildlife should occupy the area because of increases in ecotone, plant diversity, and water. Bighorn sheep,

on the other hand, should decrease in population by 128 animals. No impacts to threatened or endangered species are anticipated.

Impacts on Wild Horses and Burros

Under this alternative, the major impacts to wild horses and burros would occur in the eight proposed Allotment Management Plan (AMP) allotments within the Wild Horse Management Areas. Within these allotments, 2,692 Animal Unit Months would be allocated to 224 wild horses. Increased forage competition with livestock in pastures being grazed, as well as the benefits from range improvements and future forage production, would be the same as those described in Chapter 3, except the benefits from range improvements would be realized by 1987. Also, if wild horse winter use areas were grazed in the spring, summer, and fall (2/1-11/30) in the Buckboard, Delamar, Oak Spring, Oak Wells, Rabbit Spring, Rattlesnake, and Sheep Spring allotments, forage may be unavailable in the rested pasture during the winter because of snow.

Impacts to wild horses and burros within the allotments proposed for horse use only, as well as the impacts resulting from removals of excess wild horses are the same as those discussed in Chapter 3.

Conclusion

The greatest impacts to wild horses would occur in those horse use allotments proposed for AMPs, especially allotments with possible winter use areas (named above). However, as stated in Chapter 3, the additional water sources and forage production resulting from the AMP project developments should minimize the adverse effects associated with those allotments' AMPs.

Impacts on Cultural Resources

Impacts on cultural resources sites are similar to those described in Chapter 3; however, fewer sites would potentially be subjected to disturbance by range improvements.

Impacts on Land Uses

Impact on Livestock Grazing

Impacts to livestock grazing (change in periods-of-use, reduced or increased AUMs) would be the same as discussed in Chapter 3, with the following exceptions:

1. There should be approximately 115,000 AUMs available for allocation to livestock by 2015. (Approximately 7,500 of these

AUMs could be available by 1987 because of vegetation manipulation.)

2. Increases in forage production because of better management should be realized sooner on the 16 AMP areas. Better livestock conditions should result.

Impacts to livestock operators under this alternative are discussed in the Social Economic section.

Conclusion. After 35 years under this alternative approximately 115,000 AUMs could be available for allocation to livestock through management and vegetative manipulation. At the time additional forage is determined available for grazing use, an allocation could be made to grazing animals through the Bureau of Land Management planning system. Adverse impacts from reductions in livestock AUMs should abate after 1987 with the development of the recommended AMPs and associated treatments. Therefore, by 2015, it appears that, overall, livestock should benefit by this alternative.

Impacts on Economics

Impact on Income

Since the 1980 allocation to livestock would be the same as for the proposed action, 1980 ranch income impacts would be the same as those outlined in Chapter 3, Income.

If all Allotment Management Plans (AMPs) were determined to be feasible and manpower and funding is available, implementation of this alternative would involve the expenditure of an estimated $2 million for construction of range improvement projects. If range improvement expenditures are spaced evenly over seven years (1980-1987), direct annual income in the region's construction industry--at 41 cent per dollar of expenditure (Chapter 3, Income)--would increase by about $152,000 per year. This represents less than one percent of the 1977 construction income in the four county impact region.

Indirect income impacts would be caused because of the interrelationship of the livestock and construction industries with the rest of the region's economy. Indirect income associated with the construction industry would increase by about $46,000 per year. Total direct and indirect income, including ranch and ranch related income (from Chapter 3, Income), would increase by about $118,500 per year. This amounts to less than one percent of the region's 1977 income.

By the year 2015 construction projects associated with range improvements would end, so the stimulus to the region's economy from the construction industry would also end. By 2015 increased forage production would have the following impacts: Small cattle ranches would lose $273 per year below 1977 levels (Table 8-49). Medium sized cattle ranches would make $3,308 per year over their 1977 income (Table 8-50). Large cattle ranches would make $16,133 above their 1977 income (Table 8-51.) Sheep ranches would lose $1,029 per year below their 1977 levels (Table 8-52). Overall ranch income would increase by $71,299 per year (see Table 8-53) over the 1977 level of $96,728.

Possible long-term increases in big game populations may cause an increase in long-term income in Lincoln County's hunting-related businesses. This could amount to about $250,000 (see Appendix G, Section 7). This represents a 96 percent increase in big game related income in Lincoln County but less than one percent of the regional income.

In the long-term, maintenance of range improvements may contribute about $30,000 in direct income to the regional economy.

Direct and indirect income would increase by $404,500 (less than one percent of the region's 1977 income).

TABLE 8-53

SUMMARY OF RANCH INCOME IMPACTS
ALTERNATIVE SIX

	Change in Proprietor's Income	Change in Labor Income	Change in Total Income
	Long-Term (2015)		
Small Cattle (33 ranches)	$- 9,009	$ --	$- 9,009
Medium Cattle (13 ranches)	+ 43,004	+14,300	+ 57,304
Large Cattle (1 ranch)	+ 16,133	+13,496	+ 29,629
Sheep (5 ranches)	- 5,145	- 1,480	- 6,625
Total	+ 44,983	+26,316	+ 71,299

TABLE 8-49
BUDGET FOR SMALL RANCH

Expenses	Alternative Six 2015 (181 AUs)
Livestock Purchases	$ 592
Repairs & Maintenance	815
Depreciation	4,542
Interest	
Operating Capital	1,048
Real Estate	6,728
Gas & Lubricants	1,322
Supplements	384
Taxes	
Livestock	508
Real Estate	460
Custom Work	2,187
Insurance	700
Grazing Fees	
Caliente BLM	988
Other BLM	236
Forest Service	107
Utilities	315
Alfalfa & Grass Hay Expenses	339
Marketing Costs	574
Veterinary Costs	197
Miscellaneous	543
Pasture Rent	30
Total	22,615
Receipts	
Heifer Calves	4,591
Steer Calves	8,509
Cull Cows	2,077
Cull Bulls	605
Total	15,782
Income	-6,833
Change from 1977	- 273

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TABLE 8-50
BUDGET FOR MEDIUM RANCH

Expenses	Alternative Six 2015 (603 AUs)
Labor	$ 2,804
Livestock Purchases	3,745
Repairs & Maintenance	3,503
Depreciation	8,544
Interest	
Operating Capital	4,360
Real Estate	8,723
Gas & Lubricants	3,323
Supplements	1,122
Pasture Rent	800
Taxes	
Livestock	1,634
Real Estate	1,143
Insurance	1,300
Grazing Fees	
Caliente BLM	5,508
Other BLM	1,857
Forest Service	298
Utilities	1,000
Alfalfa & Grass Hay Expenses	938
Marketing Costs	2,117
Veterinary Expenses	537
Miscellaneous	1,097
Total	54,353
Receipts	
Heifer Calves	20,201
Steer Calves	35,655
Cull Cows	7,302
Cull Bulls	2,442
Total	65,600
Income	11,247
Change from 1977	+ 3,308

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TABLE 8-51
BUDGET FOR LARGE RANCH

Expenses	Alternative Six 2015 (3,982 AUs)
Labor	$111,496
Repairs & Maintenance	29,069
Depreciation	123,584
Gas & Lubricants	21,662
Feed & Supplements	60,177
Taxes	21,674
Insurance	3,329
Grazing Fees	
Caliente BLM	32,151
Other BLM	4,961
Utilities	12,224
Alfalfa & Grass Hay Expenses	13,920
Livestock Transportation	7,566
Veterinary Expenses	1,872
Miscellaneous	13,220
Total	456,905
Receipts from Livestock Sales	401,625
Income	- 51,298
Change from 1977	+ 16,133

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TABLE 8-52
BUDGET FOR SHEEP RANCH

Expenses	Alternative Six 2015 (2,384 Sheep)
Labor & Supplies	$16,354
Livestock Purchases	2,241
Depreciation	8,588
Interest	
Operating Capital	1,931
Real Estate	2,783
Gas, Lubricants, Repairs	13,327
Feed & Supplement Purchases	18,328
Pasture Rent	11,269
Taxes	8,502
Shearing	3,099
Insurance	1,964
Grazing Fees	
Caliente BLM	816
Other BLM	3,465
Forest Service	187
Utilities	4,855
Miscellaneous	4,877
Total	102,586
Receipts	
Lambs	96,409
Ewes	3,981
Wool (inc. incentives)	15,973
Total	116,363
Income	13,777
Change from 1977	- 1,029

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Impact on Employment

Ranch employment impacts for 1980 would be the same as those identified in Chapter 3, Employment. Construction projects associated with range improvements would involve four additional jobs. Total direct and indirect employment would amount to an increase of four jobs over 1977 levels. By 2015 direct and indirect employment impacts would amount to an increase of 42 jobs over 1977 levels. These would be associated with increases in big game hunting, livestock ranching, and maintenance of range improvements.

Impact on Tax Revenues

In 1980 livestock tax revenue impacts in Lincoln County would be the same as those identified in Chapter 3, Tax Revenues.

Impact on Ranchers' Wealth

Although the Bureau of Land Management does not recognize a capitalized value for grazing preferences, the preferences do contribute to the capital position (wealth) of the ranchers to whom they are allotted. (McConnen, 1976) (Stubblefield and Robertson, n.d.) (Nielson and Workman, 1971). Impacts associated with changes in ranch value would occur immediately, but actual dollar losses would not accrue to the ranchers until the preferences are sold, transferred or used as collateral for a loan.

In 1980 the impacts associated with changes in the value of grazing preferences would be the same as those identified in Chapter 3, Impact on Ranchers' Wealth. By 2015, the value that grazing preferences in the ES area contribute to the ranchers wealth would be $87,235 below the 1977 levels ($2,964,000).

If the change in the value of grazing preferences could be determined by comparing current AUMs licensed under permit (78,235) with future AUMs of active preference (115,087), then a much more positive long-term impact could be shown -- an increase of over $900,000 (+46 percent) above 1977 levels.

Impacts on Seasonal Production Characteristics

Impacts to the seasonal dependency of ranchers on ES area public land forage would be similar to those identified in Chapter 3, Impacts on Seasonal Production Characteristics. (See Table 8-54.)

TABLE 8-54
SEASONAL DEPENDENCY ON PUBLIC LAND FORAGE
ALTERNATIVE SIX

	Total	(Percent Dependency) Spring	Summer	Fall	Winter
		Long-Term (2015)			
Small Cattle Ranch	30	16	25	37	44
Medium Cattle Ranch	50	35	47	54	68
Large Cattle Ranch	45	41	46	46	46
Sheep Ranch	11	22	0	0	16

Conclusion

Short-term ranch impacts would be the same as those identified in Chapter 3. Construction of range improvements would cause an increase in construction income of about $152,000 per year for seven years. By 2015 increased forage production would result in an increase in ranch income of $71,299 per year over the 1977 level of $96,728.

Impacts on Social Values

Many of the Environmental Statement (ES) area ranchers would probably respond positively to Allotment Management Plans (AMPs) provided those AMPs do not include combining allotments which would require a major realignment of operators. The animosity that may be created by re-aligning operators on combined allotments cannot be quantified, but would probably be long-term and may increase over time. Other ranchers may believe that implementation of this alternative is additional evidence of government interference that further limits their management options in the day-to-day operation of their ranching enterprise. This perception would probably create negative attitudes toward this alternative that could jeopardize implementation of the AMPs. Other impacts would be similar to those indicated in the proposed action.

LOCALLY SUGGESTED VEGETATION ALLOCATION PROGRAM
ALTERNATIVE SEVEN

Description

This alternative was developed with the aid of comment letters responding to the Caliente Draft Management Framework Plan. Suggestions in the letters which were determined to be implementable involve these issues: 1) changes in periods-of-use; 2) changes in management intensity; 3) realigning of wild horse areas; 4) considering snow and waterhauls as water sources in sheep winter use areas; and 5) changes in range class. Table 8-55 illustrates this alternative by allotment.

Vegetation allocation to livestock would be the same as in the proposed action except for the following allotments: 1) 16 allotments would have 2,849 Animal Unit Months (AUMs) allocated to livestock which were allocated to wild horses and burros under the proposed action; 2) five allotments would have 4,770 AUMs allocated to livestock which were unallocated under the proposed action because of lack of water; 3) one allotment would have 43 AUMs allocated to livestock which were unallocated under the proposed action due to a no grazing management intensity.

There will be 4,893 additional acres of **vegetation** manipulations completed on the Applewhite allotment by 1985 under this alternative. (See Range Vegetation Treatment Areas Map, Alternative Seven.)

Periods-of-use would be the same as under the proposed action on 59 allotments. On 27 allotments periods-of-use would be modified.

Most of the modifications would allow additional livestock grazing during the spring. Management intensity would be the same as under the proposed action on 77 allotments. On five allotments it would be changed from no grazing to non-Allotment Management Plans (AMPs). Four allotments designated as non-AMP under the proposed action would have AMPs developed and implemented, if feasible. The total 1980 allocation to livestock would be 81,868 AUMs -- 3,633 (5 percent) more than 1977 licensed use. (See Range Management Intensity Map, Alternative Seven.)

Range classifications would be the same as under the proposed action on 80 allotments. On three allotments, classification would be changed from wild horse grazing to perennial range class. On two allotments, classification would be changed from perennial to ephemeral-perennial. Two allotments would be reclassified from no grazing to ephemeral-perennial. Possible range improvements associated with Alternative Seven are summarized in Table 8-56.

TABLE 8-55
CALIENTE ES AREA 1978 PRESENT AND PROPOSED VEGETATION ALLOCATIONS
BY ALLOTMENT AND GRAZING TREATMENT
ALTERNATIVE SEVEN

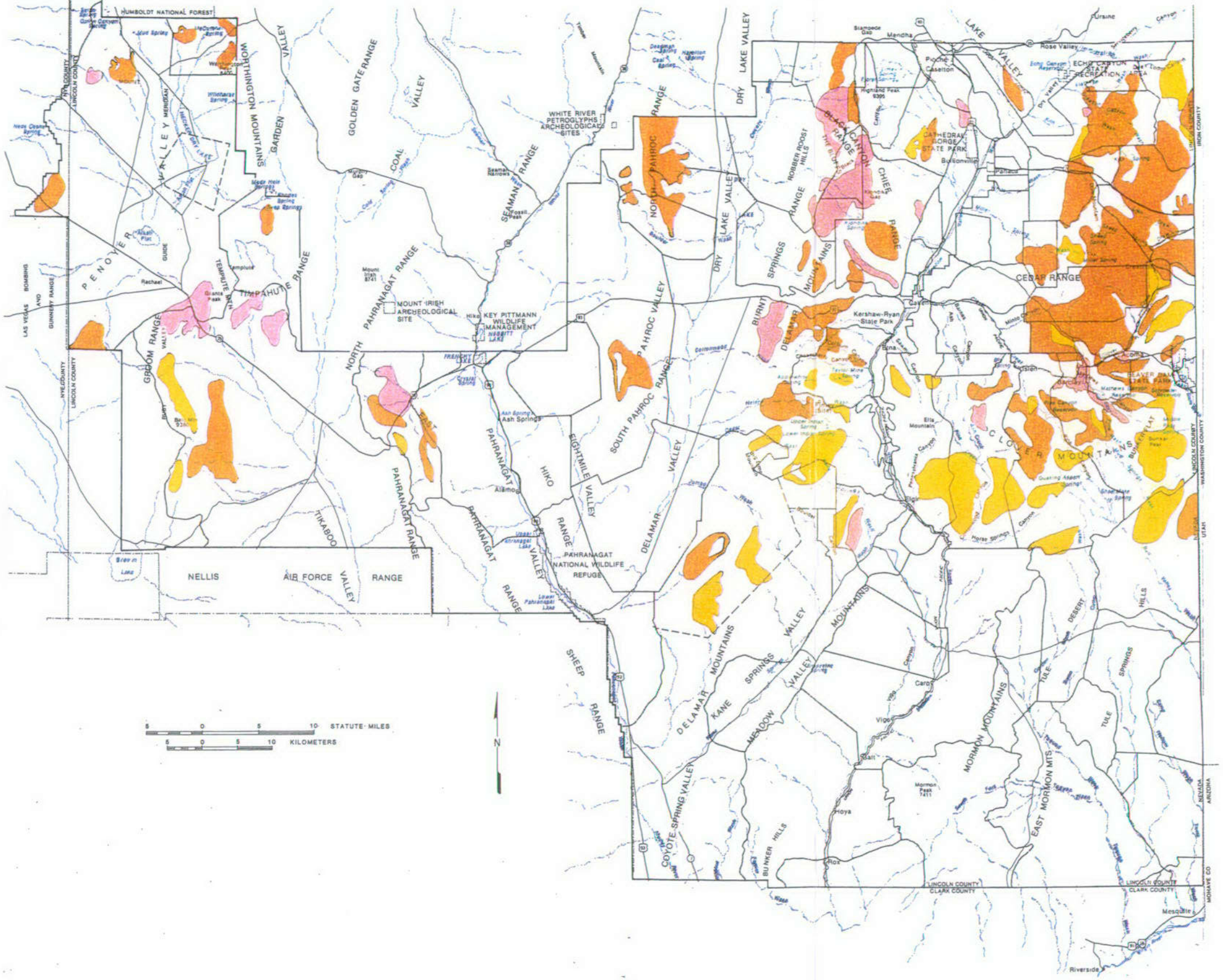
	Present							Proposed										
Allotment	Land Ownership Status[1]		Total Forage Capacity (AUMs)		Present Authorized Livestock Use & Range Class (AUMs)[4]	Period-of-Use[5]	1977 Licensed Use[6]	Proposed Forage Allocations (AUMs)					Future Forage[10] Capacity (Livestock)	Percent Change[11]		Proposed Period-of-Use	Proposed Management Intensity	Proposed Range Class
								Livestock[7]		Deer	Bighorn[8] Sheep	Wild[9] Horses						
	Public Land (acres)	Other Land (acres)	Livestock AUMs[2]	Wildlife AUMs[3]				1980	1980-90					1980	1990			
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r
Applewhite	28,448	300	2	244	562 (C) Perennial	YL	527	0	489	189	---	---	489	-100%	- 7%	---	AMP	Ephemeral-Perennial
Ash Flat	3,247	---	43	0	74 (C) Perennial	5/1-3/24	74	43	43	---	---	---	47	- 42%	- 42%	3/1-3/30	Non-AMP	Ephemeral-Perennial
Bald Mountain	269,723	5	5,332	1,096	5,811 (C) Perennial	YL	5,811	5,024	5,319	370	---	---	9,118	- 14%	- 8%	6/1-3/30	AMP	Perennial
Barclay	79,621	2,350	2,690	2,214	1,791 (C) Perennial	5/16-9/30 AMP	2,049	2,527	2,601	766	---	---	5,839	+ 23%	+ 27%	5/16-9/30	AMP (existing)	Perennial
Bennett Springs	48,264	120	3,869	578	3,498 (S) Perennial	10/16-4/30	474	3,607	3,607	293	---	---	5,576	+661%	+661%	10/16-3/30	AMP	Perennial
Beacon	5,682	---	0	---	2,095 (S) Perennial	2/1-4/30	506	0	0	---	---	---	0	-100%	-100%	---	AMP	Ephemeral
Black Canyon	8,438	---	704	154	1,005 (S) Perennial	10/16-4/30	95	667	667	64	---	---	1,382	+602%	+602%	10/16-3/30	AMP	Perennial
Black Hills	3,610	---	126	---	156 (C) Perennial	YL	156	126	126	---	---	---	171	- 19%	- 19%	7/1-3/30	AMP	Perennial
Boulder Spring	13,537	---	416	---	416 (C) Perennial	10/1-3/30	416	416	416	---	---	---	416	0	0	10/1-3/30	AMP	Ephemeral-Perennial
Breedlove	112,755	---	60	1,007	864 (C) Perennial	YL	864	0	40	4	296	---	66	-100%	- 95%	11/1-3/30	AMP	Ephemeral-Perennial
Buckboard	10,842	---	427	191	263 (C) Perennial	YL	264	0	390	56	---	---	886	-100%	+ 48%	9/1-2/28	AMP	Perennial
Buckhorn	82,968	---	5,687	---	4,010 (C) Perennial	YL	830	5,065	5,687	---	---	---	6,824	+486%	+558%	6/1-3/30	AMP	Perennial
Caliente	2,008	---	59	14	40 (C) Perennial	YL	0	0	58	4	---	---	65	---	---	6/1-3/30	AMP	Perennial
Cliff Springs	35,821	---	2,291	161	2,043 (C) Perennial	YL	2,043	2,179	2,291	77	---	---	3,037	+ 7%	+ 12%	6/1-3/30	AMP	Perennial
Clover Creek	22,876	158	368	294	613 (C) Perennial	11/1-4/30	0	278	278	216	---	24	375	---	---	11/1-3/30	Non-AMP	Perennial
Comet	9,146	600	216	---	214 (C) Perennial	YL	0	216	216	---	---	---	227	---	---	6/1-3/30	Non-AMP	Perennial
Condor Canyon	44,035	---	1,636	532	676 (C) Perennial	YL	0	0	1,402	431	---	---	2,952	---	---	7/1-2/28	AMP	Perennial
Cottonwood	62,145	---	441	1,812	1,296 (C) Perennial	5/1-10/31	1,296	55	366	954	---	---	2,437	- 98%	- 72%	6/1-10/31	AMP	Perennial
Cove	5,023	---	214	---	131 (C) Perennial	YL	0	---	---	---	---	214	218	-100%	-100%	YL	---	Wild Horses
Crescent	84,526	80	2,828	268	1,540 (S) Perennial	11/1-4/30	1,173	2,673	2,673	268	---	---	3,061	+128%	+128%	11/1-3/30	Non-AMP	Perennial
Crestline	2,415	1,300	96	34	55 (C) Perennial	YL	0	87	87	20	---	---	362	---	---	6/1-3/30	AMP	Perennial
Crossroads	19,201	---	413	350	689 (C) Perennial	5/1-10/31	690	379	379	162	---	---	1,798	- 45%	- 45%	6/1-10/15	AMP	Perennial
Crystal Springs	7,596	---	376	---	437 (C) Perennial	Winter	347	376	376	---	---	---	414	+ 8%	+ 8%	11/1-3/30	AMP	Perennial
Deer Lodge	6,880	40	319	108	167 (C) Perennial	YL	0	291	291	108	---	---	511	---	---	7/1-2/28	AMP	Perennial
Delamar	240,755	---	6,148	5,134	4,868 (C) Perennial	YL	5,573	5,490	5,903	632	84	---	8,683	- 1%	+ 6%	YL	AMP	Ephemeral-Perennial
Elgin	26,602	160	1,401	1,083	2,073 (C) Perennial	10/1-4/30	1,760	869	1,387	---	22	---	2,021	- 51%	- 21%	3/1-11/30	AMP	Ephemeral-Perennial

TABLE 8-55 -- Continued

Allotment	Present: Land Ownership Status[1] Public Land (acres) a	Present: Land Ownership Status[1] Other Land (acres) b	Present: Total Forage Capacity (AUMs) Livestock AUMs[2] c	Present: Total Forage Capacity (AUMs) Wildlife AUMs[3] d	Present: Present Authorized Livestock Use & Range Class (AUMs)[4] e	Present: Period-of-Use[5] f	Present: 1977 Licensed Use[6] g	Proposed: Proposed Forage Allocations (AUMs) Livestock[7] 1980 h	Proposed: Proposed Forage Allocations (AUMs) Livestock[7] 1980-90 i	Proposed: Proposed Forage Allocations (AUMs) Deer j	Proposed: Proposed Forage Allocations (AUMs) Bighorn[8] Sheep k	Proposed: Proposed Forage Allocations (AUMs) Wild[9] Horses l	Proposed: Future Forage[10] Capacity (Livestock) m	Proposed: Percent Change[11] 1980 n	Proposed: Percent Change[11] 1990 o	Proposed: Proposed Period-of-Use p	Proposed: Proposed Management Intensity q	Proposed: Proposed Range Class r
Ely Spring (Sheep)	22,927	849	1,136	325	1,802 (S) Perennial	10/16-5/15	0	1,014	1,130	73	---	---	2,209	---	---	10/16-3/30	AMP	Perennial
Ely Spring (Cattle)	55,168	960	4,878	7	4,248 (C) Perennial	YL (AMP)	3,980	4,265	4,878	4	---	---	6,174	+ 7%	+ 23%	YL (AMP)	AMP	Perennial
Enterprise	21,585	160	2,152	690	1,261 (C) Perennial	5/1-10/31	1,927	2,004	2,004	170	---	---	3,167	+ 4%	+ 4%	11/1-5/15	AMP	Perennial
Flat Top Mesa	6,033	---	0	0	--- (C) Ephemeral	---	6/	0	0	---	---	---	---	---	---	---	Non-AMP	Ephemeral
Garden Springs	38,823	---	2,150	390	2,809 (C) Perennial	10/16-5/15	2,629	1,871	1,902	373	---	---	2,365	- 29%	- 28%	10/16-5/15	AMP	Ephemeral-Perennial
Gourd Springs	101,125	---	1,406	362	3,458 (C) Perennial	10/16-5/15	2,233	829	1,398	1	19	---	1,547	- 63%	- 57%	10/16-5/15	AMP	Ephemeral-Perennial
Grapevine	33,328	---	560	---	560 (C) Perennial	10/1-3/30	551	560	560	---	---	---	560	0	0	10/16-3/30	AMP	Ephemeral-Perennial
Haypress	7,843	110	43	61	154 (H) Perennial	5/1-10/1	0	43	43	56	---	---	301	---	---	7/1-10/15	Non-AMP	Perennial
Henrie	131,796	---	3,127	2,593	2,400 (C) Perennial	11/1-4/30	2,400	0	2,879	408	487	---	3,440	-100%	+ 20%	10/1-3/30	AMP	Ephemeral-Perennial
Highland Peak	45,542	1,960	2,371	263	3,704 (S) Perennial	10/16-5/15	160	2,365	2,365	157	---	---	3,120	+1378%	+1378%	6/1-3/30	AMP	Perennial
Highway	4,251	40	219	63	118 (C) Perennial	YL	0	0	216	19	---	---	241	---	---	6/1-3/30	AMP	Perennial
Jack Rabbit	9,755	---	0	0	0 (C) Ephemeral	---	6/	0	0	---	---	---	---	0	0	---	Non-AMP	Ephemeral
Klondike	7,072	---	416	120	678 (S) Perennial	10/16-5/15	378	404	404	48	---	---	1,002	+ 7%	+ 7%	10/16-3/30	AMP	Perennial
Lime Mountain	67,144	---	3,830	2,814	6,754 (C) Perennial	10/1-5/15	3,580	2,419	3,191	840	---	---	5,365	- 32%	- 11%	10/1-5/15	AMP	Ephemeral-Perennial
Little Mountain	18,575	---	671	87	1,422 (WH) Perennial	YL	---	---	---	87	---	638	705	---	---	YL	---	Wild Horses
Lower Lake	107,317	---	1,145	9	1,247 (C) Perennial	YL	100	94	1,145	9	---	---	1,256	- 6%	+1045%	6/1-3/30	AMP	Ephemeral-Perennial
McCutcheon Spring	18,276	40	583	302	446 (C) Perennial	YL	0	0	547	89	---	---	1,057	---	---	6/1-3/30	AMP	Perennial
McGuffy Spring	22,115	---	325	246	298 (C) Perennial	YL	0	302	302	246	---	---	1,724	---	---	6/1-3/30	AMP	Perennial
Mahogany Peak	28,441	1,360	1,311	473	617 (C) Perennial	YL	326	1,053	1,053	473	---	---	2,850	+223%	+223%	6/1-3/30	AMP	Perennial
Meadow Valley	3,971	240	0	---	56 (C) Perennial	11/1-4/30	48	0	0	---	---	---	---	-100%	-100%	---	Non-AMP	Ephemeral
Mormon Peak	82,296	---	1,855	4,703	Undetermined (C) Perennial	Winter	328	725	1,530	116	1,081	---	1,892	+101%	+376%	10/15-5/30	AMP	Ephemeral-Perennial
Morrison-Wengert	33,264	1,200	1,043	1,387	1,760 (C) Perennial	YL	1,760	229	928	238	180	---	1,147	- 87%	- 47%	10/1-3/30	AMP	Ephemeral-Perennial
Mustang	23,877	---	444	161	1,260 (C) Perennial	YL (AMP)	987	444	444	105	---	---	744	- 55%	- 55%	YL (AMP)	AMP	Perennial
Mustang Flat	5,987	---	90	218	147 (C) Perennial	5/1-10/31	0	0	82	86	---	---	92	---	---	6/1-10/31	Non-AMP	Perennial
Naquinta Spring	52,425	140	1,058	575	Unalloted Perennial	YL	---	0	1,058	237	---	---	1,164	---	---	6/1-3/30	AMP	Perennial

TABLE 8-55 -- Continued

Allotment	Present: Land Ownership Status[1] Public Land (acres) a	Present: Land Ownership Status[1] Other Land (acres) b	Present: Total Forage Capacity (AUMs) Livestock AUMs[2] c	Present: Total Forage Capacity (AUMs) Wildlife AUMs[3] d	Present: Present Authorized Livestock Use & Range Class (AUMs)[4] e	Present: Period-of-Use[5] f	Present: 1977 Licensed Use[6] g	Proposed: Proposed Forage Allocations (AUMs) Livestock[7] 1980 h	Proposed: Proposed Forage Allocations (AUMs) Livestock[7] 1980-90 i	Proposed: Proposed Forage Allocations (AUMs) Deer j	Proposed: Proposed Forage Allocations (AUMs) Bighorn[8] Sheep k	Proposed: Proposed Forage Allocations (AUMs) Wild[9] Horses l	Proposed: Future Forage[10] Capacity (Livestock) m	Proposed: Percent Change[11] 1980 n	Proposed: Percent Change[11] 1990 o	Proposed: Proposed Period-of-Use p	Proposed: Proposed Management Intensity q	Proposed: Proposed Range Class r
N-4	43,500	5,380	396	51	824 (C) Perennial	3/1-10/1	6/	0	386	43	---	---	692	---	---	7/1-2/28	AMP	Perennial
Oak Spring	193,609	1,440	10,570	3,338	9,268 (C) Perennial	YL (AMP)	7,793	9,083	9,174	889	67	1,200	14,555	+ 17%	+ 18%	YL	AMP	Perennial
Oak Wells	29,139	40	542	476	511 (C) Perennial	YL	0	278	302	247	---	240	2,708	---	---	7/15-5/15	AMP	Perennial
Pahranagat East	34,146	---	565	---	511 (C) Perennial	8/1-5/30	289	0	565	---	---	---	678	-100%	+ 96%	8/1-5/30	AMP	Ephemeral-Perennial
Pahranagat West	70,138	---	1,289	75	2,144 (C) Perennial	8/1-5/31	1,351	0	1,289	14	---	---	1,937	-100%	- 5%	8/1-5/30	AMP	Ephemeral-Perennial
Pahroc	117,443	---	3,917	1,183	4,783 (C) Perennial	YL	4,604	3,568	3,891	266	---	---	4,825	- 23%	- 15%	10/1-4/30	AMP	Perennial
Panaca Cattle	16,275	---	596	116	453 (C) Perennial	YL	72	0	589	11	---	---	779	-100%	+551%	10/1-3/30	AMP	Perennial
Panaca SCS	4,242	---	162	15	Unalloted (C & S) Perennial	---	---	160	160	7	---	---	306	---	---	10/1-3/30	AMP	Perennial
Peck	7,698	---	190	---	268 (C) Perennial	YL	0	---	---	---	---	190	180	-100%	-100%	YL	---	Wild Horses
Pennsylvania	42,556	320	156	1,472	817 (C) Perennial	5/1-10/31	439	84	131	606	---	---	594	- 81%	- 70%	3/1-11/30	AMP	Perennial
Pine Cone	28,265	---	627	135	1,205 (C) Perennial	10/1-6/15	208	0	603	32	---	---	1,824	-100%	+190%	10/1-4/30	AMP	Perennial
Pioche	13,440	---	354	77	402 (C) Perennial	YL	155	0	354	36	---	---	389	-100%	---	6/1-3/30	AMP	Perennial
Pulsipher Wash	3,408	---	0	0	--- (C) Ephemeral	---	0	0	0	---	---	---	---	---	--	---	Non-AMP	Ephemeral
Rabbit Spring	20,975	40	720	119	1,122 (S) Perennial	10/16-4/15	0	430	430	77	---	240	1,432	---	---	10/1-3/30	AMP	Perennial
Rattlesnake	28,426	---	1,172	266	1,182 (C) Perennial	10/16-5/31	1,183	1,081	1,172	203	---	---	2,441	- 9%	- 1%	10/16-5/30	AMP	Perennial
Red Bluff	18,039	---	98	---	34 (C) Perennial	10/1-4/15	34	98	98	---	---	---	100	+188%	+188%	7/1-3/30	Non-AMP	Perennial
Roadside	1,123	---	48	---	32 (C) Perennial	12/1-2/28	0	0	48	---	---	---	53	---	---	12/1-2/28	AMP	Perennial
Rocky Hill	4,092	---	238	29	308 (C) Perennial	10/16-5/15	0	0	236	11	---	---	262	---	---	6/1-3/30	AMP	Perennial
Rox	25,870	120	0	21	756 (C) Perennial	YL	372	0	0	---	13	---	---	-100%	-100%	---	Non-AMP	Ephemeral
Sand Hollow	35,174	---	582	---	2,430 (C) Perennial	10/1-5/15	1,118	311	582	---	---	---	698	- 72%	- 48%	11/1-5/15	AMP	Ephemeral-Perennial
Sand Springs	249,685	5,200	11,019	1,303	6,091 (C) Perennial	YL (AMP)	4,918	10,313	10,993	133	---	---	13,491	+110%	+124%	YL	AMP	Perennial
Sawmill Canyon	9,177	---	97	159	181 (C) Perennial	YL	0	90	90	78	---	---	100	---	---	6/1-10/31	Non-AMP	Perennial
Schlarman	5,345	---	390	464	240 (C) Perennial	11/1-4/30	214	376	376	1	21	---	429	+ 76%	+ 76%	1/1-4/30	AMP	Ephemeral-Perennial
Shadow Well	17,862	---	1,151	---	577 (S) Perennial	11/1-4/30	440	1,151	1,151	---	---	---	1,381	+162%	+162%	1/1-4/30	AMP	Perennial
Sheep Spring	31,077	---	1,815	629	409 (C) Perennial	YL	0	1,320	1,419	262	---	240	3,917	---	---	5/15-2/28	AMP	Perennial
Sheep Flat	74,171	720	521	1,350	1,977 (C) Perennial	5/16-9/15	1,979	521	521	738	---	---	3,005	- 74%	- 74%	7/15-5/15	AMP	Perennial
Simpson	8,379	---	414	---	747 (C) Perennial	12/1-4/30	750	414	414	---	---	---	496	- 45%	- 45%	12/1-4/30	AMP	Perennial
Six Mile	34,531	---	896	125	674 (C) Perennial	YL	674	887	887	125	---	---	986	+ 32%	+ 32%	10/1-4/30	AMP	Perennial



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CALIENTE ENVIRONMENTAL STATEMENT

ALTERNATIVE-7
RANGE VEGETATION TREATMENT AREAS

1979

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TABLE 8-55 -- Continued

Allotment	Present: Land Ownership Status[1]		Present: Total Forage Capacity (AUMs)		Present: Present Authorized Livestock Use & Range Class (AUMs)[4]	Present: Period-of-Use[5]	Present: 1977 Licensed Use[6]	Proposed: Proposed Forage Allocations (AUMs)					Proposed: Future Forage[10] Capacity (Livestock)	Proposed: Percent Change[11]		Proposed: Proposed Period-of-Use	Proposed: Proposed Management Intensity	Proposed: Proposed Range Class
								Livestock[7]		Deer	Bighorn[8] Sheep	Wild[9] Horses						
	Public Land (acres) a	Other Land (acres) b	Livestock AUMs[2] c	Wildife AUMs[3] d	e	f	g	1980 h	1980-90 i	j	k	l	m	1980 n	1990 o	p	q	r
Snow Spring	44,042	---	1,530	1,015	3,567 (C) Perennial	10/1-5/15	1,650	1,207	1,207	397	---	---	1,683	- 27%	- 27%	11/1-5/30	AMP	Ephemeral-Perennial
Summit Spring	18,035	---	149	---	715 (C) Perennial	10/16-5/15	715	149	149	---	---	---	164	- 79%	- 79%	10/16-5/15	AMP	Ephemeral-Perennial
Terry	30,163	---	242	---	2,366 (C) Perennial	10/1-5/15	1,444	105	242	---	---	---	266	- 93%	- 83%	10/1-5/15	AMP	Ephemeral-Perennial
Uvada	13,608	10	554	205	355 (C) Perennial	YL	229	521	521	95	---	---	1,313	+142%	+142%	6/1-3/30	AMP	Perennial
Warm Spring	1,401	---	25	---	74 (C) Perennial	11/16-4/15	0	25	25	---	---	---	28	---	---	7/1-3/30	AMP	Perennial
White Hills	2,755	---	105	---	101 (C) Perennial	12/1-2/28	0	0	105	---	---	---	116	---	---	6/1-3/30	AMP	Perennial
White Rock	32,916	---	1,810	433	2,880 (C) Perennial	9/16-5/15	1,269	707	1,793	28	38	---	1,991	- 55%	+ 41%	9/16-3/30	AMP	Ephemeral-Perennial
Total	3,495,805	25,442	109,914	44,179	118,580		78,235	81,868	102,565	12,748	2,308	2,986	162,916					

1 Land ownership includes some acreage outside the ES area boundary in the Ely and Las Vegas districts.
2 Suitable Animal Unit Months (AUMs) include those AUMs which meet the Bureau of Land Management's production and slope criteria.
3 Wildlife AUMs include all competitive and non-competitive AUMs determined from the range survey.
4 (C) cattle (S) domestic sheep (H) domestic horses (WH) wild horses. Authorized use determined from previous range survey or by agreement.
5 (YL) yearlong (AMP) existing Allotment Management Plan
6 Licensed use occurred on these allotments, but the number of AUMs used in the ES area could not be determined because the allotment boundaries extend outside the ES area.
7 These forage allocations were based on the proposed action with the following modifications: They were reduced from the proposed action by the percentage reduction in the seasons-of-use between the proposed action and the alternative. The five existing AMPs would be managed as specified in the proposed action. Forage allocations on poor condition range were eliminated.
8 Allocated to meet reasonable numbers as specified in the proposed action.
9 Allocated as specified in the proposed action.
10 Expected forage capacity after 35 years.
11 This column represents the percent change between 1977 licensed use and the 1980 allocation.

Notes: See glossary for definitions of: ephemeral, ephemeral-perennial, perennial, suitable AUM, season-of-use, competitive forage, non-competitive forage, AMP, Non-AMP, and no grazing.

Forty-eight AUMs were allocated to antelope on the Sand Springs Allotment.

Source: U. S. Department of the Interior, Bureau of Land Management, Las Vegas District, Caliente Unit Resource Analysis and Management Framework Plan, 1978.

TABLE 8-56
POSSIBLE ADDITIONAL RANGE IMPROVEMENTS
ALTERNATIVE SEVEN

Allotment	Fencing (miles)	Spring Developments	Water Pipelines (miles)	Water Troughs	Wells	Mechanical Acres	Burn Acres
Applewhite	15					3,031	1,862
Pahranagat East			5	8	2		
Pahranagat West			10	10	2		
Pennsylvania	10	1	5	5			
Pine Cone			2	3	1		

NOTE: These proposed improvements are in addition to those proposed in Chapter 1 (Table 1-9).

Wild horses and burros would be limited to three areas and allocated 2,308 AUMs. Wildlife would be managed as specified in the proposed action.

In summary, this alternative would allocate 81,868 AUMs to livestock, 2,308 AUMs to wild horses and burros, and 15,056 AUMs to wildlife. Periods-of-use for livestock grazing would be adjusted from the proposed action to allow more grazing during the spring growing season. Slight adjustments from the proposed action in management intensity (nine allotments) and range class (seven allotments) would occur. See Figure 8-7.

Impacts on Soils

Erosion and compaction of soils with Alternative Seven would be very similar to those already described in Chapter 3, except for the following differences:

1. Erosion in Ash Flat (watershed 050) may increase slightly with the anticipated change in vegetation. This would affect 3,247 acres, presently eroding at a rate of 0.81 tons/acres/year. Any anticipated increase would still not exceed the allowable soil loss of one ton/acre/year.

2. Additional water developments and fences could cause compaction on an additional 50 acres.

Conclusion

The alternative would help stabilize soil surfaces and reduce sediment yield by about 20 percent (approximately 415,000 tons/year) (See Soils, Chapter 3). As in the proposed action,

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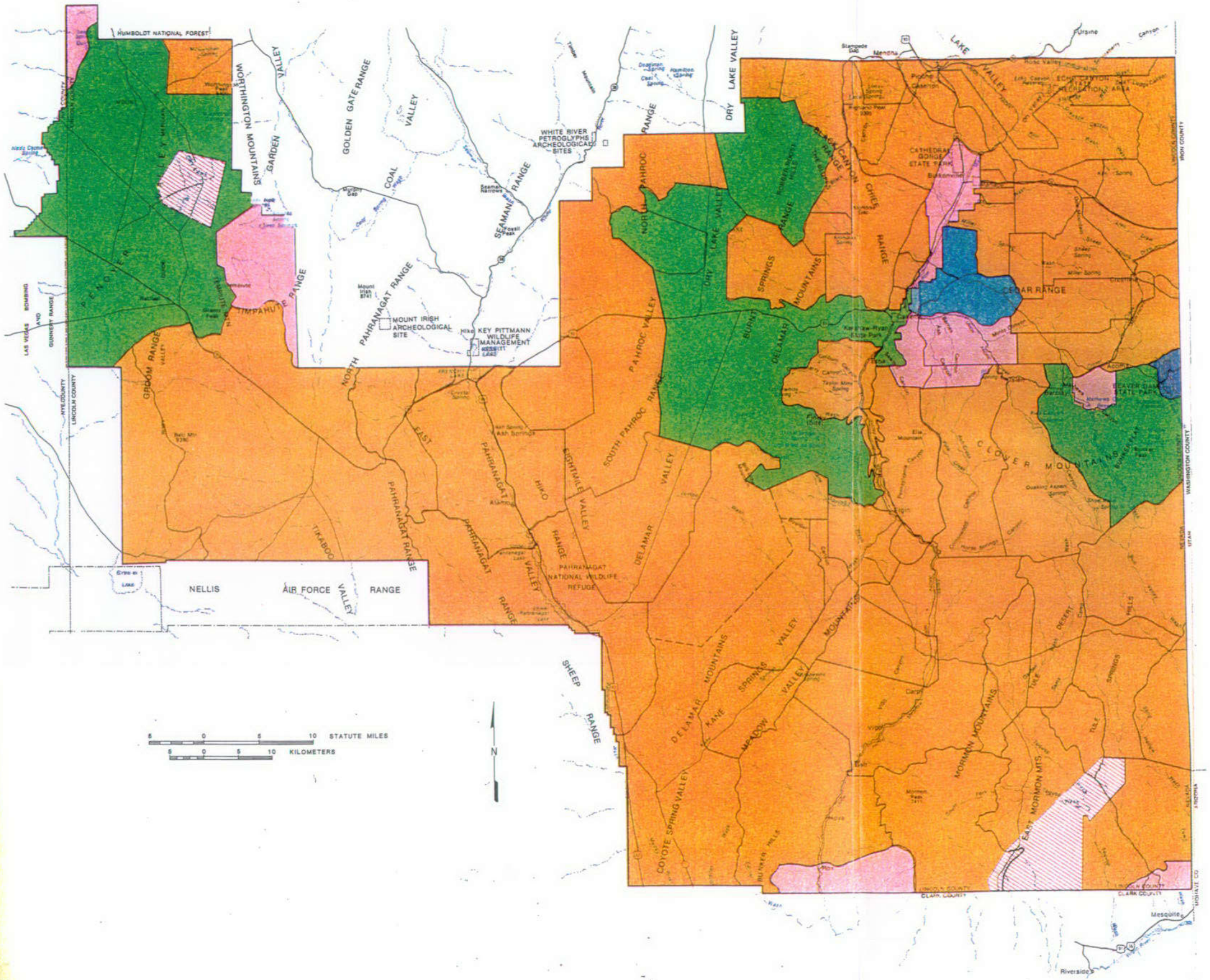

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CALIENTE ENVIRONMENTAL STATEMENT

ALTERNATIVE-7
RANGE MANAGEMENT INTENSITY

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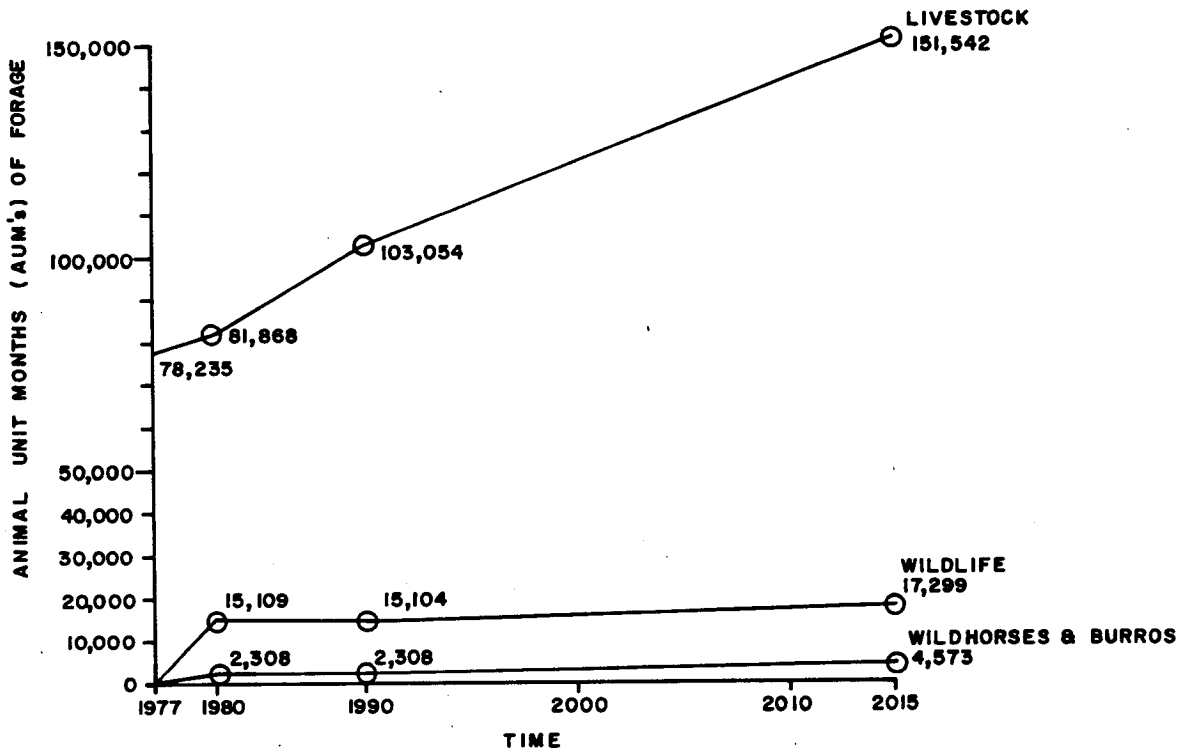
Figure 8-7
LOCALLY SUGGESTED VEGETATION ALLOCATION PROGRAM
(ALTERNATIVE SEVEN)

1980 AND POSSIBLE FUTURE ALLOCATIONS (1990-2015) TO
LIVESTOCK, WILD HORSES AND WILDLIFE IN CALIENTE ES AREA a/



a/ Livestock and wild horse AUMs are interchangeable with each other but not always with wildlife AUMs because of dietary preference.

NOTE: Possible future vegetation allocations are estimates only and are based on a series of assumptions within a framework of feasible alternative. Heavy depencence on professional judgements and probabilities are used. The vegetation allocation scenario should not be considered as a prediction or forecast.

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compaction would be reduced because of a wider distribution of livestock.

Impacts on Water Resources

Impact on Water Quantity

Water consumption by grazing animals would continue at less than one percent of the perennial yield for the Caliente Environmental Statement (ES) area. These consumptive uses would be an insignificant portion of the available water. Stream flow impacts would be the same as those identified in Chapter 3, Water Resources.

Impact on Water Quality

Impacts on water quality resulting from implementation of this alternative would be approximately the same as those identified in the Water Resources section of Chapter 3.

Conclusions. Consumptive uses would be insignificant when compared to available water. Streamflow and water impacts would be the same as for the proposed action.

Impacts on Vegetation

Impacts on vegetation under Alternative Seven should be approximately the same as those discussed in Chapter 3, with the following exceptions: Vegetation on 13 allotments (471,714 acres) should benefit since wild horses and burros would be removed under this alternative, and vegetation would not be subjected to yearlong grazing pressure by these animals. Livestock grazing on 11 of these allotments is proposed to be managed under AMPs at or below the forage capacity. Two of the above 13 allotments (15,164 acres) would be under non-intensive management, but have a specified rest period during the growing season. Also, forage is proposed to be allocated below the capacity.

Three allotments (247,562 acres) would have wild horse and burro use reduced from 2,474 AUMs to 1,464 AUMs. Changes in periods-of-use on the 27 allotments (960,670 acres) are not expected to have significant impacts on vegetation since 24 of the above allotments have been proposed for intensive grazing management systems (AMPs) which provide for a systematic rest period for each of the forage species (see Chapter 1 discussion on reasons for implementing AMPs). The vegetation on the remaining three allotments, since their periods-of-use provide for seven to eight months rest during the critical growing period, should benefit.

WILD HORSE AND BURRO REMOVAL AREA

HERD MANAGEMENT AREA

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WILD HORSE MANAGEMENT AREAS

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Grazing livestock each year on Ash Flat allotment (3,247 acres) during the late spring and early summer (3/30-6/15) and early fall (10/1-11/15) could tend to defoliate the desirable plants and prevent them from producing adequate leaves and photosynthetic tissue. Therefore, the desirable forage plants could experience reduced vigor, a decrease in crown cover, a slow down or reversal of preferred species establishment, and an increase in less preferred plant distribution.

Vegetation on the Meadow Valley allotment should not be significantly impacted by allowing grazing of ephemeral forage, because grazing would only be allowed during periods when ephemeral forage was available.

Under this alternative an additional 3,031 acres of mechanical treatment and 1,862 acres of prescribed burning could be done on the Applewhite allotment. The impact to vegetation from these additional treatments would be a change in species composition from shrubs and trees to grasses, shrubs, and forbs utilized by livestock, wildlife, and wild horses. The vegetation in these areas would therefore be maintained below ecological climax vegetation.

When compared to the proposed action, the additional water developments under this alternative would initially disturb approximately 14 additional acres and permanently remove an additional 25 miles from production. The additional 25 miles of fencing proposed under this alternative could permanently remove approximately ten additional acres from production. Livestock forage conditions would be expected to remain approximately the same in 35 years as those described in Chapter 3 because of: the removal or reduction of wild horses and burros on 16 allotments, the implementation of intensive grazing management on four additional allotments, and the provision for a systematic rest period for forage plants during the growing season. Thus, the improvement in livestock forage should be approximately the same in 35 years. On the 13 allotments where yearlong wild horse and burro use would be removed completely, improvement in condition should be apparent sooner than indicated in Chapter 3. Future condition on the Applewhite allotment is expected to improve by 2015 with 4,893 acres moving from fair to good condition leaving 3,903 in fair and 1,004 in poor condition (see Appendix E, Section 5, Table E-4). Livestock forage production should increase from 109,914 AUMs to approximately 162,688 AUMs. (See Table 8-55.)

Conclusion. Reduced levels of yearlong grazing by wild horses and burros on 16 allotments (719,276 acres) coupled with grazing management systems that provide a systematic rest or deferment from spring grazing and a shift away from concentrated use areas should result in an increase in total ground cover by live

vegetation and litter. Livestock forage condition also should improve. Livestock forage production should increase from 109,914 AUMs to approximately 162,688 AUMs by the year 2015.

Impacts on Threatened or Endangered Flora

Impacts to sensitive plant species would be the same as those described in Chapter 3, except in those allotments proposed for complete removals of wild horses and burros and in those allotments with different proposed periods-of-use.

Complete removal of wild horses and burros on an additional 13 allotments (over the proposed action recommendations) should benefit most of the species listed in Table 3-6. Species in the sagebrush and pinyon-juniper zones comprise the majority of the area contained in the horse removal allotments (see Wild Horse Management Areas Map, Alternative 7, and the Vegetation Map in Chapter 3). Since most of these species are found on rocky hillsides or limestone slopes and ridges, wild horses probably have a greater impact upon them than livestock do, because horses can generally utilize steep and rocky terrain better than livestock, and they are typically found in these types of areas. Thus, wild horse removals would probably benefit the sensitive species.

Changes in periods-of-use would probably be harmful to sensitive species in four allotments and beneficial to them in ten allotments. For analysis purposes, it is assumed that the growing periods for those species listed in Table 3-6 are generally from about March 1 to July 30 (Table 2-10) and that livestock trampling and consumption of sensitive species during this period may be more harmful to these plants than during other periods (Vegetation section, Chapter 3). This alternative would allow livestock grazing during this growing period on the Ash Flat, Elgin, and Pennsylvania allotments, and from March 1 to May 30 on the Mormon Peak allotment. Allotments which would receive additional rest during the growing period (over the present situation) are Enterprise, Oak Wells, Pahroc, Pine Cone, Sheep Flat, Six Mile, Clover Creek, Mustang Flat, Sawmill Canyon, and Sheep Spring.

Changes in proposed management intensity (from those recommended in the proposed action, Chapter 1) could be harmful to sensitive plant species. Changes in management intensity from non-AMPs to AMPs on the Ash Flat, Pahranagat East, Pahranagat West, Pennsylvania, and Pine Cone allotments could cause increased utilization and trampling of sensitive plants as a result of increased livestock densities.

Conclusion. The major benefits to sensitive plant species under this alternative would be relief from wild horse and burro damage in those allotments proposed for wild horse removals, and

the reduction of livestock grazing during the growing period in ten allotments. Four allotments would receive additional livestock use during the growing period, which could harm the sensitive plant species. Changes in management intensity from non-AMP to AMP on five allotments may also be harmful to these species.

Impacts on Wildlife

Impact on Bighorn Sheep

The impacts to bighorn sheep under Alternative Seven would be the same as identified in Chapter 3. The existing bighorn sheep population (763 animals) could be reduced by approximately 128 animals because of increased competition for space, water, and forage immediately adjacent to waters. The effect would be greatest in bighorn range BY-1 (see Big Game Areas Map, Chapter 2). Reasonable numbers (874 animals) would not be achieved by 2015 because of increased livestock use proposed with this alternative.

Impact on Mule Deer

The impacts to mule deer under Alternative Seven would be the same as described in Chapter 3 with the following differences: An additional 4,893 acres of vegetation manipulation would be constructed on mule deer range. Wild horses and burros would be removed from all deer areas except for portions of DY-3, DY-4, and DS-1 (see Big Game Areas Map, Chapter 2). This would eliminate any yearlong competition that presently occurs between wild horses and mule deer on most of the mule deer range in the ES area. Additional benefits to mule deer would result from these actions. Reasonable numbers (8,820 animals) are expected to be achieved or exceeded by the year 2015 with this alternative.

Impact on Desert Tortoise

By 1990 under Alternative Seven, livestock and wild horse grazing would be reduced approximately 5,079 AUMs (37 percent) of present use on desert tortoise habitat. Within desert tortoise habitat, on the Henrie, Morrison-Wengert, and Breedlove allotments, the period-of-use would remain the same as the proposed action with no grazing occurring during the important spring and summer periods. On the Elgin and Snow Spring allotments, livestock use would be allowed further into the spring period than presently occurs. On the remaining allotments within desert tortoise habitat, livestock use would be allowed during the same period as presently occurs (up to 5/15).

The decrease in grazing on desert tortoise habitat should reduce competition for forage and trampling of desert tortoises and tortoise burrows. However, livestock grazing would still occur on most of the desert tortoise habitat in the ES area during the spring when tortoises are emerging from hibernation. Some competition for forage would occur during this important season until AMPs are developed. Specific studies on the populations in the Caliente ES area would be necessary to provide any further quantitative dimension to these estimates.

Impact on Threatened or Endangered Wildlife

No impacts on federally listed threatened or endangered wildlife are anticipated under this alternative.

Impact on Other Wildlife

The impacts to other wildlife species with Alternative Seven would be the same as indicated in Chapter 3 with the following differences: approximately 237 new waters (182 troughs, 33 reservoirs, 22 wells) and 339 miles of pipeline that could supply 68 lateral watering devices would be constructed. Fish populations, upland game birds, non-game birds,and small mammals should benefit from this alternative because of a 58 percent reduction in grazing by livestock and wild horses on 53 miles of perennial stream, increased ecotone and plant diversity from 80,237 acres of vegetation manipulation, and increased habitat expansion resulting from the construction of 305 possible new watering sites.

Conclusion. Overall, most wildlife species except bighorn sheep should benefit from Alternative Seven. Mule deer should reach or exceed reasonable numbers (8,820 animals). Desert tortoise populations should remain static or increase slightly, providing there is a viable breeding population. Fish and bird populations dependent on riparian vegetation should occupy the area because of increases in ecotone, plant diversity, and water. Bighorn sheep, on the other hand, should decrease in population by 128 animals. No impacts to threatened or endangered species are anticipated.

Impacts on Wild Horses and Burros

Under this alternative, 33 allotments would receive complete removals of wild horses and burros, while five allotments would have vegetation allocations to wild horses, livestock, and wildlife; allocations on three allotments would be only to wild horses and wildlife. The complete removals in the 33 allotments to achieve recommended levels would represent a 77 percent decrease in the 1977 wild horse and burro population (1,072

animals to 249), and an 85 percent decrease in their available space (1,396,000 to 212,000 acres). The Wild Horse Management Areas Map, Alternative Seven, shows the allotments with wild horse vegetation allocations, as listed in Table 8-55.

The effects of wild horse and burro removals would be the same as those described in Chapter 3 (i.e., separation of animals from their native environment, distress to mares and colts if separated, and distress to stallions if separated from their harems). The benefits to wild horses in the eight allotments recommended for wild horse vegetation allocations would also be the same as those described in Chapter 3. Competition for forage with livestock would be reduced and competition among the horses themselves would be controlled by periodic removal of excess horses.

The proposed changes in livestock periods-of-use would benefit wild horses in the Clover Creek, Oak Wells, and Sheep Spring allotments. Yearly livestock use in these allotments would be reduced by one, two, and six months, respectively with all of the reductions occurring during the spring growing season. As mentioned in Alternative 4, lactating mares would especially benefit from reduced livestock forage competition, since their nutritional requirements are greatest during this period.

Other impacts to wild horses related to intensive grazing systems, range projects and vegetation manipulations would be the same as those described in Chapter 3.

Conclusion

The impacts to wild horses and burros under this alternative are basically the same as those described in Chapter 3, the major difference being the degree of reduction in wild horse and burro numbers and their available space. Those horses not removed should benefit from reduced competition with livestock for forage.

Impacts on Cultural Resources

Impacts on cultural resources sites resulting from this alternative would be the same as those identified in Chapter 3. New water sources which are to be developed could increase the potential for trampling effects at sites near these future water sources. The locations for new water troughs, etc., are unknown at this time. Therefore, the number of known cultural sites which would be in close proximity to the new water sources cannot be determined.

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Impacts on Land Uses

Impacts on Livestock Grazing

Impacts to livestock grazing under this alternative should be approximately the same as those discussed in Chapter 3 (Livestock Grazing section), with the following exceptions:

1. 2,849 additional AUMs of forage on 16 allotments are proposed to be allocated to livestock by eliminating or reducing the number of wild horses and burros on those allotments.

2. 4,770 AUMs would be allocated on five allotments, with winter sheep use, in 1980.

3. Forty-three AUMs would be allocated to livestock on the Ash Flat allotment in 1980.

4. Livestock would be allowed to graze on Meadow Valley and Applewhite allotments when ephemeral forage was available.

5. 489 AUMs of forage could be allocated to livestock on the Applewhite allotment after vegetation manipulation projects were completed by 1985.

6. After 35 years under this alternative there should be approximately 162,916 AUMs of livestock forage available compared to the present 109,914 AUMs.

Impacts to livestock operators are displayed and discussed in the Social Economics section of this alternative.

Conclusion. Livestock grazing should benefit under this alternative with 2,849 additional AUMs allocated on 16 allotments and 4,770 AUMs allocated on five winter sheep use allotments in 1980. Livestock forage production should improve from 109,914 AUMs to 162,916 AUMs by 2015.

Impacts on Agriculture

Potential changes in agricultural production patterns would be the same as those identified in Chapter 3, except that livestock operators would be less likely to make the changes under this alternative.

Impact on Economics

Impact on Income

As the budgets in Tables 8-57 through 8-60 indicate, in 1980 all categories of ranches except large cattle ranches would have reduced incomes if Alternative Seven were implemented. Small cattle ranches would lose an additional $1,112 below their 1977 income. Many have operated with net losses in the past, so it would be impossible to determine if this additional loss would force the ranchers to leave the cattle business. Medium cattle ranches would lose $724 below their 1977 income -- a nine percent decrease. This would decrease their standard of living, but would probably not force them out of the cattle business. The large cattle ranch would lose $4,131 less than in 1977. Sheep ranches would have a decrease of $1,044 below their 1977 income. Total losses in annual ranch income are estimated to be $48,688 (see Table 8-61) below the 1977 level of $96,728.

If all proposed Allotment Management Plans (AMPs) were determmined to be feasible and if manpower and funding are available, implementation of this alternative would involve the expenditure of an estimated $9,796,000 for construction of range improvement projects. If range improvement expenditures are spaced evenly over 20 years (1980-200), direct annual income in the region's construction industry - at 41 cents per dollar of expenditure (Chapter 3, Income) - could increase by about $200,000 per year. This represents less than one percent of the construction income in the four county impact region.

Indirect income impacts would be caused through the interrelationship of the livestock and construction industries with the rest of the region's economy. Overall, direct and indirect income would increase by $206,500 per year over 1977 levels. This would be less than one percent of the region's income.

In the long-term (2015) overall direct and indirect annual income may be $555,000 over 1977 levels. The stimulus to the region's economy from construction of new range improvements would end, but increased levels of livestock grazing, big game hunting and maintenance of range improvements would provide a continuing positive income impact.

Impact on Employment

Ranch employment impacts in 1980 would account for the loss of less than one full time equivalent job. Construction of new range improvement projects would cause an increase in direct and indirect employment of 18 full-time equivalent jobs over 1977

TABLE 8-57
BUDGET FOR SMALL RANCH
Alternative Seven

Expenses	1980 (157 AUs)	2015 (197 AUs)
Livestock Purchases	$ 513	$ 644
Repairs & Maintenance	707	887
Depreciation	4,542	4,542
Interest		
Operating Capital	909	1,141
Real Estate	6,728	6,728
Gas & Lubricants	1,146	1,438
Supplements	333	418
Taxes		
Livestock	441	554
Real Estate	460	460
Custom Work	2,187	2,187
Insurance	700	700
Grazing Fees		
Caliente BLM	559	1,280
Other BLM	236	236
Forest Service	107	107
Utilities	315	315
Alfalfa & Grass Hay Expense	339	339
Marketing Costs	498	624
Veterinary Costs	171	215
Miscellaneous	471	591
TOTAL	21,362	23 419
Receipts		
Heifer Calves	3,982	4,996
Steer Calves	7,381	9,261
Cull Cows	1,801	9,261
Cull Bulls	524	658
TOTAL	13,688	17,205
Income	-7,674	-6,214
Change from 1977	-1,112	+ 346

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TABLE 8-58
BUDGET FOR MEDIUM RANCH
Alternative Seven

Expenses	1980 (505 AUs)	2015 (659 AUs)
Labor	$ 1,448	$ 3,579
Livestock Purchases	3,136	4,092
Repairs & Maintenance	2,934	3,829
Depreciation	8,544	8,544
Interest		
Operating Capital	3,651	4,765
Real Estate	8,723	8,723
Gas & Lubricants	2,783	3,631
Supplements	939	1,226
Pasture Rent	800	800
Taxes		
Livestock	1,369	1,786
Real Estate	1,143	1,143
Insurance	1,300	1,300
Grazing Fees		
Caliente BLM	3,721	6,472
Other BLM	1,857	1,857
Forest Service	298	298
Utilities	1,000	1,000
Alfalfa & Grass Hay Expenses	938	938
Marketing Costs	1,773	2,313
Veterinary Costs	449	587
Miscellaneous	919	1,199
TOTAL	47,725	58,082
RECEIPTS		
Heifer Calves	16,918	22,077
Steer Calves	29,861	38,967
Cull Cows	6,116	7,980
Cull Bulls	2,045	2,669
TOTAL	54,940	71,693
Income	7,215	13,611
Change from 1977	- 724	+5,672

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TABLE 8-59
BUDGET FOR LARGE RANCH
Alternative Seven

Expenses	1980 (3,620 AUs)	2015 (4,413 AUs)
Labor	$101,369	$123,564
Repair & Maintenance	26,428	32,215
Depreciation	123,584	123,584
Gas & Lubricants	19,695	24,007
Feed & Supplements	60,177	60,177
Taxes	16,711	18,860
Insurance	3,329	3,329
Grazing Fees		
Caliente BLM	25,448	29,826
Other BLM	4,961	4,961
Utilities	12,224	12,224
Alfalfa & Grass Hay Expense	13,920	13,920
Livestock Transportation	6,879	8,385
Veterinary Expense	1,702	2,074
Miscellaneous	12,020	14,651
TOTAL	428,447	481,777
Receipts from Livestock Sales	365,147	445,095
Income	-63,300	-36,682
Change from 1977	+4,131	+30,749

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TABLE 8-60
BUDGET FOR SHEEP RANCH
Alternative Seven

Expenses	1980 (2,384 Sheep)	2015 (2,384 Sheep)
Labor & Supplies	$ 16,354	$ 16,354
Livestock Purchases	2,211	2,211
Depreciation	8,588	8,588
Interest		
Operating Capital	1,931	1,931
Real Estate	2,783	2,783
Gas, Lubricants & Repairs	13,327	
Feed & Supplements	18,328	18,328
Pasture Rent	11,269	11,269
Taxes	8,501	8,501
Shearing	3,098	3,098
Insurance	1,964	1,964
Grazing Fees		
Caliente BLM	821	821
Other BLM	3,465	3,465
Forest Service	187	187
Utilities	4,855	4,855
Miscellaneous	4,887	4,887
TOTAL	102,600	102,600
RECEIPTS		
Lambs	94,409	96,409
Ewes	3,981	3,981
Wool (Inc. Incentives)	15,972	15,972
TOTAL	116,362	116,362
Income	13,762	13,762
Change from 1977	- 1,044	- 1,044

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TABLE 8-61
SUMMARY OF RANCH INCOME IMPACTS
ALTERNATIVE SEVEN

	Proprietors Income		Labor Income		Total Income	
	1980	2015	1980	2015	1980	2015
Small Cattle (33 ranches)	$-36,696	$+11,418	$ --	$ --	$ -36,696	$+11,418
Medium Cattle (13 ranches)	- 9,412	+73,736	- 3,380	+24,323	-12,792	+98,059
Large Cattle (1 ranch)	+ 4,131	+30,749	+ 3,369	+25,564	+ 7,500	+56,313
Sheep (5 ranches)	- 5,220	- 5,220	- 1,480	- 1,480	- 6,700	- 6,700
Total	- 47,197	+110,683	- 1,491	+48,407	-48,688	+159,090

levels between 1980 and 2000. In the long-term (2015) increases in livestock grazing, big game hunting, and maintenance of range improvements would cause an increase in direct and indirect employment of 50 full-time equivalent jobs over 1977 levels.

Impact on Tax Revenues

By 1980 annual livestock tax revenues in Lincoln County would decline by $3,700 below the 1977 level. This represents an insignificant portion of the fund requirements for local government.

Impact on Ranchers' Wealth

Although the Bureau of Land Management (BLM) does not recognize a capitalized value for grazing preferences, the preferences do contribute to the capital position (wealth) of the ranchers to whom they are alloted (McConnen, 1976) (Stubblefield and Robertson, n.d.) (Nielson and Workman, 1971).

The wealth of the ranchers using ES area public land forage would decline as a result of the elimination of 35,712 AUMs of active grazing preferences. At $25 per AUM this would amount to $918,000 -- 31 percent of the value that ES area grazing preferences contributed to the ranchers' capital position in 1977. This would be a short-term impact. By 2015, additional livestock forage would become available and the estimated future preference levels would be 151,542. At $25 per AUM this should increase the value of the grazing preferences by $824,000. This represents a 28 percent increase over 1977 levels.

This would not be translated into actual dollars until the preferences are sold. If the value of ES area grazing preferences could be determined by comparing current AUMs licensed under permit (78,235) with future AUMs of active preference, then the short-term 1980 (81,868 AUMs) impact of this alternative would actually be shown as an increase in the value of the ranches. This would amount to $90,825 above the 1977 level. The long-term (151,000 AUMs) impact using this methodology would amount to an increase of over $1.5 million.

Impact on Seasonal Production Characteristics

Seasonal dependencies on public land forage are summarized in Table 8-62. The most significant short-term change in seasonal dependency would occur on small cattle ranches in the summer--a decrease from 29 percent to 11 percent. This would have little overall impact, but some individual ranchers may have trouble adjusting to new periods-of-use.

Conclusion. In 1980 ranch income would decrease by $48,637 below the 1977 level of $96,728. However, construction of range improvements would cause overall regional income to increase by about $206,500 per year. By 2015 increased livestock production, big game hunting, and maintenance of range improvements would cause an increase in regional income of $555,000. In addition, the ranchers' capital position would decrease by $918,000 in 1980, but would increase by $824,000 in 2015.

Impacts on Social Values

Those operators whose period-of-use would be adjusted as a result of their comments on the MFP 2 decisions could be expected to respond positively to the period-of-use adjustments on their respective allotment.

However, since the overall effect of the implementation of this alternative is similar to the proposed action it could be expected that the alternative would be viewed negatively by the majority of the ranching community. Other impacts would be similar to those in the proposed action.

TABLE 8-62

SEASONAL DEPENDENCY ON PUBLIC LAND FORAGE
ALTERNATIVE SEVEN

	(Percent Dependency)				
	Total	Spring	Summer	Fall	Winter
Small Cattle Ranch					
Short-term	20	21	11	18	29
Long-term	36	30	34	40	40
Medium Cattle Ranch					
Short-term	41	38	31	41	55
Long-term	54	48	42	55	72
Large Cattle Ranch					
Short-term	39	36	40	40	40
Long-term	47	43	48	48	48
Sheep Ranch					
Short -term	10	22	0	0	16
Long-term	10	22	0	0	16

SUMMARY OF IMPACTS

A summary of predicted long-term cumulative impacts from implementation of the proposed action or each of the alternatives is shown in Table 8-63 by the various resource elements.

Each of the proposals can be compared with the present situation in the first column. Relative values were established for those resources where it was impossible to predict specific estimates.

TABLE 8-63
SUMMARY OF IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES a/

Environmental Component	Present Situation	Proposed b/ Action	Alternative One Continuation of Present Management	Alternative Two Elimination of Livestock & Wild Horse & Burro Grazing	Alternative Three Minimum Constraints on Wild Horses & Burros	Alternative Four Restricted Periods of-Use	Alternative Five Reduced Levels of Livestock Grazing	Alternative Six Reduced Management Intensity	Alternative Seven Locally Suggested Vegetation Allocation Program
Soils Sediment Yield (Tons/Year)	2,165,000	1,751,000	2,165,000	2,003,000	2,114,000	1,894,000	2,002,000	1,980,000	approx (20%) 415,000
Vegetation									
Livestock Forage Condition (Acres)									
Good	689,000	1,727,000	614,000	1,374,000	1,747,000	1,727,000	863,000	1,122,000	693,800
Fair	1,375,000	355,000	1,336,000	681,000	514,000	355,000	1,199,000	1,010,000	1,352,000
Poor	512,000	512,000	624,000	518,000	333,000	512,000	512,000	444,000	512,000
Livestock Forage Capacity (AUMS) 2015	110,000	162,000	108,000	115,000	131,000	128,000	128,000	127,000	163,000
Wildlife									
Population Numbers									
Bighorn Sheep	760	870	630	870	630	870	870	630	630
Mule Deer	7,320	8,820	7,320	7,320	7,320	7,320	7,320	78,820	78,820
Desert Tortoise	Unknown c/	Increase	Decrease	Maximum increase	Static or slight increase	Increase	Increase	Increase	Increase
Fish	Unknown c/	Increase	Decrease	Maximum increase	Slight increase	Increase	Increase	Increase	Increase
Other Wildlife	Unknown c/	Maximum increase	Decrease	Slight increase	Increase	Slight Increase	Slight Increase	Increase	Increase
Wild Horse and Burro									
Population 1980	1,070	500	1,070	0	2,860	500	500	500	249
2015	---	750	1,070	0	2,860	750	750	750	406
Livestock Allocation (AUMs)									
1980	78,000	74,000	78,000	0	54,000	59,000	37,000	74,000	78,000
2015	---	146,000	78,000	0	96,000	114,000	37,000	115,000	152,000
Cultural Resources	143d/	143d/	143d/	143d/	143d/	143d/	143	143	143d/
Social-Economics									
Economics									
Regional Income 1980	1 billionf/	+ 181,500	No change	- 534,000	- 315,000	- 196,500	- 298,000	+ 118,500	+ 206,500
2015		+ 542,000	No change	- 147,000	+ 136,500	+ 232,000	- 111,500	+ 414,500	+ 555,000
Ranch Income 1980	+ 97,000	- 63,000	No change	- 356,000	- 133,000	- 131,000	- 199,000	- 63,000	- 47,000
2015		+ 169,000	No change	- 356,000	- 47,000	+ 30,000	- 199,000	+ 71,000	- 159,000
Ranchers 1980	2,964,000	-1,107,000	-1,008,000	-2,964,000	-1,610,000	-1,480,000	- 2,035,000	- 1,107,000	- 918,000
	(1,356,000)	(-100,000)	(No change)	(-1,900,000)	(- 24,000)	(- 470,000)	(-1,000,000)	(-100,000)	(+91,000)
Wealth e/ 2015		+ 686,000	-1,008,000	-2,964,000	-543,000	- 123,000	- 2,035,000	- 87,235	+ 824,000
		(+1,500,000)	(No change)	(-1,900,000)	(+ 470,000)	(+ 890,000)	(-1,000,000)	(+900,000)	(+1,500,000)
Social									
Ranching Way of Life	Preferred and desirable way of life dependent on federal action	Locally Threatened	No change	Most would leave livestock industry	Some ranchers would leave livestock industry	Locally Threatened	Some ranchers could leave livestock industry	No change	Locally Threatened
Attitudes	Ranchers held in high esteem	Alienated from government	Sense of temporary relief	Intense local resentment	Intense resentment by those ranchers losing AUMs to wild horses and burros	Alienated from government	Alienated from government	Positive if allotments aren't combined -- others further alienated	Alienated from government
Land Use Decisions	Minimal demand for residential development	Some may reluctantly sell property	No change	Most may reluctantly sell property	Some may reluctantly sell property	Some may reluctantly sell property	Some may reluctantly sell property	No change	Some may reluctantly sell property

a/ All numbers in this table are rounded to the nearest 1,000.
b/ All the figures for the proposed action are as mitigated in Chapter 4 and are shown as impacts in Chapter 3.
c/ Population estimates are unknown; however, it was assumed that populations are static or declining.
d/ Potential impacts to sites from trampling by livestock and wild horses within one mile of water.
e/ Value that ES area grazing preferences contributed to ranchers wealth. Figures as based on current active preference AUMs. Figures in parentheses are based on an assumption that changes in the value of grazing preferences could be estimated by comparing current AUMs permited with future AUMs of active preferences.
f/ Total income of Clark and Lincoln Counties in Nevada and Iron and Washington Counties in Utah.

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CONSULTATION AND COORDINATION

CHAPTER 9
CONSULTATION AND COORDINATION

CONSULTATION AND COORDINATION IN THE PREPARATION OF THE ENVIRONMENTAL STATEMENT

During the preparation of the draft Environmental Statement (DES) the team was in contact with other Federal offices, State and local agencies, interest groups, and individuals. Communications varied from formal written correspondence to informal personal contact and telephone calls. Information concerning the proposed action and the Bureau of Land Management's (BLM) preparation of this document was covered in local, regional, and statewide media.

Comments by two agencies formally contacted by letter follow. Where a specific recommendation was made concerning the proposed action, or a conflict identified, that response has been noted.

U.S. Fish and Wildlife Service

Informal consultation was initiated with the area office in Sacramento regarding potential impacts ungulate grazing might have on proposed and candidate threatened and endangered plants in the Caliente Environmental Statement (ES) area. The Service reviewed the summary of candidate plant species known or believed to occur in the ES area, and met with ES team members to view some areas where these species might occur. The Service recommended that a study of locations and populations of threatened and endangered plants be undertaken the following field season (1979), and that a spring 1979 meeting be arranged between the BLM and the Fish and Wildlife Service to discuss the threatened and endangered plants in the area, as well as the effects grazing forage allocation might have on them. (See Appendix C.)

Nevada Department of Wildlife

The Nevada Department of Wildlife (formerly the Nevada Department of Fish and Game) is the State agency which supplies the BLM with "reasonable numbers" of wildlife in an ES area. The Department furnished the ES team with a special report prepared by its Game Management Division explaining the methodology for determining reasonable mule deer numbers in the Caliente ES area. (See Appendix F.)

Several ES team members informally consulted with Federal and State agencies and individuals while gathering data for the ES.

In addition to informal consultation with the U.S. Fish and Wildlife Service, the Nevada Test Site herbarium species were reviewed for threatened and endangered flora. The Nevada State

Office (Reno) of the BLM was also involved in the search for flora information.

Several sources were contacted for information on wildlife, especially the desert tortoise and bighorn sheep. Among those contacted were the Nevada Department of Fish and Game (Wildlife); the BLM's Desert Planning Staff in Riverside, California; and the BLM's Arizona Strip District.

The range staff at Colorado State University was called in regard to some vegetation response questions. The University of Nevada, Reno, School of Veterinary Medicine was consulted on Pahranagat Valley bottom grazing problems. Other BLM districts were, of course, contacted in regard to licensing, methodologies, and grazing use.

Air quality inquiries were made of the Nevada Division of Environmental Protection Services.

In May 1978, the ES team economist and the BLM's Nevada State Office, Reno, economist met in Alamo, Nevada, with several ES area ranchers. They were joined by representatives of the University of Nevada, Reno, Cooperative Extension Service and the Division of Agricultural and Resource Economics. Together the group discussed ranch budgets for use in the economic analysis contained in this DES. Once the ranch budgets were developed, the ES team economist returned to the area (Panaca, Caliente, Nevada; St. George, Cedar City, Enterprise, Utah) to verify the results.

The ES team's social scientist visited 16 of the grazing permittees in October 1978, to discuss social values and attitudes of the Caliente ES area ranching community. After that visit, a draft summation of the discussions was written and distributed to all 16 participants for comments. One response was received.

During March 1979, the team's social scientist again returned to the area, visiting with 47 ranchers in Alamo and Caliente, Nevada, and St. George, Utah. The social scientist accompanied the Caliente resource area manager and a range conservationist who were presenting the Management Framework Plan (MFP) recommendations.

The Lincoln County Conservation District, a sub-division of State government, was periodically informed of progress on both the Caliente MFP and ES. In 1976 this group was recommended by the Lincoln County Commissioners as the medium through which BLM should communicate progress on the range survey, MFP, and ES.

A wide sector of public interest groups was contacted by letter in February 1979, to announce the writing of the Environmental Statement. The letter was accompanied by a news release and map.

The map showed the location of the area within the State of Nevada, and the news release gave additional details about the relationship between the MFP and the ES. Among the types of agencies, groups, and individuals receiving the letter were: individuals involved with grazing in the Caliente ES area; affected Federal, State and local agencies; conservation/environmental interest groups; outdoor recreation groups; wildlife oganizations; sportsmen; wild horse groups; archaeological/historical interests; livestock organizations; mining organizations; area and state libraries; and individuals who have requested information on grazing ESs or on BLM planning actions.

The February 1979, news release was distributed widely (85 media) to newspapers, radio, and television stations. Those media were located primarily in Nevada, Utah, California, and Arizona. An earlier statewide news release (October 1978) from the Nevada State Office of the BLM in Reno, had also announced the preparation of the Caliente ES and other Nevada ESs.

In addition, a notice of intent to prepare an ES on the proposed action was published in the February 27, 1979, Federal Register.

Management Framework Plan (MFP), Step 2, public participation was ongoing during the preparation of the DES, and changes as a result of that effort are incorporated into this Caliente final ES. Management Framework Plan briefings in March of 1979 to the Nevada and Utah Clearinghouses and Congressional staffs -- and the Nevada legislature's agricultural committee -- included update and progress reports on the DES. Individual meetings with grazing permittees and MFP workshops on wild horses and burros, lands, minerals, forestry, recreation, wildlife, watershed, and range also included reports on the DES.

COORDINATION IN THE REVIEW OF THE ENVIRONMENTAL STATEMENT

Requests for comments on the DES were made of the following interest groups and agencies: (An asterisk indicates those who responded.)

Congressional delegation, Nevada, and Utah

Senator Howard W. Cannon, Nevada
Senator Paul Laxalt, Nevada
Representative James Santini, Nevada
Senator Orrin Hatch, Utah
Senator Jake Garn, Utah
Representative Dan Marriott, Utah
Representative Gunn McKay, Utah

Federal agencies

* Advisory Council on Historic Preservation
Department of Agriculture
  * Forest Service
  * Soil Conservation Service
Department of Commerce
  National Weather Service
  National Oceanic and Atmospheric Administration
Department of Defense
  Nellis Air Force Base
  * Army Corp of Engineers
Department of Energy
Department of Interior
  Bureau of Indian Affairs
  Bureau of Mines
  * Bureau of Reclamation
  Fish and Wildlife Service
  * Geological Survey
  National Park Service
* Environmental Protection Agency
Interagency Archaeological Services

State agencies, government

Office of the Governor, Nevada
Nevada State Planning Coordinator
* Nevada State Clearinghouse (25 copies) -- distributes copies to State agencies
* Nevada Department of Fish and Game (Wildlife)
State senators and assemblymen (Clark County and adjoining areas)
Office of the Governor, Utah
Utah State Planning Coordinator

Local government

Lincoln County Commissioners, Nevada
Iron County Commissioners, Utah
Washington County Commissioner, Utah
* Lincoln County Conservation District (quasi-governmental)
Mayor, Caliente, Nevada
Pioche Town Advisory Board, Nevada
Panaca Town Advisory Board, Nevada
Alamo Town Advisory Board, Nevada
Five County Association of Governments, St. George, Utah

University of Nevada

Max C. Fleischmann College of Agriculture
Division of Agricultural and Resource Economics
Division of Renewable Natural Resources
Lincoln County Extension Agent
Desert Research Institute, Las Vegas and Reno
Mackay School of Mines
Nevada Bureau of Mines and Geology
Bureau of Business and Economic Research, Las Vegas

University of Utah and Utah State University

Others

AM-ARCS of Nevada
American Fisheries Society
* American Horse Protection Association, Inc.
American Institute of Mining and Metallurgical Engineering, Nevada Section and Southern Nevada
American Sportman's Club
Archaeological Research, University of Utah
Archaeo-Nevada Society
Audubon Society, Lahontan and Red Rock Chapters
Chambers of Commerce in ES area
Clark County Game Management Board
Clark County Humane Society
Comet Coalition Mining
Defenders of Wildlife
* Desert Bighorn Council
Desert Sportsman's Rifle and Pistol
Desert Tortoise Council
Exploration Geologists of Nevada
Foresta Institute
Fraternity of the Desert Bighorn
Friends of Nevada Wilderness
Geological Society of Nevada

* Grazing permit holders within Caliente ES area
International Society for the Protection of Wild Horses and Burros
Intertribal Council of Nevada
Izaak Walton League of America
Las Vegas Bronco Club
Las Vegas Jeep Club
Las Vegas Tribal Council
League of Women Voters, Nevada cities
Lincoln County Game Management Board
Moapa Business Council
Motorcycle Racing Association of Nevada
National Mustang Association
National Wild Horse Association
National Wildlife Federation
* Natural Resources Defense Council
Nevada Archaeological Association
Nevada Archaeological Survey, Southern Division
Nevada Cattlemen's Association
Nevada Conservation Forum
Nevada Farm Bureau Federation
Nevada Humane Society
Nevada Miners and Prospectors Association
Nevada Mining Association
Nevada Mining Council
Nevada Off-road Vehicle Association
Nevada Organization for Wildlife
* Nevada Outdoor Recreation Association/National Public Lands Task Force
Nevada Prospectors Association
Nevada Public Land Users Association
Nevada Recreation and Park Society
Nevada Resource Action Council
Nevada Sportsmen's Association
Nevada State Cowbelles
Nevada Wildlife Federation
Nevada Woolgrowers' Association
Northern Nevada Native Plant Society
Pacific Legal Foundation
Pennsylvania Cooperative Wildlife Research Unit
Pioche Rod and Gun Club
Public Lands Council
Rotary Clubs in ES area
Sage County Alliance for a Good Environment
Sierra Clubs in Region
Society for Range Management
Soil Conservation Society of America, Nevada Chapter
Southern Nevada Conservation Council
Southern Nevada Environmental Forum
Southern Nevada Landcruisers
Southern Nevada Museum Association

Southern Nevada Off-road Enthusiasts
Spring Mountain Free Trappers
Standard Slag Company
The Wilderness Society
Union Carbide Corporation
Utah Farm Production Credit Association
Virgin Valley Sportsmen's Association
Washington County Cattlemen's Association
Wild Horse Organized Assistance
* Wildlife Management Institute

Several private citizens requested copies of the DES. Comments submitted by individuals are treated in the Comments and Responses section of this chapter.

Availability of Final Environmental Statement

The Final Environmental Statement (FES) will be mailed to all persons, agencies or groups who commented on the DES. A general news release will be made and an announcement will be printed in the Federal Register when the FES is available.

Copies of the FES will be available at the following locations:

Bureau of Land Management Offices

Office of Public Affairs, BLM
18th and C Streets
Washington, D.C. 20240

Nevada State Office
Room 3008 Federal Building
300 Booth Street
Reno, Nevada 89509

Battle Mountain District Office
North 2nd and South Scott Streets
Battle Mountain, Nevada 89820

Carson City District Office
1050 E. Williams Street
Carson City, Nevada 89701

Elko District Office
2002 Idaho Street
Elko, Nevada 89801

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

Las Vegas District Office
4765 West Vegas
Las Vegas, Nevada 89102

Winnemucca District Office
705 East 4th Street
Winnemucca, Nevada 89445

Public Libraries

Boulder City Library
539 California Street
Boulder City, Nevada 89005

Cedar City Public Library
136 W. Center
Cedar City, Utah 84720

Clark County Library
1401 E. Flamingo Road
Las Vegas, Nevada 89109

Lincoln County Library
Box 248
Pioche, Nevada 89043

Lincoln County Library
Caliente Branch
Box 306
Caliente, Nevada 89008

Las Vegas Public Library
1726 E. Charleston Boulevard
Las Vegas, Nevada 89104

St. George Public Library
55 West Tabernacle
St. George, Utah 84770

University of Nevada, Reno
Getchall Library
Reno, Nevada 89507

University of Nevada, Las Vegas
Library
4505 Maryland Parkway
Las Vegas, Nevada 89154

Washoe County Library
301 S. Center Street
Reno, Nevada 89505

White Pine County Library
Courthouse Plaza
Ely, Nevada 89301

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PUBLIC REVIEW AND HEARINGS

The Draft Environmental Statement (DES) was filed with the Environmental Protection Agency and made available to the public on May 25, 1979. A Bureau notice of availability was published in the May 31, 1979, Federal Register (Vol. 44, No. 106). The notice announced a 45 day public review period ending July 16, 1979. The public review period was scheduled to provide concerned agencies and publics the opportunity to review the DES and offer comments on the adequacy of the DES and the environmental impacts of the proposed action.

After publication of the notice of availability, over 600 copies of the DES were distributed to reviewing agencies and interested publics with a cover letter summarizing the proposed action and announcing the times and locations of the scheduled public hearings. Reading copies of the DES were made available at all public libraries and Bureau of Land Management (BLM) Offices in Nevada, as well as the BLM Office of Public Affairs in Washington, D.C. A news release was mailed from the BLM's Las Vegas District office to radio and television stations, newspapers, and interest groups throughout the State.

Three public hearings were held during the public review period. Oral testimony was received from, or on the behalf of, a total of 76 agencies, organizations, or individuals. Information on the hearings is summarized as follows:

PUBLIC HEARINGS

Location	Date	Attendance	Number of Testimonies Presented
Caliente, Nevada	July 10, 1979	60	16
St. George, Utah	July 11, 1979	10	6
Las Vegas, Nevada	July 12, 1979	6	2

Transcripts of the public hearings are available for inspection at the following locations: BLM Las Vegas District Office, 4765 West Vegas Drive, Las Vegas; BLM Nevada State Office, Room 3008, Federal Building, 300 Booth Street, Reno; Lincoln County Soil Conservation Service, Caliente, Nevada; and the Office of Public Affairs, BLM, 18th and C Streets, Washington, D.C.

Testimony Given at Public Hearings

Name	Representing	Hearing Location
Robert E. Erickson	Nevada Legislative Counsel Bureau	Caliente
Jim Chavis (for Fred M. Jenkins)	Imperial Farms Land & Cattle Company	Caliente
Thomas W. Ballow	Nevada State Department of Agriculture	Caliente
Lavette Tennille	Self (rancher)	Caliente
James B. Tennille	Self (rancher)	Caliente
Mr. & Mrs. Patrick FitzSimons	Concerned Citizens for Our Public Land	Caliente
Connie Simkins	Self, Lincoln County Conservation District	Caliente
Kenneth D. Lee	Self, Lincoln County Conservation District	Caliente
Carole Marsh Carter	Pine Creek Ranch	Caliente
Van Peterson	State Conservation Commission State of Nevada Conservation District	Caliente
George Nesbitt	Kent Whipple Ranch	Caliente
Dave Secrist	Nevada State Cattlemen's Association	Caliente
Key Lytle	Self (rancher)	Caliente
Paul T. Tueller	Self (range ecologist)	Caliente
George Tennille	Self (rancher)	Caliente
Don L. Bradshaw	Self, Bradshaw, Inc.	Caliente
Thomas L. Williams	Livestock Grazing	St. George
Guy W. Bowler	Snow Spring, Cox, Terry allotments	St. George
L. Kelton Hafen	Hafen Brothers Washington County Cattlemen's Association	St. George
Erle H. Snow	Snow Lazy S.R. Ranch	St. George
Norman E. Gubler	Self (trucker)	St. George
H. Val Hafen	J Bar P Cattle Company	St. George
H. Bruce Cox	Self, Sheep Spring allotment	Las Vegas
James L. Wade	Self, Wade and Lytle Ranch	Las Vegas

During the public review period 40 comment letters were received from Federal, State, and local agencies; private organizations; and interested citizens. All comment letters received are reproduced in Appendix I. A complete listing of all contributors of written comments is also given in Appendix I.

All letters and testimony were reviewed to determine if they met the required criteria for response - i.e., discussion of the adequacy of the DES. Comments which presented new data, questioned facts and/or analyses, or commented on issues bearing directly on the DES or the environmental impacts of the proposed action were fully evaluated and given responses. Subsequent changes or additions to the text of the DES have been incorporated into this final statement.

Each written or oral document received was assigned an index number; each substantive comment contained therein was assigned a control number. All substantive comments are keyed to these reference numbers -- i.e., comment 19-2 is the second comment in letter no. 19.

In the following Comment and Response Section, the substantive comments are grouped by environmental element, i.e., soils, vegetation, etc. All comments are presented verbatim. Where similar comments were made by more than one individual, agency, or organization, response was given only once. In these cases, a representative comment is reproduced verbatim and the similar comments are referenced (e.g., See also Comment __-__ in Appendix I.) Where a comment is taken from a public hearing testimony, reference is made to the particular transcript where the comment is located. (Refer to availability of transcripts, p. 9-10.)

A complete list of respondents to the DES and the comment areas given response appears in Table 9-1.

TABLE 9-1
RESPONDENTS TO C .IENTE DRAFT ENVIRONMENTAL STATEMENT AND AREAS OF CONCERN

Agency, Organization, or Individual	Public Hearing Testimony Hearing Location	Comment Letter Index #	Chapter 1 - Proposed Action	Climate	Soils - Watershed and Erosion	Water Resources	Vegetation	Range Survey	Wildlife	Wild Horses and Burros	Cultural Resources	Land Uses - Agriculture	Land Uses - Wilderness	Social Economics
Robert Erickson	Caliente							■						
Jim Chavis (for Fred Jenkins)	Caliente		■				■							
Tom Ballow	Caliente						■	■						
Lavette Tennille	Caliente						■							■
James Tennille	Caliente						■							
Mr. & Mrs. Patrick FitzSimons	Caliente						■							
Connie Simkins	Caliente						■							
Ken Lee	Caliente													
Carole Marsh Carter	Caliente													
Van Peterson	Caliente													
George Nesbitt	Caliente													
Dave Secrist	Caliente				■			■	■			■		■
Ken Lytle	Caliente													
Paul T. Tueller	Caliente													
George Tennille	Caliente						■	■						
Don L. Bradshaw	Caliente						■							
Tom Williams	St. George							■						■
Guy Bowler	St. George													
Kelton Hafen	St. George													
Earl Snow	St. George													
Norman E. Gubler	St. George													
H. Val Hafen	St. George							■						
Bruce Cox	Las Vegas									■				
James L. Wade	Las Vegas													
Thomas L. Williams		1												■
Soil Conservation Service, Reno (1)		2			■		■		■					
American Horse Protection Association		3								■				
Ruth Houghton		4	■											■
Advisory Council on Historic Preservation		5												
Virlis Fischer		6												
John L. Artz		7		■										■
Wildlife Management Institute		8					■		■					
Mr. & Mrs. George R. Rowe		9					■	■						
U.S. Forest Service - Ogden		10												
Bureau of Reclamation		11					■							
Rachael Ballow (1)		12												
Rachael Ballow (2)		13												
Paul T. Tueller		14						■						
Lincoln County Conservation District		15								■				
H. Val Hafen		16												
Geological Survey		17				■								
Lavette Tennille		18				■	■							
James B. Tennille		19				■	■	■						
Environmental Protection Agency		20												
Dennis Iverson		21					■	■						
Carole Marsh Carter		22												
Soil Conservation Service - Reno (2)		23					■							
Connie Simkins		24								■				
Natural Resources Defense Council		25	■				■							■
Nevada State Conservation Commission		26					■	■	■					
Tina Nappe		27	■						■					■
Nevada Outdoor Recreation Association, Inc.		28	■				■	■	■				■	
Nevada State Department of Agriculture		29	■											
Nevada State Department of Conservation and Natural Resources		30				■					■	■		
Nevada State Division of Water Planning		31				■								
Nevada State Division of Water Resources		32	■									■		
Nevada State Division of State Parks		33												
Nevada State Department of Wildlife (1)		34					■		■					■
Nevada State Department of Wildlife (2)		35												
Nevada State Division of Forestry (1)		36												
Nevada State Division of Forestry (2)		37												
Nevada State Division of Historic Preservation and Archeology		38									■			
Desert Bighorn Council		39												
Corps of Engineers - Los Angeles District		40												

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Chapter 1 - Proposed Action

Comment 4-2 (Ruth Houghton)

I doubt...that 35 years hence is a reasonable time period to consider when by 1980 people will be severely affected by reductions. A time period of 10 to 15 years and the possible improvements at that date might be more understandable to local residents (perhaps the 35 years is imposed by the suit).

Response

The 35 year time frame was used because of climatic conditions within the Environmental Statement area. Vegetative response would occur slowly due to droughts and low precipitation levels. The social economic impacts for the short-term (1980) have been analyzed in Chapters 3 and 8.

Comment 24-1 (Connie Simkins)

This subsection should contain schedule of when, how, what, the basis for utilization studies.

Response

The implementation of the actual use, condition, trend and utilization studies is dependent upon the implementation of the Allotment Management Plans. The studies would follow Bureau guidelines and be based upon professional evaluation as to the location, number, and type of studies required to properly monitor the forage resource.

Comment 24-2 (Connie Simkins). Also see Comment 34-12 in Appendix I.

These five current AMP's are your own work. This indicates to me AMP's are not doing the proper management job if something you set up yourself has to be revised. The operators in this area should not have to stand the cuts on a bureau system fault.

Response

The five allotments currently under Allotment Management Plans (AMPs) have not been as successful as anticipated by the Bureau; however, as shown in Table 1-3 of the Environmental Statement (ES), four of the five allotments have more livestock forage available than their current recognized privileges. The one AMP which is currently over utilized has been recognized through studies and the range survey as being in need of better

management. These AMPs have been in effect for 10 years or less. The time frame in the ES (35 years) suggests that many of the vegetative responses are slow.

Comment 24-3 (Connie Simkins)

Doesn't this book serve this purpose? [Ed. note: This refers to page 1-14 of the Environmental Statement which states an Environmental Assessment would be written prior to any project implementation.]

Response

The Environmental Statement does not provide the necessary site-specific data required to properly implement the range improvements associated with the individual Allotment Management Plans (AMPs). As proposed, an Environmental Assessment would be completed to analyze those detailed impacts associated with the individual AMPs and its necessary improvements.

Comment 24-4 (Connie Simkins)

I think these inventories should be done before any cuts administered. Otherwise how do you properly and accurately establish basis for manipulation?

Response

The vegetation manipulations proposed are a indication of areas that have potential for treatment. The writers of the proposed Allotment Management Plans (AMPs) would analyze the present allotments for forage capability and determine if additional forage can be feasibly produced through the use of vegetation manipulation. The AMP writer would utilize these areas as an indication of the potential values (forage) which could be made available through manipulations. If manipulation is desired, soil and other inventories would be conducted to insure that a successful treatment is implemented.

Comment 25-1 (Natural Resources Defense Council, Inc.)

...no reasons are given for the decision to recommend the implementation of intensive management on the overwhelming majority of the Public Lands in the area, for the elimination of livestock grazing on nine allotments, or for the selection of the proposed season of use.

...it contains no discussion of the major trade-offs and no evaluation of the rationales which underlie them.

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Response

Intensive grazing management was recommended for the various allotments to help correct those resource problems outlined on pp. 1-9 and 10 (first paragraph) of the Environmental Statement (ES). The implementation of Allotment Management Plans would allow for: a) proper utilization of forage being produced by disbributing use with development of water; b) proper periods-of-use to protect key forage species; c) periods of rest on allotments to provide for increases in density, composition, vigor, and production of key forage species; and d) reduct on of conflicts between livestock and other ungulates for forage, space, and water.

The elimination of livestock grazing on the nine allotments was a management decision based upon the available forage, ability of the resource to produce suitable levels of forage, safety to the general public, and conflicts with wild horses and burros for available forage on six allotments. All available forage was allocated to wild horses. Two allotments were recommended for no grazing due to lack of suitable forage for livestock, and one allotment was recommended for no grazing due to unsafe traffic hazards associated with a state highway.

Period-of-use for the various allotments was determined by utilizing the following guidelines: a) past periods-of-use, b) plant phenology and c) conflicts with wildlife crucial areas.

These periods-of-use may require additional modification when AMPs are developed to provide for the physiological requirements of forage species. (See p. 1-9 of the ES, fourth paragraph.)

The remaining resource trade-offs are presented in Table 1-4 and in the Caliente Management Framework Plan (MFP). In April, 200 copies of the full MFP were made available to area libraries, Caliente -Las Vegas Bureau offices, and members of the public as a part of the public participation process. In addition, a detailed analysis (100+ pages) which analyzed the wide variety of resource conflicts occurring in the ES area is available at the Las Vegas District office. Resource trade-off is a common practice in the management of public lands. Careful analysis and review is required prior to making trade-offs. However, it is felt that the MFP is the logical location for this in-depth discussion of trade-offs. The purpose of Table 1-4 is to consolidate the MFP information.

Comment 25-3 (Natural Resources Defense Council, Inc.)

Although the draft indicates generally that under-utilization in the Caliente area is the result of lack of water and fences, it provides no site-specific explanations for the proposed increases

and no environmental analysis of the impacts that will result therefrom.

Response

The range survey contains the site-specific explanation of the present production capability of the forage resource. The proposed action summarizes the values found to be present on an allotment basis. It would be a massive presentation of data to include a site-specific definition of the proposed increases for each allotment receiving an increase. The range survey is available in the Las Vegas District office for public review.

The impacts of the proposed increases vary according to the resource. Soils (p. 3-2, paragraphs 1 to 3 of the Environmental Statement (ES)) discusses the impacts of new projects, water sources, and improved vegetation cover on the soil resource. Impacts to vegetation due to increased use are discussed (p. 3-9, paragraph 4 of the ES). Throughout Chapter 3, additional impacts are noted concerning the development of new water sources and the resultant utilization of the forage.

Comment 25-4 (Natural Resources Defense Council, Inc.)

If, in fact, forage is being under-utilized in the allotments involved for either or both of these reasons, then construction of needed facilities must precede the licensing of additional livestock in order to avoid adverse environmental ilmpacts which would otherwise inevitably result. While Table 1-9 indicates that many of these increases, including some of the most significant are dependent upon such facilities, (pp. 1-29 - 1-33), the draft provides no assurances that these facilities will in fact be implemented prior to 1980 when the increases are scheduled to take effect.

Response

The Bureau's policy is to allocate vegetation only on those areas which are suitable for livestock grazing. Part of the allocation requirement is a reliable water source within a four-mile radius. If the forage is not currently serviced by a reliable water source (BLM authorized), an allocation would not occur on that available forage. Those Animal Unit Months are considered to be potentially suitable until water is developed and authorized.

Comment 25-5 (Natural Resources Defense Council, Inc.)

The final statement should explain the circumstances under which it will not be "possible" to delay implementation of specific

range "improvement" projects until after AMP development. (p.1-25).

Response

Such circumstance could include: 1) identification of a public hazard (e.g., public highways unfenced); 2) extreme drought of such intensity that additional water sources would have to be developed to provide water to livestock, wild horses, or wildlife; or 3) economic hardships so severe that management would deem it necessary to forego the Allotment Management Plan and implement a project to lessen those hardships.

Comment 25-6 (Natural Resources Defense Council, Inc.)

The EIS contains a brief summary of the factors used to establish the order for AMP development and implementation. (p.1-25). It makes no attempt to apply any of these criteria to the proposed AMPs, however. While it is understandable that this order may change in the future, this possibility does not excuse the lack of such analysis.

Response

The criteria outlined on p. 1-13, paragraph 2, of the Environmental Statement (ES), was utilized to determine the feasibility of the combination and the ease of implementation. The five items used as criteria were applied at Management Framework Plan (MFP), Step 2 to analyze the recommendations by the resource specialist at MFP, Step 1. Because additional analysis would be required before implementation (e.g., benefit-cost, resource - conflict, etc.), the list of Allotment Management Plans and improvements proposed in Table 1-9 of the ES may be revised and/or amended prior to actual implementation.

Comment 25-8 (Resources Defense Council, Inc.). Also see Comment 25-7 in Appendix I.

Although it is clear that the proposed action contemplates intensive management systems, the draft discusses only possible grazing treatments and their impacts. See, e.g., pp.1-21, 1-25. No specific systems are even named. However, the draft clearly suggests that primarily reliance will be placed on the rest-rotation system of management. (p.1-21). The Bureau has been widely criticized in the past for its apparent belief that this extremely complex and expensive system is a panacea for all range problems. The ecology of these desert ranges, their droughts and the lack of any studies which address the effects of rest-rotation on such ranges, suggest that it would be difficult

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to substantiate any predictions that significant resource improvement would result from implementing the system in the Caliente area.

In any event, the fact the specific AMPs have not yet been developed does not excuse the Bureau from discussing the grazing system(s) that may be created using the possible treatments and giving some indication of the way in which those systems will be applied.

Response

Specific grazing systems are not described since the types of grazing systems required would be determined during the actual Allotment Management Plan (AMP) formulations. The intent of the section entitled General Reasons for Implementing AMPS, p. 1-9 to 1-13, is not to suggest reliance upon the rest-rotation system, but rather to stress the requirements for improvement of the forage resource through selection of appropriate grazing treatments. In addition, the selected system need not be complex or expensive to obtain the desired results. According to Lacey and Van Poolen's (1979) definition of rest-rotation, this system could describe an allotment containing two pastures with yearlong rest allowed alternately between them. In defense of rest-rotation systems on Utah desert ranges, Willard and McKell (1973) reported that "Any grazing use which prevent the completion of a normal growth cycle negatively influences the vigor and productivity of plants." Martin (1973) found on Arizona ranges that "...little benefit is gained by resting the range for only part of the normal grazing period." He concluded that rest-rotation would stimulate range more rapidly than deferred or rotation, but all are better than season long grazing.

Comment 25-10 (Natural Resources Defense Council, Inc.)

The proposed action contains no acknowledgement of the past problems involving AMPs and no safeguards designed to ensure that they will not occur in the future.

Response

The past problems with the Allotment Management Plans (AMPs) (page 2-50 paragraph 1 and 2 of the Environmental Statement) include lack of sufficient levels of manpower and funding to provide the needed evaluation and supervision of the plans. These factors combined with overstocking have contributed to our present problems with AMPs. Our future objectives are to implement a comprehensive studies and evaluation program. However, the success of such a program is contingent upon annual appropriations and cannot be assured. The impacts in the Environmental Statement have been analyzed based upon the

assumption that sufficient controls (manpower and funds) would be available. (See p. 3-1, item 3.)

Comment 25-18 (Natural Resources Defense Council, Inc.)

We suggest that the final version consider the possibility of allocating some of the proposed increases to the affected ranchers, especially where substantial increases are involved.

Response

According to the Code of Federal Regulations Circular 2443, Nos. 4410.3 and 4410.5:

> Additional forage permanently available for livestock grazing use shall first be allocated in satisfaction of grazing preferences to the permittees... authorized to graze in the allotment in which the forage is available...forage...over and above the preferences of the permittee...may be allocated in the following priority to:
>
> 1) Permittees...in proportion to their **preferences** or in proportion to the permittee's...contribution or efforts which resulted in increased forage production; or
>
> 2) Other qualified applicants...on the basis of any of the following factors:
>
> a) Historical use of the public land;
> b) Proper range management and use of water for livestock;
> c) General needs of the applicant's livestock operations;
> d) Public ingress or egress across privately owned or controlled lands to public lands;
> e) Topography
> f) Other land use requirements unique to the situation.

Comment 27-2 (Tina Nappe)

The EIS should address allocation of forage in three stages. First is the allocation of forage for 1980 and the improvements that can be made with existing funds. The second phase should cover a five-year span and describe those range improvement projects, including alternatives, and their beneficiaries based on assured funding. The 35-year year (sic) projection is the agency's "wishbook" and is surely contingent upon the availability

of extra funds. The public should be given the choices and the opportunity to prioritize projects.

Response

The schedule for allocation of vegetation and the proposed improvements was generally developed considering the Bureau limitations on funding (p. 1-9, paragraph 1 of the Environmental Statement). However, as noted, the proposed improvements would require additional manpower and funds for implementation. The 35-year time frame was used as a ecological limit on when the benefits of the intensive management to the vegetative, wildlife, and soils resources of the area would be noted.

Comment 28-4 (Nevada Outdoor Recreation Association, Inc.). Also see Comment 28-10 in Appendix I.

The reader...is not given enough information to determine impacts unless he has prior knowledge of who has preference on what allotment(s), in and out of the ES area. With more thorough data, the reader could discern, for Caliente at least, whether reductions indeed hurt an operator and whether increases in fact amount to much in terms of total herd sizes.

Response

Text revised. A table which illustrates grazing adjustments for each operator has been added to Appendix G.

Comment 28-11 (Nevada Outdoor Recreation Association, Inc.)

The impact of spreading livestock onto "underutilized" range should be mitigated by several means: fence off "special" plant species populations (it is not enough to assume that unpalatability will save them) and relict plant communities; provide additional waters for wildlife only; do not put livestock onto "new" range that is of low productivity.

Response

As stated on p. 4-2 of the Environmental Statement (ES), a field study would be required to determine the exact nature and extent of the endangered plant species in the ES area. Pending that study, special mitigation would be meaningless due to the lack of site-specific information. Presently, no known relict plant communities exist within the ES area.

The waters required to support wildlife are not a point of discussion in this ES; however, currently the ES area has numerous (40+) waters developed for quail, and several springs and guzzlers will be developed in the near future for deer and other wildlife.

It is the Bureau's policy not to allocate vegetation on range which does not meet production criteria (32 acres/Animal Unit Month).

Comment 29-1 (Thomas Ballow)

RECOMMENDED ALTERNATIVE.

We recommend a new alternative that would include the following:

1. No reductions in livestock grazing on any allotment.

2. Accelerated range improvement projects on all allotments including on those allotments the proposed action scheduled for elimination or reduction in grazing. The range improvements would include the removal of Pinon-Juniper and Sagebrush by chaining, burning, or other means and reseeding to desirable grasses and shrubs that are suitable for livestock and wildlife and which are good for watershed improvement and for prevention of soil erosion. Livestock water developments would include spring developments, pipelines, troughs, reservoirs, guzzlers and other livestock and wildlife water improvements to better distribute and control the grazing and allow better use of the forage. The schedule of improvements would be accelerated and begin now rather than waiting for all individual AMP's to be completed. This would eliminate the need for any livestock reductions.

3. Increases in livestock and wildlife grazing in all allotments as range improvements and conditions permit.

4. Removal of excess horses in all areas except two small herd management areas where the horses would be near roads and readily visible to those who wish to visit them.

Response

The proposed alternative which is suggested has essentially been analyzed by various components within the Final Environmental Statement (FES).

1. Alternative One (Continuation of Present Management) assesses the impacts if the present livestock forage allocations program is continued.

2. Alternative Six (Reduced Management Intensity) describes a situation wherein the proposed range improvements would be implemented under an accelerated schedule. In addition, those allotments receiving the largest reduction in use were given a higher priority for development and implementation of the AMPs. The proposed improvements would include projects similar to those described by the commentor. The improvements were, however, still

tied to the development of an AMP prior to implementation.

3. Any increased forage production that results from range improvements (projects or conditions) would have to be allocated through the use of the Bureau's planning system or by a District Manager's decision. The projected increases of available livestock, wildlife, and wild horse forage has been analyzed throughout the proposed action and each alternative.

4. Alternative Seven in the FES was developed in conjunction with local public input within the ES area. It presents a proposed wild horse management level of less than 250 horses on three management areas which are near roads and, therefore, readily visible to the viewing public. The horses outside these recommended management areas or numbers would be removed.

As described above, the four specific management options recommended by the commentor have been included within the FES and are available for the decision-makers when the final vegetation allocation program is determined.

Comment 29-6 (Nevada State Department of Agriculture)

It was assumed (Page 1-9) that the proposed action would: "d. Improve working relationships with livestock operators." This is an erroneous assumption because the proposed action and six alternatives would reduce grazing and actually reduce or take away the livelihood and way of life for many ranchers. This certainly will not improve relations.

Response

The title of the section containing item "d" is Purpose and Objectives. Improving working relationships with livestock operators was determined to be a desirable objective of the Bureau's program. Without positive working relationships with the livestock operators in the Environmental Statement area, a viable, productive range management program cannot be achieved.

Comment 32-1 (Nevada State Department of Conservation and Natural Resources)

Therefore, mitigation of range deterioration, due to the probable and continued inability of BLM to manage forage for long term values, needs to be addressed in the ES. In this instance, mitigation of range deterioration should not result in the simplistic solution of cutting forage allocation indefinitely for domestic livestock. The ES needs to state what guarantees are built into BLM management capabilities and proposals to avoid this deplorable yet potential state of affairs.

Response

The goal of a livestock grazing management program such as in Caliente is to achieve a vegetation allocation program which improves vegetation production for livestock, wildlife habitat, and watershed conditions. As stated on p. 1-9, first paragraph of the Environmental Statement, the Bureau would like to implement the desired intensive grazing management program in three to seven years. However, funding and manpower would probably not allow this to occur; therefore, a 10 year implementation time frame was used for the purpose of analysis.

Public Hearing Comment (Caliente transcript, p. 24, line 8)(Tom Ballow). Also see St. George transcript, p. 48, line 1.

One of the statements in the draft indicated that all range livestock would have to have Bureau of Land Management eartags placed in the ears of the livestock and indicated that that was the best means of identification of livestock. I object to that.

Response

As stated in paragraph six, p. 1-22 of the Environmental Statement "...marking of livestock would be implemented, as required, to control numbers and movement of livestock while insuring proper forage use. The preferred method of marking is ear tagging." The type of marking is at the manager's discretion.

Climate

See response to Comment 7-2 in the Social Economics section of this chapter.

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Soils - Watershed and Erosion

Comment 2-3 (Soil Conservation Service -Reno)

Erosion - The assumption was made that these data pertain to sheet and rill erosion. No data or summary is presented for gully, trenching or streambank erosion. Also, no mention is made of corrective measures that may be implemented to reduce these losses or to improve the environment.

Response

Gully, trenching and stream bank erosion were considered during the watershed conservation and development inventory on which these data are based. See page 2-12, paragraph two of the Environmental Statement. Areas of severe and critical erosion classes were identified in the Watershed Conservation and Development inventory process (BLM Manual Section #7322). The purpose of the Environmental Statement (ES) is to analyze the effect of grazing on the environment; it is not the purpose of the ES to develop site-specific plans for control of gully erosion. This aspect would be considered when Allotment Management Plans were developed and specific range improvements were proposed.

Public Hearing Comment (Caliente transcript, p. 52, line 15)(Dave Secrist)

Natural processes of erosion due to wind and water always have and always will take place. No attempt is made to qualify natural erosion as a part of the overall erosion process referred to in the environmental statement area.

Response

Erosion calculations were done using the Universal Soil Loss Equation which gives estimates for gross soil loss and includes natural geologic erosion. No studies are known that address the geologic erosion rates or associates them to calculated erosion rates.

Public Hearing Comment (Caliente transcript, p. 52, line 20)(Dave Secrist)

Wild horses, vehicle use and other land uses not related to livestock are major contributors to soil surface disturbance.

Response

Land uses not related to grazing of the range by ungulates (cattle, horses, burros, deer, sheep, etc.) were assumed to

remain constant throughout the analysis period (35 years). Soil surface disturbance associated with these land uses was held at a constant rate (i.e., no change). The impacts associated with wild horse use of the range were considered throughout the analysis particularly in alternatives where wild horse populations may be manipulated. See pp. 4-1 and 3-4 of the Environmental Statement.

Public Hearing Comment (Caliente transcript, p. 52, line 23)(Dave Secrist)

...no mention has been made of the positive contribution of livestock in controlling soil erosion. For example, livestock make a major contribution in the reestablishing of forage by the trampling effect which plants new seeds and conditions the seed for germination. Livestock also are major contributors to increasing forage production by scattering seed and fertilizing areas to promote plant growth. While much technical data exists proving a very significant positive impact livestock grazing in controlling soil erosion, this environmental statement makes no reference to that data.

Response

Trampling of seeds by livestock does help establish new plants. This is discussed in Chapter 3, Impacts on Vegetation, page 3-9 of the Environmental Statement. Seed scattering and fertilizing by cattle is effective in the humid regions of the world; however, in an arid desert the lack of moisture prevents the breakdown of manure into usable nutrients for plants. This is evidenced by the long existence of cattle feces over the range. Also, the influence of grazing animals in adding fertilizer to the soil is probably not of material value; for the animal, in reality, removes rather than adds fertility. (Stoddard and Smith, 1955)

Water Resources

Comment 17-1 (Geological Survey)

The statement should summarize pertinent details of the occurrence of ground water, particularly the aquifers tapped by the existing and planned wells and by springs. Special emphasis should be given to shallow or unconfined aquifers that are utilized in the project and to springs and wells tapping fractured rocks. The discussion of herbicide application should include plants to protect springs and wells and to monitor ground water where supplies are obtained from relatively shallow unconfined or fractured - rock aquifers.

Response

No impacts to groundwater systems are anticipated. The herbicides-pesticides intended for use in chemical treatments are biodegradable, with some types subject to photodecomposition. After percolating through the soil and being chemically acted upon by the soil microorganisms, these herbicides-pesticides would not pose a threat to the shallow aquifers. See Appendix H.

Comment 31-1 (Nevada State Division of Water Planning). Also see Comment 30-4 in Appendix I.

Chapter 2, Description of the Environment: The section on the water resources of the area included in the Environmental Statement (ES) does not address the groundwater resources. Throughout the report an estimated perennial yield from the hydrographic basins are stated as being 110,000 acre-feet (page 3-6), however, there does not seem to be any source cited for these data.

Response

No measurable impacts to groundwater resources are anticipated to result from the proposed action. The 110,000 acre-feet estimated for perennial yield was derived by totalling the perennial yield values for hydrographic basins within the Environmental Statement area, as given in Water for Nevada, Report 3, Nevada's Water Resources (Nevada State Engineer's Office, 1971).

Comment 31-2 (Nevada State Division of Water Planning). Also see Comment 30-3 in Appendix I.

Chapter 3, Environmental Impacts of the Proposed Action: There will be a deterioration of water quality as a result of the proposed action. Yet, there is no discussion of mitigation measures for water quality in Chapter 4. In Chapter 5, Unavoidable Adverse Impacts; increased suspended sediment load due

to stream bank sloughing is predicted (8 - 10), this might be an appropriate opportunity to use Best Management Practices as developed by the State's 208 planning process.

Response

The conclusion in Chapter 3 (p. 3-8) states: "Water quality would benefit by the proposed action." Since water quality would generally improve, no water quality mitigating measures are proposed. Chapter 5, Unavoidable Adverse Impacts, does not predict any water quality degradation. The conclusion on p. 8-10, Alternative One - No Action, stating that "stream bank sloughing would increase because of reduced streamside vegetation" refers only to the 53 miles of streams undergoing deterioration of streamside vegetation under present management conditions.

Vegetation

Comment 2-2 (Soil Conservation Service - Reno). Also see Comment 8-3 in Appendix I.

The grazing management systems mentioned in this ES do not properly address:

1. Protection of the remaining riparian habitat from further deterioration;

Response

The grazing management treatments indicated in the Environmental Statement (ES) are possible systems that could be used. Specific protection measures for riparian areas not covered in the ES would be determined at the time of Allotment Management Plan or Habitat Management Plan development when site-specific conflicts and needs would be identified.

Standard Operating Procedure 17 on p. 1-15 in the ES provides for fencing around spring developments to prevent trampling and overgrazing of adjacent riparian vegetation. See also mitigation measure three on p. 4-2. It provides for protection of riparian vegetation on five miles of Clover Creek.

Comment 9-3 (Mr. & Mrs. George Rowe)

Also - the area down Rainbow Canyon - Ash Flats, etc. on to Elgin has been declared "No Grazing". Anyone living in Caliente - Elgin Area can see what taking the Ranchers Cows out of the Canyon has done.

Response

Alternative Seven proposes that 43 Animal Unit Months of vegetation be allocated on the Ash Flat allotment and reclassified to ephemeral-perennial range which may also allow use of ephemeral forage when it is available.

Meadow Valley is proposed to be classified as ephemeral in Alternative Seven, and grazing may be allowed when ephemeral forage is available.

Comment 11-1 (Bureau of Reclamation)

Impacts on vegetation in Chapter 3 are described only in terms of forage and are difficult to relate to the various vegetative communities described in Chapter 2.

Response

Appendix E, Section 1, Table E-1 gives the acres per vegetative type by allotment, and Appendix E, Section 2, Table E-2 gives the associated species generally found in each vegetative type in the Environmental Statement area. Since the allocation process primarily concerns forage species and impacts to vegetation are mainly on the forage species, it is felt this analysis adequately covers the situation.

Comment 18-1, (Lavette Tennille). Also see Comment 19-3 in Appendix I; and Public Hearing Comments (Caliente transcript p. 27, line 3; p. 30, line 15.)

On page 1-40 table 1-3, it states that the season of use for the Applewhite Allotment is 5/1 - 10/31. This is in error. It is year long.

Response

Text revised.

Comment 18-3 (Lavette Tennille). Also see Public Hearing Comments (Caliente transcript, p. 27, line 12; p. 30, line 19.)

A proposed endangered species E-1 (MENTZELIA LEUCOPHYLLA), and again on page 10-9 as an explaination (sic) of the species, it states that "although it is reported from an area south of Caliente (meadow valley wash), this species is actually known only from Ash Meadows in western Nevada. Most likely the local species is M. OREOPHILIA, a closely related species. Taxonomy confused! So this statement contradicts what is on the map.

Response

As shown on the Threatened and Endangered Flora Map, a herbarium specimen of Mentzelia leucophylla was reportedly collected at the location shown. However, a field check by a U.S. Fish and Wildlife Service botanist did not verify the species. Observations of a closely related species (M. laevicaulis) indicate that the taxonomy may be confused. Further inventories are needed to be varify this species' location.

Comment 18-4 (Lavette Tennille). Also see Public Hearing Comments (Caliente transcript, p. 27, line 20; p. 33, line 13.)

On page 2-38 of the Livestock Forage Condition map, it shows all of the Applewhite Allotment, except the Meadow Valley Wash area, to be in "fair condition". Yet the grazing is being cut 100%.

Response

As stated on page 2-23 of the Environmental Statement, range condition (livestock forage condition) does not refer to ecological condition or productivity but refers instead to quality and quantity of forage of each vegetative type for the kind of livestock authorized to graze on each allotment. Condition class was determined from the percentage of plants in each of three classes (desirable, intermediate, or undesirable for livestock) which make up the total composition of all plants in the vegetative type. Therefore, an area may have sparse plant density, but still be in good condition if the plants present are either in the desirable or intermediate classification. Livestock grazing is proposed for allocation only on suitable range (i.e., 32 acres/Animal Unit Month or less, within four miles of water, and on less that 50 percent slope). Since no range meeting these criteria was found by the range survey, no vegetation was allocated.

Comment 19-4 (James B. Tennille). Also see Comment 18-2 in Appendix I; also Public Hearing Comments (Caliente transcript p. 27, line 8; p. 30. line 25.)

On page 10-9 it also says that the threatened species, shown on the map, occurs at 2,000 to 2,500 ft. elevation. The lowest point in the Applewhite Allotment is 4,000 ft.

Response

The elevational range for this species was incorrectly shown in the text. The actual habitat range as reported by Holmgren et al. (1977) is 2,000 to 5,000 feet. The table has been changed to show this revision.

Comment 21-2 (Dennis Iverson)

When annual plants are available it is rediculous (sic) to remove cattle the last 2 months in the Spring on these effemeral (sic) ranges.

Response

On allotments which are classified as ephemeral, livestock grazing may be allowed when ephemeral forage is available.

Comment 23-1 (Soil Conservation Service - Reno)

However, we encourage an effort to tie your inventory to soils and range sites so that range condition can be based on potential rather than ocular estimates of the present vegetation.

Response

An effort was made to correlate the range survey to the soil survey using range sites. The range sites for the Caliente Environmental Statement (ES) area are still in an initial draft stage, and some of the soil survey areas are yet to be tied to these range sites. Ideally, the correlation of soil survey information to range sites should be completed prior to the initiation of range survey work. This could not be done in the Caliente ES area because of time limitations.

Comment 25-9 (Natural Resources Defense Council, Inc.)

We could find no point in the draft at which the benefits of management were specifically identified and separated out from those attributable to water development and vegetative manipulation.

Response

Paragraph two, p. 3-12, discusses the reasons for the expected improvements in livestock forage conditions through management, vegetative manipulation and water development. Additional 'benefits' (wildlife, soils, livestock, wild horse, and economic) are discussed in Chapters 3 and 8.

Comment 25-11 (Natural Resources Defense Council, Inc.)

...the EIS does not contain any of the criteria utilized to identify the allotments or areas in which such projects are being considered. It presents no information about the potential productivity of those areas.

Response

Paragraph four, p. 1-13, states that range improvement projects"...are an estimate based on professional judgment and analysis." In addition, Bureau manuals and guidance would be utilized to analyze the future improvements when Allotment Management Plans are developed.

Paragraph four on p. 3-10 and paragraphs one and two on p. 3-11 state that there would be approximately 23,365 additional Animal Unit Months (AUMs) provided from mechanical treatment; 5,859 additional AUMs from chemical treatment; and 10,900 additional AUMs from burning projects. Appendix E, Section 6, p. 10-58 gives the methodology for determining the possible production of the vegetation treatments.

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Comment 25-12 (Natural Resources Defense Council, Inc.)

It states that seedings will involve native species either alone or in combination with other species, but contains no information about the success of such seedings in the area under either circumstance.

Response

This Environmental Statement assumes that the Standard Operating Procedures outlined in Chapter 1, pp. 1-13 to 1-15 (which require that an Environmental Assessment be written, detailed soils inventories be completed, and the seeded area be protected from grazing for a minimum of two years to allow establishment) would be followed. Over 29,000 acres of land have been previously treated by chaining or plowing and reseeding. Generally, these projects have been successful. (Caliente URA Step 2).

Comment 26-1 (Nevada State Conservation Commission)

The basic data from which proposed decisions are based was developed from assumptions. One example is that livestock removal will result in more forage. Scientific study however, shows that some plant species must be "trimmed" for optimum growth and others utilize the movement of hooves for "planting".

Response

The data base used to predict future conditions was a field inventory of the vegetation resource completed in the Caliente Environmental Statement area. In addition, scientific studies done in the western United States (e.g., Hughes, 1978; Mueller-Dombois and Ellerberg, 1974; and Gray, 1965) in comparable type areas were used because of a lack of specific studies done in Nevada. It is agreed that some plants do have to be "trimmed" for optimum growth, but there are many more that would increase without grazing pressure. Also, there are other methods for the natural planting of seeds, such as wind, water action and natural action of the seeds. When evaluating the impacts to the vegetation resource, all factors which may have impacts on vegetation must be considered.

Comment 28-2 (Nevada Outdoor Recreation Association, Inc.)

These authors state that p-j projects on the xeric aspects-south and southwest-are best for deer needs; does this square with project planning for livestock forage?

Response

As stated on p. 1-13, paragraph four of the Environmental Statement, the improvements were not developed in conjunction with detailed Allotment Management Plans and are an estimate based on professional judgment and analysis. A detailed analysis of each site would be made prior to any vegetation manipulation project with regard to the feasibility, project design, and location. Treatments would be done on those areas which would be productive and beneficial to the resources under consideration, e.g., wildlife, livestock, wild horses, watershed, etc.

Comment 28-6 (Nevada Outdoor Recreation Association, Inc.)

There should be expanded discussion of phenology, with its very crucial role in determining turnout times and the specifications of grazing treatments. ...the ES should carry a discussion of how phenological data are translated into range management actions---deferral, setting seasons, rest, use of ephemeral ranges, and so forth.

Response

Refer to p. 1-10 of the Environmental Statement (ES) which discusses grazing treatments as related to phenology. Also refer to p. 2-24 -- and Table 2-10 which presents a general discussion on the phenologic data available and gives a tabular portrayal of data in the individual species studied.

Comment 28-7 (Nevada Outdoor Recreation Association, Inc.)

The use of three classes for livestock range condition, "poor", "fair", and "good", may be BLM procedure, but it prevents assessment of condition for other uses, does not reflect standard breakdowns (e.g. SCS procedure), and omits "excellent" condition. If "excellent" condition is not acknowledged, we cannot find it on the ground or specify it as a goal of management.

Response

The predicted change in livestock forage condition stated on p. 3-13, Table 3-5 and in Table 8-63, p. 8-146 of the Environmental Statement (ES) shows 1,020,000 acres improving from "fair" to "good" condition. Appendix E, Section 5, p. 10-52 gives the methodology for predicting future condition. Criteria for determining livestock forage condition is stated on p. 2-23, paragraph 2 under the heading Range Condition and Trend. Bureau procedures, not Soil Conservation Service procedures, were followed to determine livestock forage condition.

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Comment 28-8 (Nevada Outdoor Recreation Association, Inc.) Also see Comment 25-2 in Appendix I.

After comparing condition and vegetation maps, we found that "poor" condition is largely synonymous with creosotebush and blackbrush types, not noteworthy for their forage production or treatment potential. May one assume that they are otherwise in satisfactory condition, and that essentially no change in the acreage of "poor" condition range over the next 35 years is inevitable and acceptable?

Response

The creosote bush and blackbrush types generally occur in an edaphic climax community where forage plants exist in sparse density or are nonexistent. Therefore, because of the loss of soil, low rainfall, and frequent drought, treatments on areas of this type are unfeasible. Also, the 35-year time frame would not be long enough to observe any significant change, even with total protection.

Comment 28-12 (Nevada Outdoor Recreation Association, Inc.). Also see Comment 28-3 and Comment 28-13 in Appendix I.

WO Instruction Memorandum 78-84 leads us to believe that "it is necessary to estimate the potential natural plant communities for public lands, for use in....grazing ES's, and in activity planning for various resources" (p. 1 of memorandum). Vegetation descriptions in the ES do not reflect the concept of potential natural vegetation, but only refer to existing cover. We trust that smaller-scale mapping and writeups will be done, and that vegetation units will reflect potential and present departure from it.

Response

Paragraph one, sentence four, p. 1-9 of the Environmental Statement states: "The vegetation, wildlife, and wild horse monitoring systems are ongoing." This monitoring includes grazing exclosures and comparison areas. The range survey method used did not require use of comparison areas to determine range site potential and is not a part of the ocular reconnaissance system. Bureau of Land Management directives which are referred to are associated with the new Soil Vegetation Inventory Method which was adopted by the Bureau in 1978.

Comment 29-5 (Nevada State Department of Agriculture)

Actually, scientific study results in Nevada show that elimination of livestock eliminates the desirable features of hooves planting the seed underground where it will grow. The forage when not

removed by grazing animals causes lodging and plant stagnation. Proper grazing by livestock actually stimulates plant growth.

Response

It is agreed, and these factors were taken into account during the analysis of the impacts from the proposed action and the alternatives, especially Alternative Two, Elimination of Livestock, Wild Horse and Burro Grazing. However, it is felt that the proposed action would establish proper grazing where it is not now occurring.

Comment 34-6 (Nevada State Department of Wildlife)

The proposed grazing system will have an adverse impact on mule deer winter range especially Purshia tridentata areas. Ten months of grazing on these perennial ranges is not much improvement from the current yearlong situation. Grazing seasons of use should be designed to be compatible (sic) with key plant phenology and proper utilization.

Response

Refer to p. 1-13, paragraph one of the Environmental Statement (ES), which states: "These grazing treatments are the 'building blocks' of the allotment-specific grazing systems..." They are proposed for the allotments shown based on phenology of the key forage species, vegetation types, range conditions, and presence of perennial streams. Also refer to p. 1-9, paragraph four of the ES, which states that periods-of-use for Allotment Management Plans (AMPs) would be based on key forage species phenology and AMP objectives. Treatment 2 on p. 1-10 provides 16 months rest for P. tridentata once every five years to allow for increases in seed production, litter accumulation, and vigor.

Comment 34-13 (Nevada State Department of Wildlife)

Vegetation on proposed non-AMP areas (p. 4-2) would continue to be degraded with the proposed continuation of early spring and fall grazing.

Response

Refer to p. 3-9, paragraph three (last two sentences) of the Environmental Statement which states: "On all ten allotments the proposed period-of-use requires that a rest be provided from 4/1 to 10/30. Therefore, the adverse effects on vegetation should be lessened." It was felt that with this long period of rest during the critical growing period, the adverse effects associated with late spring and early fall grazing would be almost eliminated and would be insignificant.

Comment 34-14 (Nevada State Department of Wildlife)

The proposed action is designed to meet B.L.M.'s State Office mandate of "two months off the range" rather than the requirements of proper plant utilization, which in the final analysis reflects on soil and water condition and the viability of the wildlife resource.

Response

When applied during the forage plants' critical growth period, the policy of "two months off the range" is designed to meet basic requirements for proper plant utilization. See Chapter One, p. 1-13, paragraph one, for further explanation of selection of grazing systems.

Public Hearing Comment (Caliente transcript, p. 25, line 20) (Tom Ballow). Also see Comment 29-4 in Appendix I; also Public Hearing Comments (Caliente transcript p. 42, line 13; p. 70, line 25).

...if you eliminate livestock grazing, within a very few years you'll have large stands of cottonwood trees and willows and tamaracks which would completely clog that drainage system through that wash, and it will be a real hazard at flood times not only to the new highway down there but also to the railroads.

Response

It is felt that the velocity of water moving down Meadow Valley Wash causes the major damages sustained by the railroad and highway. Removal of phreatophytes also increases channel scouring and watershed instability (Heady, 1975). Vegetation is probably limited because of the velocity of the water and resultant debris and not because of the present livestock grazing.

Public Hearing Comment (Caliente transcript, p. 27, line 24) (Lavette Tennille). Also see Comments 9-2, 18-5, 19-5 in Appendix I; also Public Hearing Comments (Caliente transcript p. 31, line 13; p. 37, line 9; p. 31, line 18; p. 33, line 24; and p. 69, line 3).

I feel that due to our half of the Apple White allotment being in the eight to ...16 inch precipitation area, page 2-2 on the average annual precipitation map, due to the slope factor being in error, and due to three vegetative treatment plans being proposed along the fence line of this allotment, page 1-32 on the range of vegetation treatment map, the Apple White allotment should be considered for vegetative treatment especially since the terrain on one side of the fence is the same as on the other.

Response

Alternative Seven in this Final Environmental Statement proposes 4,983 acres of vegetation manipulation on the Applewhite allotment and proposes to change range classification to ephemeral-perennial.

Public Hearing Comment (Caliente transcript, p. 39, line 13) (Connie Simkins)

In chapter three, page 38 [Ed. note: 3-8], impacts on vegetation, and it says, "Although not conducted within the environmental statement area, they are believed to be applicable." Well, I submit they ought to be absolutely applicable, and they ought to be conducted in this area before they have any effect of any kind of change one way or the other on our area.

Response

Although the cited studies were not conducted within the Environmental Statement area, they are believed applicable since the data concern basic plant requirements. Further, these data were used because of a lack of studies conducted on vegetation and range in Nevada. Martin (1975) states that by providing for plant reproductive needs and establishment, similar responses should generally result regardless of location. The cited studies were not used to make a change in the use levels of the area. The range survey establishes the recommended allocation levels. The studies serve to substantiate the professional judgement of the ES preparers on the predicted impacts of the proposed grazing management program.

Range Survey

Comment 14-1 (Paul T. Tueller)

...it must be pointed out that 1977 was an extremely dry year. We have found that Nevada shrub ranges can show as much as a 1200% difference from one year to the next. This of course can easily confound production estimates based on a single year.

Response

It is recognized that a variation in production can occur on desert rangeland. The section on ephemeral range on p. 2-24, paragraph four of the Environmental Statement says that studies found a range in ephemeral forage production of from 0 to 2,350 lbs./acre. But the range survey procedure used related only to crown densities (basal cover) and composition of the vegetation, and these densities were used to determine carrying capacity. It is felt that crown densities of perennial vegetation fluctuate little between wet and dry years.

Comment 15-1 (Lincoln County Conservation District)

There is ample evidence which gives us reason to believe that these range surveys, being made during drought years, do not present an accurate picture of forage capacity.

Response

Records show that precipitation was above average in Caliente in 1976 and 1977. See average precipitation portrayed in Table 2-1 of the Environmental Statement which shows 8.7 inches average precipitation. Records for 1976 and 1977 show 12.33 inches and 8.83 inches of precipitation, respectively.

Comment 19-1 (James B. Tennille). Also see Comment 9-1 in Appendix I; also Public Hearing Comments (Caliente transcript, p. 28, line 24; p. 69, line 9.)

Their figure of 20,265 acres, which is 67% of the Applewhite Allotment, as consisting of 50% or greater slope is in great error. I have the 7.5 minute U.S.G.S. Quad maps that contain the Applewhite Allotment. By carefully scaling the maps and shading the areas of 50% or greater slopes, I have arrived at a completely different figure. My computations for the 50% or greater slopes were 26%. A difference of 41%. In a letter I received July 7, 1979, from Mr. John Boyles, he stated that the slope determinations for the Applewhite Allotment and all the other allotments, were obtained with the use of abney hand levels. It

would take thousands of readings with these hand levels to arrive at an accurate figure in the Applewhite Allotment alone.

Response

The range survey calculations for the Applewhite Allotment have been reviewed by BLM and are felt to be correct. However, an additional field review of the slope deductions will be conducted prior to the issuing of any decisions for the Applewhite allotment.

The classification of a particular rangeland area as unsuitable does not necessarily mean that the area will not receive livestock use; rather it indicates that the available forage on the unsuitable area should not be allocated to livestock use. Allocation of the vegetation produced on rangelands classified as unsuitable generally results in over obligation and abuse of adjacent suitable ranges. For examplle, before livestock will significantly utilize the forage on slopes greater than 50 percent or in areas farther than four miles from water, the more suitable rangeland within the area would normally be used heavily and repeatedly. The over utilization of available forage through credits of forage from unsuitable rangelands has contributed greatly to range deterioration and damage to other resources.

Comment 19-2 (James B. Tennille). Also see Comment 24-7 in Appendix I; also Public Hearing Comments (Caliente transcript p. 30, line 8; p. 69, line 14.)

The vast majority of the Applewhite Allotment was never tested. These tests are supposed to be representative samples of the range.

Response

Locations of transects were based on the professional judgment of the surveyor after examination and evaluation of the entire vegetation type. Transects were then done in the area which appeared to be the most representative of that vegetation type.

For large areas of a vegetation type more than one transect was done in scattered representative locations. The transects were then summarized and one write-up sheet was made, representing the entire vegetation type. This was done on some vegetation types in the Applewhite Allotment. In many cases a vegetation type extended across several allotments and the representative transect site might have been outside a particular allotment.

Comment 21-1 (Dennis Iverson). Also see Public Hearing Comment (St. George transcript, p. 40, line 17).

Almost every year there are some annual plants for livestock to consume. There are no apparent A.U.M.'s being allowed for these annual plants.

Response

The range survey did consider annual vegetation and these plants were used when the carrying capacity for each allotment was computed.

Also, BLM Regulations provide that additional forage temporarily available for livestock grazing...may be authorized on a non-renewable basis to qualified applicants for livestock grazing use at the discretion of the authorized officer if this use is consistent with the land use plans.

Comment 26-2 (Nevada State Conservation Commission)

The data base for the range survey was of such a short duration (1976-77) that the statistical reliability of projecting up to 35 years into the future is highly suspect. Elevation, growing season, native vegetation, percentage, grazing tend (sic) over the past several years, and range and water impoundment improvements must all be evaluated on each allotment.

Response

Predictions based on the range survey were not meant to be statistically reliable; these predictions are intended to give an approximate picture of what could occur based on the best available data. The methodology for predicting future production and condition (as described in Appendix E, Sections 5, 7, 8, 9 and 10 pp. 10-52, 59, 60, 62 of the Environmental Statement) considered vegetative type, composition, precipitation, and type of grazing management.

Comment 28-5 (Nevada Outdoor Recreation Association, Inc.). Also see Public Hearing Comment (Caliente transcript, p. 55, line 107.)

There should be a map of rangeland suitability (of necessity somewhat generalized), so that the reader can determine the relation of grazed and grazable range to other features, values, and resource situations. With respect to water development, for example, it would be advisable to display "potentially suitable" so that it can be overlaid with tortoise or bighorn habitat. A further subdivision of the "potentially suitable" category should

be made where possible, in accord with the definition supplied on page 2 of WO Instruction Memorandum No. 78-134.

In relation to the above, please show where (a) the 491,000 acres of presently waterless range are; and (b) where the grazed areas of low productivity, with no forage allocated, are, if not covered by one or more of the "suitability" categories.

Response

Range survey maps and carrying capacity figures were utilized in determining rangeland suitability. Included were areas which were potentially suitable with water development, areas unsuitable due to low production, and some areas unsuitable due to slope and other terrain restrictions. The areas not presently serviced by Bureau authorized water sources are also portrayed on these maps. The range survey maps are at a scale of one inch to the mile and provide a detailed means of portraying the data base for analysis purposes. Range survey maps are available for public review in the Las Vegas District office. No maps specifically showing areas of 50 percent slope or areas grazed but unsuitable due to low productivity are presently compiled. However, all areas are covered by at least one of the Las Vegas suitability criteria.

Washington Office Instruction Memorandum No. 78-134 was issued March 17, 1978, and did not apply to the range survey completed in the Caliente Resource Area in 1976-1977. The suitability criteria utilized by the Las Vegas District is outlined in Appendix A of the Environmental Statement.

Public Hearing Comment (Caliente transcript, p. 58, line 14) (Dave Secrist)

The Draft Environmental Statement contains no basic range survey data. Numerous attempts by involved individuals to obtain base range survey data has been futile. It is impossible to make meaningful comments on the conclusions about range conditons (sic) as stated in this Draft Environmental Statement until the BLM is willing to make available its base data.

Response

The range survey data is available for public review in the Las Vegas District office of the BLM. Also refer to Appendix E, Section 3, pp. 10-39 to 10-47, for a description of the inventory procedures and methods of calculating production.

Public Hearing Comment (Caliente transcript, page 58, line 1)(Dave Secrist). Also see Comments 14-2, 15-3, 26-3, 29-2, and 29-3 in Appendix I; also Public Hearing Comments (Caliente transcript p.

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20, line 22; p. 21, line 20) (St. George transcript p. 21, line 20; p. 40, line 23; p. 40, line 25; p. 44, line 13.)

The suitability criteria are at best of highly questionable scientific reliability. Research upon which these criteria were developed for the most part involve conditions extremely foreign to the Caliente Resource Area.

Site specific analysis for this resource area demonstrates major variables exist which render the suitability criteria invalid as applied to the Caliente Resource Area.

Response

Suitability classification of rangelands for livestock grazing is considered as the capability of forage producing land to be grazed on a sustained-yield basis, under an attainable management system, without damage to the basic resources of the area or to adjacent areas. "Suitable" range should not be confused with "usable" range. Many areas can be grazed by livestock and are therefore usable, but these areas may not be suitable for grazing on a long-term basis because of the resulting damage to the area or adjacent areas.

Research information is consistent in showing that as the steepness of the slope increases, there is less utilization of forage. Steeper slopes (greater that 50 percent) are seldom utilized and when they are, it is only after damage to resources on adjacent, more gentle slopes. Literature review sources include Stoddard, et al. (1975), Cook (1966), and Phillips (1965). Numerous other references are available.

Readings on slope were taken at most transect locations. Applying professional judgement, it is felt that the range survey adequately determined areas with slopes in excess of 50 percent.

The value of four miles maximum allowable distance from reliable water is a liberal standard. Literature review indicates this is the maximum, even on level land. The distance from water should be much less on mountainous terrain (generally one mile or less). Literature review sources on this subject include Arizona Interagency Range Committee (1972), Phillips (1965), and Stoddart, et al. (1975).

Public Hearing Comment (Caliente transcript, p. 64, line 6) (Ken Lytle)

I say that your range survey is not uniform, because the allotment right next to us on N-4, which there isn't a fence, they got an increase, but we got a cut, and in the Simpson allotment--we've

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been protecting that allotment for--probably it's been fenced--I don't know for sure--probably ten to 15 years.

Response

The criteria used to determine forage production and suitability in the range survey was applied to all allotments in the Environmental Statement area (including the N-4 and Simpson Allotments) in the same way. Refer to Appendix E, Section 3, pp. 10-39 to 10-47, for a description of methodology for determining forage inventory procedures and production.

Public Hearing Comment (St. George transcript, p. 44, line 21) (H. Val Hafen)

There are three different places where the range conditions, according to this survey, change abruptly from good range to bad range. We submit that this is not possible in the areas shown. There is no major variance in either the terrain or the forage to the human eye as you ride across it on horseback.

Response

Changes in range condition are usually associated with changes in vegetative types or sub-types. The lines between the different condition classes are drawn on maps as close as possible to the area of the change. In most cases, transition zones exist between these changes, making it difficult to observe on-the-ground. Changes in condition class can be attributed to differences in percent composition of desirable, intermediate, and undesirable forage species; these changes can occur within the same vegetative type or sub-type, and in many cases these differences are not readily apparent and were determined in conjunction with the range survey process. Also refer to the discussion on condition in the second paragraph, p. 2-23 of the Environmental Statement.

Public Hearing Comment (St. George transcript, p. 47, line 17) (H. Val Hafen)

Without trend studies, as stated in the ES that there are none, how can this environmental statement claim to know if current allotments are too high?

Response

Carrying capacity was determined from the range survey. When compared to current use, some allotments were found to have grazing in excess of the amount of forage found by the range survey. Trend studies are not needed to determine the amount of suitable livestock forage available.

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Public Hearing Comment (St. George transcript, p. 47, line 20) (H. Val Hafen)

We question why the Caliente District allowed only a five percent usage factor for the black brush whereas the Hot Desert District allowed a 15 percent usage factor, and where in several areas the only difference in a terrain or forage is an invisible line that divides one BLM district from another.

Response

Proper Use Factors (PUFs) are designed to allow proper use of a forage species without damage to other associated plants in a community. By assigning a higher PUF on less palatable plants (such as blackbrush) more desirable plants might, and probably would be, damaged before proper use was obtained on the less palatable species. Determination of PUFs is also based on associated plant species, period-of-use, class of livestock, past grazing use, etc. The PUFs were developed as described in Appendix F, Section 3 p. 10-39 in cooperation with a variety of range professionals (i.e., State and District BLM range and wildlife personnel; University of Nevada, Reno professors; a Soil Conservation Service range specialist; Nevada Department of Wildlife personnel; and an employee of the Science and Education Administration.)

Wildlife

Comment 8-1 (Wildlife Management Institute)

The overall reduction in bighorns from 763 to 635 is not acceptable (p. 3-16). The mitigating measure of "wait and see" (p. 4-2) for the Mormon Mountains will not do the job. Desert bighorns are objects of wide interest throughout the nation; any grazing program should provide for an increase of sheep by livestock reductions and/or fencing.

Response

The purpose of a Habitat Management Plan (HMP) (p. 4-2) is to identify and resolve conflict areas and determine if measures, such as fencing, are needed to exclude livestock from important bighorn sheep use areas and where those measures should be applied. An HMP in the Morman Mountains would encourage increases in bighorn sheep. The mitigating measure would not allow increased livestock use above present use, thus bighorn sheep populations would remain at present levels until such time as conflicts could be eliminated by HMP development.

Comment 35-4 (Nevada State Department of Wildlife). Also see Comment 8-2 in Appendix I.

Sometime ago I asked the Bureau of Land Management director to manage bighorn sheep habitats as horse and burro free. Sheep and burros compete for food and water. Also in areas of inadequate water, horse and burro competition can even make that range area very inhospitable for successful sheep populations.

The horse and burro free management was to be taken care of in the planning process as stated in Mr. Roland's (sic) letter. This E.I.S., however, does not address that issue and as such is not acceptable.

Response

A letter to the Department of Wildlife indicated that BLM would manage the bighorn sheep introduction area to be free of wild horses and burros. This area is located entirely outside the Caliente ES area. In the Caliente ES area, the BLM has agreed to manage bighorn sheep as a sensitive species as per BLM manual, Section 6840. With this in mind, the proposed action recommends removal of wild horses and burros from 90 percent of the total bighorn sheep habitat in the ES area. Wild horses and burros would be allowed only on a portion of the bighorn range in the Delamar Mountains (BY-3). See the Wild Horse Management Areas

map (Chapter 1) and the Big Game Areas map (Chapter 2) in this Environmental Statement.

Comment 25-13 (Natural Resources Defense Council, Inc.). Also see Comment 8-4, Comment 25-15, Comment 34-2, Comment 34-3, Comment 34-4, Comment 34-5, Comment 34-7, Comment 34-11, Comment 35-1, Comment 35-2, and Comment 35-3 in Appendix I.

Other than requiring the preservation of "islands of vegetation for wildlife habitat," (p. 1-27), it supplies no standards for the protection or enhancement of wildlife values in the selection and design of projects.

Response

Since the specific locations of the proposed projects are unknown, it is beyond the scope of this document to identify resulting site-specific impacts. However, site-specific Environmental Assessments would be prepared for all projects before construction (Standard Operating Procedure 2, p. 1-14 of the Environmental Statement (ES)). If it is determined at that time that serious impacts to wildlife would result from project construction, then the project would be modified or abandoned. In addition, Standard Operating Procedures Nos. 8, 11, 12, 13, 15, 16, 17 on pp. 1-14 and 1-15 are designed to enhance the value of projects to wildlife.

On p. 1-16 of the ES it is indicated that areas to receive vegetation manipulation would be seeded with a desirable mixture of grasses, forbs, and shrubs. "Desirable" implies those species not only beneficial to livestock, but to wildlife as well. In some instances vegetation manipulations could be implemented for the total benefit of wildlife, particularly where forage shortages occurred preventing reasonable numbers from being achieved. Standard Operating Procedure 10 p. 1-15 of the ES, indicates BLM Visual Resource Management design procedures would be utilized. The application of these procedures means that vegetation manipulations would be constructed to blend into the existing landscape by following contours and using irregular shapes. An increase in edge would result in further benefitting wildlife.

Comment 25-14 (Natural Resources Defense Council, Inc.)

It fails to consider relevant and applicable research indicating that the benefits of pinyon-juniper for vegetative improvement and deer and watershed protection are questionable. See Tausch and Tueller, Pinyon-Juniper Chaining in Eastern Nevada.

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Response

Personal communication with Dr. Tueller indicates the article referred is probably: "Plant Succession Following Chaining of Pinyon-Juniper Woodlands in Eastern Nevada," Journal of Range Management, 30 (January, 1977), 44-47. This article indicates deer use increased initially for five years after treatment, then began to decline to original pre-treatment levels as pinyon-juniper began re-invading the treatment areas. The article does not indicate that deer do not benefit from vegetation manipulations. It does point out, however, that "...any treatment not successfully removing nearly all trees in the treated areas will have a short life expectancy." In other words, the benefits to deer will last longer if a treatment is done in a manner that results in an almost complete kill of pinyon-juniper. This could be remedied easily by follow-up measures within a treatment area to kill any remaining trees.

Comment 27-4 (Tina Nappe)

The discussion of wildlife values is keyed into bighorn sheep, pronghorn, and mule deer. Since all three are game animals, wild horse groups may justify opposition to the proposal based on their criticism of sportsmen's groups and wildlife agency's desire to maximize "target" species. If a short description of how each of these species relates to nongame animals were included, then the value of maintaining the game species would be more clearcut. Similarly wild horse and livestock presence along riparian areas, inparticular (sic), could be described in terms of how it affects nongame species such as native fish, nesting sites, and food sources.

Response

Animals other than big game varieties are discussed on pp. 3-19, 3-20, 3-21, 8-14, 8-23, 8-24, 8-48, 8-70, 8-91, 8-92, 8-93, and 8-113 of the Environmental Statement.

Comment 27-5 (Tina Nappe)

It is not clear what the optimum wildlife populations of the three key wildlife species, or other game and nongame species, might be. Is 17,000 AUMS the optimum wildlife consumption need? If not, what is the justification for providing less to wildlife? For those improvements proposed how does BLM plan to ensure that these projects will not be co-opted in total by livestock as they have been in the past? If riparian protection is proposed, what is its priority in relation to range improvements?

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Response

The optimum wildlife populations based on present carrying capacity are the "reasonable numbers" of animals indicated in Table 2-11, pp. 2-28 and 2-29 of the Environmental Statement (ES). An exception is found in the five areas where forage shortages occur. The optimum population which could be supported or may be desired may change as a result of future management and vegetation manipulations which would increase carrying capacity. As new data are gathered regarding wildlife populations and as increased forage becomes available, future planning documents would be needed to reallocate Animal Unit Months to competing users. See footnote "d" and the last paragraph on p. 1-4 of the ES. Optimum numbers for other wildlife species are not available from the Nevada Department of Wildlife.

Before construction, all projects would be reviewed by a wildlife biologist to determine what measures would be needed to protect or provide for wildlife. A wildlife biologist would have input into writing and developing of Allotment Management Plans (AMPs) and Environmental Assessments. Standard Operating Procedures 8, 10, 11, 12, 15, 16, and 17 on pp. 1-14 and 1-15 of this ES would insure consideration of wildlife needs.

Riparian protection is proposed (see Wildlife Recommendation 3, Table 1-4, p. 1-30 of the ES. According to Standard Operating Procedure 1, p. 1-13, the priority of a project (e.g., fencing to protect a riparian area) would be determined during the writing and development of AMPs and Habitat Management Plans (HMPs) after all the particular needs are identified in an allotment of habitat area. However, Standard Operating Procedure 1 provides the District Manager or Area Manager with the option to allow construction of fences or other measures to protect a riparian area without an AMP or HMP where protection is deemed necessary immediately.

Comment 28-1 (Nevada Outdoor Recreation Association, Inc.). Also see Comment 2-1 in Appendix I.

The ES states that there are to be more AUM's for wildlife, explicity allocated, but no increase or modest increases in wildlife numbers. Reference to a "Reasonable Numbers Methodology" cannot quell value questions about how much wildlife is desirable in 2015, particularly when the Bureau intends to increase forage capacity for livestock by about 50%. Reductions in desert bighorn numbers, most pointedly in the Mormon Mountains, are unacceptable.

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Response

"Reasonable numbers" are above present populations of mule deer and bighorn sheep. The proposed action allows for expansion by allocating vegetation to these animals based on reasonable numbers. The amount of wildlife desirable in the future would be determined in future planning documents as more complete data becomes available. Also see response to comment 8-1 in the Wildlife section.

Comment 28-9 (Nevada Outdoor Recreation Association, Inc.)

Since there's a "feral animal" alternative (No. 3) that gives free rein to a kind of animal that nearly everyone agrees should be zoned and humanely reduced, should there be a "wildlife" alternative, one in between the proposed action and elimination of stock, burros, and wild horses? As the alternatives stand now, wildlife is alloted a narrow range of change under all alternatives (and the proposed action) except #2, plainly an infeasible one. Why not an alternative that allots, say, 30,000 AUM's to wildlife, but not at the cost of eliminating the large graziers?

Response

Alternatives Four and Five (in combination with vegetation manipulations provided for in the proposed action or Alternative Six) are examples of such alternatives. A combination of alternatives could be selected at the District Manager's discretion.

Comment 34-1 (Nevada State Department of Wildlife)

Continuation of livestock grazing within and in close proximity of bighorn sheep habitats is unacceptable. Current conflicts for space, forage and water are not resolved let alone the conflicts that will arise with increased grazing as proposed with water developments.

Response

It is agreed that current conflicts have not been resolved, thus no livestock increases on bighorn sheep ranges would be allowed until a Habitat Management Plan is completed. See Mitigation Measure No. 4, page 4-2 of the Environmental Statement and the response to Comment 8-1.

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Comment 34-8 (Nevada State Department of Wildlife)

Reintroduction of bighorn sheep into historic use areas as identified in the URA and MFP are not even mentioned in the draft EIS.

Introduction of Gambel's quail and chukar partridge into suitable areas as identified in the URA and MFP are not mentioned in the draft EIS.

Response

The purpose of this Environmental Statement is to identify the impacts of the proposed vegetation allocation. Specific impacts of future resource programs (e.g., wildlife reintroductions) will be covered in other documents (i.e., Environmental Assessments and Wildlife Habitat Management Plans).

Comment 34-9 (Nevada State Department of Wildlife)

Much of the riparian and stream bank vegetation critical to wildlife and fish will continue to deteriorate under the proposed action.

Response

On the contrary, stream bank vegetation would improve. All streams presently not protected would have livestock and wild horse use significantly reduced (except for Clover Creek). See pp. 3-19 and 3-20 of the Draft Environmental Statement (DES). The important portions of this stream that contains trout would be fenced according to Mitigation Measure No. 3, p. 4-2 of the ES. See also Comment 8-3.

Public Hearing Comment (Caliente transcript, p. 54, line 23) (Dave Secrist)

The assumption has been made that wildlife and domestic livestock are competitive with and therefore detrimental to each other. Overwhelming scientific evidence exists to effectively demonstrate wildlife and domestic livestock are on a whole not only compatible with but conducive to the welfare of each other.

Response

Under proper management, livestock may not be competitive with some wildlife species such as mule deer. However, studies identified in Impacts to Bighorn Sheep, p. 3-15 of the Environmental Statement (ES), indicate bighorn sheep are extremely sensitive to livestock presence. Desert tortoise can also be

adversely impacted by livestock grazing as indicated by studies cited in the Desert Tortoise sections on pp. 2-37, 2-39, 3-18, 3-19. Under proper management, livestock can be used to stimulate growth of certain plants and thereby benefit some wildlife species. Under improper management, with over obligation of forage species as is occurring in some allotments in the Caliente ES area, neither livestock nor wildlife benefit in the long-term.

Public Hearing Comment (Caliente transcript, p. 55, line 4) (Dave Secrist)

An apparent conflict exists where the Draft Environmental Impact Statement concludes grazing cattle have forced bighorn sheep from the bighorn sheep range. Elsewhere in the Draft Environmental Impact Statement a conclusion is drawn that cattle do not effectively use slopes over 50 percent. This inconsistency needs to be explained.

Response

Bighorn sheep are not necessarily confined to areas over 50 percent slope. "Suitable" range should not be confused with "usable" range. Many areas can be grazed by livestock and are therefore usable, but may not be suitable for grazing on a long-term basis because of the resulting damage to the area or adjacent areas. The classification of a particular rangeland area as unsuitable does not necessarily mean that area will not receive livestock use, but rather that the available forage on the unsuitable area should not be allocated to livestock use. Allocation of the vegetation produced on rangelands classified as unsuitable will generally result in over obligation and abuse of adjacent suitable rangelands. For example, before livestock will significantly utilize the forage on slopes greater than 50 percent or areas farther than four miles from water, more suitable rangeland within the area will normally be used heavily and repeatedly. The over obligation of available forage through credits of forage from unsuitable rangelands has contributed greatly to range deterioration and damage to other resources.

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Wild Horses and Burros

Comment 3-1 (American Horse Protection Association)

The 1977 figures may be more accurate, but assuming that they are it is hard to much more than speculate about the rate of population increase between 1973 and 1977; at most it is 10 percent. Nor is it possible to tell much about future population growth rates. They may be 10 percent or they may be much less.

Response

The rate of population increase was necessarily determined from the combined information from the four inventories, since these inventories were the only information available. Admittedly, the ten percent figure is an approximation, but regardless of the actual rate of increase, the situation remains that many of the allotments containing wild horses and burros are being overgrazed. The intent of the proposed action is to reduce grazing by livestock and wild horses to levels consistent with the amunt of available forage. The rate of population increase for wild horses does not influence the amount of forage recommended for allocation to wild horses, but rather is most useful in determining the time interval between horse removal operations. If future rates of increase are found to be less than ten percent, the intervals between horse removal operations may be lengthened accordingly.

Comment 3-2 (American Horse Protection Association)

Second, the degree of dietary overlap between wild horses and other animals is quite low.

Response

Although limited to a four month period, the diet percentages shown in Table 2-18 [p. 2-44 of the Environmental Statement (ES)] suggest dietary overlaps among wild horses, cattle, and bighorn sheep. Hansen et al. (1977) found that yearlong dietary overlap between wild horses and cattle on vegetation typles similar to the ES area was 77 percent. Hubbard and Hansen (1976) reported 59 to 75 percent dietary overlap in predominant sagebrush types, and Olsen and Hansen (1977) found a 45 percent dietary overlap between cattle and wild horses in the Red Desert, Wyoming.

Comment 3-3 (American Horse Protection Association)

Third, there is little if any data clearly revealing the extent of competition between horses and livestock if the wild horse areas, or the extent to which grazing problems, if any, in the wild horse areas are attributable to overuse by livestock rather than by horses.

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Response

As mentioned on p. 2-42 of the Environmental Statement, 19 allotments within wild horse and burro areas are presently receiving a total grazing use by livestock and wild horses and burros of 12,972 Animal Unit Months above their combined forage capacities. Since cattle and wild horse diets are very similar, it would be unfair to attribute overuse of the forage resource to only cattle or only wild horses. Overuse of forage plants desired by both cattle and wild horses has resulted because of their combined consumptions of these plants.

Comment 3-4 (American Horse Protection Association)

Also, the Draft EIS lacks any detailed explanation of the research methods used to arrive at the 75 percent adjustment figure for actual counts.

Response

As stated in the narrative of the Environmental Statement (p. 2-43) the 75 percent adjustment figure was arrived at by averaging the two extremes of probably actual counts (50 percent and 100 percent of the total population). This method was derived by district personnel and was judged by them to be the best method available for estimating populations.

Comment 15-2 (Lincoln County Conservation District)

Putting horses in a wild and free roaming condition without close management is far more cruel to the horses, (they first multiply beyond feed availability - then inbreeding, diseases and starvation take its cruel toll).

Response

The proposed action allocates sufficient vegetation for the recommended numbers of wild horses. Periodic removals of excess horses would prevent the wild horse populations from increasing beyond forage availability. See p. 3-21 of the Environmental Statement.

Comment 24-5 (Connie Simkins)

Why wasn't a count inventory conducted in 1976?

Response

Funds were not available for conducting a count inventory in 1976.

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Public Hearing Comment (Las Vegas transcript, p. 19, line three) (Bruce Cox)

...as I interpret that law the wild horse and wild burro numbers allowed cannot be increased over what existed at that time nor can the wild horses and burros be allowed in locations where they did not exist on the date that act became law. ...the BLM is actually in violation right now, because the number of wild horses and burros is at least half and perhaps double what is was at that time.

Response

Public Law 92-195 (the Free-Roaming Wild Horse and Burro Act of 1971) directs the Secretary of the Interior to manage wild horses and burros in a manner "...designed to achieve and maintain a thriving natural ecological balance..." The Act allows for increases in the wild horse and burro populations, but it does not allow for the expansion of their range or relocation of animals to areas where they do not presently exist.

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Cultural Resources

Comment 38-1 (Nevada State Division of Historic Preservation and Archeology). Also see Comment 30-1 in Appendix I.

Section 106 of the National Historic Preservation Act does not appear to be satisfactorily comlyed (sic) with - known properties are not rated as to their possible National Register Eligibility. A reference to properties within the Caliente management area that are presently listed on the Register was not located. The survey activities mentioned above will go a long way in more fully assessing the number of National Register eligible properties that can be predicted to exist in the area.

Response

A field evaluation for a significance determination/rating would be done on a project-by-project basis. If a cultural site is encountered which appears to exhibit National Register quality, Bureau of Land Management would then consult with the Advisory Council on Historic Preservation via the Nevada State Historic Preservation Officer. An eligibility determination would be made. Potential impacts from the intended action would be assessed, and appropriate mitigating measures would be initiated to protect the site.

Comment 38-2 (Nevada State Division of Historic Preservation and Archeology)

In complaince (sic) with Section 106 of the National Historic Preservation Act and Executive Order 11593, provision should be made for the intensive survey of specific project activity areas such as fence lines and well developments.

Response

See Standard Operating Procedure No. 9 in Chapter 1 of the Environmental Statment regarding cultural site clearance to be undertaken before any improvement project or action can be initiated. It states: "In accordance with BLM policy, cultural resource clearance would be requested for all project sites, or actions prior to implementation."

Comment 38-3 (Nevada State Division of Historic Preservation and Archeology)

Given the subtle nature of the possible impacts that grazing may have on cultural resources, a monitoring program should be developed that will provide current information as to the status of the resource. With this data at hand, cultural resources can be taken into consideration in the day to day management process.

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Response

Occasional cultural resources patrol efforts in the Caliente Environmental Statement area are on-going to monitor site conditions in the form of photographic documentation. Pending funding for an additional full-time cultural resources specialist, an enhanced monitoring program would not be feasible.

Public Hearing Comment (Caliente transcript, p. 56, line 16) (Dave Secrist)

No substantial mention is made of the proven factors which have been detrimental to archeological sites and artifacts, mainly man's activities in the form of collecting and vandalizing or other non-livestock related activities. If one is to conclude domestic livestock grazing has sufficient harmful effects on archeological areas, then the same conclusion must be drawn in relation to wildlife. Acknowledgement must also be made that wild horses and burros because of their intensive activity have an even more profound detrimental effect on archeological areas.

Response

Man's activities, including collecting and vandalizing, are not part of the proposed action. It is necessary to analyze potential impacts of the proposed action which involve grazing by ungulates. Trampling may result in damage to cultural sites at the ground surface in areas where ungulates concentrate, such as near water sources.

Any impacts which may result from trampling due to grazing by all ungulates - livestock, wild horses, burros, and wildlife are considered in Chapters 3 (p. 3-23) and 8 (pp. 8-15, 8-93) of the Environmental Statement.

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Land Uses - Agriculture

Public Hearing Comment (Caliente transcript, p. 54, line 11) (Dave Secrist). Also see Comment 30-2 and Comment 32-2 in Appendix I; also Public Hearings Comment (Caliente transcript p. 54, line 16; p. 58, line 4; p 60, line 25; p. 61, line 18.) [Ed. note: These comments address inadequate consideration of various impacts associated with potential changes in the use of private lands. Such impacts could include: increased irrigation, loss of private land wildlife habitat, and conversion of agricultural lands to non-agricultural uses and subsequent land tax base.]

The DES ignores the fact that the major percent of prime wildlife habitat in the Caliente Resource Area is privately owned, irrigated, agricultural land which is dependent upon grazing permits on the public domain for economic viability.

Response

No quantitative projection of changes in private land use has been made. There are a number of possible future changes in private land use which may or may not occur -- with or without the proposed action.

These possible alternatives include: 1) no major change, 2) conversion of private agricultural land to suburban-type development, 3) conversion of private agricultural lands to ranchettes, 4) conversion of private grazing lands to irrigated crop production in order to offset short-term cuts in public land grazing, 5) conversion of private cropland to grazing land in order to cut costs by instituting less intensive land use, and 6) conversion of alfalfa or grass hay land to potato or grain production. There are other possible alternatives. It is felt that the net outcome of these changes resulting from the proposed action would not cause major changes in land use patterns in the impact region.

Actions outside the scope of this document (e.g., MX missle system, new mining activity, etc.) are expected to have greater impacts than the proposed action. Examples of possible changes are included. If more private lands are converted to irrigated crop production, then irrigation costs and water use would increase. If private agricultural lands are converted into "ranchettes" or suburban-type development, one impact would be an increase in tax revenues. Another impact of converting agricultural lands would be the loss of wildlife habitat. However, for purposes of analysis is was assumed that the "no change" alternative would be the closest to actual future events.

Land Uses - Wilderness

Comment 28-14 (Nevada Outdoor Recreation Association, Inc.)

By the time a final ES is issued, the Las Vegas District will have completed much intensive inventory work for wilderness. It would be desirable to display strong wilderness candidates on a map (perhaps with critical-areas as well) so that the relation of land treatments to these areas can be seen. In addition, the ES should address the compatibility of the treatments planned with wilderness management (using the guidelines for Interim Management) so that one can judge to what extent implementation of the ES will affect wilderness or similar proposals (see NORA Survey and Index). Conflicts do not appear to be great, except in the eastern Cedar Range, and would be less so if burning can be considered acceptable in wilderness study areas. Modifications of fencing and water development designs might also have to be done.

Response

Wilderness intensive inventories should be completed by February, 1980, and should be through the public review process by October 1980. See Standard Operating Procedure, p. 1-14, item 7.

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Social Economics

Comment 7-1 (Jack Artz). Also see Comment 1-1 in Appendix I.

However, I am very disappointed that the DES has not responded constructively to the public comment resulting from circulation of the MFP 2 proposals last March and April. I am equally disappointed that at least one alternative does not propose a program that would minimize initial severe livestock adjustments.

Response

Alternative Seven in this Final Environmental Statement was developed with the aid of public response to the Caliente Draft Management Framework Plan. Provisions in Bureau of Land Management regulations permit the District Manager to allow a three-year phase-in for reductions.

Comment 7-2 (Jack Artz). Also see Comment 1-2 and Public Hearing Comment (St. George transcript, p. 20, line 13; p. 41, line 7).

It is misleading to use any single year as a basis for stocking comparisons but is particularly misleading to use 1977, a dry, poor market year.

Response

The year 1977 was a representative year for stocking comparisons. Licensed use [78,235 **Animal** Unit Months (AUMs)] was within one percent of the estimated average for the years 1976, 1977, and 1978 (78,866 AUMs) and well above the licensed use for 1978 (75,595 AUMs), a wet, good market year. As Tables 2-23 to 2-26 in the Environmental Statement indicate, livestock prices were adjusted by using a three-year average to compensate for yearly fluctuations.

Statistics from the National Oceanic and Atmospheric Administration Climatological Annual Summaries for the two stations in the Environmental Statement area where long-term data are available - Caliente and Pioche - indicate that in 1977 precipitation was one percent above normal and 30 percent below normal, respectively. In 1976 in Pioche the total precipitation was 11.78 inches which was 1.34 inches less than average. For Caliente the 1976 percipitation was 12.33 inches which was 3.61 inches greater than average. The 1977 record shows that precipitation for Pioche was 9.38 inches (3.74 inches less than average), while for Caliente the 1977 total was 8.83 inches (0.11 inch greater than average). In 1978 Pioche recorded 27.29 inches of precipitation (14.17 inches above average), while Caliente

received 18.48 inches (9.76 inches above average). This indicates that while a portion of the ES area had low precipitation that year, it certainly cannot be assumed that the entire area received little precipitation.

Comment 4-1 (Ruth Houghton)

In the immediate future income and values will decline for the ranches of the area, what will happen to the various groups and how much loss are they willing to absorb to remain resident in the Caliente area?

Response

The purpose of the Environmental Statement (ES) is to analyze impacts of the proposed action and alternatives, not to predict how much a rancher would be willing to absorb to remain in the Caliente area. Refer to pp. 3-25 through 3-40 of the ES for an analysis of the social and economic impacts to the ranchers.

Comment 4-3 (Ruth Houghton)

Also important, but not directly considered is the degree of interest in the ranching issues and proposed cuts by the non-ranching residents of the local area, the greater share of the local population? Since public input locally and nationally is requested, this local non-ranching population should be considered in the study in some way, as well, to give a perspective on the community composition.

Response

Text revised. See Appendix G, Section 5, p. 10-95, of the Environmental Statement.

Comment 24-6 (Connie Simkins). Also see Public Hearing Comment (Caliente transcript, p. 39, line five) in Appendix I.

I would like to know who Garrett and Mitchell are? Who do they work for? What is their formal training? What is their job experience? Who funded the study? What was the original purpose of the study?

Response

James R. Garrett obtained a Bachelor of Science degree in agricultural education and a Master of Science degree in agricultural economics at New Mexico State University. He graduated from Washington State University in 1966 with a Ph.D. in agricultural economics. He has been teaching at the University of

Nevada, Reno, since that time. Burke Mitchell obtained a Bachelor of Science degree in animal science in 1971 and completed course work for a Master of Science degree in agricultural economics in 1974 from the University of Nevada, Reno. The purpose of their study was to obtain a data base for use by their department. Similar studies have been done at 10-year intervals in the past. The study was funded by the University of Nevada, Reno.

Comment 24-8 (Connie Simkins)

I seriously doubt that ranchers could even think or rebuilding on any scale if cows were reduced. The calf crop is the mainstay of operating expenses. No cows = no calves = no operating capitol (sic).

Response

Interviews with Caliente Environmental Statement area ranchers indicated that some would attempt to rebuild their operation, perhaps at the level that could be maintained on their base properties.

Comment 24-9 (Connie Simkins)

What makes you think the ranchers would consider retraining and relocation?

Response

Several of the ranchers interviewed indicated that retraining would be necessary should they elect to leave the area and seek employment in a non-ranching industry elsewhere.

Comment 24-10 (Connie Simkins)

What community institutional structures would become more elaborate? This should be given more detailed explanation.

Response

Increases in populations, housing, and economic activity in the impact area would affect local government administration. These effects would be translated into a need for additional personnel, materials, supplies, and space. For example, a city or county professional planning staff might have to be established to plan for and monitor community development; existing law enforcement and fire services may have to be augmented; community medical, mental health, and educational facilities may have to be expanded. Should city growth exceed the design capacity of the existing

community water or sewer systems, additional storage treatment and delivery systems would have to be developed.

Comment 24-11 (Connie Simkins)

Change "adult" to entire and I agree. As it is now, it connotates a lesser degree of involvement than is actually the case. This is our lives. Give it proper perspective and priority in this study.

Response

Text revised.

Comment 24-12 (Connie Simkins)

...who are the "non-local groups" referred to here? This is an environmental impact statement. It should tell the impact on our environment and not voice opinions of "non-locals".

Response

A number of non-local groups may have an interest in and may perceive the resource advocate as being impacted by public land management decisions affecting the public domain within the Environmental Statement area. The Wildlife Management Institute, the Desert Bighorn Council, the American Horse **Protection** Association, and the Natural Resource Defense Council are examples of such groups which responded to this Environmental Statement.

Comment 25-16 (Natural Resources Defense Council, Inc.). Also see Comment 34-10 in Appendix I.

...We believe that the social and economic analysis contained in the draft is totally inadequate. This analysis focusses entirely upon impacts to ranchers and persons dependent on the livestock industry. The non-livestock values of these lands are totally ignored.

Response

The text has been revised to include economic impacts from increases in mule deer and bighorn sheep populations (p. 3-32 and Appendix G, Section 7). Other non-ranching values in the Environmental Statement (ES) are the income and employment impacts from construction of range improvements and the indirect impacts to industries within the region that are associated with the construction and livestock industries.

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Physical impacts which may have economic implications include changes in soils and watershed, wild horses and burros, fish, and other wildlife species.

The vast majority of the economic impacts associated with reduced soil loss and improved watersheds are captured in increased vegetation available to livestock and big game. These impacts, stemming from increased populations are analyzed in pp. 3-25 to 3-38 and Appendix G. Other watershed impacts may include reductions in salinity and sediment flow into the Colorado River system and possible reductions in flood damage in the Meadow Valley Wash. These impacts are expected to be slight, and lack of data prevents quantification in physical and economic terms.

The changes in wild horse and burro populations are expected to have a negligible impact on income and employment in the impact region.

Changes in populations of fish and other wildlife species are expected to increase (p. 3-21). Therefore, it can be expected that income and employment associated with these species would increase, but lack of physical and economic data prevent quantification.

Identified social impacts are as follows:

Overall, it is expected that wildlife species, with the exception of bighorn sheep, should benefit from the proposed action. Those who place a positive value on increased numbers of wildlife, especially for hunting or aesthetic purposes, would probably consider the proposal beneficial. Others, such as the livestock industry may view negatively the allocation of vegetation which could be used by livestock, to wildlife. This may be expecially true in those areas where bighorn sheep and livestock are in direct competition for space, water, and forage and where the allocation of those resources has been increased for bighorn sheep while being decreased for livestock.

As wildlife numbers increase, it could be expected that increased revenue from local hunting-related goods and service industries would create a positive response to the proposal within the business community. However, if numbers of harvestable game were to increase to the point where out-of-area hunters would be attracted to the area, local residents who previously were either neutral or positive about the proposal may become negative due to the direct out-of-area competition for the limited number of harvestable game.

Mule deer advocates, although they may be expected to support the proposal, may have some reservations since the proposal includes

approximately 300 miles of fence for those allotments containing mule deer range. Those fences would be constructed to allow wildlife assess. For others, the erection of fences, particularly during the construction phase, could create unsightly, man-made intrusions that detract from the natural environment.

Providing approximately 210 new waters would probably be viewed positively by both wildlife and livestock advocates. Other recreational users, i.e., hunters, hikers, photographers, would probably also view this aspect of the proposed action positively if it resulted in a long-term increase in riparian vegetation.

Comment 25-17 (Natural Resources Defense Council, Inc.). Also see Comment 27-1 in Appendix I.

Similarly, it includes estimates of the implementation cost of the proposed action and at least some of the alternatives. Unfortunately, it does not include maintenance costs or the cost of additional personnel.

Response

The text has been revised to include the impacts of maintenance of range improvements. Refer to Appendix G, Section 8, and p. 3-32. The number of additional employees needed to implement the proposed action would be determined after the possible Allotment Management Plans have been further analyzed in Environmental Assessments and benefit cost analysis. Implementation is subject to budgetary and personnel constraints. However, for purposes of comparison it may be estimated that an additional 20 employees may be needed to implement the proposed action. If the average salary is about $14,000 per year then salary costs may total $280,000 annually. It is not expected that additional personnel would be required for Alternatives One, Four, or Five. Alternative Three could require an additional ten employees at a salary cost of $140,000. Alternative Six could require five additional employees at a salary cost of $70,000. Alternative Seven may require about the same number of additional employees as the proposed action.

Comment 27-3 (Tina Nappe)

There is a presumption in the EIS that rancher financial health is equivalent to community health. This is not necessarily so. Private open space lands are taxed at considerably less than developed lands and thus contribute far less to the local economy. Furthermore, no commercial livestock will be taxed after 1983. It is unclear how much money therefore the ranchers bring into the county versus how much they take out by having to make purchases elsewhere.

Response

Although open space lands are taxed at a lower rate than other lands, the contribution to the local economy by ranchers is not limited to tax payments. Purchases of ranch inputs and household goods by ranchers add to the regional economy. The text has been revised to include the elimination of livestock taxes by 1983.

The ratio of total imports to gross output for the meat animals and poultry sector in the flow matrix for the Southern Nevada input-output model (Lofting, 1973) is 0.54 to 1.0. In other words, for each dollar of gross output by ranchers, 54 cents flows out of the region for purchases elsewhere.

Public Hearing Comment (Caliente transcript, p. 59, line 24) (Dave Secrist). Also see Public Hearing Comment (Caliente transcript, p. 59, line 14).

This Draft Environmental Statement should have addressed such basic concepts as products produced, value of products produced, multiplier effect of money in the Caliente area and the resultant impact on the community and society.

Response

The Environmental Statement (ES) focuses on net income because the use of gross agricultural income in a regional economic impact analysis is misleading. Gross income figures fail to take into consideration the fact that many inputs are purchased outside of the region and do not contribute to the income or employment of the region. The key concepts are "value added" or "net income" because these reflect the true value of the region's contribution to production. Indirect or multiplier effects on the impact region have been analyzed in Chapters 3 and 8 of the ES. An explanation of the economic model used to assess such impacts is contained in Appendix G.

Public Hearing Comment (Caliente transcript, p. 39, line 9) (Connie Simkins)

Further in chapter two, page 97, it states that there are five LDS wards in this county, and they are all under the jurisdiction of Enterprise. This in an absolute error.

Response

Text revised. Refer to p. 2-73, paragraph two.

Public Hearing Comment (Caliente transcript, p. 60, line 7) (Dave Secrist)

An economic impact analysis of the Caliente area as developed by University of Nevada Reno economists has demonstrated gross income plus the multiplier as related to an AUM has an impact of $50 on the community. Therefore, every AUM gained increases the wealth of the area $50. Every AUM lost reduces the wealth of the area by $50....The annual impact of this reduction on the Caliente area amounts to $821,700. Now, this is in comparision to the $62,000 that was derived in this statement using the net income of the ranchers in the area.

Response

According to the Department of Agricultural and Resource Economics at the University of Nevada, Reno, no such study exists. However, the Department did provide an estimate of the impact of the sale of an additional calf on the gross output of the region. This estimate is not comparable to the analysis in the Environmental Statement for the following reasons: 1) It was based on a one month average calf price of $90 per hundred weight at or near the peak of the current price cycle. The analysis in the Environmental Statement was based on a three year average price for all cattle -- calves, cows, and bulls. 2) The estimate was for an additional calf -- dividing this estimate by 12 to get an estimate for an AUM is not a valid technique. It does not include any production parameters. The analysis in the environmental statement is based on detailed input from local ranchers including such items as calf crops, replacement ratios, bull-cow ratios, and death losses. 3) The estimate was based on gross output. The analysis in the Environmental Statement was based on value added in net income.

The impact analysis in the Environmental Statement is based primarily on linear programming techniques (Appendix G, Section 2). It analyzes net income because net income is the most appropriate measure for regional impact analysis. Use of gross output figures is misleading as it does not take into account the fact that many inputs are purchased outside of the region and therefore, do not contribute to income or employment within the region.

Changes in net income per Animal Unit Month (AUM) (p. 3-26 of the ES) amount to about $3.80. This varies depending on the category of ranch and the period-of-use. The direct and indirect impacts using a multiplier of 1.5 (Appendix G, Section 1) would amount to about $5.70 per AUM.

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Editorial Comments

The following changes should be made on the maps in the Caliente ES.

A) Range Management Intensity Map, Chapter 1

The striped areas located in the upper left corner of the map (Penoyer Valley) and in the lower right corner (near East Morman Mountains) should have been printed over a white background, indicating dual use areas.

B) Wild Horse Management Areas Map, Chapter 1

In the upper right-hand corner of the map, by Crestline, the portion covered by allotment 66 (Uvada) should have been printed in pink indicating it is a Wild Horse and Burro Removal Area. (See the Grazing Allotments Map in Chapter 1 to locate allotments.)

C) Big Game Areas Map, Chapter 2

The Cedar Range located in the upper right-hand corner of the map, should be designated as DC-4, rather than DS-4.

The DS-1 area in the center of the map should be shown in pink stripes to indicate that it is a yearlong use area for bighorn sheep.

D) Wild Horse and Burro Map, Chapter 2

In the upper right-hand corner of the map, by Crestline, the portion covered by allotment 66 (Uvada) should have been printed in yellow indicating it is a Wild Horse and Burro Area. (See the Grazing Allotments Map in Chapter 1 to locate allotments.)

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APPENDICES

APPENDIX A
SUITABILITY CRITERIA

APPENDIX A

SUITABILITY CRITERIA

Rangeland suitability was determined by utilizing the following criteria:

A. Service Areas

1. Service area of water is greater than four mile radius - potentially suitable.

2. Service area of water is less than four mile radius - suitable.

B. Productivity

1. Current production of usable forage is below 25 pounds per acre - unsuitable.
2. Current production of usable forage is above 25 pounds per acre - suitable.

C. Slope

1. Greater than 51 percent slope - unsuitable.

APPENDIX B

PLANNING PROCESS
BUREAU OF LAND MANAGEMENT

APPENDIX B
BUREAU OF LAND MANAGEMENT PLANNING PROCESS

The following describes how the land allocations supporting the proposed action were derived. The planning documents prepared for the area covered by the Caliente Environmental Statement (ES) provide an analysis of land use alternatives that lead to the development of planning guidelines indicating various lands to be used for grazing of livestock, wild horses and burros, and wildlife. The discussion identifies land uses foregone to permit the development of the proposed action and indicates the degree to which the proposal has been sealed back in favor of other land uses or because of limited resource capability.

Description of Planning System

The Bureau of Land Management (BLM) adopted a multiple use planning system during the mid-1960s which was incorporated within the Federal Land Policy and Management Act of 1976. This system is basically a tool that combines resource and social-economic data, along with identified public needs, into a specific course of action for the various natural resources administered by BLM. Documents are revised as conditions change and as new information becomes available.

The planning system process is based on the identification of specific geographic areas called "planning units." It is at this identification level that the five basic planning system components, described below, are applied. Public involvement is important in every phase of the planning system as well as in the development of each component.

Land and Resource Inventory

Inventories contain data on land and resource location, extent, utilization, and condition. Basic inventories for the Caliente ES area were updated in 1978.

Unit Resource Analysis (URA)

This document contains resource inventory summaries, analysis of resource potential, and evaluation of land capability to fill the various public resource activity needs. The URA for the Caliente ES area was completed in 1978.

Planning Area Analysis (PAA)

This component identifies and analyzes social and economic conditions of the Caliente ES area. The profile was completed in 1978.

Management Framework Plan (MFP)

This land use plan was developed using resource management opportunities identified in the URA, plus applicable social and economic opportunities. Objectives and recommendations are developed for each resource activity, consistent with social-economic, procedural, legal, and environmental needs. A multiple use analysis process then established the best "mix" of land use allocation. The MFP recommendations served as both guides and constraints in preparing the proposed action for this ES. The Caliente MFP was originally completed in 1974 and later revised through the multiple use recommendation section in 1979.

Multiple use decisions involving allocation of forage to livestock, wild horses and burros, and wildlife would be determined after completion of this ES, with consideration of the proposed action, alternatives, and recommended mitigating measures.

The Caliente MFP multiple use recommendations for forage allocation, season-of-use, livestock type, livestock numbers, and management intensity have been incorporated into this ES proposed action.

A summary of those multiple use recommendations in the Caliente MFP that interact with the proposed action are included in Table 1-4.

Activity Plans

These plans detail how multiple use guidelines would be implemented. Activity plans include Allotment Management Plans (AMPs), Wildlife Habitat Management Plans (HMPs), and wild horse and burro management plans. Five AMPs and one HMP have been developed previously in the ES area. Additional activity plans would not be prepared until after completion of this ES and after the multiple use decisions.

APPENDIX C

COORDINATION - THREATENED OR ENDANGERED SPECIES

United States Department of the Interior

FISH AND WILDLIFE SERVICE
AREA OFFICE
2800 Cottage Way, Room E-2740
Sacramento, California 95825

JAN 23 1979

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LAS VEGAS DISTRICT
BUREAU OF
LAND MANAGEMENT

MEMORANDUM

To: Mr. John S. Boyles, District Manager, Bureau of Land Management, Las Vegas District, P.O. Box 5400, Las Vegas, Nevada 89102

From: Area Manager, Sacramento, CA 95825 (SESO)

Subject: Informal Consultation on Proposed T/E Plants, Caliente Planning District, #1-1-78-1-3

This is in response to your request for informal consultation with the Fish and Wildlife Service (FWS) concerning the potential impacts of ungulate grazing on proposed and candidate threatened and endangered (T/E) plants in the Caliente Planning District (CPD) of the Bureau of Land Management (BLM), in Lincoln County, Nevada.

It is our understanding that a grazing management plan for the CPD is currently being developed by your office for approximately 3.5 million acres of BLM-administered public lands in southeastern Nevada and that this plan, when completed, will recommend forage allocations among cattle, wild horses and burros, bighorn sheep and pronghorn antelope. Inasmuch as such allocations may have a profound effect on a great number of plant species in the area -- especially T/E plants -- your office has requested information on the known or probable occurrence and distribution of such species and their relative susceptibilities to different grazing pressures.

On September 25, 1978, Joseph Dowhan of the Sacramento Endangered Species Office (SESO) met with Bruce Flinn, Roger Baker and John Shive of the BLM Las Vegas District, Division of Planning and Environmental Coordination, to discuss at length the issue of grazing effects on T/E plants in the CPD. Our discussion brought out and emphasized the fact that the effects of different regimens and intensities of grazing on rare plants could not be properly assessed at this time without a relatively detailed botanical inventory of the District and a field evaluation of grazing impacts on existing plant populations. In the absence of a comprehensive data base detailing the actual locations and population sizes of such plants, and the threats to their existence, it is quite impossible to determine the relative sensitivity of specific sites within the CPD to grazing activities. Furthermore, because such species are extremely

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rare and thus only very infrequently observed, virtually no information exists on the relative susceptibility of most such T/E plants to grazing. A foremost priority, therefore, should be given to developing a botanical data base which would specifically contain information on the actual locations of proposed and candidate T/E plant species. All of this should be done before a final grazing plan is established. It is to this point which we wish to address this consultation and to offer our recommendations.

A list and summary of 19 candidate plant species known or believed to occur in the CPD, prepared by Utah State University in March 1978, was provided by your office along with your request for consultation. We have carefully reviewed this information and have found it to be a useful, though incomplete, foundation for this consultation. On September 25th, 26th and 27th, Joseph Dowhan of SESO was accompanied in the field by Roger Baker and John Shive of the BLM to examine several sites within the CPD known to contain T/E plants as indicated in the above-cited reference. Although limited in time and scope, this trip met with some measure of success, while at the same time reinforcing the urgent need for a thorough botanical survey of the area. The cooperation and hospitality of Messers Baker and Shive during this trip is gratefully acknowledged and appreciated by this office.

Most of the area within the CPD has been little studied botanically; this is true also of adjacent counties in southwestern Utah. The topography is often rugged and the area is relatively remote from any urban centers or universities. What few collections of rare species there are for the area are quite old and not many have been field-verified in recent years. Fortunately, some very recent and truly excellent field studies on T/E plants have been conducted (some of which are still ongoing) on adjacent lands to the west of the CPD, on the Desert National Wildlife Refuge (Ackerman 1978), the Nevada Test Site (Rhoads et al. 1977, 1978) and the Tonapah Test Range in Nye, Lincoln and Clark counties. Owing to strong similarities in the vegetation and flora among these areas and the CPD, these rare plant surveys can serve to identify those T/E species which might be expected to occur on similar habitats in the CPD. Floristic studies in the Lake Mead Recreation Area to the south of the CPD are also of considerable use for this purpose. Collections and studies by the Northern Nevada Native Plant Society (NNNPS 1977), the U.S. Forest Service (Humboldt National Forest), the University of Nevada at Las Vegas and Reno, the Nevada State Museum, Utah State and B.Y.U. in Utah are all good sources of herbarium and locality information on rare plants of the area, many sources of which have been used extensively in this consultation. A list of various authorities and institutions is provided as an attachment to this report. Contacting these people and institutions directly for additional information is recommended.

Utilizing the above sources of information, including the material provided by your office as well as information contained in our files, the following information on the CPD was able to be pieced together for

the purposes of identifying T/E plant species and their areas of known or probable occurrence in the District. The information further allows the recommendation of a survey design whereby more detailed information might be obtained in the future.

The CPD is uniquely situated within a broad transition zone of the Intermountain Region and contains several important and interesting desert types, floristic regions, vegetation zones and rare, endemic species. The dry, hot Mohave Desert region, dominated by creosote-bush (Larrea tridentata) and associated Lycium andersonii-Grayia spinosa plant communities, just reaches the southern border of the CPD and low-lying valleys northward. Towards the north and northwest extends the Transition Desert, characterized mainly by blackbrush (Coleogyne ramosissima) and various Grayia-Lycium communities. The cooler Great Basin Desert with its Atriplex, sagebrush (Artemesia tridentata) and Pinyon-Juniper plant communities and zones occupies most of the northern and eastern portions of the District.

Two major intermountain floristic sections -- the Tonapah and Calcareous Mountains sections -- encompass nearly all of the CPD except for its extreme southern edge, which is Mohave Desert (Cronquist et al. 1972). These floristic sections are differentiated from each other both by their respective physiographies and endemic plant species. The Tonapah section includes most of the CPD, especially towards the south and west, and is characterized by hot, dry desert valleys and volcanic soils dominated by shadscale (Atriplex confertifolia) vegetation. The Calcareous Mountains floristic section, with its high, limestone-capped mountains and sagebrush-covered valleys, occupies most of the northern and eastern areas of the District.

Of major significance to the CPD and the present consultation is the large number of endemic plant species, many of which are quite rare, characteristic of each floristic section (Cronquist et al. 1972). A great many of these plants are restricted to limestone or dolomitic outcrops, while a few are found only on volcanic soils or in washes. Recognizing the fact that vegetation, climate, elevation and parent material interact intimately and predictably with each other, a list of rare and/or endemic candidate plant species are systematically presented in Table I in consideration of these factors. The list was developed utilizing the sources discussed earlier and by no means should be considered exhaustive or complete.

It should be emphasized here that none of the species under consideration in this consultation at this time are finally listed in the Federal Register. All, however, have been either formally proposed as endangered in the Federal Register of June 16, 1976, (41 FR 24524-24572) or proposed as T/E in the Smithsonian Institution reports on T/E plants of the United States of 1975 and 1978. Most are reasonably strong candidates for final listing. All Federal agencies must specifically address themselves to those species which may be affected by a project carried out, funded or authorized by them in order to prevent the irreversible and irretrievable commitment of resources, whether through modification or destruction of habitat or by destruction of populations. It is in the best interest of any Federal agency to consult informally on proposed, though unlisted, species early in a project or plan design before

TABLE C-1
PROPOSED THREATENED OR ENDANGERED FLORA
POSSIBLY FOUND IN THE ES AREA

I. CALCAREOUS SUBSTRATES (limestone, dolomite, etc.)

A. Creosotebush Zone (<4,000' elevation)

Gilia ripleyi (Ripley's gilia). Threatened. Limestone crevices, north end of Desert Range a/; Sheep Range. June-July b/ Perennial. See below.

Machaeranthera leucanthemifolia (daisy-leaved aster). Endangered. Coal Valley a/, near Lincoln-Nye county line. June-September. Annual or biennial.

Mirabilis pudica (four o'clock). Threatened. Calcareous gravel hills, foot of Desert Range a/; Pahranagat Lakes area. May-July. Perennial. See below.

B. Blackbrush Zone (4,000-5,000' elevation)

Agave utahensis var. eborispina (ivory-spined pygmy agava). Threatened. Limestone ridges, Clover Mts.; Mormon Mts. May-June. Perennial.

Arabis shockleyi (Shockley's rockcress). Threatened. Steep slopes and rocky crevices on dolomite and dolomitic limestone, Sheep Range and Desert Range a/. April-July. Perennial.

Coryphantha vivipara var. rosea (rosy pincushion cactus). Threatened. Gravelly slopes, limestone ridges, Clover Mts.; Sheep Range; Fossil Ridge a/. May-June. Perennial.

C. Shadscale Zone (4,500-5,000' elevation)

Arctomecon merriamii (desert poppy). Endangered. Limestone rocks. Slopes and disturbed sites, Desert Range a/; Sheep Range. April-May. Perennial.

Gilia ripleyi -- see above. Limestone ridges, Fossil Ridge a/; Desert Range a/; Sheep Range.

Haplopapus brickellioides (holly-leaved goldenweed). Threatened. Steep to gentle slopes and rocky crevices, Fossil Ridge a/; Sheep Range; Desert Range a/. Often with the above species. June-October. Perennial.

D. Sagebrush Zone (5,000-6,000' elevation)

Astragalus oophorus var. lonchocalyx (spindle locoweed). Threatened. Dry gravelly hillsides and stony flats, Highland Range; Deerlodge (Fay). May-June. Perennial.

Castilleja linoides (Indian paintbrush). Threatened. Open calcareous and gravelly soils, Clover Mts. Also in pinyon-juniper. July. Perennial.

Cryptantha compacta. Threatened. Not definitely known for Nevada, but found in adjacent Utah on gravelly slopes and ridges. Most likely occurs in Nevada. June. Perennial.

Draba crassifolia var. nevadensis (Coyote Ridge draba). Threatened. Dry rocky places, Kershaw-Ryan State Park, Caliente. May-August. Biennial.

Machaeranthera leucanthemifolia -- see above. Mountain slope five miles west of Caliente at 5,600' elevation.

Penstemon decurvus (Mahogany Mt. beardtongue). Endangered. Rocky hillsides, Mahogany Mt. (White Rock Mts.). June. Perennial.

E. Pinyon-Juniper Zone (6,000-8,000' elevation)

Agave utahensis var. eborispina -- see above. Clover Mts.; Mormon Mts.

Arabis shockleyi -- see above.

Arenaria stenomeres (narrow-petaled sandwort). Threatened. Limestone cliffs in canyon at south end of Meadow Valley Range. May. Perennial.

Astragalus convallarius var. finitimus (timber poisonweed). Threatened. Gravelly and sandy clay hillsides, Highland Range. May-June. Perennial.

Astragalus oophorus var. lonchocalyx -- see above. Dry gravelly hillsides, Highland Range.

Castilleja linoides -- see above. Clover Mountains.

Coryphantha vivipara var. rosea -- see above. Clover Mountains.

Erigeron ovinus (Sheep Mtns. fleabane). Endangered. Limestone cliffs and walls, Sheep Range. April-June. Perennial.

Forsellesia pungens (low greasebush). Endangered.

Limestone cliffs and walls, Sheep Range. April-June. Perennial.

Lesquerella hitchcockii (Hitchcock's bladder-pod). Threatened. Limestone slopes and ridges, Quinn canyon Range; Sheep Range. June-August. Perennial.

Lewisia maguirei (Maguire's bitterroot). Threatened. Gravelly slopes and loose soils, Quinn Canyon Range. June. Perennial.

Machaeranthera grindelioides var. depressa (low aster). Threatened. Ridges, Mt. Irish; Needle Mts. a/ June. Perennial.

Phlox gladiformis (dagger-leaf phlox). Threatened. Dry rocky slopes, Mormon Mountains; Crystal Springs. May-July. Perennial.

Townsendia jonesii var. tumulosa (hill townsendia). Threatened. Limestone flats and ridges, Sheep Range. May-June. Perennial.

F. Montane Zone (>8,000' elevation)

Erigeron unicialis var. conjugans (Nevada cliff daisy). Threatened. Limestone outcrops, Quinn Canyon Range. June-July. Perennial.

Primula nevadensis (Nevada primrose). Endangered. Limestone crevices, Quinn Canyon Range. July-August. Perennial.

II. VOLCANIC SOILS, WASHES, etc.

Arctomencon merriamii -- see above. Bajadas, washes, disturbed sites, Desert National Wildlife Refuge a/, base of Sheep Range.

Mentzelia "leucophylla" (white-stemmed stickleaf). Endangered. Although reported from an area south of Caliente (Meadow Valley Wash), this species is actually known only from Ash Meadows in western Nevada a/. Most likely the local species is M. oreophilia, a closely related species. Taxonomy confused. M. laevicaulis also common in area (not rare).

Mirabilis pudica -- see above. Disturbed sites, washes, Meadow Valley Wash.

Phacelia anelsonii (Aven Nelson's phacelia). Threatened. Washes, rich soil under cliffs, Meadow Valley Wash (2,000-5,000' elevation). April-May. Annual.

Phacelia beatleyae (Beatley's scorpionweed). Endangered. Washes and talus on volcanic tuff, near Papoose Lake a/ (4,000-4,500' elevation). April-June. Annual.

Editorial Notes:
a/ Location is outside of the Threatened and Endangered Flora Map area, but is listed here because of proximity or habitat similarities to areas within the ES area. Other locations mentioned in the table are shown on the Threatened and Endangered Flora Map in Chapter 2.

b/ Months shown are flowering periods.

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a species is listed so that potential problems and conflicts can be identified and resolved before they develop. If protection can be provided a species by an agency in its management plan, the species stands a good chance of not being listed.

A review of Table I reveals at least two important facts which are of considerable utility in designing a botanical survey for rare plants in the CPD: (1) a few well-delineated geographic areas (specifically limestone ranges) contain, or potentially contain, two or more E/T species, often within the same vegetataion zone and habitat; and (2) many of these candidate species reach their peak of flowering at the same period, around June. This enables one to stratify a relatively large and unsurveyed area such as the CPD into smaller areas each with a high probability of occurrence of T/E plants. Furthermore, sampling can be scheduled so as to take advantage of the peak flowering period when identification is easiest and most reliable. The following areas, in order of priority, are recommended for a detailed botanical survey at this initial stage (see map):

1. Clover Mountains (Agave utahensis var. eborispina, Coryphantha vivipara var. rosea, Castilleja linoides)

2. Mormon Mountains (Agave utahensis var. eborispina, Phlox gladiformis)

3. Mt. Irish (Erigeron ovinus, Machaeranthera grindelioides var. depressa)

4. Meadow Valley Wash (Phacelia anelsonia, Mirabilis pudica, Mentzelia "leucophylla")

5. Highland Range (Astragalus oophorus var. lonchocalyx, A. convallarius var. finitimus)

6. Mahogany Mountains (Penstemon decurvus)

7. Meadow Valley Range (Arenaria stenomeres)

8. Quinn Canyon Range (Erigeron uncialis var. conjugans, Lequerella hitchcockii, Lewisia maguirei, Primula nevadensis). Most of this range is on National Forest property and should probably be their responsibility.

Several mountain ranges in the CPD -- notably the Delamar Mts. and the Cedar Range, -- have not, to the best of our knowledge, been surveyed at all, but potentially appear very interesting. They should be considered in the next wave of priorities for sampling.

Although it is our understanding that your budget over the next few years for botanical survey work is extremely limited at this time, it is possible to begin now to collect some potentially very important and

useful information for a relatively small expenditure. Furthermore, it is the responsibility of all Federal agencies to utilize their authorities in furtherance of the purpose of the Endangered Species Act of 1973 by carrying out programs for the conservation of T/E species. The use of belt transects to sample the vegetation and flora in each of the vegetation zones on the prioritized areas during late spring and early summer could yield in an efficient manner a considerable amount of information on the occurrence and distribution of T/E species in the CPD. The use of geologic maps and aerial photographs would further facilitate sampling in each area by preliminarily identifying habitats of special interest, such as limestone outcrops. A population status report form, prepared by the N.Y. Botanical Garden, is attached and may be useful in recording data at each site. Also included is a sighting report developed by Northern Nevada Native Plant Society (NNNPS).

Botanical expertise for field survey work can be sought and obtained from nearby university graduate programs in botany. The NNNPS is always interested in exploring new and potentially interesting areas for T/E plants and they might be willing to spend some time in the area if some accommodations could be arranged.

Our office is certainly very interested in cooperating with the BLM in further developing a botanical data base for the area and would be willing to review possible candidates for the survey and to assist in a field review of techniques and population assessments this spring. Dr. Duane Atwood, endangered species botanist with the U.S. Forest Service at Uinta National Forest in Provo, Utah, has expressed an interest in meeting with our respective agencies in the field perhaps this June to investigate one or more of the potentially interesting sites. Dr. Atwood is an expert on the Utah flora and knows parts of Nevada quite well.

In conclusion, we would like to reiterate that a final consultation opinion on the effects of grazing forage allocations on T/E plants in the CPD is not possible at this time in the absence of both a grazing plan and any substantial data base on the locations and population statuses of T/E plants in the District. We are confident, however, that the acquisition of pertinent information of this type that can be used in the development of an ecologically sound grazing management plan, which takes into consideration any possible effects on T/E plants, can and should be initiated this coming field season on at least some of those sites we have preliminarily identified as being of high priority. We anticipate a continuing joint cooperation on this interesting problem and would like to arrange another meeting between our respective agencies before the spring to discuss further the issues presented here. In the meantime, please do not hesitate to contact this office if you should require any additional information or have any questions.

Enclosures: Map of recommended priority areas for T/E plant survey
Field survey form for population status report on T/E plants
NNNPS sighting report
Listing of plant authorities of areas near CPD

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cc: Regional Director, Portland, OR (AFA-SE)
Duane Atwood, U.S. Forest Service

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APPENDIX D
SOILS

SECTION 1
SOIL MAP DERIVATION

SECTION 2
ACRES BY EROSION
CONDITION CLASS

SECTION 3
METHODOLOGY FOR PREDICTING
FUTURE SOIL LOSS

APPENDIX D
Section 1

SOIL MAP DERIVATION

Data used to compose the Soils Map was derived from U.S. Department of Agriculture Soil Conservation Service (SCS) published survey No. 611 (275,684 acres; order three survey) and No. 613 (899,840 acres; order three survey). Other SCS data used were from unpublished surveys No. 754 (order four), No. 787 (order three and order four), and No. 784 (order three survey). Soil Conservation Service data, both published and preliminary (unpublished), covers almost the entire Environmental Statement (ES) area. The data from the area not covered by SCS soil surveys (57,838 acres; 1.65 percent of the ES area) came from Bureau of Land Management (BLM) watershed studies, and field work by BLM soil scientists. Since the data came from varied sources there are different degrees of precision and levels of mapping. Both BLM and SCS soils scientists who did the field work in the ES area created the map using their knowledge of the area and all available current data.

Soils-vegetation correlation was done from a similar map (BLM, Las Vegas, Caliente Unit Resource Analysis (URA), Step 2, 1978) depicting soils information at series level where possible, family level where possible, and left blank when there was an absence of any soils data. The URA-2 map was created to depict the highest levels of information available at the time, but is confusing to casual observers since mapping lines (from different levels of surveys) seldom match. Because of this complication, the URA-2 map is not duplicated in this document.

TABLE D-1
Section 2
ACRES BY EROSION CONDITION CLASS
CALIENTE ES AREA

Watershed Area	Stable	Slight	Moderate	Critical	Severe	Barren and/or Unclass.	Total
001 Beaver Dam	1,441	2,335	4,268	4,300			12,344
003 Crossroads	1,153	12,503	5,937	1,630			21,223
004 Haypress	5,304	820	137				6,261
005 Sheep Flat	6,045	21,154	46,290				73,489
006 Barclay Summer	6,627	29,251	22,791	16,418			75,087
009 Red Bluff		113,460	149,185			3,385	266,030
011 McCutcheon Spg.		10,089	8,663				18,752
012 Crescent		62,966	22,131				85,097
013 Naquinta Spg.		181	48,395			747	49,323
014 Bald Mountain		62,748	150,438	7,152			220,338
015 Crystal Spg.		268	5,807				6,075
016 East Pahranagat		11,818	26,819			3,772	42,409
017 West Pahranagat		61,760	29,904				91,664
018 Buckhorn		19,251	60,042			2,773	82,066
019 Six Mile, Pahroc	769	76,516	42,930	8,805		16,756	145,776
020 Mustang		6,705	15,879	319			22,894
021 Oak Springs	7,105	67,827	93,546	6,504		2,499	177,481
022 Rattlesnake		20,666	9,228			1,804	31,698
023 Ely Spg. Cattle		22,838	30,370			3,872	57,080
024 Ely Spg. Sheep		1,161	22,478	1,914			25,553
025 Simpson			7,034				7,034
026 Highland Peak		3,808	45,762				49,570
027 N-4		7,002	50,756				57,758

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TABLE D-1 -- Continued

Watershed Area	Stable	Slight	Moderate	Critical	Severe	Barren and/or Unclass.	Total
028 Deerlodge Condor		40,604	17,262				57,866
029 Mahogany Peak	3,096	10,479	15,197				28,872
030 McGuffy Spg.	382		22,013	2,143			24,538
031 Uvada		1,846	9,538				11,384
032 Rabbit Spg.		1,555	21,314				22,869
033 Sheep Spg.			28,364	1,542			29,906
034 Buckboard Spg.			12,828				12,828
035 Blackhill, Warm Spg.		615	22,181				22,796
036 Peck & Comet		264	10,865				11,129
037 Rocky Hills		13,775	35,044	1,283			50,102
038 Bennett Spg.		437	64,087	557			65,081
039 Cliff Spg.		9,646	24,626			2,404	36,675
040 Applewhite		1,076	16,752	9,619	3,237		30,684
041 Clover Creek		5,580	22,458	1,854			29,892
042 Little Mountain			18,372	926			19,298
043 Enterprise	512	5,312	18,708	269			24,802
044 Oak Wells	189	204	28,041				28,434
045 Barclay Winter		7,455	60,486			1,553	69,494
046 Esplin-Lytle		33,582	62,385	4,113	662	5,943	106,684
047 Henrie & Schlarman		5,912	100,095	9,172	7,121	7,755	130,055
048 Cottonwood	343	10,408	48,525	1,246	176		60,698
049 Pennsylvania Gp.			34,504	5,589			40,093
050 Meadow Valley			5,893	1,144			7,037
051 Willow Creek			21,472	194			21,666
052 Riggs		2,449	11,018				13,467
053 Jumbo	363	32,311	53,961	803			87,438
054 Sheep Mountain		18,408	40,133	9,116		4,034	71,691

TABLE D-1 -- Continued

Watershed Area	Stable	Slight	Moderate	Critical	Severe	Barren and/or Unclass.	Total
055 Jump Up		7,824	86,324	9,992		7,480	111,620
056 Boulder Spg.			14,103	4,698			18,801
057 Elgin Group			19,790	3,524		4,842	28,156
058 Morrison-Wengert			28,468	6,031		2,408	36,907
059 Grapevine		742	25,475	6,956			33,173
060 Breedlove		35,143	48,939	203		31,974	116,259
061 Rox		19,133	1,035			7,298	27,466
062 Foremaster Bros.		2,535	66,766			5,648	74,949
063 Esplin-Lytle Dual N.		9,362	28,808			383	38,553
064 Esplin-Lytle Dual S.		176	34,098	19,367		2,383	56,024
065 Snow Spring		451	48,759				49,210
066 Terry			31,646	549			32,195
067 Sand Hollow			24,612	10,423		8,662	43,698
068 Buckhorn-Pahroc		13,914	68,720	10,219		3,759	96,911
ES Area Total	33,329	906,327	2,252,553	168,565	11,196	132,134	3,504,104
% Distribution	0.95	25.86	64.28	4.82	0.32	3.77	100.00

Source: U.S. Department of the Interior, Bureau of Land Management, Las Vegas District Office, Unit Resource Analysis (Watershed), 1970.

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APPENDIX D
Section 3
METHODOLOGY FOR PREDICTING FUTURE SOIL LOSS

Factors which influence the amount of soil lost to erosion are precipitation (amount, intensity, kind, and season of delivery), erodibility of the soil (a variable resulting from the variation in physical properties of soil), steepness of slope, length of slope, cover on the soil, and soil erosion control practices. The Universal Soil Loss Equation (USLE) is an empirical relationship designed to predict soil loss in tons/acre/year based upon the previously mentioned factors. The USLE is stated as follows:

$$A = R \cdot K \cdot L \cdot S \cdot C \cdot P \qquad (1)$$

where

A = predicted soil loss in tons/acre/year
R = rainfall factor
K = soil erodibility factor
L = slope length factor
S = slope gradient factor
C = cover factor (vegetation and plant litter)
P = practice factor (contour plowing, etc.)

Standard values for these factors in Nevada are presented in "Guides for Sediment and Erosion Control in Nevada" (USDA-SCS 1976).

When predicting future soil loss for the Caliente Environmental Statement area, it was assumed that topography (hence, slope length and gradient), climate (hence, rainfall factor) and soil texture (hence, the K factor) would remain constant. Equation (1) can then be written as follows:

$$A = \text{constant} \cdot C \cdot P \qquad (2)$$

Since soil erosion control measures are designed on a site-specific basis and this Environmental Statement does not attempt to analyze treatment on a site-specific basis, the practice factor was held constant at a value of 1. Equation (2) can now be written as:

$$A = \text{constant} \cdot C \qquad (3)$$

It follows that

$$\text{constant} = A/C \qquad (4)$$

Soil loss estimates for the present situation were developed for the Caliente Unit Resource Analysis during watershed conservation

and development inventories conducted during 1964, 1973, and 1974. Future sediment yield was predicted as follows:

$$A_{future} = constant \cdot C_{future} \qquad (5)$$

Substituting equation (4) for constant gives

$$A_{future} = \frac{A_{present}}{C_{present}} \cdot C_{future} \qquad (6)$$

which can be rewritten as

$$A_{future} = A_{present} \cdot \frac{C_{future}}{C_{present}} \qquad (7)$$

The c factors used to predict future soil loss to water erosion are shown in Table D-2.

TABLE D-2
PREDICTION OF FUTURE SOIL LOSS FOR PROPOSED ACTION

	c' 1/	c" 2/	c"/c' 3/
Brush	.26	.22	.85
Grass	.20	.17	.85
Fire Treatments	.21	.17	.81
Mechanical Treatments	.26	.18	.69
Chemical Treatments	.26	.17	.65

1/ This lists the plant cover factors assumed for the present situation (1980).

2/ This lists the plant cover factors assumed for the proposed action situation (2015).

3/ This factor was used to adjust the present soil loss (in tons/acre/year) to the future sediment yield (in tons/acre/year).

Three major cover types are assumed to be significantly different in the way they affect soil loss: pinyon-juniper, brush, and grass. The amount of each of these cover types was determined for each watershed. The change in soil loss was computed as the average change in soil loss weighted by the amount of land in each major cover type; however, pinyon-juniper cover was assumed to remain unchanged unless it received either mechanical, chemical, or fire treatment.

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The following example was calculated from watershed 034 to illustrate how future erosion estimates were determined.

Given:

Present erosion (A) = 0.59 tons/acre

Present cover (C) = 0.21

(4) constant = A/C

constant = 2.81

Given:

Future cover (C) = 0.18

then,

(5) A_{future} = constant • C_{future}

Afuture = 2.81 • 0.18

future erosion (A_{future}) = 0.51 tons/acre

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APPENDIX E
VEGETATION

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ACRES / VEGETATION TYPE
BY ALLOTMENT

SECTION 2
MAJOR PLANT SPECIES OF
THE CALIENTE ES AREA
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APPENDIX E
Section 1
TABLE E-1
ACRES/VEGETATION TYPE BY ALLOTMENT
CALIENTE ES AREA

Allotment	Vegetation Type	Code	Acres	Percentage of Total by Allotment
Applewhite	Big sage	041	1,285	4
	Juniper	092	27,339	91
	Pinyon	093	1,441	5
Total Acres			30,065	100
Ash Flat	Big sage	041	435	13
	Juniper	092	1,597	47
	Blackbrush	161	1,375	40
Total Acres			3,407	100
Bald Mountain	Big sage	041	29,273	11
	Black sage	043	33,102	13
	Pinyon-Juniper	091	15,740	6
	Juniper	092	3,797	1
	Pinyon	093	5,048	2
	Shadscale	131	12,976	5
	Winterfat	151	1,757	1
	Blackbrush	161	76,682	29
	Joshua tree	163	8,556	3
	Other desert shrubs	164	62,846	24
	Bursage	167	12,067	5
	Spruce-fir	064	38	< 1
Total Acres			261,882	100
Barclay	Big sage	041	10,617	12
	Manzanita	052	2,405	3
	Oak brush	058	77	< 1
	Juniper	092	67,132	75
	Pinyon	093	8,800	10
Total Acres			89,031	100
Bennett Spring	Big sage	041	4,998	10
	Black sage	043	9,971	21
	Rabbitbrush	045	77	< 1
	Juniper	092	27,347	57
	Pinyon	093	5,694	12
	Fourwing saltbush	134	177	< 1
Total Acres			48,264	100

TABLE E-1 -- Continued

Allotment	Vegetation Type	Code	Acres	Percentage of Total by Allotment
Beacon	Creosote bush	111	6,596	100
Black Canyon	Big sage	041	1,130	12
	Black sage	043	7,100	77
	Juniper	092	731	8
	Winterfat	151	110	1
	Snakeweed	171	140	2
Total Acres			9,211	100
Black Hills	Big sage	041	490	13
	Black sage	043	781	21
	Juniper	092	2,404	66
Total Acres			3,675	100
Boulder Spring	Unsurveyed			
Breedlove	Rabbitbrush	045	5,556	5
	Creosote bush	111	8,809	8
	Blackbrush	161	34,126	33
	Bursage	167	56,394	54
Total Acres			104,885	100
Buckboard	Juniper	092	10,099	93
	Pinyon	093	743	7
Total Acres			10,842	100
Buckhorn	Big sage	041	2,526	3
	Black sage	043	1,581	2
	Rabbitbrush	045	489	1
	Dry lake bed	081	2,653	3
	Juniper	092	201	< 1
	Creosote bush	111	813	1
	Shadscale	131	20,432	25
	Fourwing saltbush	134	1,201	1
	Winterfat	151	8,560	11
	Blackbrush	161	2,945	4
	Joshua tree	163	29,168	37
	Other desert shrubs	164	10,072	12
Total Acres			80,641	100

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TABLE E-1 -- Continued

Allotment	Vegetation Type	Code	Acres	Percentage of Total by Allotment
Caliente	Big sage	041	701	39
	Black sage	043	448	25
	Juniper	092	655	36
Total Acres			1,804	100
Cliff Springs	Big sage	041	1,641	5
	Black sage	043	6,291	17
	Other mountain shrubs	059	546	2
	Barren	080	2,303	6
	Juniper	092	6,478	18
	Shadscale	131	1,167	3
	Winterfat	151	8,088	22
	Joshua tree	163	2,408	7
	Other desert shrubs	164	7,424	20
Total Acres			36,346	100
Clover Creek	Big sage	041	921	4
	Black sage	043	1,695	7
	Rabbitbrush	045	1,139	5
	Ponderosa Pine	062	461	2
	Juniper	092	18,418	81
	Other broadleaf trees	104	221	1
Total Acres			22,855	100
Comet	Big sage	041	970	11
	Black sage	043	2,012	22
	Rabbitbrush	045	3,129	34
	Juniper	092	1,321	14
	Shadscale	131	707	8
	Fourwing saltbush	134	407	4
	Snakeweed	171	600	7
Total Acres			9,146	100
Condor Canyon	Big sage	041	876	2
	Black sage	043	1,348	3
	Juniper	092	31,157	74
	Pinyon	093	8,671	21
Total Acres			42,052	100

TABLE E-1 -- Continued

Allotment	Vegetation Type	Code	Acres	Percentage of Total by Allotment
Cottonwood	Big sage	041	1,492	2
	Manzanita	052	698	1
	Oak brush	058	6,150	10
	Ponderosa pine	062	525	1
	Juniper	092	30,534	49
	Cottonwood	103	563	1
	Blackbrush	161	9,563	15
	Cheatgrass	181	828	1
	Pinyon	093	12,590	20
Total Acres			62,943	100
Cove	Big sage	041	621	12
	Rabbitbrush	045	50	1
	Juniper	092	3,922	78
	Fourwing saltbush	134	344	7
	Black greasewood	141	86	2
Total Acres			5,023	100
Crescent	Big sage	041	5,580	15
	Black sage	043	13,462	36
	Juniper	092	29	< 1
	Pinyon	093	10,065	27
	Other desert shrubs	164	7,530	20
	Steep	071	849	2
Total Acres			37,515	100
Crestline	Juniper	092	2,415	100
Crossroads	Big sage	041	1,530	8
	Juniper	092	16,376	87
	Pinyon	093	1,021	5
Total Acres			18,927	100
Crystal Spring	Blackbrush	161	4,814	64
	Other desert shrubs	164	2,672	36
Total Acres			7,486	100
Deerlodge	Big sage	041	2,899	42
	Juniper	092	3,737	54
	Pinyon	093	274	4
Total Acres			6,910	100

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TABLE E-1 -- Continued

Allotment	Vegetation Type	Type	Acres	Percentage of Total by Allotment
Delamar	Mid-grass bunch	012	1,106	1
	Big sage	041	10,198	11
	Black sage	043	6,217	6
	Manzanita	052	738	1
	Oak brush	058	5,238	5
	Dry lake bed	081	317	< 1
	Pinyon-juniper	091	11,267	12
	Juniper	092	14,092	15
	Pinyon	093	16,191	17
	Winterfat	151	254	< 1
	Joshua tree	163	19,566	21
	Snakeweed	171	1,348	2
	Cheatgrass	181	8,316	9
Total Acres			95,851	100
Elgin	Big sage	041	7,753	29
	Pinyon-juniper	091	4,709	18
	Juniper	092	3,788	14
	Blackbrush	161	10,143	39
Total Acres			26,393	100
Ely Springs Sheep	Black sage	043	10,032	44
	Juniper	092	8,585	37
	Pinyon	093	1,561	7
	Other desert shrubs	164	2,816	12
Total Acres			22,994	100
Ely Springs Cattle	Mid-grass bunch	012	4,088	7
	Big sage	041	1,970	4
	Black sage	043	6,594	12
	Rabbitbrush	045	3,723	7
	Dry lake bed	081	2,718	5
	Juniper	092	733	1
	Other mountain shrubs	059	1,863	3
	Shadscale	131	770	1
	Fourwing saltbush	134	6,159	11
	Winterfat	151	18,071	32
	Other desert shrubs	164	8,202	15
	Annual forbs	183	855	2
Total Acres			55,746	100

TABLE E-1 -- Continued

Allotment	Vegetation Type	Code	Acres	Percentage of Total by Allotment
Enterprise	Mid-grass bunch	012	866	4
	Big sage	041	424	2
	Juniper	092	18,855	93
	Pinyon	093	212	1
Total Acres			20,357	100
Flat Top Mesa	Unsurveyed			
Garden Springs	Mid-grass bunch	012	9,305	24
	Manzanita	052	1,765	5
	Juniper	092	4,552	12
	Creosote bush	111	7,131	18
	Blackbrush	161	15,845	40
	Other desert shrubs	164	198	1
Total Acres			38,796	100
Gourd Springs	Creosote bush	111	50,403	50
	Blackbrush	161	6,038	6
	Joshua tree	163	2,416	2
	Other desert shrubs	164	6,983	7
	Bursage	167	1,233	1
	Snakeweed	171	35,052	34
Total Acres			102,125	100
Grapevine	Unsurveyed			
Haypress	Big sage	041	874	13
	Juniper	092	5,791	87
Total Acres			6,665	100
Henrie	Mid-grass bunch	012	374	1
	Rabbitbrush	045	4,144	3
	Juniper	092	8,609	6
	Creosote bush	111	7,835	6
	Blackbrush	161	107,286	81
	Other desert shrubs	164	956	1
	Bursage	167	2,391	2
	Cheatgrass	181	141	< 1
Total Acres			131,736	100

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TABLE E-1 -- Continued

Allotment	Vegetation Type	Code	Acres	Percentage of Total by Allotment
Highland Peak	Juniper	092	27,344	56
	Black sage	043	6,401	13
	Rabbitbrush	045	2,177	5
	Big sage	041	1,941	4
	Snakeweed	171	883	2
	Shadscale	131	231	< 1
	Fourwing saltbush	134	292	< 1
	Pinyon	093	9,231	20
Total Acres			48,500	100
Highway	Juniper	092	2,774	67
	Big sage	041	63	23
	Black sage	043	407	10
Total Acres			4,144	100
Jackrabbit	Unsurveyed			
Klondike	Juniper	092	752	11
	Big sage	041	3,203	46
	Black sage	043	2,995	43
Total Acres			6,950	100
Lime Mountain	Blackbrush	161	27,443	43
	Juniper	092	14,349	22
	Other mountain shrubs	059	5,545	9
	Mid-grass bunch	012	11,307	18
	Pinyon-juniper	091	3,834	6
	Perennial forbs	031	1,495	2
Total Acres			63,973	100
Little Mountain	Juniper	092	15,197	82
	Black sage	043	1,458	8
	Big sage	041	1,575	8
	Rabbitbrush	045	345	2
Total Acres			18,575	100
Lower Lake	Other desert shrubs	164	8,244	9
	Shadscale	131	3,679	4
	Creosote bush	111	17,896	18
	Joshua tree	163	23,816	24
	Blackbrush	161	16,163	17
	Juniper	092	4,626	5
	Bursage	167	12,088	12
	Steep/rocky	076	10,774	11
	Black sagebrush	043	252	< 1
Total Acres			97,538	100

TABLE E-1 -- Continued

Allotment	Vegetation Type	Code	Acres	Percentage of Total by Allotment
McCutcheon Springs	Black sage	043	4,394	24
	Other desert shrubs	164	499	3
	Big sage	041	4,172	22
	Juniper	092	4,631	25
	Shadscale	131	2,609	14
	Pinyon	093	2,351	12
Total Acres			18,656	100
McGuffy Spring	Juniper	092	21,087	94
	Big sage	041	1,194	5
	Pinyon	093	265	1
Total Acres			22,546	100
Mahogany Peak	Juniper	092	3,522	13
	Big sage	041	1,217	4
	Pinyon	093	23,282	83
Total Acres			28,021	100
Meadow Valley	Juniper	092	700	18
	Big sage	041	3,197	82
Total Acres			3,897	100
Morman Peak	Bursage	167	6,031	8
	Blackbrush	161	59,652	78
	Snakeweed	171	1,223	2
	Big sage	041	2,668	3
	Steep	073	6,868	9
Total Acres			76,442	100
Morrison-Wengert	Blackbrush	161	26,408	80
	Rabbitbrush	045	1,550	5
	Juniper	092	3,299	10
	Other desert shrubs	164	1,146	3
	Steep/rocky	075	795	2
	Bursage	167	26	< 1
Total Acres			33,224	100
Mustang	Big sage	041	17,620	72
	Other desert shrubs	164	3,134	13
	Juniper	092	2,752	11
	Black sage	043	1,034	4
Total Acres			24,540	100

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TABLE E-1 -- Continued

Allotment	Vegetation Type	Code	Acres	Percentage of Total by Allotment
Mustang Flat	Ponderosa pine	062	975	16
	Juniper	092	5,012	84
Total Acres			5,987	100
Naquinta Spring	Blackbrush	161	15,649	30
	Black sage	043	12,773	24
	Mid-grass bunch	012	802	2
	Other desert shrubs	164	5,842	11
	Spruce-fir	064	152	< 1
	Pinyon	093	17,337	33
Total Acres			52,555	100
N-4	Big sage	041	7,110	20
	Black sage	043	2,335	7
	Juniper	092	22,394	62
	Pinyon	093	3,951	11
Total Acres			35,790	100
Oak Springs	Big sage	041	22,262	11
	Black sage	043	3,859	2
	Rabbitbrush	045	12,755	6
	Other mountain shrubs	059	1,316	1
	Dry lake bed	081	3,415	2
	Rock outcrop	073	483	< 1
	Pinyon-juniper	091	6,607	3
	Juniper	092	56,343	29
	Pinyon	093	11,067	6
	Shadscale	131	1,074	1
	Winterfat	151	14,077	7
	Blackbrush	161	2,712	1
	Joshua tree	163	42,140	21
	Other desert shrubs	164	14,359	7
	Cheatgrass	181	3,890	2
Total Acres			196,359	100
Oak Wells	Big sage	041	282	1
	Pinyon	093	2,554	9
	Juniper	092	26,309	90
Total Acres			29,145	100

TABLE E-1 -- Continued

Allotment	Vegetation Type	Type	Acres	Percentage of Total by Allotment
Pahranagat East	Big sage	041	303	1
	Rabbitbrush	045	82	< 1
	Juniper	092	2,348	7
	Creosote bush	111	8,668	26
	Shadscale	131	7,646	23
	Joshua tree	163	10,296	30
	Other desert shrubs	164	4,546	13
Total Acres			33,889	100
Pahranagat West	Big sage	041	3,824	6
	Black sage	043	1,040	2
	Juniper	092	5,066	7
	Creosote bush	111	8,863	13
	Shadscale	131	11,448	17
	Blackbrush	161	33,687	49
	Joshua tree	163	1,629	2
	Other desert shrubs	164	2,967	4
Total Acres			68,524	100
	Unsurveyed		363	
Pahroc	Big sage	041	34,173	29
	Black sage	043	13,161	11
	Rabbitbrush	045	33,852	28
	Juniper	092	16,697	14
	Pinyon	093	4,603	4
	Pinyon-juniper	091	1,875	2
	Joshua tree	163	8,711	7
	Other desert shrubs	164	6,187	5
Total Acres			119,259	100
Panaca Cattle	Big sage	041	2,018	12
	Juniper	092	10,815	67
	Fourwing saltbush	134	2,638	16
	Black greasewood	141	814	5
Total Acres			16,285	100
Panaca SCS	Big sage	041	222	5
	Juniper	092	4,020	95
Total Acres			4,242	100

TABLE E-1 -- Continued

Allotment	Vegetation Type	Code	Acres	Percentage of Total by Allotment
Peck	Big sage	041	1,460	19
	Rabbitbrush	045	234	3
	Juniper	092	5,060	66
	Fourwing saltbush	134	232	3
	Black greasewood	141	712	9
Total Acres			7,698	100
Pennsylvania	Big sage	041	998	2
	Manzanita	052	5,959	14
	Oak brush	058	934	2
	Other mountain shrubs	059	1,991	5
	Juniper	092	17,128	40
	Pinyon	093	6,902	16
	Blackbrush	161	5,773	14
	Cheatgrass	181	2,737	7
Total Acres			42,422	100
Pine Cone	Big sage	041	5,713	21
	Black sage	043	705	3
	Juniper	092	12,508	46
	Blackbrush	161	5,379	20
	Joshua tree	163	2,605	10
Total Acres			26,910	100
Pioche	Other mountain shrubs	059	700	7
	Juniper	092	4,788	44
	Pinyon	093	5,323	49
Total Acres			10,811	100
Pulsipher Wash	Unsurveyed			
Rabbit Springs	Big sage	041	935	4
	Juniper	092	12,855	62
	Pinyon	093	7,089	34
Total Acres			20,879	100
Rattlesnake	Big sage	041	20,446	59
	Black sage	043	1,170	3
	Dry lake bed	081	505	1
	Shadscale	131	637	2
	Winterfat	151	3,677	11
	Other desert shrubs	164	8,245	24
Total Acres			34,680	100

TABLE E-1 -- Continued

Allotment	Vegetation Type	Code	Acres	Percentage of Total by Allotment
Red Bluff	Big sage	041	3,351	28
	Pinyon	093	8,688	72
Total Acres			12,039	100
Roadside	Big sage	041	249	22
	Black sage	043	157	14
	Juniper	092	717	64
Total Acres			1,123	100
Rocky Hills	Big sage	041	731	18
	Rabbitbrush	045	57	1
	Black sage	043	1,038	25
	Juniper	092	2,266	56
Total Acres			4,092	100
Rox	Rabbitbrush	045	636	3
	Bursage	167	22,192	97
Total Acres			22,828	100
Sand Hollow	Creosote bush	111	855	2
	Joshua tree	163	7,150	21
	Bursage	167	27,169	77
Total Acres			35,174	100
Sand Springs	Mid-grass bunch	012	277	< 1
	Big sage	041	31,716	14
	Black sage	043	25,754	11
	Rabbitbrush	045	1,620	1
	Juniper	092	1,502	1
	Pinyon	093	11,908	5
	Shadscale	131	76,089	33
	Fourwing saltbush	134	6,094	3
	Black greasewood	141	10,092	4
	Winterfat	151	6,344	3
	Other desert shrubs	164	56,066	24
	Dry lake bed	081	2,248	1
Total Acres			229,710	100
Sawmill Canyon	Big sage	041	895	10
	Black sage	043	508	6
	Juniper	092	6,965	75
	Pinyon	093	852	9
Total Acres			9,220	100

TABLE E-1 -- Continued

Allotment	Vegetation Type	Code	Acres	Percentage of Total by Allotment
Schlarman	Juniper	092	3,587	67
	Blackbrush	161	1,758	33
Total Acres			5,345	100
Shadow Well	Mid-grass bunch	012	89	1
	Shadscale	131	11,144	63
	Fourwing saltbush	134	933	5
	Winterfat	151	2,244	13
	Other desert shrubs	164	2,923	16
	Annual forbs	183	427	2
Total Acres			17,760	100
Sheep Flat	Mid-grass bunch	012	561	1
	Big sage	041	1,924	3
	Rabbitbrush	045	623	1
	Oak brush	058	1,736	2
	Ponderosa Pine	062	2,153	3
	Juniper	092	39,563	54
	Pinyon	093	26,987	36
	Blackbrush	161	314	< 1
Total Acres			73,861	100
Sheep Spring	Black sage	043	318	1
	Juniper	092	28,359	91
	Pinyon	093	2,400	8
Total Acres			31,077	100
Simpson	Rabbitbrush	045	1,822	22
	Shadscale	131	4,071	49
	Winterfat	151	876	10
	Other desert shrubs	164	580	7
	Snakeweed	171	760	9
	Annual forbs	183	280	3
Total Acres			8,389	100
Six Mile	Steep/Rocky	073	1,258	4
	Big sage	041	5,243	17
	Rabbitbrush	045	10,071	33
	Pinyon	093	12,376	41
	Shadscale	131	1,317	4
	Creosote bush	111	71	< 1
Total Acres			30,336	100

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TABLE E-1 -- Continued

Allotment	Vegetation Type	Code	Acres	Percentage of Total by Allotment
Snow Spring	Manzanita	052	6,170	15
	Creosote bush	111	7,849	18
	Blackbush	161	27,294	66
	Annual forbs	183	129	< 1
	Perennial forbs	031	90	< 1
Total Acres			41,532	100
Summit Spring	Creosote bush	111	11,364	65
	Blackbrush	161	227	1
	Other desert shrubs	164	1,477	9
	Bursage	167	4,309	25
Total Acres			17,377	100
Terry	Creosote bush	111	19,717	81
	Blackbrush	161	2,569	10
	Joshua tree	163	2,191	9
Total Acres			24,477	100
Uvada	Big sage	041	2,040	18
	Juniper	092	6,281	56
	Pinyon	093	2,940	26
Total Acres			11,261	100
Warm Springs	Big sage	041	638	46
	Juniper	092	763	54
Total Acres			1,401	100
White Hills	Big sage	041	32	1
	Black sage	043	1,186	43
	Rabbitbrush	045	930	34
	Juniper	092	32	1
	Fourwing saltbush	134	575	21
Total Acres			2,755	100
White Rock	Juniper	092	423	1
	Creosote bush	111	22,816	70
	Blackbrush	161	7,045	21
	Joshua tree	163	190	1
	Other desert shrubs	164	1,668	5
	Cheatgrass	181	774	2
Total Acres			32,916	100

Source: U.S. Department of the Interior, Bureau of Land Management, Las Vegas District Office, 1976-77 Range Survey.

APPENDIX E
Section 2
TABLE E-2

MAJOR PLANT SPECIES OF THE CALIENTE ES AREA VEGETATION TYPES

VEGETATION		MAJOR PLANT SPECIES[a]	
Type (Acres)	Code	Common Name	Botanical Name
mid-grass bunch (28,775)	012	crested wheatgrass[b]	Agropyron cristatum
		big sagebrush	Artemisia tridentata
		Utah serviceberry	Amelanchier utahensis
		singleleaf pinyon	Pinus monophylla
		Utah juniper	Juniperus osteosperma
		galleta	Hilaria jamesii
perennial forb (1,585)	031	desert-marigold	Baileya multiradiata
		pointleaf manzanita	Arctostophylos pungens
		datil yucca	Yucca baccata
big sagebrush (271,044)	041	big sagebrush	Artemisia tridentata
		Douglas rabbitbrush	Chrysothamnus viscidiflorus
		Nevada jointfir	Ephedra nevadensis
		black sagebrush	Artemisia nova
		galleta	Hilaria jamesii
black sagebrush (181,579)	043	black sagebrush	Artemisia nova
		big sagebrush	Artemisia tridentata
		Douglas rabbitbrush	Chrysothamnus viscidiflorus
		Nevada jointfir	Ephedra nevadensis
		galleta	Hilaria jamesii
		squirreltail	Sitanion hystrix
rabbitbrush (85,061)	045	Douglas rabbitbrush	Chrysothamnus viscidiflorus
		rubber rabbitbrush	Chrysothamnus nauseosus
		big sagebrush	Grayia spinosa
		winterfat	Eurotia lanata
manzanita (17,735)	052	pointleaf manzanita	Arctostaphylos pungens
		Utah serviceberry	Amelanchier utahensis
		big sagebrush	Artemisia tridentata
		gambel oak	Quercus gambelii
oak brush (14,135)	058	gambel oak	Quercus gambelii
		shrub live oak	Quercus turbinella
		cheatgrass	Bromus tectorum
		Douglas rabbitbrush	Chrysothamnus viscidiflorus
		Utah serviceberry	Amelanchier utahensis

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TABLE E-2 -- Continued

other mountain shrub (6,416)	059	greenleaf manzanita	Arctostaphylos patula
		antelope bitterbrush	Purshia tridentata
		Utah serviceberry	Amelanchier utahensis
		gambel oak	Quercus gambelii
		broom snakeweed	Gutierrezia sarothrae
ponderosa pine (4,114)	062	big sagebrush	Artemisia tridentata
		pointleaf manzanita	Arctostophylos pungens
		red brome	Bromus rubens
		Utah serviceberry	Amelanchier utahensis
		ponderosa pine	Pinus ponderosa
spruce-fir (190)	064	big sagebrush	Artemisia tridentata
		Nevada bluegrass	Poa nevadensis
		eriogonum	Eriogonum sp.
		Utah serviceberry	Amelanchier utahensis
		lupine	Lupinus sp.
		white fir	Abies concolor
pinyon-juniper (44,032)	091	Utah juniper	Juniperus osteosperma
		singleleaf pinyon	Pinus monophylla
		big sagebrush	Artemisia tridentata
		Martin buckbrush	Ceanothus martinii
		eriogonum	Erigonum sp.
juniper (713,528)	092	big sagebrush	Artemisia tridentata
		Utah juniper	Juniperus osteosperma
		blackbrush	Coleogyne ramosissima
		Nevada jointfir	Ephedra nevadensis
		shortspine horsebrush	Tetradymia spinosa
pinyon (232,417)	093	singleleaf pinyon	Pinus monophylla
		big sagebrush	Artemisia tridentata
		black sagebrush	Artemisia nova
		Douglas rabbitbrush	Chrysothamnus viscidiflorus
		cliffrose	Cowania mexicana stansburiana
creosote bush (179,686)	111	white bursage	Ambrosia dumosa
		creosote bush	Larrea divaricata
		blackbrush	Coleogyne ramosissima
		Nevada jointfir	Ephedra nevadensis
		white burrobush	Hymenoclea salsola
shadscale (155,997)	131	shadscale	Atriplex confertifolia
		spiny hopsage	Grayia spinosa
		Nevada jointfir	Ephedra nevadensis
		galleta	Hilaria jamesii
		big sagebrush	Artemisia tridentata

TABLE E-2 -- Continued

four-wing saltbush (19,052)	134	four-wing saltbush	Atriplex canescens
		creosote bush	Larrea divaricata
		spiny hopsage	Grayia spinosa
		white bursage	Ambrosia dumosa
		spineless horsebrush	Tetradymia canescens
		Indian ricegrass	Oryzopsis hymenoides
black greasewood (1,162)	141	black greasewood	Sarcobatus vermiculatus
		four-wing saltbush	Atriplex canescens
		shadscale	Atriplex confertifolia
		Douglas rabbitbrush	Chrysothamnus viscidiflorus
		winterfat	Eurotia lanata
		galleta	Hilaria jamesii
winterfat (64,058)	151	winterfat	Eurotia lanata
		Russian thistle	Salsola kali
		bud sagebrush	Artemisia spinescens
		galleta	Hilaria jamesii
		shadscale	Atriplex confertifolia
		squirreltail	Sitanion hystrix
blackbrush (500,890)	161	blackbrush	Coleogyne ramosissima
		Nevada jointfir	Ephedra nevadensis
		spiny hopsage	Grayia spinosa
		Joshua tree	Yucca brevifolia
		shadscale	Atriplex confertifolia
Joshua tree (160,842)	163	spiny hopsage	Grayia spinosa
		blackbrush	Coleogyne ramosissima
		Nevada jointfir	Ephedra nevadensis
		shadscale	Atriplex confertifolia
		Joshua tree	Yucca brevifolia
other desert shrub (224,448)	164	spiny hopsage	Grayia spinosa
		Nevada jointfir	Ephedra nevadensis
		spineless horsebrush	Tetradymia canescens
		Douglas rabbitbrush	Chrysothamnus viscidiflorus
		winterfat	Eurotia lanata
bursage (143,900)	167	white bursage	Ambrosia dumosa
		creosote bush	Larrea divaricata
		Nevada jointfir	Ephedra nevadensis
		range ratany	Krameria parvifolia
		blackbrush	Coleogyne ramosissima
snakeweed (40,006)	171	turpentine-broom	Thamnosa montana
		blackbrush	Coleogyne ramosissima
		broom snakeweed	Gutierrezia sarothrae
		Nevada jointfir	Ephedra nevadensis
		filaree	Erodium cicutarium

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TABLE E-2 -- Continued

cheatgrass (16,686) annual grass (<1)	181	cheatgrass	Bromus tectorum
	182	cliffrose	Cowania mexicana stansburiana
		filaree	Erodium cicutarium
		blackbrush	Coleogyne ramosissima
		Russian thistle	Salsola kali
		red brome	Bromus rubens
annual forbs (1,691)	183	Russian thistle	Salsola kali
		red brome	Bromus rubens
		blackbrush	Coleogyne ramosissima
		cliffrose	Cowania mexicana stansburiana
		galleta	Hilaria jamesii

a/ Listed within types in order of generally decreasing relative abundance.
This is a condensed list of the species shown in the Department of the Interior, Bureau of Land Management, Las Vegas, Caliente Unit Resource Analysis, Table 34-3, 1978.

b/ Artificially seeded.

APPENDIX E
Section 3

METHODOLOGY FOR DETERMINING FORAGE INVENTORY PROCEDURES AND PRODUCTION

CALIENTE PLANNING UNIT

Range Survey

The Caliente planning unit was surveyed (where appropriate) using an ocular reconnaissance range survey method. Existing homogeneous vegetative types were delineated and sampled. The minimum mapping acreage was 160 acres. Vegetative types were mapped in the Bureau of Land Management (BLM) Las Vegas District on 7 1/2' and 15' topographic maps and 30' planimetric maps. Each vegetation type was sampled using either a toe-pace transect method or a 100-foot tape transect with "hits" recorded at one-foot intervals. The number of hits per 100 points were recorded as density on the field write-up sheets (see example 1.) Species composition was estimated and recorded on the write-up sheets, also. Slope and rock deductions were made in the field and recorded on the write-up sheets.

Slopes greater than 50 percent were considered to be totally unusable by livestock, but could be used by wildlife species. The percent of area of the vegetation type cover by rock was deducted for both livestock and wildlife species.

Proper Use Factors (PUFs) used in the Caliente planning unit range survey were established for the Las Vegas District during meetings in 1976. These meetings were attended by State and district BLM range and wildlife specialists; University of Nevada, Reno professors; a Soil Conservation Service range specialist; Nevada Department of Fish and Game personnel, and an employee of the Science and Education Administration. These PUFs were modified for local use on the Caliente planning unit. The PUF table is available for review at the Las Vegas District Office.

The Forage Acre Requirement (FAR) used in determining carrying capacities for the survey was developed from information (actual use and utilization) derived from an allotment (Crystal Springs) within the survey area.

Data collected in the Caliente ocular reconnaissance range survey was recorded on field write-up sheets. (See example 1.) All information from field write-up sheets (composition, density, and species list), Proper Use Factors, and the Forage Acre Requirement were used to compute carrying capacities for the grazing ungulate of the Caliente planning unit via a computer program developed by

the Nevada State Office, BLM.

Carrying capacities computed were based on the following formula:

$$\frac{FAR}{\sum_{n=1}^{i}(C_i D P_i U)}$$

where:

FAR = Forage Acre Requirement as determined in the Crystal Springs pasture.

C_i = Vegetative composition of each plant species (i).

D = Vegetative density of the vegetation type.

P_i = Proper Use Factor for each plant species (i) for the animal of concern and its period-of-use.

U* = Percent utilizable area of the vegetation type.

*Note: Computer calculations were made using 100 percent utilizable area in all vegetation types where terrain deductions were greater than five percent. Deduction for terrain restrictions (i.e., slope or rock) were made in a later step.

Computer print-outs (example 2) were supplied to the Las Vegas District. As shown, the print-out displays the raw data from the field write-up sheets, Proper Use Factors for each plant species by period-of-use, the Forage Acre Requirement and the percent utilizable area used in the calculation. The print-out also displays the resultant carrying capacities by season and animal species. The non-competing acre/AUM column represents the carrying capacity for each animal for the season shown assuming no competing animal species is present. The competing acre/AUM column shows the carrying capacity for the livestock species by season, assuming the competing big game species is stocked at its carrying capacity. Calculations for determining the competing livestock carrying capacity are described in the wildlife allocation portion of this Appendix.

Livestock Forage

Vegetation type delineations were transferred from the maps used in the field to 30' planimetric maps for each of the grazing units. BLM permitted waters were plotted on these maps. From these maps acreages were determined for each vegetation type. Acreages were further broken down by distance to water. Acreages in each vegetation type four miles or further from a permitted water source were determined. These acreages were summarized by vegetation type for each allotment and recorded on the Range Forage Inventory Summary sheet (example 3). At this time acreages for each vegetation type were categorized into "suitable", "potentially suitable" and "unsuitable" acres. Suitable acres included the acreage of the vegetation type within four miles of a permitted water, producing at 32 acres/AUM carrying capacity or

better, and of less than 50 percent slope. Potentially suitable acres included the acreage of the vegetation type less than 50 percent slope and which produced at 32 acres/AUM or better, but were beyond four miles from a permitted water source. Unsuitable acres included the acreage of the vegetation type that were greater than 50 percent slope plus the acres of the type cover by rock and acreages of vegetation types producing at greater than 32 acres/AUM carrying capacities.

Livestock Animal Unit Months (AUMs) available were then computed, categorized, and recorded on the range forage inventory summary sheet. The acreages recorded for each category (suitable, potentially suitable, and unsuitable) were divided by the acres/AUM figure from the computer print-out for that vegetation type, the livestock species, and its season-of-use (period-of-use). No AUMs were calculated for the terrain restriction column.

Recommended forage allocations were based on the available livestock AUMs in suitable portions of vegetation types. Allocations of forage to big game species results in a reduction of livestock AUMs available in many cases. The Wildlife Forage section of this Appendix discusses the determination of this impact.

An example of the calculations used is shown below:

Allotment	:	Barclay (1004)
Vegetation type write-up number	:	1004-03
Season-of-use	:	Summer
Kind of livestock	:	Cattle
Total acres in vegetative type	:	400
Total usable acres	:	380
Acres/AUM from print-out	:	21.30

380 acres ÷ 21.30 Acres/AUM = 18.8 AUMs produced on the usable acres.

The acres and AUMs shown above are entered in column c and d of the summary form (example 3).

The unusable acres (five percent of 400 = 20) were entered in column h of the allotment summary form.

Wildlife Forage

Introduction

Carrying capacities for antelope, mule deer, and desert bighorn sheep were calculated from the range survey data using a computer

program developed in the Bureau of Land Management's Nevada State Office. The computer program is designed to provide carrying capacities for livestock and big game species for the proper seasons-of-use (periods-of-use). These carrying capacities are based on forage species composition and density, utilizable area, Forage Acre Requirements and Proper Use Factors developed for the Caliente planning unit. The program was also developed to provide data for allocation of forage to two or more grazing ungulates. This is done by assigning a big game species (primarily mule deer) as a base animal and computing a carrying capacity for the livestock species using the maximum allowable Proper Use Factor (PUF) minus the PUF for big game species for each forage species for the appropriate season. This carrying capacity is displayed on the computer print-out under the competing acres/AUM column. Carrying capacity represents the stocking rate for livestock which would theoretically result in proper utilization of the forage species assuming big game species are at their carrying capacity.

Forage Allocation

Big game ranges for antelope, mule deer, and bighorn sheep were provided by the Nevada Department of Fish and Game (NDFG). A coordinated effort between NDFG and BLM personnel was made to adjust big game range delineations to fit existing vegetation type lines. A "reasonable number" representing an average number of animals based on population estimates over the past several years, including peak population estimates of the 1950s and the low population estimates of recent years, was assigned by NDFG to each big game range along with the season-of-use.

Forage allocation for big game species were made on an allotment basis. The reasonable number of big game for each range was proportioned by allotment based on the percent area of each allotment in each range. The objective of wildlife forage allocation was to allocate to reasonable numbers as assigned by the NDFG. In allocating forage to big game by allotment two situations occurred: (1) the total available AUMs in the allotment for the big game species exceeded the reasonable numbers, or (2) the total available AUMs in the allotment fell short of the reasonable number.

In those allotments where the available big game AUMs exceeded reasonable numbers certain vegetation types were chosen as high use areas. These vegetative types were chosen by considering species composition, forage density, and, in summer ranges, proximity to water. These factors were evaluated in relation to the big game species needs and forage preferences. These types were prioritized and all available AUMs for the species of concern were allocated beginning in the best vegetation types until the reasonable numbers for that allotment were met. In those

vegetative types where all available big game AUMs were allocated, the stocking rate for livestock is represented on the computer print-out under the competing acres/AUM column. The competitive impact in these types was calculated by subtracting the competing AUMs from the non-competing AUMs. As the reasonable number was approached occasionally only a portion of the available big game AUMs were allocated. In these cases the competitive impact of this allocation on livestock was computed using the following formula:

$$NC_c - C_c \left(\frac{D_{BG}}{A_{BG}}\right) = CI$$

where:

NC_c = Total livestock AUMs available in the vegetative type (not recognizing other uses).

C_c = Livestock AUMs available in the vegetative type following full allocation to wildlife.

D_{BG} = Big game allocation in the vegetation type (AUMs).

A_{BG} = Big game AUMs available in the vegetation type.

CI = Competitive impact (livestock AUMs).

Therefore, the available livestock AUMs after the big game allocation is expressed as follows:

$NC - CI$ = Remaining available livestock AUMs.

In allotments where big game AUMs available were inadequate to meet the reasonable numbers, all available big game AUMs were allocated. As described above the competitive impact on livestock in these cases were described by the following formula:

$$NC_c - C_c = CI$$

Forage shortages in an allotment were not compensated for by allocating additional available AUMs in adjacent allotments within the same big game range. These shortages were considered as habitat deficiencies in these areas. Specific calculation by habitat area and allotment are available in the 1976 Caliente range survey and the Caliente Management Framework Plan on file at the BLM Las Vegas District.

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EXAMPLE 1

BARCLAY

U.S. DEPA MENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORAGE SURVEY TYPE WRITEUP
(OCULAR RECONNAISSANCE METHOD)

Examiner BB 54 Bash

Day-Date 28 Photo #

SECTIONS	TWP.	RGE.	MER.
11, 14, 23	55	69E	

ACOMA

Topography:

Gently Rolling

Writeup # 1 0 0 4 - 0 3 Date 1 0 (mo) - 7 6 (yr)

Type 0 9 - J U O S - A R N O Density 1 6

CATTLE: 9 5 % SUITABLE ; SEASON OF USE 1 2 3 4

SHEEP : % SUITABLE ; SEASON OF USE

DEER : 1 0 0 % SUITABLE ; SEASON OF USE 1 2 3 4 5

: % SUITABLE ; SEASON OF USE

: % SUITABLE ; SEASON OF USE

notes	PLANT SYMBOL	%Comp.		PLANT SYMBOL	%Comp.
	ORHY	3	grasses		
	SIHY	4			
	BOGR	3			
	ARIST	T			
	PONE1	1			
subtotal			11		
	ERIOG	T	forbs		
	ASTRA	2			
	MASHA	T			
	ANNUA	2			
	SPHAE	T			
	PHBR	T			
subtotal			4		
	ARNO	79	shrubs		
	ARTR1	T			
	CHNA	T			
	CHVI1	1			
	GUSA	5			
	OPUNT	T			
subtotal			85		
TOTAL			100		

NSO 4400-1 (September 1976)

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Transect Data

1-20																				
21-40																				
41-60																				
61-80																				
81-100																				

Transect Summary

	Hits
Vegetation	17
Litter	
Small Rock	
Large Rock	
Bare Ground	
Total	

Soil Surface Factor

Soil Movement	
Surface Litter	
Surface Rock	
Pedestalling	
Rills	
Flow Patterns	
Gullies	
Total	

Utilization Deductions in Percent

Use Criteria	Cattle	Sheep			
Slope	5				
Rocks					
Timber					
Lack of Water					
Unstable Soils					
Other(specify)					
Total Deduct.	5				
% Utilizable	95				

Remarks:

Barclay Allotment

Example 2

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
FORAGE RANGE SURVEY TYPE COMPUTATION
(OCULAR RECONNAISSANCE METHOD)

PAGE NO : 1

REPORT DATE : APRIL 28, 1979
STATE : NEVADA
DISTRICT : LAS VEGAS
RESOURCE AREA : CALIENTE-VIRGINIA VA
PLANNING UNIT : CALIENTE
ALLOTMENT : BARCLAY

WRITE-UP NO : 4- 3
DATE OF WRITEUP : 10 76
VEGETATIVE TYPE : 09-JUOS-ARNO
DENSITY : 16 %

TYPE OF GRAZING ANIMAL % UTIL SEASONS
CATTLE 95 1 2 3 4 5
DEER 100 1 2 3 4 5

		VOLUME	% COMP	MAXIMUM ALLOWANCE	ANIMAL NAME	SEASON 1	SEASON 2	SEASON 3	SEASON 4	SEASON 5
GRASSES **********										
ORHY	ORYZOPSIS HYMENOIDES	1	3	50	CATTLE	50*	50*	50*	50*	50*
					DEER	5*	0*	0*	0*	5*
SIHY	SITANION HYSTRIX	2	4	40	CATTLE	40*	30*	30*	20*	30*
					DEER	5*	0*	0*	0*	5*
BOGR	BOUTELOUA GRACILIS	1	3	50	CATTLE	50*	50*	50*	40*	50*
					DEER	0*	0*	0*	0*	0*
ARIST	ARISTIDA SPP.	3	0	10						
PONE-2	POA NEVADENSIS	2	1	50	CATTLE	50*	50*	50*	40*	45*
					DEER	5*	0*	0*	0*	0*
		SUM	11							
FORBS **********										
ERIOG	ERIOGONUM SPP.	3	0	40						
ASTRA	ASTRAGALUS SPP.	3	2	0						
MACHA	MACHAERANTHERA SPP.	3	0	5						
ANNU	ANNUALS	3	2	20	CATTLE	10*	0*	0*	0*	5*
					DEER	20*	0*	0*	0*	5*
SPHAE	SPHAERALCEA SPP.	3	0	50						
PHYSA	PHYSARIA GRASSICOCIDES	3	0	0						
		SUM	4							
TREES AND SHRUBS **********										
ARNO	ARTEMISIA NOVA	3	79	30	CATTLE	5*	5*	5*	15*	5*
					DEER	0*	0*	0*	0*	0*
ARTR-	ARTEMISIA TRIDENTATA	3	0	0						
CHNA	CHRYSOTHAMNUS NAUSEOSUS	3	0	15						
CHVI-1	CHRYSOTHAMNUS VISCIDIFLOR	3	1	15	CATTLE	0*	0*	0*	0*	0*
					DEER	0*	0*	5*	5*	5*
GUSA-	GUTIERREZIA SAROTHRAE	3	5	10	CATTLE	0*	0*	0*	0*	0*
					DEER	5*	0*	0*	5*	5*
OPUN1	OPUNTIA SPP.	3	1	15						
		SUM	85							
		TOTAL SUM	100							
					TOTAL SUM CATTLE	925*	865*	865*	1575*	870*
					TOTAL SUM DEER	105*	0*	5*	30*	75*

VOLUME HIGH 5 %
MED 3 %
LOW 43 % F.....F .23

SEASON	ANIMAL	COMPETING AC/AUM	NON-COMPETING AC/AUM	MAXIMUM DUAL USE AC/AUM
SPRING	CATTLE		19.34	13.70
SPRING	DEER		166.67	
SUMMER	CATTLE		21.30	14.62
SUMMER	DEER		0.00	
FALL	CATTLE		21.30	20.58
FALL	DEER		35.00.00	
WINTER	CATTLE		11.76	6.54
WINTER	DEER		533.33	
SEASONLONG	CATTLE		21.17	10.91
SEASONLONG	DEER		233.33	

10=40

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EXAMPLE #3

RANGE FORAGE INVENTORY SUMMARY SHEET
ALLOTMENT BARCLAY

Veg. Type Write-up #	Location T.	R.	Sec.	Suitable Range Acres	Available AUMs Cattle - Wild Horse/ Burro	Available AUMs Wildlife (deer, bighorn)	Competitive AUMs	Potentially Suitable Acres	Potentially Suitable Water Development AUMs	Unsuitable Range Acres	Unsuitable Range Production AUMs	Unsuitable Range Terrain Restriction Acres
a	← b →			c	d →		e	f →		g →		h
09 JUOS - Arno 1004 - 03 (21,30)				380	18.8							20

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APPENDIX E, Section 4
TABLE E-3
PRESENT RANGE CONDITION
CALIENTE ENVIRONMENTAL STATEMENT AREA

Allotment	Condition			
	Acres Good	Acres Fair	Acres Poor	Unsuitable Acres
Applewhite	0	8,796	1,004	20,265
Ash Flat	0	0	1,317	2,090
Bald Mountain	62,523	144,214	8,102	47,043
Barclay	14,340	38,026	14,353	12,290
Beacon b/	0	5,250	0	611
Bennett Spring	3,334	33,627	4,194	5,227
Black Canyon	3,433	4,590	0	388
Black Hills	3	3,047	0	1,188
Boulder Spring a/				
Breedlove	0	55,879	30,027	23,356
Buckboard	5,970	2,851	1,568	453
Buckhorn	34,861	26,282	4,527	14,972
Caliente	1,043	248	0	513
Cliff Springs	18,588	10,945	598	6,231
Clover Creek	2,938	10,365	4,145	5,407
Comet	1,504	5,085	2,478	79
Condor Canyon	2,027	26,183	0	2,532
Cottonwood	4,190	16,611	19,788	22,528
Cove	1,175	2,351	136	1,361
Crescent	153	33,974	0	3,388
Crestline	299	2,042	0	74
Crossroads	1,021	16,635	1,079	226

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TABLE E-3 -- Continued

Allotment	Condition			
	Acres Good	Acres Fair	Acres Poor	Unsuitable Acres
Crystal Spring	489	6,997	0	0
Deerlodge	679	5,879	0	352
Delamar	12,277	54,205	2,290	68,485
Elgin	0	16,698	8,950	745
Ely Springs Cattle	33,045	11,674	4,222	9,587
Ely Springs Sheep	6,783	10,066	0	5,845
Enterprise	10,217	5,191	4,507	122
Flat Top Mesa a/				
Garden Springs	10,301	9,052	15,793	3,650
Gourd Springs	8,273	51,485	2,513	21,854
Grapevine a/				9,483
Haypress	0	5,861	697	7
Henrie	1,371	16,262	85,840	27,410
Highland Peak	10,854	26,296	2,861	7,669
Highway	2,925	407	0	812
Jackrabbit a/				
Klondike	3,478	350	2,632	490
Lime Mountain	0	17,932	41,471	5,671
Little Mountain	5,145	10,890	961	1,579
Lower Lake	1,714	46,811	34,415	29,595
McCutcheon Springs	7,670	5,487	4,021	1,478
McGuffy Spring	2,998	19,283	0	265
Mahogany Peak	20,984	1,135	0	5,902
Meadow Valley	0	0	525	3,373
Morman Peak	0	42,137	0	33,082
Morrison-Wengert	0	9,584	1,576	1,529
Mustang	3,701	5,089	11,760	4,000

TABLE E-3 -- Continued

Allotment	Condition			
	Acres Good	Acres Fair	Acres Poor	Unsuitable Acres
Mustang Flat	3,688	379	1,238	682
N-4	0	34,112	0	1,718
Naquinta Spring	6,644	27,473	0	18,338
Oak Springs	64,689	65,302	31,197	34,718
Oak Wells	10,878	15,281	277	2,709
Pahranagat East	805	18,616	0	14,468
Pahranagat West	13,667	21,732	20,406	12,719
Pahroc	52,612	24,885	19,940	21,824
Panaca Cattle	3,123	11,138	0	419
Panaca SCS	2,341	1,790	0	111
Peck	4,301	123	1,798	759
Pennsylvania	4,876	12,892	5,446	19,208
Pine Cone	705	9,057	9,192	7,956
Pioche	0	4,881	0	5,930
Pulsipher Wash a/	0	16,824	1,896	1,542
Rabbit Springs	16,460	4,583	7,324	5,644
Rattlesnake	0	7,402	0	4,376
Red Bluff	717	157	249	0
Roadside	203	2,975	731	183
Rocky Hills	0	21,282	0	2,320
Rox	1,138	31,879	0	2,157
Sand Hollow	104,836	150,283	19,625	19,871
Sand Springs	2,776	1,580	3,349	1,515
Sawmill Canyon	0	3,479	1,594	272
Schlarman	15,812	0	1,521	427
Shadow Well c/	764	13,959	29,569	704
Sheep Flat				

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TABLE E-3 -- Continued

Allotment	Condition			
	Acres Good	Acres Fair	Acres Poor	Unsuitable Acres
Sheep Spring	23,172	4,402	1,219	1,788
Simpson	7,101	1,250	0	38
Six Mile	13,731	2,044	327	14,324
Snow Spring	3,209	6,708	25,445	8,680
Summit Spring	2,141	25	4,309	4,559
Terry	0	21,908	2,509	519
Uvada	7,861	2,801	0	5,639
Warm Springs	0	895	468	38
White Hills	0	2,755	0	87
White Rock	20,195	3,915	2,767	6,039
Total	688,751	1,374,539	512,351	665,691

a/ Flat Top Mesa, Jackrabbit, Boulder Spring, Grapevine, and Pulsipher Wash allotments not surveyed.
b/ Also included in Sand Hollow totals.
c/ Acres included in Sand Springs allotment.

Source: U.S. Department of the Interior, Bureau of Land Management, Las Vegas, Caliente Unit Resource Analysis, .44-13-.44-18, 1978.

APPENDIX E
Section 5

METHODOLOGY FOR PREDICTED LIVESTOCK FORAGE CONDITION

Projections of future range condition are based upon data from studies of allotments managed under AMPs in the Bureau of Land Management's Vermillion Resource Area, Arizona (Hughes, 1978) and within the Caliente ES area. The maximum increases in key species percent composition were found to reach approximately 13 percent after 10 years of management under intensive grazing systems. These increases were generally associated with areas in fair condition prior to grazing system initiation and when annual utilization of the key forage species was limited to about 50 percent. This same level of utilization produced a maximum increase of only 5 percent for the key species in areas of good or poor condition. The lower increases observed for areas in good condition are partly due to the slower rate of vegetational changes inherent in relatively stable plant communities (Mueller-Dombois and Ellenberg, 1974). Lower increases for areas in poor condition may result from a lack of key species seed sources in the understory. In addition, the key forage species are usually grazed closely in these poor areas even though the pasture overall is lightly grazed (Gray, 1965).

As a result of the above mentioned increases in species composition, the following assumptions were made to predict future livestock forage conditions.

1. The following vegetative types should improve one condition class (unless they are in poor condition) in 35 years through management: mid-grass bunch, perennial forb, shadscale, four-wing saltbush, winterfat, Joshua tree, and bursage.

The remaining vegetative types would improve one condition class if they were in fair condition. Those vegetative types in poor condition would remain in poor condition. (See Table E-4, Appendix E.)

A small percent of the vegetative types in poor condition would move to fair condition. Such areas actually have a low fair condition, but have other characteristics that justify the acreage being rated in poor condition. Under management the poor condition of such areas would improve to fair condition.

In most cases, those acres of pinyon-juniper and conifers in fair condition would not move to good condition, since pinyon-juniper and conifers are the climax vegetation and would move to dominance in an area.

2. Condition changes within condition classes would also occur. Low fair condition types could move to high fair, but not into good condition.

3. Allotments or pastures under less intensive management are expected to remain in the same condition, with a static or slightly upward trend. With a reduction in livestock numbers, trend could be expected to improve, except in the livestock's favorite grazing and gathering areas, which would continue to deteriorate.

APPENDIX E, Section 5
TABLE E-4
FUTURE RANGE CONDITION
CALIENTE ENVIRONMENTAL STATEMENT AREA

Allotment	Condition			
	Acres Good	Acres Fair	Acres Poor	Unsuitable Acres
Applewhite	390	8,406	1,004	20,265
Ash Flat			1,317	2,090
Bald Mountain	177,397	29,340	8,102	47,043
Barclay	52,366		14,353	22,384
Beacon [b]	5,250			1,346
Bennett Spring	36,961		4,194	7,109
Black Canyon	6,338	1,685		1,188
Black Hills	771	2,279		625
Boulder Spring [a]				
Breedlove	48,391	7,488	30,027	21,699
Buckboard	8,821		1,568	453
Buckhorn	61,143	29	4,498	6,697
Caliente	1,043	248		513
Cliff Springs	29,533		582	6,231
Clover Creek	7,885	5,418	4,145	5,407
Comet	5,800	789	2,478	79
Condor Canyon	7,150	21,091		2,622
Cottonwood	13,735	7,066	19,788	22,464
Cove	1,175	2,351	136	1,361
Crescent	25,069	9,058		3,388
Crestline	1,590	751		74
Crossroads	7,488	10,168	1,079	192
Crystal Spring	7,486			
Deerlodge	4,169	2,389		352
Delamar [c]	45,430	21,052	2,290	22,277

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TABLE E-4 -- Continued

Allotment	Condition			
	Acres Good	Acres Fair	Acres Poor	Unsuitable Acres
Elgin	15,836	862	8,950	745
Ely Springs Cattle	43,248	1,471	4,222	6,805
Ely Springs Sheep	15,851	998		6,145
Enterprise	15,312	96	4,507	442
Flat Top Mesa a/				
Garden Springs	19,353	291	15,502	3,650
Gourd Springs	42,607	18,404	19,260	21,854
Grapevine a/				
Haypress	5,684	177	697	7
Henrie	17,520	113	85,840	27,305
Highland Peak	30,886	6,264	2,861	8,489
Highway	3,332			812
Jackrabbit a/				
Klondike	3,753	75	2,632	490
Lime Mountain	5,959	23,363	30,081	4,570
Little Mountain	5,300	10,735	961	1,579
Lower Lake	48,193	332	34,415	29,595
McCutcheon Springs	9,837	3,320	4,021	1,478
McGuffy Spring	3,652	18,629		265
Mahogany Peak	22,119			5,902
Meadow Valley			525	3,372
Morman Peak	42,137			33,082
Morrison-Wengert	9,584	26	1,550	894
Mustang	8,221	569	11,760	3,990
Mustang Flat	3,688	379	1,238	682
N-4	20,531	13,581		2,168
Naquinta Spring	34,117			18,438

TABLE E-4 -- Continued

Allotment	Condition			
	Acres Good	Aces Fair	Acres Poor	Unsuitable Acres
Oak Springs	110,451	21,325	29,412	35,171
Oak Wells	10,878	15,281	277	2,709
Pahranagat East	19,309	112		14,468
Pahranagat West	35,399		20,406	12,719
Pahroc	66,806	10,691	19,940	21,822
Panaca Cattle	6,138	8,881	847	419
Panaca SCS	3,312	819		111
Peck	4,301	355	1,566	1,476
Pennsylvania	13,149	4,619	5,270	19,208
Pine Cone	7,442	4,665	6,847	7,956
Pioche	4,881			5,930
Pulsipher Wash a/				
Rabbit Springs	7,355	9,469	1,896	2,255
Rattlesnake	20,282	761	7,324	6,313
Red Bluff	3,016	4,386		4,637
Roadside	874		249	
Rocky Hills	2,482	696	731	183
Rox	21,282			1,546
Sand Hollow	33,017			2,157
Sand Springs	239,629	15,490	19,625	18,724
Sawmill Canyon	4,068	288	3,349	1,515
Schlarman	3,479		1,594	272
Shadow Well d/	15,812		1,521	427
Sheep Flat	12,809	1,914	29,569	30,616
Sheep Spring	26,051	1,523	1,263	1,245
Simpson	7,831	520		38
Six Mile	13,802	1,973	327	14,324

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TABLE E-4 -- Continued

Allotment	Condition			
	Acres Good	Acres Fair	Acres Poor	Unsuitable Acres
Snow Spring	9,917		25,445	6,170
Summit Spring	2,166	82	4,227	6,343
Terry	2,191	19,717	2,509	
Uvada	10,324	338		599
Warm Springs	725	170	468	38
White Hills	2,755			
White Rock	22,597	1,513	2,767	6,039
Total	1,726,640	354,881	512,012	604,490

a/ Flat Top Mesa, Jackrabbit, Boulder Spring, Grapevine, and Pulsipher Wash allotments not surveyed.
b/ Also included in Sand Hollow totals.
c/ Only that portion of the Delamar allotment which was surveyed during the 1976-77 range survey is included in this total.
d/ Acres included in Sand Springs allotment.

Source: U.S. Department of the Interior, Bureau of Land Management, Las Vegas, Caliente Unit Resource Analysis, .44-13-.44-18, 1978.

APPENDIX E
Section 6

METHODOLOGY FOR ESTIMATING AUMS AFTER VEGETATIVE MANIPULATION

The existing vegetative manipulation projects which have been done in the Caliente Environmental Statement (ES) area have usually averaged approximately 10 acres per Animal Unit Month (AUM) after establishment. Therefore, to estimate carrying capacity for vegetative manipulation projects the acres of the proposed project were multiplied by 10 percent, the resulting number being the future number of AUMs.

For example, 223,401 acres of mechanical treatment:

223,401 x .10 = 22,340 AUMs.

APPENDIX E
Section 7

METHODOLOGY FOR PREDICTING FUTURE AUMS
PROPOSED ACTION

To predict the number of Animal Unit Months (AUMs) which would be available in 35 years (year 2015), the five existing Allotment Management Plans were analyzed to determine the percentage increase in AUMs since implementation. The increase was found to be approximately 20 percent. Each allotment was then analyzed based on the proposed management intensity, the condition of the vegetation, and the specific vegetation types associated in any given allotment. Based on professional judgment the following vegetation types in the Environmental Statement (ES) area have the best potential for improvement: mid-grass, perennial forbs, shadscale, four-wing saltbush, winterfat, Joshua tree, and bursage. Therefore, the following assumptions were made:

1. If an allotment had a significant acreage of the above vegetation types and intensive management were implemented, then the AUMs would increase by 20 percent.

2. If an allotment had only a small percentage (or none) of these vegetation types and intensive management were implemented, the AUMs would increase by 10 percent.

3. If an allotment had a significant amount of the above vegetation types but was not proposed for intensive management, the AUMs would only increase five percent.

4. If the majority of the allotment was in poor condition and was not proposed for intensive management, then the AUMs were reduced by five percent.

5. If the allotment had a small percentage of the above vegetation types, was not proposed for intensive management, but it appeared that some potential did exist for improvement, then the AUMs were increased by two percent.

6. If grazing were eliminated on an allotment presently producing some AUMs, there would be a two percent increase in AUMs.

APPENDIX E
Section 8

METHODOLOGY FOR PREDICTING FUTURE AUMS
NO ACTION
ALTERNATIVE 1

To predict the number of Animal Unit Months (AUMs), which would be available in 35 years (year 2015), the five existing Allotment Management Plans (AMPs) were analyzed to determine the percent increase in AUMs since implementation. This was found to be approximately 20 percent. Each allotment was then analyzed based on the present management intensity, the condition of the vegetation and the specific vegetative types associated with any given allotment. Based on professional judgment, the following vegetation types in the ES area have the best potential for improvement: mid-grass, perennial forb, shadscale, four-wing saltbush, winterfat, Joshua tree, and bursage. Therefore these assumptions were made:

1. If an allotment had a significant acreage of the above vegetation types and was under intensive management, the AUMs should increase by 20 percent.

2. If an allotment had only a small percentage (or none) of these vegetation types and was under intensive management the AUMs should increase by 10 percent.

3. If an allotment had a significant amount of the above vegetative types, was mostly in fair condition, was not under intensive management, and was not over allocated in terms of AUMs found by 1976 range survey, the AUMs would increase by five percent.

4. If the majority of the allotment were in poor condition and not under intensive management, the AUMs would be reduced by five percent. If the allotment were over allocated by 25 percent or less, the AUMs would be reduced by 25 percent; 26-50 percent over allocation, 50 percent reduction; and 51-100 percent over allocation, 75 percent reduction. Allocation would include AUMs demanded by livestock, wild horses and burros, and wildlife. If the current range survey found few AUMs (1-5) or no AUMs, future AUMs would be 0.

5. If the allotment had a small percentage of the above vegetative types, was mostly in fair or good condition, was not under intensive management, and was under allocated by 0-50 percent, AUMs increased by two percent; 51-100 percent under allocation, AUMs increased by five percent. If the allotment were over allocated by 5-35 percent, AUMs were reduced by 10 percent;

36-70 percent over allocation, AUMs were reduced by 20 percent; 71-100 percent over allocation, AUMs were reduced by 50 percent.

6. If there was a significant amount of the above vegetative types, the allotment was not under intensive management, and was in good or fair condition, and was under allocated by 0-50 percent, AUMs would increase by 10 percent; 51-100 percent under allocation, AUMs would increase by 20 percent. If over allocated by 0-25 percent, AUMs would increase by two percent; and if over allocated by greater than 26 percent, the future AUMs would remain the same as at present.

Under allocation refers to the number of AUMs found by the current range survey compared to the AUMs allocated in 1977 to livestock, wild horses and burros, and wildlife.

APPENDIX E
Section 9

METHODOLOGY FOR PREDICTING FUTURE AUMS
MINIMUM CONSTRAINTS ON WILD HORSES AND BURROS
ALTERNATIVE 3

On those allotments where all of the available Animal Unit Months (AUMs) would be allocated to wild horses, burros, and wildlife, these animals would be grazing year-round. It was assumed there would be a five percent reduction from present vegetative production. This reduction assumption was based on professional judgement and the fact that continuous yearlong grazing has a detrimental effect on preferred vegetative species (Stoddart, Smith and Box, 1975). Also, grazing by these animals would not be managed or controlled.

APPENDIX E
Section 10

METHODOLOGY FOR PREDICTING FUTURE PRODUCTION (AUMs)

RESTRICTED GRAZING DURING SPRING
Alternative 4

Predictions of future Animal Unit Months (AUMs) for this alternative were based on professional judgement and studies which are related to meeting basic plant needs.

Defoliation of 50 to 60 percent of a current year's growth is less harmful in the fall, early or late winter, and early spring than in late spring or early summer (Cook et al., 1970, p. 51). Vegetation in the Caliente ES area starts in late February and seeds are usually set by mid-July (see Table 2-11). Also, only areas with suitable livestock forage were allocated and these were adjusted to allow grazing for only seven and a half months of the year during the periods which are the least detrimental to plant growth.

Therefore, the following assumptions were made:

1) If an allotment presently has 75 to 100 percent of its total acreage in good or fair condition, present production was increased 30 percent.

2) If an allotment presently has an equal amount of acreage in good, fair, and poor condition, present production was increased by 15 percent (i.e., two-thirds, good and/or fair; one-third, poor).

3) If an allotment has half of the acreage in poor condition, present production was increased by five percent.

4) If an allotment had the majority of the acreage (over one half or 55-100 percent) in poor condition, AUMs were increased by two percent.

5) If no suitable AUMs (or a few, such as 1-10) were found by the range survey or were recommended for no grazing, present AUMs were assumed to be the same as for the future.

6) Future AUMs on the five existing AMPs were assumed to be the same as in the proposed action.

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APPENDIX E
Section 11

TABLE E-5

FUTURE LIVESTOCK AUMs
BY ALLOTMENT

ALTERNATIVE 6

Allotment	Present Forage Capacity AUMs [a]	Future AUMs [b]
Applewhite	2	2
Ash Flat	43	44
Bald Mountain	5332	6398
Barclay	2690	4043
Bennett Spring	3869	3946
Beacon	0	--
Black Canyon	704	718
Black Hills	126	129
Boulder Spring	416	416
Breedlove	60	63
Buckboard	427	470
Buckhorn	5687	5971
Caliente	59	60
Cliff Springs	2291	2749
Clover Creek	368	350
Comet	216	227
Condor Canyon	1636	2060
Cottonwood	441	2245
Cove	214	218
Crescent	2828	2885
Crestline	96	101
Crossroads	413	654
Crystal Spring	376	395
Deerlodge	319	335
Delamar	6148	6763
Elgin	1401	1541
Ely Springs Sheep	1136	1249
Ely Springs Cattle	4878	5854
Enterprise	2152	2367
Flat Top Mesa	0	--
Garden Springs	2150	2365
Gourd Springs	1406	1547
Grapevine	560	560
Haypress	43	45

TABLE E-5 (continued)

Allotment	Present Forage Capacity AUMs [a]	Future AUMs [b]
Henrie	3127	3440
Highland Peak	2371	2490
Highway	219	230
Jackrabbit	0	--
Klondike	416	437
Lime Mountain	3830	5297
Little Mountain	671	705
Lower Lake	1145	1168
McCutcheon Springs	583	595
McGuffy Spring	325	558
Mahogany Peak	1311	1337
Meadow Valley	0	--
Mormon Peak	1855	1892
Morrison-Wengert	1043	1147
Mustang	444	488
Mustang Flat	90	92
Naquinta Spring	1058	1164
N-4	396	436
Oak Springs	10,570	11,627
Oak Wells	542	1661
Pahranagat East	565	593
Pahranagat West	1289	1353
Pahroc	3917	4309
Panaca Cattle	596	715
Panaca SCS	162	178
Peck	190	180
Pennsylvania	156	172
Pine Cone	627	658
Pioche	354	361
Pulsipher Wash	0	--
Rabbit Springs	720	1112
Rattlesnake	1172	1789
Red Bluff	98	100
Roadside	48	53
Rocky Hills	238	243
Rox	0	--
Sand Hollow	582	698
Sand Springs	11,019	12,121
Sawmill Canyon	97	92
Schlarman	390	398
Shadow Well	1151	1209
Sheep Spring	1815	1851
Sheep Flat	521	1638
Simpson	414	435

TABLE E-5 (continued)

Allotment	Present Forage Capacity AUMs [a]	Future AUMs [b]
Six Mile	896	986
Snow Spring	1530	1453
Summit Spring	149	164
Terry	242	254
Uvada	554	565
Warm Springs	25	24
White Hills	105	116
White Rock	1810	1991
Total	109,914	127,345

~~10-66~~

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MIKE O'CALLAGHAN
GOVERNOR

GLEN K. GRIFFITH
DIRECTOR

1100 VALLEY ROAD P.O. BOX 10678 RENO, NEVADA 89510 TELEPHONE (702) 784-6214

Region III
State Mailroom Complex
Las Vegas, NV 89158
January 4, 1979

Mr. John Boyles, Manager
Las Vegas District
Bureau of Land Management
P.O. Box 5400
Las Vegas, NV 89103

Dear John:

Attached please find a response to your letter 1791 (N-058) wherein you ask for an explanation of the Department's methodology of determining reasonable deer numbers in the Caliente Resource Area. The response is in a special report form prepared by our Game Management Division.

We hope this will help clarify that portion of the Caliente E.I.S. which will deal with this subject.

Sincerely,

GLEN K. GRIFFITH, DIRECTOR

John Donaldson
Regional Supervisor

JD:rk
Attachment

cc: Director

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APPENDIX F

WILDLIFE - REASONABLE NUMBERS METHODOLOGY

SPECIAL REPORT
Nevada Department of Fish and Game
Explanation of Determining Reasonable Numbers and Methodology
Involved For Big Game in the BLM Caliente Planning Unit

Management Area 24 and the Caliente Resource Area report fall within the concepts of Page 3, Item 2-C in the Nevada Department of Fish and Game Program and Procedure for "Wildlife Input into B.L.M. and U.S.F.S. Planning Systems." The boundaries of this planning system encompass portions of three deer herd management areas with migratory movement to and from each of them as well as the neighboring state, Utah.

A general explanation for the Reasonable Numbers concept is, "that number of animals which the wildlife management agency is striving to maintain within a given planning unit under a multiple use concept on a sustained yield basis."

Due to a limited data base within Management Area 24, the development of Reasonable Numbers was difficult, and several analogies were used which were based on data from adjacent areas and short term averages. During the late 1950's and the early 1960's, deer population numbers in Management Area 24 decreased drastically along with density losses in Utah, affecting the migration movement across the border. Due to this reduction in animal numbers and limitations of man time programmed for the Wildlife Management project, no formal composition counts were attempted in southern Lincoln County. Composition data gathered on a random basis was fragmentary and not adequate for input into the population estimation process derived in the middle 1970's; therefore, the data collected in portions of northern Lincoln County was used as the basis for evaluating and enumerating deer numbers for the Caliente U.R.A.

During the post-season period of 1975, aerial flights were instituted in all of the Lincoln County Management Areas for the purpose of increasing and improving the data base for the determination of population estimates. Although the data base for Management Area 24 is still low, enough information has been gathered to indicate the use of northern data was a valid concept. The only times where large discrepancies in data were noted during the past three-year period are when insufficient data were collected for analysis.

It is imperative when interpretating these data to realize that the current population estimates and the reasonable number figures are not comparable in any way, except to show in which direction the present animal numbers should be managed to reach the desired goal of reasonable numbers. It must also be understood population estimation figures, as derived form the departments

Selleck-Hart" method, primarily measure resident deer in Management Area 24 because harvest figures normally do not include animals migrating from adjacent ranges.

It must also be understood numerical values given for deer in this management complex are derived from the best data available; and as new and updated information becomes apparent, these figures are subject to re-evaluation and change. Although the Reasonable Number figures may seem high, it is interesting to note during the seven years from 1957 through 1963 the average harvest in this Resource Area was above 775 animals per year with a high that should have surpassed 1,200 head.

Submitted by: N.D. Raymond
Fish and Game Agent II

Reviewed by: Ronald M. Lee
Regional Assistant-Game

Date: November 30, 1978

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NEVADA DEPARTMENT OF FISH AND GAME
PROGRAM AND PROCEDURE

WILDLIFE IMPUT INTO B.L.M. AND U.S.F.S. PLANNING SYSTEMS

Division: Game

A. BACKGROUND

Due to the ever-increasing demand by Land Managing Agencies for wildlife input by our Department into their planning systems, it is apparent that a statewide guideline is needed for reporting wildlife information.

This information will be submitted to the concerned agency at their basic inventory levels which are the Unit Resource Analysis (B.L.M.) and Land Use Plan (U.S.F.S.).

B. PROGRAM

It is necessary that information concerning Big Game, Upland Game, Waterfowl, Furbearers, Raptors, and Threatened and Endangered Species be submitted to include population distribution, seasons of use, reasonable numbers, AUM requirements, harvest, key areas, multiple use conflicts, and habitat management recommendations.

It is imperative that the most up-to-date information on these species be supplied to insure that wildlife habitat requirements are identified and included in the appropriate Land Management Agency's planning process for implementation into the resource management plan under the multiple use concept.

Since Land Management Agencies may be required to testify in court or at hearings regarding the validity of resource planning data, all overlays and narrative reports documented by this Department must be defendable.

C. PROCEDURE

The individual B.L.M. or U.S.F.S. District requesting wildlife input for any particular planning unit will, by letter, give two months advance notice of scheduled due date to the appropriate N.D.F.&G. Regional office as well as a copy to the Reno office of the N.D.F.&G. (attention Game Division).

All requests for wildlife input from B.L.M. District Offices will be in accordance with URA schedule (Attachment 1).

Wildlife distribution for URA or LUP input will be transcribed from Department AMS distribution maps (1:250,000) for all species by Management Area. B.L.M./U.S.F.S. will provide the Department with planning unit boundary outlines on mylar overlay film on the AMS scale for each planning unit at the time they make their initial request for our input.

A narrative report will be written to accompany overlays and will document population levels and trends, harvest, key areas, multiple use conflicts, and habitat management recommendation.

The reporting process will be handled by teams within each Region. The team will be composed of several field biologists and the Regional Game Assistant. The Regional Assistant will act as the team leader in the review of data for species distribution overlays and in the narrative report.

The completed narrative report and each species distribution overlay will be sent from the Regional office to the Reno Headquarters for final review. After review and approval at Reno, the narrative report will be mailed to the appropriate B.L.M.-U.S.F.S. District under the Director's signature. Copies of the narrative report and species distribution overlays will be duplicated at the Reno Headquarters for filing at this office and at the Regional Headquarters.

B.L.M.-U.S.F.S. personnel will be required to transcribe species distribution at out Regional offices from the completed AMS species distribution overlays for that planning unit. They will also be required to provide their own overlay material.

I. Big Game

1. Distribution - delineate species distribution by season of use on mylar overlays (frosted one side Dietzgen 138-3) from Department distribution AMS maps (1:250,000) using color code provided (attachment 2). Several species may be combined on one overlay (such as deer, elk, and antelope) in areas of low density in order to save on mylar material.

   a. Seasons of Use - delineate on overlays using symbols as follows:

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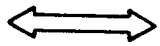
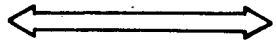
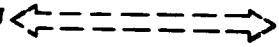
Species Symbols		Use Symbols	
Mule deer	- D	Yearlong	- Y
Antelope	- A	Summer	- S
Elk	- E	Key Summer	- KS
Bighorn Sheep	- BS	Winter	- W
Mt. Goat	- MG	Key Winter	- KS
Mt. Lion	- ML	Spring	- SP
		Intermediate or transient	- I
		Potential Introductions	- PI sp

Migration Route 3/4" Arrow 

Primary Migration Route 1 1/4" Arrow 

Unconfirmed Migration Route 1 1/4" Dashed-Arrow 

b. Symbols on overlays will coincide with symbols on tabular form N.D.F.&G. 615 (attachment 3).

2. Population Estimates (Reasonable Numbers)

a. Deer - reasonable numbers for deer will be calculated by a long-term average of the base populations using our Selleck-Hart formula. The number of years used to draw information from will depend on the validity of your data base; however, 15 years backlog should suffice for any management area.

In those areas where the data base is lacking or absent, apply your best estimates.

b. Antelope, Elk, Bighorn Sheep, Mt. Goat, Mt. Lion - Population estimates for these species are derived from survey data (ground and air) corrected by adding the estimated percentage of animals not seen. Reasonable numbers will be an average of the long-term population estimates. Allow for expansion of reasonable numbers to desired populations based on long-term history or special considerations.

c. Complication of reasonable number estimates in some management areas will occur because of migrant animals, overlapping boundaries, and intermittent Seasons of use. In these cases, that portion of a population that actually resides within a given URA-LUP boundary will have to be divided out of the management area figure as a percentage of the total and converted to actual numbers.

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3. Harvest Tables - Long-term harvest data will be provided for all big game species dating back for a period of 15 years where adequate data exists (attachment 4).

4. AUM Requirements - When computing AUM demands, use the following conversion factors:

Species	Conversion Factor
Mule Deer	4:1
Antelope	5:1
Bighorn Sheep	5:1
Rocky Mt. Sheep	5:1
Elk	1.25:1

No AUM's will be calculated for any animals under six months of age.
Computation:
Reasonable number x season of use (in months) ÷ conversion factor = AUM demand.

5. Key Areas - key areas of summer, winter, or spring use will be identified on overlays where sufficient data exists using symbols as provided. In the narrative report, these key areas will be documented and discussed as to why they are so designated.

6. Multiple Use Conflicts - in the narrative report comment on land use conflicts such as, livestock overgrazing on key deer summer and winter ranges, mining disturbances to habitat, off-road vehicle abuses to habitat, competition for available water, fencing violations, etc.

7. Habitat Management Recommendations - in the narrative report make specific habitat recommendations for correction of present deficiencies as well as those that will benefit wildlife species in the future. It will also be pointed out that as additional data on these species becomes available that such information should be included in the URA-LUP on an annual basis.

II. Upland Game

1. Chukar and Hungarian Partridge

a. Distribution - delineate distribution by relative density on mylar overlays from Department AMS maps (1:250,000) using color code provided. Density designation in square miles of occupied habitat may be determined either by estimation from the map or

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by use of a polar planimeter. The square miles of habitat for each density will be multiplied by the density of birds for that designation based on the following:

High Density = 30-50 birds per square mile.
Medium Density = 15-30 birds per square mile.
Low Density = 15 or less birds per square mile.

Generally, the mid-point of the range presented above will suffice; however, if the area biologist feels that for some valid reason, the high or low end of the range should be used, he should do so.

b. Population Estimates - to determine population estimates for any given area, multiply the number of square miles of occupied habitat times the relative density of the area.

Example: If a given area is shown on the overlay to contain 800 square miles of high density habitat, 500 square miles of density habitat, and 1,000 square miles of low density, population computation would be as follows:

800 sq. miles x 40 (midpoint high density) = 32,000
500 sq. miles x 23 (midpoint medium density) = 11,500
1,000 sq. miles x 8 (midpoint low density) = 8,000
Base population for area = 51,500

This figure will be further qualified in that, based on annual production levels, this population can drop to half or less of its present size during population lows, or can double or more the figure during population highs.

c. Harvest Tables - Long-term harvest data will be provided for these species dating back for a period of 15 years where adequate data exists (attachment 4) on a county basis.

d. Management Recommendations - in the narrative report make specific habitat recommendations for correction of present deficiencies as well as those that will benefit the species in the future. Emphasis will be placed on developing water in those areas of suitable chukar habitat devoid of water, providing water at spring sources when

pipelines are installed and installation of bird ladders at existing troughs.

2. Sage Grouse

a. Distribution - delineate distribution on mylar overlays using color code as provided. Brood areas, strutting grounds and key winter will be documented on the overlay as accurately as possible. Legal descriptions of all strutting grounds will be documented in the narrative report. It will also be pointed out in the narrative report that not all strutting grounds, brood areas, and wintering grounds have been located and documented to date. Additional information will be provided for implementation into the URA-LUP as it becomes available.

b. Population Estimates - population estimates for sage grouse will be computed by using an annual average harvest figure based on the county harvest for the last five years (10% questionnaire data) times that percent of the harvest attained within the planning unit (determined from checking station bag check data). This figure will then be divided by the total percent harvest attained on the species (use a 15% figure for total harvest - based on harvest from various Western States from band returns). In some cases, the area biologist may have good reason to adjust this percentage based on his knowledge of hunting pressure in the area, and will be so documented in the narrative report.

Example of Population Computation: Sample area - Home Camp P.U., Washoe County.

3,200 ave. annual harvest for last five years from Washoe County (10% Questionnaire).
x .30 (percent) ave. annual harvest of Washoe County attained from Home Camp P.U. (5 yr. annual average).

960 Ave. annual harvest from Home Camp P.U.
960 + .15 (percent) of total population harvested = 6,400 total sage grouse population in Home Camp P.U.

c. Harvest Tables - Long-term harvest data will be provided for this species dating back for a period

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of 15 years where adequate data exists (attachment 4) on a county basis.

d. Management Recommendations - emphasis will be placed on preserving and improving key areas such as brood use meadows, strutting grounds, and attendant nesting habitat. Also, grazing abuses will be pointed out in these areas and recommendations made for proper use during critical seasons of use.

Copies of Nevada's, "Program and Procedure on Guidelines for Vegetal Control in Sage Grouse Habitat" and "Guidelines for Habitat Protection in Sage Grouse Range," (Western States Sage Grouse Committee), will be attached to each narrative report upon final review in Reno.

3. Blue Grouse

a. Distribution - delineate in same manner as for sage grouse using designated color code.

b. Population Estimates - Compute in same manner as for sage grouse; however, use 12 percent as the total harvest on this species.

c. Harvest Tables - Long-term harvest data will be provided for this species dating back for a period of 15 years where adedquate data exists (attachment 4) on a county basis.

d. Management Recommendation - stress improvements needed to key areas such as protection of riparian vegetation along streams, proper grazing in extensive aspen stands and in mountain brush habitat, and curtailment of abusive mining practices.

4. Quail, Dove, Ruffed Grouse, Turkey, and Incidental Small Game

a. Distribution - delineate distribution on mylar overlays for those species of which you have adequate information using color code provided.

b. Population Estimates - it is probably not possible to provide population estimates for most of these species. Emphasis should be placed on distribution and identifying the key habitat types for these

species as well as making recommendations that will enhance the habitat.

c. Harvest Tables - Long-term harvest data will be provided for these species dating back for a period of 15 years where adequate data exists (attachment 4) on a county basis.

d. Management Recommendations - Emphasis will be placed on improving and expanding habitat for the enhancement of these species.

5. Waterfowl

a. Distribution - delineate distribution and use areas on mylar overlays using data from the Waterfowl Wetlands Inventory for your region. Color code as indicated. In the narrative report, provide a table of legal descriptions for these areas and seasons of use by each species (attachment 5).

b. Population Estimates - use aerial and ground count survey information for population estimates by species and season of use.

c. Harvest Tables - Long-term harvest data will be provided for waterfowl dating back for a period of 15 years where adequate data exists (attachment 6) on a county basis.

d. Management Recommendations - emphasize management of habitat that will maintain and improve existing areas as well as protecting them from excessive livestock grazing, mineral exploration and will provide for adequate pools during critical use periods.

6. Furbearers

a. Distribution - delineate distribution on mylar overlays from species surveys where adequate information exists using color code provided.

b. Population Estimates - population estimates for furbearers will be reported as high density, medium density, or low density for those areas surveyed to date.

c. Harvest Tables - harvest data will be provided for furbearers for that period of time and area for

which an adequate data base exists (attachment 4) on a county basis.

d. Management Recommendations - emphasize management of habitat that will improve and maintain existing areas as well as protecting them from excessive livestock grazing and abusive mining practices. Refer to furbearers project statements for those areas surveyed to date.

7. Raptors, Threatened and Endangered and Unique Species

a. Distribution - Key raptor nesting areas will be delineated in the following categories. A key nesting area is defined as an area where available data indicate high densities of nesting raptors.

1. CLIFF NESTING RAPTORS - Areas where high densities of cliff nesting species have been documented will be oulined in red pencil #1818. Cliff nesting raptors include mainly prairie falcons and golden eagles. Nesting peregrine falcons have not been documented in Nevada during recent years. However, if a nesting pair is located the area will be included in the key cliff nesting category.

2. FERRUGINOUS HAWKS - Areas where high densities of ferruginous hawk nests (both active and inactive nests) have been located will be outlined in orange pencil #1808.

3. ACCIPITERS - Mountain ranges where sight records and scattered nesting surveys indicate high densities of nesting accipiters will be outlined in green pencil #1307.

Wintering habits of most raptors in Nevada do not lend themselves to delineation on a map. However, golden eagles and bald eagles have been observed to utilize certain areas more heavily than others. These areas receive varying degrees of use during winters with different weather conditions and prey abundance. Areas where wintering concentrations of golden eagles have been observed and areas where bald eagles are most often observed will be outlined in black pencil #1849 and the letters G.E. and/or B.E. placed in the delineated area to indicate golden eagle and bald eagle, respectively.

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b. Population Estimates - population estimates for nongame species will be documented according to their relative abundance for general locations. Also, indicate the seasonal use of these locations as migratory or resident (attachment 6).

c. Management Recommendations - refer to guidelines set in Department Program and Procedure, "Raptor Management Considerations Recommended for Planning Systems of Land Managing Agencies."

8. Other Nongame Birds, Mammals, and Terrestrial Animals

a. Distribution - record in the narrative report only documented information concerning concentration and nesting areas of passerine birds, kit foxes, bats, desert tortoises, etc. The Land Managing Agencies will be expected to search out information from other sources concerning wildlife species which this Department does not document.

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Approved by: Glen C. Christensen, Chief
Division of Game

Date: July 8, 1976

(This report retyped verbatim by the Las Vegas District Office of the Bureau of Land Management to improve printing quality. May 1, 1979).

APPENDIX G
SOCIAL ECONOMICS

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PERMITTED USE UNDER THE
PROPOSED ACTION AND ALTERNATIVES

SECTION 4
METHODOLOGY FOR ESTIMATING
IMPACTS ON TAX REVENUES

SECTION 5
IMPACTS ON ATTITUDES,
VALUES, AND LIFESTYLES

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METHODOLOGY FOR CALCULATING
HUNTER EXPENDITURES

SECTION 7
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HUNTING INCOME AND EMPLOYMENT

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APPENDIX G
Section 1
METHODOLOGY FOR ESTIMATING INCOME AND EMPLOYMENT IMPACTS

Changes in the income and employment of small and medium sized cattle ranches were estimated with linear programming models. mpacts for large cattle ranches and sheep ranches were estimated by changing herd sizes by the amount of livestock that could be supported year-round by the changes in active licensed use resulting from the proposed action. Receipts and variable costs (including labor) were prorated to the new herd sizes.

The budgets in the impact analyses (Chapters 3, 8) are intended to represent the general tendencies of the typical rancher's reactions to the proposed action and alternatives. Obviously not all ranchers are typical; a wide variety of ranchers are contained in each category. Every rancher would not have exactly the same reaction, but most ranchers should have reactions similar to the typical ranch in their category.

Changes in the income and employment of the construction sector were based on the total output of $9,614,217. Direct coefficients from the Southern Nevada regional input-output model (State Engineers Office, 1974) were used to convert output to income and employment. The direct income (value added) coefficient is .41. For every dollar of output in the construction industry, 41 cents goes to households as income. The direct employment coefficient is 28. For every million dollars of output in the construction industry, 28 jobs are created.

Indirect income and employment impacts were estimated with multipliers from the Southern Nevada regional input-output model (Nevada State Engineers Office, 1976). Multipliers for relevant sectors are as follows:

Sector	Value Added (Income) Multiplier	Employment Multiplier
Meat Animals and Poultry (For Ranch Improvements)	1.5	1.4
New Construction (For Range Improvements)	1.4	1.5
Maintenance and Repair Construction (For Maintenance)	1.2	1.5
Retail Trade (For Hunting)	1.1	1.0
Government	1.5	1.9

These multipliers may be slightly undervalued due to the facts that: 1) The model was constructed for Lincoln and Clark Counties in nevada, whereas the impact region for this Environmental Statement also includes Iron and Washington Counties in Utah. This is expected to have little impact because the vast majority of ecomonic activity within the impact region occurs in Clark County; 2) a more significant undervaluation would be due to the use of Type 1 multipliers which account for only direct and indirect effects. This limits the secondary effects to the interindustry flows and does not include the induced impacts associated with changes in the household sector.

APPENDIX G
Section 2

LINEAR PROGRAMMING MODELS

Linear programming (LP) is a technique which optimizes an objective function by allocating constrained resources to various activities. The linear programming models used in this analysis maximize short run income to the ranchers by allocating various sources of cattle feed (i.e., Bureau of Land Management forage, alfalfa, private pasture, etc.) to livestock production through cow-calf operations. Most of the data used to develop the models were obtained at a workshop held in May 1978 with a panel of local ranchers in each size category. Other data were derived from published reports, tax records, Bureau of Land Management (BLM) operator files, and conversations with individual ranchers. After the models were first developed they were reviewed for accuracy by local ranchers. Their suggestions and comments resulted in some modifications.

Data developed for the models indicate that many ranchers are operating at a loss. If the LP models were based on conventional profit maximizing criteria they would indicate that the ranchers should choose a zero income (choose not to operate) over a negative income. Therefore, only variable costs and returns were incorporated into the models. Fixed costs were included in the budgets after the model was run. The assumption behind this methodology was that the ranchers' ranching decisions involving variable costs were conducted under profit maximizing criteria. Decisions involving fixed costs, such as whether to remain in the livestock business, were not necessarily based on expectations of high profits, but could have been based on sociological motivations such as the desire to maintain a ranching lifestyle.

This appendix is limited to analysis of the linear programming model for the medium cattle ranch. The techniques are the same for the small cattle ranch though some of the parameters are different. The major differences between the two are: the small cattle ranch has no hired labor, the calf crop for the small cattle ranch is 65 percent instead of 70 percent, and the small cattle ranch used some custom work for alfalfa and grass hay harvesting.

Cattle feed sources in the model were based on Animal Unit Months (AUMs) rather than on tons of feed or acres of productive land. Table G-1 illustrates the private feed sources for the medium cattle ranch.

TABLE G-1
PRIVATE FEED SOURCE FOR MEDIUM CATTLE RANCH LP MODEL

	Amount	Yield	Season-of-Use
Alfalfa Land	48 acres	4.5 tons/acre	SP, SU, FA, WI
Aftermath		2 AUMs/acre	SU, FA
Grass Hay Land	38 acres	2 tons/acre	SP, SU, FA, WI
Aftermath		7 AUMs/acre	SP, FA
Pasture Owned	94 acres	5 AUMs/acre	SU, FA
Pasture Rented b/	32 acres	5 AUMs/acre	SU, FA
Rangeland	455 acres	10 acres/AUM	SP, SU, FA, WI

a/ Hay was assumed to yield four AUMs per ton.
b/ Maximum acreage available.

In addition to the preceding sources, the model included the availability of leasing a limited quantity (32 acres) of pasture at $5.00 per AUM and the availability of purchasing unlimited quantities of alfalfa at $60.00 per ton.

Forage use on federal rangelands is summarized in Table 2-29. The model was constrained at permit levels rather than at available grazing preference levels in order to give a more accurate description of actual practices occurring on the ground.

The only non-feed constraints used in the model were the seasonal levels of the ranch operator's labor. They were determined to be 800 hours in the spring and fall, 636 hours in the summer, and 550 hours in the winter. Additional labor was available at $2.35 per hour for hired workers.

Livestock production was based on "basic animal units" (Lewis and Taylor, 1977). They consist of set proportions of cows, bulls, replacement heifers, calves, and horses. Each basic animal unit contributes to the production of livestock for final sales. The parameters used in determining the composition and production of the basic animal unit are presented in Table G-2.

TABLE G-2
BASIC ANIMAL UNIT FOR MEDIUM RANCH

Parameters:		
Calf Crop	70%	Calving
Replacement Rate	40%	60% spring 40% rest of year
Death Loss	3.5%	Bulls kept 4 years
Cow/Bull Ratio	22.5:1	Calves sold at 9 months
Cow/Horse Ratio	40:1	
Market Weights:		Forage Requirements Based On:
Heifer Calves	450 lbs.	1 AU for Cows
Steer Calves	500 lbs.	1.3 AUs for Cows with Calf
Cull Cows	850 lbs.	.5 AU for Weaned Calves
Cull Bulls	1,250 lbs.	.67 AU for Yearling Heifer
		1.4 AUs for Bulls
		1.25 AUs for Horses

Production:			
Heifer Calves	81.69 lbs.	per AU	@ $.41 per lb.
Steer Calves	129.35 lbs.	per AU	@ $.457 per lb.
Cull Cows	43.72 lbs.	per AU	@ $.277 per lb.
Cull Bulls	11.35 lbs.	per AU	@ $.357 per lb.

Requirements:	
Variable Costs	$35.55 per AU

Seasonal Forage Requirements:		Seasonal Labor Requirements:	
Spring	3.05 AUMs	Spring	1.66 Hours per AU
Summer	3.04 AUMs	Summer	1.43 Hours per AU
Fall	3.12 AUMs	Fall	1.66 Hours per AU
Winter	2.79 AUMs	Winter	1.14 Hours per AU

Production of alfalfa and grass hay was based on the parameters in Table G-3.

Impact analysis was based on changing the amount of Environmental Statement (ES) area BLM forage constraints by season. No changes in productivity of private lands were included. Ranchers were limited to cow-calf production only; sale of hay was not included as an option. The forage constraints for each alternative were based on the average number of AUMs allocated by season for ranchers in each category (see Appendix G, Section 3).

TABLE G-3
ALFALFA AND GRASS HAY PRODUCTION FOR MEDIUM RANCH

	Alfalfa	Grass Hay
Labor Requirements:		
Spring	.13 Hours per AUM	.16 Hours per AUM
Summer	.13 Hours per AUM	.16 Hours per AUM
Fall	.07 Hours per AUM	.08 Hours per AUM
Winter	.02 Hours per AUM	.02 Hours per AUM
Variable Cost a/	$ .78 per AUM	$ .87 per AUM

Hay harvested in summer and fall - forage value declines after winter by five percent in spring, seven percent in summer, and nine percent in fall.

a/ Fuel, repairs and maintenance, fertilizer, seed, and bale wire.

The following table illustrates the linear programming model for the medium cattle ranch. For other applications of linear programming to livestock ranching refer to Lewis and Taylor (1977); Ching, Christenson, and Ulrich, A Linear Programming Model of Nevada Ranch Enterprises, Reno: University of Nevada (1977); and Cook, Bartlett, and Evans, A Systems Approach to Range Beef Production, Fort Collins: Colorado State University (1974).

TABLE G-4

LINEAR PROGRAMMING MODEL FOR MEDIUM CATTLE RANCH

	Units	Constraints	Basic Animal Unit	Alfalfa Spring	
Objective Function			-35.55	-.78	1
Alfalfa-Winter Spring	AUMs	648		1	2
Alfalfa-Summer Fall	AUMs	216			3
Grass Hay-Winter Spring	AUMs	228			4
Grass Hay-Summer Fall	AUMs	76			5
Alfalfa Aftermath-Summer	AUMs	24			6
Alfalfa Aftermath-Fall	AUMs	72			7
Grass Hay Aftermath-Summer	AUMs	89			8
Grass Hay Aftermath-Fall	AUMs	177			9
Pasture-Summer	AUMs	282			10
Pasture-Fall	AUMs	188			11
Private Rangeland	AUMs	45			12
Forest Service-Summer	AUMs	136			13
Forest Service-Fall	AUMs	58			14
Caliente BLM-Spring	AUMs	849			15
Caliente BLM-Summer	AUMs	519			16
Caliente BLM-Fall	AUMs	631			17
Caliente BLM-Winter	AUMs	693			18
Other BLM-Spring	AUMs	317			19
Other BLM-Summer	AUMs	328			20
Other BLM-Fall	AUMs	279			21
Other BLM-Winter	AUMs	306			22
Rented Pasture-Summer	AUMs	96			23
Rented Pasture-Fall	AUMs	64			24
Operator's Labor-Spring	Hours	800			25
Operator's Labor-Summer	Hours	636			26
Operator's Labor-Fall	Hours	800			27
Operator's Labor-Winter	Hours	550			28
Forage-Spring	AUMs	0	3.05	-.95	29
Forage-Summer	AUMs	0	3.04		30
Forage-Fall	AUMs	0	3.12		31
Forage-Winter	AUMs	0	2.79		32
Labor-Spring	Hours	0	1.66	.13	33
Labor-Summer	Hours	0	1.43	.13	34
Labor-Fall	Hours	0	1.66	.07	35
Labor-Winter	Hours	0	1.14	.02	36
Sell Heifer Calf	Lbs.	0	-81.69		37
Sell Steer Calf	Lbs.	0	-129.35		38
Sell Cull Cow	Lbs.	0	-43.72		39
Sell Cull Bull	Lbs.	0	-11.35		40

Alfalfa		Grass Hay					Alfalfa Aftermath		
Summer	Fall	Winter	Spring	Summer	Fall	Winter	Summer	Fall	
-.78	-.78	-.78	-.87	-.87	-.87	-.87	0	0	1
		1							2
1	1								3
			1			1			4
				1	1				5
							1		6
								1	7
									8
									9
									10
									11
									12
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									20
									21
									22
									23
									24
									25
									26
									27
									28
			-.95						29
-.93				-.93			-1		30
	-.91				-.91			-1	31
		-1				-1			32
.13	.13	.13	.16	.16	.16	.16			33
.13	.13	.13	.16	.16	.16	.16			34
.07	.07	.07	.08	.08	.08	.08			35
.02	.02	.02	.02	.02	.02	.02			36
									37
									38
									39
									40

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Grass Hay Aftermath		Pasture		Private Rangeland				
Summer	Fall	Summer	Fall	Spring	Summer	Fall	Winter	
0	0	0	0	0	0	0	0	1
								2
								3
								4
								5
								6
								7
1								8
	1							9
		1						10
			1					11
				1	1	1	1	12
								13
								14
								15
								16
								17
								18
								19
								20
								21
								22
								23
								24
								25
								26
								27
								28
				-1				29
-1		-1			-1			30
	-1		-1			-1		31
							-1	32
								33
								34
								35
								36
								37
								38
								39
								40

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Forest Service		Caliente BLM				Other BLM		
Summer	Fall	Spring	Summer	Fall	Winter	Spring	Summer	
-1.60	-1.60	-1.51	-1.51	-1.51	-1.51	-1.51	-1.51	1
								2
								3
								4
								5
								6
								7
								8
								9
								10
								11
								12
1								13
	1							14
		1						15
			1					16
				1				17
					1			18
						1		19
							1	20
								21
								22
								23
								24
								25
								26
								27
								28
		-1				-1		29
-1			-1				-1	30
	-1			-1				31
					-1			32
								33
								34
								35
								36
								37
								38
								39
								40

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Other BLM		Rented Pasture		Operators Labor			
Fall	Winter	Summer	Fall	Spring	Summer	Fall	Winter
-1.51	-1.51	-5.00	-5.00	0	0	0	0
1							
	1						
		1					
			1				
				1			
					1		
						1	
							1
		-1					
-1			-1				
	-1						
				-1			
					-1		
						-1	
							-1

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Hired Labor				Sell	Sell	Sell	Sell	
Spring	Summer	Fall	Winter	Heifer Calf	Steer Calf	Cull Cow	Cull Bull	
-2.35	-2.35	-2.35	-2.35	.41	.457	.277	.357	1
								2
								3
								4
								5
								6
								7
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								26
								27
								28
								29
								30
								31
								32
-1								33
	-1							34
		-1						35
			-1					36
				1				37
					1			38
						1		39
							1	40

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Purchase Alfalfa				Alfalfa Transfer	Grass Hay Transfer	
Spring	Summer	Fall	Winter			
-15	-15	-15	-15	0	0	1
				-1		2
				1		3
					-1	4
					1	5
						6
						7
						8
						9
						10
						11
						12
						13
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						15
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						22
						23
						24
						25
						26
						27
						28
-1						29
	-1					30
		-1				31
			-1			32
						33
						34
						35
						36
						37
						38
						39
						40

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APPENDIX G
Section 3

METHODOLOGY FOR ESTIMATING PERMITTED USE UNDER THE PROPOSED ACTION AND ALTERNATIVES

During the 1977 grazing season ranchers with grazing preferences on the Environmental Statement (ES) area had 118,580 Animal Unit Months (AUMs) of grazing preferences. Of this amount, they paid for permits for only 78,236 AUMs, or 66 percent of the total. Under these conditions it would be unrealistic to expect they would pay for permits for 100 percent of their preferences under any new allocation. Therefore, estimated permitted use was determined by the following methodology: ranchers with decreases in preferences below their 1977 permitted use would use 100 percent of their new preferences, ranchers whose new preferences equaled their 1977 permitted use would stay at the same use level, ranchers with new preferences greater than their 1977 permitted use were held at their 1977 levels unless they used more than 80 percent of their preferences on an allotment during 1977. In those cases, it was assumed that they would pay for permits for 100 percent of their new allocations on those allotments.

APPENDIX G
Section 4
METHODOLOGY FOR ESTIMATING IMPACTS ON TAX REVENUES

Livestock tax revenues in Lincoln County would be slightly impacted because of the changes in livestock numbers and in the length of time livestock would graze in the county. These taxes are based on the amount of time each animal is grazed in a county. Although the number of livestock grazed in Clark County and Southwestern Utah would be changed, an offsetting change in the length of time the livestock would graze in these areas would occur. Therefore, tax impacts would be negligible in these areas. The changes in Lincoln County tax revenues were estimated with the ranch budgets in Chapters 2, 3, and 8.

APPENDIX G
Section 5
IMPACTS ON ATTITUDES, VALUES, AND LIFESTYLES

In October 1978 a Bureau of Land Management (BLM) Social Scientist visited 16 of the grazing permittees in Alamo, Caliente, and Panaca, Nevada, and St. George, Utah, to discuss social values and attitudes of the Environmental Statement (ES) area ranching community. These ranchers were selected on a non-probability sampling procedure in which respondents are not selected according to chance dictums or according to known probabilities. This represents a process in which respondents are chosen on the basis of informal opinion that they are representative of a given population.

During March 1979, the same Social Scientist accompanied the BLM Caliente Resource Area Manager to Alamo and Caliente, Nevada, and St. George, Utah, holding discussions with 47 ranchers, seven of who the Social Scientist had previously contacted in October 1978. The purpose of this March visit was to discuss with individual ranchers Management Framework Plan Step 2 (MFP-2) recommendations which form the basis of the proposed action. Ranchers with whom discussions were held were those who either contacted the District Office to make specific appointments in Alamo, Caliente and St. George, or those who walked in without appointments in those cities. Sixty-six percent of ES area ranchers were contacted by the Social Scientist during the two visits to the area.

Because of Office of Management and Budget (OMB) constraints on the use of structured questionnaires, the sociological data presented were derived from guided conversations rather than formalized or structured interviews. Field notes were taken during both visits to the ES area and later analyzed. Comments were incorporated into the narrative if they seemed significant to the Social Scientist, recurred in several of the interviews, or were especially emphasized by the respondent(s).

Although the survey design did not include a provision to sample over-all community attitudes, those attitudes were indirectly considered by a detailed review, among other things of a Lincoln County cultural values study conducted in 1976 by Dr.'s Loren Reichert and James Frey, Department of Sociology, University of Nevada, Las Vegas, under contract to the Bureau of Land Management. This report indicated that there is an exceptionally high degree of consistency of values among ranchers and the Lincoln County general public, particularly among the values of rurality, environmental values, neighborliness, family and natural order--the five values which Dr.'s Reichert and Frey consider to be the central themes of Lincoln County residents. (See Planning Area Analysis, (PAA), Caliente District Office). It is also interesting to note that many of the resident ranchers in Lincoln

County reside in town and their views often parallel those of other city residents.

All of the respondents interviewed in March had just been notified by letter of the MFP-2 recommendations on each of their allotments. Since the majority of these interviewed had been scheduled for grazing reductions as a result of these recommendations, a great deal of resentment, emotion, and anger was evident in the conversations. In most cases, ranchers affected by the recommendations had probably not had time to thoroughly think through their options in response to the scheduled reductions. Interviews conducted later would probably present a somewhat different perspective. Nonetheless, the strong agreement among respondents suggests the information may be representative of the actual attitudes and values of many ES area ranching community members.

Out of a total of 74 operators who have grazing privileges on public lands within the ES area, 60 are scheduled for Animal Unit Month (AUM) reductions in their active grazing preferences in the short term, with 52 operators scheduled for reductions in the long run. Nine operators are scheduled for AUM increases in short term, with 17 operators scheduled for increases in the long term. There would be no change for five operators. Although some reductions were expected and supported by the ranchers, the 47 interviewed during March 1979 appeared to be shocked and dismayed at the extent of the reductions (ranging from 1 to 100 percent) that would result from implementation of the proposed action.

All of the ranchers interviewed in both visits to the area believe their many years of experience with grazing preferences on public lands within the ES area uniquely qualifies them to assess the continually changing conditions of those public lands. As a consequence of their continuing assessment, the ranchers believe they are sensitive and responsive to changing range conditions. In support of that, many of the ranchers pointed out that their permit was often lower (sometimes considerably so) than their active grazing preference. According to these ranchers, they adjust their use from year-to-year in response to range conditions. As a consequence of this range management practice they believe that, overall, the range is in "good condition." Implicit in most of the discussions on this subject was a general feeling of anger and resentment that their many years of ranching experience within the ES area was not consulted during the on-going process that resulted in formulation of the proposed action. Their perception of being excluded from the decision making process concerning their respective allotments seemed to foster the image that the main purpose of the proposed action was to "get us off the range to satisfy the environmentalists." Several of the ranchers underscored this attitude when they indicated that BLM is far more responsive to environmentalists

than it is to the needs of the ranching community. Equally evident in these discussions was the unspoken implication that some of the ranchers considered public lands to be their property, if not by law, then by the tradition of many years of use.

Since 98 percent of Lincoln County is federally owned, the livestock industry within the ES area is dependent, to a large degree, upon continued access to area public grazing lands. Any BLM decision that threatens the continued access to those public grazing lands would probably be seen as an immediate threat to the rancher's sense of self-determination, sense of security, and purpose in life. The rancher's main goal of preserving the ranch as a business, as a home, and as a desirable and preferred way of life would probably also be perceived as threatened by implementation of the proposed action.

Perhaps one of the main impacts of the proposed action is that it underscores the unique, paradoxical situation in which ES area ranchers find themselves. The tone of many of the interviews seems to suggest that the very roots of ES area ranching idealisn is anchored in a two-fold belief. First is the belief that ranchers should be independent and self-sufficient--independent from as many external obligations as possible and independent in the exercise of his or her own risk-taking managerial powers in the day-to-day operation of the ranch. Second is the belief that public lands should be disposed of to private holders in order to promote economic stability for ranchers and others.

Because of the large federal land holdings in the ES area, the reality of the situation is that ranchers are not entirely independent of external obligations nor are they entirely self-sufficient in the sense that grazing on public lands is essential for their survival in the livestock industry. Further, they see little if any possibility that the federal government will release public lands in any great quantity to either State or private holders in the future. As a consequence, several perceptions prevail. First, the perception exists that local control over the area's future is precluded as a direct result of federal ownership and management of the majority of ES area lands. On a more personal level, the tone of the discussions seems to suggest that ranchers strongly believe that their managment options in the day-to-day operation of the ranch are severely restricted if not negated by imposition of controls on the use of public grazing lands by federal government agencies charged with the application of national goals in the management of these public lands--goals which may be contrary to local views. It also appears that the majority of ES area ranchers firmly believe that the uncertainty and frustration that federal ownership of ES area lands creates for them would be eliminated if ownership of those "Nevada" lands passed from federal ownership into State or private hands. These perceptions tend to sustain a feeling of resentment

which is likely to persist and even increase as long as the federal government remains the area's predominate landowner.

The allocation of vegetation to wild horses and burros in the proposed action is seen as yet another instance of the BLM responding more to the needs of environmentalists than to the needs of the ranching community. One rancher who has resided in the area for many years wondered "of what possible value are these horses and why aren't wild horse interest groups required to pay for wild horse and burro range privileges? What is required of the livestock industry should be required by those who support wild horses running on public ranges."

One of the ranchers stated that the proposed action indicated that BLM's past management practices have been a dismal failure. According to this rancher, the ranching community has been doing exactly as required by the BLM only to now be told that the range has deteriorated.

Several of the ranchers who had recently incurred large debts in order to expand their ranching operation felt their only alternative in response to the proposed action was to sell their livestock now while prices are high. This would at least allow them to liquidate their outstanding debts and retain their private ranch holdings which had been offered as collateral to secure loans. Should these ranchers elect this alternative, it seems likely they would attempt to rebuild their operation but initially on a much smaller scale.

A number of the small cattle ranchers indicated they would be the most severely impacted under the proposed action. Although some of these ranchers now hold full-time or part-time jobs in addition to their ranching responsibilities, several indicated they would have to seek a second job in order to maintain the lifestyle they now enjoy if the proposed action is implemented. These ranchers also indicated their main marketable employment skills were ranching related and it is possible that these skills would not be in great demand within the ES area. The possibility exists that retraining for these individuals may put them in a position to compete successfully in a job market elsewhere; it seems unlikely that retraining would place them in a better position in the limited ES area job market. There was some concern expressed by these ranchers that even if they were retrained and even if jobs were available, they would not be employable since they are middle aged. If a younger applicant were available, this may well be the case. It also seems unlikely that commuting to out-of-area employment is a realistic option since the communities that are within commuting distance offer limited opportunities for retraining or subsequent employment. Nonetheless, several of these ranchers may elect to retrain and either commute long distances or relocate temporarily elsewhere in order to find

higher paying employment that would allow them to liquidate local debts as well as allow them to hold onto private ranch properties. Should this occur, these individuals may well find that to succeed economically is to fail socially, for in succeeding economically they would have to give up many aspects of the ranching lifestyle that they hold in high esteem.

Several of the ranchers indicated that as a direct result of the proposed action, they may elect to sell portions of their private ranch properties to developers for subdividing into five acre ranchettes. Those ranchers in financial difficulty and who are scheduled for major AUM reductions may be the first to sell bits and pieces of their property to cover the costs of maintaining their way of life.

If land sales were to increase to subdivision developers, the population of the ES area may increase. Because of the lack of employment possibilities in the ES area, ranchette sales would probably attract retired "newcomers" -- a group which has, until the recent Tempiute mine re-opening, accounted for the greatest recent population influx in Lincoln County. With an increase in the elderly population, the demands for medical services would probably increase.

Because Lincoln County has historically accommodated a rapid influx as well as a rapid out-flow of population due to the traditional boom or bust cycles of the mining industry, the growth of retired "newcomers" would probably be absorbed into the community without undue stress on the social structures. However, in the long term, changes in the community could include losses in community cohesion and loss of some traditional forms of community cooperation. These losses would occur gradually and to the newcomer, would be hardly noticeable. To the long time residents, however, changes may appear to come much too rapidly as they see traditional hospitality patterns fade away, new groupings of people evolve, and community institutional structures become more elaborate.

Perhaps one of the main impacts of the proposed action affects the perceived lifestyle of individual ranchers. Many of the respondents have devoted a major portion of their adult lives to the livestock industry in the tradition of their forefathers. Ranching, in this tradition, is not just another function of society or just another way of making a living. Rather, it is a way of life where every family member is part of the enterprise and each has an essential contribution to make. In this sense, ranching is a source of identity for the family as well as for family members. The idea of success, as well as survival, for ES area ranchers appears to be based on the premise that hard work, individual initiative, persistence, and self-reliance can overcome many obstacles. This belief has been a sustaining factor as the

rancher devoted long hours of arduous labor over several decades in the slow and frustrating process of building up a ranching operation with the expectation that operation would be left to one's heirs. Any land management decision that directly affects the future of the individual ranching enterprise strikes at the very core of these beliefs. Under these circumstances, it is not surprising that the proposed action has created uncertainty, confusion, and hostility within the ranching community.

Overall, the proposed reductions in BLM grazing privileges are seen as yet another instance of insensitive decision making by distant authorities who lack knowledge and understanding of local conditions and who fail to take into account the efforts of local citizens to explain them.

Conclusions

Many of the ranchers believe that the proposed action indicates BLM is more responsive to the concerns of the environmentalists than they are to ranching community needs. Since Lincoln County is 98 percent federally owned, ranching is, to a great extent, dependent on ES area public grazing lands. Any reduction in the use of the lands poses an immediate threat to the rancher's sense of self determination, sense of security, and purpose in life.

The community perception exists that local control over the area's future is precluded by the large federal land holdings in the area. On a more personal basis, ranchers also believe that the large federal land holdings in the area severely restrict their managment options in the day-to-day operation of their ranching enterprise.

Some ranchers who have incurred large debts may sell their livestock to liquidate outstanding debts. Should this occur, it is likely they would continue to operate, but on a much smaller scale.

Small ranchers believe they would be the most severely impacted under the proposed action. Some of them may have to seek second jobs in order to maintain their present standard of living. Second job opportunities, however, appear to be limited within the area. Those ranchers who are in debt and who are scheduled for major AUM reductions may elect to sell portions of their private properties to maintain the style of living they now enjoy. Should this occur, retired newcomers would probably constitute the greatest population influx into the area. This could, in the long term, not only change the social and political structure of the community, but could also create the need for additional community services to respond to the needs of this segment of the county population.

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Evident in all of the discussions was the belief that the proposed action would accelerate the demise of a dying culture--the family owned ranch. However, in view of the ranchers' strong attachment to the lands, to the area, and their belief in the value of ranching as both a desirable and preferable way of life, it seems unlikely that many, if any, of them would sell and move away as a direct result of the proposed action.

This analysis concentrates on the reactions and perceptions of a 66 percent sample of ES area ranchers and does not include the views of non-local groups with an interest in the resources to be managed under the proposed action Trends and actions seen as undesirable by long-time residents may be looked upon as progress by other interested groups. However, lack of specific information on these groups prohibits a more extensive discussion of their points of view.

APPENDIX G
Section 6
METHODOLOGY FOR CALCULATING HUNTER EXPENDITURES

Average expenditures for Region 8, a/ Southern Nevada:

Resident Hunters	$ 96 per trip
Non Resident Hunters	$215 per trip

Average number of days per trip in Region 8: a/

Resident Hunters	3.1 days
Non Resident Hunters	4.8 days

Average expenditures per day Region 8: a/

Resident Hunters	$ 96 ÷ 3.1 = $31
Non Resident Hunters	$215 ÷ 4.8 = $45

Ratio of total expenditures to expenditures outside: a/

County of Residence:	Resident Hunters	2.5
State of Residence:	Non Resident Hunters	1.25

Average per day expenditures outside: a/

County of Residence:	Resident Hunters	$31 ÷ 2.5 = $12
State of Residence:	Non Resident Hunters	$45 ÷ 1.25 = $36

Ratio of Resident to Non Resident Hunters Management Areas 22, 23, and 24: b/

98/2

Average total expenditure per day:

(.98 x $12) + (.02 x $36) = $13

Adjustment for inflation (1967-1977): $13 x 1.81 = $24 c/

Total number of deer Management Areas 22, 23, and 24 = 6,128 b/

Total number of hunter days Management Areas 22, 23, and 24 = 19,851 b/

Hunter days per deer = 3

Expenditure per deer = 3 x $24 = $72

Total number of bighorn sheep ES area = 763 d/

Total number of hunter days ES area = 117 e/

Hunter days per sheep = 0.15

Expenditure per sheep = .15 x $72 = $11

a/ From Characteristics of Nevada Hunters R. Garrett, 1970
b/ From Big Game Investigations and Hunting Season Recommentations Nevada Department of Fish and Game, 1976
c/ Consumer Price Index + 1.81 for the years 1967-1977
d/ Table 8-63
e/ Total for Meadow Valley Range and Morman Mountains from Big Game Investigations and Hunting Season Recommentations Nevada Department of Fish and Game, 1977

APPENDIX G

Section 7

METHODOLOGY FOR CALCULATING HUNTING INCOME AND EMPLOYMENT

Expenditure per deer: $72 a/
Income per deer: 0.8 x $72 = $58 b/
Full time equivalent employment per deer:

.00012 x $58 = 0.0068 c/

Expenditure per sheep: $11
Income per sheep: 0.8 x $11 = $9
Full time equivalent employment per sheep:

0.0001 x $9 = 0.001

Current deer population:
8,820 (reasonable numbers) ÷ 2 = 4,410 d/

Change in deer population: e/

Proposed Action and Alternatives 6 & 7: 8,820 - 4,410 = 4,410
Alternatives 2, 3, 4, and 5: 7,320 - 4,410 = 2,910

Income and employment impacts from changes in deer population:
Existing situation, Proposed Action, and Alternatives 6 & 7:

Income	Employment
4,410 X $58 = $255,780	4,410 x .0068 = 30

Alternatives 2, 3, 4, and 5:

Income	Employment
2,910 x $58 = $168,780	2,910 x .0068 = 20

Change in bighorn sheep population: e/

Proposed Action, Alternatives 3, 6 & 7: 635 - 763 = -128
Proposed Action (mitigated), Alternatives 2, 4 & 5: 810 - 763 = 107

Current bighorn population: e/ 763

Income and employment impacts from changes in sheep population:

Income	Employment
Proposed Action, Alternatives 3, 6 & 7	
-128 x 9 = $-1,152	-128 x .001 = -0.1

Proposed Action (mitigated), Alternatives 2, 4 and 5

107 x $9 = $963	107 x .001 = 0.1

Current Situation

763 x $9 = $6,867	763 x .001 = 1

Total income and employment impacts from changes in deer and sheep populations:

	Income	Employment
Proposed Action, Alternatives 6 & 7	$254,628	30
Alternative 3	$167,628	30
Proposed Action (mitigated)	$256,743	30
Alternative 2,4 & 5	$169,743	20
Current Situation	$262,647	31

No significant changes in wildlife populations are expected for Alternative 1.

a/ From Appendix G, Section 6.
b/ Based on direct value added coeficient from Southern Nevada Regional Input-Output Model (0.8) Water for Nevada: Input Output Economic Models, Nevada State Engineers Office, 1974.
c/ Based on employment/income ratios for trade in Lincoln County: Table 2-30.
d/ Reasonable numbers estimated to be twice the existing population. See Appendix F.
e/ Table 8-63

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APPENDIX G
Section 8
METHODOLOGY FOR ESTIMATING MAINTENANCE COSTS AND ASSOCIATED INCOME AND EMPLOYMENT

The following annual maintenance costs were developed by the Bureau of Land Management, Nevada State Office Engineering Staff.

Fencing	$20 per mile
Spring Developments	$50 each
Water Pipelines	$100 per mile
Water Troughs	$6 each
Reservoirs	$75 each
Wells	$200 each

Income and employment impacts were estimated with the Southern Nevada regional input-output model. The direct coefficient for income in the Maintenance and Repair construction sector is 0.6; the employment coefficient is .00003.

Annual maintenance costs and associated income and employment impacts for the proposed action and alternatives are as follows:

Alternative	Cost	Income	Employment
Proposed Action	$50,469	$30,281	2
Continue Present Mgmt.	0	--	--
Eliminate Grazing	0	--	--
Minimum Constraints on Wild Horses	31,803	19,082	1
Restricted Periods-of-Use	0	--	--
Reduced Level of Grazing	0	--	--
Reduced Mgmt. Intensity	25,530	15,318	1
Locally Suggested	52,175	31,305	2

The proportion of maintenance costs to be paid by the BLM and the ranches will be determined on a case-by-case basis when the projects are implemented.

APPENDIX G
Section 9
TABLE G-5
VEGETATION ALLOCATIONS BY OPERATOR

Allotment	Operator	Percent Change from 1977 Active Qualifications	Active Qualifications w/ water devel	Licensed Use	Licensed Use w/water
Applewhite	Tennille, Jr.	-100%	-100%	-100%	-100%
Pennslvania		-90%	-84%	-81%	-70%
Ash Flat	Bradshaw, Inc.	-100%	-100%	-100%	-100%
Elgin		-65%	-40%	-41%	-29%
Pennsylvania		-89%	-84%	-81%	-70%
Ash Flat	Leo A. Stevens	-100%	-100%	-100%	-100%
Elgin		-65%	-40%	-41%	-29%
Pennsylvania		-89%	-83%	-81%	-70%
Bald Mountain	D/4 Enterprises	-14%	-8%	-14%	-8%
Barclay	Norman Gubler	+41%	+45%	+23%	+27%
Lime Mountain		-64%	-53%	-40%	-11%
Barclay	J Bar P	+41%	+45%	+23%	+27%
Garden Springs		-33%	-32%	-29%	-28%
Lime Mountain		-67%	-56%	-40%	-11%
Oak Wells		-46%	-41%	---	---
Sheep Flat		-74%	-74%	-74%	-74%
Summit Spring		-79%	-79%	-79%	-79%
White Rock		-75%	-38%	-55%	+41%
Barclay	Rodney Burgess	+41%	+45%	+23%	+27%
Lime Mountain		-64%	-53%	-40%	-11%
Barclay	Mathews Bros. Ranches	+41%	+45%	+23%	+27%
Lime Mountain		-64%	-52%	-40%	-11%
Barclay	Fenton Bowler	+41%	+45%	+23%	+27%
Snow Spring		-66%	-66%	-27%	-27%
Terry		-96%	-95%	-93%	-83%
Beacon	Don Lamoreaux	-100%	-100%	-100%	-100%
Beacon	E. Larson	-100%	-100%	-100%	-100%
Beacon	Larson & Anderson	-100%	-100%	-100%	-100%
Beacon	Roy Lundgron	-100%	-100%	-100%	-100%
Bennett Spring	H. Wendell Jones	-72%	-4%	+96%	+609%
Black Canyon		-39%	-39%	+545%	+545%
Bennett Spring	Craig & Spenser Jones	-72%	-4%	+96%	+609%
Black Canyon		-39%	-39%	+545%	+545%
Bennett Spring	Lehi Jones	-72%	-4%	+96%	+609%
Black Canyon		-39%	-39%	+545%	+545%
Black Hills	Kenneth Lee	-19%	-19%	-19%	-19%
Breedlove	H. Rice	-100%	-95%	-100%	-95%
Henrie		-100%	+20%	-100%	+20%
Cottonwood		-96%	-72%	-98%	-72%
Elgin	Rachel Ballow	-62%	-34%	-41%	-29%
Boulder Spring		0	0	0	0
Meadow Valley		-100%	-100%	-100%	-100%
Pennsylvania		-90%	-84%	-81%	-70%
Buckboard	C. Mathews Estate	-100%	+3%	-100%	-2%
Panaca Cattle		-100%	+4%	-100%	+551%
Buckhorn	Buckhorn Land & Cattle	+26%	+42%	+486%	+558%
Lower Lake		-92%	-8%	-6%	+1045%
Caliente	Culverwell Estate	-100%	+45%	---	---
Sawmill Canyon		-100%	-100%	-100%	-100%
Cove		-100%	-100%	-100%	-100%
Cliff Springs	Warm Springs Ranch	+7%	+12%	+7%	+12%
Delamar		-1%	+7%	-14%	-6%
Oak Springs		-5%	-4%	+13%	+14%
Clover Creek	Nal't. Mustang Assoc.	-100%	-100%	-100%	-100%
Haypress		-72%	-72%	---	---
Little Mountain		-55%	-55%	---	---
Rocky Hills		-100%	-23%	---	---
Clover Creek	R. Palombi	-100%	-100%	-100%	-100%
Mustang Flat		-100%	-100%	-100%	-100%
Sawmill Canyon		-100%	-100%	-100%	-100%

TABLE G-5 -- Continued

Allotment	Operator	Percent Change from 1977 Active Qualifications	Active Qualifications w/ water devel	Licensed Use	Licensed Use w/water
Comet	Lom Thompson	+1%	+1%	---	---
Cove		-100%	-100%	-100%	-100%
Highway		-100%	+83%	---	---
Peck		-100%	-100%	-100%	-100%
Condor Canyon	Delmue, A.P. & F.	-100%	+107%	---	---
Henrie	C. Brundy	-100%	+20%	-100%	+20%
Gottonwood		-96%	-72%	-98%	-72%
Crescent	B. Paris & Sons	+42%	+74%	+83%	+128%
Shadow Well		+99%	+99%	+162%	+162%
Crestline	Martin & Crockett	+58%	+58%	---	---
Crossroads	Hafen Bros.	-45%	-45%	-45%	-45%
Sand Hollow		-87%	-76%	-72%	-48%
Crystal Spring	William J. Wright	-14%	-14%	+8%	+8%
Sand Springs		+69%	+80%	+110%	+124%
Deerlodge	George Crawford	+74%	+74%	---	---
Ely Springs Sheep	Jane Whipple	-48%	-42%	---	---
Ely Springs Cattle		+ 4%	+15%	+7%	+23%
Enterprise	Harry Randall	+62%	+62%	+4%	+4%
Snow Spring		-67%	-67%	-27%	-27%
Terry		-96%	-89%	-93%	-83%
Enterprise	Heber Staheli	+57%	+57%	+4%	+4%
Snow Spring		-70%	-70%	-27%	-27%
Terry		-96%	-91%	-93%	-83%
Enterpri	Rodney Staheli	+57%	+57%	+4%	+4%
Snow Spring		-70%	-70%	-27%	-27%
Terry		-96%	-91%	-93%	-83%
Gourd Springs	Andrew Lytle	-76%	-60%	-63%	-57%
Sheep Flat		-74%	-74%	-74%	-74%
Flat Top Mesa		Ephemeral	---	---	---
Grapvine	Rice & Johnson	0	0	0	0
Highland Peak	Hammond	-78%	-41%	+418%	+1257%
Bennett Spring	Alex Williams	-72%	-4%	+96%	+609%
Klondike		-100%	-44%	-100%	+1%
Mahogany Peak	Leon Bowler	+71%	+71%	+223%	+223%
McCutcheon Springs	Carole M. Carter	-100%	+23%	---	---
McGuffy Spring	John Wadsworth	+1%	+1%	---	---
Panaca Cattle		-100%	+3%	-100%	+551%
Roadside		-100%	+50%	---	---
White Hills		-100%	+4%	---	---
Morman Peak	Phillip Foremaster	a/			
Mustang	Haworth J & J	-65%	-65%	-55%	-55%
Jack Rabbit	W. Pulsipher	Ephemeral			
Jack Rabbit	Leo Hardy	Ephemeral			
Jack Rabbit	Larry Hardy	Ephemeral			
N-4	K & G Lytle	-45%	-45%	---	---
Simpson		-100%	-54%	-45%	-45%
N-4	Delmue Bros.	-100%	-53%	---	---
N-4	J. Rosa	-100%	-54%	---	---
N-4	Imperial Farms	-100%	-52%	---	---
Pahranagat East	E. Higbee	-100%	+15%	-100%	+96%
Pahranagat East	J & E Higbee	-100%	+11%	-100%	+96%

TABLE G-5 -- Continued

Allotment	Operator	Percent Change from 1977 Active Qualifications	Active Qualifications w/ water devel	Licensed Use	Licensed Use w/water
Pahranagat West	A.J. Sharp	-100%	-41%	-100%	-5%
Pahranagat West	L. Sharp Estate	-100%	-39%	-100%	-5%
Pahranagat West	Burns	-100%	-41%	-100%	-5%
Pahroc	Stewart Bros.	-25%	-19%	-23%	-15%
Pine Cone		-100%	-50%	-100%	+190%
Six Mile		+32%	+32%	+32%	+32%
Pioche	Dale Robinson	-100%	-22%	-100%	+103%
Rabbit Springs	D. Jensen	-78%	-62%	---	---
Rattlesnake	Carter	-29%	-21%	-29%	-21%
Red Bluff	GNM Sharp	+188%	+188%	+188%	+188%
Rox	Alyce Perkins	-100%	-100%	-100%	-100%
Schlarman	Rachel Schlarman	+57%	+57%	+76%	+76%
Pennsylvania		-90%	-84%	-81%	-70%
Sheep Spring	Rulon Cox	+105%	+130%	---	---
Simpson	Delmue, A.	-45%	-45%	-45%	-45%
Simpson	F. & R. Delmue	-44%	-44%	-45%	-45%
Snow Spring	Guy Bowler	-64%	-64%	-27%	-27%
Terry		-96%	-95%	-93%	-83%
Snow Spring	Mrs. Lewis Bowler	-64%	-64%	-27%	-27%
Pulsipher Wash	Bryon Hafen	Ephemeral			
Snow Spring	Richard Bowler	-64%	-64%	-27%	-27%
Terry		-97%	-92%	-93%	-83%
Snow Spring	Tobler, E.	-64%	-64%	-27%	-27%
Terry	Dennis Iverson	-96%	-90%	-93%	-83%
Uvada	F. Don Wadsworth Est.	+47%	+47%	+142%	+142%
Morrison-Wengert	Ken Olson	-87%	-47%	-87%	-47%

a/ Total Active Qualification undetermined.

APPENDIX H

GUIDELINES FOR USE OF HERBICIDES ON PUBLIC LANDS

APPENDIX H

GUIDELINES FOR USE OF HERBICIDES ON PUBLIC LANDS

1. Environmental impacts will be identified, through an environmental assessment, and measures taken to mitigate potentially adverse environmental impacts.

2. Programs will be reviewed with user groups, interested organizations, and the general public.

3. Only federally registered pesticides will be used on public lands except as authorized by Sec. 24c, Public Law 92-516, The Federal Environmental Pesticide Control Act of 1972. Section 24c provides for State registration of certain pesticides for local needs within the State. Any pesticide proposal planned under a State registration must include a copy of the State label.

4. Tank mixes of pesticides may be approved if: such mixture is provided for on one or more labels of EPA registered products; provided for under a State registration; or if the tank mix has been tested and has a written recommendation by an Agricultural Experiment Station or the State Department of Agriculture. The pesticides recommended in the mixture must be applied at a dosage rate not to exceed the label instructions for use of any single product for the same target pest and must not be specifically prohibited from mixing on either label. Each tank mix proposal must be accompanied by appropriate labels and/or a written recommendation.

5. On May 5, 1975, EPA announced the initiation of the Pesticide Enforcement Policy Statements (PEPS) series). These statements are published in the Federal Register and are intended to clarify EPA's policy regarding the enforcement of the Federal Insecticide, Fungicide and Rodenticide Act.

PEP No. 1, published May 5, 1975, and September 17, 1975, allows for the use of a registered pesticide at less than the label dosage if such use is recommended in writing by a knowledgeable expert.

6. All proposed use of herbicides on public lands will be reviewed for approval in advance by the Bureau's Denver Service Center and/or Washington, D.C. office.

7. Federal and State agencies with responsibilities for the environment, public health, and fish and wildlife, will be informed, when necessary, of programs and cooperative measures developed.

8. Only properly trained and/or licensed personnel will handle and use herbicides on public lands. This includes applications by permittees, grantees, or licensees. At least one member of the crew, preferably the on-the-ground supervisor, must be a qualified applicator.

9. All individuals associated with the handling or application of herbicides on public lands will be familiar with emergency procedures to be used in case of a herbicide spill.

10. Water monitoring of important streams will be done when there is a possibility that contamination may result from a proposed herbicide use.

Project Design Features

Specific measures are included in the design of each proposed herbicide project in order to minimize adverse impacts on the environment. They include the following:

1. Any specific BLM proposed herbicide project will be preceded by a preliminary archaeological survey. An evaluation of the findings will determine whether there are sites of value and whether they should be salvaged by removal, or left and circumvented by the project.

2. BLM projects possibly affecting areas of historical value will be preceded by a search through the cultural and historical sites listings currently on file with the State Historic Preservation Officer and the State Parks Department. The latest edition of the National Register of Historic Places and its monthly supplements will be consulted prior to undertaking any work on proposed treatment areas. In cases where there is an effect from proposed projects, the Bureau will comply with Section 106 of the National Historic Preservation Act through the Council's "Procedures for the Protection of Historic and Cultural Properties."

3. The process of locating, identifying, and managing significant concentrations of rare and endangered plants is in a developmental stage. The Federal Register of July 1, 1975 (Vol. 40, No. 127) contains a comprehensive list of candidate endangered or threatened plants compiled by the Smithsonian Institution and submitted to the Department of the Interior as provided for by the Endangered Species Act of 1973. In addition a tentative list of plants that are proposed for inclusion on the Federal list of threatened or endangered species is available upon request (32 pages). If these plants are known or suspected to occur within the influence zone of the proposed action, an on-the-ground floristic inventory will be made. The proposed action will be

modified to protect these plants if they are threatened by the proposed action.

4. On herbicide application projects conducted directly by Bureau personnel, a licensed employee will monitor and supervise the project. Work done by contractors will be supervised by individuals having proper State licenses.

5. Contracts for application will require that the intake operation of water for mixing shall be arranged so that an air gap or reservoir will be placed between the live water intake and the mixing tank to prevent any backflow of chemical into the water source.

6. Contracts for application will require that contractors will not wash out any spray tanks in or near any streams or dispose of any chemical containers on the contract area.

7. During aerial spraying, spray will be turned off at the end of spray runs and during the time when a turn is being made to start another spray run. Initial spray swaths along buffer strips or areas to be protected will be made parallel to these areas and before spraying commences on the rest of the project area.

8. Mixing and loading operations will take place in an area where an accidental spill will not flow into a stream or body of water.

9. The following are minimum widths (measured horizontally) for protective buffer strips for all herbicides applied adjacent to waters which are valuable for domestic use, are important for angling or other recreation and/or used by significant numbers of fish for spawning, rearing or migration routes (Class I streams) bodies of water, or marshy area.

a) Aerial Spraying

Spraying Altitude (over ground)	Buffer Strip
30-45 feet	100 feet

b) Vehicle spraying — 25 feet

c) Hand application — 10 feet

10. To minimize drift and volatilization, aerial applications of all the herbicides proposed for use will be confined to periods when wind speed is less than 6 miles per hour, air temperature is under 70°F., relative humidity is over 50 percent, vegetation is free of snow or ice, precipitation is not occurring or imminent, and air turbulence will not affect normal

spray patterns. Label directions will be followed if they require additional restrictions. Low volatile ester formulations of 2,4-D will be used.

11. Daily measurements of weather conditions will be made by trained personnel at spray sites during application. Additional measurements will be made any time it appears that a weather change may be taking place that could jeopardize safe placement of spray on the target area.

12. Helicopters will normally be required to fly at an airspeed of 40 to 50 mph. at 30 to 45 feet above the vegetation. Spray pressure in the boom will be 25 to 35 pounds per square inch. Maximum drift reduction with normal spray formulations and conventional application equipment will be obtained by using D8 jet nozzles (8/64 inch diameter orifice) directed back along the airstream (Stewart, 1976). All aerial nozzles will be equipped with automatic shutoff devices to prevent loss of herbicides along nonspray flight routes. Spray mixtures will contain drift reduction adjuvants where they will be effective.

13. During air operations a radio network will be maintained which links all parts of the project. Direct radio communications between spray aircraft and ground observers will be established. Prespray reconnaissance flights will be made to orient pilots when sensitive areas such as agricultural lands, important streams, residences, and fish hatcheries are near spray target areas.

Monitoring Environmental Impacts

The overall responsibility for monitoring environmental impacts of chemical herbicides rests with the Environmental Protection Agency (P.L. 92-516, Sec. 20). Currently, EPA has a nationwide Dioxin (TCDD) monitoring plan in operation. Precise identification of the minute quantities involved and the interpretation of the findings requires the highly sophisticated research techniques and methodologies of research organizations. The Bureau's research needs are met by published research results from research agencies and by contracting for research when existing or planned research is judged inadequate.

Research on environmental impacts of herbicides to animals, water, soil, and plants is conducted by chemical companies as a prerequisite to registration with the Environmental Protection Agency. Additional research is conducted by Federal agencies and universities. The Bureau will keep abreast of these research findings and, where indicated by research results and EPA recommendations, adjust its proposed herbicide applications to minimize adverse environmental impacts.

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A water monitoring program will be carried out by the Bureau as part of the proposed action. The purpose is to determine the effectiveness of buffer strips, and administrative controls in minimizing impacts on water quality and the aquatic environment. The guidelines for when to monitor water are listed below.

1. Water monitoring will be done when any herbicide application is in a municipal watershed.

2. Water monitoring will be done when any herbicide application is located in a fish hatchery supply watershed.

3. Water monitoring will be done when any herbicide application is in a watershed with a domestic water supply intake for drinking or irrigation less than one mile downstream from the treatment area.

4. Water monitoring will be done where a herbicide application is adjacent to a major fish bearing stream.

Safeguards

The safe use of herbicides includes precautionary measures to prevent accidental spills. The following written precautions describe the measure that will be used to reduce the chance of such accidents, and the emergency action required if an accidental spill should occur.

The applicable Federal regulations concerning the storage and disposal of herbicides and herbicide containers will be followed. These are described in the Environmental Protection Agency "Regulations for Acceptance and Procedures for Disposal and Storage", Federal Register May 1, 1974, pages 15236 through 15241.

Transportation

1. It is essential to prevent damage to containers so that leaks do not develop; care will be exercised so that the containers are not punctured or ruptured, and so that the lids or caps are not loosened.

2. Precautions will be taken in the loading and stacking of herbicide containers on the transporting vehicle to assure that containers are tied down so that they will not fall as the vehicle moves.

3. Open containers will never be transported. Partly empty containers must be securely re-sealed before transport.

4. After transportation, all herbicide containers will be inspected for damage and leaks, and the vehicle should be carefully examined for contamination.

Application Safety

1. Arrange spraying schedules so that poor visibility before and shortly after sunrise and sunset will not seriously affect the safety of the pilot.

2. Do not permit uphill spraying when the climb required exceeds one-half the climbing ability of the helicopter.

3. Allow spraying from a higher altitude where steep canyonheads, snags, or standing timber in the spray area make it hazardous to spray at the specified contract heights.

4. Allow sufficient elevation to be gained by the pilot at the lower open end of drainages after a spraying run to eliminate the need to climb in returning for another spray run.

5. Allow the contractor's chief pilot to establish a pattern to avoid danger of collision when pilots spray adjoining blocks concurrently.

6. Instruct pilot to stop spraying when in his own judgement conditions are too hazardous.

7. Fly at a height above the ground that will produce effective treatment results. In no case should the minimum flight height be less than 30 feet.

8. Caution pilots about dangers such as lone snags and trees, and location of downdrafts. Review project maps with each pilot, paying particular attention to heliports, areas being sprayed, and approaches to and from those areas.

9. Caution pilots as to the location of telephone and electric lines near any heliport which will be used. Mark telephone and electric lines with highly visible material if it can be done safely.

10. If a helicopter crashes check the pilot's clothing to see if he has been splashed with herbicide. If so, and if he is not seriously injured, help him wash several times with soap.

11. When an injured pilot is taken to a hospital or doctor, make certain they know the pilot has been exposed to a herbicide and provide any herbicide label information that is available.

Tank Precautions

1. All valves capable of emptying the tanker will be lockable.

2. An air gap or reservoir between the water source and the mixing tank is required. A separate portable pump may be used.

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APPENDIX I
COMMENT LETTERS

The following is a list of organizations and individuals from whom comments were received on the Draft Environmental Statement. The numbers assigned correspond to the numbers used in the comment and response section of Chapter 9 in this Final Environmental Statement.

Letters Received

Index Number	Agency, Organization, or Individual
1	Thomas L. Williams
2	Soil Conservation Service (1)
3	American Horse Protection Association
4	Ruth Houghton
5	Advisory Council on Historic Preservation
6	Virlis Fischer
7	John L. Artz
8	Wildlife Management Institute
9	Mr. & Mrs. George R. Rowe
10	Forest Service - Ogden
11	Bureau of Reclamation
12	Rachael Ballow (1)
13	Rachael Ballow (2)
14	Paul T. Tueller
15	Lincoln County Conservation District
16	H. Val Hafen
17	Geological Survey
18	Lavette Tennille
19	James B. Tennille
20	Environmental Protection Agency, Region IX
21	Dennis Iverson
22	Carole Marsh Carter
23	Soil Conservation Service - Reno (2)
24	Connie Simkins
25	Natural Resources Defense Council
26	Nevada State Conservation Commission
27	Tina Nappe
28	Nevada Outdoor Recreation Association, Inc./ National Public Lands Task Force
29	Nevada State Department of Agriculture
30	Nevada State Department of Conservation and Natural Resources
31	Nevada State Division of Water Planning
32	Nevada State Division of Water Resources
33	Nevada State Division of State Parks
34	Nevada State Department of Wildlife (1)
35	Nevada State Department of Wildlife (2)
36	Nevada State Division of Forestry (1)
37	Nevada State Division of Forestry (2)
38	Nevada State Division of Historic Preservation and Archeology
39	Desert Bighorn Council
40	Corps of Engineers, Los Angeles District

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250 South 100 West
Cedar City, Utah 84720
June 26, 1979

John S. Boyles, District Manager
Las Vegas District
Bureau of Land Management
P. O. Box 5400
Las Vegas, Nevada 89102

Dear Mr. Boyles:

We recently received a draft copy of the Caliente Environmental Statement. This has been carefully reviewed and we find it totally unacceptable. The basic proposal by allotment, Table 1-3 on pages 1-40 through 1-43, is exactly the same as contained in Table 1-2 in the Management Framework Plan. This suggests to us that our time and effort in attending the meetings in St. George on March 21 and April 9 were a waste of time. We gave oral input at that time to Phil Range and associates, with written documentation directed to you March 17 and March 25, 1979. In both the oral and written testimony, we pointed out that the criteria used were not valid on our Klondike, Black Canyon, and Bennett Spring sheep allotments because of snow cover most of the grazing period, water hauling, and the fact that our water developments located in the center of our allotments were not anywhere near 4 miles from water. We also pointed out that livestock numbers in this area were only a fraction of those in earlier years and that the range condition was steadily improving. We also challenged the accuracy of the range survey.

1-1 Phil Range assured us that at least some of these points were valid and that the forage allocations would likely be changed in future documents. We see no evidence of this. We emphasize again that use of the 1977 licensed
1-2 use, a poor forage production year with considerable under utilization from present authorized livestock use, is an invalid and biased base. Present authorized use should be your base. Using a low base starting rate, as in 1977, makes the proposed forage allocations, short and long run, look favorable when, in fact, they are not when compared to present authorized use.

We find your alternatives two through six to the basic proposal meaningless. First, you use a low base period to start with and then you place severe constraints on livestock grazing while allowing horses, burros, and wildlife to be subject to minimum constraints. We can't believe that you would give special or equal treatment to these uses which produce no income, produce no food and fiber or anything else, while restricting livestock. Some day when food prices get even higher our country will be able to thank you people for helping bring it about.

In short, we totally disagree with your proposals and ask that you consider our point of view and make the adjustments which we know are merited. You are playing with people's livelihoods. It is not just some game. Millions of dollars of investment rest with the decisions you make.

We would like to point out that as you consider the impact of the various alternatives on the desert tortoise and the like, that you also should study the impact on the bullfrogs at Bennett Spring. These are a special variety, very large in size, and contribute about the same amount to our country's wealth as the tortoise.

We again urge you to study the points made in our March communications. We think you will find them to be correct.

Sincerely,

Thomas L. Williams

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United States Department of Agriculture — Soil Conservation Service

P. O. Box 4850
Reno, NV
89505

June 27, 1979

District Manager
Attention: ES Team
Bureau of Land Management
P. O. Box 5400
Las Vegas, NV 89102

Dear Sir:

We have reviewed the Draft Environmental Statement for the Caliente area and have the following comments to offer for your consideration:

Page 1-5

Possible future vegetative allocations appear to be detrimental to the wildlife interests. Only slight increases are proposed for wildlife.

2-1 In view of the projections indicating a steady increase of Nevada's human population, it appears that the "reasonable demand numbers" need to be re-evaluated.

The Nevada Fish and Game "Program and Procedure" format does not provide for such projections. This appears to be a serious and misleading omission. (See pages 10-70 through 10-79.)

Pages 1-21, 6-2, 3-10

Reference is made to livestock congregating in riparian zones. The solution expressed is to distribute livestock more evenly throughout the ES area.

It would appear that these proposed solutions would only further degrade the small amount of remaining riparian habitat that exist in the ES area. In general, current research belies these proposed solutions.

2-2 The grazing management systems mentioned in this ES do not properly address:

1. Protection of the remaining riparian habitat from further deterioration;
2. The rehabilitation of existing but degraded riparian habitat for esthetics, wildlife, recreation, water quality, channel stabilization and rehabilitation;

3. Restoration and protection of areas that once were riparian habitat and have been lost due to improper grazing which resulted in sheet, rill and gully erosion and the concurrent dropping of the water table.

Page 3-3

2-3 Erosion - The assumption was made that these data pertain to sheet and rill erosion. No data or summary is presented for gully, trenching or streambank erosion. Also, no mention is made of corrective measures that may be implemented to reduce these losses or to improve the environment.

For the assumed sheet and rill erosion data, approximately 70% of the ES area is in the Moderate, Critical or Severe Catagories. Most of this 70% is located in the less than 8" rainfall belt. This is the area that is least able to support sufficient vegetal cover to withstand the type of erosive storms that can occur in the area. With the proposed treatment and management suggested, the short term estimated reduction of 414,559 tons (Page 6-1) may be an unattainable goal. Also, no mention is made of grazing management that will be necessary on the steeper more erosive slopes.

Page 9-2

Reference is made to the Lincoln County Conservation District as being a multiple-use advisory board to the Lincoln County Soil Conservation Service. Please delete the reference "as being a multiple-use advisory board to the Lincoln County Soil Conservation Service." The Lincoln County Conservation District is a sub-division of state government.

We appreciate the opportunity to comment on this Draft Environmental Statement and will appreciate having a copy of the final when it is published.

Sincerely,

GERALD THOLA
State Conservationist

cc: Norman Ritter, State Resource Conservationist, SCS, Reno, NV

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CABLE "SOONER"
SUITE 1005
(202) 223-8440

June 26, 1979

District Manager
"Attention: ES team"
Bureau of Land Management
P. O. Box 5400
Las Vegas, Nevada 89102

Dear Sir:

Thank you for the opportunity to review and comment on the Draft Enviornmental Impact Statement (EIS) for the Proposed Domestic Livestock Grazing Program for the Caliente area. The American Horse Protection Association has fully considered those parts of the Program which would have a direct impact on wild horses and burros.

We consider the Program's planned reduction of the area's wild horse and burro population by more than 50 percent to be a drastic and unwarranted action. Implicitly, the Program intends to manage the horses at approximately their 1971 population levels. Beyond that, the Draft EIS is flawed because it inadequately considers the program's effects on wild horses and burros and alternatives to the program. This violates the National Environmental Policy Act's (NEPA) (42 U.S.C. §4321 et seq.) mandate that the EIS fully consider the environmental effects of this major government action.

The goal of the program clearly is to increase the availability of forage for domestic livestock grazing. By 2015, it is anticipated that livestock AUMs will increase from 78,235 to 146,001 -- an increase of nearly 100 percent. Only a small initial reduction of livestock use is planned. By contrast, wild horse AUMs will suffer an immediate reduction from 12,624 to 5,956 (53 percent), and will be permitted to increase only to 9,042 -- less than 75 percent of current use. Despite obvious significant improvements in range productivity, wild horse use will decline in absolute terms. The draft EIS provides no persuasive rationale for this result.

Several conclusions can be drawn from even a cursory examination of the draft. First, the horse population has increased in size slowly, if at all. In Area 1, the largest, there

was no apparent growth between 1973 and 1974. The 1975 figure must be aberrant, and casts doubt on the accuracy of the earlier data. The 1977 figures may be more accurate, but assuming
3-1 that they are it is hard to do much more than speculate about the rate of population increase between 1973 and 1977; at most it is 10 percent. Nor is it possible to tell much about future population growth rates. They may be 10 percent, or they may
3-2 be much less. Second, the degree of dietary overlap between wild horses and other animals is quite low. Third, there is little
3-3 if any data clearly revealing the extent of competition between horses and livestock in the wild horse areas, or the extent to which grazing problems, if any, in the wild horse areas are attributable to overuse by livestock rather than by horses. This is the only practical means of determining whether wild horse removal is necessary. It could very well be that livestock removal is the proper solution for bettering the habitat in certain areas.

3-4 Also, the Draft EIS lacks any detailed explanation of the research methods used to arrive at the 75 percent adjustment figure for actual counts. The reference to the 50 percent figure used by Dr. Omhart is of no help since there is no way of telling whether his study occurred under circumstances similar to the ones affecting the reliability of this count (e.g. - terrain, weather conditions, etc.). Furthermore, the Omhart data applies to burros, not horses. It could very well be that the actual counts made here closely approximate the total wild horse and burro population in the Caliente area. If this were true the Program's implementation would result in the removal of nearly 80 percent of the area's wild horse and burro population.

The Program has numerous negative effects on wild horses and burros. First, and most importantly, is the planned reduction of over 50 percent of the area's wild horse and burro population. Beyond this, competition for forage between livestock and cattle will actually increase in Wild Horse Management Areas because of "intensive livestock grazing" to be implemented therein. (p. 3-22). Also, the construction of fences is expected to disrupt the traditional grazing patterns of wild horses and cause injuries to them.

Despite these, and other, negative effects on wild horses and burros, the Draft EIS boldly states that the Program will benefit them in both the long and short term (p. 6-2). The EIS claims that wild horses will be "managed in herd sizes which would

be proportionate to the forage available." (Id.) What this really means is that wild horses and burros will be allocated what is left after the livestock are through grazing.

The consideration of an alternative maximizing wild horse use in present herd areas by excluding cattle is a helpful, but not complete, consideration of viable alternatives. The wild horse alternative has as its principal negative consequences the diversion of about 25,000 AUMs (21,492 additional, plus the 3,600 that are presently being used but would not be allocated to wild horses under the grazing plan) from livestock to wild horses, and consequent loss of ranching income. Wild horse numbers would increase from 1,072 to 2,863.

This alternative sets up an "either-or" situation while ignoring a viable option in the middle. Nothing in the draft excludes the possibility that wild horses could be maintained at or near their present level at a minimal cost to livestock grazing. Population increases have been small, and may well be minimal in the future. If so, a plan could be designed that would have minimal impacts to wild horses at a negligible cost to livestock grazing.

The role of the wild horse on public lands has been mandated by Congress. Wild horses are not nuisance animals. The Wild Free-Roaming Horses and Burros Act (16 U.S.C. §1331 et seq.) gives these animals at worst an equal status in the multiple use policy for public lands. The Draft EIS shows that the Bureau has failed even to afford the wild horse consideration as a use of equal importance.

We urge the Bureau to reconsider its Draft EIS in light of more recent data on wild horse population trends, and to determine whether a grazing plan with less impact on the wild horse herds in Caliente can be developed.

Very truly yours,

McCANDLESS & BARRETT

By Russell J. Gaspar
Attorneys for the American
Horse Protection Association, Inc.

cc: Joan R. Blue
President, AHPA

RUTH M. HOUGHTON
Ph.D.
CONSULTING ANTHROPOLOGIST
P.O. Box 3601 Reno, Nevada 89505 U.S.A.

July 2 1979

District Manager
Attention: ES Team
BLM
PO Box 5400
Las Vegas, Nevada 89102

To: ES Team
From: Ruth Houghton Ruth Houghton

I have reviewed the Caliente ES on grazing and it does give a good general picture of the social and economic questions that should be considered for the grazing users of these BLM lands. I am pleased to see that more social and economic issues are raised and I hope these will continue to be emphasized in future analysis. BLM traditionally has focused on the resource base, but today we see the need increasing for understanding the interaction between the resources and the economic and social factors of associatied communities.

The introductory materials in Chapter two include a good section on values and economics and this provides a general picture of the area. I am glad to see the LDS church mentioned because it has a historical and modern impact on the area. It is a community force which contributes to stability in membership and in community sociocultural content and must be recognized in any study of the local populations.

Also imrortant in Caliente is the large number of part-time ranchers who have to rely on outside income for their survival. It appears these people recognize their situation and prefer to remain as they are because they wish to life in this style-- the family oriented, and horse/cattle actvity of such small scale ranching . The impact of declining ranch values and future grazing potential on these permittees must be considered as seriously as that for the full-time ranchers.

Also of value in understanding the social and economic parameters is the reference to a specific value for an AUM. While this value may be informal and is not officially recognized, it is real in the local operations and financing and must be considered, BLM policy notwithstanding.

4-1 In the immediate future income and values will decline for the ranches of the area, what will happen to the various groups and how much loss are they willing to absorb to remain resident in the Caliente area? I don't believe this question is answerable with the present information available in the report. Also, how many
4-2 of these people could seriously believe that in 35 years there will be a 87% increase in grazing capacity? I doubt that this is an acceptable figure, or that 35 years hence is a reasonable time period to consider when by 1980 people will be severely affected by reductions. A time period of 10 to 15 years and the possible improvements at that date might be more understandable to local residents(perhaps the 35 years is imposed by the suit).

4-3 Also important, but not directly considered is the degree of interest in the ranching issues and proposed cuts by the non-ranching residents of the local area, the greater share of the local population? Since public input locally and nationally is requested, this local non-ranching population should be considered in the study in some way, as well, to give a perspective on the community composition.

Overall, the document does provide a satisfactory description of the community involved in ranching and does introduce many important social and economic issues.

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Advisory Council On Historic Preservation

1522 K Street N.W.
Washington D.C.
20005

Reply to: P. O. Box 25085
Denver, Colorado 80225

June 28, 1979

District Manager
Attention: ES Team
Bureau of Land Management
P. O. Box 5400
Las Vegas, Nevada 89102

Dear Sir:

This is to acknowledge receipt of the draft environmental statement for the Proposed Domestic Livestock Grazing Management Program for the Caliente Area, Nevada, on June 11, 1979. We regret that we will be unable to review and comment on this document in a timely manner pursuant to Section 102(2)(C) of the National Environmental Policy Act of 1969.

Nevertheless, the Bureau of Land Management is reminded that, if the proposed undertaking will affect properties included in or eligible for inclusion in the National Register of Historic Places, it is required by Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. Sec. 470f, as amended, 90 Stat. 1320) to afford the Council an opportunity to comment on the undertaking prior to the approval of the expenditure of any Federal funds or prior to the issuance of any license. The Council's regulations, "Protection of Historic and Cultural Properties" (36 CFR Part 800.4) detail the steps an agency is to follow in requesting Council comment.

Generally, the Council considers environmental evaluations to be adequate when they contain evidence of compliance with Section 106 of the National Historic Preservation Act, as amended. The environmental documentation must demonstrate that either of the following conditions exists:

1. No properties included in or that may be eligible for inclusion in the National Register are located within the area of environmental impact, and the undertaking will not affect any such property. In making this determination, the Council requires:

—evidence that the agency has consulted the latest edition of the National Register (Federal Register, February 6, 1979, and its monthly supplements);

—evidence of an effort to ensure the identification of properties eligible for inclusion in the National Register, including evidence of contact with the State Historic Preservation Officer, whose comments should be included in the final environmental statement.

2. Properties included in or that may be eligible for inclusion in the National Register are located within the area of environmental impact, and the undertaking will or will not affect any such property. In cases where there will be an effect, the final environmental statement should contain evidence of compliance with Section 106 of the National Historic Preservation Act through the Council's regulations, "Protection of Historic and Cultural Properties".

Should you have any questions, please call Jane King at (303) 234-4946, an FTS number.

Sincerely,

Louis S. Wall
Chief, Western Office
of Review and Compliance

6

VIRLIS L. FISCHER
3508 VICTORY AVENUE
LAS VEGAS, NEVADA 89121

Temporary Address:
Box 3408
Incline Village, Nev. 89450
July 2, 1979

District Manager
Attention ES Team
Bureau of Land Management
P. O. Box 5400
Las Vegas, Nevada 89102

Subject: Draft EIS Statement on Caliente Area

Dear Sir:

I regret that I will be unable to attend your public hearing in Las Vegas July 12 on the above matter, but wish to express my preference for Alternative 5 - reduced levels of livestock grazing - with preference for increased wildlife use. I do favor control of wild horses and burros.

Thank you for making this letter part of the hearing record.

Sincerely yours,

Virlis L. Fischer

10-117

559

MAX C. FLEISCHMANN COLLEGE OF AGRICULTURE
UNIVERSITY OF NEVADA RENO
DIVISION OF RENEWABLE NATURAL RESOURCES
1000 VALLEY ROAD
RENO NEVADA 89512
RESIDENT INSTRUCTION
AGRICULTURAL EXPERIMENT STATION
COOPERATIVE EXTENSION SERVICE

July 3, 1979

John S. Boyles, District Manager
Bureau of Land Management
P.O. Box 5400
Las Vegas, Nevada 89102

Dear John:

Following are my comments on the Caliente Draft EIS. I would like to include, as a part of these comments, my attached letter to you dated April 26, 1979 in which I comment on the Caliente MFP2 recommendations. I believe this is appropriate since the proposed action remains the same and I see nothing in the draft EIS indicating that these earlier comments have yet been considered.

I am pleased to see that the proposed action includes a strong commitment (1) to more intensified grazing management; (2) to monitoring of range use, condition and trend; (3) to vegetation manipulation in areas where management alone will not restore desirable range conditions; and (4) to site specific treatment of identified areas with special management problems.

7-1 However, I am very disappointed that the DES has not responded constructively to the public comment resulting from circulation of the MFP 2 proposals last March and April. I am equally disappointed that at least one alternative does not propose a program that would minimize initial severe livestock adjustments.

There is really very little in the DES that supports the need for such adjustments. The range survey is gross by BLM's own standards. There is admittedly no available data on trend, ecological condition or condition for wildlife. Wildlife numbers generally are reported to be above historical populations except perhaps for big horn sheep. Only three of sixty-four watersheds exceed SCS soil loss standards. No information is presented that indicates past April-May grazing is creating serious range problems and existing AMPs, some established since 1966, "have been less effective than expected (p. 2-72)."

I also believe your assessment of impacts of the proposed action and the alternatives understates the importance of the livestock grazing resource and

7-2 the impacts on the ranchers and local communities. It is misleading to use any single year as a basis for stocking comparisons but is particularly misleading to use 1977, a dry, poor market year. You compare change by allotments and by averages rather than by impacts on individual operators. During my review of the MFP 2 I summarized the proposed actions in terms of individual operators by size class and compared the proposed allocation with both their Class I and "active" privileges. This data (which you have) presents a rather different picture than the EIS. For example, 9 of 21 very

small operations and 6 of 28 small operators are totally excluded from the federal range in the short range. Two-thirds of all operators face 50% or greater loss of active privileges in the short range and 42% face reductions exceeding 75%.

Thus, I believe a good case can be made for consideration of an alternative that would initiate the more intensive management program more cautiously. In such an alternative stocking rates and practices would remain at present levels except where clear on-the- ground evidence shows immediate adjustment is needed to protect the basic resources (example: identified big horn sheep/cattle conflict areas, areas with uncontrolled expansion of wild horses, some riparian areas). Other key elements would include (1) immediate implementation of thorough monitoring (actual use, condition, trend, climate, etc.) programs and data collection studies (populations, habitat, ecological sites), (2) specific recommendations developed by local groups (including use of Lincoln County Master Plan), (3) establishment of an active coordinated resource planning and development group (with local government, Nevada Fish & Game, Conservation District, etc.) and (4) accelerated implementation of range improvements (including vegetation manipulation) and grazing systems. Necessary adjustments in numbers, seasons of use, and grazing practices would be made as data becomes available that not only clearly establishes the need for change but also indicates the kind of adjustment needed to effect the desired change. Also, with this locally supported approach you may be able to reduce impacts on operators, who may be most severely affected, through locally agreed-to tradeoffs in the use areas. In most cases it just doesn't make much sense for one operator to get a substantial increase while his neighbor is being put out of business.

On page 1-37 of the DES you state: "The administration of the public lands involves a complex interdependence between lands of different ownerships, user capabilities, and needs." I agree and submit that a BLM Land Use Plan cannot be successfully developed and implemented without active consideration of, and participation by, local groups and individuals. To this point local people have not been adequately considered and involved and I see little in the present draft EIS that indicates an intent to improve this situation.

Thank you for this opportunity to comment. I hope you will call on me if you decide to consider a locally responsive alternative or if you wish further comment or assistance.

Sincerely,

JOHN L. ARTZ,
RAnge Scientist

JLA/ln

Wildlife Management Institute
709 Wire Building, 1000 Vermont Ave., N.W., Washington, D.C. 20005 • 202/347-1774

DANIEL A. POOLE
President
L. R. JAHN
Vice-President
L. L. WILLIAMSON
Secretary
JACK S. PARKER
Board Chairman

July 6, 1979

District Manager
Bureau of Land Management
Attention: ES Team
Post Office Box 5400
Las Vegas, Nevada 89102

Dear Sir:

The Wildlife Management Institute is pleased to comment on CALIENTE ENVIRONMENTAL STATEMENT, PROPOSED DOMESTIC LIVESTOCK GRAZING MANAGEMENT PROGRAM, Nevada.

The plan is not acceptable for wildlife. The deficiencies are management of bighorn sheep, riparian zones, and provisions for vegetative diversity in land treatment areas.

The overall reduction in bighorns from 763 to 635 is not acceptable (p. 3-16). The mitigating measure of "wait and see" (p. 4-2) for the Mormon Mountains will

8-1 not do the job. Desert bighorns are objects of wide interest throughout the nation; any grazing program should provide for an increase of sheep by livestock reductions and/or fencing.

8-2 Wild horses and burros are incompatible with native sheep. Management plans should provide for removing wild horses and burros from desert bighorn ranges.

We appreciate that reduction of grazing will improve riparian areas. However, improvement will be very slow in this arid area and will be limited mostly to grasses and forbs. Grazing systems we have observed do not improve riparian shrubs; more drastic measures are needed. Since riparian conditions and management are now a major conservation issue, we suggest that the riparian program be re-examined and improved.

8-3 Riparian management should also include intermittent streams (p. 3-19). Vegetation on these water courses provides some of the better habitat for terrestrial wildlife species.

8-4 The plan does not provide for vegetative diversity in the 401,000 acres proposed for vegetative manipulation. Such needs as size and shape of treatment areas, leave strips and raptor perches must be accommodated. We have seen many

8-4 large chainings in nearby Utah areas that verge on monoculture. This should not happen on the Caliente Unit.

These remarks have been coordinated with William B. Morse, the Institute's Western Representative.

Sincerely,

Daniel A. Poole
President

DAP:lbb

560

9

7/10/79
Caliente, Nev.

Re. - Caliente Environmental Statement

To Whom it May Concern -

I am not a Rancher but a Concerned Citizen - and it has been pointed out to me that only 1 allotment in the whole Caliente Area has been completely 100% declared "No Grazing" (P 1-12) I refer to the Applemilte Allotment.

9-1 A shaded map I have studied shows that Applemilte has approximately 26% of 50% Slope instead of the alleged 67% of 50% Slope. As this was the main reason to cut this allotment 100% I feel that it is in error.

9-2 Page 2-2 shows that Applemilte Range is mostly in 8"-16" precipitation Area. Also, P. 2-30 shows that Applemilte is almost entirely Pinyon/Juniper. As Applemilte

3/ flood menace to the different areas in the Canyon. Sooner or later some drastic means (Sterilant)(or whatever) will have to be used to get rid of these trees to protect the Railroad + the Ranches down the Canyon. This grass + feed which grows along the Creek is just going to waste if it cannot be grazed. Also - if it is not grazed it then turns dry + is a fire hazard - (Ask the BLM - Fire Crew)!

I'm sure that if I had time to completely study this book - I could find more differences of opinion.

Respectfully Submitted.

Mr + Mrs George R. Rowe
Box 414
Caliente, Nev.
89008

2/ is completely fenced - this should mean that Applemilte allotment would be appropriate for an economical

9-2 Range Development Area instead of being cut off altogether. Some of the Vegetation Treatment Areas border on this fence line (P 1-32) why cannot the same treatment be made on the other side of the fence?

Also - the area down Rainbow Canyon - Ash Slats, etc. on to Elgin has been declared "no grazing". Anyone

9-3 living in Caliente - Elgin Area can see what taking the Ranchers Cows out of the Canyon has done. When cattle fed up + down the Creeks they kept the small trees nibbled off. Now, with little or no grazing - just see for yourself how these small trees have grown into large ones + present a potential

10

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
324 25th Street
Ogden, UT 84401

1950

July 9, 1979

District Manager
Attention: ES Team
Bureau of Land Management
P.O. Box 5400
Las Vegas, NV 89102

Dear Sir:

Reference is made to your June 1, 1979, letter requesting our comments on the draft environmental statement for proposed domestic livestock grazing in the Caliente area.

We have contacted the Dixie and Humboldt National Forests as well as the Range Management Staff group in our Regional Office. Both the Dixie Forest personnel and the Range Management Staff have reviewed the document and have no comments on the proposal. The Humboldt Forest personnel are still reviewing the document. If any substantive comments are received from their review, we will forward their comments to you as soon as they are received.

Sincerely,

GEORGE H. ROBINSON
Acting Director, Regional Planning and Budget

561

11

United States Department of the Interior
BUREAU OF RECLAMATION
LOWER COLORADO REGIONAL OFFICE
P.O. BOX 427
BOULDER CITY, NEVADA 89005

IN REPLY REFER TO LC-150
120.1

JUL 11 1979

Memorandum

To: District Manager, Bureau of Land Management, P. O. Box 5400, Las Vegas, Nevada, Attention: ES Team

From: Regional Environmental Officer

Subject: Draft Environmental Statement, Proposed Grazing Management in the Caliente Area (your undated memorandum to Director)

11-1 We have reviewed the enclosed document and have the following comments. Impacts on vegetation in Chapter 3 are described only in terms of forage and are difficult to relate to the various vegetative communities described in Chapter 2. Also, the conversion of 401,161 acres of Pinion-Juniper vegetation to subclimax grasses and forbs species may result in increased wildlife diversity and biomass, as discussed, but it will also result in changes in species composition and the displacement and/or loss of species associated primarily with Pinion-Juniper communities.

Thank you for the opportunity to review this document.

Wayne O. Deason

Enclosure

13

Caliente Nevada
July 12 1979

1792
DES
(N-058)

Mr John Boyles
attention ES Team
Bureau of Land Management
Las Vegas Nev.

Dear Mr Boyles

Referring to your DES for Caliente Resources Area my comment is: An inconsistant base of assumptions and predictions is of no use except to fool the General Public.

Thank You
Rachel Ballow
Box 265
Caliente Nv. 89008

12

Caliente Nevada
July 12 1979

1792
DES
(N-058)

Bureau of Land Management
District Manager
Mr John Boyles
Attention E S Team
Las Vegas Nevada

Dear Mr Boyles:

Referring to your letter dated June 1 1979 1792 Caliente D E S (N-058) I wish to make these Comments and Proposals

#1 To be no change in A U Ms for livestock as of Prior to 1976 Also no change in seasons of use No Person Knows better than the user that pays for use of the Range as to the ammount of stock he can run and when to remove them from the range Not even a pencil pusher

#2. Stinks.

#3. I Propose that any State that does not have wild horses or Burros be granted the rights to have their fair share of these endangered species. Be allowed to make a Sanctuary for them in their State, remove them from the state that has them (The State of Nevada) to their own State and preserve them so they can go look at them closer and not have to travel a long distance thus conserving energy and helping the economy of the Country.

#4 No restricted periods of use
#5 No Reduced levels of livestock
#6 Reduce management power to much power now putting a burden on our economy.

Every thing in the E.S. for Caliente Resources Area is based on a series of assumptions and predictions and is of no possible Value. Any one can do this.

Thank You

Rachel Ballow

562

~~10-120~~

MAX C. FLEISCHMANN COLLEGE OF AGRICULTURE
UNIVERSITY OF NEVADA RENO
DIVISION OF RENEWABLE NATURAL RESOURCES
920 VALLEY ROAD
RENO NEVADA 89512
RESIDENT INSTRUCTION
AGRICULTURAL EXPERIMENT STATION
COOPERATIVE EXTENSION SERVICE

July 13, 1979

John J. Boyles, District Manager
Bureau of Land Management
P.O. Box 5400
Las Vegas, Nevada 89102

Dear John,

The following is a summary of the comments that I made at the Caliente ES hearing held at Caliente, Nevada on the evening of July 10, 1979. I would like to have these comments included in the official record.

First of all I wish to repeat my comment that the BLM should be commended for preparing such a lengthy document with its considerable information in such a short period of time as dictated by the legal requirements of the environmental legislation. We are aware of the considerable pressure brought to bear on the scientists of the BLM to produce this material.

However, it must be remembered that the data, with few exceptions, is estimated and is a reflection of the professional competence of BLM scientists. The data itself will not hold up under any sort of detailed scientific scrutiny. I have no arguments with generally accepting the credibility of well-trained range scientists with experience. The continued need to allow your employees to better themselves by making moves tends to preclude the development of significant experience in a particular area. This, of course, acts to reduce the credibility of your scientists as they prepare such reports.

The most glaring scientific problems associated with the ES are the credibility of the 1977 Range Survey especially as it relates to range productivity and, secondly, the reliability of determinations upon which the 51% slope suitability requirement is based. In the first case it must be pointed out that 1977 was an extremely dry year. We have found that Nevada shrub ranges can show as much as a 1200% difference from one year to the next. This of course can easily confound production estimates based on a single year. In my opinion it would take production determinations over at least 5 years and preferably 10 on dry desert ranges to allow the making of reliable estimates of range productivity.

14-1

The second factor listed above is a very unfortunate one, in that your estimates of extent of slopes exceeding 50% was not accomplished with any rigorous procedure. You have stated that the estimates were made with the use of an Abney Level. It would take literally 1,000's of such readings to properly determine areas in particular slope classes. There are ways to do this although they are relatively expensive. The Geological Survey at Menlo Park has developed techniques to shade 7.5 minute quads by slope class using computer techniques. Of course, quad maps with relatively narrow contour intervals are not readily available over much of Nevada.

14-2

In view of the fact that 69 allotments were reduced due to low productivity and 76 allotments reduced becaused of steep slopes, it is unfortunate that more rigorous scientific appraisals of these factors cannot be made. It appears that many ranchers are being penalized based on less than adequate data.

I would like to make a few comments relative to Caliente Planning Unit Range Survey. A copy of this survey was sent by you to Jack Artz on July 2, 1979. Although the report was general there are a couple of problems that I see. Of minor importance is the fact that the generic name for sagebrush, Artemisia was misspelled throughout the report. Also mention was made of stocking rates between 5 acres/AUM and 350+ acres/ AUM. To me this suggests a lack of understanding relative to community ecology. Such desert range must be carefully stratified into plant communities with different levels of productivity or no productivity. At any stocking rate in excess of 50-60 acres/AUM a cow would have to go on a dead run all day long just to get enough to eat. What in fact is happening is that there are small acreages of land producing between 5 and 30 acres/AUM placed randomly within larger areas that produce virtually no useful or palatable forage.

Further understanding of community ecology should be aquired by BLM scientists.

Also the Range Survey report states that "most game populations are at the low point of their cyclic population levels". I don't think it is generally possible to predict such specific wildlife population trends based upon such a short time period in the field at least for most species. The dynamic nature of the wildlife populations will preclude such estimates. This, of course, tends to further detract from the credibility of the survey.

Finally, I don't feel that any of the alternatives suggested in the ES are acceptable. One alternative should be "increased management intensity". I say this based on the fact that over the past 15 years considerable new management data and ideas have been developed and are available for use. We should use those new techniques to properly manage all of our rangeland resources including forage, habitat, water, aesthetics, etc.

It is unfortunate that not one of the alternatives in the current draft does not propose a program that would minimize severe livestock adjustments. Thanks for the opportunity to comment.

Sincerely,

Paul T. Tueller

Paul T. Tueller
Professor of Range Ecology

563

Lincoln County Conservation District

P.O. Box 459 - Caliente, Nevada 89008
July 13, 1979

Board of Supervisors
Chairman, Keith Whipple
Vice Chairman, Robert Mathews
Sec.-Treas., Ralph Smeath
Equipment Mgr., Zone 1, Kenneth Lee
Equipment Mgr., Zone 2, William Schofield
Member, Howard McCrosky
Member, Jay Wright

Mr. John Boyles, District Manager
Las Vegas District BLM
P. O. Box 5400
Las Vegas, Nevada 89102

Dear Mr. Boyles:

Now that the E. S. hearings are completed, we recognize the huge amounts of time, effort and money expended. We certainly hope you and your staff will weigh the real needs of this land for the future of this country and the people in it. Food and fiber will become more critcal as time goes on, and livestock production will become increasingly more important.

We don't feel that cuts in livestock use will solve problems. It will intensify some and cause repercussions economically that will not justify these actions. Certainly, immediate steps to improve ranges with management techniques not now in force, improved forage through seedings, and improved water will overcome any shortages of feed substantiated by your 1976-7 surveys.

15-1 There is ample evidence which gives us reason to believe that these range surveys, being made during drought years, do not present an accurate picture of forage capacity. Certainly, such drastic steps (AUM cuts) cannot be justified from low accuracy inventories.

So much of the E. S. is based on admitted assumptions rather than scientific fact, that we have a difficult time accepting the conclusions of the E. S. as valid. It is wrong to make decisions that will disrupt people that is based on an assumption.

15-2 The issue of wild horses has not been resolved and will not until they are placed in a management situation. Putting horses in a wild and free roaming condition without close management is far more cruel to the horses, (they first multiply beyond feed availability - then inbreeding, diseases and starvation take its cruel toll). We specifically urge that the horses be put in their own range allotment with ample management arranged for.

15-3 The limitations imposed (50 percent slopes, 4 miles to water, etc.) are not realistic. Each area should be assessed according to the peculiarities encountered on a case by case basis.

After all that has been done on all sides, we are very apprehensive about your decisions.

We have always been of the firm belief that the best decisions for this E. S. can be made by committee work of all the affected parties. People working together are basically reasonable and good responsible decisions would result.

This type of decisionmaking would take the heat off your bureau people and put it on the users. The committee should be composed of qualified scientists from the University, SCS, and others as well as all of the interested parties including; recreationist, preservationist and wildlife organizations, livestock people and others as appropriate.

We feel that the E. S. deadline is too short and that it should be extended to allow this proposed committee action to be effected. Without it, a meaningvul plan cannot be developed.

We thank you for your cooperation and support for conservation and best use of our rangelands.

Sincerely,

Keith Whipple

Keith Whipple, Chairman
Lincoln County Conservation District

564

RE: Public Hearing - CALIENTE DISTRICT ENVIRONMENTAL STATEMENT

NAME: H. Val Hafen, 198 North 100 East, St. George, Utah
Representing: J - P CATTLE COMPANY

ALLOTMENTS: Summit Spring, Garden Spring, White Rocks, Lime Mountain, Sheep Flat, Oak Wells, Barkley

We feel that none of the proposed actions are acceptable. Based on past usage of our range and the present condition of the forage on our range, the proposed cuts and other proposals are completely unrealistic.

The proposal to remove all livestock from the range for two months each Spring is not feasible because:

1) To truck 600 to 1,000 head of cattle across 35 miles of desert roads and 125 miles of oil highway to our base property and then haul them back two months later would economically bankrupt us due to the cost of freighting that many cattle that far.

2) Since this is calving season, transporting cows heavy with calf and new born calves would cause us death losses of our new calves and possibly some of the cows.

3) During this time of the year, there are times when the roads are muddy and unpassable.

4) Our base property is unproductive until approximately May 15th. Therefore, it is useless and unavailable on March 1st.

5) Labor is difficult to find in March and April.

6) Actual setback of animals due to driving, hauling and change of feed two different times in this crucial calving season would be tremendous.

These proposed cuts would effect the economic base of not only Lincoln County but also Washington County and in some cases, would force some livestockmen, whose families for generations have been in the cattle business, to seek some other method of producing a living.

Based on our individual allotments, these are our observations.

SUMMIT SPRINGS - We have been running 100 head of cattle on this range for several years and the range is currently in good condition and the cattle have been fat and have produced good calf crops, yet the ES suggests that this range produces only enough AUM's for 21 head of cattle. If this is the case, what have these 100 head been eating. We suggest that there was an error in this survey. There are three different places where the range

conditions, according to this survey, change abruptly from good range to bad range. We submit that this is not possible in the areas shown. There is no major variance.

WHITE ROCKS - Per survey, this is the best allotment on the Tule Desert with more than 50% of the range listed as good, yet the ES recommends a 38% cut as well as a one and a half month usage cut from the present use. We also question this survey in the southern portion where, according to this survey, the range abruptly changes from good to bad. We submit that anyone riding this range can identify where that difference occurs.

GARDEN SPRING - Once again, we question the survey. There are areas in this allotment that are very heavily covered with browse and other forage that is shown as poor range. This is not possible. Also, there are areas here shown as bad range bordering good range. There is no apparent difference or abrupt change in the terrain or forage in most of these areas of change.

OAK WELLS - We wonder why the livestock is allocated only 36% of the total AUM's while the wild horses and wildlife received 64%. This allotment needs fencing and removal of the juniper and pines. This has a possibility of being an excellent range.

LIME MOUNTAIN - Because of our small interest in this allotment, we will leave the comments to Norman Gubler, the major owner.

SHEEP FLAT - This range was surveyed in 1960. Later, the AMP's were cut while removal of the juniper and pines was conducted with promises that these cuts would be restored upon completion. These cuts have never been restored and now the ES is suggesting an additional 74% cut. We have been running 300 head on this allotment and receiving good production from our cows and calves. This ES suggests that the carrying capacity is only 78 head. This is ridiculous. Our cattle could not have survived if there were not more AUM's available than this survey shows. The ES also allocates only 41% of the available AUM's to livestock with 59% to wildlife. We question this allocation.

The proposed cut included in the ES would cut our potential winter range cattle operation from a 1,000 head operation to a 435 head operation. It would cut the summer herd from 500 head to 227 head. Needless to say, this is material in its effect.

We submit that with the allotments that we own, that given the approval to develop some water resources which we know are available, and with the range involved, that through our own management of the range, we can run the 1,000 head of cattle that we are now alloted without adversely effecting the environment. With some mechanical vegetation manipulation on our summer allotments, we could do the same.

In correspondence received from Mr. Maxwell T. Lieurance, the Chief of the Division of Rangeland Management, in response to our request for a resurvey of our allotments, he stated and I quote: "We are concerned about the declining forage conditions on allotments such as yours. It would not

be beneficial to you or the public in the long-run to let overgrazing continue." However, the ES states that no trend studies have been made. It is the general census of opinion that these ranges have actually been improving over the past ten years based on current use. Without trend studies, how can this ES claim to know if current allotments are too high?

We question why the Caliente District allowed only a 5% usage factor for blackbrush whereas, the Hot Desert District allowed a 15% usage factor and where in several areas, the only difference in the terrain and forage is an invisible line that divides one BLM district from another.

The ear tag program suggested in the ES is impractical due to the extra handling of the cattle to change tags each year and the possibility of them being pulled and rubbed off in heavily foraged terrain. What the BLM does not seem to recognize is that ranchers receive our economic benefits from their ranges and to overgraze and overuse their range hurts the rancher, not the BLM.

On April 28, 1979, we visited the Caliente District office and reviewed the survey findings on our allotments. At that time, we formally requested copies of all information pertaining to our allotments so that we might prepare more thoroughly for this hearing. To date, we have not received any of that information.

We feel like this survey is inaccurate in its findings. There are areas where, according to the ES, the range changes from good to poor very abruptly. In the Summit Spring Allotment, it supposedly changes from taking 14 acres to produce an AUM to taking 50 acres to produce an AUM. There is no major vegetation change apparent in this area. This kind of variance is unrealistic.

Mr. Lieurance, in his letter previously mentioned, states and I quote: "We have also made a thorough review of the Caliente Range Survey and feel that it was conducted properly and without the technical discrepancies which would warrant a resurvey." In our review of our allotments, it was found that in the Garden Spring Allotment that one area was shown out of the 4 mile radius of water whereas, it was actually within several hundred yards of the main well in that area of the Tule Desert. Another area in the White Rocks Allotment was shown out of the four mile from water radius neglected to show a water line running from Garden Spring and feeding three water troughs all of which were installed with BLM cooperation but are not shown in this ES. In reviewing the Barclay Allotment, it was found that one of the survey areas was inadvertently not even included in the final tabulation of the AUM's available. If these kind of oversights can be pointed out in a very short review without all the other backup papers, how many other oversights and errors were there just in our allotments let alone the total ES. We once again question the accuracy of this survey because of apparent problems as listed above, the many assumptions that are made as well as the rushed conditions imposed on the BLM employees. We once again request a resurvey with the assistance of private individuals trained in these matters to assist the BLM with these surveys.

J - P Cattle Co.

17

United States Department of the Interior
GEOLOGICAL SURVEY
RESTON, VA. 22092

OFFICE OF THE DIRECTOR

In Reply Refer To:
EGS-DES-79/28
Mail Stop 760

JUL 9 1979

Memorandum

To: District Manager, Bureau of Land Management
Attention: ES Team
Las Vegas, Nevada

Through: Assistant Secretary--Energy and Minerals JUL 11 1979

From: Acting Director, Geological Survey

Subject: Review of draft environmental statement for domestic-livestock grazing-management program for the Caliente Area, Lincoln County, Nevada

We have reviewed the draft statement as requested in a memorandum from the State Director.

17-1 The statement should summarize pertinent details of the occurrence of ground water, particularly the aquifers tapped by the existing and planned wells and by springs. Special emphasis should be given to shallow or unconfined aquifers that are utilized in the project and to springs and wells tapping fractured rocks. The discussion of herbicide application should include plans to protect springs and wells and to monitor ground water where supplies are obtained from relatively shallow unconfined or fractured-rock aquifers.

Acting Director

ONE HUNDRED YEARS OF EARTH SCIENCE IN THE PUBLIC SERVICE

565

18

July 10, 1979

John Boyles
District Manager, BLM
P.O. Box 5400
Las Vegas, Nevada 89102

Dear Mr. Boyles,

I wish to take this opportunity to comment on a few items of the Caliente Environmental Statement on Grazing, which I feel are in error:

18-1 1. On page 1-40 table 1-3, it states that the season of use for the Applewhite Allotment is 5/1 - 10/31. This is in error. It is year long.

2. On page 2-40 in the "Threatened & Endangered Flora" map, it shows in the Applewhite Allotment:

18-2 A. A proposed threatened species T-11 (PHACELLA ANELSONII), while on page 10-9 in an explaination of the species, it states that this plant grows at an altitude of 2,000 - 2,5000 feet. This again is in error as the altitude of the Applewhite Allotment is from 4,000 ft. and higher.

18-3 B. A proposed endangered species E-1 (MENTZELIA LEUCOPHYLLA), and again on page 10-9 as an explaination of the species, it states that "although it is reported from an area south of of Caliente (meadow valley wash), this species is actually known only from Ash Meadows in western Nevada. Most likely the local species is M. OREOPHILLA, a closely related species. Taxonomy confused! So this statement contradicts what is on the map.

18-4 3. On page 2-38 of the Livestock Forage Condition map, it shows all of the Applewhite Allotment, except the Meadow Valley Wash area, to be in "fair condition". Yet the grazing is being cut 100%.

18-5 I feel that due to over half of the Applewhite Allotment being in the 8 to 16 inch precipitation area, page 2-2 on the Average Annual Precipitation map, due to the slope factor being in error and due to 3 vegetative treatment plans being proposed along the fence line of this allotment, page 1-32 on the Range Vegetation Treatment map, the Applewhite Allotment should be considered for vegetative treatment. Especially since the terrain on one side of the fence is the same as on the other side.

Even though some operators may possibly benefit by the year 2015, we most certainly will not, as you can only recover nothing from nothing!!!

Thank you for your consideration.

Sincerely,

Lavette Tennille

-2-

must be confused. There are also errors in the acreages of the private lands in some of the allotments. These errors show that the data collected in this E.S. Statement contain many falsehoods, probably due to the extreme rush to prepare this statement to meet a deadline.

19-5 I believe that the Applewhite Allotment should have a perennial - ephemeral classification. There are many annuals in the lower elevations. I have several pictures of these at home. Also I believe that the Applewhite Allotment should have range developments. It is not right to have an area as large as this to be cut 100% with no future chance of ever regaining any use. There are several areas in this allotment that could be developed. The Range Vegetation Treatment map on page 1-32 shows three proposed range developments in the Oak Springs Allotment, bordering the fenceline between these allotments. The topography is similar on both sides of the fence. The map on vegetation page 2-30 shows the majority of the Applewhite Allotment to be in the pinyon-juniper belt, as are most of the surrounding allotments. On page 2-33 the pinyon-juniper belt is described as; "This community lies between 5,000 and 7,000 feet, and receives between 10 to 18 inches of precipitation a year. The community forms a belt between the desert below and the true forest above. Precipitation is the first and soil shallowness is the second limiting factor." This statement should establish the fact that the Applewhite Allotment has plenty of precipitation and ample soil depth to establish a good range revegetation program.

I sincerely hope that these comments will be thoroughly reviewed. The range cuts and the absence of any future developments would ruin my ranch as to being a viable operating unit.

Thank you.

Sincerely,

James B. Tennille

19

July 10, 1979

John Boyles
District Manager, BLM
P.O. Box 5400
Las Vegas, Nevada 89102

Dear Mr. Boyles,

I wish to protest the 100% cut in the Applewhite Allotment. I also wish to protest the lack of any proposed future developments. I believe that the data the BLM used to arrive at their conclusions are inaccurate. Their figure of 20,265 acres, which is 67% of the Applewhite Allotment, as consisting of 50% or greater slope is in great error. I have the 7.5 minute U.S.G.S. Quad maps that contain the Applewhite Allotment. By carefully scaling the maps and shading the areas
19-1 of 50% or greater slopes, I have arrived at a completely different figure. My computations for the 50% or greater slopes were 26%. A difference of 41%. In a letter I received July 7, 1979, from Mr. John Boyles, he stated that the slope determinations for the Applewhite Allotment and all the other allotments, were obtained with the use of abney hand levels. It would take thousands of readings with these hand levels to arrive at an accurate figure in the Applewhite Allotment alone. The use of 7.5 minute series U.S.G.S. Quad maps is vastly more accurate. Mr. John Boyles also gave me the locations of the toe pace transects. He could only give the location of these tests as to the section they were in. It is impossible for me or anyone else to check the accuracy of these tests, if the exact locations aren't known. By plotting the sections, that the toe pace transects were taken, onto my maps, I find that four were taken outside my allotment. Six others were taken in Rainbow Canyon, which is narrow and has a highway, a creek, and a railroad in it. Two of these 6 tests were taken in sections 2 & 3, T 5 S., R 6 6 E. These sections are where my ranch is located in Rainbow Canyon. My private property in these two sections take up all the bottom land except for the rail road and highway right of ways. The only place left in these two sections to take a test would be the rock walls on each side of the canyon. Two other tests were taken in adjoining sections
19-2 next to Rainbow Canyon. The vast majority of the Applewhite Allotment was never tested. These tests are supposed to be representative samples of the range. There is no way they could be representative of the range and be taken in these places.

19-3 There are numerous errors in the Caliente E.S. Draft. The present season of use in the Applewhite Allotment, shown in table 1-3, page 1-41 in the Caliente E.S. is May 1, to October 31. This allotment is licensed year long and always has been. The Threatened and Endangered Flora map on 2-41 of the Caliente E.S. shows 1 endangered and 1 threatened species in the Applewhite Allotment. On page 10-9 it says of the endangered species, "this species is only known from Ash Meadows in western Nevada. It is most likely a related species common to the area and that the
19-4 taxonomy is confused." On page 10-9 it also says that the threatened species, shown on the map, occurs at 2,000 to 2,500 ft. elevation. The lowest point in the Applewhite Allotment is 4,000 ft. This plant also

566

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, Ca. 94105

Project #D-BLM-K65032-NV

E.I. Rowland
State Director, Nevada State Office
Bureau of Land Management
Room 3008 Federal Building
300 Booth Street
Reno NV 89509

JUL 10 1979

Dear Mr. Rowland:

The Environmental Protection Agency (EPA) has received and reviewed the draft environmental impact statement (DEIS) titled PROPOSED DOMESTIC LIVESTOCK GRAZING AREA FOR THE CALIENTE AREA.

The EPA's comments on the DEIS have been classified as Category LO-1. Definitions of the categories are provided on the enclosure. The classification and the date of the EPA's comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed action and the adequacy of the environmental statement.

The EPA appreciates the opportunity to comment on this draft environmental impact statement and requests three copies of the final environmental impact statement when available.

If you have any questions regarding our comments, please contact Betty Jankus, EIS Coordinator, at (415)556-6695.

Sincerely yours,

Deanna M. Wieman, Acting Director
Office of External Relations

Enclosure

EIS CATEGORY CODES

Environmental Impact of the Action

LO--Lack of Objections

EPA has no objection to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER--Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to reassess these aspects.

EU--Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

Adequacy of the Impact Statement

Category 1--Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2--Insufficient Information

EPA believes that the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3--Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement.

If a draft impact statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make such a determination.

21

July 16, 1979

District Manager
Las Vegas District
Bureau of Land Management
P.O. Box 5400
Las Vegas, Nevada 89102

Dear Sir:

In response to the Caliente Environmental statement and the proposal livestock grazing management program, I take this opportunity to make the following comments:

I recently purchased my grazing rights in the Terry allotment. I have grazed cattle there for the past 7 years. It is my opinion that this area is not in a downward trend but rather the range is improving. In the past two years the perennials have been rested because of the abundance of annual plants. Almost every year there are some annual plants for livestock to consume. There are no apparent A.U.M.'s being allowed for these annual plants. The proposed reduction on the Terry allotment is 96% for me, or from about 230 head to 12 head. I have never had such an economic slap in the face. It's proposed to take away 1,308 A.U.M.'s. At a rate of $20.00 per A.U.M. "Conservative" $26,160.00 of grazing permits are being taken from me, on this one allotment. I can't live with this. 21-1

My base cow herd is 500 head, when you take away 218 head of winter range that makes 218 head of summer range of very little value. I paid $300.00 a unit for the summer range this amounts to $65,400.00 of summer range I can't vitalize. The A.M.P. proposes that I run with Enterprise in the summer. This I don't need because my cattle summer on the Dixie National Forest.

Somehow there has got to be some A.U.M.'s allowed for annual plants and when they are not there the cattle could then be removed. This would seem more equitable to the livestock producer. Most years the annual plants are available. When they are not, the cattle could then be removed in the Spring months.

-1-

When annual plants are available it is rediculous to remove cattle the last 2 months in the Spring on these effemeral ranges. However, some base permit has to be allowed in order for a livestock man to maintain his base herd. 21-2

Sincerely,

Dennis Iverson

DI/gl

cc: Jake Garn
Orrin Hatch
Dan Marriot
Jim Santini

567

Post Office Box 1188
Elko, Nevada 89801
July 14, 1979

Pine Creek Ranch, Nye County

District Manager
Attention: ES Team
Bureau of Land Management
Post Office Box 5400
Las Vegas, Nevada 89102

Re: Pine Creek Ranch/McCutcheon Spring Allotment
Las Vegas: 1608.2 (N-050)
Ely: 4115 (N-048)

Gentlemen:

As supporting comments to my oral testimony at the July 10th hearing in Caliente, I submit the following:

I am a dedicated rancher, patriotic American, full time tax payer, responsible citizen and a para-professional member of the legal profession. My observations of the McCutcheon Spring Allotment are:

A. Year Long Use of the Allotment Should be Restored

1. The absence of cattle for nearly four years, except for the usual strays and herds driven through to other allotments, has permitted an excellent stand of grasses to return throughout the allotment and particularly in the lower country. Such grasses must be utilized by cattle during the period of highest nutrition and palatability.

2. Contrary to the concept adopted by the BLM that self-seeding ranges are the most efficient, I propose that the best ranges in the western United States are those which are seeded as a result of the feces of traveling cattle. Overgrazing due to numbers in excess of any given range's carrying capacity is a separate and distinct problem and should not be confused with perennial use of a well managed range.

3. The present recognized source of water on this water-base allotment is McCutcheon Spring, upon which spring this writer has a perpetual lease. This is a good producing year 'round spring situate in approximately the middle of the allotment.

4. In addition to the above mentioned established source of water, there have been located since June 14, 1979, three additional sources of water, the permanency of each of which has not yet been determined.

(i) One such source of water is a spring which appears to be as productive, if not more so, than McCutcheon Spring. I have filed on this spring recently with the request that it be called "Carter Spring". It is situate in Section 9 to the Northwest of McCutcheon Spring.

(ii) There is a seep-spring in the mountains Northeast of McCutcheon Spring on which I intend to file a claim within the next few days.

(iii) From the BLM maps furnished to me, Davis Creek comes through a portion of the allotment in the far Northwest corner. I confirmed this yesterday. I have hearsay information from neighbors that this creek runs from the time of the spring runoff through approximately August of a "normal" year.

B. Additional Waters Should be Developed

1. The elevation and vegetation variances on this allotment permit year long use. The development of permanent waters in several places would:

(i) Assure proper and maximum movement of cattle to all areas of the allotment.

(ii) Permit a present increase in AUM's at least to the number anticipated in the year 2015, i.e., 612.

2. This writer and her husband, who is a licensed contractor in Nevada and the owner of heavy equipment, are ready, willing and able to develop one or more water wells commencing with a well in the location of priority.

3. I strongly object to the "red tape", Section 4 permits, signing and submission of voluminous paper work which accomplish nothing on the range for the betterment of cattle, wildlife or the land itself. I have been told by the BLM that the paper work alone, if I pay all costs involved in the development of a water well, would take between six months to a year for clearance.

C. Asking for Nothing

1. We are not people of great wealth. We are self-made individuals with considerable means. We have worked very hard and deliberately to amass some land holdings which we love. We subscribe to the theory if we pay for something ourselves, as opposed to asking for a handout, it will have a direct bearing on taxation and inflation and will spare the tax-payers the burden of meeting an obligation on our behalf. It is cumbersome, inefficient, wasteful and selfish of the BLM to require a "waiting period" for the granting of a permit to someone who wants to accomplish something constructive and is willing to do so on land not even owned by that individual, but is in fact "public land".

In conclusion I shall add the following general comments:

I believe in abatement of the bureaucracy in our country and return to States' rights. I believe the Bureau of Land Management, et al, holds lands contrary to the dictates of The Constitution of the United States of America. At this point in time I have no alternative but to appeal in this letter for more liberal and reasonable policies on the part of the BLM with its lessees who are responsible and desirous of making a constructive contribution for the betterment of the land.

Mankind's primary instinct is survival. We need red meat for survival and lots of it because of our growing population. We need the lands far and wide for efficient production of range cattle with a production cost affordable to the consuming public. We have no greater source of protein to offer the nation's people than our ranch raised beef. Also incumbent upon this generation is the preservation of the cattle industry itself for future generations and the perpetuation of the very finest way of life.

BLM needs more resourceful people in the field and fewer behind the desks.

What will we have if we take the land away from the cattle people, or reduce the rancher's livelihood to an intolerably low or non-existent income? We will have, in part, an under-nourished world, the end of one of the greatest eras in American history, intentional abuse beyond present conception of the land and its resources by the public far greater and more detrimental than any caused by the cowmen and their cattle.

Recommendation: Make other "cuts" -- in budgets, personnel, red tape, environmentalist activities -- but do not cut the resources of the cattlemen by reducing the number of beef on the hoof on the ranges of the West. Work with the cow people and not against them and the rewards will be amazingly gratifying to all concerned.

Respectfully submitted,

Carole Carter

CAROLE MARSH CARTER

cc: Messrs. Terry Sodorff
Wayne M. Lowman

23

United States Department of Agriculture — Soil Conservation Service

P. O. Box 4850
Reno, NV
89505

July 16, 1979

Mr. John Boyles, District Manager
Bureau of Land Management
P. O. Box 5400
Las Vegas, NV 89102

Dear Mr. Boyles:

In addition to our previous comments, we would appreciate the opportunity to add the following three items:

1. We understand the situation with the need to meet deadlines imposed for this ES. However, we encourage an effort to tie your inventory to soils and range sites so that range condition can be based on potential rather than ocular estimates of the present vegetation. 23-1

2. We encourage use of intensified grazing management systems accompanied by sound range improvement practices. Grazing management systems should be flexible and operators should have input in their design. We encourage use of deferred-rotation systems, where each grazing unit may be grazed during some period of the year but no unit is grazed the same time in successive years.

3. There is concern about the social and economic constraints that may result from the proposed actions. There is concern that adequate lead time be allowed for the proper development of the base property to increase forage production. This will need to be done with a minimal loss of the basic soil resources.

GERALD THOLE
State Conservationist

cc: Norm Ritter, State Resource Conservationist, SCS, Reno, NV
Jim Doughty, Range Conservationist, SCS, Reno, NV

page two 76
John Boyles
July 13, 1979 certified letter 464425

Chapter one continued

page 1-9 #3-c

It seems this page is awfully brief for the impact these few short sentences will have on most of Lincoln County residents.

c. This subsection should contain schedule of when, how, what, the basis for utilization studies. 24-1

d. What are you proposing for improved working relationships?

e. Establishing a 4-1 to 5-30 proper period of use is harmful to user, range (fire hazard left by non-grazed annuals), and could be better addressed by establishing rest rotation systems.

Page 1-17 final paragraph

It would make more sense if you would scale down the reductions over the next three years working toward the idea that some range improvements may be accomplished in that time frame and the cuts therefore would not be necessary.

Page 1-21 middle first paragraph

These five current AMP's are your own work. This indicates to me AMP's are not doing the proper management job if something you set up yourself has to be revised. The operators in this area should not have to stand the cuts on a bureau system fault. 24-2

Page 1-26

(2) Doesn't this book serve this purpose? 24-3

(3) I think these inventories should be done before any cuts administered. Otherwise how do you properly and accurately establish basis for manipulation? 24-4

Page 1-28

These recommendations are very good. Additional areas are very suitable and more acreage could be beneficially included in the proposed manipulations.

Page 1-36 final paragraph

Ear tags - No ear tags should have to be changed at operators expenses. The first set were detrimental enough. The program doesn't work and this re-tagging recommendation of yours only serves to amplify that fact.

24

Connie Simkins
P.O. Box 333
Panaca, Nevada 89042
July 13, 1979

Mr. John Boyles, District Manager
Bureau of Land Management
Box 5400
Las Vegas, Nevada 89102

Certified Letter Number 464425
Mailed at West Glacier, Montana
Friday morning 11:00 a.m. PDT
July 13, 1979

Dear Mr. Boyles:

The following comments are made in addition to and support of the oral presentation I gave at theBLM formal public hearing held on Tuesday evening, July 10 in Caliente. Please review and consider my suggestions.

General

The printing and clarity of this document is to be commended. It is a big improvement over the MFP II. I was encouraged to learn you had printed twice as many of the draft ES as of the MFP II. I believe this shows you are beginning to realize how important this assessment is to Lincoln County and that the people here are interested and do wish to participate in the review of your proposals. It would have been helpful if you could have made available more copies to the general public. I requested 12 for my office. On the spot I received 6 which were all distributed the following day. The second six did not arrive until Monday, July 9.

Summary page at beginning of book (no numeral or number)

3. Cultural resources - I do not believe construction or livestock contribute significantly to the loss of artifacts. Your city dudes are the cause.

Livestock grazing reductions - How many of us whether federal bureaucrats or private work force can wait until 2015 for a raise or significant business investment return??? Your proposals spell disaster for several operators.

Chapter One

Page 1-3 final paragraph third sentence

If by this you mean "resolved" from specialists recommendation to area manager's recommendation, you would be somewhat correct but as it reads to me, it indicates you used the public comment which we both know to be false.

Please be advised here that I intend (as I said at the hearing) for my comments to be based on the LCCD committee reports. These comments are in addition and from my own view point. Several things I will not make separate comments on in this letter for convenience such as wild horses, state parks, etc. My opinion here is exactly what was in the LCCD report. Please continue with this in mind.

page three 76
John Boyles
July 13, 1979 certified letter 464425

Chapter 2

Wildlife Habitat Area fold out map between pages 2-56 and 2-57

The map I believe to be accurate. I wish to submit here that the reason the desert tortoise general range is the size and location it is - is because that is where nature intended him to be. His diet, the temperature, growing season, soils, and other factors in his ecological system are found in this area and not further north. He is "where God intends him to be".

page 2-57

review my oral comments on this page re:turtles. I strongly object to basing your proposals on such wording as "information is lacking", "assuming","habits unknown," "change,,,is probably", etc. Get facts or don't recommend.

Page 2 -62 second paragraph

Fourth sentence is Wrong. Nat'l Mustang Assoc. never helped anyone do anything. I have first hand knowledge of most of the mustanging operations in Lincoln County for the past 35 years. The fellows that formed Natl Mustang did so to play on easterners sympathy for money to make this hobby of theirs profitable and they hoped legal. Two of the founders were and are too lazy to work legitimately.

fourth paragraph

Why wasn't a count inventory conducted in 1976? 24-5

page 2-74

reiterate my oral comment. No more land to state parks please. They have a poor track record of proper use, maintainance, and especially local relations.

Page 2-81 fourth full paragraph

I would like to know who Garrett and Mitchell are? Who do they work for? What is their formal training? What is their job experience? Who funded the study? What was the original purpose of the study? Again reiterate my oral comment - statistics can be made to say anything the author wishes. 24-6

Page 2-98 second and third paragraphs

I fully agree. Accurate description. Provides good insight into why we feel as we do.

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Charter 3

Page 3-8

Impacts on Vegetation first paragraph

I strongly object to the use of data you state was not gathered within the Caliente Resource Area. I believe this to be a serious error on your part.

Chapter 5

page 5-3 final paragraph

The only way this could have been better is to have been stated stronger. Please don't soften. I hope you expand this subject and make it more forceful. Maybe then the uninformed ones who are mandating studies like this can see what it really is doing to us and why we dislike the federal bureaus so much.

Chapter 9

Page 9-3 final paragraph

first sentence

"it is anticipated..... will be incorporated"....

It is statements like this that lead us to believe you are only going through the motions on the ES public comment solicitation. From this we get the feeling you will listen to what you want to hear and use only what you wanted to in the first place. You merely go through the comment period for the "looks" of it on paper. This opinion is supported by the fact that all the meetings and comments including those by LCCD that were developed during MFP - especially MFP II were not in the draft. I am aware you are working under a tight production schedule on this but I know printers are faster than that. I will be anxiously awaiting the final and see what "changes will be made.

Appendix E section 3 page 10-39

Range Survey

24-7 I believe the fact that exact locations are not recorded when the survey is conducted and the "representative" spots are chosen - is in great error. This could be basis for a trend study. You then would not have to redo all that work and save time and money for taxpayers. Please give careful consideration to all future range surveys.

section 5 page 10-52 final paragraph

Since p-j "would move to dominance" - by your own facts - these p-j areas should move to highest priority for vegetative manipulations to improve range and forage condition.

Appendix G Section 5

page 10-95 third paragraph

Just what do you consider "significant"? This could produce a variety of levels of incorporation into the narrative depending on emphasis and weight you attach to the various comments.

fourth paragraph

Very well done.

page 10-96 final paragraph

Good but would be more accurate if worded stronger - take out "would probably seem" - - it actually would be the case.

page 10-97

first paragraph

Ranchers and farmers self esteem would be benefitted by disposing of federal land to private use. Production would increase, more sediment control measures installed, other improvements to water and brush management, increased tax base for Lincoln County.

Page 10-98

sentence at top of page

very true. Good it is in the draft.

first full paragraph

24-8 I seriously doubt that ranchers could even think of rebuilding on any scale if cows were reduced. The calf crop is the mainstay of operating expenses. No cows = no calves = no operating capitol.

second paragraph

24-9 Way off beam. What makes you think the ranchers would consider retraining and relocation? Would you if somehow the BLM would be wiped out tomorrow?

page 10-99

first full paragraph

24-10 What community institutional structures would become more elaborate? This should be given more detailed explanation.

second paragraph second sentence.

24-11 Change "adult" to entire and I agree. As it is now, it connotates a lesser degree of involvement than is actually the case. This is our lives. Give it proper perspective and priority in this study.

page 10-100

Conclusions

second paragraph - second sentence

Change the word "believe" to realize and it would be OK Surely you can see that the federal holdings do actually restrict progress. This entire preparation of ES process has severly retarded forward movement in range improvements, etc, etc.

final paragraph first sentence

24-12 For heaven's sake , who are the "non-local groups" referred to here? This is an environmental impact statement. It should tell the impacts on our environment and not voice opinions of "non-locals".

General comments

The range survey would "hold a lot of more water" if it could be conducted on a site specific basis. Each allotment is peculiar. What is an asset in one area may not be such in another area. Some slopes can be successfully grazed without harm to soils or vegetation andothers must not be used. Site specific would be meaningful and could be suported in court.

The feeling I get from the sociology portions of the draft is that the heaviest impact is upon non- Lincoln county residents so it really doesn't matter what happens to operators in the county because it isn't enough change or damage to matter. We take great exception to this view.

It is my conisdered opinion that you developed the six alternatives in such a bold manner as to subtly suggest that your original proposal is the only sensible and therefore the most desirable of the "necessary evils". Please closely consider the alternatives I brought forth in my oral comments.

I hope when your office of budget management looks at some of these range improvement proposals that they don't "shot them down" due to the cost benefit ratio theory. When they see the reduced number of cattle which would be benefitted by the improvements, I can foresee them rejecting a project on the cost benefit of the matter.

Wow. Truly enough said. As I look over the preceding pages, I didn't realize I had this much more to say. Please contact me if you have any questions with any of my comments, whether written or the oral ones.

Sincerely,

Connie Simkins

Connie Simkins

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Natural Resources Defense Council, Inc.

[redacted]

Washington Office
917 15TH STREET, N.W.
WASHINGTON, D.C. 20005
202 737-5000

25 KEARNY STREET
SAN FRANCISCO, CALIFORNIA 94108
415 [illegible]

New York Office
122 EAST 42ND STREET
NEW YORK, N.Y. 10017
212 949-0049

July 13, 1979

E.I. Rowland
State Director
Nevada State Office
Bureau of Land Management
300 Booth Street
Federal Building
Reno, Nevada 89509

RE: Draft Caliente Environmental Statement

Dear Mr. Rowland:

I have briefly reviewed the draft environmental impact statement (EIS) on the "Proposed Domestic Livestock Grazing Management Program for the Caliente Area" of Nevada and submit the following comments on its contents.

The draft EIS reveals that a number of serious resource management problems exist in the Caliente Area. These problems include, for example, the lack of forage allocations for wildlife and wilderness (p.1-2);[1/] the production of inadequate vegetation to meet the preference and suspended AUMs of livestock operators (Id.); and grazing year-long in the absence of any established proper seasons of use. The draft also reveals that, as the result of these and other problems, the publicly-owned resources of the area have been adversely impacted. Finally, as discussed more fully below, the document does evidence the BLM's attempt to remedy these problems and improve current resource conditions. As such, it appears that a significant first step has been made in the state toward fulfillment of obligations imposed by the "Organic Act" and other statutes as well as toward implementation

1/ All page references are to the draft EIS.

75
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of the "Nevada Range Policy" promulgated by you several years ago. If, however, this EIS is to be of maximum utility in achieving these objectives as well as comply fully with the requirements of the National Environmental Policy Act of 1969 it needs to be improved in several important respects. In particular, we believe that the final version of the statement must contain expanded discussions of the MFP recommendations and elements of the proposed action, and a more pointed analysis of the environmental impacts of the proposed action in order to allow readers to evaluate independently the fundamental land-use allocations that are being proposed and the alternatives thereto.

This draft deals with a proposed action designed to "incorporate" MFP II recommendations for the Caliente Area developed pursuant to the Bureau's planning system. Unquestionably, the Bureau must explain how these actions and recommendations were devised. An adequate explanation of proposed MFP recommendations requires (1) an adequate description of those recommendations; (2) a description of the reasons underlying the basic land allocations and trade-offs which they represent; and (3) an analysis of those reasons and the adequacy of the proposed recommendations.

While the draft EIS includes a table which contains a useful summary of the MFP II recommendations and identifies the "resource trade-offs," it concedes that this table "presents [just] part of the rationale used in selecting" these recommendations. (p.1-3). Indeed, underlying reasons are identified only where the recommendations concern vegetation manipulation and then only in very general terms. Thus, for example, no reasons are given for the decision to recommend the implementation of intensive
25-1 management on the overwhelming majority of the Public Lands in the area, for the elimination of livestock grazing on nine allotments, or for the selection of the proposed season of use.

See Table 1-4, pp.1-44 - 1-46. The text does not supply the
25-1 missing reasons. Moreover, it contains no discussion of the major trade-offs and no evaluation of the rationales which underlie them. Finally, there is no assessment of the degree to which the proposed recommendations will serve as an adequate basis for future management. In the absence of such information and analysis, readers of the EIS can neither fully understand nor fully evaluate the basic allocation decisions with which it deals. Since the primary reason for the Bureau's decision to prepare EIS's prior to AMP development was to allow such evaluations to be made, we submit that the final statement must contain a much more detailed explanation of the MFP recommendations.

As indicated, we also believe the final statement should include a more detailed discussion of the proposed action and its environmental impacts. The proposed action consists basically of four major elements: (1) the allocation of forage to grazing ungulates; (2) elimination of year-round grazing; (3) improved livestock distribution and forage utilization through implementation of intensive grazing management systems and associated range improvement; and (4) mechanical manipulation of vegetation. See pp.1-4 - 1-9. The draft predicts that, as the result of implementing the proposed action, widespread benefits to the resources of the Caliente Area will occur.[2/]

2/ The draft predicts that approximately 1,000,000 acres of
25-2 land will go from "poor" to "good" range conditions as the result of the proposed action. (Table 8-55, p.8-121.) However, the criteria for these condition classes are not supplied. We have previously pointed out to the Bureau that the criteria utilized in connection with other EIS's have been artificially designed and result in the assignment of lands to higher classes than would result through application of the SCS criteria. If the same or similar criteria were used in connection with this EIS, the predicted improvement in "good" condition range may be less substantial. Moreover, current range conditions may be worse than the draft indicates.

It is likely that many of the discrete actions proposed by the Bureau will, in fact, have beneficial results. For example, eliminating year-round grazing will unquestionably eliminate the adverse environmental impacts such grazing is currently producing, while excluding livestock and wild horses from certain riparian areas will protect the critical values associated with those areas. Similarly, the allocation of forage to big game animals for the first-time ever will undoubtedly benefit those species. The proposed reductions in grazing use should also have a beneficial impact upon the resources involved. However, we are concerned about the bases for, and/or environmental consequences of, other elements of the proposed action, including the recommended increases in livestock allocations, the recommended reliance on intensive management and the associated range "improvements."

The proposed action contemplates increasing livestock forage allocations in 1980 in 19 of the recommended allotments. (Table 1-7, p.1-8.) Some of the increases are very substantial. For example, 3 allotments are being increased more than 400% while 6 are being increased between 100 and 223%. (Table 1-3, pp.1-40 - 1-43.) The proposed forage allocation for a number of these allotments is more than their present authorized livestock use.

The proposed increases suggest that a substantial amount of forage in the area is under-utilized. It is, of course, surprising that the area's livestock operators, who are described as priding themselves on being "sensitive and responsive to changing range conditions," (p.10-96) are not using this forage. Although the draft indicates generally that under-utilization in the Caliente
25-3 area is the result of lack of water and fences, it provides no site-specific explanations for the proposed increases and no environmental analysis of the impacts that will result therefrom.

25-4 If, in fact, forage is being under-utilized in the allotments involved for either or both of these reasons, then construction of

needed facilities must precede the licensing of additional livestock in order to avoid adverse environmental impacts which would otherwise inevitably result. While Table 1-9 indicates that many
25-4 of these increases, including some of the most significant are dependent upon such facilities, (pp.1-29 - 1-33), the draft provides no assurances that these facilities will in fact be implemented prior to 1980 when the increases are scheduled to take effect. Indeed, it clearly suggests that they will not be in place by then. Thus, the statement indicates that implementation will not take place until after AMPs are developed[3] and that, with one exception, the allotments scheduled for substantial increases will not be among the first developed. See Table 1-8.[4]

Moreover, even if the facilities needed are going to be in place by 1980, this does not mean that there will be no adverse environmental impacts from the proposed increases. Indeed, increased livestock use of areas previously ungrazed or grazed at lesser intensities may well be significant, depending on their climatic regimes, habitat values, soils and vegetative types. The draft, however, makes no attempt to analyze the impacts of increased use of any of the areas involved.

25-7 As has been the case with virtually all of the range EIS's prepared to date by the Bureau, this EIS deals with a proposal

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25-5 [3] The final statement should explain the circumstances under which it will not be "possible" to delay implementation of specific range "improvement" projects until after AMP development. (p.1-25).

25-6 [4] The EIS contains a brief summary of the factors used to establish the order for AMP development and implementation. (p.1-25). It makes no attempt to apply any of these criteria to the proposed AMPs, however. While it is understandable that this order may change in the future, this possibility does not excuse the lack of such analysis.

25-7 to implement intensive grazing management systems on the great majority of the lands in the area. (Summary).[5] Although it predicts that such management will be successful,[6] it ignores evidence that suggests it may not be.

The draft reveals that intensive management has already been tried on a limited basis in the area. Even on that basis, however, such management has "been less effective than expected." (p.2-72). Past systems have been too complex "as to be almost impossible to follow," have been improperly supervised or have
25-10 allowed too much flexibility. (Id.) The proposed action contains no acknowledgment of the past problems involving AMPs and no

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[5] Although it is clear that the proposed action contemplates intensive management systems, the draft discusses only possible grazing treatments and their impacts. See, e.g., pp.1-21, 1-25. No specific systems are even named. However, the
25-8 draft clearly suggests that primarily reliance will be placed on the rest-rotation system of management. (p.1-21). The Bureau has been widely criticized in the past for its apparent belief that this extremely complex and expensive system is a panacea for all range problems. The ecology of these desert ranges, their droughts and the lack of any studies which address the effects of rest-rotation on such ranges, suggest that it would be difficult to substantiate any predictions that significant resource improvement would result from implementing the system in the Caliente area.

In any event, the fact the specific AMPs have not yet been developed does not excuse the Bureau from discussing the grazing system(s) that may be created using the possible treatments and giving some indication of the way in which those systems will be applied.

25-9 [6] We could find no point in the draft at which the benefits of management were specifically identified and separated out from those attributable to water development and vegetative manipulation. Although it may be that this figure can be calculated using the information contained in the statement, it should be supplied by the Bureau.

25-10 safeguards designed to ensure that they will not occur in the future. Without such safeguards, it is likely that these problems will, in fact, reoccur, even assuming that the systems ultimately selected are carefully tailored to the resource conditions of the allotments involved. Yet, the environmental analysis does not consider any of the impacts which are likely to result from the lack of safeguards.

The proposed action also recommends great reliance on range "improvement" projects, including, in particular, vegetative manipulation projects and water developments. Extensive vegetative manipulation projects, especially pinyon-juniper chainings, are proposed. The recommended chainings will apparently be used in order to create wholly new livestock ranges on certain parts of the study area. See, e.g., the proposals for allotments 65 and 68. The draft predicts that not only livestock, but also soil vegetation and wildlife will benefit from the proposed manipulation projects. It presents none of the information needed to substantiate these predictions, however.

25-11 For example, the EIS does not contain any of the criteria utilized to identify the allotments or areas in which such projects are being considered. It presents no information about the
25-12 potential productivity of those areas. It states that seedings will involve native species either alone or in combination with other species, but contains no information about the success of such seedings in the area under either circumstance. Other than
25-13 requiring the preservation of "islands of vegetation for wildlife habitat," (p.127,) it supplies no standards for the protection or enhancement of wildlife values in the selection and design of projects. It fails to consider relevant and applicable research
14 indicating that the benefits of pinyon-juniper for vegetative improvement and deer and watershed protection are questionable. See Tausch and Tueller, Pinyon-Juniper Chaining in Eastern Nevada.

The environmental analysis is similarly deficient with regard to the numerous water developments which are proposed for the Caliente area. In addition to benefiting livestock by allowing them to graze previously inaccessible forage, these developments are predicted to benefit wildlife, because "water is the major factor limiting most wildlife species" in the area. (p.3-19). Water developments which are associated with expanded livestock use do not always benefit wildlife, however. The implementation of such developments in critical wildlife habitat areas have often destroyed or reduced the values of those areas as the result of the introduction of livestock. Unfortunately, except for bighorn
25-15 sheep, no attempt is made to relate the proposed developments to wildlife species. Additionally, no criteria are supplied which would ensure that critical areas will be protected in the selection of project locations.

25-16 Finally, we believe that the social and economic analysis contained in the draft is totally inadequate. This analysis focusses entirely upon the impacts to ranchers and persons dependent on the livestock industry. The non-livestock values of these lands are totally ignored. While we do not question the Bureau's obligation to analyze the social and economic impacts of the proposed action on this subgroup, we believe the analysis should be revised to reflect all public values of the Public Lands in the Caliente area.

While we have several serious reservations about the draft statement, we believe that two of its features are noteworthy. First, its treatment of the financial costs of the proposed action and alternatives thereto, reflects improvement over many earlier EIS's. Thus, unlike earlier statements, this draft has adopted a time-frame for impact assessment that is related to the Bureau's historic funding problems and the enormous cost of the proposed

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action.[7] Similarly, it includes estimates of the implementation
25-17 cost of the proposed action and at least some of the alternatives. Unfortunately, it does not include maintenance costs or the cost of additional personnel. The total cost of each alternative, including the proposed action, is obviously relevant to the choice among available alternatives and should be included in the final statement.

Second, unlike many earlier EIS's, the mitigation measures identified in Chapter 4 appear to be genuinely responsive to the major adverse environmental impacts that were identified in Chapter 3.[8] As such, they are evidence of the value of the EIS process.

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[7] This action contemplates investing approximately $50./AUM of forage that will be produced in 2015. Currently, livestock operators in the adjacent Hot Desert area are buying BLM permits at $19./AUM. See Final Hot Desert EIS. The apparently unfavorable cost-benefit ratios which this disparity indicates, raises serious questions about the BLM's ability to defend this proposal and obtain the necessary funds to implement it. If not, we hope that the Bureau will nonetheless fulfill its responsibility to protect the fundamental resources of these lands.

[8] Only one mitigation measure is designed to minimize the economic impact of the proposed action to the ranchers involved. We suggest that the final version consider the
25-18 possibility of allocating some of the proposed increases to the affected ranchers, especially where substantial increases are involved.

Thank you in advance for your consideration of these comments. We hope that the final version of this statement will materially assist you and your staff to implement environmentally responsible management of the publicly-owned resources in the Caliente area.

Sincerely,

Johanna H. Wald

Johanna H. Wald

JHW/jt

Natural Resources Defense Council, Inc.

[redacted]

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July 16, 1979

Mr. E.I. Rowland
State Director
Nevada State Office
Bureau of Land Management
300 Booth Street
Federal Building
Reno, Nevada 89509

RE: Draft Caliente Environmental Statement

Dear Mr. Rowland:

Since sending you our comments on the Caliente Draft EIS, I have discovered a typographical error in footnote 7, page 9 which confuses its meaning. Accordingly, I have enclosed a corrected page 9 which I would appreciate having inserted in place of the original page.

Thank you in advance.

Sincerely,

Johanna H. Wald

Johanna H. Wald

JHW/jt
Enclosure:

Mr. E.I. Rowland
July 13, 1979

PAGE nine

action.[7] Similarly, it includes estimates of the implementation cost of the proposed action and at least some of the alternatives. Unfortunately, it does not include maintenance costs or the cost of additional personnel. The total cost of each alternative, including the proposed action, is obviously relevant to the choice among available alternatives and should be included in the final statement.

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[8] Only one mitigation measure is designed to minimize the economic impact of the proposed action to the ranchers involved. We suggest that the final version consider the possibility of allocating some of the proposed increases to the affected ranchers, especially where substantial increases are involved.

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July 16, 1979

Mr. John S. Boyles
District Manager
Bureau of Land Management
Las Vegas District
P. O. Box 5400
Las Vegas, Nevada 89102

Dear Mr. Boyles:

The State Conservation Commission makes the following comments and recommendations relative to the Caliente Environmental Statement.

Due to A.B. 413 of the 60th Session of the Nevada State Legislature which states that "all public lands in Nevada and all mineral not previously appropriated are the property of the State of Nevada and subject to its jurisdiction and control," we do not believe that the Bureau of Land Management has the right to determine the management program for the "States" land.

However, for the purposes of the draft document the following inputs are made.

Management Alternatives Based on Assumptions

26-1 The basic data from which proposed decisions are based was developed from assumptions. One example is that livestock removal will result in more forage. Scientific study however, shows that some plant species must be "trimmed" for optimum growth and others utilize the movement of hooves for "planting".

Another assumption is that the removal of livestock will reduce soil erosion. Again studies have shown that the removal of Pinon-Juniper and Sagebrush, followed by reseeding with desirable grasses and shrubs teamed with proper grazing will reduce soil erosion and protect the watersheds from accelerated runoff. The removal of livestock alone will not reduce soil erosion significantly.

Range Survey Reliability

26-2 The data base for the range survey was of such a short duration (1976-77) that the statistical reliability of projecting up to 35 years into the future is highly suspect. Elevation, growing season, native vegetation, percentage of the various species of existing forage, precipitation, grazing tend over the past several years, and range and water impoundment improvements must all be evaluated on each allotment.

Suitability Criteria

26-3 The 50% slope appears to be a very arbitrary criteria. The undulating slopes of the land are ever changing in degree, direction, and magnitude. It is physically impossible for a range manager to "eyeball" and determine the precise slope. Furthermore, livestock utilize slopes of greater than 50% for grazing, and as they pass through to other areas.

26-4 The 4 mile radius for cattle to graze from a water source is also very subjective. Time of year, altitude, temperature, and natural sources of water such as snow could cause cattle to exceed this criteria significantly.

We are deeply concerned by these and other statements addressed in the Caliente Environmental Statement. We all know that the range ecosystem has been neglected in the past, however, the best way to tap the potential productivity of the rangeland resource, both private and public, is a commitment both in economic as well as planning resources. The working relationship between those two sectors must be improved. Based on the information derived by the ES proposal, we do not believe that the proposed action is in the best interests of the people or the resource. With this in mind, we recommend the following:

Recommendations

1) The designation of 2 wild horse management areas. These should be established for ease of access to the public and of sufficient size for the true managment and public enjoyment of wild horses. Livestock grazing should be prohibited within the two allotments. Wild horses should therefore be removed from all other allotments.

2) Data base be expanded so that management decisions can be made on established facts and not on assumptions based on limited data.

3) A commitment for the establishment of coordinated planning of public and private lands. This will necessitate forging new working relationships with all land managers for the improvement of the total rangeland habitat.

4) Maintain present livestock grazing aum's until factual data can be provided to alter those numbers. Meanwhile, every effort should be explored to affectuate the improvement of each allotment.

5) A commitment to address rangeland conservation and management needs on a high priority basis---beginning now.

6) Strengthen rangeland research programs so that all range uses can be blended together in a more prosperous manner.

7) Receptiveness to listen to and accept for consideration local suggestions regarding policies, programs, and practices for achieving objectives in the interest of the improved productivity and protection of rangelands.

8) A financial commitment to begin revegetating critical areas on a priority basis. Improvements should include the removal of Pinon-Juniper and Sagebrush by selective harvesting, chaining or burning and reseeding with desirable grass and shrub species suitable for wildlife, livestock, and for the prevention of soil erosion.

We trust that these recommendations will be given strong consideration in developing the final environmental statement. If we can be of further help, please contact us.

Sincerely,

Ted P. Bendure
Executive Secretary

TPB/bb

cc: Roland Westergard
Bob Hill
Ed Rowland

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July 18, 1979

Mr. E. I. Rowland, State Director
Bureau of Land Management
300 Booth St.
Reno, NV. 89509

Dear Mr. Rowland:

This is a belated response to the Caliente Environmental Statement: Proposed Domestic Livestock Grazing Management program. The Caliente statement is the first to be done Nevada and thus sets the stage for both agencies and citizens of what might be expected in the following statements. The Bureau in its Multiple Framework Plan and EIS has a doubly hard job in that many Nevadans are generally unaware and often resentful of planning. The degree of public support BLM experiences with these initial EIS's will either smooth or make more difficult planning by other agencies and levels of government.

In this regard the socio-economic information is excellent. It is far more thorough than the counties or the state itself would or could do. Since rural communities are a resource in themselves and are affected by public land administration, the inclusion of such information is a valuable asset for those who review EIS documents. As a conservationist I appreciate having that information while I review alternatives and their implications.

The natural resource portions were less complete and less well-integrated. Wildlife cannot be treated as a single entity as needs of species vary. It is important to know which types of species are being served by AUM reductions or improvements. Because of this, those of us concerned about wildlife cannot feel the resource received the consideration it deserved.

The EIS brings up a number of questions:

1)If the Bureau is proposing to double livestock AUMS on lands that have historically been marginal for livestock (as indicated by the need for water-based permits, nonranch jobs, and economic losses) what types of proposals may be anticipated for those ranchers who are totally dependent on their ranch income for survival?

2) If the Bureau is willing to consider spending over nine million dollars for 74 operators many of whom are marginal operators, what are will be the expenditure requests proposed on other EIS's? Since Congress cannot be counted on to allocate funds, what is the probability of implementing competing requests for funds?

3) If BLM is willing to reduce a sensitive species like the bighorn sheep, whose needs have been well researched and whose future is the concern of conservationists, sportsmen, and wildlife agencies, what will happen to the lesser known nongame animals on Caliente and elsewhere in Nevada, most of which were ignored altogether in the EIS?

27-1 4) What will be the maintenance costs on these range improvements particularly the fencing? How long can they be expected to last if no maintenance funds are available?

5) The EIS requests interest groups to express faith in the agency's ability to implement the plan. To establish credibility the agency should implement in the plan in incremental stages with reductions of wild horses and livestock coming first.

27-2 6)The EIS should address allocation of forage in three stages. First is the allocation of forage for 1980 and the improvements that can be made with existing funds. The second phase should cover a five-year span and describe those range improvement projects, including alternatives, and their beneficiaries based on assured funding. The 35-year year projection is the agency's "wishbook" and is surely contingent upon the availability of extra funds. The public should be given the choices and the opportunity to prioritize projects.

No one can predict what will be occuring in 35 years. At this point it is most important to know what the choices are and to develop a process for decision making. It may be that 15 years from now wild horses or mule deer will be the most cost-effective meat producers, particularly if ,as is happening throughout Nevada, the private lands are developed. Perhaps the highest and best agricultural use of private lands will be vegetables or grains.

7) The EIS places a heavy emphasis on ameliorating the adversity and marginality of Caliente ranchers. The cultural value of small communities, including their regional variation so well described in the EIS, and of the rancher's role in that community is becoming recognized but nine million dollars worth of improvements seems improbable.

27-3 There is a presumption in the EIS that rancher financial health is equivalent to community health. This is not necessarily so. Private open space lands are taxed at considerably less than developed lands and thus contribute far less to the local economy. Furthermore, no commercial livestock will be taxed after 1983. It is unclear how much money therefore the ranchers bring into the county versus how much they take out by having to make purchases elsewhere. The State has made clear, by legislation such as the greenbelt law and including livestock under the inventory tax exemption, that county income is not their concern. Therefore the Bureau need not dislocate or reduce the potential of other resources out of a concern for county income.

Conservationists generally support the continuance of ranching because of its contribution, however minimal, to food production, providing at least a partial contribution to the maintenance of public lands, and being a way of life incorporating both cultural and economic benefits. However, from a county perspective ranch lands may be tying up valuable land and water resources which could more profitably be used for some other purpose. Is BLM by proposing to underwrite range improvements and thus maintaining the status quo of the community in effect stifling creative innovation of community members to develop new income sources?

8) If the purpose of some of the range projects is to offset the AUMS lost in 1980, this is should be made clear. Some may oppose new AUM's going to livestock but not oppose providing alternative AUMS for those who are being reduced.

27-4 9) The discussion of wildlife values is keyed into bighorn sheep, pronghorn, and mule deer. Since all three are game animals, wild horse groups may justify opposition to the proposal based on their criticism of sportsmen's groups and wildlife agency's desire to maximize "target" species. If a short description of how each of these species relates to nongame animals were included, then the value of maintaining the game species would be more clearcut. Similarly wild horse and livestock presence along riparian areas, inparticular, could be described in terms of how it affects nongame species such as native fish, nesting sites, and food sources.

27-5 10) It is not clear what the optimum wildlife populations of the three key wildlife species, or other game and nongame species, might be. Is 17,000 AUMS the optimum wildlife consumption need? If not, what is the justification for providing less to wildlife? For those improvements proposed how does BLM plan to ensure that these projects will not be co-opted in total by livestock as they have been in the past? If riparian protection is proposed, what is its priority in relation to range improvements?

In the final EIS these 10 areas must be addressed and integrated into the final document. A summary statement of approximately 10 pages describing the proposal might have been useful in the draft and will be in the final EIS to avoid misunderstandings or the asking of already answered questions. It is difficult to integrate the MFP and EIS and be assured that information in the former has been incorporated into the latter. The chart on page I-6 presents a picture which suggests that despite extensive legislation over the past weven years which has expanded the agency's responsibilities, BLM still feels most comfortable with a livestock mission.

Sincerely,

Tina Nappe

Tina Nappe
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July 13, 1979

Mr. Ed Rowland
State Director
Nevada State Office
Bureau of Land Management
Federal Building, Room 3008
300 Booth Street
Reno, NV 89509

Dear Mr. Rowland:

We have reviewed the Draft Environmental Statement, Proposed Domestic Livestock Grazing Management Program, Caliente Area, and would like to offer comments for the consideration of the Bureau and for inclusion in the "Public Comments" section of the Final Environmental Statement.

This submission includes comments on the proposed action, suggestions for improvement of the Final ES, and a set of recommendations for modification of the adopted plan.

The Caliente Area is of particular interest to us for several reasons, a number of which form the basis for our comments. These reasons are:

(1) NORA has surveyed Lincoln County in past years, and this interest continues today. Applicable sections of the Lincoln County chapter, Nevada Outdoor Recreation Resources - Index and Survey document primitive, recreational, and critical-feature values of public lands within the ES area. Much of the survey work, accomplished prior to FLPMA passage, will gain in importance as the wilderness review proceeds and Areas of Critical Environmental Concern (ACEC's) are documented.

(2) The Caliente ES is the first such document prepared in Nevada.

(3) The ES area encompasses a steppe-desert transition (Great Basin-Mojave Desert) and contains

** IN MEMORIAM **
(NORA Founders)
nner L. Evans, ...ess, Nevada
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a rich intermingling of floristic elements, vegetation communities, and, we suppose, birds and mammals. The unusual qualities of this large-scale ecotone have received scientific attention, most notably in the paper published in Intermountain Biogeography (K.T. Harper and J.L. Reveal, eds., Brigham Young University, 1978), by Dr. Meyer of UN-Las Vegas.

(4) The ES area is contiguous to, or shares characteristics with, the Dixie and Kingman Resource Areas, both of which have undergone the ES process in a nexus of controversy about grazing of fragile habitat, incursions on tortoise and bighorn, livestock reductions, and challenges to the efficacy of planned land treatments and grazing systems. The Caliente ES should reflect hard experience gained during those two prior efforts.

(5) The proposal and alternatives provide for explicit allocations of forage to wildlife under a criterion of "reasonable" numbers.

(6) Repeated mention of Lincoln County as one of the main sites for the Missile-X installation injects considerable uncertainty into the planning process. Whether it's acknowledged as such or not, the Final ES will be a baseline document for what may be an extraordinary amount of change in the socioeconomics of the area and the viability of ranching. The schedule of MX construction, deployment, and decommissioning is quite coincident with the time frame of the proposed action, to the year 2015.

(7) Some unprecedented changes in livestock numbers are planned for many allotments; some will be retired while others will see as much as three times the number of permitted livestock they support now. NORA is interested in tracing how the reductions and increases affect individuals and firms, and in seeing that the necessary adjustments are upheld on behalf of land recovery, wildlife needs, and relief of over-used areas.

The discussion below outlines our particular concerns, preparatory to recommendations for changes in the ES and the adopted plan.

The proposal invcolves spreading livestock onto nearly 500,000 acres of lightly-used or unused range, in order to obtain increased forage and to relieve bottomlands, level areas, and over-concentrations. This should be done with extreme care, in view of the documented impacts of livestock brought onto remote ranges by new water sources. ES writers will recall the concerns voiced by wildlife interests about the Cerbat-Black Mountain ES. We concur with those who express concerns about bringing livestock onto new range, and we suggest some measures to alleviate potential harm.

28-1 The ES states that there are to be more AUM's for wildlife, explicitly allocated, but no increase or modest increases in wildlife numbers. Reference to a "Reasonable Numbers Methodology" cannot quell value questions about how much wildlife is desirable in 2015, particularly when the Bureau intends to increase forage capacity for livestock by about 50%. Reductions in desert bighorn numbers, most pointedly in the Mormon Mountains, are unacceptable.

28-2 The heavy reliance on mechanical treatments, particularly in the northeastern part of the Area, brings to mind the many reservations that have been expressed, and documented, about benefits. In the aggregate, benefits to wildlife and watershed of pinyon-juniper chaining have been shown to be indifferent or even slightly negative. The research on land treatments in eastern Nevada, for instance the work of Tausch and Tueller, should receive interpretation in the ES as well as adoption in project plans. These authors state that p-j projects on the xeric aspects-south and southwest-are best for deer needs; does this square with project planning for livestock forage?

28-3 In the Caliente ES, as in others we've seen, there is no mention of reference and comparison areas in descriptions of the existing environments, monitoring and evaluation, description of the action, and mitigation sections. Natural areas are a long-standing concern of NORA's, and we point out their value in practical range management. There's no sign in the ES that comparison areas will be set aside and used, or that ES writers and field personnel sought such areas and attempted to use them in accord with BLM directives.

The ES presents a complex picture of the allotments and the proposed changes therein (e.g. Table 1-3), and other sections reveal that many operators utilize more than one allotment, that a number of operators have primary reliance on forage outside the Area, and that ranching is a sideline for some. The reader, be he an affected individual or a person attempting to assess how adverse reductions indeed are, is not given enough information to determine
28-4 impacts unless he has prior knowledge of who has preference on what allotment(s), in and out of the ES area. With more thorough data, the reader could discern, for Caliente at least, whether reductions indeed hurt an operator and whether increases in fact amount to much in terms of total herd sizes. We can infer from the "Social Economics" discussion that ranchers will object on principle to reductions.

Recommendations for Final ES

28-5 There should be a map of rangeland suitability (of necessity somewhat generalized), so that the reader can determine the relation of grazed and grazable range to other features, values, and resource situations. With respect to water development, for example, it would be advisable to display "potentially suitable" so that it can be overlaid with tortoise or bighorn habitat. A further subdivision of the "potentially suitable" category should be made where possible, in accord with the definition supplied on page 2 of WO Instruction Memorandum No. 78-134.

In relation to the above, please show where (a) the 491,000 acres of presently waterless range are; and b) where the grazed areas of low productivity, with no forage allocated, are, if not covered by one or more of the "suitability" categories.

Please elaborate on the nature of monitoring and evaluation, taking note of the skepticism that will be expressed about progress and the need to demonstrate improvement. Would replicability of measurements, and the use of tests of statistical significance, have use here (refer to ES's written by Susanville District for guidance)? Below, we suggest how use of comparison areas could be made. Refer to Instruction Memo 78-84, as well.

28-6 There should be expanded discussion of phenology,

with its very crucial role in determining turnout times and the specifications of grazing treatments. Granted, phenology work is not completed (and ought to be before grazing treatments and seasonal restrict-
28-6 ions are begun in earnest), but the ES should carry a discussion of how phenological data are translated into range management actions---deferral, setting seasons, rest, use of ephemeral ranges, and so forth. In view of the reliance put on shortening seasons of use, the phenology section has to be very defensible.

The use of three classes for livestock range condition, "poor", "fair", and "good", may be BLM procedure, but it prevents assessment of condition for other uses, does not reflect standard breakdowns
28-7 (e.g. SCS procedure), and omits "excellent" condition. If "excellent" condition is not acknowledged, we cannot find it on the ground or specify it as a goal of management.

After comparing condition and vegetation maps, we found that "poor" condition is largely synonymous with creosotebush and blackbrush types, not noteworthy
28-8 for their forage production or treatment potential. May one assume that they are otherwise in satisfactory condition, and that essentially no change in the acreage of "poor" condition range over the next 35 years is inevitable and acceptable?

We compliment the BLM on the lengthy, informative section on alternatives. Since there's a "feral animal" alternative (No. 3) that gives free rein to a kind of animal that nearly everyone agrees should be zoned and humanely reduced, should there be a "wildlife"
28-9 alternative, one in between the proposed action and elimination of stock, burros, and wild horses? As the alternatives stand now, wildlife is alloted a narrow range of change under all alternatives(and the proposed action) except #2, plainly an infeasible one. Why not an alternative that allots, say, 30,000 AUM's to wildlife, but not at the cost of eliminating the large graziers?

We noted above that it is not possible to discern the impact of reductions and increases on individual operators and firms. It would be very difficult to trace all impacts, because the Caliente Area is not an hermetic unit and many allotments have several preferences. A stockman with preferences in the Area can discern impacts of adjustments on his allotments and those of ranchers he knows, but most
28-10 other readers cannot. To remedy this as best we can, a table should display adjustments with reference to individual operators, firms, or families (identified anonymously, if necessary).

For example, operator "K" would be shown as running 500, 250, and 100 AUM's on three separate allotments. Displaying allocations by these allotments, grouped by preference, might reveal that, although a deep cut is to be made on one allotment, the loss is more than made up on others---resulting in no net loss to the operator.

An arrangement of data such as this is necessary, because reductions are controversial and the interested public would like to know whether cuts (say, for some "public purpose" such as bighorn welfare) are opposed on principle or for economic reasons. And, in the aggregate, one wonders what the economic impact will be,given that licensed use is well below authorized use and that the total percent change for 1980 is only minus 6%, rebounding to a plus 26% in only ten years.

Recommendations concerning the Proposed Action

The impact of spreading livestock onto"underutilized" range should be mitigated by several means: fence off
28-11 "special" plant species populations (it is not enough to assume that unpalatability will save them) and relict plant communities; provide additional waters for wildlife only; do not put livestock onto "new" range that is of low productivity.

WO Instruction Memorandum 78-84 leads us to believe
28-12 that "it is necessary to estimate the potential natural plant communities for public lands, for use in....grazing ES's, and in activity planning for various resources" (p. 1 of memorandum). Vegetation descriptions in the ES do not

reflect the concept of potential natural vegetation, but only refer to existing cover. We trust that smaller-
28-12 scale mapping and writeups will be done, and that vegetation units will reflect potential and present departure from it.

The memorandum cited above further states, "..it is necessary to identify and study comparison areas". There is no evidence in the ES that this was done in
28-13 the Caliente Area, or that it will be done as part of "Support Reqirements", for instance through fencing of study exclosures and searches for relict or near-relict vegetation of types being grazed.

Comparison or reference areas range from utilization cages set out on allotments to exclosures to research natural areas. When final guidelines are set forth, the ACEC process will help in the identification of these types of areas and of unusual range vegetation such as one would expect in this transitional area.

By the time a final ES is issued, the Las Vegas District will have completed much intensive inventory work for wilderness. It would be desirable to display strong wilderness candidates on a map (perhaps with critical-areas as well) so that the relation of land treatments to these areas can be seen. In addition,
28-14 the ES should address the compatibility of the treatments planned with wilderness management (using the guidelines for Interim Management) so that one can judge to what extent implementation of the ES will affect wilderness or similar proposals (see NORA Survey and Index). Conflicts do not appear to be great, except in the eastern Cedar Range, and would be less so if burning can be considered acceptable in wilderness study areas. Modifications of fencing and water development designs might also have to be done.

We support an accelerated T/E floral inventory, and believe that 11 of the 27 species thus far identified are too many to be jeopardized by herbivores.

Thank you for the opportunity to comment.

Sincerely yours,

Charles S. Watson, Jr.
Director

STATE OF NEVADA
GOVERNOR'S OFFICE OF PLANNING COORDINATION
CAPITOL COMPLEX
CARSON CITY, NEVADA 89710
(702) 885-4065

July 13, 1979

Mr. E.I. Rowland, State Director
Bureau of Land Management
NEVADA STATE OFFICE
Room 3008 Federal Bldg.
300 Booth Street
Reno, NV 89509

Dear Mr. Rowland:

Attached are the comments from the following affected State Agencies:
Department of Agriculture
Department of Conservation Natural Resources
Division of Water Planning
Division of Water Resources
State Parks, Dept. of Wildlife
Division of Forestry
Historical Preservation and Archeology

concerning the above referenced project.

These comments constitute the State Clearing house review of this proposal. Please address these comments in the final or summary report.

Sincerely,

Mike Nolan for
Robert M. Hill
State Planning Coordinator

RMH:md

Enclosures

ROBERT LIST
GOVERNOR

STATE BOARD OF AGRICULTURE
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STATE OF NEVADA
DEPARTMENT OF AGRICULTURE
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RENO, NEVADA 89510
TELEPHONE (702) 784-6401

July 12, 1979

Bob Hill
State Planning Coordinator
Governor's Office
Capitol Complex
Carson City, Nevada

I appreciate the opportunity to submit comments and recommendations on behalf of the Nevada State Department of Agriculture regarding the CALIENTE ENVIRONMENTAL STATEMENT, PROPOSED DOMESTIC LIVESTOCK GRAZING PROGRAM. Our comments and recommendations follow:

PROPOSAL AND ALTERNATIVES.

The EIS contained a proposed action and six alternatives for the management of livestock, wild horses, wildlife and forage. The proposed action was unacceptable and we cannot accept or recommend acceptance of any one of the alternatives. The proposed action and each alternative provided unacceptable provisions even though some did have some desirable features. We are recommending a different alternative which incorporates some desirable provisions of the proposed action and of the six alternatives, includes no unacceptable provisions, and provides some new desirable provisions not presented by the proposed action or any of the six alternatives.

First, I would like to explain why we feel the proposed action and the six proposed alternatives were unacceptable.

Reasons for Unacceptability.

Proposed Action.

The proposed action was unacceptable in its entirety because of several reasons as follows: (a) It was based on unacceptable suitability criteria; (b) It was based on too many assumptions and on too little factual historical data; (c) It was based on unsuitable field application of the criteria; and (d) It would require drastic cuts in livestock grazing that are improper and unnecessary. (We will elaborate on these elsewhere.)

Alternative 1.
"Continuation of Present Management with No Action."

There is a vast opportunity and need for range improvement projects in the area which the present management has ignored. These include livestock water developments, removal of competitive shrubs such as Pinon, Juniper and Sagebrush, reseeding with desirable grasses and shrubs. These needed projects, even though promised by the BLM years ago, have not been provided and we can no longer tolerate the delays of the present management.

Alternative 2.
"Elimination of Livestock, Wild Horse and Burro Grazing."

This alternative would bring economic disaster to the area, ruin the social, economic and physical environment of the people in the community and would be contrary to the intent of Congress and the laws they have passed relating to grazing and range management.

Alternative 3.
"Minimum Constraints on Wild Horses and Burros."

This alternative would cause severe damage to the range, soil, water, wildlife and ranching values. It would be contrary to the Wild Horse Act, which requires a thriving ecological balance.

Alternative 4.
"Restricted Period of Use by Livestock."

There is only about 1½ - 2% of the land available in the area to support the cattle in the "off" periods. This land is necessary during that period of time to produce hay and pasture for use during the winter months. We feel that a rest-rotation system designed for the particular ranch unit in lieu of no spring grazing would be an acceptable approach. Portions of the allotment then can be grazed while rest is provided other areas during spring growth on a rotation basis.

Alternative 5.
"Reduced Levels of Livestock Grazing."

This alternative is unnecessary because the reductions were already made in recent years. It is unacceptable because of the severe economic consequences to the livestock operator and the community.

Alternative 6.
"Reduced Management Intensity."

The area needs a higher level of range improvement projects than provided by this alternative.

RECOMMENDED ALTERNATIVE.

29-1 We recommend a new alternative that would include the following:

1. No reductions in livestock grazing on any allotment.

2. Accelerated range improvement projects on all allotments including on those allotments the proposed action scheduled for elimination or reduction in grazing. The range improvements would include the removal of Pinon-Juniper and Sagebrush by chaining, burning, or other means and reseeding to desirable grasses and shrubs that are suitable for livestock and wildlife and which are good for watershed improvements and for prevention of soil erosion. Livestock water developments would include spring developments, pipelines, troughs, reservoirs, guzzlers and other livestock and wildlife water improvements to better distribute and control the grazing and allow better use of the forage. The schedule of improvements would be accelerated and begin now rather than waiting for all individual AMP's to be completed. This would eliminate the need for any livestock reductions.

29-1

3. Increases in livestock and wildlife grazing in all allotments as range improvements and conditions permit.

4. Removal of excess horses in all areas except two small herd management areas where the horses would be near roads and readily visible to those who wish to visit them.

DEFICIENCIES IN SUITABILITY CRITERIA.

50% Slope.

This was adopted as an apparent tool to eliminate livestock grazing from sloping areas. The truth of the matter is that there are very few straight or constant slopes. Almost all slopes of the land are varying degrees of compound undulating slopes ever changing in degree, direction and magnitude. It is physically impossible for a range manager to look at a landscape and determine the degree of slope or the acreage that exceeds 51%. Livestock do utilize slopes that exceed 51% and in many cases graze through such areas to reach other more suitable areas that are at a different elevation. In winter months, wildlife and livestock prefer south slopes where it is warmer and snow is not so deep. In late spring, they prefer north slopes because the grass is greener and more abundant. This item (Slope) and its improper application on the Applewhite and other allotment caused the proposal to erroneously eliminate or reduce livestock grazing where in reality there is suitable land area in the majority of the allotment.

29-2

4-Mile Radius.

Actual history shows that livestock will graze up to nine or ten miles from water depending on the area and the breed. The use of the short 4-mile radius resulted in excluding a large portion of suitable forage from the survey and resulted in proposed cuts in AUM's that are unnecessary.

29-3

Ear Tags.

The proposal provides for the placing of BLM numbered tags in the ears of permitted livestock and assumes that they are the best means of identification. The BLM tags cause extreme animosity against the BLM. They are not necessary because the livestock carry more permanent identification in the form of brands and earmarks that are customarily used and accepted as identification. The tags become lost and they cause extra work on the part of BLM and the ranchers. The extra handling of the animals causes loss of life and weight.

Meadow Valley Wash.

29-4 I commented in opposition to this in my response to MFP II. However, in addition I want to say that experience in the area shows that elimination of grazing in the wash would allow the wash to become overgrown with Cottonwood and Willows to the extent that it would create severe flood hazards and expense to maintain the railroad and highway down the wash.

TOO MANY ASSUMPTIONS.

The entire EIS was based largely on assumptions that were not based on facts or scientific research data. The short and long range results of the proposed action and the six alternatives were assumed. For example, it assumed that livestock removal would result in more forage. Actually, scientific study results in Nevada show 29-5 that elimination of livestock eliminates the desirable features of hooves planting the seed underground where it will grow. The forage when not removed by grazing animals causes lodging and plant stagnation. Proper grazing by livestock actually stimulates plant growth. Grazing livestock actually transport needed seeds from one area to another and provides natural organic fertilizer.

The EIS assumed that removal of livestock would reduce soil erosion when the reverse may actually occur. Actually range studies show that removal of Pinon-Juniper and Sagebrush, followed by reseeding with desirable grasses and shrubs and proper grazing would bring the desired result. This would also improve the watershed characteristics and forage for wildlife and livestock.

The erroneous assumptions that livestock will not forage more than 4 miles from water and on slopes greater than 50% are discussed elsewhere.

29-6 It was assumed (Page 1-9) that the proposed action would: "d. Improve working relationships with livestock operators." This is an erroneous assumption because the proposed action and six alternatives would reduce grazing and actually reduce or take away the livelihood and way of life for many ranchers. This certainly will not improve relations. Even those not currently

reduced will not trust BLM because in their heart they will feel they will be next. The desired improved relationships would occur if no one's livelihood or way of life was threatened by reduced grazing and if the Bureau followed through swiftly with the range improvement projects earlier described. The feeling of hopelessness, despair and frustration evident in the local community over the EIS and related actions would disappear if the Bureau followed through promptly with our recommended alternative.

We sincerely hope that BLM officials follow our advice and that of the other local people. If we can be of further help, please call.

Sincerely,

Thomas W. Ballow
Executive Director
NEVADA STATE DEPARTMENT OF AGRICULTURE

TWB:sm

30

NORMAN HALL, *Director*
STEVE ROBERTSON, *Assistant Director*
ISABELLE L. LITTLE, *Assistant Director*
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MIKE O'CALLAGHAN
Governor

DIVISIONS
Conservation Districts
Environmental Protection
Forestry
Historic Preservation and Archeology
State Lands
Mineral Resources
State Parks
Water Planning
Water Resources
COMMISSIONS
State Conservation Commission
State Environmental Commission

STATE OF NEVADA

Department of Conservation and Natural Resources

OFFICE OF THE DIRECTOR
CARSON CITY, NEVADA 89710

June 27, 1979

MEMORANDUM

TO: Bob Hill, State Planning Coordinator

FROM: Roland Westergard, Director, DC&NR

SUBJECT: Caliente Environmental Statement, SAI #79300071

This Department has reviewed the above referenced document and comments from the Divisions are attached for your consideration.

A number of serious questions have been raised thus far in the review process and more may be developed by the State Conservation Commission during their July 10 - 11 meeting in Caliente.

Some of the more important issues which we have identified are the following:

30-1 1) Section 106 of National Historic Preservation Act does not appear to be satisfactorily complied with.

2) Comments submitted by the Division of State Parks during the development of the Management Framework Plan (MFP) were not incorporated in this ES.

3) The ES does not have a statement concerning the proposed methods of placing water to beneficial use.

30-2 4) The effect of increased irrigation on private lands to offset the loss of grazing permits is not addressed.

30-3 5) Mitigation measures to reduce the predicted increase in suspended solids in surface waters are not considered.

30-4 6) The groundwater resources of the EIS are not addressed.

7) The EIS addresses what is described as "unavoidable adverse impacts." A sharp decline in ranch value ($1,107,177) is identified as occurring in 1980 which definitely would be an adverse effect on existing viable ranching operations. Some allotments are proposed to be reduced 100%, and it would appear that this is unacceptable. It is also interesting to note that one of the additional "unavoidable" adverse impacts is in the area of public values and attitudes. The EIS states that the "possibility of having to sell ranch property is unsettling. Alienation and distrust of the government would intensify."

We appreciate the opportunity to comment on this EIS, and would like to offer this Department's assistance to the BLM in addressing the issues we have identified.

RGW:vb

Attachments

579

ROBERT LIST
GOVERNOR

NEVADA DIVISION OF WATER PLANNING

JAMES P. HAWKE
ADMINISTRATOR

STATE OF NEVADA

ADDRESS REPLY TO:
DIVISION OF WATER PLANNING
201 S. FALL STREET, NYE BLDG.
CAPITOL COMPLEX
CARSON CITY, NEVADA 89710

TELEPHONE (702) 885-4877

31

June 27, 1979

MEMORANDUM

TO: Roland Westergard, Director

FROM: James P. Hawke

SUBJECT: Comment on Caliente Environmental Statement, SAI #79300071

The above referenced document has been reviewed and we would like to make the following observations:

31-1 1. Chapter 2, Description of the Environment: The section on the water resources of the area included in the Environmental Statement (ES) does not address the groundwater resources. Throughout the report an estimated perennial yield from the hydrographic basins are stated as being 110,000 acre-feet (page 3-6), however, there does not seem to be any source cited for these data.

31-2 2. Chapter 3, Environmental Impacts of the Proposed Action: There will be a deterioration of water quality as a result of the proposed action. Yet, there is no discussion of mitigation measures for water quality in Chapter 4. In Chapter 5, Unavoidable Adverse Impacts; increased suspended sediment load due to stream bank sloughing is predicted (8 - 10), this might be an appropriate opportunity to use Best Management Practices as developed by the State's 208 planning process.

JPH:tb

A DIVISION OF THE DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES ROLAND D. WESTERGARD, DIRECTOR

0-317

32

STATE OF NEVADA
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF WATER RESOURCES

OFFICE MEMORANDUM

To: Bill Newman Date: June 26, 1979

From: Vic Hill

Subject: Draft Environmental Statement, "Proposed Domestic Livestock Grazing Management Program for the Caliente Area", by the BLM

Comments follow concerning subject ES, as the proposals therein might affect the public waters of Nevada. General statements concerning proposals are also included.

An indeterminate number of new water developments for the purpose of wider distribution of grazing pressure upon the public domain are referenced in the text. It is not clear from the text what the mix of total developments will be among wells, springs and streams and what developments will be made upon sources with existing water rights. Nor is it clear what the ownership will be for water rights on new and existing sources, and whether grazing permittees will be guaranteed water for domestic livestock if the BLM proposes to own or control the rights to water. Evidently, domestic livestock, wild horses and burros and wildlife will all be controlled at least in part by a system of fences, which may affect access to sources of water.

All of these aspects for more widely distributing grazing pressure upon the public domain bear upon satsifying requirements for making beneficial use of the public waters of the State of Nevada. As such, these aspects strongly relating to beneficial use of water involve the public interest and welfare. The Caliente ES is incomplete without clear statements for public review regarding proposed methods of placing water to beneficial use.

In Table 1-6, the Caliente area is estimated to be 98% public domain. Existing ranches, mines and settlements must, therefore, exist upon the remaining 2% of land area. Federal-state-private institutional conflicts have developed increasingly in the recent past over a high proportion of this small and isolated private base. Federal and state agencies are increasingly engaged in regulating private activities, and federal agencies are concurrently competing to enforce their own functions upon withdrawals of the public domain. These essentially institutional conflicts

JUN 2 6 1979

Bill Newman
Page Two
June 26, 1979

in the Caliente area, with a small population, stand out relatively clearly compared to those in more populated and urban areas. In the face of conflicts between the government and area residents, food and fiber production and the economic welfare of the area will depend upon whether existing base support ranches remain viable operations. Due to the leverage exercised by the federal position, there is a high probability that some of the smaller ranching operations will fail and be absorbed by larger operations or cease production of food and fiber.

According to Figure 1-1 of the ES, forage allocation for domestic livestock is proposed to drop in the short term and increase in the long term, under proposed intensive grazing management and vegetation treatment. However, the intensity of action proposed by BLM will require additional money and employees. There is no guarantee, in this time of inflation and increasingly tight governmental budgets, that the proposed long term increase in forage allocation can be delivered. This would leave the short term decrease in forage allocation to be continued into the future.

A continued decrease in forage allocation for domestic livestock would be a cruel hoax which all users of the public domain should deplore. Presently, BLM does not appear to have the manpower to even manage grazing by wild horses, or to make proper range improvements. Therefore, mitigation of range deterioration, due to the probable and continued inability of BLM to manage forage for long
32-1 term values, needs to be addressed in the ES. In this instance, mitigation of range deterioration should not result in the simplistic solution of cutting forage allocation indefinitely for domestic livestock. The ES needs to state what guarantees are built into BLM management capabilities and proposals to avoid this deplorable yet potential state of affairs.

Effects upon ground water resources of significant cuts in forage allocation for grazing permittees could be nearly immediate. The ES is incomplete without addressing the effects of increased irrigation upon private lands for purposes of forage production to replace forage no longer available upon the public domain. The ES should also address whether additional public land is being considered for release to settlers who would irrigate crops for purposes of mitigating proposed forage decreases. Both of these outcomes would cause increased total pumpage of ground water as well as increased concentration of pumpage, thus placing additional stress upon the State's already scarce ground water resources.

Bill Newman
Page Three
June 26, 1979

In summary, BLM has not adequately considered effects of their proposed actions set forth in the Caliente ES, as required by court decisions and laws. However, court decisions and laws do not guarantee the realism of planning and particularly do not guarantee success on the ground. BLM is caught, unfortunately, upon the horns of cumbersome requirements and lack of funding/people. The direct sufferers under these conditions apparently will be the residents and producers of food and fiber in the Caliente ES area, with the general public, as users of food and fiber, being indirectly deprived.

VH/dh

580

801.6b(7) 33

NEVADA

DIVISION OF STATE PARKS

MEMO

TO Mr. Roland D. Westergard, Director
Department of Conservation and Natural Resources

FROM Jay Meierdierck

DATE 6/26/79

SUBJECT CALIENTE GRAZING ES

The Caliente draft ES was prepared prior to receiving comments on the Bureau of Land Management's Management Framework Plan (MFP). The Division of State Parks made extensive comment on the MFP and those comments are still pertenant to this grazing ES. We would offer no additional comments regarding vegetation allocation recommendations. A copy of our Caliente MFP comments are attached. [File code number 801.6b(7).]

/nw

a division of the Department of Conservation and Natural Resources

801.6b(7)

Mr. Phil Range
Caliente Area Resource Manager
P.O. Box 5400
4765 Vegas Drive
Las Vegas, Nevada 89102

Dear Mr. Range:

Subject: CALIENTE MANAGEMENT FRAMEWORK PLAN

The Division of State Parks appreciates the opportunity to review this management framework plan and offers the following comments. The Nevada Statewide Comprehensive Outdoor Recreation Plan (SCORP) directs the Division of State Parks to undertake recreation, open space, and conservation planning and coordination throughout the state. Our review and comments on the management framework plan are related to these areas. For the most part, we endorse the multiple use recommendations as presented in the draft plan, but do offer the following detailed comments.

Located within the Caliente management area are four state parks: Cathedral Gorge, Kershaw-Ryan, Beaver Dam, and Echo Canyon. As you have indicated, the Division of State Parks has applied for Recreation and Public Purposes Act lands to expand the recreational opportunities provided in these parks. At Echo Canyon our original application was made in October, 1971. In July, 1978, it was referred to the district office for determination. The Kershaw-Ryan application was filed in December of 1971, and in February of 1973, it was referred to the district office for action. The Beaver Dam application was made in February, 1973, and again, that file is in the district office for action. The Cathedral Gorge application was filed in May, 1974, and was directed to the district for action in July, 1974.

The Caliente Planning Unit draft plan (R-2.3) states that inadequate development plans and justification have been provided for these applications. If this is so, we would like to meet with you to correct these problems. Since these applications have been waiting several years, we would like to expedite them if possible.

Mr. Phil Range
Page 2

Many of the natural areas to be protected within the planning unit are too small to provide complete ecosystem protection. Specifically, the Highland Park area (R-1.1) is recommended to be designated as a research natural area with a land area of only 480 acres. We recommend that an area large enough to protect the Bristlecone, White Pine, and other species in a natural balance be considered.

In the Quaking Aspen Spring area (R-1.4) only 25 acres are to be protected. This area should be expanded to provide an area large enough to protect the resource. In the "high quality geological sightseeing areas" (R-1.6), mining should be added to the list of activities requiring appropriate protective stipulations, unless this is included under your term "land treatment projects." The litter pits and refuse collection areas (R-2.1) should be intergrated with historic markers, rest areas, or scenic pullouts, and made available year-round.

The Division of State Parks has recently completed a Statewide Trail Study. The study includes foot, horse, and vehicle trails throughout the state. A segment of the proposed Basin and Range Trail crosses through the Caliente Planning Area. This trail combines existing OHV trails into a system reaching from Las Vegas to the Pony Express Trail. We would like to work with the BLM in designating this trail.

Another recommendation in the Statewide Trail Study is a proposed foot and horse trail connecting Spring Valley State Park with Echo Canyon, Cathedral Gorge and Kershaw-Ryan parks. There is also a possibility of extending this to include the Highland Range and Gleason Canyon areas. Again we would like to work with the BLM recreation planners in providing this trail. The ORV planning section (R-3.1) should be expanded so that recommendation "(F)" includes: (1) that no competitive use of ORV's occur in the Delamar Valley, (2) that ORV activity be limited to existing roads and no competitive events be allowed in those areas that have been designated for transfers to state parks.

Mr. Phil Range
Page 3

The Division of State Parks would like to cooperate in the inventory of ORV activity and suitability studies (R-3.2) and offer any assistance we can. The Nevada Statewide Trail Study proposes to develop user education trails where the user would be educated on safety, environmental impacts, and techniques and skills that are required in the operation of ORV's. The trails would be similar to an interpretative trail in that it would be self guiding. We would like to work with the Bureau of Land Management in possibly developing one of these trails to serve southern Nevada. The Caliente planning area may be a desirable area to do this.

The Nevada Statewide Comprehensive Outdoor Recreation Plan cites in several areas the desirability of providing wilderness areas throughout the state. We have been and will continue to work with the BLM and their wilderness designation program. We feel that the wilderness analysis should be considered as a major resource activity in the land use plan.

Etna Cave and the Belmont Ghost Town should be included as possible National Historic Landmarks (R-7.3). The discussion of cultural resource management planning presents class 2 and class 3 designations. We do not understand what the differences between these designations are, but feel that the scenic values of the areas around the state parks, Rainbow Canyon and Delamar Ghost Town, should be protected equal to the areas listed in the class 2 designations.

The Nevada Division of State Parks has inventoried a few recreational areas within the Caliente Planning Unit that did not appear in your inventory. One is the Oak Spring Summit (T. 4 S., R. 65 E.), a second, the Mount Ella Area (T. 6 S., R. 67 E.), and a third is the Pine and Matthews Reservoir.

The Department of the Interior, Heritage Conservation and Recreation Service, has identified four areas within or adjacent to the Caliente Planning Area as potential Natural Landmarks. Natural Landmarks are outstanding examples of national

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significance of natural resources. Ms. Debra Szarka of your Las Vegas staff has a copy of the Natural Landmarks Inventory of the Great Basin. We would encourage you to make official nomination for Natural Landmark designation the Highland Range, Gleason Canyon, Leviathan Cave, and the Pahranagat Valley Fish Sanctuaries.

Thank you very much for your consideration. I look forward to working with you throughout the planning process for the Caliente Planning Unit.

Sincerely,

John L. Meder
Administrator

By: Jay Meierdierck
Program Coordinator

JM:ba

34

ROBERT LIST
[illegible]

GLEN E. GRIFFITH
Director

1100 VALLEY ROAD P.O. BOX 10678 RENO, NEVADA 89510 TELEPHONE (702) 784-6214

July 12, 1979

Robert M. Hill
State Planning Coordinator
Heroes Memorial Building
108 W. Second Street
2nd Floor
Carson City, Nevada 89701

Re: Caliente Draft EIS
Clearinghouse #79300071

Dear Mr. Hill:

The Nevada Department of Wildlife appreciates the opportunity to review and provide comments on the Calient Draft EIS - SAI Nv #79300071.

A. General Comments

Bureau of Land Management's major emphasis in this document of determining the level of grazing, by allotment, which can be conducted on a sustained yield basis, and the allocation of forage to competing herbivores within the current grazing capacity is very commendable. However, there are major adverse impacts to wildlife that have not been adequately addressed. The proposed livestock forage allocation for 1980, of 74,293 AUM's is acceptable except, in those allotments occupied by bighorn sheep (designated as BY-1, BC-2, BY-3, BY-4) and in reintroduction areas of historic use designated in the URA and MFP as the Groom Range, South Pahroc Range and North Pahroc Range.

Wildlife input supplied by the Nevada Department of Wildlife to the Bureau of Land Management's URA and MFP planning process stressed the sensitivity and severe competition to bighorn sheep by domestic livestock. The Department and Nevada B.L.M. State office under agreement (B.L.M. manual 6840.31) has further recognized the desert bighorn as a sensitive species which requires special management and protection. In may areas, multiple use may not be attainable between livestock and bighorns especially when considering AUM allocations, water developments and vegetal manipulations. In order to reach and maintain reasonable bighorn sheep numbers on a sustained yield basis, it is necessary to confine livestock grazing to areas outside of those designated bighorn sheep habitats.

Increases in livestock AUM's as proposed by development of waters, vegetal manipulation and intensive grazing management is geared solely to increased livestock production in this EIS area without adequately considering the adverse impacts on other resource values. As written, the draft definitely places the priority on livestock grazing with all other resource values subservient to this interest.

B. Specific Comments to the Proposed Action With Regards to Impacts on Wildlife Are As Follows:

34-1 1. Continuation of livestock grazing within and in close proximity of bighorn sheep habitats is unacceptable. Current conflicts for space, forage and water are not resolved let alone the conflicts that will arise with increased grazing as proposed with water developments.

34-2 2. The 492 miles of allotment fences as proposed are not acceptable to wildlife especially in bighorn sheep areas.

34-3 3. Water developments for the purpose of increasing livestock AUM's and distributing livestock into areas not currently grazed is unacceptable, from the standpoint that additional competition for forage, space and water will be exerted on bighorn sheep, mule deer, upland game and many nongame species with no reciprocal actions to benefit wildlife. Water development and attendant livestock grazing within deer winter range or bighorn sheep areas will severely impact these species..

34-4 4. Vegetal treatments for the purpose of increasing livestock forage should not be considered in bighorn sheep areas. Strict stipulations and site specific evaluations have not been addressed for the proposed treatments.

34-5 5. Vegetal treatments are proposed in many areas of only 4-8 inches of precipitation per year. Standard recommendations for successful seeding in arid areas is no less than 10 inches of precipitation per year (Plummer 1955, 1968).

34-6 6. The proposed grazing system will have an adverse impact on mule deer winter range especially Purshia tridentata areas. Ten months of grazing on these perennial ranges is not much improvement from the current yearlong situation. Grazing seasons of use should be designed to be compatible with key plant phenology and proper utilization.

34-7 7. Support facilities for AMP's such as fences, spring developments, pipelines, livestock troughs, reservoirs and wells are not specifically identified by location within each allotment. Without having precise locations, it is extremely difficult to assess predicted impacts on wildlife values.

8. Reintroduction of bighorn sheep into historic use areas as identified in the URA and MFP are not even mentioned in the draft EIS.

9. Introduction of Gambel's quail and chukar partridge into suitable areas as identified in the URA and MFP are not mentioned in the draft EIS.

10. Mitigating measures to deal with impacts on wildlife from the proposed action are insufficient.

34-9 11. Much of the riparian and stream bank vegetation critical to wildlife and fish will continue to deteriorate under the proposed action.

34-10 12. No social economic profile was developed for wildlife values occurring on the ES area.

C. Specific Comments To The Range Section Of The Proposed Action.

34-11 1. Bureau of Land Management livestock grazing suitability criteria has identified 1,208,195 acres (34.5%) out of the total 3,495,805 acres (65.5%) in the ES area as presently being suitable for livestock grazing (Table 1-3, and page 2-71). Thirty two (32) of the eight six (86) allotments presently have no suitable livestock AUM's (Table 1-3). However, under the proposed action of intensive water developments and vegetal treatments at the cost of $9,614,317, seventy six (76) allotments would then have suitable grazing AUM's. However, the impacts such as a massive development scheme would have on wildlife are not addressed.

34-12 2. The five allotments managed under current AMP's (p. 2-72) have been found to be ineffective; how then can the B.L.M. expect the proposed twenty seven (27) new allotments to be successful?

34-13 3. Vegetation on proposed non-AMP areas (p. 4-2) would continue to be degraded with the proposed continuation of early spring and fall grazing. Solution to this problem seems quite evident, however, B.L.M. fails to make the proper recommendation.

4. Allotments with severe or critical erosion conditions are proposed for grazing with the stipulation that these areas will be evaluated on a site by site basis and fenced to eliminate the problem (p. 4-1). It is questionable that fencing alone is the proper action to implement in these situations when wildlife resources will continue to suffer.

d. Comments To The Alternative Management And Allocation Levels.

Realistically, alternative four (with modifications) would be the preferred action as far as wildlife requirements are concerned. Modifications to alternative four to meet wildlife needs are as follows:

1. Elimination of livestock grazing within and in close proximity to areas of designated bighorn sheep habitats.

2. Allocate livestock AUM's only in those allotments that currently have suitable livestock AUM's available (Table 8-26).

3. Base season of use periods for livestock grazing on phenology and proper utilization of key perennial plant species (no grazing March 1 through July 15).

4. Utilization on key species should not exceed 50 percent.

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5. Future forage allocations should be based on findings of new range forage surveys.

E. Summary

Bureau of Land Management has attempted to allocate forage to competing grazing ungulates based on current suitability criteria, however, the management system proposed emphasizes increased livestock grazing through water developments and large scale vegetal treatments which would impose severe adverse impacts on wildlife and other resource values. The proposed action is designed to meet B.L.M.'s State Office mandate of "two months off the range" rather than the requirements of proper plant utilization, which in the final analysis reflects on soil and water condition and the viability of the wildlife resource. It is quite apparent that the B.L.M. needs to make major revisions to the final ES in order to place the wildlife values in the proper perspective with other resource uses.

Sincerely,

Glen K. Griffith
Director

[redacted]
Department of Conservation and Natural Resources

LOWELL V. "Lew" SMITH
State Forester Firewarden

ROBERT LIST
[redacted]
Governor

Address Reply to
Nye Building
201 S. Fall Street
Carson City, Nevada 89710
[illegible]

36

STATE OF NEVADA
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF FORESTRY
CAPITOL COMPLEX
CARSON CITY, NEVADA 89710

June 19, 1979

To: L.V. Smith

From: Matt Frolich

Subject: Caliente ES

The management goal of the Caliente District BLM is to increase the amount of forage available to livestock.

Practices to achieve this include grazing management, fencing, development of water and modification of the vegetation through mechanical means (chaining), chemicals and burning.

I think that we, as foresters, should be concerned most with the chaining proposed. The target is to chain 233,641 acres of pinyon-juniper. I do not know what the volume would be on this, but must wonder if this can support a cement board plant. Over a 35 year period, the harvest would be 6,500 acres/yr. the area would have increased forage and another resource utilized rather than destroyed.

pt
attach

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ROBERT LIST
[redacted]
GOVERNOR

GLEN K. GRIFFITH
DIRECTOR

1100 VALLEY ROAD P.O. BOX 10678 RENO, NEVADA 89510 TELEPHONE (702) 784-6214

July 13, 1979

Mr. Robert Hill
State Planning Coordinator
Heroes Memorial Building
108 Second Street - Second Floor
Carson City, NV 89701

Dear Bob:

On Thursday, July 12, the Department of Wildlife sent technical comments pertinent to the Caliente Environmental Impact Statement, SAI NV 7930071. I would like to have included the following comments:

35-1 The draft E.I.S. is unacceptable as produced. The E.I.S. provides for some 492 miles of fencing that will certainly complicate wildlife movement and management together, possibly, with making horse roundups and removal much more difficult. Fencing should not be looked at as a project. Fences should be used where necessary for areas (riparian, for example) that defies management under a general range land management program.

35-2 The Morman Mountains were handled tersely and without a formal plan of management. That is not acceptable. Some 400,000 acres are proposed for vegetative manipulation. As presented in the E.I.S. this is without diversification; this is objectionable.

35-3 Fences in bighorn sheep areas are counterproductive to their habitat needs. Their activities and movement will be restricted which will certainly create a negative impact on that sensitive wildlife resource. Any management program implemented, that would reduce the numbers of bighorn sheep is not acceptable. Certainly in the planning process sheep should be planned and programmed for, so that they will have non-competitive uses in the more rugged terrain which they inhabit.

35-4 Sometime ago I asked the Bureau of Land Management director to manage bighorn sheep habitats as horse and burro free. Sheep and burros compete for food and water. Also in areas of inadequate water, horse and burro competition can even make that range area very inhospitable for successful sheep populations.

Mr. Robert Hill
July 13, 1979
Page 2

35-4 The horse and burro free management was to be taken care of in the planning process as stated in Mr. Roland's letter. This E.I.S., however, does not address that issue and as such is not acceptable.

It is surprising that the Bureau would develop such a document that if implemented, would have such adverse impacts on the several wildlife species.

If the Department of Wildlife can supply data and information in an effort to accommodate a valid E.I.S., then, certainly we are willing to extend that cooperation and input.

Sincerely,

Glen K. Griffith
Director

GKG:dr

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[redacted]
Department of Conservation and Natural Resources

LOWELL V. "Lowe" SMITH
State Forester Firewarden

ROBERT LIST
[redacted]
Governor

Address Reply to
Nye Building
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885-4250

37

STATE OF NEVADA
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

DIVISION OF FORESTRY

CAPITOL COMPLEX
CARSON CITY, NEVADA 89710

June 27, 1979

To: Pat Murphy

From: Matt Frolich

Subject: Utilization of Pinyon-Juniper

There are several possibilities for the utilization of PJ other than chaining.

1. The material can be harvested on a whole tree basis and made into a fuel pellet of different sizes. The smallest pellets can be augered into boilers as fuel, larger sizes can be handled as presto logs. The fuel is low sulfur, therefore, presents a minimal problem for air pollution. Woodex (Oregon) is one company already in operation utilizing wood waste.

2. Juniper foliage is a source of juniper oils. This had already been worked out in Utah in a pilot project. The grades obtained by steam distillation were suitable for janitorial supplies. Fritsche, Dodge and Olcott of New York City are dealers in this material. The spent foliage can be pelleted for fuels.

3. Whole tree juniper chips are suitable for the manufacture of Kraft paper.

4. Pinyon Pine is a fairly rich source of alpha pinene. This substance can be changed chemically to form menthol - used in the tobacco industry. Mild cracking produces a product that is used in the manufacture of tires. Goodyear uses fairly large quantities obtained as a by product of the paper industry.

5. Pine oil can be obtained from Pinyon foliage. It goes into commerce through such companies as Fritsche, Dodge and Olcott or Glidden Organics.

6. Chips from both can be used to make particle board, oriented structure board, cement board and molded products. Juniper is especially suitable for the latter as it is dimensionally stable to changes in humidity.

7. Both are probably sources of natural resins that can be used as extenders of synthetic resins in particle board and plywood manufacture. This would have to be determined by chemical analysis.

8. Finally, both can be used directly, as wood, to provide fuel for domestic space heating or processed in simple kilns to provide charcoal.

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TO Pete Morros, Assistant Director
Dept. of Conservation & Natural Resources

FROM Div. Historic Preservation & Archeology

Memo

DATE June 20, 1979

SUBJECT Comments on the Caliente Grazing Program EIS

This Division's review of the above referenced report shows it to be deficient in several areas relating to the identification, and protection of cultural resources.

1. It would appear that existing data is being relyed on as an adequate and fair representation of the area's cultural resource potential. The survey data must be adequate to predict the location, frequency, and National Register eligibility of sites that exist in the area and may be impacted by the proposed grazing actions and options. I question the proposed whether dependance on existing data derived from numerous separate projects satisfies these needs. A research and survey design should be developed to augment the existing data. This plus a program of continued cultural resources inventory in the area will ensure that the agency's responsibilities under Section 2(b) of Executive Order 11593 are being satisfied.

38-1 2. Section 106 of the National Historic Preservation Act does not appear to be satisfactorily complyed with - known properties are not rated as to their possible National Register Eligibility. A reference to properties within the Caliente management area that are presently listed on the Register was not located. The survey activities mentioned above will go a long way in more fully assessing the number of National Register eligible properties that can be predicted to exist in the area.

38-2 3. In complaince with Section 106 of the National Historic Preservation Act and Executive Order 11593, provision should be made for the intensive survey of specific project activity areas such as fence lines and well developments.

38-3 4. Given the subtle nature of the possible impacts that grazing may have on cultural resources, a monitoring program should be developed that will provide current information as to the status of the resource. With this data at hand, cultural resources can be taken into consideration in the day to day management process.

Continued consultation with this Division will be required before a formal determination of the project's effects can be arrived at.

June 19, 1979

MEMORANDUM

TO: Historic Preservation & Archeology

FROM: Environmental Protection

SUBJECT: SAI# 79300071

In reference to the above project, the Division of Environmental Protection staff had the following comments:

AIR

Page 2-7 Should be Nevada Division of Environmental Protection not "SERVICES".

WATER

No comment

SOLID WASTE

No comment

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CDZ:vh

DESERT BIGHORN COUNCIL

Established to promote the advancement of knowledge concerning the Desert Bighorn Sheep and the long-range welfare of these animals.

601 Fourth and Pike Building
Seattle, Washington 98101

July 20, 1979

District Manager
Attention: ES Team
Bureau of Land Management
P.O. Box 5400
Las Vegas, Nevada 89102

Dear Sir:

Thank you for including the Desert Bighorn Council among the reviewers of your Draft Caliente Environmental Statement. For faster receipt of mail by the Council, it would be helpful if you would change our address to: Desert Bighorn Council, National Park Service, Death Valley, California 92328.

The three things in the Statement that are obvious to me are: 1) livestock are to be increased; 2) wild horses and burros are to be managed; and 3) desert bighorn are to be reduced in population.

1) The Council has no objection to increasing livestock on desert ranges where those ranges can sustain the added pressure and where they are not in competition with desert bighorn for food, water, space, and other needs. We know that bighorn and livestock can get along together, but in many seemingly uncontrollable instances, bighorn are the victims of several livestock diseases, among which are blue tongue, soremouth, scabies (now making a comeback), and others. We recommend that no livestock allotments be made on lands normally inhabited by desert bighorn or lands which could be considered desert bighorn habitat.

2) The Council would not object to allowing a number of burros to inhabit desert lands; however, as noted in the attached Desert Bighorn Council Resolution, April 6, 1967, we resolved "That the responsible resource management agencies be requested to effect control on feral burros by every means currently at their command." Since the resolution was passed, studies illustrating the damage by burros to range, water sources and even

the bighorn themselves have repeatedly been reported upon. We therefore request that as few burros as possible (preferably none) be allowed on bighorn ranges.

3) The Council as well as the Federal and State agencies involved in bighorn management (including activities to increase the bighorn population), look with decided disfavor upon any actions that would decrease numbers. We recommend that the decision makers on this proposal think seriously about a more positive approach and an increase in population. We think a planned decrease of this species should be discouraged.

Hopefully, this statement will be of some help to you; we also hope that you will take a second look at your environmental statement for Caliente and attempt to make changes as noted above.

Sincerely yours,

James A. Blaisdell
Chairman, Technical Staff
Desert Bighorn Council

Enclosure

COPY

DESERT BIGHORN COUNCIL

RESOLUTION

Adopted April 6, 1967

WHEREAS field studies conducted for more than thirty years by numerous agencies and research institutions have consistently demonstrated that wild burros, unless their numbers are properly regulated, compete severely with native wildlife, and inflict long-lasting and sometimes irreversible damage to native desert vegetation, and

WHEREAS these studies show that wild burros have no effective natural enemies, and that no other natural population-regulating factors become effective until after damage to the habitat and to other wildlife has reached prohibitive levels, and

WHEREAS continuing observations reveal that uncontrolled wild burro populations in the Western States are on the increase and in many areas are nullifying the attempted habitat improvement and wildlife protection programs of various State and Federal agencies, and

WHEREAS most of these lands are within Federal jurisdiction,

NOW THEREFORE BE IT RESOLVED by the Desert Bighorn Council in session on April 6, 1967 that the responsible resource management agencies be requested to effect control on feral burros by every means currently at their command;

AND BE IT FURTHER RESOLVED every effort be made to modify and repeal present legislation that prohibits effective control of feral burro populations;

AND BE IT FURTHER RESOLVED that copies of this resolution be sent to the Secretary of the Interior, the Director of the Bureau of Land Management, The Wildlife Society, appropriate state and federal legislators and such conservation and sportsmen's organizations as Death Valley 49ers, Sierra Club, Nature Conservancy, Desert Protective Council, Fraternity of the Desert Bighorn, Izaak Walton League, National Wildlife Federation, and Wildlife Management Institute.

Passed.

Abstentions: Representatives of the Nevada Fish and Game Commission.

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P. O. BOX 2711
LOS ANGELES, CALIFORNIA 90053

SPLED-E

27 July 1979

District Manager, ES Team
United States Department of the Interior
Bureau of Land Management
P.O. Box 5400
Las Vegas, Nevada 89102

Dear Sir:

This is in response to a letter from the office of the State Director, Nevada State Office, dated 1 June 1979 which requested review and comments on the Draft Environmental Impact Statement for the Proposed Domestic Livestock Grazing Management Program for the Caliente Area.

The proposed plan does not conflict with existing or authorized plans of the Corps of Engineers. We have no comments on the environmental statement for the proposed action.

Thank you for the opportunity to review and comment on this statement.

Sincerely,

NORMAN ARNO
Chief, Engineering Division

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GLOSSARY

GLOSSARY

active qualifications:	Synonomous with grazing preference.
actual use:	The true amount of grazing in Animal Unit Months based on the numbers of stock and grazing dates submitted by the livestock operator and confirmed by periodic field checks by BLM.
adjudication:	Allocation of forage based on a court decision.
Allotment Management Plan:	A livestock grazing management plan dealing with a specific unit of rangeland, based upon multiple use resource management objectives. The Allotment Management Plan (AMP) considers livestock grazing in relation to other uses of the range (i.e., watershed, vegetation, wildlife, etc.), and in relationship to non-renewable resources. An AMP establishes the period-of-use, number of livestock and the range improvements needed for development.
alluvial fan:	A fan-shaped landform made as a stream deposits material because of achange in the ability of the stream to transport sediment, such as when a stream leaves a narrow mountain canyon and enters a broad valley.
alluvial terrace:	A land form developed as several alluvial fans join together.
Animal Unit Month:	The amount of forage necessary for the subsistence of one cow or its equivalent for a period of one month.
aspect (vegetative):	The appearance that a dominant or most common species of vegetation to the viewer, i.e., short grass, pinyon-juniper, big sagebrush. (See vegetative type.)

bajada:	An alluvial plain formed at the base of a mountain by the coalescing of several alluvial fans.
Basin and Range Physiographic Province:	A region of similar geologic structures that has mountains formed by faulted and tilted blocks of strata.
bed and bank erosion:	Refers to channel cutting by fast moving water. Bed erosion is the depth of the eroded area; bank erosion is the width of the eroded area.
block-fault origin:	When a mass is bounded on opposite sides by faults; it may be elevated (mountains) or depressed (valleys) relative to the adjoining region.
calcareous:	Composed of, containing, or characteristic of calcium carbonate, calcium, or limestone.
carrying capacity:	The maximum stocking rate possible without inducing damage to vegetation or related resources. Carrying capacity may vary from year-to-year on the same area due to fluctuating forage production.
Class I existing data inventory	An inventory study of a defined area designed to provide a cultural resource overview derived from existing information and to provide a compilation of existing cultural resource site data. The procedure involves an exhaustive literature search of published and unpublished sources.
Class II Attainment Area:	An area in which the following standard is being met: air quality deterioration accompanies moderate, well-controlled growth and the deterioration is considered insignificant.

competitive forage:	Forage which is being utilized by more than one grazing animal at the same period of time or in the same areas.
crucial wildlife habitat:	Habitat that is necessary to sustain the existence and/or perpetuation of a species at critical periods during its life cycle.
economies of scale:	Lower costs per unit associated with a larger scale of operation.
ecotone:	A transition area between two adjacent ecological communities, such as between two vegetation types.
edaphic climax:	A community which is below the natural climax because succession has ended due to changes in topography, soil, water, fire or other factors which prevent further development toward the natural climax for the area.
ephemeral-perennial:	An area with both ephemeral and perennial vegetation. (See definitions of perennial and ephemeral vegetation.)
ephemeral range:	Range which does not consistently produce forage, but periodically provides annual vegetation suitable for livestock grazing.
ephemeral streams:	Streams which do not flow year-round.
evapotranspiration:	The process of transferring moisture from the earth to the atmosphere by evaporation of water and transpiration (emitting watery vapor) from plants.
faunal assemblage:	A natural grouping of fossilized animal remains within a rock unit.

fecal coliform:	Nonspore-forming, rod-shaped bacteria (example: Escherichia coli).
fire breaks:	A barrier of cleared or plowed land intended to check a fire.
flake scatters:	Areas exhibiting evidence of aboriginal stone working or tool manufacturing activities.
forb:	A broadleaved herb; a weed.
gallinaceous:	Belonging to or pertaining to the order Galliformes, comprising the grouse, pheasant, turkey, partridge, and domestic fowl.
grazing permit:	A document authorizing use of the public lands within grazing districts under section 3 of the act for the purpose of grazing livestock.
grazing preference:	Preference denotes the number of active Animal Unit Months (AUMs) of livestock grazing on public lands available to be authorized by permit. Does not include suspended AUMs.
grazing system:	A systematic sequence of grazing use and nonuse of an allotment to reach identified multiple-use goals or objectives by improving the quality and quantity of vegetation.
gully:	A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

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herbaria:	Plural of herbarium. A collection of dried plants mounted and labeled for use in scientific study.
hunter day:	Participation of one person in hunting for all or part of one day.
hydrographic area:	A region wholly or partially surrounded by topographic barriers and comprised of watersheds which drain to a common point, either to an interior basin or to an adjoining hydrographic area.
igneous:	Rocks that are formed by solidification from a molten or partially molten state.
infiltration:	To permeate; to filter into or through.
isoline:	A line on a map or chart along which there is a constant value (as of temperature, pressure, or rainfall).
key forage species:	Relatively or potentially abundant, endures moderately close grazing, and serves as an indicator of changes occurring in the vegetational complex. This species is an important vegetative component which, if overused, will have significant effect on watershed condition, grazing capacity, or other resource values.
kind of livestock:	Species of domestic livestock grazing on a range (cattle, horses, sheep or a combination of these). May be broken down to greater detail (cow with calves, yearlings, steers, ewes, ewes with lambs, etc.).
lay-down fences:	Fencing constructed so that sections can be lowered from the vertical position, when not needed, to prevent snow damage or to permit passage of wildlife.

licensed active use: (licensed use)	Synonomous with Grazing permit.
litter:	A disorderly accumulation of plant material consisting chiefly of decaying organic matter.
low production:	Refers to areas where more than 32 acres are required for each AUM.
mesic:	Characterized by, relating to, or requiring a moderate amount of moisture. For soils, a regime wherein the mean annual soil temperature is 8°C or higher but lower than 15°C, and where the difference between mean summer and mean winter soil temperatures is more than 5°C at a depth of 20 inches or at a stone contact, whichever is shallower.
metamorphic:	Rocks that have formed in the solid state in response to changes of temperature, pressure, and chemical environment (example: slate).
no grazing:	Allotment or grazing areas that have been determined by resource analysis to be unfit for grazing of domestic livestock.
non-AMP:	Allotment or grazing areas where management action has determined that intense grazing is not desirable.
non-commercial forests:	Forests that are not capable of producing at least 20 cubic feet per acre per year of timber-producing tree species.
non-competitive forage:	Forage utilized by only one type of grazing animal.
nonuse (regular):	The authorization by permit to refrain from placing livestock on the range without loss of preference for future consideration in livestock use of public lands. Expressed in Animal Unit Months.
nonuse (suspended):	The difference between the grazing preferences and the present allowable stocking rate of the public lands.

pedestalling:	A phenomenon of erosion where plants or rocks are left standing on columns (or pedestals) of soil. Pedestals are formed when raindrop energy removes the soil surrounding the rock or plant.
perennial:	A plant having a life cycle of three or more years.
perennial waters:	Water which is available for use all year.
perennial yield:	The maximum amount of groundwater that can be salvaged each year over the long-term without depleting the groundwater reservoir. Perennial yield cannot be more than the natural recharge to a groundwater basin.
permit:	See grazing permit.
period-of-use:	The time of livestock grazing on a range area, based on type or state of vegetative growth.
phenology:	A term used to describe the sequence of events and time of occurrence of the life processes of a plant, i.e., start of growth, bloom stage, seed ripe, dormant stage.
phreatophyte:	A long-rooted plant which absorbs its water from the water table or the soil above it.
planning unit:	A geographic area within a District used for assembling resource inventory data. It includes a group of related lands, resource and use pressure problems which should be considered together. The planning unit is the basic recordation and display unit for planning. It should avoid undue separation of natural units such as watersheds, timber stands, etc. In some instances it is possible and advantageous to use county lines as

	unit boundaries. As used in this Environmental Statement the Caliente ES area and the Caliente Planning Unit are identical.
playa:	The shallow central basin of a desert plain in which water gathers after precipitation and then either infiltrates or evaporates.
preference:	See grazing preference.
prescribed burn:	A controlled fire used to meet management goals, (i.e., reduce shrub and tree invasion, change species composition towards a more desirable forage).
privilege:	Synonomous with grazing preference.
ranch budget:	An itemized summary of the expenditures and receipts of a ranch operation.
raptor:	A bird of prey such as an eagle, hawk or owl.
rhizomatous grass:	Grasses with a rootlike, usually horizontal, stem growing under or along the ground and sending out roots from its lower surface and leaves or shoots from its upper surface.
rill:	A small intermittent water course with steep sides, usually only a few inches deep.
riparian habitat:	The environment, including vegetation, on or adjacent to a water supply such as a riverbank, lake, or pond.
riparian vegetation:	Plants that are adapted to moist growing conditions found along waterways, ponds, and generally moist environments.
season-of-use:	Synonomous with 'period-of-use'.

sedimentary:	Rocks that are formed from fragments of other rocks and deposited in water (sand-stone, shale, conglomerate), by precipitation from solution (gypsum) or from secretions of organisms (mostly limestone).
soil survey order:	Order of survey is an indication of detail of survey. A third order survey is more detailed than a fourth order survey. The greater amount of detail is a result of either a larger scale of mapping (i.e. 2 inches to the mile is a larger scale than 1 inch to the mile) or a greater number of test pits per unit area or both.
spring box:	A structure usually made of metal or concrete, often buried, to collect water at a developed spring. From the spring box the water is usually piped to one or more troughs.
stake:	An administrative unit of the Church of Jesus Christ of the Latter Day Saints consisting of five or more wards.
suitable AUM:	An Animal Unit Month of forage determined to meet the range suitability criteria as follows: a) slope less than 50 percent; b) water within four miles; c) forage production in excess of 32 acres/AUM.
talus:	A slope formed by the accumulation of rock debris.
temple district:	Refers to a geographical area around a Church of Jesus Christ of the Latter Day Saints Temple.
thermic:	As applied to soils, a regime wherein the mean annual soil temperature is 15°C or more but lower than 22°C, and where the difference between mean sumer and mean winter soil temperatures is more than 5°C at a depth of 20 inches or at a stone contact, whichever is shallower.
tuff:	A rock composed of compacted volcanic ash.
understory:	An underlying layer of low

ungulate:	A hoofed mammal belonging to one of two taxonomic categories called orders and including horses, cattle, and deer.
vegetation type:	A plant community with distinguishable characteristics. A term used to differentiate vegetation. It generally refers to the species or various combinations of species which have similar stature, morphology, and appearance and which dominate or appears to dominate a site, giving the site a common appearance.
ward:	Basic administrative unit in the Church of Jesus Christ of the Latter Day Saints. It consists of a group of families in a geographical area who meet for religious worship.
water gaps:	A space or break left in a fence to allow access to water.
wilderness study area:	A roadless area which has been found to have wilderness characteristics (thus having the potential of being included in the National Wilderness System), which will be subject to intensive analysis in the BLM Planning System and to public review to determine wilderness suitability, and which is not yet the subject of a congressional decision regarding its designation as wilderness.
wildlife biomass:	The amount of living matter, specifically wildlife, in a unit area or volume of habitat.
withdrawal:	A land area officially removed for a specific purpose from certain types of uses.

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