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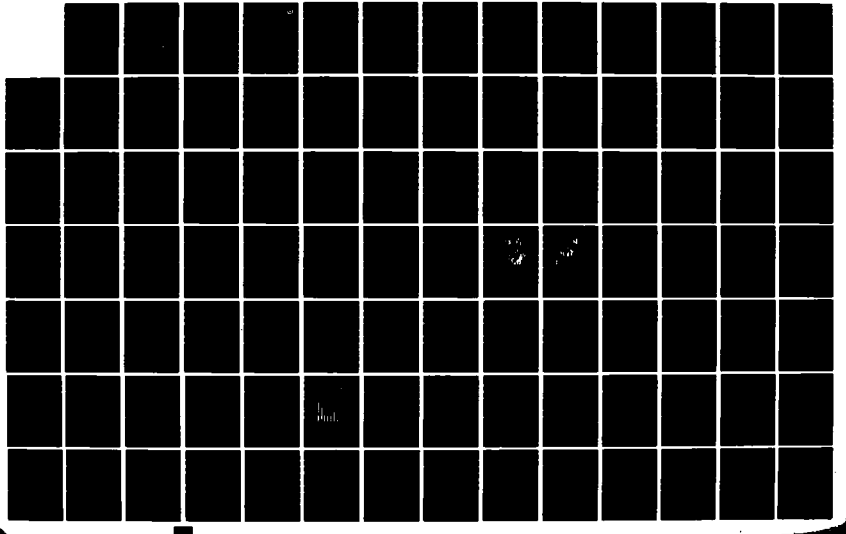

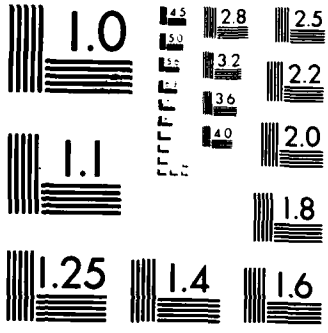

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M-X/MPS

ENVIRONMENTAL

TECHNICAL REPORT

PRELIMINARY FEIS

REVIEW COPY 2 OCTOBER 1981

ETR 40

GRAZING

DEPLOYMENT AREA SELECTION AND LAND WITHDRAWAL/ ACQUISITION

DEPARTMENT OF THE AIR FORCE

M-X ETR-40

ENVIRONMENTAL CHARACTERISTICS OF ALTERNATIVE DESIGNATED DEPLOYMENT AREAS: GRAZING

Prepared for

United States Air Force
Ballistic Missile Office
Norton Air Force Base, California

By

Henningson, Durham & Richardson, Inc.
Santa Barbara, California

REVIEW COPY OF WORK IN PROGRESS

2 October 1981

DEPARTMENT OF THE AIR FORCE
WASHINGTON 20330

OFFICE OF THE ASSISTANT SECRETARY

Federal, State and Local Agencies

On October 2, 1981, the President announced his decision to complete production of the M-X missile, but cancelled the M-X Multiple Protective Shelter (MPS) basing system. The Air Force was, at the time of these decisions, working to prepare a Final Environmental Impact Statement (FEIS) for the MPS site selection process. These efforts have been terminated and the Air Force no longer intends to file a FEIS for the MPS system. However, the attached preliminary FEIS captures the environmental data and analysis in the document that was nearing completion when the President decided to deploy the system in a different manner.

The preliminary FEIS and associated technical reports represent an intensive effort at resource planning and development that may be of significant value to state and local agencies involved in future planning efforts in the study area. Therefore, in response to requests for environmental technical data from the Congress, federal agencies and the states involved, we have published limited copies of the document for their use. Other interested parties may obtain copies by contacting:

National Technical Information Service
United States Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161
Telephone: (703) 487-4650

Sincerely,

JAMES F. BOATRIGHT
Deputy Assistant Secretary
of the Air Force (Installations)

1 Attachment
Preliminary FEIS

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1.0 INTRODUCTION

Rangelands, areas used primarily for the production of livestock and wildlife forage, constitute nearly one-half of the land surface of the earth and over 40 percent of the continental United States (Council for Agricultural Science and Technology, 1974). They represent a wide diversity of soil and vegetation types. They are topographically, edaphically, and climatically heterogeneous. They are also seldom, if ever, in an entirely stable condition. With or without grazing, their soils and cover vary greatly from place to place, often over relatively short distances. Natural disturbances such as drought, flood, freezing, fire, and avalanche, for example, induce significant temporary, and sometimes permanent, changes in the productivity of a particular rangeland. Adjustment in the use and management of rangeland is, therefore, a continuing locally-specific process (Sharp, 1979). Because range forage vegetation regenerates each year, it is a renewable natural resource. Livestock use of rangelands can tap food energy from the sun that would otherwise go unutilized, and does so without adversely affecting the habitat (Long, 1974a). Raising beef cattle, sheep, and goats on the range, moreover, requires less than half the energy, in fossil fuels or electricity, that must be expended to raise them elsewhere.

In the 11 western states, 48 percent of the total land area is federally owned, and 73 percent of this area is grazed. This federal land provides about 75 percent of the feed required by beef cattle and about 90 percent of that required by sheep. Significant portions of the private land in these states are also grazed (Council for Agricultural Science and Technology, 1974). An average acre of federally-managed rangeland currently produces around 100 lb of air-dry forage. Despite the limited production, grazing is still the most economically productive use for much of this land (Clawson, 1972).

Before the passage of the Taylor Grazing Act in 1934, livestock grazing was unregulated on most of federal land. Rangeland can be abused, as occurred between 1865 and the 1930s with near catastrophic results (Council for Agricultural Science and Technology, 1974). There are limits to the grazing pressure that rangeland vegetation and soil can tolerate. Following settlement of the West, livestock numbers rapidly increased, reaching peaks that far exceeded current numbers. This severe overgrazing caused major changes in relative populations of the plant species present, and thereby reduced forage productivity and decreased the livestock-carrying capacity of many rangelands (Stoddart, et al., 1975; Young, et al., 1976). The more palatable native perennial grasses and a few shrubs were selectively eaten, while less palatable shrubs and annual grasses, some introduced, increased in relative numbers to become dominant. After only a half century of uncontrolled use, grazing lands in the U.S. had suffered a loss of over half their forage productivity (Lieurance, 1979). This damage reflected use by too many animals for too long a period, and at the wrong seasons of the year.

Combined with some severe winters, the overgrazing resulted in a sharp decline in animal numbers toward the close of the 19th century. Since World War I, livestock numbers have continued a slow but relatively steady decline. Domestic livestock use of the National Forest lands declined from nearly 20.5 million animal unit months (AUMs) in 1918 to 6.5 million in 1956. (Grazing capacity is measured in AUMs. An AUM represents the forage required to support one mature cow, or its

equivalent in other animals, for one month; for sheep, the equivalent number is five.) The use of BLM lands has declined from nearly 16 million AUMs in 1944 to less than 15 million in 1964 (Clawson, 1967). Since 1965, grazing on BLM lands has decreased by about 14 percent (Vale, 1979). Nevertheless, use is still large (Godfrey, 1979), and over the last 30 to 40 years the productivity of a representative acre has increased by about 20 percent in the intermountain region, by 25 percent in the Rocky Mountain region, and by about 17 percent for the ranches in the prairie states. Each AUM of grazing capacity is roughly equivalent to 28.6 pounds of meat for cattle and 23.3 pounds of meat, or 4.3 pounds of wool, for sheep (Council for Agricultural Science and Technology, 1974). However, this will vary by season, type of livestock, and quality of forage available.

In response to the degradation of public-domain rangeland brought about by unrestricted grazing, the Taylor Grazing Act established the Bureau of Land Management (originally called the Grazing Service). By 1974 the decline in range condition, started during the 19th century, had been stopped on most of the 170 million acres of rangeland managed by the BLM. However, about 80 percent of these areas are still only in "fair" (or worse) condition (Vale, 1979). Where intensive management has been implemented on the remaining 20 percent, the condition of most of these areas is improving (Lieurance, 1979; Vale, 1979). The condition of nonfederal rangelands has also improved markedly since the early 1960s (Davis, 1979).

Over the last 30-40 years, the value of ranches, per animal unit of grazing capacity, has increased ten to fifteenfold. The animal unit (AU) of livestock feeding capacity differs from the AUM. An animal unit is a hypothetical single animal, usually defined as one cow or five sheep. The grazing capacity in Nevada/Utah is measured in AUMs as rangeland provides only forage. Ranch and farmland in Texas/New Mexico provides both forage and feed grains; the equivalent number of animals a ranch or farm can support is measured in AUs. Current values for many ranches appear to be well above their earning capabilities in livestock operations (Saunderson, 1973). Operating costs have also gone up, but the returns received for animals produced have not gone up as fast, resulting in a cost-price squeeze that has made many ranches only marginally profitable.

The current importance of grazing to western rangelands is underscored by a recent surge in activity addressing range problems. A 1974 Natural Resources Defense Council suit, followed by the Federal Land Policy and Management Act (1976) and the Public Rangelands Improvement Act (1978), has made necessary a series of environmental impact statements for compliance with section 102(2)C of the National Environmental Policy Act of 1969. By 1988, 144 individual EISs will have been prepared covering all grazing land. To date, four environmental impact statements relating to the Nevada/Utah study area have been completed by BLM: the Caliente and Tonopah Grazing Environmental Impact Statements (Nevada), the Hot Desert Grazing Management Environmental Impact Statement (Utah), and the Mountain Valley Rangeland Management Environmental Impact Statement (Utah). As a possible result of these EISs, reductions averaging 25 to 33 percent in permitted AUMs, may be imposed in many of the BLM planning units.

The federal government tries to achieve a fair market value in setting its grazing fees. In actual practice, the fee charged is generally a conservative estimate of value, being less than what a rancher would have to pay to lease

comparable forage land from a private owner. This judgment is indirectly supported by the observation that ranchers were paying premium rates for ranches with "attached" grazing permits in order to acquire the use of public lands with low grazing fees (USDI - BLM, 1979, 1980; Vale, 1979). On March 1, 1980, grazing fees were raised from $1.89 to $2.36 per AUM. A comparison of 1979 and 1980 forage fees is shown in Table 1-1.

The future trends for rangelands and the livestock industry will probably be as variable as they have been over the past 50 years. Adding to this variability are the uncertain energy future and the economic uncertainty that is always involved in the use of rangelands (Anderson, 1979). Livestock production has been, and will probably remain, the traditional use of rangeland (Clawson, 1972). Demand for beef is expected to continue to increase. However, the available rangeland in the eleven western states has been declining, by about 1.4 million acres per year. Recent conversions of forest land to rangeland may have slowed or reversed this trend (USDA, 1980). There has been increasing pressure lately for more livestock production from a declining land base (Council for Agricultural Science and Technology, 1974). Since the most suitable rangelands are now being fully utilized for grazing, expansion of cattle and sheep grazing would require improvement of currently-used areas, conversion to rangeland of other areas such as cropland or forest land, or use of marginal lands. The effects on marginal or unimproved land would be similar to those in areas where overgrazing has occurred. The kind of range, intensity of grazing, and type of management employed to control the livestock use of rangelands all determine the kind of environmental effects that would occur. Other uses of rangeland such as energy development, mining, and recreation are increasing (and competing with) the traditional livestock use of rangelands. How these uses may change and what their impacts will be is uncertain.

Rangeland is both useful, and sensitive to impact. Many comments on the Draft EIS have been concerned about both aspects of rangeland. The following comment is an example of the type of concern expressed.

PUBLIC COMMENT ON THE DRAFT EIS:

> "Grazing livestock on the rangelands of the western U.S. is one of the best uses of this arid land. With proper management these rangelands provide a sustained forage base from year to year for a large number of livestock. Loss of seasonal grazing areas, watering facilities, access, or vegetation from these areas will have a great effect on grazing. We hope that whatever may happen in this area that these renewable resources are conserved as much as possible so that they may continue to be harvested economically on a sustained yield." (B0166-7-468)

1.1 NEVADA/UTAH REGION

Nevada and Utah lands are used mainly by the livestock industry. In Nevada, livestock and agriculture represent 75 percent of the income in the rural areas. Use of BLM lands for open-range grazing constitutes the most typical livestock operation in the Nevada/Utah study area.

Table 1-1. Grazing fee determinants for 1979 and 1980.

Animal Group	1979 Fee (Head/Month)	1980 Fee (Head/Month)
Cow	$1.89	$2.36
Cow and Calf	2.46	3.07
Yearling	1.32	1.65
Bull/Horse	2.46	3.07
Ewe and Lamb	0.57	0.71
Ewe	0.38	0.47

T307/8-15-81

Source: B.L.M., 1979.

Overall, livestock producers in Nevada obtain 33 percent, and in Utah 13 percent, of their annual forage requirements from public lands (Vale, 1979). About 79 percent of Nevada, and 77 percent of Utah, is grazed (Council for Agricultural Science and Technology, 1974).

Cattle and sheep operators are headquartered on private land holdings and, by permit, graze their animals on private, BLM, and Forest Service land, generally near their home bases. Numerous sheep operations, however, are headquartered in Utah, but have significant grazing leases in Nevada BLM planning units. The large operators in a given community will often have cattle or sheep grazing leases on lands in a number of different planning units. The individual grazing allotments within each district operate under controlled time periods, generally designed to increase forage quality and quantity as well as to meet multiple-use requirements imposed by mining, recreation, wildlife, or environmental-protection interests. Overall, nearly 700 individual ranching operations utilize federal lands in the Nevada/Utah study area. Approximately 78 percent of these are cattle operations and the remainder for sheep.

Because of water available from the Wasatch Mountains, western Utah has a more diversified agricultural economy, though livestock is still the predominant industry in most of the study area. Open-range grazing is the most typical farm operation in western Utah.

About 29 million acres of BLM-administered land in the Nevada/Utah study area are covered in this report. Although most of this land is grazed, still more is grazable. The BLM planning units in the more arid reaches of the study area have a lower proportion of grazed to grazable lands than do some planning units in areas of greater precipitation. In the arid Caliente planning unit in southern Nevada, for example, there are 3,375,473 acres of BLM-administered land; 2,222,027 acres, or 66 percent, are grazed. Another 15 percent is grazable but is not currently used. In the Tonopah planning unit, there are 3,616,733 acres of BLM lands; 2,998,059 acres, or 83 percent, are grazed. Another 8 percent is grazable. The 15 percent of the Caliente District and the 8 percent of the Tonopah District are currently unused because water is unavailable. The BLM considers that about 4 mi is the farthest cattle can travel from water and still graze efficiently. Even in areas where water is available its distribution is sometimes inadequate for optimum use by livestock, wildlife, wild horses, and burros (U.S.D.I.-BLM, 1979, 1980b).

The two most common types of livestock operations in the Nevada/Utah area are cow-calf and ewe-lamb. A cow-calf operation consists of a base herd of bulls and cows that produce a calf crop each year. A few of the heifer calves are kept to enter the breeding cow herd. Most of the calf crop and the nonproductive or old cows and bulls are marketed. Market size for calves is usually between six and fourteen months of age. Ewe-lamb operations function in a similar manner but the animals are usually kept on the range for a greater portion of their lives before slaughter. With the rising cost of grain a larger proportion of beef cattle now spend additional time on "grass fattening," or range forage. Marketed animals usually go to other states for additional fattening on rangelands, pasture, and/or feedlots. The limited cropland in Nevada and Utah is used primarily to raise feed to carry the base herd over the winter period when range forage is limited, or not available.

Range use between areas and seasons and between private and federal ownership is tightly integrated. Each operator has developed a balance between his seasonal ranges and his available supplemental feeds. A loss of only one season's forage crop, on one range, affects all the other ranges used, even if these are not directly impacted (Vale, 1979). Use of rangelands is also tightly controlled by availability of water and access. Disruption of either water supplies or access can seriously affect the use of rangelands. Livestock operators, owning grazing permits and private property have often utilized those rangelands for generations, and these operations represent the maintenance of long family heritages and traditions. This long history of the industry in the region, and its potential susceptibility to impact, has been expressed in many public comments on the Draft EIS.

PUBLIC COMMENT ON THE DRAFT EIS:

> "We have been engaged in this business for three generations. My grandfather grazed animals freely on the open range in the days before grazing . . . was passed into law. My father spent his lifetime putting together a viable economic operation and I have spent the past twenty years trying to hold it together. The economic climate in this particular industry at this particular time is such that just a little more adversity may cause the industry to disappear." (B0261-6-001)

Use of rangelands by wild horses and burros currently exceeds range carrying capacity in many areas (U.S.D.I.-BLM, 1979, 1980). Management of the animals to maintain numbers in balance with available forage is hampered by legal and funding restrictions. Domestic livestock numbers and utilization could result in reduction of AUMs by the BLM in areas where horse and burro overstocking occurs. Disturbances by projects such as M-X will intensify these problems.

In the mid-1970s, livestock population totaled approximately 555,000 animal units on Nevada, and 764,000 on Utah (Council for Agricultural Science and Technology, 1974), grazing rangelands. Cattle and sheep inventories for 1970, 1974, and 1978 are presented in Table 1.1-1. These figures include all livestock, not just those using federal range. During this same period, the number of cattle decreased slightly in Nevada and increased slightly in Utah. Both states experienced a 50 percent reduction in sheep numbers from 1970 to 1978. This reduction in sheep numbers occurred in all study-area counties except Lander (Table 1.1-2). This downward trend has apparently reversed recently.

During the 1970s, all study-area counties, except those in Utah, and Clark, Esmeralda, and Eureka counties in Nevada, had declining numbers of cattle. Drought conditions, falling cattle prices (since the high year of 1973), and an overall decrease in the quality of range forage for livestock herds have been cited as reasons for Nevada's declining herd size.

Based on the data in Table 1.1-2, the 1978 animal population totaled 367,000 animal units (one cow or five sheep), 166,000 in Utah and 201,000 in Nevada, grazing both private and federal range within the study area. In the individual hydrologic subunits of the study area, the number of animal units were about 1,900 to 24,000 in Utah and 150 to 16,000 in Nevada. As part of an economics study of potential M-X

Table 1.1-1. Livestock inventory, Nevada/Utah, 1970-1978 (in thousands).

State	Cattle			Sheep		
	1970	1974	1978	1970	1974	1978
Nevada	626	664	570	227	177	114
Utah	808	832	864	1,053	772	491

T505/9-23-81/F

Sources: USDA, Nevada Agricultural Statistics, 1977; Utah Department of Agriculture, Utah Agricultural Statistics, 1978.

Table 1.1-2. Livestock inventories, Nevada/Utah study area counties, 1974 and 1978 (in thousands).

County	Cattle			Sheep		
	1974	1978	Percent of Total State Production	1974	1978	Percent of Total State Production
Nevada						
Clark	15	17	3.0	*	*	
Esmeralda	6	6	2.0	*	*	
Eureka	32	34	6.0	14	5	4.4
Lander	34	31	5.4	4	5	4.4
Lincoln	26	21	3.7	*	*	
Nye	32	27	4.7	6	4	3.5
Pershing	39	35	6.1	18	6	5.3
White Pine	26	21	3.7	34	24	21.0
Nevada Study Area Totals	210	192	33.7	76	44	38.6
Utah						
Beaver	25	26[1]	3.0	4	3[1]	0.6
Iron	23	24[1]	2.8	56	36[1]	7.3
Juab	16	17[1]	2.0	7	4[1]	0.8
Millard	67	70[1]	8.1	13	8[1]	1.6
Tooele	14	15[1]	1.7	29	18[1]	3.7
Utah Study Area Totals	145	152	17.6	109	69	14.0
Regional Totals	355	344	23.7	185	113	18.7

T506/9-17-81/F

*Less than 500 sheep.

[1]Utah estimates are derived by assuming that each county's share of the state output has remained constant since 1974.

Source: U.S.D.A., 1979a; Nevada Agricultural Statistics, 1977; Utah Department of Agriculture, 1978; Utah Agricultural Statistics, 1978.

impact to ranches in Nevada and Utah (Resource Concepts Inc., 1981) the study area was divided into five regions (Figure 1.1-1). Analyses of BLM grazing records and U.S. Forest Service data for the study area revealed a total of 667 operators, with livestock equivalent to 193,000 animal units, using federal range. A breakdown of the livestock operations in the study area by region, and by cattle and sheep operations is shown in Table 1.1-3.

Concentration of livestock is measured by the number of acres required to support each animal unit (AU), the higher the number of acres, the lower the concentration. Utah required an average of about 68 acres for each animal unit and Nevada an average of about 126 acres (Council for Agricultural Science and Technology, 1974). In the Utah study area the average concentration of livestock is about 70 acres per AU, and in the Nevada study area about 90 acres per AU. Each animal unit on federal range in Nevada and Utah requires a grazing capacity of approximately 5 AUM. The importance of federal range is related to how critical it is to the operation's annual forage supply.

In 1980, grazing capacity was about 2,554,000 AUMs on 1,107 allotments in the BLM resource areas affected by the M-X deployment (Table 1.1-4). Grazing capacity varies from as much as 118,000 AUMs to less than 100 among the individual hydrologic subunits potentially impacted by the project (Table 1.1-5). The estimated concentration of use varies from as few as about 6 acres to support each AUM in the highy productive hydrologic subunits, to over 100 acres to support each AUM in less productive hydrologic subunits (Table 1.1-5). The U.S. Forest Service had a total of 384,000 AUMs of rangeland use in the Great Basin region of Nevada and Utah, and this use is projected to increase to over 392,000 AUMs by the year 2000 (U.S. Dept. of Agriculture, 1981). These USFS lands are at higher elevations, used primarily in the summer, and are generally more productive than BLM land because they receive more precipitation. Vegetation productivity is also not uniform within a valley. These variances in productivity have been an area of concern in several public comments such as the one following:

PUBLIC COMMENT ON THE DRAFT EIS:

> "The valley bottoms where the roads and the missile shelters would be located are the sites producing the most forage for the entire drainage. Shelter--cluster designers prefer the topography where the deepest soils occur. So do the more palatable and productive plants, and livestock." (B0125-3-433)

In both states, the use of land for agricultural purposes is generally encouraged by planning and zoning ordinances designed to protect agricultural land from urban development. Because of limited water availability, soils with good agricultural potential are used for grazing rather than cropland, in most of the study area. Forage management programs on these good soils respond well to treatment, and their permitted AUMs per acre can more than double. The limited cropland and available water in Nevada and Utah is used primarily to raise feed to carry the base herd over the winter, when range forage is limited or unavailable.

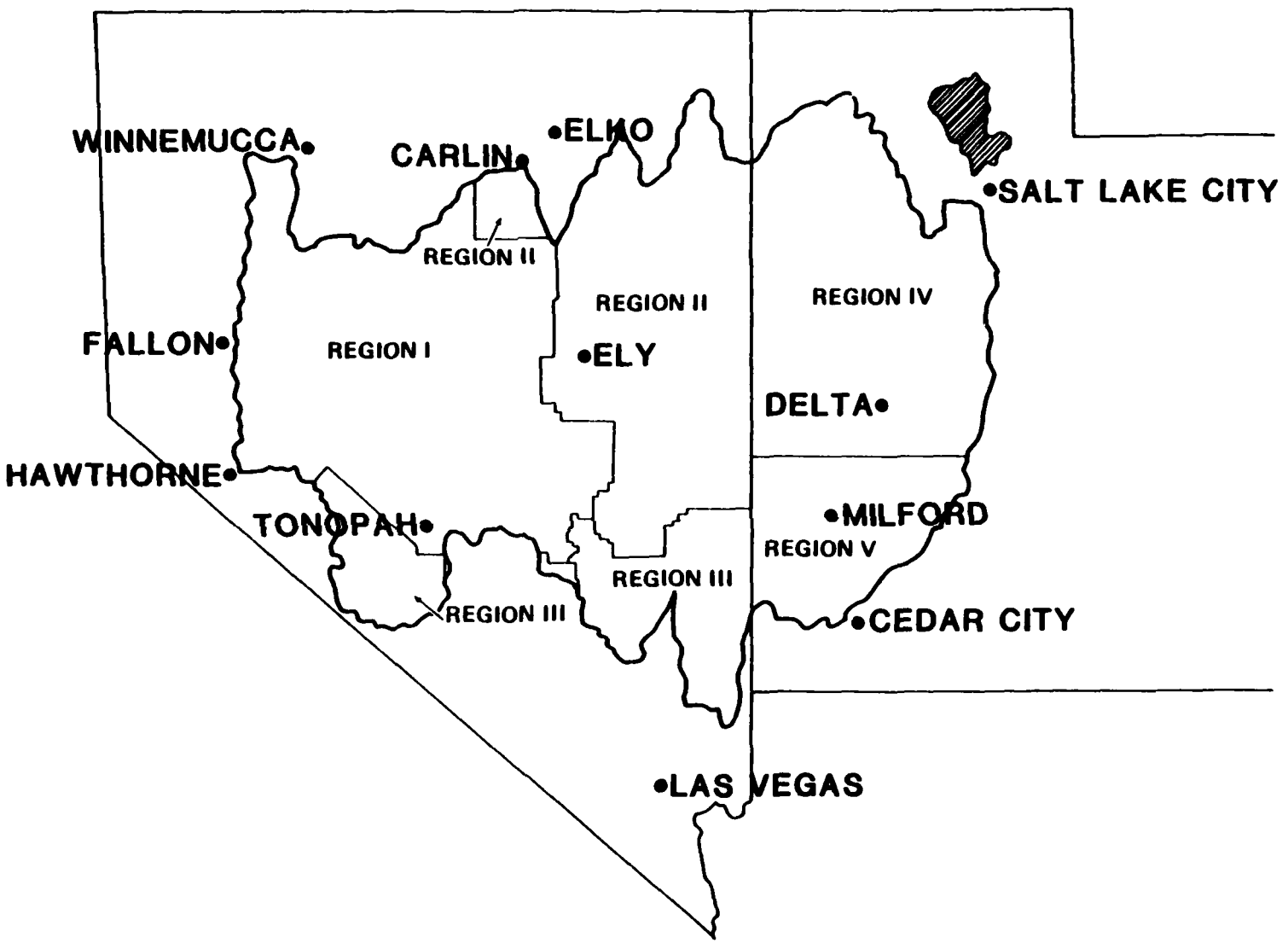

Figure 1.1-1. The Nevada/Utah ranch economics study regions.

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Table 1.1-3. Characteristics of the range livestock industries of Nevada and Utah located within the study area.

Region	All Operators	Cattle Operators	Sheep Opertors	Total Cattle	Total Sheep
I.	84	78	6	18,038	16,300
II.	116	101	15	42,300	89,541
III.	44	44	--[1]	12,900	--
IV.	262	178	84	21,961	201,717
V.	161	117	44	22,434	69,935
Study Area	667	518	149	117,633	377,493

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[1]Sheep operators utilizing BLM range resources within Region III were home based in Utah and thus included in Region V.

Source: USDI, Bureau of Land Management, printout of Range Management Grazing Masters for July 15, 1980.

Table 1.1-4. Distribution of allotments and grazing capacity (AUMs) in BLM resource areas affected by M-X deployment (1980).

Nevada			Utah		
BLM District and Resource Area	Number of Allotments	Grazing Capacity (AUMs)	BLM Distict and Resource Area	Number of Allotments	Grazing Capacity (AUMS)
Elko District			Salt Lake District		
Elko	137	396,053	Pony Express	83	119,075
Wells	101	375,199	Cedar City District		
Ely District			Beaver River	208	168,664
Egan	76	211,296	Dixie	81	21,176
Schell	67	278,330	Richfield District		
Las Vegas District			House Range	96	146,585
Stateline-			Warm Springs	57	157,597
Esmeralda	16	38,352	Sevier River	88	46,937
Caliente-	97	113,464			
Virgin Valley					
Battle Mountain District					
Shoshone-					
Eureka	64	317,027			
Tonopah	30	163,964			
Nevada Totals	494	1,893,685	Utah Totals	613	660,034

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Table 1.1-5. Total AUMs and acres per AUM on BLM allotments in Nevada/Utah study area hydrologic subunits (Page 1 of 3).

Hydrologic Subunit No.	Name	AUMs in Hydrologic Subunit	Acres/AUM
3	Deep Creek, Nev./Utah	15,543	13.06
4	Snake, Nev./Utah	101,389	14.75
5	Pine, Utah	33,824	11.45
6	White, Utah	32,605	17.45
7	Fish Springs, Utah	22,448	13.13
8	Dugway, Utah	17,511	9.77
9	Government Creek, Utah	26,442	10.14
13	Rush, Utah	1,176	10.35
32B	Great Salt Lake, Utah	49,788	13.72
46	Sevier Desert, Utah	117,650	13.67
46A	Sevier Desert-Dry Lake, Utah	33,504	13.88
47	Huntington, Nev.	39,689	8.00
49	Elko Segment, Nev.	5,480	6.61
50	Milford, Utah	64,204	10.56
52	Lund, Utah	28,945	11.90
53	Beryl, Utah	22,739	15.60
53	Pine, Nev.	49,999	9.97
54	Crescent, Nev.	27,298	12.14
54	Wah Wah, Utah	31,312	12.11
55	Carico Lake, Nev.	18,696	11.99
56	Upper Reese River, Nev.	31,346	13.68
57	Antelope, Nev.	19,892	13.39
58	Middle Reese River, Nev.	12,306	15.60
59	Lower Reese River, Nev.	18,060	11.27
60	Whirlwind, Nev.	2,171	11.68
134	Smith Creek, Nev.	16,493	18.34
135	Ione Valley, Nev.	9,652	19.59
137A	Big Smoky-Tonopah Flat, Nev.	22,174	37.56
137B	Big Smoky-North, Nev.	19,792	20.16
138	Grass, Nev.	31,168	11.63
139	Kobeh, Nev.	30,125	15.54
140A	Monitor-North, Nev.	8,069	18.52
140B	Monitor-South, Nev.	5,858	22.22
141	Ralston, Nev.	20,379	20.81
142	Alkali Springs, Nev.	2,746	53.06
143	Clayton, Nev.	6,479	53.05
144	Lida, Nev.	5,963	53.29

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Table 1.1-5. Total AUMs and acres per AUM on BLM allotments in Nevada/Utah study area hydrologic subunits (Page 2 of 3).

Hydrologic Subunit No.	Name	AUMs in Hydrologic Subunit	Acres/AUM
145	Stonewall Flat, Nev.	318	52.92
148	Cactus Flat, Nev.	1,441	22.99
149	Stone Cabin, Nev.	17,708	22.30
150	Little Fish Lake, Nev.	12,550	15.15
151	Antelope, Nev.	17,695	13.49
152	Stevens, Nev.	1,120	10.72
153	Diamond, Nev.	27,643	14.91
154	Newark, Nev.	25,284	17.21
155A	Little Smoky-North, Nev.	16,335	23.28
155B	Little Smoky-Central, Nev.	848	47.22
155C	Little Smoky-South, Nev.	13,582	24.19
156	Hot Creek, Nev.	25,278	26.35
169A	Tikapoo-North, Nev.	3,643	60.30
170	Penoyer, Nev.	9,336	33.81
171	Coal, Nev.	13,47?	20.10
172	Garden, Nev.	13,502	13.65
173A	Railroad-South, Nev.	12,752	26.22
173B	Railroad-North, Nev.	59,038	16.89
174	Jakes, Nev.	14,232	15.57
175	Long, Nev.	22,590	17.85
176	Ruby, Nev.	37,961	18.02
178A	Butte-North, Nev.	13,641	12.64
178B	Butte-South, Nev.	19,713	23.60
179	Steptoe, Nev.	62,504	14.63
180	Cave, Nev.	10,595	18.41
181	Dry Lake, Nev.	29,983	18.12
182	Delamar, Nev.	9,282	22.20
183	Lake, Nev.	20,980	15.98
184	Spring, Nev.	72,868	11.72
185	Tippett, Nev.	13,200	14.45
186A	Antelope-South, Nev.	6,837	11.26
186B	Antelope-North, Nev.	15,034	12.24
194	Pleasant, Nev.	3,326	15.03
196	Hamlin, Nev./Utah	29,644	16.56
198	Dry, Nev.	1,478	47.12
199	Rose, Nev.	90	45.67
200	Eagle, Nev.	1,617	23.38
201	Spring, Nev.	8,653	20.32
202	Patterson, Nev.	12,704	20.56

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Table 1.1-5. Total AUMs and acres per AUM on BLM allotments in Nevada/Utah study area hydrologic subunits (Page 3 of 3).

Hydrologic Subunit No.	Name	AUMs in Hydrologic Subunit	Acres/AUM
203	Panaca, Nev.	9,481	20.59
204	Clover, Nev.	6,030	37.10
205	Meadow Valley Wash, Nev.	12,797	44.69
206	Kane Springs, Nev.	5,476	25.99
207	White River, Nev.	39,986	19.05
208	Pahroc, Nev.	19,110	14.61
209	Pahranagat, Nev.	12,927	28.57
210	Coyote Spring, Nev.	3,806	56.74
219	Muddy River Springs, Nev.	589	103.6
Total		1,844,459	

Overall acres per AUM = 15.26

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Source: USDI, Bureau of Land Management grazing record masters, December 8, 1980.

Another result of the aforementioned EIS studies is planned reductions, of up to two thirds or more, of the AUMs on many allotments. If implemented, these cutbacks will significantly reduce the short-term livestock production in Nevada and Utah. Over the long term, however, livestock use of BLM lands is projected to increase by up to 30 percent. Much of this increased grazing capacity would come from improved rangeland, because treatment would result in more productive vegetation.

Approximately 59 percent of the potentially impacted hydrologic subunits already have areas of treated rangeland. Within these subunits, the area of treated rangeland ranges from 0.01 to 14 percent of the total land area. The Caliente Grazing EIS (U.S.D.I. - BLM, 1979) proposes to treat 233,641 acres by chaining, plowing, or brush beating; 58,560 acres by chemical herbicide treatment, and 108,960 acres by farming. Reseeding with more desirable species would follow treatment. The total area to be treated amounts to nearly 12 percent of the district. In the Draft Tonopah Grazing EIS (U.S.D.I. - BLM, 1980), the Bureau of Land Management has proposed to treat 16,405 acres by burning. Seeding of more desirable species would also follow treatment.

The importance of some rangelands to the livestock industry is not always accurately reflected in either the total use or level of grazing concentration in a valley. Areas having low total use or concentration are capable of providing forage during seasons when other sources may not be available or usable (Holmgren and Hutchings, 1972), or they may be vital for the continued operation of ranches dependent on them (U.S.D.I. - BLM 1979; 1980). A generally limited grazing capacity, because of aridity or past misuse, coupled with the current economic situation has made many ranch operations only marginally profitable (U.S.D.I. - BLM, 1979; 1980). Even relatively small livestock reductions resulting from project impacts are of concern, because they could force ranches out of business that otherwise would remain in operation. Project-related loss of forage area could result in the overgrazing of other rangelands, degrading them and encouraging the spread of alien annuals such as Halogeton glomeratus. Impacts expected from halogeton are covered more thoroughly in ETR-14, Vegetation.

Major grazing impacts that could occur from reduction of the vegetation cover by M-X deployment in the Nevada/Utah valleys could include a reduction in the livestock grazing capacity, interference with livestock management and operations, and increased operating expenses. Impacted grazing lands would include many acres of creosote bush scrub, alkali sink scrub, shadscale, Great Basin sagebrush, and pinyon-juniper woodland vegetation types. These areas support large populations of livestock, feral horses and burros, and large native herbivores. Most of the vegetation impacts from M-X deployment would occur in the sagebrush and shadscale vegetation types. Sagebrush vegetation occurs in the higher, usually moister, and more productive regions of the valleys. It is used primarily for other than winter grazing. The lower, drier, more extensively impacted sites with shadscale vegetation are used primarily for winter grazing.

The plant species used for forage vary considerably. Some widespread and abundant species, such as big sagebrush (Artemisia tridentata) or species of rabbitbrush (Chrysothamnus spp.), are only lightly utilized. Others, such as winterfat (Eurotia lanata), antelope bitterbrush (Purshia tridentata), and palatable grasses may cover less acreage, but local concentrations can provide a high

percentage of the forage in these areas. Improved rangelands are also examples of these areas. Because of their localized nature, significant changes in regional grazing capacity can occur if the areas containing these valuable species are impacted.

The successional patterns in many Great Basin shadscale (Holmgren and Hutchings, 1972) and sagebrush communities (Young et al., 1972) have profoundly changed as a result of overgrazing. The shadscale community, which sometimes includes pure or nearly pure stands of winterfat, is highly variable and often unpredictable in its patterns of secondary succession following disturbance. Areas having an abundance of winterfat are also some of the most productive winter ranges in the region, and some of the most difficult to revegetate after disturbance. The vegetation resulting from grazing impacts is often similar in many areas, even though the pregrazing communities from which it originated were different (Holmgren and Hutchings, 1972). Often grazing has so altered a community that its original composition is no longer discernible and its pattern of recovery uncertain. These differences appear to result from plant-soil relationships that are little understood (Holmgren and Hutchings, 1972).

In many sagebrush communities, grazing has reduced or eliminated the perennial grasses and changed the shrub composition in many ways. Shrubs least preferred for grazing, including the dominant species of Artemisia, have increased in population density, while preferred forage species have become less common. Introduced annuals such as Russian thistle (Salsola iberica), tumbling mustard (Sisymbrium altissium), and cheatgrass (Bromus tectorium), are now so widespread, and form such a complete understory in some degraded communities, that reestablishment of native perennial grasses is often precluded (Young and Evans, 1973), and fire behavior and secondary succession are altered (Young et al., 1976; Young and Evans, 1978). Without additional disturbance, Russian thistle will be gradually replaced by sagebrush on many of the higher elevation sites (Holmgren and Hutchings, 1972). Similar patterns have resulted from past overgrazing of other vegetation communities in the potentially impacted hydrologic subunits.

1.2 TEXAS/NEW MEXICO REGION

The livestock industry represents the principal land use in the Texas/New Mexico study area. The vegetation, climate, and topography of the study area are conducive to rangeland and pasture productivity. Lack of water restricts much of the land in some portions of the study area to grazing instead of crop production. Agriculture and livestock industries have historically comprised a substantial part of the economy. The study area was settled for purposes of cattle ranching, and then farming, and over the years agriculture has been relatively stable in terms of production levels and areas farmed. Most of the livestock present today are found on farms rather than ranches. The study-area counties have some of the most highly productive cropland in the two states; their crops, however, are largely consumed in cattle feedlots. The importance of the livestock industry can be expected to continue into the future and concern about its sensitivity to impacts by M-X was also expressed in public comments in the Draft EIS.

PUBLIC COMMENT ON THE DRAFT EIS:

> "This proposed site is some of the nations prime farm and ranch land. Many large feedlots in and around the area depend on grain and other feed commodities grown under irrigation within the proposed site. The area proposed is also very fertile, with the bundant native grasses for grazing of beef cattle. As I understand the M-X plan, the farming and ranching in the area would be a thing of the past. In a world as hungry as this can we afford to do away with this much prime farm and ranch land?" (A0054-6-002)

Overall, about 86 percent of New Mexico and 73 percent of Texas is grazed, including cropland where the stubble in fields is grazed after harvest. Just under 60 percent of the 20 study-area counties, about 13 million acres, is used for grazing and pasture land. The major portion (75 percent) of the grazing land in the Texas/New Mexico study area, lies in New Mexico (Council for Environmental Science and Technology, 1974). This grazing land is entirely privately owned, except in Chaves County, New Mexico, where the BLM administers certain lands in a manner similar to that used in Nevada and Utah. National Grassland grazing areas in Dallam County Texas are administered by the USFS.

In the mid-1970s the livestock population amounted to approximately 1,231,000 animal units in New Mexico and 13,988,000 in Texas. Within the study area, the total livestock population amounted to 2,269,000 animal units, 1,486,000 in Texas and 783,000 in New Mexico (Table 1.2-1).

Cattle and sheep inventories have generally decreased recently in New Mexico counties, while only the cattle inventory has decreased in the Texas counties. Much of the livestock sold in Texas in 1974 was raised in the Texas portion of the study area. Many factors, such as market conditions, influence sheep and cattle production, and the current decline should not be used to predict future land use by the livestock industry. Based on the total acreage in each state, each animal unit of livestock population requires about 12 acres in Texas and 63 acres in New Mexico (Council for Agricultural Science and Technology, 1974). Average livestock concentration in the study area is about 7 acres per animal unit in Texas, and 25 acres per animal unit in New Mexico. Rangeland productivities in the two states are roughly equivalent for similar vegetation types.

Although cow-calf and ewe-lamb operations are important, a major part of the greater livestock concentration figures for Texas/New Mexico, relative to those for Nevada/Utah, is due to large numbers of animals in feedlots, where they are finished out prior to slaughter. Cattle are shipped to feedlots in the region from as far away as New Hampshire. In the New Mexico study area, nearly 60,000 cattle per year are finished out feedlots. This number represents about 10 percent of all cattle in the region. Cattle finishing is an even larger industry in west Texas, with about 75 percent of the 1.49 million cattle in the Texas study-area counties maintained in feedlots. Approximately two thirds of the final cost and one third of the final weight of the animals are added in the feedlots.

Another factor affecting the amount of land used for grazing is the continued availability of water for the irrigation of cropland. Within 40 years, major portions

Table 1.2-1. Abundance (total animal units) and concentration (acres/animal unit) in the Texas/New Mexico study area.

State/County	Total Animal Units[1]	Animal Unit Concentration[2]
Texas		
Bailey	48,000	11.1
Castro	192,000	2.9
Cochran	30,000	16.7
Dallam	92,000	10.4
Deaf Smith	227,000	4.3
Hale	94,000	7.0
Hartley	109,000	8.7
Hockley	14,000	46.8
Lamb	42,000	15.6
Moore	78,000	7.4
Oldham	64,000	14.8
Parmer	159,000	3.5
Randall	96,000	6.1
Sherman	99,000	5.9
Swisher	142,000	4.0
Texas Totals	1,486,000	6.5
New Mexico		
Chaves	171,000	22.8
Curry	88,000	10.2
De Baca	42,000	35.9
Harding	47,000	29.1
Lea	86,000	32.7
Quay	91,000	20.2
Roosevelt	90,000	17.5
Union	168,000	14.5
New Mexico Totals	783,000	20.9

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[1] Data for Texas and New Mexico derived from the 1974 agricultural statistics for each county. These figures were converted to animal units (one animal unit equals one cow or five sheep).

[2] An average animal unit density figure (acres per animal unit) was computed for each county from its total number of animal units and area in acres.

of the Ogallala aquifer, which supplies the high plains region of Texas and New Mexico with irrigation water, will have been depleted. About 2 million acre-feet of water are currently consumed annually. This usage rate is lowering the water table by an average of two feet per year in many areas, and up to eight feet during some years. Water is mainly used for irrigating crops, the most demanding of which is corn. As water loss due to the overdrafts of the Ogallala aquifer continue, corn production will decrease. Since over 95 percent of the corn raised is used to feed cattle in local feedlots, some feedlots may go out of business. Cattle will either have to be shipped out of the study area counties for fattening in other feedlots (Colorado, Nebraska, Iowa, etc.) or spend more time on rangelands. Marginal irrigated croplands that are no longer usable can either be converted to dryland agriculture or abandoned. This shift from irrigation is already taking place in several study-area counties, where the increased cost of petroleum is making it uneconomical to pump irrigation water from ever-increasing depths. If abandoned, these croplands may be converted to dryland crops or back to usable grazing land, thus avoiding invasion by annual weeds, and providing livestock forage.

About 2,237,000 acres of land are used for grazing in the Texas/New Mexico study area counties. This area constitutes about 40 percent of the land suitable for M-X construction. Most of the potentially impacted rangeland, 74 percent, is in the New Mexico counties. Percentages of rangeland in those counties range from 24 percent in Curry County, to over 95 percent in Chaves County. The range is lower in the Texas counties, varying from 5 percent in Deaf Smith County to 78 percent in Hartley County. The remaining land area is primarily agricultural.

The range of potential impacts to occur as a result of M-X is considerable even though the potential level of effect is small for many of them. That those who could feel the effects of these impacts are aware of the possibility is evident in many comments, such as the following.

PUBLIC COMMENT ON THE DRAFT EIS:

> "The estimated AUM losses are greatly underestimated. Indirect losses of AUMs are not considered. Loss of water will reduce AUMs nuisance and obstruction as noise, ORVs dust, and loss of vegetation will drastically reduce AUMs. Interruption of normal grazing patterns will cause great losses. The change in these patterns will cause serious management problems, as well as uncontrollable hearding problems of change in watering patterns. Total withdrawal of AUMs in DDA areas will occur because of halogeten." (B0107-1-005)

2.0 METHODOLOGY FOR IMPACT ANALYSIS

2.1 NEVADA/UTAH REGION

Grazing capacity (AUM) losses resulting from vegetation disturbance by M-X deployment have been estimated as direct impacts. All potential impacts associated with project construction that could temporarily reduce livestock use of rangelands have been combined in a worst-case analysis. Grazing capacity (AUM) loss would be relatively larger in high productivity hydrologic subunits than in low productivity subunits for each acre directly disturbed or removed from production by construction disturbances. Discussion of analysis methodology for estimating potential economic losses associated with grazing capacity (AUM) loss and indirect impacts follows.

Within each hydrologic subunit, M-X impacts on grazing, and the resulting changes over time, would depend primarily on the proportion of the subunit area affected by the project. The level of impact to grazing operations on lands in surrounding hydrologic subunits would also influence the grazing lands impact in any particular hydrologic subunit. The types of impact in each hydrologic subunit are essentially the same, but differ in magnitude, depending on the amount and productivity of the land in the hydrological subunit.

An estimate of total area (acres) and grazing capacity (AUMs) allotted was determined for each BLM-mapped allotment within each hydrologic subunit in the Nevada/Utah study area. AUM equivalents used for the analyses are listed in Table 2.1-1. Allotted acres and AUM values were determined from BLM grazing records of December 8, 1980. The proportions of the acres and AUMs of each allotment within the boundaries of each hydrologic subunit were estimated from the relative areas of each allotment in each hydrologic subunit and the allotment's productivity. Both the direct impacts and the construction exclusion impacts were determined for each allotment using these data. Some impacted areas in each hydrologic subunit were not named on BLM allotment maps. These areas were planimetered, their livestock productivity estimated from surrounding allotments of similar topographic position, and their total number of AUMs computed. Losses estimated for these areas are included only in the hydrologic subunit and area impact totals. Impacts to operators, listed in the grazing record masters as using the allotments, were analyzed in a similar manner. These detailed analyses address some of the concerns expressed in public comment on the draft EIS.

PUBLIC COMMENT ON THE DRAFT EIS:

> "Grazing capacity - The entire treatment of this subject is naive and/or oversimplified from a range management point of view. The projected reduction in grazing capacity, if M-X is deployed, almost certainly underestimates the actual value by a large margin." (B0125-3-433)

A factor determining potential for livestock population reductions, due to vegetation loss, is the productive potential of each hydrologic subunit. This

Table 2.1-1. AUM equivalents used for each livestock class for these analyses.

Livestock Class	AUM Equivalency
Cow	1
Calf (less than 6 months of age)	0
Yearling (over 6 months of age)	0.67
Bull	1
Horse	1
Ewe	0.20
Ram	0.20
Replacement ewe	0.20
Lamb	0

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Sources: USDI, April 1980; National Academy of Science, 1976.

productive potential was indexed by its average livestock concentration (acres-per-AUM). The less area it takes to support an animal unit for a month, the more AUMs of grazing capacity a hydrologic subunit has. Subunits with less concentrated use will be less severely impacted for each acre of vegetation disturbed. Hydrologic subunits with high levels of concentration and use have the potential for the largest reductions of livestock numbers. The acres-per-AUM index for each hydrologic subunit was computed by dividing its total allotted area (in acres) by its total allotted AUMs as determined from grazing record masters.

In Table 2.1-2, the names of hydrologic subunits in the study area are listed in order of increasing number of acres required to support one animal unit for one month. The one third of the hydrologic subunits requiring the lowest number of acres to support an animal unit for a month, being the more productive valleys for livestock in the project area, are generally located in northern Nevada and Utah and along Utah's Wasatch Front. These valleys represent the generally wetter, more productive areas of the Great Basin.

DIRECT IMPACTS (2.1.1)

Areas potentially disturbed by direct removal of vegetation in each hydrologic subunit, by the construction of shelters, cluster roads, and DTN were determined for conceptual full-basing and split-basing layouts. Areas disturbed by the DTN route from the DDA to the main operating base were not estimated as DTN route location and area of disturbance have not yet been established.

Full- and split-basing AUM losses from vegetation removal were determined for each hydrologic subunit on an allotment-by-allotment basis. The BLM grazing record masters record both the allotted acreage and livestock use figures by four vegetation biomes: grassland, desert, woodland, and coniferous forest. Data provided for the grassland and desert biomes, the vegetation in which M-X deployment would be concentrated, were primarily used in the impact assessment. For many of the hydrologic subunits which would be used for both full- and split-basing options, the project layout and level of disturbance would be the same. Estimates of AUM losses from direct impacts were computed by summing the losses within each allotment, or portion thereof, in each hydrologic subunit.

Project distribution within a hydrologic subunit would not be uniform; with project elements concentrating more in the allotments in one, or some parts of a valley, than in others. This distribution could result in one, or a few, allotments and operators experiencing most of the impact. Geotechnical restrictions on the location of M-X facilities and unique requirements of the various types of livestock operations could also cause differential impacts. This potential heterogeneity of impact was investigated through individual analyses of each impacted allotment and operator listed in the grazing record masters.

It has not been possible to incorporate direct impacts, other than those from DTN, cluster roads, and shelters, into either the hydrologic-subunit, allotment, or operator specific analyses because site-specific data on the other facilities are not yet available. Impacts estimated for these additional facilities were added for the entire deployment area. These estimates are based on acreages the impacts would affect, and the changes in average number of acres per AUM due to all impacts resulting from shelters, cluster roads, and DTN.

Table 2.1-2. Hydrologic subunits in the Nevada/Utah Study arranged by decreasing livestock production capability as determined by the average number of acres required to support one animal unit for one month on all the BLM allotments found within the hydrologic subunit boundary (Page 1 of 3).

Hydrologic Subunit		Acres Per AUM
No.	Name	
49	Elko Segment, Nev.	6.61
47	Huntington, Nev.	8.00
8	Dugway, Utah	9.77
53	Pine, Nev.	9.97
9	Government Creek, Utah	10.14
13	Rush, Utah	10.35
50	Milford, Utah	10.56
152	Stevens, Nev.	10.72
186A	Antelope-South, Nev.	11.26
59	Lower Reese River, Nev.	11.27
5	Pine, Utah	11.45
138	Grass, Nev.	11.63
60	Whirlwind, Nev.	11.68
184	Spring, Nev.	11.72
52	Lund, Utah	11.90
55	Carico Lake, Nev.	11.99
54	Wah Wah, Utah	12.11
54	Crescent, Nev.	12.14
186B	Antelope-North, Nev.	12.24
178A	Butte-North, Nev.	12.64
3	Deep Creek, Nev./Utah	13.06
7	Fish Springs, Utah	13.13
57	Antelope, Nev.	13.39
151	Antelope, Nev.	13.49
172	Garden, Nev.	13.65
46	Sevier Desert, Utah	13.67
56	Upper Reese River, Nev.	13.68
32B	Great Salt Lake-West Desert	13.72
46A	Sevier Desert-Dry Lake	13.88
185	Tippett, Nev.	14.45
208	Pahroc, Nev.	14.61
179	Steptoe, Nev.	14.63
4	Snake, Nev./Utah	14.75
153	Diamond, Nev.	14.91
194	Pleasant, Nev.	15.03
150	Little Fish Lake, Nev.	15.15

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Table 2.1-2. Hydrologic subunits in the Nevada/Utah Study arranged by decreasing livestock production capability as determined by the average number of acres required to support one animal unit for one month on all the BLM allotments found within the hydrologic subunit boundary (Page 2 of 3).

Hydrologic Subunit No.	Name	Acres Per AUM
139	Kobeh, Nev.	15.54
174	Jakes, Nev.	15.57
183	Lake, Nev.	15.98
58	Middle Reese River, Nev.	15.60
53	Beryl-Enterprise, Utah	15.60
196	Hamlin, Nev./Utah	16.56
173B	Railroad North, Nev.	16.89
154	Newark, Nev.	17.21
6	White, Utah	17.45
175	Long, Nev.	17.85
176	Ruby, Nev.	18.02
181	Dry Lake, Nev.	18.12
134	Smith Creek, Nev.	18.34
180	Cave, Nev.	18.41
140A	Monitor-North, Nev.	18.52
207	White River, Nev.	19.05
135	Ione, Nev.	19.59
171	Coal, Nev.	20.10
137B	Big Smoky-North, Nev.	20.16
201	Spring, Nev.	20.32
202	Patterson, Nev.	20.56
203	Panaca, Nev.	20.59
141	Ralston, Nev.	20.81
182	Delamar, Nev.	22.20
140B	Monitor-South, Nev.	22.22
149	Stone Cabin, Nev.	22.30
148	Cactus Flat, Nev.	22.90
155A	Little Smoky-North, Nev.	23.28
200	Eagle, Nev.	23.38
178B	Butte-South, Nev.	23.60
155C	Little Smoky-South, Nev.	24.19
206	Kane Springs, Nev.	25.99
173A	Railroad South, Nev.	26.22
156	Hot Creek, Nev.	26.35
209	Pahranagat, Nev.	28.57
170	Penoyer, Nev.	33.81
204	Clover, Nev.	37.10

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Table 2.1-2. Hydrologic subunits in the Nevada/Utah Study arranged by decreasing livestock production capability as determined by the average number of acres required to support one animal unit for one month on all the BLM allotments found within the hydrologic subunit boundary (Page 3 of 3).

Hydrologic Subunit No.	Hydrologic Subunit Name	Acres Per AUM
137A	Big Smoky-Tonopah Flat, Nev.	37.56
205	Meadow Valley Wash, Nev.	44.69
199	Rose, Nev.	45.67
198	Dry, Nev.	47.12
155B	Little Smoky-Central, Nev.	47.22
145	Stone Wall Flat, Nev.	52.92
143	Clayton, Nev.	53.05
14	Alkali Spring, Nev.	53.06
144	Lida, Nev.	53.29
210	Coyote Spring, Nev.	56.74
169A	Tikapoo-North, Nev.	60.30
219	Muddy River Springs, Nev.	103.60

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CONSTRUCTION EXCLUSION IMPACTS (2.1.2)

Both direct and indirect project construction effects could reduce the area available to grazing, and prevent livestock use of undisturbed vegetation as well as that directly removed. This has also been pointed out by public comment on the Draft EIS.

PUBLIC COMMENT ON THE DRAFT EIS:

> "Also, I believe that the loss of AUMs as a result of construction activity off the site may be much more significant than the loss as a result of activities on the site." (B0876-1-018)

Examples of these construction effects include:

1. Additional loss of vegetation due to siltation and erosion from disturbed areas.

2. Areas rendered temporarily ungrazable because project construction activities have cut-off access.

3. A general reduced use of areas in the vicinity of construction activities because livestock are unacclimated to the disturbance.

4. Deliberate and unintentional harassment of livestock by people working and pursuing recreational activities in the area.

5. Temporary loss of watering sites due to construction disturbance rendering associated areas ungrazable for a period of time.

6. Inability to economically graze an area because of construction-caused gaps in fencing, or the loss of other range improvements used in normal livestock management.

7. Reductions in livestock use levels, that may be necessary during the initial periods of revegetation efforts, to permit plant establishment.

8. Areas with reduced productivity, or that are rendered economically unusable, because of the increased incidence of halogeton.

9. Reduced grazing capacity of adjoining areas resulting from the displacement of wild horses and burros from disturbed areas.

All of these types of impacts could occur, but until a finalized project layout and more site-specific information becomes available, their duration and degree cannot be quantified. They are discussed in more detail in the section on other impacts (Section 3.1.3). Concern over the potential effects of these types of impacts was also evident in public comment on the Draft EIS.

PUBLIC COMMENT ON THE DRAFT EIS:

"The indication is that 'overall' impact of the Proposed Action on grazing will be moderate. However, on individual operators it may be significant. Therefore, we suggest for this tier that a worst case analysis of impacts to a typical ranching operation be presented." (B0855-5-105)

Because individual analyses for impacts like those listed above are not possible, this analysis reflects a generalized worst-case scenario that includes all the important impacts that could reasonably be expected to affect the use of grazing land by livestock. Because of the unknowns involved, the analysis had to be broad enough to include all reasonable possibilities. All of the other impacts have been generally grouped together as temporary "construction-exclusion impacts," and represent an estimated worst-case summation of impacts on operators and allotments due to construction requirements and disturbances, plus other effects of the project on livestock. These analyses assume that livestock may not be able to use areas adjacent to construction sites as a result of some combination of the types of impacts described above. The Air Force, BLM, Corps of Engineers, and contractors will make efforts to cooperate with livestock operators. This should alleviate most of these impacts.

The area of potential interference was assumed to be the entire area occupied by each cluster, and, a corridor along DTN routes. The construction exclusion zone was defined for these analyses as the area within one-half mile of shelters, cluster roads, and DTN (Figure 2.1.2-1). The one-half mile distance is the minimum possible that still results in the exclusion of the total area occupied by each cluster of shelters. It also permits comparison with losses presented as part of public comment on the Draft EIS that also used a one-half mile distance. A lesser exclusion distance results in small areas within the deployment area of a cluster of shelters that could be subject to impacts under worst-case assumptions. These worst-case analyses also address public comment on the Draft EIS.

PUBLIC COMMENT ON THE DRAFT EIS:

"Finally, one must suspect that livestock would not be allowed free access to, or be frightened away from, the construction areas during the building periods. Livestock could hardly be allowed access to such areas where heavy equipment would be in operation. While this is temporary, many ranchers operate on such a narrow margin that they could not weather such periods of nonproduction." (B0125-3-433)

The result is a worst-case analysis intended to encompass most, if not all, of the important impacts that will occur in addition to direct vegetation removal. Actual impacts will probably be less.

The analyses used the conceptual system layouts are illustrated in the impact sections of this document. Construction exclusion impacts were also analyzed for

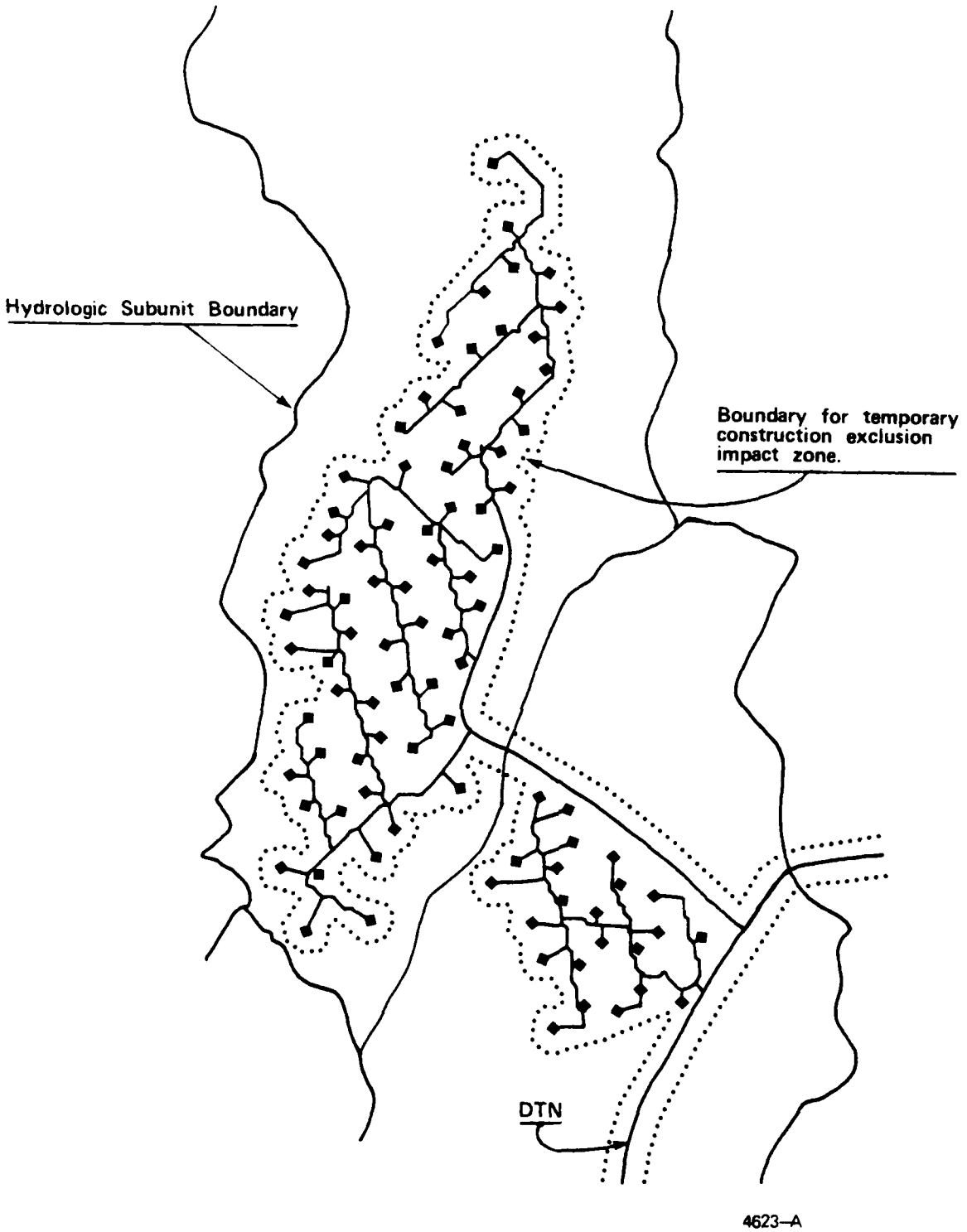

Figure 2.1.2-1. Temporary construction exclusion impact zones used for the worst-case impact analyses.

each hydrologic subunit, as well as for each impacted allotment and operator listed in the grazing record masters.

OPERATING BASE IMPACTS (2.1.3)

Operating base impact analyses for the Nevada/Utah study area utilized the OB suitability zones illustrated in the appropriate impact sections of this document. The area of each allotment within each suitability zone was determined and used to compute the estimated proportion of the allotted AUMs that fall within the suitability zone. Average and range of acres per AUM were estimated for all the allotments wholly or partly within the suitability zone. These acres-per-AUM figures for each allotment were used to estimate the average, and the range in impacts, that could result from OB construction depending on the actual location within the suitability zone.

ECONOMIC ANALYSES (2.1.4)

As a part of initial ranch economic studies, ranches in the study area using federal range have been categorized by size, location, management practices, land use patterns, past economic trends, present economic status, types of livestock, and grazing schedules. All information has been summarized on the basis of five regions selected for their livestock management similarities by Resource Concepts, Inc. (1981). (Figure 1.1-1, Table 1.1-3). These data are specific as to the types of priority elements associated with each type of range (i.e., water developments, other improvements, and access). These data were analyzed for thirteen impact scenarios (Table 2.1.4-1) for each of fifteen ranch classifications (Table 2.1.4-2) by a linear programming technique. The average ranch budgets for each of the 15 classifications are in the appendix. This approach provided a detailed analysis of potential economic impacts to individual livestock operators (Resource Concepts Inc, 1981).

As interpreted by Resource Concepts, the use of the larger impact scenarios was incorrect. These interpretations were corrected for use in this report. The sizes of the allotments to the average ranch for many of the ranch classifications are too small to realistically contain all the facilities associated with the larger scenarios. In some scenarios, the total acreage of vegetation disturbance is larger than the entire allotment area of the average ranches analysed (indicated by N/A in Tables 3.1.2-2 through 3.1.2-4, Section 3.1.2). The size of the areas required to deploy the DDA portion of each scenario are listed in Table 3.1.2-1 (Section 3.1.2). Project requirements for the M-X make this kind of packing of the project facilities impossible. Although the larger scenarios are inappropriate for the average ranch for some of the classifications, they can be applied to the larger allotments and to the allotted area of the larger ranches in the Nevada/Utah study area.

Disturbed acreage was converted to loss of AUMs prior to the economic analyses, and the same AUM loss is possible from a number of different impacts. The ranch economics model used does not consider the cause of the AUM loss, only the level of that loss. Although the high levels of AUM loss from direct vegetation removal were not possible from direct vegetation removal, equivalent AUM losses are potentially possible under the worst-case assumptions of temporary construction exclusion impacts. The data from the larger scenarios has been used to estimate economic losses potentially associated with the worst-case impacts.

Table 2.1.4-1. Summary of impact scenarios used for linear programming analysis.

Scenario Number	Scenario Description
I.	First operating base--construction
II.	Single cluster of shelters--construction
III.	Single cluster of shelters--operation
IV.	Five clusters of shelters--construction
V.	Five clusters of shelters--operation
VI.	Ten clusters of shelters/all facilities--construction
VII.	Ten clusters of shelters/all facilities--operation
VIII.	20 clusters of shelters/all facilities--construction
IX.	20 clusters of shelters/all facilities--operation
X.	100 percent loss of seasonal natural resource land grazing
XI.	25 percent increase in variable costs
XII.	100 percent increase in death loss
XIII.	Ten clusters of shelters/all facilities--construction; 25 percent increase in variable costs; 100 percent increase in death loss

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Table 2.1.4-2. Aggregation classifications, total number of ranches, and number of ranches sampled in each classification for linear programming economic analyses (data from Resource Concepts Inc., 1981).

Region	Classification	Total Number of Ranches	Number of Sampled Ranches	Percent of Ranches Sampled
I	Summer Cattle[1]	37	6	16
	Year-round Cattle	41	11	27
II	Summer Cattle	63	11	17
	Year-round Cattle	38	12	32
I & II	Year-round Sheep	21	6	29
III	Year-round Cattle	44	9	20
IV	Summer Cattle	132	20	15
	Year-round Cattle[2]	46	8	14
	Year-round Sheep	27	6	22
	Winter Sheep	57	8	14
V	Summer Cattle	73	10	14
	Winter Cattle	14	5	36
	Year-round Cattle	30	7	23
	Year-round Sheep	44	9	20
Total		667	128	

T4973/8-23-81

[1]Summer operator: grazes federal range during summer months only; winter operator: grazes federal range during winter months only; year-round operator: grazes federal range year-round.

[2]Two classification models for this classification type were utilized, one selling yearlings and the other weaner calves.

Regression analyses were used to linearly interpolate between the herd sizes and impact levels provided in the report by Resource Concepts, Inc., (1981). These interpolation results were used to estimate first approximation economic losses to potentially impacted ranch operations that were of a different size than those used in the economic analyses. Economic losses to each operator were estimated for AUM losses from four impact levels. These levels correspond to full-basing direct, full-basing construction exclusion, split-basing direct, and split-basing construction exclusion.

Each impacted ranch operator was assigned to one of the fifteen ranch classifications listed in Table 2.1.4-2. Five impact types were developed from the results of the linear intepolation and used with each operator for each of the four levels of impact. These five impact types were (1) dollar loss due only to direct AUM loss, (2) AUM loss plus losses from a 5 percent increase in variable costs and a 25 percent increase in the rate of livestock loss, (3) AUM loss plus losses from a 10 percent increase in variable costs and a 50 percent increase in the livestock loss rate, (4) AUM loss plus losses from a 15 percent increase in variable costs and a 75 percent increase in the livestock loss rate, and (5) AUM loss plus losses from a 25 percent increase in variable costs and a 100 percent increase in the livestock loss rate. Use of these impact types allowed estimates for the range of indirect impacts between zero and the 25 percent increase in variable costs and 100 percent increase in livestock death loss used by Resource Concepts, Inc. (1981). The results of ranch economic analyses provide for the relative comparison of overall impact levels and alternatives only. Accurate assessment of the operator-by-operator and site-specific industry impacts requires a finalized project layout and more specific economic analyses. The acceptability of costs to the American public could be an item of concern.

Significance Analysis (2.1.5)

The impacts discussed involve individual allotments, operators, and hydrologic subunits (valleys) as well as the entire project area. Estimates of the impacts to individual allotments, operators, and hydrologic subunits are based on the direct effects of the major project facilities: DTN, cluster roads, and shelters. Estimates of the total impacts for each alternative also include those resulting from support roads, CMFs, antennas, ASCs, RSSs, construction camps, concrete plants, material sites, wells, marshaling yards, operating bases, and construction camps. These estimates are based on Air Force disturbance acreage projections. The percentage of all AUMs potentially lost to the temporary construction exclusions impacts was used as an index of allotment areas significantly impacted by the project deployment. By this, the potential for indirect, and therefore, for total impacts was assumed related to the worst-case analysis of the amount of allotment, operator, and hydrologic area over which project facilities would be deployed.

Because of the susceptibility of livestock operations to the types of impacts which would result from M-X deployment, worst-case impacts representing inclusion of 30 percent or more of currently available grazing capacity (and associated AUM loss) was found to be sufficient to end economic viability of all analyzed ranch operations (based on data presented by Resource Concepts, 1981). These worst-case impacts were assumed to represent a potential for significant impact. At temporary construction exclusion impacts representing about 10 percent grazing capacity loss, analyzed ranches not already operating at a loss began

showing negative returns over variable costs. These were assumed to have intermediate potential for significant grazing resource impact. Grazing capacity loss less than 10 percent was assumed to have low potential for significant impacts. These rankings were applied to the results of the hydrologic subunit, allotment, and operator impact analyses. The approximate AUM loss associated with the 10 (200 AUMs) percent and 30 (6500 AUMs) percent worst-case losses for the median sized subunit hydrologic were also used in determining impact significance for OB sites.

Based on regression analysis of the full basing DDA impacts described in Table 3.1.1-7 in Section 3.1.1, a 0.2 percent level of direct impact is approximately equivalent to a 10 percent worst-case temporary construction exclusion impact, and a 1.0 percent direct impact is approximately equivalent to a 30 percent worst-case exclusion impact. These direct impact percentages were used for the significance analysis for the operating bases where worst-case construction exclusion impacts figures are not available.

2.2 TEXAS/NEW MEXICO REGION

Within each county, M-X impacts on livestock are primarily dependent on the area disturbed by the project, and is relatively independent of the number of counties impacted. The types of impacts found in each county are essentially the same, but are relatively larger in counties having large livestock populations and smaller in counties having small livestock populations. The available data has allowed analyses to be taken only to county level. The more detailed analyses necessary in later reports will require data from onsite field studies.

The total number of cattle and sheep was estimated for each county in Texas and New Mexico using 1974 census data on livestock populations. These statistics were converted to animal units for impact analysis. Grazing capacity data, in AUMs, was generally not available for this tier of analysis, but will be included in later reports. Both a total number of animal units and an average animal unit concentration figure (acres per animal units) were tabulated for each county. The concentration of livestock in a county is a measure of the average number of acres required to support each animal unit. It is an indicator of the sensitivity to impact of the livestock industry in that county. Counties with lower concentrations of livestock have a lower impact potential for each acre of land disturbed; counties with the highest concentrations have the highest potential for damage to animal units. Concentrations of livestock are not uniform within a county and impacts could vary widely with specific project locations. Appropriate site-specific data were not available for these analyses.

All the potentially impacted counties in the Texas/New Mexico study area were assigned to high, medium, and low concentration of livestock categories on the basis of 1974 data. The results placed an approximately equal number of counties in each category.

DIRECT IMPACTS (2.2.1)

Irrigated cropland, dry cropland, and rangeland areas in each county which could be directly disturbed by vegetation removal due to construction of shelters, cluster roads, and DTN were determined for both conceptual full-basing and split-basing project layouts. Land use types were determined from maps published

by the Eastern Plains Council of Governments (1974) and the Texas Department of Water Resources (1977). Estimates of potential animal unit losses from full basing were determined by dividing the total area of each category disturbed in each county by the county-average acres-per-animal-unit figure. Disturbance figures for split basing were similarly obtained. For most of the counties used for both full and split basing modes, the level of disturbance is the same. Additional animal unit losses were then computed for the remaining project facilities by dividing their acres of disturbance by the average acres-per-animal unit resulting from the shelter, cluster road, and DTN analyses for full and split basing.

TEMPORARY CONSTRUCTION EXCLUSION IMPACTS (2.2.2)

Temporary construction exclusion impact analyses provided worst-case loss estimates for all the potential impacts that could result from temporary construction interference with livestock use of affected rangelands. For these analyses, the rangeland area in each county within one-half mi of shelters, cluster road, or DTN was estimated from the disturbed-to-exclusion area ratios found in the Nevada/Utah exclusion analyses. Facilities locations were determined from the conceptual Texas/New Mexico split and full basing layouts presented in the impact analyses sections of this document. For the total worst-case impact estimates, directly impacted irrigated and dry cropland acreage was added to the rangeland exclusion acreage. A more detailed explanation of temporary construction exclusion impacts is in Section 2.1.2.

OPERATING BASE IMPACTS (2.2.3)

The potential Texas/New Mexico operating base grazing impacts were estimated by dividing the total acreage required for each OB by the average animal-units-per-acre figure for the counties in which the OB is located. The quotients estimate potential animal-unit losses for each OB.

SIGNIFICANCE ANALYSIS (2.2.4)

The same general procedures used for the Nevada/Utah area were repeated for the Texas/New Mexico area. The worst-case equivalent direct impacts of 0.2 and 1.0 percent were also used, because the same engineering requirements on project design are used for both areas. Because of the increased land use complexity and variation in county size in the Texas/New Mexico region, an additional qualifier of the approximate number of animal units potentially lost by the median-sized county for the 0.2 and 1.0 percent lost was added to the evaluation of the potential for significant impact. Losses of less than 500 animal units were considered as having low potential for significant impact. Between 500-1,000 animal units lost were considered to have a moderate potential, and losses in excess of 1,000 animal units were considered as having high potential for significant impact. The DDA impacts in the individual counties and the operating base impacts were evaluated by the same criteria.

PUBLIC COMMENT ON THE DRAFT EIS:

"The contractors analyzed the impact of M-X on livestock grazing honestly, although they scattered it and bured it in the 1,900 pages of

the DEIS. This may have been intentional because otherwise the only valid conclusion that can be drawn from their anlaysis is too obvious: M-X will eliminate livestock grazing. Ranching as a way of life in the Great Basin will be just a memory." (A04560-6-002)

The impact analyses that follow were modified to more directly address these types of concerns expressed in public comment on the Draft EIS.

3.0 ENVIRONMENTAL CONSEQUENCES

3.1 PROPOSED ACTION

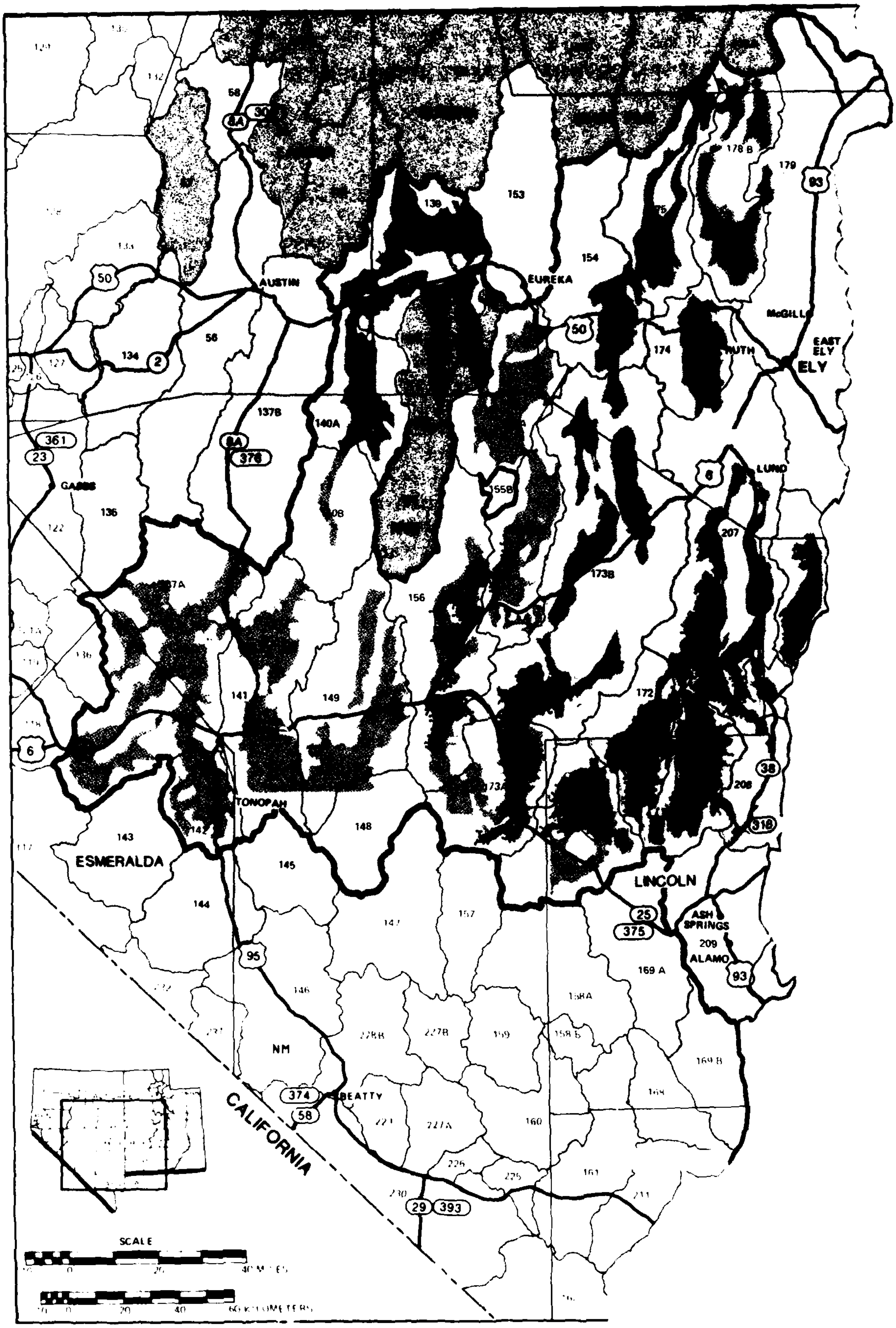
PHYSICAL IMPACTS (3.1.1)

Nearly all of the M-X project construction and operations would occur on rangeland which now covers much of the Nevada/Utah study area. The pattern of project impacts on grazing can be seen in Figure 3.1.1-1.

The direct impact of project construction in Nevada/Utah will occur principally on rangeland, with up to, approximately, 160,000 acres directly affected adversely. Because of the aridity of the Nevada/Utah area and the difficulty of revegetation, these impacts could persist indefinitely. This direct impact represents a relatively small portion of the total of about 29 million acres of BLM rangeland in the study area. Approximately 14 percent of these 29 million acres is geotechnically suitable and thus the potential for impacts. In some areas, the considerable activity associated with construction of the M-X could make short-term livestock use difficult or even impossible. These temporary construction effects might result in temporary impacts of a far greater magnitude than those from direct land disturbance.

The approximate loss of grazing capacity (AUM) due to the direct impacts of the Proposed Action will total about 9,700 AUMs (Table 3.1.1-1). This loss represents about 0.38 percent of the total grazing capacity in the affected BLM resource areas (Table 3.1.1-2), or 0.83 percent of the total grazing capacity in all the affected hydrologic subunits. These impacts involve nearly 200 allotments (Table 3.1.1-2), or about 18 percent of the total number of allotments in the affected BLM resource areas (Table 1.1-4). Sixty-six percent of the direct AUM loss would be in Nevada, and 34 percent in Utah. The estimated direct losses in the individual hydrologic subunits from shelters, cluster roads, and DTN total nearly 8,100 AUMs, and range from 8 to 650 AUMs (Table 3.1.1-3). Additional impacts are anticipated from the construction of power transmission corridors, and command, control, and communication networks. Site-specific location and acreage disturbance data are not yet available.

All the AUM losses from project impacts are primarily to BLM allotments where livestock spend an average of about five months of the year (Council for Agricultural Science and Technology, 1974). If the interrelatedness of seasonal range use in Nevada/Utah were inflexible, every five AUMs lost from BLM range would mean the loss of an animal unit and a total of 12 AUMs of total loss to individual operators, because the animals would no longer be available to graze their other ranges. Ranch economics analyses by Resource Concepts Inc. (1981) indicate that the potential carryovers resulting from lost grazing capacity on BLM ranges are between 8.0 to 17.7 AUMs for every animal unit lost, depending on the type of operation (Table 3.1.1-4). The average is 11.7 AUMs lost for every animal unit lost, indicating considerable flexibility in adjusting to AUMs lost from one segment of their rangelands. These results represent averages, and even within the same classification some ranch operators are considerably less flexible in preventing carryover impacts than are others. Year-round cattle operations in Nevada, and summer cattle operation in Utah, appear to be the most vulnerable to carryover



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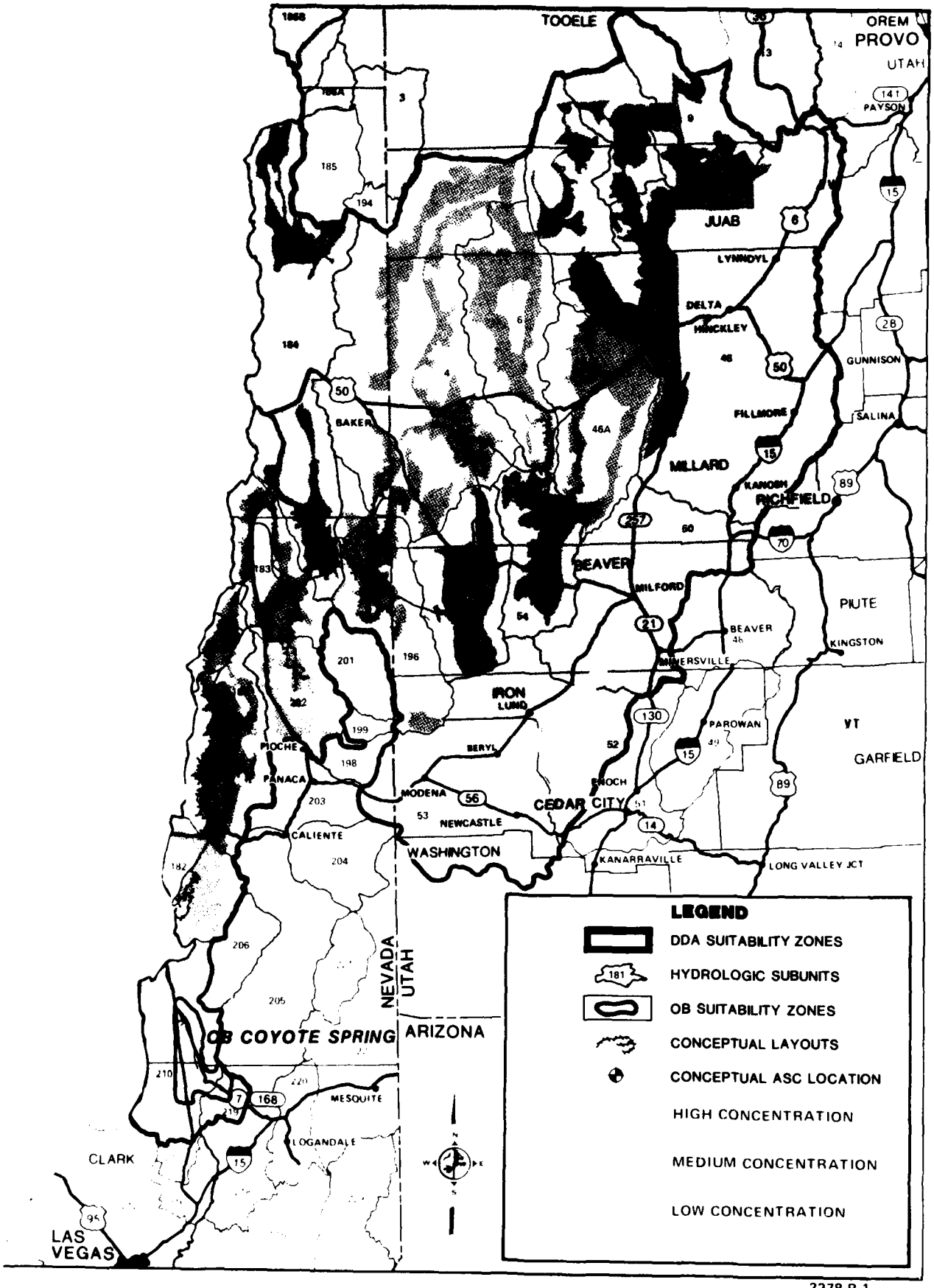

Figure 3.1.1-1. AUM concenetration and split-basing overlay.

Table 3.1.1-1. Total estimated Nevada/Utah AUM losses from direct impacts (vegetation removal and damage) and temporary, worst case construction exclusion impacts of M-X construction. The allotment by allotment full basing analyses for shelters, cluster roads, and DTN were used to derive an average acres per AUM for estimating the impacts for other DDA facilities.

	AUMs Lost from M-X Impacts by Construction of:									
Alternative	Shelters, Cluster Roads, and DTN	Support Roads, CMFs, Antennas, ASCs, and RSSs	Construction Camps, Concrete Plants, Material Sources, Wells, Marshaling Yards, and Construction Camps	First OB	Second OB	Total Direct AUM Loss	Percent of Study Area Total	Total Worst Case Loss[2]	Percent of Study Area Total	Potential Impact[1]
Proposed Action	8,093	672	591	136	253	9,745	0.53	278,100	15.1	***
1	8,093	672	591	136	279	9,771	0.53	278,100	15.1	***
2	8,093	672	591	136	177	9,669	0.52	278,000	15.1	***
3	8,093	672	591	550	447	10,353	0.56	278,700	15.1	***
4	8,093	672	591	550	69	9,975	0.54	278,300	15.1	***
5	8,093	672	591	497	447	10,330	0.56	278,600	15.1	***
6	8,093	672	591	497	69	9,922	0.54	278,200	15.1	***
8	4,092	336	296	136	--	4,860	0.26	139,200	7.5	***

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[1] Potential impact based on the results of the potential for the overall impact to the individual allotments and operators in Tables 40-18 and 40-19.

- \- = No AUM reduction.
- * = Low impact. Direct AUM losses of less than 0.2 percent or worst case loss of less than 10 percent of the total in the area.
- *** = Moderate impact. Direct AUM losses from 0.2 percent to less than 1.0 percent or worst case losses of 10 to 30 percent of the total in the area.
- ***** = High impact. Direct AUM losses of greater than 1.0 percent or worst case losses greater than 30 percent of the total in the area.

[2] Computed from area within 1/2 mi of project facilities of shelters, cluster road and DTN. Assumes no livestock use during construction. Construction exclusion imacts represent a worst case summation of all impacts that can reasonably be expected to potentially reduce livestock use of an area because of construction disturbvances. Because of the current construction schedules, the maximum exclusion that would occur during any single year would be about 80,000 AUMS, and cooperation between impacted operators and the Air Force and its representatives will substantially reduce these impacts.

Table 3.1.1-2. Distribution of allotments and AUMs in BLM resource areas impacted by the construction of DDA facilities, cluster roads and DTN for the Proposed Action and Alternatives 1-6.

Resource Area	Direct Impacts (Long-term)		Exclusion Impacts[1] (Short-term)	
	Number of Allotments	AUMs Lost	Number of Allotments	AUMs Lost
Nevada				
Ely District				
Egan	35	739	35	25,115
Schell	36	1,817	37	65,788
Las Vegas District				
Stateline-Esmeralda	2	65	2	2,296
Caliente-Virgin Valley	10	332	10	11,562
Battle Mountain District				
Shoshone-Eureka	11	873	11	28,390
Tonopah	14	1,510	14	47,078
Nevada Totals	108	5,336	109	180,229
Utah				
Salt Lake District				
Pony Express	4	145	5	4,116
Cedar City District				
Beaver River	18	718	18	23,033
Richfield District				
House Range	30	1,137	31	41,622
Warm Springs	34	710	35	25,686
Utah Totals	86	2,710	89	94,457

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[1] Construction exclusion impacts represent a worst case summation of all impacts that can potentially reduce livestock use of an area because of construction disturbances. See the Methods section for a more complete description.

Source: BLM grazing record masters dated December 1980.

Table 3.1.1-3. Potential direct long-term impacts and short-term construction exclusion impacts to grazing as a result of DDA construction in Nevada/Utah for the Proposed Action and for Alternatives 1-6.

No.	Hydrologic Subunit Name	AUM Concentration In the Area	Long-Term Direct Effects		Short-Term Construction Exclusion Impacts[1]		Potential Impact[2]
			Estimated AUM Loss	Loss as Percent of Total AUMs in Area	Estimated AUM Loss	Loss as Percent of Total AUMs in Area	
	Subunits with M-X Clusters and DTN						
4	Snake, Nev./Utah	101,389	657	0.7	24,816	24.5	***
5	Pine, Utah	33,824	307	0.9	9,819	29.0	***
6	White, Utah	32,605	254	0.8	8,000	24.5	***
7	Fish Springs, Utah	22,448	143	0.6	4,967	22.1	***
8	Dugway, Utah	17,511	184	1.1	6,659	38.0	*****
9	Government Creek, Utah	26,442	74	0.3	2,771	10.5	***
46	Sevier Desert, Utah	117,650	486	0.4	17,742	15.1	***
46A	Sevier Desert-Dry Lake, Utah	33,504	234	0.7	8,394	25.1	***
54	Wah Wah, Utah	31,302	473	1.5	13,703	43.8	*****
137A	Big Smoky-Tonopah Flat, Nev.	22,174	102	0.5	3,736	16.9	***
139	Kobeh, Nev.	30,125	332	1.1	12,161	40.4	*****
140A	Monitor-North, Nev.	8,069	171	2.1	5,445	67.5	*****
140B	Monitor-South, Nev.	5,858	12	0.2	288	4.9	*
141	Ralston, Nev.	20,379	310	1.5	10,193	50.0	*****
142	Alkali Spring, Nev.	2,746	59	2.2	2,075	75.6	*****
148	Cactus Flat, Nev.	1,441	8	0.6	173	12.0	***
149	Stone Cabin, Nev.	17,708	218	1.2	8,028	45.3	*****
151	Antelope, Nev.	17,695	267	1.5	7,744	43.8	*****
154	Newark, Nev.	25,284	129	0.5	4,004	15.8	***
155A	Little Smoky-North, Nev.	16,335	127	0.8	4,380	26.8	***
155C	Little Smoky-South, Nev.	13,582	93	0.7	3,323	24.5	***
156	Hot Creek, Nev.	25,278	257	1.0	5,643	22.3	***
170	Monover, Nev.	9,336	101	1.1	3,471	37.2	*****
171	Coal, Nev.	13,472	206	1.5	6,666	49.5	*****
172	Garden, Nev.	13,502	245	1.8	9,119	67.5	*****
173A	Railroad-South, Nev.	12,752	160	1.3	2,447	42.7	*****
173B	Railroad-North, Nev.	59,038	472	0.8	18,861	32.0	*****
174	Jakes, Nev.	14,232	193	1.4	5,080	35.7	*****
175	Long, Nev.	22,590	111	0.5	4,281	19.0	***
178A	Butte-South, Nev.	19,713	103	0.5	3,948	20.0	***
179	Steptoe, Nev.	62,504	14	0.02	406	0.7	*
180	Cave, Nev.	10,595	107	1.0	3,672	34.7	*****
181	Dry Lake, Nev.	29,983	415	1.4	16,251	54.2	*****
182	Delamar, Nev.	9,282	94	1.0	3,140	33.8	*****
183	Lake, Nev.	20,980	285	1.4	9,417	44.9	*****
184	Spring, Nev.	72,568	94	0.1	3,381	4.6	*
	Hamlin, Nev./Utah	29,364	256	0.9	9,308	31.4	*****
	Patterson, Nev.	12,704	43	0.3	1,564	12.3	***
187	White River, Nev.	39,986	213	0.5	8,077	20.2	***
188	Panaca, Nev.	19,110	33	0.2	1,257	6.6	*
189	Pahranagat, Nev.	12,927	39	0.3	276	2.1	*
Overall DDA Impact		1,107,121	8,082	0.7	274,686	24.8	***

T-3.1.1-3(3)

[1] Construction exclusion impacts represent a worst case summation of all impacts that can potentially reduce livestock use of an area because of construction disturbances. See the methods section for a more complete description.

- = No AUM reduction.
- * = Low impact. Maximum construction exclusion AUM losses of less than 10 percent of the total in the area.
- *** = Moderate impact. Maximum construction exclusion AUM losses from 10 percent to less than 30 percent of the total in the area.
- ***** = High impact. Maximum construction exclusion AUM losses of 30 percent or greater of the total in the area.

Table 3.1.1-4. Average AUM reduction for each animal unit lost.

Ranch Classification	Average AUMs per Animal Unit Lost[1]
Region I[2]	
Summer Cattle	11.1
Year-round Cattle	11.0
Region II	
Summer Cattle	12.7
Year-round Cattle	8.5
Region III	
Year-round Cattle	12.7
Region IV	
Summer Cattle	8.8
Year-round Cattle (yearling)	17.7
Year-round Cattle (calf)	13.0
Region V	
Summer Cattle	8.0
Winter Cattle	12.1
Year-round Cattle	12.3
Region I and II Sheep	12.1
Region IV	
Year-round Sheep	12.1
Winter Sheep	12.0
Region V Year-round Sheep	11.9
Average	11.7

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[1]Data from Resource Concepts, Inc., 1981.

[2]Regions are mapped in Figure 1.1-1.

impacts. Most year-round cattle operators in Utah who sell yearlings apparently have sufficient private-land grazing capacity to offset much of the direct impact loss to their BLM allotments. Impacts to individual operators do not necessarily represent loss to the industry, as nonimpacted operators can potentially make use of forage no longer used by impacted operators.

Susceptibility to carryover impacts by individual operators is not directly related to the degree of their dependency on BLM for part of their annual forage supply. Utah summer cattle operators, for example, have some of the lowest average percent annual dependency on BLM range of any of the ranch classifications (Table 3.1.1-5), but some of the highest susceptibility to impact carryover. Susceptibility to impact carryover is a function of how critical the period of use of BLM rangeland is to each operation. If a livestock operator has no other way of carrying his livestock through the season of BLM range use, the loss of that range could mean the loss of most of his livestock, and of his economic viability. Any forage thus made available could be used by unimpacted ranches to expand their operations.

The affected hydrologic subunits were ranked on the basis of the average productivity of their impacted allotments (Table 3.1.1-6). The four most productive subunits, and six of the top nine, are found in Utah. Most of the impacted Utah subunits are important winter ranges. In 26 (63.4 percent) of the impacted hydrologic subunits, the average productivity of the impacted allotments listed in Table 3.1.1-6 exceeds (has a lower number of acres required to support an animal unit for a month) than for all the allotments in the subunit listed in Table 2.1-2.

All the combined impacts represented by the worst-case construction exclusion impacts could total nearly 275,000 lost AUMs over the construction period of the Proposed Action (Table 3.1.1-3). This represents a temporary loss of about 7,000 sq mi of grazing land. The maximum loss that would probably occur during any single year of construction would be about one third of the overall total, or about 93,000 AUMs. Computations by the state of Nevada using the same one-half mi distance resulted in larger losses.

PUBLIC COMMENT ON THE DRAFT EIS:

> "Arguments may be built for or against the loss of the livestock forage in the IOSD area, but it will be impacted by construction, equipment, fencing, and most importantly, invading noxious annuals. Also, if, as suggested earlier, the clusters sit on the more productive sites, this loss could well approach 700,000 to one million AUM's. THESE IMPACTS MUST BE CLEARLY DOCUMENTED IN THE FINAL EIS" (B0164-2-512).

Cooperation between affected operators and the Air Force and its representatives could prevent most of this loss. In the individual hydrologic subunits, the temporary construction exclusion impact grazing capacity losses could range from 173 to 24,800 AUMs (Table 3.1.1-3). About 66 percent of the temporary construction exclusion AUM losses would occur in Nevada, and 34 percent in Utah

Table 3.1.1-5. Average percent of dependency on federal and private land for the 15 ranch classifications used in the linear programming economic analysis.

Region[1]	Ranch Classification	Annual Percent Dependency		
		BLM	USFS	Private
I	Summer Cattle	45	1	54
	Year-round Cattle	62	6	32
II	Summer Cattle	36	4	60
	Year-round Cattle	59	4	37
III	Year-round Cattle	68	2	30
IV	Summer Cattle	32	3	65
	Year-round Cattle (c)	58	2	40
	Year-round Cattle (y)	47	2	51
V	Summer Cattle	33	2	65
	Winter Cattle	37	0	63
	Year-round Cattle	56	1	43
I & II	Year-round Sheep	45	8	47
IV	Year-round Sheep	41	21	38
	Winter Sheep	43	0	57
V	Year-round Sheep	31	3	66

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[1]Regions are mapped in Figure 1.1-1.

Source: Resource Concepts Inc., 1981.

Table 3.1.1-6. Hydrologic subunits, potentially affected by the Proposed Action, ranked by the average acres per AUM of allotments that could be impacted by the DDA.

Hydrologic Subunit No.	Name	Acres/AUM[1]
8	Dugway, Utah	9.6
9	Government Creek, Utah	10.5
5	Pine, Utah	10.7
54	Wah Wah, Utah	10.8
183	Lake, Nev.	11.0
172	Garden, Nev.	12.0
184	Spring, Nev.	13.4
46A	Sevier Desert-Dry Lake, Utah	13.4
46	Sevier Desert, Utah	13.6
202	Patterson, Nev.	13.7
4	Snake, Nev./Utah	14
7	Fish Springs Valley, Utah	14.1
181	Dry Lake, Nev.	14.3
209	Pahranagat, Nev.	14.5
139	Kobeh, Nev.	14.5
196	Hamlin, Nev./Utah	14.7
151	Antelope, Nev.	14.8
208	Pahroc, Nev.	15.0
174	Jakes, Nev.	15.1
171	Coal, Nev.	15.1
180	Cave, Nev.	15.2
175	Long, Nev.	15.4
173B	Railroad-North, Nev.	15.7
154	Newark, Nev.	17.7
148	Cactus Flat, Nev.	17.9
149	Stone Cabin, Nev.	18.1
140A	Monitor-North, Nev.	18.3
140B	Monitor-South, Nev.	18.5
156	Hot Creek, Nev.	18.6
155A	Little Smoky-North, Nev.	19.5
141	Ralston, Nev.	19.5
182	Delamar, Nev.	19.7
6	White, Nev.	20.1
207	White River, Nev.	20.3
155C	Little Smoky-South, Nev.	21
179	Steptoe, Nev.	21.2
173A	Railroad-South, Nev.	22.8
178B	Railroad-North, Nev.	26.1
137A	Big Smoky-Tonopah Flat, Nev.	29.8
170	Penoyer, Nev.	35.3
142	Alkali Spring, Nev.	52.7

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[1] The fewer acres required to support an animal unit for a month, the more productive the impacted area of the valley.

(Table 3.1.1-2). Public comment has expressed concern that analyses need to be taken to the operator and allotment before impacts can be really understood.

PUBLIC COMMENT ON THE DRAFT EIS:

> "Effects on grazing discussion in Chapter 4 are defined as potential impact of construction and operation of M-X on AUMs by planning unit or hydrologic subunit. While this is an impact on grazing, the analysis should be broadened by identifying the approximate number of ranch units or allotments significantly affected" (B0855-5-030).

The following allotment and operator analyses provide this type of information.

A total of 199 individually named and mapped allotments are directly impacted by the Proposed Action, and an additional three allotments are affected by temporary construction exclusion impacts (Table 3.1.1-7). These allotments represent an average of 4,553 AUMs, with an average loss of 40 AUMs (0.9 percent) from direct impacts, and an average potential loss of 1325 AUMs (29.1 percent) from worst-case construction exclusion impacts. On the average, one third of the area of the impacted allotments has project facilities deployed within it. The direct impacts range from less than 1 to 500 AUMs, and the construction exclusion impacts from 1 to over 18,000 AUMs in the affected allotments (Table 3.1.1-7).

A total of 193 of the operators listed in the grazing record masters are directly impacted from vegetation removal by the Proposed Action, and an additional nine operators are potentially affected by the temporary construction exclusion impacts (Table 3.1.1-8). The impacted operators have an average loss of 36 AUMs (0.78 percent) from direct impacts, and an average loss of 1,165 AUMs (25.5 percent) from worst-case temporary construction exclusion impacts. An average of one fourth of the BLM allotment area of the impacted operators contains project features. Direct impacts range from less than 1 to 290 AUMs, and worst-case temporary construction exclusion impacts range from 1 to 9,300 AUMs (Table 3.1.1-8).

The distribution of impacts among the affected operators and allotments is as important as the range in impacts. The number of operators and allotments in twelve levels of impact by clusters (each cluster equals 23 shelters) is illustrated in Figure 3.1.1-2. One hundred and forty-five of the impacted operators, with individual deployment impacts of one cluster or less from the Proposed Action, account for only just over 1,000 total shelters. Conversely, the remaining 48 operators with individual alloted areas impacted by the deployment of up to more than 10 clusters account for nearly 3,600 shelters.

Seventy-five percent of the 199 allotments, also with individual deployment impacts equivalent to one cluster of shelters or less, account for about 1,300 shelters. As for the impacted operators, the bulk of the impact (over 3,300 shelters) falls on 50 allotments (Figure 3.1.1-2). These are generally the larger allotments in the deployment area.

Table 3.1.1-7. Summary of full basing impacts to BLM allotments in the Nevada/Utah study area (Page 1 of 6).

Name	Total AUMs Allotted[1]	Direct Impacts from Vegetation Disturbance		Impacts from Temporary Exclusion from Construction[2]		Potential Impacts[3]
		AUMs Lost	Percent of Total	AUMs Lost	Percent of Total	
Dry Creek	5,501	30	0.5	1,121	19.7	***
Fish Creek Ranch	18,914	289	1.5	8,624	45.6	*****
Lucky C	5,080	46	0.9	1,565	30.8	*****
Potts	9,262	179	1.9	5,581	60.3	*****
Roberts Mountain	20,493	195	1.0	6,524	31.8	*****
Santa Fe	5,202	61	1.2	2,558	49.2	*****
Seven Mile	8,852	32	0.4	1,189	13.4	***
Snowball Ranch	991	3	0.3	163	16.4	***
Sweeny Wash	478	12	2.5	273	57.1	*****
San Antone	15,943	92	0.6	3,388	21.3	***
Butterfield	4,779	11	0.2	688	14.4	***
Ralston	19,303	288	1.5	9,278	48.1	*****
Monitor	4,011	1	0.02	49	1.2	*
Hunts Canyon	3,741	53	1.4	1,924	51.4	*****
Stone Cabin	16,742	196	1.17	7,169	42.8	*****
Morey	2,250	11	0.5	392	17.4	***
Hot Creek	8,850	125	1.4	4,289	48.5	*****
Reveille	25,730	305	1.2	7,027	27.3	***
Sand Springs Unit	9,145	78	0.9	2,786	30.5	*****
Crater Blackrock	5,028	69	1.4	2,568	51.1	*****
Nyala	18,506	100	0.5	4,030	21.8	***
Blue Eagle	9,862	177	1.8	1,737	17.6	***
Indian George	3,177	1	0.03	75	2.4	*
Devils Gate (Nev)	2,320	10	0.4	328	14.1	***
Smith Creek (Nev)	5,573	20	0.4	682	12.2	***
Baker Creek	4,247	11	0.3	545	12.8	***
Chokecherry	6,032	39	0.6	2,537	42.1	*****
Cottonwood	4,106	62	1.5	2,209	53.8	*****
Hamlin Valley	8,177	135	1.7	5,096	62.3	*****
Cherry Creek	7,040	9	0.1	249	3.5	*
Jakes Unit Trail	832	8	1.0	245	29.4	***
North Butte	500	9	1.8	232	46.4	*****
Thirty Mile Spring	7,000	53	0.8	2,220	31.7	*****
South Butte	650	8	1.2	268	41.2	*****
Warm Springs	17,500	55	0.3	1,789	10.2	***
Newark	9,519	44	0.5	1,733	18.2	***

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Table 3.1.1-7. Summary of full basing impacts to BLM allotments in the Nevada/Utah study area (Page 2 of 6).

Name	Total AUMs Allotted[1]	Direct Impacts from Vegetation Disturbance		Impacts from Temporary Exclusion from Construction[2]		Potential Impacts[3]
		AUMs Lost	Percent of Total	AUMs Lost	Percent of Total	
Dry Mountain	966	3	0.3	279	28.9	***
Sabala Springs	1,700	29	1.7	1,095	64.4	*****
North Pancake	648	11	1.7	137	21.1	***
Six Mile	1,356	20	1.5	870	64.2	*****
Monte Cristo	1,129	25	2.2	75	6.6	*
South Pancake	1,154	27	2.3	999	86.6	*****
Black Point	687	2	0.3	149	21.7	***
Silverado	338	1	0.3	15	3.9	*
Moorman Ranch	10,009	35	0.3	1,536	15.2	***
Tom Plain	6,039	113	1.9	4,083	67.6	*****
Indian Jake	2,948	35	1.2	258	8.8	*
Douglas Point	368	1	0.3	32	8.7	*
North Cove	732	5	0.7	130	17.8	***
Wells Station	302	3	1.0	175	57.9	*****
Badger Spring	1,412	34	2.4	167	11.8	***
Cave Valley Ranch	2,403	5	0.2	232	9.7	*
Shingle Pass	2,802	26	0.9	853	30.4	*****
Haggerty Wash	194	6	3.1	148	76.3	*****
Cave Valley Siding	200	4	2.0	141	70.5	*****
Cliff Spring	2,043	18	0.9	675	33.0	*****
Wild Horse	315	2	0.6	63	20.0	***
Batterman Wash	2,093	44	2.1	1,821	87.0	*****
Hardy Springs	5,746	38	0.7	1,354	23.6	***
Sunnyside	8,787	156	1.8	5,245	59.7	*****
Dry Farm	733	6	0.8	261	35.6	*****
Ely Spring Sheep	1,802	5	0.3	193	10.7	***
McCutcheon Spring	446	6	1.3	224	50.2	*****
Mustang	880	1	0.1	186	21.1	***
Oak Springs AMP	9,268	75	0.8	2,520	27.2	***
Pahroc	4,783	58	1.2	954	19.9	***
Rattlesnake	1,180	15	1.3	484	41.0	*****
Sand Springs AMP	6,091	74	1.2	2,529	41.5	*****
Delamar	4,858	8	0.2	283	5.8	*
Geyser Ranch	14,850	234	1.6	7,422	50.0	*****
Grassy Mountain	200	--	--	22	11.0	***
Simpson	747	24	3.2	747	100	*****

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Table 3.1.1-7. Summary of full basing impacts to BLM allotments in the Nevada/Utah study area (Page 3 of 6).

Name	Total AUMs Allotted[1]	Direct Impacts from Vegetation Disturbance		Impacts from Temporary Exclusion from Construction[2]		Potential Impacts[3]
		AUMs Lost	Percent of Total	AUMs Lost	Percent of Total	
Cowboy Pass	2,636	24	0.9	788	29.9	***
Antelope	7,660	72	0.9	2,689	35.1	*****
Blind Valley	2,466	19	0.8	605	24.5	***
Boob Canyon	2,870	41	1.4	1,359	47.4	*****
Crows Nest	1,460	22	1.5	832	57.0	*****
Brecks Knoll	6,999	60	0.9	2,183	31.2	*****
Buckskin	2,475	3	0.1	95	3.8	*
Coyote Knoll	2,628	60	2.3	831	31.6	*****
Crater	3,408	32	0.9	1,220	35.8	*****
Crystal Peak	1,787	28	1.6	767	42.9	*****
Conger Springs	5,179	10	0.2	301	5.8	*
Death Canyon	2,666	9	0.3	325	12.2	***
Deadman Wash	5,432	74	1.4	2,665	49.1	*****
Ferguson	863	7	0.8	275	31.9	*****
Gandy	3,939	16	0.4	784	19.9	***
Garrison	1,614	3	0.2	174	10.8	***
Granite	3,150	28	0.9	1,013	32.2	*****
Henry Creek	171	1	0.6	95	55.6	*****
Knoll Spring	1,213	5	0.4	194	16.0	***
King	6,742	30	0.4	1,421	21.1	***
Lady Laird	5,169	51	1.0	1,847	35.7	*****
Little Drum	5,505	20	0.4	720	13.1	***
North Canyon	1,791	8	0.4	331	18.5	***
Notch Peak	3,844	7	0.2	222	5.8	*
Painted Potholes	2,602	31	1.1	703	27.0	***
Painter Springs	3,240	7	0.2	320	9.9	*
Sand Pass	2,127	17	0.8	570	26.8	***
Skull Rock	4,470	45	1.0	1,840	41.2	*****
Smith Creek (UT)	163	--	--	14	8.6	*
Steamboat	2,294	14	0.6	465	20.3	***
Swazey Knoll	4,928	6	0.1	276	5.6	*
Skunk Springs	2,490	15	0.6	789	31.7	*****
Tatow	4,500	58	1.3	1,868	41.5	*****
Tule Springs	1,303	20	1.5	294	22.6	***
Moorman Gap	3,291	3	0.1	67	2.0	*
Pine Valley	4,140	46	1.1	889	21.5	***

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Table 3.1.1-7. Summary of full basing impacts to BLM allotments in the Nevada/Utah study area (Page 4 of 6).

Name	Total AUMs Allotted[1]	Direct Impacts from Vegetation Disturbance		Impacts from Temporary Exclusion from Construction[2]		Potential Impacts[3]
		AUMs Lost	Percent of Total	AUMs Lost	Percent of Total	
Smelter Mountain	995	6	0.6	271	27.2	***
Death Canyon	9,493	23	0.2	878	9.2	*
Indian Springs	2,020	36	1.8	930	46.0	*****
Riverbed	6,029	57	0.9	1,978	32.8	*****
South Keg	2,530	51	2.0	1,560	61.7	*****
East Topaz	2.615	28	1.1	1,009	38.6	*****
Bitner Knoll	2,208	9	0.4	408	18.5	***
Blackrock	2,852	29	0.8	901	23.3	***
Wildhorse	1,789	41	2.3	1,296	72.4	*****
Callao	2,982	5	0.2	175	5.9	*
East Fish Springs	1,385	3	0.2	103	7.4	*
Indian Peak	4,485	9	0.2	287	6.4	*
Monte Cristo	9,352	4	0.04	157	1.7	*
Sheep Mountain	1,740	4	0.2	221	12.7	***
Montezuma	8,100	59	0.7	2,024	25.0	***
Klondike	85	1	0.1	48	56.5	*****
Deseret	13,274	34	0.3	2,113	15.9	***
Crickett	9,386	42	0.4	1,481	15.8	***
Coates	1,860	11	0.6	364	19.6	***
Twin Peaks	24,692	2	0.01	103	0.4	*
Seely	5,362	81	1.5	2,774	51.7	*****
Big Wash	311	1	0.3	2	0.6	*
Willow Creek	5,817	54	0.9	2,311	39.7	*****
Antelope Peak	6,552	14	0.2	280	4.3	*
High Rock	2,914	5	0.2	145	5.0	*
Ephraim-Bagnall	5,391	5	0.1	199	3.4	*
Hardpan	2,386	24	1.0	669	28.0	***
Voorhees	3,216	48	1.5	1,775	55.2	*****
Well	2,524	55	2.2	1,932	76.5	*****
Indian Creek	1,128	8	0.7	103	9.1	*
Buckhorn	3,715	85	2.3	2,953	79.5	*****
Red Cove	3,254	42	1.3	1,720	52.9	*****
Sewing Machine	1,611	18	1.1	463	28.3	***
Fairview	5,546	2	0.04	73	1.3	*
State Line (NV)	5,134	15	0.3	540	10.5	***
Buckhorn	4,010	21	0.5	697	17.4	***

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Table 3.1.1-7. Summary of full basing impacts to BLM allotments in the Nevada/Utah study area (Page 5 of 6).

Name	Total AUMs Allotted[1]	Direct Impacts from Vegetation Disturbance		Impacts from Temporary Exclusion from Construction[2]		Potential Impacts[3]
		AUMs Lost	Percent of Total	AUMs Lost	Percent of Total	
Bull Creek	1,731	4	0.2	358	20.7	***
Cove	1,138	10	0.9	270	23.7	***
Crescent	1,218	5	0.4	156	12.8	***
Currant Ranch	3,289	24	0.7	1,031	31.3	*****
Fish Creek	1,825	32	1.8	1,316	72.1	*****
Green Springs	6,497	61	0.9	2,541	39.1	*****
Hildebrand Canyon	1,106	5	0.4	176	15.9	***
Ike Springs	3,294	12	0.4	357	10.8	***
McKay	930	4	0.4	59	6.3	*
Red Mountain	1,609	7	0.4	261	16.2	***
South Spring Valley	6,329	11	0.2	361	5.7	*
Telegraph Cr. Unit	1,925	5	0.3	275	14.3	***
Willow Ranch	3,697	22	0.6	733	19.8	***
Bad Lands	610	15	2.5	469	76.9	*****
Burbank	557	12	2.2	246	44.2	*****
Christensen	3,693	16	0.4	506	13.7	***
Confusion Mountain	3,706	47	1.3	1,627	43.9	*****
Devils Gate (UT)	651	15	2.3	651	100	*****
Flint	1,957	22	1.1	927	41.4	*****
Grassy Cove	5,376	39	0.7	614	11.4	***
Lakeview	1,220	26	2.1	248	20.3	***
Lawson Cove	10,929	84	0.8	2,852	26.1	***
Marble Wash	2,002	33	1.6	1,672	82.7	*****
Mountain Home	1,990	2	0.1	90	4.5	*
Nevada Cattle	892	2	0.2	71	8.0	*
Patch-Im-Pa	1,398	6	0.4	97	6.9	*
Pruess Lake Ely	171	2	1.2	13	7.6	*
Wah Wah	10,929	177	1.6	4,640	42.5	*****
Warm Creek	614	16	2.6	590	96.1	*****
Medicine Butte	14,914	33	0.2	1,212	8.1	*
Fox Mountain	6,680	7	0.1	290	4.3	*
Oreana Spring	3,433	21	0.6	651	19.0	***
Timber Mountain	965	4	0.4	126	13.1	***
Irish Mountain	2,915	11	0.4	363	12.5	***
South Kiko Six Mile	807	7	0.9	164	20.3	***
Forest Moon	3,780	61	1.6	2,356	62.3	*****

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Table 3.1.1-7. Summary of full basing impacts to BLM allotments in the Nevada/Utah study area (Page 6 of 6).

Name	Total AUMs Allotted[1]	Direct Impacts from Vegetation Disturbance		Impacts from Temporary Exclusion from Construction[2]		Potential Impacts[3]
		AUMs Lost	Percent of Total	AUMs Lost	Percent of Total	
Middle Coal Valley	1,138	23	2.0	823	72.3	*****
Pine Creek	2,207	40	1.8	1,374	62.3	*****
Coal Valley	848	13	1.5	401	47.3	*****
Cottonwood	3,016	47	1.6	1,664	55.2	*****
Needles	3,617	56	1.5	1,935	53.5	*****
Seaman Springs	1,619	12	0.7	402	24.8	***
W. Timber Mountain	735	13	1.8	332	45.2	*****
Worthington Mountain	6,298	109	1.7	4,084	64.8	*****
East Water Gap	1,209	19	1.6	672	55.6	*****
West Water Gap	460	8	1.7	272	59.1	*****
Ely Spring AMP	4,248	57	1.3	3,078	72.5	*****
Shadow Wells	577	17	2.9	577	100	*****
Wilson Creek	53,710	486	0.9	18,259	34.0	*****
Government Creek	3,919	--	--	31	0.8	*
Table Mountain	5,188	66	1.3	2,062	40.3	*****
Kane Spring	1,077	19	1.8	745	69.2	*****
Fandangle	3,555	34	1.0	794	22.3	*****
Triangle	2,794	46	1.6	1,460	52.2	*****
Spor Mountain	2,749	51	1.9	2,024	73.6	*****
Trout Creek	19,452	171	0.9	5,925	30.5	*****
West Fish Springs	4,632	25	0.5	1,286	27.8	***
Reserved For Wildlife	1,081	13	1.2	748	69.2	*****
Average	4,553	40	0.9	1,325	29.1	***

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[1] Named allotments on BLM maps that did not have data in the grazing record masters were planimetered for area, an acres per AUM figure was estimated from surrounding allotments and an estimated total AUMs then computed.

[2] Construction exclusion impacts represent a worst case summation of all impacts that can potentially reduce livestock use of an area because of construction disturbances. See the methods section for a more complete description.

[3]
- \- = No AUM reduction.
- * = Low to moderately low impact. Maximum construction exclusion AUM losses of less than 10 percent of the total in the area.
- *** = Moderate to moderately high impact. Maximum construction exclusion AUM losses from 10 percent to less than 30 percent of the total in the area.
- ***** = High impact. Maximum construction exclusion AUM losses of 30 percent or greater of the total in the area.

Table 3.1.1-8. Summary of full basing impacts to operators using BLM allotments in the Nevada/Uta study area (Page 1 of 6).

Operator Number	Total AUMs Allotted	Direct Impacts from Vegetation Disturbance[1]		Impacts from Temporary Exclusion by Construction[2]		Potential Impacts[3]
		AUMs Lost	Percent of Total	AUMs Lost	Percent of Total	
1	2,728	0.3	0.01	25	0.93	*
2	14,182	56	0.4	1,465	10.3	***
3	2,317	36	1.6	930	40.1	*****
4	667	11	1.6	349	52.3	*****
5	1,243	4	0.3	148	11.9	***
6	1,104	3	0.3	103	9.3	*
7	6,237	87	1.4	2,522	40.4	*****
8	4,523	13	0.3	701	15.5	***
9	2,331	60	2.6	831	35.7	*****
10	1,328	14	1.1	536	40.3	*****
11	1,698	18	1.1	685	40.3	*****
12	366	2	0.5	83	22.7	***
13	3,074	14	0.5	701	22.8	***
14	171	1	0.8	95	55.6	*****
15	4,830	51	1.1	1,847	38.2	*****
16	5,704	6	0.1	276	4.8	*
17	105	2	1.5	49	46.3	*****
18	11,336	138.2	1.2	4,752	41.9	*****
19	274	1	0.5	61	22.3	***
20	298	2	0.7	88	29.4	***
21	362	2	0.5	68	18.8	***
22	92	1	1.4	6	6.6	*
23	515	4	0.8	135	26.2	***
24	2,530	51	2.0	1,560	61.7	*****
25	1,207	4	0.4	168	13.9	***
26	2,604	10	0.4	363	13.9	***
27	1,404	5	0.4	196	14.0	***
28	1,733	31	1.8	975	56.3	*****
29	1,180	21	1.8	664	56.3	*****
30	750	14	1.9	423	56.3	*****
31	2,982	24	0.8	890	29.8	***
32	400	3	0.8	119	29.8	***
33	1,995	9	0.5	408	20.5	***
34	2,750	51	1.9	2,124	77.2	*****
35	963	11	1.1	523	54.3	*****
36	578	1	0.2	45	7.8	*
37	127	0.3	0.2	10	7.9	*
38	288	0.6	0.2	22	7.8	*

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Table 3.1.1-8. Summary of full basing impacts to operators using BLM allotments in the Nevada/Utah study area (Page 2 of 6).

Operator Number	Total AUMs Allotted	Direct Impacts from Vegetation Disturbance[1]		Impacts from Temporary Exclusion by Construction[2]		Potential Impacts[3]
		AUMs Lost	Percent of Total	AUMs Lost	Percent of Total	
39	692	2	0.3	106	15.3	***
40	20,203	154	0.08	5,350	26.5	***
41	146	1	0.08	39	26.4	***
42	425	3	0.07	113	26.5	***
43	1,450	11	0.08	385	26.6	***
44	158	1	0.08	42	26.6	***
45	780	3	0.4	109	14.0	***
46	5,773	20	0.4	720	12.5	***
47	2,615	33	1.3	1,111	42.5	*****
48	2,615	14	0.5	507	19.4	***
49	5,522	69	1.2	2,367	42.9	*****
50	2,489	3	0.1	95	3.8	*
51	6,574	44	0.7	1,643	25.0	***
52	4,542	10	0.2	301	6.6	*
53	3,294	5	0.1	201	6.1	*
54	4,378	25	0.6	691	15.8	***
55	3,751	46	1.2	889	23.7	***
56	240	1	0.6	38	16.0	***
57	240	1	0.6	38	16.0	***
58	3,074	48	1.6	1,775	57.7	*****
59	6,379	76	1.2	2,689	42.1	*****
60	2,500	9	0.4	316	12.6	***
61	2,653	25	0.9	1,003	37.8	*****
62	10,611	135	1.3	4,761	44.9	*****
63	795	4	0.5	158	19.9	***
64	863	4	0.5	173	20.0	***
65	2,408	7	0.3	222	9.2	*
66	80	1	1.3	44	55.2	*****
67	80	1	1.3	44	55.2	*****
68	2,004	2	0.1	49	2.4	*
69	2,163	16	0.7	739	34.2	*****
70	5,598	15	0.3	1,252	22.4	***
71	2,921	7	0.2	320	11.0	***
72	5,005	2	0.04	73	1.5	*
73	2,548	10	0.4	396	15.5	***
74	932	4	0.4	145	15.5	***

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Table 3.1.1-8. Summary of full basing impacts to operators using BLM allotments in the Nevada/Utah study area (Page 3 of 6).

Operator Number	Total AUMs Allotted	Direct Impacts from Vegetation Disturbance[1]		Impacts from Temporary Exclusion by Construction[2]		Potential Impacts[3]
		AUMs Lost	Percent of Total	AUMs Lost	Percent of Total	
75	1,103	13	1.2	412	37.3	*****
76	1,313	16	1.2	490	37.3	*****
77	3,926	20	0.5	701	17.8	***
78	3,926	20	0.5	701	17.8	***
79	182	1	0.5	33	17.9	***
80	260	1	0.5	46	17.7	***
81	371	1	0.3	63	4.0	*
82	1,690	11	0.7	364	21.5	***
83	19,690	2	0.01	103	0.5	*
84	4,523	24	0.5	788	17.4	***
85	3,481	5	0.1	145	4.2	*
86	6,095	20	0.3	663	10.9	***
87	2,040	34	1.7	1,274	62.5	*****
88	6,132	101	1.7	3,822	62.3	*****
89	5,628	39	0.7	2,537	45.1	*****
90	29,984	167	0.6	6,263	20.9	***
91	64	0.2	0.3	8	12.8	***
92	5,317	54	1.0	2,311	43.5	*****
93	658	2	0.3	34	5.1	*
94	2,282	6	0.3	118	5.2	*
95	1,371	3	0.3	70	5.1	*
96	5,334	62	1.2	2,201	41.3	*****
97	2,127	0.6	0.03	19	0.9	*
98	3,755	9	0.3	475	12.7	***
99	490	1	0.3	62	12.7	***
100	3,182	1	0.04	75	2.4	*
101	2,291	10	0.4	328	14.3	***
102	2,475	41.7	1.7	1,132	45.7	*****
103	4,379	4	0.1	51	1.2	*
104	4,427	46	1.0	1,509	34.1	*****
105	5,510	46	0.8	1,411	25.6	***
106	338	1	0.3	15	4.4	*
107	605	1	0.2	33	5.5	*
108	8,849	40	0.5	1,653	18.17	***
109	14,760	54	0.4	2,086	14.1	***
110	3,095	6	0.2	170	5.5	*

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Table 3.1.1-8. Summary of full basing impacts to operators using BLM allotments in the Nevada/Utah study area (Page 4 of 6).

Operator Number	Total AUMs Allotted	Direct Impacts from Vegetation Disturbance[1]		Impacts from Temporary Exclusion by Construction[2]		Potential Impacts[3]
		AUMs Lost	Percent of Total	AUMs Lost	Percent of Total	
111	194	0.3	0.1	7	3.6	*
112	19,139	36	0.2	1,318	6.9	*
113	1,546	17	1.1	501	32.4	***
114	26,937	62	0.2	2,032	7.5	*
115	716	2	0.3	39	5.5	*
116	11,558	91	0.8	2,525	21.9	***
117	4,889	5	0.1	130	2.7	*
118	10,092	35	0.3	1,536	15.2	***
119	6,036	113	1.9	4,083	67.6	*****
120	1,873	3	0.16	175	9.3	*
121	4,585	5	0.1	94	2.1	*
122	7,400	25	0.3	75	1.0	*
123	2,552	3	0.1	32	1.3	*
124	1,341	9	0.7	287	21.4	***
125	1,011	1	0.1	32	3.2	*
126	1,700	20	1.2	150	8.8	*
127	2,400	5	0.2	232	9.7	*
128	590	4	0.7	141	23.9	***
129	1,337	15	1.1	106	7.9	*
130	194	6	3.1	148	76.3	*****
131	1,120	3	0.3	58	5.1	*
132	3,371	85	2.5	2,953	87.6	*****
133	2,894	42	1.5	1,720	59.4	*****
134	2,076	33	1.6	1,223	58.9	*****
135	3,600	23	0.6	741	20.6	***
136	250	8	3.2	242	96.8	*****
137	3,600	56	1.6	2,118	58.8	*****
138	7,792	107	1.4	3,991	51.2	*****
139	29,844	234	0.8	7,422	24.9	***
140	3,902	39	1.0	1,350	34.6	*****
141	6,290	13	0.2	376	6.0	*
142	659	10	1.6	384	58.2	*****
143	1,250	19	1.5	676	54	*****
144	456	7	1.6	274	60.1	*****
145	440	7	1.6	256	58.1	*****
146	3,835	42	1.1	1,421	37.0	*****

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Table 3.1.1-8. Summary of full basing impacts to operators using BLM allotments in the Nevada/Utah study area (Page 5 of 6).

Operator Number	Total AUMs Allotted	Direct Impacts from Vegetation Disturbance[1]		Impacts from Temporary Exclusion by Construction[2]		Potential Impacts[3]
		AUMs Lost	Percent of Total	AUMs Lost	Percent of Total	
147	513	5	1.0	204	39.8	*****
148	1,484	22	1.5	840	56.6	*****
149	17,329	219.1	1.3	7,452	43.0	*****
150	3,206	64.4	2.0	2,312	75.5	*****
151	51	0.5	1.0	13	25.7	***
152	300	5	1.6	183	60.9	*****
153	227	2	1.0	58	25.7	***
154	2,442	37	1.5	1,314	53.8	*****
155	12,427	64	0.5	2,372	19.1	***
156	7,859	73	0.9	2,485	31.6	*****
157	11,326	178	1.6	6,639	58.6	*****
158	70	1.0	1.4	37	52.2	*****
159	11,316	56	0.5	1,935	17.1	***
160	1,180	15	1.3	484	40.8	*****
161	1,395	1	0.1	186	13.3	***
162	7,076	58	0.8	954	13.5	***
163	36,323	45	0.1	1,543	4.3	*
164	717	2	0.3	55	7.6	*
165	6,128	62	1.0	3,271	53.4	*****
166	6,533	74	1.1	2,529	38.7	*****
167	8,100	59	0.7	2,024	25.0	***
168	2,952	4	0.1	221	7.5	*
169	7,257	30	0.4	1,121	15.5	***
170	8,852	32	0.4	1,189	13.4	***
171	20,493	195	1.0	6,524	31.8	*****
172	5,080	46	0.9	1,565	30.8	*****
173	478	12	2.5	273	57.1	*****
174	1,200	3	0.2	163	13.6	***
175	8,267	19	0.2	666	8.1	*
176	9,262	179	1.9	5,581	60.3	*****
177	28,419	289	1.0	8,624	30.4	*****
178	1,227	14	1.2	604	49.2	*****
179	5,437	47	0.9	1,954	36.0	*****

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Table 3.1.1-8. Summary of full basing impacts to operators using BLM allotments in the Nevada/Utah study area (Page 6 of 6).

Operator Number	Total AUMs Allotted	Direct Impacts from Vegetation Disturbance[1]		Impacts from Temporary Exclusion by Construction[2]		Potential Impacts[3]
		AUMs Lost	Percent of Total	AUMs Lost	Percent of Total	
180	18,560	289	1.6	9,325	50.2	*****
181	14,535	131	0.9	4,789	33.0	*****
182	1,893	23	1.2	832	43.9	*****
183	11,625	138	1.2	3,176	27.3	***
184	14,105	167	1.2	3,851	27.3	***
185	19,503	231	1.2	8,213	42.1	*****
186	4,779	11	0.2	688	14.4	***
187	9,352	4	0.04	157	1.7	*
188	18,176	92	0.5	3,388	18.6	***
189	16,192	100	0.6	4,030	24.9	***
190	2,025	36	1.8	356	17.6	***
191	7,416	95	1.3	3,475	46.9	*****
192	3,972	61	1.5	2,356	59.3	*****
193	2,040	14	0.7	465	22.8	***
194	1,395	--	--	14	1.0	*
195	375	--	--	3	0.8	*
196	390	--	--	3	0.8	*
197	513	--	--	4	0.8	*
198	420	--	--	4	0.8	*
199	65	--	--	0.5	0.8	*
200	130	--	--	1	0.8	*
201	270	--	--	2	0.8	*
202	65	--	--	0.5[4]	0.8	*
Total	924,485	6,924	0.75	235,372[4]	25.5	***
Average	4,577	35.9	0.78	1,165	25.5	

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[1] Computed from area impacted by shelters, cluster road and DTN.

[2] Computed from area within 1/2 mi of project facilities of shelters, cluster road and DTN. Assumes no livestock use during construction. Construction exclusion impacts represent a worst case summation of all impacts that can potentially reduce livestock use of an area because of construction disturbances.

[3]
- \- = No AUM reduction.
- * = Low to moderately low impact. Maximum construction exclusion AUM losses of less than 10 percent of the total in the area.
- *** = Moderate to moderately high impact. Maximum construction exclusion AUM losses from 10 percent to less than 30 percent of the total in the area.
- ***** = High impact. Maximum construction exclusion AUM losses of 30 percent or greater of the total in the area.

[4] Because of the current construction schedules, the maximum exclusion that would occur during any single year would be about 80,000 AUMs.

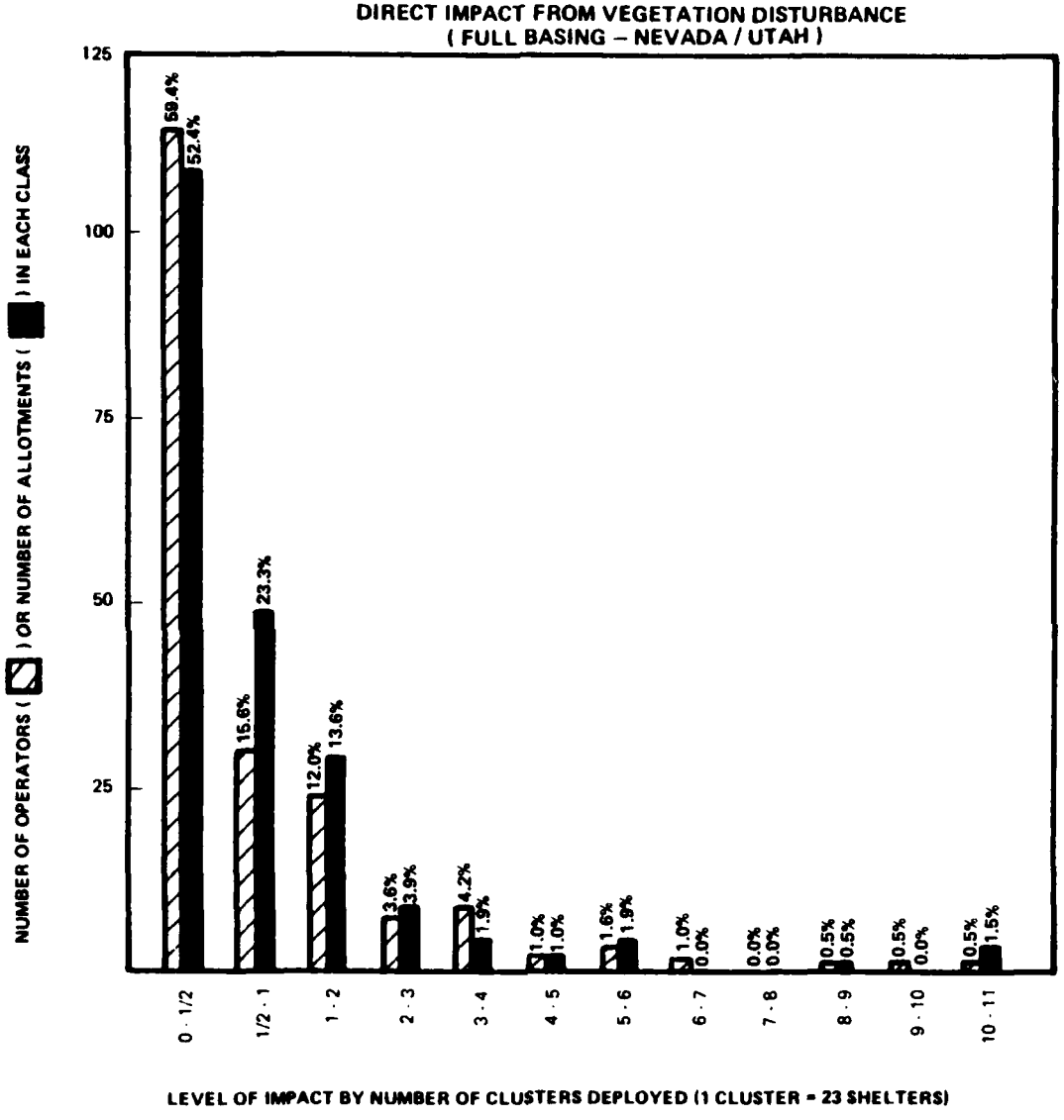

Figure 3.1.1-2. Number of operators and allotments in each impact class on BLM administered lands in the Nevada/Utah study area.

Forty-nine of the impacted operators would account for three-fourths of the total direct impact AUM losses (about 5,200 AUMs). They would have individual losses ranging from 46 to 290 AUMs (Figure 3.1.1-3). The remaining 144 operators would account for less than 1,800 of the total AUMs lost and have individual losses ranging from less than 1 to 45 AUMs. Three fourths of the total direct AUM loss would occur on sixty of the impacted allotments. The individual losses for these allotments range from 41 to 490 AUMs. The remaining impacted allotments would have individual losses that range from less than 1 to 40 AUMs.

Three fourths of the worst-case temporary construction exclusion losses, amounting to 177,000 AUMs, also occur on the alloted area of 49 operators. These operators would have individual losses ranging from 1,560 to 9,330 AUMs. The remaining 144 operators would have individual losses ranging from 1 to 1,540 (Figure 3.1.1-3).

Fifty-nine impacted allotments would account for a total of three fourths of the worst-case AUM losses, amounting to about 210,500 AUMs and would have individual losses ranging from 1,480 to over 18,000 AUMs. The remaining 140 impacted allotments would have individual losses ranging from 2 to 1,460 AUMs.

The size of an impact to an operator does not necessarily reflect the severity of that impact to his operations. What is possibly more important than the size of an impact is the proportion of an operator's total allotted area that is potentially affected by M-X deployment. For example, although experiencing a relatively small impact, a small operator could have a large proportion of his total BLM allotted AUMs affected, and his operation seriously impacted. Much of the valley-bottom area to be used by M-X is vital winter range. The susceptibility of these areas to impact was expressed in public comment on the draft EIS.

PUBLIC COMMENT ON THE DRAFT EIS:

> "The valley bottoms, for which M-X is proposed, are generally used for winter range. The loss of a relatively limited amount of grazing capacity in these areas--whether the 7,200 AUMs claimed in the DEIS, or the massively greater number contended in this review -- would be likely to eliminate a considerably greater proportion of the grazing systems. The effect is a keystone one." (B0125-3-433)

To analyze for potential impacts the proportion or percentage of each operator's total BLM alloted area that would be affected by project deployment was compiled for each operator based on the temporary construction exclusion analyses. This provides an index of how much of an operator's total allotment area receives project deployment relative to the total allotted. All the affected operators were grouped into ten classes of percent of total allotted area affected by project construction. The number of operators in each of the ten classes is indicated in Figure 3.1.1-4.

As with the previously discussed impacts, the largest number of operators have a relatively small proportion of their allotted area potentially affected by all the impacts associated with project construction. Forty-eight percent of the 193

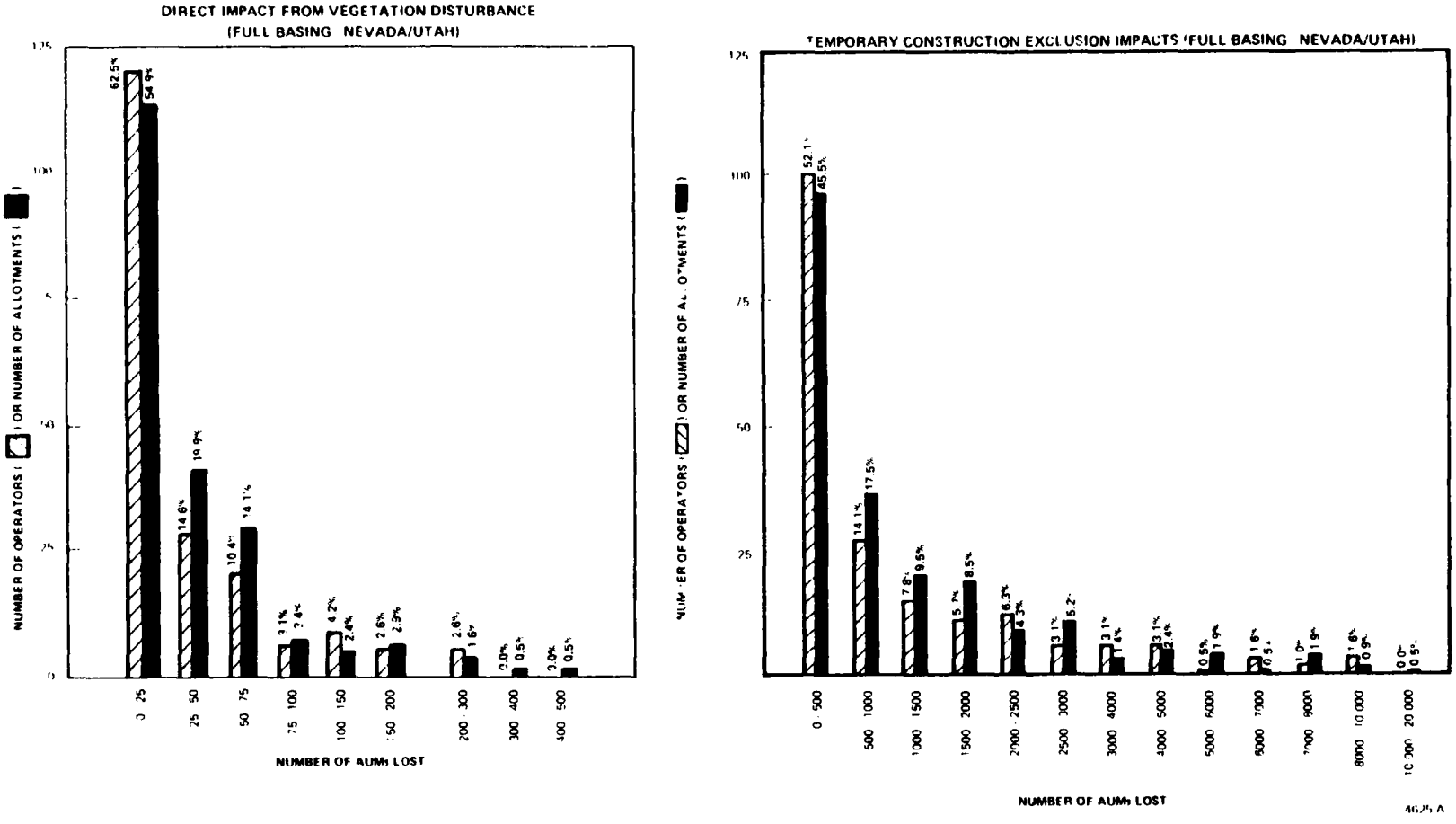

Figure 3.1.1-3. Number of operators and number of allotments on BLM administered land in the Nevada/Utah study area.

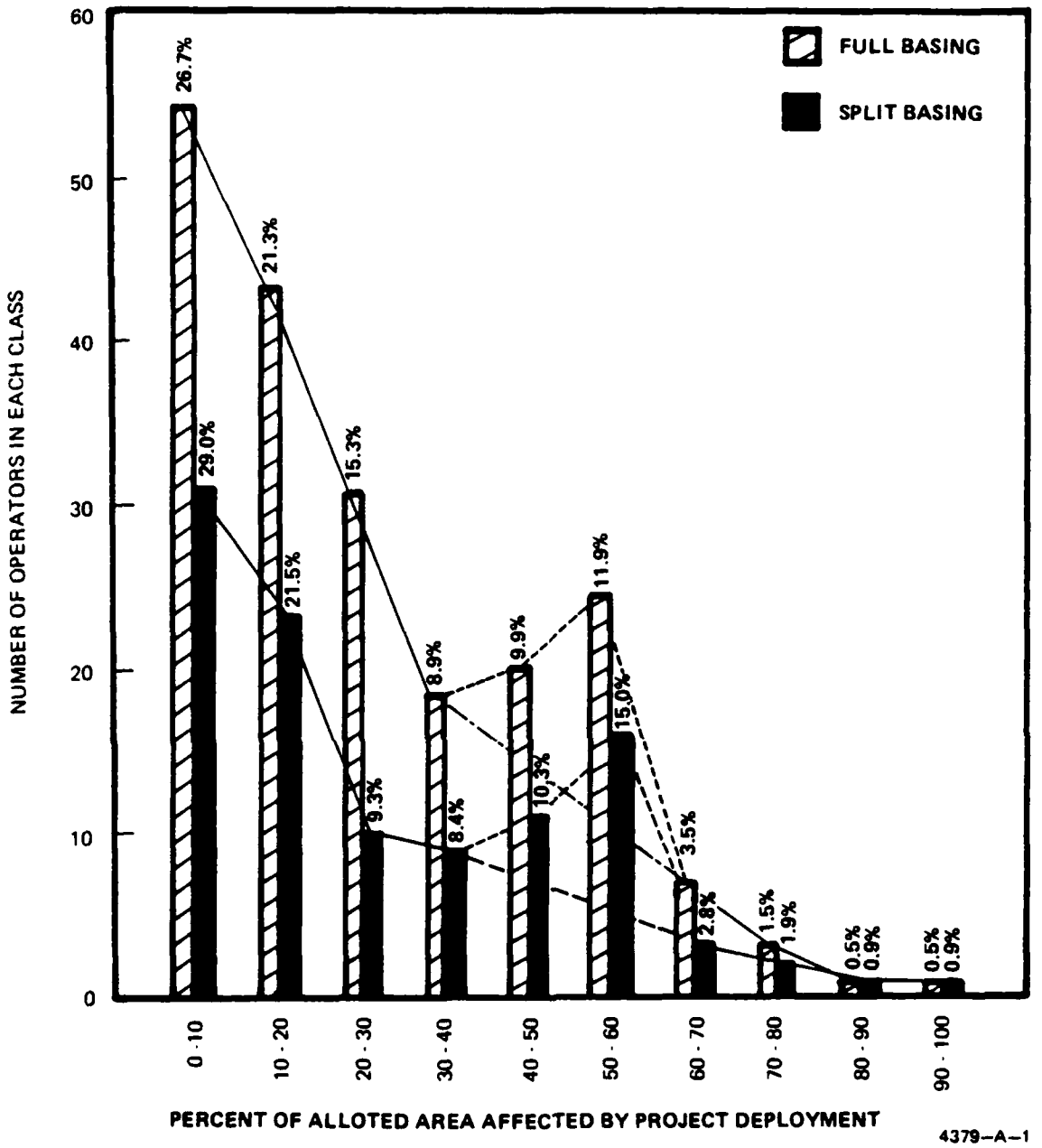

Figure 3.1.1-4. Number of operators on BLM administered land in the Nevada/Utah study area and percentage of allotment affected by project deployment.

operators would have 20 percent or less of their total allotted area potentially affected (Figure 3.1.1-4). About one fifth of the impacted operators have deployment impacts over a range of 40 to 60 percent of their total allotted area.

One fourth of all the impacted operators would have project deployment and construction disturbances occurring over 40 percent or more of their allotted areas. These differential temporary construction exclusion impacts to selected livestock operations are the result of their dependence on vegetation types that are differentially impacted by the project. These operators may have difficulty remaining in operation during the period of construction on their allotments because of the widespread nature of the affects. The total allotted AUMs of these operators comprises about one fourth of the total alloted AUMs of all the impacted operators and about 12 percent of the total AUMs in the study-area hydrologic subunits. If they are unable to remain in operation during M-X construction, their individual losses as a result of temporary construction exclusion impacts would total about 350,000 AUMs or 19 percent of the study area total. Unimpacted rangeland made available by the loss of these operations would soon be utilized by other area ranches. To remain in operation under these kinds of impacts, the affected operators would need to be supported financially during construction and during a recovery period following construction.

Those operators with the project deployed over 30 percent or more of their allotted area account for 37 percent of the total allotted AUMs of the 193 impacted operators, and 69 percent of the total worst-case temporary construction exclusion AUM losses. If operations with deployment on 30 percent or more of their allotted area cannot remain functional during construction disturbances, individual losses of a total of up to 420,000 AUMs, or about 23 percent of the study area total, could occur over the construction period. Again, adjustments within the industry could reduce these losses. Losses of these magnitudes could have a short-term impact on livestock foraging on surrounding National Forest lands that provide summer forage for many livestock that use BLM land during other seasons of the year. Cooperative agreements between the affected operators and the BLM, Air Force, and its representatives should prevent most of these losses, however.

Vegetation on the valley floors generally differs considerably from the vegetation on the benches, and both differ from the vegetation on the mountains. Valley floor vegetation is also generally assigned to different allotments than higher elevation vegetation. The unique habitat requirements of the valley floor vegetation species appears to generally coincide with the geotechnical requirements for M-X deployment. The unique characteristics of the valley floor vegetation also generally dictate the kind of livestock operations that utilize those areas and the location of allotment boundaries.

PUBLIC COMMENT ON THE DRAFT EIS:

"In general, the proposed M-X system would affect ranchers differently, and these differential impacts should have been estimated?" (B0125-3-460)

The following analysis addresses these kinds of concerns as expressed in several public comments on the draft EIS. Impacted livestock operations, identified

from the grazing record masters, were assigned to five general categories (summer cattle, year-round cattle, winter cattle, winter sheep, and year-round sheep) to investigate the differential impacts to different types of operators. The 667 operators for the entire study area (Table 1.1-3) were similarly categorized as the baseline for analysis.

Summer cattle operators accounted for 45.7 percent of the study area operations, but only 19.2 percent of those impacted (Table 3.1.1-9). This difference reflects the general use of allotments by this type of operation that are generally above the project deployment areas. Year-round cattle ranchers made up 29.8 percent of all the operators in the study area, and 40.2 percent of those impacted. This type of operation tends to make greater use of the valley floors. This loss of valley floor winter range can increase the need for feeding the livestock, representing an expense, including increased labor costs, that is critical in determining the profitability of cattle operations (Gray, 1970).

Winter-sheep operations comprise only 8.6 percent of all the study-area livestock operations, but represent 26.2 percent of those impacted. Overall, about 90 percent of the winter-sheep operations in the study area are impacted by the Proposed Action. These operations are highly dependent on the valley floor vegetation, and therefore on the most geotechnically suitable areas for the project. The economics of a sheep operation are such that the winter range provides critically needed forage. Increased costs associated with dry lot feeding during this period can easily eliminate the operation's profit (Price, 1979). Sheep operations will also have the most herd management problems with the M-X road system, and the greatest susceptibility to animal losses from the spread of halogeton associated with construction. The halogeton problem is discussed in more detail in ETR-14 on native vegetation. For some sheep operations to remain viable during construction, and a period of time following it, some alternative source of winter forage may have to be provided.

The effects of M-X impacts on the livestock industry will also be determined, at least in part, by the climatic conditions that occur during M-X facilities construction. Dry years will intensify AUM losses, further aggravate any water problems, and frustrate revegetation efforts. Thunderstorm activity can greatly extend the range of erosion and siltation problems locally, and potentially destroy recently revegetated areas. High winds can aggravate dust and wind erosion and deposition problems. Over much of the area, climatic extremes, rather than averages, are more often the rule.

Economic Impacts (3.1.2)

Economic impacts are a concern expressed many times in public comment on the Draft EIS. The following are two examples.

PUBLIC COMMENT ON THE DRAFT EIS:

"An EIS must contain an economic impact analysis; this DEIS does not. Therefore, at this time it does not meet NEPA guidelines. (B0164-2-554)

Table 3.1.1-9. Comparison of the relative proportions of five categories of livestock operations in the study area with the relative proportions of the impacted operators in the same five categories.

Ranch Category	Operators in Each Category as a Percent of Total in Study Area[1]	Percent of Total Impacted by: Full Basing	Split Basing
Summer Cattle	45.7	19.2	12.1
Year-Round Cattle	29.8	40.2	45.7
Winter Cattle	2.1	0	0
Winter Sheep	8.6	26.2	22.4
Year-Round Sheep	13.8	14.5	19.8

T4960/10-2-81

[1]Data for the entire study area from Resource Concepts Inc., 1981.

"High short-term costs and reduced long-term profit margins may drive many current users out of business and this should be discussed." (B0851-4-042)

Economic analyses were used to determine the potential for economic losses that could be associated with M-X impacts. Parameters for the analyses were based on current management practices of typical Nevada/Utah livestock operations. Approximately 20 percent of the 667 livestock operators in the study area were interviewed for the necessary economic data (Resource Concepts Inc., 1981). Economic baseline information was determined for a typical ranch in each of 15 classifications (Table 2.1.4-2). Budgets for the average ranch of each of the 15 classifications are in Appendix A. Each ranch was "impacted" with 13 different M-X deployment scenarios incorporating both direct and indirect impacts (Table 2.1.4-1). The data on an approximate acreage disturbed by M-X siting, the average AUMs lost from this direct disturbance, and the total area actually required to deploy the scenario are presented in Table 3.1.2-1. The linear programming technique used in these analyses adjusted livestock numbers and management practices to optimize returns under the conceptualized impact each of the 13 scenarios. As interpreted by Resource Concepts, the use of the larger scenarios was incorrect and has been remedied for this report (see Section 2.1.4).

AUM reductions which might be experienced by the typical ranch impacted by each of the 13 scenarios are listed in Table 3.1.2-2. It is apparent that in each M-X deployment scenario the impact depends, to a large extent, on the type of ranch affected, and even on where it is located in the study area. Where correspondence is high between the topographic requirements of livestock operations and the geotechnical requirements of M-X, and where the operations are particularly susceptible to M-X impacts, losses are heavy. Percentage reductions expected in herd size are listed in Table 3.1.2-3. Most forage made available by the reduced herd sizes of directly impacted operations can be expected to be incorporated into other area operations.

The reduction in the ratio of net returns to variable costs was computed in the ranch economics analyses for the AUM losses which would be caused by construction. These reductions are shown in Table 3.1.2-4 as a percentage of the corresponding ratios if M-X were not deployed. These AUM losses range from less than one percent to over 100 percent of total AUMs.

These analyses show that the greatest potential economic losses do not stem directly from the building of the M-X defense system, but from the indirect impacts of increased variable costs (Scenario XI, Table 2.1.4-1) or increased livestock death-loss rates (Scenario XII, Table 2.1.4-1). The narrow profit margins of most Great Basin ranches make these operations far more vulnerable to the indirect impacts of inflationary costs, and heavier livestock losses, than to impacts that merely deprive them of some of their grazable rangeland.

The influx of large industrial projects into ranching areas is expected to increase wage rates. In areas of Wyoming where coal-energy development is taking place, wage differences between the ranching and the coal-energy sectors were found to be a major factor in cutting the supply of farm labor. Economic analyses of a typical Wyoming ranch revealed that both rising wages and reduced labor supply

Table 3.1.2-1. Potential acreage disturbed and average AUMs lost in direct disturbance and allotment area (acres) required for M-X deployment.

Scenario[1]	Approximate Acreage of Disturbance	Average AUMs[2] Lost	Allotment Area Required for Deployment
1	8,340	525	8,340
2	1,030	65	16,000
3	615	39	16,000
4	5,150	324	80,000
5	3,075	193	80,000
6	11,003	692	160,000
7	6,154	387	160,000
8	22,100	1,390	320,000
9	12,360	777	320,000

T4980/10-2-81

[1]Four additional scenarios involve indirect impact projections in addition to acreage disturbance figures.

[2]Based on the average acres per AUM in the allotments impacted by the Proposed Action and data from Resource Concepts Inc. (1980).

Table 3.1.2-2. Comparison of direct AUM reductions in herd sizes between regions and scenarios.[1]

Region	Operation Type	Scenario I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
I	Summer Cattle	454	56	38	278	166	595	332	1,189	664	3,127	0	0	595
	Year-Round Cattle	454	56	33	278	166	595	332	1,189	664	7,533	0	0	1,496
II	Summer Cattle	488	60	36	300	179	639	357	1,278	714	1,865	0	0	639
	Year-Round Cattle	488	60	36	300	179	639	357	1,278	714	3,914	0	0	639
I & II	Sheep	470	58	34	288	172	616	344	1,232	688	3,979	0	0	616
III	Year-Round Cattle	354	43	26	217	130	464	260	928	2,123	3,520	0	0	3,925
IV	Summer Cattle	N/A	78	47	391	233	N/A	N/A	N/A	N/A	433	0	52	391
	Year-Round Cattle (calf)	638	78	47	391	233	867	467	N/A	1,080	1,365	0	0	1,144
	Year-Round Cattle (yearling)	1,175	78	47	536	233	1,684	732	N/A	1,930	2,150	0	0	1,684
	Year-Round Sheep	638	78	47	391	233	835	467	1,719	934	5,480	0	0	835
	Winter Sheep	638	78	47	391	233	835	467	1,671	934	2,990	0	0	835
V	Summer Cattle	671	82	49	411	246	N/A	256	N/A	N/A	756	0	83	411
	Winter Cattle	671	82	49	411	246	879	491	N/A	982	1,043	0	0	879
	Year-Round Cattle	1,065	82	49	482	246	1,532	661	N/A	1,635	1,837	0	0	1,510
	Year-Round Sheep	671	82	49	411	246	879	491	1,758	982	2,040	0	0	879

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[1] Where percent reductions are shown as not applicable (N/A), the reduction in AUM's associated with the given scenario was greater than the total number of AUM's specified as available for that ranch type. In these cases, the impact is the same as that shown for Scenario X, "100 Percent Reduction ion AUM's." Data from Resource Concepts, Inc. (1981).

Table 3.1.2-3. Comparison of percent reductions in herd sizes between regions and scenarios.[1]

Region[2]	Operation Type	Scenario I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
I	Summer Cattle	6.3	0.8	0.4	3.8	2.3	8.2	4.6	16.3	9.2	50.0	0.2	0.0	19.7
	Year-Round Cattle	3.1	0.4	0.2	1.9	1.1	4.0	2.3	8.1	4.5	51.6	8.5	8.5	12.5
II	Summer Cattle	5.9	0.2	0.5	3.6	2.3	7.7	4.4	15.6	8.7	22.8	0.0	0.0	4.9
	Year-Round Cattle	5.1	0.6	0.4	3.1	1.9	6.8	3.8	13.4	7.5	59.4	7.4	0.0	14.0
I & II	Sheep	3.1	0.4	0.2	1.9	1.2	4.1	2.3	8.2	4.6	26.6	3.3	0.0	4.1
III	Year-Round Cattle	6.9	0.8	0.6	4.2	2.5	8.9	5.0	18.0	40.7	67.6	0.0	0.0	75.3
IV	Summer Cattle	N/A	4.2	2.1	27.4	14.7	N/A	N/A	N/A	N/A	31.6	0.0	0.0	24.2
	Year-Round Cattle	32.2	2.4	1.6	14.5	6.7	45.9	20.0	N/A	52.5	62.0	0.0	0.0	45.9
	Year-Round Cattle (yearling)	14.1	2.0	1.2	8.6	15.2	15.2	11.7	N/A	19.9	26.2	0.0	0.0	25.8
	Year-Round Sheep	7.0	0.9	0.5	4.3	2.6	9.2	5.1	18.9	10.2	60.1	4.5	4.5	13.7
	Winter Sheep	9.3	1.1	0.7	5.7	3.4	13.4	6.8	24.3	13.6	43.6	0.0	0.0	32.2
V	Summer Cattle	37.1	3.0	1.5	17.4	9.1	N/A	9.8	N/A	N/A	43.2	1.5	0.0	12.9
	Winter Cattle	21.5	2.3	1.4	13.1	7.9	28.5	15.9	N/A	31.8	33.6	2.8	2.8	31.3
	Year-Round Cattle	34.1	3.2	1.6	20.2	11.9	44.8	24.6	N/A	49.6	49.6	0.0	0.0	43.7
	Year-Round Sheep	11.4	1.4	0.8	7.0	4.2	15.0	8.4	29.9	16.8	34.8	0.0	0.0	29.5

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[1] Where percent reductions are shown as not applicable (N/A), the reduction in AUMs associated with the given scenario was greater than the total number of AUMs specified as available for that ranch type. In these cases, the impact is the same as that shown for Scenario X, "100 Percent Reduction AUMs".

[2] Regions are illustrated in Figure 1.1-1.

Source: Resource Concepts, Inc., 1981.

Table 3.1.2-4. Comparison of percent reductions in the ratio of net returns over variable costs between regions and scenarios[1].

Ranch Economic Study Region	Livestock Operation	Scenario I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
I	Summer Cattle	13.5	1.7	1.0	8.3	4.9	17.7	9.9	35.4	19.8	95.3	94.4	77.9	170.0
	Year-Round Cattle	2.9	0.4	0.2	1.8	1.0	3.8	2.1	7.5	4.2	47.5	28.0	26.2	55.1
II	Summer Cattle	5.7	0.7	0.4	3.5	2.1	7.5	4.2	15.0	8.4	21.9	22.9	16.1	42.8
	Year-Round Cattle	5.0	0.6	0.4	3.1	1.9	6.6	3.7	13.2	7.4	58.3	35.4	32.1	67.5
I & II	Sheep	2.7	0.3	0.2	1.7	1.0	3.5	2.0	7.1	4.0	22.9	12.4	25.9	40.3
III	Year-Round Cattle	8.2	1.0	0.6	5.0	3.0	10.8	6.0	21.5	49.2	81.7	80.6	50.5	143.9
IV	Year-Round Cattle (yearling)	21.7	3.1	2.3	11.8	7.1	41.0	13.9	12.3	36.9	44.2	30.6	26.1	74.7
	Year-Round Cattle	36.5	2.4	1.5	16.7	7.2	52.4	22.8	N/A	60.0	72.6	50.1	41.4	105.6
	Winter Sheep	20.7	2.5	1.5	12.7	7.5	27.0	15.1	54.1	30.2	96.8	47.9	41.9	101.0
	Year-Round Sheep	6.7	0.8	0.5	4.1	2.4	8.8	4.9	18.0	9.9	57.3	27.7	28.2	58.9
	Summer Cattle	N/A	5.2	3.1	40.8	22.1	N/A	N/A	N/A	N/A	45.8	38.9	28.9	94.1
V	Year-Round Cattle	37.1	3.3	1.8	19.5	10.8	51.2	24.9	N/A	58.2	64.7	36.3	20.5	90.6
	Year-Round Sheep	12.4	1.5	0.9	7.6	4.6	16.3	9.1	32.5	18.2	37.7	24.7	26.8	60.0
	Summer Cattle	53.8	3.8	2.3	23.4	11.5	N/A	12.4	N/A	N/A	63.7	63.1	48.9	122.2
	Winter Cattle	23.3	2.9	1.7	14.3	8.6	30.6	17.1	N/A	34.2	34.2	40.4	28.5	83.7

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[1]Where percent reductions are shown as not applicable (N/A), the reduction in AUMs associated with the given scenario was greater than the total number of AUMs specified as available for that ranch type. In these cases, the impact is the same as that shown for Scenario X, "100 Percent Reduction in AUMs".

Source: Resource Concepts, Inc., 1981.

had the greatest impact on the rancher's economy (Conklin et al., 1979). Powder River Basin, Wyoming ranchers, included in an area survey, felt that they were significantly affected by inflationary costs related to recent coal-energy development. Increased costs for materials, supplies, fuel, and feed will be a further hardship on the economy of marginal livestock operations. Trespassing and vandalism of their property was common to Wyoming ranchers already mentioned (Bradly et al., 1979). Livestock losses resulting from vandalism and rustling can be expected as an indirect effect of local siting of M-X. A second cause of livestock loss will be the rise in road traffic accidents associated with an expanding population.

Moreover, project construction disturbances and other inadvertent and deliberate livestock harrassment can reduce livestock weight gain, and income. Increases in many of these indirect impacts will occur without M-X due to the increased mining, gas and oil exploration, and power projects. Inflated costs for supplies and labor will also occur without M-X. Monitoring methods will be needed to separate these effects from M-X-induced impacts.

The sizes of the allotments of the typical ranches for many of the ranch classifications are too small to realistically contain all the facilities associated with the direct impacts of the larger scenarios. In some scenarios the total acreage of vegetation disturbance is larger than the entire allotment area (indicated by N/A in Tables 3.1.2-2 through 3.1.2-4). Although these larger scenarios are inappropriate for the typical ranch for some of the classifications, they can be applied to the larger allotments and to the alloted area of the larger ranches in the Nevada/Utah study area.

Disturbed acreage was converted to AUM loss prior to use in the ranch economics analyses, and the same AUM loss is possible from a number of different sources. The economic analytical technique used does not consider the source of the AUM loss, only the level of that loss. Although the high levels of AUM loss were not possible from direct vegetation removal, the same AUM losses are potentially possible under the worst case assumptions of temporary construction exclusion impacts.

Each of the impacted operators identified by number in Table 3.1.1-8 was categorized into one of the 15 ranch classifications. The average ranch budget for each of the classifications is in Appendix A. The impact data for each operator was then used in the ranch economics model to estimate the reduction in the operator's ratio of net returns to variable costs for each of five impact types. Among others, these impact types included 1) AUM loss only and 2) AUM loss plus four different combinations of increased variable costs and increased annual livestock death loss rate (Table 3.1.2-5). This variation in indirect impact was included to provide a range of estimates of economic loss in the absence of quantitative information as to the source or magnitude of loss.

Proposed action losses from direct impacts ranged from $46,300, for AUM losses only, to $6,319,800 for AUM losses plus a 25 percent increase in variable costs and a 100 percent increase in the annual death loss of livestock. Worst case exclusion impacts ranged from $405,200 for AUM loss only to $6,669,000 for AUM loss plus a 25 percent increase in variable costs and a 100 percent increase in livestock death rate. These analyses assumed the worst-case position of all ranches

Table 3.1.2-5. Annual dollar loss ($) to impacted livestock operations. (Analysis assumes a maximum of 1/3 of the total temporary exclusion impacts will occur during any single year.[1])

Alternatives	Scenarios				
	AUM Loss Only	AUM Loss Plus 5% in Variable Costs and 25% Increase in Death Loss	AUM Loss Plus 10% in Variable Costs and 50% Increase in in Death Loss	AUM Loss Plus 15% in Variable Costs and 75% Increase in in Death Loss	AUM Loss Plus 25% in Variable Costs and 100% Increase in in Death Loss
Full Basing Direct	46,300	1,458,700	2,876,400	4,294,100	6,319,800
Full Basing Exclusion	405,200	1,817,700	3,221,100	4,637,500	6,669,900
Split Basing Direct	22,500	800,700	1,579,300	2,357,900	3,466,800
Split Basing Exclusion	200,400	973,900	1,741,100	2,515,500	3,624,300

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[1]Construction exclusion impacts represent a worst case summation of all impacts that can potentially reduce livestock use of an area because of construction disturbances. See the methods section for a more complete description.

Source: Data are based on the results of economic analyses for 15 ranch classifications and 13 impact scenarios from Resource Concepts, Inc. (1981).

receiving the same level of indirect losses. All the potential impacts expected to occur during construction, as indexed by the worst-case temporary construction exclusion impacts, might result in economic losses about ten times those resulting from only direct vegetation removal. Exclusion impacts, however, would only represent 6 to 25 percent of the total economic loss when indirect impacts are also included. The results of these analyses again indicate that it is the indirect impacts that increase the operating expenses and management problems of each operation and that will potentially have the greatest effect on individual and industry economic return. Labor represents a major operating expense and one of particular concern to local residents.

PUBLIC COMMENT ON THE DRAFT EIS:

> "The rancher is faced with literally survival. He is dead. He's fighting for his life, there's only about two hundred and ten of them out there in Nevada. Their back is against the wall. You really don't understand -- you're concerned about the AUMs that they're losing, so are they, but this is not their big problem. They are presently paying from four to five hundred dollars per month for most of their labor, plus room and board. This is what the average buckaroo makes. As soon as M-X comes in, that is going to pull all of that labor force away from those ranchers and he cannot survive. This is what is going to kill him. This is what is going to kill Reno too when those of us in construction leave for the big money, out to build this M-X project. I just cannot support it even though I can stand to make a lot of money. Thank you very much" (B0782-1-002).

Specific data will be needed during subsequent tiering actions to accurately describe and quantify these impacts.

Among the analysis results, the percentage of the impacted operators whose returns did not meet variable costs ranged from 15 percent for only AUM loss to 29 percent for AUM loss, plus a 25 percent increase in variable costs, and a 100 percent increase in annual livestock death losses (Table 3.1.2-6). Temporary construction exclusion impacts resulted in a range of 20 to 36 percent of the directly impacted ranches being unable to meet variable costs (equipment and supplies) for the same scenarios. By including the fixed costs, which are unknown, the number of ranches not meeting expenses would also increase. The results of these analyses also represent only an approximation of possible economic impacts. Refining the approximation requires a finalized project layout and more specific economic analyses.

The figures presented in Table 3.1.2-6 represent the losses to only the directly affected operators. These operators represent less than 30 percent of those in the study area and an even smaller percentage of those found in the entire states of Nevada and Utah. The indirect impacts would affect all operators, not just those directly impacted by M-X. For the region and industry as a whole, the worst-case dollar losses to the livestock operators from indirect impacts might be as much as three times those reported here for those also receiving direct impacts. Because impacts will decrease with distance from the project, actual losses will probably be less. Other livestock operations, only indirectly impacted, may also potentially lose

Table 3.1.2-6. Percent of operators whose variable costs exceed their net return for long term direct and temporary construction exclusion impacts, and full and split basing. (Results are based on the analyses for Table 3.1.2-5.)

	AUM Loss only	AUM Loss Plus 5 Percent Increase in Variable Costs and 25 Percent Increase in Death Loss	AUM Loss Plus 10 Percent Increase in Variable Costs and 50 Percent Increase in Death Loss	AUM Loss Plus 15 Percent Increase in Variable Costs and 75 Percent Increase in Death Loss	AUM Loss Plus 25 Percent increase in Variable Costs and 100 Percent Increase in Death Loss
Full Basing Direct	15.1	17.5	20.8	23.1	28.8
Full Basing Exclusion	20.4	24.0	27.6	29.9	36.2
Split Basing Direct	14.8	16.5	20.0	23.5	27.0
Split Basing Exclusion	20.9	24.3	27.8	31.3	35.6

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economic viability. The actual dollar losses which could result from M-X impacts will depend primarily on the levels of cost inflation, animal death losses that actually occur, and the distance of the operation from project activities.

If a ranch must terminate its operations, additional losses will occur. Each animal unit of grazing capacity in a ranch can be worth up to 1,400 dollars. Also included in the value of a ranch are the values of the land and capital equipment owned. Currently all of these features together represent a large investment and the potential for a substantial loss for anything that cannot be sold could easily exceed $1,000,000 for a single operation. Any forage made available by the termination of an operation will probably be incorporated into the expansion of other area operations remaining in business.

Livestock sold by Nevada/Utah area ranchers, particularly by cow-calf and ewe-lamb operations, supply the calves and lambs for many other types of livestock operations. They are usually found in other states and generally raise yearlings. The loss of supplies from the Nevada/Utah study area may require finding other sources, possibly at increased expense, or cutting back by these other operations. This will extend the impact into other areas. Such losses are potentially significant during construction and will be negligible over the long term.

Many types of predator control activities currently exist in the Nevada/Utah area including the use of low-flying aircraft. There is some concern in the area that these types of activities may no longer be possible once M-X is present. This could result in some increased livestock losses to predators, particularly for sheep operations.

OTHER IMPACTS (3.1.3)

The long term direct impacts calculated here generally represent the minimal level to occur. Further vegetation distruction from erosion, siltation, additional construction roads, and construction vehicle or ORV travel in other areas will increase the impacts. Construction exclusion impacts represent a rough estimate of the upper worst-case limit to these additional impacts. The actual level of impact will be somewhere between these two end points, probably closer to the lower end, but where that point will actually be cannot be determined until more information is available.

Recovery of Great Basin vegetation is slow under optimum conditions, and will be even slower, or prevented entirely, if the disturbed areas are grazed before sufficient recovery has occurred. This also applies to recovery on disturbed areas that have been revegetated. When there is continued use of the disturbed areas by domestic and feral livestock (such as wild horses) and by wildlife, poisonous annual plants like halogeton can persist for extended periods of time. This has been of particular concern to reviewers of the Draft EIS.

PUBLIC COMMENT ON THE DRAFT EIS:

"I came to the Nevada Test Site in 1961 with the resumption of testing of nuclear weapons. At that time halogeton was a botanical

curiosity. Its only known occurrence was a small colony in Frenchman Flat, the scene of the earliest weapons testing. After 1962 all tests were underground. Numerous roads were constructed, vegetation was bladed off at several hundred sites in the intervening years for drilling pads and instrument trailer parks. Halogeton has spread throughout the 1,400 sq mi of the test site. With the tremendous seed source now available, any area large or small that becomes bare for any reason is invaded by halogeton." (A0450-6-002)

Project disturbance from the conceptual layout will result in a checkerboard pattern in the distribution of halogeton throughout many areas of susceptible hydrologic subunits. When forage and drinking water have been limited, sheep will consume toxic quantities of halogeton, if it is available, immediately after drinking water has been obtained. Under some conditions, cattle can also consume toxic quantities of halogeton (ETR-14). Successful grazing under these circumstances requires a sufficient area that is reasonably free of halogeton. Many undisturbed areas within the cluster layouts could be too small and scattered to be generally usable under such conditions.

If this occurs it will not only prevent the reestablishment of the former grazing capacity, but can restrict the use of adjacent undisturbed areas as well. Any additional disturbance beyond actual construction areas will expand the problem. Changes in the types and locations of project facilities from those used for these analyses can also substantially change analysis results.

Water developments for livestock are of critical importance in much of the Nevada/Utah area and this has been an area of concern in the comments received.

PUBLIC COMMENT ON THE DRAFT EIS:

"Any spring that was curtailed from running a normal amount of water risks not having sufficient water for the wildlife and cattle it normally serves. This could result in loss of AUMs, habitat, etc." (B0164-2-469)

Around 10-15 percent of some areas is currently ungrazed due to lack of water. The BLM considers efficient cattle grazing to occur generally not farther than about 4 mi from drinking water, although some herds can successfully graze farther than that distance. The loss of one water site by either direct construction impacts or indirect pollution of the water can mean the loss of 50 sq mi or more of grazing land. The AUM loss resulting from the loss of one water site can equal or exceed the AUM loss in a valley resulting from direct vegetation disturbance by full project deployment within it.

In addition to directly impacting water developments, the installation of M-X also has the potential of creating substantial drawdowns in groundwater supplies. If drawdowns occur, they could deplete water resources necessary to maintain other livestock-supporting uses. This includes cropland that is used for raising hay, alfalfa, or other forage for winter and supplemental feed. Gains in improvements in

range forage utilization could easily be offset by the loss of local forages for winter feeding. Such drawdowns could also affect existing water developments, many of which rely on wells and springs fed by groundwater supplies. Loss of range water sites from M-X groundwater disturbances could add significantly to their contribution to the realization of the worst case exclusion AUM losses.

The number of AUMs lost to temporary construction exclusion impacts that will be regained after construction, how soon the return to use will occur, and whether or not it will be by the same types of livestock or for the same periods of use, can only be determined on a site by site basis. The successful operation of ranches largely depends on the continuity of their operation. They can not cease operations for a few years and then easily resume operations at a later date. Many current operations that would be heavily impacted by M-X would not be able to sustain the period of construction, or rebuild after it, without help. In addition, the widespread nature of the project will alter how an area is used. The vegetation types involved, any revegetation efforts undertaken, the established season(s) of use, type of livestock involved, existing allotment boundaries and the types of cooperative agreements occurring between ranchers and the Air Force will all affect the return to livestock use.

Each operators' livestock are adapted to his particular allotment conditions from years of selection and acclimation. If a period of nonuse occurs as a result of M-X construction some livestock may need to be reacclimated to the area, a process which will take additional time before full productivity is again achieved.

Many of the impacted allotments contain improved rangelands such as crested wheatgrass seedings that have higher productivity than the rest of the allotment. These areas will need to be specifically identified for possible avoidance. Additional impacts to grazing may occur from dust generation, even though a dust prevention program will be employed. Toxic residues from construction operations that could include reduced forage palatability and availability, increased livestock disease problems, increased tooth wear, and increased herd management difficulties. An increased fire frequency usually associated with increased population density can also destroy needed range forage.

Vitally important to grazing management are fences, and this concern has been expressed in the following public comment.

PUBLIC COMMENT ON THE DRAFT EIS:

> "Another problem complicating the issue in ways perhaps not yet envisaged is that of fencing. Existing fences which now control livestock patterns may be rendered useless by cluster and connector roads crossing them." (B0125-3-433)

Fences control both the management of the use of forage by livestock within allotments, as a part of grazing management systems, and separate allotments leased by different operators. The extensive road system for M-X will directly or indirectly cause numerous breaks in existing fencing. This will be particularly true during construction when uncompleted roads will have continuous use. If cattle

guards and gates do not prove economic and efficient in preventing livestock from moving through these gaps, use of the affected allotments may have to be curtailed and some type of agreement worked out with and between affected permit holders. Allotment boundaries may also have to be altered to reduce M-X effects. Similar fencing problems will remain during operations, particularly along cluster roads used by transporter vehicles. If cluster locations require realignment of allotment boundaries, the political and economic problems associated with the historic commitments to those boundaries will need to be dealt with.

Deployment of M-X would intensify problems associated with the increasing number of wild horses and burros, if current management and control capabilities remain unchanged. The disturbance caused by M-X construction, in particular, would displace these animals from many areas, potentially concentrating them in other areas. This may result in serious overgrazing problems and further reduce the available range for livestock. The potential losses in forage production that could result from such concentrations could equal or exceed those resulting from the direct vegetation losses of M-X construction.

Deployment of M-X would coincide with the possible implementation, by the Bureau of Land Management, of many allotment management plans (AMPs). The AMPs are resulting from the grazing environmental impact statements that are either completed or nearing completion. Many of these AMPs call for substantial short-term reductions in livestock numbers in some allotments because of past or present overuse. The short-term reductions would be followed by long-term increases in grazing capacity through increased and better distributed sources of drinking water and improved vegetation production. Most of these AMPs are presently in a state of flux with considerable alteration possible before final decisions are made.

Livestock grazing is an important, and in some instances the major, source of economic return in the hydrologic subunits. Grazing management in these areas involves the effective use of the grazing capacity of each allotment. Many types of range improvements are necessary for livestock to properly utilize grazing resources. Most of this management depends on agreements and commitments between management agencies and private users. With the greatly increased population levels associated with M-X, particularly during construction, an increase in vandalism to both facilities and livestock and a change of current use patterns are possible. The dispersed and isolated nature of many range improvements enhances this likelihood. Particularly susceptible would be corrals, water developments, cabins, gates, cattle guards, and fences located in isolated areas.

In general, the livestock industry in the Nevada/Utah area operates on a narrow profit margin. Short-term impacts resulting from M-X could be difficult to survive, and longer-term impacts could be devastating for some operators. Any unimpacted rangeland made available by the loss of some operations would be utilized by others in the area. The impact of such a large project on such a sparsely populated area will make at least some change in the regional ranching lifestyle inevitable, within the deployment area.

PROPOSED ACTION IMPACT SUMMARY (3.1.4)

The total loss of grazing capacity from the direct impacts associated with vegetation removal would be around 10,000 AUMs, with some variation depending on the siting alternative. The losses from DDA shelters, cluster roads, and DTN will total about 8,100 AUMs, and range from 8 to 657 AUMs in the impacted hydrologic subunits. The worst-case losses resulting from construction exclusion impacts could total nearly 275,000 AUMs, or about 93,000 AUMs per year during the peak years of construction. Cooperation between affected operators and the BLM, the Air Force, and Air Force representatives could prevent most of these losses. A total of 199 BLM allotments and 193 operators using those allotments would be affected by the DDA grazing impacts. Impacts could primarily affect winter sheep, year-round sheep, and year-round cattle operators. The largest economic losses could occur from indirect impacts resulting in increased operating costs and increased livestock losses, rather than from lost rangeland. Although a number of operators will be significantly impacted, and possibly put out of business, impacts to the livestock industry, once project construction is complete, should be no more than moderate and probably less.

MITIGATIONS (3.1.5)

The major impacts to grazing would occur as a consequence of loss of forage or loss of its use, loss of livestock, and increased operating costs to ranchers. These impacts would be both direct and indirect and would occur primarily because of: loss of forage through direct destruction of vegetation by construction of project facilities; loss of vegetation through indirect destruction of vegetation resulting from erosion, sedimentation, and vehicular traffic associated with the construction and operation of M-X; loss of forage use through loss of accessability to range lands by construction, operation or indirect interference associated with M-X; loss of forage use through loss of watering sites needed to utilize rangelands; increased loss of livestock from increased road kills; increased loss of livestock from increased theft and vandalism; increased operating expenses from dispersion of cattle through breaks in fences and increased movement resulting from disturbance; increased livestock losses and reductions in weight gain from an increased frequency and biomass of toxic plants such as halogeton in areas disturbed by M-X; increased costs of operation and reduced returns resulting from increased wage scales and reduced labor availability associated with M-X presence; increased costs of ranching resulting from increased costs and reduced availability of materials and equipment caused by M-X presence; reduced viability of livestock operations resulting from the combined direct, indirect and economic impacts of M-X; damage to adjacent rangeland and reduced livestock capacity from feral wildhorses and burros, and wildlife displaced by M-X disturbances; increased operating expenses resulting from increased damage to livestock operations, facilities and range improvements brought about by M-X presence; and loss of grazing capacity from vegetation destruction by increased occurrence of wildfire.

Mitigation measures would be directed toward minimizing these impacts.

Air Force Programs (3.1.5.1)

Measures to reduce the impact of M-X on grazing and ranching operations should be directed toward minimizing the loss of annual forage through removal of

vegetation, loss of access to rangelands, the loss of watering sites and other disturbances which could increase ranch operating costs.

The Air Force will implement programs to minimize the disruption of ranch operations through system design and control of off-road construction traffic. This will be accomplished in part by providing gates, cattle-guards, fencing and improved access. The Air Force will also provide replacement water sources for livestock as required.

In order to further reduce impacts on ranching operations, the Air Force will accomplish a revegetation program and an erosion control program in cooperation with appropriate federal and state agencies. In those cases where grazing resources and facilities cannot be avoided or ranching operations are affected, the Air Force will provide monetary compensation to owners in accordance with law. The Air Force will institute education programs for construction and operating base personnel.

Other Mitigations under Consideration (3.1.5.2)

Loss of Forage through Direct Destruction by Construction (3.1.5.2.1)

Three potential measures that could mitigate the impact of loss of forage through direct destruction of vegetation by construction of project facilities follow. Highly productive grazing areas (e.g., native vegetation such as winterfat-dominated winter ranges and improved rangelands such as crested wheatgrass seedings) can be avoided in some instances to help reduce impacts. Cropland and pastures primarily used to raise feed for livestock and rangelands that are critical to the continued viability of livestock operations regardless of productive capacity could also be avoided. Also, construction activities should be timed to occur as much as possible during periods when affected rangelands are not used used by livestock.

Another mitigation could be monetary compensation for lost resources and facilites where authorized by law. Subsidies to assist in acquiring supplemental forage when local sources are impacted, or otherwise nonaccessable during the M-X construction period, are possible. The major problem with this mitigation is that livestock adapted to range forage can have considerable difficulty switching to feed because of time required for adaptation of the rumen microflora (Stoddart et al., 1975).

Loss of Forage through Loss of Accessibility to Rangeland (3.1.5.2.2)

There are potential mitigation measures that could reduce the impact of the loss of forage through loss of accessability to rangelands by construction, operation, or indirect interference associated with M-X. One could be the payment of monetary compensation for lost resources, livestock and facilities where authorized by law. Another could be to schedule construction activities to occur as much as possible during periods when affected rangelands are not used by livestock. Finally, construction activities could be regulated to minimize disturbance and access restrictions to livestock.

Loss of Forage Use through Loss of Water Availability (3.1.5.2.3)

A potential mitigative measure that could be included to reduce the impact of loss of forage through loss of watering sites needed to utilize rangelands could be payment of monetary compensation for lost resources, livestock, and facilities where authorized by law.

Loss of Livestock from Theft and Vandalism (3.1.5.2.4)

A possible mitigation could be more enforcement personnel to control illegal impacts to the livestock industry. Provisions for subsidies to local law enforcement agencies to allow for larger numbers of law enforcement personnel to increase surveillance of livestock ranges would reduce losses due to theft and vandalism.

Increased Operating Expenses from Dispersion of Cattle (3.1.5.2.5)

Potential mitigations that could reduce the impacts on ranchers' increased operating expenses from dispersion of cattle through breaks in fences and increased movement resulting from project construction disturbances are monetary compensation for lost resources, livestock and facilities where authorized by law; schedule construction activities to occur as much as possible during periods when affected rangelands are not used by livestock; and subsidies to livestock operators to cover increased costs of labor and materials resulting from project presence.

Loss of Livestock through Loss of Rangeland (3.1.5.2.6)

There are several potential mitigations that could be included to reduce the impact of loss of livestock capacity through carryover effects of the loss of critical rangelands and/or forage supplies during critical seasons of the year. One potential measure could be monetary compensation for lost resources, livestock, and facilities where authorized by law. Subsidies could be provided to assist in importing supplemental forage when local sources are impacted by M-X. The avoidance, where possible, of those rangelands that are critical to the continued viability of livestock operations could be a possible and potential mitigation measure.

Loss of Economic Viability of Livestock (3.1.5.2.7)

One potential mitigation that could be included to reduce the impact of loss of economic viability of livestock operations resulting from the combined direct, indirect, and economic impacts of M-X could be payment of monetary compensation where authorized by law for uneconomic remnants.

Increased Operating Expenses (3.1.5.2.8)

One potential mitigation measure that could be included is to reduce the impact of increased operating expenses resulting from increased damage to livestock operations, facilities, and range improvements directly brought about by M-X presence.

Loss of Grazing Due to Wildfire (3.1.5.2.9)

A potential mitigation to loss of grazing capacity from vegetation destruction due to increased occurrence of indirect M-X project wildfires would be to increase

fire detection and control capabilities. Subsidizing local fire protection agencies would be one measure to help mitigate this problem.

COYOTE SPRING OPERATING BASE (3.1.6)

The Coyote Spring operating base would be located in an area having a low AUM concentration (Figure 3.1.6-1). The operating base suitability zone intersects four allotments (Table 3.1.6-1), with a total of nearly 1,800 AUMs, and a total of four users. An average loss of about 136 AUMs could result. This level could vary from 43-182 AUMs with the movement of base facilities within the suitability area. This results from the different average productive capabilities (acres/AUM) of the impacted allotments (Table 3.1.6-2). These figures do not include areas disturbed by DTN, roads, rail lines or power transmission corridors to the base and OBTs.

The loss of AUMs from direct vegetation disturbance will peak with the completion of the OB, and the loss will remain at that level through decommissioning. Any grazing restrictions in the vicinity of the base will increase the potential AUM loss. Additional disturbance will result from the construction of the DTN through Coyote Spring and Pahranagat hydrologic subunits to connect the base with Delamar Valley, and from the construction of a railroad from the existing line south of Coyote Spring to the OB site. The significance of the AUM losses associated with the base will depend on how important these allotments are to the success of the local operators and on how the disturbance alters the BLM grazing management policy for the region.

Because of the aridity of the region, limited opportunity exists for mitigating AUM losses. A detailed discussion of possible mitigation procedures is in Section 3.1.1.

MILFORD OPERATING BASE (3.1.7)

The Milford operating base (second OB for the Proposed Action) is located on public land, and irrigated pasture on private land, in a valley with a high AUM concentration (Figure 3.1.7-1). The suitability zone for this OB includes or intersects 22 allotments (Table 3.1.7-1), a total of nearly 18,000 AUMs and 39 operators on BLM-administered land. This operating base would result in the loss of about 253 AUMs, based on the average AUM concentration of the allotments in the OB suitability zone (Table 3.1.6-2). This level could vary from 98-567 AUMs because of the different productive capabilities (acres/AUM) of the potentially affected allotments. These figures do not include areas disturbed by DTN, roads, rail lines, or power transmission corridors to the base and OBTS.

The loss of AUMs is a direct function of the grazing land lost to base facilities and will generally remain at that level through decommissioning. Grazing may also be restricted in the vicinity of the base, resulting in additional AUM losses.

Avoidance of the more productive areas, particularly on private land, could mitigate some of the lost grazing capacity. Most of the mitigation measures and problems discussed in Section 3.1.1 also apply here.

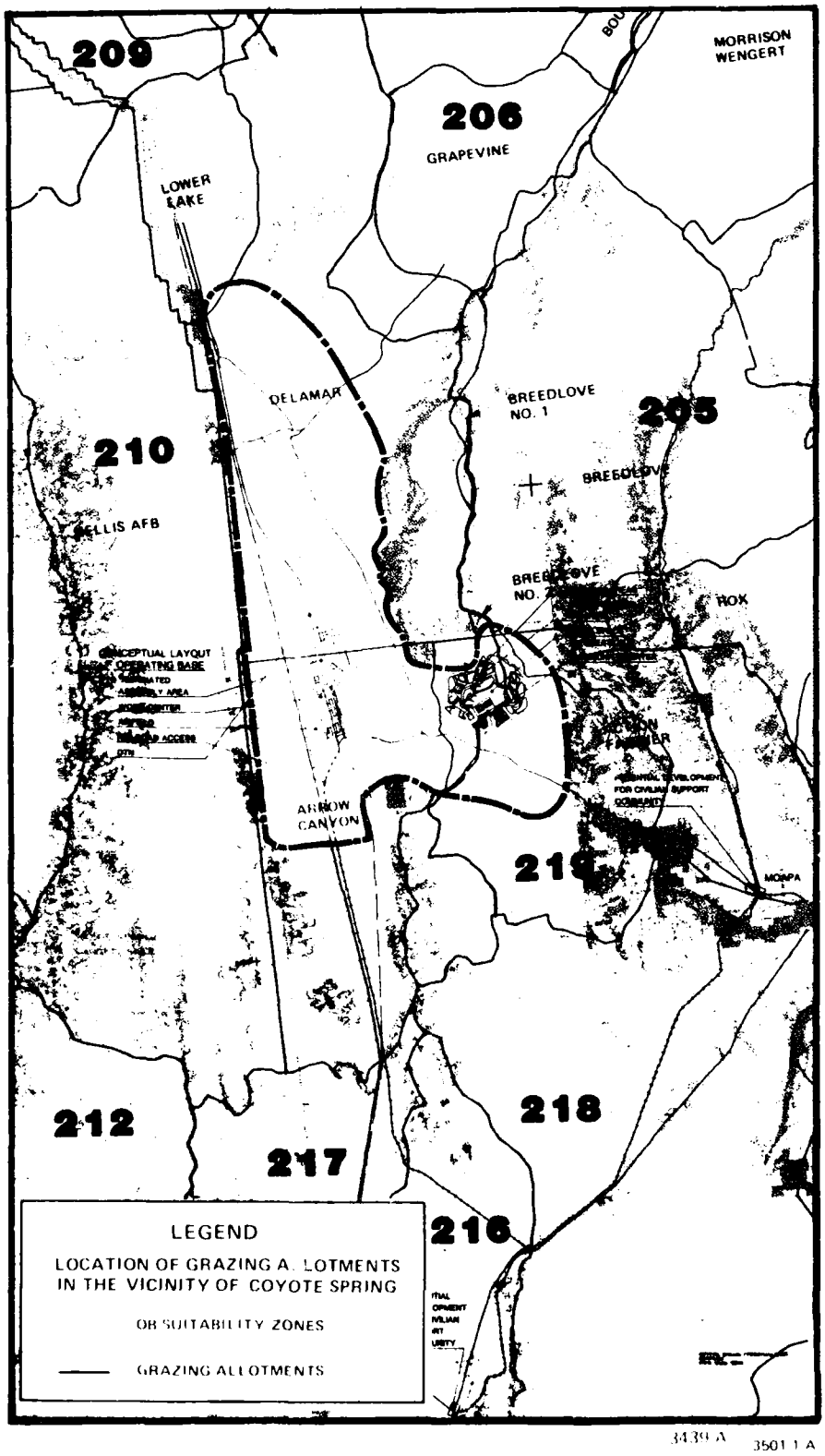

Figure 3.1.6-1. Location of grazing allotments in the vicinity of the Coyote Spring OB site.

Table 3.1.6-1. Acres and AUMs within the Coyote Spring OB suitability zone, by allotment.

Allotment Name	Acres in OB Suitability Zone	AUMs in OB Suitability Zone	Average Acres per AUM
Lower Lake	852	19	45.86
Delamar	54,051	1,153	46.88
Action Farrier	9,083	47	192.76
Arrow Canyon	45,356	558	81.23
OB Totals	109,342	1,777	61.53

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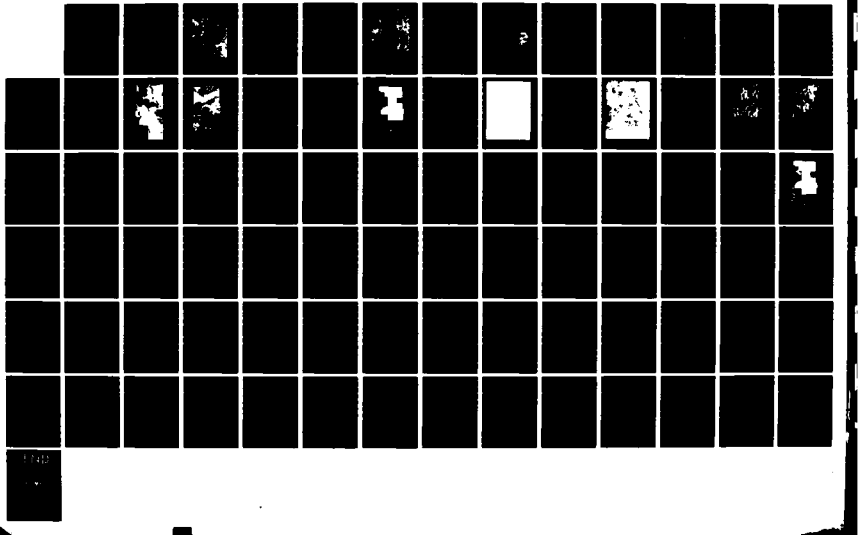

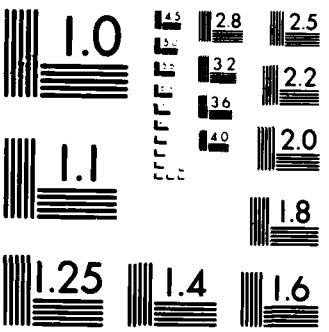

Table 3.1.6-2. Average and range in potential for direct AUM losses resulting from vegetation removal by OB construction and operation in the Nevada/Utah study area.

Alternative	Operating Base	Average AUM Loss	Range in Potential AUM Loss[1]	Potential Overall Impact[2]
Proposed Action	Coyote Spring, NV	136	43-182	*****
	Milford, UT	253	98-567	*****
Alternative 1	Coyote Spring, NV	136	43-182	*****
	Beryl, UT	279	78-910	*****
Alternative 2	Coyote Spring, NV	136	43-182	*****
	Delta, UT	177	176-281	***
Alternative 3	Beryl, UT	550	154-1,790	*****
	Ely, NV	447	64-1,155	*****
Alternative 4	Beryl, UT	550	154-1,790	*****
	Coyote Spring, NV	69	22-92	*****
Alternative 5	Milford, UT	497	193-1,115	*****
	Ely, NV	447	64-1,155	*****
Alternative 6	Milford, UT	497	193-1,115	*****
	Coyote Spring, NV	69	22-92	*****
Alternative 8	Coyote Spring, NV	136	43-182	*****

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[1]The high and low AUM loss values represent the impacts to the most and least productive allotments occurring within the OB suitability zone.

[2]- = No AUM reduction.

* = Low impact. Projected maximum AUM reducitons from direct impacts representing less than 0.2 percent of AUMs in the OB suitability zone or totalling less than 200 AUMs.

*** = Moderate impact. Projected maximum AUM reductions from direct impacts representing 0.2 percent of AUMs in the OB suitability zone or totalling 200-500 AUMs.

***** = High impact. Projected AUM reductions from direct impacts representing more than 1 percent of those in the OB suitability zone or totalling 500 or more AUMs.

(a 1 percent direct impact is equivalent to approximately a 30% indirect worst case impact).

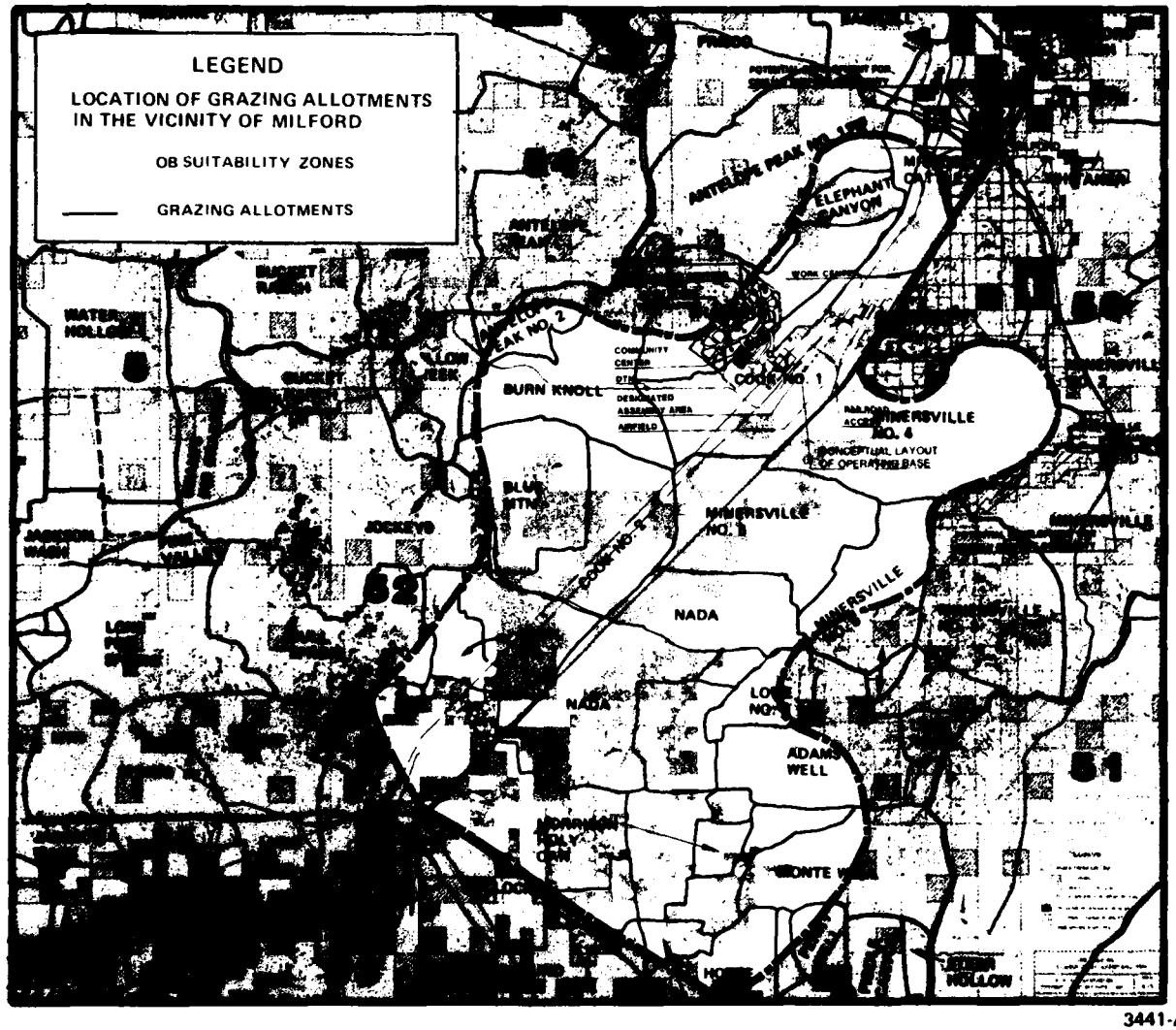

Figure 3.1.7-1. Grazing allotments in the vicinity of the Milford OB site.

Table 3.1.7-1. Acres and AUMs within the Milford OB suitability zone, by allotment.

Allotment Name	Acres in OB Suitability Zone	AUMs in OB Suitability Zone	Average Acres per AUM
Antelope Peak	4,532	534	8.48
Elephant Canyon	3,951	381	10.36
Milford Cattle	9,659	352	7.48
Shauntie	14,050	1,358	10.35
Cook	52,170	3,737	9.32
Burn Knoll	16,894	927	18.22
Minersville #4	29,437	1,307	16.72
Blue Mountain	12,912	644	11.35
Minersville #6	9,982	970	10.29
Minersville #5	9,524	1,097	8.68
Nada	49,729	831	43.15
Perry Well	567	57	9.90
Bull Spring	533	29	18.71
Horse Hollow	5,065	752	6.74
Perkins Nelson	5,532	297	8.89
Lowe	2,902	499	5.81
Lund	14,220	1,001	14.21
Adams Well	12,598	1,065	11.83
Bulloch	23,417	1,074	21.80
North Well	3,626	311	11.83
Desert	8,995	898	9.66
Mortensen Hollyoak	5,205	535	9.73
OB Totals	296,390	17,655	16.79

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3.2 ALTERNATIVE 1

The DDA for Alternative 1 and the impacts associated with its construction and operation are identical with those for the Proposed Action (Section 3.1).

COYOTE SPRING OPERATING BASE (3.2.1)

Impacts to grazing in Coyote Spring hydrologic subunit are the same for this alternative as those discussed for the Proposed Action (Section 3.1).

BERYL OPERATING BASE (3.2.2)

The Beryl operating base, second OB for Alternative 1, is located in an area with a medium AUM concentration category (Figure 3.2.2-1). The suitability zone for this operating base occupies all or part of 24 allotments (Table 3.2.2-1), and nearly 13,000 AUMs on BLM-administered land. A total of 22 operators have BLM grazing permits on these allotments. Total losses from direct vegetation disturbance in the four allotments average about 27[illegible] AUMs (Table 3.1.5-2). The loss of grazing capacity from vegetation disturbance would vary from 78-910 AUMs depending on which allotments were impacted by placement of base facilities within the suitability area. These figures do not include areas disturbed by DTN, roads, rail lines, or power transmission corridors to the base and OBTS.

AUM losses will reach a maximum with the completion of the base and will remain at approximately that level through decommissioning. Grazing may also be restricted in the vicinity of the base, resulting in further AUM losses. The grazing losses associated with the establishment of this base could significantly affect any operators dependent on the impacted allotment.

Avoidance of the more productive areas of the affected allotments could be used to mitigate some of the grazing losses. Additional mitigations and associated problems are discussed in more detail in Section 3.1.1.

3.3 ALTERNATIVE 2

The DDA for Alternative 2 is identical with that for the Proposed Action and the potential impacts are the same (see Section 3.1).

COYOTE SPRING OPERATING BASE (3.3.1)

Impacts to grazing in Coyote Spring Valley are the same for this alternative as those discussed for the Proposed Action (Section 3.1.2).

DELTA OPERATING BASE (3.3.2)

The Delta operating base, the second OB for Alternative 2, is located in an area with a high AUM concentration (Figure 3.3.2.-1). The suitability zone for this operating base intersects two allotments (Table 3.3.2-1) and about 4,300 AUMS. A total of four users have grazing permits on these allotments. Total grazing losses from direct vegetation disturbance will be about 177 AUMs (Table 3.1.5-2). The loss of grazing capacity from vegetation disturbance would change from 176-281 AUMs with the movement of base facilities within the suitability area. These figures do

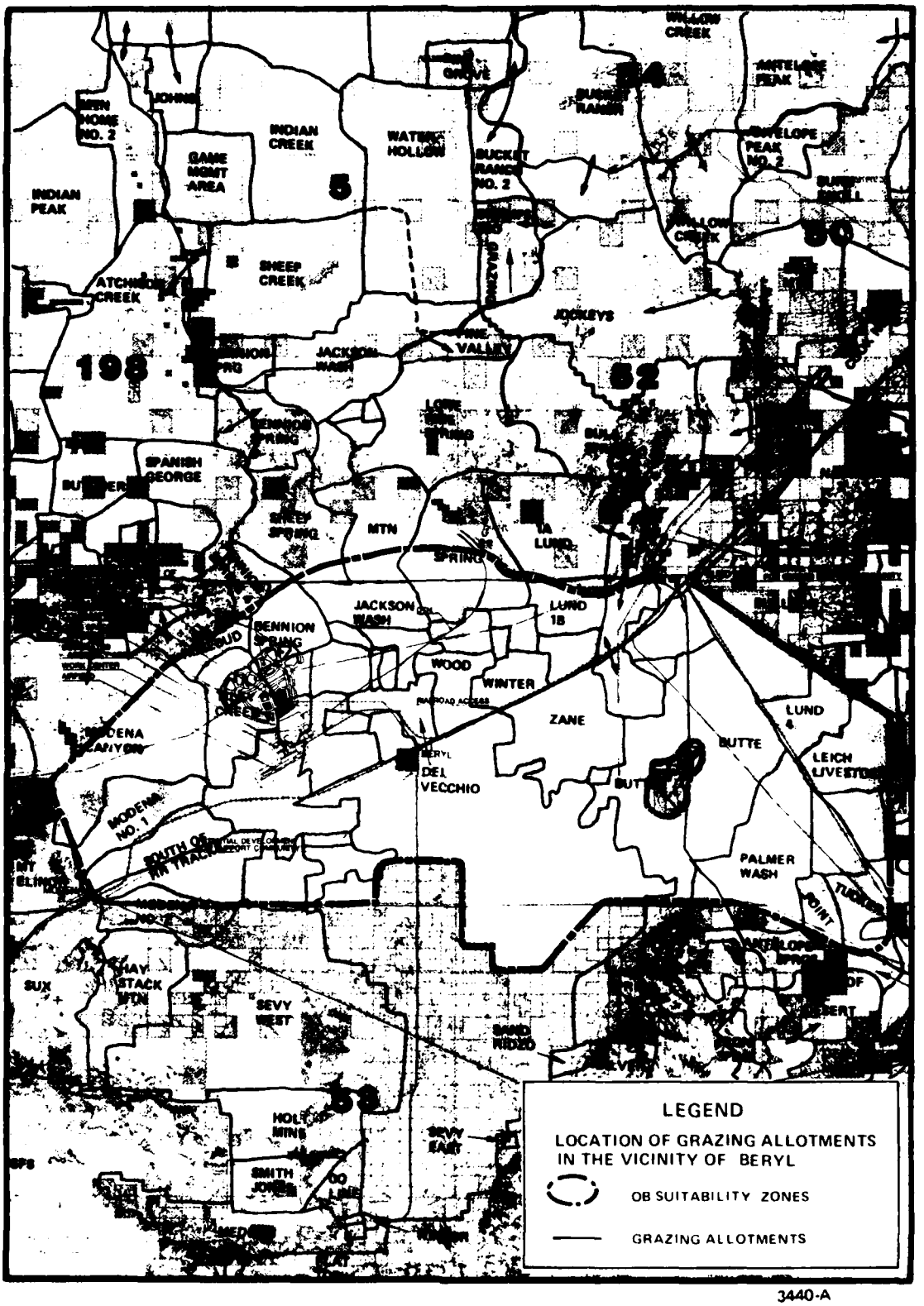

Figure 3.2.2-1. Grazing allotments in the vicinity of the Beryl OB site.

Table 3.2.2-1. Acres and AUMs within the Beryl OB suitability zone, by allotment.

Allotment Name	Acres in OB Suitability Zone	AUMs in OB Suitability Zone	Average Acres per AUM
Delvecchio	5,972	476	12.55
Modena Canyon	7,353	230	32.02
Mt. Elinor	506	33	15.49
Modena	6,130	346	12.07
South of Railroad Tracks	12,918	80	28.00
Austin	2,512	52	21.59
Eight Mile Spring	4,734	248	15.96
Tilly Creek	11,357	1,179	9.63
Rosebud	1,610	41	39.62
Bennion Spring	24,541	3,268	7.51
Sheep Spring	1,924	64	30.00
Jackson Wash	6,555	477	13.75
Mountain Spring	9,604	654	14.69
Beryl	3,460	217	15.92
Wood Winter	17,360	312	54.04
Lund	26,558	1,869	14.21
Butte	23,024	1,101	20.90
Leigh Livestock	6,359	1,076	5.91
Reed Leigh	5,533	165	5.62
Jensen	2,735	234	11.68
Tucker Point	9,267	294	7.45
Three Peaks	909	66	13.68
Big Hollow	496	106	4.66
Iron Spring	418	53	7.82
OB Totals	191,835	12,642	15.17

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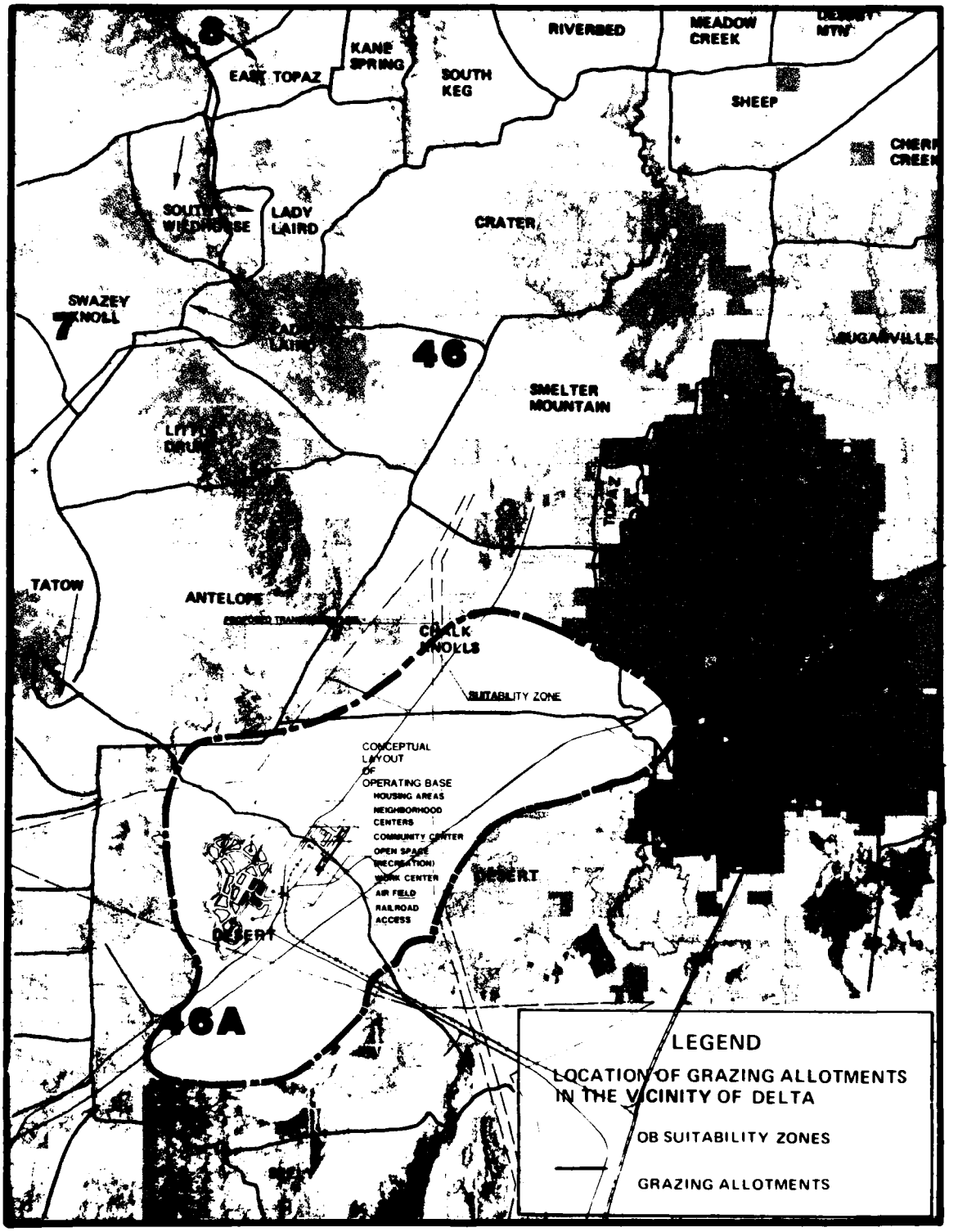

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Figure 3.3.2-1. Grazing allotments in the vicinity of the Delta OB site.

Table 3.3.2-1. Acres and AUMs within the Delta OB suitability zone, by allotment.

Allotment Name	Acres in OB Suitability Zone	AUMs in OB Suitability Zone	Average Acres per AUM
Deseret	101,047	4,202	24.05
Antelope	1,183	78	15.09
OB Totals	102,230	4,280	23.89

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not include areas disturbed by DTN, roads, rail lines, or power transmission corridors to the base and OBTS.

Grazing losses will peak with the completion of the base and that level of loss is expected to remain through decommissioning. Livestock use may also be restricted in the vicinity of the base, resulting in further AUM losses. The significance of the grazing losses will depend on the importance of the area to the livestock operators leasing grazing rights in that portion of the Deseret allotment. The mitigation measures and associated problems discussed in Section 3.1.1 also generally apply here.

3.4 ALTERNATIVE 3

The DDA for Alternative 3 is identical with that for the Proposed Action and the potential impacts are the same (see Section 1.3.1).

BERYL OPERATING BASE (3.4.1)

The Beryl main operating base has the same grazing impacts as the Beryl secondary operating base discussed in Section 3.2.2 but with the following exceptions. The direct loss of vegetation from base construction will reduce the grazing capacity of the impacted allotments by an average of about 550 AUMs instead of the previous 279 AUMs. The level of grazing loss could vary from about 154 to 1790 AUMs with movement of base facilities within the suitability area. Additional losses will also be incurred from the construction of the DTN from the base to the DDA and to the OBTS. This will affect areas in both the Beryl and Pine Valley hydrologic subunits. Impacts and mitigations are generally the same as those discussed in Section 1.3.2.2. Operating base AUM loss data are summarized in Table 3.1.5-2.

ELY OPERATING BASE (3.4.2)

The Ely operating base, the secondary OB for Alternative 3, is located in the Steptoe Valley hydrologic subunit (Figure 3.4.2-1). This is an area within the medium AUM concentration category (Figure 3.1.1-1). The suitability zones for this base intersect 16 livestock allotments (Table 3.4.2-1) and nearly 19,000 AUMs on BLM-administered land. There are a total of 20 operators with grazing permits on these allotments. Total grazing losses from direct vegetation disturbance would be about 447 AUMs and the loss could vary from 64 to 1,155 AUMs with the movement of base facilities within the suitability areas. Impacts to areas of improved rangeland such as crested wheatgrass seedings could further increase impact losses.

Grazing losses will reach a maximum with the completion of construction and will remain through decommissioning. Livestock use will also probably be restricted in the vicinity of the base, resulting in further AUM losses.

The significance of the grazing losses will depend on the importance of the allotments impacted by base construction to the livestock operations using them. These types of effects are currently under study. AUM loss data for the various operating base alternatives are summarized in Table 3.1.5-2. Mitigation procedures and associated problems discussed in Section 3.1.1 also generally apply here.

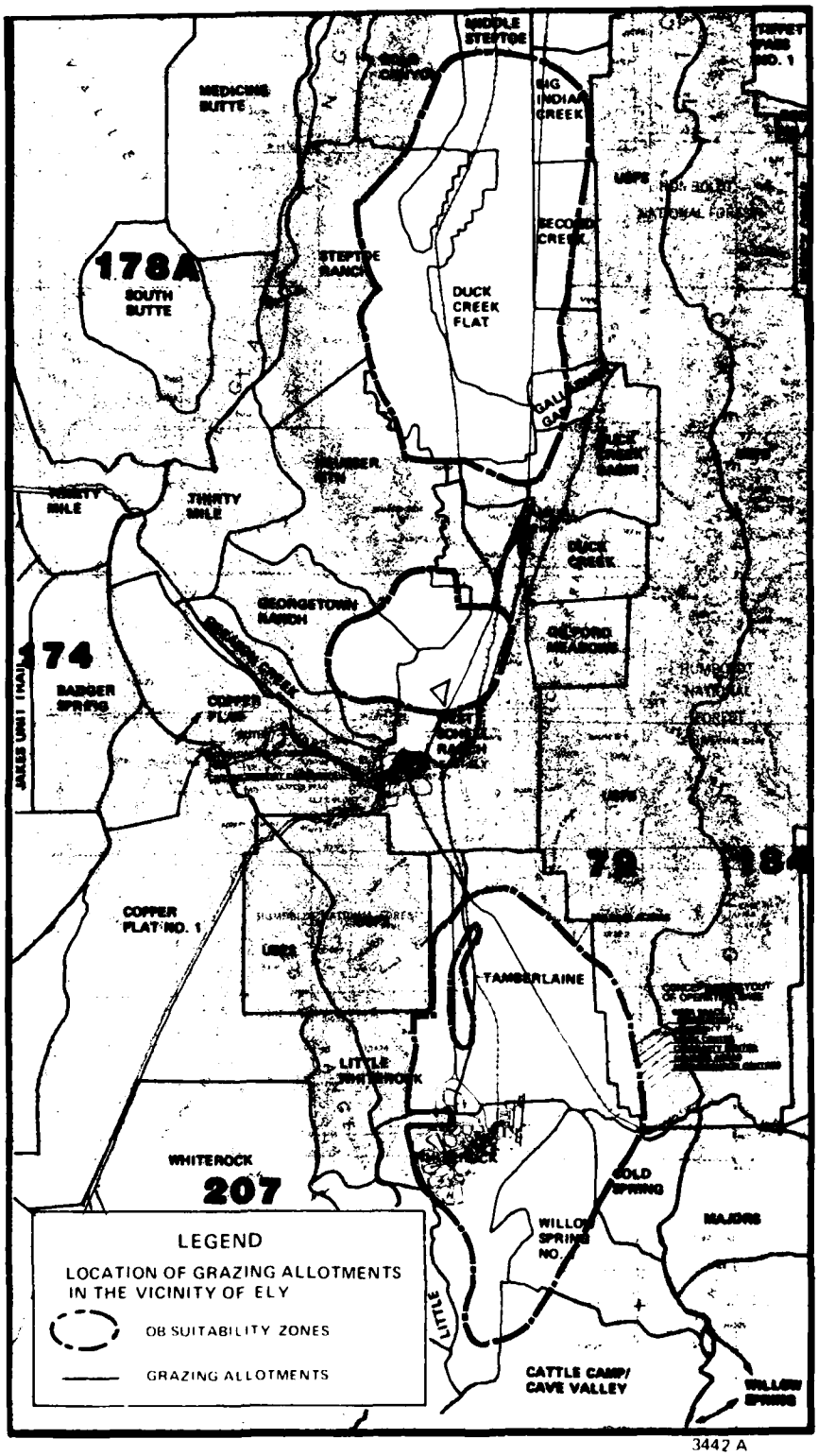

Figure 3.4.2-1. Grazing allotments in the vicinity of the Ely OB site.

Table 3.4.2-1. Acres and AUMs within the Ely OB suitability zone, by allotment.

Allotment Name	Acres in OB Suitability Zone	AUMs in OB Suitability Zone	Average Acres per AUM
Steptoe	33,517	3,448	9.72
Cattle Camp/Cave Valley	2,544	217	11.70
Willow Spring	13,519	3,684	3.67
White Rock	18,486	1,617	11.43
Cold Spring	2,872	334	8.6
Copper Flat	12,379	826	14.99
Tamberlaine	30,786	5,621	5.33
Georgetown Ranch	8,388	574	14.62
Goat Ranch	78	3	27.51
Heusser Mountain	6,687	529	12.65
Schoolhouse Spring	3,387	87	39.07
Gallagher Gap	1,849	89	20.71
Duck Creek Flat	28,568	1,198	23.85
Second Creek	5,870	255	23.04
Big Indian Creek	4,625	70	65.85
Gold Canyon	4,127	176	23.49
OB Totals	177,682	18,727	9.49

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3.5 ALTERNATIVE 4

The DDA for Alternative 4 is identical with that for the Proposed Action and the potential impacts are the same (see Section 3.1).

BERYL OPERATING BASE (3.5.1)

Impacts to grazing in the Beryl-Enterprise hydrologic subunit resulting from the Beryl first operating base are the same for this alternative as those discussed for Alternative 3 (Section 3.4.1).

COYOTE SPRING OPERATING BASE (3.5.2)

Impacts to grazing in the Coyote Spring hydrologic subunit are the same for this alternative as those discussed for the Proposed Action (Section 3.1) with the following exceptions. Average grazing losses will be approximately 69 instead of 136 AUMs, and could vary from 22 to 92 AUMs (Table 3.1.5-2). There will not be a DTN constructed from the base to the DDA.

3.6 ALTERNATIVE 5

The DDA for Alternative 5 is identical with the Proposed Action and the potential impacts are the same (see Section 3.1).

MILFORD OPERATING BASE (3.6.1)

The grazing impacts for the Milford first OB are the same as those for the Milford secondary operating base in the Proposed Action (Section 3.1.3) with the following additions: additional facilities will raise the total average grazing loss from vegetation disturbance, from 253 to 497 AUMs (Table 3.1.5-2). These losses could vary from 193 to 1115 AUMs with movement of the OB facilities around in the suitability zone. Disturbance will also include the construction of a DTN from the base to the DDA in Wah Wah or Pine Valley.

ELY OPERATING BASE (3.6.2)

Impacts to the grazing resource in the Steptoe Valley hydrologic subunit are the same for this alternative as those discussed for Alternative 3 (Section 3.4.2).

3.7 ALTERNATIVE 6

The DDA for Alternative 6 is identical with that for the Proposed Action and the potential impacts are the same (See Section 3.1).

MILFORD OPERATING BASE (3.7.1)

Impacts to grazing in the Milford hydrologic subunit resulting from the Milford primary operating base for this alternative are the same as those discussed for Alternative 5 (Section 3.6.1).

COYOTE SPRING OPERATING BASE (3.7.2)

Impacts to grazing resources in the Coyote Spring hydrologic subunit resulting from the Coyote Spring operating base would be the same for this alternative as for Alternative 4 (Section 3.5.2).

3.8 ALTERNATIVE 7 - FULL DEPLOYMENT IN TEXAS/NEW MEXICO

Agriculture in the counties in the Texas/New Mexico study area includes a complex association of rangeland, irrigated pasture, and feedlots (Figure 3.8-1). Extensive acreages of cropland are harvested for cattle feed. Impacts to any of these areas potentially reduces the number of livestock. The disturbance in each county was assumed to affect each of the above livestock supporting areas in direct proportion to their relative abundance of livestock in each county. The importance of the area to the local residents and their concern for its potential susceptibility to M-X impacts were expressed in several comments similar to the following one.

PUBLIC COMMENT ON THE DRAFT EIS:

> "Texas/New Mexico. This proposed site is some of the nation's prime farm and ranch land. Many large feedlots in and around the area depend on grain and other feed commodities grown under irrigation within the proposed site. The area proposed is also very fertile, with abundant native grasses for grazing of beef cattle. As I understand the M-X plan, the farming and ranching in the area would be a thing of the past. In a world as hungry as this can we afford to do away with this much prime farm and ranch land?" (A0054-6-002).

Data available for Texas/New Mexico are census statistics and are expressed here in animal units. These are not directly comparable with the AUM productivity data used in Nevada/Utah.

Over 16,400 animal units, or about 0.7 percent of the total present in the affected counties, would be lost as a result of direct impacts in this alternative (Table 3.8-1). The direct animal unit losses in the individual counties could vary from 4 to 3,200 animal units (Table 3.8-2). Fifty-seven percent of the direct impacts would be on irrigated cropland, 8 percent on dry cropland, and 35 percent on rangeland. Texas has 65 percent of the total animal units in the affected counties, and would sustain about 74 percent of the loss. Over the period of construction, the estimated worst case full basing exclusion impacts, from all sources combined, could total over 160,000 animal units (Table 3.8-2). Fifty-one percent of these losses would occur in Texas, and 49 percent in New Mexico. Temporary construction exclusion animal unit losses in the individual counties could vary from 8 to 25,000 animal units. Cooperation between the affected farms and ranches and the Air Force and its representatives could prevent most of these losses.

In Nevada and Utah, each AUM of use on federal land is equivalent to about 0.21 animal units, and on federal land in New Mexico each animal unit is equivalent to about 6.2 AUMs. The full-basing direct loss of animal units in Texas/New Mexico is over 50 percent greater than the loss of AUMs in the Nevada/Utah area. In

economic terms, this difference is even larger, equalling about a 7-times difference in direct impact between the full-basing alternatives. Losses from all the impacts included in the temporary construction exclusion effects could be expected to have a similar differential.

The one third of the study area counties with the highest animal unit concentration are in Texas (Figure 3.8-2). All but two of the counties with intermediate concentration are also in Texas; the rest are in New Mexico. This difference is primarily the result of the much higher concentration of stockyards in Texas increasing the total number of animal units in those counties.

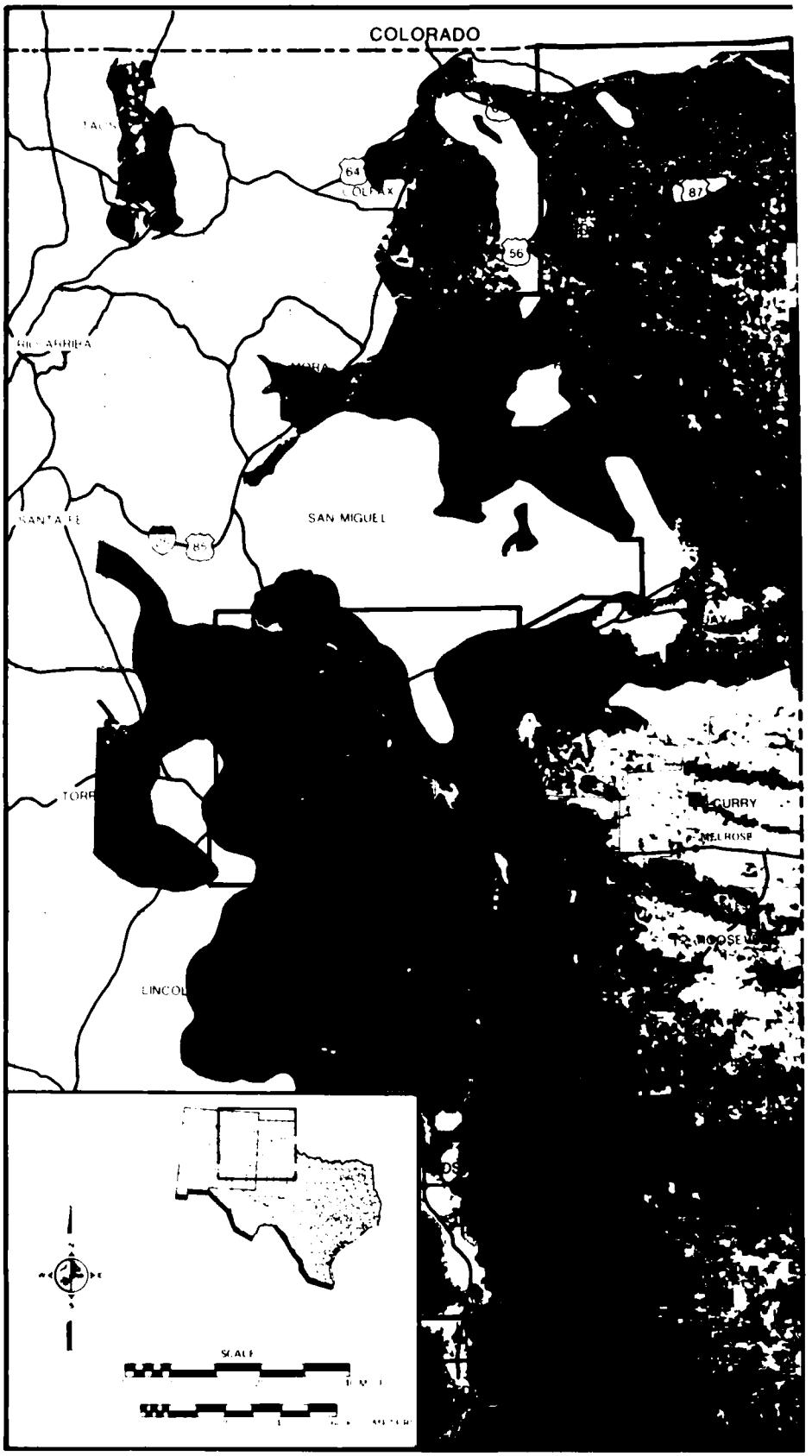
Twenty-six percent of the counties potentially directly impacted by this alternative are high ranked and account for 20 percent of the total land area disturbed and 49 percent of the total potential animal unit loss. Thirty-seven percent of the counties impacted by the DDA are medium ranked and account for 42 percent of the total area disturbed, and 33 percent of the animal units potentially lost. The remaining impacted counties have a low animal unit concentrations. The percentage of the possible animal units lost in each county, relative to the total number in each, was highest in the high concentration counties (0.92 percent) and intermediate in the medium concentration counties (0.78 percent).

The loss of livestock support capacity through the direct disturbance of rangeland, cropland supporting livestock, and feedlots, will be directly proportional to the level of construction activity, and will generally peak at the completion of the project. Recovery for most of the area will be relatively rapid compared to that expected in the Great Basin, with time measured in years rather than decades. Because of its inherent value, cropland will probably be renovated fairly rapidly. Some care will be needed to prevent the invasion of toxic weeds into grazed areas. A discussion of possible toxic species appears in ETR-14 on vegetation.

The livestock industry is a primary economic resource in the Texas/New Mexico study area. The impacts resulting from direct project disturbance, restrictions to movement during and immediately following construction, and indirect impacts could substantially affect selected livestock operations. The total annual livestock losses in this region from direct impacts could exceed $1.5 million, and from exclusion impacts several times that figure, during the peak years of construction disturbances. However, as in Nevada and Utah, the monetary losses from indirect impacts, particularly from inflated costs and a shortage of labor and materials, will probably exceed the costs from direct impacts by several times. As stated in public comments these losses could affect more than just the livestock industry.

PUBLIC COMMENT ON THE DRAFT EIS:

> "This report pertains primarily with the effects the M-X Missile will have on the farmers and ranchers located in Curry County, New Mexico. However, much that is stated will effect all residents of this area, since farming and ranching activities provide approximately one-third of the economy of the county" (A1150-1-001).



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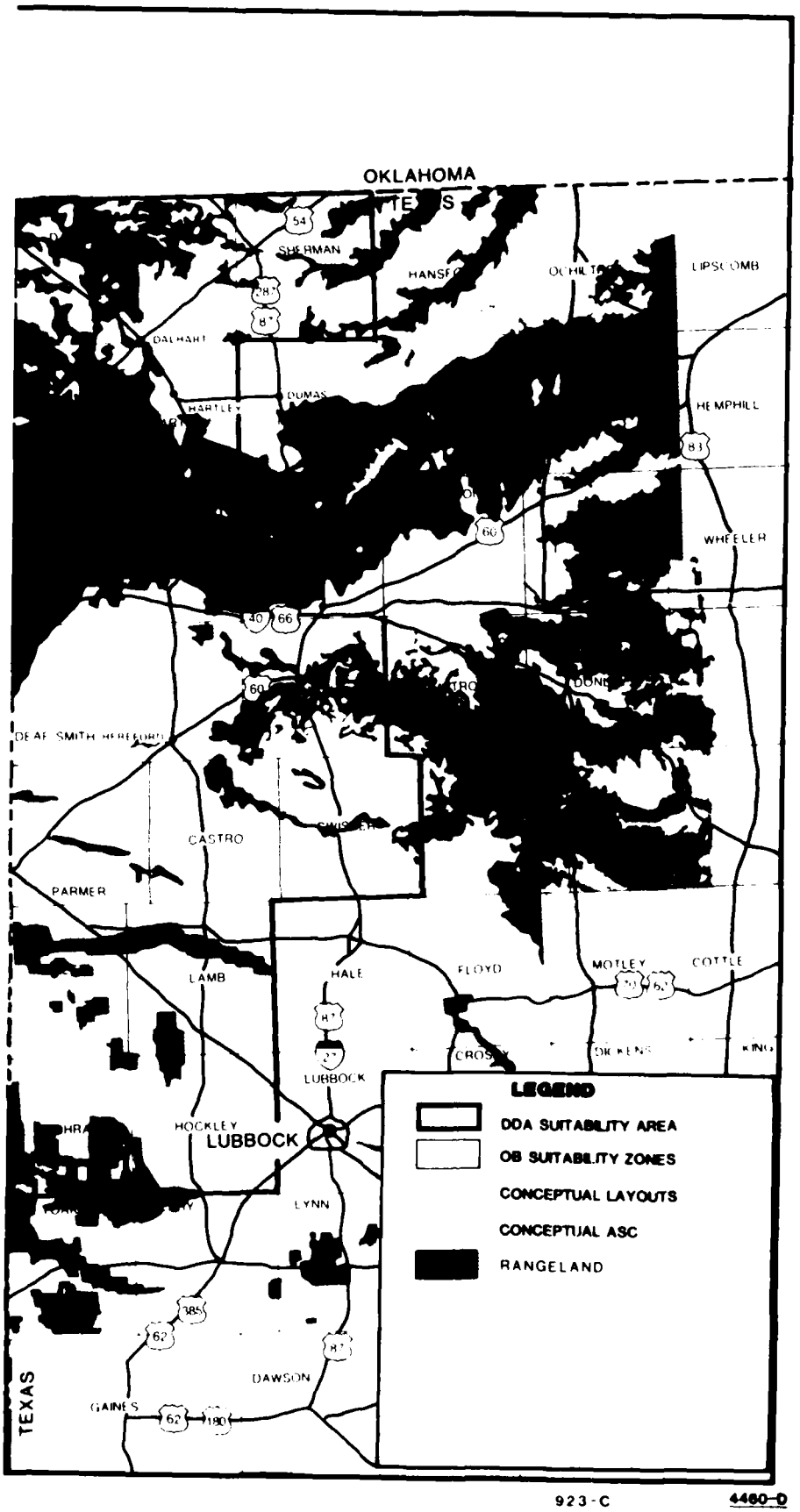

Figure 3.8-1. Rangeland in the Texas/New Mexico study area. (Sources: Eastern Plains Council of Government, 1974, and Texas Dept. of Water Resources, 1977.)

Table 3.8-1. Total estimated Texas/New Mexico animal unit losses from direct impacts and temporary, worst case construction exclusion impacts of M-X construction.[1]

Alternative	Animal Units Lost from M-X Impacts by Construction of: Shelters, Cluster Roads, and DTN	Support Roads, CMFs, Antennas, ASCs, and RSSs	Construction Camps, Concrete Plants, Material Sources, Wells, Marshaling Yards, and Construction Camps	First OB	Second OB	Total Direct AUM Loss	Percent of Study Area Total	Total Worst Case Loss[3]	Percent of Study Area Total	Potential Impact[2]
Proposed Action										
7	13,000	1,135	996	818	487	16,436	0.72	160,956	7.1	***
8	4,827	423	373	818	--	6,441	0.28	95,568	4.2	***

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[1]The county by county full or split basing analyses for shelters, cluster roads, and DTN were used to derive an average acres per animal unit for estimating the impacts for other DDA facilities.

[2]- = No AUM reduction.
* = Low impact. Direct animal unit losses of less than 0.2 percent of the total in the study area.
*** = Moderate impact. Direct animal unit losses from 0.2 percent to less than 1.0 percent of the total in the study area.
***** = High impact. Direct animal unit losses of 1.0 percent or greater of the total in the study area.

[3]Computed from area within 1/2 mi of project facilities of shelters, cluster road and DTN. Assumes no livestock use during construction. Construction exclusion imacts represent a worst case summation of all impacts that can reasonably be expected to potentially reduce livestock use of an area because of construction disturbances. Because of the current construction schedules, the maximum exclusion that would occur during any single year would be about 80,000 AUMS, and cooperation between impacted operators and the Air Force and its representatives will substantially reduce these impacts.

Table 3.8-2. Potential direct and short-term construction exclusion impacts to livestock as a result of DDA construction in Texas/New Mexico for Alternative 7.

County	AUM Concentration In the Area[1]	Long-Term Direct Effects		Short-Term Construction Exclusion Impacts[1]		Potential Impact[2]
		Estimated Animal Unit Loss	Loss as Percent of Total Animal Units in Area	Estimated Animal Unit Loss	Loss as Percent of Total Animal Units in Area	
Bailey	48,000	317	0.66	876	1.8	***
Castro	192,000	1,357	0.71	13,727	7.1	*****
Cochran	30,000	81	0.27	114	0.4	***
Dallam	92,000	1,652	1.80	24,682	26.8	*****
Deaf Smith	227,000	3,175	1.40	8,110	3.6	*****
Hartley	109,000	994	0.91	25,011	22.9	***
Hockley	14,000	8	0.06	8	0.6	*
Lamb	42,000	67	0.16	67	0.2	*
Oldham	64,000	118	0.18	908	1.4	*
Parmer	159,000	1,417	0.89	3,556	2.2	*****
Randall	96,000	185	0.19	2,554	2.7	*
Sherman	99,000	179	0.18	2,614	2.6	*
Swisher	142,000	144	0.10	440	0.3	*
Texas DDA Totals	1,314,000	9,694	0.74	82,667	6.3	***
Chaves	171,000	524	0.31	17,764	10.4	***
Curry	88,000	593	0.14	4,607	5.2	***
DeBaca	42,000	237	0.56	7,969	19.0	***
Guadalupe	59,000	4	0.01	136	0.23	*
Harding	47,000	182	0.39	6,170	13.1	***
Lea	86,000	12	0.01	407	0.47	*
Quay	91,000	549	0.42	12,117	14.4	***
Roosevelt	90,000	826	0.60	18,658	20.7	***
Union	168,000	381	0.16	9,461	5.6	*
New Mexico DDA Totals	842,000	3,308	0.39	78,289	9.3	***
Overall DDA Impacts	2,156,000	13,002	0.60	160,956	7.5	***

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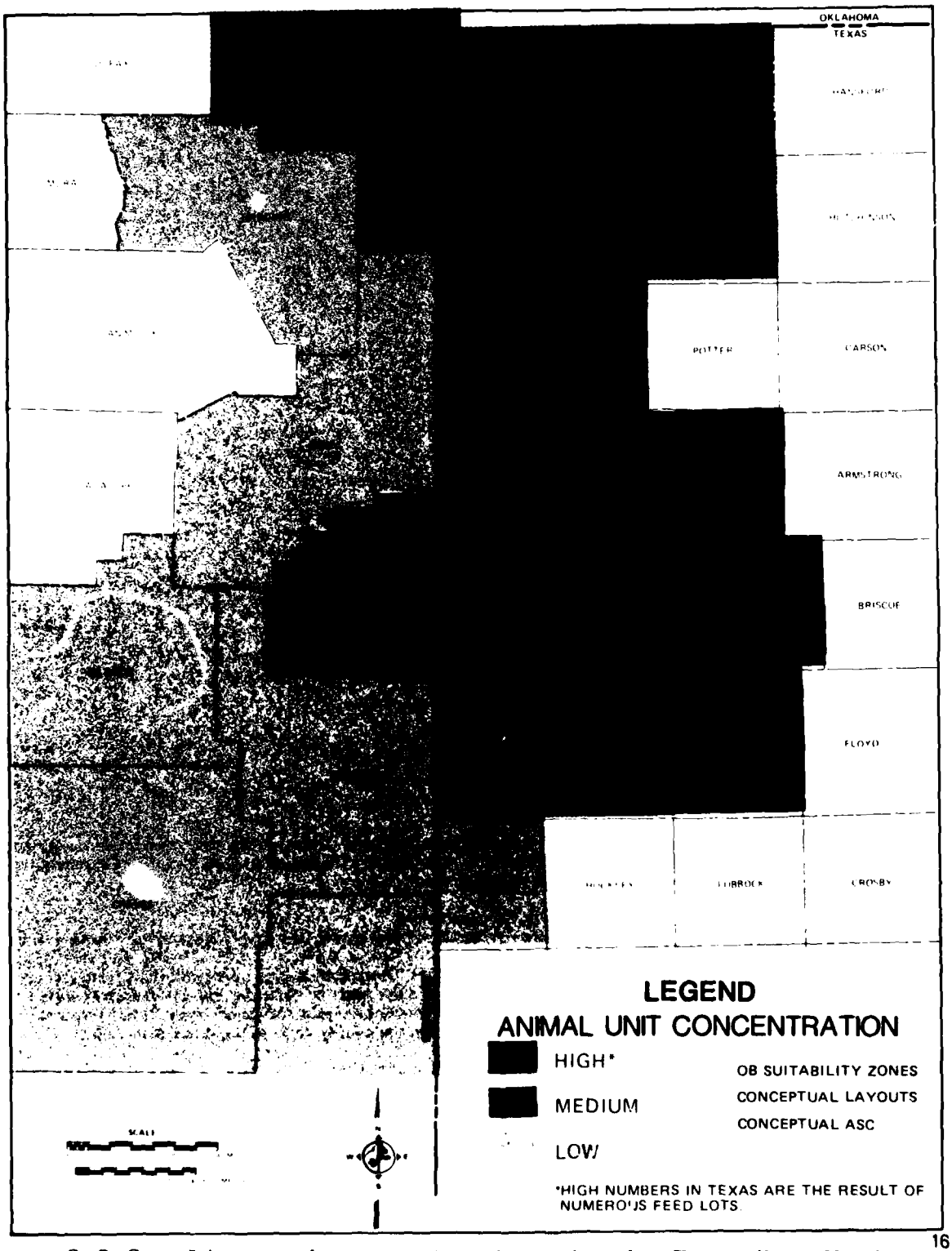
[1] Construction exclusion acreages computed on the basis of rangeland only. Construction exclusion impacts represent a worst case summation of all impacts that can potentially reduce livestock use of an area because of construction disturbances. See the methods section for a more complete description.

[2]
- = No animal unit reductions (no animal unit concentration).
- * = Projected animal unit reductions from direct impacts representing less than 0.2 percent of those in the county or totalling less than 500 animal units.
- *** = Moderate impact (moderate animal unit concentration). Projected animal unit reductions from direct impacts representing less than 1.0 percent of those in the county or totalling 500-1,000 animal units.
- ***** = High impact (high animal unit concentration). Projected animal unit reductions from direct impacts representing 1.0 percent or more of the animal units in the county or totalling more than 1,000 units.

(A 1 percent direct impact is approximately equivalent to a 30% indirect worst case impact).



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3213-A

Figure 3.8-2. Livestock concentrations in the Texas/New Mexico study area.

The segments of the local economy affected by these losses could be significantly impacted. Losses would also accrue from the disturbance of croplands. Additional disturbance would result from the construction of power transmission corridors, and for command, control, and communication networks. Site specific location and disturbance data are not yet available.

The impact of the project on livestock production in Texas/New Mexico could be substantially reduced by the avoidance of feedlots and agricultural areas directly supporting them. Such avoidance could reduce the losses in some Texas counties by as much as 75 percent, and in some New Mexico counties, by over 30 percent. The avoidance of support areas includes cropland primarily used to raise feed for livestock. Avoidance of the most productive areas of rangeland would also reduce impacts. Many of the impacts discussed for the Nevada/Utah area (Section 2.3.1.1) could also be considered in Texas and New Mexico. Allowances would need to be made for the far larger amount of cropland and for the large number of livestock on farms versus the more strictly range operations in the Nevada/Utah area. Because of the larger number of livestock in the Texas/New Mexico area compared to Nevada/Utah, the multiplier effects of the larger Texas/New Mexico losses through the regional and national economies will be greater.

CLOVIS OPERATING BASE (3.8.1)

The Clovis operating base is located in Curry county, which has a medium animal unit concentration (Figure 3.8.1-1). The county in which the OB site is located is largely agricultural and contains feedlots accommodating over 40 percent of its livestock. Land usage within the Clovis suitability zone is about 65 percent irrigated cropland, 17 percent rangeland, 14 percent dry cropland, 3 percent playa lake and 2 percent residential. The rangeland carries from about 2 acres per AUM, when in excellent condition, to 8 plus acres per AUM in poor condition. (U.S. Army, Corps of Engineers, 1981). Poor-condition rangeland in the Clovis OB suitability zone is equivalent to some of the best rangeland in the Nevada/Utah study area. The livestock losses from the construction of the OB would be about 800 animal units, depending on the types of livestock supporting facilities impacted in addition to rangeland (Table 3.8.1-1). Animal unit losses from the construction of this base will peak with its completion, and the loss will remain at that level. Reduced losses will occur from DTN construction because it will be routed along existing county roads. Impacts to livestock will be significant for the livestock operations directly affected. Because the surrounding area is fully utilized by existing livestock and agricultural enterprises, mitigation by some form of replacement of lost area will probably not be possible. Compensation of directly affected operations could be used as a mitigating measure.

DALHART OPERATING BASE (3.8.2)

The Dalhart operating base is located southwest of Dalhart, Texas in Hartley County. This county is in the medium animal unit category and contains extensive rangeland, as well as cropland and feedlots (Figure 3.8.2-1). Losses from the placement of this base would be about 500 animal units, but would depend on the types of livestock-supporting facilities impacted in addition to rangeland (Table 3.8.1-1). Rangeland in this region is typically short-grass prairie supporting around 15-20 head per section.

Figure 3.8.1-1. Land use in the vicinity of the Clovis OB site/3 site. 4255-B

Table 3.8.1-1. Average and range in potential for direct AUM losses resulting from vegetation removal by OB construction and operation in the Texas/New Mexico study area.

Alternative	Location	Estimated Animal Unit Loss	Loss as Percent of Total County Animal Units	Potential Impact[1]
Alternative 7	Clovis, NM	818	0.9	***
	Dalhart, TX	487	0.5	***
Alternative 8	Clovis, NM	818	0.9	***

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[1] - No animal unit reductions.

* Low impact. Projected animal unit reductions representing less than 0.2 percent of those in the county or totaling less than 500 animal units.

*** Moderate impact. Projected animal unit reductions representing less than 1 percent of those in the county or totaling 500-1,000 animal units.

***** High impact potential. Projected animal unit reductions representing 5 percent or more of the animal units in the county or totaling more than 1,000 animal units.

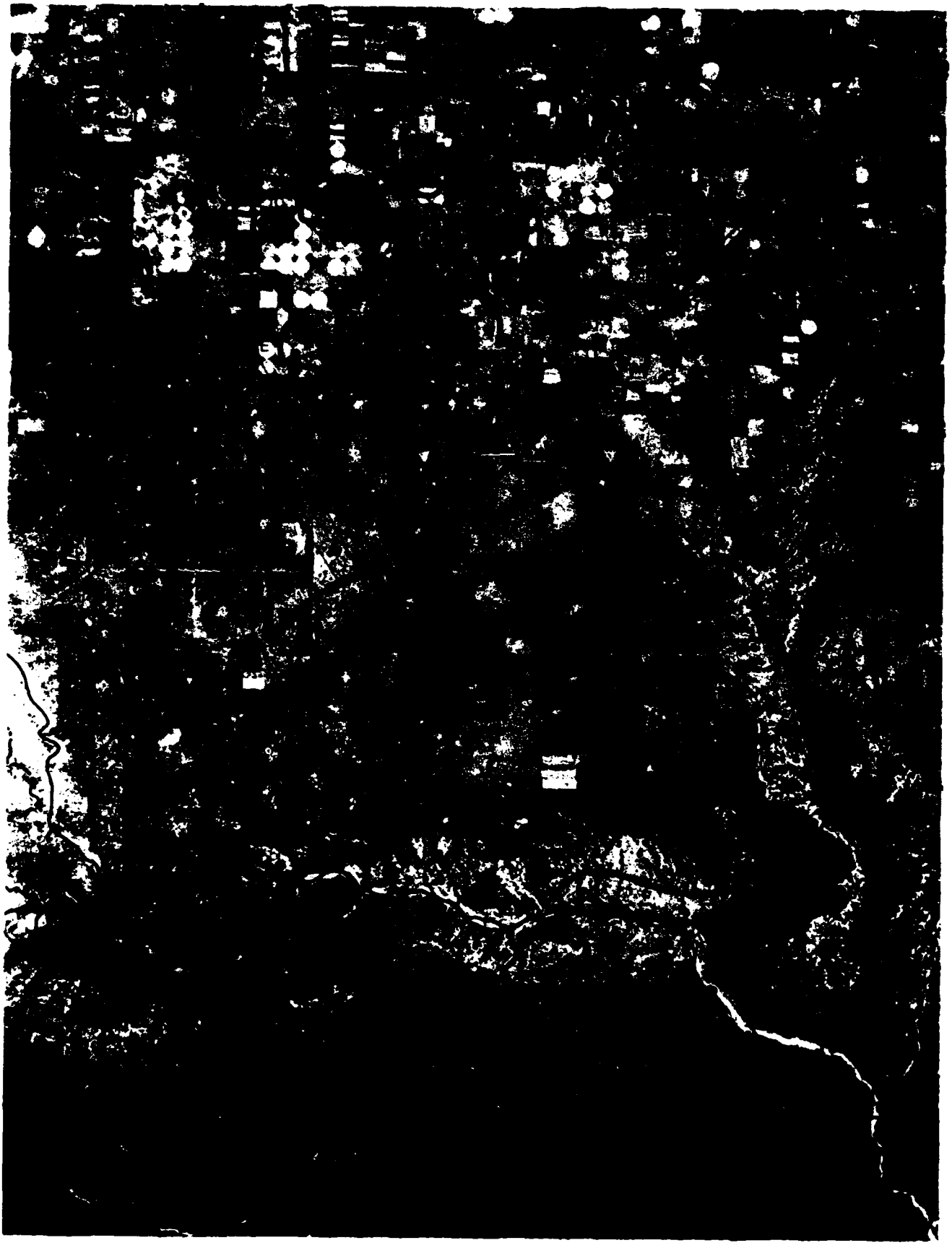


Figure 3.8.2-1. Land use in the vicinity of the Dalhart OB site. 4256-B

Animal unit losses resulting from the construction of this base will peak with its completion and will remain at that level through decommissioning. Impacts to livestock will be significant for the livestock operations directly impacted. Some possible mitigation measures are discussed in Section 3.8.

3.9 ALTERNATIVE 8

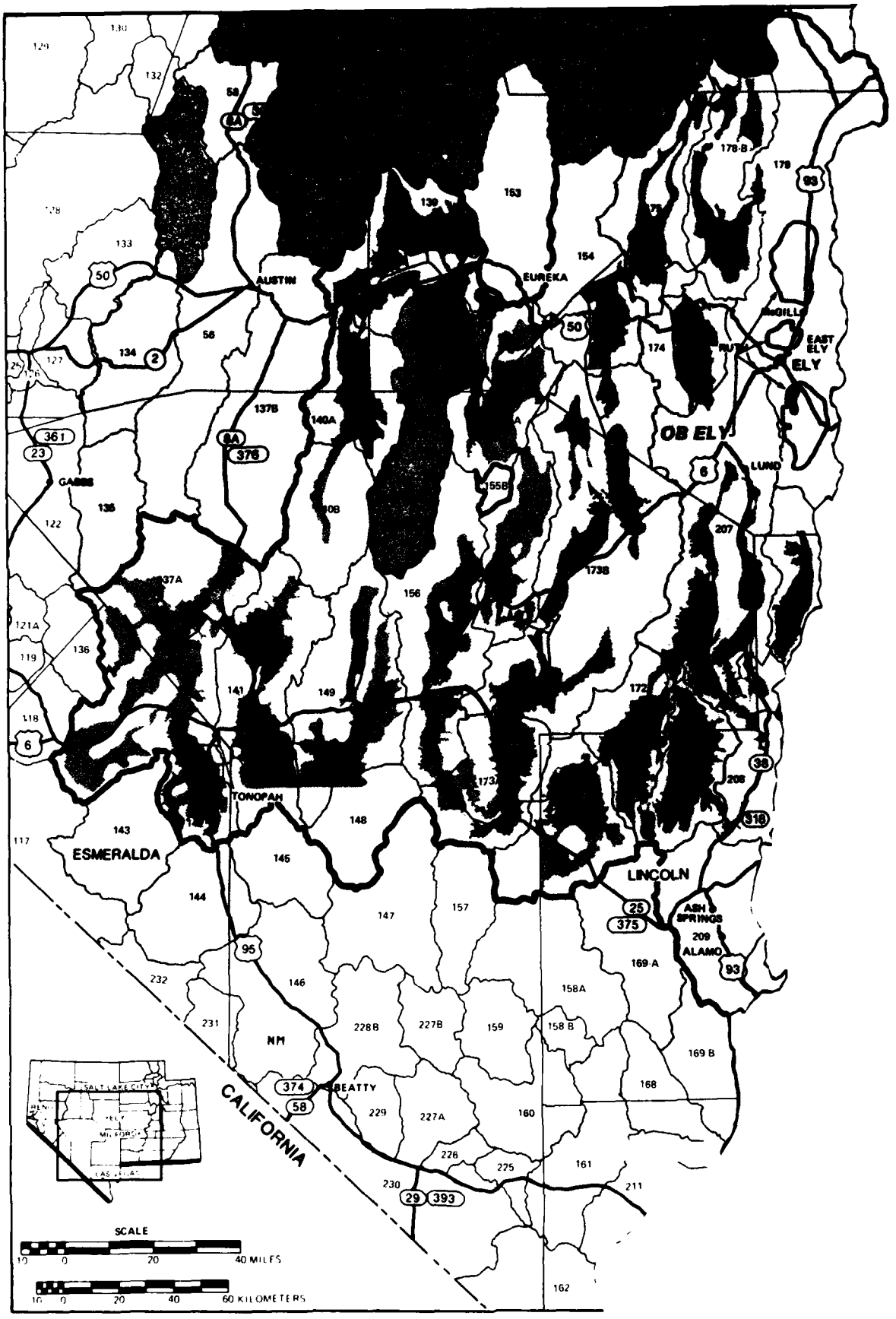
NEVADA/UTAH DDA (3.9.1)

The split-basing designated deployment area (DDA) in Nevada/Utah is identified in Figure 3.9.1-1.

The loss of grazing capacity through the split-basing direct impacts could total about 4,860 AUMs (Table 3.1.1-1). This AUM loss represents about 0.16 percent of the total grazing capacity (AUMs) in the affected BLM resource areas (Table 3.9.1-1) or 0.63 percent of the total AUMs in all the affected hydrologic subunits (Table 3.9.1- 2). These impacts would involve over 100 allotments (Table 3.9.1-1), or about 9 percent of the total number of allotments in the affected BLM resource areas (Table 1.1-3). Sixty-three percent of the direct AUM loss would be in Nevada and 37 percent in Utah. The estimated direct losses in the individual hydrologic subunits from the M-X facilities (shelters, cluster road, and DTN) total nearly 4,100 AUMs, and range from 6 to 470 AUMs (Table 3.9.1-2). Additional impacts are anticipated to result from the construction of power transmission corridors and command, control, and communication networks. Site-specific location and acreage disturbance data are, however, not yet available for these corridors and networks.

All the combined impacts represented by the temporary construction exclusion impacts could total a loss of nearly 140,000 AUMs over the period of construction of the split-basing deployment (Table 3.9.1-2). The maximum loss that would occur during any single year of construction would be about one third of the overall total or about 47,000 AUMs, but cooperation between affected operators and the BLM, Air Force, and its representatives could prevent most of this loss. In the individual hydrologic subunits the worst-case exclusion impacts could range from 162 to 16,200 AUMs (Table 3.9.1-2). About 64 percent of the temporary construction exclusion AUM losses would occur in Nevada and 36 percent in Utah (Table 3.9.1-1). The exclusion impact losses are proportional to the area of the hydrologic subunit or allotment over which project facilities are located and is therefore an index of the proportion utilized by the M-X project.

A total of 109 individually named and mapped allotments would be directly impacted by split basing for both direct impacts and the temporary construction exclusion impacts (Table 3.9.1-3). These allotments have an average of 4,335 AUMs each, and could experience an average loss of 37 AUMs (0.8 percent) from direct impacts and an average loss of 1,240 AUMs (28.6 percent) from all the impacts included among the worst-case temporary construction exclusion impacts. Over one fourth of the area of the impacted allotments contains project facilities. The direct impacts to grazing capacity range from less than 1 to 480 AUMs, and all the worst-case temporary construction exclusion impacts from 1 to 18,000 AUMs in the affected allotments (Table 3.9.1-3).



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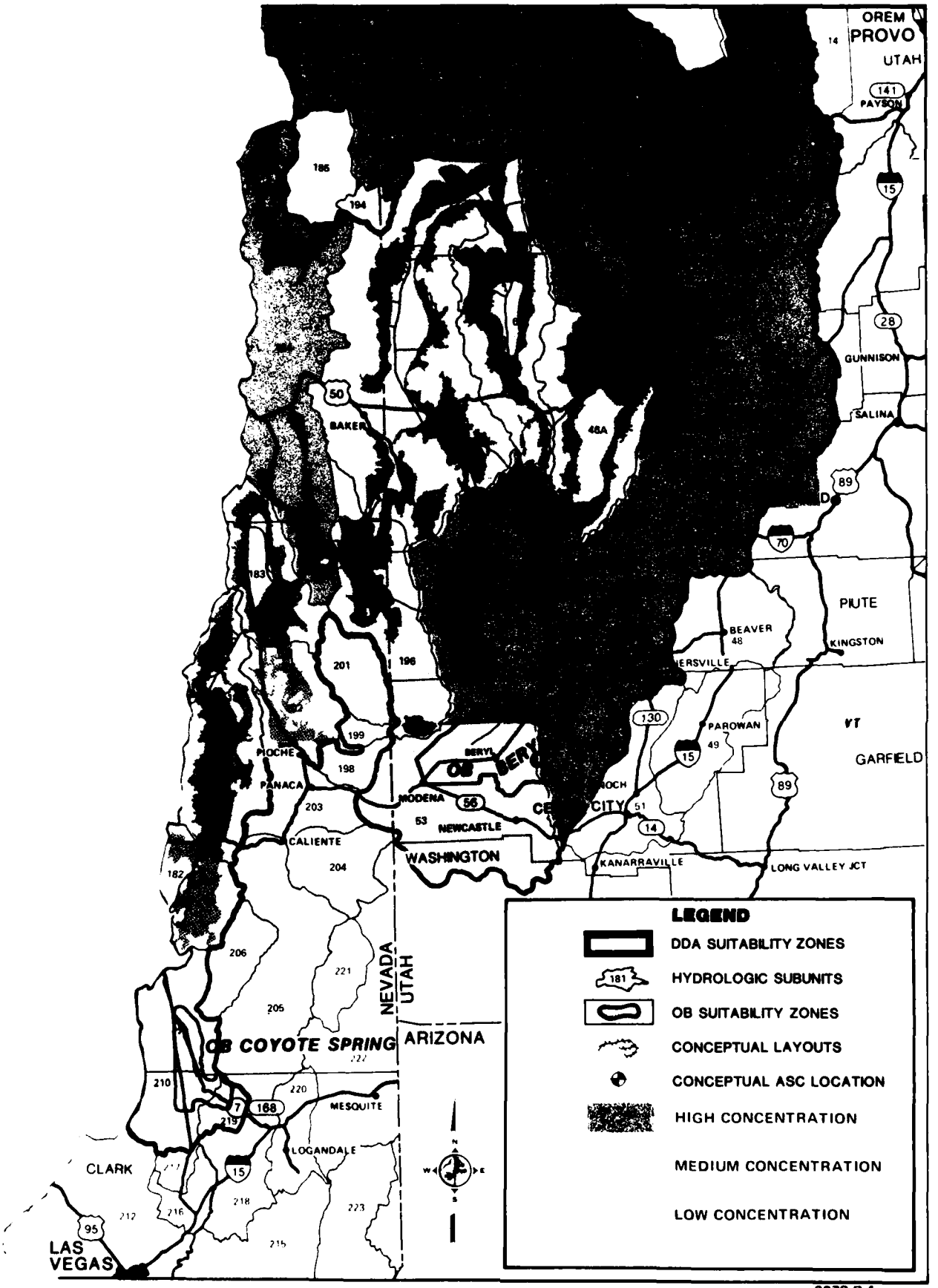

Figure 3.9.1-1. AUM concentration and Alternative 8 for Nevada/Utah. 3278-B-1 3230-D-1

Table 3.9.1-1. Distributions of allotments and AUMs in BLM resource areas impacted by DDA facilities, shelters, cluster roads and DTN for split basing Alternative 8.

Resource Area	Direct Impacts		Exclusion Impacts	
	Number of Allotments	AUMs Lost	Number of Allotments	AUMs Lost
Nevada				
Ely District				
Egan	7	35	7	1,190
Schell	31	1,693	32	61,95
Las Vegas District				
Caliente-Virgin Valley	10	293	10	11,370
Battle Mountain District				
Tonopah	6	542	6	14,743
Nevada Totals	54	2,563	55	89,258
Utah				
Cedar City District				
Beaver River	18	730	18	22,389
Richfield District				
House Range	9	298	9	10,091
Warm Springs	22	489	22	17,330
Utah Totals	49	1,517		49,810

Table 4978/9-19-81

Table 3.9.1-2. Potential direct and short-term construction exclusion impacts to grazing and livestock as a result of DDA construction in Nevada/Utah for Alternative 8 (split basing).

No.	Hydrologic Subunit Name	AUM Concentration In the Area	Long-Term Effects		Short-Term Construction Exclusion Impacts[2]		Potential Impact[1]
			Estimated AUM Loss	Loss as Percent of Total AUMs in Area	Estimated AUM Loss	Loss as Percent of Total AUMs in Area	
	Subunits with M-X Clusters and DTNs						
4	Snake, Nev./Utah	101,389	277	0.27	12,093	12.0	***
5	Pine, Utah	33,824	307	0.91	9,819	29.0	*****
6	White, Utah	32,605	51	0.16	1,165	3.6	*
7	Fish Springs, Utah	22,448	6	0.03	162	0.7	*
46	Sevier Desert, Utah	117,650	242	0.21	8,531	7.3	*
46A	Sevier Desert-Dry Lake, Utah	33,504	180	0.54	6,623	25.4	***
54	Wah Wah, Nev.	31,302	473	1.5	13,703	43.8	*****
155C	Little Smoky-South, Nev.	16,335	63	0.39	2,923	17.9	***
156	Hot Creek, Nev.	25,278	235	0.93	5,558	22.0	***
170	Penoyer, Nev.	9,336	101	1.1	3,473	37.2	*****
171	Coal, Nev.	13,472	206	1.5	6,666	49.5	*****
172	Garden, Nev.	13,502	245	1.8	9,119	67.5	*****
173A	Railroad-South, Nev.	12,752	128	1.0	4,404	34.5	*****
173B	Railroad-North, Nev.	59,038	116	0.20	1,830	3.1	*
180	Cave, Nev.	10,595	107	1.0	3,672	34.7	*****
181	Dry Lake, Nev.	29,983	414	1.3	16,207	54.1	*****
182	Delamar, Nev.	9,282	87	0.94	2,904	31.3	*****
183	Lake, Nev.	20,980	210	1.0	6,834	32.6	*****
184	Spring, Nev.	72,868	94	0.13	3,381	4.6	*
196	Hamlin, Nev./Utah	29,644	256	0.86	9,308	31.4	*****
202	Patterson, Nev.	12,704	43	0.34	1,564	12.3	***
207	White River, Nev.	39,986	207	0.52	7,875	19.7	***
208	Pahroc, Nev.	19,110	33	0.17	1,257	6.6	*
Nevada/Utah DDA Totals		767,587	4,080	0.53	139,068	18.1	***

T4866/10-2-81/F

[1] - = No AUM reduction.
* = Low impact. Maximum construction exclusion AUM losses of less than 10 percent of the total in the area.
*** = Moderate impact. Maximum construction exclusion AUM losses from 10 percent to less than 30 percent of the total in the area.
***** = High impact. Maximum construction exclusion AUM losses of 30 percent or greater of the total in the area.

[2] Construction exclusion impacts represent a worst case summation of all impacts that can potentially reduce livestock use of an area because of construction disturbances. See the methods section for a more complete description.

Table 3.9.1-3. Summary of split basing impacts to BLM allotments in the Nevada/Utah study area (Page 1 of 3).

Name	Total AUMs Allotted[1]	Direct Impacts from Vegetation Disturbance		Impacts from Temporary Exclusion from Construction[2]		Potential Impacts[3]
		AUMs Lost	Percent of Total	AUMs Lost	Percent of Total	
Morey	2,250	11	0.5	394	17.5	***
Hot Creek	8,850	125	1.4	4,289	48.5	*****
Reveille	25,730	250	1.0	5,907	23.0	***
Sand Springs Unit	9,145	61	0.7	2,157	23.6	***
Crater Blackrock	5,028	9	0.2	994	19.8	***
Nyala	18,506	86	0.5	1,004	5.4	*
Baker Creek	4,247	18	0.4	545	12.8	***
Chokecherry	6,032	11	0.2	2,537	42.1	*****
Cottonwood	4,106	62	1.5	2,209	53.8	*****
Hamlin Valley	8,177	135	1.7	5,096	62.3	*****
Douglas Point	368	1	0.3	32	8.7	*
North Cave	732	5	0.7	130	17.8	***
Wells Station	302	3	1.0	175	57.9	*****
Cave Valley Ranch	2,403	5	0.2	232	9.7	*
Shingle Pass	2,802	26	0.9	853	30.4	*****
Haggerty Wash	194	6	3.1	148	76.3	*****
Cave Valley Siding	200	4	2.0	141	70.5	*****
Cliff Spring	2,043	18	0.9	675	33.0	*****
Wild Horse	315	2	0.6	63	20.0	***
Batterman Wash	2,093	44	2.1	1,821	87.0	*****
Hardy Springs	5,746	38	0.7	1,354	23.6	***
Sunnyside	8,787	156	1.8	5,245	59.7	*****
Dry Farm	733	6	0.8	261	35.6	*****
Ely Spring Sheep	1,802	5	0.3	193	10.7	***
McCutcheon Spring	446	6	1.3	224	50.2	*****
Mustang	880	1	0.1	186	21.1	***
Oak Springs AMP	9,268	73	0.8	2,476	26.7	***
Pahroc	4,783	21	0.4	606	12.7	***
Rattlesnake	1,180	15	1.3	484	41.0	*****
Sand Springs AMP	6,091	74	1.2	2,529	41.5	*****
Delamar	4,858	8	0.2	283	5.8	*
Geyser Ranch	14,850	161	1.1	4,911	33.1	*****
Grassy Mountain	200	--	--	22	11.0	***
Simpson	747	24	3.2	747	100.0	*****
Antelope	7,660	72	0.9	2,689	35.1	*****
Blind Valley	2,466	19	0.8	605	24.5	***
Boob Canyon	2,870	41	1.4	1,359	47.4	*****
Crows Nest	1,460	21	1.4	820	56.2	*****
Breaks Knoll	6,999	60	0.9	2,183	31.2	*****
Crater	3,408	23	0.7	467	13.7	***
Crystal Peak	1,787	28	1.6	767	42.9	*****
Death Canyon	2,666	9	0.3	325	12.2	***
Deadmans Wash	5,432	74	1.4	2,665	49.1	*****

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Table 3.9.1-3. Summary of split basing impacts to BLM allotments in the Nevada/Utah study area (Page 2 of 3).

Name	Total AUMs Allotted[1]	Direct Impacts from Vegetation Disturbance		Impacts from Temporary Exclusion from Construction[2]		Potential Impacts[3]
		AUMs Lost	Percent of Total	AUMs Lost	Percent of Total	
Ferguson	863	6	0.7	202	23.4	***
King	6,742	16	0.2	568	8.4	*
Lady Laird	5,169	51	1.0	1,847	35.7	*****
Little Drum	5,505	20	0.4	720	13.1	***
North Canyon	1,791	8	0.4	331	18.5	***
Notch Peak	3,844	7	0.2	222	5.8	*
Painted Potholes	2,602	31	1.1	703	27.0	***
Skull Rock	4,470	45	1.0	1,840	41.2	*****
Steamboat	2,294	14	0.6	465	20.3	***
Swazy Knoll	4,928	2	0.04	56	1.1	*
Tatow	4,500	58	1.3	1,868	41.5	*****
Moorman Gap	3,291	3	0.1	67	2.0	*
Pine Valley	4,140	46	1.1	889	21.5	***
Smelter Mountain	995	6	0.6	271	27.2	***
Indian Peak	4,485	9	0.2	287	6.4	*
Klondike	85	1	0.1	48	56.5	*****
Deseret	13,274	8	0.06	977	7.4	*
Crickett	9,386	5	0.05	175	1.9	*
Big Wash	311	1	0.3	2	0.6	*
Willow Creek	5,817	54	0.9	2,311	39.7	*****
Antelope Peak	6,552	14	0.2	280	4.3	*
High Rock	2,914	5	0.2	145	5.0	*
Ephraim-Bagnall	5,391	5	0.1	199	3.4	*
Hardpan	2,386	24	1.0	669	28.0	***
Voorhees	3,216	48	1.5	1,775	55.2	*****
Well	2,524	55	2.2	1,932	76.5	*****
Indian Creek	1,128	8	0.7	103	9.1	*
Buckhorn	3,715	85	2.3	2,953	79.5	*****
Red Cove	3,254	42	1.3	1,720	52.9	*****
Sewing Machine	1,611	18	1.1	463	28.3	*****
Fairview	5,546	2	0.04	73	1.3	*
State Line (NV)	5,134	14	0.3	540	10.5	***
Buckhorn	4,010	21	0.5	697	17.4	***
Cove	1,138	10	0.9	270	23.7	***
Crescent	1,218	5	0.4	156	12.8	***
South Spring Valley	6,329	11	0.2	361	5.7	*
Bad Lands	610	15	2.5	469	76.9	*****
Burbank	557	12	2.2	246	44.2	*****
Christensen	3,693	16	0.4	506	13.7	***
Grassy Cove	5,376	39	0.7	614	11.4	***
Lakeview	1,220	26	2.1	248	20.3	***
Lawson Cove	10,929	84	0.8	2,852	26.1	***
Montain Home	1,990	2	0.1	90	4.5	*

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Table 3.9.1-3. Summary of split basing impacts to BLM allotments in the Nevada/Utah study area (Page 3 of 3).

Name	Total AUMs Allotted[1]	Direct Impacts from Vegetation Disturbance		Impacts from Temporary Exclusion from Construction[2]		Potential Impacts[3]
		AUMs Lost	Percent of Total	AUMs Lost	Percent of Total	
Nevada Cattle	892	2	0.2	71	8.0	*
Patch-Im-Pa	1,398	6	0.4	97	6.9	*
Pruess Lake-Ely	171	2	1.2	13	7.6	*
Wah Wah	10,929	177	1.6	4,640	42.5	*****
Fox Mountain	6,680	7	0.1	290	4.3	*
Oreana Spring	3,433	21	0.6	651	19.0	***
Timber Mountain	965	4	0.4	126	13.1	***
Irish Mountain	2,915	11	0.4	363	12.5	***
Forest Moon	3,780	61	1.6	2,356	62.3	*****
Middle Coal Valley	1,138	23	2.0	823	72.3	*****
Pine Creek	2,207	40	1.8	1,374	62.3	*****
Coal Valley	848	13	1.5	401	47.3	*****
Cottonwood	3,016	47	1.6	1,664	55.2	*****
Needles	3,617	56	1.5	1,935	53.5	*****
Seaman Springs	1,619	12	0.7	402	24.8	***
W. Timber Mountain	735	13	1.8	332	45.2	*****
Washington Mountain	6,298	109	1.7	4,084	64.8	*****
East Water Gap	1,209	19	1.6	672	55.6	*****
West Water Gap	460	8	1.7	272	59.1	*****
Ely Spring AMP	4,248	57	1.3	3,078	72.5	*****
Shadow Wells	577	17	2.9	577	100	*****
Wilson Creek	53,710	484	0.9	18,187	33.9	*****
Reserved for Wildlife	1,081	13	1.2	748	69.2	*****
Average	4,335	36.8	0.8	1,240	28.6	***

T4963/8-21-81

[1] Named allotments on BLM maps that did not have data in the grazing record masters were planimetered for area, an acres per AUM estimated from surrounding allotments and an estimated total AUMs computed.

[2] Construction exclusion impacts represent a worst case summation of all impacts that can potentially reduce livestock use of an area because of construction disturbances. See the methods section for a more complete description.

[3]
- \- = No AUM reduction.
- * = Low impact. Maximum construction exclusion AUM losses of less than 10 percent of the total in the area.
- *** = Moderate impact. Maximum construction exclusion AUM losses from 10 percent to less than 30 percent of the total in the area.
- ***** = High impact. Maximum construction exclusion AUM losses of 30 percent or greater of the total in the area.

Table 3.9.1-4. Summary of split basing impacts to operators using BLM allotments in the Nevada/Utah study area (Page 1 of 3).

Number	Total AUMs Allotted	Direct Impacts from Vegetation Disturbance[1]		Impacts from Temporary Exclusion from Construction[2]		Potential Impacts[3]
		AUMs Lost	Percent of Total	AUMs Lost	Percent of Total	
1	1,243	4	0.3	148	11.9	***
2	6,237	82	1.3	2,522	40.4	*****
3	1,328	10	0.8	205	15.4	***
4	1,698	13	0.8	262	15.4	***
5	4,830	51	1.1	1,847	38.2	*****
6	5,704	2	0.04	56	1.0	*
7	105	2	1.4	49	46.3	*****
8	274	1	0.4	48	17.5	***
9	298	2	0.6	83	27.9	***
10	362	1	0.3	54	14.9	***
11	92	1	1.1	48	52.2	*****
12	2,615	19	0.7	605	23.1	***
13	5,522	69	1.2	2,367	42.9	*****
14	6,574	38	0.6	1,376	20.9	***
15	4,378	25	0.58	691	15.8	***
16	3,751	46	1.2	889	23.7	***
17	240	1	0.6	38	16.0	***
18	240	1	0.6	38	16.0	***
19	3,074	48	1.7	1,775	57.7	*****
20	6,379	76	1.2	2,689	42.1	*****
21	2,500	9	0.3	325	13.0	***
22	2,653	21	0.8	820	30.9	*****
23	10,611	115	1.1	4,467	42.1	*****
24	795	4	0.5	158	19.9	***
25	863	4	0.5	173	20.0	***
26	2,408	7	0.3	222	9.2	*
27	2,004	2	0.1	46	2.3	*
28	2,163	8	0.4	296	13.7	***
29	5,598	8	0.1	273	4.9	*
30	5,005	2	0.04	35	0.7	*
31	2,548	10	0.6	396	15.5	***
32	932	4	0.4	145	15.5	***
33	3,926	2	0.06	83	2.1	*
34	3,926	2	0.06	83	2.1	*
35	182	0.1	0.06	4	2.1	*
36	260	0.2	0.06	5	2.1	*
37	371	8	2.2	977	2.6	*
38	3,481	5	0.1	145	4.2	*
39	2,040	34	1.7	1,274	62.5	*****
40	6,132	101	1.7	3,822	62.3	*****
41	5,628	11	0.2	2,537	45.1	*****
42	29,984	166	0.55	6,238	20.8	***
43	64	0.3	0.4	8	12.8	***

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Table 3.9.1-4. Summary of split basing impacts to operators using BLM allotments in the Nevada/Utah study area (Page 2 of 3).

Number	Total AUMs Allotted	Direct Impacts from Vegetation Disturbance[1]		Impacts from Temporary Exclusion from Construction[2]		Potential Impacts[3]
		AUMs Lost	Percent of Total	AUMs Lost	Percent of Total	
44	5,317	54	1.0	2,311	43.5	*****
45	658	2	0.3	34	5.1	*
46	2,282	6	0.3	118	5.2	*
47	1,371	3	0.3	70	5.1	*
48	5,334	62	1.2	2,209	41.4	*****
49	3,755	16	0.4	475	12.7	***
50	490	2	0.4	62	12.7	
51	2,475	42	1.7	1,132	45.7	*****
52	4,379	4	0.1	51	1.2	***
53	4,427	46	1.0	1,509	34.1	*****
54	5,510	6	0.11	214	3.9	*
55	8,849	6	0.07	216	2.4	*
56	14,760	8	0.05	274	1.9	*
57	26,937	5	0.02	188	0.7	*
58	4,889	5	0.1	130	2.7	*
59	1,873	3	0.15	175	9.3	*
60	4,585	10	0.22	270	5.9	*
61	1,341	9	0.7	287	21.4	*****
62	1,011	1	0.1	32	3.2	*
63	2,400	5	0.2	232	9.7	*
64	590	4	0.7	141	23.9	***
65	194	6	3.0	148	76.3	*****
66	1,120	3	0.3	58	5.1	*
67	3,371	85	2.5	2,953	87.6	*****
68	2,894	42	1.5	1,720	59.4	*****
69	2,076	33	1.6	1,219	58.7	*****
70	3,600	21	0.6	704	19.5	***
71	250	8	3.1	242	96.8	*****
72	3,600	56	1.6	2,110	58.6	*****
73	7,792	106	1.4	3,975	51.0	*****
74	29,844	161	0.5	4,911	16.5	***
75	3,972	61	1.5	2,356	59.3	*****
76	3,902	39	1.0	1,350	34.6	*****
77	6,290	12	0.2	362	5.8	*
78	659	10	1.5	382	60.0	*****
79	1,250	19	1.5	675	54.0	*****
80	456	7	1.6	273	59.8	*****
81	440	7	1.5	255	57.9	*****
82	3,835	42	1.1	1,421	37.0	*****
83	513	5	0.94	204	39.7	*****
84	1,484	22	1.5	837	56.4	*****
85	17,329	219	1.3	7,452	43.0	*****
86	3,206	64	2.0	2,289	71.4	*****

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Table 3.9.1-4. Summary of split basing impacts to operators using BLM allotments in the Nevada/Utah study area (Page 3 of 3).

Number	Total AUMs Allotted	Direct Impacts from Vegetation Disturbance[1]		Impacts from Temporary Exclusion from Construction[2]		Potential Impacts[3]
		AUMs Lost	Percent of Total	AUMs Lost	Percent of Total	
87	300	5	1.6	182	60.6	*****
88	2,442	36	1.5	1,281	52.5	*****
89	12,427	63	0.5	2,365	19.0	***
90	7,859	73	0.9	2,485	31.6	*****
91	11,326	178	1.6	6,630	58.5	*****
92	70	1	1.4	36	52.0	*****
93	11,316	55	0.5	1,913	16.9	***
94	1,180	15	1.3	484	41.0	*****
95	1,395	1	0.09	186	13.3	***
96	776	21	0.3	606	8.6	*
97	36,323	44	0.1	1,521	4.2	*
98	717	2	0.2	55	7.6	*
99	6,128	62	1.0	3,271	53.4	*****
100	6,533	74	1.1	2,529	38.7	*****
101	8,267	15	0.2	516	6.2	*
102	11,625	113	0.97	2,670	23.0	*****
103	14,105	137	1.0	3,237	23.0	*****
104	19,503	165	0.9	6,421	32.9	*****
105	16,192	86	0.5	1,004	6.2	*
106	5,773	20	0.3	720	12.5	***
107	2,040	14	0.7	465	22.8	*****
Total	532,925	3,538	0.7	122,955	23.1	***
Average	4,981	33		1,149		

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[1]Computed from area impacted by shelters, cluster road, and DTN.

[2]Construction exclusion impacts represent a worst case summation of all impacts that can potentially reduce livestock use of an area because of construction disturbances. See the methods section for a more complete description. Computed from area within ½ mi of the project facilities of shelters, cluster road, and DTN and assumes no livestock use of the area within that distance during construction.

[3]
- = No AUM reduction.
- * = Low impact. Maximum construction exclusion AUM losses of less than 10 percent of the total in the area.
- *** = Moderate impact. Maximum construction exclusion AUM losses from 10 percent to less than 30 percent of the total in the area.
- ***** = High impact. Maximum construction exclusion AUM losses of 30 percent or greater of the total in the area.

A total of 107 of the operators listed in the grazing record masters would be directly impacted by split basing and the same number would be affected by all the temporary construction exclusion impacts (Table 3.9.1-4). The impacted operators would experience an average loss of 33 AUMs (0.7 percent) from direct impacts and an average loss of 1,149 AUMs (23.1 percent) from all the impacts included among the temporary construction exclusion impacts. On the average, nearly one fourth of the BLM allotment area of the impacted operators contains project facilities. Direct impacts to grazing capacity range from less than 1 to 219 AUMs, and worst-case temporary construction exclusion impacts range from 4 to 7,450 AUMs (Table 1.3.9.1-4). The losses included in the temporary construction exclusion impacts should be substantially reduced by cooperation between the affected operators and the Air Force and its representatives.

The distribution of impacts among the affected operators and allotments is as important as the average, and range, in impacts. The numbers of operators and allotments in twelve levels of impact by clusters deployed (each cluster equals 23 shelters) are listed in Table 3.9.1-5. Seventy-one of the shelters impacted operators, with individual impacts of one cluster of shelters or less, would account for only a total of less than 500 shelters. Conversely, 36 operators, with up to more than 10 clusters of shelters deployed on their alloted area, would experience a total impact of more than 1,800 shelters.

Twenty-eight of the split basing impacted operators would account for three fourths of the total direct impact AUM losses amounting to about 2,650 AUMs. They would have individual losses ranging from 46 to 200 AUMs (Table 3.9.1-6). The remaining 79 operators would account for less than 1,000 AUMs lost and would have individual losses ranging from less than 1 to 45 AUMs.

Three fourths of the total split-basing direct AUM loss would occur on 32 of the impacted allotments. The individual losses on these allotments range from 41 to 480 AUMs. The remaining impacted allotments would have individual losses that range from less than 1 to 40 AUMs.

Three fourths of the worst case temporary construction exclusion AUM losses for split basing, amounting to 92,000 AUMs, would occur on the grazing area allotted to 28 operators. These 28 operators would have individual losses ranging from 1,700 to 7,450 AUMs. Thirty-one impacted allotments would account for a total of three-fourths of the worst-case losses, amounting to about 105,000 AUMs, and would have individual losses ranging from 1,420 to over 18,000 AUMs. The remaining 78 split basing impacted allotments would have individual losses that range from 1 to 1,400 AUMs.

The proportion, or percentage, of each operator's total BLM-allotted areas that would be affected by project deployment was compiled for each operator from the construction exclusion data. This percentage provides an index of how much of an operator's allotment area receives M-X deployment impacts. All the affected operators were then grouped into ten classes of percent-of-allotted-area-affected by project construction. The number of operators in each of the ten classes is indicated in Figure 3.1.1-4.

As with the previously discussed Proposed Action impacts, the largest number of operators would have a relatively small proportion of their allotted area affected

Table 3.9.1-5. Percent of operators and allotments on BLM-administered lands in the Nevada/Utah study area that are in each of the listed classes of number of clusters of impact, and AUMs lost from direct impacts (vegetation removal) for split basing. Each cluster equals 23 shelters, one-half of a cluster equals 12 shelters.

Clusters of Impact by Class	Percent in Each Class for		AUMs Lost by Class	Percent in Each Class for	
	Operators	Allotments		Operators	Allotments
0-½	59.8	56.6	0-25	64.5	62.8
½-1	15.9	23.0	25-50	10.3	15.0
1-2	10.3	8.8	50-75	11.2	11.5
2-3	7.5	8.0	75-100	3.7	3.5
3-4	2.8	0			
4-5	2.8	1.8	100-150	5.6	2.7
5-6	0	0	150-200	3.7	2.7
6-7	0.9	0	200-300	0.9	0.9
7-8	0	0	300-400	0	0
8-9	0	0.9	400-500	0	0.9
9-10	0	0			
10-11	0	0.9			

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Table 3.9.1-6. Percent of operators and allotments on BLM-administered lands in the Nevada/Utah study area that are in each of the listed classes of AUMs lost from short-term construction impacts (indirect and direct interference with livestock use) for split basing.[1]

AUMS Lost From Exclusion by Class	Percent in each class for Operators	Allotments
0-500	54.2	47.3
500-1,000	10.3	20.5
1,000-1,500	7.5	5.4
1,500-2,000	4.7	7.1
2,000-2,500	6.5	5.4
2,500-3,000	5.6	5.4
3,000-4,000	4.7	1.8
4,000-5,000	2.8	3.6
5,000-6,000	0	2.7
6,000-7,000	2.8	0
7,000-8,000	0.9	0
8,000-10,000	0	0
10,000-20,000	0	0.9

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[1] Construction exclusion impacts represent a worst-case summation of all impacts that can potentially reduce livestock use of an area because of construction disturbances. See the methods section for a more complete description.

by project construction. Over 50 percent of the 107 split basing operators would have 20 percent or less of their total allotted area potentially affected (Figure 3.1.1-4). For split-basing, about 25 percent of the operators have deployment over 40 to 60 percent of the total allotted area.

Nearly one third of all the split-basing impacted operators would have project deployed over 40 percent or more of their allotted area. These differential construction exclusion impacts to selected livestock operations are again the result of their dependence on vegetation types that are differentially impacted by the project. These operators may have difficulty remaining in business during the period of construction because of the widespread nature of the affects. The total allotted AUMs of these operators comprises about one fifth of the total alloted AUMs of all the impacted operators, and 7 percent of the total AUMs in the study area hydrologic subunits. If these operators are unable to continue operations during M-X construction, the total individual losses as a result of construction exclusions would total about 186,000 AUMs, or 10 percent of the study area total. Unimpacted rangeland made available by the loss of these operations would be utilized by other area ranches. Cooperation between the affected operators and the Air Force and its representatives could substantially reduce these impacts.

Split-basing operators with project deployed over 30 percent or more of their allotted area have 29 percent of the total alloted AUMs of the impacted operators and 68 percent of the total worst-case temporary construction exclusion AUM losses. If these operations cannot remain functional during construction, individual losses could be up to 222,000 AUMs, or about 12 percent of the study area total over the construction period. Losses of these magnitudes could have a temporary impact on livestock use on surrounding National Forest lands that provide summer forage for many livestock on BLM land during other seasons of the year.

Livestock operations identified from the grazing record masters were classified into five general categories (summer cattle, year-round cattle, winter cattle, winter sheep and year-round sheep) to investigate the potential differences in M-X deployment impacts to different types of livestock operators. The 667 operators for the entire study area (Table 1.1-3 in Section 1.1) were similarly categorized as the baseline for analysis.

Summer cattle operators made up 45.7 percent of the study area operations, but only 12.1 percent of those impacted by split basing (see Table 3.1.1-9 in Section 3.1.1). This difference reflects the general use of grazing lands by this type of operation that are located at higher elevations than those used by the M-X. Year-round cattle operations made up 29.8 percent of all the operators in the study area and 45.7 percent of those impacted by the split-basing deployment. This type of operation tends to make greater use of grazing resources on the valley floors. Winter sheep operators comprise only 8.6 percent of all the study area operators, but 22.4 percent of those impacted. The M-X deployment impacted winter sheep operations represent 44 percent of all the study area winter sheep operations. All-year sheep operations (13.8 percent of those in the study area) make up 19.8 percent of the split-basing impacted operators.

Additional disturbance would result from the construction of power transmission corridors, or corridors and other disturbance areas for command,

control, and communications networks. Site-specific or acreage disturbance data for these facilities are not yet available.

The mitigative measures discussed for the Proposed Action (Section 1.3.4) are applicable to Alternative 8 as well.

COYOTE OPERATING BASE (3.9.2)

The Coyote Spring operating base for the split-basing alternative is identical to that discussed in the Proposed Action (Section 3.1.2). Its environmental consequences would be the same in both alternatives.

TEXAS/NEW MEXICO DDA (3.9.3)

Split-basing deployment in Texas/New Mexico is illustrated in Figure 3.9.3-1. The descriptions of environmental consequences for Alternative 7 (Section 3.8) generally apply here also.

For split basing, about 4,800 animal units or about 0.3 percent of the total annual population in the affected counties would be lost from direct impacts (Table 3.9.1-2). The individual county losses vary from 0.01 to 0.66 percent of their total animal units. Thirty-seven percent of the direct impacts to agricultural acreage would be to irrigated cropland, six percent to dry cropland, and 57 percent to rangeland. Losses from indirect impacts are expected to be several times those from direct impacts. These indirect impacts are discussed in more detail in Section 3.1.

All but one of the Texas counties having high animal-unit concentrations (AU/acre) are avoided in this alternative. All the counties having intermediate and low animal-unit concentration classifications in Alternative 7 are also included in this alternative. Alternative 8 reduces animal-unit losses in Texas by 71 percent and losses in New Mexico by 35 percent relative to Alternative 7 (Section 3.8).

Only 7 percent of the counties potentially impacted by this alternative are high ranked. This is a reduction of 80 percent compared to Alterative 7. These high-ranked counties account for 9 percent of the total land area potentially disturbed, and 26 percent of the total potential animal loss. Forty-four percent of the counties impacted by the DDA are in the intermediate animal unit classification, and they account for 34 percent of the total area disturbed and 41 percent of the animal units potentially lost. The remaining percentage is in counties with a low animal unit concentration ranking. The number of intermediate and low concentration classification counties impacted were not changed from Alternative 7. The percentage of the possible AUMs lost in each county, relative to the total number in each, was highest in the high concentration counties (0.64 percent), intermediate in the intermediate concentration counties (0.36 percent), and lowest in the low concentration counties (0.33 percent).

Over the period of construction, the split-basing losses from all the sources included in the temporary construction exclusion impacts could total almost 96,000 animal units (Table 3.9.1-2). Forty percent of these losses would occur in Texas, and 60 percent in New Mexico. Temporary construction exclusion animal unit losses in the individual counties could vary from 0.03 percent to 20.3 percent of the total

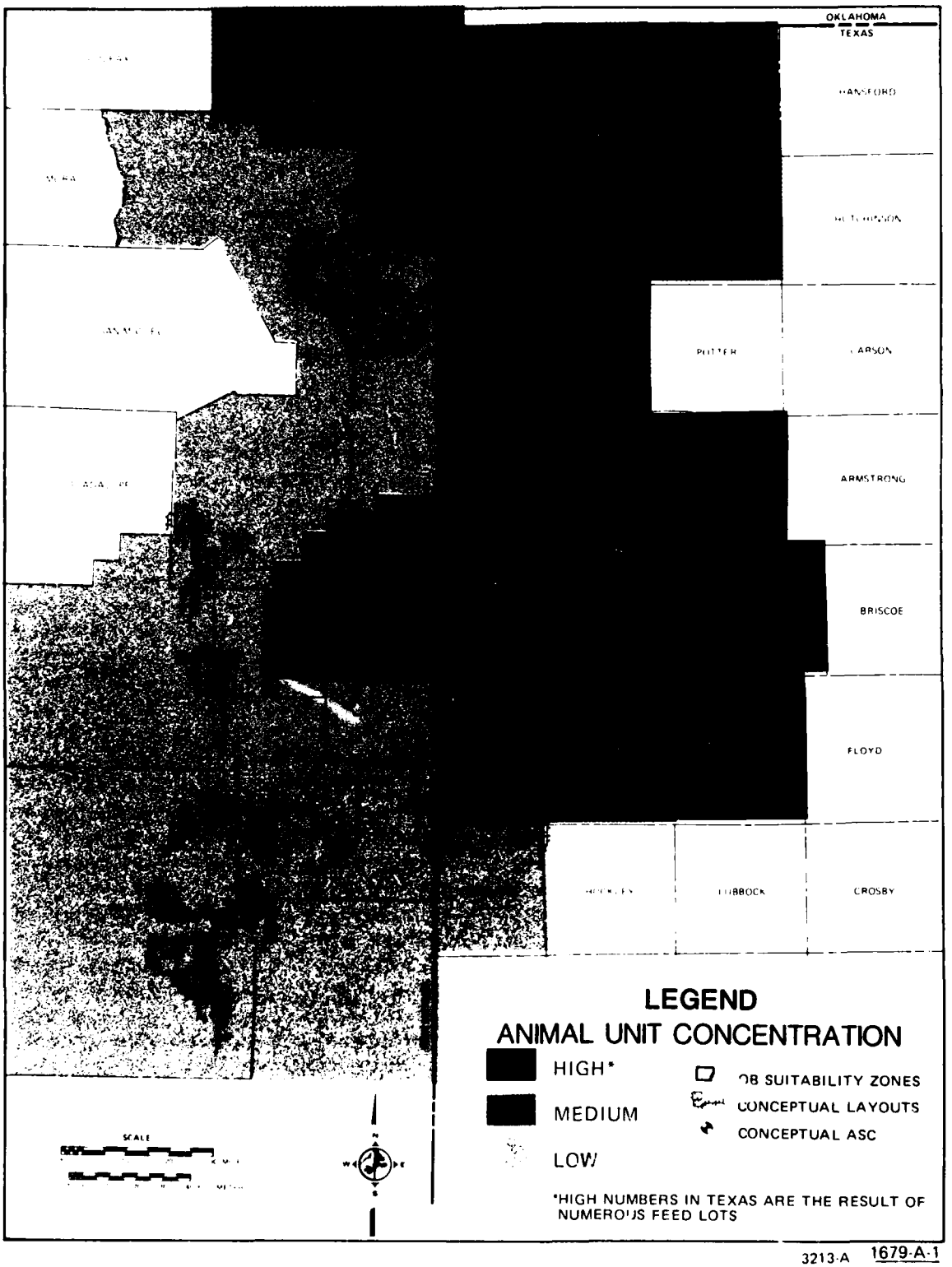

Figure 3.9.3-1. Livestock concentration and Alternative 8 for Texas/New Mexico.

present. Cooperation between the affected operators and the Air Force and its representatives could substantially reduce these losses.

Additional animal unit losses will occur from direct disturbances resulting from the construction of power transmission corridors, or corridors and other disturbances for command, control, and communication networks. Site-specific disturbance data and locations for these facilities are not yet available. Possible mitigation measures discussed in Section 3.8 also apply here.

CLOVIS OPERATING BASE (3.9.4)

The environmental consequences of the operating base being located near Clovis are described in Section 3.8.1. The Clovis operating base is also part of Alternative 7.

APPENDIX

The following 15 ranch budgets were assembled and used by Resource Concepts Inc. (1981) for their baseline economic analyses. The data used for the tables were collected in interviews of about 20 percent of the 667 operators in the study area. The entries are averages derived from the data for the sampled ranches in each of the 15 classifications. Results of the economic analyses by Resource Concepts Inc. were used to estimate potential economic losses to the livestock industry in Nevada and Utah from M-X deployment. The methods are explained in Section 2.1.4 and the results are in Section 3.1.2.

TABLE 1

REGION I SUMMER CATTLE
LIVESTOCK, CROP PRODUCTION, AND RESOURCE STATISTICS

I. CROP AND RANGE RESOURCES

DESCRIPTION	UNITS	AMOUNT	TONS/ACRE	VARIABLE COST PER UNIT
Summer federal range	AUMS	3,127		$2.36
Private rangeland	AUMS	1,431		0.00
Alfalfa hayland	ACRES	257	3.4	109.00[a]
Grass hayland	ACRES	154	1.4	25.00[a]

II. LIVESTOCK PRODUCTION

DESCRIPTION	AMOUNT	UNITS
Number of cows	478	Head
Calf crop	87	Percent
Calf death loss	5	Percent
Cow death loss	3	Percent
Steer calf selling weight	424	Pounds
Heifer calf selling weight	400	Pounds
Calves sold as weaners	64	Percent
Replacement rate	14	Percent
Bulls per 100 cows	5	Percent
Horses per 100 cows	4	Percent

[a]/Source: Myer et al. (1980).

TABLE 2

REGION I SUMMER CATTLE ENTERPRISE BUDGET

			$/Cow
I.	SALES		
1.	Steer calves	(424 lbs x $.78 x .41)	135.60
2.	Heifer calves	(400 lbs x $.66 x .27)	71.28
3.	Cull cows	(975 lbs x $.45 x .14 x .97)	59.58
4.	Cull bulls	(1400 lbs x $.45 x .25 x .05 x .97)	7.64
6.	TOTAL SALES		274.10
II.	PRODUCTION COSTS		
	A. VARIABLE COSTS		
1.	Raised alfalfa hay fed	(1.82 ton x $32.15)	58.51
2.	Raised grass hay fed	(.45 ton x $17.73)	7.98
3.	Government grazing fees	(6.5 AUM's x $2.36)	15.34
4.	Livestock labor	(19 hours x $5.00)	95.00
5.	Veterinary expenses		1.89
6.	Hired trucking		2.17
7.	Marketing commission		1.47
8.	Fuel		6.50
9.	Repairs and maintenance		2.36
10.	Accounting		1.32
11.	Brand inspection		.32
12.	Salt and minerals		1.09
13.	Fencing		1.36
14.	Bull	($1500 for 4 yrs. @ 13% x .05)	25.21
15.	Horses	($1000 for 15 yrs. @ 13% x .01)	1.55
16.	Other		12.26
17.	TOTAL VARIABLE COSTS		234.33
	B. FIXED COSTS		
18.	Equipment and machinery depreciation		30.03
19.	Taxes		4.50
20.	Dues		.49
21	Interest on brood stock ($575[a] @ 13%)		74.75
22.	Interest on equipment and buildings		3.37
23.	TOTAL FIXED COSTS		113.14
24.	RETURN TO LAND AND MANAGEMENT		-73.37

[a]/Personal communication with Mr. Paul Bottari, Secretary of Nevada Cattlemen's Association, October, 1980.

TABLE 3

REGION I YEAR-ROUND CATTLE
LIVESTOCK, CROP PRODUCTION, AND RESOURCE STATISTICS

I. CROP AND RANGE RESOURCES

DESCRIPTION	UNITS	AMOUNT	TONS/ACRE	VARIABLE COST PER UNIT
Summer federal range	AUMS	3,762		$ 2.36
Winter BLM range	AUMS	4,719		2.36
Private rangeland	AUMS	3,969		0.00
Alfalfa hayland	ACRES	123	4.5	109.00[a]
Grass hayland	ACRES	355	1.4	25.00[a]

II. LIVESTOCK PRODUCTION

DESCRIPTION	AMOUNT	UNITS
Number of cows	1,015	Head
Calf crop	80	Percent
Calf death loss	4	Percent
Cow death loss	4	Percent
Steer calf selling weight	429	Pounds
Heifer calf selling weight	395	Pounds
Calves sold as weaners	52	Percent
Replacement rate	16	Percent
Bulls per 100 cows	6	Percent
Horses per 100 cows	1	Percent

[a]/Source: Myer et al. (1980)

BLM spring, fall, and winter range was typically grazed from about September 1 through June 30. From July 1 until August 31, operators utilized BLM and/or USFS summer range.

Since most operators did not have BLM permits for the total herd during the winter, winter feeding for part of the herd, from about the middle of December until the end of March, was also common for the ranchers interviewed. An estimated average of .38 tons of alfalfa hay and .49 tons of grass hay was fed per cow (Table 27).

Seven of the eleven operators interviewed had alfalfa hayland in addition to grass hayland. Of these seven, five operators sold an average of 35 percent of alfalfa hay produced. To correspond to this management practice, the LP model representing these ranchers was allowed to sell a maximum of 35 percent of the alfalfa hay produced.

Region II Summer Cattle

Of the eleven operators interviewed in Region II that had federal grazing permits for the summer only, nine operated cow-yearling enterprises. Yearlings were generally sold in September or October at an average weight of 682 pounds for steers and 612 pounds for heifers (Table 28). The average number of cows raised was 390 head. Average calf crop of 91 percent was the highest level reported for any of the ranch classifications in Nevada. Calf death loss of 4 percent was comparatively low.

Of the $457.62 in returns for Region II summer operators, $387.87 was derived from livestock sales. Eight of the eleven operators interviewed had alfalfa hayland. On the average, these operators sold 30 percent of the hay grown, or nearly one ton of alfalfa hay per cow raised for an additional return of $69.75 per cow (Table 29).

As previously mentioned, yearling operators generally indicated that yearlings were not turned out on federal ranges. Instead, yearling forage requirements were provided from private forage sources. These results correspond to the findings reported in Table 11 where Region II operators (cow-yearling enterprises) had significantly more acres of alfalfa hayland and private rangeland than Region I and III operators (cow-calf enterprises).

Estimated return to land and management, $72.83, was much higher than for other ranch types. However, $69.75 of total sales per cow came from hay sales. When receipts from hay sales are subtracted, return to land and management considering only livestock sales, $3.08, is only slightly higher than other Nevada cattle operations.

Region II summer cattle operators generally grazed cow-calf pairs and bulls on BLM range from the middle of April through the middle of October. The 13 operators with USFS permits did not generally turn-out on USFS allotments until around July 1. The average yearly dependency upon federal range was 40 percent.

TABLE 4

REGION I YEAR-ROUND CATTLE ENTERPRISE BUDGET

			$/Cow
I.	SALES		
1.	Steer calves	(429 lbs x $.78 x .39)	130.50
2.	Heifer calves	(395 lbs x $.66 x .24)	62.57
3.	Cull cows	(884 lbs x $.45 x .15 x .96)	57.28
4.	Cull bulls	(1400 lbs x $.45 x .25 x .05 x .96)	7.56
5.	Alfalfa hay sales	(.19 ton x $75.00)	14.25
6.	TOTAL SALES		272.16
II.	PRODUCTION COSTS		
	A. VARIABLE COSTS		
1.	Raised alfalfa hay sold	(.19 ton x $24.22)	4.60
2.	Raised alfalfa hay fed	(.38 ton x $24.22)	9.20
3.	Raised grass hay fed	(.49 ton x $18.00)	8.82
4.	Government grazing fees	(8.4 AUM's x $2.36)	19.82
5.	Livestock labor	(19 hours x $5.00)	95.00
6.	Veterinary expenses		1.56
7.	Hired trucking		2.43
8.	Marketing commission		1.56
9.	Fuel		6.85
10.	Repairs and maintenance		4.48
11.	Accounting		1.32
12.	Brand inspection		.32
13.	Salt and minerals		1.09
14.	Fencing		1.36
15.	Bull	($1500 for 4 yrs. @ 13% x .05)	25.21
16.	Horse	($1000 for 15 yrs. @ 13% x .01)	1.55
17.	Other		4.08
18.	TOTAL VARIABLE COSTS		189.25
	B. FIXED COSTS		
19.	Depreciation on equipment and machinery		14.71
20.	Taxes		3.40
21.	Dues		.40
22.	Interest on brood stock ($575[a] @ 13%)		74.75
23.	Interest on equipment and buildings		1.97
24.	TOTAL FIXED COSTS		95.23
25.	RETURN TO LAND AND MANAGEMENT		-$12.32

[a]/Personal communication with Mr. Paul Bottari, Secretary of Nevada Cattlemen's Association, October, 1980.

TABLE 5

REGION II SUMMER CATTLE
LIVESTOCK, CROP PRODUCTION, AND RESOURCE STATISTICS

I. CROP AND RANGE RESOURCES

DESCRIPTION	UNITS	AMOUNT	TONS/ACRE	VARIABLE COST PER UNIT
Summer federal range	AUMS	1,865		$2.36
Private rangeland	AUMS	3,017		0.00
Alfalfa hayland	ACRES	302	4.0	109.00[a]
Grass hayland	ACRES	277	1.8	25.00[a]

II. LIVESTOCK PRODUCTION

DESCRIPTION	AMOUNT	UNITS
Number of cows	390	Head
Calf crop	91	Percent
Calf death loss	4	Percent
Cow death loss	3	Percent
Steer yearling selling weight	682	Pounds
Heifer yearling selling weight	612	Pounds
Calves sold as yearlings	77	Percent
Replacement rate	14	Percent
Bulls per 100 cows	4	Percent
Horses per 100 cows	1	Percent

[a]/Source: Myer et al. (1980)

TABLE 6

REGION II SUMMER CATTLE ENTERPRISE BUDGET

			$/Cow
I.	SALES		
1.	Steer yearlings	(682 lbs x $.69 x .44)	207.06
2.	Heifer yearlings	(612 lbs x $.61 x .305)	113.91
3.	Cull cows	(989 lbs x $.45 x .14 x .975)	60.75
4.	Cull bulls	(1400 lbs x $.45 x .25 x .04 x .975)	6.15
5.	Alfalfa hay sales	(.93 ton x $75.00)	69.75
6.	TOTAL SALES		457.62
II.	PRODUCTION COSTS		
	A. VARIABLE COSTS		
1.	Alfalfa hay sold	(.93 ton x $27.25)	25.34
2.	Raised alfalfa hay fed	(2.16 ton x $27.25)	58.86
3.	Raised grass hay fed	(1.26 ton x $14.06)	17.72
4.	Government grazing fees	(4.8 AUM's x $2.36)	11.33
5.	Livestock labor	(19 hours x $5.00)	95.00
6.	Veterinary expenses		2.64
7.	Hired trucking		.22
8.	Marketing commission		.72
9.	Fuel		4.00
10.	Repairs and maintenance		3.00
11.	Accounting		2.38
12.	Brand inspection		.41
13.	Salt and minerals		2.24
14.	Fencing		3.78
15.	Bull	($1500 for 4 yrs. @ 13% x .04)	20.17
16.	Horses	($1000 for 15 yrs. @ 13% x .01)	1.55
17.	Other		11.78
18.	TOTAL VARIABLE COSTS		261.14
	B. FIXED COSTS		
19.	Depreciation on equipment and machinery		37.03
20.	Taxes		6.06
21.	Dues		.81
22.	Interest on brood stock ($575[a] @ 13%)		74.75
23.	Interest on equipment and buildings		5.00
24.	TOTAL FIXED COSTS		123.65
25.	RETURN TO LAND AND MANAGEMENT		72.83

[a]/Personal communication with Mr. Paul Bottari, Secretary of Nevada Cattlemen's Association, October, 1980.

Operators generally fed hay from about December 1 through April 15, when federal range became available. Since yearlings must also be fed winter supplements, a considerable amount of winter forage was required; slightly over 3 tons on a per cow basis.

Region II Year-Round Cattle

Year-round operators in Region II had an average herd size of 680 head. Seventy-two percent of the calves raised were sold as weaner calves at an average selling weight of 407 pounds for steers and 385 for heifers (Table 30).

The 38 operators in this classification depended upon BLM range for 59 percent of annual forage requirements. Ten operators also had USFS allotments meeting an additional 16 percent of yearly forage requirements. The overall corresponding dependency upon federal range was 63 percent.

Operators generally grazed BLM winter allotments between October 1 and May 30. The season of use of federal summer permits was typically from June 1 through September 30.

Ranchers fed an estimated .58 tons of hay resources per cow (Table 31) starting about December 1 and continuing through March 31. The total cow herd was not fed hay, at least not for the entire winter since an estimated 63 percent of the winter forage requirements was met by BLM rangeland.

Operators generally did not purchase or sell any hay. Hay resources for winter supplementing were home-grown. Alfalfa hay yields, 2.8 tons per acre, were relatively low as compared to the 4 tons per acre reported by Region II summer cattle operators.

Region I & II Year-Round Sheep

Sheep operators within Regions I and II were found to run bands of sheep on range year-round. The average dependency upon federal range was 53 percent, with 42 percent of the operators having USFS permits for summer grazing.

Sheep operators lambed on range in the spring starting around April 1 and finished by June 15. Operators generally did not feed any supplemental feeds. Average estimated herd size was 4,932 ewes (Table 32). Lambing percentage at docking was 100 percent with a death loss of 12 percent for lambs. Operators indicated that a significant amount of death loss occurred due to predators.

TABLE 7

REGION II YEAR-ROUND CATTLE
LIVESTOCK, CROP PRODUCTION, AND RESOURCE CHARACTERISTICS

I. CROP AND RANGE RESOURCES

DESCRIPTION	UNITS	AMOUNT	TONS/ACRE	VARIABLE COST PER UNIT
Summer federal range	AUMS	1,951		$2.36
Winter BLM range	AUMS	3,914		2.36
Private rangeland	AUMS	2,784		0.00
Alfalfa hayland	ACRES	43	2.8	109.00[a]
Grass hayland	ACRES	139	1.9	25.00[a]

II. LIVESTOCK PRODUCTION

DESCRIPTION	AMOUNT	UNITS
Number of cows	680	Head
Calf crop	88	Percent
Calf death loss	6	Percent
Cow death loss	3	Percent
Steer calf selling weight	407	Pounds
Heifer calf selling weight	385	Pounds
Calves sold as weaners	72	Percent
Replacement rate	13	Percent
Bulls per 100 cows	5	Percent
Horses per 100 cows	1	Percent

[a]/Source: Myer et al. (1980)

TABLE 8

REGION II YEAR-ROUND CATTLE ENTERPRISE BUDGET

			$/Cow
I.	SALES		
1.	Steer calves	(407 lbs x $.78 x .41)	130.16
2.	Heifer calves	(385 lbs x $.66 x .29)	73.69
3.	Cull cows	(942 lbs x $.45 x .12 x .97)	49.34
4.	Cull bulls	(1400 lbs x $.45 x .25 x .05 x .97)	7.64
6.	TOTAL SALES		260.83
II.	PRODUCTION COSTS		
	A. VARIABLE COSTS		
1.	Raised alfalfa hay fed	(.17 ton x $40.04)	6.70
2.	Raised grass hay fed	(.41 ton x $12.50)	5.13
3.	Government grazing fees	(8.5 AUM's x $2.36)	20.06
4.	Livestock labor	(19 hours x $5.00)	95.00
5.	Veterinary expenses		1.84
6.	Hired trucking		1.71
7.	Marketing commission		.62
8.	Fuel		9.43
9.	Repairs and maintenance		5.94
10.	Accounting		1.43
11.	Brand inspection		.30
12.	Salt and minerals		1.97
13.	Fencing		1.73
14.	Bull	($1500 for 4 yrs. @ 13% x .05)	25.21
15.	Horse	($1000 for 15 yrs. @ 13% x .01)	1.55
16.	Other		5.85
17.	TOTAL VARIABLE COSTS		184.47
	B. FIXED COSTS		
18.	Equipment and machinery depreciation		24.71
19.	Taxes		5.01
20.	Dues		.35
21.	Interest on brood stock	($575[a] @ 13%)	74.75
22.	Interest on equipment and buildings		3.24
23.	TOTAL FIXED COSTS		108.06
24.	RETURN TO LAND AND MANAGEMENT		-$31.70

[a]/Personal communication with Mr. Paul Bottari, Secretary of Nevada Cattlemen's Association, October, 1980.

TABLE 9

REGION I & II YEAR-ROUND SHEEP
LIVESTOCK, CROP PRODUCTION, AND RESOURCE STATISTICS

I. CROP AND RANGE RESOURCES

DESCRIPTION	UNITS	AMOUNT	VARIABLE COST PER UNIT
Summer federal range	AUMS	3,979	$2.36
Winter BLM range	AUMS	3,979	2.36
Private rangeland	AUMS	7,058	0.00

II. LIVESTOCK PRODUCTION

DESCRIPTION	AMOUNT	UNITS
Number of ewes	4,932	Head
Lamb crop (at docking)	100	Percent
Lamb death loss	12	Percent
Ewe death loss	6	Percent
Lamb selling weight	92	Pounds
Replacement rate	23	Percent
Rams per 100 ewes	2	Percent
Horses per 1000 ewes	1	Head

Return to land and management for sheep operators home based within Nevada was calculated at $12.30 per ewe (Table 33). This was higher than the corresponding return to land and management for Nevada cattle operators.

Region III Year-Round Cattle

Region III year-round cattle operators reported lower calving percentages, 75 percent, than did similar year-round operators in Regions I and II (Table 34). Calving for operations of this type generally occurs on the range year-round. Operators depend heavily upon range forage for animal feed requirements.

The average dependency upon federal rangeland was 70 percent, with only two operators having USFS allotments. Operators were generally more dependent upon federal range in the winter months (November through May), 89 percent, than during the summer (June through October), 60 percent.

Region III operators had considerably fewer acres of hayland than did Region I and II operators. Of the nine operators interviewed, 77 percent had either alfalfa or grass haylands. Only 22 percent of the interviewed ranchers sold hay. Two operators had their hay put-up on a custom basis. Operators generally had a substantial investment in machinery in relation to the acres of hayland farmed (Appendix F).

Region III year-round cattle operators had the lowest estimated return to land and management of the three regions in Nevada. Return to land and management for this ranch type was estimated at minus $91.45 (Table 35). The negative return is due in part to a large capital investment in machinery and equipment in relationship to average herd sizes. In addition, many of the ranchers interviewed depend heavily upon non-farm sources of income (Table 23) and as such are not full time ranchers.

Region IV Summer Cattle

Region IV summer operators had an average cow herd size of only 95 head. Calves were generally raised to yearlings and were finished on pastures and in drylot to an average weight of 884 pounds for steers and 828 pounds for heifers (Table 36). These operators sold the heaviest weight yearlings of any ranch classification. Corresponding to heavy selling weights, Region IV summer operators fed not only roughages, hay, to yearlings, but also concentrates, feed grains.

Region IV summer operators also maintained farming operations. To correspond to the large amount of farming, the model representing Region IV summer cattle operators was allowed to sell a maximum of 10 percent of alfalfa hay grown, 34 tons, and 50 percent of barley grain grown, 1,410 bushels. These percentages correspond to the average amount of alfalfa and barley grain reported as sold by Region IV summer cattle operators.

TABLE 10

REGION I & II YEAR-ROUND SHEEP ENTERPRISE BUDGET

			$/ewe
I.	SALES		
1.	Wool	(11 lbs. x $1.12)	12.32
2.	Lambs	(92 lbs. x $.64 x .68)	40.04
3.	Cull Ewes	(.23 head x $30.00 x .94)	6.49
4.	TOTAL SALES		58.85
II.	COSTS		
	A. VARIABLE COSTS		
1.	Labor	(4 hours x $5.00)	20.00
2.	Grazing fees	(1.6 AUM's x $2.36)	3.78
3.	Veterinary expenses		.14
4.	Fuel		3.30
5.	Repair and maintenance		1.07
6.	Salt and minerals		.30
7.	Fencing		.85
8.	Shearing		1.04
9.	Accounting		.37
10.	Horses	($1000 for 15 years @ 13% x .001)	.12
11.	Rams	($325 for 3 years @ 13% x .02)	2.75
12.	Other		.75
13.	TOTAL VARIABLE COSTS		34.47
	B. FIXED COSTS		
14.	Equipment and machinery depreciation		3.21
15.	Taxes		.71
16.	Dues		.18
17.	Interest on brood stock ($65 [a] @ 13%)		8.45
18.	Interest on equipment and buildings		.41
19	TOTAL FIXED COSTS		12.96
20.	RETURN TO LAND AND MANAGEMENT		12.30

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[a]/Personal communication with Mr. A. Z. Joy, Agricultural Extension Specialist, University of Nevada, October, 1980.

TABLE 11

REGION III YEAR-ROUND CATTLE
LIVESTOCK, CROP PRODUCTION, AND RESOURCE STATISTICS

I. CROP AND RANGE RESOURCES

DESCRIPTION	UNITS	AMOUNT	TON/ACRE	VARIABLE COST PER UNIT
Summer federal range	AUMS	1,299		$2.36
Winter BLM range	AUMS	2,636		2.36
Private rangeland	AUMS	866		0.00
Alfalfa hayland	ACRES	36	4.3	138.00[a]
Grass hayland	ACRES	23	2.1	52.00[a]

II. LIVESTOCK PRODUCTION

DESCRIPTION	AMOUNT	UNITS
Number of cows	361	Head
Calf crop	75	Percent
Calf death loss	3	Percent
Cow death loss	3	Percent
Steer calf selling weight	429	Pounds
Heifer calf selling weight	391	Pounds
Calves sold as weaners	87	Percent
Replacement rate	13	Percent
Bulls per 100 cows	5	Percent
Horses per 100 cows	4	Percent

[a]/Source: Davidson (1979).

TABLE 12

REGION III YEAR-ROUND CATTLE ENTERPRISE BUDGET

			$/Cow
I.	SALES		
1.	Steer calves	(429 lbs x $.78 x .36)	120.46
2.	Heifer calves	(391 lbs x $.66 x .23)	59.35
3.	Cull cows	(950 lbs x $.45 x .13 x .97)	53.91
4.	Cull bulls	(1400 lbs x $.45 x .25 x .05 x .97)	7.64
5.	TOTAL SALES		241.36
II.	PRODUCTION COSTS		
	A. VARIABLE COSTS		
1.	Raised alfalfa hay fed	(.32 ton x $32.26)	10.33
2.	Raised grass hay fed	(.14 ton x $24.63)	3.44
3.	Government grazing fees	(10.9 AUM's x $2.36)	25.72
4.	Livestock labor	(19 hours x $5.00)	95.00
5.	Veterinary expenses		1.81
6.	Hired trucking		2.33
7.	Marketing commission		1.28
8.	Fuel		24.41
9.	Repairs and maintenance		10.29
10.	Accounting		2.06
11.	Brand inspection		.33
12.	Salt and minerals		1.25
13.	Fencing		2.56
14.	Bull	($1500 for 4 yrs. @ 13% x .05)	25.21
15.	Horse	($1000 for 15 yrs. @ 13% x .01)	1.55
16.	Other		7.68
17.	TOTAL VARIABLE COSTS		215.25
	B. FIXED COSTS		
18.	Equipment and machinery depreciation		30.61
19.	Taxes		7.66
20.	Dues		.90
21.	Interest on brood stock (575[a] 13%)		74.75
22.	Interest on equipment and buildings		3.64
23.	TOTAL FIXED COSTS		117.56
24.	RETURN TO LAND AND MANAGEMENT		-$91.45

[a]/Personal communication with Mr. Paul Bottari, Secretary of Nevada Cattlemen's Association, October, 1980.

TABLE 13

REGION IV SUMMER CATTLE
LIVESTOCK, CROP PRODUCTION, AND RESOURCE STATISTICS

I. CROP AND RANGE RESOURCES

DESCRIPTION	UNITS	AMOUNT	TONS/ACRE	VARIABLE COST PER UNIT
Summer federal range	AUMS	433		$2.36
Private rangeland	AUMS	721		0.00
Leased private pasture	AUMS	39		8.20
Alfalfa hayland	ACRES	75	4.6	138.00[a]
Barley cropland	ACRES	44	1.9	115.50[a]

II. LIVESTOCK PRODUCTION

DESCRIPTION	AMOUNT	UNITS
Number of cows	95	Head
Calf crop	87	Percent
Calf death loss	5	Percent
Cow death loss	4	Percent
Steer yearling selling weight	884	Pounds
Heifer yearling selling weight	828	Pounds
Calves sold as yearlings	77	Percent
Replacement rate	15	Percent
Bulls per 100 cows	4	Percent
Horses per 100 cows	4	Percent

[a]/Source: Davidson (1979).

Return to land and management was calculated at minus $88.61 (Table 37). Negative returns to land and management were largely due to fixed costs being spread over a small number of cows. Estimated annual depreciation, $14,777, (Appendix F) was similar to other ranch classifications. However, since estimated herd size was only 95 head, depreciation and interest on equipment and buildings on a per cow basis, is considerably more.

Average dependency on federal range was 35 percent with 17 of the 132 operators depending upon USFS for 18 percent of yearly forage requirement. Operators also generally leased private range during the spring and fall.

Region IV Year-Round Cattle

Of the eight year-round cattle operators who were interviewed in Region IV, 57 percent sold weaner calves and 43 percent sold yearlings. Thus, no clear distinction could be made as to the class of livestock that the typical operator sold. Consequently, two separate models were made for Region IV year-round cattle operators; one selling weaner calves and the other yearlings. Production parameters were the same for each model. Private resources (i.e., hayland, private rangeland) varied to correspond with increased forage requirements of yearlings in the yearling model (Tables 38 and 39).

The average dependency upon federal range was 49 percent; less than Region I and II year-round cattle operators. Operators generally utilized BLM winter range from November 1 through April 31. Federal summer permits were generally grazed between May and October. Leased private pasture was utilized in addition to federal rangelands.

Winter feeding generally was necessary from the middle of December until April 15 for part of the cow herd. In addition to hay produced for winter feed, operators generally also sold hay. Eighteen percent of alfalfa hay produced was sold. Correspondingly, the models reflected alfalfa hay sales of .45 ton per cow with the same level of hay sales allowed in both the yearling and weaner calf models.

The difference in return to land and management estimated for the yearling model (Table 40), $14.98, versus the weaner calf model (Table 41), minus $61.76, resulted from much higher total livestock sales for yearling operators. The yearling model accounted for an additional variable cost per cow of $35.93 which reflects additional winter feeding of yearlings.

Region IV Year-Round Sheep

Year-round sheep operators in Region IV raised an average of 3,122 ewes (Table 42). Average lambing percentage at docking was 106 percent. Death loss was 11 percent for lambs and eight percent for ewes.

Operators generally graze USFS range in the summer (July 1 through September 30) and BLM range during the winter (October 1 through June 30). Average annual dependency was 21 percent for USFS and 41 percent for BLM. In addition to federal range, operators graze an estimated 714 AUMS of state rangeland and 414 AUMS of leased private range.

TABLE 14

REGION IV SUMMER CATTLE ENTERPRISE BUDGET

			$/Cow
I.	SALES		
1.	Steer yearlings	(884 lbs x $.69 x .42)	256.18
2.	Heifer yearlings	(828 lbs x $.61 x .27)	136.37
3.	Cull cows	(1011 lbs x $.45 x .14 x .96)	61.15
4.	Cull bulls	(1400 lbs x $.45 x .25 x .04 x .96)	6.04
5.	Alfalfa hay sales	(.36 ton x $56.00)	20.16
6.	Barley Sales	(18.3 bu. x $2.26)	41.36
7.	TOTAL SALES		521.26
II.	PRODUCTION COSTS		
	A. VARIABLE COSTS		
1.	Alfalfa sold	(.36 ton x $30.29)	10.89
2.	Raised alfalfa hay	(3.24 ton x $30.29)	98.04
3.	Barley sold	(18.3 bu. x $1.47)	26.90
4.	Barley fed	(18.1 bu. x $1.47)	26.61
5	Leased private pasture	(.41 AUM's x $8.20)	3.36
6.	Government grazing fees	(4.6 AUM's x $2.36)	10.86
7.	Livestock labor	(19 hours x $5.00)	95.00
8.	Veterinary expenses		3.39
9.	Hired trucking		1.70
10.	Marketing commission		3.01
11.	Fuel		16.42
12.	Repairs and maintenance		13.27
13.	Accounting		1.04
14.	Brand inspection		.34
15.	Salt and minerals		3.21
16.	Fencing		2.21
17.	Bull	($1500 for 4 yrs. @ 13% x .04)	20.17
18.	Horses	($1000 for 15 yrs. @ 13% x .01)	1.55
19.	Other		10.61
20.	TOTAL VARIABLE COSTS		348.58
	B. FIXED COSTS		
21.	Equipment and machinery depreciation		155.56
22.	Taxes		11.42
23.	Dues		.59
24.	Interest on brood stock ($575[a] @ 13%)		74.75
25.	Interest on equipment and buildings		19.27
26.	TOTAL FIXED COSTS		261.59
27.	RETURN TO LAND AND MANAGEMENT		-88.61

[a]/Personal communication with Mr. Paul Bottari, Secretary of Nevada Cattlemen's Association, October, 1980.

TABLE 15

REGION IV YEAR-ROUND CATTLE (YEARLING)
LIVESTOCK, CROP PRODUCTION, AND RESOURCE STATISTICS

I. CROP AND RANGE RESOURCES

DESCRIPTION	UNITS	AMOUNT	TONS/ACRE	VARIABLE COST PER UNIT
Summer federal range	AUMS	1,084		$2.36
Winter BLM range	AUMS	1,066		2.36
Private rangeland	AUMS	1,039		0.00
Private leased pasture	AUMS	121		8.20
Alfalfa hayland	ACRES	167	3.8	117.00[a]

II. LIVESTOCK PRODUCTION

DESCRIPTION	AMOUNT	UNITS
Number of cows	255	Head
Calf crop	95	Percent
Calf death loss	5	Percent
Cow death loss	2	Percent
Steer yearling selling weight	759	Pounds
Heifer yearling selling weight	600	Pounds
Calves sold as yearlings	43	Percent
Replacement rate	14	Percent
Bulls per 100 cows	4	Percent
Horses per 100 cows	3	Percent

[a]/Source: Davidson (1979)

TABLE 16

REGION IV YEAR-ROUND CATTLE (CALF)
LIVESTOCK, CROP PRODUCTION, AND RESOURCE STATISTICS

I. CROP AND RANGE RESOURCES

DESCRIPTION	UNITS	AMOUNT	TONS/ACRE	VARIABLE COST PER UNIT
Summer federal range	AUMS	1,084		$2.36
Winter BLM range	AUMS	1,066		2.36
Private rangeland	AUMS	893		0.00
Private leased pasture	AUMS	100		8.20
Alfalfa hayland	ACRES	87	3.8	117.00[a]

II. LIVESTOCK PRODUCTION

DESCRIPTION	AMOUNT	UNITS
Number of cows	255	Head
Calf crop	95	Percent
Calf death loss	5	Percent
Cow death loss	2	Percent
Steer calf selling weight	418	Pounds
Heifer calf selling weight	397	Pounds
Calves sold as weaners	57	Percent
Replacement rate	14	Percent
Bulls 100 cows	4	Percent
Horses per 100 cows	3	Percent

[a]/Source: Davidson (1979)

TABLE 17

REGION IV YEAR-ROUND CATTLE (YEARLING) ENTERPRISE BUDGET

			$/Cow
I.	SALES		
1.	Steer yearlings	(759 lbs x $.69 x .44)	230.43
2.	Heifer yearlings	(600 lbs x $.61 x .31)	113.46
3.	Cull cows	(1027lbs x $.45 x .14 x .98)	63.41
4.	Cull bulls	(1400 lbs x $.45 x .25 x .04 x .98)	6.17
5.	Alfalfa Hay Sales	(.45 ton x $56.00)	25.20
6.	TOTAL SALES		438.67
II.	PRODUCTION COSTS		
	A. VARIABLE COSTS		
1.	Alfalfa hay sold	(.45 ton x $30.97)	13.94
2.	Raised alfalfa hay fed	(2.03 ton x 30.97)	62.25
3.	Government grazing fees	(8.5 AUM's x $2.36)	19.82
4.	Leased private pasture	(.47 AUM's x $8.20)	3.85
5.	Livestock labor	(19 hours x $5.00)	95.00
6.	Veterinary expenses		2.78
7.	Hired trucking		2.64
8.	Marketing commission		2.27
9.	Fuel		20.68
10.	Repairs and maintenance		19.42
11.	Accounting		1.39
12.	Brand inspection		.39
13.	Salt and minerals		.67
14.	Fencing		3.42
15.	Bulls	($1500 for 4 yrs. @ 13% x .04)	20.17
16.	Horses	($1000 for 15 yrs. @ 13% x .01)	1.55
17.	Other		13.30
18.	TOTAL VARIABLE COSTS		283.54
	B. FIXED COSTS		
19.	Equipment and machinery depreciation		46.48
20	Taxes		12.26
21.	Dues		.84
22.	Interest on brood stock	($575[a] @ 13%)	74.75
23.	Interest on equipment and buildings		5.82
24.	TOTAL FIXED COSTS		140.15
25.	RETURN TO LAND AND MANAGEMENT		14.98

[a]/Personal communication with Mr. Paul Bottari, Secretary of Nevada Cattlemen's Association, October, 1980.

TABLE 18

REGION IV YEAR-ROUND CATTLE (CALF) ENTERPRISE BUDGET

			$/Cow
I.	SALES		
1.	Steer calves	(418 lbs x $.78 x .45)	146.72
2.	Heifer calves	(397 lbs x $.66 x .32)	83.85
3.	Cull cows	(1027lbs x $.45 x .14 x .98)	63.41
4.	Cull bulls	(1400 lbs x $.45 x .25 x .04 x .98)	6.17
5.	Alfalfa hay sales	(.45 ton x $56.00)	25.20
6.	TOTAL SALES		325.35
II.	PRODUCTION COSTS		
	A. VARIABLE COSTS		
1.	Alfalfa hay sold	(.45 ton x $30.97)	13.94
2.	Raised alfalfa hay fed	(.85 ton x $30.97)	26.32
3.	Government grazing fees	(8.5 AUM's x $2.36)	19.82
4.	Leased private pasture	(.39 AUM's x $8.20)	3.20
5.	Livestock labor	(19 hours x $5.00)	95.00
6.	Veterinary expenses		2.78
7.	Hired trucking		2.64
8.	Marketing commission		2.27
9.	Fuel		20.68
10.	Repairs and maintenance		19.42
11.	Accounting		1.39
12.	Brand inspection		.39
13.	Salt and minerals		.67
14.	Fencing		3.42
15.	Bull	($1500 for 4 yrs. @ 13% x .04)	20.17
16.	Horse	($1000 for 15 yrs. @ 13% x .01)	1.55
17.	Other		13.30
18.	TOTAL VARIABLE COSTS		246.96
	B. FIXED COSTS		
19.	Equipment and machinery depreciation		46.48
20	Taxes		12.26
21.	Dues		.84
22.	Interest on brood stock ($575[a] @ 13%)		74.75
23.	Interest on equipment and buildings		5.82
24.	TOTAL FIXED COSTS		140.15
25.	RETURN TO LAND AND MANAGEMENT		- 61.76

[a]/Personal communication with Mr. Paul Bottari, Secretary of Nevada Cattlemen's Association, October, 1980.

TABLE 19

REGION IV YEAR-ROUND SHEEP
LIVESTOCK, CROP PRODUCTION, AND RESOURCE STATISTICS

I. CROP AND RANGE RESOURCES

DESCRIPTION	UNITS	AMOUNT	VARIABLE COST PER UNIT
Summer Forest Service	AUMS	1,926	$2.52
Winter BLM range	AUMS	3,770	2.36
State rangeland	AUMS	714	2.36
Leased private pasture	AUMS	414	8.20
Private rangeland	AUMS	2,345	0.00

II. LIVESTOCK PRODUCTION

DESCRIPTION	AMOUNT	UNITS
Number of ewes	3,122	Head
Lamb crop (at docking)	106	Percent
Lamb death loss	11	Percent
Ewe death loss	8	Percent
Lamb selling weight	96	Pounds
Replacement rate	17	Percent
Rams per 100 ewes	3	Percent
Horses per 1000 ewes	4	Head

Shed lambing was typical for Region IV year-round sheep operations. However, this was variable with some operators interviewed lambing while on range.

Estimated return to land and management (Table 43) was $7.41 on a per ewe basis. This is comparable to the same estimate for other sheep operators within the study area.

Region IV Sheep Enterprise with Federal Winter Grazing

Efficiency of production was high for Region IV winter sheep operators with average lambing percentages of 116 percent and lamb death losses of 9 percent (Table 44). The average number of ewes raised was 2,351 head.

Winter sheep operators in Region IV had total estimated feed costs of $20.45 per ewe (Table 45), as compared to $6.03 for Region IV year-round sheep operators (Table 41). This follows, since winter sheep operators only had BLM grazing privileges during the winter months (November 16 through April 30) and depended upon more expensive private leased pasture and operator owned private rangeland during the summer months. Operators also fed supplemental alfalfa-grain pellets during the spring lambing period.

Average yearly dependency upon federal range was 43 percent, which is 95 percent during the 5-1/2 months when sheep were turned out on BLM range. Only one of the six operators interviewed leased state rangeland. However, winter sheep operators leased a considerable amount of private range.

Region V Summer Cattle

Summer cattle operators in Region V typically sold yearlings. Average selling weights of 724 pounds for steers and 690 pounds for heifers (Table 46) were similar to those reported by other Utah yearling operators.

In addition to estimated livestock sales of $387.64 per cow, Region V summer cattle operators had estimated alfalfa hay sales of $64.96 per cow. Operators sold 28 percent of the alfalfa raised. Operators interviewed indicated that 31 percent of their disposable income came from crops.

Region V summer cattle operators reported the best average alfalfa hay yield (5.4 tons per acre) of operators in the study area. An estimated 3.8 tons of hay per cow was fed. This included hay fed to all livestock classes. Winter feeding was generally required from December 1 through April 30.

TABLE 20

REGION IV YEAR-ROUND SHEEP ENTERPRISE BUDGET

			$/ewe
I.	SALES		
1.	Wool	(11 lbs. x $1.12)	12.32
2.	Lambs	(96 lbs. x $.64 x .81)	49.77
3.	Cull ewes	(.17 head x $30.00 x .93)	4.74
4.	TOTAL SALES		66.23
II.	COSTS		
	A. VARIABLE COSTS		
1.	Grazing fees		
	a. Forest Service	(.62 AUMS x $2.52)	1.56
	b. BLM & State	(1.44 AUMS x $2.36)	3.40
2.	Rented pasture	(.13 AUMS x $8.20)	1.07
3.	Labor	(4 hours x $5.00)	20.00
4.	Veterinary expenses		.92
5.	Hired trucking		3.08
6.	Fuel		4.16
7.	Repair and maintenance		3.44
8.	Salt and minerals		.17
9.	Fencing		.55
10.	Shearing		2.02
11.	Accounting		.30
12.	Horses	($1000 for 15 years @ 13% x .004)	.15
13.	Rams	($325 for 3 years @ 13% x .03)	4.13
14.	Other		1.48
15.	TOTAL VARIABLE COSTS		46.43
	B. FIXED COSTS		
16.	Equipment and machinery depreciation		2.18
17.	Taxes		1.59
18.	Dues		.24
19.	Interest on brood stock	($65[a] @ 13%)	8.45
20.	Interest on equipment and buildings		.53
21.	TOTAL FIXED COSTS		12.99
22.	RETURN TO LAND AND MANAGEMENT		7.41

[a]/Personal communication with Mr. A. Z. Joy, Agricultural Extension Specialist, University of Nevada, October, 1980.

TABLE 21

REGION IV WINTER SHEEP
LIVESTOCK, CROP PRODUCTION, AND RESOURCE STATISTICS

I. CROP AND RANGE RESOURCES

DESCRIPTION	UNITS	AMOUNT	VARIABLE COST PER UNIT
Winter BLM range	AUMS	2,990	$2.36
Private rangeland	AUMS	1,673	0.00
Leased private pasture	AUMS	1,501	8.20
Purchased pellets	Ton	316	89.00[a]

II. LIVESTOCK PRODUCTION

DESCRIPTION	AMOUNT	UNITS
Number of ewes	2,351	Head
Lamb crop (at docking)	116	Percent
Lamb death loss	9	Percent
Ewe death loss	7	Percent
Lamb selling weight	91	Pounds
Replacement rate	18	Percent
Rams per 100 ewes	2	Percent
Horses per 1000 ewes	3	Head

[a]/Personal communication with employees of Dodge Pellet Mill, Fallon, Nevada, October, 1980.

TABLE 22

REGION IV WINTER SHEEP ENTERPRISE BUDGET

			$/ewe
I.	SALES		
1.	Wool	(10 lbs. x $1.12)	11.20
2.	Lambs	(91 lbs. x $.64 x .89)	51.83
3.	Cull ewes	(.18 head x $30.00 x .93)	5.02
4.	TOTAL SALES		68.05
II.	COSTS OF PRODUCTION		
	A. VARIABLE COSTS		
1.	Purchased alfalfa-grain pellets	(.14 ton x $89.00)	12.46
2.	Government grazing fees	(1.3 AUMS x $2.36)	3.07
3.	Rented private pasture	(.6 AUMS x $8.20)	4.92
4.	Labor	(4 hours x $5.00)	20.00
5.	Veterinary expenses		.29
6	Hired trucking		3.31
7.	Marketing commission		.23
8.	Fuel		2.30
9.	Repair and maintenance		1.75
10.	Salt and minerals		.61
11.	Fencing		.64
12.	Shearing		1.32
13.	Accounting		.21
14.	Horses	($1000 for 15 years @ 13% x .003)	.45
15.	Rams	($325 for 3 years @ 13% x .02)	2.75
16.	Other		3.03
17.	TOTAL VARIABLE COSTS		57.34
	B. FIXED COSTS		
18.	Equipment and machinery depreciation		2.57
19.	Taxes		1.26
20.	Dues		.10
21.	Interest on brood stock	($65[a] @ 13%)	8.45
22.	Interest on equipment and buildings		.51
23.	TOTAL FIXED COSTS		12.89
20.	RETURN TO LAND AND MANAGEMENT		-2.18

[a]/Personal communication with Mr. A. Z. Joy, Agricultural Extension Specialist, University of Nevada, October, 1980.

TABLE 23

REGION V SUMMER CATTLE
LIVESTOCK, CROP PRODUCTION, AND RESOURCE STATISTICS

I. CROP AND RANGE RESOURCES

DESCRIPTION	UNITS	AMOUNT	TONS/ACRE	VARIABLE COST PER UNIT
Summer federal range	AUMS	756		$2.36
Private rangeland	AUMS	690		0.00
Private leased pasture	AUMS	52		8.20
Alfalfa hayland	ACRES	122	5.4	138.00[a]

II. LIVESTOCK PRODUCTION

DESCRIPTION	AMOUNT	UNITS
Number of cows	132	Head
Calf crop	90	Percent
Calf death loss	6	Percent
Cow death loss	6	Percent
Steer yearling selling weight	724	Pounds
Heifer yearling selling weight	690	Pounds
Calves sold as yearling	70	Percent
Replacement rate	16	Percent
Bulls per 100 cows	4	Percent
Horses per 100 cows	2	Percent

[a]/Source: Davidson (1979).

Average dependency upon federal range for yearly forage requirements was 35 percent. Season of use of Federal range was generally from May 1 through October 31.

Only two of the nine operators interviewed leased state rangeland. Thus, state rangelend was not included in the Region V summer cattle model. Private rangeland was leased by 40 percent of the operators interviewed.

Estimated average cow herd size was 132 head. Since herd size was relatively small, fixed costs were high, $192.41, on a per cow basis, as compared to other ranch classifications with larger average herd sizes (Table 47).

Region V Winter Cattle

An average cow herd size of 214 head was estimated for Region V winter cattle operators. Seventy-six percent of calves raised were sold as weaner calves. Average selling weights of 445 pounds for steer calves and 415 pounds for heifer calves were reported (Table 48).

Total livestock sales of $295.97 (Table 49) supplied a major portion of income for winter cattle operators within Region V. Operators depended upon cattle sales for 78 percent of disposable income. Non-farm jobs made up the other 22 percent (Table 23).

Average annual dependency upon BLM range for yearly feed requirements was 37 percent. Only one of the 14 operators grazed USFS range. BLM range was generally grazed between November 1 and April 30. Not all cattle grazed BLM range for the total season of use, however, since 30 percent of winter forage requirements were met from private resources.

During the summer months, operators generally depended upon their own private range. Leased private range for cattle forage requirements was used to a lesser degree.

Region V Year-Round Cattle

Year-round cattle operators in Region V generally raised and sold yearlings. Average selling weights of 773 pounds for steer and 660 pounds for heifers were reported by ranchers interviewed (Table 50). Yearlings were generally intensively managed, receiving both high quality alfalfa hay and concentrated grain rations.

Region V year-round cattle operators had the highest estimated variable costs of production, $300.73, of any year-round cattle ranch classification (Table 51). This corresponds to the high level of nutrition typically maintained for yearling calves. Operators depended upon BLM range for 56 percent of yearly forage requirements with only one of the 30 operators depending upon USFS grazing. In addition to BLM rangelands, operators leased an estimated 408 AUMS of private pasture.

TABLE 24

REGION V SUMMER CATTLE ENTERPRISE BUDGET

			$/Cow
I.	SALES		
1.	Steer yearlings	(724 lbs x $.69 x .42)	209.82
2.	Heifer yearlings	(690 lbs x $.61 x .27)	109.43
3.	Cull cows	(923 lbs x $.45 x .16 x .94)	62.47
4.	Cull bulls	(1400 lbs x $.45 x .25 x .04 x .94)	5.92
5.	Alfalfa hay sales	(1.16 ton x $56.00)	64.96
6.	TOTAL SALES		452.60
II.	PRODUCTION COSTS		
	A. VARIABLE COSTS		
1.	Alfalfa hay sold	(1.16 ton x $25.56)	29.65
2.	Alfalfa hay fed	(3.80 ton x $25.56)	97.13
3.	Government grazing fees	(5.7 AUM's x $2.36)	13.45
4	Leased private pasture	(.39 AUM's x $8.20)	3.20
5.	Livestock labor	(19 hours x $5.00)	95.00
6.	Veterinary expenses		3.52
7.	Hired trucking		1.05
8.	Marketing commission		3.85
9.	Fuel		38.33
10.	Repairs and maintenance		22.17
11.	Accounting		.66
12.	Brand inspection		.70
13.	Salt and minerals		1.23
14.	Fencing		2.95
15.	Bull	($1500 for 4 yrs. @ 13% x .04)	20.17
16.	Horses	($1000 for 15 yrs. @ 13% x .01)	1.55
17.	Other		12.58
18.	TOTAL VARIABLE COSTS		347.19
	B. FIXED COSTS		
19.	Equipment and machinery depreciation		81.45
20.	Taxes		24.78
21.	Dues		1.38
22	Interest on brood stock ($575[a] @ 13%)		74.75
23.	Interest on equipment and buildings		10.05
24	TOTAL FIXED COSTS		192.41
25	RETURN TO LAND AND MANAGEMENT		-$87.00

[a]/Personal communication with Mr. Paul Bottari, Secretary of Nevada Cattlemen's Association, October, 1980.

TABLE 25

REGION V WINTER CATTLE
LIVESTOCK, CROP PRODUCTION, AND RESOURCE STATISTICS

I. CROP AND RANGE RESOURCES

DESCRIPTION	UNITS	AMOUNT	TONS/ACRE	VARIABLE COST PER UNIT
Winter BLM range	AUMS	1,043		$2.36
Private rangeland	AUMS	1,566		0.00
Private leased pasture	AUMS	90		8.20
Alfalfa hayland	ACRES	46	3.4	117.00[a]

II. LIVESTOCK PRODUCTION

DESCRIPTION	AMOUNT	UNITS
Number of cows	214	Head
Calf crop	87	Percent
Calf death loss	4	Percent
Cow death loss	2	Percent
Steer calf selling weight	445	Pounds
Heifer calf selling weight	415	Pounds
Calves sold as yearlings	76	Percent
Replacement rate	14	Percent
Bulls per 100 cows	4	Percent
Horses per 100 cows	2	Percent

[a]/Source: Davidson (1979).

TABLE 26

REGION V WINTER CATTLE ENTERPRISE BUDGET

			$/Cow
I.	SALES		
1.	Steer calves	(445 lbs x $.78 x .43)	149.25
2.	Heifer calves	(415 lbs x $.66 x .29)	79.43
3.	Cull cows	(990 lbs x $.45 x .14 x .98)	61.12
4.	Cull bulls	(1400 lbs x $.45 x .25 x .05 x .98)	6.17
6.	TOTAL SALES		295.97
II.	PRODUCTION COSTS		
	A. VARIABLE COSTS		
1.	Raised hay fed	(.72 ton x $34.52)	24.85
2.	Government grazing fees	(4.9 AUM's x $2.36)	11.56
3.	Leased private pasture	(.42 AUM's x $8.20)	3.44
4.	Livestock labor	(19 hours x $5.00)	95.00
5.	Veterinary expenses		1.33
6.	Hired trucking		4.05
7.	Marketing commission		1.48
8.	Fuel		27.25
9.	Repairs and maintenance		5.64
10.	Accounting		82
11.	Brand inspection		.22
12.	Salt and minerals		3.16
13.	Fencing		4.54
14.	Bull	($1500 for 4 yrs. @ 13% x .04)	20.17
15.	Horses	($1000 for 15 yrs. @ 13% x .01)	1.55
16.	Other		10.75
17.	TOTAL VARIABLE COSTS		215.81
	B. FIXED COSTS		
18.	Equipment and machinery depreciation		62.64
19.	Taxes		8.39
20.	Dues		.85
21	Interest on brood stock ($575[a] @ 13%)		74.75
22.	Interest on equipment and buildings		7.42
23.	TOTAL FIXED COSTS		154.05
24.	RETURN TO LAND AND MANAGEMENT		-73.89

[a]/Personal communication with Mr. Paul Bottari, Secretary of Nevada Cattlemen's Association, October, 1980.

TABLE 27

REGION V YEAR-ROUND CATTLE
LIVESTOCK, CROP PRODUCTION, AND RESOURCE STATISTICS

I. CROP AND RANGE RESOURCES

DESCRIPTION	UNITS	AMOUNT	TONS/ACRE	VARIABLE COST PER UNIT
Summer federal range	AUMS	770		$2.36
Winter BLM range	AUMS	1,067		2.36
Private rangeland	AUMS	1,205		0.00
Private leased pasture	AUMS	408		8.20
Alfalfa hayland	ACRES	117	4.2	138.00[a]

II. LIVESTOCK PRODUCTION

DESCRIPTION	AMOUNT	UNITS
Number of cows	252	Head
Calf crop	87	Percent
Calf death loss	3	Percent
Cow death loss	2	Percent
Steer yearling selling weight	773	Pounds
Heifer yearling selling weight	660	Pounds
Calves sold as yearlings	71	Percent
Replacement rate	14	Percent
Bulls per 100 cows	4	Percent
Horses per 100 cows	2	Percent

[a]/Source: Davidson (1979).

TABLE 28

REGION V SUMMER CATTLE ENTERPRISE BUDGET

			$/Cow
I.	SALES		
1.	Steer yearlings	(773 lbs x $.69 x .42)	224.02
2.	Heifer yearlings	(660 lbs x $.61 x .27)	108/70
3.	Cull cows	(907 lbs x $.45 x .14 x .98)	60.00
4.	Cull bulls	(1400 lbs x $.45 x .25 x .04 x .98)	6.17
5.	Alfalfa hay sales	(.55 ton x $56.00)	30.80
6.	TOTAL SALES		429.69
II.	PRODUCTION COSTS		
	A. VARIABLE COSTS		
1.	Alfalfa hay sold	(.55 ton x $33.09)	18.20
2.	Alfalfa hay fed	(1.39 ton x $33.09)	46.00
3.	Purchased barley fed	(6.3 bu. x $2.57)	18.25
4.	Government grazing fees	(7.3 AUM's x $2.36)	17.23
5.	Private leased pasture	(1.62 AUMS x $8.20)	13.28
6.	Livestock labor	(19 hours x $5.00)	95.00
7.	Veterinary expenses		2.54
8.	Hired trucking		2.21
9.	Marketing commission		3.60
10.	Fuel		28.51
11.	Accounting		1.28
12.	Brand inspection		.63
13.	Repairs and maintenance		12.15
14.	Salt and minerals		1.79
15.	Fencing		8.04
16.	Bull	($1500 for 4 yrs. @ 13% x .04)	20.17
17.	Horses	($1000 for 15 yrs. @ 13% x .01)	1.55
18.	Other		10.30
19.	TOTAL VARIABLE COSTS		300.73
	B. FIXED COSTS		
19.	Depreciation on Equipment and Machinery		61.72
20.	Taxes		8.23
21.	Dues		.30
22.	Interest on Brood Stock ($575[a] @ 13%)		74.75
23.	Interest on Equipment and Buildings		6.95
24.	TOTAL FIXED COSTS		151.95
25.	RETURN TO LAND AND MANAGEMENT		-22.99

[a]/Personal communication with Mr. Paul Bottari, Secretary of Nevada Cattlemen's Association, October, 1980.

Operators sold an estimated 28 percent of the alfalfa hay produced. Crop sales amounted to 17 percent of disposable income for operators interviewed. Additionally disposable income derived from cattle sales was 71 percent; sheep sales 7 percent; and non-farm sources 5 percent (Table 23). Thus, year-round cattle operators in Region V make their living almost entirely from some facet of agriculture.

Region V Year-Round Sheep

Region V sheep operators, although classified as year-round, typically depended most heavily upon federal range during the winter months (October 16 through April 30) only. Private pastures owned and/or leased by the operator were used as the primary forage source during the summer months (May 1 through October 15). Operators depended upon leased pasture for an estimated 14 percent of yearly forage requirements. Supplemental feeding of roughages and concentrates was also common.

Average dependency upon BLM range for yearly forage requirements was 31 percent. Only four of the 30 operators grazed USFS allotments. As mentioned earlier, some sheep operators home based in Region V grazed BLM allotments in Region III.

Region V sheep operators raised an average of 2,011 ewes. Operators interviewed generally intensively managed sheep; shed lambing was common. Consequently they reported the greatest efficiency of production of any sheep enterprise classification with an average lambing percentage of 130 percent and average lamb selling weights of 99 pounds (Table 52). Region V sheep operators had the highest estimated total sales per ewe, $78.75, of any sheep enterprise classification (Table 53).

TABLE 29

REGION V YEAR-ROUND SHEEP
LIVESTOCK, CROP PRODUCTION, AND RESOURCE STATISTICS

I. CROP AND RANGE RESOURCES

DESCRIPTION	UNITS	AMOUNT	TONS/ACRE	VARIABLE COST PER UNIT
BLM range	AUMS	2,040		$2.36
Private rangeland	AUMS	2,690		0.00
Private leased pasture	AUMS	853		8.20
Alfalfa hayland	ACRES	36	4.2	138.00[a]

II. LIVESTOCK PRODUCTION

DESCRIPTION	AMOUNT	UNITS
Number of ewes	2,011	Head
Lamb crop (at docking)	130	Percent
Lamb death loss	13	Percent
Ewe death loss	8	Percent
Lamb selling weight	99	Pounds
Replacement rate	18	Percent
Rams per 100 ewes	3	Percent
Horses per 1000 ewes	4	Head

[a]/Source: Davidson (1979).

TABLE 30

REGION V YEAR-ROUND SHEEP ENTERPRISE BUDGET

			$/ewe
I.	SALES		
1.	Wool	(11 lbs. x $1.12)	12.32
2.	Lambs	(99 lbs. x $.64 x .97)	61.46
3.	Cull ewes	(.18 head x $30.00 x .92)	4.97
4.	TOTAL SALES		78.75
II.	COSTS		
	A. VARIABLE COSTS		
1.	Raised alfalfa hay fed	(.08 ton x $33.12)	2.65
2.	Purchased grain fed	(.37 bu. x $2.57)	.95
3.	Government grazing fees	(1.01 AUMS x $2.36)	2.38
4.	Rented pasture	(.42 AUMS x $8.20)	3.44
5.	Labor	(4 hours x $5.00)	20.00
6.	Veterinary expenses		.34
7.	Hired trucking		1.29
8.	Marketing commission		.15
9.	Fuel		3.95
10.	Repairs and maintenance		2.81
11.	Accounting		.32
12.	Salt and minerals		2.94
13.	Fencing		.67
14.	Shearing		2.07
15.	Horses	($1000 for 15 years @ 13% x .003)	.45
16.	Rams	($325 for 3 years @ 13% x .03)	4.13
17.	Other		2.85
18.	TOTAL VARIABLE COSTS		51.39
	B. FIXED COSTS		
19.	Equipment and machinery depreciation		7.75
20.	Taxes		1.23
21.	Dues		.09
22.	Interest on brood stock ($65[a] @ 13%)		8.45
23.	Interest on equipment and buildings		1.10
24.	TOTAL FIXED COSTS		18.62
25.	RETURN TO LAND AND MANAGEMENT		8.74

[a]/Personal communication with Mr. A. Z. Joy, Agricultural Extension Specialist, University of Nevada, October, 1980.

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