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1 OF 4

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M-X ENVIRONMENTAL TECHNICAL REPORT

ETR 20 LAND USE

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

A study of the land ownership resources in the two potential deployment regions is important because of the relatively large amounts of land that will be required to be disturbed by the MX project. Although only about 25 NM^2 will be fenced for the system, another 116 to 121 NM^2 will be used for the life of the project for military purposes but will also be open to public use. Of these 76 to 92 NM^2 will be roadways. These roadwyas will provide both needed access to remote areas, and make possible undesirable trespass onto both public and private lands. (continued on reverse)

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Item 20 continued

In addition to the above cited area requirements, another 53 to 55 NM^2 of public/state, and private land will be disturbed during the construction phase of the project. Upon completion of the construction phase of the project, these areas will revert to their original use and ownership rights. During the construction phase these lands and adjoining lands could be subject to certain problems resulting from construction activities, such as dust, noise, and potential problems of human activity including pilfering and possible vehicle accidents.

Although there are may types of land ownerships, only three would be used by project deployment; provate land, state land, and public (domain) land. All other types such as BIA, NFS, DOD, NPS, wildlife preserves, and local government lands screened out. All three of the potential land ownership types that could be required are protected by laws that assure their legal transfer to military use and ownership. Use of private lands can only be obtained for public (military) use through eminent domain procedures. State lands would be acquired through trades for public domain land of equal value. Public lands are withdrawn for AF use through Federal Land Policy Management Act procedures.

M-X ETR-20

ENVIRONMENTAL CHARACTERISTICS OF ALTERNATIVE DESIGNATED DEPLOYMENT AREAS: LAND OWNERSHIP/LAND USE PATTERNS

Prepared for

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

By

Henningson, Durham and Richardson
Santa Barbara, California

22 December 1980

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INTRODUCTION

This Environmental Technical Report sets forth affected environment and environmental consequences analysis related to land ownerships and land uses in the Dedicated Deployment Areas (DDAs) of the potential Nevada/ Utah and Texas/New Mexico regions.

Three types of land ownerships are discussed here: privately owned land, state land and federal land managed by the BLM. These are the only ownership types on which the project would be deployed. BLM land dominates in the Nevada/Utah region, and private land dominates in the Texas/New Mexico region.

While many types of land uses exist within the DDAs, the emphasis here is placed on homes and ranches, croplands, grazing land, and recreation because they are likely to be directly disturbed or displaced by the project. The other two types of land uses which exist in the DDAs and are summarized here are energy transmission lines and transportation corridors.

The discussion on homes and ranches is important because all dwellings within a radius of 2,965 feet of a protective shelter (PS) would be required to be relocated or vacated to assure safety for residents and security for the project. With 4,600 PSs proposed and with a 1 mi^2 safety zone around each having to be vacated, many homes and ranches would be affected, especially in the Texas/New Mexico region.

Both irrigated and dry croplands are discussed here, the main impacts being in the Texas/New Mexico region. Grazing on BLM lands is the most important agricultural issue in the Nevada/Utah region. Recreation in the DDAs would be greatly impacted not only by construction-induced populations, but also by the operations phase populations which would be living in the vicinity of the operating bases. Both the use of existing areas, and dispersed recreation activities would be greatly expanded.

Other technical reports have been prepared on the subjects of energy supply and transportation effects. Here only the land use aspects of these topics have been treated.

1.0 RURAL LAND OWNERSHIP

1.1 AFFECTED ENVIRONMENT

A study of the land ownership resources in the two potential deployment regions is important because of the relatively large amounts of land that will be required to be disturbed by the MX project. Although only about 25 NM^2 will be fenced for the system, another 116 to 121 NM^2 will be used for the life of the project for military purposes but will also be open to public use. Of these 76 to 92 NM^2 will be roadways. These roadways will provide both needed access to remote areas, and make possible undesirable trespass onto both public and private lands.

In addition to the above cited area requirements, another 53 to 55 NM^2 of public/state, and private land will be disturbed during the construction phase of the project. Upon completion of the construction phase of the project, these areas will revert to their original use and ownership rights. During the construction phase these lands and adjoining lands could be subject to certain problems resulting from construction activities, such as dust, noise, and potential problems of human activity including pilfering and possible vehicle accidents.

Although there are many types of land ownerships, only three would be used by project delopyment: private land, state land, and public (domain) land. All other types such as BIA, NFS, DOD, NPS, wildlife preserves, and local government lands have been screened out. All three of the potential land ownership types that could be required are protected by laws that assure their legal transfer to military use and ownership. Use of private lands can only be obtained for public (military) use through eminent domain procedures. State lands would be acquired through trades for public domain land of equal value. Public lands are withdrawn for AF use through Federal Land Policy Management Act proceedures.

NEVADA-UTAH REGION (1.1.1)

Ownership and administration of land in the state of Nevada is distributed among a large number of federal, state, local, and private jurisdictions. The state contains approximately 70.7 million acres, of which nearly 86.0 percent, or about 60 million acres, are under federal jurisdiction. Nearly 70.0 percent (49.1 million acres) is administered by the Bureau of Land Management. Private holdings represent the next largest group of land owners comprising approximately 10.3 million acres, or nearly 15.0 percent of the state. Lands under the ownership of the state, county and local governments, and the Bureau of Indian Affairs comprise the remaining portions of the state.

Federal Land (1.1.1.1)

Federal administration of lands in the Nevada/Utah study area counties is extensive and is shared by several agencies. Tables 1.1.1-1 and 1.1.1-2 present the federally administered acreage by county within the Nevada/Utah study area on an agency-by-agency basis. The Bureau of Land Management administers the largest percentage (82.1 percent)

Table 1.1.1-1. Federally administered acreage by county in the Nevada/Utah study area, excluding BLM administered land.

COUNTY	FOREST SERVICE	NATIONAL PARKS	WATER AND POWER RESOURCES SERVICE[1]	FISH/ WILDLIFE SERVICE	INDIAN RESERVATION	DEPARTMENT OF DEFENSE
Nevada						
Clark	38,800	498,100	50,200	501,800	4,400	338,400
Esmeralda	46,000	2,000	—	—	—	—
Eureka	162,200	—	—	—	200	—
Lander	279,200	—	—	—	200	—
Lincoln	23,000	—	—	276,500	—	576,000
Nye	1,662,800	92,200	—	—	9,300	2,327,000
Pershing	—	—	22,400	—	200	—
White Pine	855,900	—	—	11,500	70,700	—
TOTAL	3,067,900	592,300	72,600	789,800	85,000	3,241,400
Utah						
Beaver	138,400	—	—	1,000	—	—
Iron	243,500	9,000	—	—	—	—
Juab	117,800	—	600	15,400	37,700	—
Millard	361,700	—	—	59,500	—	—
Tooele	150,200	—	—	—	—	1,522,600
TOTAL	1,011,600	9,000	600	75,900	37,700	1,522,600
Study Area Total	4,079,500	601,300	73,200	865,700	122,700	4,774,000

2889-1

[1]Formerly Bureau of Reclamation.

Source: Department of Interior, 1978; University of Utah, 1978.

Table 1.1.1-2. State, private, and BLM-administered lands in the Nevada/Utah study area counties, in thousands of acres.

STATE/COUNTY	TOTAL LAND	BLM ADMINISTERED LAND	PERCENT OF TOTAL	PRIVATELY OWNED LANDS	PERCENT OF TOTAL	STATE LAND	PERCENT OF TOTAL
Nevada							
Clark	5,174	3,481	67	489.4	9.5	46.1	.9
Esmeralda	2,285	2,121	92	162.6	7.1	—	—
Eureka	2,688	2,187	81	486.2	18.2	—	—
Lander	3,597	3,303	92	289.7	8.1	0.3	—
Lincoln	6,816	6,580	96	219.4	3.2	6.7	0.1
Nye	11,561	10,712	92	822.7	7.1	10.5	0.1
Pershing	3,859	2,910	76	917.2	23.7	—	—
White Pine	5,699	4,365	77	392.1	6.9	1.6	—
Utah							
Beaver	1,656	1,159	70	272.4	16.5	145.0	8.8
Iron	2,112	974	46	753.1	35.7	132.10	6.2
Juab	2,184	1,408	65	393.9	18.0	179.80	8.2
Millard	4,255	2,992	70	474.0	11.1	402.72	9.5
Tooele	4,423	4,083	92	83.4	1.8	256.27	5.7
Totals	56,309	45,275	82.1	5,756.1	10.2	1,181.1	2.1

3023-1

NOTE: Does not include lands administered by federal agencies other than the BLM.

Source: Nevada Governor's Office of Planning Coordination, January 1978, and University of Utah, 1978.

of the little more than 56 million acres which comprise the entire study area. The entent to which the Bureau of Land Management administers land in any particular county ranges from as little as 46.0 percent in Iron County, Utah, up to 96.0 percent in Lincoln County, Nevada. Other federal agencies with substantial holdings within the study area include the Department of Defense (DOD), which administers approximately 4.8 million acres study area wide. DOD lands, however, are centered in 4 counties: Nye (2.3 million acres); Tooele (1.5 million acres); Lincoln (0.6 million acres); and, Clark (0.3 million acres).

The U.S. Forest Service administers nearly 4.1 million acres within the study area, but unlike the DOD, has holdings in every county except Pershing. Other federal agencies having jurisdiction over lands within the study area include the National Park Service, Water and Power Resources Service (formerly the Bureau of Reclamation), the U.S. Fish and Wildlife Service, and Bureau of Indian Affairs.

Clark County's federally controlled lands are shared between seven agencies. Of the 5.2 million acres comprising the county, 67 percent is administered by the BLM, 9.6 percent by the U.S. Fish and Wildlife Service, 9.6 percent the National Park Service, 6.5 percent the Department of Defense, and 1.0 percent the Water and Power Resources Service. Indian lands and national forest areas jointly comprise approximately 0.8 percent of Clark County's total land area.

Private Land (1.1.1.2)

Privately-owned land in the Nevada/Utah study area is characterized by intermittent wide spatial distribution. Only 10.2 percent of the total land area comprising the study area counties are under private ownership. The extent to which a particular county is privately owned ranges from as little as 1.8 percent (Tooele County, Utah) to as high as 35.7 percent (Iron County, Utah). Most of the other counties within the study area have between 5 and 20 percent of their land in private holdings. Table 1.1.1-2 presents each county's quantity of private land and its proportion of the total land area. Figure 1.1.1-1 graphically depicts the wide distribution of these private lands for the entire study area. Note that the Utah portion of the study area contains tight clusters of private holdings. This is due to concentrated non-grazing agriculture which occurs in that area. Notable in this regard are Beaver, Iron, Millard, and Juab Counties. Since this type of agriculture occurs in Nevada on a less frequent basis and mainly along drainage areas, the incidence of private lands is less frequent and more widely distributed spatially. After private holding in agriculture, most other private land within the study area is distributed among various population centers. In most cases, existing communities are located in areas where adequate private land exists to support additional development. In some areas, however, extensive growth and development of communities would be restricted without public land being made available.

State Lands (1.1.1.3)

The state lands discussed here are actually owned by the federal government, but by a congressional grant such lands are administered by the

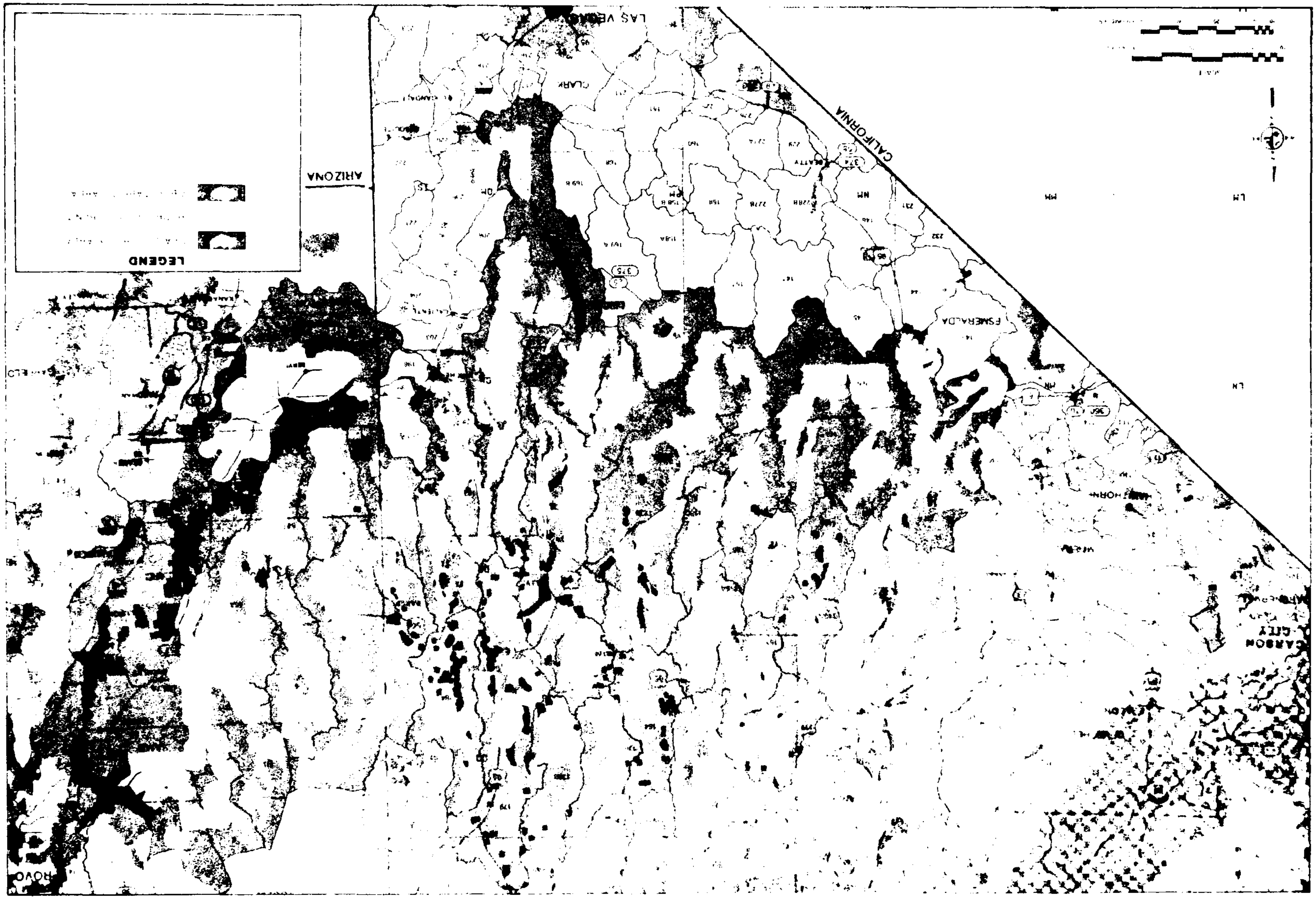

Figure 1.1.1-1. Private lands within the Nevada/Utah study area.

state and revenues from them are for the benefit of schools administered by the state (Utah M-X Coordinating Office, June 16, 1980). State lands comprise only 2.1 percent of the study area's 56.3 million acres. Most of this area is in Utah. Nevada's portion of the study area contains only three counties where any state land occurs: Clark, Nye, and Lincoln. In none of these counties, however, do the state lands account for 1.0 or more percent of the total land area. Each of Utah's study area counties are between 5.0 and 10 percent state-owned: Beaver, 8.8 percent; Iron, 6.2 percent; Juab, 8.2 percent; Millard, the highest, with 9.5 percent; and Tooele, with 5.7 percent. Table 1.1.1-2 presents the state land areas within these and all other study area counties, while Figure 1.1.1-2 depicts their spatial distribution. Note that the distibution of state lands in Utah is rather uniform. This is attributable to the fact that under the Utah Statehood Act of July 16, 1894, the U.S. Congress provided that administration of sections 2, 16, 32, and 36 of each township in the state would be given to the state to support public schools. Lands which were withdrawn by the federal government for defense and other purposes prior to a survey of the state resulted in an inequitable distribution of state-owned lands as granted in 1894. In cases where state lands were "lost" via federal withdrawal, the state was allowed to select other lands "in lieu" of those lands for which title was not vested.

TEXAS NEW MEXICO REGION (1.1.2)

While public land dominates the Nevada Utah region, private ownership dominates the Texas/New Mexico region with over three-quarters of the land in that category in the study area counties. No BLM administered public land exists in the Texas portion of the region.

Federal Lands (1.1.2.1)

Federal ownership or administration of lands in the Texas/New Mexico study area is not extensive. Of the 22.31 million acres comprising the study area, less than 8 percent is federally controlled. With the exception of the Rita Blanca National Grasslands (77,000 acres), which is administered by the U.S. Forest Service, and several smaller federal holdings (8,000 acres), the Texas portion of the study area is notably void of federal land. In New Mexico, federal lands also play a minor role, except in Chaves County, where 32.5 percent of the land area is federally administered, mainly by the Bureau of Land Management. The remaining New Mexico counties range between 0.8 and 8.4 percent in terms of federal administration of their respective land areas. Table 1.1.2-1 presents the extent of federal land ownership in the Texas/New Mexico study area. Figure 1.1.2-1 illustrates the spatial distribution of federal lands.

Private Land (1.1.2.2)

The Texas/New Mexico study area is characterized by a high degree of private ownership. In the Texas portion of the study area, no county is less than 91.0 percent privately owned. If fact, of the 14 counties in the Texas portion of the study area, 8 (Castro, Cochran, Deaf Smith, Hale, Hartley, Lamb, Oldham, and Parmer) are entirely privately owned. The New

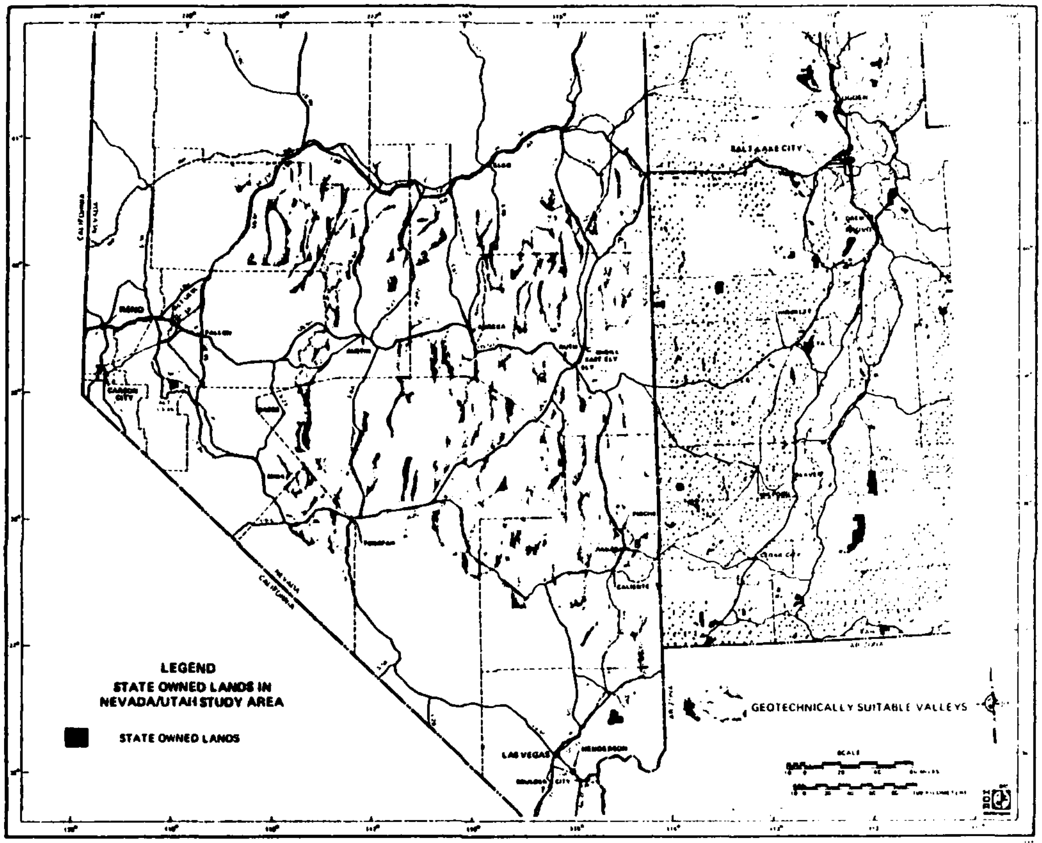

Figure 1.1.1-2. State land in the Nevada/Utah study area.

Table 1.1.2-1. State, private and BLM-administered lands in the Texas/New Mexico study area counties, in thousands of acres.

STATE/COUNTY	TOTAL AREA	FEDERAL LANDS	PERCENT OF TOTAL	BLM-ADMINISTERED LAND	PERCENT OF TOTAL	STATE LANDS	PERCENT OF TOTAL	PRIVATELY OWNED LANDS	PERCENT OF TOTAL
Texas									
Bailey	536	5.8	1.1	-	-	-	-	530	98.9
Castro	563	-	-	-	-	-	-	563	100.0
Cochran	501	-	-	-	-	-	-	501	100.0
Dallas	956	77.2	8.1	-	-	-	-	879	91.9
Deaf Smith	736	-	-	-	-	-	-	736	100.0
Hale	626	-	-	-	-	-	-	626	100.0
Hartley	956	-	-	-	-	-	-	956	100.0
Hockley	581	-	-	-	-	-	-	581	100.0
Lamb	654	-	-	-	-	-	-	654	100.0
Moore	582	-	-	-	-	-	-	575	98.8
Oldham	946	-	-	-	-	-	-	946	100.0
Parmer	550	-	-	-	-	-	-	550	100.0
Randall	585	7.2	1.4	-	-	-	-	567	96.9
Sherman	586	-	-	-	-	-	-	586	100.0
Swisher	573	0.6	0.1	-	-	-	-	572	99.8
New Mexico									
Chaves	3,901	1,266.0	32.5	1,195.9	30.7	703.6	18.0	1,932	49.5
Curry	899	3.9	8.4	0.4	0.4	60.7	6.8	834	92.8
De Baca	1,514	90.8	6.0	81.5	5.4	243.6	16.1	1,180	77.9
Harding	1,368	70.5	5.2	7.7	0.6	345.0	25.2	953	46.7
Lea	2,812	-	-	467	16.6	874	31.1	1,471	52.3
Quay	1,845	14.5	0.8	7.6	0.4	237.[illegible]	12.9	1,593	36.3
Roosevelt	1,572	38.5	2.4	16.4	1.0	211.1	13.4	1,323	84.2
Union	2,443	56.7	2.4	0.5	0.02	441.9	18.1	1,942	79.5
Study Area Totals	26,285		6.2	1,769.3	6.7	3,117.6	11.9	21,048	75.6

3022-1

NOTE Percent totals may not equal 100 percent due to rounding.

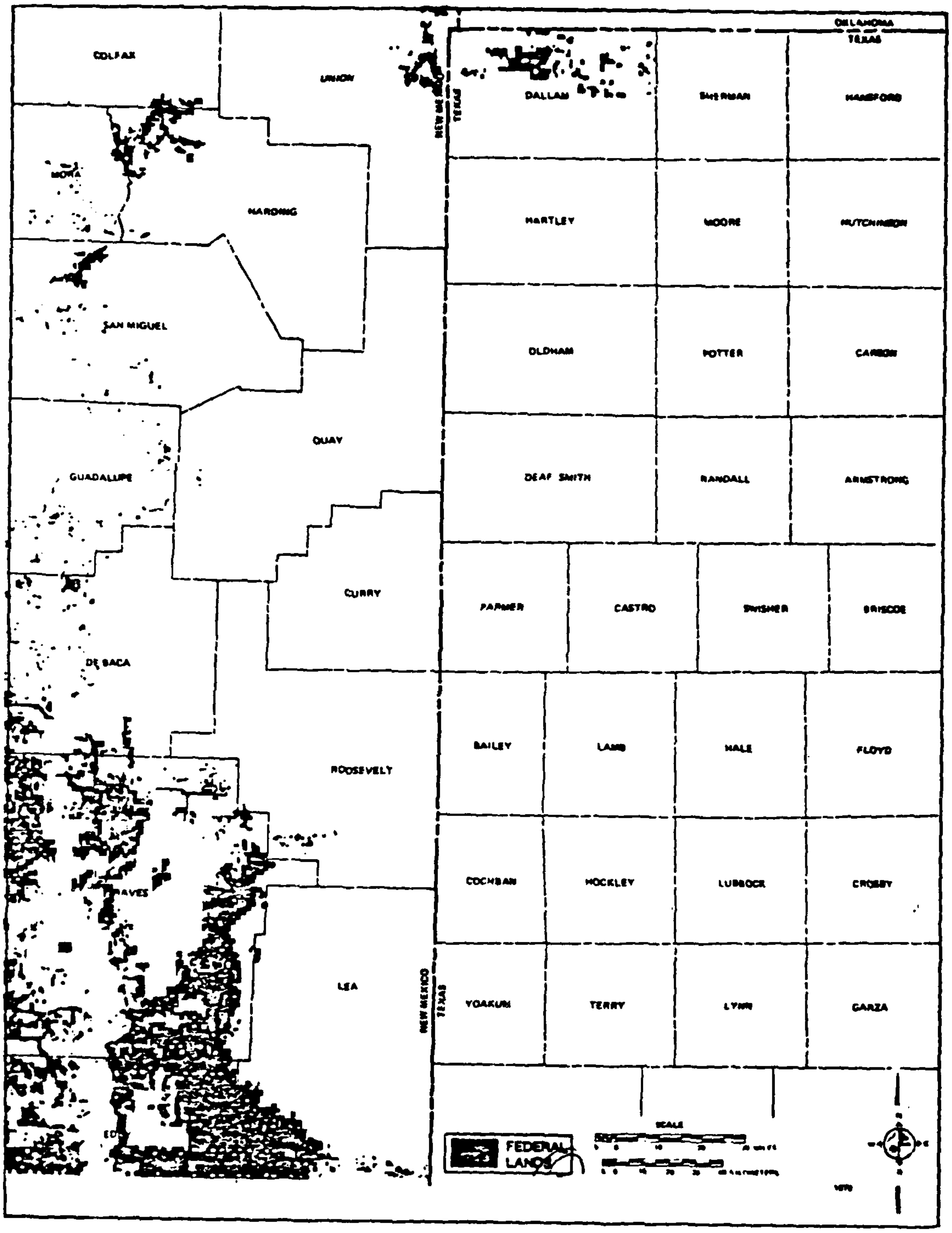

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Figure 1.1.2-1. Public lands in the Texas/New Mexico study area.

Mexico portion of the study area is also mostly private owned, but to a lesser extent. Table 1.1.2-1 indicates the proportion of the total land area in each Texas/New Mexico study area county which is privately held, while Figure 1.1.2-2 indicates their spatial distribution. Only one county in New Mexico, Chaves, is less than 50.0 percent privately owned, all the rest fall between 75 and 97 percent as follows: Harding is 96.7 percent private; Curry, 92.8 percent; Quay, 86.3 percent; Roosevelt, 84.2 percent; Union, 79.5 percent; and De Baca County, 77.9 percent.

State Land (1.1.2.3)

There are no state lands in the Texas portion of the study area. However, the New Mexico portion of the study area contains substantial portions of state land. Approximately 10.1 percent (2.2 million acres) of the entire study area is state land. Counties in New Mexico range between 6.8 and 26.0 percent in terms of their total land area under state control. Lea County contains the largest share, 31.1 percent, while Curry County is comprised of the least portion, 6.8 percent. Table 1.1.2-1 shows these data, and Figure 1.1.2-3 shows the location of state lands in the region.

1.2 METHODOLOGY FOR IMPACT ANALYSIS

The number of acres of land for each ownership type in each Nevada/Utah hydrologic subunit and in each Texas/New Mexico county that would have to be disturbed for MX, was determined by overlaying the alternative project deployment layouts on 1:500,000 scale land status maps for each region, and counting the number of PSs that would fall within each land ownership type. That number of PSs was then multiplied by the average number of acres required to be disturbed per PS (excluding operations base complexes). The average is estimated to be 32.7 acres per PS for the construction phase (total disturbed area of 150,400 acres divided by 4,600 PSs), and 20.4 acres per PS for the operations phase (total disturbed area of 93,800 acres divided by 4,600 PSs). These are maximum expected disturbances and could be 8 to 10 percent less in each case.

1.3 ENVIRONMENTAL CONSEQUENCES

Three types of land ownership exist in the geotechnically suitable DDA. They are: public domain land, state land, and private land. In the Nevada/Utah region, public domain land, administered by the BLM, comprises about 80 percent of the total land. In the Texas/New Mexico region, private land comprises over 80 percent of the study area counties. Community growth induced by this project could also require some public land to be converted to private ownership. This matter is discussed in the individual community ETRs.

The tables in this section rate the levels of disturbance on private, state, and (BLM) lands. The definitions of the ratings are found in the footnotes of each table.

"Suitability zones" have been designated around each operating base. These zones are areas of 100 to 400 mi^2, any part of which would be suitable

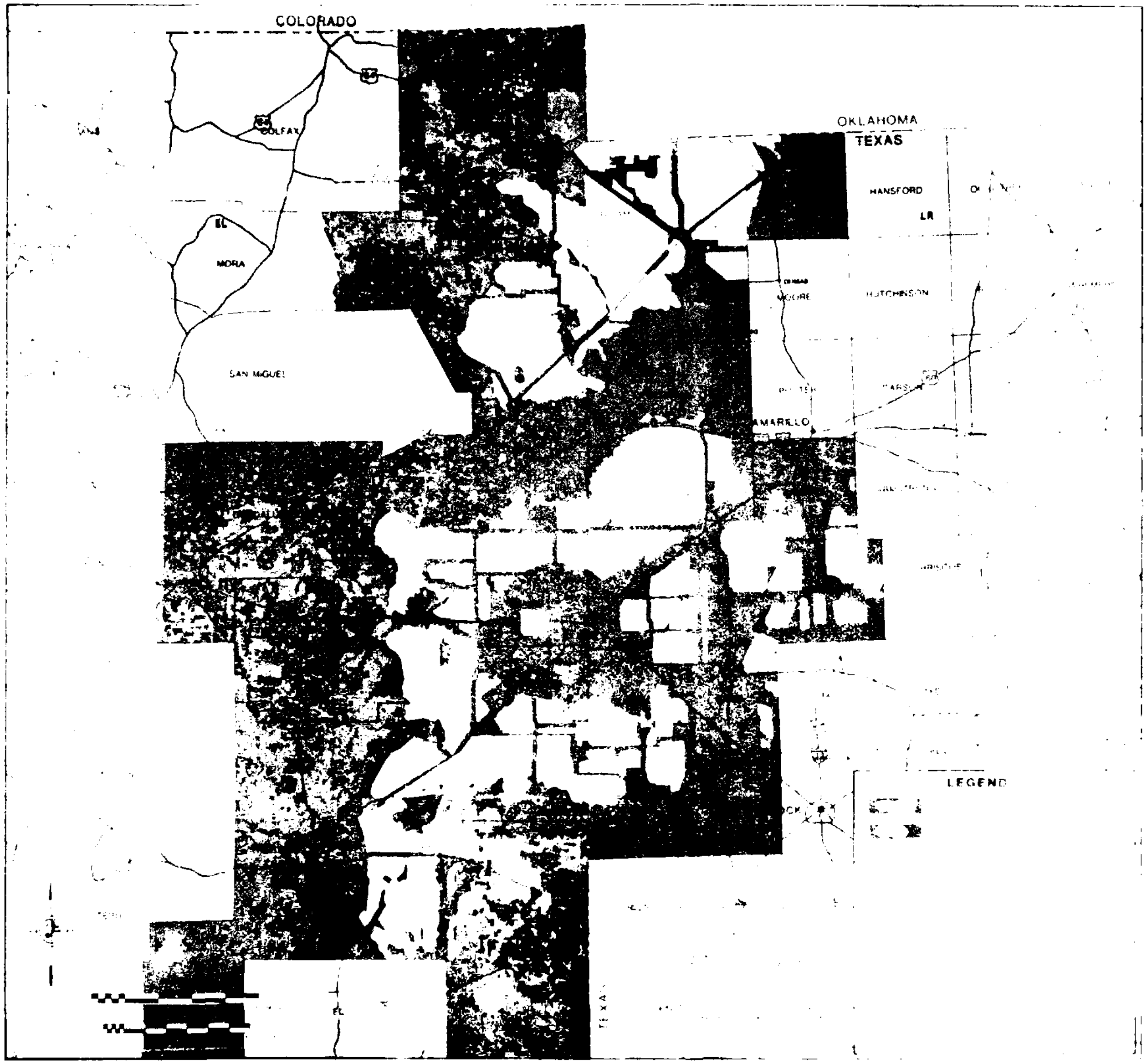

Figure 1.1.2-2. Private lands in the Texas/New Mexico study area. (See Fig. 3.3.3.7-2 of DEIS)

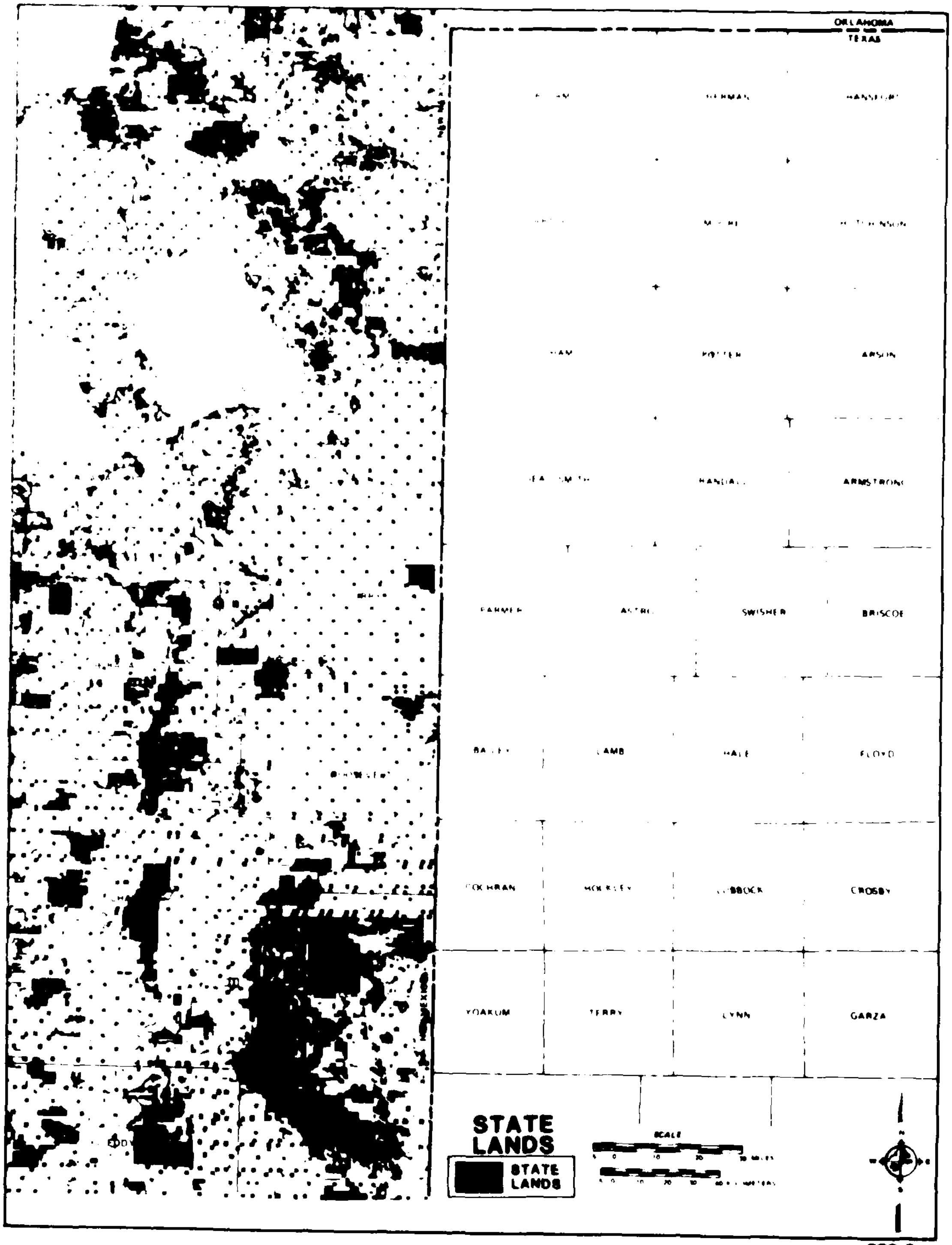

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Figure 1.1.2-3. State lands in the Texas/New Mexico study area.

for an alternate operating base location. This section contains a brief statement for each base describing how an alternate location within the suitable zone would impact those lands.

PRIVATE LAND (1.3.1)

Proposed Action (1.3.1.1)

Figure 1.3.1-1 shows the coincidence of the proposed action cluster and DTN layout with private lands. Private lands in the region generally lie in the center of the valleys or along passes where water is most likely to be found. Clusters are often located in the centers of the valleys and the DTN frequently traverses the passes.

Table 1.3.1-1 shows valleys that have private land coincident with M-X DDA facilities, the acres of such land that could be disturbed for both construction and operations phases, the percentage of total private land in those valleys that the disturbed land represents, and the level of significance of those disturbances for each valley. Of the 17 valleys for the construction phase in which there are private lands coincident with project deployment, 14 have a low significance level, and three have a moderate potential impact level.

Under the Proposed Action, 1,440 acres of private land would be disturbed by the construction phase, and 895 acres by the operations phase. The difference, 545 acres, could be returned to private use upon completion of the construction phase. The 1,440 acres and the 895 acres are equal to only 0.7 and 0.4 percent respectively of the acres of private land in the Nevada/Utah hydrologic subunits.

Future non-M-X projects such as IPP, WPPP, and Nevada Moly will also use some privately owned land. The Nevada open pit molybdenum mine in Nye County, will use about 2,900 acres of privately owned grazing land, and is the only projected significant non-M-X use of privately owned land in the region (ABT Associates, Inc., 1979). Because of the permanent nature of the M-X protective structures, it is unlikely that the ground on which they are located would be retrieved for private agricultural use. Roadway systems, however, could be returned to either the original owner's use, or left open to public use with maintenance by local or state jurisdictions.

Impact on private land could be mitigated by assuring that project deployment and operation would not interfere with the use of adjoining private land. Because a maximum of about 1,440 acres of private land would be disturbed (about 1.0 percent of the 150,000 total disturbed acres), it may be possible to avoid privately owned land with minor alterations of the system layout during the Tier Two decision making for specific selection of cluster and road sitings.

Alternative 1 (1.3.1.2)

The cluster layout for Alternative 1 is the same as for the Proposed Action, and the DDA impacts on private land would be the same.

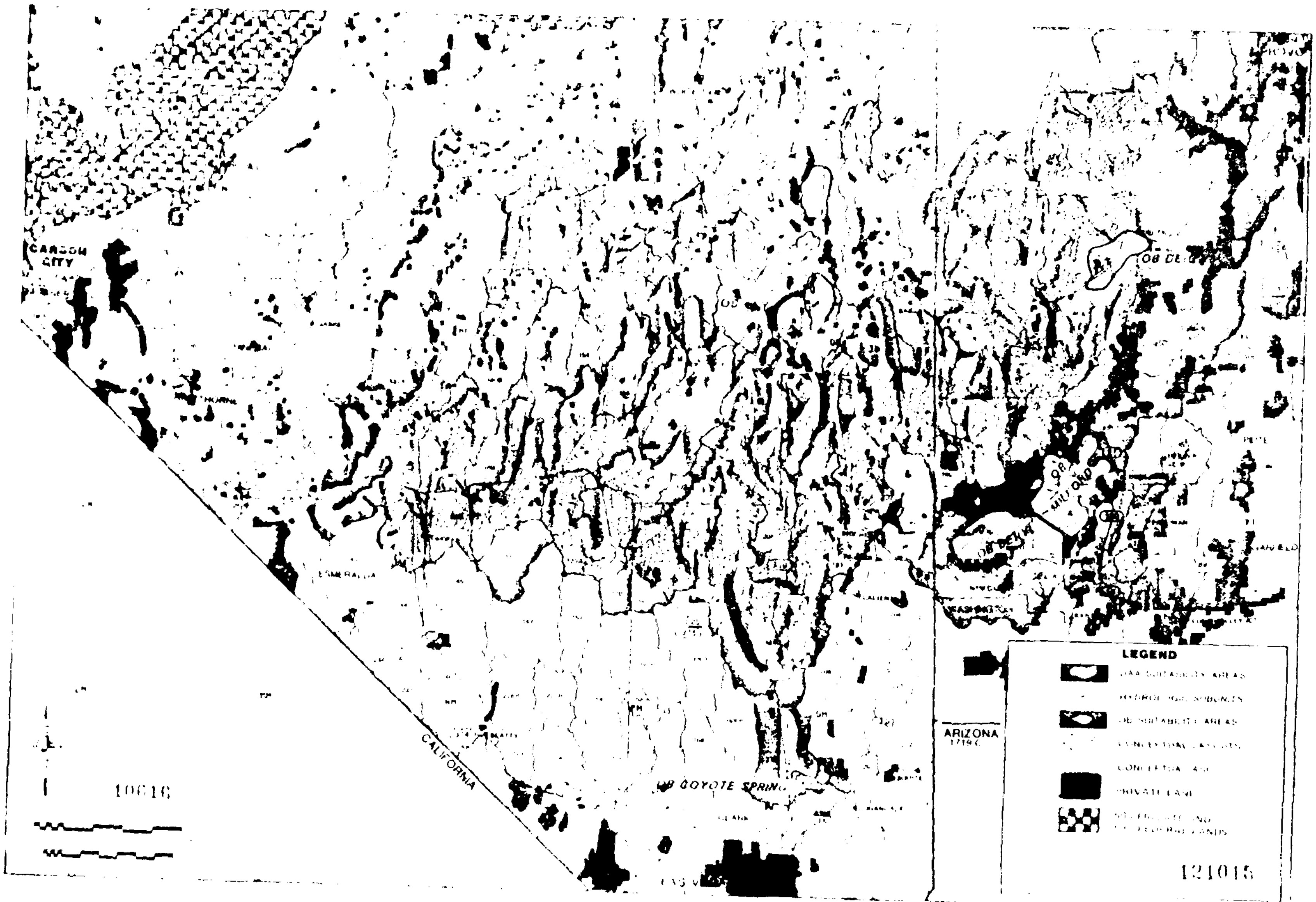


Figure 1.3.1-1. Private land and proposed action conceptual project layout.

Table 1.3.1-1. Potential impact on private land in Nevada/Utah DDA for the proposed action and Alternatives 1-6.

HYDROLOGIC SUBUNIT		SHORT-TERM EFFECTS			LONG-TERM EFFECTS		
		PRIVATE LAND DISTURBED		POTENTIAL IMPACT[1]	PRIVATE LAND DISTURBED		POTENTIAL IMPACT[1]
NO	NAME	ACRES	PERCENT OF TOTAL IN HYDRO-SUBUNIT		ACRES	PERCENT OF TOTAL IN HYDRO-SUBUNIT	
	Subunits with M-X Clusters and DTN						
4	Snake	65	0.2		41	0.1	
5	Pine	—	—		—	—	
6	White	—	—		—	—	
7	Fish Springs	—	—		—	—	
8	Dugway	33	0.6		20	0.2	
9	Government Creek	98	0.6		61	0.4	
46	Sevier Desert	—	—		—	—	
46A	Sevier Desert & Dry Lake*	—	—		—	—	
[illegible]4	Wah Wah	164	1.3		102	0.8	
137A	Big Smoky-Tonopah Flat	229	2.8		143	1.7	
139	Kobeh	131	1.3		82	0.8	
140A	Monitor—Northern	65	1.7		41	1.1	
140B	Monitor—Southern	—	—				
141	Ralston	98	1.1		61	0.7	
142	Alkali Spring	—	—		—	—	
148	Cactus Flat	—	—		—	—	
149	Stone Cabin*	33	1.1		20	0.7	
151	Antelope	98	1.0		61	0.6	
154	Newark*	—	—		—	—	
155A	Little Smoky—Northern	33	0.5		20	0.3	
155C	Little Smoky—Southern	—	—		—	—	
156	Hot Creek	33	0.9		20	0.5	
170	Penoyer	—	—		—	—	
171	Coal	33	3.3		20	0.2	
172	Garden	—	—		—	—	
173A	Railroad—Southern	—	—		—	—	
173B	Railroad—Northern	65	0.3		41	0.2	
174	Jakes	33	1.3		20	0.8	
175	Long	—	—		—	—	
178B	Butte—South	—	—		—	—	
179	Steptoe	—	—		—	—	
180	Cave	33	0.1		20	0.1	
181	Dry Lake*	—	—		—	—	
182	Delamar	—	—		—	—	
183	Lake	—	—		—	—	
184	Spring	—	—		—	—	
196	Hamlin	—	—		—	—	
202	Patterson	—	—		—	—	
207	White River	98	0.3		61	0.2[2]	
208	Pahroc	—	—		—	—	
209	Pahranagat	98	3.1		61	1.9	
	Overall DDA	1,440[2]	0.7		895	0.4	

3876-3

[1]

No impact. (No private land disturbed.)

Low to moderately low impact. (Less than 100 acres or less than 1 percent of private land disturbed in subunit.)

Moderate to moderately high impact. (Less than 1,000 acres or less than 3 percent of private land disturbed in subunit.)

High impact. (More than 1,000 acres or more than 3 percent of private land disturbed in subunit.)

*[illegible] location of Area Support Centers (ASCs).

Alternative 2 (1.3.1.3)

The cluster layout and impacts for Alternative 2 are the same as for the Proposed Action.

Alternative 3 (1.3.1.4)

The cluster layout and impacts for Alternative 3 are the same as for the Proposed Action.

Alternative 4 (1.3.1.5)

The cluster layout and impacts for Alternative 4 are the same as for the Proposed Action.

Alternative 5 (1.3.1.6)

The DDA impacts on private land would be the same as for the Proposed Action.

Alternative 6 (1.3.1.7)

The impacts upon DDA and OB land ownership for this alternative are similar to those described for the Proposed Action.

Alternative 7 (1.3.1.8)

Two hundred clusters of 23 protective shelters each would be deployed in the Texas/New Mexico region under Alternative 7. Figure 1.3.1-2 shows the coincidence of private lands and project activity. Private lands dominate in the Texas counties, and in the New Mexico counties.

Table 1.3.1-2 shows the counties in the Texas/New Mexico study area, the acres of private land that could be disturbed for both construction and operations phases, the percentage of the total private land in those counties that the disturbed land represents, and the level of significance of those disturbances for each county.

It can be seen that for the construction phase, of the 21 counties in which there are private lands coincident with project deployment, none would have a low potential impact, one (Hockley) would have a moderate impact, and all of the others would have a high potential impact. Alternative 7 would have high absolute impacts of 146,680 acres of private land disturbed during the construction phase, and 91,507 acres during operations.

The 146,680 acres and the 91,507 acres are equal to 0.7 and 0.4 percent respectively, of the 21 million acres of private land in the Texas/New Mexico region. Thus, there will be localized high impacts, but regionally the effects will not be significant. 55,1[illegible] acres could be returned to private use upon completion of the construction phase.

Future non-M-X projects such as the Tolk Power Plants, Highway I-27, and the CO_2 pipelines will not use significant amounts of privately owned land. Because of the permanent nature of the M-X structures, it is unlikely

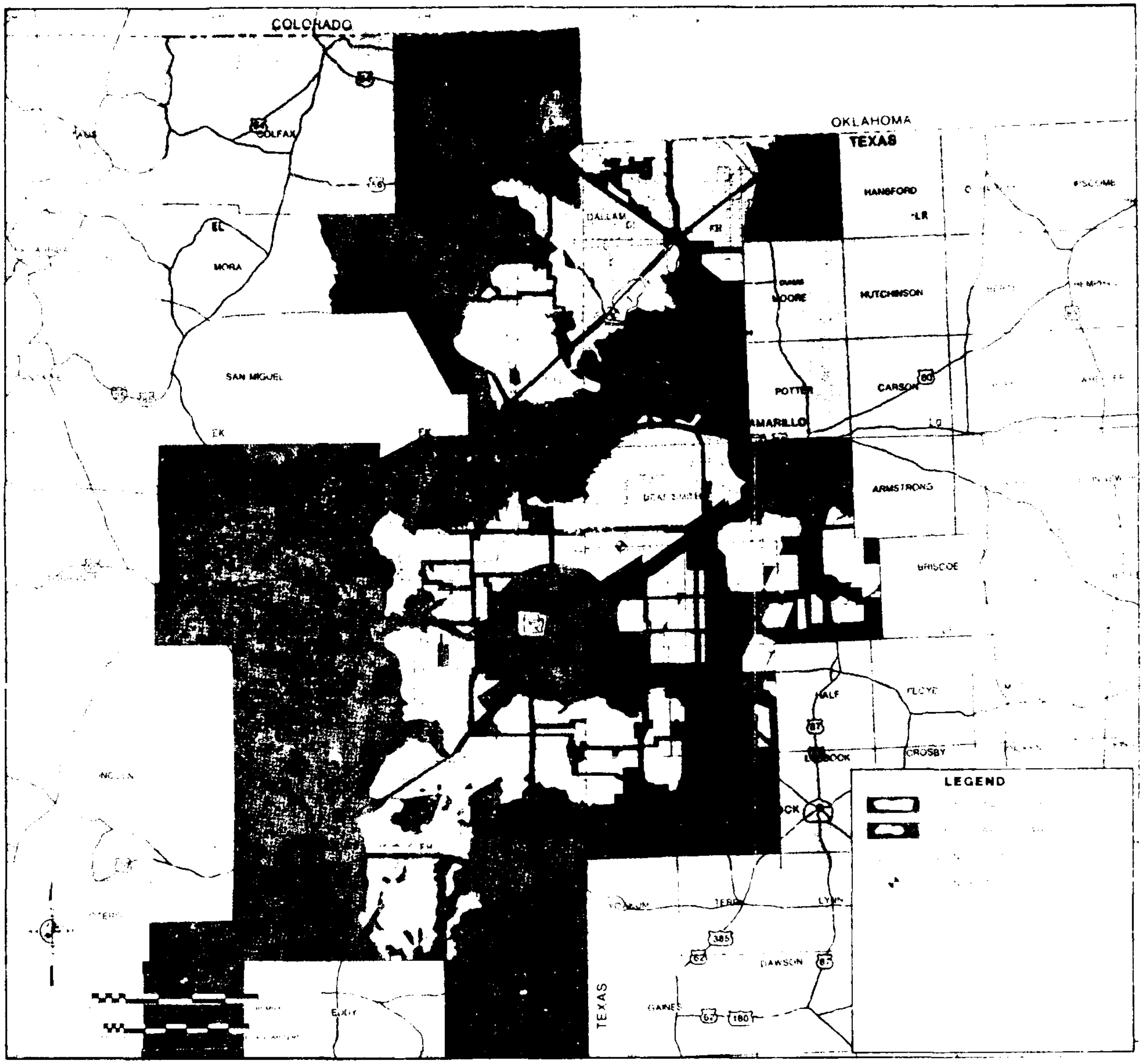


Figure 1.3.1-2. Private lands and project activities. (See Fig. 4.3.2.11-7 of DEIS)

Table 1.3.1-2. Potential impact to private land in the Texas/New Mexico DDA for Alternative 7.

COUNTY	SHORT-TERM EFFECTS			LONG-TERM EFFECTS		
	PRIVATE LAND DISTURBED		POTENTIAL IMPACT[1]	PRIVATE LAND DISTURBED		POTENTIAL IMPACT[1]
	ACRES	PERCENT OF TOTAL IN COUNTY		ACRES	PERCENT OF TOTAL IN COUNTY	
Counties with M-X Clusters and DTN						
Bailey, TX	4,301	0.6		2,122	0.4	
Castro, TX	4,611	0.8		2,877	0.5	
Cochran, TX	2,322	6.5		1,449	0.3	
Dallam, TX	19,653	2.2		12,261	1.4	
Deaf Smith, TX[2]	23,675	3.2		14,770	2.0	
Hartley, TX[2]	12,720	1.3		7,935	0.8	
Hockley, TX	752	0.1		469	0.1	
Lamb, TX	1,570	0.2		979	0.1	
Oldham, TX	2,420	0.3		1,510	0.2	
Parmer, TX	7,031	0.1		4,386	0.8	
Randall, TX	2,158	0.4		1,346	0.2	
Sherman, TX	1,210	0.2		755	0.1	
Swisher, TX	1,537	0.3		959	0.2	
Chaves, NM	13,898	0.7		8,670	0.5	
Curry, NM[2]	4,208	0.7		3,873	0.7	
DeBaca, NM	2,965	0.3		1,550	0.2	
Guadalupe, NM	—	—	—	—	—	—
Harding, NM	6,794	0.7		4,238	0.4	
Lea, NM	2,285	0.2		1,426	0.1	
Quay, NM	7,165	0.4		4,470	0.3	
Roosevelt, NM[2]	18,283	1.4		11,406	0.9	
Union, NM	6,022	0.3		3,757	0.2	
Overall DDA	146,680	0.7		91,507	0.4	

3877-1

No impact. (No private land disturbed.)

Low to moderately low impact. (Less than 100 acres or less than 1 percent of private land disturbed in subunit.)

Moderate to moderately high impact. (Less than 1,000 acres or less than 3 percent of private land disturbed in subunit.)

High impact. (More than 1,000 acres or more than 3 percent of private land disturbed in subunit.)

[2]Conceptual location of Area Support Centers (ASCs).

the ground on which they are located would be retrieved for agriculture. Roadway systems, however, could be left open to the public with maintenance by local or state jurisdictions. Return to private ownership would be in accord with established procedures.

The impact on private land could be mitigated by assuring that project deployment and operation would not interfere with the use of adjoining land. Under Alternative 7, an estimated 146,680 acres of private land would be disturbed (about 98 percent of the potential 150,000 total disturbed acres). It would not be possible to avoid privately owned land in the Texas/New Mexico region.

Alternative 8 (1.3.1.9)

DDA IMPACTS

Alternative 8 is a split basing system with 70 clusters in Nevada, 30 in Utah, 35 in Texas, and 65 in New Mexico. The deployment system for the Nevada/Utah region is shown on Figure 1.3.1-3, together with cluster coincidence with private lands. Figure 1.3.1-4 shows this information for the Texas/New Mexico portion of Alternative 8.

The permanent nature of the structures make it unlikely that the ground they occupy could be retrieved for agricultural use, unless they were removed and the earth restored. The roadway systems could be left open to the public.

The impact of the project upon adjoining private land could be mitigated by assuring that project deployment would not interfere with irrigation systems, that access roads to farmlands remain open and that natural drainage areas remain unimpeded. All private lands in Nevada/Utah could be avoided with tier two refinement. In Texas/New Mexico, however, this would not be possible.

NEVADA/UTAH

Table 1.3.1-3 shows the valleys in the Nevada/Utah study area which have proposed clusters which coincide with private land for Alternative 8, the number of acres of private land that would be disturbed by both the construction phase and operations phase, the percentage of total private land in those valleys the disturbed land represents, and the level of significance of those disturbances for each valley. Of the six valleys in which private lands coincide with project deployment, five have a low significance level, and one has a moderate significance level.

459 acres of private land could be disturbed by the construction phase and 284 acres by the operations phase. These acreages represent 0.008 percent and 0.005 percent, respectively, of the 5,756,100 acres of privately owned land in the Nevada/Utah study area counties (Dept. of Commerce, 1979) and 0.6 and 0.3 percent respectively of the private land in the affected counties. The difference between the acreage disturbed for construction and for operations is 175 acres of private land, which could be returned to private use upon completion of the construction phase.

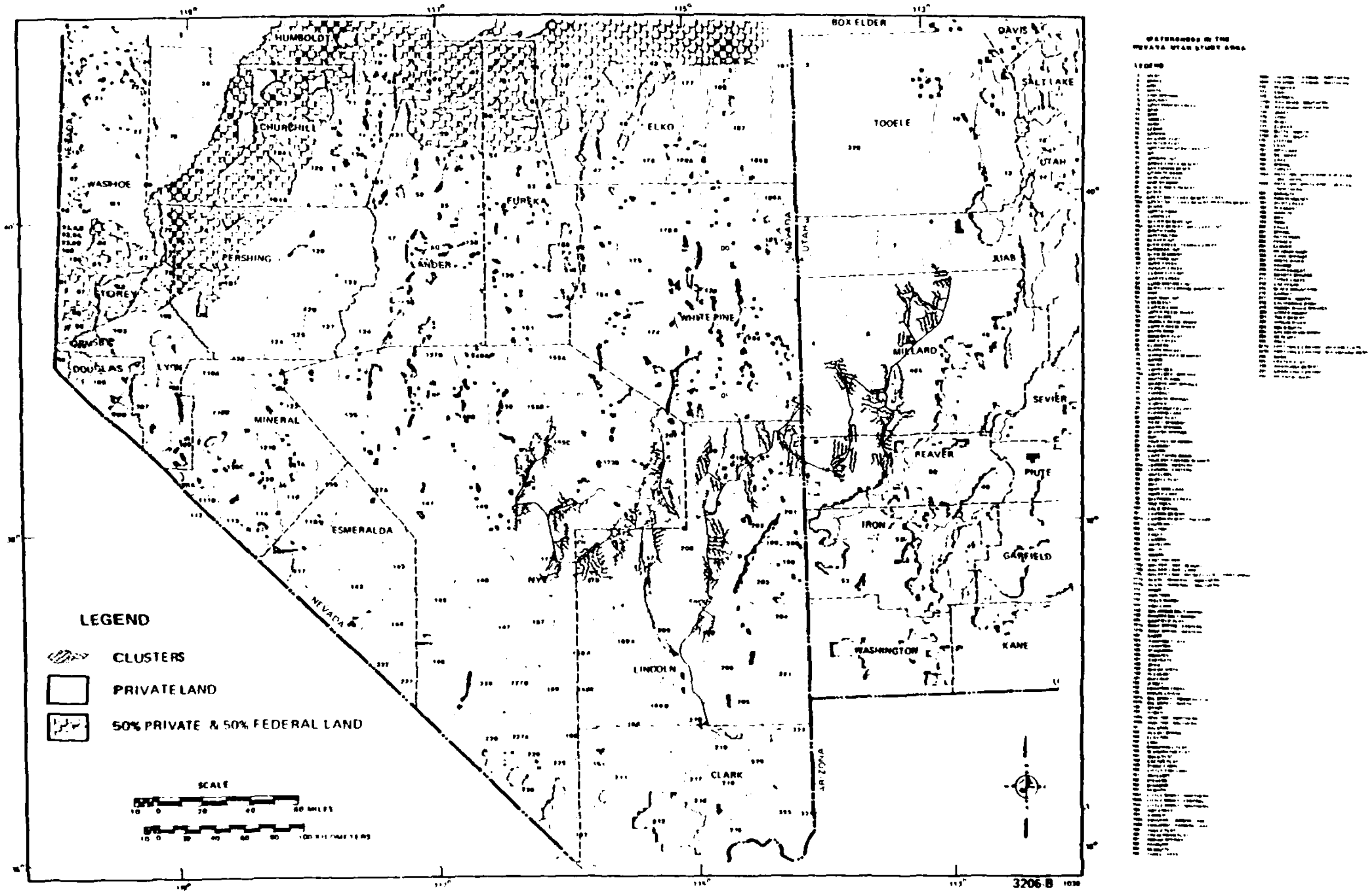


Figure 1.3.1-3. Private land and Alternative 8 cluster deployment in the Nevada/Utah region.

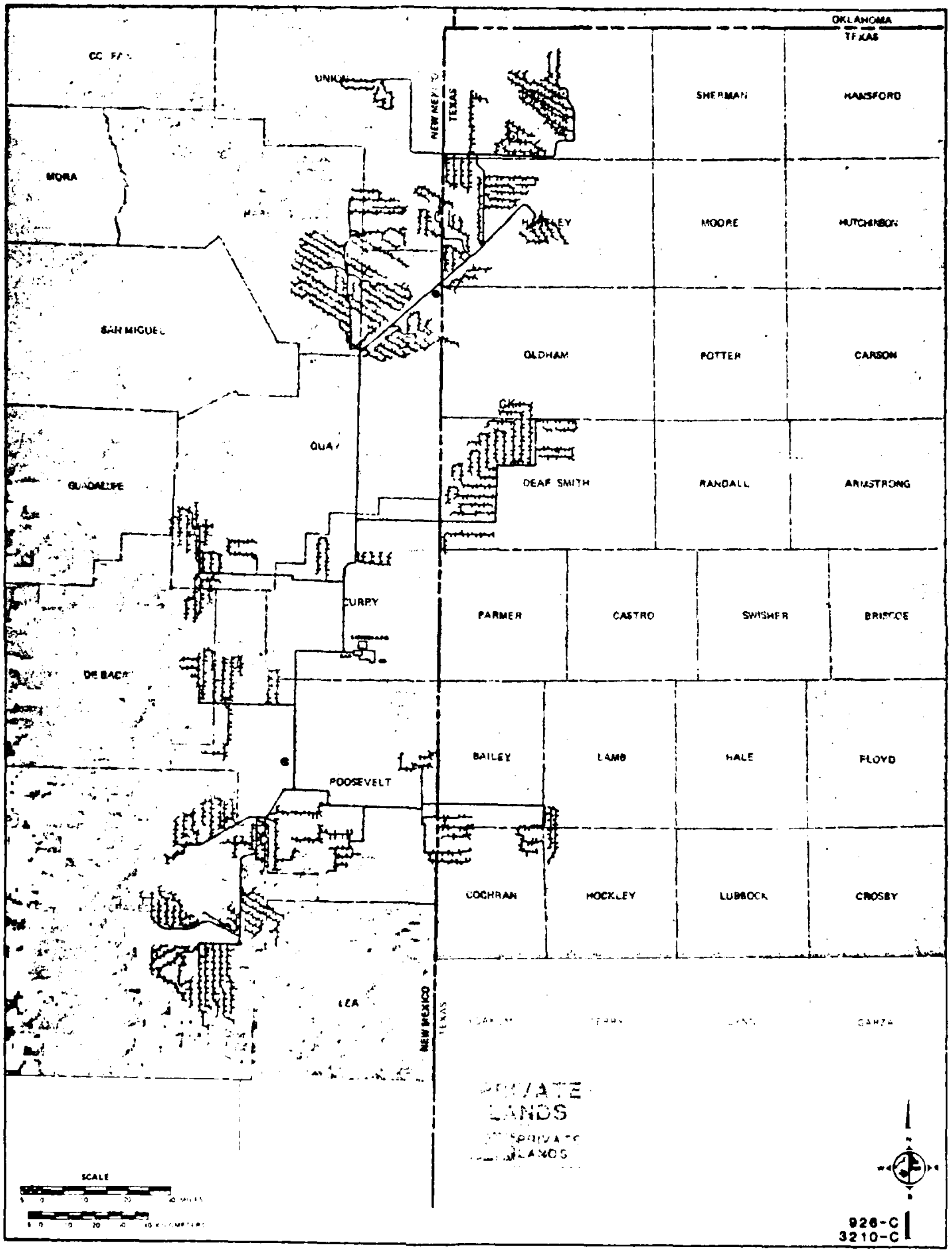


Figure 1.3.1-4. Private land and alternative cluster deployment in the Texas/New Mexico counties.

Table 1.3.1-3. Potential impact on private land in Nevada/Utah and Texas/New Mexico DDAs for Alternative 8.

HYDROLOGIC SUBUNIT OR COUNTY		SHORT-TERM EFFECTS			LONG-TERM [illegible]		
		PRIVATE LAND DISTURBED		POTENTIAL IMPACT[1]	PRIVATE LAND DISTURBED		POTENTIAL IMPACT[1]
NO	NAME	ACRES	PERCENT OF TOTAL IN SUBUNIT OR COUNTY		ACRES	PERCENT OF TOTAL IN SUBUNIT OR COUNTY	
Subunits and Counties with M-X Clusters and DTN							
4	Snake	—	—		—	—	
5	Pine	—	—		—	—	
6	White	—	—		—	—	
7	Fish Springs	—	—		—	—	
46	Sevier Desert	—	—		—	—	
46A	Sevier Desert & Dry Lake[2]	—	—		—	—	
54	Wah Wah	164	1.3		102	0.8	
155C	Little Smoky—Southern	—	—		—	—	
156	Hot Creek	33	0.9		20	0.5	
170	Penoyer	—	—		—	—	
171	Coal	33	3.3		20	0.2	
172	Garden	—	—		—	—	
173A	Railroad—Southern	—	—		—	—	
173B	Railroad—Northern	—	—		—	—	
180	Cave	—	—		—	—	
181	Dry Lake[2]	—	—		—	—	
182	Delamar	—	—		—	—	
183	Lake	—	—		—	—	
184	Spring	—	—		—	—	
196	Hamlin	33	0.1		20	0.1	
202	Patterson	—	—		—	—	
207	White River	98	0.3		61	0.2	
208	Pahroc	—	—		—	—	
209	Pahranagat	98	3.1		61	1.9	
	Bailey, TX	458	0.1		286	0.06	
	Cochran, TX	1,537	0.3		959	0.2	
	Dallam, TX	6,442	0.7		4,019	0.5	
	Deaf Smith, TX	8,175	1.1		5,110	0.7	
	Hartley, TX	7,619	0.8		4,753	0.5	
	Hockley, TX	458	0.1		286	0.5	
	Lamb, TX	294	0.04		183	0.03	
	Oldham, TX	1,341	0.14		837	0.09	
	Parmer, TX	—	—		—	—	
	Chaves, NM	14,423	0.8		8,998	0.5	
	Curry, NM	1,297	0.2		809	0.1	
	DeBaca, NM	2,347	0.2		1,465	0.1	
	Guadalupe, NM	—	—		—	—	
	Harding, NM	6,547	0.7		4,085	0.4	
	Lea, NM	525	0.04		328	0.02	
	Quay, NM	9,852	0.6		6,146	0.4	
	Roosevelt, NM[2]	6,208	0.5		3,873	0.3	
	Union, NM	4,972	0.3		3,102	0.2	
	Overall Nevada/ Utah DDA	459	0.6		284	0.3	
	Overall Texas/ New Mexico DDA	72,459	0.34		46,920	0.22	
	Overall Alternatives	72,918	—		47,204	—	

[1]
- None. (No private land disturbed.)
- Low to moderately low impact. (Less than 100 acres or less than 1 percent of private land disturbed in subunit.)
- Moderate to moderately high impact. (Less than 1,000 acres or less than 3 percent of private land disturbed in subunit.)
- High impact. (More than 1,000 acres or more than 3 percent of private land disturbed in subunit.)

[2]Conceptual location of Area Support Centers (ASCs).

The future non-M-X project which would have the most significant impact on private land would be Nevada Moly, with 2,900 acres. Population growth resulting from the project could result in the use of undeveloped private land.

TEXAS/NEW MEXICO

Table 1.3.1-3 also shows the study area counties in the Texas/New Mexico region, the number of acres of private land that would be disturbed by the Alternative 8 conceptual layout for both construction and operations phases of the project, the percentage of the total private land in the counties that the disturbed land represents, and the level of potential impact of those disturbances for each county. Of the 18 study area counties, two have no direct impacts. Four would have a moderate impact, and 12 would have a high impact level. The total acreage is lower than that impacted under Alternative 7, but in specific counties the impact is essentially unchanged.

Construction could disturb 72,459 acres of private land and operations, 46,920 acres. These acreages represent 0.34 percent and 0.22 percent, respectively, of the 21,048,000 acres of private land in the Texas/New Mexico study area counties (Dept. of Commerce, 1979). The difference between the construction acreage disturbed and the operations acreage disturbed is 25,539 acres. This area could be returned to private use after the completion of construction.

Future non-M-X projects such as the Tolk power plants, Highway I-27, and the CO_2 pipelines are not expected to use significant amounts of private lands.

STATE LANDS (1.3.2)

The state lands discussed here are actually owned by the federal government, but by a congressional grant such lands are administered by the state and revenues from them are for the benefit of schools administered by the state (Utah M-X Coordinating Office, June 16, 1980).

Proposed Action (1.3.2.1)

Under the proposed action, 200 clusters of 23 protective shelters each would be deployed in the Nevada/Utah region, as shown on Figure 1.3.2-1. That figure also shows the coincidence of the proposed action cluster and DTN layout with the location of the state lands in the valleys of the region. It can be seen that the few state lands in the region generally lie in Utah where generally it is found that four sections out of every township are state lands.

Table 1.3.2-1 shows the abundance index of state lands in each valley, the acres of state land that could be disturbed for both construction and operations phases, the percentage of the total state land in those valleys that the disturbed land represents, and the level of impact of those disturbances for each valley. It can be seen for the construction phase, that of the nine valleys in which there are state lands coincident with

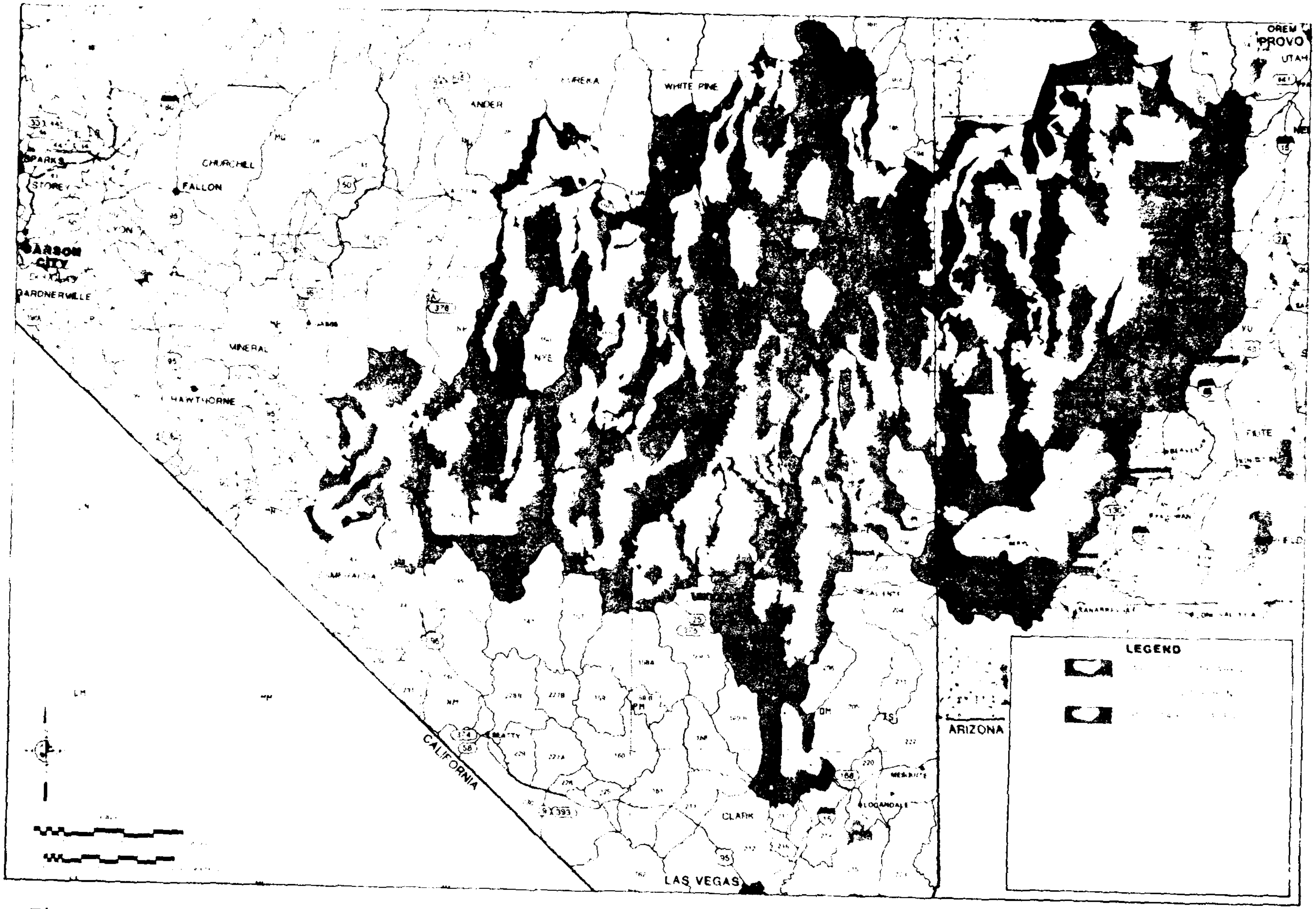


Figure 1.3.2-1. State land and Proposed Action cluster deployment in Nevada/Utah region. (See Fig. 3.2.3.7-2 of DEIS)

Table 1.3.2-1. State land disturbed in the Nevada/Utah region for the Proposed Action.

HYDROLOGIC SUBUNIT		CONSTRUCTION (SHORT-TERM)			OPERATIONS (LONG-TERM)		
		CROPLAND DISTURBED		IMPACT POTENTIAL[1]	CROPLAND DISTURBED		IMPACT POTENTIAL[1]
NO.	NAME	ACRES	PERCENT OF TOTAL		ACRES	PERCENT OF TOTAL	
4	Snake	752	0.6	3	469	0.4	3
5	Pine	425	1.1	3	265	0.7	3
6	White	131	0.2	3	82	0.12	2
7	Fish Creek	229	1.4	3	143	0.4	3
8	Dugway	229	1.4	3	143	0.9	3
9	Government Creek	98	0.4	2	61	0.2	2
46	Sevier Desert	916	0.5	3	571	0.3	3
46A	Sevier Desert & Dry Lake	360	0.6	3	224	0.4	3
54	Wah Wah	752	1.8	3	469	1.1	3
137A	Big Smoky-Tonopah Flat	—	—	1	—	—	1
139	Kobeh	—	—	1	—	—	1
140A	Monitor—North	—	—	1	—	—	1
140B	Monitor—South	—	—	1	—	—	1
141	Ralston	—	—	1	—	—	1
142	Alkali Spring	—	—	1	—	—	1
148	Cactus Flat	—	—	1	—	—	1
149	Stone Cabin	—	—	1	—	—	1
151	Antelope	—	—	1	—	—	1
154	Newark	—	—	1	—	—	1
155A	Little Smoky—North	—	—	1	—	—	1
155B	Little Smoky—South	—	—	1	—	—	1
156	Hot Creek	—	—	1	—	—	1
170	Penoyer	—	—	1	—	—	1
171	Coal	—	—	1	—	—	1
172	Garden	—	—	1	—	—	1
173A	Railroad—South	—	—	1	—	—	1
173B	Railroad—North	—	—	1	—	—	1
174	Jakes	—	—	1	—	—	1
178B	Butte—South	—	—	1	—	—	1
179	Steptoe	—	—	1	—	—	1
180	Cave	—	—	1	—	—	1
181	Dry Lake	—	—	1	—	—	1
182	Delamar	—	—	1	—	—	1
183	Lake	—	—	1	—	—	1
184	Spring	—	—	1	—	—	1
196	Hamlin	—	—	1	—	—	1
202	Patterson	—	—	1	—	—	1
207	White River	—	—	1	—	—	1
208	Pahroc	—	—	1	—	—	1
209	Pahranagat	—	—	1	—	—	1
	DAA Overall	3,891	0.6	—	2,428	0.4	—

4143

[1] 1 = None. (No state land disturbed.)

2 = Low to moderately low impact. (Less than 100 acres or less than 1 percent of state land disturbed in subunit.)

3 = Moderate to moderately high impact. (Less than 1,000 acres or less than 3 percent of state land disturbed in subunit.)

4 = High impact. (More than 1,000 acres or more than 3 percent of state land disturbed in subunit.)

potential project deployment, six have a low impact level, and three have a moderately low level of impact.

All together, under the Proposed Action, 3,891 acres of state land would be disturbed by the construction phase, and 2,428 acres by the operations phase. The difference between these two acreages, 1,463 acres, could be returned to state use upon completion of the construction phase. The 3,891 acres and the 2,428 acres are equal to only 0.6 and 0.4 percent respectively of the acres of state land in the Nevada/Utah valleys. These impacts are very low on a region-wide basis especially in Nevada where little state land exists, and none would be impacted. The loss of this state land to MX would reduce the present state grazing revenue by the same 0.6 and 0.4 percent for the construction and operations phases respectively.

Future non-M-X projects such as IPP, WPPP, and Nevada Moly are not expected to use significant amounts of state land. Because of the permanent nature of the protective structures, it is unlikely that the ground on which they are located would be retrieved for state use in the foreseeable future. The project roadway systems, however, could be returned to either the state's use, or left open to public use with maintenance by local or state jurisdictions upon termination of the operations phase of the project.

The impact on state land could be mitigated by assuring that project deployment and operation would not interfere with the use of adjoining state land. In view of the fact that under the proposed action a maximum of only about 3,891 acres of private land would be disturbed (about 2.6 percent of the 150,000 total disturbed acres), it should be possible to completely avoid state land with minor alterations of the system layout during the tier two refinement of cluster and road siting.

Alternative 1 (1.3.2.2)

Same layout and DDA impacts on state land as Proposed Action.

Alternative 2 (1.3.2.3)

Same layout and DDA impacts on state land as Proposed Action.

Alternative 3 (1.3.2.4)

Same layout and DDA impacts on state land as Proposed Action.

Alternative 4 (1.3.2.5)

Same layout and DDA impacts on state land as Proposed Action.

Alternative 5 (1.3.2.6)

Same layout and DDA impacts on state land as Proposed Action.

Alternative 6 (1.3.2.7)

Same layout and DDA impacts on state land as Proposed Action.

Alternative 7 (1.3.2.[illegible])

Two hundred clusters of 23 protective shelters each would be deployed in the Texas/New Mexico region under Alternative 7, as shown on Figure 1.3.2-[illegible]. That figure also shows the coincidence of the location of the state lands in the counties of the region. It can be seen that in both the Texas and New Mexico counties, private land represents the majority land ownership, and further state land is found only in New Mexico where at least two sections out of every township are state lands.

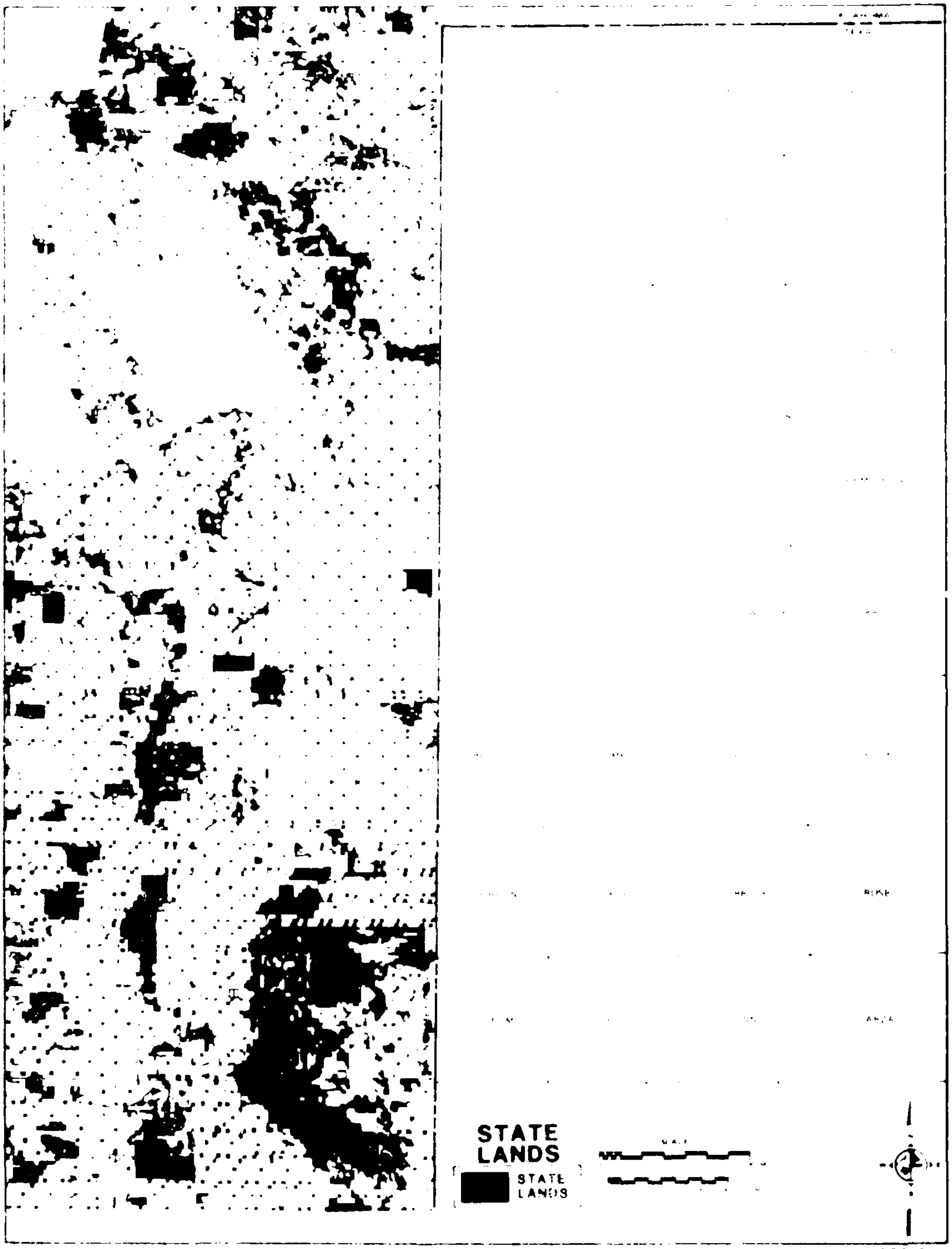
Table 1.3.2-2 shows the counties in the Texas/New Mexico study area, the coincidence index of state land in each county, the acres of such land that would be disturbed for both construction and operations phases, the percentage of the total private land in those counties that the disturbed land represents, and the level of impact of those disturbanced for each county.

It can be seen that of the eight counties in which there are private land coincident with potential project deployment, seven have a low impact level, and one has a moderately low impact level. None of the Texas counties have coincident land. All together, under the Proposed Action, 12,[illegible] acres of state land would be disturbed by the construction phase, and 7,[illegible] acres by the operations phase. The difference between these two figures, 4,785 acres, could be returned to state use upon completion of the construction phase.

The 12,720 acres and the 7,935 acres are equal to only 0.5 and 0.3 percent respectively of the 2,[illegible]31,000 acres of state land in the Texas/New Mexico study area counties. These very low percentage figures are not considered to be significant, and the annual revenues to the state of New Mexico would not be affected significantly.

Future non-M-X projects such as the Tolk Power Plants, Highway I-27, and the CO_2 pipelines will not use significant amounts of state land (M-X-HDRS-HDRS-522). Because of the permanent nature of the protective structures, it is unlikely that the ground on which they are located would be retrieved for state use in the foreseeable future. The roadway system, however, could be returned to either the original owner's exclusive use, or left open to public use with maintenance by local or state jurisdictions upon termination of the operations phase of the project.

The impact on state land could be mitigated by assuring that project deployment and operation would not interfere with the use of adjoining land. In view of the fact that under Alternative 7, a maximum of 12,720 acres of state land would be disturbed (about 8.5 percent of the potential 150,000 total disturbed acres), it may be possible to avoid state land in the Texas/New Mexico region, but such shifting would place the project on even more privately owned land.



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1679

Table 1.[illegible] State lands disturbed in the Texas/New Mexico region, Alternative 7.

[illegible]	[illegible]	ABUNDANCE [illegible]	CONSTRUCTION (SHORT TERM)			OPERATIONS (LONG TERM)		
			CROPLAND DISTURBED		IMPACT[illegible]	CROPLAND DISTURBED		IMPACT[illegible]
			A[illegible]	PERCENT OF TOTAL		AC	PERCENT OF TOTAL	
Texas								
[illegible]		[illegible]	—	—	1	—	—	[illegible]
[illegible]		[illegible]	—	—	[illegible]	—	—	[illegible]
[illegible]chran		[illegible]	—	—	[illegible]	—	—	[illegible]
Dallam		[illegible]	—	—	1	—	—	[illegible]
Deaf Smith		[illegible]	—	—	1	—	—	[illegible]
Hale		[illegible]	—	—	[illegible]	—	—	[illegible]
Hartley		[illegible]	—	—	1	—	—	[illegible]
Hockley		[illegible]	—	—	[illegible]	—	—	[illegible]
Lamb		[illegible]	—	—	[illegible]	—	—	[illegible]
Moore		[illegible]	—	—	[illegible]	—	—	[illegible]
Oldham		[illegible]	—	—	[illegible]	—	—	[illegible]
Parmer		[illegible]	—	—	1	—	—	[illegible]
Randall		[illegible]	—	—	[illegible]	—	—	[illegible]
Sherman		[illegible]	—	—	[illegible]	—	—	[illegible]
Swisher		[illegible]	—	—	[illegible]	—	—	[illegible]
State Total		[illegible]	—	—	—	—	—	—
New Mexico								
[illegible]	[illegible]		[illegible]	4	4	[illegible]	[illegible]	4
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	326	[illegible]	[illegible]
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4	[illegible] 897	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]		[illegible]	[illegible]	4	[illegible]	[illegible]	4
[illegible]	[illegible]		[illegible]	[illegible]	4	[illegible]	[illegible]	4
[illegible]	[illegible]		[illegible]	[illegible]	4	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]		12 720	[illegible]	—	7 935	[illegible]	—
[illegible]	[illegible]		12 72[illegible]	[illegible]	—	7,935	0.3	—

3867-[illegible]

[illegible]

[illegible] than [illegible] acres or less than 1 percent of state land disturbed [illegible]

[illegible] than [illegible] acres or less than 3 percent of state land [illegible]

[illegible] more than 3 percent of state land disturbed in subunit.

Alternative 8 (1.3.2.9)

Nevada/Utah Portion of Alternative 8

Alternative 8 is a split basing system with 70 clusters in Nevada and 30 in Utah (M-X80-NAFB-INC-286). The deployment system for the Nevada/Utah region is shown on Figure 1.3.2-3 together with cluster coincidence with state lands.

Table 1.3.2-3 shows the valleys in the Nevada/Utah study area which have proposed clusters which coincide with state land for Alternative 8, the state land abundance index for each valley, the number of acres of state land that would be disturbed by both the construction phase and operations phase of the project, the percentage of the total private land in those valleys that the disturbed land represents, and the level of impact of those disturbances for each valley. It can be seen that of the six valleys in which state lands coincide with potential project deployment, five have a low impact level, and one has a moderately low impact level.

All together, 2,323 acres of state land could be disturbed by the construction phase and 1,448 acres by the operations phase. These acreages represent 0.4 percent and 0.24 percent, respectively, of the 600,300 acres of state owned land in the Nevada/Utah study area counties (Dept. of Commerce, 1979). The difference between the acreage that would be disturbed for construction and for operations is 875 acres of state land which could be returned to state use upon completion of the construction phase. All of the impacts in state land are in Utah and are not considered to be significant.

Because of the permanent nature of the shelter structures, it is unlikely that the ground on which they would be located could be retrieved for state use in the foreseeable future, unless they are physically removed and the earth restored. The roadway systems, however, could be either returned to the state's use, or left open to public use upon decommissioning of the project.

The impact of the project upon adjoining state land could be mitigated by assuring that ranch acess roads remain open and that natural drainage areas remain unimpeded. The majority of state lands in the Nevada/Utah region could be avoided with tier refinement.

Texas/New Mexico Portion of Alternative 8

Alternative 8 is a split basing system with 35 clusters in Texas and 65 in New Mexico (M-X80-NAFB-INC-286). The deployment system for the Texas/New Mexico region is shown on Figure 1.3.2-4 together with cluster coincidence with state lands.

Table 1.3.2-4 shows the valleys in the Texas/New Mexico area which have proposed clusters which coincide with state land for Alternative 8, the state land abundance index for each valley, the number of acres of

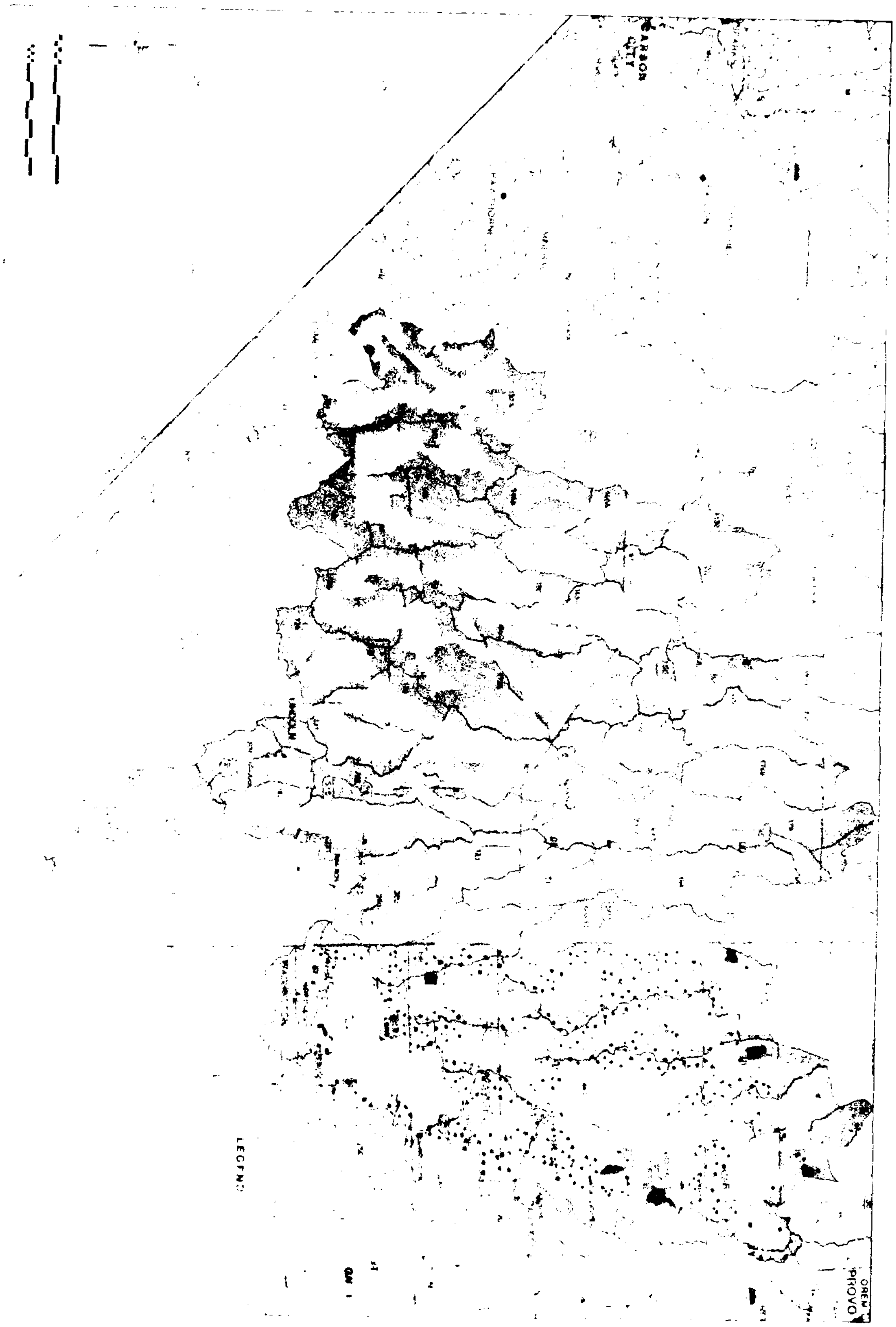

Figure 1.3.2-3. State land and Alternative 8 cluster deployment in Nevada/Utah region.

Table 1.3.2-3. State land disturbed in the Nevada/Utah region, Alternative 8.

VALLEY NO.	VALLEY NAME	ABUNDANCE INDEX[1]	CONSTRUCTION (SHORT TERM) STATE LAND DISTURBED AC	CONSTRUCTION (SHORT TERM) STATE LAND DISTURBED PERCENT OF TOTAL	CONSTRUCTION (SHORT TERM) IMPACT[2]	OPERATIONS (LONG TERM) STATE LAND DISTURBED AC	OPERATIONS (LONG TERM) STATE LAND DISTURBED PERCENT OF TOTAL	OPERATIONS (LONG TERM) IMPACT[2]
4	Snake	3	262	0.2	2	163	0.1	2
5	Tule	3	425	1.1	2	265	0.7	2
6	White	4	33	0.05	2	21	0.03	2
7	Fish Creek	3	—	—	2	—	—	2
8	Dugway	3	—	—	1	—	—	1
9	Government Creek	3	—	—	1	—	—	[illegible]
46	Sevier Desert	3	589	0.3	2	367	0.2	2
46A	Sevier Desert & Dry Lake	3	262	0.5	2	163	0.3	2
54	Wah Wah	4	752	1.8	2	469	1.1	2
137A	Big Smoky-Tonopah Flat	1	—	—	1	—	—	[illegible]
139	Kobeh	1	—	—	1	—	—	[illegible]
140A	Monitor-Northern	1	—	—	1	—	—	[illegible]
140B	Monitor-Southern	1	—	—	1	—	—	[illegible]
141	Ralston	1	—	—	1	—	—	[illegible]
142	Alkali Spring	1	—	—	1	—	—	[illegible]
148	Cactus Flat	1	—	—	1	—	—	[illegible]
149	Stone Cabin	1	—	—	1	—	—	[illegible]
151	Antelope	1	—	—	1	—	—	[illegible]
154	Newark	1	—	—	1	—	—	[illegible]
155A	Little Smoky-Northern	1	—	—	1	—	—	[illegible]
155B	Big Smoky-Southern	1	—	—	1	—	—	[illegible]
156	Hot Creek	1	—	—	1	—	—	[illegible]
170	Penoyer	1	—	—	1	—	—	[illegible]
171	Coal	1	—	—	1	—	—	[illegible]
172	Garden	1	—	—	1	—	—	[illegible]
173A	Railroad-Southern	1	—	—	1	—	—	[illegible]
173B	Railroad-Northern	1	—	—	1	—	—	[illegible]
174	Jakes	1	—	—	1	—	—	[illegible]
175	Long	1	—	—	[illegible]	—	—	[illegible]
178B	Butte-South	1	—	—	1	—	—	[illegible]
179	Steptoe	1	—	—	1	—	—	[illegible]
180	Cave	1	—	—	1	—	—	[illegible]
181	Dry Lake	1	—	—	1	—	—	[illegible]
182	Delamar	1	—	—	1	—	—	[illegible]
183	Lake	1	—	—	1	—	—	[illegible]
184	Spring	1	—	—	1	—	—	[illegible]
196	Hamlin	3	—	—	1	—	—	[illegible]
202	Patterson	1	—	—	1	—	—	[illegible]
207	White River	2	—	—	1	—	—	1
208	Pahroc	1	—	—	1	—	—	1
209	Pahranagat	2	—	—	1	—	—	[illegible]
	DDA Overall	3	2,373	0.4	2	1,448	0.24	2

3,4[illegible]

1 None — No state land disturbed.

2 Low to moderately low impact. (Less than 100 acres or less than 1 percent of state land disturbed in subunit.)

3 Moderate to moderately high impact. (Less than 1,000 acres or less than 3 percent of state land disturbed in subunit.)

4 High impact. (More than 1,000 acres or more than 3 percent of state land disturbed in subunit.)

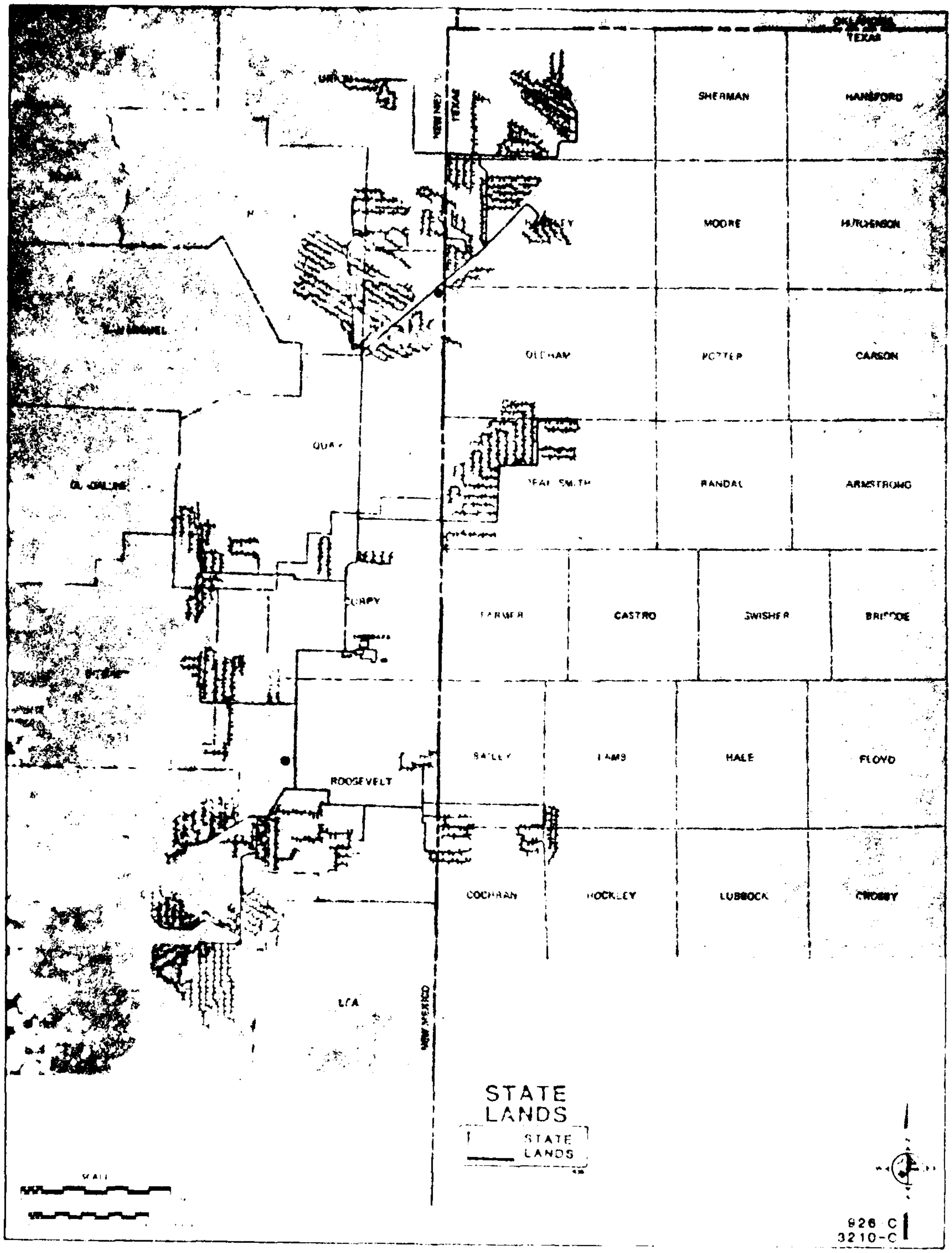

Figure 4.3.2.11-11. Private land, Texas/New Mexico, and Alternative 8.

Table 1.3.2-4. State land disturbed in the Texas/New Mexico region, Alternative 8.

STATE/COUNTY	ABUNDANCE INDEX[1]	CONSTRUCTION (SHORT TERM)			OPERATIONS (LONG TERM)		
		CROPLAND DISTURBED		IMPACT[1]	CROPLAND DISTURBED		IMPACT[1]
		AC	PERCENT OF TOTAL		AC	PERCENT OF TOTAL	
Texas							
Bailey	1	—	—	1	—	—	1
Castro	1	—	—	1	—	—	1
Cochran	1	—	—	1	—	—	1
Dallam	1	—	—	1	—	—	1
Deaf Smith	1	—	—	1	—	—	1
Hale	1	—	—	1	—	—	1
Hartley	1	—	—	1	—	—	1
Hockley	1	—	—	1	—	—	1
Lamb	1	—	—	1	—	—	1
Moore	1	—	—	1	—	—	1
Oldham	1	—	—	1	—	—	1
Parmer	1	—	—	1	—	—	1
Randall	1	—	—	1	—	—	1
Sherman	1	—	—	1	—	—	1
Swisher	1	—	—	1	—	—	1
State Total	1	—	—	1	—	—	1
New Mexico							
Chaves	3	2,714	0.4	2	1,693	0.2	2
Curry	3	327	0.5	2	204	0.3	2
DeBaca	3	392	0.2	2	245	0.1	2
Harding	4	3,041	0.9	2	1,897	0.5	2
Lea	2	360	0.4	2	225	0.3	2
Quay	3	1,994	0.8	2	1,244	0.5	2
Roosevelt	3	981	0.5	2	612	0.3	2
Union	3	818	0.2	2	510	0.1	2
State Total	3	10,628	0.3	2	6,630	0.2	2
Region Total	3	10,628	0.3	2	6,630	0.2	2

3868-1

[1]1 = None. (No state land disturbed.)

2 = Low to moderately low impact. (Less than 100 acres or less than 1 percent of state land disturbed in subunit.)

3 = Moderate to moderately high impact. (Less than 1,000 acres or less than 3 percent of state land disturbed in subunit.)

4 = High impact. (More than 1,000 acres or more than 3 percent of private land disturbed in subunit.)

state land that would be disturbed by both the construction phase and operations phase of the project, the percentage of the total private land in those valleys that the disturbed land represents, and the level of impact of those disturbances for each valley. It can be seen that of the nine counties in which state lands coincide with potential project deployment, all have a low impact level.

All together, 10,628 acres of state land could be disturbed by the construction phase and 6,630 acres by the operations phase. These acreages represent 0.3 percent and 0.2 percent respectively, of the 600,300 acres of state owned land in the Nevada/Utah study area counties (Dept. of Commerce, 1979). The difference between the acreage that would be disturbed for construction and for operations is 9,753 acres of state land which could be returned to state use upon completion of the construction phase. All of the impacts of state land are in New Mexico and are not considered to be significant.

The permanent shelter structures and roadway easements could be returned to state or public ownership upon decommissioning of the project.

The impact of the project upon adjoining state land could be mitigated by assuring that project deployment would not interfere with irrigation systems, that access roads to farmlands remain open, and that natural drainage areas remain unimpeded. Some state lands in Texas/New Mexico could be avoided with tier two refinement.

PUBLIC LANDS (1.3.3)

Although several types of federal land ownership exist in the Nevada/Utah region, the M-X suitable areas are only located on public domain lands administered by the BLM, and that is the only type of federal land to be discussed in this section. The impacts on public land discussed here for alternatives 1 through 6 have identical DDA impacts as the Proposed Action, and therefore no separate discussion is presented for each.

Future non-M-X projects such as IPP, WPPP and Nevada Moly in the Nevada/Utah region, will also use some public land, however their impact on public land is likewise not expected to be significant. Because of the permanent nature of the protective structures, it is unlikely that the ground on which they are located could be retrieved for public use in the foreseeable future. The project roadway systems, however, could be returned to either BLM's multiple use program or left open to public use with maintenance either by BLM, the state, or county agencies upon termination of the operations phase of the project.

The impact on public land could be mitigated by assuring that project deployment and operation would not interfere with the use of adjoining public land, and that natural drainage systems, irrigation systems, and access roads to farmlands remain unimpeded.

Proposed Action (1.3.3.1)

Under the Proposed Action, 200 clusters of 23 protective shelters each would be deployed in the Nevada/Utah region. Nearly all of the Nevada portion of the region is public land, and nearly 32 out of the 36 sections in each township in the Utah portion of the region are public land.

Table 1.3.3-1 shows the number of acres of land that would be disturbed in each hydrologic subunit of the Nevada/Utah region for both construction (short term) and operations (long term) phases of the project. That table also shows the percentage of the BLM land in those subunits that the disturbed land represents. It can be seen that for the construction phase, of 41 affected hydrologic subunits 14 would have at least one percent of its public land disturbed, and one would have two percent affected.

All together, under the proposed action, 145,090 acres of public land would be disturbed by the construction phase, and 90,575 acres would be disturbed by the operations phase of the project. The difference between these two figures, 54,515 acres, could be returned to public use upon completion of the construction phase. The 145,090 acres and 90,595 acres are 0.8 and 0.5 percent, respectively, of the 18,959,900 acres of public land in the Nevada/Utah hydrologic subunits. These direct impacts are considered to be very low in terms of the continued availability of BLM lands for multiple use purposes.

Alternative 1 (1.3.3.2)

Same layout and DDA impacts on state land as Proposed Action.

Alternative 2 (1.3.3.3)

Same layout and DDA impacts on state land as Proposed Action.

Alternative 3 (1.3.3.4)

Same layout and DDA impacts on state land as Proposed Action.

Alternative 4 (1.3.3.5)

Same layout and DDA impacts on state land as Proposed Action.

Alternative 5 (1.3.3.6)

Same layout and DDA impacts on state land as Proposed Action.

Alternative 6 (1.3.3.7)

Same layout and DDA impacts on state land as Proposed Action.

Table 1.3.3-1. Public land disturbed in the Nevada/Utah region, Proposed Action.

HYDROLOGIC SUBUNIT		CONSTRUCTION PHASE		OPERATIONS PHASE	
NO.	NAME	LAND DISTURBED (ACRES)	PERCENT OF TOTAL	LAND DISTURBED (ACRES)	PERCENT OF TOTAL
4	Snake	10,366	0.8	6,467	0.5
5	Pine	3,303	0.8	2,061	0.5
6	White	4,905	1.0	3,060	0.6
7	Fish Springs	2,027	0.8	1,265	0.5
8	Dugway	2,420	1.5	1,510	0.9
9	Government Creek	556	0.2	347	0.1
46	Sevier Desert	6,573	0.5	4,101	0.3
46A	Sevier Desert & Dry Lake	3,401	0.7	2,122	0.4
54	Wah Wah	5,101	1.5	3,182	0.9
137A	Big Smoky-Tonopah Flat	3,532	0.4	2,203	0.2
139	Kobeh	5,134	1.0	3,203	0.6
140A	Monitor—Northern	4,055	1.4	2,530	0.9
140B	Monitor—Southern	392	0.3	245	0.2
141	Ralston	6,278	1.5	3,917	0.9
142	Alkali Spring	3,761	1.9	2,346	1.2
143	Cactus Flat	360	0.9	225	0.6
147	Stone Cabin	4,872	0.9	3,039	0.6
151	Antelope	4,415	2.0	2,754	1.2
154	Newark	2,256	0.5	1,857	0.3
155A	Little Smoky—Northern	2,976	0.5	1,857	0.3
155C	Little Smoky—Southern	2,549	0.7	1,570	0.5
156	Hot Creek	5,232	0.8	3,264	0.5
170	Penoyer	4,513	1.3	2,815	0.8
171	Coal	3,728	1.2	2,326	0.7
172	Garden	3,761	1.8	2,346	1.1
173A	Railroad—Southern	4,905	1.5	3,060	0.9
173B	Railroad—Northern	6,671	0.5	4,162	0.3
174	Jakes	2,976	1.5	1,857	0.9
175	Long	2,256	0.6	1,407	0.4
178B	Butte—South	3,401	0.8	2,122	0.5
179	Steptoe	360	0.04	225	0.2
180	Cave	2,256	0.9	1,407	0.6
181	Dry Lake	7,096	1.3	4,427	0.8
182	Delamar	2,256	0.9	1,407	0.6
183	Lake	3,008	0.9	1,877	0.6
184	Spring	1,504	0.2	938	0.1
196	Hamlin	4,872	1.3	3,039	0.8
202	Patterson	1,112	0.4	694	0.2
207	White River	4,807	0.6	2,999	0.4
208	Pahroc	294	0.1	183	0.06
209	Pahranagat	757	0.2	469	0.1
	Total	145,090	0.8	90,575	0.5

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Alternative 7 (1.3.3.8)

Under Alternative 7, 200 clusters of 23 protective shelters each would be deployed in the Texas/New Mexico region. All of the public land in the region is located in the New Mexico counties, and the only coincidence of public land and the project layout is in Chaves County.

Table 1.3.3.2 shows the number of acres of public land that would be disturbed in each county of the Texas/New Mexico region for both construction (short term) and operations (long term) phases of Alternative 7. That table also shows the percentage of the public land in those counties that the disturbed land represents. It can be seen that for the construction phase, of 23 counties in the region, the project would have no impact on 22, and an 0.2 percent impact on one – Chaves County.

Under Alternative 7, 4,055 acres of public land would be disturbed by the construction phase, and 2,530 acres would be disturbed by the operations phase of the project. The difference between these two figures, 1,525 acres, could be returned to BLM use upon completion of the construction phase. The 4,055 acres and 2,530 acres are 0.16 and 0.1 percent, respectively, of the 2,501,600 acres of public land in the Texas/New Mexico counties. These direct impacts are considered to be very low in terms of the continued availability of public lands for multiple use purposes.

Alternative 8 (1.3.3.9)

Nevada/Utah Region

Alternative 8 is a split basing system with 70 clusters proposed in Nevada, and 30 in Utah. Nearly all of the Nevada portion of the region is public land, and all but about two sections out of every township (state lands) are public land in Utah. Both states also have some private land.

Table 1.3.3-3 shows the number of acres of public land that would be disturbed in each hydrologic subunit, for both construction and operations phases in the Nevada/Utah portion of Alternative 8. That table also shows the percentage of the public land in those subunits that the disturbed land represents. It can be seen for the construction phase, that Alternative 8 would disturb land in 23 subunits, only seven of which would have more than one percent of its public land disturbed.

All together, under Alternative 8, 78,440 acres of Nevada/Utah region public land would be disturbed by the construction phase, and 48.935 acres would be disturbed by the operations phase of the project. The difference between these two figures, 29,505 acres, could be returned to BLM uses upon completion of the construction. The 74,385 acres and the 46,405 acres represent 0.4 and 0.3 percent, respectively, of the 18,959,900 acres of public land in the Nevada/Utah hydrologic subunits. These direct impacts are considered to be very low in terms of the continued availability of public lands for non-project uses.

Table 1.3.3-2. Public land disturbed in the Texas/New Mexico region, Alternative 7.

STATE COUNTY	CONSTRUCTION PHASE		OPERATIONS PHASE	
	LAND DISTURBED (ACRES)	PERCENT OF TOTAL	LAND DISTURBED (ACRES)	PERCENT OF TOTAL
Texas				
Bailey	-	-	-	-
Castro	-	-	-	-
Cochran	-	-	-	-
Dallam	-	-	-	-
Deaf Smith	-	-	-	-
Hale	-	-	-	-
Hartley	-	-	-	-
Hockley	-	-	-	-
Lamb	-	-	-	-
Moore	-	-	-	-
Oldham	-	-	-	-
Parmer	-	-	-	-
Randall	-	-	-	-
Sherman	-	-	-	-
Swisher	-	-	-	-
State Total	-	-	-	-
New Mexico				
Chaves	4,055	0.2	2,530	0.1
Curry	-	-	-	-
De Baca	-	-	-	-
Harding	-	-	-	-
Lea	-	-	-	-
Quay	-	-	-	-
Roosevelt	-	-	-	-
Union	-	-	-	-
State Total	4,055	0.16	2,530	0.1
Regional Total	4,055	0.16	2,530	0.1

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Table 1.3.3-3. Public land disturbed in both Nevada/Utah and Texas/New Mexico region, Alternative 8.

HYDROLOGIC SUBUNIT OR COUNTY		CONSTRUCTION PHASE		OPERATIONS PHASE	
		ACRES DISTURBED	PERCENT OF TOTAL	ACRES DISTURBED	PERCENT OF TOTAL
4	Snake	4,284	0.3	2,673	0.2
5	Pine	3,761	0.9	2,346	0.6
6	White	719	0.1	449	0.1
7	Fish Springs	131	0.1		
46	Sevier Desert	5,396	0.4	3,366	0.2
46A	Sevier Desert and Dry Lake	3,630	0.7	2,265	0.4
54	Wah Wah	5,919	1.8	3,693	1.1
155C	Little Smoky So.	1,799	0.5	1,122	0.3
156	Hot Creek	4,970	0.8	3,101	0.5
170	Penoyer	4,186	1.2	2,611	0.8
171	Coal	3,761	1.2	2,347	0.8
172	Garden	3,499	1.7	2,183	1.1
173A	Railroad So.	3,728	1.2	2,326	0.7
173B	Railroad No.	2,289	0.0	1,428	0.1
180	Cave	2,256	0.9	1,407	0.7
181	Dry Lake	7,063	1.3	4,406	0.7
182	Delamar	2,158	0.9	1,346	0.6
183	Lake	2,812	0.8	1,754	0.5
184	Spring	1,504	0.2	938	0.1
196	Hamlin	4,742	1.2	2,958	0.7
202	Patterson	752	0.3	469	0.2
207	White River	5,199	0.7	3,243	0.4
208	Pahroc	327	0.1	204	0.1
Chaves County		4,055	0.2	2,530	0.1
	TOTAL	78,440	-	48,935	-

4201

Texas/New Mexico Region

Under Alternative 8, 35 clusters of 23 protective shelters each would be located in Texas, and 65 would be located in New Mexico. All of the public land in the region is located in the New Mexico counties, and the only coincidence of public land and the project layout is in Chaves County.

Table 1.3.3-3 shows the number of acres of land that would be disturbed in Chaves County of the Texas/New Mexico region for both construction (short term) and operations (long term) phases of Alternative 8. That table also shows the percentage of the public land in those counties that the disturbed land represents.

Under Alternative 8, 4,055 acres of public land would be disturbed by the construction phase, and 2,530 acres would be disturbed by the operations phase of the project. The difference between these two figures, 1,525 acres, could be returned to BLM use upon completion of the construction phase. The 4,055 acres and 2,530 acres are 0.16 and 0.1 percent, respectively, of the 2,501,600 acres of public land in the Texas/New Mexico counties. These direct impacts are considered to be very low in terms of the continued availability of BLM lands for multiple use purposes.

EFFECTS ON LAND OWNERSHIP AT OPERATING BASES (1.3.4)

Beryl, Utah (1.3.4.1)

Figure 1.3.4-1 shows the potential operating base at Beryl, Utah, and the land ownerships in the area. Table 1.3.4-1 shows the number of acres of land of each ownership type that would be occupied by the potential operating base and facilities, and the number of acres of each ownership type within the suitability zone around the potential base.

It can be seen that 54 percent of the area of the operating base facilities would be located on public land, 38 percent on private land, and the remainder on state land. Because the suitability zone extends southerly into the private land of Escalante Valley, 62 percent of the zone is in private ownership and 31 percent is BLM land with the remainder being state land.

Because of the mountainous character of most of the public land within the suitability zone, it is unlikely that the operating base could be relocated to take additional advantage of public land. The 3,200 acres of private land for an operating base at Beryl is equal to 0.4 percent of the private land in Iron County. This would be a very low impact on that resource.

Coyote Spring Valley, Nevada (1.3.4.2)

Figure 1.3.4-2 shows the potential operating base at Coyote Spring Valley, Nevada, and the land ownerships in the area. Table 1.3.4-2 shows the number of acres of land of each ownership type that would be occupied by the potential operating base and facilities, and the number of acres of each type of ownership within the suitability zone around the potential base.

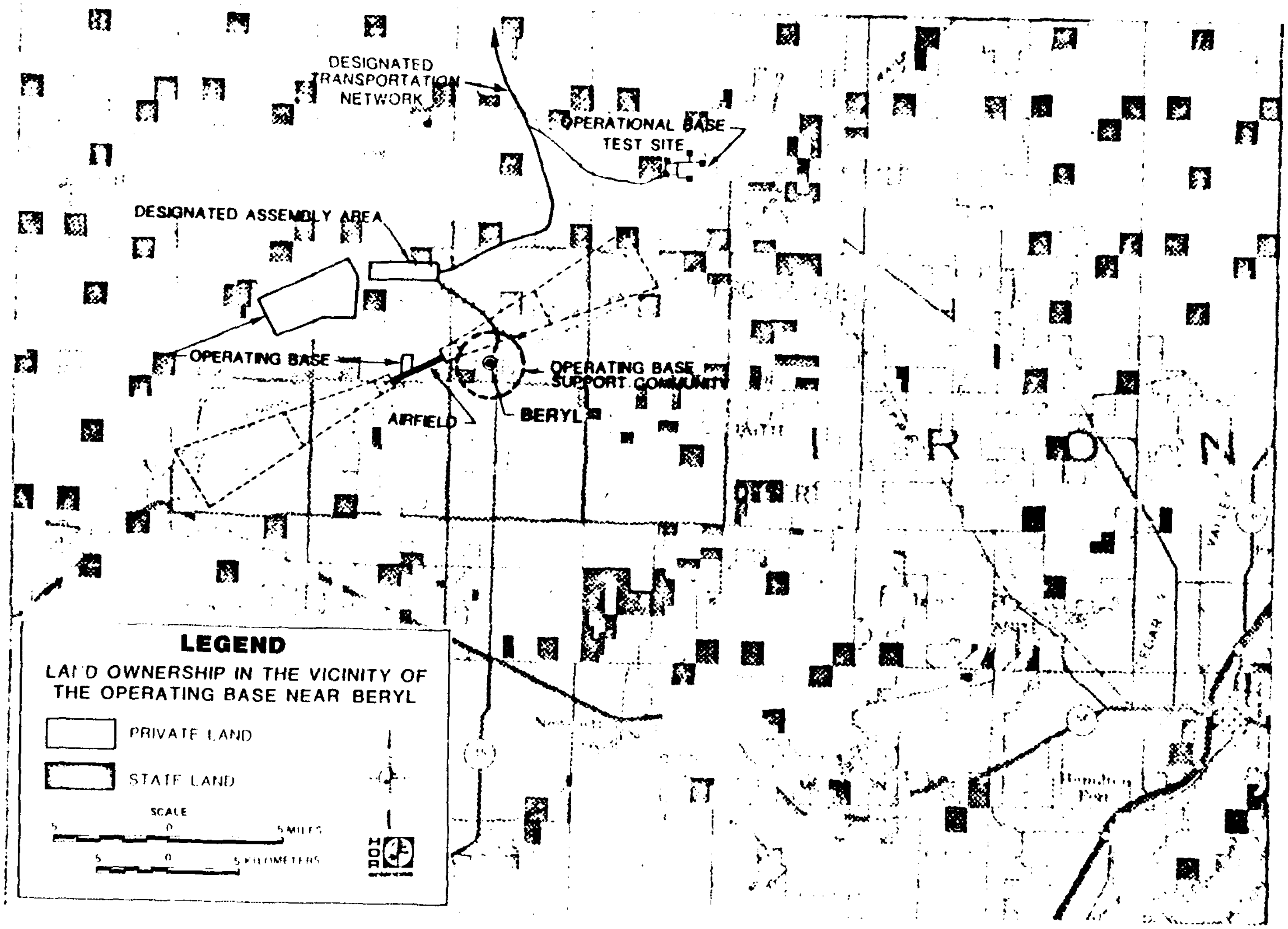

Figure 1.3.4-1. Land ownership in the vicinity of the operating base at Beryl, Utah.

Table 1.3.4-1. Land ownership at potential operating base facilities at Beryl.

OWNERSHIP TYPE	OPERATING BASE FACILITIES		SUITABILITY ZONE	
	ACRES	PERCENT OF OB	ACRES	PERCENT OF ZONE
Private	3,200	38	181,760	62
State	640	8	21,760	7
Public	4,500	54	91,520	31
Total	8,340	100	295,040	100

3854

Source: Department of Interior, 1977.

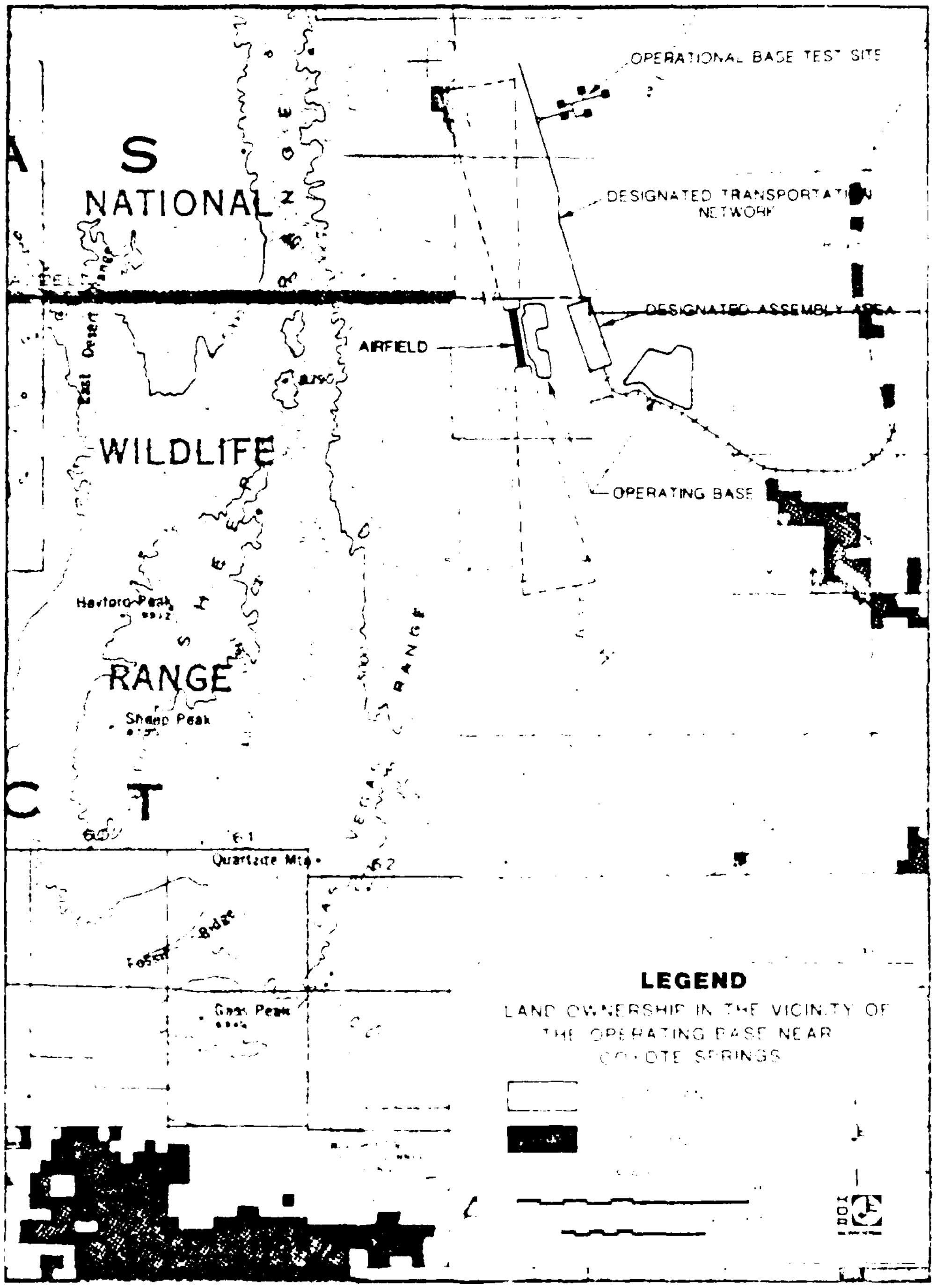

Figure 1.[illegible]4-2. Land ownership in the vicinity of Coyote Spring operating base.

Table 1.3.4-2. Land ownership at potential operating base facilities at Coyote Spring Valley, Nevada.

OWNERSHIP TYPE	OPERATING BASE FACILITIES		SUITABILITY ZONE	
	ACRES	PERCENT OF OB	ACRES	PERCENT OF ZONE
Private	0	0	0	0
State	0	0	0	0
Public	8,340	100	126,720	100
Total	8,340	100	126,720	100

3855-1

Source: University of Nevada, 1972.

It can be seen that 100 percent of the area of the operating base facilities would be located on public land. Likewise, the suitability zone is entirely public land.

The 8,340 acres of public land that would be required for the operating base at Coyote Spring is equal to 0.2 percent of the public land in Clark County, and is not considered to be a significant impact.

Delta, Utah (1.3.4.3)

Figure 1.3.4-3 shows the potential operating base at Delta, Utah, and the land ownerships in the area. Table 1.3.4-3 shows the number of acres of land of each ownership type that would occupied by the potential operating base and facilities, and the number of acres of each ownership type within the suitability zone around the potential base.

It can be seen that 72 percent of the area of the operating base facilities would be located on public land, and 28 percent on private land. Eighty percent of the suitability zone is public land, with the remainder divided between state and private land.

The 4,650 acres of public land required for the operating base is equal to 0.5 percent of the public land in Iron County. The 1,790 acres of state land for the base is equal to 0.1 percent of the state land in Iron County. These are not considered to be significant impacts.

Ely, Nevada (1.3.4.4)

Figure 1.3.4-4 shows the potential operating base at Ely, Nevada, and the land ownerships in the area. Table 1.3.4-4 shows the number of acres of land of each ownership type that would be occupied by the potential operating base and facilities, and the number of acres of each type within the suitability zone around the potential base.

It can be seen that 80 percent of the area of the operating base facilities would be located on public land and 20 percent on private land. The suitability zone is 83 percent BLM and 17 percent private land.

The 5,140 acres of BLM land is equal to 0.1 percent of the BLM land in White Pine County, and the 1,300 acres of private land for the operating base is equal to 0.3 percent of the private land in that county. These are not considered to be significant impacts.

Milford, Utah (1.3.4.5)

Figure 1.3.4-5 shows the potential operating base near Milford, Utah, and the land ownerships in the area. Table 1.3.4-5 shows the number of acres of land of each ownership type that would be occupied by the potential operating base and facilities, and the number of acres of each type within the suitability zone around the potential base.

It can be seen that 88 percent of the area of the operating base facilities would be located on public land, 8 percent on private land, and the remainder on state land. Considerably more private land is involved

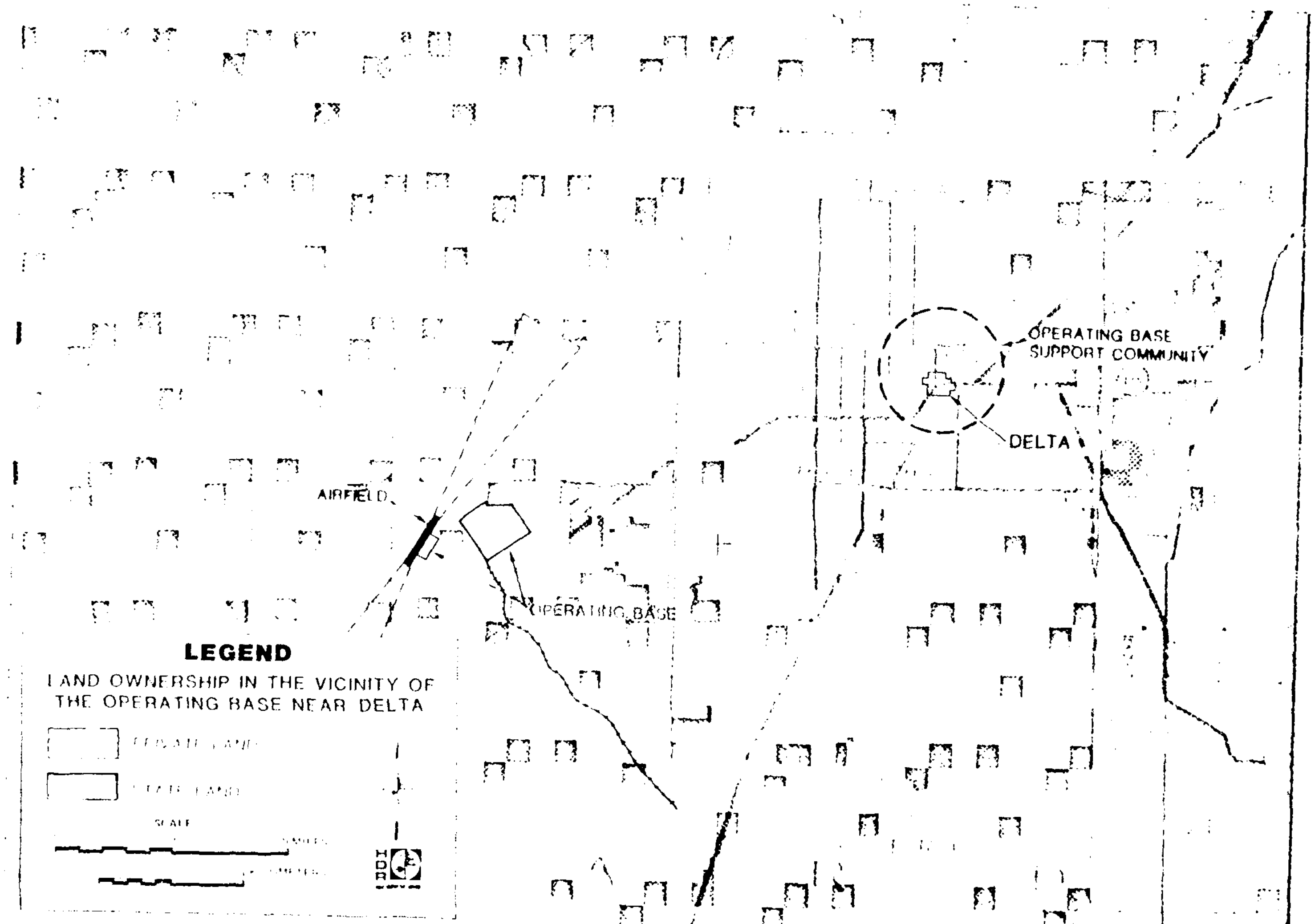

Figure 1.3.4-3. Land ownership in the vicinity of the operating base near Delta, Utah.

Table 1.3.4-3. Land ownership at potential operating base facilities at Delta, Utah.

OWNERSHIP TYPE	OPERATING BASE FACILITIES		SUITABILITY ZONE	
	ACRE	PERCENT OF OB	ACRE	PERCENT OF ZONE
Private	0	0	11,520	10
State	1,790	28	12,160	10
BLM	4,650	72	95,360	80
Total	6,440	100	119,040	100

3856

Source: Department of the Interior, 1977.

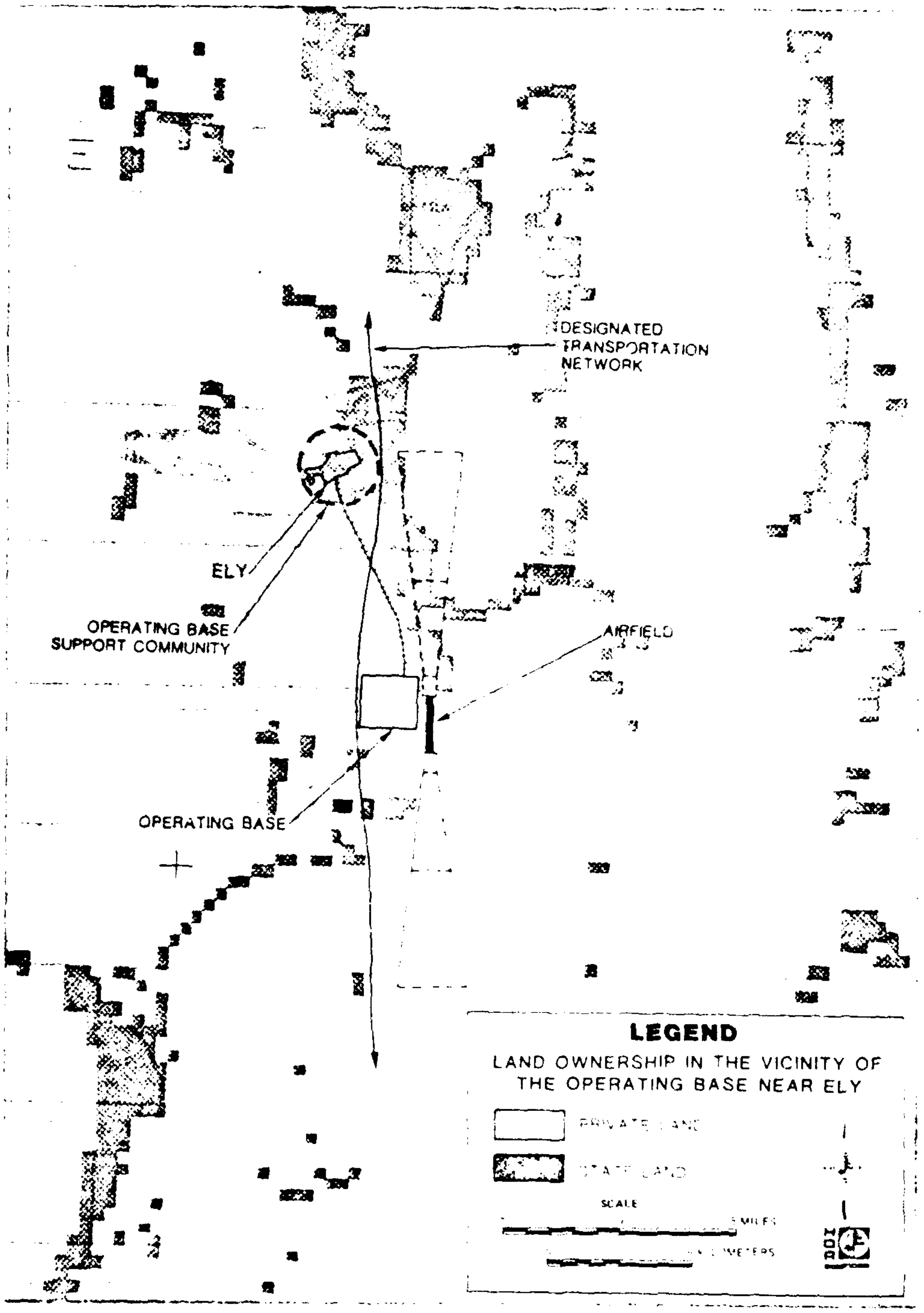

Figure 1.3.4-4. Land ownership in the vicinity of the operating base near Ely, Nevada.

Table 1.3.4-4. Land ownership at potential operating base facilities at Ely, Nevada.

OWNERSHIP TYPE	OPERATING BASE FACILITIES		SUITABILITY ZONE	
	ACRE	PERCENT OF OB	ACRE	PERCENT OF ZONE
Private	1,300	20	25,600	17
State	0	0	0	0
	5,140	80	123,300	83
Total	6,440	100	149,100	100

3857-1

Source: University of Nevada, 1972.

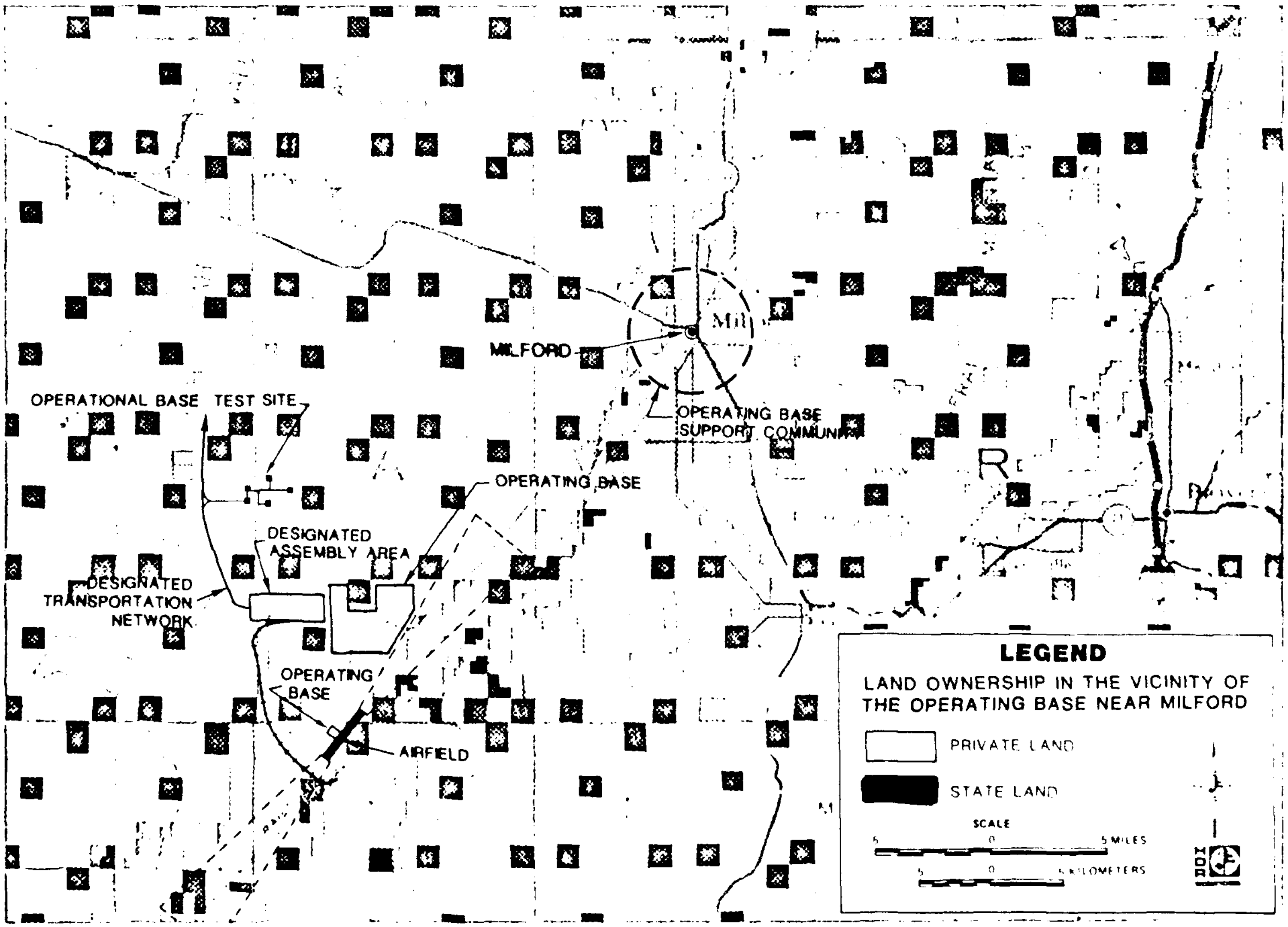

Figure 1.3.4-5. Land ownership in the vicinity of the operating base near Milford, Utah.

Table 1.3.4-5. Land ownership at potential operating base facilities at Milford, Utah.

OWNERSHIP TYPE	OPERATING BASE FACILITIES		SUITABILITY ZONE	
	ACRE	PERCENT OF OB	ACRE	PERCENT OF ZONE
Private	640	8	91,520	43
State	430	4	30,720	15
BLM	7,380	88	87,040	42
Total	8,340	100	209,280	100

3858-1

with the suitability zone, however, being 43 percent of the zone, and with public and state lands being 42 and 15 percent, respectively.

The 7,380 acres of public land, 640 acres of private land, and 320 acres of state land required for the potential Milford operating base are equal to 2.5, 0.1, and 0.08 percent of those resources in Millard County, respectively. These are not considered to be significant impacts.

Clovis, New Mexico (1.3.4.6)

Figure 1.3.4-6 shows the potential operating base at Clovis, New Mexico, and the land ownerships in the area. Table 1.3.4-6 shows the number of acres of land of each ownership type that would be occupied by the potential operating base and facilities, and the number of acres of each type within the suitability zone around the potential base.

It can be seen that all of the area of the operating base facilities would be located on private land. Because the suitability zone extends easterly only, onto Cannon AFB, 35 percent of the suitability zone is DOD land. It is intended that M-X share the runway facilities with Cannon AFB.

The 6,400 acres of private land required for the potential operating base is equal to 0.8 percent of the private land in Curry County. This is not considered to be a significant impact.

Dalhart, Texas (1.3.4-7)

Figure 1.3.4-7 shows the potential operating base at Dalhart, Texas, and the land ownerships in the area. Table 1.3.4-7 shows the number of acres of land of each ownership type that would be occupied by the potential operating base and facilities, and the number of acres of each type within the suitability zone around the potential base.

It can be seen that 100 percent of the area of the operating base facilities would be located on private land. Suitability zone is also 100 percent private land.

Because of the mountainous character of most of the public land within the suitability zone, it is unlikely that the operating base could be relocated to take additional advantage of public land. The 3,200 acres of private land for an operating base at Beryl is equal to 0.4 percent of the private land in Iron County. This would be a very low impact on that resource.

The 6,440 of privately owned land required for the operating base facilities is equal to 0.7 percent of the private land in Hartley County. This loss of private land is not considered to be a significant impact on the total amount of private land in Dallam County.

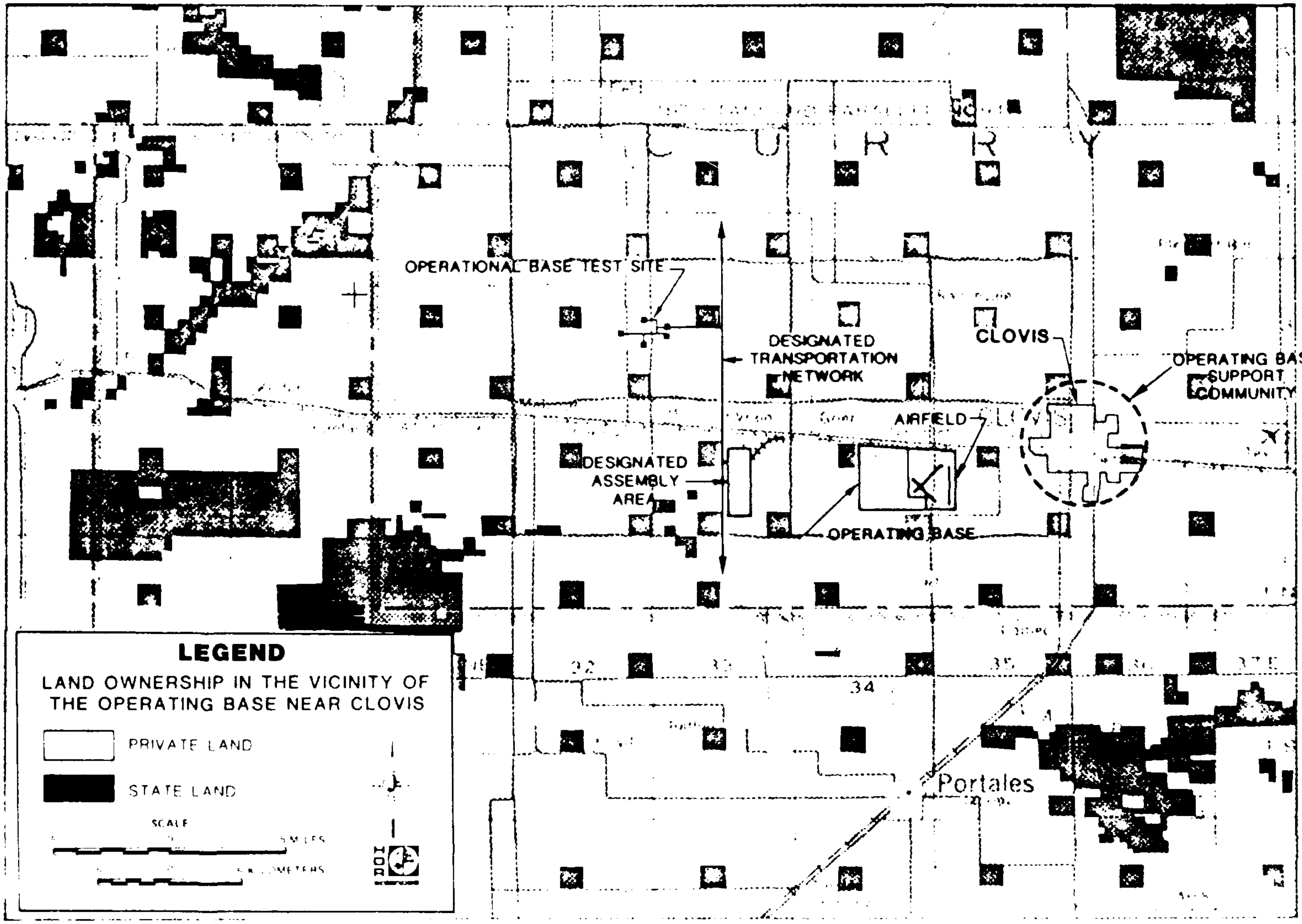

Figure 1.3.4-6. Land ow ership in the vicinity of the operating base near Clovis, Texas.

Table 1.3.4-6. Land ownership at potential operating base facilities at Clovis.

OWNERSHIP TYPE	OB, DAA AND OBTS FACILITIES		SUITABILITY ZONE	
	ACRES	PERCENT	ACRES	PERCENT
DOD[1]	0	0	3,440	35
Private	6,400	100	6,400	65
State	0	0	0	0
Public	0	0	0	0
Total	6,400	100	9,840	100

3859-1

Source: Panhandle Regional Planning Commission, 1978.

[1]Cannon AFB

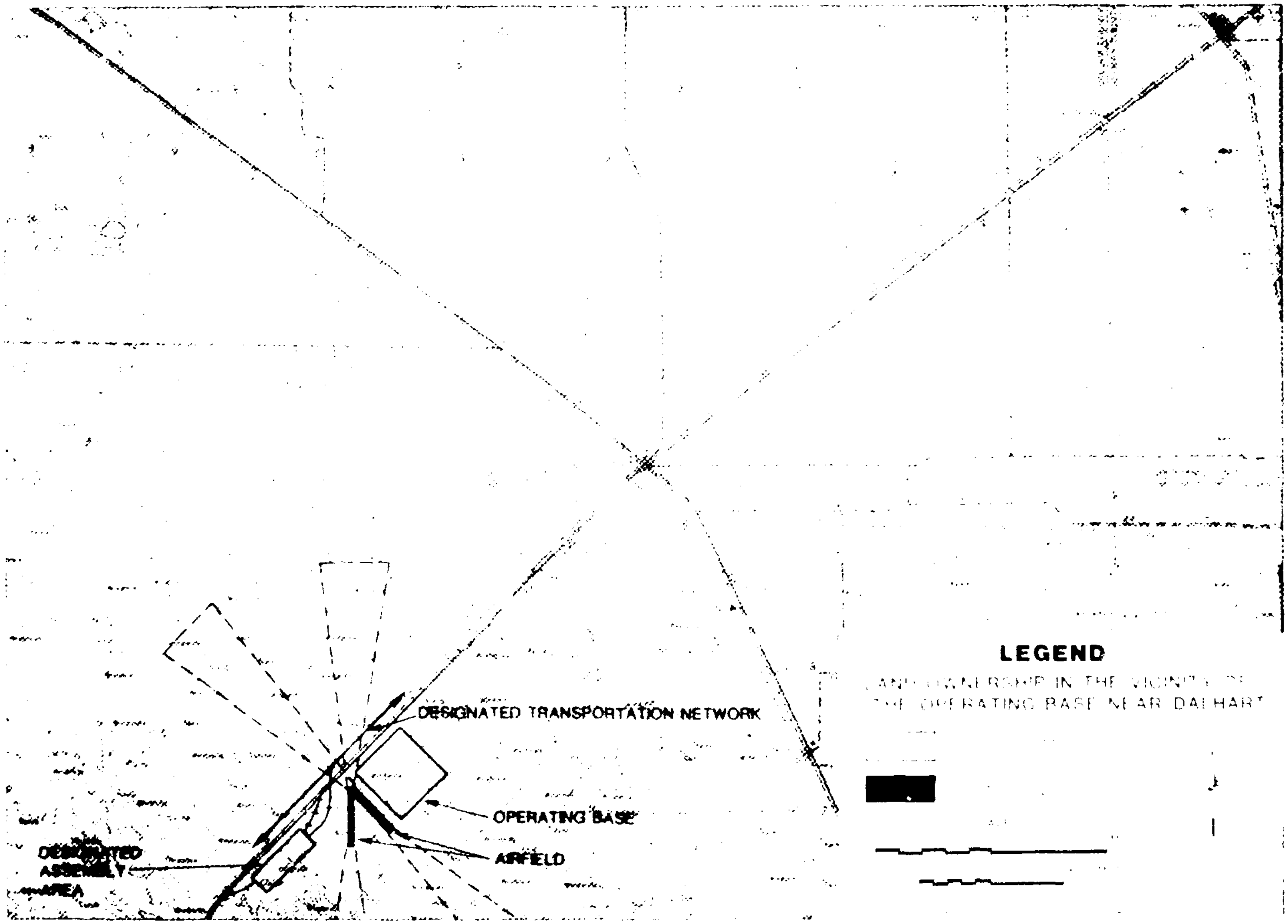

Figure 1.3.4-7. Land ownership in the vicinity of the operating base near Dalhart, Texas.

Table 1.3.4-7. Land ownership at potential base facilities at Dalhart, Texas.

OWNERSHIP TYPE	OPERATING BASE FACILITIES		SUITABILITY ZONE	
	ACRES	PERCENT	ACRES	PERCENT
Private	6,440	100	60,160	100
State	0	0	0	0
Public	0	0	0	0
Total	6,400	100	60,160	100

3860

Source: Panhandle Regional Planning Commission 1978.

2.0 HOMES AND RANCHES

One of the most important elements of the social environment is the homes in which the population lives. The issue of homes and ranches is important to the MX project because of the necessity to assure safety for inhabitants, and security to the project.

A Quantity-Distance (QD) safety zone is proposed to be located for a distance of 2,965 feet around each MX protective shelter. The zone gains significance in the environmental process because no habitable structures such as homes and ranches will be permitted for construction and/or occupancy within the QD zones during the operations phase of the project, for purposes of safety and security. This criteria would require the vacation or relocation of such structures which are already situated in the future QD zones. Further, the area created by the QD zones could not be used for new residential development for the duration of the operations phase of the project.

2.1 AFFECTED ENVIRONMENT

Table 2.1-1 shows the number of homes and ranches presently located within the geotechnically suitable areas of the two regions. The Texas/New Mexico region exceeds the Nevada/Utah region by 124 to 1 (11 to 1365). It is unlikely that the number of ranches and homes within the geotechnically suitable areas of either the Nevada/Utah or Texas/New Mexico regions, without MX, will change significantly in the future. The main reason for this is the lack of water in the NV-UT region and the diminishing supply of water from the Ogalalla Basin in the TX-NM region, especially after the year 2000. Prior to that year there is projected to be additional land put into irrigated agriculture, mostly because of improved farming methods. However, this should not significantly increase the population (and hence rural housing). The reason for this is that the same improved farming methods will tend to make farming more labor efficient.

2.2 METHODOLOGY FOR IMPACT ANALYSIS

The number of homes and ranches in each county that would have to be relocated because of proposed QD zones, was determined by overlaying the alternative project deployment layouts on 1:125,000 scale state and county highway maps The number of dwellings that fell within the QD zones was then counted. In addition, the total number of acres of land within the QD zones was then determined by multiplying the number of PSs proposed in each county by 640 acres, the area of the QD zones.

2.3 ENVIRONMENTAL CONSEQUENCES

In order to assure resident safety around the protective structures, no habitable buildings will be allowed within a 2,965 foot radius circle around each Protective Structure. This area is called the explosive safety Quantity-Distance (QD) zone. The purpose of the zone is to provide safety to residents from potential accidental explosion of missile propellant (see Chapter 1).

Table 2.1-1. Homes and ranches within the geotechnically suitable areas within the alternative study regions.

STUDY REGION	HOMES AND RANCHES*
Nevada/Utah	11
Texas/New Mexico	1,365

1584-2

Source: Individual State Department of Highway maps, with the following dates of publication: Nevada, 1975-76; Utah, 1976; Texas 1979; New Mexico 1979.

*Note: Since not all of the geotechnically suitable areas will be used for M-X deployment, the number of structures (ranches and homes) presented in this table overstates the number of potentially impacted structures.

Figure 2.3-1 shows how the QD zones could affect existing homes and ranches in the DDAs. Whenever a home would fall within the QD zone of a proposed PS the first attempt would be to move the PS to a location at least 2,965 feet from the home. If this could not be done, because of the proximity of other PSs, or is impractical because of the topography or other physical problems, it would be necessary to remove the home.

If it is possible, and the owner is willing, the home would be relocated onto the same parcel but outside the QD zone, as with Home A, on Figure 2.3-1. If that option is not practical or acceptable, the home would either be relocated onto another parcel outside the QD zone, or the owner would be compensated for the value of the home and then it would be removed.

The number of homes and ranches that could potentially be relocated have been counted for the DDAs. The effect in the base locations would be negligible and is not considered here.

HOMES AND RANCHES RELOCATION (2.3.1)

Proposed Action (2.3.1.1)

Under the Proposed Action, a maximum of ten buildings would have to be relocated as the result of the QD zones. Six of the ten relocations would be in Nye County. No relocations would be necessary in Utah. Tier two refinement would probably negate the necessity to relocate any ranches or homes in the Nevada/Utah region. The potential relocations are not considered to be a significant impact since it is not expected that they would occur.

Alternative 1 (2.3.1.2)

Impacts same as under Proposed Action.

Alternative 2 (2.3.1.3)

Impacts same as under Proposed Action.

Alternative 3 (2.3.1.4)

Impacts same as under Proposed Action.

Alternative 4 (2.3.1.5)

Impacts same as under Proposed Action.

Alternative 5 (2.3.1.6)

Impacts same as under Proposed Action.

Alternative 6 (2.3.1.7)

Impacts same as under Proposed Action.

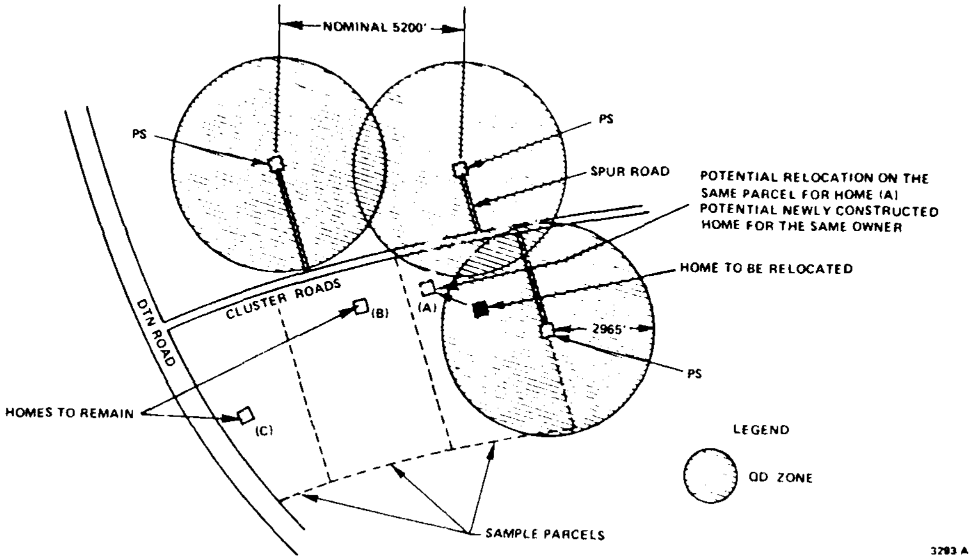

Figure 2.3-1. Effect of quantity distance zones on ranches and homes.

Alternative 7 (2.3.1.8)

Table 2.3.1.8-1 shows that approximately 1,300 homes and ranches fall within the QD zones in the Texas/New Mexico region. This number reflects the relatively higher rural dwelling unit and population density of the High Plains region. Potential relocations in Texas exceed those in New Mexico by about two to one with almost half of the Texas relocations being in Deaf Smith County (146) and Parmer County (225). About sixty percent of the New Mexico relocations are in Roosevelt County (297).

Even with monetary compensation, the necessity to relocate one's home or ranch is a serious matter. In 9 of the 22 counties in the Texas/New Mexico region, the potential for relocation exceeds 50 homes and ranches. The impact in those counties is considered to be highly significant. It is anticipated that Tier 2 siting could avoid up to 10 homes in any one county so no impact is ascribed up to that level. To the impacted homeowner, loss, or even relocation of the homestead would be significant.

Alternative 8 (2.3.1.9)

Under Alternative 8 split basing deployment, impacts in the Nevada/Utah region would be negligible.

In the Texas/New Mexico region, a total of 141 residences may have to be relocated (see Table 2.3.1.8-1). In Texas/New Mexico, Alternative 8 DDA facilities were selected from those in Alternative 7 to specifically minimize the number of homes directly affected. With tier two refinements in the cluster layouts, even these figures could be further reduced.

QD ZONES (2.3.2)

In addition to the impacts of housing relocation, is the matter of the inability to use the area of the QD zones for new residential development during the operations phase of the project. Because homes and ranches are not permitted on non-patented public land, the QD zone is not a problem for most of the DDA in the Nevada/Utah region.

Proposed Action (2.3.2.1)

Under the Proposed Action, as well as under Alternatives 1 through 6, there would be 44 PSs located on private land in the region, however, and this means that 28,160 acres (44 x 640 acres) of privately owned land would fall within the QD zones and would be subject to the non-residential development restrictions. This is not considered to be a significant impact on the 5,756,000 acres of privately owned land in the Nevada/Utah study area counties.

Alternative 7 (2.3.2.2)

The total amount of land included in the QD safety zones for Alternative 7 is shown by county in Table 2.3.2.2-1. With one $mi.^2$ per QD zone, approximately 1.5 million acres, or seventeen percent of the total land area in the Texas study area counties, would be included in the QD zone. Dallam County, with 690 protective structures, would have nearly

Table 2.3.1.8-1. Potential impact to homes and ranches in Texas/New Mexico DDA for Alternatives 7 and 8.

COUNTY	ALTERNATIVE 7			ALTERNATIVE 8		
	POTENTIAL NUMBER OF HOUSING UNITS WHICH COULD BE RELOCATED	PERCENT OF HOUSING UNITS IN COUNTY WHICH COULD BE RELOCATED	POTENTIAL IMPACT[1]	NUMBER OF HOUSING UNITS WHICH COULD BE RELOCATED	PERCENT OF HOUSING UNITS WHICH COULD BE RELOCATED	POTENTIAL IMPACT[1]
Bailey, TX	118	4.1	High impact	6	0.2	No impact
Castro, TX	82	2.6	High impact	0	0	No impact
Cochran, TX	5	0.3	No impact	3	0.2	No impact
Dallam, TX	103	4.4	High impact	17	0.7	No impact
Deaf Smith, TX	146	2.4	High impact	32	0.5	Moderate impact
Hartley, TX	31	3.1	Moderate impact	5	0.5	No impact
Hockley, TX	0	0.0	No impact	0	0	No impact
Lamb, TX	62	0.9	High impact	0	0	No impact
Oldham, TX	12	1.7	Low impact	0	0	No impact
Parmer, TX	225	6.5	High impact	0	0	No impact
Randall, TX	17	0.2	Low impact	0	0	No impact
Sherman, TX	2	0.2	No impact	0	0	No impact
Swisher, TX	25	0.7	Moderate impact	0	0	No impact
Chaves, NM	6	< 0.1	No impact	6	< 0.1	No impact
Curry, NM	74	0.6	High impact	2	< 0.1	No impact
DeBaca, NM	9	0.7	No impact	6	0.5	No impact
Guadalupe, NM	0	0	No impact	0	0.0	No impact
Harding, NM	4	0.7	No impact	4	0.7	No impact
Lea, NM	0	0	No impact	0	0.0	No impact
Quay, NM	52	1.2	High impact	19	0.4	No impact
Roosevelt, NM	297	5.2	High impact	28	0.5	Moderate impact
Union, NM	33	1.7	Moderate impact	13	0.2	No impact
Overall Alternative	1,303	1.3	Moderate impact	141	0.1	Low impact

[1]
- No impact. (Less than 10 housing units and less than 1.0% of the county housing stock.)
- Low impact. (10-20 housing units or greater than 1.0% of the county housing stock.)
- Moderate impact. (20-50 housing units and less than 5.0% of the county housing stock.)
- High impact. (50 or more housing units or greater than 5% of the county housing stock.)

Sources: Individual state department of highway maps, Texas, 1979, and New Mexico, 1970.

Table 2.3.2.2-1. Area requirements for quantity-distance zone in Texas/ New Mexico for full deployment (Alternative 1).

STATE/COUNTY	NO. OF PSS IN COUNTY	TOTAL AREA UNDER Q-D ZONE (AC)[1]	TOTAL COUNTY AREA (AC)	PERCENT OF TOTAL COUNTY AREA
Texas				
Bailey	126	79,900	534,528	14.9
Castro	137	86,900	563,200	13.3
Cochran	61	38,700	500,800	7.7
Dallam	690	437,500	956,160	45.8
Deaf Smith	574	363,900	966,400	37.7
Hartley	354	224,400	952,192	23.6
Hockley	16	10,100	581,184	1.7
Lamb	42	26,600	654,015	4.0
Oldham	74	41,900	945,600	4.9
Parmer	246	156,000	549,760	28.4
Randall	55	34,900	585,024	6.0
Sherman	39	24,700	586,240	4.2
Swisher	26	16,500	573,376	2.9
State Total	2,440	1,547,000	8,948,479	17.3
New Mexico				
Chaves	481	304,900	3,900,800	7.8
Curry	196	124,300	898,560	13.8
De Baca	137	86,800	1,514,240	5.7
Guadalupe	6	3,800	1,919,360	0.2
Harding	215	136,300	1,368,320	10.0
Lea	16	10,100	2,812,160	0.4
Quay	342	216,800	1,845,120	11.8
Roosevelt	542	343,600	1,572,480	22.5
Union	225	142,700	2,442,880	5.8
State Total	2,160	1,369,400	18,273,920	7.5
Region Total	4,600	2,916,400	27,222,399	10.7

4202

[1]Based on 2,965 ft radius QD zone around each PS. QD zone = 634 acres.

Sources: Alternative 7 cluster layout (area in QD zone), and Department of Commerce 1977 (county areas).

44,000 acres, or 45.8 percent of its total area included in the QD zone. Approximately 1.4 million acres totalling 7.5 percent of the New Mexico counties will be located in the QD zone. The Texas/New Mexico region total of nearly 3 million acres, equals 10.7 percent of the total area of study area counties.

Although little problem should be encountered with finding adequate area to relocate housing from QD zones, the overall effect of placing 17.3 percent of the land area in the Texas study area counties in QD zones, per Alternative 7, is fairly significant, because the establishment of the QD zones precludes those areas from residential development for the duration of the operations phase of the project. In some counties the percentage of non-developable land for residential purposes could be considered significantly high. These counties are Dallam, 45.8 percent; Hartley, 23.6 percent; Parmer, 28.4 percent; and Roosevelt, 22.5 percent. While the land in the QD zones would not be removed from the county tax rolls, as would be the 2.5 acre PS parcels, they would have to be assessed at a rate that reflects the loss of residential development rights. This could be likened to agricultural preserve assessments in those states that have such statutes. But unlike the purpose of those statutes, the QD zones would not preclude the premature development or the scattering of residential development in rural areas. This is because the areas between the QD zones could still be developed for residential purposes, unless local zoning precluded it.

Alternative 8 (2.3.2.3)

For Alternative 8, split basing, the amount of land included in the QD zone is much less, as shown in Table 2.3.2.2-2. The total area in both states is 1.5 million acres, or 5.4 percent of the study area counties. This includes 5.8 percent of the Texas counties' land area, about 515,000 acres, and 5.2 percent of the New Mexico counties' land area, about 943,000 acres. The amount of QD zone area in the Nevada/Utah region has not been determined, but would be insignificant, because most PSs would be located on public land.

Table 2.3.2.2-2. Area requirements for quantity-distance zone in Texas/ New Mexico for split deployment (Alternative 8).

STATE/COUNTY	NO. OF PSS IN COUNTY	TOTAL AREA UNDER Q-D ZONE (AC)[1]	TOTAL COUNTY AREA (AC)	PERCENT OF TOTAL COUNTY AREA
Texas				
Bailey	14	8,880	534,528	[illegible]
Costro	0	0	563,200	0.0
Cochran	51	32,330	500,800	6.5
Dallam	190	120,460	956,160	12.6
Deaf Smith	242	153,430	966,400	15.9
Hartley	250	158,500	952,192	16.6
Hockley	14	8,880	581,184	1.5
Lamb	9	5,700	654,015	0.9
Oldham	41	26,000	945,600	2.7
Parmer	1	630	549,760	.1
Randall	0	0	585,024	0.0
Sherman	0	0	586,240	0.0
Swisher	0	0	575,376	0.0
State Total	812	514,808	8,948,479	5.8
New Mexico				
Chaves	474	300,520	3,900,800	7.7
Curry	43	27,260	898,500	3.0
De Baca	115	72,900	1,514,240	4.8
Guadalupe	6	3,800	1,919,360	0.2
Harding	202	128,068	1,368,320	9.4
Lea	17	10,780	2,812,160	0.4
Quay	312	197,810	1,845,120	10.7
Roosevelt	164	104,000	1,572,480	6.6
Union	155	98,270	2,442,880	4.0
State Total	1,488	943,390	18,273,920	5.2
Region Total	2,300	1,458,200	27,222,399	5.4

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[1] Based on 2,965 ft radius QD zone around each PS. QD zone = 634 acres = approximately 1.0 mi^2.

Sources: Alternative 8 cluster layout (area in QD zone), and Department of Commerce 1977 (county areas).

3.0 CROPLANDS

The CEQ guidelines under paragraph 202(b)(4) of NEPA require the analysis of impacts of Prime and Unique Farmlands in all environmental impact statements. Surveys of prime and unique farmlands in the states of Nevada, Utah, New Mexico and Texas, conducted by the USDA, are incomplete. In the absence of prime and unique farmland surveys, a "worst case" impact analysis has been performed which treats all irrigated cropland in the study area as if it were prime farmland. The discussion here identifies the amount of irrigated and dry cropland and the area of such cropland likely to be disturbed by the M-X deployment.

The irrigated cropland data for Nevada/Utah were obtained from satellite images (LANDSAT). Several publications show the estimated number of acres of irrigated cropland in Nevada. However, these data vary by as much as 100 percent. LANDSAT satellite images have been used to calculate total irrigated acreage in each valley, as well as the potential disturbed acreage. The irrigated cropland areas for Texas/New Mexico were obtained from LANDSAT and the Census of Agriculture, 1974. The deployment layouts were overlayed on the LANDSAT imagery and the area of all irrigated cropland that coincided with DAA facilities was computed.

A study of the cropland resources in the two potential deployment regions is important because of the relatively large amounts of land that will be required to be disturbed by the MX prospect. Although only about 25 NM^2 will be fenced for the military, another 116 to 121 NM^2 will be used for the life of the project for military purposes but will also be open to public use. Of these, 76 to 92 NM^2 will be in roadways. These roadways will provide superior access to areas presently without access.

In addition to the above cited area requirements, another 53 to 55 NM^2 of land will be disturbed during the construction phase of the project. Upon completion of the construction phase of the project, these areas will revert to their original use and ownership rights. During the construction phase these lands and adjoining lands could be subject to certain problems resulting from construction activities, such as dust, noise, and potential problems of human activity including pilfering and possible vehicle accidents.

The discussion on croplands will be related to both irrigated and dry croplands. This section will discuss the affected environment, the methodology used to determine impacts, and the potential project impacts in croplands.

3.1 AFFECTED ENVIRONMENT

NEVADA/UTAH REGION (3.1.1)

General Agriculture

Agriculture is important to Nevada and Utah because of the vast amounts of land used, especially for grazing of livestock. As indicated by Table 3.1.1-1, however, agricultural income in 1978 accounted for only 0.9 percent of the personal income in Nevada and only 1.9 percent in Utah. The U.S. average was 2.5 percent (BEA, April 1979).

Much of each state was originally settled for agricultural development. Nevada's agricultural development is geared, in large measure, to the livestock industry, while in Utah, a more diversified agricultural economy exists. Both states encourage use of land for agricultural purposes and have planning and zoning ordinances designed to protect agricultural land from urban development. The location of farm land is related to the availability of water, and to some extent, the geographical location impacted by the elevation and length of growing season.

Agriculture has historically played a more important role in the economies of the rural counties. Many of these areas were settled for farming purposes as much as for mining and mineral development. Over the years, many of the mining operations have come and gone whereas agriculture has been relatively stable in terms of production levels, areas farmed and amounts of farm products produced.

While livestock operations predominate, some form of cropland agriculture is evident wherever water is available. Cropland and livestock production are closely related in that hay, the largest crop in both acreage and dollar value, is consumed locally by the livestock industry.

The number of farms in the two states and the study area have shown a steady decline over the last several decades, reflecting the national trend. Figures 3.1.1-1 and 3.1.1-2 graphically show this trend for Nevada and Utah while Table 3.1.1-2 presents the data numerically.

The average farm increased in size as more land has been brought into agricultural production by decreasing number of farmers. However, the irrigated and harvested acreage in Nevada and Utah has been very steady since 1940. This is due in part to a continual dependence on scarce water supplies which are fully utilized in those valleys where agriculture is located. A surplus of adequate soils which could be irrigated exists in all planning units, if additional water were available.

There currently are approximately 2,000 farms in Nevada and nearly 12,000 in Utah. A majority of the farm land is pasture and rangeland, reflecting the overall dominance of the livestock industry in Nevada and Utah agriculture. The average size of a farm was 5,209 acres in Nevada and 871 in Utah in 1974. Not all the farms in these two states are this large however. The median farm size in Nevada was reported in the category 250-499 acres while the median in Utah is even smaller (U.S. Department of Interior, 1979). A considerable number of small operators remain even though the high average suggests that the large farm is the typical operation.

Table 3.1.1-3 presents some general statistics describing agricultural operations in the study area counties. There exists a large acreage devoted to agriculture, about 3.6 million acres. Moreover, the scale of operations is large, with Nevada study area farms averaging over 3,300 acres per farm,

Table 3.1.1-1. Agricultural income and earnings as a percentage of total income, Nevada/Utah study area counties, 1978.

STATE/COUNTY	PERCENTAGE OF TOTAL INCOME
Nevada	0.9
Clark	0.1
Esmeralda	6.0
Eureka	8.9
Lander	4.2
Lincoln	5.3
Nye	1.0
White Pin	2.9
Utah	1.9
Beaver	12.8
Iron	3.5
Juab	6.3
Millard	37.3
Tooele	1.9
U.S.	2.5

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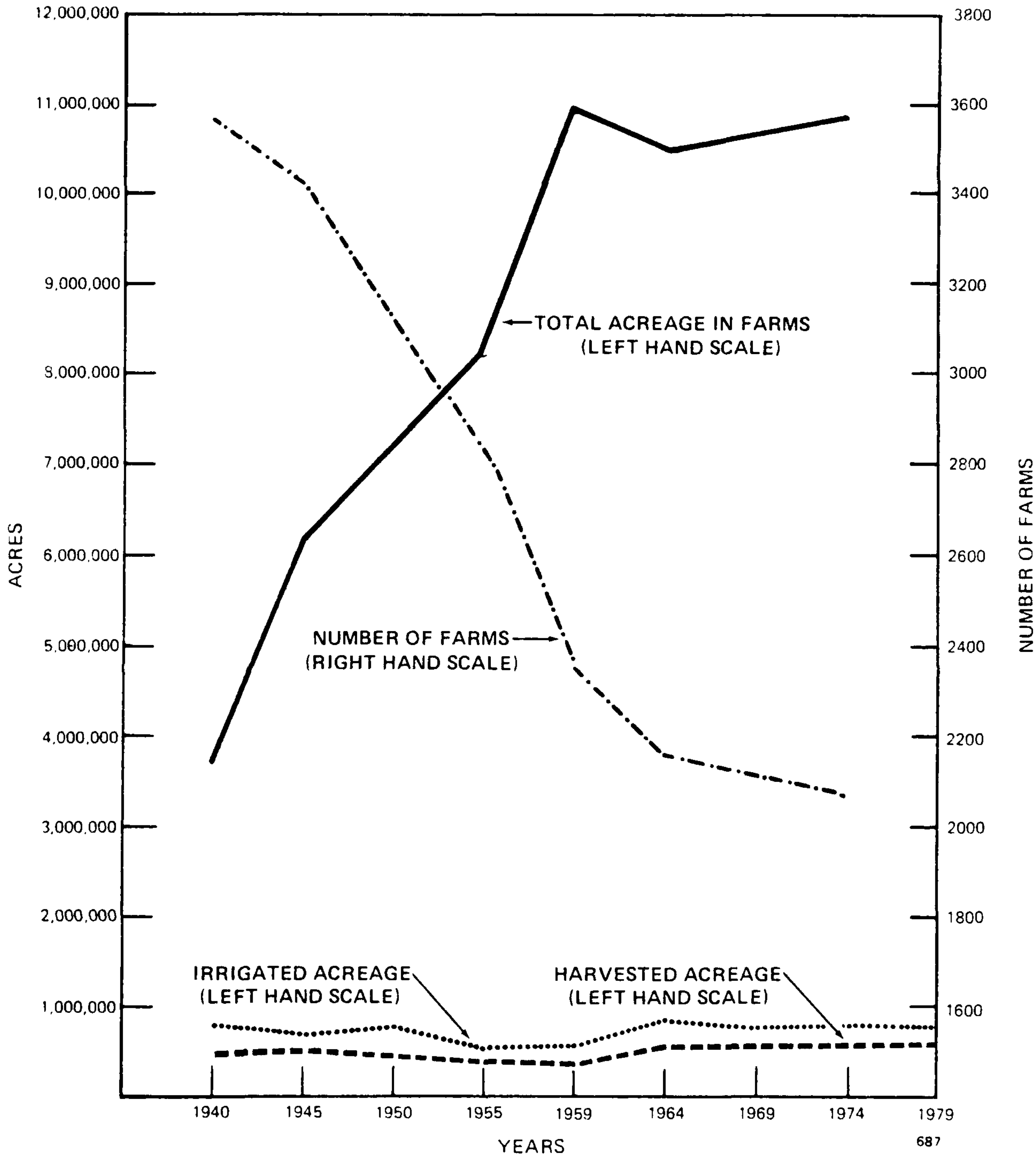
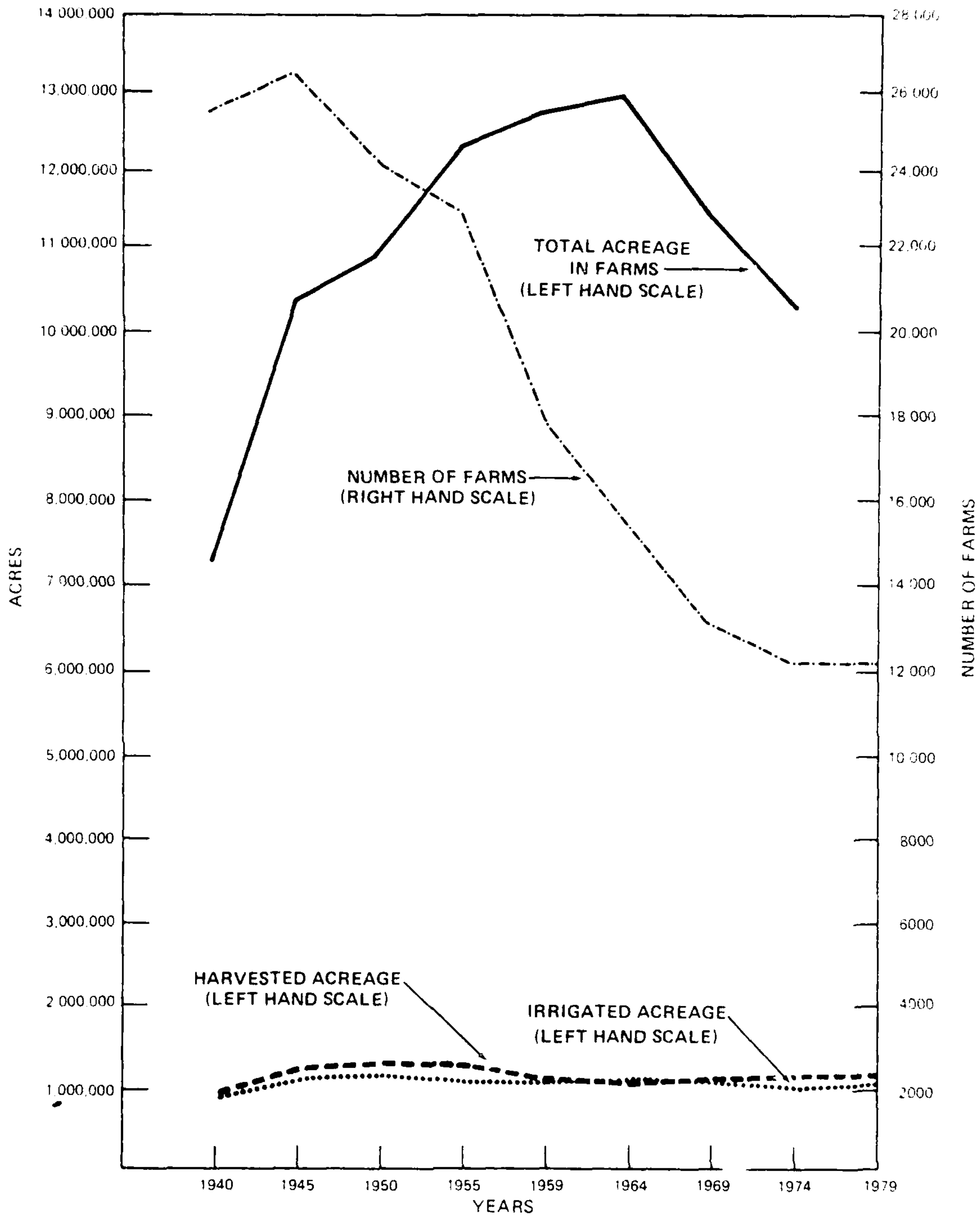
Source: BEA, July, 1980.



[1] 1979 ESTIMATES BASED ON PERSONAL COMMUNICATIONS AND NEVADA AGRICULTURAL STATISTICS 1977.

Figure 3.1.1-1. Trends in farming in Nevada, 1940-1979.



*1979 ESTIMATES BASED ON PERSONAL COMMUNICATIONS AND UTAH AGRICULTURAL STATISTICS 1978 SOURCE U.S. DEPARTMENT OF COMMERCE, BUREAU OF THE CENSUS 1974 CENSUS OF AGRICULTURE, UTAH STATE AND COUNTY DATA VOL. 1 PART 44 1977, P. I-1

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Figure 3.1.1-2. Trends in farming in Utah, 1940-1979.

Table 3.1.1-2. Trends in farming in Nevada/Utah, 1950-1974.

YEAR	NUMBER OF FARMS	ACREAGE IN FARMS	IRRIGATED ACREAGE IN FARMS	HARVESTED ACREAGE IN FARMS
Nevada				
1950	3,110	7,064,000	727,000	421,000
1954	2,857	8,231,000	567,000	360,000
1959	2,354	10,943,000	543,000	338,000
1964	2,156	10,482,000	824,000	507,000
1969	2,112	10,708,000	753,000	521,000
1974	2,076	10,814,000	778,000	551,000
Utah				
1950	24,176	10,865,000	1,138,000	1,279,000
1954	22,826	12,262,000	1,073,000	1,228,000
1959	17,811	12,688,000	1,062,000	1,062,000
1964	15,759	12,868,000	1,092,000	1,039,000
1969	13,045	11,313,000	1,025,000	1,024,000
1974	12,184	10,610,000	970,000	1,089,000

3024-1

Source: Department of Commerce, 1977.

Table 3.1.1-3. Farms and farmland in Nevada/Utah study area counties, 1974.

STATE/COUNTY	NO. OF FARMS	TOTAL ACREAGE IN FARMLAND[1]	AVERAGE FARM SIZE	FARMLAND AS PERCENTAGE OF COUNTY AREA	FARMLAND AS PERCENTAGE OF STATE FARMLAND
Nevada					
Clark	147	78,300	530	1.6	0.9
Esmeralda	26	162,600	6,250	7.1	1.9
Eureka	62	265,400	4,280	7.4	3.1
Lander	58	625,600	10,790	17.4	7.4
Lincoln	75	58,300	780	0.9	0.7
Nye	97	445,100	4,590	3.9	5.3
White Pine	100	231,200	2,310	4.1	2.7
State Total	565	1,866,500	5,300	5.2	22.0
Utah					
Beaver	183	150,400	820	9.1	1.4
Iron	337	459,900	1,360	21.8	4.3
Juab	201	156,800	780	7.2	1.5
Millard	652	536,400	820	12.3	5.1
Tooele	229	429,500	1,880	9.7	4.0
State Total	1,602	1,733,000	1,080	5.3	16.3
Bi-State Total	2,167	3,599,500	1,660	5.2	19.0

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[1]Includes all cropland, pasture, and grazing land except that on open range under government permit.

Source: Department of Commerce, 1977.

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about twice as large an acreage as the Utah study area farms. With somewhat less agricultural land there are many more farm operations in the Utah counties, 1,602 compared to 565 in Nevada. Utah agriculture is also less dominated by the livestock industry, and has a more diversified agriculture. Esmeralda and Lander counties in Nevada possess much larger operations than the average for the whole study area with approximately 6,250 and 10,790 acres respectively per farm.

The above data include all cropland, pastureland and rangeland which is not used under Government permit. The majority of rangeland in Western States is under Government permit on BCM, NFS, and state land. In Nevada, Lander County, which has a relatively large portion of its land in private ownership (18.2 percent), has the highest percentage of its area in farmland with 17.4 percent. In Utah, the highest percentage of county area in farmland is Iron County with 21.8 percent. Overall, the study area counties have about 19 percent of the non-government permit farmland in the two state region.

Nevada

In the Nevada/Utah region, the Nevada study area counties have a somewhat larger amount of acreage in agricultural development (1,860,500 versus 1,733,000 acres). Agriculture has historically provided an important part of the economy in the rural counties. Except for Clark and Tooele Counties, all other study area counties have a higher percentage of their total income from farming than the state percentage. Many of these areas were settled for farming purposes as much as for mining and mineral development. Over the years, many of the mining operations have come and gone whereas agriculture has been relatively stable in terms of production levels, areas farmed and amounts of farm products produced. Agriculture in Nevada is heavily tied to the livestock industry which, because of the rise and fall of beef prices, causes a substantial fluctuation in the value of agriculture feed crops produced.

About 22.0 percent of the farmland in Nevada lies in the study area counties (see Table 3.1.1-3). Most planning and zoning ordinances in the state cite the protection of agriculture as one important policy of the county. Following is a resume of agriculture in each of the study area counties:

Clark County

Clark County is located in southeastern Nevada with the California border to the west and the Arizona border to the east. Las Vegas serves as the county seat and is surrounded by a large amount of private land relative to other Nevada counties. Ownership of most of the remainder of Clark County is held by various agencies of the federal government. Clark County has the largest number of farms (147) and the smallest average farm size (530 acres) of the Nevada study area counties. The 78,000 acres of farmland in Clark County represent 0.9 percent of the State's total farmland.

Esmeralda County

Esmeralda County is located in the southwesterly part of the state adjacent to the California border. As with most Nevada counties, most of the land is under federal land ownership (92 percent). The public land is used primarily for livestock grazing under government permit. The county has 26 farms utilizing some 162,600 acres of non-federal land. Most of the cropland in Esmeralda County is located in the westerly part of the county near the California border.

Eureka County

Eureka County is in the north-central part of the state. Cropland is found in the southern part of the county near the city of Eureka and again in the northern part of the county along the Humboldt River. In Eureka County, 265,400 acres of land is identified as agricultural land on about 7.4 percent of the land area of the county. Sixty-two separate farms are identified averaging about 4,300 acres each.

Lander County

Lander County contains about 626,000 acres of agricultural land with 58 separate farms averaging nearly 11,000 acres each. Over 17 percent of the land in the county is devoted to agriculture excluding federal land. The 626,000 acres represents about 7.4 percent of the farmland in Nevada (excluding BLM and NFS rangeland). Lander County is also located in the north-central part of the State of Nevada, and covers approximately the same land area as Eureka County. Most of the agricultural land is found along the Reese River near Austin, in the southern portion of the county and along the Humboldt River near Butte Mountain in the northern part of the county.

Lincoln County

Agricultural land in Lincoln County is very limited. Partly because of the high percentage of land under public jurisdiction and limited water supplies, only some 58,000 acres of agricultural land have been developed, much less than in other study area counties. Most of the agricultural land is in the southern part of the county in the Pahranagat Valley near Alamo and Ash Springs, along with some land in the eastern part of the county around Panaca and to a small extent near Ursine (Eagle Valley). There are a few small parcels south of Caliente, along the railroad, but these areas are small in size and scattered in location.

Nye County

Nye County, in central Nevada, is normally considered to be oriented to a mining and mineral development economy. There are, however, some 445,000 acres of agricultural land. Much of this land is located in the southern part of the county near Pahrump and in the north-central portion north of Round Mountain. There are 97 farms in Nye County with an average farm size of about 4,600 acres.

White Pine County

White Pine County is located along the east-central border of Nevada. Most of the county is high in elevation, limiting the number of growing days for agricultural crop production. In spite of this handicap, there are 231,000 acres of agricultural land in the county. Agricultural lands in White Pine county are relatively scattered with major agricultural areas being in the Preston-Lund area, in the southern part of the county, near Baker, along the eastern border, and at scattered locations up and down most of the north/south valleys in the county. There are 100 farms in the county with an average size of 2,300 acres. Just over 5 percent of the total county land area is devoted to agriculture.

Utah

Agriculture is important to the counties of southwestern Utah, especially in Millard County where 37.3 percent of the personal income is derived from agriculture (see Table 3.1.1-1). Historically, the area was settled by pioneers sent to colonize and develop agriculture. These people were required, of necessity, to live on the land and to support themselves with what they produced. Since that time, conditions have changed. Farms, while declining in total land area, have become larger in size as farm units have been combined into more economic units. Numbers of farm operators have diminished and other sources of employment and income have, in many areas, replaced agriculture as the prime economic base.

The fact that farms and farm operations are still important to the economy of the area, however, is evidenced by the fact that in all areas where planning studies have been prepared, local residents have established planning policies and developed ordinances which protect and attempt to preserve the remaining agricultural land. Table 3.1.1-3 shows the number of farms in southwestern Utah, by county, the average farm size, the total acreage in farmland and farmland as a percentage of all land. About 16.3 percent of the farmland in Utah lies in the Utah study area counties.

Beaver County

The 183 farms in Beaver County comprise 150,000 acres or 9.1 percent of the land area in the county (Table 1.2.1-2). The average farm is about 820 acres. Farmland in Beaver County is located primarily in three general areas. In the Milford area, farmland is located southward from the town and includes a large part of the harvested cropland in the county. Another area of farmland though much smaller, is located west and south of Minersville and the third major farming area is located north and west from Beaver City. Farmland extends northward from Beaver City to Manderfield area and westward to the Greenville/Adamsville area.

Iron County

Iron County has 337 farms containing some 460,000 acres of land, or about 22 percent of the land area in the county (Table 3.1.1-3). Farms in Iron County average 1360 acres which is among the largest in the area and state. Most of the farmland in Iron County is located around Beryl Junction and New Castle in the western part of the county, north and west of Kanarraville in the southern part, north and west of Cdear City in the Cedar Valley area, and between Summit and Paragonah toward the north-easterly part of the county.

Juab County

Juab County is located in the west-central part of the state just south of Tooele and Utah counties and has 157,000 acres of agricultural land on 201 farms (Table 3.1.1-3). About 7 percent of the land in the county is farmland. In Juab County most of the farmland is located in the eastern part of the county in the Nephi Valley. Some smaller areas are found in the western part of the county in connection with the Goshute Indian Reservation and a small amount is in the northern part of the county near Eureka.

Millard County

Millard County, the third largest county in Utah, is located in the southwestern part of the state. It contains the most agricultural land of study area counties in Utah. Over 536,000 acres of farmland in the county on 652 farms (i.e., 12.3 percent of the land in the county) is devoted to agriculture (Table 3.1.1-3). The 536,000 acres represents about 5.1 percent of all of the farmland in Utah (excluding federal and state open rangeland).

Tooele County

Tooele County is adjacent to the Nevada border in the north-central area of Utah. The central portions of the county are occupied by the Wendover Bombing and Gunnery Range on the Great Salt Lake Desert. Approximately 430,000 acres are used for farming purposes by 229 separate farm operators in Tooele County. Tooele County has the largest average farm size, 1,876 acres, of the Utah study area counties.

Croplands

Croplands are a subset of a broader category of farmland discussed in the previous section. Details of the averages of total harvested and irrigated cropland are presented in Table 3.1.1-4. The 563,000 acres of cropland equal only 15.6 percent of the 3,599,500 acres of farmland in the Nevada/Utah study area counties. The small percentage of land which is suitable for cropland reflects the scarcity of irrigation resources and the historical pattern of land ownership within the study area. Land which has water access has been patented and withdrawn from the BLM administration through the Desert Land Entry Program, which will be disucssed later. Land for crops is thus found to occur on private property.

Lander and Pershing counties in Nevada on the northern extreme of the potential deployment area have large private land holdings tracing back to the property transfer associated with construction of the Union Pacific Railroad. In addition, the Humboldt River flows through these counties

Table 3.1.1-4. Cropland acreage Nevada/Utah study area counties, 1974.

COUNTY	TOTAL CROPLAND	HARVESTED CROPLAND	CROPLAND USED ONLY FOR PASTURE	LAND IRRIGATED	CROPLAND AS PROPORTION OF STATE CROPLAND
Clark	12,000	8,000	2,000	11,000	1.6
Esmeralda	6,000	4,000	2,000	8,000	0.8
Eureka	34,000	24,000	6,000	31,000	4.5
Lander	38,000	28,000	4,000	32,000	5.0
Lincoln	30,000	13,000	16,000	19,000	4.0
Nye	28,000	16,000	7,000	28,000	3.7
Pershing	38,000	35,000	3,000	36,000	5.0
White Pine	28,000	15,000	7,000	24,000	3.7
Nevada Total	214,000	143,000	47,000	189,000	28.4
Beaver	27,000	21,000	4,000	23,000	1.5
Iron	66,000	43,000	16,000	46,000	3.6
Juab	60,000	26,000	16,000	14,000	3.3
Millard	157,000	98,000	25,000	93,000	8.5
Tooele	39,000	18,000	14,000	15,000	2.1
Utah Total	349,000	206,000	75,000	191,000	19.0
Nevada/ Utah Total	563,000	349,000	246,000	380,000	21.7

502-1

Source: Department of Commerce, 1977.

giving them greater water access and consequently greater opportunity for irrigation and cropland agriculure. Cropland averages in Utah are greater than in Nevada with Millard, Iron, and Juab counties having the most extensive cropland areas. Cropland statistics presented in Table 3.1.1-4 confirm these observations. Due to the arid environment of the Great Basin almost all of the harvested cropland occurs on land which is irrigated. The geographic distribution of cropland is presented in Figure 3.1.1-3. Although cropland occurs within each county in the potential deployment area (Table 3.1.1-4), Figure 3.1.1-3 shows that cropland is not distributed evenly throughout the region. Rather, due to the localized availability of water, cropland and irrigated agriculture are located in very specific areas within each county. This distribution makes it potentially possible to successfully avoid cropland in the siting of the M-X project. In addition, a preponderance of the irrigation lands are located on the outer boundaries of the study area, namely, along the Humboldt River in Nevada and along Interstate 15 in Utah, facilitating avoidance of these sensitive areas.

The prevalence of irrigated cropland is almost always associated with higher productivity levels and population densities. Table 3.1.1-5 presents data on the economic productivity of agriculture within the counties. Clark, Iron and Millard counties are clearly the most productive, receiving over 35 percent of the agricultural returns in the study area for 1974. Only Iron County has a majority of its agricultural dollars coming from their cropland. Alfalfa seed and potatoes are very important components of agricultural output in Iron and Millard Counties with Iron County being the potato center of Utah and the area around Delta in Millard County being the center for alfalfa seed production. Production could be consideraly expanded if more irrigation water was made available (Sevier Desert URA, 1973).

The value of agricultural products sold in 1974 for the total of the study area counties was about 74,278,000 with about 66 percent from Utah counties. Nevada counties received 78 percent of its agricultural market value from livestock, while in Utah counties livestock contributed nearly 62 percent. While livestock grazing dominates agriculture and is the most prevalent land-use pattern on both private land and BLM administered land in the Nevada/Utah study area, Utah with its somewhat milder climate and greater access to water supplies for irrigation is getting approximately 38 percent of its agricultural return from its cropland. The greater incidence of irrigated cropland and private property in Utah explains why Utah study area counties can support over twice as many farm operations as the Nevada study area counties with much less total acreage of farmland (Table 3.1.1-3). Much more intensive farming on smaller holdings is prevalent in the Utah study area counties including such activities as numerous dairy farms, some feedlots, orchards, sugar beets, corn for grain and silage, and other irrigated and dryland crops. This productive agriculture supports numerous small towns in the eastern portion of the study area.

Tables 3.1.1-6 and 3.1.1-7 present information on the production and value of various crops grown in Nevada and Utah. Hay, including alfalfa and wild hay, is the most prevalent crop, comprising 83 percent of the

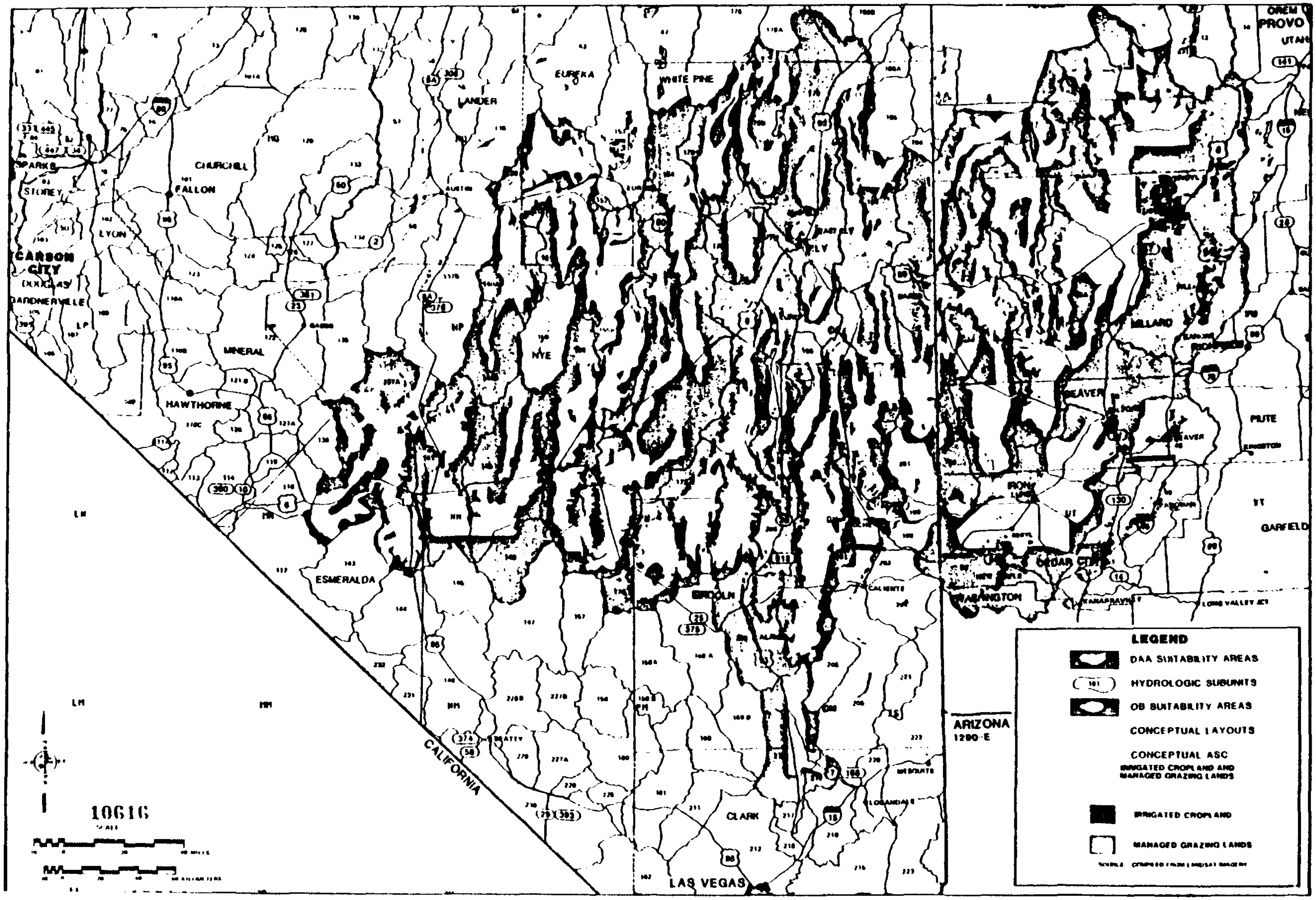

Figure 3.1.1-3. Cropland in the Nevada/Utah study area.
(See Fig. 3.2.3.8-1 of DEIS)

Table 3.1.1-5. Market value of agricultural products sold, Nevada/Utah study area counties, 1974.

COUNTY	VALUE OF AGRICULTURAL PRODUCTS SOLD (THOUSANDS OF DOLLARS)	VALUE OF CROPS AND HAY (PERCENT OF COUNTY TOTAL)	VALUE OF LIVESTOCK AND LIVESTOCK PRODUCTS (PERCENT OF COUNTY TOTAL)	OTHER PRODUCTS (PERCENT OF COUNTY TOTAL)	VALUE OF AGRICULTURAL PRODUCTS AS PERCENTAGE OF STATE TOTAL PERCENTAGE
Nevada					
Clark	7,734	9.8	89.3	0.9	5.8
Esmeralda	1,233	40.0	59.9	0.1	0.9
Eureka	3,476	35.8	64.2	0.0	2.6
Lander	3,821	22.3	77.7	0.0	2.9
Lincoln	2,096	17.5	82.5	0.0	1.6
Nye	3,068	38.8	60.9	0.3	2.3
White Pine	3,399	9.9	88.5	1.6	2.5
Total	24,827	21.1	78.4	0.5	18.6
Utah					
Beaver	6,560	30.7	69.3	0.0	1.9
Iron	11,715	53.9	45.9	.2	3.4
Juab	3,133	37.0	62.3	.1	0.9
Millard	24,434	35.6	64.5	.4	7.2
Tooele	3,609	20.1	78.2	1.6	1.1
Total	49,451	38.2	61.6	0.2	14.6
Nevada/Utah Total	74,278	33.7	65.9	0.4	15.7

501-3

Source: Department of Commerce (1977)

Table 3.1.1-6. Value of major crops in Nevada, 1977.

CROP	ACRES HARVESTED		PRODUCTION			VALUE OF PRODUCTION	
	THOUSAND ACRES	PERCENT	PER ACRE	THOUSAND	UNIT	THOUSAND DOLLARS	PERCENT
Winter Wheat	16.0	3	60.0	960	bushels	2,544	3
Spring Wheat	12.0	2	50.0	600	bushels	1,560	2
Oats	4.0	1	55.0	220	bushels	286	*
Barley	19.0	4	65.0	1,235	bushels	2,408	3
Alfalfa Seed	15.5	3	520.0	8,060	pounds	10,075	12
Cotton, Lint	1.3	*	628.0	1.7	bale	465	1
Potatoes	14.0	3	340.0	4,760	cwt.	13,804	17
Corn for Silage	3.0	1	15.0	45	ton	945	1
Alfalfa Hay	180.0	36	3.4	603	ton	N/A	N/A
All other Hay	240.0	48	1.2	276	ton	N/A	N/A
ı Hay	420.0	83	2.1	879	ton	48,785	60
Total	508.4	100.0	—	—	—	80,934	100.0

503-1

*Less than 1 percent.

Source: Nevada Agricultural Statistics, 1977.
U.S. Dept. of Agriculture, 1979.

Table 3.1.1-7. Value of major crops in Utah, 1977.

CROP	ACRES HARVESTED		PRODUCTION			VALUE OF PRODUCTION	
	THOUSAND ACRES	PERCENT	YIELD PER ACRE	THOUSAND	UNIT	THOUSAND DOLLARS	PERCENT
Winter Wheat	180.0	17.7	23.0	4,140	bushels	10,557	5.9
Spring Wheat	24.0	2.4	24.0	576	bushels	1,469	.8
Oats	10.0	1.0	55.0	550	bushels	770	.4
Barley	115.0	11.3	54.0	6,210	bushels	11,489	6.5
Alfalfa Seed	13.0	1.3	250.0	3,250	pounds	3,738	2.1
Potatoes	5.4	.5	240.0	1,296	cwt.	4,056	2.3
Corn (Grain)	13.0	1.3	89.0	1,157	bushels	2,835	1.6
Corn for Silage	62.0	6.1	17.0	1,054	tons	18,129	10.2
Sugar Beets	9.8	1.0	17.7	173	tons	3,356[1]	1.9
Sugar Beet Seed	0.2	*	22.9	5,042	cwt.	202	.1
Fruit	12.0	1.2	—	49	tons	14,275	8.0
All Hay	584.0	57.3	3.2	1,842	tons	106,836	60.1
Dry Beans	1.0	.1	2	2	cwt.	46	*
Total	1,019.4	101.2[2]	—	—	—	177,758	99.9[2]

504-1

*Less than 1 percent

[1]Estimate based on 1976 price

[2]Does not add to 100 due to rounding error

Source: U.S. Dept. of Agriculture, 1977.

harvested acres in Nevada and 57 percent in Utah. In both states, hay contributes 60 percent of the market value of crop prduction. The contribution of potatoes to Nevada farmers comprises 17 percent of the market value of the 1977 crop output. The data in Table 1.2.1-7 confirms the earlier observation that Utah has a more diversified agricultural industry. Wheat, barley, corn, sugar beets, and many varieties of fruit are grown in Utah. Utah's fruit crop on just 12,000 acres produces 8 percent of Utah production value, at $14,275,000. Comparing the level of production achieved per acre cultivated between the two states, Nevada's potatoes, alfalfa seed, barley, and wheat are much more productive than their Utah counterparts. This greater productivity per acre cultivated is the result of a higher proportion of irrigation on lands cultivated for crops in Nevada. The greater amount of dry cropping in Utah has a lower level of production, but with much less capital investment and operating costs required.

Future Changes in Cropland

The cropland changes discussed here relate to changes that are projected to occur in the amount of irrigated land in each of the hydrologic units and each of the counties being studied. While no direct projections of changes in the amount of irrigated cropland in the future are available, projection of the amount of water expected to be consumed for agriculture have been made for many areas, and the average projections found here are derived from those data.

Nevada

Table 3.1.1-8 indicates the 1980 estimated irrigated land total for the proposed M-X Study area in Nevada. Data is presented by hydologic unit. These figures were extrapolated from various sources and presented in the 1980 Desert Research Institute Document entitled, Industry Activity Information, Nevada M-X Siting Area. Future land area requirements for irrigated agriculture were assumed to remain constant through the year 2000. This assumption is questionable pending the final disposition of the Carey and DLE land acts.

The current trend in agriculture has been toward fewer farms with more acreage. On the whole, there has been a reduction in the acres farmed due to several factors. These include rising operating costs; including fuel, land, energy costs for irrigation, as well as labor, which makes farming on marginal land uneconomical. Problems with enough water to irrigate crops has been one major reason for the agricultural decline in this area. Water withdrawal has exceeded perennial yields in many areas with associated costs, as water quality decreases. Several areas in Nevada may be suitable for irrigation but the physical problems associated with providing water may preclude their use. Unless new deep well technology, major new reservoirs, or water importation schemes are developed, the future is expected to produce little or no expansion of irrigated agriculture and little increases in irrigated croplands.

Table 3.1.1-8. Projected irrigated cropland, Nevada M-X study area counties, through 2000.[1]

BASIN NAME	BASIN NUMBER	ACRES	BASIN NAME	BASIN NUMBER	ACRES
Big Smoky Valley (Tonopah Flat)	N-137A	2,070	Coal Valley	N-171	0
Big Smoky Valley (No. Part)	N-137B	11,260	Garden Valley	N-172	100
Kobeh Valley	N-139	1,800	Railroad Valley (So. Part)	N-173A	0
Monitor Valley (So. Part)	N-140B	2,212	Railroad Valley (No. Part)	N-173B	6,000
Ralston Valley	N-141	400	Steptoe Valley	N-179	13,000
Alkali Spring Valley (Esmeralda)	N-142	0	Cave Valley	N-180	400
Clayton Valley	N-143	80	Dry Lake Valley	N-181	0
Lida Valley	N-144	80	Delamar Valley	N-182	0
Stonewall Flat	N-145	0	Lake Valley	N-183	6,500
Sarcobatus Flat	N-146	320	Spring Valley	N-184	9,650
Cactus Flat	N-148	0	Pleasant Valley	N-194	300
Stone Cabin Valley	N-149	750	Snake Valley	N-195	2,500
Little Fish Lake Valley	N-150	240	Hamlin Valley	N-196	50
Antelope Valley (Eureka and Nye)	N-151	500	Dry Valley	N-198	1,100
Stevens Basin	N-152	0	Rose Valley	N-199	350
Diamond Valley	N-153	37,000	Eagle Valley	N-200	500
Newark Valley	N-154	4,600	Spring Valley	N-201	1,400
Little Smoky Valley (No. Part)	N-155A	1,700	Patterson Valley	N-202	0
Little Smoky Valley (Central Part)	N-155B	0	Panaca Valley	N-203	2,300
Little Smoky Valley (So. Part)	N-155C	0	Clover Valley	N-204	300
Hot Creek	N-156	300	Lower Meadow Valley	N-205	1,500
Emigrant Valley Groom (Lake Valley)	N-158A	0	Kane Springs Valley	N-206	0
Tikapoo Valley (No. Part)	N-169A		White River Valley	N-207	8,000
Penoyer Valley (Sand Spring Valley)	N-170	1,000	Pahroc Valley	N-208	0
			Pahranagat Valley	N-209	5,200
TOTAL					124,062

2944-1

[1]Acres indicated for each valley were derived by DRI:

a. From "Water for Nevada: Forecasts for the future - Agriculture," published by State Engineer's Office, Nevada Dept. of Conservation and Natural Resources, Carson City, 1974.

b. From the Nevada Water Resources Reconnaissance Series reports as prepared by the U.S. Ecological Survey in Cooperation with the Nevada Department of Conservation and Natural Resources.

Source: Desert Research Institute, 1980.

Utah

Table 3.1.1-9 illustrates the 1974 irrigated land total for study areas counties and consumptive water use for irrigated purposes. Millard County in 1975, had the largest amount of area, approximately 93,200 acres devoted to irrigated land. By the year 2000 it is projected that this land area will increase 3.6 percent to about 96,600 acres. Beaver County will experience the largest increase of 26,000 acres from 1975 to 2000. These projected land requirements are based on 1975 consumptive water usage for irrigation and projected 2000 consumptive water use.

The current trend in agriculture has been towards fewer farms with more acreage. On the whole, there has been a reduction in the acres farmed due to several factors. These include using fuel, land, energy costs for irrigation, as well as labor, which makes farming on marginal land uneconomical. Problems with enough water to irrigated cropland has been one major reason for the agriculture decline in this area. Overdrafting has taken place in Milford and Delta areas for decades with associated costs, as pumping expenses increase and water quality decreases. Although several areas in Utah may be suitable for expanded irrigated crop production, the availability and cost of providing necessary water may restrict this use. Unless new deep well technology, major new reservoirs, or water importation schemes are developed, the future is expected to produce little or no expansion of irrigated agriculture and few increases in harvested acreage of croplands in Utah.

Desert Land Entry Program

In cases where soil suitable for crop production exists and where water can be developed for irrigation, public land can be removed from federal administration and can be conveyed to private ownership under the Desert Land Entry Program (DLE) of 1877. Because of the typically low productivity of desert lands and high expense of developing systems of irrigation, the Homestead Act providing 160 acres (64 ha) of land to aspiring farmers was felt to be inadequate for supporting a profitable operation. The 1877 Desert Land Entry Act provided procedures for an individual to receive 640 acres (256 ha) for $1.25/acre to be improved through irrigation. Amendments later reduced the acreage to 320 acres (128 ha) for an individual (640 acres (256 ha) for a family), and contained specific requirements for irrigation. (One eighth of the entry is to be cultivated and irrigated to produce profitable results. A DLE claimant has four years to show proof of the reclamation, i.e., cultivation and improvements of the land to qualify for patent title.) Between 1877 and 1976, 1,687 applications have been patented on 376,338 acres (150,535 ha) in the State of Nevada compared to 3,308 applications on 514,764 acres (205,906 ha) in Utah (Department of the Interior, 1979). The most active period of interest occurred from WW II to 1964 when 758 patents for 187,371 acres (74,948 ha) were recorded. The scarcity of water for developing irrigation sources has severely limited the utilization of this program in Nevada. In fact, due to concern over appropriating scarce water in some valleys, the program was terminated in Nevada on June 4, 1964 by the Secretary of the Interior, to provide time for assessment of water availability and agricultural potential of the valleys.

Table 3.1.1-9. Irrigated farmland and consumptive water use in Utah, selected counties.

STATE/COUNTY	WATER CONSUMPTION FOR IRRIGATION PURPOSES (ACRE-FT.)		IRRIGATED AREAS (ACRES)		PERCENT CHANGE
	1975	2000 PROJECTED	1974	2000 PROJECTED	1974-2000
Utah					
Beaver	60,500	130,400	22,500	48,600	116
Iron	124,500	268,300	46,400	99,900	115
Millard	289,700	300,200	93,200	96,600	3.6
Juab	43,600	45,200	14,100	14,600	3.6

2945

Source: U.S. Department of Energy, 1980b

The moratorium on Desert Land Entries was lifted January 1, 1979. Over 8,000 inquiries and 1,745 applications were received during the initial 90-day filing period. An analysis of the economics of farming new desert land entries in Nevada was recently completed by the BLM Nevada state office. Their findings suggest that the current level of agricultural prices, land preparation costs, the costs of developing wells, purchasing irrigation equipment, and expending energy to irrigate is so high that only under assumptions of above average crop yields for potatoes, or alfalfa seed does it appear profitable to even attempt a Desert Land Entry application. The major problem facing new DLE applicants is the lack of unallocated water in most of the areas where applications were entered. Inasmuch as processing Desert Land Entry applications is an unbudgeted item (hence a low priority item) for the Nevada BLM, it is estimated that it will be years before any of the current applications will be allocated for farming. The Desert Land Entry program is available in all of Elko County and in portions of other counties in southern and western Utah, but none of this land falls within the study region.

NV-UT Agricultural Summary

Agriculture statistics, based on 1974 census figures, show an industry that involved 2,167 farms, producing a variety of crops and livestock, with a combined economic value of $74,278,000 to the 12-county study area. The 1974 average farm production is approximately $34,000, representing money which circulates throughout the community as labor and operations costs, profits, taxes, etc. Many small communities exist servicing the needs of this group, selling implements, shipping products to market, managing the federal land, and providing a social situation for carrying on the distinctive lifestyles of the region.

Two distinct types of farming operations have been observed as characteristic of the study areaa. First is the part-time farmer who lives on farmland, and runs a few cattle or plants a small crop, while keeping another job nearby or commuting to an urban area for employment. Second, and more important in terms of output, are the full-time farm and livestock operations which are very large, including large amounts of equipment, land, federal leasing privileges, and hired help.

The average income of farmers in Nevada is not commensurate with the very large average farm size and shows great fluctuations with the prices of livestock and the scale of the operation. Income, where crop production is a large share of agricultural output, show the greatest stability, while counties most dependent on cattle show the greatest variation and instability. Many farmers with small operations find they must work off the farm to support their families and ranch operations. Statistics for 1974 report that just over half (54 percent) of the farmers reported working off-farm. Lander, Eureka, Lincoln, and Nye counties show negative net proprietors' income for 1974 to 1976, thus providing a strong inducement to augment their income from another job source (Department of the Interior, May 1979).

Unlike Nevada, Utah's more diversified agriculture showed an increasing average farm income since 1973. Many farms near cities and large towns are primarily residential in function, although they qualify as farms for statistical reporting if they produce over $50 worth of production and are over 10 acres in size. These are part-time farmers whose principal occupation is something other than farming. The 1974 Census of Agriculture reports 46.2 percent of Utah farms fit this category. The full-time farm income is no doubt much higher than the reported average for all farms in 1976 of $32,238.

A major source of agricultural information for the study area is the 1974 Census of Agriculture for Nevada and Utah. This census provides the data base for agricultural information in the 1977 County and City Data Book which summarizes agricultural data by county. The 1974 census data are updated for a number of variables of interest by state-generated agricultural statistics. Nevada Agricultural Statistics, 1977, Utah Agricultural Statistics, 1978, and Analysis of Agricultural Potential for Desert Land Entries in Nevada, 1979 are also data sources but provide incomplete coverage of agriculture at the county level and little information on future developments. Tables and figures concerning agricultural crops rely predominantly on these sources of information. Data have been aggregated and presented in summary form for a number of variables which best describe agricultural phenomena of relevance and interest to the M-X siting analysis.

BLM documents, including map overlays, provide agricultural and grazing information by various geographic breakdowns such as district, resource area, and planning unit for the study area. Information concerning livestock production and grazing are presented for the 31 separate planning units in the study area. The coverage on some variables is incomplete and most inventories compiled between 1972-1974 are generally more dated than the 1974 Census of Agriculture. Moreover, Utah BLM districts have recently changed their resource area and planning unit boundaries thus making statistical comparisons with county level data difficult.

TEXAS/NEW MEXICO REGION (3.1.2)

Because of the vast amounts of land used, agriculture is a very important land use in both Texas and New Mexico. However, in 1978 income accounted for only 1.7 percent of the total Texas personal income, 3.9 percent of this, in total New Mexico income. The U.S. average was 2.5 percent (BEA, April, 1979). Table 3.1.2-1 shows this data.

General Agriculture

The economy of most of the Texas/New Mexico study areas counties is highly dependent upon agriculture. Approximately 25 percent of the study area is in irrigated cropland, 15 percent is in non-irrigated cropland, and 50 percent is in rangeland. In addition, about 50 percent of the livestock sold in Texas in 1974 was in the Texas study area counties while the study area counties produced approximately 40 and 80 percent of the state total sorghum production for Texas and New Mexico, respectively.

Farming trends from 1950-1974 for Texas and New Mexico are shown in Table 3.1.2-2, and are represented graphically in Figures 3.1.2-1 and 3.1.2-2.

Table 3.1.2-1. Agricultural income and earnings as a percentage of total income, Texas/ New Mexico study area counties, 1978.

STATE/COUNTY	PERCENTAGE OF TOTAL INCOME
Texas	1.7
Bailey	26.1
Castro	46.7
Cochran	18.4
Dallam	19.9
Deaf Smith	3.3
Hale	14.3
Hartley	22.9
Lamb	28.5
Moore	-6.3[1]
Oldham	41.0
Parmer	9.7
Randall	-8.0[1]
Sherman	-137.1[1]
Swisher	45.2
New Mexico	3.9
Chaves	12.2
Curry	9.8
De Baca	42.0
Harding	22.6
Lea	5.2
Quay	21.9
Roosevelt	32.5
Union	51.0
U.S.	2.5

4197

[1]Farm income was negative.

Source: BEA, July, 1980.

Table 3.1.2-2. **Trends in farming in Texas and New Mexico 1950-1974.**

YEAR	NUMBER OF FARMS	ACREAGE IN FARMS	IRRIGATED ACREAGE IN FARMS	HARVESTED ACREAGE IN FARMS
Texas				
1950	331,567	145,389,000	3,132,000	28,108,000
1954	292,947	145,813,000	4,707,000	24,885,000
1959	227,071	143,218,000	5,656,000	22,236,000
1964	205,115	141,705,000	6,385,000	19,408,000
1969	213,550	142,567,000	6,888,000	19,825,000
1974	174,068	134,185,000	6,594,000	19,014,000
New Mexico				
1950	23,599	47,522,000	655,000	1,898,000
1954	21,070	49,451,000	650,000	1,135,000
1959	15,919	46,293,000	732,000	1,077,000
1964	14,206	47,646,000	813,000	906,000
1969	11,641	46,792,000	823,000	1,008,000
1974	11,282	47,046,000	867,000	976,000

3030-1

Source: Department of Commerce, 1977.

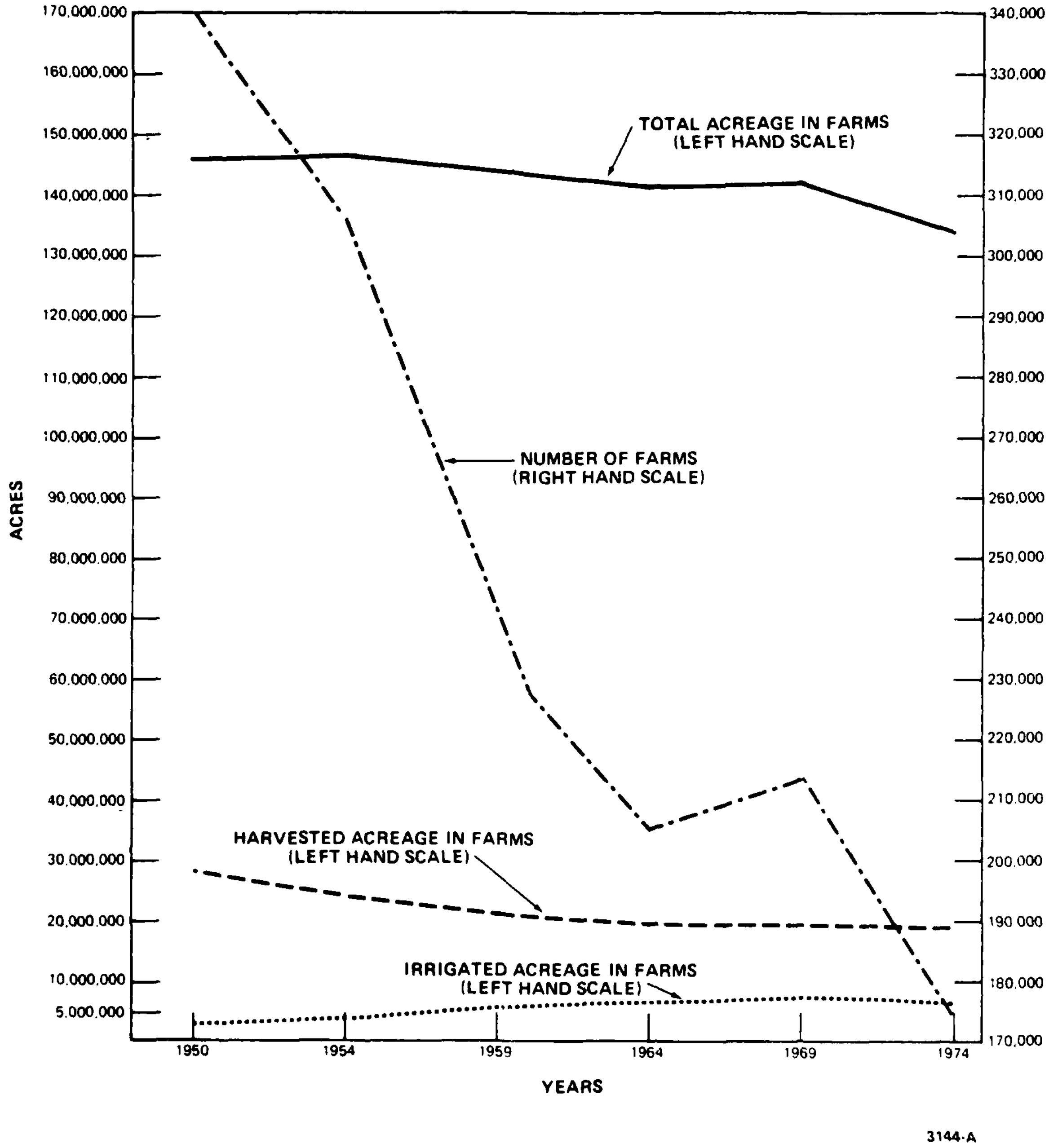

Figure 3.1.2-1. Trends in farming in Texas, 1950-1974.

SOURCE: DEPARTMENT OF COMMERCE, 1977

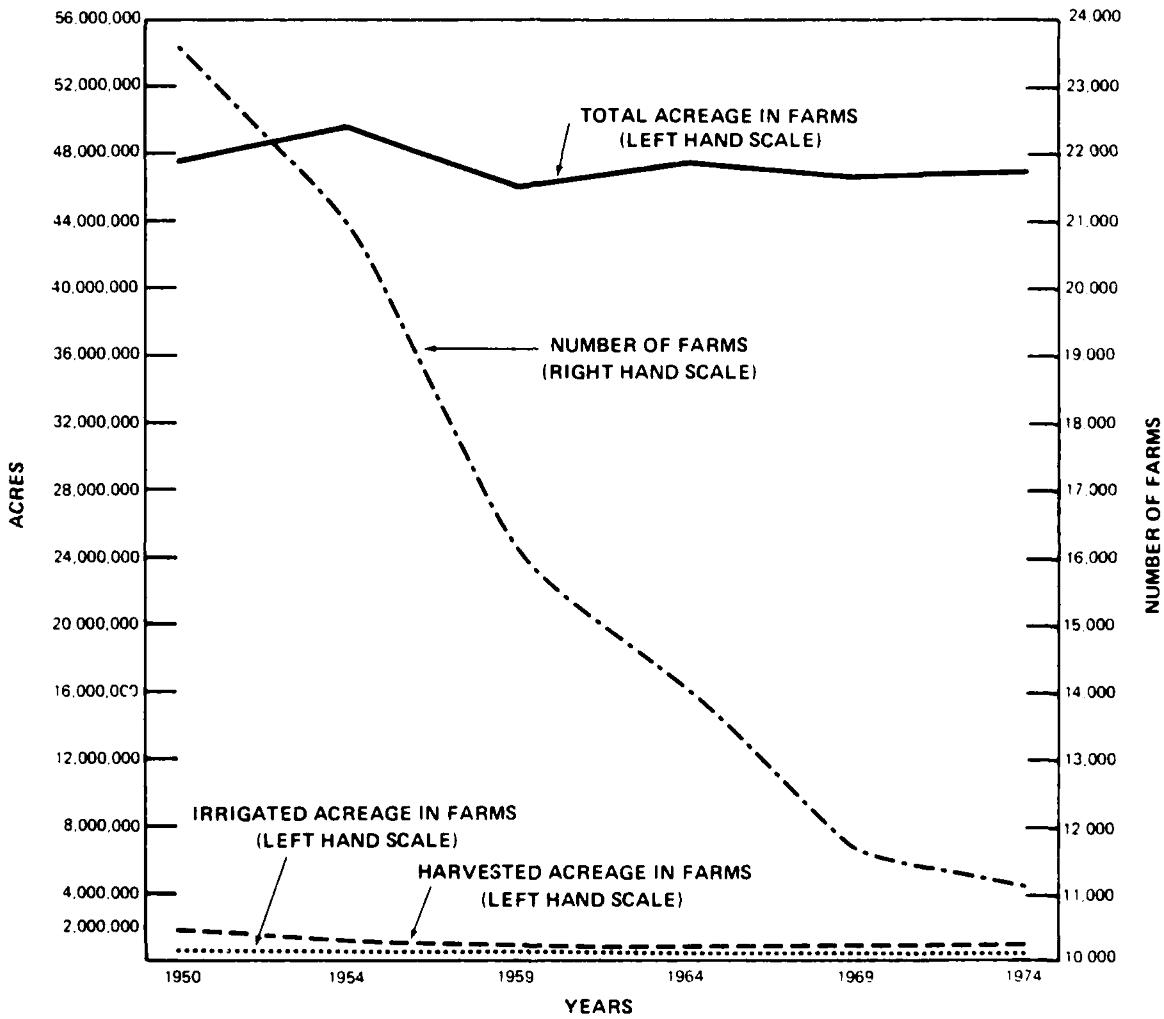

Figure 3.1.2-2. Trends in farming in New Mexico, 1950-1974.

It is apparent that the number of farms has been reduced by one-half over this time period while the acreage in the farms has declined slightly in Texas and remained constant in New Mexico. Hence the acreage per farm has increased. Irrigated acreage has increased significantly in both states by more than doubling in Texas and increasing by about 34 percent in New Mexico between 1950 and 1974. Simultaneously the harvested acreage has declined over the time period further increasing the proportion of the harvested acreage under irrigation.

The New Mexico study area counties have a greater amount of agricultural acreage than do the Texas study area counties. The number of farms, total farmland acreage, and the percentage of the states' total farmland for Texas and New Mexico study area counties is indicated in Table 3.1.2-3. The average farm size in the study area counties of New Mexico is almost three times larger than the average farm size in Texas. Such a difference reflects the greater dependence upon the livestock industry in New Mexico which requires larger areas for grazing. The study area counties in New Mexico represent a significantly larger portion (29.9 percent) of the total state farmland than the study area counties in Texas (6.7 percent). Farmland is defined as land used for crops, pasture, and grazing except that grazed under government permit.

Croplands

Croplands, as noted previously, are a subject of the broader category of farmlands. In the Texas/New Mexico study area the productivity of croplands is high and has been augmented by expanded irrigation. A zone of high productivity attributable to the Ogallala aquifer, extends west from the High Plains of the Texas Panhandle into small portions of eastern New Mexico. Table 3.1.2-4 shows the amount of cropland, harvested cropland, and pasture for the study area counties. The 3.0 million acres of irrigated cropland in the Texas/New Mexico region equals 16.1 percent of the region's farmland (Table 3.1.2-4). The Texas portion of the study area (2.6 million acres) accounts for approximately 39 percent of the total irrigated acreage in Texas while the comparable figure for the New Mexico counties (0.45 million acres) is 52 percent. As such, both areas are very important to the states' agricultural economies. The role of the study area counties in New Mexico is larger than in Texas when the percentage of the states' total cropland is examined: the New Mexico counties represent 61.2 percent and the Texas counties, 13.4 percent.

The value of agricultural products sold is presented in Table 3.1.2-5. The proportion of agricultural sales is not evenly distributed between the 20 Texas/New Mexico study area counties, as three Texas counties (Castro, Deaf Smith, and Parmer) collectively received 38 percent of the region's agricultural returns. The relative importance of cropland returns vis a vis livestock returns varies between the two states as well as between counties within each state. In general, the importance of cropland agriculture is higher in Texas than New Mexico. In addition, the statewide significance of the Texas counties is higher (29 percent) than the New Mexico counties (13 percent) in terms of value of agricultural products sold.

Table 3.1.2-3. Farmland in Texas and New Mexico study area counties, 1974.

COUNTY	NUMBER OF FARMS	AVERAGE FARM SIZE ACRES	TOTAL ACREAGE IN FARMLAND	FARMLAND AS PROPORTION OF COUNTY LAND (PERCENTAGE)[1]	COUNTY FARMLAND AS PROPORTION OF STATE FARMLAND (PERCENTAGE)
Texas					
Bailey	479	878	420,800	78.7	0.3
Castro	616	944	581,500	103.2	0.4
Cochran	297	1,376	408,600	81.6	0.3
Dallam	345	2,783	960,100	100.4[2]	0.7
Deaf Smith	637	1,344	856,100	86.6	0.6
Hale	1,078	636	685,400	109.4	0.5
Hartley	196	4,657	912,800	95.9	0.7
Lamb	944	677	639,500	97.8	0.5
Moore	270	1,906	514,600	88.5	0.4
Oldham	154	5,296	815,600	86.3	0.6
Parmer	704	824	580,100	105.5	0.4
Randall	486	1,089	529,200	90.5	0.4
Sherman	300	1,865	559,500	95.4	0.4
Swisher	699	800	559,200	97.5	0.4
Total or average	7,205	1,252	9,023,000	—	6.7
New Mexico					
Chaves	517	5,316	2,771,600	71.2	5.9
Curry	636	1,316	837,200	93.3	1.8
DeBaca	177	7,198	1,274,000	84.5	2.7
Harding	175	7,874	1,377,900	100.9	2.9
Lea	512	4,404	2,254,900	80.2	4.8
Quay	607	3,226	1,957,900	106.4	4.2
Roosevelt	905	1,691	1,530,200	97.4	3.2
Union	416	4,916	2,045,000	83.7	4.3
Total or average	3,945	3,561	14,048,700	—	29.9
Texas/New Mexico Total	11,150	2,069	23,071,700	—	12.7

3212-1

[1]Includes all cropland, pastures, and grazing land except that on open ranges under government permit.

[2]Tabulated as being in the operator's principal county which is defined as the one with the largest value of agricultural products produced. This is where the operator reported all of the largest portion of his total land. As a result of this procuedure, several counties exceed 100 percent.

Source: Department of Commerce, 1977.

Table 3.1.2-4. Cropland acreage in Texas/New Mexico study area counties, 1974.

COUNTY	TOTAL CROPLAND	HARVESTED CROPLAND	CROPLAND USED ONLY FOR PASTURE	LAND IRRIGATED	CROPLAND AS PROPORTION OF STATE CROPLAND PERCENTAGE
Texas					
Bailey	299,000	137,000	20,000	119,000	0.8
Castro	441,000	330,000	25,000	295,000	1.2
Cochran	254,000	138,000	6,000	89,000	0.7
Dallam	324,000	212,000	31,000	111,000	0.8
Deaf Smith	510,000	285,000	31,000	238,000	1.4
Hale	574,000	468,000	34,000	401,000	1.6
Hartley	217,000	130,000	12,000	84,000	0.6
Lamb	451,000	327,000	18,000	277,000	1.2
Moore	228,000	154,000	11,000	121,000	0.6
Oldham	96,000	35,000	17,000	15,000	0.3
Parmer	446,000	349,000	22,000	339,000	1.2
Randall	289,000	123,000	37,000	77,000	0.8
Sherman	342,000	232,000	21,000	161,000	0.9
Swisher	400,000	278,000	39,000	252,000	1.1
TOTAL	4,873,000	3,198,000	324,000	2,579,000	13.4
New Mexico					
Chaves	95,000	78,000	12,000	84,000	4.3
Curry	426,000	172,000	42,000	145,000	19.4
DeBaca	11,000	5,000	4,000	7,000	0.5
Harding	34,000	4,000	11,000	7,000	1.6
Lea	86,000	52,000	20,000	62,000	3.9
Quay	252,000	70,000	43,000	38,000	11.5
Roosevelt	346,000	181,000	58,000	84,000	15.8
Union	90,000	35,000	29,000	27,000	4.1
TOTAL	1,340,000	597,000	219,000	454,000	61.2
TEXAS/NEW MEXICO TOTAL	6,213,000	3,795,000	543,000	3,033,000	16.1

3033

Source: Department of Commerce, 1977.

Table 3.1.2-5. Market value of agricultural products, Texas/New Mexico study area counties, 1974.

COUNTY	VALUE OF AGRICULTURAL PRODUCTS SOLD ($1000'S)	VALUE OF CROPS AND HAY (PERCENT OF TOTAL)	VALUE OF LIVESTOCK AND LIVESTOCK PRODUCTS (PERCENT OF TOTAL)	VALUE OF OTHER PRODUCTS (PERCENT OF TOTAL)	VALUE OF AGRICULTURAL PRODUCTS AS PROPORTIONAL OF STATE TOTAL (PERCENT)
Texas					
Bailey	48,083	39.8	60.2	0.0	0.8
Castro	204,810	30.1	69.7	0.2	3.6
Cochran	33,919	26.5	73.3	0.2	0.6
Dallam	64,233	33.4	66.5	0.1	1.1
Deaf Smith	266,871	19.3	80.7	0.0	4.7
Hale	136,017	50.0	49.9	0.1	2.4
Hartley	80,101	20.7	79.3	0.0	1.4
Lamb	67,734	74.3	25.4	0.3	1.2
Moore	101,819	23.6	76.4	0.0	1.8
Oldham	33,731	6.2	92.3	1.5	0.6
Parmer	261,487	30.9	69.1	0.0	4.6
Randall	107,970	10.6	88.4	1.0	1.9
Sherman	103,445	28.0	71.9	0.1	1.8
Swisher	124,913	28.3	71.6	0.1	2.2
TOTAL	1,635,133	—	—	—	29.7
New Mexico					
Chaves	84,146	20.6	79.4	0.0	16.1
Curry	59,479	36.9	63.0	0.1	11.4
DeBaca	6,562	15.3	84.7	0.0	1.2
Harding	5,415	3.3	96.6	0.1	1.0
Lea	24,710	29.8	69.7	0.5	4.7
Quay	27,352	15.8	84.1	0.1	5.2
Roosevelt	38,344	32.9	66.1	1.0	7.2
Union	38,580	8.1	91.8	0.1	7.4
TOTAL	284,588	—	—	—	54.6
REGIONAL TOTAL	1,919,721				13.2

3034

Source: Department of Commerce, 1977.

The location of irrigated and non-irrigated (dry) croplands in the Texas/New Mexico study area is shown in Figures 3.1.2-3 and 3.1.2-4. The irrigated croplands receive water from groundwater aquifers and surface waters.

The Ogallala aquifer varies in thickness from 50 to 500 feet with severe diminution of the supply in the thin sections. In the southern High Plains, the supply is nearly depleted, and irrigated cropland is being converted to dryland farming or returned to grasses. The amount of groundwater used in the High Plains in 1974 was estimated at 8 million acre-feet or 78 percent of the groundwater used in the entire state. At projected rates of use, the groundwater in the study area counties of the High Plains may only support irrigation to the year 2015. This is one of the most severe water supply problems in Texas because of the high agricultural productivity of this region (Texas Water Development Board, 1977).

The New Mexico Counties lie in three river basins (from north to south): the Arkansas-White-Red River Basin, the Texas-Gulf Basin, and the Pecos River Basin. The Arkansas-White-Red-River Basin in New Mexico is the same basin as the Canadian, Red, and Brazos basins in Texas. (Bureau of Reclamation, 1976.)

Of the six river sub-basins in the Arkansas-White-Red Basin, only the Dry Cimmeron has perennial surface water flows. Groundwater in the Arkansas River Basin is used in rural households and for watering livestock, irrigation, and supplying a number of municipalities. Depth to groundwater is generally less than 200 feet. Groundwater depletion in this area is about 63,000 acre-foot per year, about 13,000 acre-foot of that being surface water related to groundwater. It is estimated that 75 million acre-foot of fresh groundwater and 160 million acre-foot of slightly saline groundwater are recoverable in the basin (Bureau of Reclamation 1976).

Future Changes in Cropland

Texas

Future baseline conditions for cropland have been analyzed by regional planning commissions in two portions of the Texas Panhandle. The Panhandle Regional Planning Commission in a 1978 study entitled "Region and Land Resource Management Plan" examined current cropland acreage and projected acreages for the year 2000. Dry cropland was projected to decrease by 1.5 percent due to the conversion of dryland to irrigated land. Irrigated cropland was expected to increase 39 percent. The conversion of dry land to irrigated land was assumed to be due to new and improved farming techniques. The groundwater projections showed a decline in the yield between the years 1974 and 2000. The inconsistency between these two projections, the amount of irrigated acres and the amount of water available for irrigation was not addressed. The Panhandle Regional Planning Commission projections and 1975 cropland acreages are provided in Table 3.1.2-6.

The South Plains Association of Governments (SPAG) assessed the role of cropland in the southern portion of the Texas Panhandle (south of the

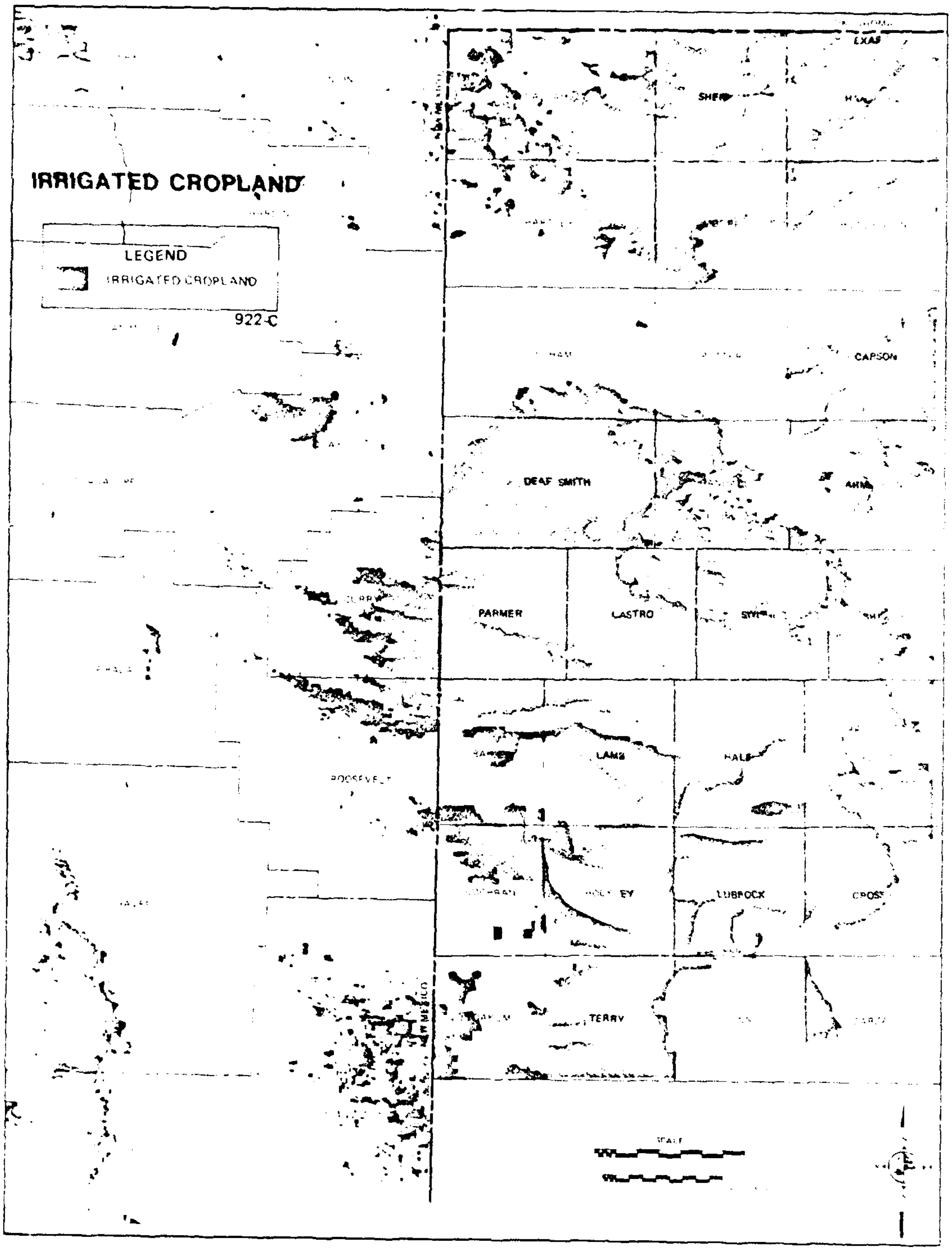

Figure 3.1.2-3. Irrigated cropland in the Texas/New Mexico study area.

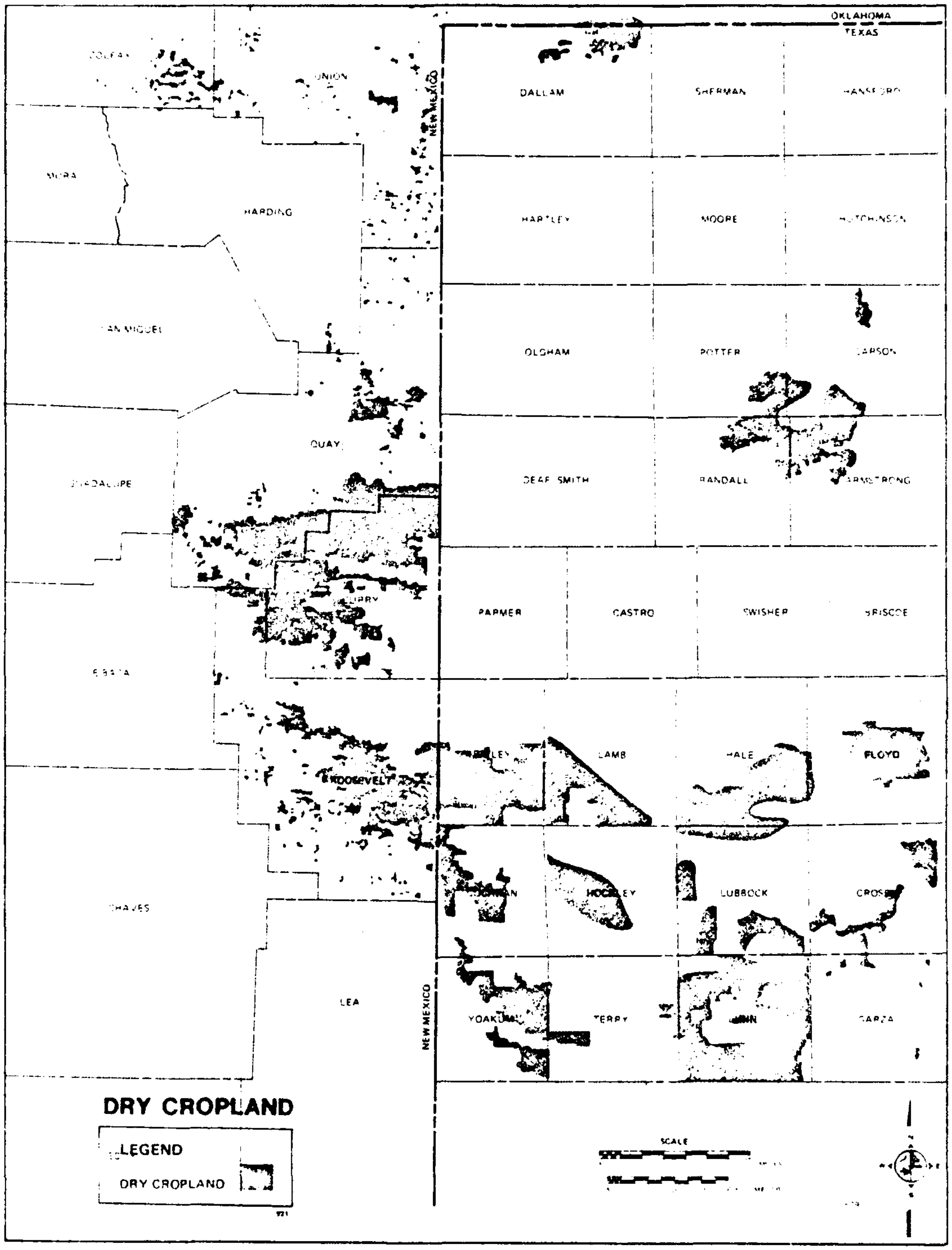

Figure 3.1.2-4. Dry cropland in the Texas/New Mexico study area.

Table 3.1.2-6. Irrigated cropland, Texas/New Mexico region study area counties 1975 and 1979 through 2000.

STATE/COUNTY	IRRIGATED CROPLAND ACREAGE		
	1975[1]	2000	1975-2000 PERCENT INCREASE (DECREASE)
Texas			
Bailey	78,200	NA	NA
Castro	181,000	308,865	70.6
Cochran	99,900	NA	NA
Dallam	102,500	282,887	176
Deaf Smith	240,400	416,800	73.3
Hale	374,600	NA	NA
Hartley	82,800	325,000	292
Lamb	232,900	NA	NA
Moore	112,600	215,000	90
Oldham	12,900	24,000	86
Parmer	144,600	410,474	184
Randall	89,700	63,236	(41.8)
Sherman	157,500	245,000	55.5
Swisher	244,900	270,194	10.3

STATE/COUNTY	IRRIGATED ACRES			1979-2000 % INCREASE (DECREASE)
	1969	1979	2000	
New Mexico				
Chaves	99,600	94,650	100,000	5.7
Curry	148,700	160,460	50,000	(221.0)
DeBaca	8,300	10,930	13,080	19.7
Harding	5,500	4,150	13,110	216
Lea	73,800	74,020	129,000	74.2
Quay	30,600	40,950	61,310	49.7
Roosevelt	82,400	110,130	65,000	(69.4)
Union	29,500	46,800	68,400	46.1
STATE TOTAL	478,400	501,140	499,960	(0.2)

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[1] Texas Crop and Livestock Reporter Service, 1978.
[2] Panhandle Regional Planning Commission,
[3] New Mexico Interstate Stream Commission and New Mexico State Engineers Office, 1975. Bureau of Reclamation, 1976.

Parmer-Bailey county line) in the "Regional Land Resources Management Plan, 1977". Croplands occupied approximately 56 percent of the SPAG study area. These lands were fairly equally divided between irrigated and non-irrigated lands. Baseline projections into the future were not made by SPAG. However, SPAG indicated that the decline of the groundwater table may have adverse impacts upon the future of irrigated cropland.

The effect of agriculture prices on the amount of cropland appears to be fairly steady if price influences found in the Nevada/Utah areas are valid in the Texas area. Urban pressure and conversions of agricultural lands to urban uses are present in the Panhandle region. However, the relative impact of cropland/urban conversions is minor in comparison to the impact of the declining groundwater supply on croplands.

In summary, it may be foreseen that the amount of irrigated cropland in the Panhandle area of Texas will be dependent upon the availability of groundwater. The amount of non-irrigated cropland will also be tied to the future of the groundwater resources. As groundwater supplies diminish some irrigated areas may revert back to non-irrigated farming. This effect will be accompanied by a trend for rangelands to be converted to drycropping. Hence, the total number of acres of nonirrigated cropland should increase.

New Mexico

Future baseline projections for irrigated acres of agricultural land have been made for New Mexico using data from a 1976 study entitled "New Mexico Water Resources Assessment for Planning Purposes" plus several background reports.

The future projections identify increases in the irrigated acreages for six of the eight study area counties. Roosevelt and Curry counties are projected to be subject to diminishing groundwater yields in the year 2000, hence necessitating the retirement of some areas from irrigation. Other counties are projected to be past the peak period of groundwater pumping by the year 2000 but still able to maintain more irrigated acreages than in the base years 1969-1970. Chaves and DeBaca counties are projected to be in this category.

3.2 METHODOLOGY FOR IMPACT ANALYSIS

The number of acres of land for each ownership type in each Nevada/Utah hydrologic subunit and in each Texas/New Mexico county that would have to be disturbed for MX, was determined by overlaying the alternative project deployment layouts on LANDSAT images which show the location of irrigated and dry croplands in each region, and counting the number of PSs that would fall within each land use type. That number of PSs was then multiplied by the average number of acres required to be disturbed per PS (excluding operations base complexes). The average is estimated to be 32.7 acres per PS for the construction phase (total disturbed area of 150,400 acres divided by 4,600 PSs), and 20.4 acres per PS for the operations phase (total disturbed area of 93,800 acres divided by 4,600 PSs). These are maximum expected disturbances and could be 8 to 10 percent less in each case.

3.3 ENVIRONMENTAL CONSEQUENCES

This section sets forth the impacts of the construction and operation of M-X on irrigated and dry croplands. The impact data shows the number of acres disturbed and the importance of those disturbances, in each hydrologic subunit in the Nevada/Utah region, and in each county in the Texas/New Mexico region. The DDA impacts are discussed for each conceptual deployment alternative, (Sections 3.31 and 3.3.2) and the impacts on croplands within the 100 to 400 mi^2 suitability zones around the potential operating bases are set forth separately (Section 3.33).

IRRIGATED CROPLANDS (3.3.1)

Proposed Action (3.3.1.1)

Figure 3.3.1-1 presents the coincidence of the Proposed Action with its 200 clusters of 23 protective shelters each, and the irrigated cropland for the Nevada/Utah region. The major coincidences of clusters and irrigated cropland are in Snake, Lake, and Monitor Valleys.

Table 3.3.1-1 shows the valleys which have irrigated cropland coincident with M-X DDA facilities, the acres of cropland disturbed for both construction and operations purposes, the percentage of each valley's cropland that the disturbed area represents and the level of impact potential of those disturbances for each valley. Twenty-five of the 41 valleys with proposed clusters have irrigated agriculture, and 10 of these 25 valleys have cropland that could be disturbed by the Proposed Action. An estimated 180 acres of irrigated cropland could be disturbed during construction. After construction, an estimated 77 acres could be returned to agriculture, and 113 acres would remain out of agriculture for the life of the project. The 180 acres and the 113 acres are equal to 0.09 and 0.06 percent of the 380,000 acres of irrigated cropland in the 41 hydrologic subunits. It can be seen that all ten would have a low potential impact.

The impact of the project upon irrigated cropland could be mitigated by assuring that project deployment would not interfere with irrigation systems and access roads to cropland areas. It is anticipated that the majority of this potentially impacted 180 acres of irrigated cropland will be avoided during the tier two refinement of shelter and road siting.

Future non-M-X projects such as IPP, WPPP, and Nevada Moly are not expected to directly impact large areas of irrigated cropland although population growth in nearby communities may result in urban development on some croplands if planning measures are not taken in advance. Because of the permanent nature of the shelter structures, it is unlikely that the ground on which they are located would be retrieved for agricultural purposes in the foreseeable future. The roadway system and new AF developed water resources could contribute to increased irrigated cropland.

Alternative 1 (3.3.1.2)

The cluster layout for Alternative 1 is the same as for the Proposed Action.

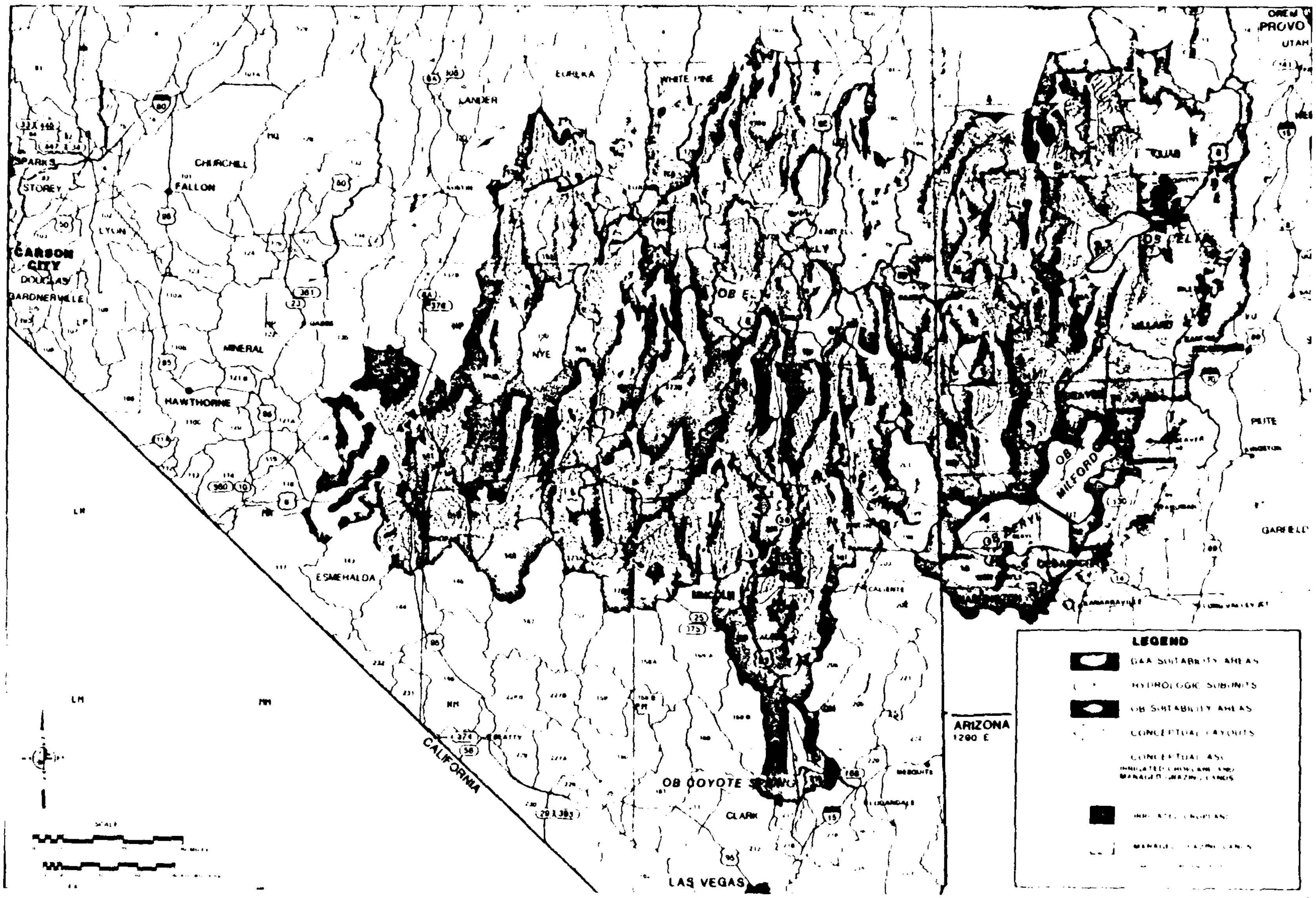

Figure 3.3.1-1. Irrigated cropland and proposed action, Nevada/Utah region. (See Fig. 4.3.2.12-1 of the DEIS)

Table 3.3.1-1. Potential impact on irrigated cropland in Nevada/Utah region for proposed action.

HYDROLOGIC SUBUNIT		SHORT-TERM EFFECTS			LONG-TERM EFFECTS		
		IRRIGATED CROPLAND DISTURBED		POTENTIAL IMPACT[1]	IRRIGATED CROPLAND DISTURBED		POTENTIAL IMPACT[1]
NO.	NAME	ACRES	PERCENT OF TOTAL IN HYDRO-SUBUNIT		ACRES	PERCENT OF TOTAL IN HYDRO-SUBUNIT	
	Subunits with M-X Clusters and DTN						
4	Snake	64	0.6	Low to moderately low	40	0.4	Low to moderately low
5	Pine	—	—	None	—	—	None
6	White	—	—	None	—	—	None
7	Fish Springs	—	—	None	—	—	None
8	Dugway	—	—	None	—	—	None
9	Government Creek	5	2.4	Low to moderately low	3	1.4	Low to moderately low
46	Sevier Desert	—	—	None	—	—	None
46A	Sevier Desert & Dry Lake[2]	—	—	None	—	—	None
54	Wah Wah	—	—	None	—	—	None
137A	Big Smoky-Tonopah Flat	5	0.2	Low to moderately low	3	0.1	Low to moderately low
139	Kobeh	4	0.2	Low to moderately low	3	0.1	Low to moderately low
140A	Monitor—Northern	14	0.7	Low to moderately low	9	0.5	Low to moderately low
140B	Monitor—Southern	—	—	None	—	—	None
141	Ralston	—	—	None	—	—	None
142	Alkali Spring	—	—	None	—	—	None
148	Cactus Flat	—	—	None	—	—	None
149	Stone Cabin[2]	—	—	None	—	—	None
151	Antelope	4	1.8	Low to moderately low	3	1.6	Low to moderately low
154	Newark[3]	—	—	None	—	—	None
155A	Little Smoky—Northern	—	—	None	—	—	None
155C	Little Smoky—Southern	—	—	None	—	—	None
156	Hot Creek	—	—	None	—	—	None
170	Penoyer	—	—	None	—	—	None
171	Coal	—	—	None	—	—	None
172	Garden	—	—	None	—	—	None
173A	Railroad—Southern	—	—	None	—	—	None
173B	Railroad—Northern	3	0.03	Low to moderately low	1	0.02	Low to moderately low
174	Jakes[3]	9	2.0	Low to moderately low	6	1.4	Low to moderately low
175	Long	—	—	None	—	—	None
178B	Butte—South	—	—	None	—	—	None
179	Steptoe	—	—	None	—	—	None
180	Cave	—	—	None	—	—	None
181	Dry Lake[3]	—	—	None	—	—	None
182	Delamar	—	—	None	—	—	None
183	Lake	66	1.0	Low to moderately low	41	0.6	Low to moderately low
184	Spring	—	—	None	—	—	None
196	Hamlin	—	—	None	—	—	None
202	Patterson	—	—	None	—	—	None
207	White River	7	0.09	Low to moderately low	4	0.09	Low to moderately low
208	Pahroc	—	—	None	—	—	None
209	Pahranagat	—	—	None	—	—	None
	Overall DDA	180	0.09	Low to moderately low	113	0.06	Low to moderately low

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[1] None. (No cropland disturbed.)

Low to moderately low impact. (Less than 100 acres or less than 1 percent of cropland disturbed in subunit.)

Moderate to moderately high impact. (Less than 1,000 acres or less than 3 percent of cropland disturbed in subunit.)

High impact. (More than 1,000 acres or more than 3 percent of cropland disturbed in subunit.

[3] Conceptual location of Area Support Centers (ASCs).

Alternative 2 (3.3.1.3)

DDA irrigated agriculture impacts would be the same as for the Proposed Action.

Alternative 3 (3.3.1.4)

DDA impacts are the same as for the Proposed Action.

Alternative 4 (3.3.1.5)

DDA impacts on irrigated agriculture would be the same as for the Proposed Action.

Alternative 5 (3.3.1.6)

The DDA impacts on irrigated agriculture would be the same for the Proposed Action.

Alternative 6 (3.3.1.7)

The DDA impacts on irrigated agriculture would be the same for the Proposed Action.

Alternative 7 (3.3.1.8)

Under Alternative 7, there will be a total of 200 clusters of 23 PSs each deployed in the Texas/New Mexico region, as shown on Figure 3.3.1-2. That figure also shows the location of the irrigated cropland and counties in the region.

Table 3.3.1-2 shows the counties in the Texas/New Mexico study area, the number of acres of irrigated cropland that would be disturbed by both construction and operation phases of the project, the percentage of the total acres of irrigated cropland in the county that the disturbed acres represent, and the level of potential impact that those disturbances represent. All together, about 9100 acres of irrigated cropland could be disturbed by the construction phase under Alternative 7. About 2800 of these acres could be returned to agricultural use upon completion of construction leaving about 6,300 acres remaining out of agricultural use for the life of the project. The 9,100 and 6,300 acres represent 0.3 and 0.2 percent of the 3,194,000 acres of irrigated cropland in the Texas/New Mexico study area counties.

Future non-M-X projects such as the Tolk Power Plants, Highway I-27, and the CO2 pipelines are not expected to significantly disturb irrigated cropland in the Texas/New Mexico region. Because of the permanent nature of PSs, it is unlikely that the ground on which they are located could be retrieved for agricultural purposes in the foreseeable future. The roadway system, however, could be returned to their original agriculture use upon decommissioning of the project. In many instances, however, the roadway system could remain open to public use where they could better serve public purposes. The roadway system and new Air Force developed water resources could contribute to increased irrigated cropland.

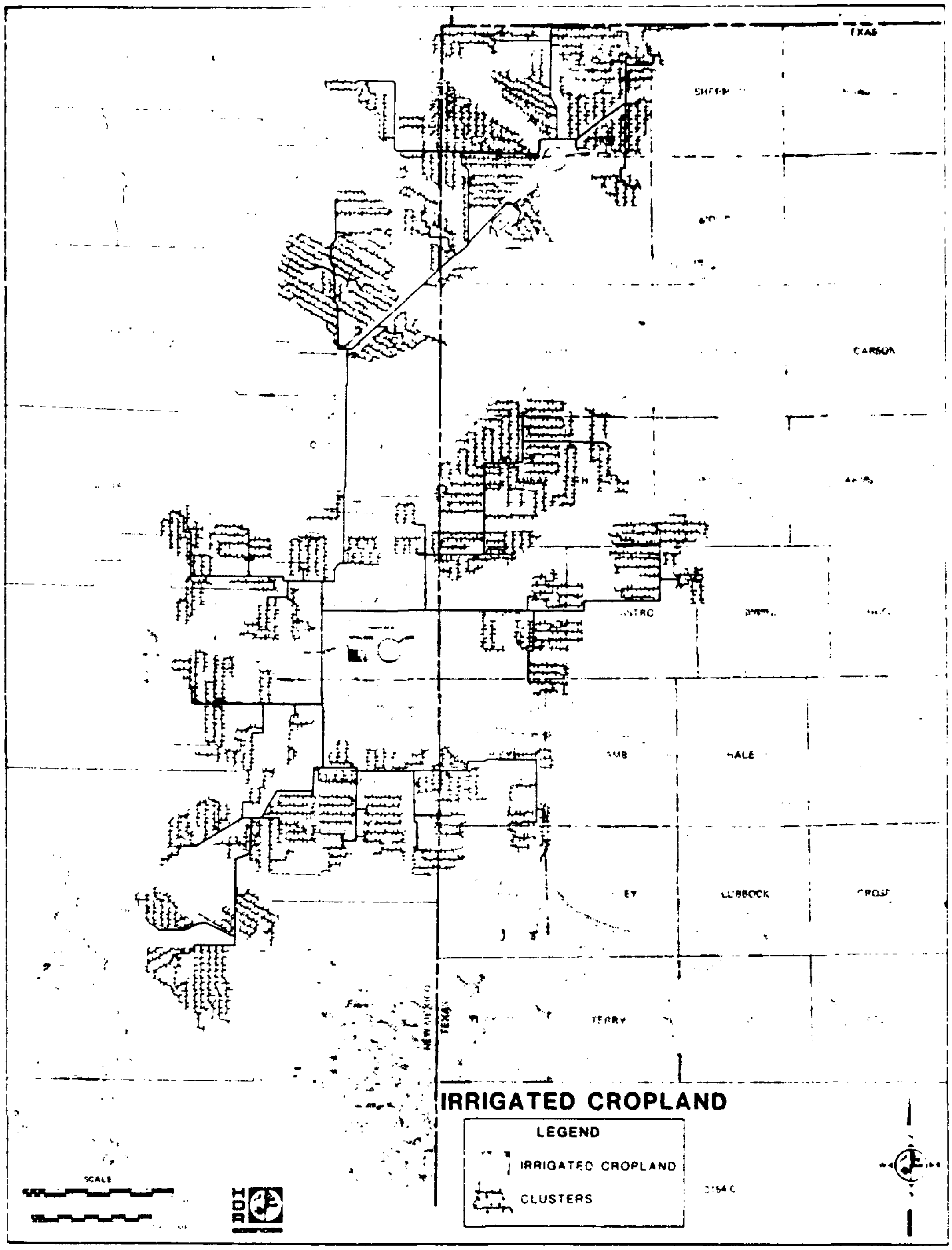

Figure 3.3.1-2. Irrigated cropland and Alternative 7 cluster layout, Texas/New Mexico.

Table 3.3.1-2. Potential impact to irrigated cropland in Texas/New Mexico for Alternative 7.

COUNTY	SHORT-TERM EFFECTS: IRRIGATED CROPLAND DISTURBED — ACRES	SHORT-TERM: PERCENT OF TOTAL IN COUNTY	SHORT-TERM: POTENTIAL IMPACT[1]	LONG-TERM EFFECTS: IRRIGATED CROPLAND DISTURBED — ACRES	LONG-TERM: PERCENT OF TOTAL IN COUNTY	LONG-TERM: POTENTIAL IMPACT[1]
Counties with M-X Clusters and DTN						
Bailey, TX	88	0.07	Low	55	0.33	Low
Castro, TX	1,097	0.37	High	684	0.23	Moderate
Cochran, TX	19	0.62	Low	12	0.39	Low
Dallam, TX	1,513	1.42	High	981	0.89	Moderate
Deaf Smith, TX[2]	1,692	0.71	High	1,056	0.44	High
Hartley, TX[2]	508	0.60	Moderate	317	0.37	Moderate
Hockley, TX	10	0.006	Low	6	0.004	Low
Lamb, TX	890	0.32	Moderate	555	0.20	Moderate
Oldham, TX	64	0.43	Low	40	0.27	Low
Parmer, TX	2,254	0.66	High	1,406	0.41	High
Randall, TX	70	0.09	Low	44	0.06	Low
Sherman, TX	160	0.01	Moderate	100	0.06	Moderate
Swisher, TX	376	0.15	Moderate	235	0.09	Moderate
Chaves, NM	0	0	No impact	0	0	No impact
Curry, NM	165	0.11	Low	103	0.07	Moderate
DeBaca, NM	2	0.03	Low	1	0.02	Low
Guadalupe, NM			No impact			No impact
Harding, NM	8	0.11	Low	5	0.07	Low
Lea, NM	0	0	No impact	0	0	No impact
Quay, NM	30	0.08	Low	19	0.05	Low
Roosevelt, NM[2]	34	0.04	Low	21	0.02	Low
Union, NM	99	0.37	Low	62	0.23	Low
Texas Total (DDA)	8,741	0.40	High	6,129	0.20	High
New Mexico Total (DDA)	338	0.01	Moderate	211	0.01	Moderate
Total for DDA	9,079	0.30	High	6,340	0.20	High

3886-3

[1]:

- No impact. (No cropland disturbed.)
- Low impact. (Less than 100 acres or less than 1 percent of cropland disturbed in county.)
- Moderate impact. (Less than 1,000 acres or less than 3 percent of cropland disturbed in county.)
- High impact. (More than 1,000 acres or more than 3 percent of cropland disturbed in county.)

[2]Conceptual location of Area Support Centers (ASCs).

The impact of the project upon irrigated cropland would be mitigated by assuring that project deployment would not interfere with irrigation systems, that access roads to farm areas remain open, and that natural drainage ways remain unimpeded whenever possible. Because about 85 percent of the irrigated cropland in the Texas/New Mexico region occurs in the State of Texas, the impact on such croplands could be mitigated by relocating as many clusters as practical to New Mexico.

The proposed operating base near Clovis would require about 3,520 acres of irrigated cropland, for the year life of the project. The crops that are produced on the site are corn, wheat, and grain, which are rotated on a seasonal basis. The 3,500 acres represents about 2.4 percent of the 143,000 acres of irrigated cropland in Curry County (Department of Commerce, 1977).

To mitigate the impact on irrigated croplands, care can be taken to assure that the development of base facilities does not interfere with irrigation systems and natural drainage areas. Relocation of the base or annexation in another location would not be as desirable if the existing runways at Cannon AFB were to be used and if the existing master plan for housing at Cannon were to be complied with.

The present use of the proposed site near Dalhart is privately owned grazing land, and no irrigated cropland would be disturbed by the project. Relocation of the proposed base location within the suitable zone would not change this condition.

Alternative 8 (3.3.1.9)

Alternative 8 is a split basing system with 70 clusters in Nevada, 30 in Utah, 35 in Texas, and 65 in New Mexico. The deployment system for the Nevada/Utah region is shown on Figure 3.3.1-3 together with cluster coincidence with irrigated cropland. Figure 3.3.1-4 shows this information for the Texas/New Mexico portion of Alternative 8.

Because of the permanent nature of the shelter structures, it is unlikely that the ground on which they would be located could be retrieved for agricultural purposes in the foreseeable future, unless they are physically removed and the earth restored. The roadway systems, however, could be returned to their original agricultural use upon decommissioning of the project. In many instances, however, the roadway system could remain open to public use where they could better serve public purposes and access to existing farmlands. Further, new Air Force developed water resources could contribute to increased irrigated cropland.

The impact of the project upon irrigated cropland could be mitigated by assuring that project deployment would not interfere with irrigation systems, that access roads to farmlands remain open, and that natural drainage areas remain unimpeded. With only slight modification to the system layout as anticipated by tier two refinement, all croplands in Nevada/Utah could be avoided. In Texas/New Mexico, however, more extreme modification of the system layout would be required to avoid using any irrigated cropland.

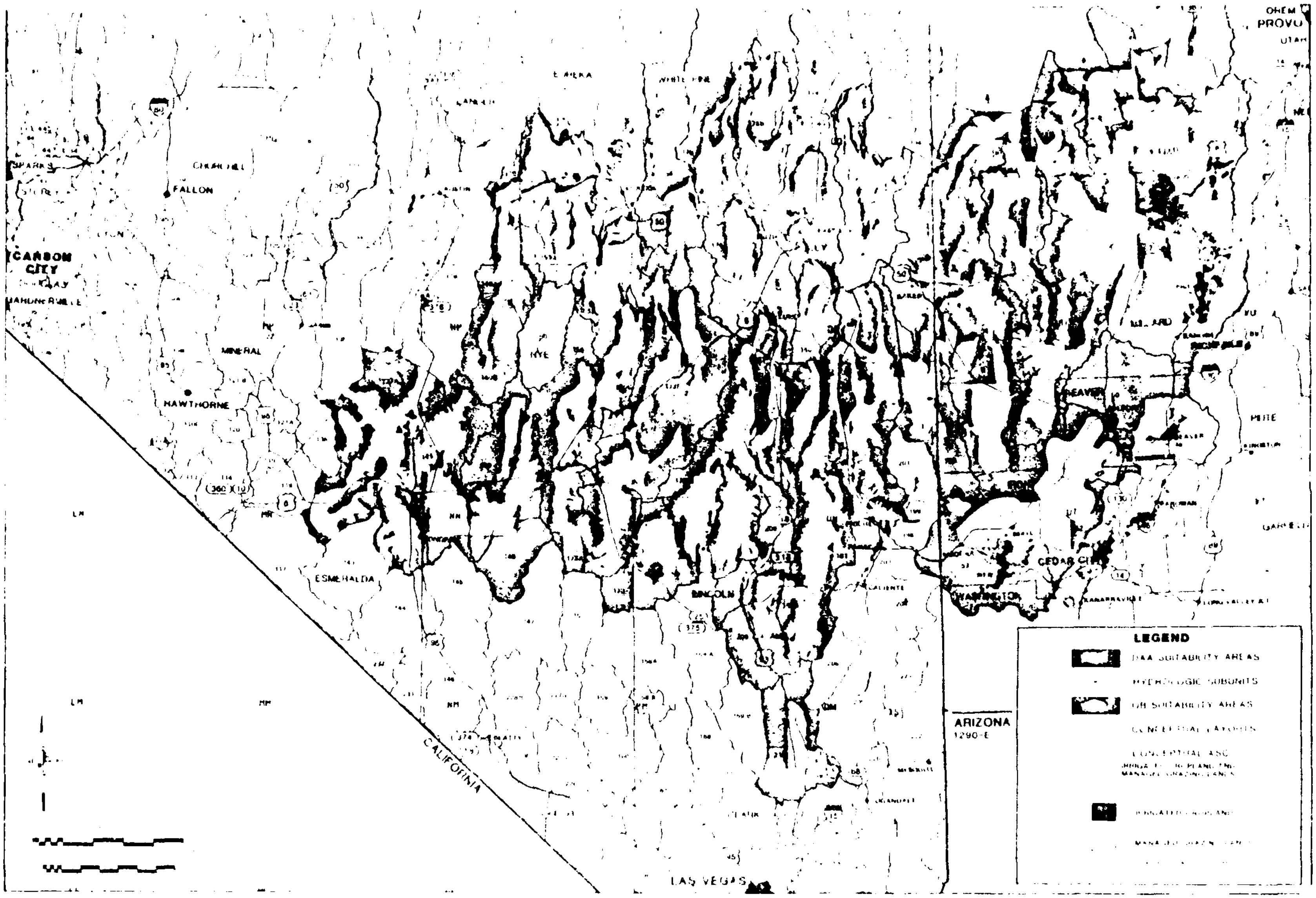

Figure 3.3.1-3. Irrigated cropland and Alternative 8 cluster layout, Nevada/Utah portion. (See Fig. 4.3.2.12-7 of DEIS)

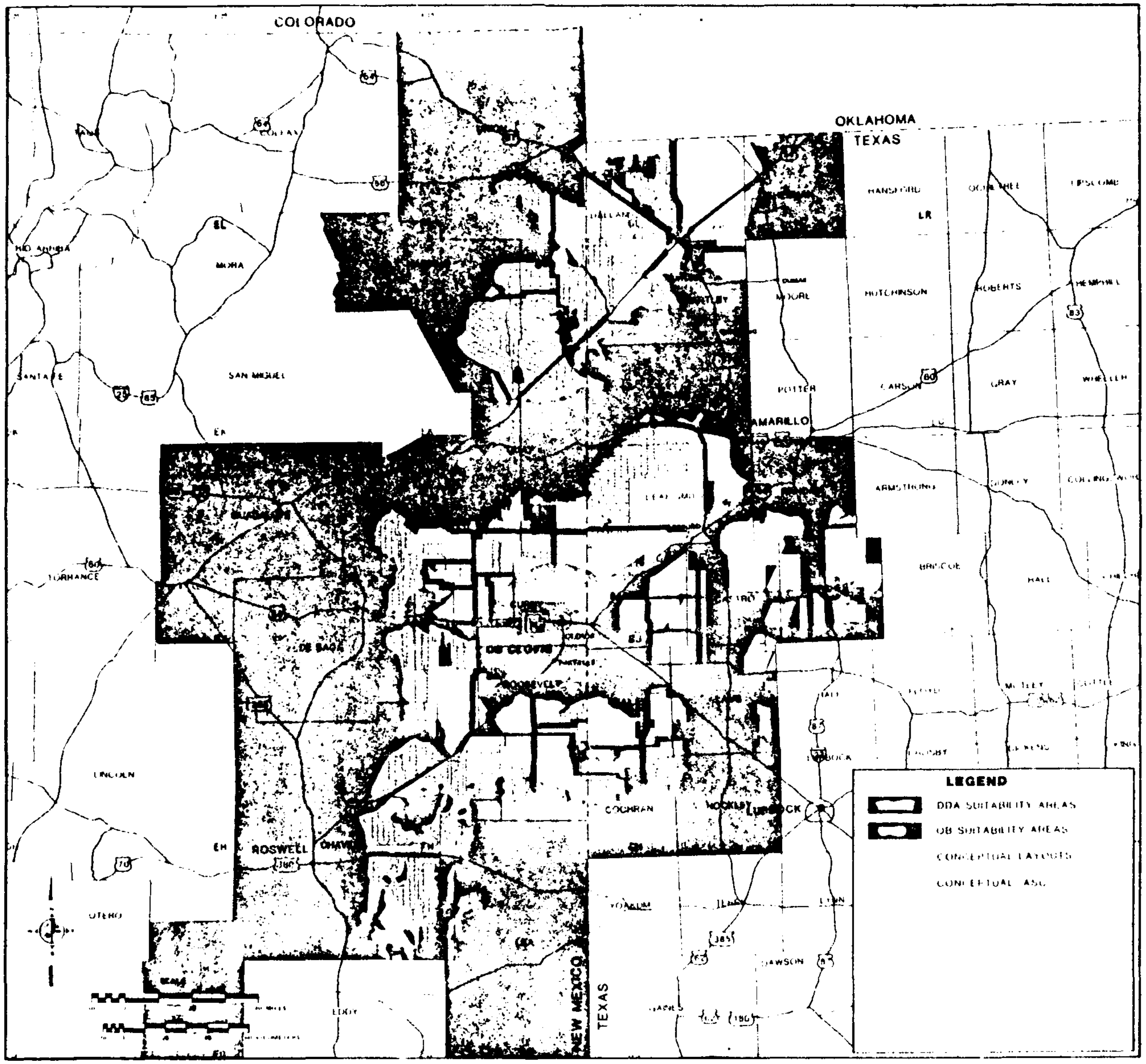

Figure 3.3.1-4. Irrigated cropland and Alternative 8 cluster layout, Texas/New Mexico portion. (See Fig. 4.3.2.12-8 of the DEIS)

Nevada/Utah

Table 3.3.1-3 shows the valleys in the Nevada/Utah study area which have proposed clusters which coincide with irrigated cropland for Alternative 8, the number of acres of irrigated cropland that would be disturbed by both the construction phase and operations phase of the project, the percentage of each valley's cropland that the disturbed area represents, and the level of potential impact of those disturbed acres for each valley. All together, 92 acres of irrigated cropland could be disturbed by the construction phase and 57 acres by the operations phase. These acreages represent 0.02 percent and 0.015 percent, respectively, of the 380,000 acres of irrigated cropland in the Nevada/Utah study area counties (Department of Commerce, 1979). The 35 acre difference between construction and operations could be returned to agricultural use upon completion of the construction phase.

Future non-M-X projects such as IPP, WPPP, and Nevada Moly are not expected to impact irrigated cropland in the Nevada/Utah region, although population growth in nearby areas could result in urban encroachment on some croplands.

The present use of the operating base site in Coyote Spring Valley is for low density open rangeland, and no irrigated croplands would be impacted by the project. Impacts would be the same as for the Proposed Action.

Texas/New Mexico

Table 3.3.1-3 also shows the study area counties in the Texas/New Mexico region, and the number of acres of such croplands that would be disturbed by Alternative 8 for both construction and operations phases of the project. Also shown are the percentage of the total county irrigated cropland that the disturbed areas represent, and the level of potential impact of those disturbances. All together, 1,783 acres of irrigated cropland could be disturbed by the construction phase, and 1,089 acres by the operations phase. These acreages represent 0.06 and 0.04 percent respectively of the 3,184,000 acres of irrigated cropland in the Texas/New Mexico study area counties (Department of Commerce, 1979). The 620 difference between the construction acreage disturbed and the operations acreage disturbed could be returned to agricultural use after the completion of construction.

Future non-M-X projects such as the Tolk power plants, Highway I 27, and the CO2 pipelines are not expected to use significant amounts of irrigated croplands (MX80-HDRS-HDRS-522).

The second operating base would be located at Clovis, New Mexico. The impacts and mitigations are the same as in Alternative 7.

DRY CROPLANDS (3.3.2).

Proposed Action and Alternatives 1 through 6 (3.3.2.1).

Because of the arid climate, very little dryland farming takes place in the Nevada/Utah region hydrologic subunits. Therefore, little data on that subject exists, and no impacts on dry cropland will be presented here.

Table 3.3.1-3. Potential impact on irrigated cropland in Nevada/Utah and Texas/New Mexico regions for Altnerative 8.

HYDROLOGIC SUBUNIT OR COUNTY		SHORT-TERM EFFECTS			LONG-TERM EFFECTS		
		IRRIGATED CROPLAND DISTURBED		POTENTIAL IMPACT[1]	IRRIGATED CROPLAND DISTURBED		POTENTIAL IMPACT[1]
NO.	NAME	ACRES	PERCENT OF TOTAL IN SUBUNIT OR COUNTY		ACRES	PERCENT OF TOTAL IN SUBUNIT OR COUNTY	
	Subunits or Counties with M-X Clusters and DTN						
4	Snake[2]	26	0.3	Low	16	0.2	Low
5	Pine	—	—	None	—	—	None
6	White	—	—	None	—	—	None
7	Fish Springs	—	—	None	—	—	None
46	Sevier Desert	—	—	None	—	—	None
46A	Sevier Desert & Dry Lake	—	—	None	—	—	None
54	Wah Wah	—	—	None	—	—	None
155C	Little Smoky—Southern	—	—	None	—	—	None
156	Hot Creek	—	—	None	—	—	None
170	Penoyer	—	—	None	—	—	None
171	Coal[2]	—	—	None	—	—	None
172	Garden	—	—	None	—	—	None
173A	Railroad—Southern	—	—	None	—	—	None
173B	Railroad—Northern	—	—	None	—	—	None
180	Cave	—	—	None	—	—	None
181	Dry Lake	—	—	None	—	—	None
182	Delamar	—	—	None	—	—	None
183	Lake	66	1.0	Low	41	0.6	Low
184	Spring	—	—	None	—	—	None
196	Hamlin	—	—	None	—	—	None
202	Patterson	—	—	None	—	—	None
207	White River	—	—	None	—	—	None
	Bailey, TX	—	—	None	—	—	None
	Cochran, TX	19	0.02	Low	12	0.01	Low
	Dallam, TX	419	0.38	Moderate	261	0.24	Moderate
	Deaf Smith, TX	812	0.34	Moderate	507	0.21	Moderate
	Hartley, TX	377	0.44	Moderate	223	0.27	Moderate
	Hockley, TX	10	0.006	Low	6	0.004	Low
	Lamb, TX	—	—	None	—	—	None
	Oldham, TX	—	—	None	—	—	None
	Parmer, TX	—	—	None	—	—	None
	Chaves, NM	—	—	None	—	—	None
	Curry, NM	24	0.02	Low	15	0.01	Low
	DeBaca, NM	2	0.03	Low	1	0.02	Low
	Guadalupe, NM	—	—	None	—	—	None
	Harding, NM	8	0.11	Low	5	0.07	Low
	Lea, NM	—	—	None	—	—	None
	Quay, NM[2]	23	0.06	Low	14	0.04	Low
	Roosevelt, NM[2]	17	0.02	Low	11	0.01	Low
	Union, NM	72	0.27	Low	45	0.17	Low
	Overall Nevada/Utah DDA	—	—	Low	—	—	Low
	Overall Texas/New Mexico DDA	—	—	Low	—	—	Low
	Overall Alternative 8	—	—	Low	—	—	Low

3887-3

[1] No impact. (No irrigated cropland disturbed.)
Low impact. (Less than 100 acres or less than 1 percent of irrigated cropland disturbed in subunit or county.)
Moderate impact. (Less than 1,000 acres or less than 3 percent of irrigated cropland disturbed in subunit or county.)
High impact. (More than 1,000 acres or more than 3 percent of irrigated cropland disturbed in subunit or county.)

[2] Conceptual location of Area Support Centers (ASCs).

In any event, project impacts on dryland farming in the Nevada/Utah region could be extremely low.

Alternative 7 (3.3.2.2)

Under Alternative 7, there would be a total of 200 clusters of 23 PSs each deployed in the Texas/New Mexico region, as shown on Figure 3.3.2-1. That figure also shows the location of the dry cropland and counties in the region.

Table 3.3.2-1 shows the counties in the Texas/New Mexico study area, the number of acres of dry cropland that would be disturbed by both construction and operation phases of the project, and percentage of the total acres of dry cropland in the county that the disturbed areas represent, and the level of impact that those disturbances represent. All together, about 27,000 acres of dry cropland could be disturbed by the construction phase under Alternative 7. About 10,000 of these acres could be returned to agricultural use upon completion of construction leaving less than 17,000 acres remaining out of agricultural use for the life of the project. The 27,000 and 17,000 acres represent 0.7 and 0.5 percent of the 3,696,650 acres of irrigated cropland in the Texas/New Mexico study area counties. The impacts of 0.7 percent disturbance for construction phase and 0.5 percent for operations phase are considered to be very low, because other factors such as weather and market variations have a much greater impact on crops and crop values.

Future non-M-X projects such as the Tolk Power Plants, Highway I-27, and the CO_2 pipelines are not expected to significantly disturb dry cropland in the Texas/New Mexico region. Because of the permanent nature of PSs, it is unlikely that the ground on which they are located could be retrieved for agricultural purposes in the foreseeable future. The roadway system, however, could be returned to their original agricultural use upon decommissioning of the project. In many instances, however, the roadway system could remain open to public use where they could better serve public purposes. The roadway system could contribute to accessibility to dry cropland.

The impact of the project upon dry cropland could be mitigated by assuring that project deployment would not interfere with planting and harvesting operations, that access roads to farm areas remain open, and that natural drainage ways remain unimpeded.

Alternative 8

Alternative 8 is a split basing system, with 35 clusters in Texas, and 65 in New Mexico (MX80-NAFB-INC-286). The deployment system for the Texas/New Mexico region is shown on Figure 3.3.2-2 together with cluster coincidence with dry cropland. As indicated in Section 3.32, no dry cropland impacts are projected for the Nevada/Utah region. This would apply to those portions of Alternative 8.

Table 3.3.2-2 shows the study area counties in the Texas/New Mexico region, and the number of acres of dry croplands that would be disturbed by Alternative 8 for both construction and operations phases of the project.

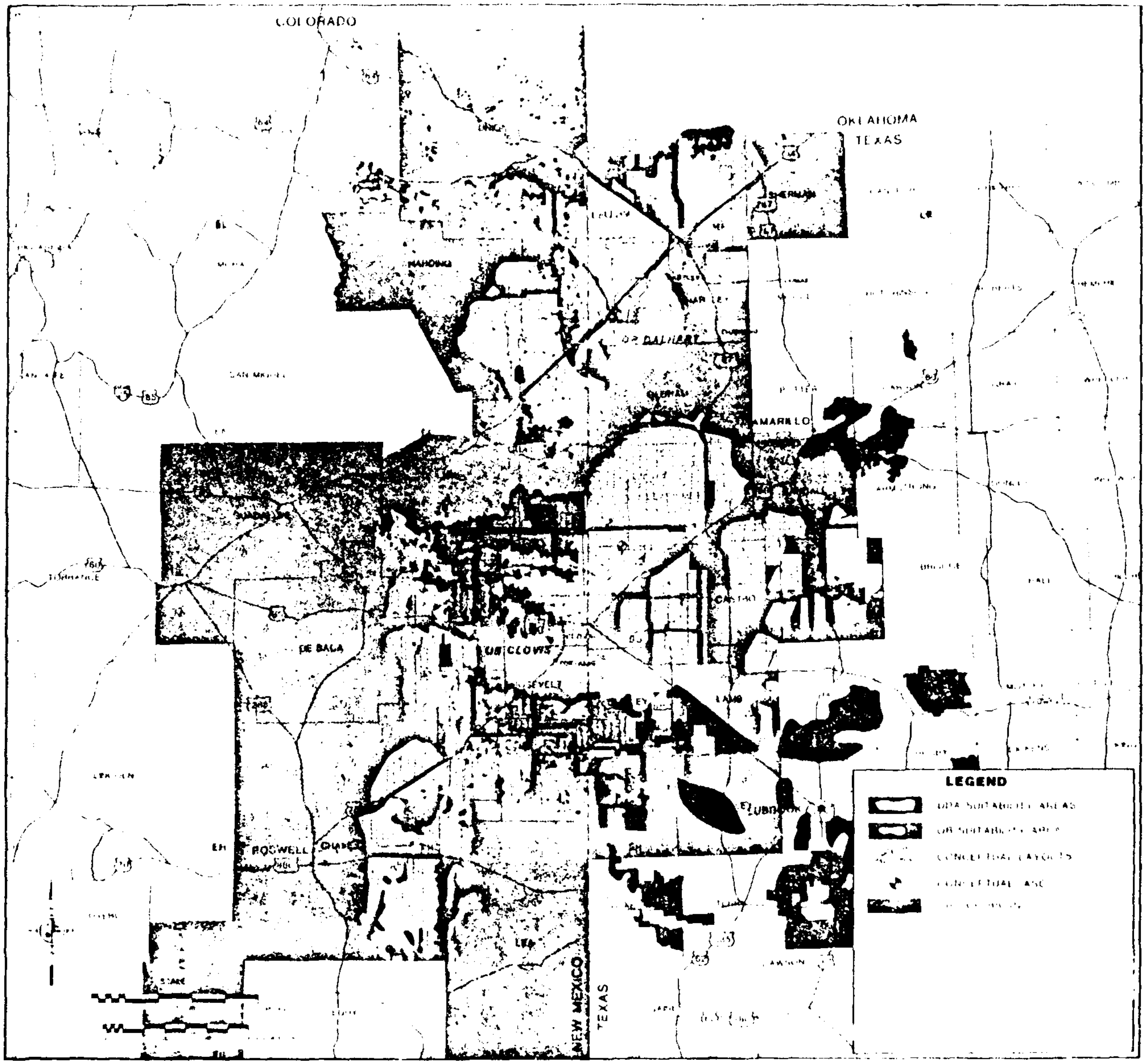

Figure 3.3.2-1. Dry cropland and Alternative 7 cluster deployment in Texas/New Mexico region.

Table 3.3.2-1. Dry cropland disturbed in the Texas/New Mexico region, Alternative 7.

STATE/COUNTY	CONSTRUCTION (SHORT TERM)			OPERATIONS (LONG TERM)		
	CROPLAND DISTURBED		IMPACT[1]	CROPLAND DISTURBED		IMPACT[1]
	AC	PERCENT OF TOTAL		AC	PERCENT OF TOTAL	
Texas						
Bailey	2,240	1.6	4	1,399	1.0	4
Castro	948	1.4	3	404	0.9	3
Cochran	268	0.1	3	167	0.06	3
Dallam	5,497	2.4	4	3,429	1.5	4
Deaf Smith	3,086	1.0	4	1,925	0.6	4
Hale	107	0.1	3	67	0.06	2
Hartley	1,413	0.8	4	882	0.5	3
Hockley	96	0.1	2	60	0.06	2
Lamb	425	0.3	3	265	0.2	3
Moore	179	0.2	3	112	0.1	3
Oldham	362	0.4	3	226	0.2	3
Parmer	959	0.9	3	598	0.6	3
Randall	412	0.2	3	257	0.1	3
Sherman	402	0.3	3	251	0.2	3
Swisher	253	0.2	3	158	0.1	3
State Total	16,647	0.7	—	10,385	0.4	—
New Mexico						
Chaves	—	—	1	—	—	1
Curry	2,111	0.5	4	1,317	0.3	4
DeBaca	—	—	1	—	—	1
Harding	1,148	2.0	4	716	1.2	3
Lea	—	—	1	—	—	1
Quay	2,481	0.8	4	1,547	0.5	4
Roosevelt	3,212	0.9	4	2,004	0.6	4
Union	1,357	1.5	4	487	0.9	3
State Total	10,309	0.8	—	6,431	0.5	—
Region Total	26,956	0.7	—	16,816	0.5	—

3948-1

[1]1 = No impact. (No dry cropland disturbed.)

2 = Low to moderately low impact. (Less than 100 acres or less than 1 percent of dry cropland disturbed in subunit.)

3 = Moderate to moderately high impact. (Less than 1,000 acres or less than 3 percent of dry cropland disturbed in subunit.)

4 = High impact. (More than 1,000 acres or more than 3 percent of dry cropland disturbed in subunit.)

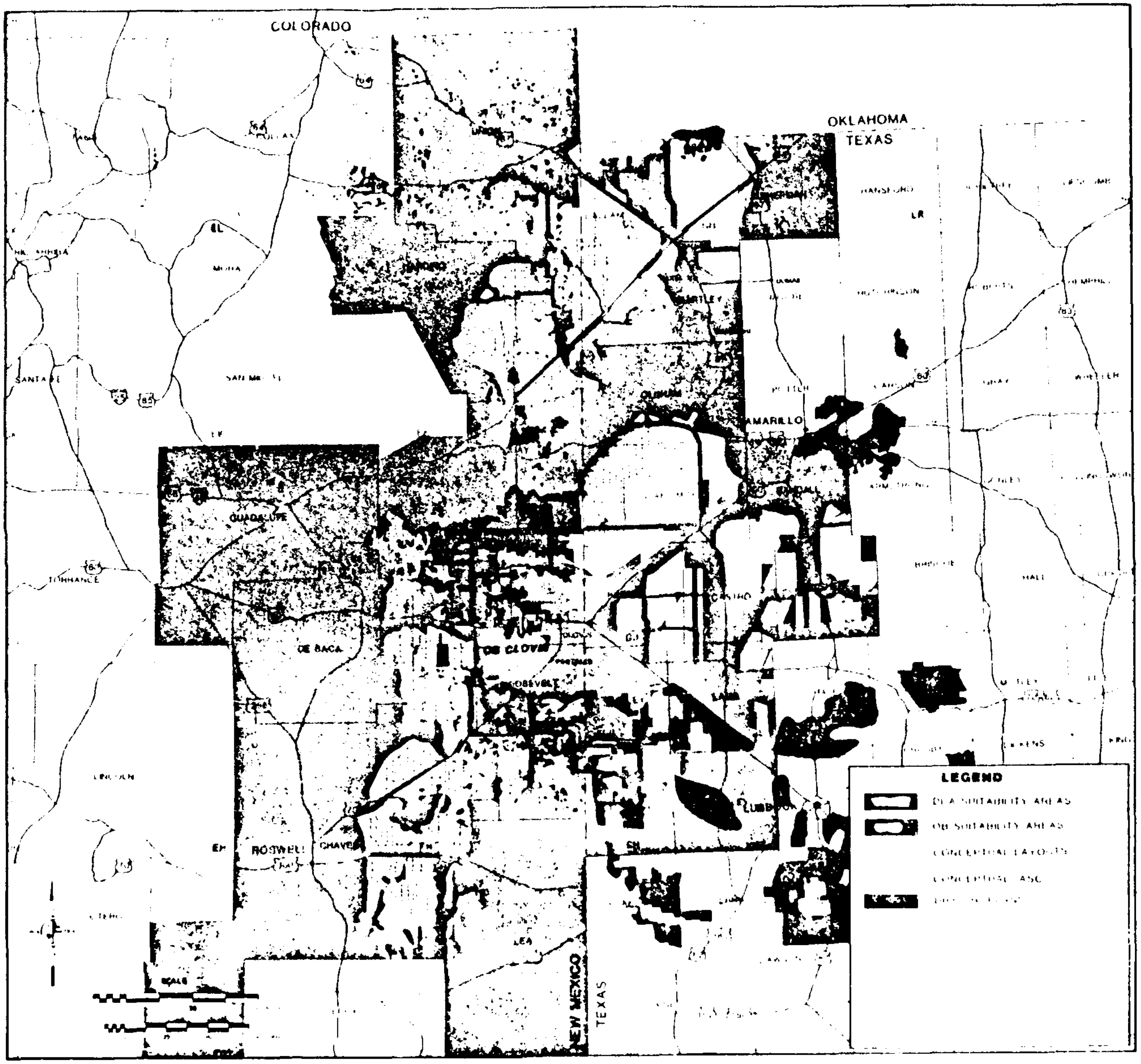

Figure 3.3.2-2. Dry cropland and Alternative 8 cluster deployment in Texas/New Mexico region.

Table 3.3.2-2. Dry cropland disturbed in the Texas/New Mexico region, Alternative 8.

STATE/COUNTY	CONSTRUCTION (SHORT TERM)			OPERATIONS (LONG TERM)		
	CROPLAND DISTURBED		IMPACT[1]	CROPLAND DISTURBED		IMPACT[1]
	AC	PERCENT OF TOTAL		AC	PERCENT OF TOTAL	
Texas						
Bailey	90	0.1	2	56	0.06	2
Castro	—	—	1	—	—	1
Cochran	238	0.1	2	148	0.06	3
Dallam	1,571	0.7	4	879	0.4	3
Deaf Smith	1,323	0.4	4	825	0.3	3
Hale	—	—	1	—	—	1
Hartley	914	0.5	3	571	0.3	3
Hockley	96	0.1	2	60	0.06	2
Lamb	74	0.1	2	46	0.06	2
Moore	—	—	1	—	—	1
Oldham	181	0.2	2	113	0.12	3
Parmer	—	—	1	—	—	1
Randall	—	—	1	—	—	1
Sherman	—	—	1	—	—	1
Swisher	—	—	1	—	—	1
State Total	4,487	0.2	—	2,797	0.12	—
New Mexico						
Chaves	—	—	1	—	—	1
Curry	496	0.1	2	293	0.06	3
DeBaca	—	—	1	—	—	1
Harding	1,148	2.0	4	716	1.2	3
Lea	—	—	1	—	—	1
Quay	1,654	0.5	4	1,031	0.3	4
Roosevelt	838	0.2	3	523	0.12	3
Union	950	1.0	3	593	0.06	3
State Total	5,059	0.4	—	3,156	0.3	—
Region Total	9,546	0.3	—	5,953	0.2	—

3947-1

[1] 1 = No impact. (No dry cropland disturbed.)

2 = Low to moderately low impact. (Less than 100 acres or less than 1 percent of dry cropland disturbed in subunit.)

3 = Moderate to moderately high impact. (Less than 1,000 acres or less than 3 percent of dry cropland disturbed in subunit.)

4 = High impact. (More than 1,000 acres or more than 3 percent of dry cropland disturbed in subunit.)

Also shown are the percentage of the total county irrigated croplands that the disturbed areas represents, and the level of the potential impact of those disturbances. All together, about 9,500 acres of dry cropland could be disturbed by the construction phase, less than 6,000 acres by the operations phase. These acreages represent 0.3 and 0.2 percent respectively of the 3,696,650 acres of irrigated cropland in the Texas/New Mexico study area counties (Dept. of Commerce, 1979). The approximate 3,500 acre difference between the construction acreage disturbed and the operations acreage disturbed could be returned to agricultural use after the completion of construction. The above impacts are considered to be very low because other factors such as weather and crop market variations have a much greater effect on crop yields and crop values.

Future non-M-X projects such as the Tolk power plants, Highway I-27, and the CO2 pipelines are not expected to use significant amounts of irrigated croplands (MX80-HDRS-HDRS-522).

Because of the permanent nature of the shelter structures, it is unlikely that the ground on which they would be located could be retrieved for agricultural purposes in the foreseeable future, unless they are physically removed and the earth restored. The roadway systems, however, could be returned to their original agricultural use upon decommissioning of the project. In many instances, however, the roadway system could remain open to public use where they could better serve public purposes and access to existing farmlands.

The impact of the project upon dry cropland could be mitigated by assuring that project deployment would not interfere with planting and harvesting operations, that access roads to farmlands remain open, and that natural drainage areas remain unimpeded.

EFFECTS ON CROPLANDS AT POTENTIAL OPERATING BASES (3.3.3)

This section will discuss the impacts on irrigated cropland at the potential OBs and the inventory of such croplands within the suitability zones around each base.

Beryl, Utah (3.3.3.1)

Figure 3.3.3-1 shows the potential operating base at Beryl, and the croplands in the area. Table 3.3.3-1 shows the number of acres of each type of cropland that would be occupied by the potential base facilities, and the number of acres of each cropland type within the suitability zone around the potential base.

It can be seen that the operating base would occupy no existing cropland. However, 1,000 acres of the suitability zone is in existing irrigated agriculture, and is equal to 0.3 percent of that area. Ample area exists within the zone to relocate the base within the zone without having to use irrigated cropland.

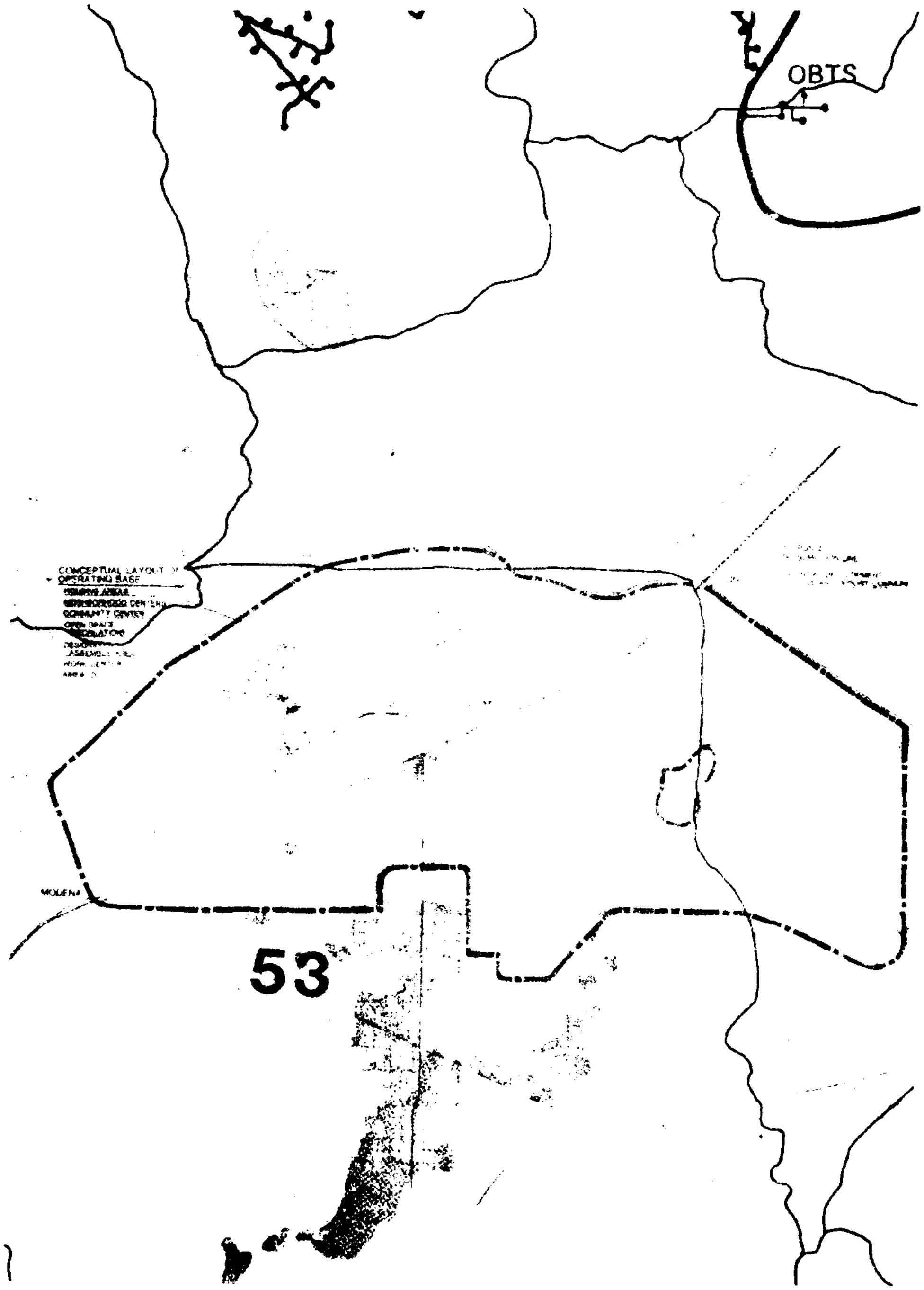

Figure 3.3.3-1. Irrigated cropland in the Beryl OB vicinity.
(See Fig. 4.3.2.12-3 of DEIS)

Table 3.3.3-1. Cropland use at potential operating base facilities at Beryl.

CROPLAND TYPE	OPERATING BASE FACILITIES		SUITABILITY ZONE	
	ACRES	PERCENT OF OB	ACRES	PERCENT OF ZONE
Irrigated	0	0	1,000	0.3
Dry	0	0	0	0
Total	0	0	1,000	0.3

3861

Source: Iron County, 1972.

Because of its proximity to the potential operating base, the croplands in lower Escalante Valley could be subject to pressure for private urban development unless laws protecting such farmland are adopted and enforced by the county.

Coyote Spring Valley, Utah (3.3.3.2)

Although no croplands exist at the potential operating base site nor within the suitability zone, there is irrigated cropland in Moapa Valley about 10 miles southeast of the proposed site. Because of their proximity to the potential operating base, they could be subject to pressure for private urban development unless laws protecting such farmland are adopted and enforced by the county.

Delta, Utah (3.3.3.3)

Although no croplands exist at the potential operating base near Delta, nor within the suitability zone, irrigated croplands do exist near the city of Delta about 15 miles northeast of the proposed site (See Figure 3.3.3-2). Because of its proximity to the potential operating base, the croplands within the suitability zone could be subject to pressure for private urban development unless laws protecting such farmland are adopted and enforced by the county.

Ely, Nevada (3.3.3.4)

Figure 3.3.3-3 shows the potential operating base near Ely, Nevada and the croplands in the area. Table 3.3.3-2 shows the number of acres of each type of cropland that would be occupied by the potential base facilities, and the number of acres of each cropland type within the suitability zone around the potential base.

It can be seen that the base would occupy no existing cropland. However, 2,050 acres of the suitability zone is in existing irrigated agriculture. This is equal to 4.4 percent of the suitability zone. Further, 1,800 acres of the suitability zone are in dry cropland; this is 3.9 percent of the suitable zone. Ample area exists within the zone to relocate the base without having to use cropland. Because of its proximity to the potential operating base, the croplands within the suitability zone could be subject to pressure for private urban development unless laws protecting such farmland are adopted and enforced by the county.

Milford, Utah (3.3.3.5)

Neither the base nor the suitability zone would occupy any existing cropland (See Figure 3.3.3-4). Because of the proximity of the potential operating base to croplands near Milford, they could be subject to pressure for private urban development unless laws protecting such farmland are adopted and enforced by the county.

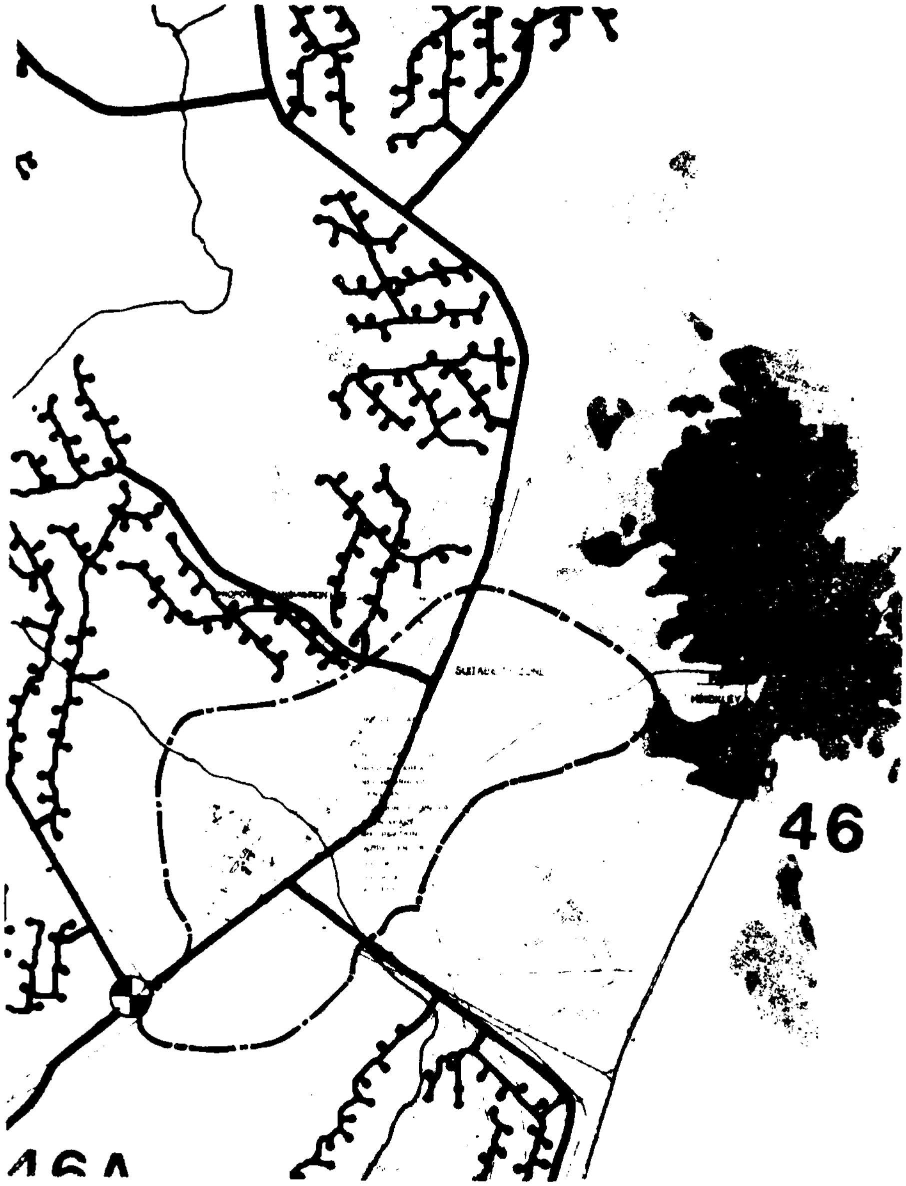

Figure 3.3.3-2. Irrigated cropland in the Delta OB vicinity.
(See Fig. 4.3.2.12-4 of DEIS)

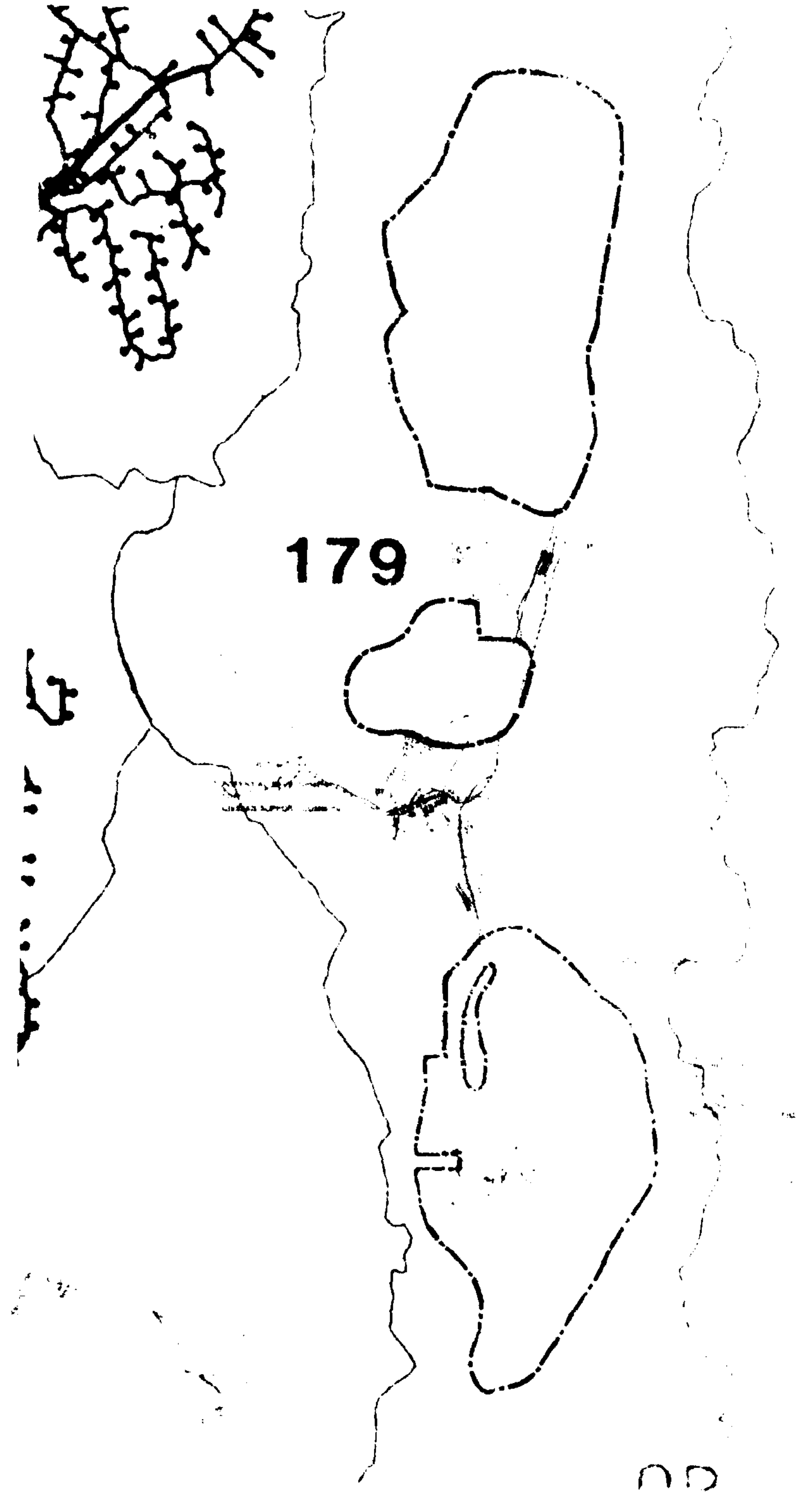

Figure ... Irrigated cropland (solid ...) ... (dot pattern) ... (... of OLIS)

Table 3.3.3-2. Cropland uses at potential operating base facilities at Ely, Nevada.

CROPLAND TYPE	OPERATING BASE FACILITIES		SUITABILITY ZONE	
	ACRES	PERCENT	ACRES	PERCENT OF ZONE
Irrigated	0	0	2,050	4.4
Dry	0	0	1,800	3.9
Total	0	0	3,850	8.3

3862

Source: University of Nevada, April 1966.

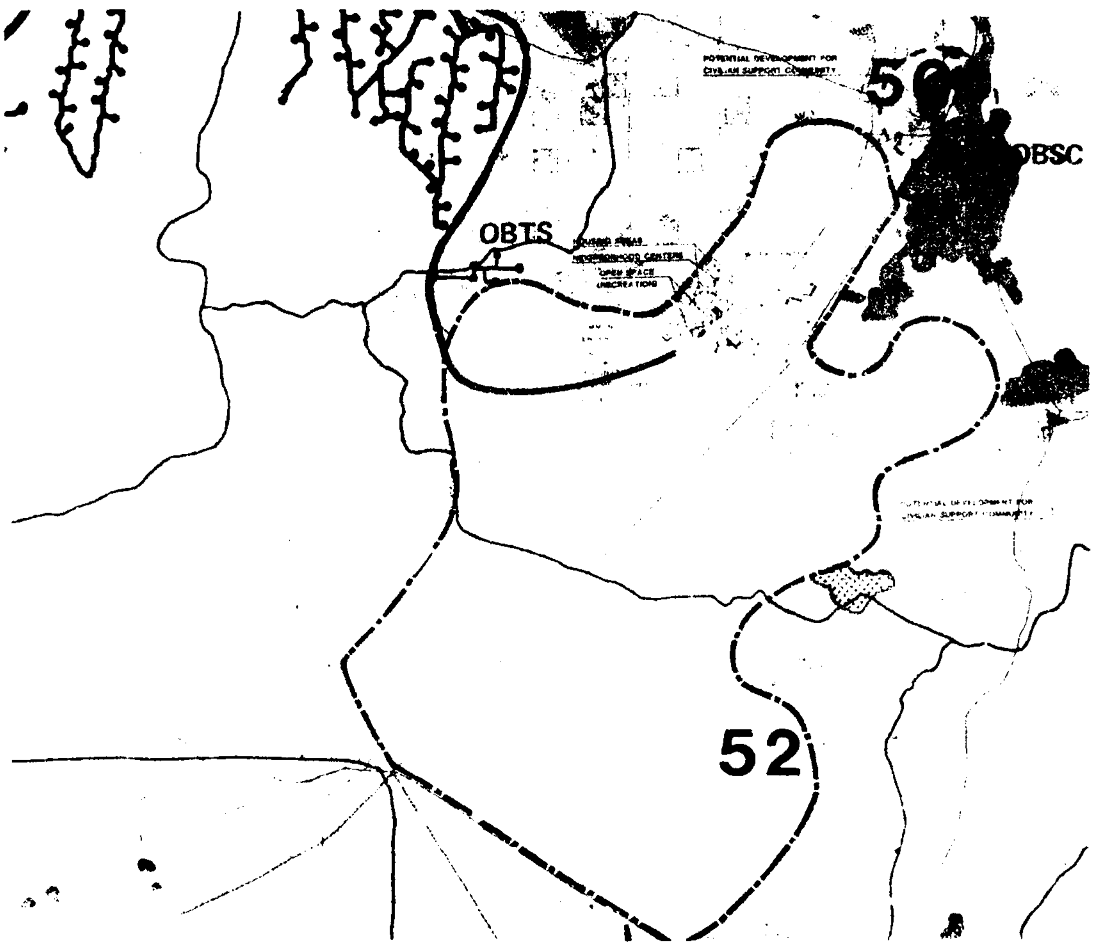

Figure 3.3.3-4. Irrigated cropland in the Milford OB vicinity. (See Fig. 4.3.2.12-2 of DEIS)

Clovis, New Mexico (3.3.3.6)

Figure 3.3.3-5 shows the potential operating base near Clovis and the croplands in the area. Table 3.3.3-3 shows the number of acres of each type of cropland that would be occupied by the potential base facilities, and the number of acres of each cropland type within the suitability zone around the potential base.

It can be seen that the base would occupy 3,500 acres of irrigated cropland, and 2,880 acres of dry cropland. The suitability zone has no additional farmland because it includes nothing more than Cannon AFB The 3,520 acres represents 2.4 percent of the irrigated cropland in Curry County, and the 2,880 acres represents 0.7 percent of the dry cropland in Curry County. Neither of these acres are considered to be of significant impact.

Dalhart, Texas (3.3.3.7)

Figure 3.3.3-6 shows the potential operating base at Beryl, and the croplands in the area.

It can be seen that the base would occupy no existing cropland, nor are there any croplands within the suitability zone. Irrigated croplands do exist northeast of the suitability zone, however. Because of the proximity to the potential operating base of these croplands, there could be pressure for private urban development on them unless laws protecting such farmland are adopted and enforced by the county.

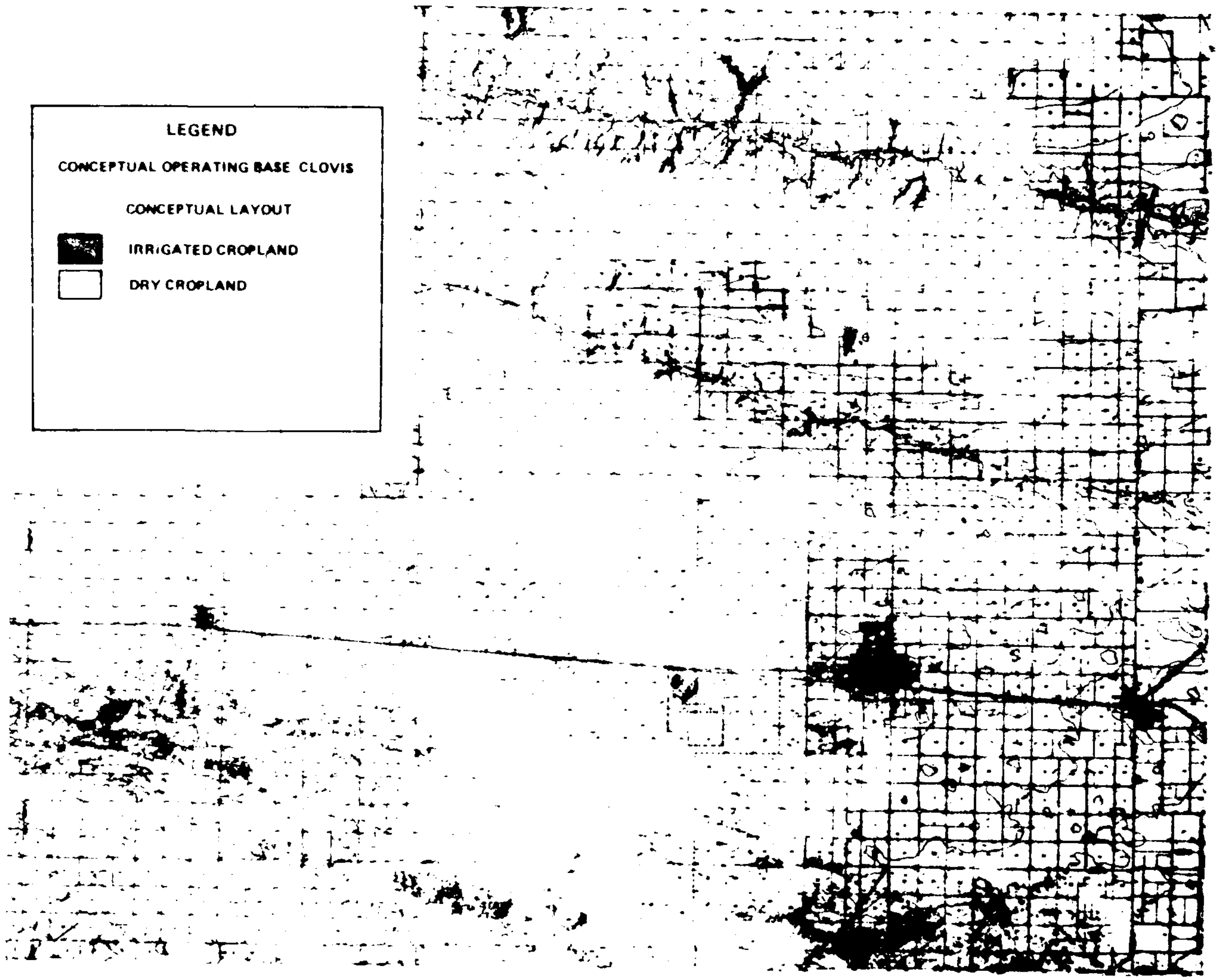

Figure 3.3.3-5. Croplands in the vicinity of the operating base at Clovis, New Mexico.

Table 3.3.3-3. Cropland uses at potential operating base facilities, Clovis, New Mexico.

CROPLAND TYPE	OB, DAA AND OBTS FACILITIES		SUITABILITY ZONE[1]	
	ACRES	PERCENT OF OB	ACRES	PERCENT OF ZONE
Irrigated	3,520	55	3,520	36
Dry	2,800	45	2,880	29
Total	6,400	100	6,400	65

3864-1

[1]Includes area of Cannon AFB

Source: New Mexico State Engineer's Office, 1979

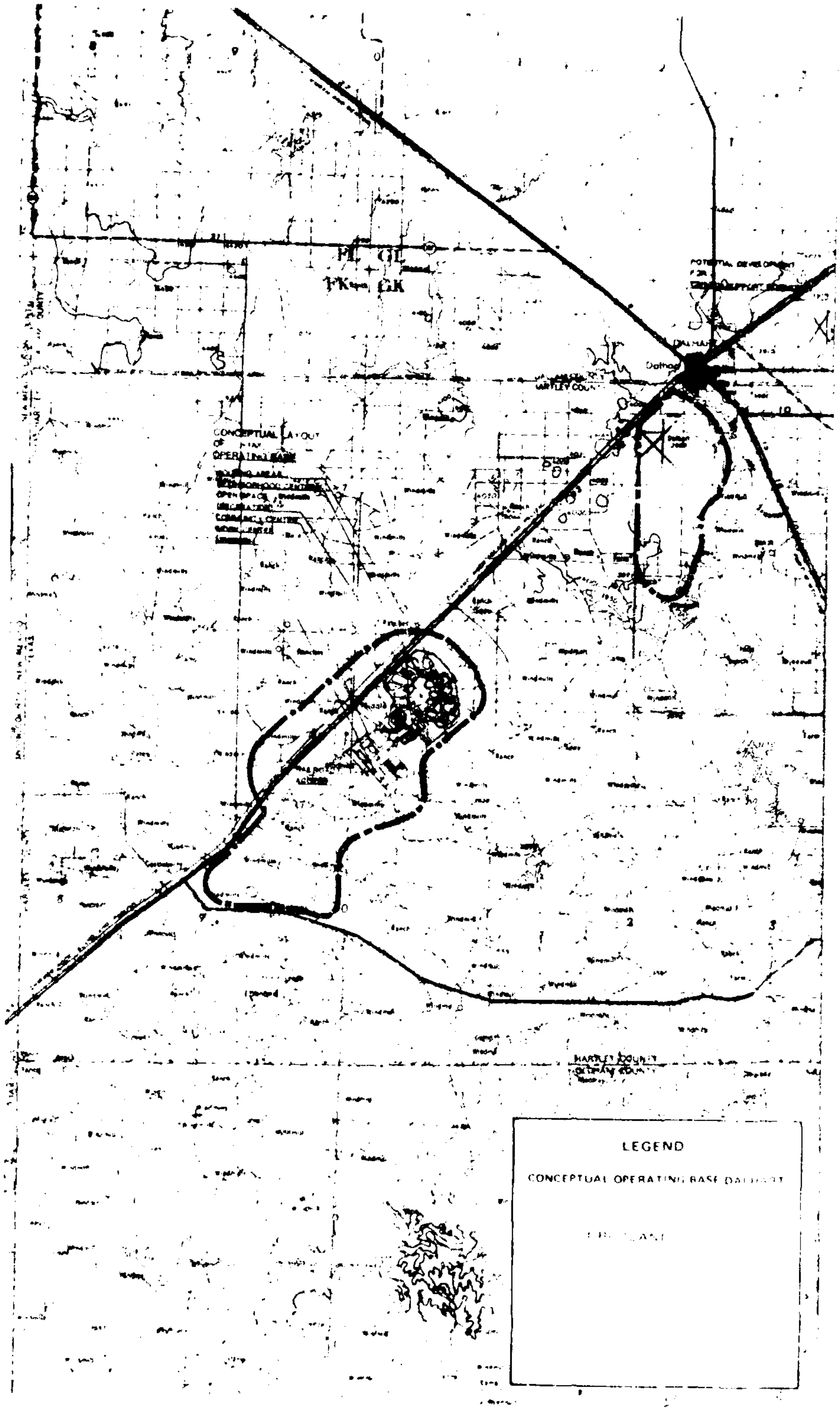

Figure 3.3.3-6. Cropland and operating base in the vicinity of Dalhart, Texas.

IMPACT ON PIVOT IRRIGATION SYSTEMS (3.3.4)

Much of the irrigated land in the Texas/New Mexico region is irriagated with center pivot irrigation systems. The land irrigated by systems could be impacted by protective shorter spur roads that would run from the shelters to the existing section line roads in that region. Figure 3.3.4-1 illustrates a typical deployment layout in two quarter sections, one with pivot and the other with row irrigation.

Construction of spur roads along quarter section lines could avoid center pivot irrigation systems. The "end gun" nozzle at the end of the pivot system could irrigate the spur road segments without damage to the roads (one pass is equal to about 3 inches of rain). Row irrigation would be impacted more severely since the shelter itself and the roadway would take fully irrigated land out of production. Running the spur roads parallel to the furrows could reduce interference with the irrigation system.

For a typical quarter section system (some one-half section systems exist), the protective shelter could be designed to avoid any irrigated land. Assuming minimum system overlap, there would be two 0.14 acre partial circle segments displaced for spur roads for each section, but the center pivot system operation would not be effected by the spur road. The Ties 2 siting will avoid irrigated agriculture to the maximum extent feasible. The 0.14 acres is equal to 0.11 percent of the 124 sites irrigated by a quarter mile center pivot system (assumes 1310 ft. radius).

Table 3.3.4-1 shows the number of center pivot systems that could be impacted by Alternatives 7 and 8 and the total acreage involved in each Texas/New Mexico region county, using the above assumptions. The total center pivot system irrigation acreage disturbed by the project is 90 acres for Alternative 7, and is equal to 0.003 percent of the three million acres of irrigated land in the region's counties in 1974. (Department of Commerce, 1977.)

Only two sections out of three would be used for a protective shelter (2/3 filling). Large areas of four pivot systems per section are not common, however, and are mostly located in Dallum County. In actual practice row pivot systems are rather widely scattered through the High Plains Region; consequently few would be impacted by the MX system layouts.

Of greater consequence is acreage removed from row system irrigation. A 40 foot wide spur road and a 2.5 acre fenced shelter area is equal to about five acres, which is about 0.8 percent of the approximately 630 acres that could be cultivated in a section with section line roads on all four sides.

IMPACTS ON TEXAS/NEW MEXICO CROP INCOME (3.3.5)

Because of widespread farming in the Texas/New Mexico region, considerable cropland acreage would be disturbed for both short term and long term construction and operations or the MX Project. Previous sections of this report set forth the estimated acreage that would be disturbed for each deployment alternative. This section sets forth a summary of the

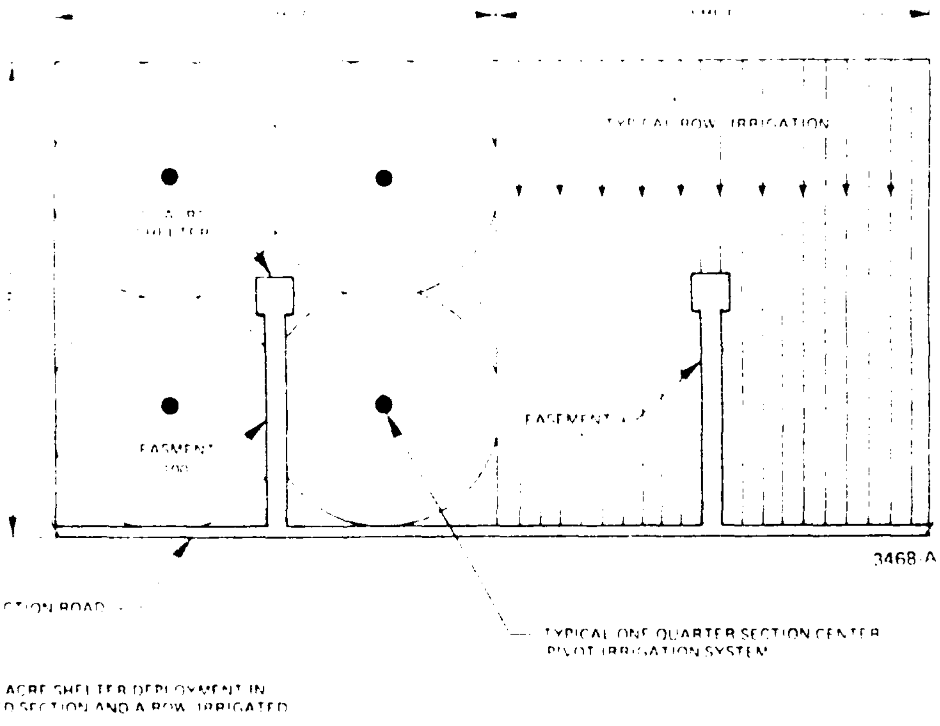

Figure 3.3.4-1. Center pivot and row irrigation systems with shelter and spur road conceptual layouts.

Table 3.3.4-1. Pivot irrigation systems and acreage loss to spur road construction.

COUNTY	ALTERNATIVE 7		ALTERNATIVE 8	
	NUMBER OF PIVOTS AFFECTED	ACREAGE LOST	NUMBER OF PIVOTS AFFECTED	ACREAGE LOST
Bailey	6	0.8	0	0
Castro	14	2.0	—	—
Cochran	0	0	—	—
Dallam	366	51.2	72	10.1
Deaf Smith	40	5.6	2	0.3
Hartley	98	13.7	22	3.1
Hockley	0	0	—	—
Lamb	4	0.6	—	—
Oldham	0	0	—	—
Parmer	36	5.0	—	—
Randall	0	0	—	—
Sherman	2	0.3	—	—
Swisher	0	0	—	—
Chaves	0	0	—	—
Curry	18'	2.5	12'	1.7
De Baca	0	0	—	—
Guadalupe	0	0	—	—
Harding	10	1.4	—	—
Lea	0	0	—	—
Quay	0	0	—	—
Roosevelt	8	1.1	2	0.3
Union	46	6.4	12	1.7
Total	656	90.6	122	17.2

Note: Hyphen (-) incidates no deployment or no pivot systems in that county.

projected annual dollar loss in crop income based on 1978 farm income in the deployment area counties, for both irrigated and dry crops, for both Alternatives 7 and 8.

The annual income loss values were determined by multiplying the number of acres of cropland disturbed by the average income per acre of eight types of crops which would most likely be disturbed by MX deployment: barley, soybean, corn, cotton, hay, sorgum, sunflower, and wheat. The averages are based on 1975 through 1979 acreages, yields, and values per unit ($ per bushel, pound, or ton). For each of the deployment area counties the average incomes per acre used are shown in Table 3.3.5-1. Tables 3.3.5-2 through 3.3.5-5 show both the total estimate income logs per county, and the percentage of the total crop income of each county that the loss figure represents. Government payments are not included in any of the values.

Irrigated Cropland

Alternative 7. Table 3.3.5-2 shows the estimated irrigated crop income loss (based on 1975 through 1979 incomes) for each of the study area counties where project deployment would coincide with irrigated cropland. It can be seen, that for short term, the annual Texas crop income loss is estimated to be about two million dollars, and New Mexico loss would be about 0.1 million dollars for a total regional loss of about 2.0 million dollars. This is equal to about 0.3 percent of the total 1979 crop income in the study area counties. The long term annual losses would be about two-thirds of these amounts because only about two-thirds as much land would remain out of cultivation after completion of the construction phase.

Alternative 8. It is assumed here that no or very little irrigated cropland in the Nevada/Uath Region would be disturbed by Alternative 8. Table 3.3.5-3 shows the estimated irrigated crop annual income loss for each of the Texas/New Mexico counties where project deployment would coincide with irrigated cropland. It can be seen, for short term, that the Texas counties irrigated crop income loss is estimated to be about 0.3 million dollars, and the New Mexico loss would be about 0.9 million dollars, for a total regional loss of about 1.2 million dollars. This is equal to about 0.04 percent of the total 1979 irrigated crop income in the study area counties. The long term losses would be about two-thirds of these amounts.

Dry Cropland

Alternative 7. Table 3.3.5-4 shows the estimated dry crop annual income loss for each of the Texas/New Mexico counties where project deployment would coincide with dry croplands. It can be seen, for short term, that the Texas counties dry crop income loss is estimated to be about 1.1 million dollars and the New Mexico loss would be about 0.5 million dollars, for a total regional loss of about 1.6 million dollars. This is equal to about 0.2 percent of the total 1979 crop income in the study area counties. The long term losses would be about two-thirds of these amounts.

Table 3.3.5-1. Average crop incomes per acre in Texas/New Mexico region counties.[1]

COUNTY	IRRIGATED CROPS	DRY CROPS
Bailey	224.70	80.40
Castro	249.60	78.60
Cochran	148.20	80.30
Dallam	180.20	51.80
Deaf Smith	203.70	63.00
Hale	175.30	60.00
Hartley	164.70	63.60
Hockley	153.70	93.10
Lamb	225.30	104.20
Moore	182.30	98.60
Oldham	156.00	56.90
Parmer	272.70	74.60
Randall	146.00	60.90
Sherman	175.90	61.80
Swisher	182.50	63.50
Curry	262.10	41.50
DeBaca	242.60	37.30
Harding	72.50	26.60
Quay	205.50	36.60
Roosevelt	176.00	46.70
Union	161.00	45.50

[1]Based on 1975-1979 average acreages, yields, and incomes per production unit.

Sources: U.S. Department of Agriculture 1979, Department and University of New Mexico, 1979.

Table 3.3.5-2. Potential annual impact on irrigated crop incomes, Alternative 7.[1]

COUNTY	SHORT TERM		LONG TERM	
	DOLLARS (x 1000)	PERCENT OF TOTAL	DOLLARS (x 1000)	PERCENT OF TOTAL
Bailey	19.8	0.05	12.4	0.03
Castro	273.8	0.3	170.7	0.02
Cochran	2.8	0.007	1.8	0.004
Dallam	273.6	0.9	176.8	0.6
Deaf Smith	344.7	0.6	199.8	0.4
Hartley	83.7	0.4	52.2	0.2
Hockley	1.5	0.004	40.9	0.002
Lamb	200.5	0.3	125.0	0.2
Oldham	10.0	0.1	6.2	0.06
Parmer	614.7	0.6	219.3	0.4
Randall	10.2	0.04	6.4	0.02
Sherman	28.1	0.09	17.6	0.06
Swisher	68.6	0.1	42.9	0.06
Curry[2]	89.5	0.1	55.8	0.06
DeBaca	0.5	0.03	0.2	0.01
Harding	0.6	0.08	0.4	0.05
Quay	3.2	0.04	2.0	0.02
Roosevelt	6.0	0.02	3.7	0.01
Union	15.9	0.2	10.0	0.1
Texas Total	2032.0	0.3	1267.7	0.2
New Mexico Total	115.7	0.1	72.1	0.06
Regional Total	2147.7	0.3	1339.8	0.2

[1] Based on 1975-1979 county average incomes per acre.

[2] Includes 3520 acres at Clovis OB.

Sources: U. S. Department of Agriculture, 1979, and University of New Mexico, November 1979.

Table 3.3.5-3. Potential annual impact on irrigated crop incomes, Alternative 8.[1]

COUNTY	SHORT TERM		LONG TERM	
	DOLLARS (x 1000)	PERCENT OF TOTAL	DOLLARS (x 1000)	PERCENT OF TOTAL
Cochran	2.8	0.007	1.8	0.004
Dallam	75.5	0.20	47.0	0.12
Deaf Smith	165.4	0.28	103.3	0.17
Hartley	62.1	0.32	36.7	0.2
Hockley	1.5	0.004	0.9	0.002
Curry[2]	858.0	1.99	856.0	1.98
DeBaca	0.5	0.025	0.2	0.02
Harding	0.6	0.075	0.4	0.05
Quay	2.4	0.027	1.5	0.02
Roosevelt	1.8	0.01	1.2	0.006
Union	11.6	0.11	7.2	0.07
Texas Total	307.3	0.2	191.7	0.1
New Mexico Total	874.9	0.9	545.8	0.6
Regional Total	1182.2	0.04	737.5	0.02

[1]Based on 1975-1979 county average incomes per acre.

[2]Includes 3,520 acres at Clovis OB.

Sources: U. S. Department of Agriculture, 1979, and University of New Mexico, November 1979.

Table 3.3.5-4. Potential annual impact on dry crop incomes, Alternative 7.[1]

COUNTY	SHORT TERM		LONG TERM	
	DOLLARS (x 1000)	PERCENT OF TOTAL	DOLLARS (x 1000)	PERCENT OF TOTAL
Bailey	180.1	0.04	117.5	0.02
Castro	74.5	0.09	31.8	0.06
Cochran	21.5	0.05	13.4	0.03
Dallam	284.7	0.09	177.6	0.06
Deaf Smith	194.4	0.3	121.3	0.02
Hale	6.4	0.006	4.0	0.004
Hartley	89.9	0.5	56.1	0.3
Hockley	8.9	0.02	5.6	0.1
Lamb	44.3	0.07	27.6	0.04
Moore	17.6	0.06	11.0	0.04
Oldham	20.6	0.3	12.9	0.2
Parmer	71.5	0.07	44.6	0.04
Randall	25.1	0.1	15.7	0.05
Sherman	24.8	0.08	15.5	0.05
Swisher	16.1	0.03	10.0	0.02
Curry[2]	203.8	0.5	170.9	0.3
Harding	30.5	0.4	19.0	0.2
Quay	90.8	1.0	56.6	0.6
Roosevelt	150.0	0.4	93.6	0.2
Union	61.7	0.6	38.5	0.4
Texas Total	1081.4	0.1	674.6	0.06
New Mexico Total	536.8	0.5	334.9	0.3
Regional Total	1618.2	0.2	1009.5	0.1

[1]Based on 1975-1979 average incomes per acre.

[2]Includes 2,800 acres at Clovis OB.

SOURCES: U. S. Department of Agriculture, 1979, and University of New Mexico, November 1979.

Table 3.4.5-5. Potential annual impact on dry crop incomes, Alternative 8.[1]

COUNTY	SHORT TERM		LONG TERM	
	DOLLARS (x 1000)	PERCENT OF TOTAL	DOLLARS (x 1000)	PERCENT OF TOTAL
Bailey	7.2	0.02	4.5	0.01
Cochran	19.1	0.05	11.9	0.03
Dallam	81.4	0.3	45.5	0.2
Deaf Smith	83.3	0.1	52.0	0.06
Hartley	57.9	0.3	36.1	0.2
Hockley	8.9	0.02	5.6	0.01
Lamb	7.7	0.01	4.8	0.006
Oldham	10.3	0.1	6.4	0.06
Curry[2]	136.8	0.3	128.4	0.2
Harding	30.5	0.4	19.0	0.2
Quay	60.5	0.7	37.7	0.4
Roosevelt	39.1	0.1	24.4	0.06
Union	43.2	0.4	27.0	0.2
Texas Total	275.7	0.07	166.8	0.04
New Mexico Total	310.1	0.3	236.5	0.2
Regional Total	585.8	0.1	403.3	0.06

[1]Based on 1975-1979 average incomes per acre.

[2]Includes 2,800 acres at Clovis OB.

Sources: U. S. Department of Agriculture, 1979 and University of New Mexico, November 1979.

[illegible] amount [illegible] or non-irrigated crop land [illegible] in the Nevada/[illegible] Region by Alternative [illegible]. [illegible] estimated dry crop annual income loss for each of [illegible] Texas counties where project deployment would coincide with [illegible]. It can be seen, for short term, that the Texas counties [illegible] is estimated to be about [illegible] million dollars and the [illegible] also be about [illegible] million dollars, for a total [illegible] about [illegible] million dollars. This is equal to about [illegible] percent of the total 1979 dry crop income in the study area counties. The long term losses would be about two-thirds of these amounts.

[illegible] RANGE [illegible]

[illegible] primarily for livestock and wildlife forage [illegible] of the land surface of the earth, [illegible] continental United States. Rangelands are [illegible] with widely diverse types of soil and vegetation [illegible], if ever, in a stable condition, with or without [illegible] of natural disturbance such as drought, [illegible], volcanoes, etc. that periodically occur. Adjustments [illegible], therefore, require ongoing evaluation and [illegible]. Because range forage renews each year it is [illegible]. Livestock use of rangelands can tap food [illegible] that would otherwise go unutilized and without adversely [illegible]. Raising beef cattle and sheep on the [illegible] half the energy inputs [illegible] to raise them anywhere else.

[illegible] States [illegible] percent of the total land area is [illegible] this area is grazed. This federal land [illegible] percent of the feed required by beef cattle and about [illegible] by sheep. [illegible] private [illegible] Agricultural Science and Technology, 1974). [illegible] rangeland currently produces around 10[illegible] [illegible]. Despite the limited production, grazing is still [illegible] for much of this area (Clawson, 1972).

[illegible] Taylor Grazing Act in [illegible], livestock grazing [illegible] was unregulated. There are limits to the [illegible] rangeland vegetation and soil can tolerate. It can be [illegible] about 1867 and the 1930's [illegible] (Council for Agricultural Science and Technology, 1974). [illegible] livestock numbers rapidly increased, [illegible] than is currently present. This resulted [illegible] has caused major changes in plant species presence [illegible], and has generally reduced productivity and [illegible] of many rangelands (Gilbert, Smith and [illegible]). More palatable native perennial grasses [illegible] over time, while less palatable [illegible], increased in dominance. After [illegible], grazing lands in the U.S. had [illegible] (Clawson, 1970). This [illegible] the wrong [illegible]

[illegible] resulted in a sharp [illegible] century. Following [illegible] relatively steady, [illegible] System declined from [illegible]. An AUM (animal [illegible] its equiva- [illegible]. The [illegible] AUM lands has declined from nearly 16 million AUMs in 1944 to less than [illegible] million in 1964 (Clawson, 1967). Although these declines have generally continued to the present, the numbers remaining are still large and over the last 30-40 years the per unit productivity has increased by about [illegible] 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 equivalent to about an average of 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, but will clearly vary by season, type of livestock, and quality of forage available.

In response to the degradation of rangeland brought about by the unrestricted grazing, the Taylor Grazing Act was passed in 1934 and the Bureau of Land Management (originally called the grazing service) was established. By 1974 the decline started during the 19th century had been [illegible] or stopped on roughly 135 million of the 170 million acres of rangeland managed by the BLM, but these areas were still only in "fair" (or worse) condition. On the remaining land where intensive management had been implemented, however, over half have showed improving condition (Lieurance, 1979). The condition of non-federal rangelands has also improved markedly since the early 1960's (Davis, 1979).

Over the last 30-40 years, the value of ranches per animal unit of capacity has increased by an average of 10-15 times. Current values for many ranches appear to be well above their foreseeable earning capabilities as livestock operations (Saunderson, 1973). Operating costs have also gone up but the returns received for products produced have not kept pace, resulting in a cost price squeeze that has put many ranches on a marginal basis.

The current importance of grazing on western rangelands is underscored by a recent pulse 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 resulted in the requirement of 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 EIS's will be prepared for all grazing land. To date, three environmental statements relating to the Nevada/Utah study area have been completed by BLM: The Caliente and Tonopah Grazing Environmental Statement (Nevada), the Hot Desert Grazing Management Environmental Statement (Utah), and the Mountain Valley Rangeland Management Environmental Statement (Utah). One of the expected results of these, and of like statements, is that reductions averaging 25-33 percent in permitted AUMs may occur in many of the planning units. This has met with opposition from local interests.

A fair market value (FMV) is the goal which the federal government tries to achieve 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 from a private owner. This 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 (Department of Agriculture and Department of Interior, 1977:6.4). On March 1, 1980, grazing fees were raised to $2.36 from $1.89 per animal unit month (AUM). Rather than a straight fee charged per animal month, it has been suggested that animal weight gain could be the basis for a variable fee arrangement. The variable fee option has not been adopted. A comparison of forage requirements based on age and body weight is shown in Table 4.0-1.

The future trends for rangelands and the livestock industry will probably be as volatile as the changes in this resource over the past 50 years. Adding to this variability is our uncertain energy future. Livestock production has been, and will probably remain, the traditional output from rangeland (Clawson, 1972). Demand for beef is expected to continue increasing while 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 reversed this trend. The result has been increasing pressure for more production from a declining land base (Council for Agricultural Science and Technology, 1974). These trends can be expected to continue, at least into the near future. Since the most suitable areas are currently utilized for grazing, expansion of cattle and sheep grazing would require the improvement of currently used areas, the conversion to rangeland of other areas such as cropland or forest land, or the use of lands marginally suited for this purpose. The effects on marginal or unimproved land would be similar to those in areas where past overgrazing has occurred. The kind of range, the intensity of grazing and the kind of management employed to control the livestock use of rangelands all determine the kind of eventual environmental effects that will occur. Other uses are also increasingly competing with the traditional livestock use of rangelands and how these uses may change and what their impacts will be in the future is uncertain.

4.1 AFFECTED ENVIRONMENT

NEVADA/UTAH REGION (4.1.1)

Nevada and Utah have been and are primarily geared to the livestock industry. In Nevada it represents up to 75 percent of the dollar value. Utilization of the extensive land holdings of the BLM for open range grazing constitutes the most typical farm operation occurring in the Nevada/Utah study area. Cattle and sheep ranches are headquartered on private land holdings and graze through permits on BLM and Forest Service land holdings, generally near their home base. Numerous sheep operations, however, are headquartered in Utah but have significant grazing leases in Nevada BLM planning units. For cattle, this pattern is reversed. Large operators located in a given community will often have cattle or sheep grazing leases on holdings 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 other constituencies such as 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 run sheep.

Even with the passage of the Taylor Grazing Act in 1934, portions of central Nevada remained unregulated until the 1950's. In western Utah a more diversified agricultural economy exists because of water available from the Wasatch Mountains, but livestock is still the predominant industry over most

Table 4.0-1. Grazing fee determinants and seasonal forage requirements.

ANIMAL GROUP	AUM COEFFICIENT	1979 FEE (HEAD/MONTH)	1980 FEE (HEAD/MONTH)
Cow	1.0	$1.89	$2.36
Cow and Calf	1.3	2.46	3.07
Yearling	0.7	1.32	1.65
Bull/Horse	1.3	2.46	3.07
Ewe and Lamb	.3	0.57	0.71
Ewe	.2	0.38	0.47

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Sources: Department of the Interior and Department of Agriculture, 1977; Las Vegas, Nevada, Bureau of Land Management, 1979.

of the study area. This trend will continue without additional irrigation water. Open range grazing is the most typical farm operation. Stock trails and cattle drives of the past have given way to highways and trucks to move the herds. Overall about 79 percent of Nevada and 77 percent of Utah is grazed.

There are over 36 million acres of BLM-administered land in the Nevada/Utah study area. Although most of this is grazed, still more is grazable and 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. Depending on breed and range conditions, cattle will generally not travel further than about 4 miles from water. Even in areas where water is available its distribution is often inadequate for optimum vegetation use by livestock, wildlife, wild horses, and burros.

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 rotate 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 similarly but the animals are usually on the range for a greater portion of their preparation for slaughter. With the increasing cost of grain an increasing proportion of beef cattle are spending additional time on "grass fattening", increasing importance of 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 primarily used to raise feed to carry the base herd over the winter period when range forage is limited or not available.

Use of rangelands by wild horses and burros is currently exceeding range carrying capacity in many areas. Management of the animals to maintain numbers in balance with available forage is currently hampered with legal restrictions. Domestic livestock utilization and numbers are reduced in areas where the horse and burro overstocking occurs.

In the mid 1970s there were a total of approximately 555,000 animal units in Nevada and 764,000 in Utah (Council for Agricultural Science and Technology, 1974). These figures include all livestock, not just those using Federal Range. Cattle, sheep, and hog inventories for 1970, 1974 and 1978 are presented in Table 4.1-1. Hog population has held steady in Nevada and Utah from 1970-1978. During this same time period, cattle decreased slightly in Nevada and increased slightly in Utah. Both states have 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 4.1-2). This downward trend has apparently recently reversed, however.

Table 4.1-1. Livestock inventory, Nevada/Utah, 1970-1978 (in thousands).

STATE	CATTLE			SHEEP			HOGS		
	1970	1974	1978	1970	1974	1978	1970	1974	1978
Nevada	626	664	570	227	177	114	9.4	11.0	9.0
Utah	808	832	864	1,053	772	491	45.0	44.0	42.0[1]

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[1]1977.

Sources: Nevada Agricultural Statistics, 1977; Utah Agricultural Statistics, 1978.

Table 4.1-2. 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	16	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	16.7

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*Less than 500 sheep.

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

Source: Nevada Agricultural Statistics, 1977; Utah Agricultural Statistics, 1978.

During this time period, 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 decling herd size.

Within the study area, there are a total of about 343,000 animal units, 122,000 in Utah and 221,000 in Nevada grazing both private and Federal range. In the individual study area hydrologic subunits the range in animal units is 1,900 to 24,000 for Utah and 150 to 16,000 for Nevada. The density or concentration of livestock in each state is reflected in the number of animal units present on each acre, the higher the number of animal units, the higher the concentration. Utah required about 68 acres for each animal unit and Nevada about 126 acres (Council for Agricultural Science and Technology, 1974). In the Utah study area it is about 70 acres per animal unit and in the Nevada study area about 90 acres per animal unit. Each animal unit in Nevada and Utah represents approximately 5 animal unit months.

In 1979 there were a total of about 1,800,000 AUMs of livestock use on the Bureau of Land Management planning units within which the M-X deployment study area is located (Table 4.1-3). Within the individual hydrologic subunits potentially impacted by the project the estimated numbers of AUM's varies from about 88,000 to less than 1,000 (Table 4.1-4). The estimated concentration of use varies from as few as about 10 acres for each AUM in the high concentration hydrologic submits to over 70 acres for each AUM in lowest production hydrologic subunits (Table 4.1-4).

In both states the use of land for agricultural purposes is encouraged by planning and zoning ordinances designed to protect agricultural land from urban development. In most of the study area, soils with good agricultural potential are used for grazing rather than cropland because of limited water availability. Forage management programs on these good soils respond well to treatment and their permitted AUMs per acre can as much as double. The limited cropland in Nevada and Utah is primarily used to raise feed to carry the base herd over the winter period when range forage is limited or not available.

As a result of the EIS studies for grazing the BLM has been required to produce, cutbacks of up to two-thirds or more on many allotments are programmed for the near future. If implemented, these cutbacks will significantly reduce the short-term livestock production in these states. 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, those areas where treatment has resulted 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 their total land area. The Caliente Grazing E.I.S. 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. Re-seeding with more desirable species would follow treatment. The total area to be treated amounts to nearly 12 percent

Table 4.1-3. Distribution of animal unit months (AUMs) by BLM planning units, 1979,

NEVADA			
PLANNING UNITS	AUMS	PLANNING UNITS	AUMS
Elko District		Ely District	
Buckhorn	86,610	Moriah	145,942
Currie	118,709	White River	65,964
Total	205,319	Lake Valley	12,308
Battle Mountain District		Wilson Creek	55,326
Cortez	112,688	Steptoe	20,359
Mount Airy	69,717	Butte	27,289
Pony Express	71,441	Newark	71,263
Devil's Gate	61,675	Duckwater	30,069
Tonopah PA West	68,201	Preston Land	39,482
Tonopah PA East	85.329	Horse and Cattle Camp	21,565
Total	469,566	Total	489,566
Las Vegas District		Nevada Study Area Total	1,277,847
Caliente	78,235		
Esmeralda	35,161		
Total	113,396		

UTAH			
PLANNING UNITS	AUMS	PLANNING UNITS	AUMS
Salt Lake City District		Richfield District	
Gold Hill	21,336	Topaz	74,105
Skull Valley-Lakeside	82,773	Confusion	88,261
Onaqui-Aquirrh	21,321	Tintic	39,030
Total	125,430	Warm Springs	73,535
Cedar City District		Total	274,931
Cedar	36,572	Utah Study Area Total	524,308
Pinyon	87,375		
Beaver	48,818	NEVADA/UTAH STUDY AREA TOTAL	1,802,155
Total	123,947		

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Source: BLM Planning Unit Documents.

Table 4.1-4. Abundance (total AUMs) and concentration (acres/AUM) in all the valleys in the Nevada/Utah study area.

NUMBER	LOCATION	TOTAL AUMs	AUM CONCEN-TRATION	NUMBER	LOCATION	TOTAL	AUM CONCEN-TRATION
3	Deep Creek	12,860	17.1	153	Diamond	28,250	16.4
4	Snake	87,910	16.9	154	Newark	35,840	13.9
5 (U)	Pine	25,620	18.2	155	Little Smoky	30,870	20.5
6	White	26,650	22.6	156	Hot Creek	28,360	23.4
7	Fish Springs	12,440	27.0	169a	Tikaboo-Northern	8,170	35.5
8	Dugway	9,940	17.9	170	Penoyer	9,450	36.2
9	Government Creek	12,030	25.5	171	Coal	15,280	21.1
17	Rush	6,820	49.9	172	Garden	8,370	26.6
32b	Great Salt Lake Desert-Western Desert	39,850	18.4	173	Railroad	57,540	25.5
				174	Jakes	16,680	12.1
46	Sevier Desert	80,440	20.8	175	Long	26,560	15.7
46a	Sevier Desert-Dry Lake	29,900	20.1	176	Ruby	25,350	20.6
47	Huntington	14,850	18.4	178b	Butte-South	26,900	16.3
50	Milford	52,730	17.1	179	Steptoe	43,790	24.1
52	Lund District	24,812	19.4	180	Cave	14,740	14.6
53 (N)	Pine	39,530	16.4	181	Dry Lake	30,730	18.4
53 (U)	Beryl-Enterprise District	32,400	20.0	182	Delamar	9,940	24.7
54 (U)	Wah Wah	21,900	17.5	183	Lake	16,520	21.7
54 (N)	Crescent	31,570	15.7	184	Spring	76,910	11.0
55	Carico Lake	16,650	14.6	185	Tippett	17,924	10.8
56	Upper Reese River	29,560	15.5	186	Antelope	13,520	18.9
57	Antelope	20,053	14.8	187	Goshute	23,220	23.6
58	Middle Reese River	14,720	14.1	194	Pleasant	4,140	13.6
134	Smith Creek	20,950	15.5	196	Hamlin	27,810	16.4
135	Ione	7,790	24.8	198	Dry	2,800	21.7
137a	Big Smoky-Tonopah Flat	21,920	38.1	199	Rose	870	20.5
137b	Big Smoky-North	22,790	17.4	200	Eagle	2,550	20.5
138	Grass	25,280	14.0	201	Spring	8,680	20.5
139	Kobeh	33,510	14.9	202	Patterson	8,890	30.0
140	Monitor	16,780	17.2	203	Panaca	7,830	30.5
141	Ralston	17,520	24.4	204	Clover	3,710	40.1
142	Alkali Spring	2,630	75.6	206	Kane Springs	3,980	40.1
149	Stone Cabin	16,200	35.0	207	White River	49,030	16.9
150	Little Fish Lake	7,640	20.1	208	Pahroc	12,650	24.2
151	Antelope	11,980	19.5	209	Pahranagat	16,380	27.9
152	Stevens	730	16.4	210	Coyote Spring	6,070	40.1

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of the district. In the Draft Tonopah Grazing E.I.S. the Bureau of Land Management has proposed to treat 16,405 acres by burning. Seeding to more desirable species could also follow treatment. The importance of some areas to the livestock industry is not always accurately reflected in either the total use or level of concentration in a valley because 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 to the continued operation of ranches dependent on them (U.S.D.I., Bureau of Land Management, 1979; 1980). A generally limited grazing capacity that sometimes resulted from past misuse, coupled with the current economic situation has placed many ranch operations on a marginal basis (U.S.D.I., Bureau of Land Management, 1979; 1980). Even relatively small livestock reductions resulting from project impacts are of concern because they could force ranches out of business that otherwise might remain in operation. Project-related loss of forage area could result in the overgrazing of other areas, degrading those rangelands and encouraging the spread of alien annuals such as Halogeton glomeratus.

One of the major impacts to occur from reduction of the vegetation cover from M-X deployment in the affected Nevada/Utah valleys would be a reduction in the livestock grazing capacity. Impacted grazing lands would include many acres of creosote bush scrub, alkali sink scrub, shadscale, Great Basin sagebrush, and pinyon-juniper woodland vegetation types throughout the project region. These areas support large populations of livestock, feral horses and burros, and native large 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 elevation, usually moister, and more productive regions of the valleys. It is used primarily for other than winter grazing. The lower, drier sites with shadscale vegetation are used primarily for winter grazing.

The plant species involved vary considerably in forage production. 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 (Eurotial Lanatal), antelope bitterbrush (Purshia tridentata), and areas with a high cover of palatable grasses, are less abundant in acreage, but local concentrations can provide a high percentage of the forage for some regions. Improved rangelands are also examples of this type. 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 sagebruch communities (Young, et al., 1972) have profoundly changed as a result of overgrazing. The shadscale type, which sometimes includes pure or nearly pure stands of winterfat, is a highly variable and often unpredictable community for patterns of secondary succession following disturbance. In many areas the vegetation that has resulted from past grazing impacts is often similar today, even though the pre-grazing communities from which they 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. The differences observed appear to result from plant-soil relationships that are little understood (Holmgren and Hutchings, 1972).

In many sagebrush communities, grazing has [illegible] perennial grasses, and changed the shrub composition [illegible] that are least preferred for grazing, including the dominant [illegible] *Artemisia*, have increased in dominance, while preferred [illegible] become less common. Introduced annuals such as Russian-thistle [illegible] *iberica*), tumbling must and (*Sisymbrium altissimum*) and cheatgrass [illegible] *tectorium*), are now so widespread, and form such a complete [illegible] in some degraded communities, that reestablishment of native perennial [illegible] is often precluded (Young and Evans, 1973), and fire behavior and [illegible] succession are altered (Young, et al., 1976; Young and Evans, [illegible]). Without additional disturbance, Russian-thistle will be gradually [illegible] sagebrush on many of the higher elevation sites ([illegible], 1972). Similar patterns have resulted from past overgrazing [illegible] tation communities in the potentially impacted hydrologic [illegible].

TEXAS/NEW MEXICO [illegible] (4.1.2)

The livestock industry represents the major [illegible] New Mexico study area. The vegetation, climate, and [illegible] study area are very conducive to rangeland and pasture. [illegible] restricts much of the land in some areas to grazing [illegible] tion. In Texas and New Mexico, agriculture and livestock [illegible] historically constituted a substantial part of the economy. [illegible] settled for purposes of cattle ranching, and then farming, [illegible] years agriculture has been relatively stable in terms of [illegible] and areas farmed. The Texas/New Mexico study area counties [illegible] the most highly productive cropland in the two states; [illegible] are largely for feed in cattle feedlots. The importance of the [illegible] industry can be expected to continue into the future.

Overall, about 86 percent of New Mexico and 7[illegible] percent of [illegible] grazed. About 13 million acres in the 2[illegible] study area counties [illegible] 60 percent, are used for grazing and pasture land (Figure 4.[illegible]-1). [illegible] portion (75 percent) of the grazing land in the Texas/New Mexico [illegible] lies in New Mexico. This grazing is entirely on private [illegible] Chaves County, New Mexico, where the BLM administers [illegible].

In the mid 1970s there were approximately 1,[illegible] New Mexico and 13,988,000 in Texas. Within the study area, [illegible] total of about 2,255,000 animal units, 1,472,[illegible] in Texas [illegible], New Mexico (Table 4.1-[illegible]).

Cattle and sheep inventories have recently [illegible] New Mexico counties, while only the cattle inventory [illegible] Texas counties. Approximately 5[illegible] percent of [illegible] 1974 was raised in the Texas portion of the study area. [illegible] as market conditions influence sheep and cattle [illegible] decline cannot be reliably projected [illegible] the livestock industry. Based on the total [illegible] animal unit required about 1[illegible] acres in Texas [illegible] (Council for Agricultural Science and [illegible]) [illegible] tion in the study area is 7 acres per [illegible] animal unit in New Mexico.

Table 4.1-5. Abundance (total animal units) and concentration (acres per 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	10.7
Dallum	92,000	10.4
Deaf Smith	227,000	4.3
Hale	94,000	7.0
Hartley	109,000	6.7
Lamb	42,000	15.6
Moore	78,000	7.4
Oldham	64,000	14.6
Parmer	159,000	3.5
Randall	96,000	6.1
Sherman	99,000	5.9
Swisher	142,000	4.0
Texas Totals	1,472,000	6.5
New Mexico		
Chaves	171,000	22.8
Curry	88,000	10.2
DeBaca	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

[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.

Although cow-calf and ewe-lamb operations are important, a major part of the greater density in Texas/New Mexico compared to Nevada/Utah is the presence of large numbers of livestock in stockyards (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 study area of New Mexico, nearly 60,000 cattle are fed annually in feedlots. This represents about 10 percent of all cattle in the region. It is an even larger industry in west Texas with about 75 percent of the 1.47 million cattle in the Texas study area counties maintained in feedlots. Approximately two-thirds of the cost and one-third of the weight are added in the feedlots. The weight is for the most part fat and it takes about 9 lb of irrigated corn to put a pound of fat on a calf or steer.

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 of the Ogallala basin 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 is decreasing the water table by an average of 2 feet a year in many areas, and up to 8 feet during some years. Water is primarily used for irrigated crops, the most demanding of which is corn. As water loss due to the over-drafts of the Ogallala aquifer continues, corn production will decrease. Since over 95 percent of the corn is used to feed cattle in regional feedlots, some feedlots may go out of business. Cattle will either have to be shipped out of the region for fattening in other feedlots (Colorado, Nebraska, Iowa, etc.) or the diet of Americans will have to accommodate to rangefed beef. Marginal irrigated croplands that are no longer usable can either be converted to dryland agriculture or abandoned as cropland. This shift from irrigation is already taking place in several study area counties where the increased costs of petroleum are making it uneconomical to pump irrigation water from ever-increasing depths. If abandoned, these croplands should be converted to dryland crops or back to usable grazing land to avoid invasion by annual weeds, and to provide livestock forage.

There are about 2,237,000 acres of land used for grazing in the Texas/New Mexico study area counties. This 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 ranges from 24 percent in Curry County to 100 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.

4.2 IMPACT ANALYSIS METHODOLOGY

NEVADA/UTAH REGION (4.2.1)

The impacts of project construction in Nevada and Utah will occur principally on rangeland with up to 160,000 acres directly and adversely affected. This direct impact represents a relatively small portion of the total of over 36 million acres of BLM rangeland in the study area. Approximately 14 percent of this 36 million acres is geotechnically suitable and potentially impactable.

Within each hydrologic subunit, M-X impacts on grazing and the resulting changes over time are primarily dependent on the size of the project in the subunit and are relatively independent of the number of subunits impacted. The types of impacts found in each hydrologic subunit are essentially the same, just relatively larger in high abundance and for high productivity valleys and smaller in low abundance and for low productivity valleys. The available data has allowed analyses to only be taken to the level of an entire hydrologic subunit.

An estimated total AUMs (animal unit months) was determined for each hydrologic subunit (valley) in the Nevada/Utah study area. AUM values were based on BLM planning unit records for 1979. The proportion of the planning unit or units within the hydrologic subunit boundaries of each valley were used, along with the average acres per AUM for each planning unit, to estimate the total AUMs, in most of the valleys. For a subset of the valleys where complete data was available the same procedure was followed on an individual allotment, rather than a planning unit basis.

Another factor, in addition to total AUM's lost, that determines the potential for livestock reductions resulting from vegetation loss in the concentration of use (acres/AUM) in each hydrologic subunit. The less area it takes for each AUM, the more AUMs of grazing capacity a valley has. The concentration of use is a good single indicator of sensitivity of a hydrologic subunit to impact. 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.

An average acres per AUM was determined for each hydrologic subunit by dividing its total area in acres by its total estimated AUMs. The acres per AUM figures for all the hydrologic subunits in the study are listed ir Table 4.1-4.

All the subunits in the proposed M-X deployment area were listed in order of decreasing number of AUMs per acre (decreasing concentration of use). The list was then divided into thirds. A similar list was made for decreasing total numbers of AUMs and again divided into thirds. The one-third of the hydrologic subunits with the highest concentration of use, the generally most productive valleys for livestock in the project area, are listed in Table 4.2-1 according to their class of total AUMs (high, medium, or low abundance). Their locations are indicated in Figure 4.2-1. Two general groups of hydrologic subunits are evident. One is in the north central portion of Nevada and the other is along the central portion of the Utah/Nevada border. Both areas represent generally higher elevation, wetter and more productive areas of the Great Basin. The abundance and concentration rankings for all valleys are listed in Table 4.2-2.

Table 4.2-1. Nevada/Utah hydrologic subunits with the highest concentration of use (lowest acres/AUM), listed according to their abundance class of total AUMs.*

HIGH ABUNDANCE		MEDIUM ABUNDANCE		LOW ABUNDANCE	
NUMBER	VALLEY NAME	NUMBER	VALLEY NAME	NUMBER	VALLEY NAME
4	Snake	3	Deep Creek	152	Stevens
50	Wilford	55	Jarico Lake	174	Jakes
53 (N)	Pine	57	Antelope	194	Pleasant
54 (N)	Crescent	58	Middle Reese River		
56	Upper Reese River	134	Smith Creek		
139	Kobeh	138	Grass		
153	Diamond	180	Cave		
154	Newark	185	Tippett		
175	Long				
178B	Butte Valley South				
184	Spring				
196	Hamlin				
207	White River				

2323-2

*Note: Classifications were determined from listings in Table 4.2.2.9.1.3-9.

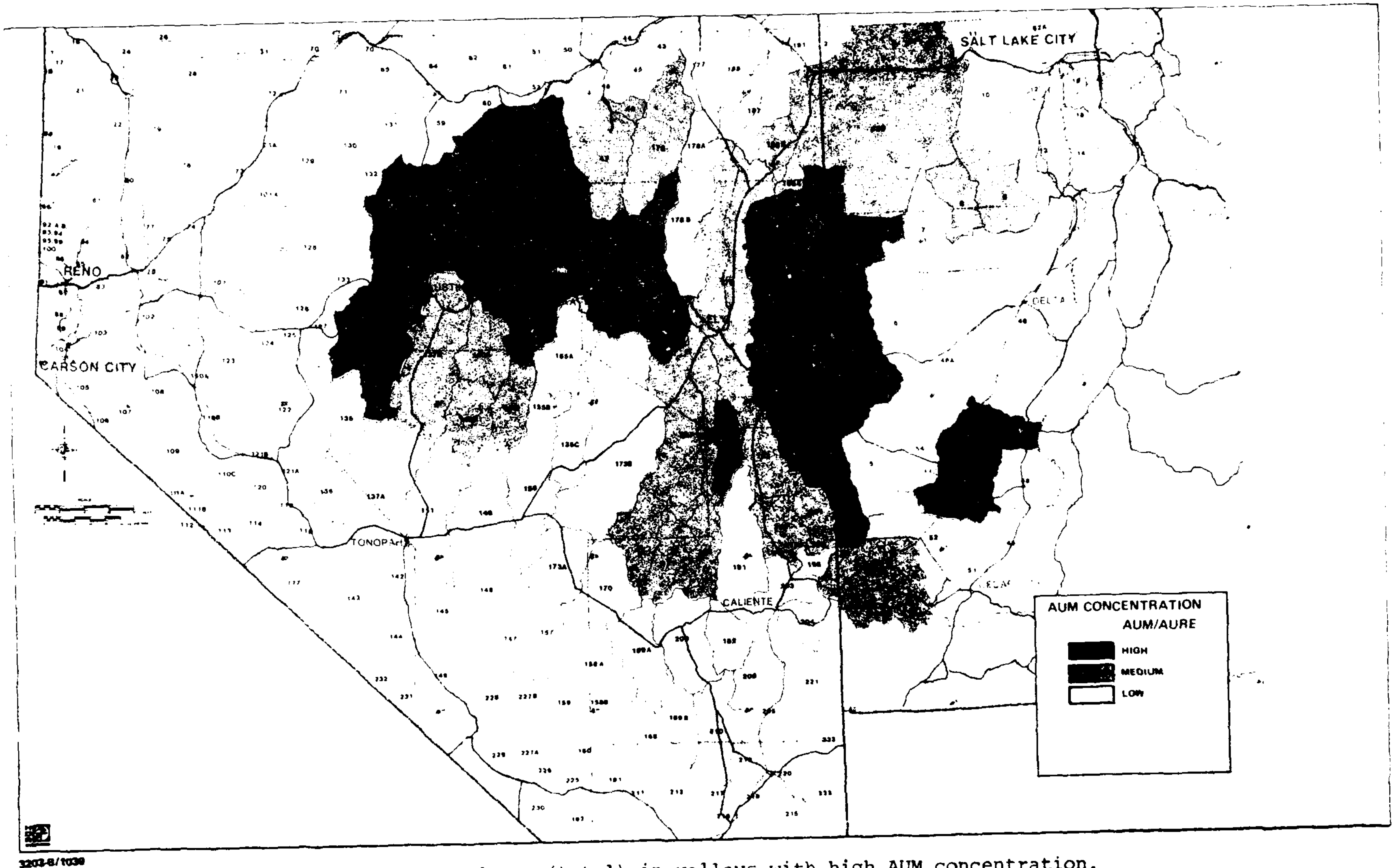


Figure 4.2-1. AUM abundance (total) in valleys with high AUM concentration.

Table 4.2-2. Abundance (total AUMs) and concentration (AUM/acre) to impact for grazing, Nevada/Utah study area.

NUMBER	LOCATION	TOTAL AUM CLASS[1]	AUM CONCEN-TRATION CLASS[1]	NUMBER	LOCATION	TOTAL AUM CLASS	AUM CONCEN-TRATION CLASS
3	Deep Creek	I	H	153	Diamond	H	H
4	Snake	H	H	154	Newark	H	H
5 (U)	Pine	I	I	155	Little Smokey	H	I
6	White	H	I	156	Hot Creek	H	I
7	Fish Springs	L	L	169a	Tikaboo-Northern	L	L
8	Dugway	L	I	170	Penoyer	L	L
9	Government Creek	L	L	171	Coal	I	I
13	Rush	L	L	172	Garden	L	L
32b	Great Salt Lake Desert-Western Desert	H	I	173	Railroad	H	L
				174	Jakes	I	H
46	Sevier Desert	H	I	175	Long	H	H
46a	Sevier Desert-Dry Lake	H	I	176	Ruby	I	I
47	Huntington	I	I	178b	Butte-South	H	H
50	Milford	H	H	179	Steptoe	H	L
52	Lund District	I	I	180	Cave	I	H
53 (N)	Pine	H	H	181	Dry Lake	H	I
53 (U)	Beryl-Enterprise District	H	I	182	Delamar	L	L
54 (U)	Wah Wah	I	I	183	Lake	I	I
54 (N)	Crescent	H	H	184	Spring	H	H
55	Carico Lake	I	H	185	Tippett	I	H
56	Upper Reese River	H	H	186	Antelope	I	I
57	Antelope	I	H	187	Goshute	I	L
58	Middle Reese River	I	H	194	Pleasant	L	H
134	Smith Creek	I	H	196	Hamlin	H	H
135	Ione	L	L	198	Dry	L	I
137a	Big Smokey-Tonopah Flat	I	L	199	Rose	L	I
137b	Big Smokey-North	I	I	200	Eagle	L	I
138	Grass	I	H	201	Spring	L	I
139	Kobeh	H	H	202	Patterson	L	L
140	Monitor	I	I	203	Panaca	L	L
141	Ralston	I	L	204	Clover	L	L
142	Alkali Spring	L	L	206	Kane Springs	L	L
149	Stone Cabin	I	L	207	White River	H	H
150	Little Fish Lake	L	I	208	Pahroc	L	L
151	Antelope	L	I	209	Pahranagat	I	L
152	Stevens	L	H	210	Coyote Springs	L	L

2321-4

[1]Class level determined by listing hydrologic subunits (valleys) by increasing AUMs and then by increasing AUM concentration and then dividing each list into thirds to allow a relative comparison between hydrologic subunits.

L = low, I = intermediate, H = high.

Areas potentially disturbed in each hydrologic [illegible] construction of shelters, cluster roads and DTN were [illegible] tical full basing and split basing layouts. [illegible] each hydrologic subunit were then determined by dividing [illegible] disturbed in each subunit by its average acres per AUM [illegible]. [illegible] figures for split basing were obtained by adjusting the [illegible] figures provided for full basing in proportion to the [illegible] number of shelters in each hydrologic subunit [illegible] full basing. For most of the hydrologic [illegible] layouts, the level of disturbance is the same. AUM [illegible] for the adjusted disturbance figures.

Additional data available for some valleys indicates that project distribution within a hydrologic subunit is not uniform, concentrating more in one or some parts than in others. This can result in one or a few allotments and operators taking the brunt of the impact. This potential heterogeniety of impact within a hydrologic subunit was [illegible] through allotment by allotment analyses in one hydrologic subunit from each AUM concentration class. The total AUMs, total area and average acres for AUM was determined for each allotment, or portion of allotment, within the watershed boundary of each hydrologic subunit. These hydrologic subunits were [illegible] (high AUM concentration), Dry Lake (medium AUM concentration) and [illegible] (low concentration) (Table 4.2-2).

It has not been possible to incorporate direct impacts other than those from DTN, cluster roads and shelters into the analysis because valley specific data on them is not yet available. Also, preliminary results from ranch economic studies indicate that indirect impacts such as increased management and operation costs and increased livestock losses (from several sources) will potentially impact some individual operators up to several times more than the direct impacts from vegetation losses. Higher levels of direct losses in a hydrologic subunit potentially increase the level of both direct and indirect impacts, particularly in areas where the project may be concentrated. These analyses of direct impacts are therefore a general index of the potential for significant impacts in each hydrologic subunit.

To do more than a general assessment of these impacts requires site-specific information and, toward that end, ranch studies have been undertaken. Ranches in the study area have been categorized by size, location, management practices, land-use patterns, past trends, and present economic status and types and schedules of livestock grazed. All information has been summarized on a planning unit by planning unit basis. These data are specific as to the types of priority elements associated with each type of range (i.e., range water, development, or access to a farm pasture). These data are currently being analyzed by linear programming techniques for a more detailed analysis of potential economic impact to the livestock industry.

TEXAS/NEW MEXICO REGION (4.2.2)

Within each county, M-X impacts on livestock and the resulting changes over time are primarily dependent on the size of the project in the county and is relatively independent of the number of counties impacted. The types of impacts found in each county are essentially the same, just relatively larger in high abundance counties and smaller in low abundance counties. The available data has allowed analyses to be taken to the level of an entire county.

An estimated total number of animal units was determined for each county in Texas and New Mexico using the 1974 agricultural statistics for each of the individual counties. These figures were converted to animal units (one animal unit equals one cow or five sheep). Both a total number of animal units and an average animal unit density figure (acres per county divided by total number of animal units) were tabulated for each county. The concentration of livestock in a county is a good simple indicator of the sensitivity of the livestock industry in that county to impact. Counties with lower concentrations of livestock potentially have a lower impact for each acre of land disturbed while counties with the highest concentration have the highest potential for animal unit reductions.

All the potentially impacted counties in the Texas/New Mexico study area were ranked by the total estimated animal units present in 1974, into high, medium, and low animal unit concentration (animal units/acre) categories. This ranking placed an approximately equal number of counties in each ranking. The counties were similarly ranked by these total animal units present. The results of both rankings are in Table 4.2-3.

All of the counties in the high animal unit concentration category are in Texas (Figure 4.2-2). All but two of the counties in the medium concentration classification are also in Texas. Only one of the counties in the low concentration classification is in Texas. The rest are in New Mexico. This difference is primarily the result of the much higher concentration of stockyards in Texas.

Areas potentially disturbed in each county by the construction of shelters, cluster roads and DTN were determined for hypothetical full basing and split basing layouts. An estimate of potential animal unit losses from full basing was determined by dividing the total area disturbed in each county by its average acres per animal unit figure. Disturbance figures for split basing were obtained by adjusting the disturbance figures provided for full basing in proportion to the decrease in the number of shelters in each county in split basing over full basing. For most of the counties used for both basing modes the level of disturbance is the same. Animal unit losses were then computed from the adjusted disturbance figures. As with the Nevada/Utah area analyses, higher level of direct losses in a county potentially indicates an increase in the level of both direct and indirect impacts, particularly in areas where the project may be concentrated.

4.3 ENVIRONMENTAL CONSEQUENCES

PROPOSED ACTION (4.3.1)

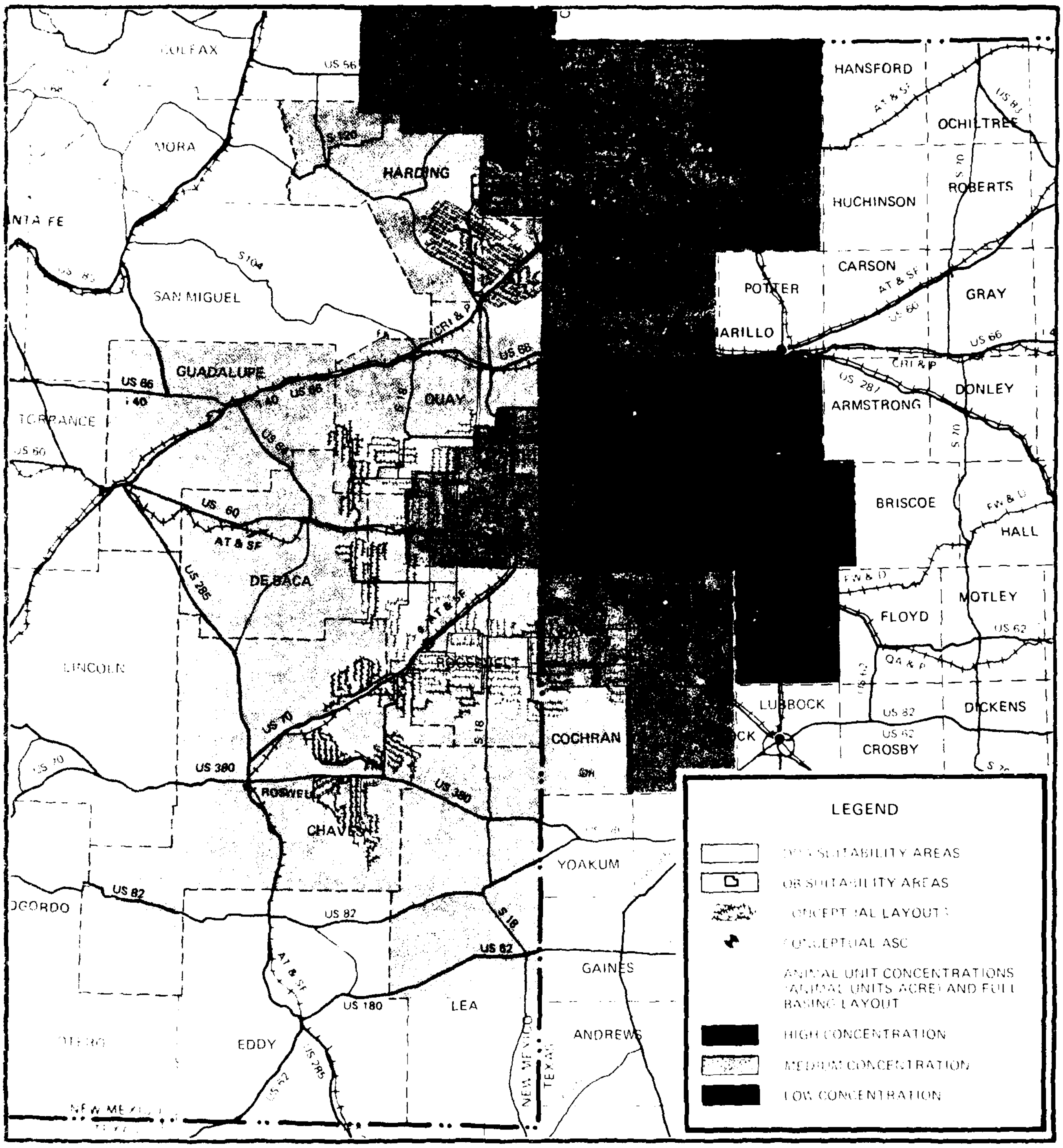
Because of its extensiveness in the Nevada/Utah study area, nearly all of the project is on rangeland. Impacts to rangeland are primarily through

Table 4.2-3. Abundance (total AUMs) and concentration (AUMs/acre) to impact for grazing in all the counties in the Texas/New Mexico study area.

COUNTY	ABUNDANCE[1] (ANIMAL UNITS)	CONCENTRATION[1] (ANIMAL UNITS/ACRE)
Texas		
Bailey	Low (L)	Medium (M)
Castro	High (H)	High (H)
Cochran	L	Low (L)
Dallam	Medium (M)	M
Deaf Smith	M	H
Hale	H	M
Hartley	L	M
Lamb	L	M
Moore	H	H
Oldham	M	H
Parmer	H	H
New Mexico		
Chaves	H	L
Curry	M	M
DeBaca	L	L
Harding	L	L
Lea	M	L
Quay	M	L
Roosevelt	M	L
Union	H	M

3724-1

[1]Class level determined by listing counties by increasing number of animal units and then by increased animal unit concentration and then dividing each list into thirds to allow a relative comparison between counties.



4.2-2. Live stock concentrations in the Texas/New Mexico study area the loss of forage from direct disturbance of vegetation. The pattern of project impacts on grazing can be seen on Figure 4.3-1.

Impacts on grazing that would result from vegetation disturbance by M-X deployment will generally remove a portion of the total AUMs in each subunit. AUM loss would be relatively larger in high productivity than in low productivity hydrologic subunits.

The approximate loss of animal unit months (AUMs) in the DDA, assuming that the project will impact the various vegetation and range types in the hydrologic subunits in proportion to their occurrence, will be about 7,200 AUMs. This represents about 0.52 percent of the total AUMs in the affected BLM planning units (Tables 4.3-1 and 4.3-2) or 0.72 percent of the total in all the affected hydrologic subunits (Table 4.3-3). Sixty-eight percent of the loss would be in Nevada and 32 percent in Utah. The estimated AUM losses in the individual hydrologic subunits of this alternative range from 0.1 percent to 2.0 percent.

Twenty-six percent of the DDA impacted hydrologic subunits have a high AUM concentration ranking. Twenty-six percent of the land area disturbed and 35 percent of the AUM loss also occurs in these high-ranked subunits. Hydrologic subunits with medium AUM concentration account for 34 percent of the impacted subunits and these hydrologic subunits contain 40 percent of the area disturbed and 23 percent of the AUM loss. The hydrologic subunits with medium AUM concentration receive the highest concentration of deployment area facilities. This concentration by project facilties was reflected in the AUMs lost and also in the percentage of the total AUMs lost, relative to the total in each hydrologic subunit. They were the highest in the medium-concentration subunits (3,000 AUMs, 0.94 percent) intermediate in the high-concentration subunits (2,500 AUMs, 0.64 percent), and lowest in the low-concentration subunits (1,700 AUMs, 0.59 percent). Over the entire project area potential non-M-X projects would contribute little to changes in AUM levels.

Additional impacts are anticipated to result from the construction of support and construction roads, area support centers, remote surveillance sites, power transmission corridors, and command, control and communications networks. Site-specific location and disturbance data are not yet available. It also does not include indirect losses that may be due to construction disturbances.

Potential impacts from MX construction would generally not be uniform over a hydrologic subunit. Project facilities can be concentrated in one part of a subunit, leaving other parts untouched. Livestock operators dependent upon the impacted areas of a hydrologic subunit could be significantly affected. The following analysis of the allotment by allotment differences within one sample hydrologic subunit from each AUM concentration category illustrates these differences in project concentration.

Jakes hydrologic subunit is one of the higher AUM concentration subunits in the study area. Five of the 6 allotments that are all or partly within this watershed are impacted by the project. The AUMs lost in the allotments vary from 6 to 212 AUMs (Table 4.3-4). The loss of 212 AUMs represents nearly 64 percent of the total AUM loss in the hydrologic

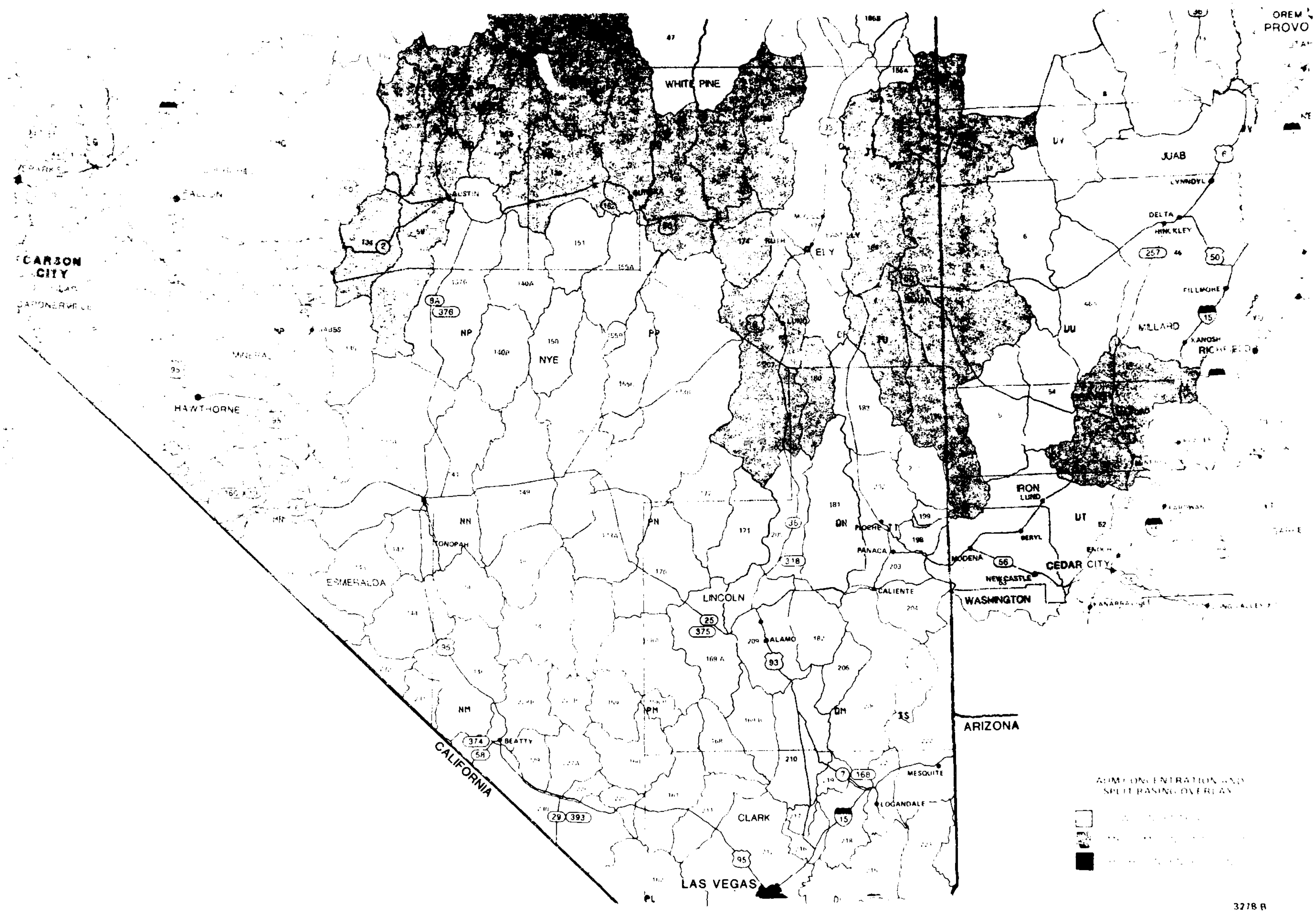


Figure 4.3-1. AUM concentrations in study area hydrologic subunits.

Table 4.3-1. Potential impact of DDA on AUMs in Nevada[1] for the proposed action and for alternatives 1-6.

COUNTY BLM PLANNING UNIT	PSs	ACRES DISTURBED[2]	AUM REDUCTION	
			NUMBER	PERCENT
Clark				
Virgin Valley	0	0	0	0
Esmeralda				
Esmeralda	133	4,349	56	0.2
Eureka				
Pony Express	193	6,311	418	1.0
Devil's Gate	216	7,063	431	0.7
Lander				
Pony Express	86	2,812	186	0.6
Lincoln				
Caliente	143	4,676	117	[illegible]
White River	335	10,954	509	0.8
Wilson Creek	555	18,148	844	[illegible]
Nye				
Tonopah West	311	10,170	410	0.9
Tonopah East	633	20,699	873	0.7
Duckwater	154	5,036	167	[illegible]
Pershing				
Sonoma	0	0	0	0
White Pine				
Newark	184	6,017	452	0.6
Butte	92	3,008	140	0.5
Preston-Lund	92	3,008	197	0.5
Moriah	19	621	58	0.0
Nevada Totals	3,176	104,104	4,858	0.52

3177

[1] Assumes 32.7 acres per PS disturbed area for all facilities except OB, DAA, CBTS and airfields (150,470 maximum disturbance ÷ 4,600).

[2] The acres disturbed was determined by applying a factor of 32.7 acres per PS found in the grazing land areas. The 32.7 acres per PS was calculated by adding together the land disturbed by all of these elements of the project (land requirements for construction facilities), (land requirements for facilities), and (land requirements for roads), and dividing the total by 4,600 (150,470 ÷ 4,600 = 32.7). The number of AUMS lose was determined by dividing the acres per AUM in each planning unit into the calculated acres disturbed for each planning unit.

Sources: Denver Regional Office of BLM, 1980 computer printouts of AUM distribution by allotments, and the DDA layout.

Table 4.3-2. Potential impact of DDA on AUMs in Utah[1] from proposed action.

COUNTY/BLM PLANNING UNIT	PSs	ACRES DISTURBED	AUM REDUCTIONS NUMBER	AUM REDUCTIONS PERCENT
Beaver				
Pinyon	260	8,502	607	0.9
Juab				
Topaz	420	13,734	479	[illegible]
Millard				
Confusion	192	6,278	374	0.4
Warm Springs	218	7,[illegible]	439	0.6
Topaz	247	8,077	277	[illegible]
Tooele				
Gold Hill	0	0	0	0
Skull Valley-Lakeside	75	2,452	156	0.2
Utah Totals	1,424	54,904[2]	[illegible]	[illegible]

3178

[1]Assumes 32.7 acres per PS disturbed for all facilities except OB, DAA, OBTS and airports (see Table 4.2.2.9.1.3-5 for explanation of this assumption).

[2]Includes 8,340 acres for OB, airfield, OBTS, and DAA.

Sources: Denver Regional Office of BLM, 1980 computer printouts of AUM distribution by allotments, and the DDA layout.

Table 4.3-3. Potential direct impact to grazing as a result of M-X DDA construction in Nevada/Utah for proposed action and alternatives 1-6.

HYDROLOGIC SUBUNIT AREA		AUM CONCENTRATION IN AREA[1]	SHORT-TERM AND LONG-TERM EFFECTS		
NO.	NAME		ESTIMATED AUM LOSS	LOSS AS % OF TOTAL AUMS IN AREA	POTENTIAL IMPACT[1]
	Subunits with M-X Clusters and DTN				
4	Snake		636	0.2	
5	Pine		225	0.9	
6	White		215	0.8	
7	Fish Springs		78	0.6	
8	Dugway		111	1.1	
9	Government Creek		23	0.2	
46	Sevier Desert		277	0.3	
46A	Sevier Desert-Dry Lake[2]		404	1.4	
54	Wah Wah		329	1.5	
137A	Big Smoky-Tonopah Flat		87	0.4	
139	Kobeh		335	1.0	
140A	Monitor—Northern		216	2.5	
140B	Monitor—Southern		18	0.2	
141	Ralston		262	1.5	
142	Alkali Spring		44	1.7	
148	Cactus Flat		10	0.4	
149	Stone Cabin[2]		132	0.8	
151	Antelope		226	1.9	
154	Newark[2]		175	0.5	
155A	Little Smoky—Northern		139	1.0	
155C	Little Smoky—Southern		105	0.6	
156	Hot Creek		202	0.7	
170	Penoyer		108	1.1	
171	Coal		179	1.2	
172	Garden		128	1.5	
173A	Railroad—Southern		162	1.2	
173B	Railroad—Northern		271	0.6	
174	Jakes[2]		334	2.0	
175	Long		186	0.3	
178B	Butte—South		208	0.7	
179	Steptoe		19	0.1	
180	Cave		140	1.0	
181	Dry Lake[2]		397	1.3	
182	Delamar		82	0.8	
183	Lake		142	0.9	
184	Spring		128	0.2	
196	Hamlin		250	0.9	
202	Patterson		20	0.2	
207	White River		250	0.5	
208	Pahroc		11	0.1	
209	Pahranagat		23	0.1	
	Overall DDA Impact		7,187	0.7	

3833-3

[1]

No AUM reduction (No AUM concentration).

Low - Moderately Low Impact (Low AUM Concentration). Projected AUM reductions representing less than 1 percent of AUMs in the hydrologic subunit or totalling less than 200 AUMs.

Moderate - Moderately High Impact (Moderate AUM Concentrations). Projected AUM reductions representing 1-5 percent of AUMs in the hydrologic subunit or totalling 200-500 AUMs.

High Impact (High AUM Concentrations). Projected AUM reductions representing 5 percent or more of those in the hydrologic subunit or totalling 500 or more AUMs.

[2] Conceptual location of Area Support Center (ASC)

Table 4.3-4. Estimated AUM totals and AUMs lost in impacted allotments in the Jakes Valley hydrologic subunit for the short and long term impacts.[3]

ALLOTMENTS IN WATERSHED	ESTIMATED TOTAL AUMs IN ALLOTMENT	ESTIMATED AUMs PER ACRE	ESTIMATED AUMs LOST	IMPACT INDEX OF AUMs LOST[1]	AUMs LOST AS OF % OF TOTAL IN ALLOTMENT	IMPACT INDEX OF PERCENT LOSS
Moorman Ranch	7,300	.17	6		0.10	
Tom Plain	4,200	.11	212		5.05	
Jakes Unit Trail	800	.12	23		2.88	
Badger Spring	1,400	.057	7		0.50	
Indian Lake	1,800	.11	86		4.78	
Totals	15,500		334		2.15	

3723-1

[1] Index of AUMs lost was determined by comparing AUM loss data from Tables 4.2.2.9.1.3-10, -11, and -12, and listing the allotments in order of decreasing AUMs lost and dividing the list into thirds. The highest relative impact was given the darkest shading, , the intermediate impact, an intermediate shading and the lowest impact the lightest shading

[2] Derived as for footnote[1] above for a relative comparison of project density in the affected allotments.

[3] Assumes no mitigation of lost grazing capacity through revegetation of area disturbed by construction.

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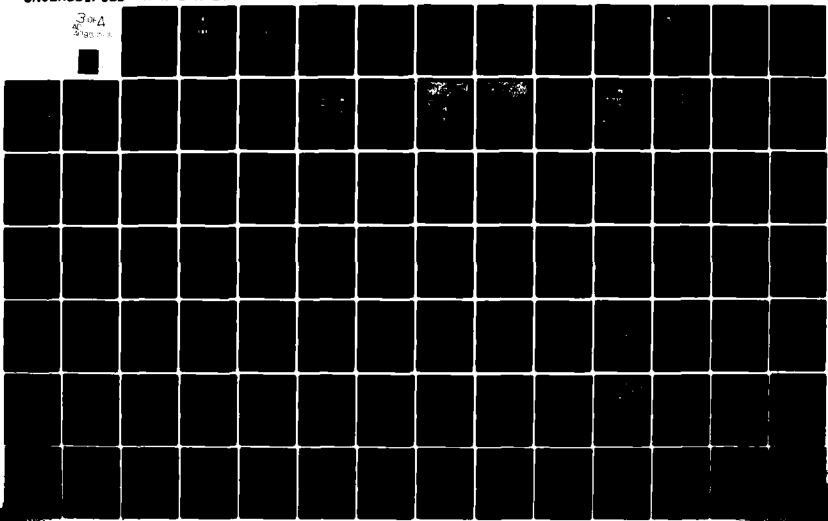

subunit and 5 percent of the AUMs in the portion of the Tom Plain Allotment occurring the the Jakes hydrologic subunit. This is a sufficient level of disturbance to potentially significantly impact an operator dependent on the allotment.

The Dry Lake hydrologic subunit has a medium level of AUM concentration (AUMS/acre). Eight of the 15 allotments that are all or partly within the Dry Lake subunit are affected by the project. The AUM loss in the affected allotments varies from 7 to 123 AUMs (Table 4.3-5). One-third of the AUM loss occurs in one allotment where it accounts for about 1 percent of its AUMs. Another 27 percent of the loss occurs in the Ely Springs AMP allotment where it represents 2.6 percent of its total AUMs. This is a level that could possibly be significant for an operator dependent on the allotment.

Delamar hydrologic subunit is in the low AUM concentration category. All of the allotments occuring in this watershed are impacted by the project. The AUM losses in the impacted allotments range from 7 to 35 AUMs (Table 4.3-6). Seventy-seven percent of the losses occur in two allotments where they represent an average of about 1 percent of the AUMs present. This may or may not be significant for operators dependent on these allotments. Disturbance resulting from project construction will be present for a considerable period of time following construction because of the arid nature of this hydrologic subunit.

Overall, loss of grazing capacity through vegetation disturbance will be directly proportional to the level of construction activity and will peak at the completion of the project. 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. Under the initial disturbance, plus continued disturbance from grazing by domestic and feral livestock and by wildlife, poisonous annual plants like halogeton can persist for extended periods of time. 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.

Deployment of M-X would coincide with the 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 reductions in livestock numbers over the short term. 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. The extensive development of water supplies that will be necessary for M-X construction have the potential of improving the abundance and distribution of water developments for livestock in a much shorter time period than could be accomplished by the BLM alone. An increase in livestock utilization would be possible in many of the affected valleys. To accomplish these increases, the water developments would need to be both properly placed and permanent. Direct water use by livestock is small compared to M-X and other use requirements.

Table 4.3-5. Estimated totals and AUMs lost in impacted allotments in the Jakes Valley hydrologic subunit for the short and long term impacts.[3]

ALLOTMENTS IN WATERSHED	ESTIMATED TOTAL AUMs IN ALLOTMENT	ESTIMATED AUMs PER ACRE	ESTIMATED AUMs LOST	IMPACT INDEX OF AUMs LOST[1]	AUMs LOST AS OF % OF TOTAL IN ALLOTMENT	IMPACT INDEX OF PERCENT LOSS[2]
Wilson Creek	13,600	.047	132		0.97	
Ely Spring Sheep	1,800	.079	7		0.39	
Simpson	750	.089	50		6.67	
Ely Spring Amp	4,250	.077	109		2.56	
Rattlesnake	980	.042	14		1.43	
Mustang	950	.053	16		1.68	
Oak Springs	2,900	.048	49		1.69	
Cliff Springs	1,900	.057	20		1.05	
Totals	27,130	.054	397		1.46	

3694-1

[1]Index of AUMs lost was determined by comparing AUM loss data from Tables 4.2.2.9.1.3-10, -11, and -12, and listing the allotments in order of decreasing AUMs lost and dividing the list into thirds. The highest relative impact was given the darkest shading, , the intermediate impact, an intermediate shading , and the lowest impact the lightest shading

[2]Derived as for footnote[1] above for a relative comparison of project density in the affected allotments.

[3]Assumes no mitigation of lost grazing capacity through revegetation of area disturbed by construction.

Table 4.3-6. Estimated AUM totals and AUMs lost in impacted allotments in the Delamar Valley hydrologic subunit for the short and long term impacts.[3]

ALLOTMENTS IN WATERSHED	ESTIMATED TOTAL AUMs IN ALLOTMENT	ESTIMATED AUMs PER ACRE	ESTIMATED AUMs LOST	IMPACT INDEX OF AUMs LOST[1]	AUMs LOST AS OF % OF TOTAL IN ALLOTMENT	IMPACT INDEX OF PERCENT LOSS
Pahroc	2,520	.041	12		0.48	
Oak Springs	3,810	.048	35		0.92	
Buckhorn	2,580	.048	28		1.09	
Delamar	1,025	.020	7		0.68	
Total	9,935	.040	82		0.83	

3695-1

[1]Index of AUMs lost was determined by comparing AUM loss data from Tables 4.2.2.9.1.3-10, -11, and -12, and listing the allotments in order of decreasing AUMs lost and dividing the list into thirds. The highest relative impact was given the darkest shading, , the intermediate impact, an intermediate shading , and the lowest impact the lightest shading .

[2]Derived as for footnote[1] above for a relative comparison of project density in the affected allotments.

[3]Assumes no mitigation of lost grazing capacity through revegetation of area disturbed by construction.

The installation of M-X also has the potential of substantial drawdowns in groundwater supplies. If drawdowns occur they could deplete water resources necessary to maintain other livestock supporting uses, such as cropland that is used for raising hay, alfalfa or other forage for winter and supplemental feeding of livestock. Otherwise gains 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. This could also offset gains made by the installation of additional watering sites.

Because of the presence of large equipment associated with M-X construction, it may be possible to assist the BLM and other state and federal agencies with vegetation improvement projects designed to increase forage for wildlife and livestock.

Deployment of M-X would intensify the problems associated with the increasing number of wild horses and burrows, 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 and intensifying an already serious overgrazing problem. 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.

Grazing management is the effective use of grazing capacity of an allotment. Many types of range improvements are necessary to accomplish the proper utilization of the grazing resource by livestock. Most of these are associated with various types of agreements and commitments between management agencies and private users. Water developments providing livestock drinking water are of critical importance in much of the Nevada/Utah area. Around 10-15 percent of the area is currently ungrazed because of the lack of water. Efficient cattle grazing does not generally occur further than 4 mi from drinking water. The loss of water site can mean the loss of up to 50 mi^2 of grazing land. A loss of one water site in a valley can mean several times the AUM loss from direct vegetation disturbance of full project occupancy of the allotments in a hydrologic subunit. Because of widespread nature of the project and its potential for groundwater drawdown, the loss of livestock watering sites is a definite possibility.

Equally important for grazing management are fences. Fences control both the management of the use of forage by livestock within allotments and separate allotments leased by different operators. The extensive road system for M-X will cause numerous breaks in existing fencing. This will be particularly true during construction when uncompleted roads will have continuous use. If ways cannot be found to economically prevent livestock from moving through these gaps, use of the affected allotments may have to be curtailed or some type of agreement worked out between permit holders. Similar fencing problems will remain during operations, particularly along cluster roads used by transporter vehicles. Cluster locations may require realignment of allotment boundaries. The associated political and economic problems associated with the historic commitments to allotment boundaries will then need to be dealt with.

Livestock grazing is the major, and in some instances the only reliable source of economic return in the hydrologic subunits. In addition to the significance of grazing capacity lost by direct vegetation disturbance, and the potential problem resulting from the disruption of watering sites and fences, is a pattern of disturbance that is unique to the project. Although the area directly impacted is relatively small, the geometric pattern of the project results in large areas being affected. In some instances the project covers essentially the entire floor of a hydrologic subunit. This can have serious implications for many types of livestock operations, particularly sheep operations.

The project disturbance could result in a checkerboard pattern in the distribution of halogeton throughout the floor of susceptible hydrologic subunits. When forage and drinking water have been limited, sheep will consume toxic quantities of halogeton if it is available after drinking water has been obtained. Successful grazing under these circumstances requires sufficient area that is reasonably free of halogeton to be profitably used. The undisturbed areas within the project layout could be too small to be generally usable under such conditions.

In addition to direct vegetation disturbance, there are potentially other indirect adverse effects of project deployment on ranching operations and AUMs that would be greatest during the construction phase. At peak periods, livestock access to some forage or watering areas (or other necessary movements) could be restricted. Increased cost of operation and/or increased loss of animals from other indirect causes also potentially increase the impact on livestock operations. In general, the livestock industry in the Nevada/Utah area operates on a narrow profit margin. Short-term impacts of the level resulting from M-X could be difficult to survive and longer term impacts could be devastating for some operators.

Mitigation Measures (4.3.1.1)

Possible mitigation measures include avoidance of highly productive areas, provision of additional water supplies, reimbursement for losses of supplemental feed, and improvement of range productivity. Of these, the most effective would be avoidance through system design of the most productive allotments within utilized subunits when possible. Supplying additional water resources to improve livestock utilization of areas not affected by the project could also be used to mitigate losses. In some instances, reimbursement for losses or providing supplemental feed could be used to compensate for short-term losses. A longer term mitigation is the improvement of range productivity in areas adjacent to those impacted by the project. Establishment of improved vegetation, however, would require several years and controlled use by grazing animals.

Coyote Spring Operating Base (4.3.1.2)

The Coyote Spring operating base is located in an area with a low AUM concentration (Figure 4.3-2). Operating base impacts to grazing occur about equally within two allotments (Delamar and Arrow Canyon). The Arrow Canyon allotment is currently ungrazed so losses will be to future uses. A total of about 153 AUMs could result, and this level would not significantly vary with the movement of base facilities within the suitability area.

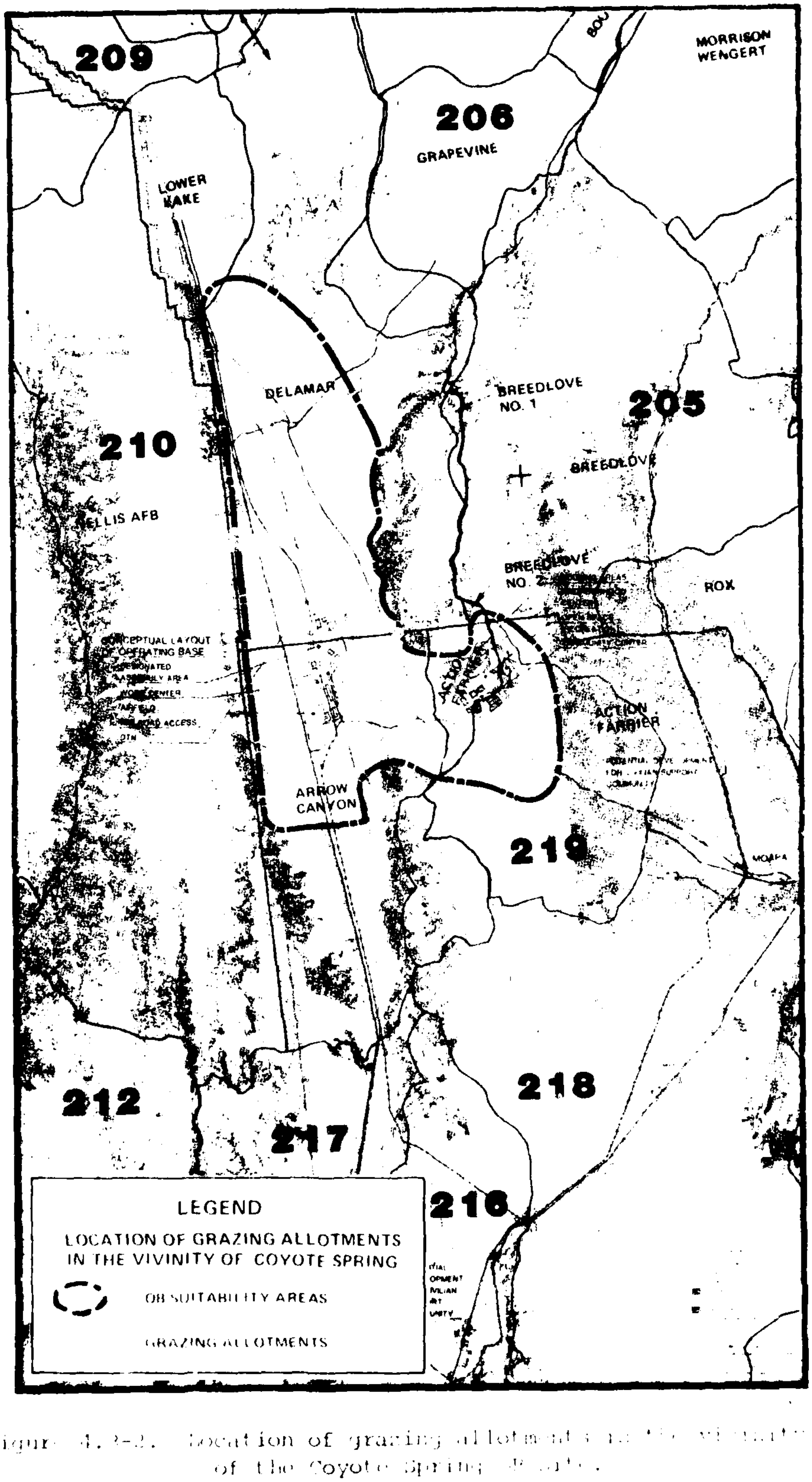

Figure 4.3-2. Location of grazing allotments in the vicinity of the Coyote Spring OB site.

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. Grazing will also probably be restricted in the vicinity of the base, increasing the potential AUM loss. Additional disturbance will occur from the construction of DTN through Coyote Spring and Pahranagat hydrologic subunits to connect the base with Delamar Valley.

The significance of the AUM losses associated with the base will depend on how important these allotments are for local operators and on how the disturbance alters the BLM grazing management plans for the region. The operating base data are summarized in Table 4.3-7.

Because of the aridity of the region limited opportunity exists for mitigating AUM losses. Compensation is one mitigative measure that could be taken.

Milford Operating Base (4.3.1.3)

The Milford operating base (second OB for the proposed action) is located in a valley with a high AUM concentration on public land and irrigated pasture on private land (Table 4.2-2). Impacts to grazing from the Milford secondary operating base occur about half on two allotments (Cook and Antelope Peak) and about half on private land (Figure 4.3-3). This operating base would result in the loss of about 248 AUMs, based on the average AUM concentration in the valley. This level could significantly vary within the suitability envelope depending on the mix of public and private land.

The loss of AUMs is a direct function of the grazing land lost to base facilities and will remain at that level through decommissioning. Grazing will also probably be restricted in the vicinity of the base resulting in additional AUM losses. The operating base data are summarized in Table 4.3-7.

Avoidance of the more productive areas, particularly on private land, could mitigate some of the lost grazing capacity. Range improvement projects on adjacent, undisturbed areas could also be used as a mitigation measure. Compensation and/or providing supplemental feed are also possible mitigation measures.

ALTERNATIVE 1 (4.3.2)

The DDA for Alternative 1 and the impacts associated with its construction and operation are identical with those for the Proposed Action (Section 4.3.1).

Coyote Spring Operating Base (4.3.2.1)

Impacts to grazing in Coyote Spring hydrologic subunit are the same for this alternative as those discussed for the proposed action (Section 4.3.1.2).

Table 4.3-7. Potential direct impact to grazing from area disturbed by construction of operating bases for the proposed action and alternatives 1-6 and 8 (Coyote Spring Valley). (Page 1 of 2)

ALTERNATIVE	LOCATION	ESTIMATED AUM LOSS	LOSS AS % OF HYDROLOGIC SUBUNIT TOTAL AUMS	POTENTIAL OVERALL IMPACT[1]
Proposed Action	Coyote Spring Valley, NV	153	2.5	Moderate
	Milford, UT	248	0.5	Moderate
Alternative 1	Coyote Spring Valley, NV	153	2.5	Moderate
	Beryl, UT	212	0.7	Moderate
Alternative 2	Coyote Spring Valley, NV	153	2.5	Moderate
	Delta, UT	208	0.2	Moderate
Alternative 3	Beryl, UT	307	1.0	Moderate
	Ely, NV	176	0.4	Low
Alternative 4	Beryl, UT	307	1.0	Moderate
	Coyote Spring Valley, NV	106	1.7	Moderate
Alternative 5	Milford, UT	359	0.7	Moderate
	Ely, NV	176	0.4	Low
Alternative 6	Milford, UT	359	0.7	Moderate
	Coyote Spring Valley, NV	106	1.7	Moderate
Alternative 8	Coyote Spring Valley, NV	153	2.5	Moderate

3834-1

[1] No AUM reduction.

Low - Moderately Low Impact. Projected AUM reductions representing less than 1 percent of AUMs in the hydrologic subunit or totalling less than 200 AUMs.

Moderate - Moderately High Impact. Projected AUM reductions representing 1-5 percent of AUMs in the hydrologic subunit or totalling 200-500 AUMs.

High Impact. Projected AUM reductions representing 5 percent or more of those in the hydrologic subunit or totalling 500 or more AUMs.

Table 4.3-7. Potential direct impact to grazing from area disturbed by construction of operating bases for the proposed action and alternatives 1-6 and 8 (Coyote Spring Valley). (Page 2 of 2)

ALTERNATIVE	LOCATION	ESTIMATED ANIMAL UNIT LOSS	LOSS AS % OF TOTAL COUNTY ANIMAL UNITS	POTENTIAL IMPACT[1]
Alternative 7	Clovis, NM Dalhart, TX	470-800	0.4-0.7	[Moderate - Moderately High Impact]
Alternative 8	Clovis, NM	900	1.0	[Moderate - Moderately High Impact]

3834-1

[blank box] No animal unit reductions.

[open boxes] Low-Moderately Low impact. Projected animal unit reductions representing less than 1 percent of those in the county or totalling less than 500 animal units.

[hatched] Moderate - Moderately High Impact. Projected animal unit reductions representing less than 5 percent of those in the county or totalling 500-1,000 animal units.

[solid] High Impact potential. Projected animal unit reductions representing 5 percent or more of the animal units in the county or totalling more than 1,000 animal units.

Note: "animal units" and "AUM" (animal unit months) are not equivalent, they represent different data sets.

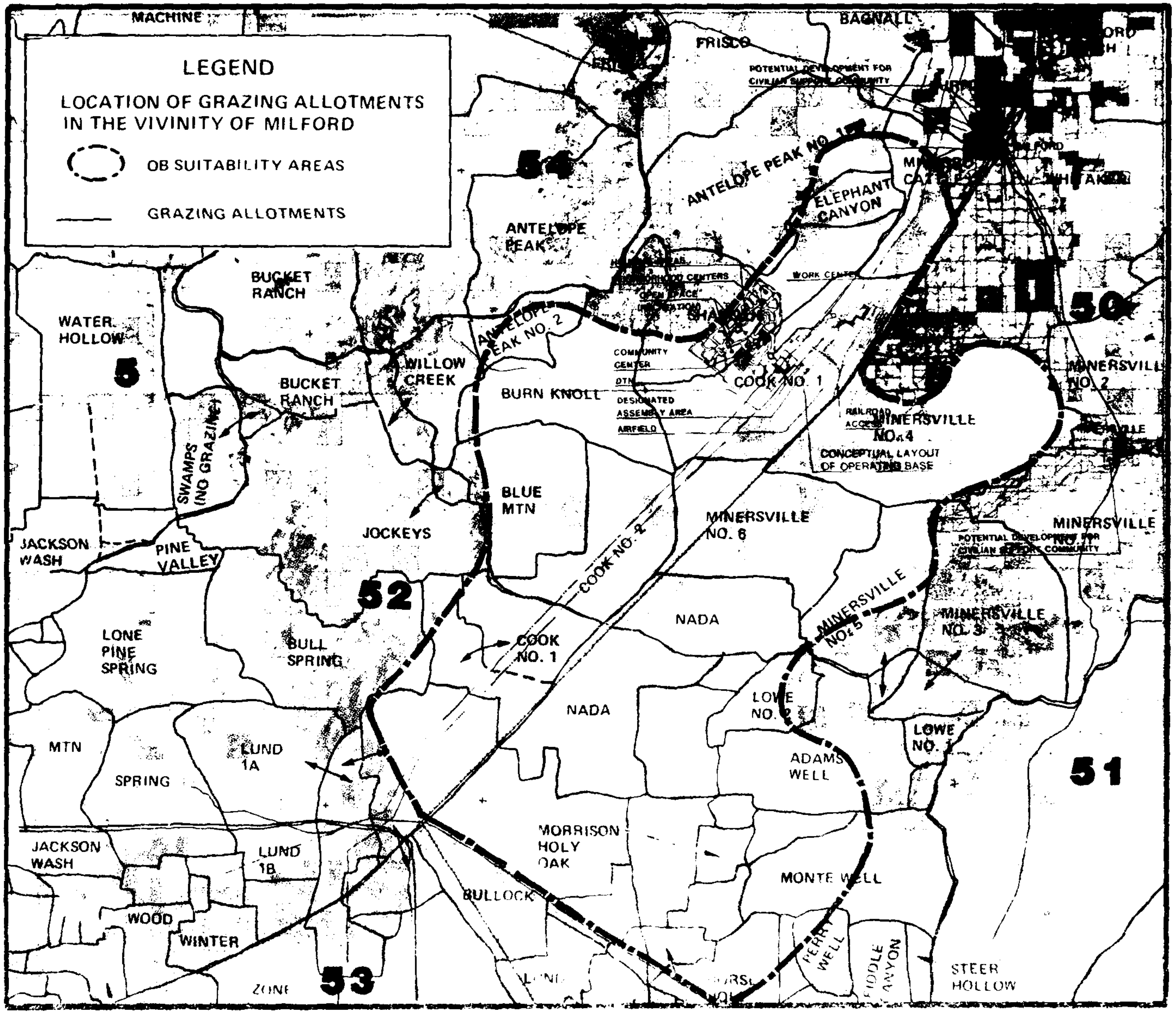

Figure 4.3-3. Grazing allotment (dot pattern) in the vicinity of the Milford OB site.

Beryl Operating Base (4.3.2.2)

The Beryl operating base, second OB for alternative 1, is located in an area with a medium AUM concentration category (Table 4.2-2). The facilities for this operating base occupy parts of four allotments (Tilly Creek, Bennion Springs, Del Vecchio, and Mule Springs (Figure 4.3-4). Total losses from direct vegetation disturbance in the four allotments will be about 212 AUMs. The loss of grazing capacity from vegetation disturbance will not significantly change with the movement of base facilities within the suitability area.

AUM losses will reach a maximum with the completion of the base and will remain at that level through decommissioning. Grazing will also probably 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. Operating base AUM loss data are summarized in Table 4.3-7.

Avoidance of the more productive areas of the affected allotments could be used to mitigate some of the grazing losses. Rangeland improvement projects in undisturbed areas of the affected allotments could be used to mitigate most, or even all of the grazing losses. Monetary compensation and/or provision of supplemental feed, particularly during the disruption of construction, are also possible mitigation measures.

ALTERNATIVE 2 (4.3.3)

The DDA for alternative 2 is identical with the proposed action and the potential impacts are the same (see Section 4.3.1).

Coyote Spring Operating Base (4.3.3.1)

Impacts to grazing in Coyote Spring Valley are the same for this alternative as those discussed for the proposed action (Section 4.3.1.2).

Delta Operating Base (4.3.3.2)

The Delta operating base, the second OB for alternative 2, is located in an area with a medium AUM concentration (Table 4.2-2). The facilities for this operating base are located in a single allotment (Desert) (Figure 4.3-5). Total grazing losses from direct vegetation disturbance will be about 208 AUMs. The loss of grazing capacity from vegetation disturbance will not significantly change with the movement of base facilities within the suitability area.

Grazing losses will peak with the completion of the base and that level of loss is expected to 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 area to the livestock operators leasing grazing rights in that portion of the Desert allotment. Operating base data are summarized in Table 2.3-7.

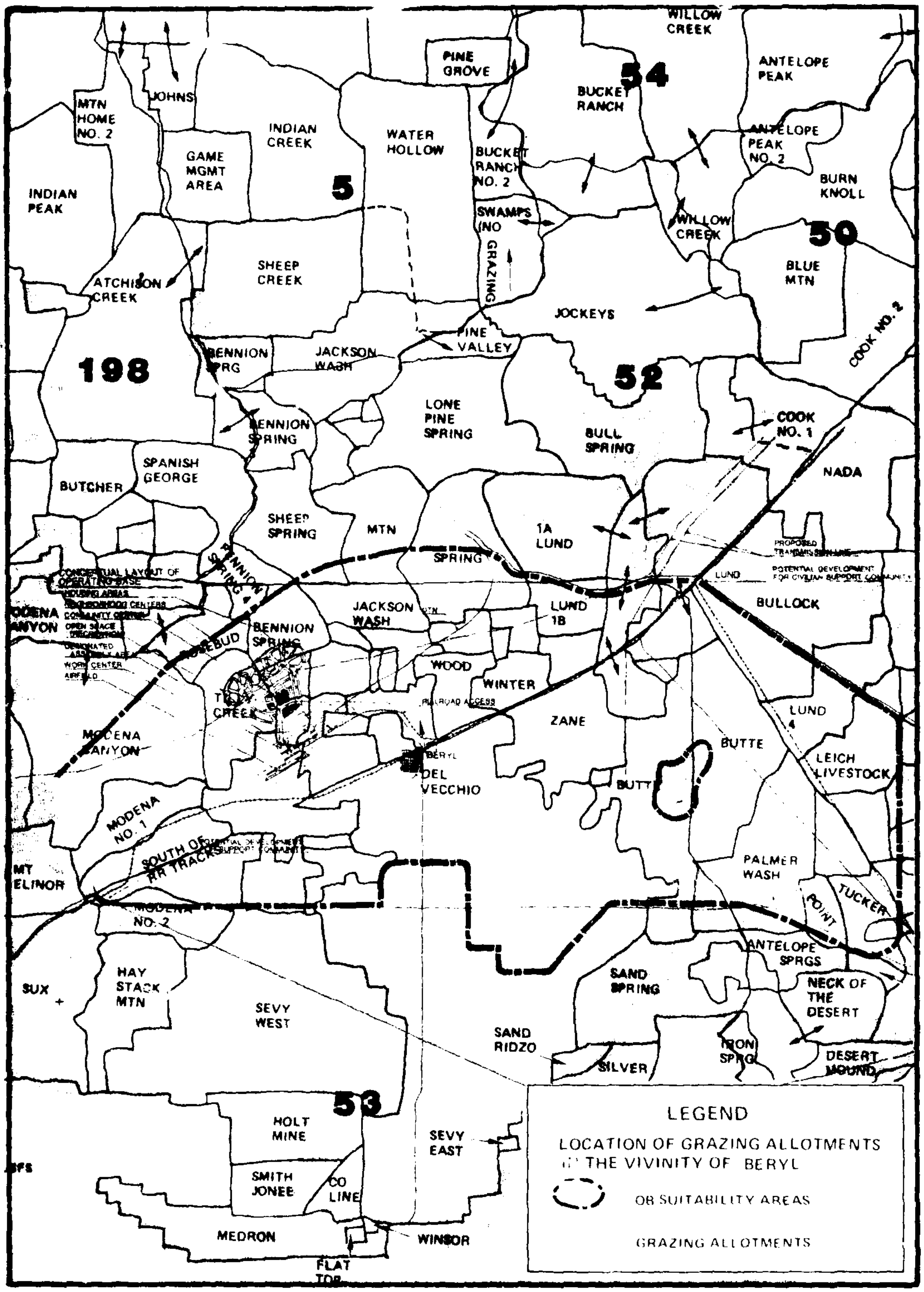

Figure 4.3-4. Allotment boundaries (dot patterns) in the vicinity of the Beryl OB site.

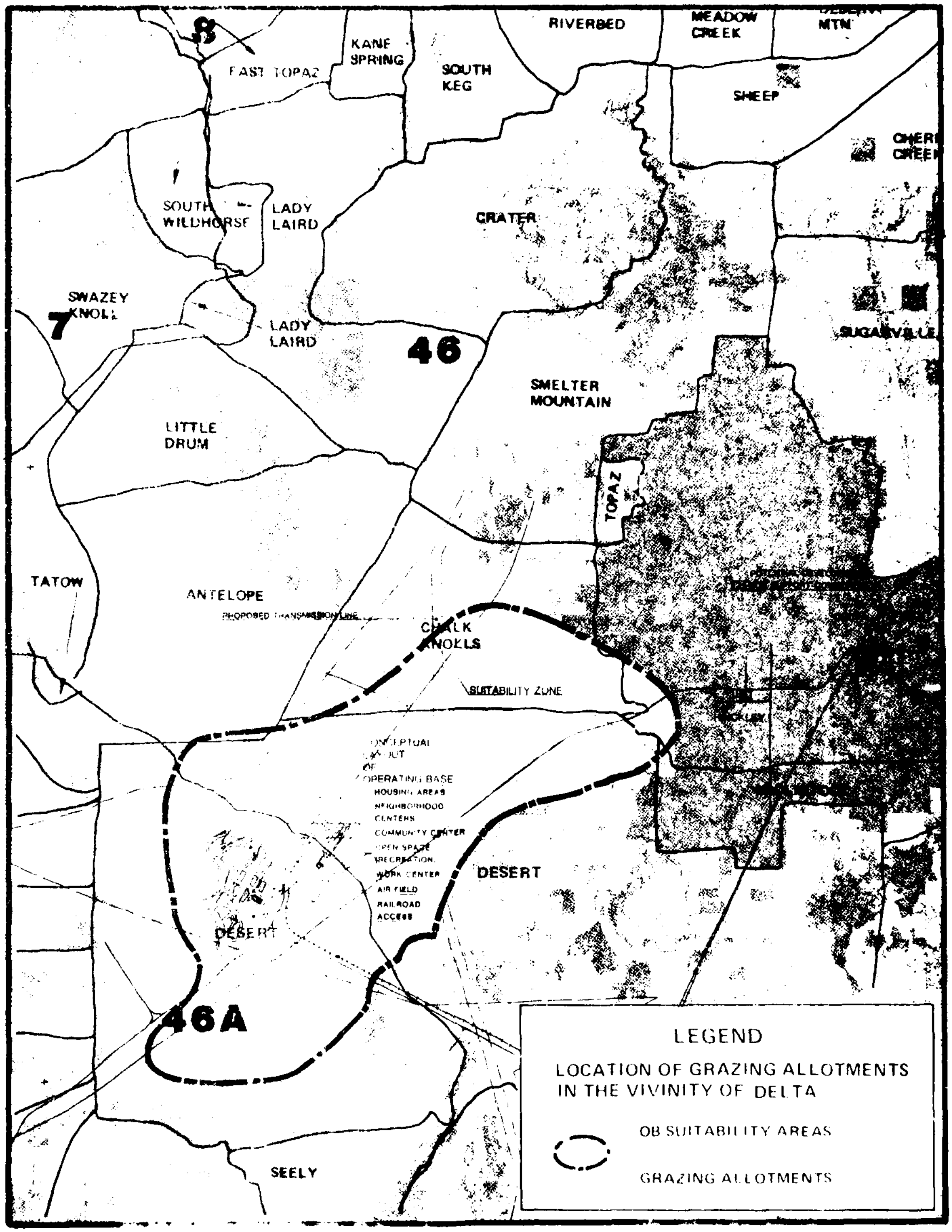

Figure 4... ...ndaries in the vicinity of the Delta OB site.

Avoidance of the more productive areas of the affected allotments could be used to mitigate some of the grazing losses. Rangeland improvement projects in undisturbed areas of the affected allotment could be used to mitigate the grazing losses. Supplemental feed could also be supplied to carry affected operators through the construction phase and over the period of time needed for improved rangeland to become sufficiently estab-lsihed to support grazing.

ALTERNATIVE 3 (4.3.4)

The DDA for Alternative 3 is identical with the proposed action and the potential impacts are the same (see Section 4.3.1).

Beryl Operating Base (4.3.4.1)

The Beryl main operating base has the same grazing impacts as the Beryl secondary operating base discussed in Section 4.3.2.2 but with the following exceptions. The direct loss of vegetation from base construction will reduce the grazing capacity of the impacted allotments by a total of about 370 AUMs instead of the previous 212 AUMs. The level of grazing loss will probably not vary significantly with any 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. 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 4.3.2.2. Operating base AUM loss data are summarized in Table 4.3-7.

Ely Operating Base (4.3.4.2)

The Ely operating base, the secondary OB for alternative 3, is located in the Steptoe Valley hydrologic subunit. This is an area within the low AUM concentration category (Table 4.2-2). The facilities for this base are located in three livestock allotments (Tamberlain, Little White Rock, and West Schell Bench) (Figure 4.3-6). Total grazing losses from direct vegetation disturbance will be about 176 AUMs and the loss will probably not significantly change with the movement of base facilities around within the suitability area.

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 4.3-7.

Avoidance of the more productive areas of the affected allotments could be used to mitigate some of the grazing losses. Rangeland improvement projects in undisturbed areas of the affected allotments could also mitigate AUM losses. Supplemental feed could be supplied to carry affected operators through the construction phase over the period of time needed for improved rangeland to become sufficiently established to support grazing.

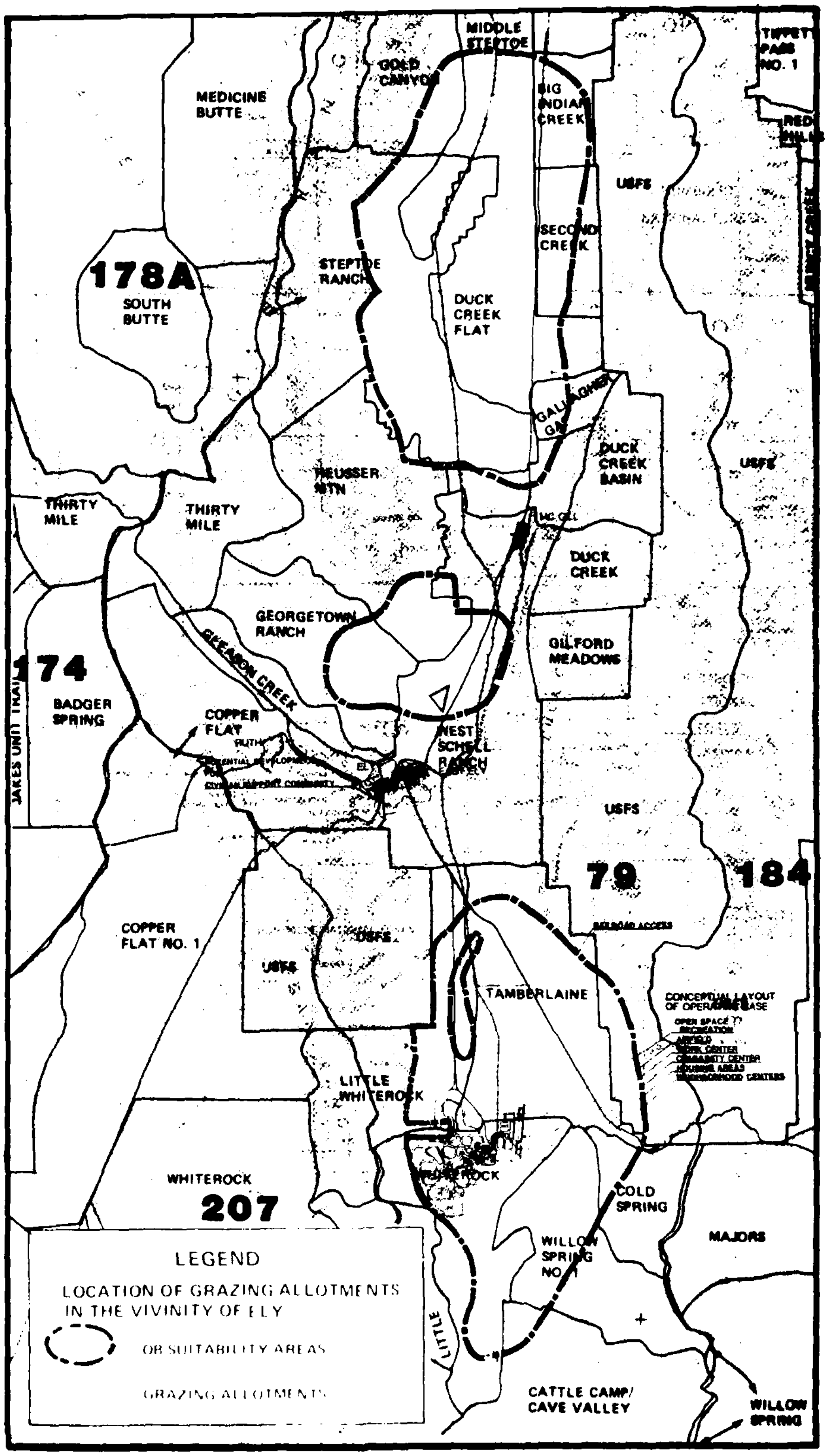

Figure 4.3-6. Managed grazing land (dot pattern) and irrigated (solid green) in the vicinity.

ALTERNATIVE 4 (4.3.5)

The DDA for alternative 4 is identical with the proposed action and the potential impacts are the same (see Section 4.3.1).

Beryl Operating Base (4.3.5.1)

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 4.3.4.1).

Coyote Spring Operating Base (4.3.5.2)

Impacts to grazing in the Coyote Spring hydrologic subunit are the same for this alternative as those discussed for the proposed action (Section 4.3.1.2) with the following exceptions. Grazing losses will be approximately 106 instead of 153 AUMs (Table 4.3-7). There will not be a DTN constructed from the base to the DDA.

ALTERNATIVE 5 (4.3.6)

The DDA for Alternative 5 is identical with the proposed action and the potential impacts are the same (see Section 4.3.1).

Milford Primary Operating Base (4.3.6.1)

The grazing impacts for the Milford first OB are the same as those for the Milford secondary operating base in the proposed action (Section 4.3.1.3) and the following additions. Additional facilities will raise the total grazing loss from vegetation disturbance from 248 to 359 AUMs (Table 4.3-7). Disturbance will also include the construction of DTN from the base to the DDA in Wah Wah Valley.

Ely Operating Base (4.3.6.2)

Impacts to the grazing resource in the Steptoe Valley hydrologic subunit are the same for this alternative as those discussed for Alternative 3 (Section 4.3.4.2).

ALTERNATIVE 6 (4.3.7)

The DDA for Alternative 6 is identical with the proposed action and the potential impacts are the same (See Section).

Milford Operating Base (4.3.7.1)

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 4.3.6.1).

Coyote Spring Operating Base (4.3.7.2)

Impacts to grazing in the Coyote Spring hydrologic subunit resulting from the Coyote Spring operating base are the same for this alternative as those discussed for Alternative 4 (Section 4.3.5.2).

ALTERNATIVE 7 - FULL DEPLOYMENT IN TEXAS/NEW MEXICO (4.3.8.)

The counties in Texas and New Mexico are a complex association of native rangeland, irrigated pasture, and feedlots. Extensive acreages of cropland are also 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 in each country. Based on these assumptions, up to 14,600 animal units or about 0.7 percent of the total present in the affected counties would be lost in this alternative (Table 4.3-8). The animal unit losses in the individual counties vary from 0.08 to 1.64 percent of the total present. Texas has 65 percent of the total animal units in the affected counties vary from 0.08 to 1.64 percent of the total present. Texas has 65 percent of the total animal units in the affected counties and would sustain about 74 percent of the loss. In Nevada and Utah, each AUM 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 loss of animal units in Texas/ New Mexico is over twice the loss of AUMs in the Nevada/Utah area. In economic terms, this difference is larger, equating out to about a 10-times difference in impact between the full basing alternatives.

All of the counties in the high animal unit concentration category are in Texas. (Figure 2.3.3.11.2-3). All but two of the counties in the medium concentration classification are also in Texas. Only one of the counties in the low concentration classification is in Texas. The rest are in New Mexico. This difference is primarily the result of the much higher concentration of stockyards in Texas.

Twenty-six percent of the counties potentially impacted by this alternative are high-ranked counties, which account for 20 percent of the total land area potentially disturbed and 49 percent of the total potential animal loss. Thirty-seven percent of the counties impacted by the DDA are medium ranked counties, which account for 42 percent of the total area disturbed and 33 percent of the animal units potentially lost. The remaining impact will be in counties with a low animal unit concentration ranking. The percentage of the possible animals lost in each county, relative to the total number in each, was highest in the high concentration counties (7,100 animal units, 0.92 percent), intermediate in the medium concentration counties (4,800 animal units, 0.78 percent), and lowest in the low concentration counties (2,700 animal units, 0.48 percent). This differs from the Nevada/ Utah results in that the highest project concentration falls in the highest animal unit concentration counties.

The loss of livestock capacity through the disturbance of rangeland, cropland supporting livestock, and feedlots will be directly proportional to the level of construction activity and will peak at the completion of the project. Recovery will be potentially rapid compared to that expected

Table 4.3-8. Potential direct impact to grazing as a result of M-X DDA construction in Texas/New Mexico for alternative 7.

COUNTY	ANIMAL UNIT CONCENTRATION IN COUNTY[1]	ESTIMATED ANIMAL UNIT LOSS	LOSS AS % OF COUNTY TOTAL ANIMAL UNITS	POTENTIAL IMPACT[1]
Counties with M-X Clusters and DTN				
Bailey, TX	Low	317	0.7	Low
Castro, TX	High	1,210	0.6	High
Cochran, TX	Low	144	0.5	Low
Dallam, TX	Moderate	1,840	2.0	High
Deaf Smith, TX[2]	High	3,723	1.6	High
Hartley, TX[2]	High	1,188	1.1	High
Hockley, TX	Low	5	0.1	Low
Lamb, TX	Low	122	0.3	Low
Oldham, TX	Low	122	0.2	Low
Parmer, TX	High	1,833	1.2	High
Randall, TX	Moderate	221	0.2	Low
Sherman, TX	Moderate	109	0.1	Low
Swisher, TX	High	270	0.2	None
Chaves, NM	High	598	0.4	Moderate
Curry, NM	Moderate	739	0.8	Moderate
DeBaca, NM	Low	34	0.1	Low
Guadalupe, NM	Moderate	5	0.1	Low
Harding, NM	Low	169	0.4	Low
Lea, NM	Moderate	17	0.1	Low
Quay, NM	Moderate	701	0.8	Moderate
Roosevelt, NM[2]	Moderate	1,026	1.1	High
Union, NM	High	454	0.3	Low
Overall DDA Impact		14,847	0.7	Moderate

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[1]
- (open box symbol) No animal unit reductions (No Animal Unit Concentration).
- (box grid symbol) Low Impact. (Low Animal Unit Concentration). Projected animal unit reductions representing less than 1 percent of those in the county or totalling less than 500 animal units.
- (vertical hatch symbol) Moderate Impact. (Moderate Animal Unit Concentration). Projected animal unit reductions representing less than 5 percent of those in the county or totalling 500-1,000 animal units.
- (solid black symbol) High Impact (High Animal Unit Concentration). Projected animal unit reductions representing 5 percent or more of the animal units in the county or totalling more than 1,000 units.

[2]Conceptual location of Area Support Centers (ASCs).

Note: "Animal Units" and "AUM" (animal unit months) are not equivalent; they represent different data sets.

in the Great Basin with time measured in years rather than decades. Because of its inherent value, cropland will probably be renovated relatively rapidly. Some care will be needed to present the invasion of toxic weeds into grazed areas.

The livestock industry is the primary source of economic return in the Texas/New Mexico study area. The impacts resulting from both the direct project disturbance and the restrictions to movement during and immediately following construction could substantially impact selected individuals and livestock operations. The total livestock losses in this region could exceed $1.5 million per year during the peak years of disturbances. The segment of the economy on which these losses will be focused will be significantly impacted. These figures are in addition to any losses accrued from the disturbance of croplands.

Additional disturbance will result from the construction of support roads, construction roads, area support centers, remote surveillance sites, power transmission corridors, or corridors and other disturbances for command, control and communication networks. Site specific location and disturbance date are not yet available. It also does not include losses that may result from construction disturbances.

The impact of the project on livestock production in Texas and New Mexico could be substantially reduced by the avoidance of feedlots. Such avoidance could reduce the losses in some Texas counties by as much as 3/4 and in some New Mexico counties by over 30 percent. The avoidance of cropland that is primarily used to raise feed for livestock could also significantly reduce losses. Avoidance of the most productive areas of rangeland would also help.

Clovis Operating Base (4.3.8.1)

The Clovis operating base is located in Curry county, which has medium animal unit concentration (Figure 4.3-7). The OB site is largely agricultural and contains feedlots containing over 40 percent of the livestock in the county. The livestock losses from the contribution of the operating base would vary from about 470 to 800 or more depending on whether feedlots are impacted. Animal unit losses from the construction of this base will peak with its completion and the loss will remain at that level. Little if any losses will occur from DTN construction because it will be routed along existing county roads. Impacts to livestock from the placement of this base 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 affected operations could be used as a mitigating measure.

Dalhart Operating Base (4.3.8.2)

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 4.3-8). Losses from the placement of this base could be as much as 900 plus animal units, depending on the types of livestock facilities impacted.

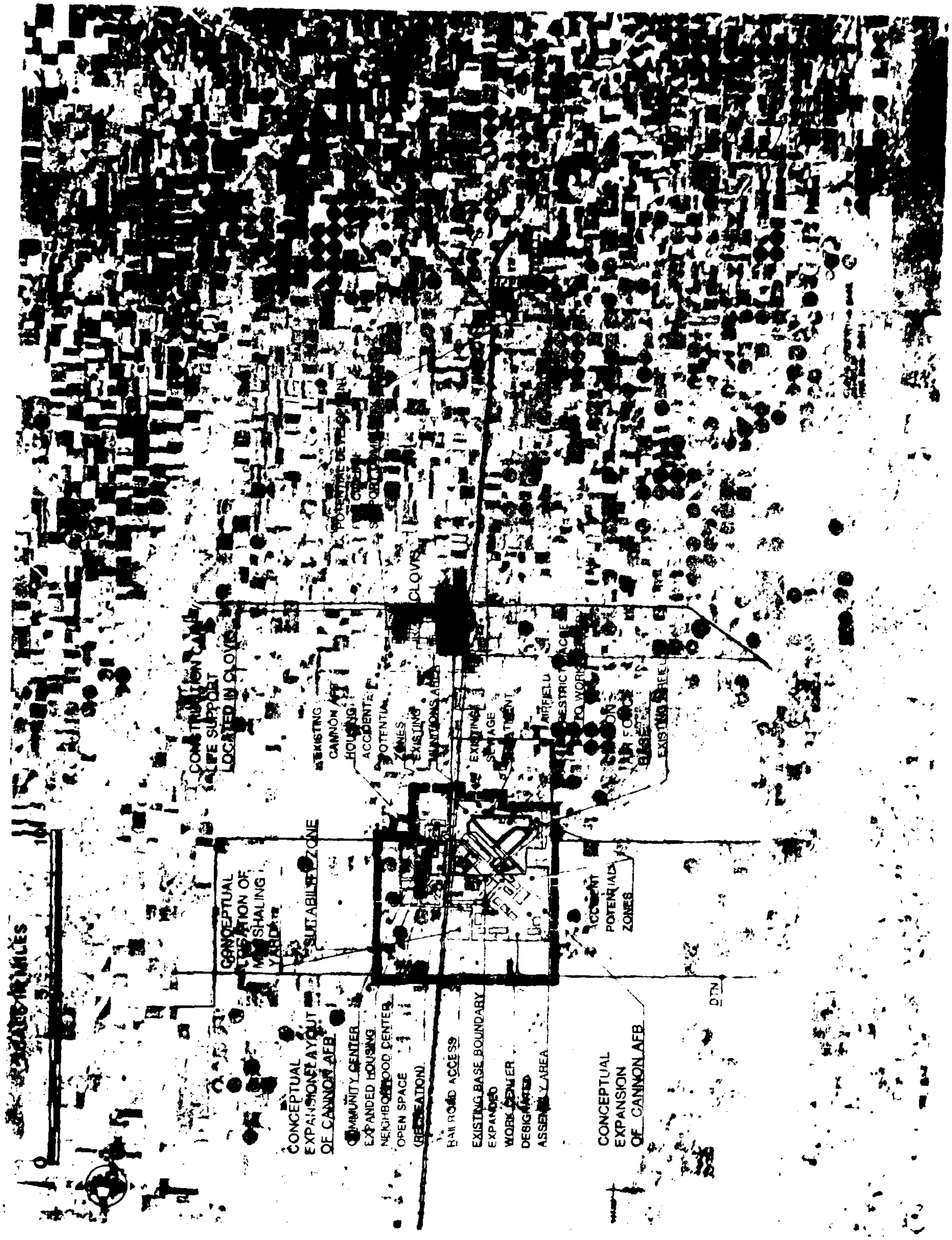

Figure 4.3-7. Clovis OB site.

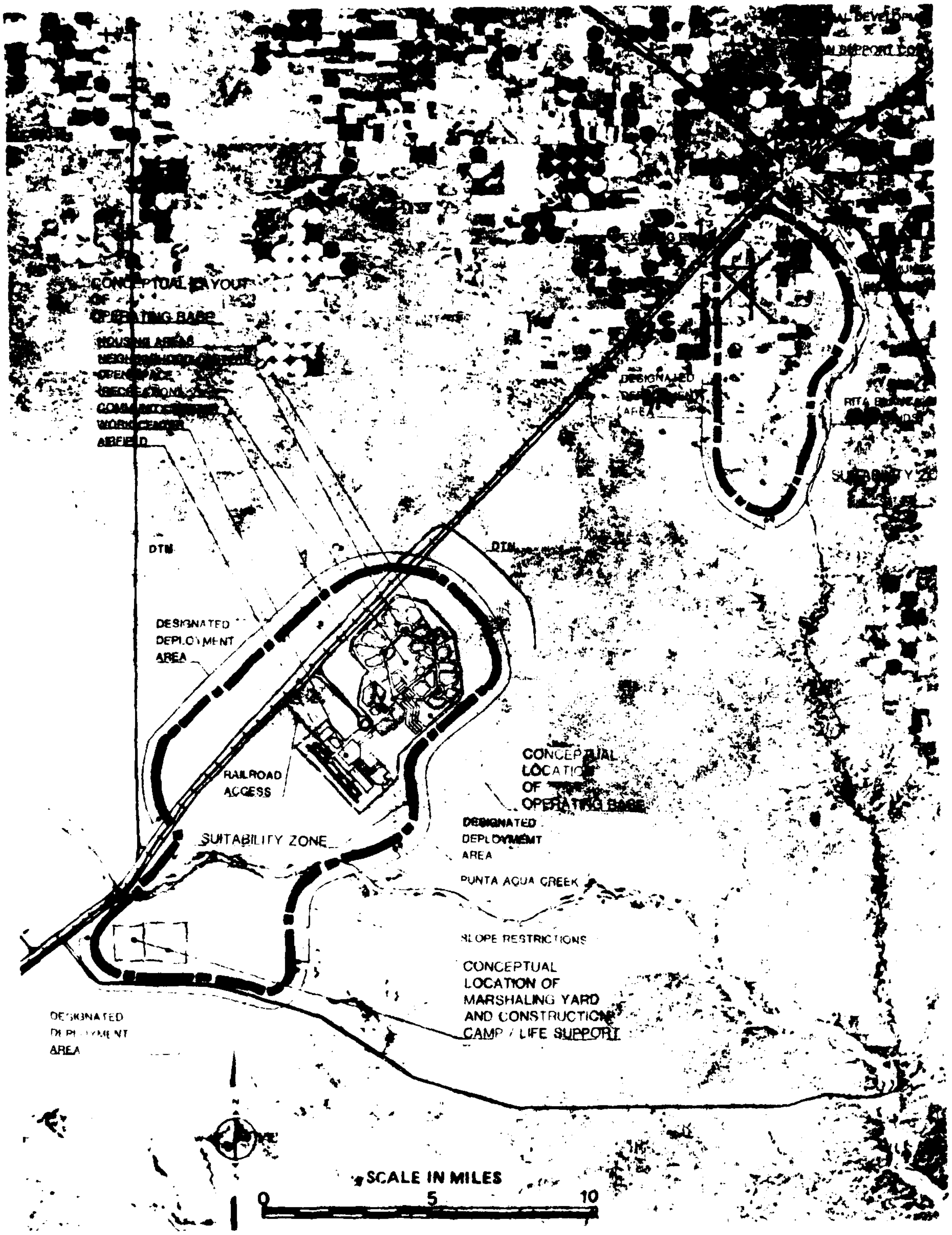

Figure 4.3-8. Dalhart OB site.

Animal unit losses resulting from the construction of this base will peak with its completion and will remain at that level through decomissioning.

Impacts to livestock will be significant for the livestock operations directly impacted. Rangeland improvements in the surrounding area could be used to mitigate some of the livestock losses. Compensation is also a mitigation that could be used.

ALTERNATIVE 8 (4.3.9)

Nevada/Utah DDA (4.3.9.1)

The split basing deployment area in Nevada/Utah is illustrated in Figure 4.3-9.

Potential Effects (4.3.9.1.1)

The approximate loss of animal unit months (AUMs) in the DDA, assuming that the project facilities of DTN, cluster roads and shelters for split basing will impact the various vegetation and range types in the hydrologic subunits in proportion to their occurrence, will be about 3,650 AUMs or 0.55 percent of the total in all the affected subunits. Fifty-three percent of the loss would be in Nevada and 42 percent in Utah. The estimated AUM losses in the individual hydrologic subunits of this alternative ranges from 0.02 percent to 1.29 percent. Other indirect losses are also possible.

Twenty-three percent of the DDA impacted hydrologic subunits have a high AUM concentration (Table 4.3-9). Twenty-two percent of the land area disturbed and 29 percent of the AUM loss would occur in these high-ranked subunits. This is a 50 percent reduction compared to the proposed action (Section 4.3.1). Hydrologic subunits with intermediate AUM concentration account for 41 percent of the impacted subunits, 50 percent of the area disturbed and 51 percent of the total AUM loss. This is a 25 percent reduction when compared to the proposed action (Section 4.3.1). The remaining impacted hydrologic subunits with a low ranking of AUM concentration have 28 percent of the area disturbed, 20 percent of the AUM loss, and a 47 percent reduction compared to the proposed action (Section 4.3.1). As with the proposed action, the valleys with intermediate AUM concentration receive the highest density of deployment area facilities. This is reflected in the percentage of the total AUMs lost, relative to the total in each subunit, which were the highest in the intermediate-concentration hydrologic subunits (1,850 AUMs, 0.41 percent), and intermediate in the low-concentration (750 AUMs, 0.49 percent). The split basing alternative removes the project from more high and low than from intermediate AUM concentration valleys.

Additional disturbance would result from the construction of support roads, construction roads, area support centers, remote surveillance sites, power transmission corridors, or corridors and other disturbance areas for command, control and communications networks. Site specific disturbance data for these facilities are not yet available. It also does not include losses that may result from construction disturbances.

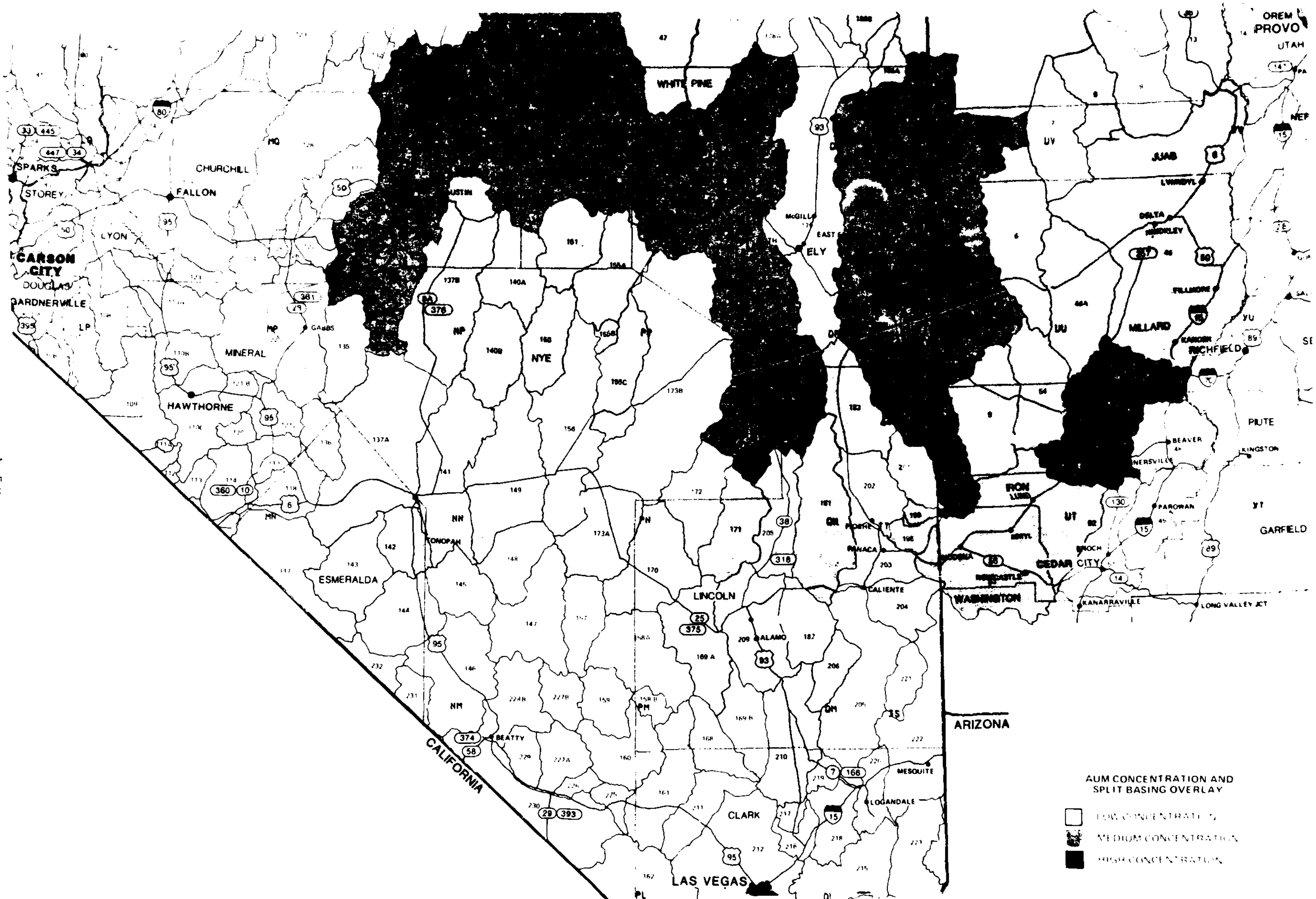

Figure 4.3-9. AUM concentration in study area hydrologic subunits.

Table 4.3-9. Potential direct impact to grazing as a result of DDA construction in Nevada/Utah and Texas/New Mexico for alternative 8 (split basing).

HYDROLOGIC SUBUNIT NO.	NAME	AUM CONCENTRATION IN THE AREA[1]	SHORT-TERM AND LONG-TERM EFFECTS: ESTIMATED AUM LOSS	LOSS AS % OF TOTAL AUMS IN AREA	POTENTIAL IMPACT[1]
	Subunits or Counties with M-X Clusters and DTNs				
4	Snake[2]		274	0.3	
5	Pine		225	0.9	
6	White		215	0.8	
7	Fish Springs		3	0.1	
46	Sevier Desert		160	0.5	
46A	Sevier Desert & Dry Lake[4]		186	0.2	
54	Wah Wah		277	0.3	
155C	Little Smoky—Southern		69	0.4	
156	Hot Creek		180	0.6	
170	Penoyer		108	1.1	
171	Coal[2]		179	1.2	
172	Garden		128	1.5	
173A	Railroad—Southern		131	1.0	
173B	Railroad—Northern		78	0.2	
180	Cave		140	1.0	
181	Dry Lake[4]		397	1.3	
182	Delamar		82	0.8	
183	Lake		142	0.9	
184	Spring		128	0.2	
196	Hamlin		250	0.9	
202	Patterson		20	0.2	
207	White River		250	0.5	
	COUNTY	ANIMAL UNIT[3] CONCENTRATION[2]	ESTIMATED ANIMAL UNIT LOSS	LOSS AS % OF TOTAL ANIMAL UNIT IN AREA	POTENTIAL IMPACT[2]
	Bailey, TX		14	0.1	
	Cochran, TX		126	0.4	
	Dallam, TX		510	0.6	
	Deaf Smith, TX		1,460	0.6	
	Hartley, TX[4]		967	0.9	
	Hockley, TX		5	0.1	
	Lamb, TX		11	0.1	
	Oldham, TX		74	0.1	
	Parmer, TX		10	0.1	
	Chaves, NM		598	0.4	
	Curry, NM		318	0.4	
	DeBaca, NM		29	0.1	
	Guadalupe, NM		5	0.1	
	Harding, NM		169	0.4	
	Lea, NM		17	0.1	
	Quay, NM[2]		525	0.6	
	Roosevelt, NM[2,4]		393	0.4	
	Union, NM		370	0.2	
Other Affected Subunits					
208	Pahroc		11	0.1	
210	Coyote Spring		208	3.43	
	Overall Impact				

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[1]AUM[3] RELATED IMPACTS FOR NEVADA/UTAH

No AUM reduction (no AUM concentration).

Low - moderately low impact (low AUM concentration). Projected AUM reductions representing less than 1 percent of AUMs in the hydrologic subunit or totalling less than 200 AUMS.

Moderate - moderately high impact (moderate AUM concentration). Projected AUM reductions representing 1-5 percent of AUMs in the hydrologic subunit or totalling 200-500 AUMs.

High impact (high AUM concentration). Projected AUM reductions representing 5 percent or more of those in the hydrologic subunit or totalling 500 or more AUMs.

[2]ANIMAL UNIT[3] IMPACTS FOR TEXAS/NEW MEXICO

No animal unit reductions (no animal unit concentration).

Low - moderately low impact (low animal unit concentration). Projected animal unit reductions representing less than 1 percent of those in the county or totalling less than 500 animal units.

Moderate - moderately high impact (moderate animal unit concentration). Projected animal unit reductions representing less than 5 percent of those in the county or totalling 500-1,000 animal units.

High impact (high animal unit concentration). Projected animal unit reductions representing 5 percent or more of the animal units in the county or totalling more than 1,000 animal units.

[3]NOTE "ANIMAL UNITS" AND "ANIMAL UNIT MONTHS" ARE NOT EQUIVALENT; THEY REPRESENT DIFFERENT DATA SETS.
[4]CONCEPTUAL LOCATION OF AREA SUPPORT CENTERS (ASCs).

The mitigative measures discussed in the proposed actions (Section 4.3.1) equally apply here.

Coyote Operation Base (4.3.9.2)

The Coyote Springs operating base for the split basing alternative is identical to that discussed in the proposed action (Section 4.3.1.2).

Texas/New Mexico DDA (4.3.9.3)

The split basing deployment in Texas/New Mexico is illustrated in Figure 4.3-10. The general discussions of the Texas/New Mexico area found in Alternative 7 (Section 4.3.8) also apply here.

All but one of the counties in the high animal unit concentration category in Texas were eliminated from this alternative. All the counties in the intermediate and low concentration classifications in Alternative 7 are also included in this Alternative. The counties are no longer impacted because project size reductions have come entirely from high animal unit concentration counties in Texas.

This reduced animal-unit losses in Texas by 71 percent and losses in New Mexico 35 percent compared to Alternative 7 (Section 4.3.8).

Only seven percent of the counties potentially impacted by this alternative are high-ranked counties. This is a reduction of 80 percent compared to Alternative 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 the 34 percent of the total area disturbed and 41 percent of the animal units potentially lost. The remainder 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 animals lost in each county, relative to the total number in each, was highest in the high concentration counties (1,500 animal units, 0.64 percent) intermediate in the intermediate concentration counties (2,300 animal units, 0.37 percent) and lowest in the low concentration counties (1,900 animal units, 0.33 percent). This differs from the the results for the individual Nevada and Utah subunits where the highest project concentration falls in the subunits with a medium AUM concentration.

Additional animal unit losses will occur from direct disturbances resulting from the construction of support roads, construction roads, area support centers, remote surveillance sites, power transmission corridors, or corridors and other disturbances for command, control and communication networks. Site specific disturbance data for these facilities are not yet available. It also does not include losses that may be due to construction disturbances.

Clovis Operating Base (4.3.9.4)

This discussion of the operating base is covered in Alternative 7 (Section 4.3.8.1).

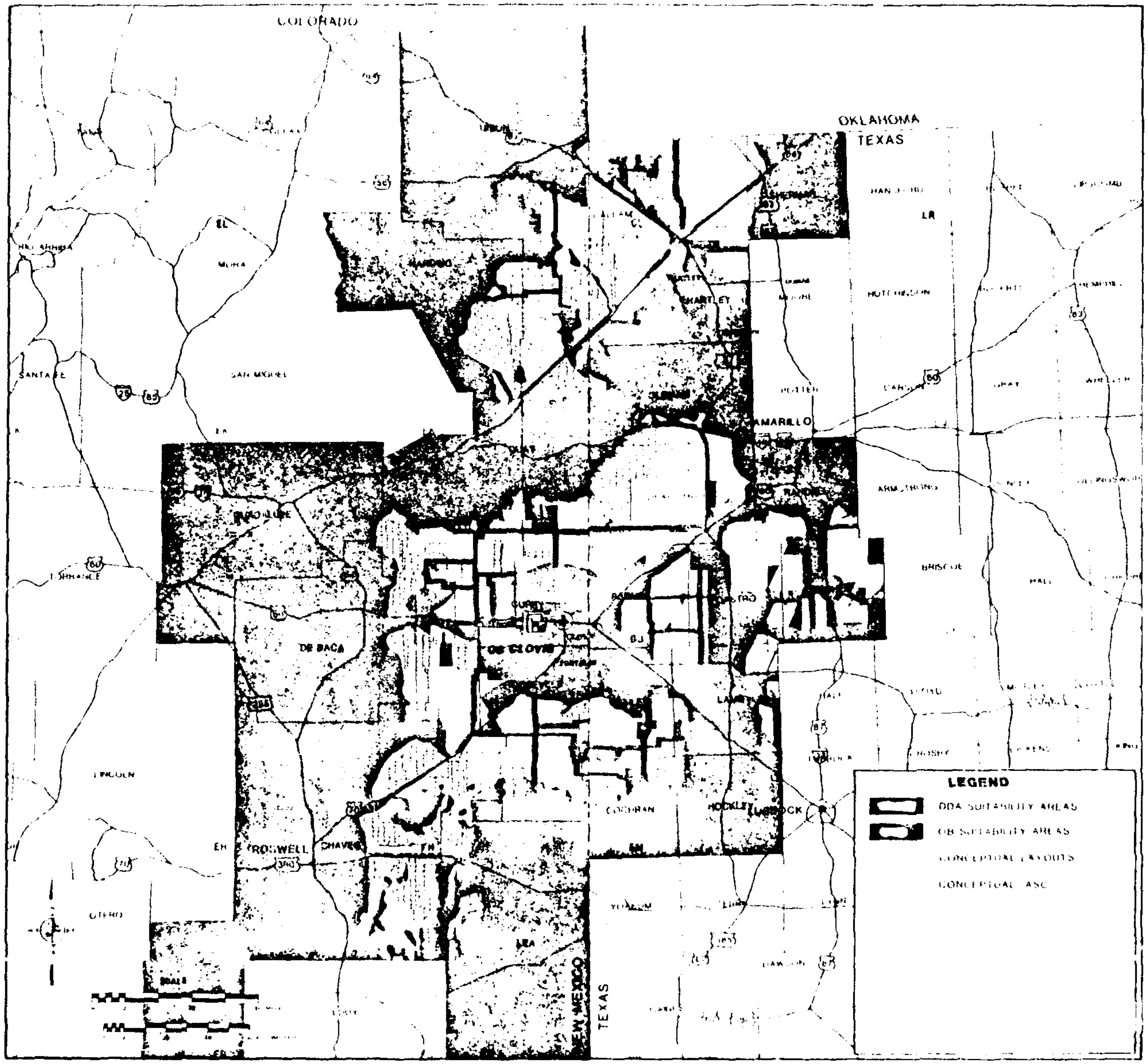

Figure 4.3-10. Animal unit concentration and split basing layout.

4.4 SIGNIFICANCE ANALYSIS

Nevada/Utah Region (4.4.1)

The impacts discussed are based on the direct effects of the major project facilities of DTN, cluster roads and shelters. There will also be other direct and indirect impacts not specifically covered. For significance analysis purposes the overall impact was assumed to be proportional to the direct impacts actually quantified. The potential for indirect, and therefore for total, impacts was also assumed to be related to the amount of a hydrologic subunit, and associated allotments, over which project facilities are dispersed.

Because of the nature of the project layout, the loss of approximately one percent of the area in an average hydrologic subunit means that project facilities have the potential for being dispersed over all of at least one allotment, if not several. At a five percent loss of area the project facilities are dispersed over the entire valley floor of a subunit. This five percent figure therefore estimates maximum impact and the highest potential for significance of impact. At values between one and five percent the potential exists for project facilities to fully occupy one to several allotments and was rated as having a moderate potential for significant impacts. At project levels affecting less than one percent of a hydrologic subunit the potential exists for no allotment to be fully occupied and was rated as having a low potential for significant impacts.

The hydrologic subunits impacted vary considerably in size and the percentage figures discussed can under estimate impacts in the largest of them. The total number of AUMs was also included in assessing the potential for significant impacts to address this possibility. At a loss of 200 AUMs the potential again exists for project facilities to be dispersed over all of at least one allotment in a hydrologic subunit. At over 500 AUMs, project facilities will be dispersed over all of the valley floor of most of the potentially impacted hydrologic subunits and represent a high potential for significant impacts. Losses from direct impacts from the major project facilities was assumed to represent a moderate potential for significant impact and losses of less than 200 AUMs a low potential for significant impact. Overall impacts represent an average of the significance ratings of the individual hydrologic subunits.

Texas/New Mexico Region (4.4.2)

The basic procedures described above for Nevada/Utah were repeated for Texas/New Mexico. One percent and five percent boundary values were also used for Texas/New Mexico to maintain consistency in the significance analyses. Because of the larger livestock population and potential for larger herd sizes, a loss of 500 animal units was assumed to represent an approximate boundary between low and medium potential for the significance of impact. Losses above 1000 animal units were assumed to represent the highest potential for significant impacts. Overall impact represents an average of the significance ratings of the individual counties.

5.0 RECREATION

5.1 INTRODUCTION

Recreation represents an important activity for the residents of the Proposed Deployment area as well as for out-of-state visitors who come to these states to take advantage of the many recreational resources available.

Geist (1978) contends that recreation in natural settings akin to those offered in the deployment areas is vital to "increasing the individuals physical, intellectual and social competence which in turn maximizes health, develops a sense of mastery, and increases life span". Data indicate that recreation is an integral part of a life style which maximizes health. The importance of providing recreational opportunities as perceived by federal, state, local, and other entities, can best be summed up by paraphrasing the major goal of the Utah State Division of Parks and Recreation:

> To provide a broad spectrum of quality outdoor park and recreational opportunities and facilities so that existing and future generations, both resident and nonresident, may enjoy their choice of new and traditional outdoor experiences.

Consideration of all recreation activities in Nevada and Utah would send the accumulated activity occasions into the billions or at least a sufficient investment of time and money to make recreation an important issue.

For example $73,000,000 would be required from Nevada state funds by 1981 to meet the full range of the state's outdoor recreation needs, $41,500,000 of which would be used for urban development of urban parks and active recreation segments. (Nevada State Park System, 1977). In Utah, over $269 million has been spent by federal, state, and local governments between 1971 and 1976 on recreation-related problems.

Both Utah and Nevada receive a heavy influx of out-of-state recreators. A Nevada survey of non-resident motorists revealed that 1.1 million parties of motorists, all of whom participated in some form of outdoor recreation, passed through the state in the summer of 1975.

New Mexico attracts more than 22 million out-of-state visitors each year who spend an estimated $483 million. The New Mexico tourist and travel industry is the state's largest private employer (New Mexico Planning Office, 1976).

NEVADA/UTAH REGION (5.1.1)

Ownership/Administration: In general, responsibility for providing recreational resources is distributed among federal, state, local, and private concerns (Table 5.1.1-1). In the Nevada/Utah study area most of the developed recreational areas and campgrounds are administered primarily by the Bureau of Land Management, U.S. Forest Service, National Park Service, Nevada State Park System, and the Utah Division of Parks and

Table 5.1.1-1. Agencies managing and/or owning major recreational resources in the Nevada/Utah study area.

TYPE	AGENCY
Federal	Bureau of Land Management
	U.S. Forest Service
	National Park Service
	U.S. Fish and Wildlife Service
	U.S. Water and Power Resources Service
	Corps of Engineers
	U.S. Bureau of Indian Affairs
State	Nevada State Park System
	Nevada Department of Highways
	Nevada Department of Wildlife
	Utah Division of Parks and Recreation
	Utah Division of Wildlife Resources
	Utah Division of Forestry and Fire Control
Other	Various county and other local governments
	Private enterprises

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Sources: Nevada State Park System, 1977; Utah Department of Outdoor Recreation, 1978.

Recreation. Tables 5.1.1-2 and 5.1.1-3 indicate the proportion of developed recreational alnd in Nevada and Utah, respectively, attributable to each managing group of agencies (federal, state, etc.) as reported in the states' Statewide Comprehensive Outdoor Recreation Plan (SCORP). Several cited acreages appear noticeably disproportionate when compared to others in the same managing category for other counties. This may be a result of variation in the data collection methodology which depends on responses to questionnaires sent to individual agencies. The notable examples of questionable acreage totals in Tables 5.1.1-2 and 5.1.1-3 are White Pine, Elko, and Churchill counties in Nevada and Juab County in Utah. Thus, the accuracy of these figures may be in question

In the Nevada portion of the study region the federal government provides nearly 781,000 acres or 72.0 percent of developed recreational lands. State-managed developed recreational lands total approximately 101,000 acres (9.0 percent). Noticeable in Nevada is the large amount of state-developed recreation areas in Clark County, nearly 65,000 acres. While other counties in the state do have higher proportions of state-managed developed acreage than other managing entities, their significance in terms of location and use are much less due to a much smaller proximal user population.

In Utah, the state provides the largest share of developed recreational areas within study area counties. This amounts to nearly 61.0 percent (205,000+ acres). Federally developed lands equal approximately 101,000 acres (30.0 percent). It is apparent that as population increases, the proportion of more localized provision of developed recreational areas correspondingly increases. This hold true for both Nevada and Utah.

Campgrounds and Major Outdoor Recreational Facilities (5.1.1.1)

There are many campgrounds and major recreational facilities in and around the Nevada/Utah study area. In Nevada, these are concentrated primarily in Clark, Lincoln, and White Pince counties; in Utah major recreational areas are located on both sides of Interstate 15.

In the Nevada study area, Clark County contains twenty-four major outdoor recreational facilities, White Pine contains fourteen, and Lincoln County has six. Although Elko County has more than 10 major recreational areas, most of them are distant from the study area. Table 5.1.1-4 and Figure 5.1.1-1 show the distribution of these facilities and campgrounds for all Nevada counties by managing or operating agency.

Federal, state, and local parks and campgrounds offer a wide variety of activities and vary in their degree of development. The degree of development is generally guided by visitor demand, resource availability, and limiting physical factors. Thus, development ranges from relatively little, which implies a rather primitive area, to extensive, where a wide range of amenities such as bathrooms, drinking water, tables, barbecue pits, and the like are available. An example of an undeveloped state park is Cave Lake State Park, off U.S. 93, about 14 mi (22 km) southeast of Ely in White Pine County. Limited factilities are available, and primitive camping is allowed. By contrast, Valley of Fire

Table 5.1.1-2. Outdoor recreation facility inventory - acres of land facilities, Nevada, 1976 (acres).

COUNTY	FEDERAL[2]	PER-CENT	STATE	PER-CENT	COUNTIES	PER-CENT	COMMUNITIES	PER-CENT	PRIVATE	PER-CENT	SCHOOLS	PER-CENT	TOTAL
Churchill	141,579	89.7	4,899	3.1	71	0.0	15	0.0	11,304	7.2	—	—	157,868
Clark	62,192	47.4	64,534	49.2	617	0.5	1,616	1.2	1,934	1.5	257	0.2	131,150
Elko	159,814	90.1	--	—	245	0.1	257	0.1	15,743	8.9	—	—	176,059
Esmeralda	—	—	15	2.9	—	—	—	—	500	97.1	—	—	515
Eureka	—	—	—	—	1	0.0	31	4.4	667	95.4	—	—	699
Humboldt	6	2.7	46	20.9	17	7.7	125	56.8	26	11.8	—	—	220
Lander	66	17.1	296	76.5	--	—	1	0.3	24	6.2	—	—	387
Lincoln	7,341	50.4	5,366	36.8	7	0.0	13	0.0	1,852	12.7	—	—	14,576
Mineral	3,089	99.5	1	0.0	7	0.2	—	—	7	0.2	—	—	3,104
Nye	56	0.2	29,175	99.6	—	—	17	0.0	52	0.2	—	—	29,300
Pershing	—	—	16,712	88.1	--	—	1	0.0	2,252	11.9	—	—	18,965
White Pine	551,922	99.6	1,828	0.3	62	0.0	67	0.0	98	0.0	—	—	553,997
Region	926,065	85.2	122,871	11.3	1,027	0.1	2,143	0.2	34,459	3.2	257	<.1	1,086,822

[1]These data were collected via a mailed questionnaire, variations in the figures may be due to a variation in the response by the agencies.

[2]Bureau of Indian Affairs recreational acreage included.

Source: Nevada State Park System, 1977.

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Table 5.1.1-3. Outdoor recreation facility inventory - acres of land facilities, Utah, 1976 (acres).

COUNTY	FEDERAL[2]	PER-CENT	STATE	PER-CENT	COUNTIES	PER-CENT	COMMUNITIES	PER-CENT	PRIVATE	PER-CENT	SCHOOLS	PER-CENT	TOTAL
Beaver	2,716	74.8	230	6.3	15	0.4	282	7.8	354	9.7	35	1.0	3,632
Iron	1,588	57.7	123	4.5	24	0.9	138	5.0	790	28.7	89	3.2	2,752
Juab	78,982	99.7	40	<0.1	8	<0.1	124	0.2	14	<0.1	33	<0.1	7,920
Millard	875	12.5	5,711	81.7	85	1.2	97	1.4	147	2.1	73	1.0	6,988
Paiute	483	29.0	120	7.2	—	—	40	2.4	1,007	60.4	18	1.1	1,668
Salt Lake	689	5.5	2,387	19.0	1,507	12.0	1,495	11.9	4,674	37.2	1,804	14.4	12,556
Sanpete	660	22.0	98	3.3	61	2.0	64	2.1	1,716	57.1	405	13.5	3,004
Sevier	1,307	65.9	—	—	20	1.0	117	5.9	495	25.0	44	2.2	1,983
Tooele	2,303	1.2	192,361	98.3	35	0.02	99	0.05	794	0.4	158	0.8	195,750
Utah	1,559	16.1	186	1.9	—	—	1,485	15.3	5,866	60.5	601	6.2	9,697
Washington	14,829	67.8	6,407	29.3	—	—	139	0.6	409	1.9	78	0.4	21,862
Region	105,991	31.3	207,663	61.2	1,755	0.5	4,080	1.2	16,266	4.8	3,338	1.0	339,093

[1] These data were collected via a mailed questionnaire, variations in the figures may be due to a variation in the response by the agencies.

[2] Bureau of Indian Affairs recreational acreage included.

Source: Institute for the Study of Outdoor Recreation and Tourism, 1976.

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Table 5.1.1-4. Campgrounds and major recreational areas in selected Nevada counties, 1977. (Page 1 of 2).

COUNTY	ADMINISTERING AGENCY	AREA/PARK NAME
Humboldt	U.S. Forest Service	Lye Creek
Elko	U.S. Forest Service	Jack Creek Wild Horse Crossing Big Bend Pine Creek Jarbidge Angel Lake Angel Creek Thomas Canyon
	Bureau of Land Management	North Wildhorse Recreation Area Ruby Marsh
	Local	Sheep Creek Reservoir
Pershing	Nevada State Parks	Rye Patch Reservoir
Churchill	Nevada State Parks	Lahontan Reservoir
Lander	U.S. Forest Service	Big Creek Bob Scott
	Bureau of Land Management	Hickison Petroglyph Site
Eureka (no major recreational areas or campgrounds)		
White Pine	U. S. Forest Service	East Creek Bird Creek Timber Creek Berry Creek Cleve Creek Ward Mountain White River Lehman Creek Baker Creek Wheeler Peak Snake Creek
	Nevada State Parks	Cave Lake Ward Charcoal Ovens
	National Park Service	Lehman Caves National Monument
Mineral	Bureau of Land Management	Tamarack Point Sportman's Beach
	U.S. Forest Service	Alum Creek

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Table 5.1.1-4. Campgrounds and major recreational areas in selected Nevada counties, 1977. (Page 2 of 2).

COUNTY	ADMINISTERING AGENCY	AREA/PARK NAME
Esmeralda (no major recreational areas or campgrounds)		
Nye	Nevada State Parks	Berlin-Icthyosaur
	U.S. Forest Service	Peavine Creek Kingston Pine Creek Currant Creek Cherry Creek
	National Park Service	Death Valley National Monument
Lincoln	Nevada State Parks	Spring Valley Echo Canyon Reservoir Cathedral Gorge Kershaw Ryan Beaver Dam
	Bureau of Land Management	Meadow Valley Campground
Clark	U.S. Forest Service	McWilliams Deer Creek Mahogany Grove Hilltop Dolomite Camp Cathedral Rock Fletcher View Kyle Canyon Foxtail Old Mill
	Bureau of Land Management	Willow Creek Cold Creek Red Rock Canyon Recreational Land
	Nevada State Parks	Red Rock Canyon Valley of Fire
	National Park Service	Las Vegas Wash Boulder Beach Callville Bay Echo Bay Overton Beach Sunset Park Sportmen's Park Tule Springs

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Source: Nevada State Park System, 1977.

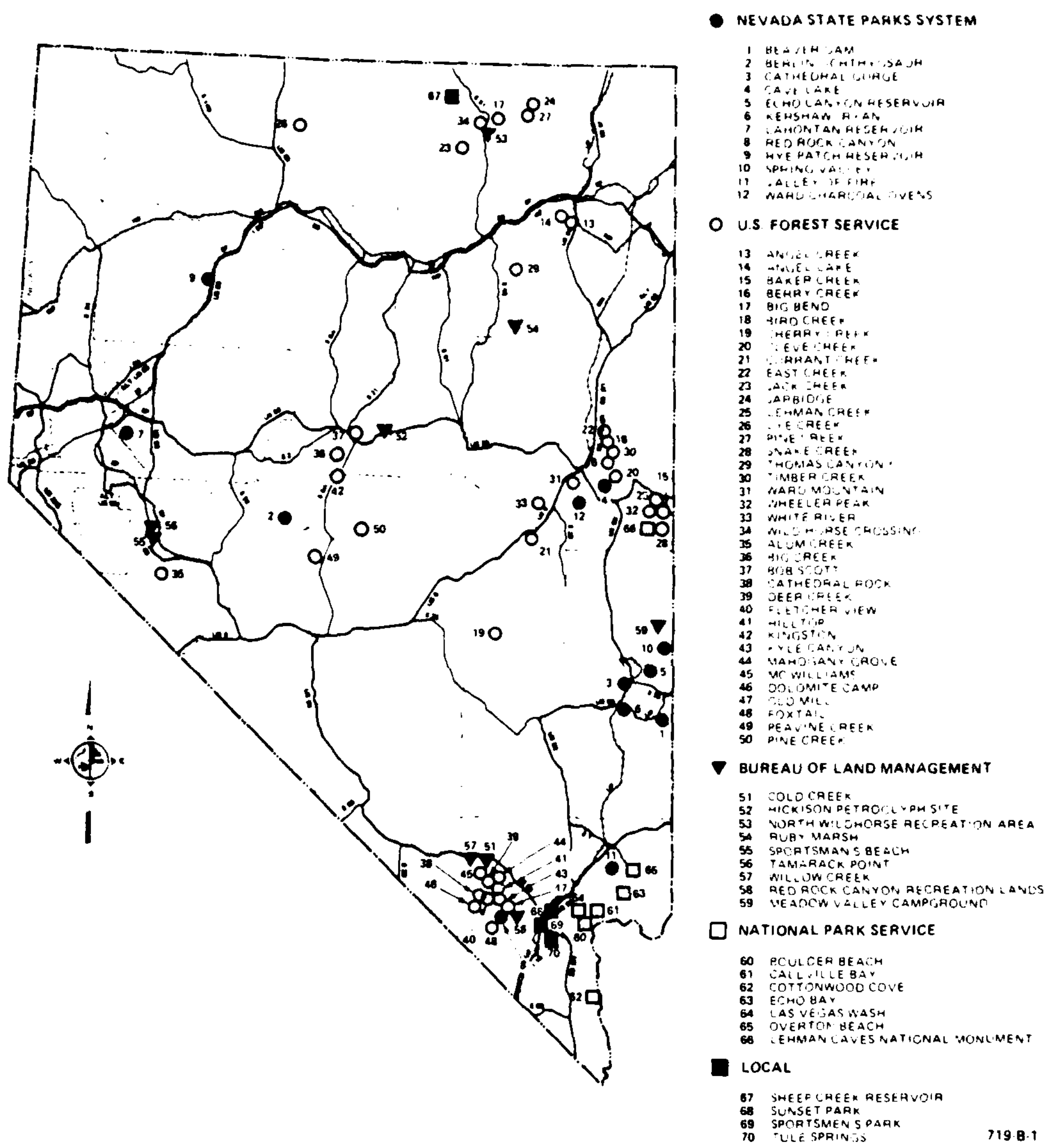

Figure 5.1.1-1. Major outdoor recreation facilities in Nevada.

State Park in northeastern Clark County contains a visitor center, has drinking water, and privides 50 camping units.

In the Utah study area, Tooele, Juab, Millard, Beaver, and Iron counties all contain portions of National Forest Service lands on which there are many campgrounds and picnic areas. The forest involved are Wasatch N.F. in Tooele County, Fishlake N.F. in Millard and Beaver counties, Uinta N.F. in Juab County, and Dixie National Forest in Iron County. Table 5.1.1-5 and Figure 5.1.1-2 present an inventory of major recreational areas and campgrounds in Utah counties by managing or operating entity.

Water-Based Recreation (5.1.1.2)

Water based recreation is important in the Nevada/Utah study area. This is shown by high participation rates for residents in both states. Resident participation surveys conducted since 1975 indicate that swimming, boating, fishing, and waterskiing, the four major water-oriented recreational activities, rank among the top 20 recreational pursuits in each state. Swimming and fishing rank especially high. Other recreational activities such as picnicking are enhanced by the availability of water nearby.

Table 5.1.1-6 indicates the surface acreage of existing lakes in Nevada and Utah. As indicated, lakes near the potential deployment areas (less than 60 mi (95 km)) comprise more than 1 million surface acres. However, more than 90 percent of those are attributable to the presence of the Great Salt Lake. Without the Great Salt Lake, approximately 113,000 surface acres of water-based recreation areas on lakes are available in western Utah.

Tables 5.1.1-7 and 5.1.1-8 indicate important fishing streams in Nevada and Utah, respectively. It is important to note that in many instances, only portions of these streams support fishing. Because of access problems and fluctuations in fishing resources, these tables serve as best approximations of high quality fishing areas (see Fishing, later in this section).

Off-Road Vehicle (ORV) Recreation (5.1.1.3)

In addition to lands that have been provided by various agencies specifically for the purpose of recreation, many other areas, mainly in the public domain, are also utilized. These are generally referred to as dispersed recreational activity areas which are characteristically undeveloped, yet possess appropriate and/or desired characteristics for a variety of recreational uses. Nearly all of these areas are under the jurisdiction of the Bureau of Land Management in both Nevada and Utah.

Activities of a dispersed nature are primarily hunting, fishing, camping, collecting, sightseeing, and others, nearly all of which are associated with off-road vehicle (ORV) use. Virtually all areas accessible or conductive to ORV enthusisiasts or hunters, are utilized unless permission to do so is restricted. Table 5.1.1-9 indicates many of the high quality ORV lands as determined by the Bureau of Land Management within the Nevada/Utah study area.

Table 5.1.1-5. Campgrounds and major recreational areas in selected Utah counties. (Page 1 of 4).

COUNTY	MANAGING AGENCY	AREA/PARK NAME
Beaver	Utah Division of Parks and Recreation	Minersville Lake
	U.S. Forest Service	Anderson Meadow Kents Lake Little Reservoir Ponderosa Little Cottonwood Mahogany Cove
Iron	Utah Division of Parks and Recreation	Iron Mission
	U.S. Forest Service	Vermillion Castle Cedar Canyon
	National Park Service	Cedar Breaks National Monument
Juab	Utah Division of Parks and Recreation	Yuba Lake
	U.S. Forest Service	Bear Canyon Cottonwood Ponderosa
	Bureau of Land Management	Little Sahara Complex: Oasis Jericho
Millard	Utah Division of Parks and Recreation	Territorial Statehouse
	U.S. Forest Service	Adelaide Meadow Creek Shell Oil Site Copley Cove Shingle Mill Buckskin Charley Pistol Rock Maple Hollow Maple Grove Plantation Flat Oak Creek

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Table 5.1.1-5. Campgrounds and major recreational areas in selected Utah counties. (Page 2 of 4).

COUNTY	MANAGING AGENCY	AREA/PARK NAME
Paiute	Utah Division of Parks and Recreation	Paiute Lake
	U.S. Forest Service	City Creek
Salt Lake	Utah Division of Parks and Recreation	Great Salt Lake Salt Air Beach Pioneer Trail
	U.S. Forest Service	Box Elder Terraces Maple Grove Evergreen Maple Cove Fir Crest Clover Springs Big Water Oak Ridge Dogwood Ledgemere The Birches Storm Mountain Mill B South Fork Moss Ledge Jordan Pines The Spruces Redman Brighton Tanners Flat Albion Basin Alta Ski Area Snowbird Ski Area Brighton Ski Area Solitude Ski Area
Sanpete	Utah Division of Parks and Recreation	Palisade Lake
	U.S. Forest Service	Gooseberry Spring City Lake Hill Manti Community Pinchot Twelve Mile Ferron Reservoir Willow Lake

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Table 5.1.1-5. Campgrounds and major recreational areas in selected Utah counties. (Page 3 of 4).

COUNTY	MANAGING AGENCY	AREA/PARK NAME
Sevier	National Park Service	Capital Reef National Park (partial)
	U.S. Forest Service	Castle Rock Monrovian Park Bowery Mackinaw Twin Creek Frying Pan Johnson Boat Ramp Gooseberry
Tooele	Utah Division of Parks and Recreation	Danger Cave
	U.S. Forest Service	Cottonwood Intake Boy Scout Lower Narrows Upper Narrows Loop Little Valley
	Bureau of Land Management	Simpson's Spring
Utah	Utah Division of Parks and Recreation	Camp Floyd Deer Creek Lake Utah Lake
	U.S. Forest Service	Hawthorne Whiting Kellys Grove Cherry Picnic Area Birch Sulphur Kolof Lone Fir Dry Canyon Balsam Rock Canyon Hope Theater-in-the-Pines Mt. Timpanogos Timpooneke Altamont Hanging Rock

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Table 5.1.1-5. **Campgrounds and major recreational areas in selected Utah counties.** (Page 4 of 4).

COUNTY	MANAGING AGENCY	AREA/PARK NAME
Utah (Cont.)	U.S. Forest Service (Cont.	Little Mill Roadhouse Gray Cliff North Mill Echo House Rock Riverside Martin Warnick Mile Rock Granite Flat Maple Bench Payson Trumboldt Picnic Area
	National Park Service	Timpanogos Cave National Monument
Washington	Utah Division of Parks and Recreation	Gunlock Lake Snow Canyon
	U.S. Forest Service	Pine Park Enterprise Reservoir Pine Valley
	National Park Service	Zion National Park
	Bureau of Land Management	Red Cliffs

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Sources: U.S. Dept. of Agriculture, U.S. Forest Service, 1968, 1974, 1969, 1968a, 1962, 1968b, 1969a, 1966, 1969b.

Bureau of Land Management, 1977

University of Utah, Bureau of Economic and Business Research, 1978

Nevada State Park System, 1977

Utah Outdoor Recreation Agency, 1978

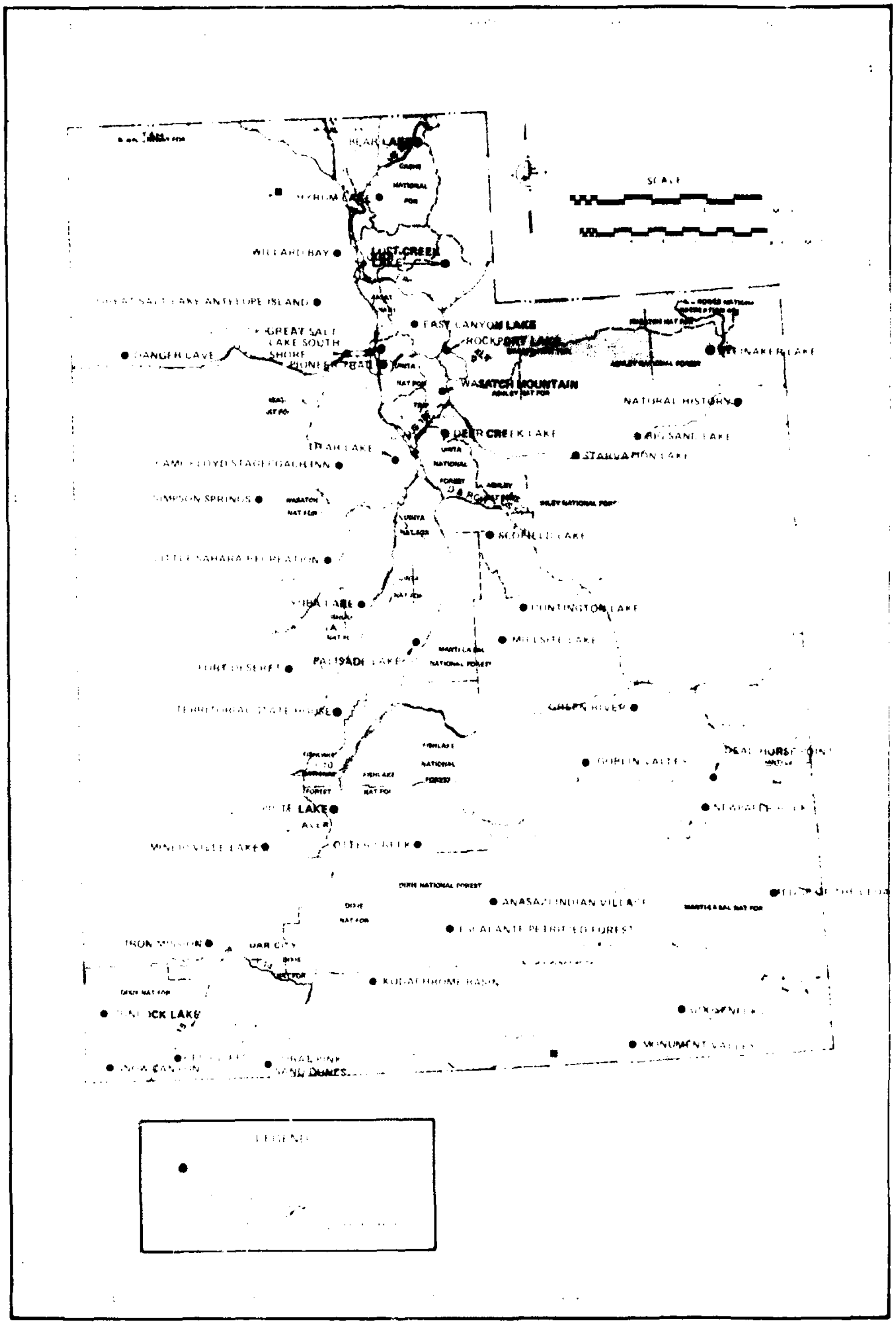

Figure 5.1.1-2. Major recreational facilities and campgrounds in Utah.

Table 5.1.1-6. Rank order of existing lakes and reservoirs in Nevada and Utah by size.

LAKE/RESERVOIR	SURFACE ACRES
Nevada	
Washoe, Storey, Churchill Lyon, Carson City & Douglas Counties	
Pyramid	108,000
Tahoe*	36,400
Lahontan	14,800
Washoe (Big and Little)	6,100
Stillwater Point	1,900
Topaz*	1,250
Indian Lakes	700
Big Soda Lake	400
Ft. Churchill Cooling Ponds	200
Tracy Pond	30
Paradise Lake	25
Virginia Lake	24
Nye, Esmeralda, and Mineral Counties	
Walker	38,800
Weber Reservoir	950
Dacey & Adams-McGill	791
Haymeadow Reservoir	203
Clark County	
Mead*	100,000
Mohave*	14,100
Eureka, White Pine, and Lincoln Counties	
Ruby Marsh	3,000
Bassett Lake	120
Echo Reservoir	65
Eagle Valley Reservoir	59
Cave Lake	32
Illipah Reservoir	30
Beaver Dam	20
Comins Lake	20
Silver Creek Reservoir	13
Tonkin Reservoir	4
Elko County	
Ruby Marsh	4,000
Wildhorse	2,830
Sheep Creek Reservoir	885
Wilson Reservoir	827
Willow Creek Reservoir	761
Bull Run Reservoir	106
Deco Creek Reservoir	92
Liberty Lake	21
Overland Lake	20
Favre Lake	19
Robertson Lake	17
Angel Lake	13
Hidden Lake	9
Island Lake	7
Nevada (Continued)	
Lander, Pershing, and Humbolt Counties	
Rye Patch	11,400
Chimney Creek Reservoir	2,000
Summit Lake	560
Orion Valley	100
Knat Creek Reservoir	100
Little Orion	30
Dufuena Ponds	25
Smith Reservoir	20
Groves Lake	17
Iowa Reservoir	15
Blue Lakes	11
NEVADA TOTAL	351,722
Utah	
Great Salt Lake**	960,000
Utah Lake**	95,900
Bear Lake	71,000
Yuba Lake**	10,700
Willard Bay	9,920
Scofield Lake	2,804
Starvation Lake	2,760
Other Creek Lake	2,520
Deer Creek Lake**	2,435
Piute Lake**	2,250
Minersville Lake**	1,130
Rockport Lake	1,030
Steinaker Lake	795
East Canyon Lake	681
Hyrum Lake	457
Millsite Lake	435
Big Sand Lake	393
Lost Creek Lake	365
Gunlock Lake**	240
Huntington Lake	237
Palisade Lake**	33
UTAH TOTAL	1,170,203

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*Averages shown here are estimates of areas on the Nevada portion of these lakes.

**Denotes that water body is proximal to potential deployment areas (< 60 miles).

Sources: Nevada State Park System, 1977.
Utah Bureau of Economic and Business Research, Jan. 1977.

Table 5.1.1-7. **Major fishing streams in Nevada.**[1]

COUNTY(S)	STREAM	COUNTY(S)	STREAM
Washoe, Storey, Churchill, Lyon, Carson City, and Douglas Cos.	Desert Sweetwater Thomas Bronco Galena Ash Canyon Clear	Elko Co.	Badger Blue Jacket Bull Run Bruneau Columbia Humboldt (N. & S. Fork) Owyhee (E. Fork) Jarbridge Mary's Lamoille
Nye, Esmeralda, and Mineral Cos.	Chiatovich Indian South Twin Barley Pine Reese Jett	Lander, Pershing, and Humboldt Cos.	Little Humboldt R. (N. Fork) Martin Dutch John Rebel McDermitt Jackson Kings R. Mill Trout Willow Kingston Steiner Birch Big
Clark Co.	Cold Willow		
Eureka, White Pine, and Lincoln Cos.	Roberts Fish Creek Cave Silver Baker Cleve Lehman		

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[1] In all, there are 2,589 miles (4,167 km) of suitable fishing streams in Nevada.

Source: Nevada State Park System, 1977.

Table 5.1.1-8. Streams with good to excellent fishery resources in selected western Utah counties.*

COUNTY	STREAM
Tooele	S. Willow Creek Clover Creek
Juab	Trout Creek Birch Creek Granite Creek Burnt Cedar Creek Sevier River Chicken Creek Pidgeon Creek
Millard	Lake Creek Oak Creek Pioneer Creek Chalk Creek N. Chalk Creek Choke Cherry Creek Meadow Creek Corn Creek S. Fork Corn Creek Maple Grove Springs
Sanpete	Cedar Creek Birch Creek S. Fork Birch Creek S. Spring Creek Cottonwood Creek
Salt Lake	Jordan River City Creek Red Butte Creek Parley Creek Mountain Dell Lambs Canyon R. Fork Lambs Canyon Mill Creek Big Cottonwood Creek Little Cottonwood Creek
Iron	Castle Creek Louder Creek Asay Creek W. Fork Asay Creek Clear Creek Bunker Creek
Piute	Deer Creek Beaver Creek Ten Mile Creek City Creek E. Fork Sevier River Otter Creek Box Creek S. Fork Box Creek Greenwich Creek
Sevier	Otter Creek Salina Creek Gooseberry Creek Meadow Creek Lost Creek Little Lost Creek Glenwood Creek Willow Creek Monroe Creek Doxford Creek Dry Creek Clear Creek Fish Creek Shingle Creek
Washington	Santa Clara River Water Canyon Leeds Creek Mill Creek N. Fork Virgin River

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*Evaluations based on availability of game fish and overall rating of stream reach as per source.

Source: Wydoski, R.S., and Berry C.R., Dec. 29, 1976, *Atlas of Utah Stream Fishing Values*, Logan, Utah.

Table 5.1.1-9. High quality off-road vehicle and associated recreational activity areas in the Nevada/Utah study area.

BLM DISTRICT[1]	AREA NAME	COMMENT
Nevada		
Elko	Whirlwind	B rating[2]
	Robinson	B rating
	Woodruff	B rating
	Dixie	B rating
	Wendover Area	B rating (established course)
Battle Mountain	Crescent Sand Dunes	A rating (occasional organized events)
	Alkalin Flat	B rating
	Tonopah Unit	B rating
	Hot Creek-Kawich Unit	B rating
	Mud Lake	B rating
Ely	Duck Creek Basin	B rating
	Mountain Lands[3]	B rating
	Heusser Mountain Rock Out-cropping	B rating (occasional motorcycle trails area)
	Bench Lands[4]	B rating
	380-acre parcel east of Pioche	No additional data
	Mount Wilson	Hunters only
Utah		
Salt Lake	Onaqui Mountains	—
	Boulter Area	A rating
	Vernon Hills	A rating (one organized event held in 1974)
	Rush Valley	Rating unknown; heavily used, however
	Thorpe Hills	—
	South Oquirrh Mountains	Rating unknown; heavily used; developed motorcross area (Manning Canyon); organized events.
	Middle Oquirrh Mountains	Rating unknown, heavily used
	Rush Lake	Rating unknown, heavily private use
	Lookout Pass	Rating unknown, heavily used
	Mercury Canyon	—
	Butterfield Canyon	Heavily used
Fillmore	Oak City	B rating
	Little Sahara Complex	One of the best quality ORV areas in the country; organized events
Cedar City	Coral Pink Sand Dunes	Rating unknown; dune buggy area
	Sand Mountain	Rating unknown; proposal to develop into ORV play area

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[1]Some BLM district planning documents such as those for Las Vegas, do not contain insufficient data for comprehensive analysis.

[2]A = high quality; B = medium quality (some B areas are marginally high); C = low quality.

[3]Due to evaluation methodology, mountain lands include all mountain lands with no specific cited areas. Data relevant to Cherry Creek Planning Area only.

[4]Due to evaluation methodology, bench lands include all bench lands with no specific cited areas. Data relevant to Moriah Planning Unit only.

Source: Bureau of Lnad Management, 1973, 1974, 1975, 1975a, 1977, 1972, 1973a, 1975-78, 1972a, 1974-76, 1972-75, 1972b, 1970-76, 1973-74, 1970-73, 1973b, 1974a.

The U.S. Forest Service also manages lands designated as dispersed recreation areas. Table 5.1.1-10 presents the names of some of these areas that are located only on those U.S. Forest Service lands in close proximity to potential M-X deployment areas. This represents all lands suitable and available for recreation, but not otherwise codified or described and inventoried as development sites or other dispersed recreation areas. It is on these lands where ORV and associated dispersed recreation activities generally occur. The other types of dispersed recreation areas identified by the U.S. Forest Service include: Roads, Recreation Ways (formally designated); Trails, Lakes or Ponds; Reservoirs and Impoundments; and Rivers and Streams.

Snow-related Activities (5.1.1.4)

Snow-related recreational activities in Nevada and Utah are mainly skiing, snowshoeing, and more recently, snow-mobiling. These activities are concentrated in three areas in Nevada and Utah: the Nevada-California border (Lake Tahoe area), the Mt. Charleston area (Clark County), and the national forests in central Utah. To a lesser extent, all other U.S. Forest Service holdings and other mountainous lands within the study area also receive recreational demand related to snow, but because of their distance from large concentrations of population and the abundance of higher quality alternative locations the demand is much less frequent. Areas included in this regard would be east-central Lincoln County, Toiyabe N.F. in Nye, Lander, and Eureka counties, and Humboldt N.F. in White Pine County.

Visitor Use (5.1.1.5)

The degree of recreational activity in areas designated for such uses is dependent on several factors. Among them are: size and characteristics of nearby population; degree of development at the various recreation areas; accessibility; variety of recreational opportunities; and other factors such as distance and cost of travel. In view of these factors, all developed recreational areas in or near areas determined geotechnically suitable for M-X deployment, will be discussed in this section in terms of their degree of use. Agencies monitoring use levels of their developed recreation areas generally use visitor-days as a basic measure. According to the U.S. Forest Service a visitor day consists of "12 visitor-hours which may be aggregated continuously, intermittently, or simultaneously, by one or more persons." For the purpose of evaluating visitor-days in terms of recreation, these "one or more persons" can be engaged "in any activities, except those which are part of, or incidental to, the pursuit of a gainful occupation." This definition can be viewed as acceptable for all administering agencies.

In Nevada, only the agencies providing the largest share of such facilities are accounted for. This includes the Nevada State Park System, U.S. Forest Service, National Park Service, and Bureau of Land Management. Clark County received the largest amount of recreational vists in 1979. Almost all major recreational areas in the county received use exceeding 20,000 visitor-days. The major factor contributing to the high amount of visitor-use at parks in Clark and Lincoln counties is their close proximity to the Las Vegas Valley in which there are approximately 400,000 residents.

Table 5.1.1-10. Dispersed recreational activity areas in portion of selected National Forests in the Nevada/Utah study area.[1]

FOREST (STATE)	COUNTY	AREA NAME[2]
Dixie National Forest (Utah)	Iron	Cedar City #2
	Iron	Pine Valley #1
Fishlake National Forest (Utah)	Millard	Fillmore #1
	Juab	Fillmore #3
	Millard	Beaver #1
	Beaver	Beaver #2
	Iron	Beaver #5
	Beaver	Beaver Mt. #8
Humboldt National Forest (Nevada	Elko	Mountain City
	Elko	Ruby Mountains #1
	White Pine	Ruby Mountains #2
	Elko	Ruby Mountains #3
	Nye	White Pine #1
	White Pine	White Pine #2
	Lincoln	White Pine #3
	White Pine	Ely
	White Pine	Wheeler Peak
Toiyabe National Forest (Nevada)	Eureka	Austin #1
	Lander	Austin #2
	Nye	Austin #3
	Nye	Icthyosaur State Monument
	Nye	Tonopah
Wasatch National Forest (Utah)	Tooele	Tooele

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[1]These dispersed recreation areas are a subset of a larger set of dispersed recreation areas identified by different codes. These are all 61.0 KIND CODE. A 61.0 area is one designated General Undeveloped Areas (all lands suitable and available for recreation, but not otherwise codified or described and inventoried as developed sites or other dispersed recreation areas).

[2]In many cases, the same name appears followed by a site number. This implies the same general area, but that different checkpoints exist for the purpose of estimating visitor demand.

Source: U.S. Forest Service, December, 1979 (RIM data).

The Lake Mead area, which includes the Las Vegas Wash, Boulder Beach, Callville Bay, Echo Bay, and Overton Beach recreational sites, received more than 6.5 million visitations in 1979. Other recreational facilities (excluding Clark and Lincoln counties) which received use exceeding 20,000 visits include Lahontan Reservoir in Churchill County, Thomas Canyon in Elko County, Rye Patch Reservoir in Pershing County, and Cave Lake and Lehman Caves National Monument in White Pine County. Table 5.1.1-11 provodes use in visitor-days on major recretional facilities in Nevada for 1979.

In Utah providing agencies are similar to those of Nevada.

Several recreational areas within the Utah study region experienced use exceeding 100,000 visitor-days in 1979. These include: Cedar Breaks National Monument in Iron County; Yuba Lake and the Little Sahara Complex in Juab County; Salt Air Beach and Pioneer Trail in Salt Lake County; Capital Reef National Park in Sevier County, Deer Creek Lake, Utah Lake; Timpanogos Cave National Monument in Utah County; and Snow Canyon and Zion National Park in Washington County. Some are within 60 mi (95 km) of areas determined to be geotechnically suitable for M-X development.

Common to most of the recreational areas in Utah study area counties is their accessibility to urban centers. This is particularly true for those in the more northern counties (Salt Lake, the far eastern portions of Tooele and Juab, and Utah). A good road network throughout the eastern portion of the Utah study area provides easy access from urban areas. Most notably these include Interstate 15/U.S. 91, U.S. 6/50, U.S. 89 and Utah State Highways 56, 14, 21, 25, 125, 148, 132, 36 and Interstate 80/ U.S. 40 near the northernmost portion of the study area. Access from geotechnically suitable areas, however, is currently limited to four improved highways: Interstate 15 from the south (Clark County, Nevada and Washington County, Utah), U.S. 50/6 and Utah State Highway 21 from the west (White Pine County, Nevada), and Utah State Highway 56 also from the west (Lincoln County, Nevada) which intersects Interstate 15 in Cedar City. Table 5.1.1-12 presents the use of major recretional areas within Utah study area counties in terms of visitor-days.

Fishing (5.1.1.6)

Sport fishing is identified as one of the most preferred modes of recreation in Nevada and Utah (Nevada State Park System, 1977 and Utah Outdoor Recreation Agency, 1978). There are 351,287 lake acres and 2,589 mi of stream suitable for fishing in Nevada. (Nevada State Park System, 1977); in Utah, the figures are 441,400 lake acres and 3,226 mi of fishing stream (Utah Outdoor Recreation Agency, 1978). The area of lakes and streams within the study area is much smaller. Statewide figures are shown because current use patterns indicate willingness to travel long distances to use such resources. The increase cost of fuel has reduced the number of individual trips but has also increased the average length of stay. This change in travel pattern for fishing has not changed the upper trend in the number of fisherman-days in the more rural portions of the basing area.

Table 5.1.1-11. Visitor use on major recreational facilities in selected Nevada counties, 1979. (Page 1 of 3).

COUNTY	AGENCY[1]	FACILITY NAME	VISITOR-DAYS OR VISITATIONS[2,3]
Churchill	NSPS	Lahontan Reservoir	510,300
Clark	USFS	McWilliams	61,100
		Deer Creek	3,900
		Mahogany Cove	3,500
		Hilltop	23,500
		Dolomite Camp	14,400
		Cathedral Rock	57,100
		Fletcher View	28,900
		Kyle Canyon	24,200
		Foxtail	15,800
		Old Mill	35,100
	BLM	Willow Creek	UNK
		Cold Creek	UNK
		Red Rock Canyon Recreational Lands	UNK[5]
	NSPS	Red Rock Canyon	508,000
		Valley of Fire	167,300
		Lake Mead	6,649,600
	NPS[4]	Las Vegas Wash	---
		Boulder Beach	---
		Callville Bay	---
		Echo Bay	---
		Overton Beach	---
Elko	USFS	Jack Creek	1,400
		Wild Horse Crossing	9,400
		Big Bend	7,300
		Pine Creek	4,100
		Jarbridge	5,000
		Angel Lake	10,700
		Angel Creek	11,300
		Thomas Canyon	25,100
	BLM	North Wild Horse Recreational Area	3,500
		Ruby Marsh	6,500
Humboldt	USFS	Lye Creek	9,500

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Table 5.1.1-11. Visitor use on major recreational facilities in selected Nevada counties, 1979. (Page 2 of 3).

COUNTY	AGENCY	FACILITY NAME	VISITOR DAYS OR VISITATIONS[2,3]
Lander	USFS	Big Creek	8,500
		Bob Scott	16,300
Lincoln	NSPS	Spring Valley	43,700
		Echo Canyon Reservoir	77,600
		Cathedral Gorge	83,800
		Kershaw-Ryan	20,800
		Beaver Dam	7,100
	BLM	Meadow Valley	UNK
Mineral	BLM	Tamarack Point	UNK
		Sportsmen's Beach	UNK
	USFS	Alum Creek	3,200
Nye	NSPS	Berlin-Icthyosaur	13,800
	USFS	Peavine Creek	13,200
		Kingston	6,200
		Pine Creek	8,100
		Currant Creek	5,500
		Cherry Creek	1,700
Pershing	NSPS	Rye Patch Reservoir	75,300
White Pine	USFS	East Creek	1,600
		Bird Creek	3,700
		Timber Creek	4,400
		Berry Creek	1,700
		Cleve Creek	1,600
		Ward Mountain	1,900
		White River	3,200
		Lehman Creek	5,400
		Baker Creek	1,800
		Wheeler Peak	3,700
		Snake Creek	5,000
	NSPS	Cave Lake	32,300
		Ward Charcoal Ovens	no count
	NPS	Lehman Caves National Monument	40,300

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See legend on following page.

Table 5.1.1-11. Visitor use on major recreational facilities in selected Nevada counties, 1979. (Page 3 of 3).

[1]NSPS - Nevada State Park System
USFS = U.S. Forest Service
BLM = Bureau of Land Management
NPS = National Park Service

[2]All USFS data for fiscal year 1979; all NSPS data for January-November, 1979; NPS data is 1978. All NPS and NSPS data are in visitations.

[3]All USFS data for season of highest use, only.

[4]NPS areas all part of Lake Mead. See text.

Sources: U.S. Forest Service (RIM data), 1979.
Nevada State Park System, 1980.
National Park Service, 1980 (personal communication).
Bureau of Land Management, 1980 (personal communication).

Table 5.1.1-12. Visitor use on major outdoor recreational facilities in selected Utah counties, 1979. (Page 1 of 3).

[illegible]NTY	AGENCY[1]	FACILITY NAME	VISITOR-DAYS OR VISITATIONS[2,3,4]
Beaver	UDPR	Minersville Lake	37,500
	USFS	Anderson Meadow	6,300
		Kents Lake	11,100
		Little Reservoir	9,800
		Ponderosa	6,500
		Little Cottonwood	15,100
		Mahogany Cove	[illegible]
[illegible]	UDPR	Iron Mission	26,800
	USFS	Vermillion Castle	5,200
		Cedar Canyon	[illegible]
	NPS	Cedar Breaks National Monument	362,200
[illegible]	UDPR	Yuba Lake	100,700
	[illegible]	Bear Canyon	13,900
		Cottonwood	[illegible]
		Ponderosa	[illegible]
	BLM	Little Sahara Complex	[illegible]
[illegible]	UDPR	Territorial Statehouse	[illegible]
	USFS	Adelaide	4,4[illegible]
		Meadow Creek	Unk.
		Shell [illegible] Site	Unk.
		[illegible]pley Cove	[illegible]
		Shingle Mill	[illegible]
		Buckskin Charley	[illegible]
		Pistol Rock	[illegible]
		Maple Hollow	[illegible]
		Maple Grove	[illegible]
		Plantation Flat	Unk.
		Oak Creek	34,400
[illegible]	UDPR	Piute Lake	4,4[illegible]
	USFS	City Creek	[illegible]
[illegible]	UDPR	Salt Air Beach	[illegible]
		Pioneer Trail	[illegible]

[illegible]

Table 5.1.1-12. Visitor use on major outdoor recreational facilities in selected Utah counties, 1979. (Page 2 of 3).

COUNTY	AGENCY[1]	FACILITY NAME	VISITOR-DAYS OR VISITATIONS[2,3,4]
Salt Lake (Cont)	USFS	Box Elder	3[illegible],600
		Terraces	7,700
		Maple Grove	2,600
		Evergreen	2,300
		Maple Cove	2,500
		Fir Crest	2,900
		Clover Springs	2,500
		Big Water	1,900
		Oak Ridge	6,300
		Dogwood	2,200
		Ledgemere	6,000
		The Birches	4,[illegible]00
		Storm Mountain	25,900
		Mill B South Fork	2,600
		Moss Ledge	2,600
		Jordan Pines	9,000
		The Spruces	1,000
		Redman	44,600
		Brighton	6,200
		Tanners Flat	4,800
		Albion Basin	6,200
		Alta Ski Area	145,900
		Snowbird Ski Area	133,600
		Brighton Ski Area	68,700
		Solitude Ski Area	48,300
Sanpete	UDPR	Palisade Lake	39,800
		Gooseberry	(pending)
		Spring City	(pending)
		Lake Hill	(pending)
		Manti Community	(pending)
		Pinchot	(pending)
		Twelve Mile	(pending)
		Ferron Reservoir	(pending)
		Willow Lake	(pending)
Sevier	NPS	Capital Reef Nstional Park	288,900
	USFS	Castle Rock	4,600
		Monrovian Park	5,600
		Bowery	25,200
		Macinaw	35,600
		Twin Creek	2,000
		Frying Pan	4,000
		Johnson Boat Ramp	500
		Gooseberry	4,300

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Table 5.1.1-12. Visitor use on major outdoor recreational facilities in selected Utah counties, 1979. (Page 3 of 3).

COUNTY	AGENCY[1]	FACILITY NAME	VISITOR-DAYS OR VISITATIONS[2,3,4]
Tooele	UDPR	Danger Cave	Unk.
	USFS	Cottonwood	1,900
		Intake	1,400
		Boy Scout	3,500
		Lower Narrows	2,200
		Upper Narrows	5,600
		Loop	1,700
		Little Valley	2,000
	BLM	Simpson's Springs	3,000
Utah	UDPR	Camp Floyd	26,200
		Deer Creek Lake	351,600
		Utah Lake	443,600
	USFS	Hawthorne	1,800
		Whiting	12,600
		Cherry Picnic Area	3,100
		Birch	2,600
		Sulphur	2,600
		Kolob	9,700
		Lone Fir	3,500
		Balsom	11,000
		Maple Bench	6,900
		Payson	1,800
		Trumboldt Picnic Area	4,500
	NPS	Timpanogos Cave National Monument	125,100
Washington	UDPR	Gunlock Lake	52,200
		Snow Canyon	244,200
	USFS	Pine Park	1,500
		Enterprise Reservoir	500
		Pine Valley	1,300
	NPS	Zion National Park	1,040,500
	BLM	Red Cliffs	9,300

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[1]UDPR = Utah Division of Parks and Recreation; USFS = U.S. Forest Service; NPS = National Park Service; BLM = Bureau of Land Management

[2]All USFS data for FY 1979; all UDPR data for 1978; all NPS data for 1979.

[3]All USFS data for season of highest use only.

[4]Visitations for NPS areas.

Sources: U.S. Forest Service (RIM data), 1979; Utah Division of Parks & Recreation, 1979; National Park Service, 1980 (personal communication); Bureau of Land Management, 1980 (personal communication).

Revenue for sport fishing management comes primarily from the sale of hunting and fishing licenses in Nevada and Utah (e.g. in Utah, about 90 percent of the fishing management originates from this source.) Fish per angler-hour estimates for both Nevada and Utah currently average approximately 3/4 - 1 fish per angler-hour for cold water species (trout, pike, salmonids). There are substantially higher catch estimates for warm water species (e.g., large mouth bass, white bass, striped bass). There are no commercial fisheries in Nevada. Utah has several small commercial fisheries, but these have been encouraged by Utah State Department of Fish and Game to remove only common and typical nongame fish which are competitors of sport fish. Table 5.1.1-13 lists gamefish in Nevada and Utah; fishing streams are listed in Tables 5.1.1-14 and 5.1.1-15, and the number and lengths of fishing streams in the study area hydrologic units are shown in Table 5.1.1-16.

Hunting (5.1.1.7)

Hunting big and upland game is an important form of recreation in Nevada and Utah. Hunting (or trapping for some furbearer species) waterfowl and furbearers is of less importance, primarily because of the limited resources in these states.

Big game hunting is closely regulated in Nevada and Utah. Hunters must apply for a permit by species and area in which they plan to hunt (game management areas published by state wildlife agencies). In Nevada and Utah, permits are awarded through drawings. Surveys of animal abundance are conducted each year to determine the number of permits to be issued for each management unit. Currently, hunter demand exceeds permit availability for most big game species (Tsukamoto, 1979a; Jense and Burruss, 1979). In Nevada, a hunter may apply for and obtain a derr permit every year. For pronghorn, however, a hunter may apply for another permit five years after having received one. A similar restriction applies to elk and bighorn permits with the exception that if an animal is bagged, the hunter may not apply again for 10 years. In Utah, a hunter may apply for and obtain deer and elk permits every year. Pronghorn permits are restricted to one every three years, and only one bighorn sheep permit is allowed in a lifetime. Upland game hunting requires only a state hunting license. Open seasons and bag limits are established each year as determined by population and harvest trends. The taking of furbearers in Nevada requires a trapping license, and in Utah a license, permit, and tag are required for bobcats and kit foxes.

Population levels of most game animals have shown moderate to large population fluctuations over time as a result of numerous factors, particularly those related to human activities, and past harvest data reflect this. Figures 5.1.1-3 and 5.1.1-4 shows past harvest data for big game animals in Nevada and Utah. Population levels were low for all these species in the early 1900s; subsequent implementation of management practices, along with strict hunting regulations, substantially increased the herds of most species. Deer harvest increased to a high in the early 1960s in both states, and then declined. This decline is probably related to changes in vegetation which have reduced the carrying capacity for deer. Hunting opportunities for pronghorn in both states and particularly for elk in Utah have increased considerably as a result of management

Table 5.1.1-13. Game fish in Nevada and Utah.

COMMON NAME	SCIENTIFIC NAME	NEVADA	UTAH
SALMON, TROUT, GRAYLING & WHITEFISH	Family SALMONIDAE		
King Salmon	*Oncorhynchus tsawytscha*	X	
Kokanee Red Salmon	*O. nerka kennalyi*	X	X
Lake Trout	*Salvelinus namayeush*	X	
Brook Trout	*S. fontinalis*	X	
Dolly Varden Trout	*S. malma*	X	
Cutthroat Trout	*Salmo clarki*		
Lahontan Cutthroat Trout	*S. c. henshawi*	FT	FT
Colorado Cutthroat Trout	*S. c. pleuriticus*	X	
Utah Cutthroat Trout	*S. c. Utah*	SE	X
Yellowstone Cutthroat Trout	*S. c. lewisi*	X	X
Humboldt Cutthroat Trout	*S. c. spp.*	X	
Rainbow Trout	*S. gaidneri*		X
Southcoast Rainbow Trout	*S. g. irideus*	X	
Kamloops Rainbow Trout	*S. g. kamloops*	X	
Tahoe Rainbow Trout	*S. g. regalis*	X	
Pyramid Rainbow Trout	*S. g. smaragdus*	X	
Golden Trout	*S. aquabonita*	X	X
Brown Trout	*S. trutta*		X
Arctic Grayling	*Thymallus arcticus*		X
Mountain Whitefish	*Prosopium williamsoni*	X	X
Bonneville Cisco	*P. gemmiferum*		X
Bonneville Whitefish	*P. spilonotus*		X
Bear Lake Whitefish	*P. abyssicola*		X
PIKE	Family ESOCIDAE		
Northern Pike	*Esox lucius*		X
NORTH AMERICAN CATFISH	Family ICTALURIDAE		
Channel Catfish	*Ictalurus punctatus*	X	X
White Catfish	*I. catus*	X	
Brown Bullhead	*I. nebulosus*	X	
Black Bullhead	*I. melas*	X	X
Northern Black Bullhead	*I. m. melas*	X	
Southern Black Bullhead	*I. m. catulus*	X	
Yellow Bullhead	*I. natalis*		X
PERCH	Family PERCIDAE		
Yellow Perch	*Perca flavescens*	X	
Walleye	*Stigostedion vitreum vitreum*		X
SUNFISH	Family CENTRARCHIDAE		
Sacramento Perch	*Archophtes interruptus*	X	X
Largemouth Bass	*Micropteres salmoides*	X	X
Smallmouth Bass	*M. dolomieui*	X	X
Striped Bass	*Morone saxatilis*	X	X
White Bass	*M. chrysops*	X	X
Bluegill Sunfish	*Lepomis macrochirus*	X	X
Green Sunfish	*L. cyanellus*	X	X
Black Crappie	*Pomoxis nigromaculatis*	X	X
White Crappie	*P. annularis*	X	X

NOTE: FT = federally listed threatened species, caught as a gamefish in Nevada and Utah.
SE = State listed endangered species in Utah, caught as a gamefish in Nevada.

Table 5.1.1-14. Major fishing streams in Nevada.[1]

COUNTY(s)	STREAM
Washoe, Storey, Churchill, Lyon, Carson City, and Douglas Cos.	Desert Sweetwater Thomas Bronco Galena Ash Canyon Clear
Nye, Esmeralda, and Mineral Cos.	Chiatovich Indian South Twin Barley Pine Reese Jett
Clark Co.	Cold Willow
Eureka, White Pine, and Lincoln Cos.	Roberts Fish Creek Cave Silver Baker Cleve Lehman
Elko Co.	Badger Blue Jacket Bull Run Bruneau Columbia Humboldt (N. & S. Fork) Owyhee (E. Fork) Jarbridge Mary's Lamoille
Lander, Pershing, and Humboldt Cos.	Little Humboldt R. (N. Fork) Martin Dutch John Rebel McDermitt Jackson Kings R. Mill Trout Willow Kingston Steiner Birch Big

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[1] In all, there are 2,589 miles of suitable fishing streams in Nevada. in Nevada.

Source: Nevada State Park System, 1977.

Table 5.1.1-15. Streams with good to excellent fishery resources in selected western Utah counties.*

COUNTY	STREAM
Tooele	S. Willow Creek
	Clover Creek
Juab	Trout Creek
	Birch Creek
	Granite Creek
	Burnt Cedar Creek
	Sevier River
	Chicken Creek
	Pidgeon Creek
Millard	Lake Creek
	Oak Creek
	Pioneer Creek
	Chalk Creek
	N. Chalk Creek
	Choke Cherry Creek
	Meadow Creek
	Corn Creek
	S. Fork Corn Creek
	Maple Grove Springs
Sanpete	Cedar Creek
	Birch Creek
	S. Fork Birch Creek
	S. Spring Creek
	Cottonwood Creek
Salt Lake	Jordan River
	City Creek
	Red Butte Creek
	Parley Creek
	Mountain Dell
	Lambs Canyon
	R. Fork Lambs Canyon
	Mill Creek
	Big Cottonwood Creek
	Little Cottonwood Creek
Iron	Castle Creek
	Louder Creek
	Asay Creek
	W. Fork Asay Creek
	Clear Creek
	Bunker Creek
Piute	Deer Creek
	Beaver Creek
	Ten Mile Creek
	City Creek
	E. Fork Sevier River
	Otter Creek
	Box Creek
	S. Fork Box Creek
	Greenwich Creek
Sevier	Otter Creek
	Salina Creek
	Gooseberry Creek
	Meadow Creek
	Lost Creek
	Little Lost Creek
	Glenwood Creek
	Willow Creek
	Monroe Creek
	Doxford Creek
	Dry Creek
	Clear Creek
	Fish Creek
	Shingle Creek
Washington	Santa Clara River
	Water Canyon
	Leeds Creek
	Mill Creek
	N. Fork Virgin River

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*Evaluations based on availability of game fish and overall rating of stream reach as per source.

Source: Wydoski, R.S., and Berry C.R., Dec. 29, 1976, *Atlas of Utah Stream Fishing Values*, Logan, Utah.

Table 5.1.1-16. Number of game fishing streams and their total length for hydrologic units within the study area.

NUMBER	UNIT NAME	NUMBER OF STREAMS	LENGTH OF STREAMS (mi)	NUMBER	UNIT NAME	NUMBER OF STREAMS	LENGTH OF STREAMS (mi)
4	Snake	15	122	150	Little Fish Creek	4	12
46	Sevier Desert	5	36	151	Antelope	1	5
47	Huntington	26	295	154	Newark	2	8
53	Pine	1	42	156	Hot Creek	2	5
55	Carico Lake	2	16	172	Garden	4	15
56	Upper Reece River	16	108	173b	Railroad - North	6	26
50	Lower Reece River	5	60	174	Jakes -	1	7
134	Smith Creek	3	24	176	Ruby	15	65
137b	Big Smoky - North	23	106	177	Clovis	9	36
138	Grass	4	22	178	Butte	2	10
139	Kobeh	1	8	179	Steptoe	17	93
140	Monitor	11	62	184	Spring	17	99
141	Ralston	1	3	205	Meadow Valley Wash	1	45
149	Stone Cabin	1	2	207	White River	4	37

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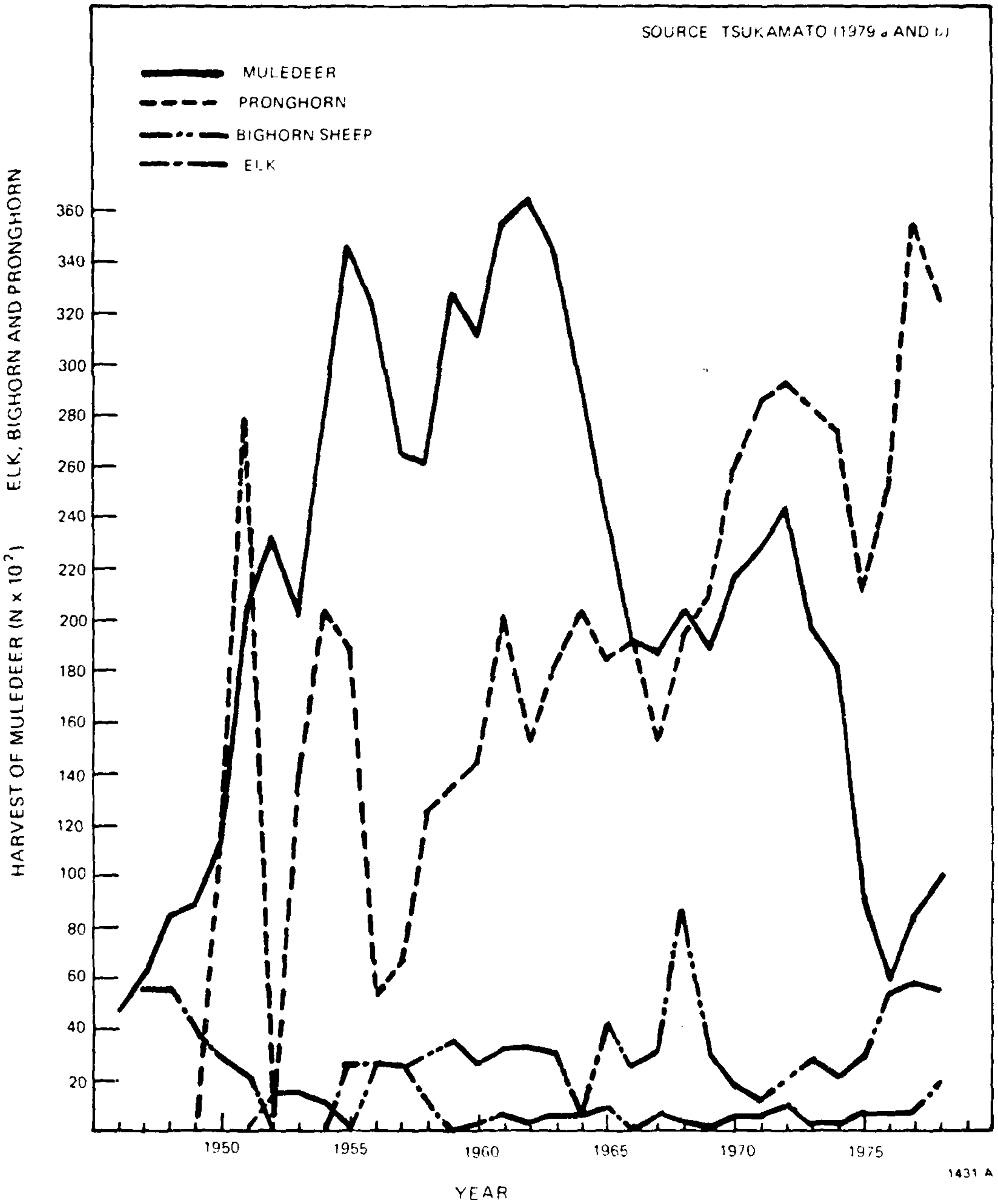

Figure 5.1.1-3. Big game harvest in Nevada.

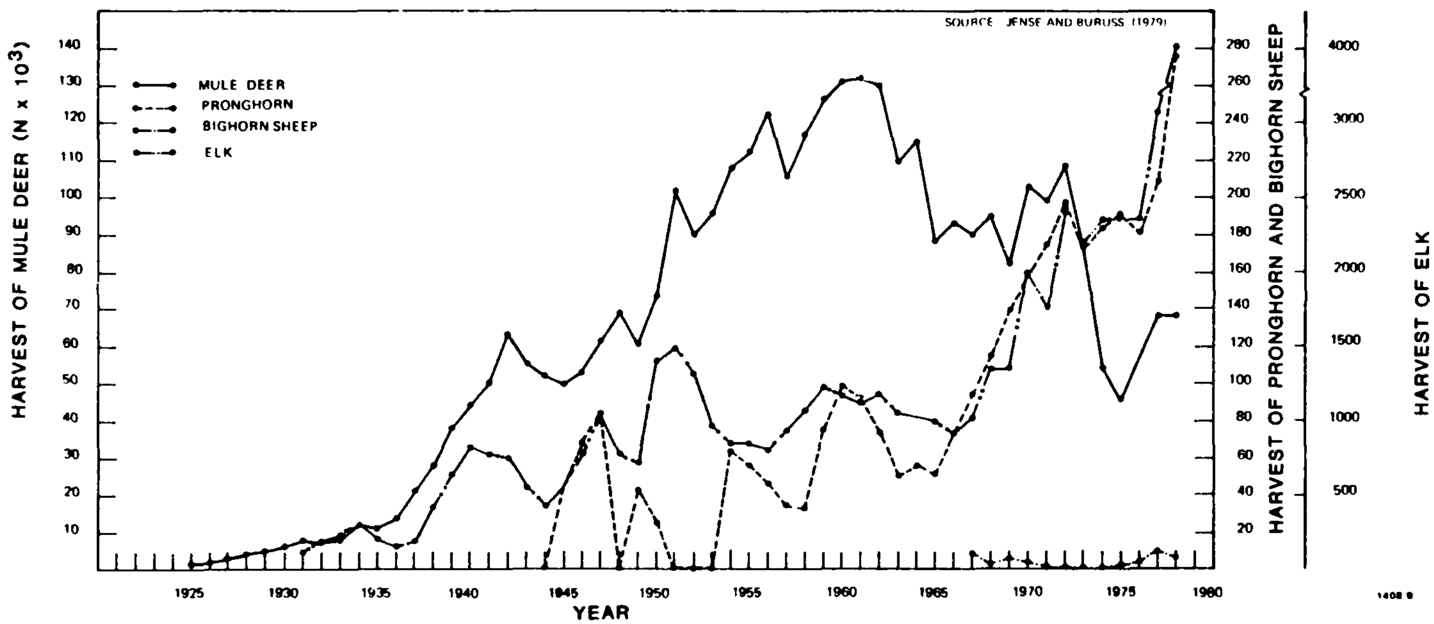

Figure 5.1.1-4. Big game harvest in Utah.

practices. Pronghorn populations, however, are still low compared to historic levels because of range deterioration form overgrazing domestic livestock, and habitat loss to agricultural and urban development. Because the species is not native to the state, elk hunting is restricted in Nevada; only one of the introduced populations is large enough to support hunting. Bighorn sheep hunting has (1952 in Nevada and 1967 in Utah) been allowed only recently. State-side population levels are still low, however, resulting in limited hunting opportunities.

Records for upland games, furbearer, and waterfowl harvest do not go back as far as they do for the big game species, which makes observation of long-term trends difficult. Upland game harvest has shown moderate to large annual fluctuations related to population trends with dove harvest generally increasing over the past 25 years in both states. Sage grouse harvest in Utah appears to have increased in the last 10 years as have harvests of fox and coyote in Nevada (Molini and Barngrover, 1979; Leatham and Bunnell, 1979).

Big game harvest data in the study area for 1978 are presented in Tables 5.1.1-17 and 5.1.1-18 by management unit (Figures 5.1.1-5 through 5.1.1-9). These data indicate that mule deer provide most of the big game hunting opportunities in the study area. Approximately one half of the Nevada's state-wide harvest was taken in the study area compared to about 10 percent for western Utah. The large percentage in Nevada results from the high deer concentration in Elko and White Pine Counties. Most of the deer in Utah inhabit the mountains to the east of the study area. Prongforn harvest in the study area was low compared to state totals. In Nevada, most (77 percent) pronghorn are harvested in Washoe and Humboldt Counties in the northwestern part of the state, while most of the Utah harvest was from the south-central and northeastern parts of the state. About 75 percent of the Nevada bighorn harvest occurs in the study area, primarily in the mountains of the southern part of the state. In Utah, on the other hand, no bighorn were harvested in the study area. All elk hunting in Nevada took place in the Schell Creek Range just east of Ely. In Utah, elk are hunted primarily to the east of the study area, with less than 1 percent of the harvest in the West Desert area. Most of the Nevada mountain lion harvest was from the study area, and no data were available for harvest in Utah.

Hunting opportunities for mule deer and elk are similar in the Nevada and Utah portions of the study area. On a state-wide basis, however, Utah offers considerably more opportunities. Pronghorn hunting is similar for both states, within the study area and state-wide, while bighorn sheep hunting opportunities are greater in Nevada than in Utah.

Upland game harvest data are presented by county in Table 5.1.1-19. In Nevada, approximately 30 to 75 percent of the state-wide upland game harvest occurred within the study area. In the West Desert area of Utah, however, only harvest of dove (30 percent) and rabbit (47 percent) exceeded 20 percent of the state totals. Upland game species, with the exception of chukar and quail, are more abundant in Utah (state-wide and in study area) than in Nevada. Consequently, they provide more hunting opportunities in Utah.

Table 5.1.1-17. Pronghorn, bighorn sheep, and elk harvest by management unit for 1978 for those areas in the potential study area.

MANAGEMENT AREA[1]	PRONGHORN		BIGHORN SHEEP		ELK	
	HARVEST	NUMBER HUNTERS	HARVEST	NUMBER HUNTERS	HARVEST	NUMBER HUNTERS
NEVADA						
10	10	11				
11	21	29			19	20
16	3	5				
20		Closed				
22		Closed				
23	6	10				
25A	7	7				
25B	4	5				
70			3	3		
71			2	5		
73			3	4		
74			4	7		
75			4	4		
76			6	6		
77			4	6		
78			6	6		
79			2	6		
80			8	11		
Sub Total	51		41			
STATE TOTAL	324	387	55	81	19	[illegible]
UTAH						
Cedar City	5	5				
Southwest Desert	29	35				
West Desert Riverbed	12	15				
Snake Valley	12	15				
4					17	20
18					1	10
Sub Total	58		0		18	
STATE TOTAL	276	320	7	23	4,09[illegible]	[illegible],5[illegible]4

[1]See Figures 5.1.11.3-6 and 7 for management area locations.

Source: Tsukamoto, 1979b; Jense and Burruss, 1979.

Table 5.1.1-18. Mule deer and mountain lion harvest by management area for 1978 for those areas within the potential study area.

MANAGEMENT AREA[1]	MULE DEER[2]		MOUNTAIN LION	
	HARVEST	NUMBER HUNTERS	HARVEST	NUMBER HUNTERS
NEVADA				
8			10	20
9			4	14
10	1,423	3,048	3	12
11	958	2,605	2	20
12	184	404	1	6
13	376	1,000		
14	421	942		
15	210	509	0	4
16	386	959	1	10
17	226	643	0	4
18	37	100	3	12
19			0	10
20	236	589	5	14
21	30	95	2	8
22	308	772	0	4
23	175	542	1	5
24	122	275	0	5
25	19	43	0	3
Sub Total	5,111		32	
STATE TOTAL	10,169	23,257	39	202
UTAH				
11	1,655	4,755		
12	985	3,341		
13	827	2,786		
14	388	1,571		
53	293	1,351		
54	566	1,927		
55	1,006	2,786		
56A	303	1,140		
56B	142	495		
56C	368	1,303		
62A	152	566		
62B	86	192		
62C	118	310		
Sub Total	6,889			
STATE TOTAL	68,282	216,951	N.D.[3]	N.D.

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[1]Management areas for mule deer and mountain lion do not have the same boundaries although numbered the same. See Figs. 3.1.11.3-8,-9,& -10.

[2]Harvest includes regular license, control permits, and primitive weapons.

[3]No data available.

Source: Tsukamoto, 1979a&b; Jense and Burruss, 1979.

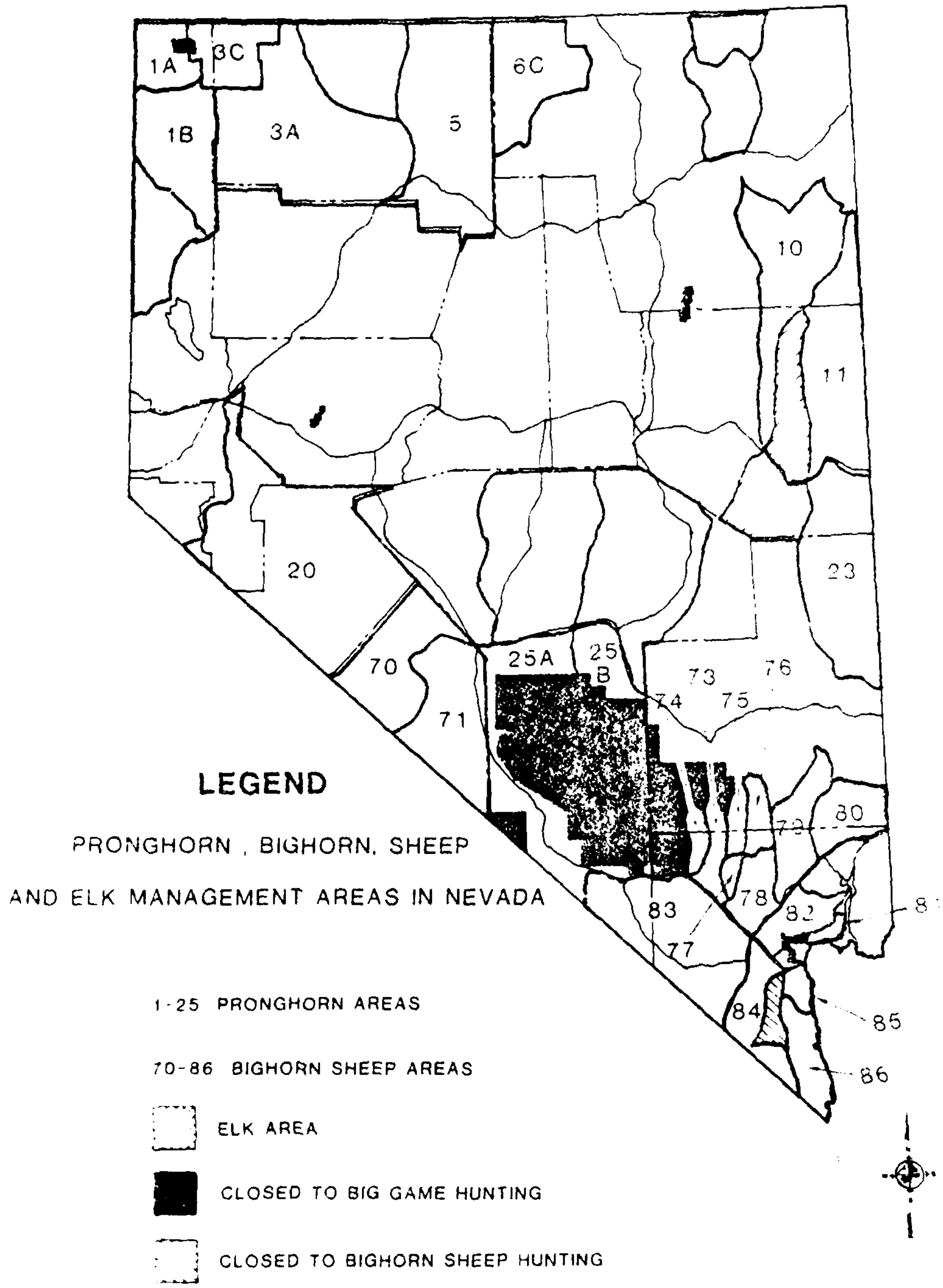

Figure 5.1.1-5. Pronghorn, bighorn sheep, and elk management areas in Nevada.

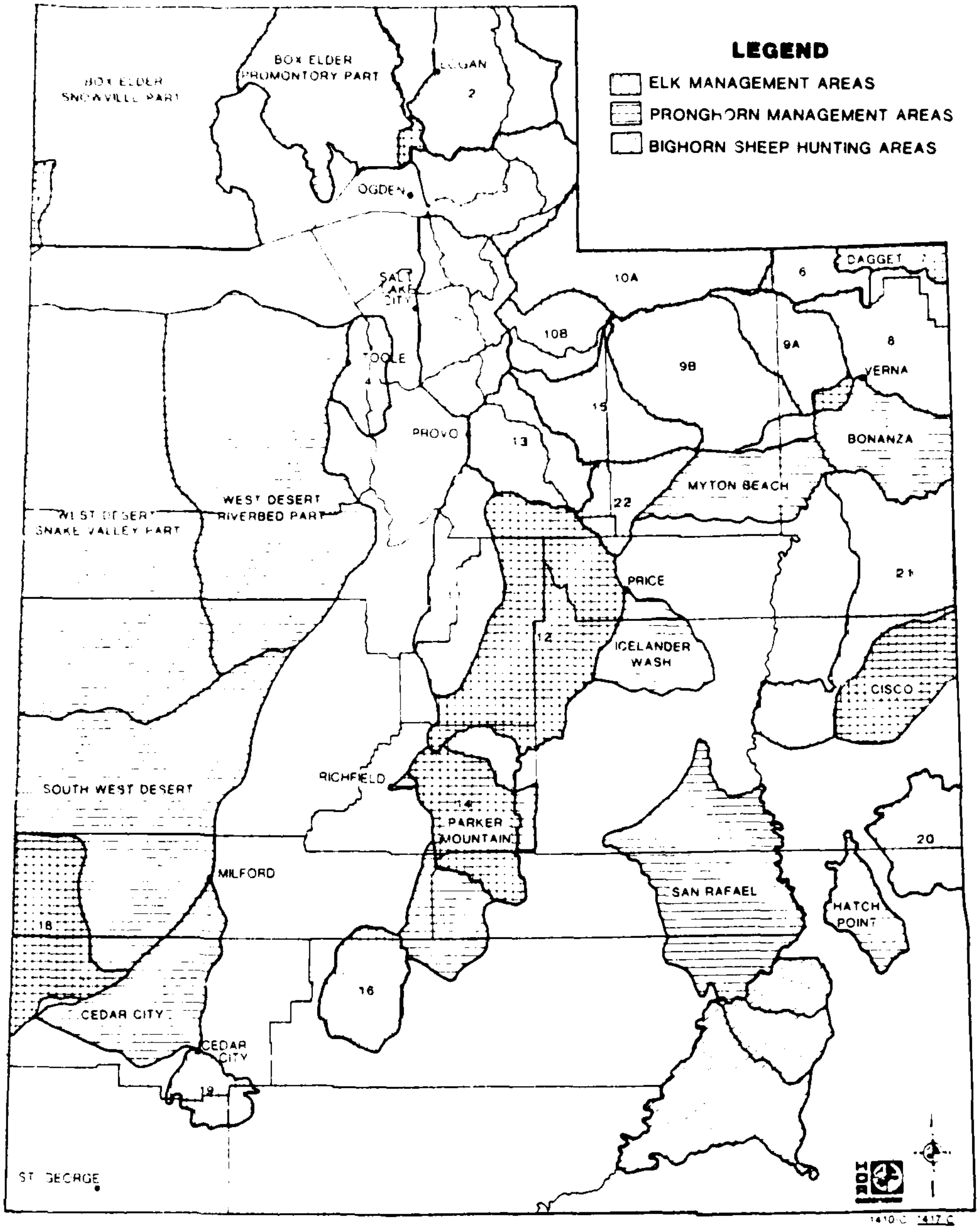

Figure 5.1.1-6. Elk, pronghorn, and bighorn sheep management areas in Utah.

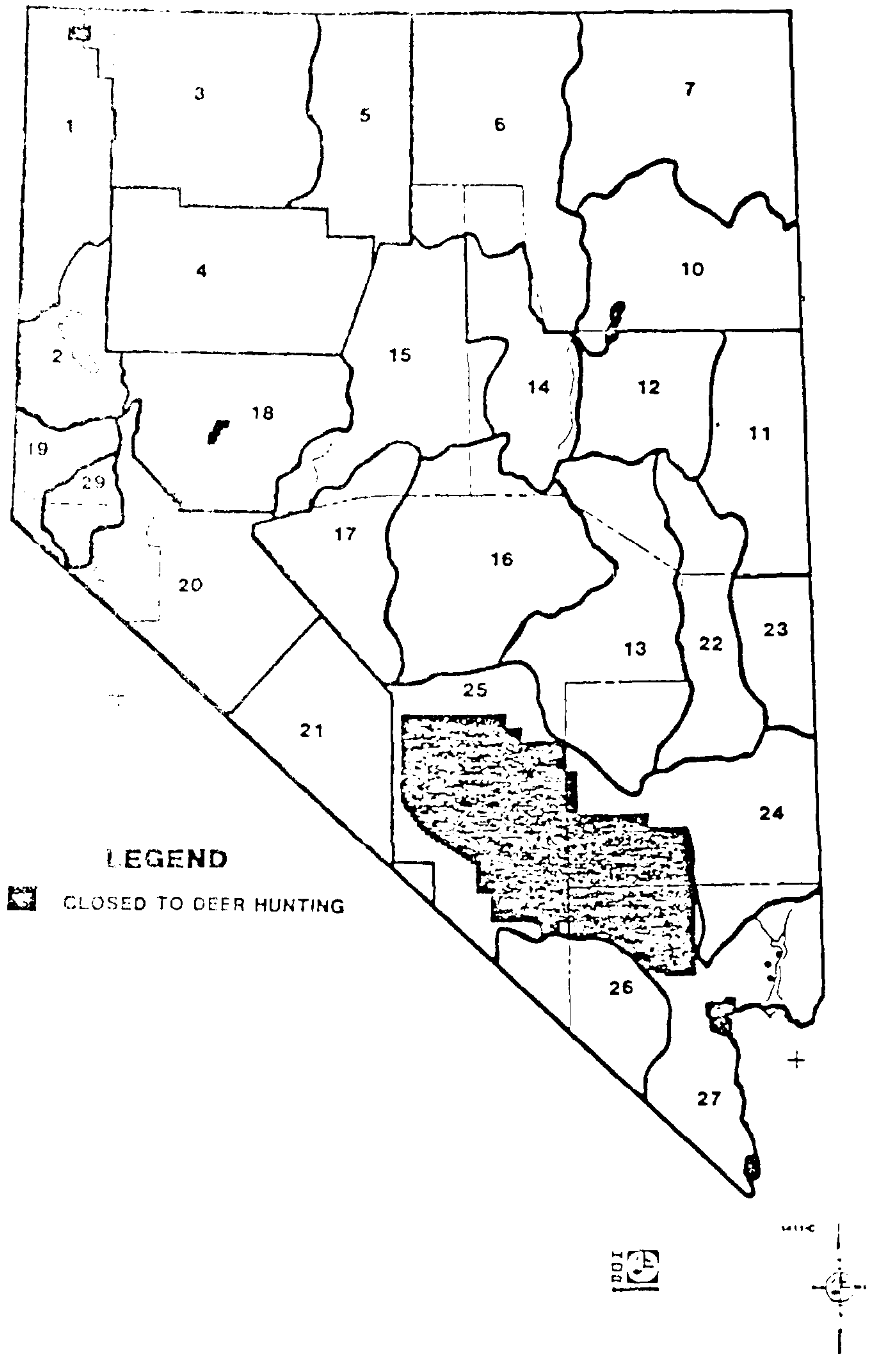

Figure 5.1.1-7. Mule deer management areas in Nevada.

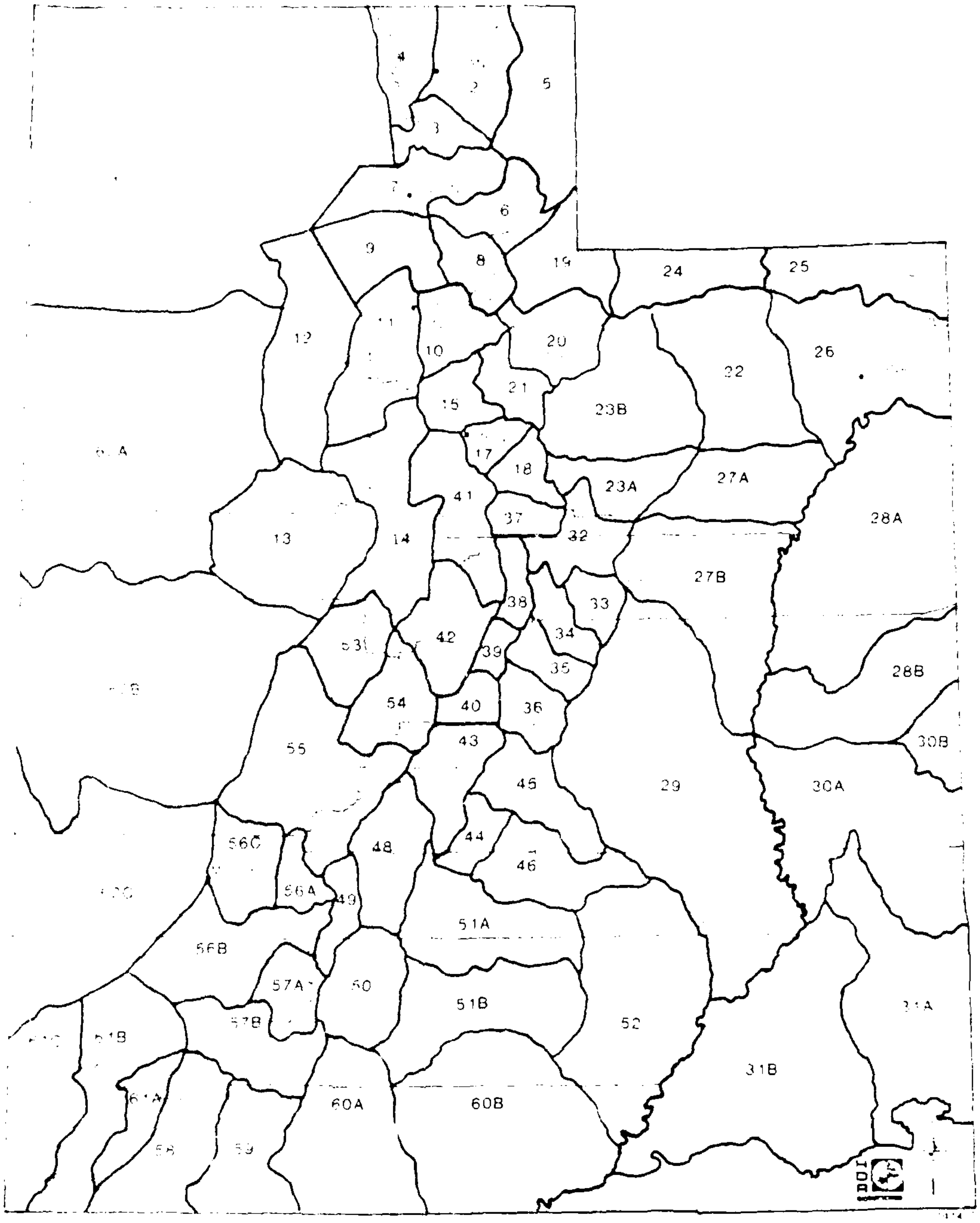

Figure 5.1.1-8. Mule deer management areas in Utah (numbers indicate herd units).

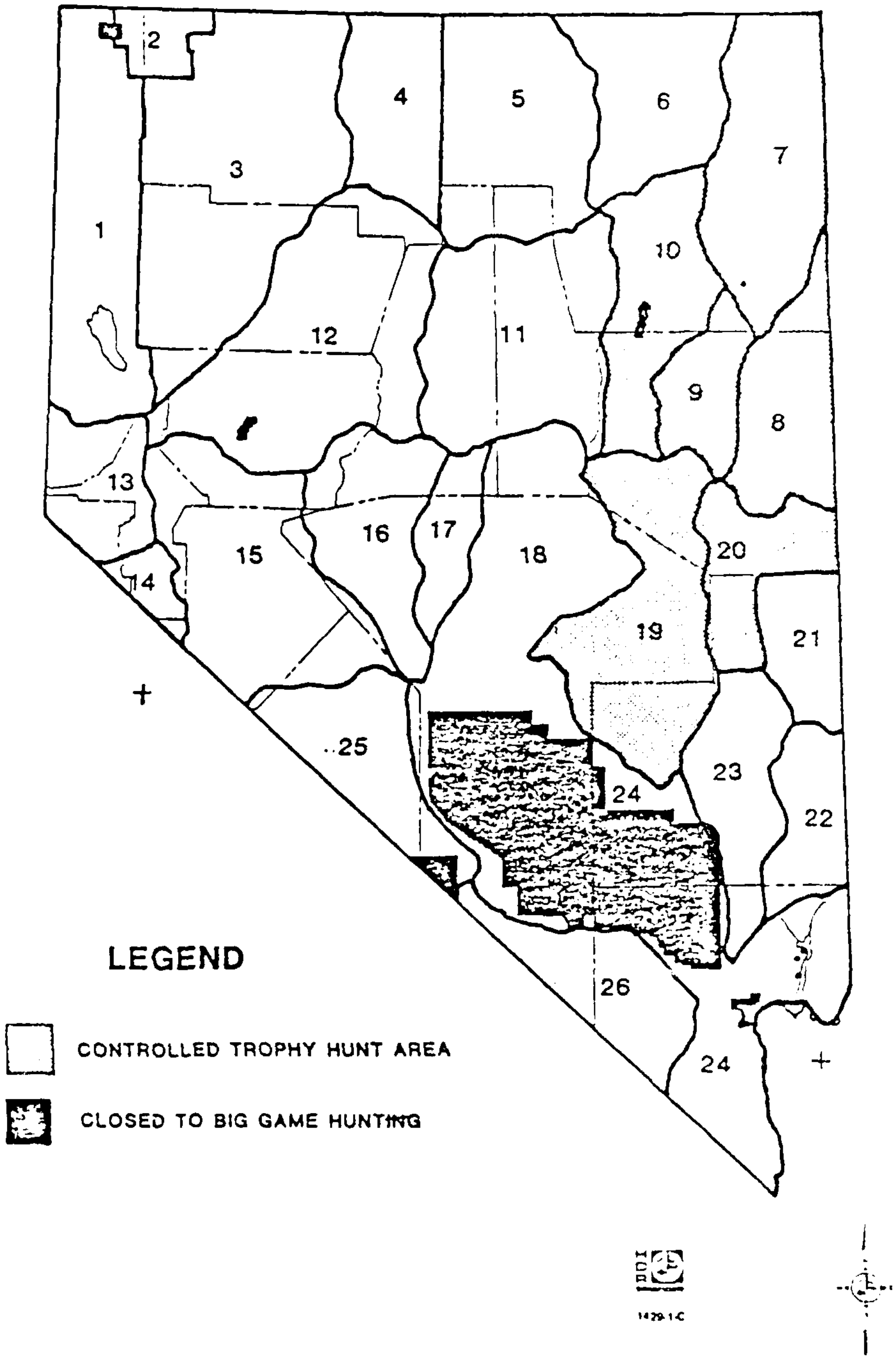

Figure 5.1.1-9. Mountain lion management areas in Nevada.

Table 5.1.1-19. Upland game harvest by county for 1978 for those counties in the potential study area.

STATE/ COUNTY	SAGE GROUSE		CHUKAR		QUAIL		DOVE		RABBIT		OTHER[1]	
	HARVEST	NUMBER HUNTERS	HARVEST	NUMBER HUNTERS	HARVEST	NUMBER HUNTERS	HARVEST	NUMBER HUNTERS	HARVEST	NUMBER HUNTERS	HARVEST	NUMBER HUNTERS
NEVADA												
Clark	13	3	462	100	39,750	3,376	41,340	2,872	31,017	3,071	135	257
Elko	6,722	2,122	12,296	1,493	65	31	2,558	325	6,304	962	2,718	987
Esmeralda	0	1	2,470	349	40	5	753	92	603	91	0	0
Eureka	1,153	368	2,456	400	366	44	897	134	442	84	57	44
Lander	1,724	880	3,708	588	154	80	445	78	2,739	290	482	212
Lincoln	0	0	124	63	9,181	816	8,155	556	9,218	746	4	4
Mineral	244	152	4,375	442	274	50	1,373	127	2,075	284	48	14
Nye	1,939	720	7,743	1,166	3,342	478	13,325	1,114	6,925	983	77	75
White Pine	1,596	640	287	97	0	0	2,874	229	5,541	607	871	400
Sub Total	13,301		33,921		53,172		71,720		55,646		4,392	
STATE TOTAL	17,693	6,765	108,775	14,561	104,939	9,765	113,048	9,860	99,817	11,628	10,219	5,251
UTAH												
Beaver	360	174	0	11	0	0	6,465	317	3,562	345	1,721	496
Iron	300	229	0	11	0	26	16,132	997	4,564	673	3,303	1,102
Juab	240	153	580	277	120	17	34,065	2,112	20,684	1,555	3,282	1,433
Millard	40	44	981	301	80	78	35,606	1,922	6,648	790	10,367	3,351
Tooele	260	261	11,008	3,108	0	35	23,697	2,051	40,788	3,716	6,825	2,729
Sub Total	1,200		12,569		200		115,965		192,211		25,498	
STATE TOTAL	25,938	16,231	65,747	16,291	15,491	5,924	383,696	35,985	401,071	35,590	314,925	113,861

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[1]Includes pheasant, blue and ruffed grouse, and Hungarian partridge.

Source: Molini and Barngrover, 1979; Leatham and Bunnell, 1979.

Trapping and hunting of burbearers generally provide a much smaller recreational resource than either big or upland game. Recent harvest data shown in Table 5.1.1-20 indicate that opportunities are much greater in the Nevada portion of the study area than in Utah.

Waterfowl hunting provides a moderate recreational opportunity in Nevada, although most of the hunting areas are outside the potential M-X deployment area. Harvest data for 1978 are shown in Table 5.1.1-21. Approximately 30 percent of the Nevada state-wide harvest was taken in counties of the study area.

The state wildlife agencies are managing game species to maintain or enhance hunting opportunities. Demand, however, currently exceeds availability for bighorn sheep, pronghorn, and elk (in Nevada only). Projections for big game population levels to the year 2020 (Walstrom, 1973) indicate that hunting opportunities may increase for all except bighorn sheep. Projected populations of upland game species could support more hunting for all species except sage grouse. Furbearer hunting opportunities are expected to remain the same as at present, while those for waterfowl may decline. All of the above projections assume no additional habitat loss resulting from human activities.

General Project Effects Nevada/Utah (5.1.1.8)

Currently, the demand for the most popular recreational opportunities, particularly water-related recreation, in Nevada and Utah, either approaches or exceeds the supply. The recreation demand scenario for the Nevada/Utah deployment area follows from three expected effects.

First, absolute increases (i.e., visitor use days) in recreational demand resulting from M-X - related population growth are expected to be substantial. In some areas the visual impacts of M-X may deter certain recreationists; in any case it is unlikely that recreationists will be drawn to the deployment valleys - at least in the long term, and the migration of recreationists out of the deployment areas will create added demand (of unknown proportions) on sites removed from the M-X influence. The value of the deployment game area as a hunting resource may be affected through human disturbance and habitat change. It is possible that certain game species (i.e., farm game commensals) will benefit but others, notably pronghorn, will probably show irreversible negative effects.

The sequence of M-X - related indirect effects, those resulting from recreational activities of project induced in-migrants, are as follows; increased recreation demand, increased competition for recreation resources, lower recreational quality, possible environmental degradation and greater administrative responsibilities placed on management agencies. These effects would not normally pose constraints on future recreation development opportunities. Only is cases where a non-renewable recreational resource is consumed, such as ORV activity in arid wildlands, is there concern over possible constraints. Normally, high intensity ORV recreation occurs in ORV parks, where landscape destruction has already occurred; otherwise it is so localized in space as to not be of concern with respect to future land-use constraints.

Table 5.1.1-20. Furbearer harvest by county in 1978 for those counties in the potential study area.

STATE COUNTY	BOBCAT		FOX[1]		COYOTE		MUSKRAT		BEAVER		OTHER[2]	
	HARVEST	NUMBER HUNTERS	HARVEST	NUMBER HUNTERS	HARVEST	NUMBER HUNTERS	HARVEST	NUMBER HUNTERS	HARVEST	NUMBER HUNTERS	HARVEST	NUMBER HUNTERS
NEVADA												
Clark	526		457		527		200		0		91	
Elko	357		106		1,760		2,760		266		312	
Esmeralda	130		18		65		0		0		8	
Eureka	107		21		243		6		13		16	
Lander	353		27		297		0		6		46	
Lincoln	523		443		1,002		115		0		93	
Mineral	199		292		396		37		42		29	
Nye	308		230		389		1		1		79	
White Pine	211		136		416		1,192		13		60	
Sub Total	2,714		1,730		5,095		4,311		341		734	
STATE TOTAL	4,542	909	2,322	909	8,458	909	9,898	909	715	909	1,261	909
UTAH												
Beaver							N/A	N/A	1	0		
Iron							N/A	N/A	4	0		
Juab							N/A	N/A	8	3		
Millard							349	N/A	0	0		
Tooele							N/A	N/A	0	0		
Sub Total							349		13			
STATE TOTAL	N/A[3]	N/A	N/A	N/A	N/A	N/A	11,790	N/A	2,958	213	279	76

734

[1]Gray and kit fox.

[2]Includes ringtail cat, mink, otter, skunk, weasel, raccoon, and badger in Nevada; marten and mink in Utah.

[3]N/A - Not available in state harvest reports.

Source: Molini and Barngrover, 1979; Provan, 1979.

Table 5.1.1-21. Waterfowl harvest data by county for Nevada/Utah study area.

STATE/ COUNTY	DUCKS		GEESE		COOTS	
	HARVEST	NUMBER HUNTERS	HARVEST	NUMBER HUNTERS	HARVEST	NUMBER HUNTERS
NEVADA						
Clark	8,369	1,262	443	1,262	367	206
Elko	5,536	666	166	666	0	0
Esmeralda	43	6	2	6	21	3
Eureka	1,100	119	7	119	9	9
Lander	202	73	0	73	3	3
Lincoln	6,513	898	68	898	748	136
Mineral	1,958	113	496	113	0	0
Nye	5,508	837	128	837	553	84
White Pine	1,051	201	5	201	0	0
Sub Total	30,280		1,315		1,701	
STATE TOTAL	104,840	12,452	6,940	12,452	3,184	805
UTAH[1]						
Beaver						
Iron						
Juab						
Millard						
Tooele						
Sub Total						
STATE TOTAL						

735-1

[1]Data for Utah are presently not available.

Source: Molini and Barngrover, 1979.

Second, the perimeters of the deployment areas under the various alternatives encompass between 20,000 and 30,000 square miles of land currently receiving heavy levels of dispersed and developed recreation use. It is plausible that part of the recreation demand currently met in the deployment area will shift to adjacent undisturbed areas.

Third, a critical change has occurred over the last decade in recreation planning in that supply is no longer increasing at the same rate as demand.

The likely outcome of these three trends is heightened competition for the recreational resources. The expected demand for dispersed recreation may not be met until after 1990. The increase in dispersed recreation demand, particularly for ORV recreation and hunting/fishing, may result in general environmental degradation. As dispersed recreation increases, conflict between non-complementary users may grow: hunters, birdwatchers, ORV recreationists, and persons seeking solitude may increasingly come into conflict.

Finally, the heightened recreation demand may impact land management agencies which are charged with maintaining the multiple uses of public lands.

Future Trends Without M-X — Nevada/Utah (5.1.1.9)

Both aspects of the recreational resource, the natural resource and the recreators, change continually and will do so whether or not M-X facilities are deployed over the landscape. Two factors are responsible for this change: demographic changes (age structure, total numbers, and distributions) of the Nevada and Utah populations, and changes in human recreational behavior.

Nevada's population is expected to increase from 487,000 people censused in 1970 to 1,200,000 people by 1995 (Nevada State Park System, 1977), based on past in-migration and birth rate trends. In fact, since 1950 over 70 percent of Nevada's population growth has resulted from in-migration, the peaks of which correspond to unemployment peaks in adjacent states, notably California. On the other hand, the major component of Utah's population growth is attributed to natural increases (Utah Outdoor Recreation Agency, 1978). The overwhelming majority of population growth in both states has been in counties surrounding metropolitan areas. Steady state population predictions for Nevada and Utah range from relatively high growth in a few Utah counties to population declines in others (Lincoln, White Pine counties, Nevada).

Factors contributing to changes in recreational resource supply and demand include:

(1) Energy Supply. National park and national forest visitation levels are dramatically affected by gasoline supply (and perhaps price) levels (Crocker, personal communication), with a future worsening of the petroleum market almost imminent, a long-term trend will likely emerge: that is, an increased strain on developed urban recreation resources and concommitant decline in per capita dispersed recreation demand.

Changes in total demand would become a function of population changes. Support for this scenario is provided by Utah statistics showing a 30 percent reduction in camping, hiking, and backpacking during the 1971-1972 and 1976-1977 periods. (Utah Outdoor Recreation Agency, 1976).

(2) Changes in recreational preferences. The lack of data on recreational preference trends makes this a difficult factor to comment on. However, the effects of increased interest in backpacking, camping, and hiking seen on a national level probably are evident in the increasing use of natural areas in the study area. Questions concerning the duration of this trend and its importance relative to demographic changes require future attention.

(3) Demographic changes attributable to other developments in the study area. Currently we are aware of seven such projects which will have similar but smaller impacts on recreational resource supply and demand through in-migration, Allen-Warner Valley Energy System, Alunite Plant, Anaconda-Moly Project, Intermountain Power Project, Kennecott Mine, White Pine County Electric Generating Plant and Pine Grove Molybdenum Mine.

Determination of projected conditions of outdoor recreation in Nevada and Utah warrants a clear understanding of future trends in recreational developments, demand, and a description of related recreational concerns. The following discussion will present the following: (1) an inventory and narrative of proposed parks and other recreation areas as indicated by federal and state planning officials; and (2), future visitor demand projections determined via guidlines established by respective recreation management agencies.

Proposed Developments (5.1.1.9.1)

In 1977, the Department of Interior, in response to Section 8 of Public Law 9183, as amended, provided to Congress, in 1977, a listing in general descending order of importance or merit, 13 areas in the United States which appeared to be of national significance and which were determined to have potential for inclusion into the National Park System. It was determined that an area representative of the Great Basin region should be considered.

The proposed Great Basin National Park was originally proposed in 1959. In the fall of 1979 the Secretary of the Interior submitted a report on the study of this area for potential inclusion in the National Park System (House Document No. 96-202, Part VI). Of the four areas considered, the Snake Range/Spring Valley Study Area was selected for further study as the choice for the location of the park. The Snake Range/Spring Valley Study Area is an 811,600 acre area approximately 30 miles east of Ely, White Pine County, Nevada. Field investigations in July 1980 resulted in a draft document on specific park alternatives. The report is to be submitted for appropriate committee and congressional review in December 1980.

No other substantial recreational developments are anticipated by the National Park Service which might have a direct bearing on M-X project activities.

The U.S. Forest Service does not anticipate any major recreational developments in the Nevada/Utah study area between 1980 and 1990. However, two small projects are currently being considered: (1) in Fishlake National Forest (Utah), Oak Creek Campground is expected to undergo major rehabilitation in an effort to increase its capacity between 1983 and 1985; and (2) Lamoille Canyon, in Humboldt National Forest (Elko County, Nevada) is expected to receive an established trailhead in the late 1980s. No further developments are currently expected.

Data concerning proposed BLM developed recreational sites were not available from any centralized source, but were collected on a district by district basis. Therefore, findings will be presented on a similar basis.

NEVADA BLM DISTRICTS

Ely. No formally proposed developed recreational areas are identified in the Ely district.

Battle Mountain (northern portion). Only one site is currently in the proposal stage: a day use area with picnic tables and shade structures at Mill Creek, approximately 20 mi (32 km) southeast of Battle Mountain. Several other areas, however, are currently in the conceptual stage as potential developed recreational areas. These include Robert's Mountain in central Eureka County and Lewis Canyon, immediately south of Battle Mountain.

Tonopah Resource Area (southern portion of Battle Mountain District. Although no formal proposals currently exist for the development of recreation sites, two areas are under consideration for re-evaluation should visitors reach 2,500 yearly. These areas are Lunar Crater and the Black Rock Lava Flow.

Elko. No formally proposed developed recreational areas are identified south of Interstate 80 in the Elko district. However, Ruby Marsh (south central Elko County) recreation site is currently in the process of being transferred into U.S. Forest Service ownership and management.

Las Vegas. No formally proposed developed recreational areas are identified in the Las Vegas district. However, the La Madre Range on the northern fringe of the Red Rock Canyon Recreation area may eventually be developed as a group camping area.

UTAH BLM DISTRICTS

Salt Lake. The only proposed development identified in the Salt Lake district proximal to areas determined as suitable for M-X deployment is expansion of facilities at Simpson's Springs, 32 mi (51 km) south of Tooele. The time frame of this development is currently unknown. Additionally, attention is being focussed on potential development of dispersed recreational areas as continued demand from the Wasatch Front area proliferates. This continuing trend of demand increases is in part dur to the desire by metropolitan residents to recreate closer to home in response to rapidly increasing travel costs.

Richfield. No new developed recreational sits are currently proposed in the Richfield district. However, potential improvements in the way of additional access, restrooms, and boat launching facilities may occur at the Yuba Dam Reservoir in the near future in a cooperative effort with the Utah Division of Parks and Recreation. Additional improvements are also expected at the Little Sahara Complex in eastern Juab County.

Several other areas were identified for potential recreational development should demand dictate it. These include the Deep Creek Mountains and Baker Hot Springs.

Cedar City. One site for potential future development identified in the Cedar City district is the Sand Mountain ORV area, located on south central Washington County. An additional development includes expansion of the already existing Red Cliffs campground, also in Washington County. Time frames for either development are unknown.

NEVADA STATE PARK SYSTEMS. Plans for additional recreational developments by the Nevada State Park System within study area counties are centered mainly in southeastern Nevada, particularly in Lincoln and Clark counties. Time frames relating to the establishment of these facilities are currently unavailable. However state recreation planning officials indicate that several areas may be developed between 1980 and 1900 as the demand for recreational resources necessitates.

Seven different sites are currently in long-range plans for recreational development in Lincoln County. They are: Freilbug (Leviathan) Cave in the western portion of the county; Rainbow Canyon, southern Lincoln County; Bristol Wells and Big Trees to the north; Pine-Mathews Reservoir in the Clover Mountains near Beaver Dam; Cleveland Ranch; and a historical site, the Pioche Courthouse.

Clark County may also receive as many as seven additional recreation areas in the future. These include: Bitter Ridge-Whitney Pockets; Fort Mohave; Keyhole Canyon; Knob Hill; Potosi-Yellow Plug; Spring Mountains; and Tule Springs. Of these seven, Fort Mohave will be the area developed for the most intensive recreation.

Seven potential preservation and interpretation areas could also become part of the Nevada State Park System in Clark County. Recreational development on these areas would be more restricted than on thos recreation areas mentioned above. The potential preservation/interpretation areas include: Arrow Canyon; Buffington Pockets; Gregory's Arch; Las Vegas Wash; McCullough and Highland Ranges; Rainbow Gardens; and the Virgin Mountains.

Although all of the aforementioned potential recreation, preservation/interpretation areas are situated in Clark County, of particular relevance to the M-X project are those areas which are primarily to the north of, or proximal to, Las Vegas. This includes: Tule Springs; Virgin Mountains; Whitney Pockets-Bitter Ridge; Buffington Pockets; Rainbow Gardens; and the Las Vegas Wash. Figure 5.1.1-10 presents the locations of these areas and their proximity to Las Vegas.

UTAH DIVISION OF PARKS AND RECREATION. At the present time, there are no proposed Utah State Park System elements within or proximal to the study area. Efforts are currently underway, however, to determine the need for additional state parks statewide. The effort is based upon analysis of population characteristics and participation rate projections on a Multi-County District basis which is expected to be completed later this year.

Visitor Demand - Developed Recreation Areas (5.1.1.9.2)

The following section will describe trends in visitations to developed recreation areas in Nevada and Utah on an agency by agency basis. Notable will be the absence of projections from each agency. This is partly due to the recent fluctuations in visitor demand experienced by many areas which make accurate forecasting tenuous.

The uncertainty about predicting future demand lies in the fact that the number of out of state visitors, which for many areas constitute a substantial share of the visitations, are influenced by factors whose futures are erratic such as the cost of travel. However, visitations to developed recreational resources attributable to local residents is closely correlated to population grouwth with the region. Estimates have been obtained which identify counties in the Nevada/Utah study area likely to experience substantial population increases between 1980 and 1994. These counties include White Pine, Clark, Lincoln, and Washoe Counties in Nevada, and Iron, Beaver, Juab, Millard, Salt Lake Utah, and Washington Counties in Utah, all of which are anticipated to experience an average annual change in excess of 3.0 percent during this period. As a result, visitations to developed recreational areas proximal to these counties will likely experience substantial increases in demand pressure. The tables accompanying the following agency discussions which forecast future visitation trends would include the number of visits attributable to local residents.

The National Park Service currently administers two recreational resources within the study area: Lehman Caves National Monument, White Pine County; and, the Lake Mead National Recreational Area, along the Colorado River in southeastern Clark County. Contacts with officials at both locations indicate that visitor demand, which experienced a substantial decrease between 1978 and 1979, is likely to continue a decline or level off in the near future. The recent downturn was primarily due to the energy crisis. As a result, officials at both sites feel that forecasts for future visitor demand would at best be tenuous until a clear picture of the energy situation becomes evident.

Lehman Caves National Monument is located in an area currently being studied for potential as an addition to the National Park System. It is the contention of the National Monument's administrative officer that if Lehman Caves were to become an element of a national park, that visitations would experience a dramatic increase.

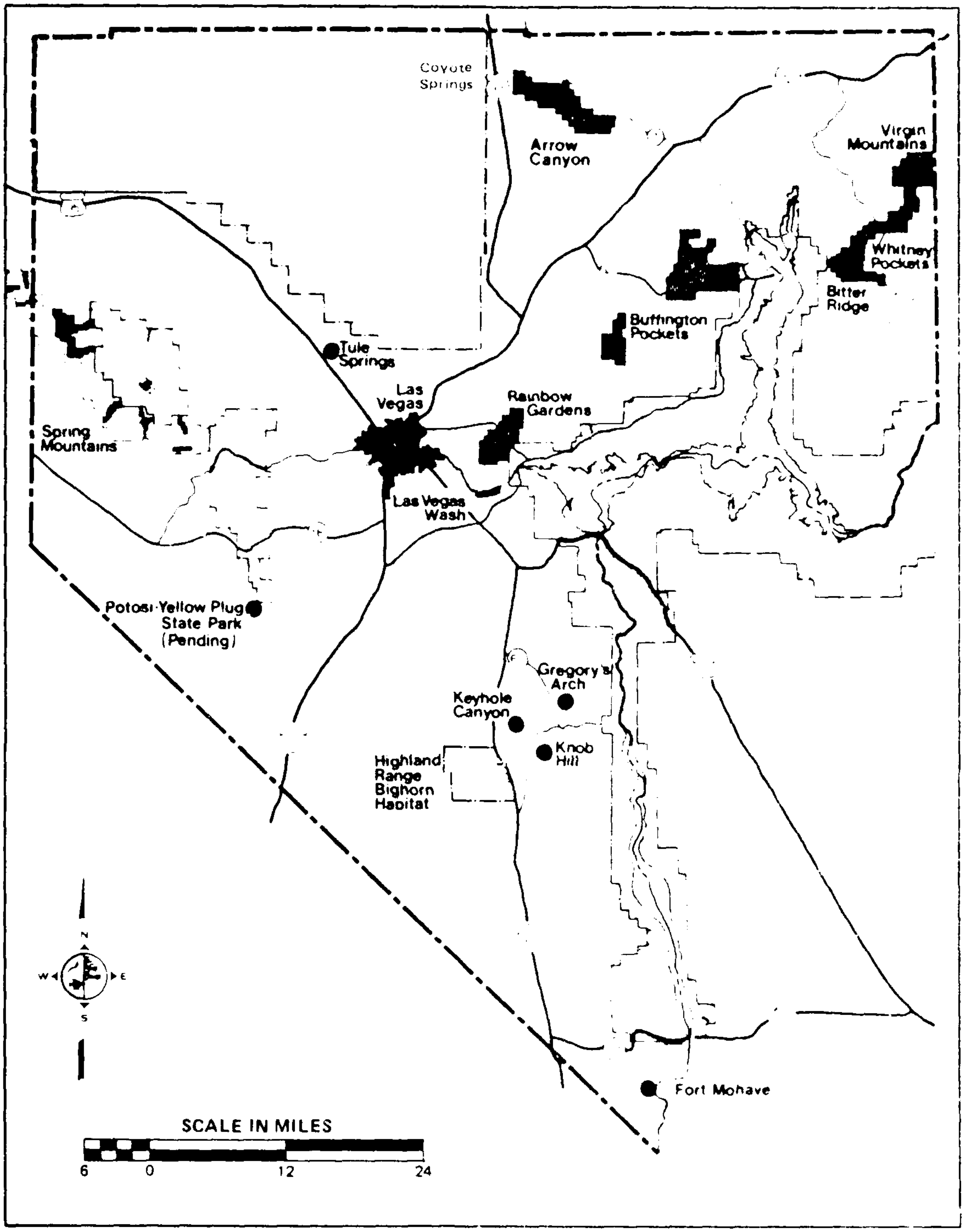

Figure 5.1.1-10. Potential Nevada state park system elements in Clark County.

The U.S. Forest Service currently administers seven national forests which have elements within study area counties. No projections of visitor demand are available from this agency for the period 1980-1990. As a results, estimation of yearly visitor demand between 1980 and 1990 based upon the rate of average annual growth between 1970 and 1979 has been undertaken on a forest-by-forest basis (Table 5.1.1-22). These estimates serve as approximations and assume an upward linear growth trend. Fluctuations due to exogenous factors such as the cost of travel and rapid population growth attributable to projects other than M-X are not considered.

As is the case with nearly all agencies providing [illegible] resources in the study area, U.S. Forest Service officials indicate that the recent energy situation has and probably will continue to have a great deal of influence upon visitor use on their respective forests. The situation is compounded by the remoteness of some national forest lands. Notable in this regard are the portions of Toiyabe and Humboldt National Forests in central and east-central Nevada, around which the population base is extremely small. Humboldt National Forest, in particular, experienced less than 0.5 percent of growth between 1970 and 1979 on an average annual basis and is therefore expected to receive the least amount of additional growth between 1980 and 1990 without implementation of the project.

No visitor demand projections for the period between 1980 and 1990 are available from the BLM. However, contacts with various Districts did result in at least an opinion on the part of recreation planners on whether or not visitor use is likely to increase, remain steady, or decrease in the near future. Table 5.1.1-23 indicates projected trends in visitor demand for BLM developed recreational sites in the Nevada/Utah study area.

The Nevada State Parks Agency does not at the present time have projections of visitor demand for components of its state park system within the study area. However, agency officials have indicated that an 8.0 percent average annual rate of growth would be acceptable for estimating purposes. It is important to note that projections on this basis [illegible] an upward linear growth trend, and that exogenous factors such as [illegible] travel, weather conditions, and others, are not accounted for. [illegible] respective rates of growth for individual state park elements [illegible] considered. Several elements of the system, for example, [illegible] declines in the number of visitations between 1976 and 1978 [illegible] Lake, and Spring Valley), while others, experienced [illegible] rates (Lahontan Reservoir, Echo Canyon, and Red Rock Canyon).

Table 5.1.1-24 indicates anticipated visitor [illegible] Nevada State Park System elements based upon the 8.0 percent [illegible] rate of growth factor. As shown, Lahontan Reservoir and Red Rock [illegible] more than 1 million visitors by 1990. Nevada State Park [illegible] indicate that many of the state parks would receive demand [illegible] capacity should an 8.0 percent linear growth rate be experienced, however.

Between 1970 and 1978, Utah State Park System elements within the study area experienced increased visitor demand at the average annual rate of 12.9 percent, as a group. Table 5.1.1-25 indicates visitor demand projections for all years between 1980 and 1990 assuming continuance of the same growth rate. Variation between rates of growth for individual park system components is not considered, nor are exogenous factors such as cost of travel, weather or large scale population increases. It can be expected that the

Table 5.1.1-22. Projections of visitor demand selected Nevada and Utah National Forest, 1980-1990, without the project (in thousands).*

FOREST	1970	1979	AVERAGE ANNUAL GROWTH 1970-79 PERCENT	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Toiyabe	[illegible]	2,825.1	2.72	2,953.3	3,033.6	3,116.1	3,200.9	3,288.0	3,377.4	3,469.3	3,563.6	3,660.6	3,760.1	3,862.4
Humboldt	470.8	482.6	0.28	484.0	485.3	486.7	488.0	489.4	490.8	492.1	493.5	494.9	496.3	[illegible]
Dixie	[illegible]	1,335.3	6.98	1,428.5	1,528.2	1,634.9	1,749.0	1,871.1	2,001.7	2,141.4	2,290.9	2,450.8	2,621.8	[illegible]
Fishlake	1,019.0	1,265.4	2.46	1,296.3	1,327.9	1,360.3	1,393.5	1,427.5	1,462.3	1,498.0	1,534.6	1,572.0	1,610.4	[illegible]
Manti-LaSal	[illegible]	[illegible]	8.00	1,005.5	1,085.6	1,172.4	1,266.2	1,367.5	1,476.9	1,595.1	1,722.2	1,860.5	[illegible]	[illegible]
[illegible]	1,484.9	[illegible]	2.39	1,880.1	[illegible]	[illegible]	2,018.1	2,066.4	2,115.8	2,166.4	2,218.2	2,271.2	[illegible]	[illegible]
[illegible]	[illegible]	5,872.2	9.71	6,442.4	[illegible]	7,754.2	8,507.2	[illegible]	10,239.5	11,233.7	12,324.5	13,521.2	14,834.2	[illegible]

* [illegible] annual growth trend between 1960 and 1979 on a by-forest basis. Assumes continuous linear growth trend. As a region, these [illegible] percent annual growth yearly between 1970-1979.

[illegible] Forest Service, 20 Feb. 1980, Jim [illegible], personal communications. HDR Computations.

Table 5.1.1-23. Expected trends in visitor use on BLM developed recreation sites in the Nevada/Utah study area.

SITE	DISTRICT	TREND	COMMENTS
North Wildhorse	Elko	Remain Steady	Unless development occurs
Ruby Marsh	Elko	Remain Steady	—
Hickison Petroglyph	Battle Mountain	Remain Steady	Approximately 200 visitor days yearly
Willow Creek	Las Vegas	Remain Steady	—
Cold Creek	Las Vegas	Remain Steady	—
Willow Spring	Las Vegas	Remain Steady	Upgrading to refurbish vandalized amenities occurring
Little Sahara Complex	Richfield	Remain Steady	—
Simpson's Spring	Salt Lake	Moderate Increase	—
Red Cliffs	Cedar City	Increase	4.3 percent annually

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Sources: Elko BLM District, Feb. 1980, Gene Dreis, Personal communication;
Battle Mt. BLM District, Feb. 1980, Alan Steinbeck, personal communication;
Las Vegas BLM District, Feb. 1980, Russ Storbo, personal communication;
Richfield BLM District, Feb 1980, Stuart Jacobson, personal communication;
Salt Lake BLM District, Feb. 1980, John Scabinski, personal communication;
Cedar City BLM District, Feb. 1980, Paul Boos, personal communication.

[illegible] 1980-1990 WITHOUT THE PROGRAM [illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	11,258	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	884,908	[illegible]	[illegible]	1,113,672	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	106,204	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	7,139	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	12,233	13,212	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	112,132	126,826	[illegible]	147,930	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	51,827	59,213	63,956	69,066	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	100,781	108,847	[illegible]	[illegible]	137,115	148,385	159,931	[illegible]	[illegible]
Kershaw Ryan	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	36,612	[illegible]	[illegible]	[illegible]	41,148	[illegible]	[illegible]
[illegible]	45,964	49,641	53,612	[illegible]	62,533	[illegible]	[illegible]	78,774	85,676	91,682	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5,442	[illegible]	6,347	6,855	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	323,172	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

several state parks which have historically experienced large visitor demand will continue to do so. Notable in this regard are Deer Creek, Gunlock, Saltair Beach, and Yuba Lake.

Deer Creek Lake, Saltair Beach, Pioneer Trail, Snow Canyon, and Utah Lake can all be expected to receive in excess of one million visitors by 1990 should continued growth at the rate of 12.9 percent yearly occur. It must be noted, however, that these and several other areas may reach maximum capacity long before 1990 at this rate.

TEXAS/NEW MEXICO (5.1.2)

Ownership/Administration (5.1.2.1)

Most parklands and major developed recreational areas in east-central New Mexico and the northeastern portion of the Texas Panhandle fall under the jurisdiction of, and are owned and/or administered by, the following federal and state agencies: National Park Service, U.S. Fish and Wildlife Service, Corp of Engineers, U.S. Forest Service, New Mexico Parks and Recreation Commission, and Texas Department of Parks and Wildlife.

Campgrounds and Major Outdoor Recreational Areas (5.1.2.2)

Major recreational areas in the Texas/New Mexico project area are shown in Figure 5.1.2-1. Campgrounds and major recreational areas and most of the major parklands and recreational facilities are found near the the periphery of the study area. The distribution of these areas in selected New Mexico and Texas counties and the managing and/or operating agency shown in Tables 5.1.2-1 and 5.1.2-2. Most are associated with water bodies. Many of the parklands, particularly state parks, and all major parks are situated close to major transportation corridors.

Water-based Recreation (5.1.2.3)

Swimming, boating, fishing, and waterskiing are the major water-oriented recreational activities in the New Mexico and Texas study areas. Other recreational-activities such as picnicking and hiking are also enhanced by the availability of nearby water. Tables 5.1.2-3 and 5.1.2-4 list major water bodies in the New Mexico and Texas study areas. See Figure 5.1.2-2.

Off-road Vehicle (ORV) Recreation (5.1.2.4)

The Texas portion of the study area is primarily agricultural land and is not conducive to extensive ORV activity; in New Mexico, ORV use is much greater. No designated or high-quality (2,000 plus annual visits) ORV use-areas have been identified within the study area.

Snow-related Activities (5.1.2.5)

Snow-related activities such as crosscountry skiing, snow-mobiling, and sledding hold relatively low recreational priorities for residents within the study area. This is due primarily to the absence of quality

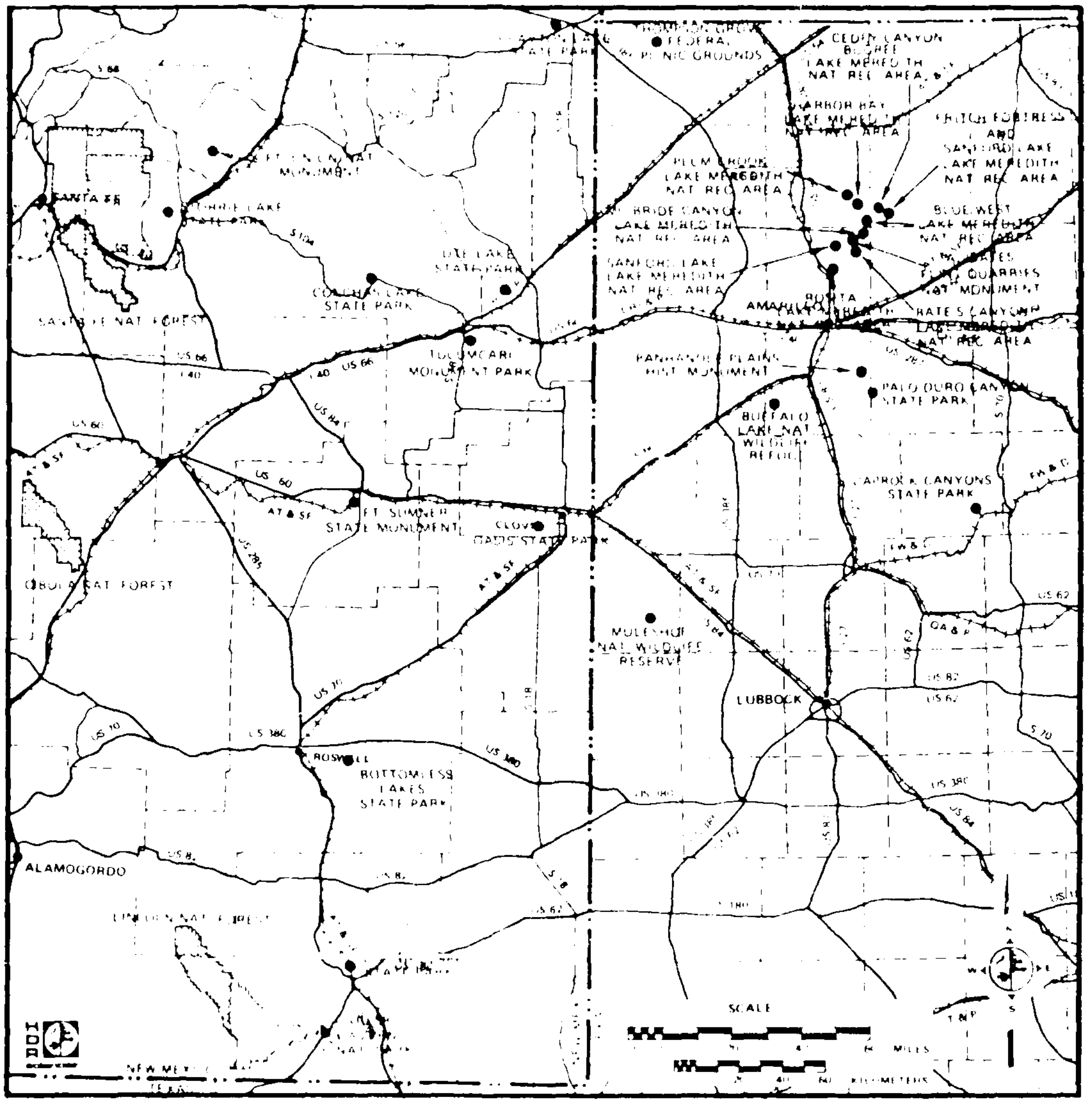

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Figure 5.1.2-1. Major recreational areas in Texas/New Mexico.

Table 5.1.2-1. Major parklands and recreational facilities in New Mexico study area counties.

COUNTY	ADMINISTERING AGENCY	PARK/AREA NAME
De Baca	New Mexico Parks and Recreation Commission	Sumner Lake State Park
Chaves	New Mexico Parks and Recreation Commission	Bottomless Lakes State Park
	U.S. Fish and Wildlife Service	Bitter Lakes National Wildlife Refuge
	U.S. Forest Service	Lincoln National Forest (portion)
Curry	No major parklands	
Quay	New Mexico Parkland Recreation Commission	Ute Lake State Parks
Roosevelt	New Mexico Parks and Recreation Commission	Oasis State Park
	U.S. Fish and Wildlife Service	Grulla National Wildlife Refuge
Union	New Mexico Parks and Recreation Commission	Clayton Lake State Park
	National Park Service	Capulin Mountain National Monument
	U.S. Forest Service	Kiowa National Grasslands (portion)
Harding	New Mexico Parks and Recreation Commission	Chicosa Lake State Park
	U.S. Forest Service	Kiowa National Grasslands (portion)
San Miguel	New Mexico Parks and Recreation Commission	Conchas Lake State Park
	New Mexico Parks and Recreation Commission	Storrie Lake State Park
	New Mexico Parks and Recreation Commission	Villanueva State Park
	U.S. Forest Service	Santa Fe National Forest (portion)
	U.S. Fish and Wildlife Service	Las Vegas National Wildlife Refuge

2864

Source: New Mexico State Comprehensive Outdoor Recreation Plan 1976; State Parks for New Mexico's Future [illegible]; Rand McNally Road Atlas, [illegible], [illegible], Mex[illegible].

Table 5.1.2-2. Major parklands and recreational [illegible] Texas study area counties.

COUNTY	ADMINISTERING AGENCY	[illegible]
Dallam	U.S. Forest Service	Rita Blanca [illegible]
Sherman	No major parklands	
Moore	National Park Service	Lake Meredith National [illegible] Area (portion)
Potter	National Park Service	Lake Meredith Nat[illegible] Area (portion)
	National Park Service	Alibates Flint [illegible] Monument
Oldham	No major parklands	
Deaf Smith	No major parklands	
Randall	U.S. Fish and Wildlife Service	Buffalo Lake Nation[illegible] Refuge
	Texas Department of Parks and Wildlife	Palo Duro Cany[illegible] (portion)
Parmer	No major parklands	
Castro	No major parklands	
Swisher	No major parklands	
Briscoe	Texas Department of Parks and Wildlife	Caprock Canyon [illegible]
Bailey	U.S. Fish and Wildlife Service	Muleshoe Nati[illegible]
Lamb	No major parklands	

Source: Rand McNally Road Atlas (U.S., Can., Mex.).

Table 5.1.2-3. Recreational lakes and streams in the New Mexico study area.

COUNTY	STREAMS	LAKES WITH GREATER THAN 40 SURFACE ACRES
Union	Perico Cimarron (100 mi) Carrizozo North Canadian(Seneca) Carrizo Ute Tramperos	Clayton Lake Weatherly Lake Pasamonte Lake
Quay	Ute Canadian (50 mi) Conchas Canal Plaza Largo	Ute Res. Tucumcari Lake Hudson Lake
Curry	Frio	La Tule Lake
Roosevelt		Lewiston Lake Salt Lake Little Salt Lake
De Baca	Pecos (80 mi) Rio Penasco (40 mi) Rio Hondo (47 mi)	Red Lake Alamogordo Res. Bitter Lakes (7)
Chaves	Arroyo del Macho Rio Felix Pecos (118 mi)	Two Rivers Res. Roswell Saline Zuber Lake Lake Van

2804

Table 5.1.2-4. Recreational lakes and streams in the Texas study area counties.

COUNTY	STREAMS	LAKES
Dallam	Carrizo Mustange (West Rita Blanca) Cold Water	
Hartley	Punta de Agua Rita Blanca	
Oldham	Rita Blanca Canadian	Lake Meredith (portion)
Moore	S. Palo Duro	Lake Meredith (portion)
Deaf Smith	Palo Duro Tierra Blanca Frio	
Randall	Palo Duro Tierra Blanca	Buffalo Lake
Parmer	Frio Running Water	
Castro	Running Water Frio	
Swisher	Tule	
Bailey	Blackwater	
Lamb	Blackwater Running Water	
Hale	Blackwater Running Water	
Cochran	Sulphur Draw	

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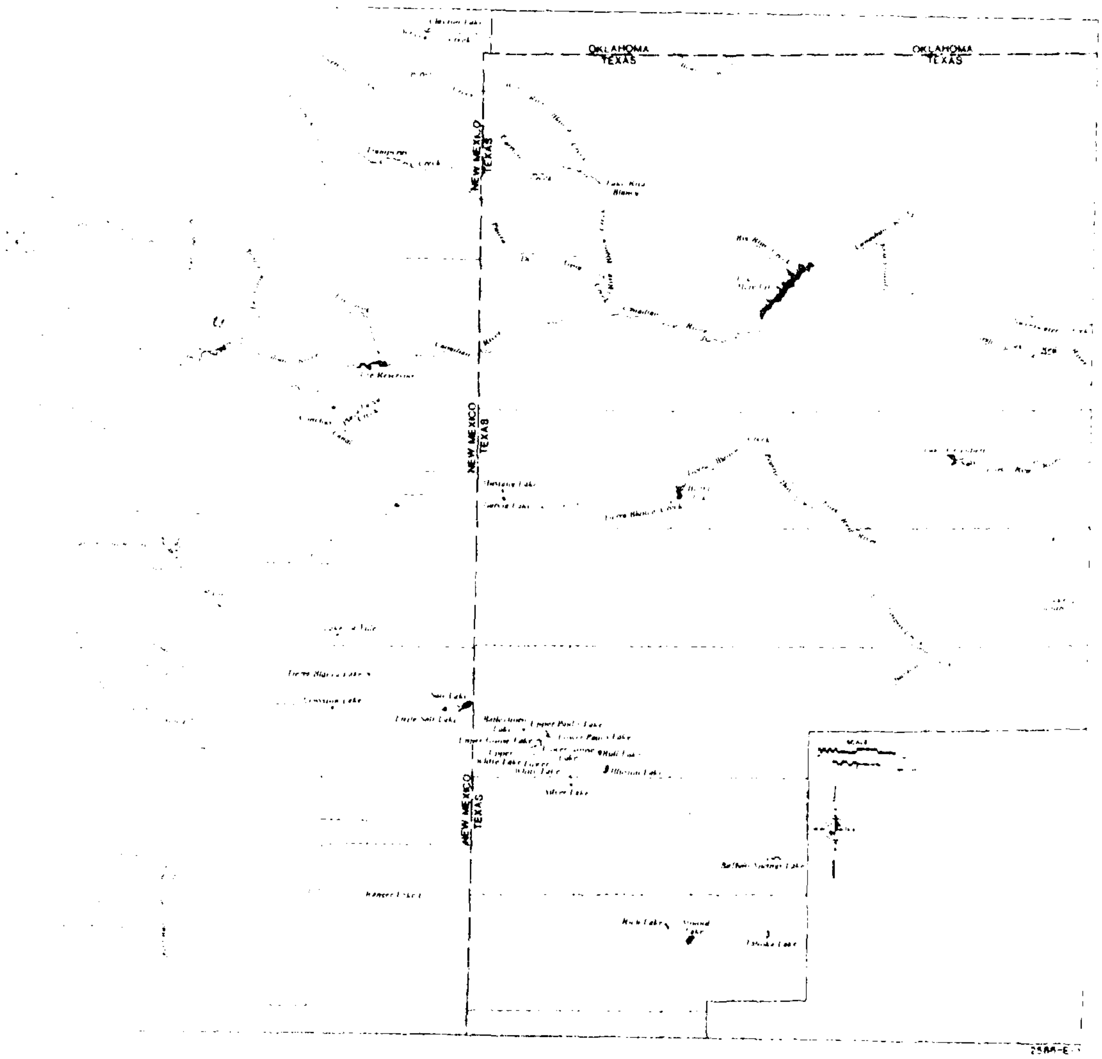

Areas of water based recreation in the Texas/ New Mexico study area.

snow-play areas nearby. Out of the 35 major recreational activities analyzed to determine recreational preferences of New Mexico and Texas residents within the study area no single snow-related activity ranked higher than 23rd (sledding), while most of the others fell between 30th and 35th. Most snow play areas occur farther than 150 miles from the key population centers in the study area.

Visitor-Use (5.1.2.6)

Table 5.1.2-5 presents the number of visitations to major parklands in the Texas/New Mexico study area in 1975 and 1979. As indicated, parkland visitations in the Texas portion of the study area are concentrated primarily at Lake Meredith and Palo Duro Canyon State Park. In 1975, more than 2.5 million visits were made to these two areas alone. Four state parks in the New Mexico portion of the study area each experienced more than 100,000 visits in 1979: Bottomless Lakes State Park, Chaves County (188,200); Ute Lake State Park, Quay County (258,900); and Conchas Lake and Storrie Lake State Parks, both in San Miguel County, (136,800 and 485,900, respectively). There is a strong relationship between water-oriented developed recreational areas and a high incidence of visitation in the Texas/New Mexico study area.

Hunting (5.1.2.7)

Big game hunting is not an important activity in the Texas/New Mexico study area because big game are found mostly in habitats east or north of the area. For example, white-tailed deer population estimates range from zero in 13 High Plains counties of Texas, to 50 in Moore County, and 200 in Potter County. During late fall through early spring, mule deer concentrate to feed on wheat fields adjacent to Palo Duro Canyon, well to the east of the Texas and New Mexico project area. The imported aoudad (barbary sheep) also inhabits Palo Duro Canyon, and each fall a census of its population is conducted by helicopter from the upper reaches of the canyon in Randall County south to Floyd County. An annual aerial census of pronghorn shows that most of the antelope are found in the northern portion of the study area in Oldham, Hartley, Dallam and Potter counties. An inventory of the big game hunted in the High Plains Red River drainage area is shown in Table 5.1.2-6.

The data on small game show that the Rio Grande turkey population in the High Plains habitat area is insignificant and confined to Randall and Swisher Counties. The introduced ring-necked pheasant population that thrives on the irrigated cropland of the High Plains is approximately one-tenth that of nonirrigated cropland. The lowest density of mourning dove in the High Plains is due to lack of cover and diversity of habitat. Fox squirrel habitat in the High Plains is insignificant. Rabbit are not considered as game animals in Texas and little census data exist concerning these species. The eastern cottontail is distributed widely, and the black-tailed jackrabbit and desert cottontail increase in abundance in the open western areas.

Ponds and playas that remain wet for at least 60 percent of the time are considered habitat for waterfowl. Approximately 25 percent of the surface areas of lakes are effective waterfowl habitat. Even though geese

Table 5.1.2-5. Visitations to major parklands in the Texas/ New Mexico study area, 1979.

COUNTY	PARK NAME	ADMINISTERING AGENCY	VISITATIONS
Texas			
Moore	Lake Meredith National Recreation Area (Portion)	National Park Service	1.7 Million[1]
Potter	Lake Meredith National Recreation Area (Portion)	National Park Service	Same as Above
Randall	Palo Duro Canyon State Park	Texas Parks & Wildlife Dept.	[illegible]51,000[2]
Briscoe	Caprock Canyons State Park	Texas Parks & Wildlife Dept.	12,2[illegible][3]
New Mexico*			
DeBaca	Sumner Lake State Park	New Mexico Parks & Recreation Commission	67,100
Chaves	Bottomless Lakes State Park	New Mexico Parks and Recreation Commission	188,200
Curry	No major parklands[illegible]		
Quay	Ute Lake State Park	New Mexico Parks and Recreation Commission	255,900
Roosevelt	Oasis State Park	New Mexico Parks and Recreation Commission	92,000
Union	Clayton Lake State Park	New Mexico Parks and Recreation Commission	34,600
Harding	Chicosa Lake State Park	New Mexico Parks and Recreation Commission	9,700
San Miguel	Conchas Lake State Park	New Mexico Parks and Recreation Commission	136,800
	Storrie Lake State Park	Same as Above	485,900
	Villanueva State Park	Same as Above	24,600

3361

[1,2,3] Visitation data is 1975.

* All visitations are 1979 and rounded to nearest 100.

Sources: New Mexico Parks and Recreation Commission, Planning Division, 30 July 1980, Bob Findling, Planner, Telephone Communication.

Texas: Bureau of Business Research (University of Texas at Austin), 1976, _Atlas of Texas_, Austin, Texas.

Table 5.1.2-6. Wildlife inventory estimates in the High Plains drainage area of the Red River.

SPECIES	HABITAT (ACRES)	TOTAL POPULATION
White-Tailed Deer	55,850	30
Mule Deer	73,260	380
Aoudad (Barbary Sheep)	55,850	150
Pronghorn	—*	—*
Rio Grande Turkey	72,330	130
Ring-Necked Pheasant	1,239,770	47,850
Lesser Prairie Chicken	—*	—*
Quail	2,578,830	23,200
Mourning Dove	3,070,000	185.520
Fox Squirrel	23,040	90
Ducks	35,370	176,850
Geese	35,370	35,370

2817

[1]From U.S.D.A., Special Report, 1976.

*Numbers not available.

[illegible] cultivated fields [illegible] are important [illegible] limiting factor. [illegible] and a small number of waterfronts [illegible] area is the limiting factor. [illegible] of [illegible] demand for [illegible] hunting [illegible]

[illegible]

Ponds, playas and lakes [illegible] than [illegible] fishing habitats in the Texas and New Mexico High Plains. [illegible] of the playas are thought to contain [illegible] throughout the year. In a special 197[illegible] report [illegible] Department of Agriculture in cooperation with [illegible] was assumed that [illegible] on private land [illegible] and that only [illegible] percent of [illegible] available [illegible] for [illegible] surface acres of lakes [illegible] to meet the expected fishing demand.

[illegible] Texas/New Mexico [illegible]

[illegible] in Texas/New Mexico is [illegible] tion opportunities in Texas/New Mexico are [illegible] sites scattered over the agricultural plateau. [illegible] construction phase will result in an increase [illegible] to existing [illegible] Area, [illegible] visitor [illegible] are expected [illegible] phase. The Texas/New Mexico recreation facilit[illegible] local residents [illegible] percent of visitors [illegible] sites. If this pattern of [illegible] tion and operation phases, then the few developed [illegible] experience severe over crowding. [illegible] in Texas and [illegible] New Mexico will [illegible] tion supply [illegible] recreation facilit[illegible] example [illegible] would be [illegible]

Future [illegible]

[illegible]

[illegible]

[illegible] that [illegible] for [illegible] [illegible] other areas of the [illegible] the [illegible] demand not [illegible] developments are anticipated in the [illegible] portion of the study area between 1980 and 1990. Federal [illegible] parks in the Texas [illegible] is currently the subject of continuing [illegible].

[illegible] and one is currently [illegible] within the New Mexico portion of the study area. On [illegible] approximately [illegible] northwest of Clovis, the New Mexico State Parks [illegible] [illegible] a park to be named either [illegible] Eastern State Park. Although construction of facilities at this [illegible] may conclude late in 1980, dedication of the facility is not anticipated until spring, 1981. Two other parks are proposed within the study area. The time frames for these developments are currently unknown, however [illegible] tentatively named Lea County State Park, would be located approximately [illegible] northwest of Hobbs in southeastern New Mexico. [illegible] park combination [illegible] [illegible] developments are identified [illegible] New Mexico study area. Federal proposals for park developments in the New Mexico [illegible] are currently the subject of continuing studies.

Visitor Demand [illegible] Recreation Areas [illegible]

[illegible] trends in visitation [illegible] [illegible] will [illegible] recent fluctuation [illegible] forecasting [illegible] based on [illegible] to date.

[illegible] future [illegible] factors, which for many [illegible] influenced by factors [illegible] However, visitation [illegible] to local residents [illegible] the region. Estimates have been [illegible] Texas/New Mexico study area likely [illegible] population increases between [illegible] Chaves, Harding, Quay, and [illegible] [illegible] Randall Counties in Texas, [illegible] annual change [illegible] result, visitation to parks [illegible] corresponding increases in [illegible] future visitor demand [illegible] of visitor attendance [illegible]

[illegible] estimates are available [illegible] portion of the study area [illegible] Duro Canyon State Park. However, [illegible]

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The New Mexico State Parks Department does not have projections of visitor demand for components of its state park system within the study area. However, agency officials indicated on a park-by-park basis what they felt future trends would likely be. As a result, projections based upon these perceptions were made using 1979 visitations as the base year. These estimates are presented in Table 5.1.2-7. As indicated, several parks are likely to experience relatively stable levels of demand. Although due to several factors, the predominant reason for this stability is that while out-of-state visitors are expected to decrease, the reduction would be offset by local demand. Summer Lake, Oasis, Clayton Lake, and Storric Lake State Parks are likely to have this type of experience. Bottomless Lakes, Ute Lake, and Conchas Lake State Parks are anticipated to receive substantial increases in visitors, however. This is due primarily to their proximity and access to sizeable populated areas. Only Villanueva State Park in San Miguel County is experiencing decreasing visitations. Federal Park visitation trends in the New Mexico portion of the study area are currently the subject of ongoing studies.

5.2 METHODOLOGY FOR IMPACT ANALYSIS

The impact analysis was separated into DDA or region wide impacts and impacts to the OB sites and vicinities. Within each of these project components direct and indirect impacts were addressed. Direct impacts are defined as occasions when the conceptual project layout intersects with recreational lands. Indirect impacts are measured as project induced increases in resource utilization or demand.

DDA IMPACTS (5.2.1)

Direct Impacts

In each of the two alternative deployment regions the 1:500,000 scale designated deployment area maps, 3222-E for full basing and 3291 for split basing in Nevada/Utah; 1617-E-A for full basing and 3235 for split basing in Texas/New Mexico, were overlaid on 1:500,000 recreational resource maps for each region, 3334-E for Nevada/Utah and 3335-J for Texas/New Mexico. (See Figure 5.2.1-1 and 5.2.1-2). The recreational resource maps were generated from a number of references (TORP 1979; NMORP 1976; Nevada BLM 1977; Utah BLM 1971; U.S.F.S. 1969, Utah and Nevada State Department of Transportation 1979 and 1980). Intersections between these conceptual project layouts and recreational resources were determined from this base.

Indirect Impacts

Estimates of resident utilization of recreational resource parklands in the two alternative regions was used as a measure of the expected indirect impacts. The U.S. Bureau of Census National Travel Survey (1979) and the Nevada Division of State Parks (1980) indicate that a reasonable estimate of the annual number of outdoor recreational trips per capita is 1.95. This figure was then multiplied by the M-X-induced populations in each county in peak year (1987) and steady state (1994) and these data were summed regionally for each respective year. This assumes that all project induced

Table 5.1.2-7. Projections of visitor demands at state parks within the study area, 1980-1990 without the project. (Page 1 or 2).

SITE	PERCENTAGE CHANGE IN VISITATION[1]	1979	1980	1981	1982	1983	1984
Sumner Lake	Stable	67,100	67,100±	67,100±	67,100±	67,100±	67,100±
Bottomless Lakes	+10.0%	188,000	206,900	227,500	250,300	275,300	302,900
Ute Lake	+5.0%	259,000	271,900	285,500	299,800	314,800	330,500
Oasis	Stable	92,000	92,000±	92,000±	92,000±	92,000±	92,000±
Clayton Lake	Stable	34,600	34,600±	34,600±	34,600±	34,000±	34,600±
Chicosa Lake	+1.0%	9,700	9,800	9,900	10,000	10,100	10,200
Conchas Lake	+5.0%	136,800	143,600	150,800	158,300	166,300	174,600
Storrie Lake	Stable	485,900	486,000±	486,000±	486,000±	486,000±	486,000±
Villanueva	-2.0%	24,600	24,100	23,600	23,100	22,700	22,200

4104

[1]Assumes linear growth or decline (personal communication, New Mexico State Planning Division, 1980).

Table 5.1.2-7. Projections of visitor demands at New Mexico state parks within the study area, 1980-1990 without the project. (Page 2 of 2).

SITE	1985	1986	1987	1988	1989	1990
Sumner Lake	67,100±	67,100±	67,100±	67,100±	67,100±	67,100±
Bottomless Lakes	333,100	366,500	403,100	443,400	487,800	536,500
Ute Lake	347,000	364,400	382,600	401,700	421,800	442,900
Oasis	92,000±	92,000±	92,000±	92,000±	92,000±	92,000±
Clayton Lake	34,600±	34,600±	34,600±	34,600±	34,600±	34,600±
Chicosa Lake	10,300	10,400	10,500	10,600	10,700	10,800
Conchas Lake	183,300	192,500	202,100	212,200	222,800	233,900
Storrie Lake	486,000±	486,000±	486,000±	486,000±	486,000±	486,000±
Villanueva	21,800	21,300	20,900	20,500	20,100	19,700

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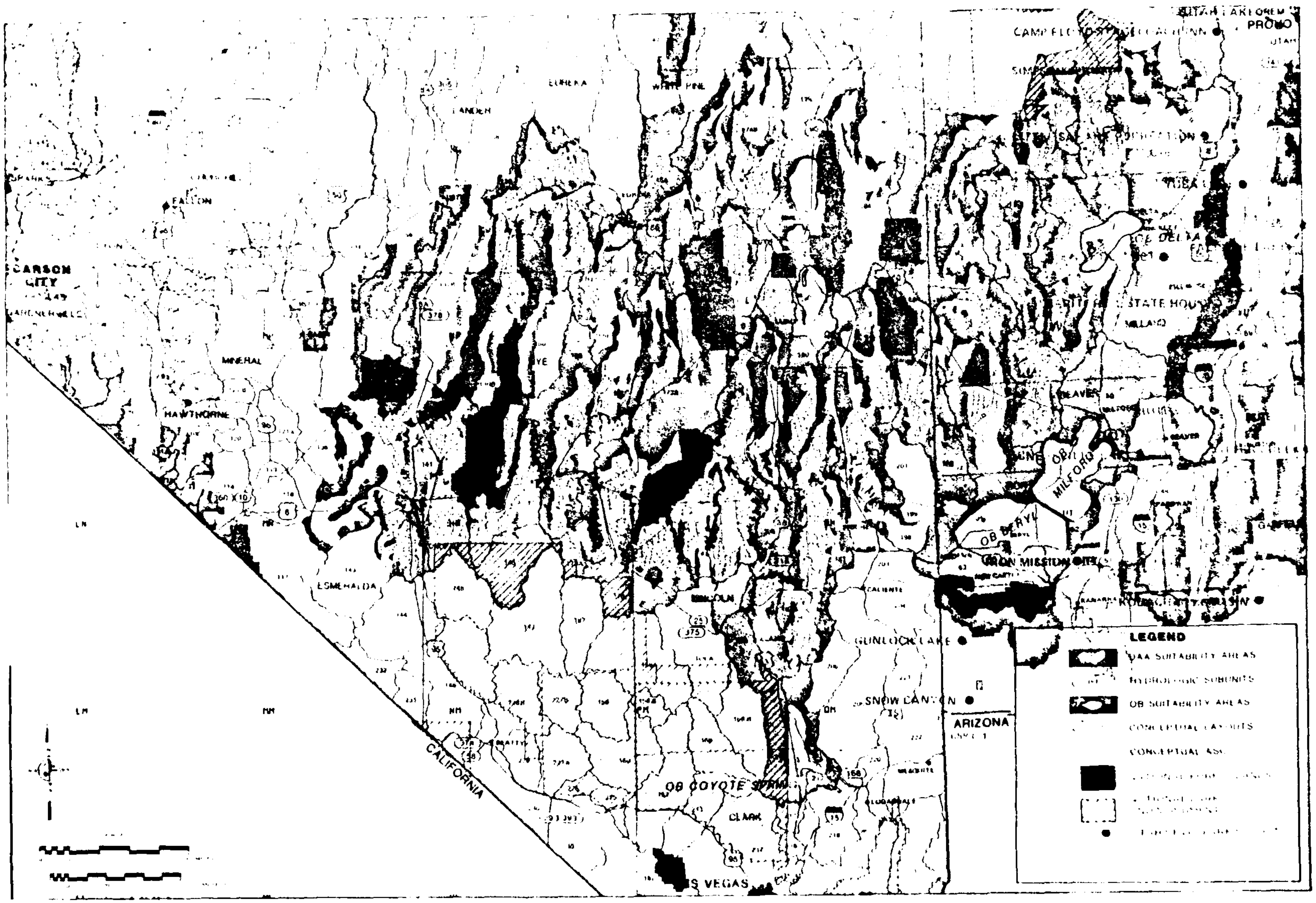


Figure 5.2.1-1. Recreational areas in Nevada/Utah.

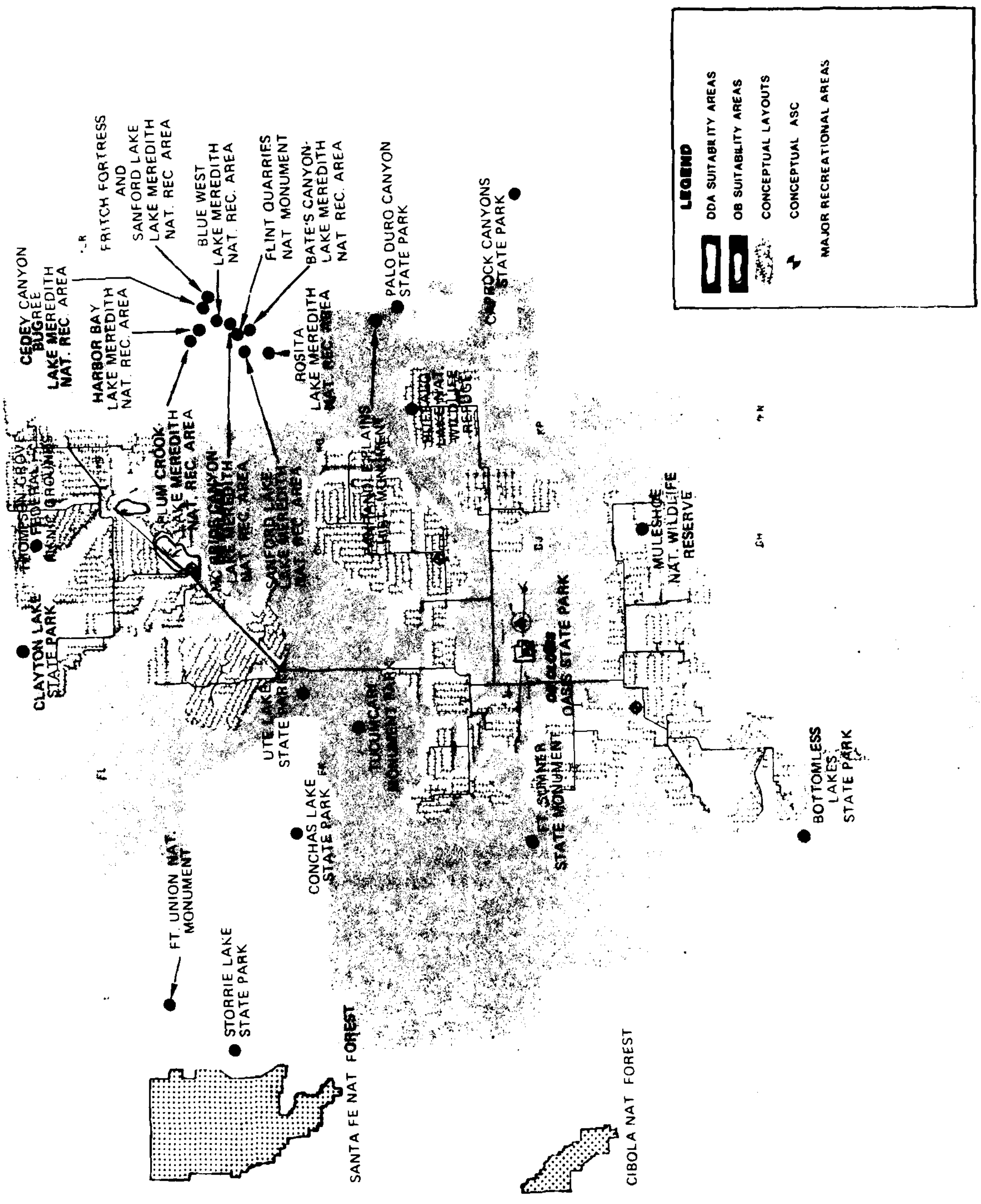


Figure 5.2.1-2. Major recreational sites in the New Mexico/ Texas study area with the DDA.

in-migrants will have the same parkland visitation rate and ignores demographic variances in an effort to determine an average impact. It was assumed that 85 percent of these outdoor recreation trips were for the purpose of parkland visits. The remaining 15 percent of the recreation trips were assumed to be in dispersed or undeveloped recreation sites. The formulas used to estimate M-X induced outdoor recreation visits to parklands and dispersed recreational sites are:

Population in-migration for peak year (1987) x
1.95 x 0.85 = Parkland Visits

Population in-migration for steady state (1994) x
1.95 x 0.15 = Dispersed Recreational Visits

OB IMPACTS (5.2.2)

Direct Impacts

Potential direct impacts as a result of OB siting were determined by placing the OB suitability envelope over the assumed "area of influence" around the OB sites (Figure 5.2.2-1) at 1:500,000 scale. Resources falling within the suitability envelopes were considered potential direct impact sites.

Indirect Impacts

Indirect impacts related to population in-migration and consequent increases in visitation rates to outdoor recreation sites in the OB vicinities were estimated via the indirect effects index model (see ETR-855). This model is based on an assumption of normally distributed impacts about OB sites, thus the model assumes most of the impacts would occur within 100 miles from the OB site. Research indicates that 90 percent of all outdoor recreation takes place within 125 miles of the participant's home (Bureau of Outdoor Recreation, 1966; University of New Mexico, 1975; Nevada State Park System, 1977). An appeal rating factor was included in the model. Outdoor recreational sites were evaluated by recent visitor use figures, uniqueness of natural resources and available facilities in assigning an appeal rating. National Recreation Areas, Parks, and Monuments were assigned as appeal rating of 3, many state parks and lakes were assigned a rating of 2 and local forest service campgrounds were assigned a rating of 1 (Table 5.2.2-1).

Indirect effect index figures of 10,000 or larger were assigned a high value, 1,000 to 10,000 a moderate value and less than 1,000 a low value (Table 5.2.2-2 to 5.2.2-8).

To estimate the impact of the projected effects a simplified need analysis was conducted for each OB site. The analysis was limited to major public outdoor recreational sites approximately 50 road miles from the basing site, the assumed "area of influence." Research indicates that approximately

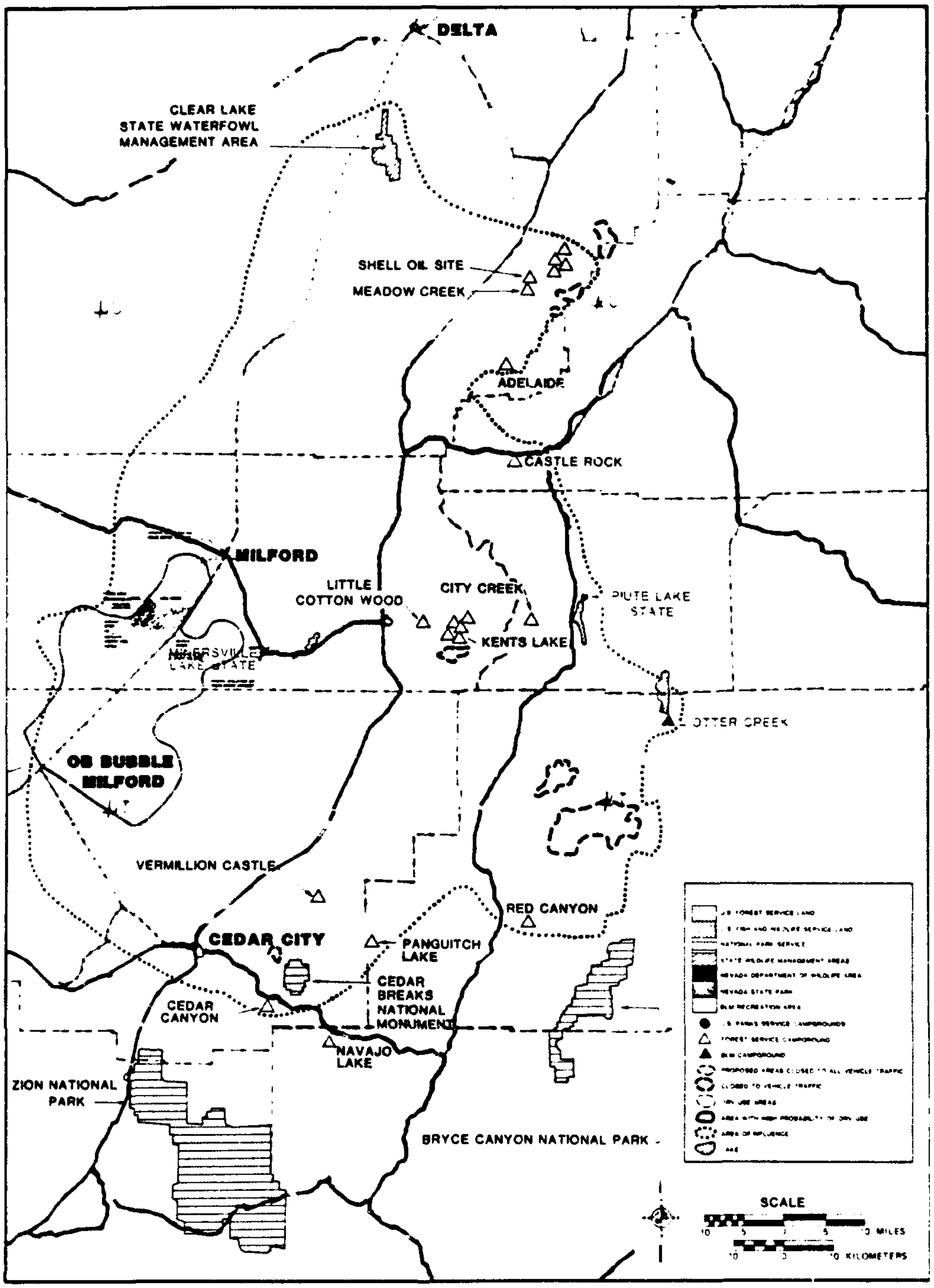


Figure 5.2.2-1. Area of most intensive recreational influence around the proposed Milford OB site.

Table 5.2.2-1. Example of indirect effect analysis print out.

EFFECT INDEX OF BASING ALTERNATIVES ON RECREATION AREAS

ALTERNATIVE NO. 4
BASE A: BERYL LONG TERM POP. 16943.0
BASE B: COYOTE LONG TERM POP. 12195.0

LOCATION			MILES TO A			EFFECT INDEX OF BASE A			MILES TO B			EFFECT INDEX OF BASE B			COMBINED EFFECTS		
NO.	APPL	NAME	N	F	AVE	MAX	MIN	AVE	N	F	AVE	MAX	MIN	AVE	MAX	MIN	AVE
1	3.0	LAKE MEAD	124.0	124.0	124.0	8436.2	8436.2	8436.2	56.0	56.0	56.0	10578.3	10578.3	10578.3	19014.5	19014.5	19014.5
2	3.0	ZION PARK	32.0	32.0	32.0	16174.2	16174.2	16174.2	116.0	116.0	116.0	6624.5	6624.5	6624.5	22798.7	22798.7	22798.7
3	3.0	BRYCE CAN	96.0	96.0	96.0	11155.1	11155.1	11155.1	168.0	168.0	168.0	3390.7	3390.7	3390.7	14545.8	14545.8	14545.8
4	3.0	CEDAR BRKS	56.0	56.0	56.0	14696.8	14696.8	14696.8	132.0	132.0	132.0	5533.5	5533.5	5533.5	20230.3	20230.3	20230.3
5	1.0	WHITE RIV	116.0	116.0	116.0	69.8	69.8	69.8	152.0	152.0	152.0	1.0	1.0	1.0	70.8	70.8	70.8
6	1.0	WARD MT.	116.0	116.0	116.0	69.8	69.8	69.8	168.0	168.0	168.0	0.1	0.1	0.1	69.9	69.9	69.9
7	1.0	SHELL CRK	108.0	128.0	118.0	145.0	21.1	57.6	172.0	188.0	180.0	0.1	0.0	0.0	145.1	21.1	57.7
8	2.0	WHEELER PK	88.0	88.0	88.0	7687.9	7687.9	7687.9	160.0	160.0	160.0	894.7	894.7	894.7	8582.7	8582.7	8582.7
9	2.0	RUBY MTN	232.0	232.0	232.0	69.8	69.8	69.8	272.0	272.0	272.0	6.4	6.4	6.4	76.2	76.2	76.2
10	1.0	DIXIE W S	24.0	40.0	32.0	13393.3	8818.0	11155.1	76.0	92.0	84.0	1154.3	385.3	684.6	14547.6	9203.3	11839.6
11	1.0	DIX E S	56.0	68.0	62.0	4710.8	2566.4	3528.5	136.0	144.0	140.0	6.4	2.6	4.1	4717.2	2569.0	3532.6
12	1.0	RED CANYON	84.0	84.0	84.0	951.1	951.1	951.1	160.0	160.0	160.0	0.4	0.4	0.4	951.4	951.4	951.4
13	1.0	KENTS LK	80.0	80.0	80.0	1243.1	1243.1	1243.1	172.0	172.0	172.0	0.1	0.1	0.1	1243.2	1243.2	1243.2
14	1.0	SHELL OIL	116.0	116.0	116.0	69.8	69.8	69.8	212.0	212.0	212.0	0.0	0.0	0.0	69.8	69.8	69.8
15	1.0	OAK CREEK	140.0	140.0	140.0	5.7	5.7	5.7	236.0	236.0	236.0	0.0	0.0	0.0	5.7	5.7	5.7
16	1.0	LITTLE VLY	172.0	172.0	172.0	0.1	0.1	0.1	264.0	264.0	264.0	0.0	0.0	0.0	0.1	0.1	0.1
17	2.0	VALLEY FIR	104.0	104.0	104.0	5619.2	5619.2	5619.2	32.0	32.0	32.0	10985.1	10985.1	10985.1	16604.2	16604.2	16604.2
18	2.0	BEAVER DAM	28.0	28.0	28.0	15640.4	15640.4	15640.4	72.0	72.0	72.0	7185.4	7185.4	7185.4	22825.7	22825.7	22825.7
19	2.0	GORGE	32.0	32.0	32.0	15262.0	15262.0	15262.0	76.0	76.0	76.0	6764.2	6764.2	6764.2	22026.1	22026.1	22026.1
20	2.0	SNOW CYN	36.0	36.0	36.0	14844.2	14844.2	14844.2	80.0	80.0	80.0	6346.9	6346.9	6346.9	21191.1	21191.1	21191.1
21	2.0	ECHO CYN	24.0	24.0	24.0	15975.9	15975.9	15975.9	92.0	92.0	92.0	5141.5	5141.5	5141.5	21117.4	21117.4	21117.4
22	2.0	CORRAL PNK	84.0	84.0	84.0	8247.0	8247.0	8247.0	128.0	128.0	128.0	2291.5	2291.5	2291.5	10538.5	10538.5	10538.5
23	2.0	CHARCOAL	104.0	104.0	104.0	5619.2	5619.2	5619.2	156.0	156.0	156.0	1017.9	1017.9	1017.9	6637.1	6637.1	6637.1
24	1.0	GUNLOCK	40.0	40.0	40.0	8818.0	8818.0	8818.0	72.0	72.0	72.0	1469.8	1469.8	1469.8	10287.8	10287.8	10287.8
25	2.0	ENTERPRISE	24.0	24.0	24.0	15975.9	15975.9	15975.9	76.0	76.0	76.0	6764.2	6764.2	6764.2	22740.0	22740.0	22740.0
26	1.0	NAVIPAN LK	68.0	68.0	68.0	2566.4	2566.4	2566.4	144.0	144.0	144.0	2.6	2.6	2.6	2569.0	2569.0	2569.0
27	2.0	OTTER CRK	104.0	104.0	104.0	5619.2	5619.2	5619.2	192.0	192.0	192.0	283.5	283.5	283.5	5902.6	5902.6	5902.6
28	2.0	PIUTE LAKE	92.0	92.0	92.0	7143.3	7143.3	7143.3	180.0	180.0	180.0	447.0	447.0	447.0	7590.4	7590.4	7590.4
29	2.0	MINNERSVLE	64.0	64.0	64.0	11155.1	11155.1	11155.1	156.0	156.0	156.0	1017.9	1017.9	1017.9	12173.0	12173.0	12173.0
30	2.0	YUBA LAKE	152.0	152.0	152.0	1603.7	1603.7	1603.7	244.0	244.0	244.0	28.0	28.0	28.0	1631.7	1631.7	1631.
31	1.0	CUMINS LK	108.0	108.0	108.0	145.0	145.0	145.0	168.0	168.0	168.0	0.1	0.1	0.1	145.1	145.1	145.1
32	1.0	BASSETT 1K	92.0	92.0	92.0	535.3	535.3	535.3	140.0	140.0	140.0	4.1	4.1	4.1	539.4	539.4	539.4
33	2.0	LAS VEGAS	112.0	112.0	112.0	4710.8	4710.8	4710.8	24.0	24.0	24.0	11498.9	11498.9	11498.9	16209.7	16209.7	16209.7
34	1.0	SAND MOUNT	60.0	60.0	60.0	3898.0	3898.0	3898.0	92.0	92.0	92.0	385.3	385.3	385.3	4283.3	4283.3	4283.3
35	3.0	LITTLE SAH	152.0	152.0	152.0	5942.1	5942.1	5942.1	248.0	248.0	248.0	749.6	749.6	749.6	6691.6	6691.6	6691.6

Table 5.2.2-2. Relative effects ratings for recreation for the Proposed Action.

OUTDOOR RECREATIONAL SITES	EFFECT INDEX RATING[1]		
	OPERATING BASE I	OPERATING BASE II	COMBINED
Lake Mead	4	3	4
Zion National Park	3	4	4
Bryce Canyon National Park	3	4	4
Cedar Breaks National Park	3	4	4
White River Campgrounds	2	2	2
Ward Mountain Recreational Area	2	2	2
Shell Creek Campgrounds	2	2	2
Wheeler Park	3	3	3
Ruby Mountains	2	2	2
Dixie National Forest, Western Section	2	2	3
Dixie National Forest, Eastern Section	2	3	3
Red Canyon Campgrounds	2	3	3
Kents Lake Campgrounds	2	3	3
Shell Oil Site Campgrounds	2	3	3
Oak Creek Campgrounds	2	2	2
Little Valley Campgrounds	2	2	2
Valley of Fire State Park	4	2	4
Beaver Dam State Park	3	3	4
Cathedral Gorge State Park	3	3	4
Snow Canyon State Park	3	3	4
Echo Canyon Campgrounds	3	3	4
Corral Pink Sand Dunes	3	3	3
Charcoal Ovens State Park	3	3	3
Gunlock Lake State Beach	3	2	3
Enterprise Reservation	3	3	4
Navajo and Panguitch Lakes	2	3	3
Otter Creek State Park	2	3	3
Paiute Lake State Park	2	4	4
Minersville Lake State Park	3	4	4
Yuba Lake State Park	2	3	3
Comins Lake	2	2	2
Bassett Lake	2	2	2
Las Vegas ORV Areas	4	2	4
Sand Mountain ORV Area	3	2	2
Little Sahara ORV Area	3	3	3

4116

[1] 1 = None.
2 = Low.
3 = Moderate.
4 = High.

Table 5.2.2-3. Relative effects ratings for recreaction for Alternative 1.

OUTDOOR RECREATIONAL SITES	EFFECT INDEX RATING[1]		
	OPERATING BASE I	OPERATING BASE II	COMBINED
Lake Mead	4	3	4
Zion National Park	3	4	4
Bryce Canyon National Park	3	3	4
Cedar Breaks National Park	3	4	4
White River Campgrounds	2	2	2
Ward Mountain Recreational Area	2	2	2
Shell Creek Campgrounds	2	2	2
Wheeler Park	3	3	3
Ruby Mountains	2	2	2
Dixie National Forest, Western Section	2	3	3
Dixie National Forest, Eastern Section	2	3	3
Red Canyon Campgrounds	2	2	2
Kents Lake Campgrounds	2	2	2
Shell Oil Site Campgrounds	2	2	2
Oak Creek Campgrounds	2	2	2
Little Valley Campgrounds	2	2	2
Valley of Fire State Park	4	3	4
Beaver Dam State Park	3	4	4
Cathedral Gorge State Park	3	4	4
Snow Canyon State Park	3	4	4
Echo Canyon Campgrounds	3	4	4
Corral Pink Sand Dunes	3	3	3
Charcoal Ovens State Park	3	3	3
Gunlock Lake State Beach	3	3	3
Enterprise Reservation	3	4	4
Navajo and Panguitch Lakes	2	3	3
Otter Creek State Park	2	3	3
Paiute Lake State Park	2	3	3
Minersville Lake State Park	3	3	3
Yuba Lake State Park	2	3	3
Comins Lake	2	2	2
Bassett Lake	2	2	2
Las Vegas ORV Areas	4	3	4
Sand Mountain ORV Area	2	3	3
Little Sahara ORV Area	2	3	3

4117

[1] 1 = None.
2 = Low.
3 = Moderate.
4 = High.

Table 5.2.2-4. Relative effects ratings for recreation in Alternative 2.

OUTDOOR RECREATIONAL SITES	EFFECT INDEX RATING[1]		
	OPERATING BASE I	OPERATING BASE II	COMBINED
Lake Mead	4	2	4
Zion National Park	3	3	4
Bryce Canyon National Park	3	3	4
Cedar Breaks National Park	3	3	4
White River Campgrounds	2	2	2
Ward Mountain Recreational Area	2	2	2
Shell Creek Campgrounds	2	2	2
Wheeler Park	3	3	3
Ruby Mountains	2	2	2
Dixie National Forest, Western Section	2	2	2
Dixie National Forest, Eastern Section	2	2	2
Red Canyon Campgrounds	2	2	2
Kents Lake Campgrounds	2	3	3
Shell Oil Site Campgrounds	2	3	3
Oak Creek Campgrounds	2	4	4
Little Valley Campgrounds	2	3	3
Valley of Fire State Park	4	2	4
Beaver Dam State Park	3	3	4
Cathedral Gorge State Park	3	3	4
Snow Canyon State Park	3	2	3
Echo Canyon Campgrounds	3	3	3
Corral Pink Sand Dunes	3	2	3
Charcoal Ovens State Park	3	3	3
Gunlock Lake State Beach	3	2	3
Enterprise Reservation	3	3	4
Navajo and Panguitch Lakes	2	2	2
Otter Creek State Park	2	3	3
Paiute Lake State Park	2	3	3
Minersville Lake State Park	3	3	3
Yuba Lake State Park	2	4	4
Comins Lake	2	2	2
Bassett Lake	2	2	2
Las Vegas ORV Areas	4	2	4
Sand Mountain ORV Area	2	2	2
Little Sahara ORV Area	2	4	4

4118

[1] 1 = None.
2 = Low.
3 = Moderate.
4 = High.

Table 5.2.2-5. Relative effects ratings for recreation for Alternative 3.

OUTDOOR RECREATIONAL SITES	EFFECT INDEX RATING[1]		
	OPERATING BASE I	OPERATING BASE II	COMBINED
Lake Mead	3	3	3
Zion National Park	4	3	4
Bryce Canyon National Park	4	3	4
Cedar Breaks National Park	4	3	4
White River Campgrounds	2	3	3
Ward Mountain Recreational Area	2	4	4
Shell Creek Campgrounds	2	4	4
Wheeler Park	3	4	4
Ruby Mountains	2	3	3
Dixie National Forest, Western Section	4	2	4
Dixie National Forest, Eastern Section	3	2	3
Red Canyon Campgrounds	2	2	2
Kents Lake Campgrounds	3	2	3
Shell Oil Site Campgrounds	2	2	2
Oak Creek Campgrounds	2	2	2
Little Valley Campgrounds	2	2	2
Valley of Fire State Park	3	2	3
Beaver Dam State Park	4	3	4
Cathedral Gorge State Park	4	3	4
Snow Canyon State Park	4	3	4
Echo Canyon Campgrounds	4	3	4
Corral Pink Sand Dunes	3	2	3
Charcoal Ovens State Park	3	4	4
Gunlock Lake State Beach	3	2	3
Enterprise Reservation	4	3	4
Navajo and Panguitch Lakes	3	2	3
Otter Creek State Park	3	2	3
Paiute Lake State Park	3	3	3
Minersville Lake State Park	4	3	4
Yuba Lake State Park	3	3	3
Comins Lake	2	4	4
Bassett Lake	2	4	4
Las Vegas ORV Areas	3	2	3
Sand Mountain ORV Area	3	2	3
Little Sahara ORV Area	3	3	4

4119

[1] 1 = None.
2 = Low.
3 = Moderate.
4 = High.

Table 5.2.2-6. Relative effects ratings for recreation for Alternative 4.

OUTDOOR RECREATIONAL SITES	EFFECT INDEX RATING[1]		
	OPERATING BASE I	OPERATING BASE II	COMBINED
Lake Mead	3	4	4
Zion National Park	4	3	4
Bryce Canyon National Park	4	3	4
Cedar Breaks National Park	4	3	4
White River Campgrounds	2	2	2
Ward Mountain Recreational Area	2	2	2
Shell Creek Campgrounds	2	2	2
Wheeler Park	3	2	3
Ruby Mountains	2	2	2
Dixie National Forest, Western Section	4	2	4
Dixie National Forest, Eastern Section	3	2	3
Red Canyon Campgrounds	2	2	2
Kents Lake Campgrounds	3	2	3
Shell Oil Site Campgrounds	2	2	2
Oak Creek Campgrounds	2	2	2
Little Valley Campgrounds	2	2	2
Valley of Fire State Park	3	4	4
Beaver Dam State Park	4	3	4
Cathedral Gorge State Park	4	3	4
Snow Canyon State Park	4	3	4
Echo Canyon Campgrounds	4	3	4
Corral Pink Sand Dunes	3	3	4
Charcoal Ovens State Park	3	3	3
Gunlock Lake State Beach	3	3	4
Enterprise Reservation	4	3	4
Navajo and Panguitch Lakes	3	2	3
Otter Creek State Park	3	2	3
Paiute Lake State Park	3	2	3
Minersville Lake State Park	4	3	4
Yuba Lake State Park	3	2	3
Comins Lake	2	2	2
Bassett Lake	2	2	2
Las Vegas ORV Areas	3	4	4
Sand Mountain ORV Area	3	2	3
Little Sahara ORV Area	3	2	3

4120

[1] 1 = None.
2 = Low.
3 = Moderate.
4 = High.

Table 5.2.2-7. Relative effects ratings for recreation for Alternative 5.

OUTDOOR RECREATIONAL SITES	EFFECT INDEX RATING[1]		
	OPERATING BASE I	OPERATING BASE II	COMBINED
Lake Mead	3	3	3
Zion National Park	4	3	4
Bryce Canyon National Park	4	3	4
Cedar Breaks National Park	4	3	4
White River Campgrounds	2	3	3
Ward Mountain Recreational Area	2	4	4
Shell Creek Campgrounds	2	4	4
Wheeler Park	3	4	4
Ruby Mountains	2	3	3
Dixie National Forest, Western Section	3	2	3
Dixie National Forest, Eastern Section	3	2	3
Red Canyon Campgrounds	3	2	3
Kents Lake Campgrounds	4	2	4
Shell Oil Site Campgrounds	3	2	3
Oak Creek Campgrounds	3	2	3
Little Valley Campgrounds	2	2	2
Valley of Fire State Park	3	2	3
Beaver Dam State Park	3	3	4
Cathedral Gorge State Park	3	3	4
Snow Canyon State Park	3	3	3
Echo Canyon Campgrounds	4	3	4
Corral Pink Sand Dunes	3	2	3
Charcoal Ovens State Park	3	4	4
Gunlock Lake State Beach	2	2	2
Enterprise Reservation	3	3	4
Navajo and Panguitch Lakes	3	2	3
Otter Creek State Park	4	2	4
Paiute Lake State Park	4	3	4
Minersville Lake State Park	4	3	4
Yuba Lake State Park	3	3	3
Comins Lake	2	4	4
Bassett Lake	2	4	4
Las Vegas ORV Areas	2	2	3
Sand Mountain ORV Area	2	2	2
Little Sahara ORV Area	4	3	4

4121

[1] 1 = None.
2 = Low.
3 = Moderate.
4 = High.

Table 5.2.2-8. Relative effects ratings for recreation for Alternative 6.

OUTDOOR RECREATIONAL SITES	EFFECT INDEX RATING[1]		
	OPERATING BASE I	OPERATING BASE II	COMBINED
Lake Mead	3	4	4
Zion National Park	4	3	4
Bryce Canyon National Park	4	3	4
Cedar Breaks National Park	4	3	4
White River Campgrounds	2	2	2
Ward Mountain Recreational Area	2	2	2
Shell Creek Campgrounds	2	2	2
Wheeler Park	3	2	3
Ruby Mountains	2	2	2
Dixie National Forest, Western Section	3	2	3
Dixie National Forest, Eastern Section	3	2	3
Red Canyon Campgrounds	3	2	3
Kents Lake Campgrounds	4	2	4
Shell Oil Site Campgrounds	3	2	3
Oak Creek Campgrounds	3	2	3
Little Valley Campgrounds	2	2	2
Valley of Fire State Park	3	4	4
Beaver Dam State Park	3	3	4
Cathedral Gorge State Park	3	3	4
Snow Canyon State Park	3	3	4
Echo Canyon Campgrounds	4	3	4
Corral Pink Sand Dunes	3	3	3
Charcoal Ovens State Park	[illegible]	3	3
Gunlock Lake State Beach	2	3	3
Enterprise Reservation	3	3	4
Navajo and Panguitch Lakes	3	2	3
Otter Creek State Park	4	2	4
Paiute Lake State Park	4	2	4
Minersville Lake State Park	4	3	4
Yuba Lake State Park	3	2	3
Comins Lake	2	2	2
Bassett Lake	2	2	2
Las Vegas ORV Areas	2	4	4
Sand Mountain ORV Area	2	2	2
Little Sahara ORV Area	4	2	4

4122

[1] 1 = None.
2 = Low.
3 = Moderate.
4 = High.

60 percent of outdoor recreation participation takes place within 40 miles of any metropolitan area (Bureau of Outdoor Recreation, 1966). The Nevada SCORP (1977) assumes a 100 mile radius area of influence with "much more" visitations expected at a site 50 miles from an urban center than one 100 miles away. Thus the 50 mile radius is felt to be conservative "area of influence" for the majority (assumed to be 70 percent) of the expected demand.

The projected population figures (see ETA 27) of the county in which the OB is to be sited were used as the "effective population" in this analysis. Both peak year and steady state population figures were used to define short-term and long-term effects. In those cases in which the short term impacts were found not to be significant it was assumed that the long term impact would also not be significant.

Non-resident use or demand was not included in this analysis since this influence M-X in-migrants is assumed to be more localized and not to have a significant influence on interregional recreational patterns.

Each OB site had an "area of influence" and effective population as defined above. The projected recreational need was then calculated. Each state used a variety of the formula presented below in their SCORP (Statewide Comprehensive Outdoor Recreation Plan). Activity participation may be generally defined as the average number of times or occasions a typical resident of the region would engage in an activity in any given year. An activity standard is the number of occasions a unit of that activity can support in a year.

[70% of Total Outdoor Use] x [Effective Population] x [Activity Participation Rate (SCORP)] = [Activity Occasions Or Demand]

[Activity Occasions Or Demand] ÷ [Activity Standard (SCORP)] = [Facility Requirements]

[Facility Requirements] - [Facility Supply Within "Area of Influence"] = [Recreational Needs]

This above formula is simplistic and whenever other factors were available from the state SCORP they were included in an effort to add regional significance to the analysis. The analysis methodology for each of the OB sites within the affected states, Nevada, Utah, Texas and New Mexico, is discussed below.

Nevada

The Nevada SCORP (1977) used a very similar formula to the one defined above:

$$\frac{\text{Activity occasions x percent of weekend participation}}{\text{Design days x turnover rate x activity standard}}$$

Projected activity occasions were derived by multiplying 1977 activity participation rates by effective population figures. This assumes that participation rates will remain constant over time. The percent of weekend participation and design days, defined as the number of typical weekend days during the season of highest use, attempts to measure the expected demand for facilities during highest use. For most activities the design days ranged from 27 to 29 days. Since the design days per activity were not given, a factor of 28 days was assumed for each activity. Table 5.2.2-9 lists all the figures used in the analysis conducted for the Coyote Spring and Ely bases.

Utah

The Nevada SCORP used a general multiplying factor, TIM-P Factor, to calculate increased or decreased use or participation in their future projections. This factor considered changes in income, available discretionary time and mobility (Utah Department of Outdoor Recreation Draft 1978). This TIM-P factor was multiplied by the projected demand factor. The formulas below were used in calculating the recreational needs in the Utah OB vicinities.

I. Participation rates = Activity occasions for activity/population

II. Participation rates x Projected effective population = Demand

III. Demand in activity occasions x TIM-P Factor = Adjusted demand

IV. (0.70) Adjusted demand/activity standard = Facility requirements

V. Facility requirements - Facility supply = Recreational needs.

Table 5.2.2-10 shows the actual figures used.

New Mexico

The New Mexico SCORP (1976) projected demands by multiplying an activity participation rate, defined as the percentage of the population in the planning district that participated in a given activity in 1975, by the mean number of times a participant would participate per year. This factor was then applied to the projected population figures or effective population (formula I).

Table 5.2.2-9. Data used in the Recreational Need Analysis for Nevada OB sites.

OB SITE	EFFECTIVE POPULATION				ACTIVITY	PARTICIPATION RATE (ACTIVITY OCCASIONS/CAP.)	TURNOVER RATE (USE/DESIGN DAY)	ACTIVITY STANDARD PEOPLE/UNIT	PERCENT WEEKEND PARTICIPATION[4]	FACILITY SUPPLY[7]
	PEAK YEAR		STEADY STATE							
	M-X	BL[6]	M-X	BL						
Coyote Spring (Clark County)	27,800	560,000	16,000	623,800	Camping	0.87[1]	1	4/Campsite	71[5]	290 Campsites
					Motorboating	1.48	3	0.25/Surface Acres	74	192,000 Surface Acres
					Water-Skiing	1.08	2	0.20/Surface Acres	69	
					Lake Fishing	2.09[2]	1.5	2.5/Surface Acres	68	
Ely (White Pine County)	21,300	9,000	14,500	9,700	Camping	1.18[3]	1	4/Campsite	71[5]	176 Campsites
					Motorboating	1.22	3	0.25/Surface Acres	74	175 Surface Acres
					Water-Skiing	.33	2	0.20/Surface Acres	69	
					Lake Fishing	3.69[2]	1.5	2.5/Surface Acres	68	

4123

[1]This is average participation rate for tent camping and vehicle camping in Planning District III or Clark County (Nevada SCORP 1977).

[2]This is for all fishing; stream as well as lake.

[3]Average participation rate for tent camping and vehicle camping in Planning District IV (Nevada SCORP 1977).

[4]U.S. Department of the Interior, Bureau of Outdoor Recreation 1973.

[5]Average of tent and car camping.

[6]BL - Baseline population.

[7]Facilities at major public recreation sites, e.g., U.S. Forest Service Campgrounds, etc.

Table 5.2.2-10. Data used in the recreational need analysis for Utah OB sites.

OB SITE	EFFECTIVE POPULATION				ACTIVITY	PARTICIPATION RATE (ACTIVITY OCCASIONS PER CAP.)	TIM-P FACTOR		ACTIVITY STANDARD (ACTIVITY OCC./UNIT)	FACILITY SUPPLY[6]
	PEAK YEAR		STEADY STATE							
	M-X	BL[1]	M-X	BL[1]			1985	1990		
Milford (Beaver Co.)	20,800	5,200	17,200	5,500	Camping	160,300/46,500[2]=3.45	.53[3]	.53[3]	442/Campsite	177 Campsites
					Boating	52,800/46,500=1.14			18/Surface Acre[4]	6,000 Surface Acres
					Water-skiing	34,700/46,500=0.75			9.6/Surface Acre[4]	
Beryl (Iron Co.)	20,500	17,000	21,350	23,300						211 + Campsites 1,494 + Surface Acres
Delta (Millard Co.)	24,000	11,600	13,700	12,300	Camping	130,000/44,300[5]=2.93	.29	.29		101 + Campsites
					Boating	34,[illegible]00/44,300[5]=.77				10,700 Surface Acres
					Water-skiing	40,200/44,300[5]=.91				

4124

[1]BI = Baseline population.

[2]1977 Population estimate for planning district 6 (Utah SCORP 1978).

[3]TIM-P = Factor which considers future trends in recreational use with changing trends in income, leisure time and mobility per planning district (Utah SCORP 1978 draft).

[4]Used Nevada activity standards x turnover rates x 24 (peak days per season) from Utah SCORP (1978).

[5]1979 population estimate for planning district 5 (Utah SCORP 1978).

[6]Major public recreation sites, e.g., State parks.

I Demand = Participation rate x Mean number of times per participant x Effective Population

The facility requirements are then computed by dividing the projected demand (I) by the activity standard in persons/unit/year. Unlike the Nevada method this activity standard takes into account the turnover rate and total design days per year. Table 5.2.2-11 shows those factors discussed above.

Texas

The effective population in the Dalhart, Texas OB siting is split between Dallam and Hartley Counties, where the OB support community is to be located, and Potter & Randall Counties where a significant in-migration is expected, primarily in Amarillo. These two center of population in-migration are approximately 50 miles apart. Recreational resources between the areas will experience demands from both effective populations. A separate analysis was conducted for each population source and those recreational sites within the area of influence "of both sources were assumed to receive 50 percent of the demand from each.

The Texas SCORP (Texas Parks and Wildlife Department 1980 Draft) uses participation rates (activity per capita) that were derived from a rural trend-distribution model utilizing participation trend data for 1963-1968. Projected participation rates for 1985 and 2000 were used in this analysis as peak year and steady state rates respectively. For example, the average resident participation days for camping in rural areas is projected to be 1.9 days in 1985. Based upon the participation rate change from 1963-1968 and assuming a constant rate of change, the average resident in the panhandle region of Texas is projected to participate in camping 2.9 days/year by the year 2000. In this analyses each projected participation rate was multiplied by the effective population to estimate a demand figure (equation 1).

I Demand = Participation rate for target year x Effective Population

In this analysis only resident demand was considered. The demand figure is then divided by activity standard to obtain the facility requirements. Table 5.2.2-12 lists all the factors used in this analysis.

5.3 ENVIRONMENTAL CONSEQUENCES

EFFECTS ON RECREATION IN NEVADA/UTAH (5.3.1)

The increased population in the study area attributable to the project, is expected to increase outdoor recreational activities. The most significant increase will occur in hunting, fishing, ORV use, and parkland recreation. Split basing would have approximately one-half the impact of full basing in the region.

Table 5.2.2-11. Data used in the recreational need analyses for the Clovis (Curry County) OB site in New Mexico.[5]

EFFECTIVE POPULATION				ACTIVITY	PARTICIPATION RATE[2]	MEAN NUMBER OF TIMES[3] PARTICIPATE	ACTIVITY STANDARD[4]	FACILITY SUPPLY[6]
PEAK YEAR		STEADY STATE						
MX	BL[1]	MX	BL[1]					
26,600	44,300	19,000	44,400	Camping	.251	3.06	480	
				Picnicking	.605	2.64	600	79± Campsites
				Boating	.117	4.12	60	10,740 surface acres
				Water Skiing	.037	3.84	90	

4125

[1]BL = Baseline population in Curry County, New Mexico.

[2]Participation rate = % of population in planning district 4 who participated.

[3]Mean number of times participated per individual in planning district 4.

[4]Persons/unit/year.

[5]New Mexico SCORP, 1976.

[6]Major public recreation sites, e.g. state parks.

Table 5.2.2-12. Data used in the recreational need analyses for the Dalhart, Texas, OB site.

EFFECTIVE POPULATION								ACTIVITY	PARTICIPATION RATES[2]		ACTIVITY STANDARD[3]	FACILITY SUPPLY[4]
DALLAM/HARTLEY COUNTIES				POTTER/RANDALL COUNTIES								
PEAK YEAR		STEADY STATE		PEAK YEAR		STEADY STATE			1985	2000		
M-X	BL[1]	M-X	BL[1]	M-X	BL[1]	M-X	BL[1]					
23,700	11,300	12,800	12,600	15,400	176,800	2,800	192,000	Camping	1.9	1.9	377/ composite	UNK[6]
								Picknicking	3.1	4.0	493/table	500± tables
								Freshwater Boating	4.8	6.1	324/surface acre	19,000± surface acres[5]

4200

[1]BL = baseline population

[2]Participation rate = average resident days per capita for each activity in region. (TORP 1980 draft)

[3]Activity standard = number of activity days/unit/year.

[4]Supply at major public recreation sites.

[5]Total surface acres x 0.8825 (a factor for average usable surface acre for activity).

[6]Lacking information.

Fishing

Impacts to game fish habitats, and therefore game fishing, would include physical habitat and water quality degradation during construction and during operation from other recreational uses as listed in ETR 16, Aquatic Habitats and Biota. These impacts would result from physical habitat disturbance, sedimentation, degradation of water quality, elevation of ambient temperature, and possible reduction of water volumes. Number of anglers per fishing resource area will increase in some areas, and decreased fishing quality (as measured either by fishing success or aesthetic quality of the fishing experience) could result if management activities are not implemented to compensate for increased pressure (Manning, 1979; Adriano, 1980; Dieringer, 1980).

The game fishery would be expected to experience increased fishing pressure from construction workers and support personnel (Dieringer, 1980). Fishing has been identified as one of the most preferred recreational activities by residents of both states (Nevada State Park System, 1977; and Utah Outdoor Recreation Agency, 1976). Due to the limited number of fishable waters in Nevada and Utah, the fishing quality is likely to decrease without additional management. In Nevada, fish hatcheries at Reno (2), Las Vegas (1), Ely (1), and Ruby Marshes (1), are now operating at their limit and public waters are presently stocked to their limit (Dieringer, 1980; Curren, 1980).

Based on the most recent (1977) state population data and numbers of state resident fishing licenses held, it is expected that the increase in population resulting from M-X construction and operation would increase the number of licensed fishermen by 2.8 percent in 1987 and 2.65 percent in 1994. While there is expected to be an increase in the number of people and fisherment as a result of M-X, it is difficult to accurately assess the specific effects on fishing. The range of the effects is based on the disturbance of people on the unit's habitats. However, without an increase in fish stocking rates and in fish habitat resource, fishing success in both states will decrease with the increased population associated with M-X. Regardless of how many fish are stocked in a given water body, there will be a loss of fishing quality due to a loss of the aesthetic quality of the fishing experience with increased numbers of anglers (Manning, 1980).

Both Nevada and Utah have a diverse freshwater game fishery. The relative importance of game fisheries in the project area is evaluated on the basis of the number of fishable streams within each hydrologic subunit. Importance values were based on the combination of abundance and sensitivity values shown in Table 5.3.1-1. Hydrologic subunits indicated to be of high abundance have more than twelve fishable streams. Hydrologic subunits indicated to be of intermediate abundance have between five and twelve fishable streams. Hydrologic subunits having less than five fishable streams have been given a ranking of low abundance with respect to game fisheries. Hydrologic subunit sensitivity was based on its isolation from other hydrologic subunits with a similar resource abundance and the quality of resource present in the unit, as described in the stream evaluation studies for each state. Figure 5.3.1-1 provides a graphic presentation of Table 5.3.1-1.

Table 5.3.1-1. Abundance and sensitivity to impact for game fish, Nevada/Utah.

HYDROLOGIC SUBUNIT	LOCATION	A	S	HYDROLOGIC SUBUNIT	LOCATION	A	S
3	Deep Creek	L	L	151	Antelope	I	L
4	Snake	H	I	152	Stevens	L	L
5 (U)	Pine	I	L	153	Diamond	I	I
6	White	L	L	154	Newark	I	I
7	Fish Springs	L	L	155	Little Smoky	I	I
8	Dugway	L	L	156	Hot Creek	I	L
9	Government Creek	L	L	169a	Tikaboo-Northern	L	L
13	Rush	L	L	170	Penover	[illegible]	[illegible]
32b	Great Salt Lake Desert Western Desert	L	L	171	Coal	L	L
				172	Garden	I	I
46	Sevier Desert	I	H	173a	Railroad-Southern	L	L
46a	Sevier Desert-Dry Lake	L	L	173b	Railroad-Northern	I	H
47	Huntington	H	I	174	Jakes	I	I
50	Milford	L	L	175	Long	L	L
52	Lund District	L	L	176	Ruby	H	I
53 (N)	Pine	I	I	178	Butte	I	L
53 (U)	Beryl-Enterprise District	L	L	179	Steptoe	H	I
54 (U)	Wah Wah	L	L	180	Cave	L	L
54 (N)	Crescent	L	L	181	Dry Lake	L	L
55	Carico Lake	I	I	182	Delamar	L	L
56	Upper Reese River	H	I	183	Lake	L	L
57	Antelope	L	L	184	Spring	H	I
58	Middle Reese River	I	I	185	Tippett	L	L
122	Gabbs	L	L	186	Antelope	L	[illegible]
124	Fairview	L	L	187	Goshute	L	L
125	Stingaree	L	L	194	Pleasant	L	L
126	Cowkick	L	L	196	Hamlin	L	L
127	Eastgate	L	L	198	Dry	L	[illegible]
133	Edwards Creek	I	I	199	Rose	L	L
134	Smith Creek	I	I	200	Eagle	L	L
135	Ione	L	L	201	Spring	L	[illegible]
136	Monte Cristo	L	L	202	Patterson	L	L
137a	Big Smoky-Tonopah Flat	L	L	203	Panaca	I	H
137b	Big Smoky-North	H	I	204	Clover	L	L
138	Grass	I	I	205	Meadow Valley Wash	I	I
139	Kobeh	I	I	206	Kane Springs	L	L
140	Monitor	I	H	207	White River	I	I
141	Ralston	I	I	208	Pahroc	L	L
142	Alakli Spring	L	L	209	Pahranagat	L	L
143	Clayton	L	L	210	Coyote Springs	L	L
144	Lida	L	L	219	Muddy River Springs	I	L
149	Stone Cabin	I	I	128*	Dixie	I	I
150	Little Fish Lake	I	I	129*	Buena Vista	I	I
				132*	Jersey	L	L

2317-2

A = Abundance; S = Sensitivity to impact; L = Low; I = Intermediate; H = High N = Nevada; U = Utah; * = Hydrologic Subunits in the study area which have not had project features planned within the boundary.

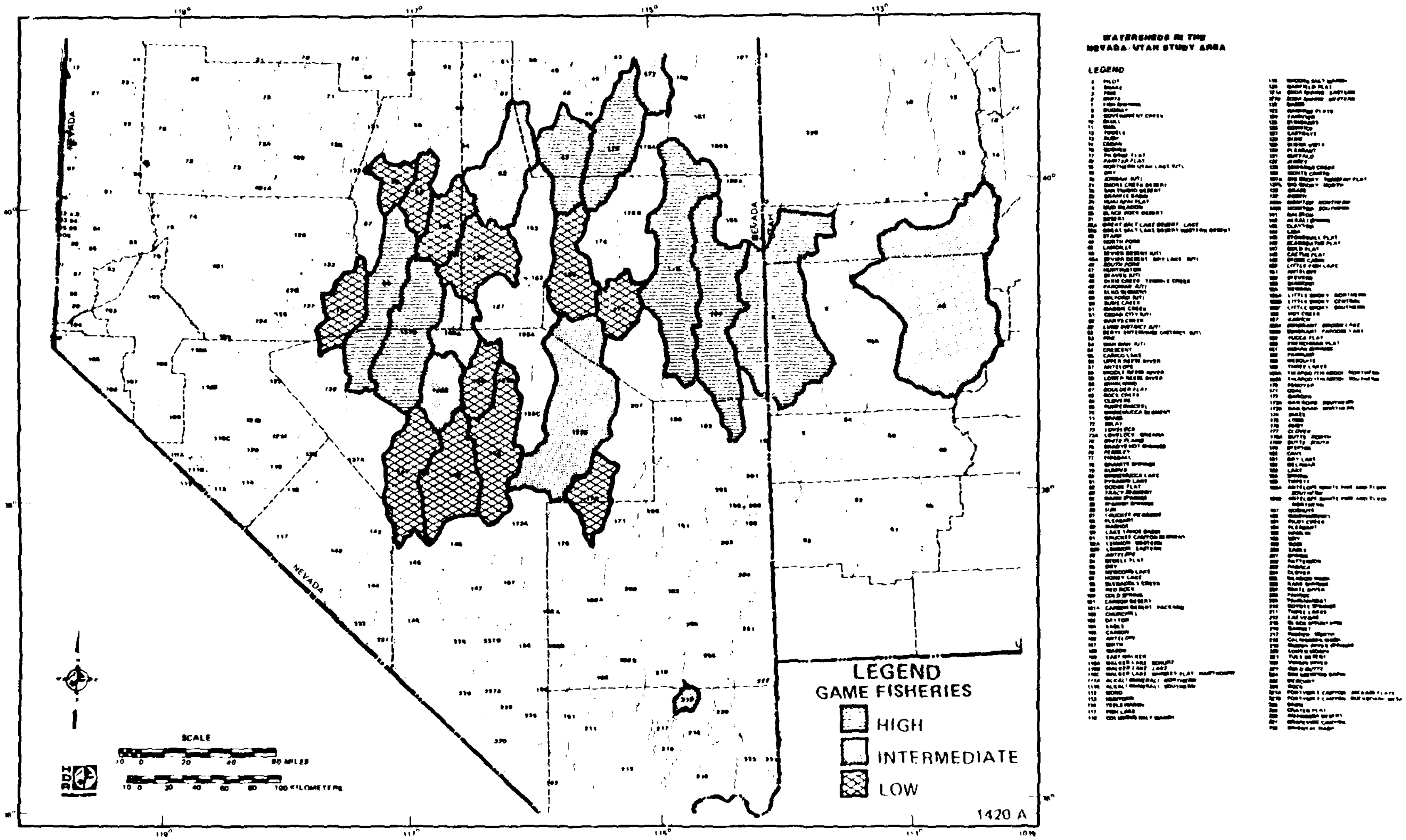


Figure 5.3.1-1. Ranking of game fish resource importance (abundance and sensitivity to impact) by watershed in the study area.

Indirect effects due to M-X construction and operation could include changes in fishery management policies (e.g., reduced bag limits, decreased number of fish stocked per angler, increased put and take fishing, and increased catch and release fishing) (Dieringer, 1980; Adriano, 1980).

Increased population associated with M-X could result in increased law enforcement needs relating to fishing (e.g., increased poaching, disturbance of native fish habitats, and introduction of exotic species). Increased law enforcement activity due to large influxes of construction personnel have already been experienced in Nevada during periods of large operations at Nellis Air Force Base (Dieringer, 1980).

In White Pine County, it is estimated that full Nevada/Utah deployment would result in the need for up to fifteen new enforcement officers. The siting of an operating base in Steptoe Valley, near Ely, would further increase the demand for new enforcement personnel (McLelland, 1980). The illegal taking of fish would be expected to follow a similar trend as has been found in Elko County over the last five years as a result of an upswing in mining activities in that county. Citations processed for violations of wildlife laws in that county have increased 70 percent in the last five years (Greenley, 1980).

The Department of Wildlife in Nevada and the Department of Wildlife Resources in Utah receive federal support for their sport fishing management programs. The Dingell-Johnson Program matches state money on a 3:1 basis for non-consumptive uses (e.g., land acquisition, research). The money cannot be spent on fish production, stocking, or law enforcement. States could acquire a limited amount of land under the Dingell-Johnson Program to set up new sport fisheries. As soon as the fishery becomes established, however, federal money could no longer be used. The money presently allocated by the states for non-consumptive uses would be insufficient to maintain any additional sport fishing resource habitat (Dieringer, 1980; Adriano, 1980).

Hunting

Deployment of M-X in the Nevada/Utah study area could affect hunting through possible localized hunting restrictions during construction and through decreasing abundance of some game species as a result of habitat loss or reduced availability during construction and activities of in-migrating people such as increased hunting pressure, poaching, and habitat degradation. Habitat loss resulting from construction and operation (i.e., habitat removal for emplacement of facilities, loss of surface water through groundwater withdrawal, and behavioral avoidance of the project by game species), as described in ETR-15, could cause a decrease in abundance for several game species. The species most likely to be affected are those with much of their range located in valley bottoms and bajadas, such as pronghorn and sage grouse. Both the species are expected to be significantly affected by construction of the project (ETR 15).

Pronghorn are sensitive to human activities in their habitat and, consequently, are verly likely to abandon areas were construction activities are ongoing. The animals thus displaced must locate suitable habitat or perish. The amount of habitat and associated numbers of animals potentially lost in this manner cannot be quantified at this time, since such calculations require a finalized project layout and construction schedule in addition to more detailed knowledge of pronghorn behavioral responses to large scale construction and operation activities, carrying capacity of adjacent areas, present population estimates, and demographic characteristics of each population, none of which are presently available. The areas of greatest impact potential in Nevada can be estimated, however, and are in the eastern part of the state from northern Steptoe Valley southeast through Spring, Snake, and Hamlin valleys.

For big game species other than pronghorn, the potential for project effects on population size is relatively small. Construction of roads and other communication/surveillance facilities as well as use of borrow pits could interfere with migrations of these animals along established migration routes or cause loss of habitat with a subsequent decline in population numbers.

Sage grouse abundances are likely to be decreased by construction activities, particularly if brood use areas, strutting grounds, or wintering grounds are disturbed or destroyed through emplacement of structures or by construction camps, equipment storage areas, and spoil disposal/storage areas. Impacts would be most likely in the northern part of the study area where sage grouse inhabitat valleys. During operations, sage grouse should be able to utilize all habitat not greatly disturbed by construction. Thus, populations could recover to near preproject levels in a few years and effects on hunting would be short-term.

Another potential effect of the project on hunting could occur if construction areas are closed to hunting for safety or other project-related reasons. This would not cause a decline in population levels, and could lead to a temporary increase. The extent and rate of population increase will depend on herd structures, habitat potential and project impacts.

The influx of people predicted would result in a increased hunting demand for all game species. For the big game species (except deer and elk in Utah), increased demand would increase competition for the limited number of permits available. For other game animals, license availability would not limit hunting opportunities, but hunter success may decline as abundance decreases. Changes in management policies, such as reductions in season length and bag limit, may be necessary to maintain resource levels that will support the hunting demand. The concentration of people in the vicinity of the support bases would also cause increased hunting pressure in those areas, particularly for upland game species.

Another effect of population increases in remote areas would be an increase in poaching. This would likely be dispersed through the study area during construction and more localized around base locations during operations. In areas of low game animal abundance, poaching could have significant effects on population size, thus reducing hunting opportunities. All species could be affected in this manner, but antelope, mule deer, upland game, and waterfowl are the most likely to be measurably impacted. Potential effects on game population sizes, however, cannot be estimated because of the clandistine nature of poaching.

Dispersed recreation activities of the in-migrating people, other than hunting, could affect game animals through loss of habitat. For example, development of recreational facilities and camping adjacent to bighorn sheep watering sites could cause these animals to abandon that part of their range. This could result in a population decline if the carrying capacity of mountain ranges were reduced. To estimate quantity of habitat lost in this manner would require estimates of induced population growth at specific locations and assumptions about the types and frequency of recreation activities in each location as well as information about animal abundance, sensitivity to various recreation activities, and habitat carrying capacity. Most of these factors are not presently available.

Assuming that all in-migrating people would have the same hunting preferences as the current population, and license (excluding big game) sales without the project would increase linearly with population, 2,125 licenses in Nevada and 4,107 in Utah would be bought by the in-migrating people during construction (in 1987). This would represent an increase of about 3 percent in each state. During operations (1994), license sales would increase by 1,373 in Nevada and 2,130 in Utah as a result of the project. This is an increase of 1.6 percent for Nevada and 1.3 percent for Utah. Increased revenue from sale of hunting licenses will provide funds for enhancing game habitat and/or research (Pittman-Robertson Act). This income, however, could not be used to offset the cost required to manage the resources for use by these additional people, such as providing game wardens and reintroducing animals in former range.

Parklands

Project effects upon parklands in the Nevada/Utah study area are evaluated primarily in terms of how much additional visitor demand each park or group of parks might experience as a result of M-X-induced direct and indirect population in-migration. The primary source of demand will come from the remaining in-migrants who will be living in communities during both project construction and operations, and to a lesser extent construction workers residing in construction camps.

The number of visitations attributable to M-X are presented for peak year (1987), the time when regional in-migration is estimated to be at its highest level (5 percent above baseline) and for the steady state period (1994) onward or 2 percent above baseline/year) the time when the project will be operational and regional population will have assumed a normal growth posture.

Table 5.3.1-2 presents the number of in-migrants anticipated to enter the Nevada/Utah study area by county and the number of subsequent visitations to parklands attributable to each. As shown, White Pine and Iron counties where the potential operating bases could be located (assuming full deployment alternative 3) would be the sources of the largest visitor numbers during both peak year (1987) and steady state (subsequent to 1990). Together, they would account for 76.0 percent of the total M-X induced demand during peak year, and more than 91.0 percent during steady state.

As indicated in Table 5.3.1-2, nearly 91,700 additional visits to study area parklands are estimated to be attributable to M-X related population increases during peak year (1987) and approximately 57,100 during steady state (subsequent to 1990).

Table 5.3.1-2. Preliminary estimates of the number of parkland visitations generated by county as a result of M-X induced population in-migration, Nevada/Utah peak year and steady state.[2]

COUNTY	PEAK YEAR (1987)[2]		STEADY STATE (1994)	
	ESTIMATED POPULATION IN-MIGRATION	NUMBER OF VISITATIONS	ESTIMATED POPULATION IN-MIGRATION	NUMBER OF VISITATIONS
Nevada				
White Pine	21,300	35,300	14,400	24,000
Eureka	6,000	1,000	0	0
Lincoln	4,000	7,000	400	700
Nye	8,500	9,500	0	0
Utah				
Iron	20,500	34,000	17,000	28,200
Beaver	2,200	3,700	1,300	2,200
Juab	5,600	9,300	0	0
Millard	4,000	6,600	0	0
Washington	1,700	2,800	1,200	2,000
Region	73,800	91,700	34,300	57,100

3676-1

[1]Assumes full deployment in Nevada/Utah with 80 percent military residing onbase.

[2]Peak-year refers tothe period (1987) when regional in-migration attributable to M-X is anticipated to be at its highest level. Peak in-migration into a particular county may occur either prior or subsequent to 1987.

These figures represent an increase of 5 percent over the projected baseline parkland trips during the peak year 1987 and a 2 percent increase for the steady state period. The above increases are expected to produce minimal adverse effects upon the quality of parkland recreation in a regional sense. However, there would likely be situations around OB sites where an increase in visitation levels to a particular site may require more controlled management. Short-term impacts may occur in years where construction in-migration significantly adds to the area population and thus demand (Nye County in Table 5.3.1-2). Recreation in these areas would also have impacts upon the natural resources in the recreation areas.

ORV Use

There are generally two types of ORV uses that are of concern: 1) the use of an ORV as a means of providing an exhilarating and challenging experience to the driver; and 2) the use of an ORV as a means to provide access to remote areas for other forms of recreation. Project-induced in-migrants are expected to produce additional demands for both ORV activities cited above.

Projections of the extent of increased ORV use and predictions of their activity sites are rought at best. Site-intensive ORV use is generally associated with attractive features, such as challenging terrain (0-25 percent slope), a lack of physical barriers (i.e., vegetation) and a population center to support such activity. Areas with appropriate natural characteristics to sustain intensive ORV use are considerable in the project area, approximately one-quarter of Nevada for example, (Nevada State Park System, 1977). Sand dunes and dry lake beds are commonly preferred ORV sites. The Little Sahara Complex in Utah and a number of Dry Lake beds in the Las Vegas, Nevada area are sites of extensive ORV use and may well be expected to receive additional demands as a result of project related in-migrations. In addition to these and other currently-used ORV sites, site-intensive ORV use is expected around any population center in the project area. Potential OB sites such as at Ely and/or Delta may be expected to receive the greater proportion of this effect; however, smaller towns such as Pioche and Caliente may also expect to receive some additional use. In addition to these existing populated areas, suitable areas around construction camps may well be expected to receive site-intensive ORV use. A rough approximation of area impact is a three-mile radius around each population center (Rajala, Pers. Comm. 1980).

The use of ORVs as a means of access is a much more prevalent form of ORV activity in the project area than site-intensive use. It is expected that such activity will utilize existing roads for the most part; however in some areas new roadways associated with the project may provide added access to or near remote recreational sites. New dirt road access routes may be generated from existing dirt roads or in response to new DTN access routes. It is nearly impossible to predict where these new roads may occur; however, likely locations would be near springs, hunting areas, up canyons and at the end of existing roads. One preliminary study in the BLM Ely District indicated that in two seasons existing roads have been extended one to three miles as vehicle trails (Anderson, Pers. Comm. 1980).

It is impossible to accurately predict visitor use levels for ORV related activities because such figures are not available. Using a demographic profile by Kellert (1980), projected ORV use for the entire project area for peak year (1987) in-migration and steady state (1992) is summarized in Table 5.3.1-3. Approximately 18.7 percent of the general populace in the United States have used an ORV in the past two years. This would translate to a total of approximately 16,000 M-X related ORV recreationists added to the region during the peak year (1987) and approximately 6,000 ORV users during the operations phase.

The use of an ORV for an exhilarating experience, such as hillclimbing, motorcross racing, etc., is site-intensive and, thus, produces much more intensive physical and biological effects in the use area. ORV use as a means of providing access to remote areas is expected to be the most common and widespread ORV activity in the project area. The former activity is expected to have a greater site-intensive effect upon the physical and biological resources; however, the latter activity is expected to have a more extensive effect in the project area. These effects include degradation of erodible soils, conflicts with the flora and fauna as well as dust and auditory intrusions.

Snow-Related Activities

Increases in demand for snow-related recreational resources can be expected as a result of M-X related population in-migration in the Nevada/Utah study area. Areas expected to receive the largest share of these increases include Mt. Charleston (Spring Range) in Clark County, the mountainous areas in east-central Lincoln County, Humboldt National Forest in White Pine County, and the U.S. Forest Service lands in central Utah, particularly Wasatch National Forest where the development of snow play areas is most substantial. The increase in demand is not expected to be significant in this region since it would amount to only 5 percent during peak year (1987) and only 2.5 percent during operations.

Water-Based Recreation

Increased in demand for water-based recreational activities can be expected as a result of M-X related population in-migration into the Nevada/Utah study area. There are few water bodies in the project area large enough or with adequate facilities for boating and/or water skiing. Areas expected to receive the largest share of these increases include Lake Mead, Wildhorse Reservoir, Willow Creek Reservoir, Rye Patch Reservoir, and Walker Reservoir. Lake surface deficiencies have been projected for all of eastern Nevada by 1985 without M-X (Nevada State Park System 1977). This means that in this region people wishing to fish, motor boat or water ski in lakes may have to travel to more distant lakes or reservoirs. The in-migration associated with M-X would contribute to the demand, especially around OB sites. In Nevada there are 21,080 linear feet of usable beach for swimming concentrated around Lake Mead, Lahontan Reservoir and Lake Tahoe. Recreational swimming in the project area would be primarily in public and private swimming pools with such facilities being developed as the demand increases.

Table 5.3.1-3. Projected ORV users in the Nevada/Utah project area.[1]

USE	PEAK YEAR 1987	STABLE STATE 1992
1-5 Days 10.95%[2]	2000	700
6-10 Days 4.45%[2]	700	300
11+ Days 9.7%[2]	1600	600

3684

[1]Assumes full basing.

[2]These are the average percentages for the Rocky Mountain and Pacific regions in Kellert 1980.

In Utah, lake boating, waterskiing, lake fishing and swimming are primarily associated with the Great Salt Lake and many natural lakes in the mountains east of the project area. The population in-migration related to M-X is not expected to have as great an impact upon water based recreational opportunities in this region as in Nevada.

EFFECTS ON RECREATION IN TEXAS/NEW MEXICO (5.3.2)

The increased population in study area, attributable to the project, is expected to affect recreational activities. Outdoor activities are expected to increase. The most significant increases will occur in hunting, fishing, ORV use, and parkland recreation. Split basing would be expected to have approximately one-half the impact of full basing in the region.

Fishing

The effects of M-X construction and operation on fishing relate to habitat degradation or loss which would reduce fishery resources and increase fishing pressure. Effects of construction activities on fish habitat include physical habitat disturbance, sedimentation, and degradation of water qualify. The resulting impacts to fish populations are not expected to be significant.

Project-induced population in-migration (both direct labor and indirect population growth) would be expected to increase fishing pressure proportionately. Total population increase for full basing in Texas/New Mexico is estimated to reach 13 percent during construction and 5 percent during operations. Unless more fish are stocked, this may result in a decline in angler success for some locations. Increased fishing pressure may require changes in management policies, such as reduced bag limits, shorter seasons, increased put and take fishing, and increased catch and release fishing.

Facilities for all types of fishing — streambank, lake shore, boat or pier — are adequate to meet the expected increased demands of project-related population in-migrations. Water bodies and rivers expected to receive most of the increased demand include Lake Meredith, the Canadian River, Ute Lake, Conchas Lake and the Pecos River.

The Dingell-Johnson Act levies an 11 percent excise tax on sale of fishing gear and matches state money on a 3:1 basis for habitat acquisition, development, improvement and/or research. As a result of project-related population growth, therefore, fishing may be improved in or near the project area. These monies, however, cannot be used for stocking or law enforcement.

Hunting

Deployment of M-X in the Texas/New Mexico study area would affect hunting directly through habitat loss and possible localized hunting restrictions during construction. Indirect affects would result from activities of in-migrating people. Direct habitat loss resulting from construction and operation (i.e., habitat removal for emplacement of facilities and behavioral avoidance of the project) could cause a decrease in abundance for at least some game and furbearing species. The species most likely to be affected are pronghorn antelope, quail, waterfowl, mule deer, ringnecked pheasant, barbary sheep, coyote, grey and red fox, bobcat, and raccoons.

Indirect effects on hunting would result from influx of people into the project area, causing a concomitant increase in hunting demand for all game species. The sale of hunting licenses to many of these people would provide the state with additional revenue. This income, however, is not expected to offset the cost required for the state wildlife agencies to manage these resources. Increased hunting pressure on game species may require changes in management, such as reductions in season length and bag limit, in order to maintain resource levels that will support the hunting demand. In the Texas portion of the project area, hunting is a preferred recreational activity, often drawing hunters from other parts of the northern Texas region. The grain farms of the High Plains provide hunting grounds for ring-necked pheasant, dove, and quail.

Recreation activities of the in-migrating people could affect game animals through loss of habitat. For example, the development of recreational facilities, such as campsites or reservoirs, adjacent to or on the ranges of important species, could result in a population decline if the carrying capacity of the region were reduced.

The Pittman Robertson Act (Federal Aid in Wildlife Restoration Act) levies an 11 percent excise tax on sale of hunting gear. The program set up by this act matches state money on a 3:1 basis for purchase, development and/or improvement of wildlife lands or for research. As a result of project-related population growth, game habitat may be improved in or near the project area. The income, however, could not be used to offset the additional cost of managing the resources for use by the immigrating people.

Parklands

Project effects upon parklands in the Texas/New Mexico study area were evaluated in terms of increased trips generated by the added population and thus an added demand in the region. Estimates of the number of trips attributable to M-X-related population in-migrants have also been calculated (Table 5.3.2-1). The number of trips attributable to M-X are presented for peak year (1987), the time when regional in-migration is estimated to be at its highest level, and for the steady state period (1990 onward), when the project will be fully operational and the regional population will have assumed a normal growth posture.

Dallam, Hartley, and Curry counties, which would contain the two operating base sites, would be the sources of the largest number of visitors. Potter and Randall counties would also generate substantial parkland visits as a result of population increases. Together, all five counties would account for 70.0 percent of the total M-X induced recreation demand during the peak year, and more than 90.0 percent during steady state.

The project trip increases are small in comparison to existing trip levels creating small effects on recreational quality in the parklands of the deployment region. Significant impacts may occur to some parklands in the vicinity of OB sites.

Table 5.3.2-1. Preliminary estimates of the parkland trips generated by county as a result of M-X induced population immigration, Texas/New Mexico. Peak year and steady state.[1]

COUNTY	PEAK YEAR (1987)[2]		STEADY STATE (1994)	
	ESTIMATED POPULATION IN-MIGRATION	NUMBER OF TRIPS	ESTIMATED POPULATION IN-MIGRATION	NUMBER OF TRIPS
Texas				
Castro	400	650	0	0
Dallam	9,900	16,450	1,600	2,700
Hartley	13,800	23,000	11,200	18,600
Bailey	3,100	5,100	0	0
Cochran	100	200	0	0
Deaf Smith	2,500	4,000	0	0
Hale	700	1,000	0	0
Hockley	500	800	0	0
Lamb	200	360	0	0
Lubbock	5,500	9,000	60	100
Moore	2,700	4,000	1,600	2,600
Oldham	100	100	0	0
Parmer	1,300	2,000	0	0
Potter Randall	15,400	25,500	2,750	4,600
Sherman	500	500	0	0
Swisher	100	200	0	0
New Mexico				
Curry	25,000	41,550	18,900	31,400
DeBaca	50	80	0	0
Harding	5,700	9,500	0	0
Quay	400	700	0	0
Roosevelt	5,400	9,000	800	1,400
Union	100	200	0	0
Chaves	1,450	2,400	0	0
Total	94,800	157,000	36,950	61,200

2302-2

[1]Assumes full deployment in Texas/New Mexico with 80.0 percent military [illegible].

[2]Peak year refers to the period (1987) when regional in-migration attributable to M-X is anticipated to be at its highest level. Peak in-migration into a particular county may occur either prior, or subsequent to 1987.

ORV Use

Off-road vehicle (ORV) use as a recreational activity has not historically been preferred in the Texas/New Mexico project area. The reasons for this are the lack of nearby high quality developed ORV use areas with challenging topography and large expanses and the lack of undeveloped public lands on which ORV enthusiasts can roam. In the Texas portion of the project less than 1 percent of the region is in public ownership as recreational lands. ORV recreation is not identified as a preferred activity in the Outdoor Recreation in Rural Areas of Texas (Texas Parks and Wildlife Department 1975). In New Mexico, those regions of the state in which the project is to occur have trailbiking and four-wheeling ranked between 19th and 24th in terms of activity occasions (New Mexico State Planning Office 1976). The majority of the four-wheeling activity occurs within 30 minutes of urbanized areas primarily on BLM and Forest Service Lands. In general, the primary increase in ORV activity in the Texas/New Mexico region as a result of M-X, would be on public lands around existing urban areas and around construction camps. These increases are not expected to be substantial since the opportunities are limited.

Water-Based Recreation

Project effects upon water-based recreational activities are anticipated since swimming, boating, fishing, and waterskiing are major recreational pursuits in the project area of Texas/New Mexico. It is anticipated that current trends in demands for recreational facilities will continue with or without M-X and the impacts of this project will be additive. Those water bodies closest to Clovis include Ute Reservoir, Alamogordo Reservoir, Conchas Reservoir, and Bottomless Lake State Park. All these areas are state parks with developed fishing, swimming and/or boating facilities. There is at present a limited supply of lake swimming areas due, in part, to algal growth and/or pollution of water (New Mexico State Planning Office 1976). An increase in demand associated with M-X will require the development of additional outdoor swimming pools and actions to maintain the water quality of existing swimming areas. Boating and waterskiing opportunities appear to be abundant in the area with Ute, Conchas, and Almogordo all providing facilities.

In Texas, outdoor recreation is often centered around lakes. In 1976, Lake Meredith accommodated almost half of the yearly visitors to federally owned recreation facilities (Texas Parks and Wildlife Department 1975). The surface acres available in this region of Texas for boating and skiing are expected to be sufficient to satisfy demands until 1990. Additional facilities are expected to be necessary after 1990, regardless of M-X-related effects. Freshwater swimming areas in this region of Texas are presently in short supply, with a project need of 781,000 sq. yd. by the year 2000 without M-X. M-X deployment in this area is expected to increase demand, but not to create new deficiencies.

In summary, it would appear that the present supply of water-based recreational activities are adequate to support an M-X-related population in-migration for boating and water skiing; however, the supply of freshwater swimming facilities is presently limited and demands are expected to increase with M-X, unless new facilities are developed.

Snow-Related Activities

Project effects upon snow-related activities are anticipated to be minimal since the incidence of snow-based recreational resources within the study area are limited. Any snow-related activities which may be generated by M-X-induced population in-migrants will likely occur outside the study area at Lincoln, Cibola, or Santa Fe National Forests.

EFFECTS ON RECREATION IN THE BERYL OB SITE AND VICINITY (5.3.3)

No fishing, hunting or other recreational sites are located within the suitability envelope of the operating base (Figure 5.3.3-1). Dispersed recreation such as rock collecting, small game hunting and ORV use will be restricted in the immediate vicinity of the OB. At the present time, dispersed recreation is rather limited on the site.

The M-X induced in-migration will produce a concomitant increase in demand and use of recreation sites in the OB vicinity. Assuming a worse case of a first base at Beryl (alternatives 3 and 4), the peak year 1986 will have an M-X induced in-migration of 22,000 persons or 104 percent over baseline projections. There will be a subsequent decrease to 17,000 or 70 percent over baseline by 1993. According to the indirect effect index analyses (ETR-30), by 1994 those recreational sites expected to receive the greatest M-X-related demand increase include: Zion and Bryce Canyon National Parks, Cedar Breaks National Monument, campgrounds on the western section of the Dixie National Forest, Beaver Dam, Cathedral Gorge, Snow Canyon, Echo Canyon State Parks and Enterprise and Minersville Lakes (see Section 5.2.2).

Camping and picnicking facilities appear to be in good supply in those areas east and south of the Beryl site (Table 5.3.3-1). Approximately 70 percent of the camping activity in this region is done by residents of the region (Utah SCORP 1978 Draft). The remaining 30 percent are either from other regions of Utah or out of state. As present, Pine Park, Enterprise Reservoir, and Pine Valley are well below their theoretical capacity (U.S.F.S., 1979). With increased demand associated with M-X, these sites may be upgraded to the level of a "well managed site" (U.S.F.S. 1979 RIM Data). The demand for campsites projected to result from M-X in-migration is not expected to exceed the present levels of supply in the area (Table 5.3.3-1).

Water based recreation sites are not expected to be in sufficient supply to meet the expected demand for power boating or waterskiing (Table 5.3.3-1). The projected need is slightly exaggerated because Enterprise Lake, an underutilized facility, is not included. The excess demand is expected to be transferred to nearby attractive sites such as Lake Mead and Otter Creek Reservoir.

EFFECTS ON RECREATION IN THE MILFORD OB SITE AND VICINITY (5.3.4)

There are no fishing or recreational areas located on land designated for the OB site or in the suitability envelope (see Figure 5.3.4-1). Those portions of the area in public domain are open to dispersed recreational use, including collecting activities, off-road recreational use, and small game hunting.

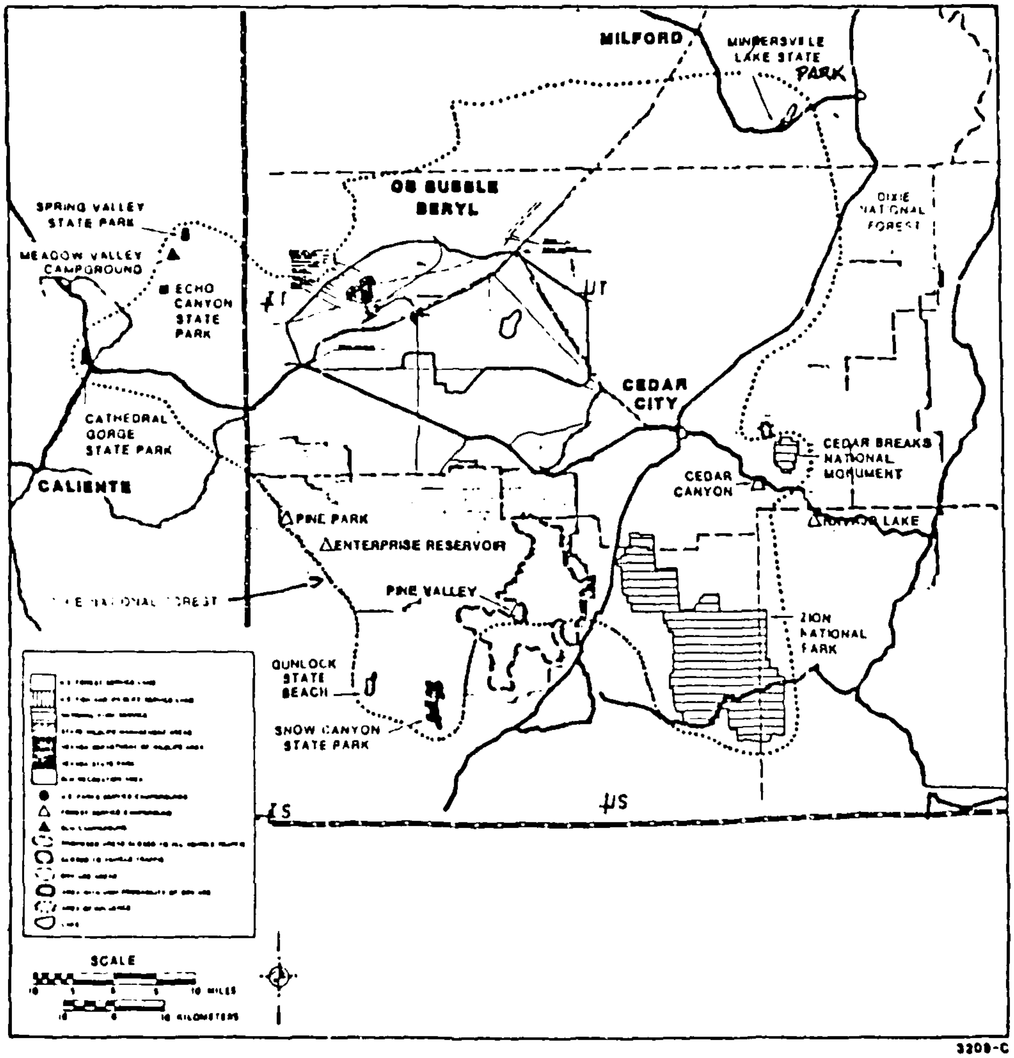


Figure 5.3.3-1. The area of most intensive recreational influence around the proposed Beryl OB site.

Table 5.3.3-1. Projected recreational needs in the Beryl, Utah OB vicinity.[1]

I ACTIVITY	II FACILITY REQUIREMENTS[2]		III FACILITY SUPPLY	IV NEED[3] (II-III)	
	PEAK YEAR	STEADY STATE		PEAK YEAR	STEADY STATE
Camping	121 Campsites	118 Campsites	627 Campsites[4]	+506	+509
Power Boating	1,853 Surface Acres	1,785 Surface Acres	1,494+ Surface Acres[5]	-359	-291
Waterskiing	2,286 Surface Acres	2,229 Surface Acres	1,494+ Surface Acres[5]	-792	-735

4109

[1] Vicinity = assumed 50-mi "area of influence" around the OB site.

[2] Projected demand (.70)/activity standard = facility requirements (see Section 5.2).

[3] + = sufficient supply; - = deficiency in supply.

[4] Federal and state campsites in Iron and Washington Counties (Utah's Outdoor Recreation Facilities, 1976).

[5] Does not include Enterprise Lake.

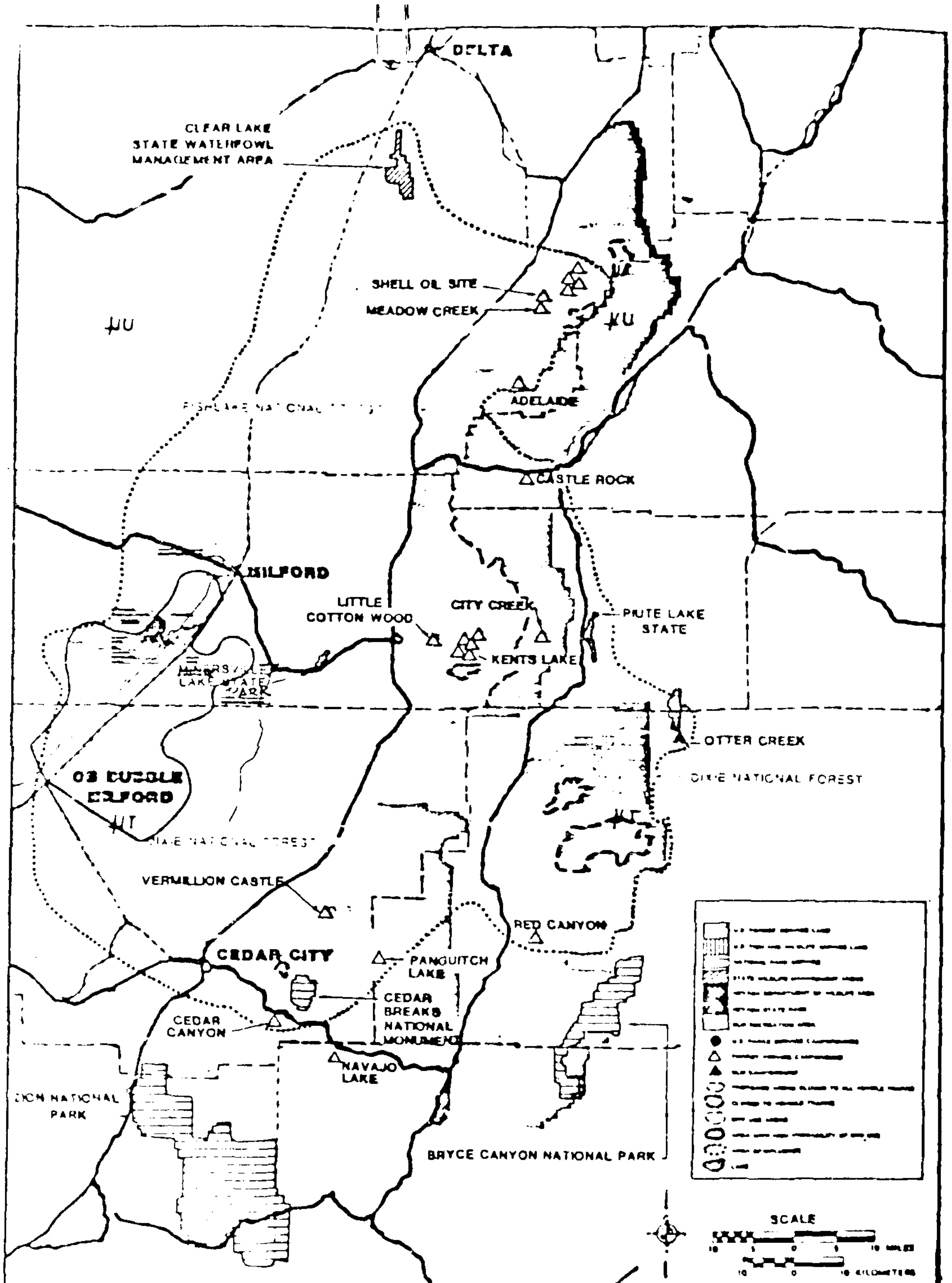


Figure 5.3.4-1. Area of most intensive recreational influence around the proposed Milford OB site.

The proposed OB site at Milford is projected to have a population in-migration of approximately 18,000 people in the peak year of 1989 with a steady state of 13,000 by 1991 in Beaver County. Both these population levels represent significant increases over projected baseline population levels with or without other proposed projects (e.g., Intermountain Power Project, Alunite Plant). This substantial population increase is expected to produce a concomitant increase in recreational demand or visitations. This projected recreational demand is assumed to be most significant at those sites which are most attractive and of close proximity. Based upon the indirect effect index analysis (ETR-30), those recreation sites expected to receive the greatest amount of demand are Bryce Canyon and Zion National Parks, Cedar Breaks National Monument, the eastern section of the Dixie Division of the Dixie National Forest, Red Canyon, Piute Lake, Minersville Lake, Kents Lake and Otter Creek State Park.

Fishing resources sites within approximately 50 miles of the proposed Milford OB would be expected to receive the greatest amount of new fishing pressure. Resources within 50 miles are located in the following hydrologic subunits: Milford, Pine, Wah Wah, Lund, Beryl-Enterprise, Snake, Hamlin, White, Parowan and Beaver. For a list of the resources within these subunits see Table 3.1.7.2-1 in the aquatic habitats and biota technical report (ETR-715).

An OB at Milford would result in a 336 percent population increase in the peak year (1989) and a 244 percent increase in 1991 over baseline projections. An approximately equivalent increase in recreational demand is expected in those recreational sites around the base. Although the Utah SCORP (1978 Draft) projects a shortage of campsites in this region of Utah by 1990 the demand attributable to M-X is not expected to produce a shortage of campsites in the vicinity (Table 5.3.4-1). Approximately 60 campsites would service the M-X in-migration population in the peak year. A total of approximately 75 sites would be needed to meet projected needs from Beaver County. The 177 existing campsites in the area would thus meet this demand. Projected shortages (Utah Department of Outdoor Recreation 1978 Draft) may thus be primarily from outside visitations.

Projected demands upon water based recreational facilities would be met by the existing supply of many lakes in the vicinity (Table 5.3.4-1). Thus, although M-X would create a large population increase over baseline projections, the existing recreational facilities in the immediate vicinity are expected to be adequate to meet the projected increase in demand associated with M-X in-migration.

EFFECTS ON RECREATION IN THE ELY, NEVADA OB SITE AND VICINITY (5.3.5)

There are two recreation sites within the suitability envelopes of the proposed OB site, Comins and Bassett Lakes (see Figure 5.3.5-1). It is doubtful that these lakes would be directly impacted by the construction of the OB site or that access to these sites will be limited. Both their value as recreational resources, they represent 2 of only 3 lakes in the vicinity, and their limited areas, approximately 150 acreas, would strongly suggest for avoidance by the project. Recreational activities at these sites would thus be expected to continue.

Table 5.3.4-1. Projected recreational needs in the Milford, Utah OB vicinity.[1]

I ACTIVITY	II FACILITY REQUIREMENTS[2]		III FACILITY SUPPLY	IV NEED[3] (II-III)	
	PEAK YEAR	STEADY STATE		PEAK YEAR	STEADY STATE
Camping	75 Campsites	66 Campsites	177 Campsites	+102	+111
Power Boating	1,152 Surface Acres	1,009 Surface Acres	6,000 Surface Acres	+4,848	+4,991
Waterskiing	1,420 Surface Acres	1,244 Surface Acres	6,000 Surface Acres	+4,580	+4,756

4110

[1]Vicinity = assumed 50-mi "area of influence" around OB site.

[2]Facility requirements = demand (.70)/activity standard (see Section 5.2).

[3]+ = sufficient supply.

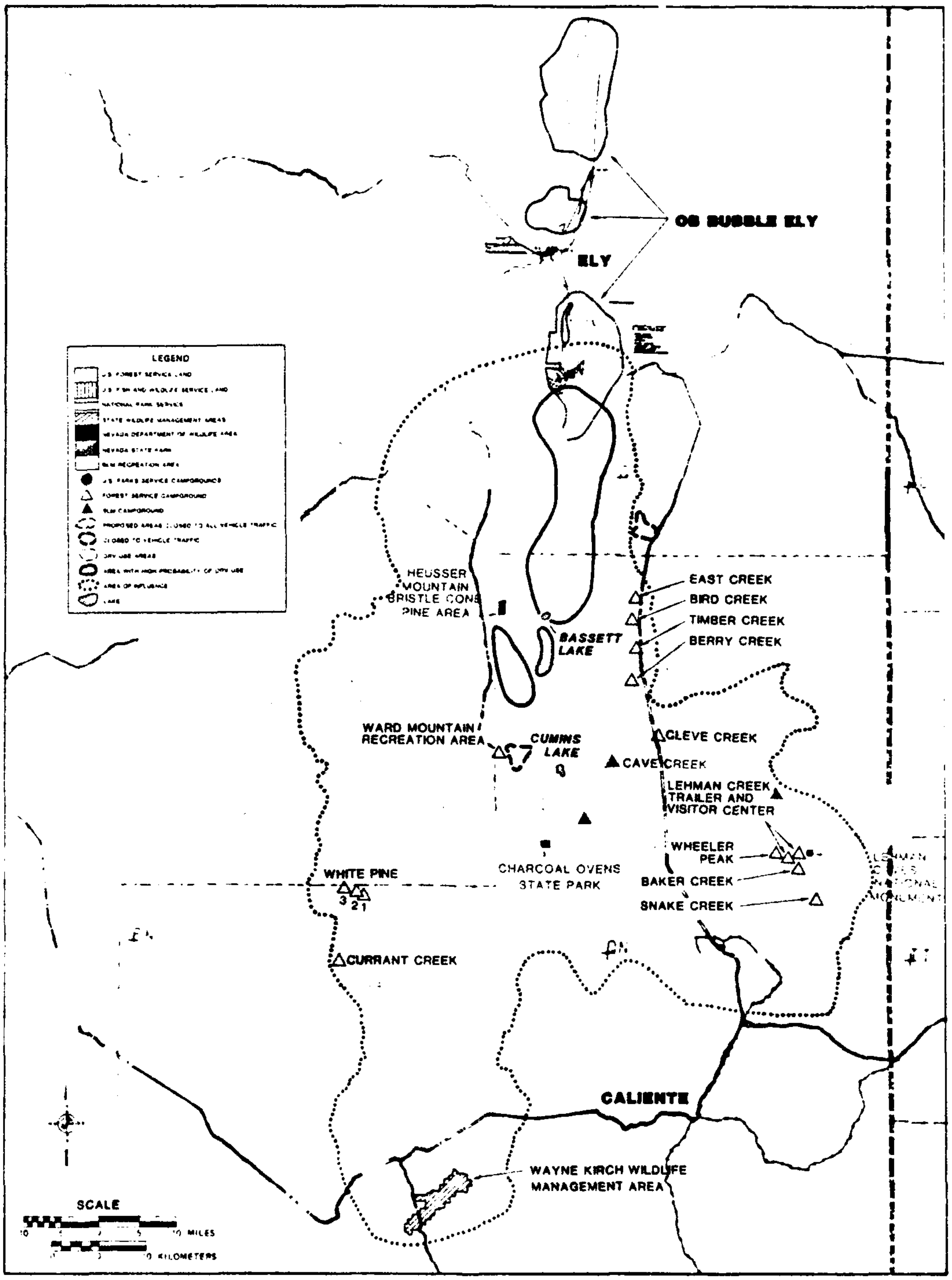


Figure 5.3.5-1. Area of most intensive recreational influence around the proposed Ely OB site.

The BLM (1978) has identified two areas north of Ely, Smith Valley and Duck Creek Basin, as areas of high potential ORV use. Portions of these areas occur within two of the suitability envelopes (see Figure 5.3.5-1). Location of the OB within either envelope will result in restrictions in ORV activity within the area. In all likelihood, any ORV use that may have occurred in these areas would be transferred to remote areas within these valleys and the Heusser Mountain area.

The expected M-X induced in-migration of 21,500 people into White Pine County during the peak year, 1988, would produce a 235 percent population increase over the baseline population projection of 9,150. Decreasing to a steady state by 1994, the M-X in-migration will be 140 percent over baseline. These increases will have the greatest potential impact on recreation sites in the vicinity. According to the indirect effect index analysis (ETR-30), the following sites are expected to receive the greatest demand: Comins and Bassett Lakes, Ward Mountain Recreation Area, U.S.F.S. campgrounds in the Schell Creek range, Lehman Caves National Monument, Wheeler Peak Scenic Area, and Charcoal Ovens State Park.

Fishing resource sites within approximately 50 miles of the proposed Ely OB would be expected to receive the largest amount of new fishing pressure. Resources within 50 miles are in Steptoe, Spring, Snake, White River, Jakes, Butte, Long, Newark, Railroad, Cave and Lake hydrologic subunits. For a list of the fishing resources within these subunits see Table 3.1.7.2-1 in the aquatic habitats and biota technical report (ETR 16).

As indicated in Table 5.3.5-1, existing supplies of camping sites are expected to adequately meet the increased demand. Water-based recreation sites are limited however and the added demand associated with M-X in-migrants will exacerbate an existing need or deficiency of lake surface acres. Opportunities to supply additional water bodies in this area are limited due to the nature of the region. Much of this added demand would be expected to be transferred to other sites further away, e.g., Ruby Marsh or Lake Mead or substituted by other recreational pursuits.

There appears to be enough dispersed recreation opportunities in this region to support the added demand. Hiking, backpacking, ORV travel and motorcycle riding areas are in good supply. It is difficult to evaluate the adequacy of this supply with added demands; however, the large amount of public lands surrounding Ely would suggest a diversity of management alternatives should these present sites become overcrowded and more are needed.

EFFECTS ON RECREATION IN THE COYOTE SPRING, NEVADA OB STIE AND VICINITY (5.3.6)

No fishing or concentrated recreation sites are located on land designated for the potential OB site or in the suitability envelope (Figure 5.3.6-1). Since the region is entirely in the public domain, it is subject to dispersed recreational use. In particular, the Coyote Spring/Meadow Valley Wash area is used by off-road vehicles.

Table 5.3.5-1. Projected recreational needs in the Ely, Nevada OB vicinity.[1]

I ACTIVITY	II FACILITY REQUIREMENTS[2]		III FACILITY SUPPLY	IV NEED[3] (II-III)	
	PEAK YEAR	STEADY STATE		PEAK YEAR	STEADY STATE
Camping	159 Campsites	127 Campsites	176 Campsites	+17	+49
Power Boating	911 Surface Acres	728 Surface Acres	175 Surface Acres[4]	-736	-553
Waterskiing	431 Surface Acres	344 Surface Acres	175 Surface Acres[4]	-256	-169
Lake Fishing	506 Surface Acres	405 Surface Acres	175 Surface Acres	-331	-230

4111

[1]Vicinity = within the assumed 50-mi "area of influence" around the OB site.

[2]Facility requirements = projected demand (.70)/activity standard (see Section 5.2).

[3]+ = sufficient supply; - = deficiency in supply.

[4]Over estimate, waterskiing or power boating may not be allowed on some of these lakes.

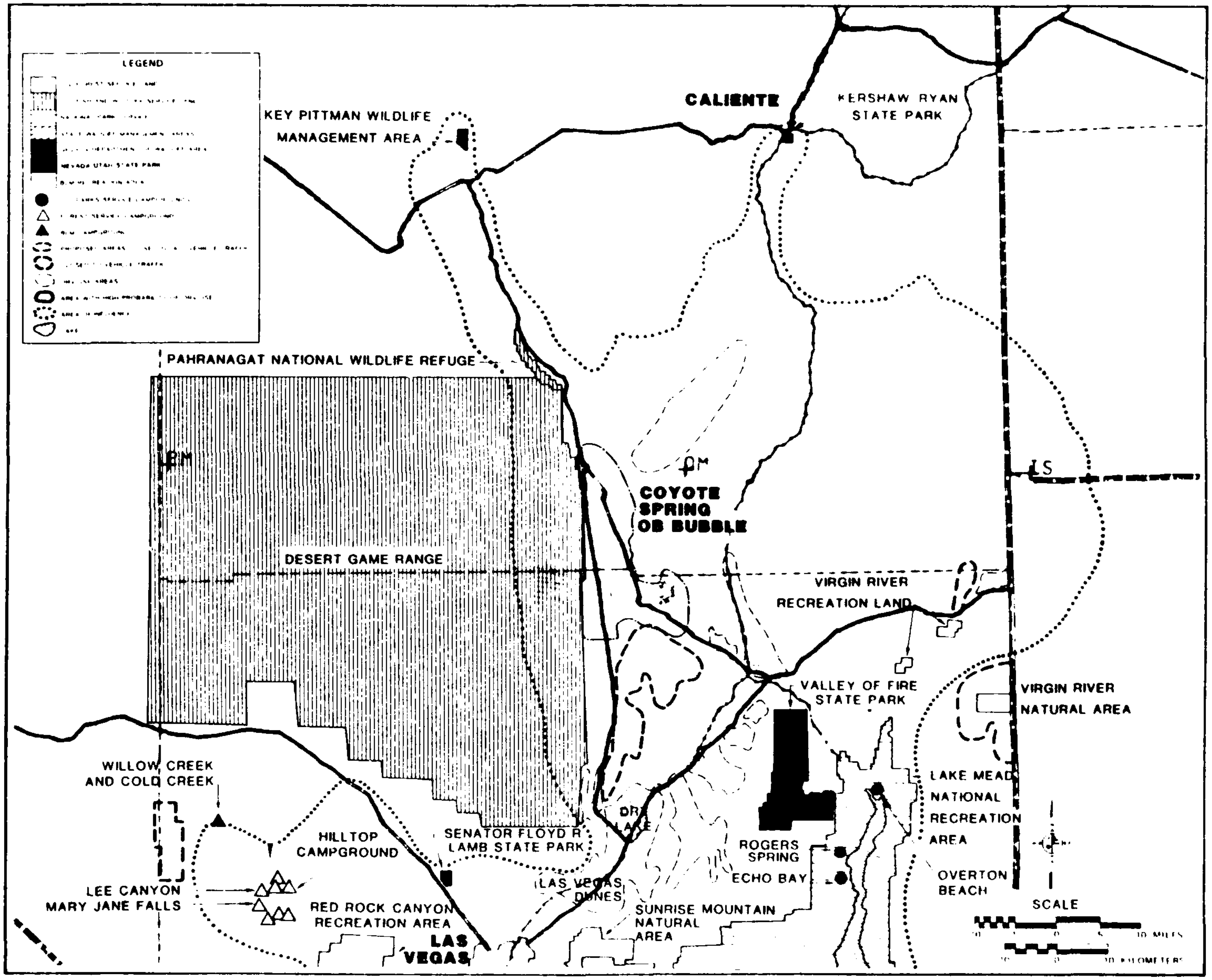


Figure 5.3.6-1. Coyote Spring initiability envelope siting and surrounding recreational sites.

Those recreational sites in the vicinity of the proposed OB site projected to receive a significant proportion of the increased use due to the population in-migration include the following: Lake Mead National Recreation Area, Valley of Fire State Park and the ORV areas north of Las Vegas (ETR 30). The greatest demand increase is expected in the peak year, 1986, when the population increase related to M-X will represent a 5 percent increase over baseline projections for Clark County. This short term is expected to decrease to a stable M-X population level by 1991, when the increase is expected to be 2.5 percent over baseline. This long term impact will persist through the life of the project. This projected in-migration will create a minor increase in recreational demand when compared to the demand associated with normal baseline growth (15 percent by 1986 and 32 percent by 1991).

The Nevada SCORP (Statewide Comprehensive Outdoor Recreation Plan) predicts a shortage of picnicking, tent/trailer camping sites and vehicle camping sites by 1985 with the present population growth rate in Clark County. The M-X induced in-migration will add to this deficiency (Table 5.3.6-1). Non-resident use of tent/trailer campsites is greater than resident use in this area. The lack of developed campsites puts added pressure on the aesthetic and environmental qualities of an area as campers seek undeveloped sites. This problem is especially acute along the shores of Lake Mead and Lake Mojave.

Based upon Nevada SCORP projects (Nevada State Parks, 1977), there will be a surplus of lake fishing acres even with the increased demand of M-X. Although Clark County has 114,100 surface acres of lake, the various water-oriented activities – waterskiing, boating, sailing, and fishing – combined are projected to create deficiencies in one or more of these activities by 1990. As a result of increased demands from M-X related in-migration, this deficiency may occur in 1985-87. This deficiency would appear to have a significant contribution from non Clark County residents since the supply appears adequate to supply the need of the residents with M-X (Table 5.3.6-1).

There is presently a shortage of snow-related activity facilities in Clark County. The Alpine ski facilities at Mt. Charleston were at capacity in 1977 and the potential for further development is limited. Many skiers from this area visit Brianhead, Utah, where more facilities are available. The Mt. Charleston area cannot meet the demands for snowplay or snowmobiling at present. As a result, the M-X induced in-migration will be an additive factor to this problem but will not create it.

Developed or designated off-road riding and competition areas are scarce in Nevada, especially around urban centers where the demand is the greatest (Nevada State Parks, 1977). The Las Vegas area has some of the largest and most numerous ORV sites in the state, however. M-X induced increased demand is expected to affect past ORV sites such as Meadow Valley and Kane Springs Valley and may even increase use in such currently remote areas as Delamar Valley. Future land management decisions will dictate the degree to which ORV demand levels will be met; however, at present ORV sites are in abundance around the Las Vegas area.

Table 5.3.6-1. Projected recreational needs in the Coyote Spring, Nevada OB vicinity.[1]

I ACTIVITY	II FACILITY REQUIREMENTS[2]		III FACILITY SUPPLY	IV NEED[3] (II-III)	
	PEAK YEAR	STEADY STATE		PEAK YEAR	STEADY STATE
Camping	2,269 Campsites	2,470 Campsites	290 Campsites[4]	-1,979	-2,180
Motor Boating	21,458 Surface Acres	23,357 Surface Acres	114,100 Surface Acres	+65,266[5]	+61,757[5]
Waterskiing	27,376 Surface Acres	28,986 Surface Acres	114,100 Surface Acres		
Lake Fishing	5,569 Surface Acres	6,062 Surface Acres	—[6]	+59,697	+55,695

4112

[1]Vicinity = within the assumed 50-mi "area of influence" around the OB site.

[2]Facility requirements = projected demand (.70)/activity constant (see Section 5.2).

[3]+ = adequate supply; - = deficiency in supply.

[4]Not including campsites at Toiyabe National Forest (Las Vegas District).

[5]Combined motor boating and waterskiing facility requirements.

[6]Used surplus of surface acres after motor boating and waterskiing subtracted 65,266 in peak year and 61,757 in steady state.

EFFECTS ON RECREATION IN THE DELTA, UTAH OB SITE AND VICINITY (5.3.7)

No fishing, hunting or other concentrated recreational sites occur within the suitability envelope of the proposed Delta OB (Figure 5.3.7-1). Dispersed recreation such as rock hounding, small game hunting and ORV use will be restricted within the envelope area. At present, dispersed recreation is rather limited in this area.

Recreational demand is expected to increase concomitantly with the population in-migration. In Alternative 2 with Delta as a second base, M-X will effect a 206 percent increase in population over baseline projections in peak year 1988 for Millard County. This is expected to drop off to a steady state population of 110 percent over baseline by 1992. These substantial population increases will have an equivalent effect upon recreational demand and needs in this area. According to the indirect effect index analyses (ETR-30), the following recreational sites are expected to receive a substantial proportion of the M-X induced demand: Oak Creek Campground, Yuba Lake State Park and Little Sahara Recreational Area.

Fishing resource sites within approximately 50 miles of the proposed Delta OB would be expected to receive the largest amount of new fishing pressure. Resources within 50 miles are in Snake, Wah Wah, Milford, White, Dugway, and Government Creek hydrologic subunits and in the Sevier River drainage east of Delta. For a list of the fishing resources within these areas see Table 3.1.7.2-1 in the aquatic habitats and biota technical report (ETR 715).

Although the Utah SCORP (1978 Draft) projects a shortage of camping units in this region, residents of Millard County including M-X in-migrants would not produce a demand exceeding the supply (Table 5.3.7-1). Non resident-demands may account for a good deal of the need projected by the SCORP. There appears to be an adequate supply of water surface areas (Yuba Lake) to meet the added demand associated with M-X in-migrants (Table 5.3.7-1).

EFFECTS ON RECREATION IN THE CLOVIS, NEW MEXICO OB SITE AND VICINITY (5.3.8)

No fishing or concentrated recreation areas are located on the proposed OB site or within the suitability envelope (see Figure 5.3.8-1). Dispersed recreational activities are probably not permitted by the owners of the affected land.

The base at Clovis is expected to increase the population in Curry County by 60 percent over baseline projections by the peak year of 1986. An equivalent increase in recreational demand is expected. Outdoor recreational sites expected to receive the major portion of this increase in demand are Summer Lake, Ute Lake and Oasis State Park. Each of these sites is within an hour's driving time and thus of easiest access.

Baseline projections indicate that this region of New Mexico is expected to need added camping and picnicking facilities (New Mexico State Planning Office 1976).

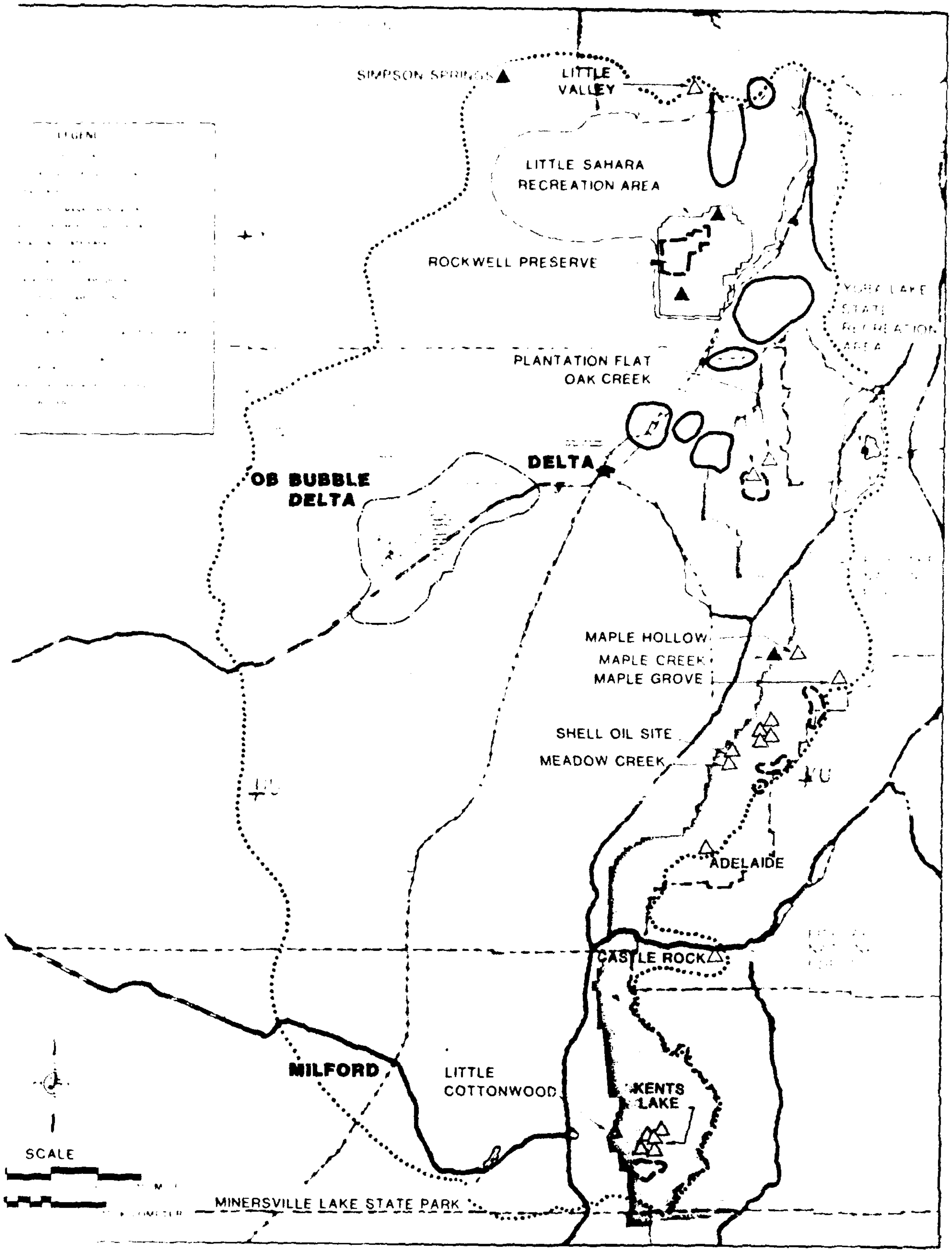


Figure 5.3.7-1. Delta OB suitability envelope siting and recreational sites in the vicinity.

Table [illegible]. Projected recreational needs in the Delta, Utah OB vicinity.[1]

I ACTIVITY	II FACILITY REQUIREMENTS[2]		III FACILITY SUPPLY	IV NEED[3] (II-III)	
	PEAK YEAR	STEADY STATE		PEAK YEAR	STEADY STATE
Camping	48 Campsites	36 Campsites	137+ Campsites[4]	+89	+101
Power Boating	1,066 Surface Acres	779 Surface Acres	10,700 Surface	+9,634	+9,921
Waterskiing	2,363 Surface Acres	1,725 Surface Acres	10,700 Surface Acres	+8,337	+8,975

4113

[1]Vicinity = within the assumed 50-mi "area of influence" around the OB site.

[2]Facility requirements = projected demand (.70)/activity standard (see Section 5.2).

[3]+ = adequate supply; - = deficiency in supply.

[4]Does not include Maple Creek—data not available.

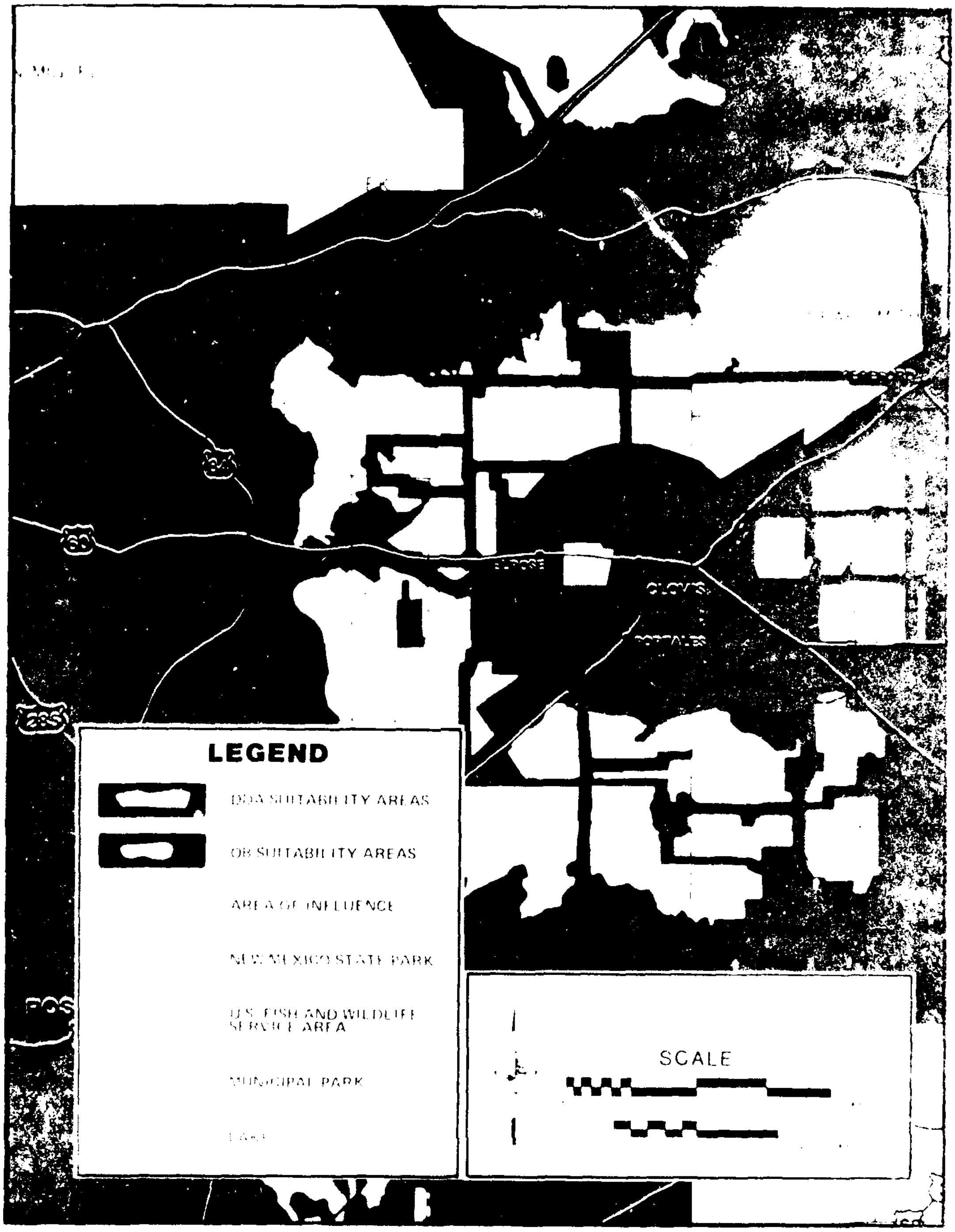


Figure 5.3.8-1. Clovis OB site suitability envelope and recreational sites in the vicinity.

The added M-X demand will create a local deficiency in camping sites (Table 5.3.8-1) at Summer Lake, Ute Lake and Oasis State Park. These recreational sites do provide adequate picnicking and boating opportunities in this area (Table 5.3.8-1) including projected M-X in-migrant demands.

EFFECTS ON RECREATION IN THE DALHART, TEXAS OB SITE AND VICINITY (5.3.9)

There are no fishing or concentrated recreational areas located on the land designated for OB facilities. Lake Rita Blanca County Park is immediately adjacent to the northern suitability envelope. This area is not expected to be directly impacted by the construction of the OB primarily because of its value as a recreational resource. Dispersed recreational activities are generally not permitted by the private owners of the affected land.

Recreational demand on sites and resources in the Dalhart region is expected to increase as a result of the M-X induced in-migration.

This increase in demand attributable to M-X in-migration is relatively minor compared to the baseline increase. For instance, 1540 picnic tables will be needed to meet the demand in Potter and Randall counties in 1987. Of this total, M-X in-migrants are projected to require only about 300 tables per year. Thus approximately 80 percent of the total demand is attributable to baseline growth and two-thirds of the need is a result of baseline growth (Table 5.3.9-1). Boating facilities are in adequate supply in this region to meet projected M-X demands.

5.4 SIGNIFICANCE ANALYSIS

DDA IMPACTS (5.4.1)

Direct Impacts

Deployment of the project would not intersect any developed or designated recreational lands and thus there would be no significant direct impact.

Indirect Impacts

The projected regional impacts upon parkland visitation, hunting licenses, fishing and ORV activity are expected to be approximately 2 to 5 percent over the baseline projections and thus not considered to be significant.

OB IMPACTS (5.4.2)

Direct Impacts

The only OB sites which have recreation sites within their suitability envelopes are Ely and Dalhart. In each case a lake(s) is involved. It is unlikely that actual construction would involve these areas and since they are valuable recreational resources in the region, utilization is expected to continue.

Table 5.3.8-1. Projected recreational needs in the Clovis, New Mexico OB vicinity.[1]

I ACTIVITY	II FACILITY REQUIREMENTS[2]		III FACILITY SUPPLY	IV NEED[3] (II-III)	
	PEAK YEAR	STEADY STATE		PEAK YEAR	STEADY STATE
Camping	114 Campsites	101 Campsites	79$\pm$ Campsites	-35	-22
Picnicking	189 Tables	169 Tables	228 Tables	+39	+59
Power Boating	570 Surface Acres	509 Surface Acres	10,740 Surface Acres	+10,170	+10,231
Water Skiing	112 Surface Acres	100 Surface Acres	10,740 Surface Acres	+10,628	+10,640

[1]Vicinity = within the assumed 50-mi "area of influence" around the OB site.

[2]Facility requirements = projected demand (.70)/activity standard (see Section 5.2).

[3]+ = adequate supply; - = deficiency in supply.

Table 5.3.9-1. Projected recreational needs in the Dalhart, Texas OB vicinity.[1]

I ACTIVITY	II FACILITY REQUIREMENTS[2]		III FACILITY SUPPLY	IV NEED[3] (II-III)	
	PEAK YEAR	STEADY STATE		PEAK YEAR	STEADY STATE
Picnicking	1,540 Tables	1,466 Tables	500± Tables	-1,040	-966
Freshwater Boating	1,683 Surface Acres	1,632 Surface Acres	19,000± Surface Acres	+17,317	+17,368

4115

[1]Vicinity = within the assumed 50-mi "area of influence" around the OB site.

[2]Facility requirements = projected demand (.70)/activity standard (see Section 5.2).

[3]+ = adequate supply; - = deficiency in supply.

Indirect Impacts

Tables 5.4.2-1 and 5.4.2-2 both indicate those recreational sites which are expected to be significantly impacted by the individual OB sites. A significant or high value was attributed to those sites within the 50 mile "area of influence" that offer recreational facilities that are projected to have shortages as a result of the added M-X demand and/or in which M-X will significantly add to the already projected shortage.

Total OB impact was evaluated as high if 50 percent or more of the recreational sites within the "area of influence" were projected to have a high impact.

Table 5.4.2-1. Potential impacts to outdoor recreational sites in the vicinity of the proposed Nevada/Utah OB sites.

RECREATIONAL SITE	POTENTIAL IMPACT[1]				
	MILFORD	BERYL	DELTA	COYOTE	ELY
Lake Mead[2]	Low	Moderate	Low	Low	Moderate
Zion National Park[5]	Low	Low	Low	Moderate	Low
Bryce Canyon	Low	Low	Low	Moderate	Low
Cedar Breaks National Monument[6,5]	Low	Low	Low	Moderate	Low
White River Campground[3]	Low	Low	Low	Low	Low
Ward Mountain Recreation Area[3]	Low	Low	Low	Low	High
Schell Creek Range[3]	Low	Low	Low	Low	High
Wheeler Peak Area[3]	Low	Low	Low	Low	High
Ruby Mountains	Low	Low	Low	Low	Low
Dixie National Forest West Sec.[5]	Low	Low	Low	Low	Low
Dixie National Forest East Sec.[6]	Low	Moderate	Low	Low	Low
Red Canyon Recreation Area[2]	Low	Low	Low	Low	Low
Kents Lake[6]	Low	Moderate	Low	Low	Low
Shell Oil Site[4,6]	Low	Low	Low	Low	Low
Oak Creek[4]	Low	Low	Low	Low	Low
Little Valley[4]	Low	Low	Low	Low	Low
Valley of Fire[3]	Low	Moderate	Low	Low	Low
Beaver Dam[5]	Low	High	Low	Moderate	High
Cathedral Gorge[5]	Low	Low	Low	Moderate	Low
Snow Canyon[5]	Low	Moderate	Low	Moderate	Low
Echo Canyon[5]	Low	High	Low	Moderate	Low
Corral Pink Sand Dunes	Moderate	Moderate	Low	Moderate	Low
Charcoal Ovens State Park[3]	Low	Low	Low	Moderate	High
Gunlock Lake[5]	Low	High	Low	Moderate	Low
Enterprise Reservoir[5]	Low	High	Low	Moderate	Low
Navajo and Panguitch Lakes[4,5]	Low	High	Low	Low	Low
Otter Creek Reservoir[6]	Low	Moderate	Low	Low	Low
Piute Lake[4,6]	Low	Moderate	Low	Low	Low
Yuba Lake[4]	Low	Moderate	Low	Low	Low
Comins Lake[3]	Low	Low	Low	Low	High
Bassett Lake[3]	Low	Low	Low	Low	High
Las Vegas ORV Areas[2]	Low	Moderate	Low	Low	Low
Sand Mountain	Low	Moderate	Low	Low	Low
Little Saharah Recreation Area[4]	Moderate	Moderate	Moderate	Low	Low
Minersville Lake[5,6]	Low	High	Low	Moderate	Low
Overall Impact	Low	Moderate	Low	Low	High

4044

None. M-X-related population growth not expected to produce a measurable increase in demand on the resource.

Low. M-X-related population growth expected to increase demand but not create a deficiency in the availability of the resource.

Moderate. Resource beyond 50 miles (assumed area of influence) for which M-X-related population growth may create or add to a projected deficiency in availability.

High. M-X-related population growth projected to create a deficiency or significantly add to projected deficiency in the availability of the resource.

[2]Recreation sites within 50 miles of the assumed area of influence, Coyote OB.

[3]Recreation sites within 50 miles of the assumed area of influence, Ely OB.

[4]Recreation sites within 50 miles of the assumed area of influence, Delta.

[5]Recreation sites within 50 miles of the assumed area of influence, Beryl.

[6]Recreation sites within 50 miles of the assumed area of influence, Milford.

Table 5.4.2-2. Potential impacts to outdoor recreational sites in the vicinity of the Clovis, New Mexico and Dalhart, Texas OB sites.

RECREATIONAL SITE	ESTIMATED IMPACT[1]	
	CLOVIS	DALHART
Lake Meredith National Recreation Area[3]	Moderate	Low
Clayton Lake State Park[3]	Low	Low
Kiowa National Grasslands[3]	Low	Low
Thompson Grove Fed. Picnic Grounds[3]	Low	Low
Rita Blanca Lake County Park[3]	Low	Low
Panhandle Plains Historical Monument	Low	Low
Palo Duro Canyon State Park	Moderate	Low
Buffalo Lake National Wildlife Refuge	Moderate	Low
Muleshoe National Wildlife Refuge[2]	Moderate	Low
Caprock Canyons State Park	Low	Low
Oasis State Park[2]	High	Low
Carlsbad Caverns National Monument	Moderate	Low
Living Desert State Park	Low	Low
Bottomless Lakes State Park	Moderate	Low
Fort Sumner State Monument[2]	Moderate	Low
Sumner Lakes State Park[2]	High	Low
Ute State Park[2]	High	Low
Tucumcari Municipal Park[2]	Moderate	Low
Conchas Lake State Park	Moderate	Low
Fort Union National Monument	Low	Low
Storrie Lake State Park	Moderate	Low
Villanueva State Park	Low	Low
Cibola National Forest	Low	Low
Santa Fe National Forest	Low	Low
Valley of Fire National Park	Moderate	Low
Lincoln National Forest	Moderate	Low
Overall Impact	High	Low

4045-1

[1]

- None. M-X-related population growth not expected to produce a measurable increase in demand on the resource.
- Low. M-X-related population growth expected to increase demand but not create a deficiency in the availability of the resource.
- Moderate. Resource beyond 50 miles (assumed area of influence) for which M-X-related population growth may create or add to a projected deficiency in availability.
- High. M-X-related population growth projected to create a deficiency or significantly add to projected deficiency in the availability of the resource.

[2]Recreation sites within 50 miles, the assumed area of influence, of the Clovis OB.

[3]Recreation sites within 50 miles, the assumed area of influence, of the Dalhart OB.

6.0 ENERGY TRANSMISSION LINES

The following section is a brief description of project area transmission lines and project related impacts on energy transmission. A more complete discussion can be found in ETR-24.

6.1 AFFECTED ENVIRONMENT

NEVADA/UTAH REGION (6.1.1)

The project area in Nevada/Utah is traversed with numerous electric power transmission lines and fuel pipelines. The location of existing and proposed power transmission lines in Nevada/Utah is depicted in Figure 6.1.1-1. The relative scarcity of existing and proposed fuel pipelines is shown in Figure 6.1.1-2.

TEXAS/NEW MEXICO (6.1.2)

The Texas/New Mexico region, due to its greater population density, has a much higher concentration of power transmission lines as shown in Figure 6.1.2-1. Since this region is a large producer of natural gas and petroleum, a large network of fuel pipelines (shown in Figure 6.1.2-2) are located in the project area.

6.2 METHODOLOGY FOR IMPACT ANALYSIS

The impact on energy transmission was evaluated both in terms of the impact of deployment on existing transmission corridors as well as the impact of increased energy demand on existing transmission facilities.

6.3 ENVIRONMENTAL CONSEQUENCES

Energy transmission would be affected in two ways. First, all existing transmission lines for fuel and electricity require a minimum 100 foot right of way corridor. This 100 foot wide area must not be obstructed by deployment. Due to the relative infrequency of occurrence of power and fuel lines in Nevada/Utah, existing lines will generally be avoided. The greater density of energy transmission and production facilities in Texas/New Mexico will be more difficult to avoid.

The second impact of the project on energy transmission would be in terms of the necessary construction of new fuel and power lines into currently rural, undeveloped areas.

PROPOSED ACTION (6.3.1)

As previously stated, the impacts of deployment in Nevada/Utah will not necessitate the relocation of power lines to avoid conflict with shelter locations. The increased demand for electricity, though, will require that existing transmission lines will be expanded and new lines be built. The actual location of the required transmission lines will depend upon the deployment configuration as well as negotiations with energy and utility companies.

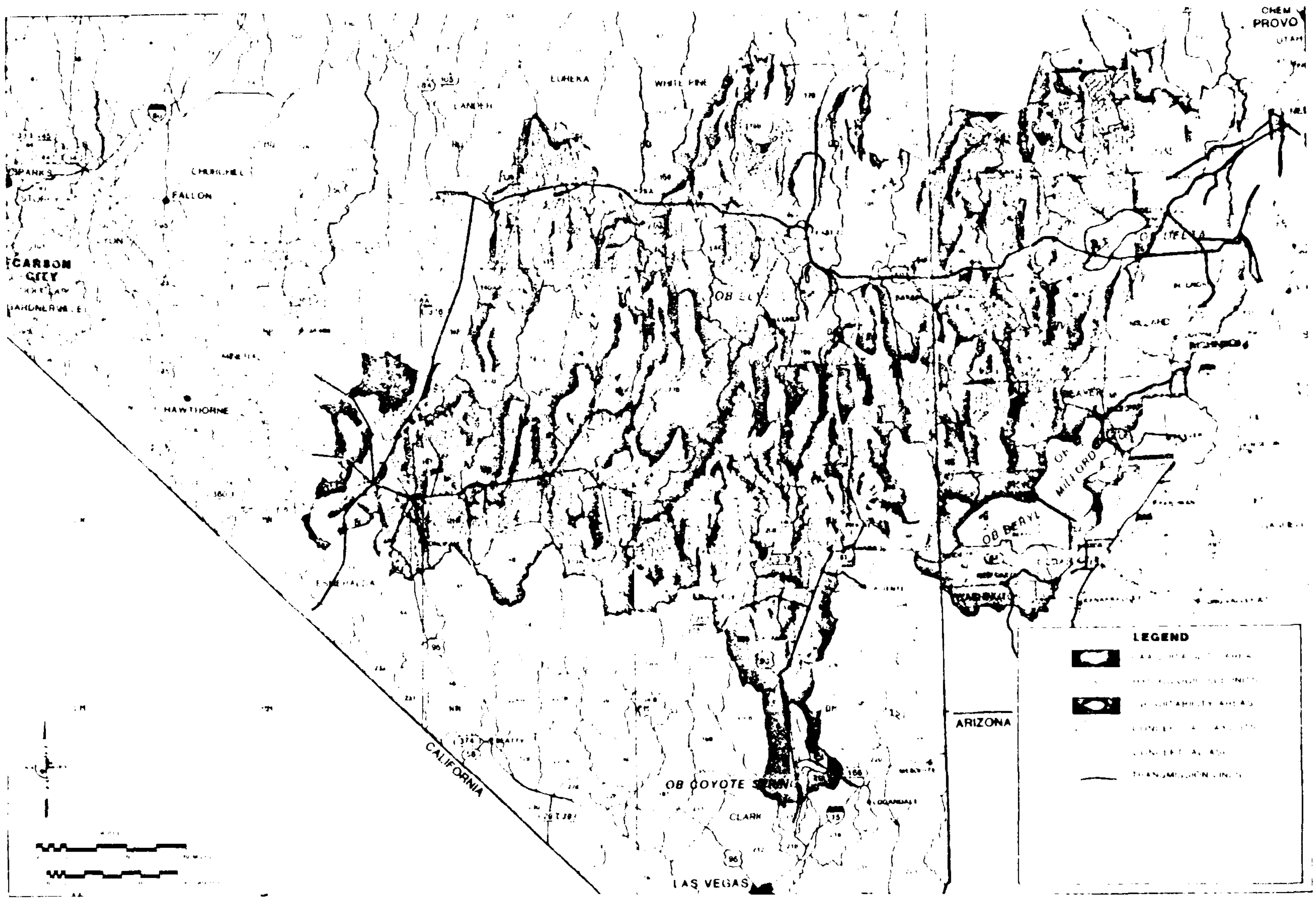


Figure 6.1.1-1. Existing and proposed power transmission lines and Proposed Action.

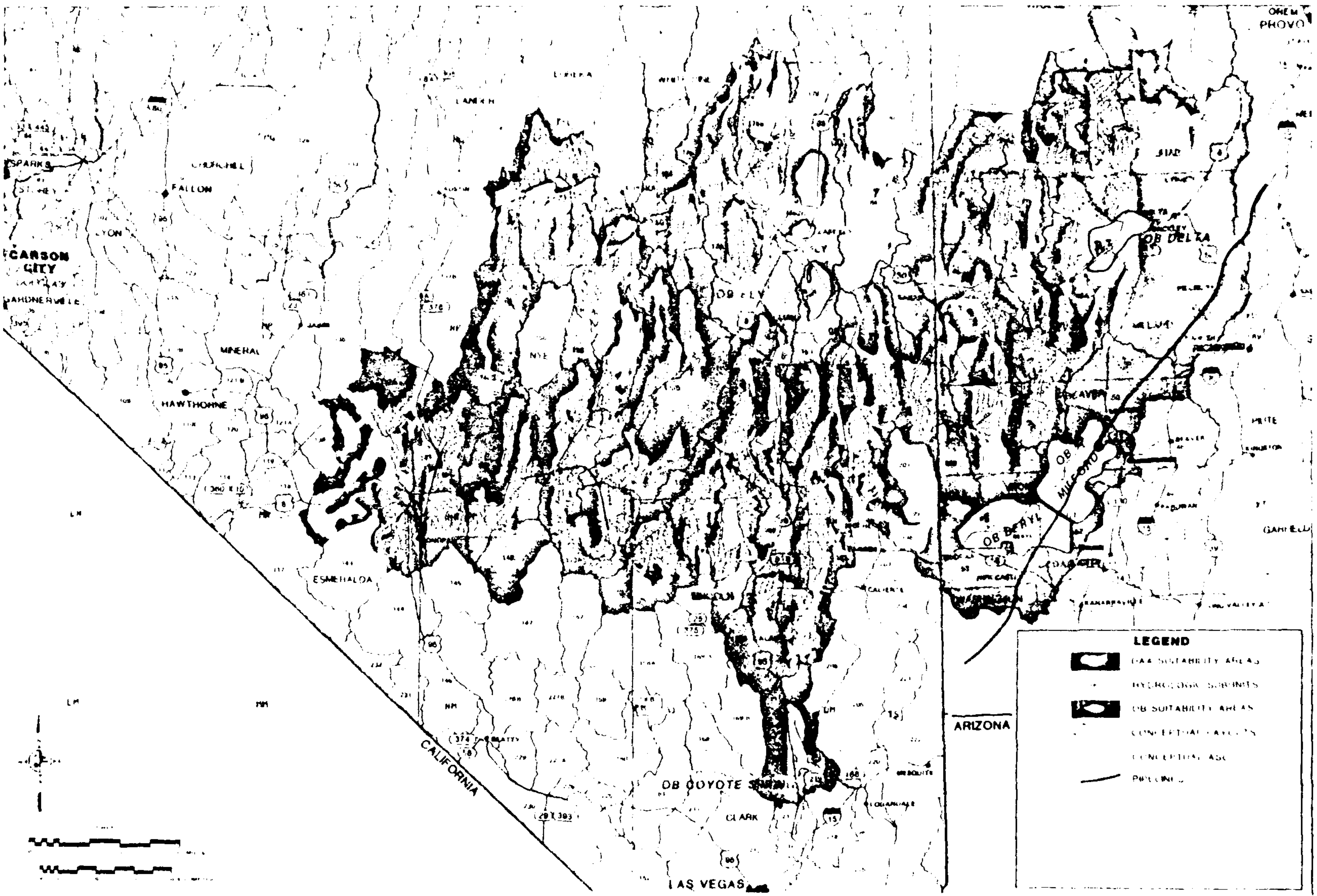


Figure 6.1.1-2. Existing and proposed pipelines and Proposed Action.

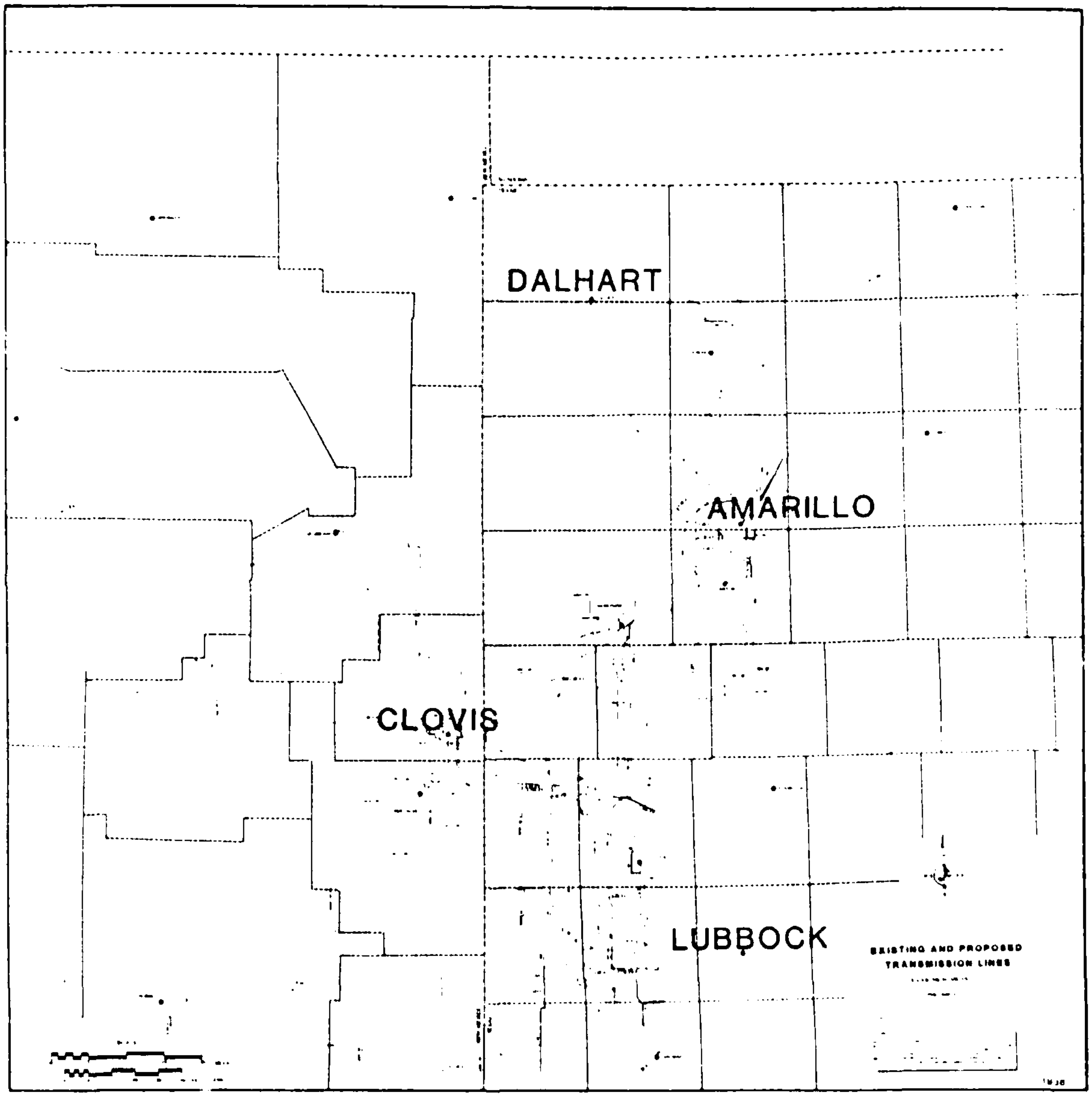


Figure 6.1.2-1. Existing and proposed transmission lines in Texas/New Mexico region.

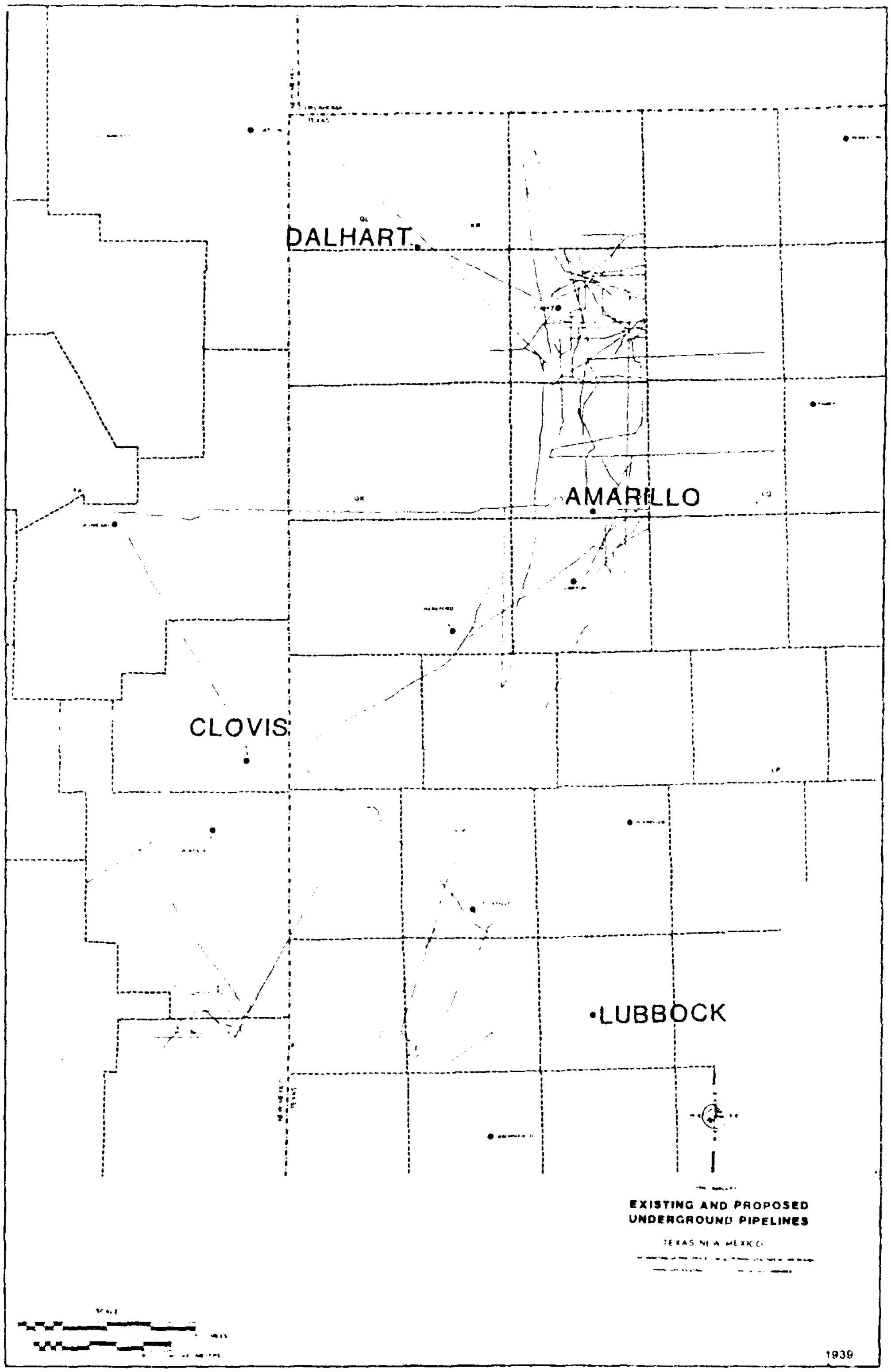


Figure 6.1.2-2. Existing and proposed pipelines in Texas/New Mexico region.

The proposed operating base site at Coyote Spring Valley may require the construction of a fuel pipeline from Las Vegas. A potential conflict exists between the IPP transmission line routing and the conceptual operating base location.

A similar situation exists for the second operating base at Milford, Utah. This base location will require the construction of a new power line. A potential conflict exists between the IPP transmission line routing and the conceptual operating base location.

ALTERNATIVE 1 (6.3.2)

The effects of deployment would be the same as for the proposed action. The impacts to the first operating base at Coyote Spring Valley would be the same as in the Proposed Action. The impacts from the operating base at Beryl, Utah would be the same as those for Milford. A potential conflict exists between the IPP transmission line routing and the proposed operating base location.

ALTERNATIVE 2 (6.3.3)

The effects from deployment would be similar to those for the proposed action. The impact from the operating base at Coyote Spring Valley would be the same as in the Proposed Action. The second operating base would be located at Delta, Utah. Delta would also be affected in the same way as Milford. A new natural gas pipeline may also be required to service the operating base.

ALTERNATIVE 3 (6.3.4)

The impact of deployment and from the operating base at Beryl, Utah would be the same as the Proposed Action. The second operating base at Ely would require the construction of new power lines to access the IPP generating plant in Utah and the White Pine Power Project in Nevada.

ALTERNATIVE 4 (6.3.5)

The impacts on energy transmission would be the same as those described for Alternative 1.

ALTERNATIVE 5 (6.3.6)

The operating base 1 impacts would be the same as those for Milford in the Proposed Action. The operating base 2 impacts would be the same as those for Ely in Alternative 3.

ALTERNATIVE 6 (6.3.7)

The energy impacts would be the same as for the Proposed Action.

ALTERNATIVE 7 (6.3.8)

The more extensive power transmission line network and the higher concentration of natural gas and fuel lines in the Texas/New Mexico region would greatly reduce the amount of new energy transmission lines which will have to be constructed. As previously stated, however, this higher concentration of fuel lines will be difficult to avoid and potential conflict may result between deployment and existing power transmission and fuel pipeline right of way corridors.

The energy impacts from the operating base at Clovis, New Mexico could be met by upgrading existing facilities. The second operating base at Dalhart, Texas will require the construction of a new power transmission line.

ALTERNATIVE 8 (6.3.9)

The energy requirements and impacts for the DDA would be about half of the impact from the Proposed Action in the Nevada/Utah region and half of the impacts of Alternative 7 in the Texas/New Mexico region.

The effects on the operating base at Coyote Spring Valley, Nevada would be the same as for the Proposed Action. The impact of the second operating base at Clovis, New Mexico would be the same as for Alternative 7.

7.0 TRANSPORTATION CORRIDORS

This section is a brief discussion of the effects which the project would have upon transportation corridors. A more detailed treatment of this subject can be found in the Environmental Technical Appendix on Traffic.

7.1 AFFECTED ENVIRONMENT

In the Nevada/Utah region the project would be constructed in an area of the Great Basin which presently has relatively poor access. The existing road system in the affected region and recent traffic data are shown in Figure 7.1-1.

The Texas/New Mexico region, by comparison, has much better accessibility than the Nevada/Utah region. Figure 7.1-2 shows the existing road system within the affected region and recent traffic data.

7.2 METHODOLOGY FOR IMPACT ANALYSIS

The effect of the project on transportation was estimated using classic analytical traffic forecasting techniques wherein predictions of future travel patterns are based on forecasts of future population, employment, and land use. The impact of these projected travel patterns on the existing transportation network is then analyzed in terms of increased traffic as well as the addition of new roads.

7.3 ENVIRONMENTAL CONSEQUENCES

The transportation system within the project area might be significantly affected in two ways: it will be greatly expanded thus improving accessibility within the region and traffic may increase on the system as a result of the influx of people into the region. Tables 7.3-1 and 7.3-2 summarize the impacts on traffic for the Proposed Action and Alternatives 1-7.

PROPOSED ACTION (7.3.1)

The proposed action would involve the construction of 8,500 miles of new roads. The expansion of the road system would increase the accessibility of the region and in doing so would facilitate the use of the area for recreation. The increase in traffic on existing roads would increase the maintenance efforts needed to keep the roads in acceptable condition.

At the proposed Coyote Spring Valley base site, increased traffic would require that US 93, between the OB and I-15 be widened to four lanes. Other minor road improvements may be needed to accommodate traffic.

Near the proposed OB site at Milford, the increased traffic may warrant the construction of a road between Milford and the OB as well as between Minersville and the operating base site. Some minor road improvements may also be necessary in Milford.

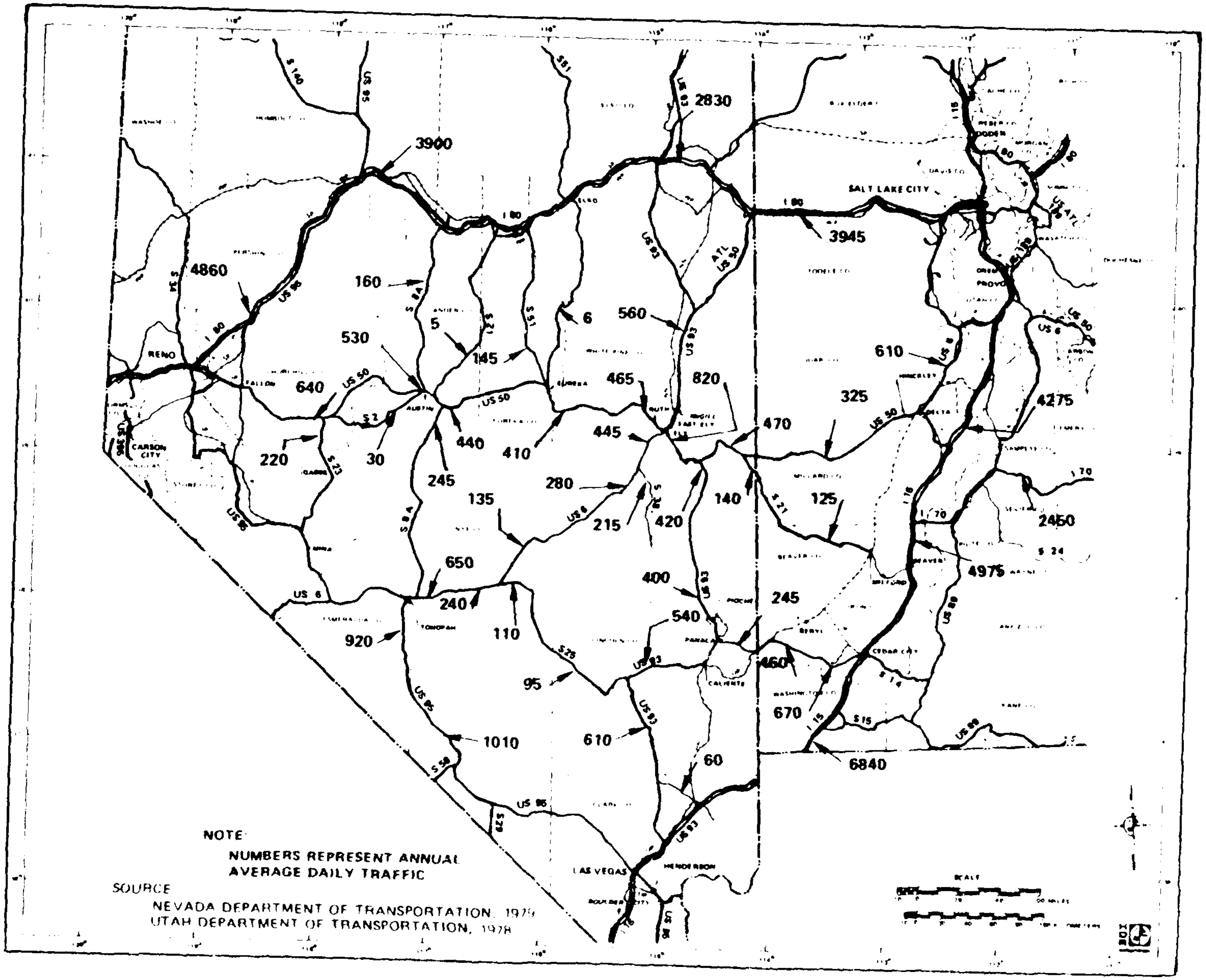
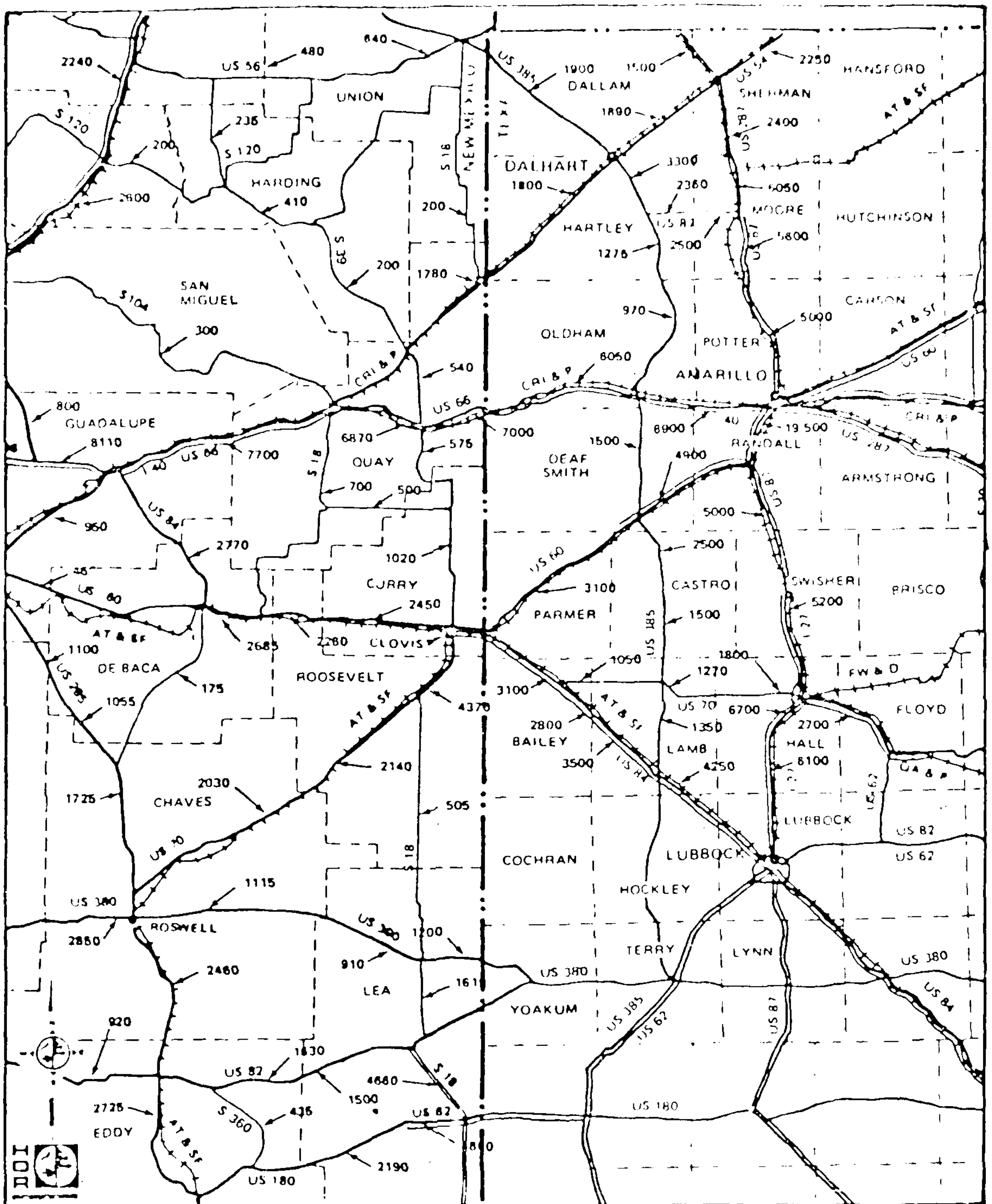


Figure 7.1-1. Existing traffic volumes—Nevada/Utah.



NOTE
NUMBERS REPRESENT ANNUAL AVERAGE DAILY TRAFFIC

SOURCE
TEXAS STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION, 1975
NEW MEXICO STATE HIGHWAY DEPARTMENT, 1978

LEGEND
2 LANE HIGHWAYS
4 LANE HIGHWAYS

SCALE
10 0 20 40 60 MILES
10 0 20 40 60 KILOMETERS

2123-A

Figure 7.1-2. Existing highways and current traffic levels–Texas/New Mexico.

Table 7.3-1. Potential impact [illegible] for accessibility and traffic generation which could result due to the location of the MX in Nevada/Utah for the proposed action and Alternatives 1-6.

HYDROLOGIC SUBUNIT		TRAFFIC	ACCESSIBILITY
NO.	NAME	SHORT-TERM IMPACT[1]	LONG-TERM IMPACT[2]
Subunits with M-X Clusters and DTN			
4	Snake[3]	[illegible]	[illegible]
5	Pine[3]	[illegible]	[illegible]
6	White[3]	[illegible]	[illegible]
7	Fish Springs	[illegible]	[illegible]
8	Dugway	[illegible]	[illegible]
9	Government Creek	[illegible]	[illegible]
46	Sevier Desert[3]	[illegible]	[illegible]
46A	Sevier Desert & Dry Lake[3]	[illegible]	[illegible]
54	Wah Wah[3]	[illegible]	[illegible]
137A	Big Smoky-Tonopah Flat	[illegible]	[illegible]
139	Kobeh	[illegible]	[illegible]
140A	Monitor—Northern	[illegible]	[illegible]
140B	Monitor—Southern	[illegible]	[illegible]
141	Ralston[3]	[illegible]	[illegible]
142	Alkali Spring	[illegible]	[illegible]
148	Cactus Flat	[illegible]	[illegible]
149	Stone Cabin[3]	[illegible]	[illegible]
151	Antelope	[illegible]	[illegible]
154	Newark[3]	[illegible]	[illegible]
155A	Little Smoky—Northern[3]	[illegible]	[illegible]
155C	Little Smoky—Southern	[illegible]	[illegible]
156	Hot Creek	[illegible]	[illegible]
170	Penoyer	[illegible]	[illegible]
171	Coal[3]	[illegible]	[illegible]
172	Garden	[illegible]	[illegible]
173A	Railroad—Southern[3]	[illegible]	[illegible]
173B	Railroad—Northern	[illegible]	[illegible]
174	Jakes	[illegible]	[illegible]
175	Long[3]	[illegible]	[illegible]
178B	Butte—South	[illegible]	[illegible]
179	Steptoe	[illegible]	[illegible]
180	Cave	[illegible]	[illegible]
181	Dry Lake[3]	[illegible]	[illegible]
182	Delamar	[illegible]	[illegible]
183	Lake[3]	[illegible]	[illegible]
184	Spring	[illegible]	[illegible]
196	Hamlin	[illegible]	[illegible]
202	Patterson	[illegible]	[illegible]
207	White River	[illegible]	[illegible]
208	Pahroc	[illegible]	[illegible]
209	Pahranagat	[illegible]	[illegible]

3912-1

[1] No impact. (No or insignificant increase in traffic.)

Low impact. (Some increases in traffic is expected, however, no road improvements should be required.)

Moderate impact. (Increases in traffic likely to cause delay or inconvenience to motorists. Minor road improvements may be required at critical locations.)

High impact. (Major increases in traffic expected which could generate requirements for substantial road system improvements.)

[2] No impact.

Low impact. (New roads will only slightly improve access.)

Moderate impact. (Quality of roads substantially improved.)

High impact. (High quality roads constructed to areas where only a few or poor quality roads currently exist.)

Table 7.3-2. Potential impacts to road system accessibility and traffic congestion which could result due to the location of the DDA in Texas/New Mexico for Alternative 7.

COUNTY	SHORT-TERM IMPACT[1]	LONG-TERM IMPACT[1]
Counties with M-X Clusters and DTN		
Bailey, TX[2]	Moderate	No
Castro, TX[2]	High	No
Cochran, TX	Low	No
Dallam, TX[2]	High	High
Deaf Smith, TX[2]	High	No
Hartley, TX[3]	High	High
Hockley, TX	No	No
Lamb, TX	No	No
Oldham, TX	No	No
Parmer, TX[2]	Moderate	No
Randall, TX[2]	Moderate	No
Sherman, TX	No	No
Swisher, TX	No	No
Chaves, NM[2]	Moderate	No
Curry, NM[3]	High	High
DeBaca, NM	Low	No
Guadalupe, NM	No	No
Harding, NM[2]	Moderate	No
Lea, NM	No	No
Quay, NM[2]	Moderate	No
Roosevelt, NM[2]	Moderate	Moderate
Union, NM	No	No

3914-1

[1] No impact. (No or insignificant increases in traffic on existing roads.)

Low impact. (Some increases in traffic expected; however, no road improvements should be required.)

Moderate impact. (Increases in traffic likely to cause occassional delay or inconvenience to motorists. Minor road improvements may be required of critical locations).

High impact. (Increases in traffic expected which could generate requirements for substantial road system improvements

[2]Construction camp in county.

[3]Operating base in county.

ALTERNATIVE 1 (7.3.2)

This alternative would use the same DDA as the Proposed Action as well as the first operating base at Coyote Spring. The second base would be at Beryl where the road between Beryl and Beryl Junction would have to be widened to four lanes.

ALTERNATIVE 2 (7.3.3)

The impacts would be the same as for the Proposed Action except that the second operating base would be at Delta. To accommodate the increased traffic, US 50 between the proposed site and Delta would have to be widened. Some improvements would also be necessary in Delta.

ALTERNATIVE 3 (7.3.4)

This alternative uses the same DDA as the Proposed Action but has operating bases located at Beryl and Ely.

Near Beryl the traffic impacts would be similar to those discussed for Alternative 1, but since it would be the first operating base in this case, traffic volumes would be about 20 percent higher.

Near Ely, the increased traffic along US 6-50-93 between the proposed site and Ely may require widening the road to four lanes. Within Ely, the anticipated traffic, especially on US 50, would make improvements necessary to avoid congestion.

ALTERNATIVE 4 (7.3.5)

The impacts would be similar to those identified for Alternative 1. The only difference is that Beryl would be the first operating base in this case and therefore projected traffic levels will be about 20 percent higher (as in Alternative 3) and Coyote Spring Valley would be the second operating base and therefore projected traffic levels would be about 20 percent less.

ALTERNATIVE 5 (7.3.6)

The impacts within the DDA would be comparable to the Proposed Action. Milford, however, would be the first operating base in this alternative. Consequently, project traffic levels would be about 20 percent higher than for the Proposed Action. The second operating base would be at Ely and the impacts would be the same as discussed for Alternative 3.

ALTERNATIVE 6 (7.3.7)

The impacts would be the same as for the Proposed Action except that the location of the first and second operating bases would be switched. Projected traffic levels would be about 20 percent higher near Milford (as in Alternative 5) and about 20 percent lower near Coyote Spring Valley (as in Alternative 4).

ALTERNATIVE 7 (7.3.8)

Within the DDA the existing road network in Texas and New Mexico is quite extensive and accessibility is good in most areas. Therefore, the need for the construction of new roads will be much lower than in Nevada/Utah. In general, due to low current traffic volumes, traffic increases would not exceed the capacity of the road system.

The first operating base at Clovis would be an expansion of Cannon Air Force Base. Though traffic patterns would remain basically the same, the volume of traffic would increase. Some improvements may be necessary along US 60 between Clovis and Cannon Air Force Base, within Clovis itself, and on State Route 467.

Near the second operating base at Dalhart, the surrounding communities of Dalhart, Dumas, and Hartley could be adversely affected by increased traffic and congestion.

ALTERNATIVE 8 (7.3.9)

This alternative involves placing half of the system in Nevada/Utah and half in Texas/New Mexico with one operating base in each. Consequently the impacts in each region would be less extensive.

Only half as many roads would be constructed in each region. Therefore the increase in accessibility would be proportionately less than discussed for the Proposed Action and Alternative 7.

The impacts on traffic near the Coyote Spring Valley operating base site would be similar to those discussed for the Proposed Action and the impacts near the Clovis operating base site would be similar to those discussed for Alternative 7.

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